Bioeconomy & Low Carbon Technology Overview for April 2025

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

Highlights by Topic: April 2025

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

Contents

Biobased chemicals

1. **Biobased chemicals**: China. BASF announced the start-up of the world's first commercial loopamid® plant. The production facility at the Caojing site in Shanghai, China, has an annual capacity of 500 metric tons and marks an important step in the supply of sustainable products for the textile industry. loopamid is a recycled polyamide 6 that is entirely based on

textile waste. The new production facility supports the growing demand for sustainable polyamide 6 fibers in the textile industry. To produce loopamid in its new plant, BASF currently utilizes industrial textile waste from textile manufacturing and will gradually increase the share of post-consumer waste. Link /08/04/2025.

2. **Biobased chemicals**: JapanZeon Corporation and Visolis announced that, following the successful completion of a joint feasibility study, the companies are initiating preparatory steps toward construction of a new production facility. The proposed facility, for which multiple sites are being evaluated, is intended to support commercial-scale manufacturing of bio-based isoprene and sustainable aviation fuel using Visolis' proprietary fermentation and downstream processing technology. Link 15/04/2025.
3. **Biobased chemicals**: Thailand. PTT Global Chemical Public Company Limited (GC is accelerating its biorefinery productions, building upon its success as Thailand's first producer of Sustainable Aviation Fuel (SAF). In addition to its SAF production capacity of 6 million litres per year in the first phase, GC is utilizing its expertise in refining and developing advanced chemicals to develop a co-processing system that integrates seamlessly with existing refinery units. This process transforms used cooking oil (UCO) into high-value bio-chemicals and bio-polymers, catering to industries seeking sustainable, environmentally responsible materials. Link 28/04/2025.

Biobased plastics

4. **Biobased plastics**: Thailand. Braskem Siam, a joint venture between SCG Chemicals (SCGC), and Braskem, has signed a Letter of Intent with Mitr Phol Bio Fuel, part of the Mitr Phol Group – the world's leading sustainable in the food products industry and ASEAN's leading ethanol producer – to supply agricultural based ethanol to produce bio-ethylene. Braskem Siam will produce bio-ethylene for SCGC, to use as feedstock to produce bio-based Polyethylene. Link 04/04/2025.
5. **Biobased plastics**: TotalEnergies Corbion, a global leader in polylactic acid (PLA) bioplastics, and Benvic, a leading expert in compounding, are collaborating to drive the adoption of sustainable Luminy® PLA-based compounds. This collaboration will expand the use of plant-based solutions in durable applications such as automotive, healthcare and medical, cosmetics packaging, appliances, and electric & electronics. Link 14/04/2025.
6. **Biobased plastics**: UAE Emirates Biotech selected SAMSUNG E&A as the contractor for its upcoming Polylactic Acid (PLA) production plant in the United Arab Emirates. The strategic project, officially named Falcon PLA, will deliver a cutting-edge facility producing a biodegradable and environmentally friendly plastic alternative. Emirates Biotech recently selected Sulzer as the technology provider for its PLA plant. Link 18/04/2025.

Biofuels

7. **Biofuels**: Belgium. BDI-BioEnergy International has signed a contract with Ghent Renewables BV to begin the construction of a biofuel feedstock refinery plant. This facility will be unique in its approach, integrating advanced technologies for the refining of feedstock for sustainable fuels Link 07/04/2025
8. **Biofuels**: Canada. Expander Energy Inc is to proceed with the Carseland Bio-Synfuels project. project in British Columbia. Expander has notified Cielo that it is contractually entitled to proceed with the Carseland Bio-Synfuels Project. The Carseland project will integrate: the operational Rocky Mountain Clean Fuels Inc. (RMCFI) Natural Gas to Liquids facility; a new Biomass Gasifier capable of providing additional bio-syngas feed for the facility and increasing production by 8 million litres/year of Bio-SynDiesel™ and Bio-SynJet; a new

Isomerization unit capable of producing Arctic Diesel and Synthetic Kerosene (Jet)and a new hydrogen purification unit to allow for Hydrogen vehicle fuelling in the Calgary area. Link 17/04/2025.

9. **Biofuels**: India. Uttar Pradesh is expanding the production of compressed biogas, biocoal, and biodiesel. Following a recent investment summit, the state's renewable energy department gave initial approval to 197 investors, with plans to invest a total of ₹7,135 crore. Out of these, 62 investors received final approval to receive support and financial benefits from the state government. These approved projects represent a combined investment of ₹2,676 crore. Some of the major investors include Reliance Bio Energy Limited, which plans to set up a compressed biogas plant in Jalaun with an investment of ₹125 crore; Indian Oil, which plans a similar project in Jaunpur worth ₹100 crore; Lakhimpur Kheri RNG Pvt Ltd, investing ₹102 crore in Basti; Adani Total Energies Biomass Limited, investing ₹65 crore in Mathura; and Circle CBG India Private Limited, planning a ₹62 crore project in Meerut. Link 11/04/2025.
10. **Biofuels**: Italy. Eni and Saipem extended the collaboration agreement signed between the two companies in November 2023 to combine their respective skills and specializations in the industrial field for new projects of Eni's interest. The agreement concerns, in particular, the construction of new biorefineries, the conversion of traditional refineries into biorefineries and, generally, the development of new initiatives by Eni in the field of industrial transformation. In line with the agreement, Eni has recently awarded Saipem a contract for the start-up of detailed engineering, procurement services and the purchase of critical equipment for the upgrading of the Enilive biorefinery in Porto Marghera, next to Venice. The project provides for the increase in the capacity of the plant, from the current 400 thousand tons/year to 600 thousand and, starting from 2027, also the production of sustainable aviation biofuel (SAF). Link 17/04/2025.
11. **Biofuels**: Malaysia. As global demand for sustainable energy solutions intensifies, Malaysia is emerging as a leading contender to become the next global biofuels hub. The country's strategic location on the Malacca Straits, abundant feedstock resources, robust infrastructure and biofuels expertise positions it as an ideal destination for biofuel feedstock aggregation, biofuels production and export. Between 2025 and 2030, the country could drive regional and global biofuel markets, playing a pivotal role in the shift toward sustainable energy. Link 18/04/2025.
12. **Biofuels**: Sweden. VARO Energy reached agreement to acquire Preem Holding AB and Preem AB through the purchase of 100% of the share capital of the parent company, Corral Petroleum Holdings AB ("CPH"), in an all-cash transaction. An early mover in renewable fuel production, Preem has invested nearly US$1 billion since 2010 in the production of renewable fuels and initiatives aimed at reducing the carbon intensity throughout the value chain. As a result of these investments, Preem's current renewable fuel production of 0.3 mtpa will rise to 1.3 mtpa with the Synsat diesel plant upgrade enabling up to 40% co-processing of renewable feedstocks. The company also has a material pipeline of other renewable fuel projects. Link 02/04/2025.
13. **Biofuels**: USA. Optimus-technologies-launches-vector-system-allowing-heavy-duty-engines-to-use-b100. Optimus Technologies announced the production launch of its latest Vector System, a fuel system technology that enables heavy-duty engines to operate on 100% biodiesel (B100). The system is now available for integration into trucks equipped with the International S13 engine platform via ship-thru from Fontaine Modification. The Vector System offers Class 8 fleets a practical, immediate decarbonization upgrade at a time when electrification continues to face significant challenges in cost. Link 24/04/2025.

14. **Biofuels**: USA. Production of US domestic renewable diesel – mainly hydrotreated vegetable oil (HVO) – declined sharply in January to around 167,000 bpd. Preliminary February 2025 data show it was even weaker at 130,000 bpd. We note that the final number can end up around 20% higher after the reporting is complete, but it is already quite clear that HVO supply is on track for a very significant drop in the first quarter of this year. A prolonged period of weak biomass-based diesel renewable identification number (D4 RIN) margins coupled with the persistent uncertainty around 45Z clean fuel tax credit rules under the new US administration have pushed HVO operators towards temporary shut-ins and reduced utilization rates of existing capacity. Link 16/04/2025.

Biogas

15. **Biogas**: Brazil. The Costa Pinto biomethane plant in Piracicaba, Brazil was completed in April 2025. PENETRON ADMIX, a crystalline waterproofing admixture, and PENETRON ARC, an acid-resistant coating, were specified to ensure optimal durability of the new concrete structures and protect against the sulfuric acid generated by the biomethane purification process. Part of the Costa Pinto Bioenergy Park, the new R$ 300 million ($53.3 million) biomethane plant is located close to the Comgás gas distribution network, facilitating the delivery of biomethane to client facilities. The Piracicaba plant will produce up to 26 million cubic meters of biomethane annually. Link 23/04/2025.
16. **Biogas**: Canada. Thermogenics is introducing a new biogas enrichment system that enables industrial boilers to operate using renewable biogas (or sometimes referred to as digester gas)—either independently or in combination with natural gas. Ideal for customers in the food and beverage sector, waste management, and other sustainability-driven industries. Link 11/04/2025.
17. **Biogas**: India. NexGen Energia Ltd has raised a $1 Billion USD investment pledge from regional investment behemoth Capital Edge of Kuwait. Equity-based funding will enable NexGen Energia, India's leading installer of Compressed Bio-Gas (CBG) plants, to expand its CBG infrastructure across the country. Link 22/04/2025.
18. Biogas: India. The Cuttack Municipal Corporation (CMC) signed an agreement with Oil India Limited (OIL) to build a compressed biogas (CBG) plant based on municipal solid waste (MSW) at Jagatpur. The facility, with a capacity of 200 tonnes per day. Under the agreement, OIL will design, finance, construct, operate, and maintain the plant at an estimated cost of ₹150 crore. The facility, which can be expanded to 300 TPD in the next three to five years. Link 08/04/2025.
19. **Biogas**: Ireland The Greengate Biogas plant will contribute to Ireland's green energy transition, improving energy security and reducing reliance on imported natural gas. The plant will process agricultural residues (i.e. cattle and pig slurry, farmyard straw manure and poultry manure) into biomethane, biogenic CO2 and fertilizer. The plant will support local farmers to improve their manure management and create a circular economy by returning the degassed agricultural residues to farmland. Link 03/04/2025.
20. **Biogas**: Italy. Anaergia Inc. through its subsidiary, Anaergia S.r.l., has signed a contract with Techbau S.p.A., a leading Italian company specializing in large-scale engineering and construction projects for the building of five new biomethane production plants in Italy. Anaergia S.r.l. will supply state-of-the-art equipment for the biomethane production process, while Techbau will serve as the general contractor, responsible for the engineering, procurement, and construction of the facilities that are to be strategically located across Southern Italy. Link 04/04/2025.

21. **Biogas**: Italy. Anaergia S.r.l. entered a binding LoI with Capwatt Biomethane Unipessoal, Lda. Under the terms of this agreement, Anaergia will design and build nine state-of-the-art facilities for biomethane production from agro-industry waste in Portugal, Spain, and Italy. Under the terms of this binding LOI, the projects are expected to be completed within the next 30 months and are expected to generate more than C$60 million in total revenue for Anaergia during this period. Link 23/04/2025.
22. **Biogas**: Italy. Plenium Partners announced the financing for its first biomethane plant in Italy. ING Italia has provided over €25 million in financing for this project through a bilateral Project Finance. This is the first plant of a larger portfolio that includes three other biomethane plants in Italy, whose management agreement was closed last July, in partnership with Aragorn Value Leadership. The plant is to be located in Lombardy, in the province of Pavia. The plant will contribute to improving waste management in the area, treating approximately 50,000 tons per year of livestock and agricultural waste .Link 24/04/2025
23. **Biogas**: Italy. Q8 Italia announced the purchase of 100% of the shares of Agriferr and ArMa, companies operating in the Biogas/Biomethane and BioGNL production sector. Q8 Italia thus becomes the sole shareholder of Agriferr, owner of two plants, one for the production of BioGNL, active since 2023, with a production capacity of 2.5 million standard cubic meters per year, and the other for the production of Biogas from agricultural by-products, which will be converted to produce Biomethane, with a potential of 2.1 million standard cubic meters per year. Also, for the ArMa plant, now fully controlled, Q8 Italia has planned a significant investment to convert the Biogas plant from agricultural waste to Biomethane production, with the aim of reaching an annual output of 2.1 million standard cubic meters. Link 04/04/2025.
24. **Biogas**: Romania. BSOG Energy, an energy company focused on developing biomethane production plants across Romania owned by Black Sea Oil & Gas, and Unigrains Trading, a company that manages approx. 3,300 hectares of cereal farming land in Constanta County and one of the main seed producers in the southern part of Romania, signed of a cooperation agreement for a combined biomethane and biofertilizer production facility. The facility aims to produce 57 MW of biomethane and over 250,000 tons of organic fertilizers per annum. Link 11/04/2025.
25. **Biogas**: USA. American Power Group demonstrated low carbon fuelling results on existing Class 8 diesel engines when utilizing its vehicular dual fuel solution and displacing 50-60% of fossil diesel consumption with RNG from dairy manure. The estimated RNG dual fuel CI score was between -104 to -145 gC02e/MJ and would avoid between an estimated 500 to 610 metric tons of CO2 per year per vehicle. APG utilized EcoEngineers, a consulting, auditing and advisory firm exclusively focused on the energy transition and decarbonization which was recently acquired by leading global assurance partner LRQA. Link 16/04/2025.
26. **Biogas**: USA. EnviTec Biogas commissioned its largest anaerobic digestion plant in the country to date, the biogas specialist - through its U.S. subsidiary - is strengthening its partnership with SJI Renewable Energy Ventures and local suppliers. Located in South Dakota, the plant has been processing over 300,000 gallons per day of manure from more than 9,500 dairy cows per day since the beginning of the year. It is expected to produce 483 standard cubic feet per minute (scfm) of renewable natural gas (RNG), equivalent to around 177,000 million BTU per year. Link 03/04/2025.

Biojet/SAF

27. **Biojet/SAF**: Australia. Jet Zero Australia Pty Ltd (Jet Zero) confirmed the signing of a Front-End Engineering Design (FEED) Contract with Technip Energies and the continuation of the Owner's Engineering Services Contract with Long Energy & Resources (LERA) for Project Ulysses, a bioethanol-to-Sustainable Aviation Fuel (SAF) initiative based in Townsville, Australia. The goal of the Project is to produce 102 million litres of SAF and 11 million litres of renewable diesel annually by 2028, sourced from Australian bioethanol. This will be achieved using the cutting-edge Alcohol-to-Jet (ATJ) technology developed by LanzaJet, a leading SAF technology provider. Link 08/04/2025.
28. **Biojet/SAF**: Australia. Virgin Australia and Qatar Airways agreed to work together with Renewable Developments Australia (RDA) to become key partners on a project that will set out to deliver a homegrown Sustainable Aviation Fuel (SAF) production facility in the Charters Towers Region of North Queensland. The project aims to establish a fully integrated Ethanol to Jet (EtJ) facility that converts bioethanol derived from sugarcane grown onsite into 100% SAF, using proprietary PureSAFSM technology supplied from KBR, while also generating all of the project's energy requirements from renewable source. Link 07/04/2025.
29. **Biojet/SAF**: Canada. Tidewater began commercial operations at its renewable diesel and renewable hydrogen (HDRD) complex during the final quarter of 2023. The HDRD complex achieved a daily throughput of 2,677 barrels per day during the fourth quarter of 2024. Tidewater has proposed to develop 6,500 barrels per day of SAF capacity at the Prince George biorefinery. The company said it has continued to make meaningful progress on the front-end engineering design work for the proposed SAF project and expects to make a final investment decision during the second half of 2025. Link 10/04/2025.
30. **Biojet/SAF**: Germany. Mabanaft started delivering a blend of sustainable aviation fuel (SAF), made from HEFA SPK, to airlines operating at Frankfurt Airport. This marks the company's entry into the German aviation market, expanding its presence beyond the UK and Norway. The company has partnered with Skytanking to ensure smooth and secure operations at the airport since the beginning of the year. Notable achievements include the successful start of SAF supply to major carriers such as Singapore Airlines and the Lufthansa Group. Mabanaft plans to supply over 1,000 tons of SAF at Frankfurt Airport this year in line with the European SAF mandate. Link 23/04/2025.
31. **Biojet/SAF**: Japan. Cosmo Oil Co. Ltd announced that construction is complete on a sustainable aviation fuel (SAF) plant located within the company's existing Sakai refinery. The facility, operated by Saffaire Sky Energy LLC, is expected to begin supplying SAF in April 2025. The SAF facility will convert waste oil feedstock into SAF. Once fully operational, the project is expected to have the capacity to produce 30 million litres per year (7.93 MMgy) of SAF. Cosmo Oil, JGC Holdings and Revo International have been working to develop SAF capacity since 2020. The groups established Saffaire Sky Energy in 2022. Cosmo Oil and JGC Holdings each hold 48% ownership in Saffaire Sky Energy. Revo International holds the remaining 4% ownership. Link18/04/2025.
32. **Biojet/SAF**: Spain. BP decided to pause the expansion of its biofuels project aimed at producing sustainable aviation fuel (SAF) at the Castellon oil refinery in Spain. The Castellon project was part of a larger €2 billion decarbonization initiative announced in 2023 for the site located on Spain's eastern coast. Despite the pause, BP said it will continue evaluating a similar biofuels expansion at its Rotterdam facility in the Netherlands, with a final investment decision expected by 2027. Link 10/04/2024.

33. **Biojet/SAF**: The Netherlands Neste started producing SAF at its renewable products refinery in Rotterdam, the Netherlands. The refinery has been modified to enable Neste to produce up to 500,000 tons of SAF per annum. As a result, Neste's global SAF production capability has increased to 1.5 million tons (around 1.875 billion litres) per annum. Link 10/04/2025.
34. **Biojet/SAF**: USA. Syzygy Plasmonics completed performance testing of the world's largest all-electric GHG e-Reforming demonstration unit in Houston. Syzygy's novel approach uses inexpensive biogas that would otherwise be flared or sold at commodity prices into reasonably priced SAF. This monetizes stranded, valuable feedstock assets, fulfilling critical demand for low carbon aviation fuels. Syzygy noted its biogas-to-SAF method is unlocking new possibilities as its modular design monetizes valuable biogas sources from dairy farms, landfills, and wastewater sites into valuable biogas sources, without the need for pipelines or costly infrastructure. Link 22/04/2025.
35. **Biojet/SAF**: Spain. Volotea signed a partnership with TotalEnergies to supply sustainable aviation fuel (SAF) to flights operating from French airports. Volotea plans to purchase up to 7.5 million litres of SAF from TotalEnergies between 2025 and 2029, a volume that will allow the airline to reduce its carbon footprint on flights operated from French airports. Link 17/04/2025.

Biomaterials

36. **Biomaterials**: China. Covation Biomaterial launched bioPTMEG, an advanced, sustainable polytetramethylene ether glycol (PTMEG). BioPTMEG is a bio-based alternative to petroleum-based PTMEG, helping customers reduce their reliance on non-renewable materials and maintain the durability and resilience expected in high performance applications such as spandex, polyurethanes and thermoplastic elastomers. Link 22/04/2025.
37. **Biomaterials**: Finland. Boreal Bioproducts has developed LigNoFog®, the world's first known consumer product where lignin is the primary functional component. LigNoFog® is a 100% bio-based anti-fog coating designed to keep swim goggles and diving masks clear. Only a limited number of units will be produced, and the product will be available in selected sports and swimming gear stores. Link 02/04/2025.
38. **Biomaterials**: Finland. IFF and Kemira announced the formation of Alpha Bio, a joint venture aimed at commercial-scale production of renewable biobased materials. With an investment of approximately €130 million, the Alpha Bio facility will start production in late 2027, converting up to 44,000 MT of plant sugars to bioproducts, including high-performance biopolymers for use in various applications, such as home and personal care and industrial solutions. Alpha Bio's production will use IFF's Designed Enzymatic Biomaterial™ (DEB) platform technology, integrated at the IFF biorefinery in Kotka, Finland.https://renewable-carbon.eu/news/iff-and-kemira-form-joint-venture-to-produce-sustainable-biobased-materials-at-scale/08/04/2025
39. **Biomaterials**: France. Elkem ASA's Silicones division launched two additions to its SILCOLEASE® range for release liners, reinforcing its commitment to circularity and innovation. These groundbreaking products offer superior carbon profiles and deliver identical technical performance to their non-recycled counterparts. They are the first commercial products from Elkem's state-of-the-art chemical recycling pilot unit in Saint Fons, France. Link 17/04/2025.
40. **Biomaterials**: Germany. As part of the "BioSHIP" project funded by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) under the "Maritime Research Program", industry and science are working together to develop such environmentally friendly coatings. The aim of the "BioSHIP" project is to develop a biodegradable, self-

polishing ship coating that requires significantly lower levels of toxic heavy metals and minimizes environmental pollution. A promising approach for biodegradable, self-polishing coatings lies in the targeted control of the degradation rate in order to ensure a long-lasting antifouling effect. The project focuses on more sustainable formulations, including the use of bio-based polymers such as polylactide (PLA) or chitosan derivatives, which degrade in a controlled manner under marine conditions without leaving harmful residues. Link 16/04/2025.

41. **Biomaterials**: Sweden. Södra announced that it is investing in a production line at its Värö forest industry facility in Sweden to create a vegetable tanning agent derived from bark. Södra will produce large volumes of this type of tannin, and the new line will have the capacity to produce tannin for millions of square metres of leather. Link23/04/2025.
42. **Biomaterials**: United Kingdom. Econic Technologies signed a global license agreement for strategic rights to Saudi Aramco Technologies Company's (SATC) CO2 polymer technologies. By incorporating the technology into its existing portfolio, Econic will expand its overall product offering, allowing it to better serve new and existing customers in coatings, adhesives, sealants, and elastomers (CASE) and other market segments. Econic Technologies is a UK-based deep tech company focused on renewable carbon. Its innovative catalyst and process technology allows manufacturers to produce polymers based on CO2 instead of petrochemicals. Link 17/04/2025.
43. **Biomaterials**: USA. Buscar Company announced the acquisition of a 50% stake in Terramer, Inc., a pioneer in hemp-based bioplastics, through a strategic stock swap transaction. Terramer, Inc. is the developer of TERBO-1000, a proprietary hemp-based bioplastic that is 100% biodegradable within 180 days and leaves no microplastic residue. With a 350,000 sq. ft. production facility capable of producing 300 million pounds annually, Terramer is poised to disrupt the $44 billion bioplastics market. The company has already secured $6.8 million in agreed purchase orders and over $80 million in signed letters of intent (LOIs) from the major household brands. Link 25/04/2025.

CO2 removal

44. **CO2 removal**: Japan. JFE Steel will supply by-product gases generated in the steel manufacturing process to Mitsubishi Gas Chemical, which will conduct demonstrations of methanol production using these gases as raw material at a new demonstration plant to be constructed. Mitsubishi Chemical will utilize this methanol to evaluate the compatibility with their propylene production technology (DTP®*) at its existing demonstration facilities and consider applications for other chemical products. Link 04/04/2025.
45. **CO2 removal**: Sweden. Saipem has received from Stockholm Exergi, the district of Stockholm's energy company, a full notice to proceed for a large-scale CO2 capture project at Stockholm Exergi's existing bio-cogeneration plant in Sweden, after the successful financial closure of the project. The contract is worth approximately 600 million euro and entails the detailed engineering, procurement, construction and commissioning of the carbon capture, CO2 storage, and ship loading systems. Once operational, the plant will capture 800,000 tonnes of biogenic carbon dioxide annually from the biomass-fueled Värtaverket power plant in Stockholm, enabling net removal of CO2 from the atmosphere. Link15/04/2025.
46. **CO2 removal**: USA AtmosClear BR signed a contract with Microsoft for 6.75 million metric tons of engineered carbon removal over 15 years from bioenergy carbon capture & storage ("BECCS"). The deal is the world's largest for permanent carbon removal to date. AtmosClear is developing a carbon capture facility at the Port of Greater Baton Rouge in Louisiana. The plant will use sustainable materials like sugarcane bagasse and trimmings from prudent

forest management to produce clean energy while capturing 680,000 metric tons of biogenic carbon dioxide per year for permanent storage or beneficial use, like as a feedstock for low-carbon natural gas or other synthetic fuels. Link 17/04/2025.

47. **CO2 removal**: USA. To generate the carbon-negative material, the researchers started by inserting electrodes into seawater and applying an electric current. The low electrical current split water molecules into hydrogen gas and hydroxide ions. While leaving the electric current on, the researchers bubbled CO2 gas through seawater. This process changed the chemical composition of the water, increasing the concentration of bicarbonate ions. Finally, the hydroxide ions and bicarbonate ions reacted with other dissolved ions, such as calcium and magnesium, which occur naturally in seawater. The reaction produced solid minerals, including calcium carbonate and magnesium hydroxide. Calcium carbonate directly acts as a carbon sink, while magnesium hydroxide sequesters carbon through further interactions with CO2. Link 02/04/2025.
48. **CO2 removal**: Wärtsilä Gas Solutions launched the Wärtsilä Gas Solutions Puregas BC, a system designed to purify and liquefy the carbon dioxide captured from biogas upgrading plants. This solution offers a reliable, energy-efficient, carbon-negative, and profitable process for plant owners. This approach transforms biogas, already a circular and zero-carbon footprint fuel, into a carbon-negative solution. When combined with Wärtsilä's Puregas CA biogas upgrading system, the Puregas BC solution further eliminates the already minimal methane emissions (less than 0.1%), as any methane slip can be redirected back to the upgrader Link 10/04/2025

E-Fuels

49. **e-fuels**: Belgium. Hinicio launched an advanced optimisation and simulation tool designed for hydrogen power-to-X projects, dubbed Andrea. Hinicio's Andrea platform can simulate everything from multi-year strategies to minute-by-minute operations for green hydrogen, e-fuel, and ammonia-based projects, giving developers a real-world view of performance before a single asset is built. Link 18/04/2025.
50. **e-fuels**: Denmark. Danish renewable energy company European Energy A/S has produced the first batch of pure e-methanol at its Power-to-X facility in Kasso, Denmark, achieving a tested purity level above the industry standard of 99.85%. The project, which will become the world's largest commercial e-methanol facility, is powered by the adjacent 300-MW Kasso solar park and uses biogenic carbon dioxide (CO2) from biogas production. It will be inaugurated in May. Link 04/04/2025.
51. **e-fuels**: Finland. Q Power began hydrogen-based e-methane production at its Harjavalta facility, which is co-located with P2X Solutions' 20MW green hydrogen plant. Q Power announced that the plant had produced the first molecules of synthetic methane in Finland by combining green hydrogen with captured CO2. Commissioning of the plant is still underway, with the company focused on optimising the process and boosting microbial activity in the coming weeks to transition the facility to stable, full-scale production. Link 18/04/2025.
52. **e-fuels**: India. Honeywell UOP India signed an MOU with NTPC Green Energy to explore the potential use of Honeywell's eFining technology for e-SAF production, using green hydrogen and carbon captured from NTPC's plants. NTPC Green Energy has a $21.6 billion green hydrogen hub project at Pudimadaka in Andhra Pradesh set to be complete in 2027, and this additional technology could potentially be an add on to it. The project expects to produce 1,500 metric tons per day of green hydrogen and 7,500 tonnes per day of green methanol, green urea and SAF. Link 30/04/2025.

53. **e-fuels**: USA. Mitsui & Co., Ltd. invested in Infinium Holdings, Inc. Series C funding round. Infinium is a US based leading provider of gas conversion solutions and developer of eFuels technology and projects. This is Mitsui's second initiative in the synthetic fuel area, following the investment in Twelve Benefit Corporation. Infinium was the first in the world to start up a synthetic eFuel production operation using their proprietary reverse water gas shift (RWGS) and Liquid Fuel Production* processes. Its first production plant in Corpus Christi, Texas commenced production in late 2023. Customers include Amazon who uses the eDiesel produced at the plant to fuel its delivery trucks, and Borealis who take the eNaphtha to produce low-carbon plastics. Infinium's second facility. Link 18/04/2025.

Ethanol

54. **Ethanol**: Japan. Sumitomo Forestry announced that it has signed an agreement with Osaka-based Rengo Cohave to explore the production of wood-derived bioethanol to be used as a raw material for sustainable aviation fuel. The wood-derived ethanol would be produced from construction waste such as wood chips from Sumitomo Forestry's housing construction sites. The two companies will continue to hold discussions and plan to establish a joint venture company by December 2025 with the goal to achieve commercial production of 20,000 kL per year by 2027. Link 29/04/2025.

Feedstock

55. **Feedstock**: Brazil. Increased demand for biodiesel blending domestically has soaked up a lot of surplus soybean oil that would have typically been available for export. US Foreign Agricultural Service data showed that despite a record soybean crop last season, export availability of soybean oil remained steady at 1.3 million metric tons. Oil production soared to 12 million tons on the back of the bumper crop. With lower production of palm oil in Southeast Asia, vegetable oil markets are even tighter with less Brazilian soy oil available. Link 16/04/2025.
56. **Feedstock**: Spain. Repsol and Bunge announced a major milestone in the development of renewable fuels in Europe: the incorporation of intermediate novel crops in the production of renewable fuels. Specifically, camelina and safflower will be processed into low-carbon intensity oils and used as feedstock to produce hydrotreated vegetable oil (HVO), a fully compatible drop-in replacement for conventional diesel fuel or sustainable aviation fuel (SAF). Repsol will utilize advanced technology in its industrial assets to convert these oils into renewable fuel, creating a new pathway for the development of renewable fuels in Spain. Link 30/04/2025.
57. **Feedstock**: USA. Archer Daniels Midland decided to shut down the soybean processing plant in Kewshaw as it seeks to save up to $700 million over the next three years as well as offset potential challenges related to tariff-induced demand cuts from China. It is the first soybean plant to be shut down following years of increased production demand due to biodiesel. Link 25/04/2025.
58. **Feedstock**: USA. Farmers along the southern and Midsouth regions of the Corn Belt are successfully growing winter canola with plans to produce more this year, in time to supply Bunge Chevron Ag Renewables' new plant in Destrehan, La. With Bunge focused on farmers who can access ports along the Mississippi, the company expects winter canola production could increase by 30% before the end of the decade. Link 23/04/2025.
59. **Feedstock**: USA. USDA's Partnerships for Climate-Smart Commodities program has been cancelled. The USDA announced the launch of PCSC in February 2022, indicating plans to invest $1 billion partnerships to support America's climate-smart farmers, ranchers and

forest owners. The program was designed to finance pilot projects that would create market opportunities for U.S. agricultural and forestry products that use climate-smart practices and include innovative, cost-effective ways to measure and verify greenhouse gas (GHG) benefits. Link 04/2025.

Hydrogen

60. **Hydrogen**. China. The Chinese Ministry of Finance allocated 2.34bn yuan ($321.5m) to three cities and seven provinces for fuel-cell electric vehicle (FCEV) demonstration projects. The funding for the third year of the country's FCEV city clusters programme is far higher than in the first two years, which saw 1.14bn yuan allocated in 2023 and 1.62bn yuan in 2024. This brings the three-year total spend for the programme — which aims to accelerate the development and commercialisation of FCEVs in the country — to 5.11bn yuan ($701m). Link 24/04/2025.
61. **Hydrogen**: Austria. Rio Tinto signed a co-operation agreement with three partners to jointly fast-track the development of new technology that aims to reduce the cost of hydrogen-fired direct iron reduction used in the production of green steel. London-based Primetals Technologies, will provide its new HYFOR (Hydrogen-based Fine-Ore Reduction) technology, which is described as the world's first direct-reduction iron (DRI) tech that can extract iron from ore without the need to first crush the rock down into small pellets — an energy-intensive process known as agglomeration or pelletisation. The project is a partnership between Primetals Technologies, Mitsubishi and Voestalpine. Link 04/2025.
62. **Hydrogen**: Belgium. TotalEnergies' Antwerp platform is speeding up its own decarbonization. As part of a 200 MW Air Liquide electrolyzer project, TotalEnergies has signed a tolling agreement for 130 MW dedicated to the annual production of 15,000 tons of green hydrogen for its Antwerp platform. An initial project to produce 50,000 tons a year of SAF via coprocessing will be implemented at the Antwerp platform in 2025. Coprocessing is a SAF production method that enables the simultaneous treatment of hydrocarbons and biomass in a conventional refining unit. Link 25/04/2025.
63. **Hydrogen**: Brazil. GoVerde Energia signed a letter of intent with the Bahia state government to develop a hydrogen-based methanol and ammonia production facility in Brazil. Under an initial agreement with the Bahia state Secretariat for Economic Development (SDE), GoVerde plans to invest BRL 5.4bn ($949m) into the industrial project, and a further BRL 3.6bn ($632.6m) into an additional solar plant. For the industrial portion, GoVerde has estimated the plant will produce 300 tonnes of green methanol and ammonia, and 155 tonnes of byproduct oxygen per day. Link 29/04/2025.
64. **Hydrogen**: China. China Energy informed that the first offshore platform for the integrated production of green hydrogen, ammonia, and methanol has been constructed in Yantai, China, and is set to commence the trial operation. The semi-submersible offshore hydrogen production platform measures over 50 meters in height and weighs more than 20,000 tons. It is equipped with photovoltaic power generation systems and electrochemical energy storage devices that enable the platform to achieve self-sufficiency. Link 22/04/2025.
65. **Hydrogen**: China. Toyota launched a new hydrogen fuel cell joint venture (JV) in China with state-owned Shudao Group and its subsidiary, Sichuan Shudao Equipment Technology. Marking Toyota's second fuel cell JV in China, Shudai Toyota Hydrogen Energy Technology Co. will set up base in Chengdu, Sichuan, with a 10,000m2 facility. Huafeng Fuel Cell Co. (FCTS) said it would have the capacity to produce up to 10,000 fuel cell systems per year for heavy-duty commercial vehicles. Link 24/04/2025.

66. **Hydrogen**: Egypt. Egypt and France have signed a €7bn ($7.6bn) agreement to work together on the development and operation of a green hydrogen production facility. By 2030, Egypt aims to capture 5-7% of the hydrogen market, initially planning to export 100% of its hydrogen as green ammonia. In November 2023, the country approved its national green hydrogen strategy, which set out goals to create 100,000 jobs and increase GDP by $10-18bn by 2040. Link 09/04/2025.
67. **Hydrogen**: Finland. ABO Energy group was granted a planning reservation to build a hydrogen production plant in Oulu in northern Finland. In the preliminary plan, the new hydrogen plant would have an electrolyser with a maximum capacity of 600 MW. Implementation would take place in 2–3 phases. In addition to hydrogen production, the company is exploring the possibility of producing methanol and sustainable aviation fuel (E-SAF) in Oulu. The feasibility of synthetic fuel production depends on the availability of biogenic carbon dioxide. Link 25/04/2025.
68. **Hydrogen**: Finland. Energiequelle GmbH reserved a site in Oulu, northern Finland, to build a green hydrogen plant with a total capacity of over 500 MW. The project will be carried out in three stages between 2028 and 2033. The first phase covers the construction of a hydrogen production facility of up to 5 MW and a hydrogen refuelling station for buses and other heavy-duty vehicles. In the next phase, the capacity of the plant will be expanded to between 10 MW and 50 MW. Link 14/04/2025.
69. **Hydrogen**: France. Haffner Energy introduced Hynoca® Flex 500 IG; a line of hydrogen production units capable of producing 12 tonnes of green hydrogen per day to be delivered under €3/kg without subsidies. Hynoca®Flex 500 IG also enables the production of cost-competitive renewable electricity to manage fluctuations in hydrogen demand or ensure energy autonomy. Hynoca® Flex 500 IG generates highly competitive syngas, the precursor to hydrogen. Its low cost opens up new economic opportunities beyond hydrogen production. Each Hynoca® Flex 500 IG unit generates 58,000 tonnes of biogenic CO_2 per year, a key resource for PTL (e-fuels) production and a critical enabler for hydrogen from electrolysis. Link 28/04/2025.
70. **Hydrogen**: France. Lhyfe announced that the French Prime Minister has officially confirmed, a $169 million grant for the firm's future green hydrogen production plant located near the Grand Canal of Le Havre. The facility is expected to reach a capacity of up to 34 tons per day. Lhyfe now has 4 production sites in France and Germany and is developing numerous sites throughout Europe. Link 22/04/2025.
71. **Hydrogen**: France. The French Government approved €99.84m ($133.5m) in public funding for Gen-Hy to construct a manufacturing site for anion exchange membrane (AEM) electrolysers. The public funding agreement was signed with Bpifrance to develop France's first AEM electrolyser factory in the Bourgogne-Franche-Comté region. Gen-Hy, backed by the Eiffage Group and Saint-Gobain, has already broken ground on the Allenjoie facility and is expected to be operational by Q1 2026. Once at full-scale, the facility will produce 350 AEM electrolyser units, each ranging from 100kW to 2MW in capacity. Link 18/04/2025.
72. **Hydrogen**: Germany. Hydrogen produced from Air Liquide's PEM electrolyser in Oberhausen, Germany, was certified under renewable fuel of non-biological origin (RFNBO) criteria. The Oberhausen site has a capacity of up to 2,900 tonnes of green hydrogen per year and uses electrolyser stacks produced by Air Liquide's joint venture with Siemens Energy. The certificate allows Air Liquide's customers, especially those in the transport sector, to contribute to the legally required reduction quotas. Link 11/04/2025.
73. **Hydrogen**: Germany. Hydrogenious LOHC was granted a permit to build and operate a hydrogen storage plant based on liquid organic hydrogen carrier (LOHC) technology. The

'Hector' plant at Chempark Dormagen in North Rhine-Westphalia will store around 1,800 tonnes of hydrogen per year in Hydrogenious' LOHC benzyltoluene to advance further research into the technology and supply its planned release plant. Hydrogen produced by Hydrogenious' shareholder Covestro Deutschland, at its chlorine electrolysis plant, will be used during the project. Link 30/04/2025.

74. **Hydrogen**: Germany. Thyssenkrupp Materials Processing Europe will offtake up to 100,000 tonnes of hydrogen-based flat steel per year from Hydnum Steel's planned plant in Puertollano, Spain. Under a seven-year deal, green steel from Hydnum will power Thyssenkrupp's push to decarbonise its supply chains across automotive, construction and appliances – being one of the world's top mill-independent materials distributors and service providers. Link 03/04/2025.
75. **Hydrogen**: Germany. Westenergie AG, part of E. ON SE (ETR:EOAN), announced on Tuesday the start of a pilot hydrogen infrastructure project in the Sauerland region in western Germany. The project, HydroNet, covers the entire value chain. The core of the initiative includes the conversion of an 11-km former natural gas pipeline for the transportation of hydrogen. The pipeline connects the towns of Arnsberg and Balve. HydroNet also involves the establishment of electrolysis and storage facilities as well as connection pipelines to regional businesses. An integration to Germany's planned hydrogen core network is also planned. Link 03/04/2025.
76. **Hydrogen**: Indonesia. Hyundai Motor Group is to establish an overseas waste-to-hydrogen project in West Java, Indonesia. The initiative will convert biogas sourced from the Sarimukti landfill, which processes about 1,500 tonnes of waste daily, into hydrogen using Hyundai Rotem's steam methane reformer (SMR) technology. Using the SMR process, Hyundai Rotem's Hy-Green can reportedly produce up to 640kg of high-purity hydrogen per day from natural gas or, in this case, biogas. Link 16/04/2025.
77. **Hydrogen**: Japan JGC Holdings signed a memorandum of understanding with U.S.-based Amogy to use its low-ruthenium ammonia cracking catalyst in a project targeting 100,000 tons per year of hydrogen production. The system, developed in collaboration with Kubota and Taiyo Nippon Sanso, will convert ammonia into hydrogen through a tubular cracking furnace designed by JGC. Amogy's catalyst enables low-temperature hydrogen production with higher efficiency and lower capital expenditure. Link 25/04/2025.
78. **Hydrogen**: Japan. Developers of the Hydrogen Energy Supply Chain (Hesc) project are changing plans to source hydrogen domestically in Japan, amid prolonged delays encountered with Australian authorities. The project was being led by two consortiums, with J-Power and Sumitomo Corporation planning to produce up to 30,000 tonnes of hydrogen per year from Latrobe Valley coal with carbon capture in the Bass Strait. KHI and Iwatani's Susio Energy would purchase the hydrogen and handle liquefaction at Hastings before exporting to Japan. The Japanese Government had pledged over $1.4bn to Hesc's commercial development to ensure it's completed by 2030. However, the project has now been relocated to Japan to meet this deadline and remain competitive. Link 01/04/2025.
79. **Hydrogen**: Japan. Kawasaki Heavy Industries ordered a hydrogen pump unit from Nikkiso which will be integrated into a hydrogen-fuelled ship using a low-speed, two-stroke hydrogen dual-fuel engine. The technology will complement Kawasaki's 2.4MW dual-fuel generator engine, which it secured a ClassNK approval in principle (AiP) for in 2022. Nikkiso's multi-stage, high-pressure system takes liquefied hydrogen from onboard cryogenic tanks and pressurises it to the levels needed for engine combustion. It's then fed into an evaporator, which turns it into gaseous hydrogen for engine use. The system combines technology from

hydrogen refuelling stations and LNG ship fuel supply systems, such as cryogenic handling and marine integration. Link 11/04/2025.

80. **Hydrogen**: Norway. Norwegian Hydrogen has taken a final investment decision (FID) on its 25MW green hydrogen plant in Rjukan, Norway. The project, acquired from Aker Horizons earlier this year, includes a power purchase agreement (PPA) with local utility Tinn Energi to guarantee renewable electricity supply. Nel will supply the 25MW alkaline electrolyser system, with Norwegian Hydrogen eyeing future scale-up potential. The firm is targeting offtake agreements across the Nordics, aiming to supply green hydrogen to both existing and new customers in southern Norway and parts of Sweden on predictable, competitive terms. Link 02/04/2025.
81. **Hydrogen**: Oman. Eleven parties signed a joint development agreement to create the world's first liquid hydrogen import corridor between Oman, the Netherlands and Germany. The corridor will connect the port of Duqm in Oman, the port of Amsterdam and German logistics hubs, including the port of Duisburg. The project is focused on delivering large-scale green hydrogen volumes from Oman to Europe by 2029. It builds on an existing partnership between Oman's green hydrogen orchestrator Hydrom, the Omani Ministry of Energy and Minerals, the port of Amsterdam, ECOLOG and EnBW for the development of the liquid hydrogen corridor. Link 18/04/2025.
82. **Hydrogen**: Oman. Oman is planning hydrogen pipelines spanning 300-400km to serve its green hydrogen industry as well as a CO2 transport network by 2030, according to OQ Gas Networks'. Under a joint development agreement (JDA), Oman will look to export liquid hydrogen from its Port of Duqm to the Port of Amsterdam for use in the Netherlands and Germany. Link 28/04/2025.
83. **Hydrogen**: Pakistan. Pakistan Oxygen Limited (POL) plans to invest around PKR 1.3bn ($4.6m) to build a hydrogen production plant at Port Qasim. The industrial gas supplier says it has already signed a 15-year supply contract with chemicals firm Archroma Pakistan for its Jamshoro facility. The Port Qasim investment adds to green hydrogen interest in Pakistan. London-listed Oracle Power has been developing a 400MW green hydrogen plant in Thatta, Sindh – some 70km from Port Qasim – since 2021. Link 23/04/2025.
84. **Hydrogen**: Spain. Spain approved €1.22bn ($1.34bn) in funding for 2.3GW worth of green hydrogen hub projects in Aragon, Andalusia, Castilla y León and Galicia. Madrid-headquartered solar firm RIC Energy secured €81.4m ($89.8m) for its 220MW Compostilla Green, SAF and hydrogen plant in Castilla y León, where it plans to produce green hydrogen which will be combined with CO2 captured from biomass operations to produce sustainable aviation fuels (SAF). Naturgy and Enagás Renovable were granted €179.99m ($198.6m) for their 415.2MW Leon Green Hydrogen Valley which could supply hydrogen to Fertiberia. Link 07/04/2025.
85. **Hydrogen**: Spain. The European Commission approved a €400m ($453m) Spanish state aid scheme designed to accelerate green hydrogen production through the European Hydrogen Bank's (EHB) Auction-as-a-Service tool. The European Commission has stated the scheme will support the construction of up to 345MW of installed electrolyser capacity and the production of 221,000 tonnes of green hydrogen in Spain. Link 16/04/2025.
86. **Hydrogen**: Sweden. A RES-led group is set to advance a 500-MW green hydrogen project in Sweden to its next phase of implementation after the required environmental permits for the initiative have become final. Located in Ange municipality, the Alby project will seek to produce up to 80,000 tonnes of green hydrogen per year. A portion of this output will be ultimately combined with biogenic carbon dioxide (CO2) and converted into e-SAF at a co-located site. The project was initiated by RES, with Prime Capital and Norsk e-Fuel later

joining as co-owners and key development partners for SAF production. RES sold the project to the German independent asset manager in December, while Norsk e-Fuel entered in mid-February. Link 16/04/2025.

87. **Hydrogen**: United Kingdom. A consortium led by JCB announced plans to build 1GW of green hydrogen production capacity across the UK by 2030. Project Hyspeed, the consortium made up of Centrica, Heidelberg, ITM Power, JCB, Johnson Matthey and National Gas. The consortium believes it can produce green hydrogen at a strike price of £5.96/kg ($7.84/kg) with "aggregated procurement of equipment and services, optimised power purchase and low-cost financing. Based on company graphics, the scheme will likely involve building around 16 plants across the UK, ranging from under 50MW to over 300MW. The companies anticipate the projects would attract £6.5bn ($8.55bn) of private investment and create at least 12,150 UK jobs while reducing one million tonnes of CO2 emissions per year. Link 15/04/2025.
88. **Hydrogen**: United Kingdom. Oil and Gas Climate Initiative (OGCI) released The Road Ahead for Hydrogen Powered Mobility, a report exploring strategies to accelerate hydrogen's role in achieving a low-carbon transport future. With transportation a major source of global CO_2 emissions, the report highlights how scaling hydrogen adoption through infrastructure expansion, regulatory updates and industry collaboration would help enable decarbonization of the sector. While hydrogen is a promising solution for hard-to-electrify sectors like heavy-duty transport, its success depends on significant investment in distribution networks, alongside clear policies and safety frameworks. Link 04/04/2025.
89. **Hydrogen**: United Kingdom. Statera Energy received planning approval for a 3GW green hydrogen plant in Aberdeenshire, one of the largest of its kind in the UK. Kintore Hydrogen, which has already won UK government funding, plans to set up an initial 500MW electrolyser capacity by 2030 before scaling up to 3GW. The project intends to use local wind power to produce hydrogen that could be used in hard-to-abate heavy industries, as well as power generation. Link 8/04/2025".
90. **Hydrogen**: USA. Hyundai will bring a new hydrogen fuelling station online this autumn to serve its fleet of 21 heavy-duty trucks transporting parts to its electric vehicle battery factory in Georgia, US. The 1,200kg per day station will be installed in Pooler, 10 miles outside of the Port of Savannah, near the Hyundai Motor Group Metaplant America (HMGMA) and could be expanded to supply up to 4,200kg of hydrogen per day. Though the source of the hydrogen is still to be confirmed. Link 30/04/2025.
91. **Hydrogen**: USA. The Trump administration has thrown a tremendous amount of instability and risk into everything in sustainable fuels and chemicals. Increasingly, Hamilton Clark Sustainable Capital will be looking to the EU and UK for business due to the policy uncertainty unfolding in the US. The US Department of Energy (DOE) may move to axe funding for regional clean hydrogen hub (H2Hub) developments in Democratic-voting states. Link 09/04/2025.

Marine Fuels

92. **Marine fuels** Australia. Fortescue and CMB.Tech are partnering to develop a hydrogen-based ammonia dual-fuel vessel capable of transporting iron ore from Australia to China. The vessel is part of a series of large dry bulk carriers ordered by Bocimar – Cmb.Tech's bulk, coal, and iron ore shipping division – currently under construction at Qingdao Beihai Shipyard. Fortescue's dual-fuel ammonia-powered vessel, dubbed Green Pioneer, has been travelling the globe for the past year. Last month, the ship arrived at the Port of Southampton, UK, for inspection. Link 15/04/2025.

93. **Marine fuels**: Australia. HyFuel Solar Refinery, a subsidiary of Vast Renewables Limited, was awarded $441,000 through the Australia-Singapore Low Emissions Technologies (ASLET) initiative for maritime and port operations. The funding will progress the development of South Australia Solar Fuels (SA Solar Fuels), a sustainable fuels project collaboration between Vast and global energy company Mabanaft. SA Solar Fuels, previously known as Solar Methanol 1, or SM1, is being developed to meet the rapidly growing demand for sustainable fuels by the maritime and aviation industries. The SA Solar Fuels demonstration plant will be capable of producing 7,500 tons per annum of green methanol. Preliminary front-end engineering and design (pre-FEED) for SA Solar Fuels has been completed by global engineering firms Fichtner and bse Methanol. Link 01/04/2025.
94. **Marine fuels**: ChinaHMM Green, a new 9,000 TEU methanol-powered container ship operated by South Korea's Hyundai Merchant Marine, is set to complete its first ship-to-ship bunkering of bio-methanol at Shanghai's Yangshan Port. HMM Green, the first of the nine dual-fuel methanol-powered container ships ordered by HMM in 2023, positions the company as the fourth globally to invest in such eco-friendly vessels. The company is expected to receive the remaining eight ships in the years leading up to 2026. Link 03/04/2025.
95. **Marine fuels**: Denmark. DS NORDEN and MASH Makes have successfully completed the world's first commercial vessel trial using biofuel produced from a carbon-negative process. The vessel operated on a roundtrip voyage from Singapore to Brazil, successfully using 65 metric tons of fuel blend with 20% MASH Makes biofuel in its auxiliary engine. Mash Makes use thermochemical processes to convert agricultural waste into bio oil, hydrogen, and electricity. The main byproduct of this process is biochar—a form of charcoal that captures CO2 from the atmosphere. Biochar can then be added to soil to support plant growth. Link 28/04/2025.
96. **Marine fuels**: Germany. ZERO44 and Frontier Fuels announced a strategic partnership aimed at assisting maritime stakeholders in decreasing their emissions and achieving compliance with the latest regulations. Following the introduction of CII and EU ETS regulations in 2023 and 2024, FuelEU Maritime adds another layer of compliance requirements for the industry. Planning ahead becomes even more important. By combining ZERO44's advanced compliance tools with Frontier Fuels' cost-effective biofuel offerings, the two companies are making it easier than ever for maritime stakeholders to integrate sustainable fuels into their operations. Link 07/04/2025.
97. **Marine fuels**: Hong Kong. Chimbusco Pan Nation (CPN), a marine fuel and marine biofuel supplier in Hong Kong announced the commencement of its B30 marine biofuel supply in Hong Kong. Following the IMO MEPC 83 approval of MEPC.1/Circ.917, this initiative is now officially effective. Building on prior biofuel bunkering operations, CPN is scaling up its offerings to provide seamless, and ISCC certified biofuels supply across Hong Kong's port. B30, a blend of 30% biodiesel and 70% conventional fuel, offers a practical pathway to lower greenhouse gas emissions without huge investment on retrofitting .Link 18/04/2025
98. **Marine fuels**: Japan. Japan Engine Corporation began co-firing operations with ammonia on the country's first domestically developed large low-speed marine engine, as part of a government-backed initiative under the Green Innovation Fund to cut emissions from international shipping. This is the first full-scale version of the engine J-ENG began testing in 2023, which demonstrated "stable operation at high ammonia co-firing rates and safe handling of ammonia." The unit is slated for shipment in October and will power an ammonia-fuelled medium gas carrier in sea trials. Link 25/04/2025.

99. **Marine fuels**: Norway. NCL (North Sea Container Line AS) together with partners Elkem ASA, and MPC Container Ships ASA (MPCC), initiated the operation of NCL VESTLAND in Haugesund, Norway. NCL VESTLAND and NCL NORDLAND are the first ships powered with bio-methanol in operations in Norway. They are designed in Norway by NCL, with support from the NOx fund and Norwegian Enova. Elkem owns 40 per cent of NCL. The innovative vessel design enables a significant increase in freight capacity and a 63 per cent reduction in energy consumption per TEU per nautical mile compared to existing fleet. Link 03/04/2025.
100. **Marine fuels**: Singapore. EcoCeres Inc., Mitsui & Co. Energy Trading Singapore Pte. Ltd., KPI OceanConnect, and Global Energy jointly conducted the sustainable supply of Hydrotreated Vegetable Oil with the delivery of 400 metrics tons to a renowned cruise line in Singapore. EcoCeres Inc. and Mitsui & Co. Energy Trading Singapore Pte Ltd, have partnered with KPI OceanConnect to provide Renewable Diesel/HVO for a cruise ship. The delivery was performed by an IMO Type II chemical tanker owned by Global Energy. Link03/04/2025.
101. **Marine fuels**: Singapore. Swire Shipping, a leading shipping company in the Asia-Pacific, announced that three of its vessels serving the South Pacific have made the switch to B24 and B30 2nd generation biofuel blends. The three vessels involved in the biofuel program are Apia Chief and Tonga Chief on the Pacific Weekly Express (PWX) service running direct calls from Southeast Asia to Papua New Guinea, Solomon Islands, New Caledonia and Fiji, and Kokopo Chief on the East Timor (ETS) service which provides direct service every 10 days between Singapore, Dili, Darwin and Surabaya. The vessels will bunker B24 in Singapore in Q2 2025 enroute to the South Pacific and subsequently transition to B30. Link 29/04/2025.
102. **Marine fuels**: The International Maritime Organization (IMO) has achieved another important step towards establishing a legally binding framework to reduce greenhouse gas (GHG) emissions from ships globally, aiming for net-zero emissions by or around, i.e close to 2050. Global fuel standard: Ships must reduce, over time, their annual greenhouse gas fuel intensity (GFI) – that is, how much GHG is emitted for each unit of energy used. This is calculated using a well-to-wake approach. Global economic measure: Ships emitting above GFI thresholds will have to acquire remedial units to balance its deficit emissions, while those using zero or near-zero GHG technologies will be eligible for financial rewards. Link 17/04/2025.
103. **Marine fuels**: The Netherlands. FincoEnergies is acquiring a stake in the business operations of Oliehandel Klaas de Boer, a well-known player in marine fuel supply. This strategic move strengthens FincoEnergies' position as a supplier of high-quality (bio)fuels and sustainable energy solutions in the Netherlands. This acquisition supports FincoEnergies' strategic ambition to serve its customers in the transport sector even more efficiently and sustainably. By integrating a part of Klaas de Boer's operations, FincoEnergies strengthens its presence along the entire Dutch coastline, expands its storage capacity, and enhances the security of supply for its customers. Link 28/04/2025.
104. **Marine fuels**: The Netherlands. In Rotterdam, engine.online reports on April 22, 2025, the cost of 100% biofuel bunker dropped to $97 per metric ton below very low sulphur fuel oil, while liquefied biomethane became up to $331/mt cheaper, as EU shipping regulations and Dutch rebates shifted the fuel market in favour of lower-carbon alternatives. Adjusted pricing data—factoring in EU ETS surcharges, FuelEU Maritime compliance, and Dutch HBE rebates—showed B100 moving from a $3/mt premium to a $66/mt discount against high sulphur fuel oil for scrubber-fitted vessels. Link 25/04/2025.

105. **Marine fuels**: Turkiye. Turkish shipping company Ulusoy Sealines joined Finland-headed energy company Gasum Oyj's FuelEU Maritime pool as an offtaker of the pool's regulation compliance service. By joining Gasum's pool, Ulusoy Sealines is able to buy compliance as a service, where one vessel using biofuel generates compliance on behalf of others. Gasum has control over the whole process, from data gathering to bunkering the right amount of biofuel, and we can trust them to deliver what they promise. It's the perfect solution for a shipping company. Link 09/04/2025.
106. **Marine fuels**: United Kingdom The International Maritime Organization (IMO) Marine Environment Protection Committee meeting (MEPC 83) was held from April 7-11, 2025 when The "Interim Guidance on the Carriage of Blends of Biofuels and MARPOL Annex I Cargoes by Conventional Bunker Ships" was approved, which allows transportation of blends of not more than 30% by volume of biofuel by conventional bunker ships (i.e. oil tankers as defined in Regulation 1.5 of MARPOL Annex I that are engaged in the transport and delivery of fuel oil for use by ships). Link 16/04/2025.
107. **Marine fuels**: USA. BWC Terminals (BWC) celebrated the official completion of its expanded renewable fuels terminal at the Port of Stockton, marking a significant milestone in strengthening California's renewable fuels and maritime infrastructure. The state-of-the-art terminal includes the first newly constructed Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS)-compliant dock built in California in nearly 30 years. It will play a vital role in advancing the renewable fuels supply chain across the state. It is designed to safely and efficiently transfer renewable diesel and biodiesel from marine vessels, supporting California's efforts to decarbonize hard-to-electrify sectors such as heavy-duty transportation. Link 30/04/2025.
108. **Marine fuels**: China. MAN, Energy Solutions signed a framework agreement with COSCO Shipping Heavy Industry Co., Ltd. (CHI) regarding their future cooperation on decarbonization retrofit projects. The new framework agreement provides for the retrofitting of existing ships to operation on new alternative fuels like methane, methanol and ammonia – all fuels that can be produced in a sustainable way through power-to-X processes. MAN, Energy Solutions will provide advanced engine-retrofit technology and digital energy-efficiency solutions, while CHI will leverage its rich EPC (Engineering, Procurement, and Construction) experience in large-scale ship modification projects. Link 14/04/2025.

Methanol

109. **Methanol**: Canada. Enerkem is developing a pipeline of new projects to produce 1,000,000 tonnesper year of sustainable methanol. The methanol is from sustainable feedstocks, suitable for all markets and competitive to compliance costs in regulated markets. Enerkem is inviting the market to express in an EoI process its needs for sustainable methanol. Link 04/2025.
110. **Methanol**: Denmark. Clariant announced the successful startup of its MegaMax 900 methanol synthesis catalyst at European Energy's e-methanol plant. Located in Kasso, Denmark, the facility is one of the world's first and, up to now, largest commercial e-methanol plant, using biogenic CO2 and green hydrogen to produce up to 42,000 tons of green methanol annually. MegaMax 900 operated with excellent activity and stability despite the challenging conditions of CO2-to-methanol conversion. Clariant's MegaMax 900 is an ideal solution for European Energy's Power-to-Methanol project, as it provides the enhanced stability required for green methanol production. The catalyst also offers outstanding activity – even at very low reactor temperatures and pressures. Moreover,

MegaMax is very well suited for CO2 to methanol process conditions delivering high conversion rates and long catalyst lifetime. Link 16/04/2025.

111. **Methanol**: Japan. Mitsubishi Gas Chemical Company announced it has commenced construction of a methanol production demonstration facility within its Mizushima Plant. The facility will utilize diverse gases, including CO2 and industrial by-product gases as raw materials. The facility will have an annual production capacity of 100 tons of methanol and is expected to begin demonstration operations in fiscal year 2026. Link 01/04/2025.
112. **Methanol**: Prometheus announced its first product – a 99.9% pure, carbon neutral methanol fuel that is molecularly identical to fossil methanol but made from air. Orders for our first million tons of the fuel are sold out. Link 30/04/2025.
113. **Methanol**: Spain. BASF and Forestal de Atlántico S.A. (Forestal) have signed an early disclosure agreement (EDA) aimed at advancing the production of e-methanol (eMeOH) through carbon capture solutions. Under this strategic partnership, BASF has been selected to share its proprietary OASE® blue technology, designed for the efficient removal of CO2 from flue gases, for use in Forestal's pioneering Triskelion project in Galicia, Spain. The Triskelion project is set to be a game-changer, with a design capacity of 156 metric tons per day of e-methanol production. The CO2 captured from the exhaust gases of electricity generating turbines will be transformed into e-methanol by reacting it with renewable hydrogen. Link 07/04/2025.
114. **Methanol:** Spain. BASF and Forestal de Atlántico S.A. (Forestal) have signed an early disclosure agreement (EDA) aimed at advancing the production of e-methanol (eMeOH) through carbon capture solutions. Under this strategic partnership, BASF has been selected to share its proprietary OASE® blue technology, designed for the efficient removal of CO2 from flue gases, for use in Forestal's pioneering Triskelion project in Galicia, Spain. Link 09/04/2025.
115. **Methanol**: USA.C2X LTD and ENEOS Corporation jointly announced a combined investment in C2X of $100 million from ENEOS and existing shareholders A.P. Møller Holding and A.P. Møller – Mærsk. The proceeds from the investment will primarily be used to fund the final development phase of the BLRE project which C2X is developing together with SunGas Renewables Inc. in Alexandria, Louisiana. Once operational, BLRE will produce over 500,000 tonnes of green methanol per annum and is in discussions to secure long-term offtake from Maersk and other high-quality customers in the shipping, chemicals and industrial sector. he multibillion-dollar project aims to start construction in second half of 2026. Link 04/04/2025.

Policy

116. **Policy**: The Netherlands. The Dutch government will allocate €2.1bn ($2.4bn) in subsidies to boost domestic hydrogen production and introduce a 4% mandate for the use of green hydrogen in industrial applications. Significant investment has been earmarked for hydrogen production and use. Up to €2.1bn will be available for green hydrogen production, while €662m ($751m) has been dedicated to encouraging the adoption of green hydrogen within industrial processes. Furthermore, the government has opted "for a relatively low mandatory amount of renewable hydrogen of 4%. The Netherlands is a major EU grey hydrogen consumer, using around 1.3 million tonnes per year in industries like refining and ammonia. Based on this, H2 View estimates that the 4% mandate would require 52,000 tonnes of green hydrogen. Link 29/04/2025.
117. **Policy**: United Kingdom. The UK Government launched a call for evidence on hydrogen-to-power (H2P) projects that can be delivered by 2030, ahead of large-scale enabling

infrastructure. The government wants to understand the type of H2P plants that could be delivered rapidly, including the scope of planned projects, timescales, costs and barriers. Specifically, projects that could generate electricity from 100% hydrogen by 2030, first-of-a-kind, standalone or semi-standalone initiatives not reliant on large-scale infrastructure are desired by the government. While hydrogen is set to play a central role in the UK's energy transition – with a 2030 target of 10GW capacity – progress has been hampered by high production costs, uncertain demand, and limited infrastructure. Link 02/04/2025.

118. **Policy**: USA. U.S. Secretary of Agriculture Brooke Rollins announced the U.S. Department of Agriculture (USDA) will release obligated funding under the Higher Blends Infrastructure Incentive Program (HBIIP) for 543 projects totalling $537 million in 29 states. This includes new projects approved within the first 100 days of the Trump Administration and advances President Trump's January 20th Executive Order on Unleashing American Energy. Link 02/04/2025.
119. **Policy**: USA. The Trump administration has pulled out of critical International Maritime Organisation (IMO) negotiations to decarbonise shipping — that green hydrogen producers had been hoping would result in greater uptake of clean fuels — and threatened to retaliate against any emissions fees imposed on US vessels. The decision came in the form of a diplomatic message sent by the US to other delegations at the IMO as a high stakes meeting of its Marine Environment Protection Committee (MEPC) in London was working to finalise negotiations on policy measures by the end of this week. Link 11/04/2025.

Pyrolysis

120. **Pyrolysis**: USA. China New Energy Group Company entered into a strategic agreement to commercialize the syngas technology developed by BioEnergy Solutions Inc., an Alberta, Canada renewable energy developer, to launch the first commercial deployment of the bioReactor – a modular, containerized waste-to-energy system. The bioReactor is engineered within a 40-foot shipping container and utilizes pyrolysis to convert manure and other organic waste into clean thermal energy and biochar. The compact system delivers up to 1.5 megawatts of thermal energy per hour from 2 tons per hour of cow manure. The bioreactors will be placed close to waste sites, creating a micro-power Grid for all farming operations. The initial installation is proposed to be located onsite at a major cattle operation in California's San Joaquin Valley. Link 24/04/2025.

Recycling plastic

121. **Recycling plastic**: Canada. UpSolv (the new business name for Polystyvert in line with the company's extension of activities), offers the solution to make recycled plastics as cost-effective as virgin plastics and suitable for the needs of many industries. Thanks to a proprietary, flexible and highly optimized production process, it is now possible to manufacture a custom purified resin, offering the most advantageous recycling solution. The company is transitioning from a specialization in PS (polystyrene) to a technological platform for recycling most thermoplastics. In addition to PS and HIPS (No. 6 plastic) and ABS, which are more mature applications, the company is expanding its activities to most polyolefin-type thermoplastics (PE, PP and PC), also known as plastics 2, 4 and 5. Link 25/04/2025
122. **Recycling plastic**: Germany. Audi is developing the circular economy in the automotive industry. The company is increasing the use of secondary materials in vehicles where it is technically feasible and makes ecological and economic sense. The aim is to increasingly use raw materials for new purposes after their initial usage has ended. Audi has therefore

been testing approaches to implement this in the MaterialLoop program since 2023. After initially focusing on technical feasibility, the company has now become the first car manufacturer to develop and implement an economically viable recycling concept for recyclates from end-of-life vehicles together with its partner TSR Resource. Link 15/04/2025.

123. **Recycling plastic**: USA. Brightmark LLC announced that its subsidiaries operating a recycling facility in Ashley, IN, have filed for Chapter 11 bankruptcy protection with the intention of selling their assets. The San Francisco–based company, which converts plastic waste into fuel, has filed motions to continue operations during the bankruptcy proceedings and to pursue an auction and sale process under Section 363 of the US Bankruptcy Code. Link 01/04/2025.

Renewable diesel

124. **Renewable diesel**: Singapore. Neste and DB Schenker have collaborated to work towards expanding DB Schenker's adoption of Neste MY Renewable Diesel in Asia-Pacific. Both companies embarked on a trial which took place from December 2024 to February 2025, in which Neste MY Renewable diesel was used in Singapore for the first time to power DB Schenker's land transport operations Link 07/04/2025

Textiles

125. **Textiles**: Canada. lululemon announced a multi-year collaboration with Califirnia-based biotechnology pioneer ZymoChem to help expand the company's use of bio-based nylon. Together, lululemon and ZymoChem will sustainably transform a key building block of nylon 6,6 – a foundational material used in many of lululemon's iconic products including its Align and Wunder Train leggings. lululemon's work with ZymoChem began last year with an initial investment to support innovative technologies used to create a bio-based version of adipic acid. The next phase of this partnership will focus on scaling ZymoChem's technologies to support the commercialization of this bio-based alternative. Link 01/04/2025.
126. **Textiles**: USA. Modern Meadow, a leader in sustainable materials, announced a strategic partnership with Bellroy, the global carry brand from Australia. Bellroy will leverage Modern Meadow's INNOVERA™ biomaterial, formerly known as BIO-VERA®, to produce select consumer carry goods. INNOVERA™ is engineered with plant-based proteins, biopolymers and post-consumer waste to replicate the look and feel of the collagen found in leather. With over 80% renewable carbon content, it provides an animal-free solution that integrates into industry standard manufacturing processes. INNOVERA™, offered in various colours, haptics and finishes, is lightweight and twice as strong as traditional leather. Link 29/04/2025.
127. **Textiles**: USA. The Lycra Company is to launch bio-derived LYCRA® EcoMade fiber made with QIRA® which is sourced from annually renewable corn from Iowa, offering raw material origin transparency and a sustainable solution to help reduce the environmental impact of apparel. This innovative fiber, composed of 70 percent renewable content, has the potential to reduce the carbon footprint of LYCRA® fiber by up to 44 percent*, delivering equivalent performance to the original LYCRA® fiber. It is a one-to-one replacement requiring no re-engineering of fabrics, processes, or garment patterns. Link 28/04/2025.

GIFFORD
CONSULTING

Company Summary – **April 2025**

Frequency of mention

Company	Frequency
BASF	3
TotalEnergies	3
Anaergia	2
Braskem Siam	2
EU	2
Hyundai	2
IMO Committee	2
Neste	2
US Government	2
ABO Energy	1
ADM	1
Air Liquide	1
American Power Group	1
AtmosClear	1
Audi	1
BDI-BioEnergy	1
Boreal Bioproducts	1
Brightmark	1
BSOG Energy	1
Buscar	1
BWC Terminals	1
Chevron	1
China Energy	1
China New Energy Group	1
Clariant	1
Cosmo Oil	1
Costa Pinto	1
Covation Biomaterials	1
Total	**121**

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

Frequency of mention

Category	Frequency
Hydrogen	34
Marine fuels	16
Biogas	12
Biofuels	8
Biojet	8
Biomaterials	8
Methanol	7
CO2 Removal	5
Feedstock	5
e-fuels	4
Policy	4
Biobased chemicals	3
Biobased plastics	3
Recycling plastic	3
Textiles	3
Ethanol	2
e-fuels	1
Integration for the supply of marine fuels	1
Plastic recycling	1
Pyrolysis	1
Renewable diesel	1
Total	**130**