

THE DIGEST 100: HOTTEST PROJECTS IN THE BIOECONOMY — 2026

100 ranked projects redefining the bioeconomy, profiled.

 **100**
RANKED PROJECTS
AROUND THE WORLD

 **15+**
COUNTRIES AND
OFFSHORE SITES

 **2026**
THE DEFINITIVE
ANNUAL GUIDE



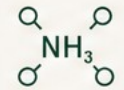
COVERING SIX KEY PATHWAYS



SUSTAINABLE
AVIATION FUEL



GREEN
HYDROGEN



GREEN
AMMONIA



E-METHANOL



BIO-BASED
CHEMICALS



CELLULOSIC
ETHANOL

01 — Bangchak / BSGF — Phra Khanong SAF Unit

Bangkok, Thailand | HEFA-SPK stand-alone unit | Sustainable aviation fuel



THE PROJECT

Bangchak Group built a dedicated production unit at its Phra Khanong refinery in Bangkok to make 100% neat SAF by the HEFA-SPK route, operated through group affiliate BSGF. Rated at around a million litres a day, it takes used cooking oil and other waste fats and supplies both domestic aviation and export cargoes.



THE EDGE

Unlike co-processing arrangements that borrow capacity from existing refinery units, this is purpose-built and stand-alone, so neat SAF output is not constrained by competing refinery duty and can be certified and exported as its own product.



PROGRESS

OPERATING — Commercial production began 18 May 2026; first export shipped the following day.

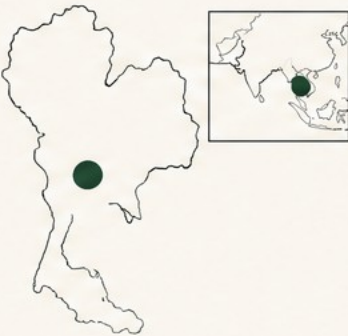


WHY IT'S HOT

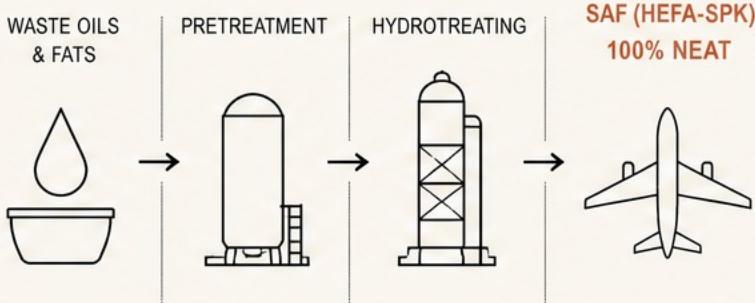
Commercial neat SAF production began, the first export followed within a day, and the unit booked its first earnings contribution the same quarter.

WHERE

Phra Khanong Refinery
Bangkok, Thailand



ROUTE: HEFA-SPK



CAPACITY

~1,000,000

LITRES PER DAY

100% NEAT SAF (HEFA-SPK)

MARKETS



DOMESTIC AVIATION
(HOME MARKET)



EXPORT CARGOES
(INTERNATIONAL)

02 — European Energy — Kassø Power-to-X Facility

Aabenraa, Denmark | Power-to-X e-methanol | *e-Methanol*

THE PROJECT

European Energy, with Mitsui holding 49%, operates a EUR 100 million power-to-X plant at Kassø near Aabenraa producing about 42,000 tonnes of e-methanol a year from renewable electricity and biogenic CO₂. Offtake is contracted to A.P. Moller–Maersk, Novo Nordisk and the LEGO Group across marine fuel, pharmaceutical and plastics uses.

THE EDGE

Offtake signed across three unrelated end markets before startup spreads demand risk in a fuel with no established commodity market.

PROGRESS

OPERATING — First industry-grade batch April 2025; plant inaugurated May 2025; product converted into gasoline by May 2026.

WHY IT'S HOT

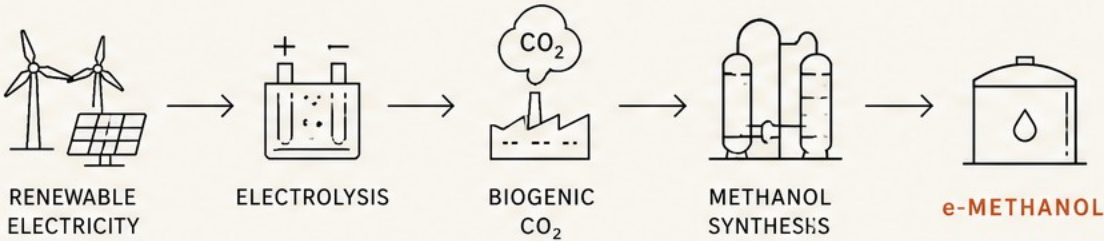
Moved within a year from first batch to inauguration to downstream conversion, with contracted offtake across three separate markets.



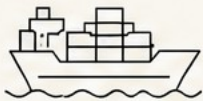
AABENRAA,
DENMARK

55.04° N
9.48° E

POWER-TO-X PROCESS



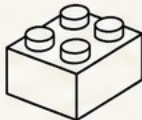
CONTRACTED OFFTAKE ACROSS THREE MARKETS



A.P. MOLLER–MAERSK
—
MARINE FUEL



NOVO NORDISK
—
PHARMACEUTICALS



THE LEGO GROUP
—
PLASTICS

03 — Everfuel — HySynergy I Electrolysis Plant

Fredericia, Denmark | 20 MW PEM electrolysis | **Green hydrogen**

THE PROJECT

Everfuel operates a 20 MW electrolyser at Fredericia supplying certified green hydrogen directly to the adjacent Crossbridge Energy refinery, with surplus heat taken by district heating utility TVIS. Designed as the first phase of a larger site inside an operating industrial cluster.

THE EDGE

Physical integration with a working refinery and district heating network gives a contracted hydrogen buyer and a second revenue stream from waste heat, both on existing infrastructure.

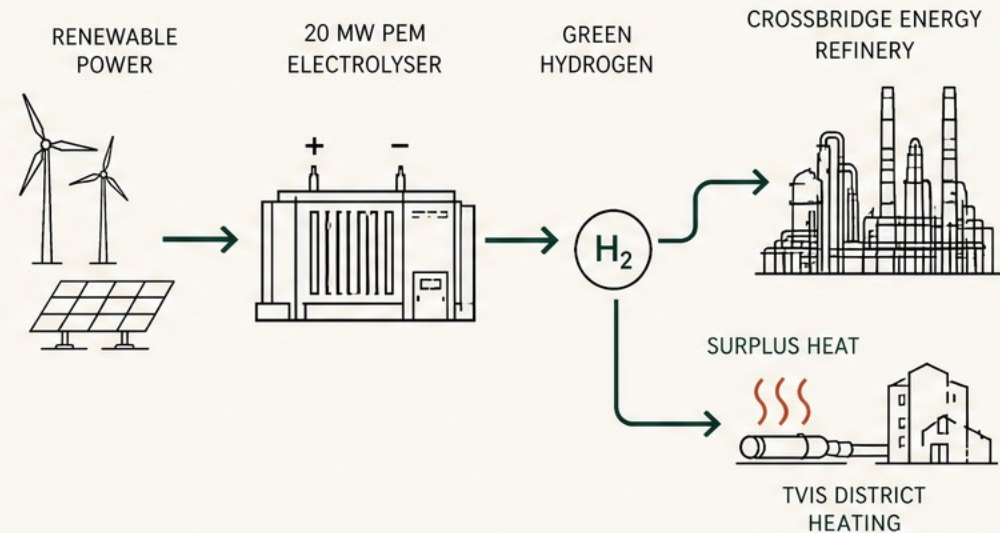
PROGRESS

OPERATING — First hydrogen delivered March 2025; plant inaugurated November 2025.

WHY IT'S HOT

Delivered certified hydrogen into a working refinery, then became the first such plant to balance the power grid while producing.

FREDERICIA, DENMARK



CONTRACTED HYDROGEN BUYER
Crossbridge Energy refinery



SECOND REVENUE STREAM
Waste heat to TVIS district heating



GRID BALANCING
First such plant to balance the power grid while producing

04 — ADM — Columbus Corn Processing Complex Carbon Capture

Columbus, Nebraska, USA | Bioethanol CCS | *Captured biogenic CO₂*



THE PROJECT

ADM added carbon capture to its corn processing complex at Columbus, Nebraska, routing biogenic CO₂ from fermentation into Tallgrass's repurposed Trailblazer pipeline for permanent geological storage in Wyoming, bolted onto an existing operating plant.



THE EDGE

Fermentation CO₂ is nearly pure so capture cost is far below flue-gas capture; a repurposed pipeline removes the infrastructure bottleneck that stalls most ethanol carbon projects.



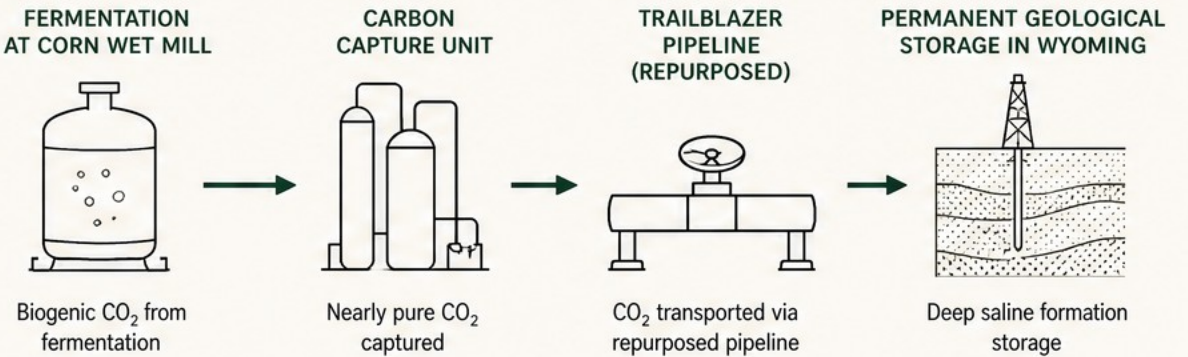
PROGRESS

OPERATING — Capture operations started 11 November 2025.



WHY IT'S HOT

Capture started at a working corn processing complex, with biogenic CO₂ moving through a repurposed pipeline into permanent storage.



BIOGENIC CO₂ REMOVED
~220,000
tonnes per year



PERMANENT STORAGE
100%
geological storage



EXISTING ASSETS LEVERAGED
Operating plant + repurposed pipeline

05 — Skovgaard Energy — Dynamic Green Ammonia Plant

Ramme, Lemvig, Denmark | Dynamic electrolysis and ammonia synthesis | Green ammonia

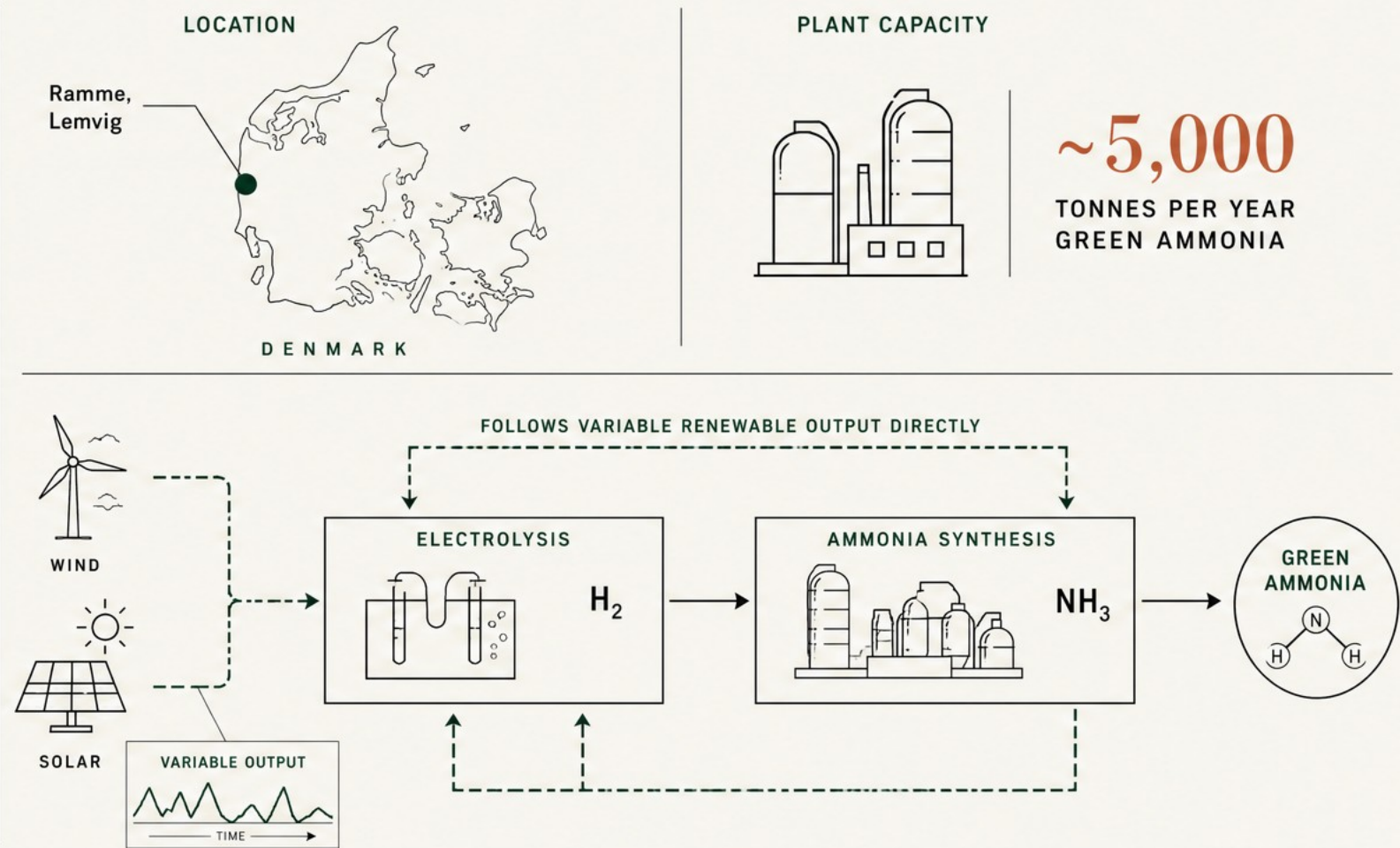
THE PROJECT |

Skovgaard Energy operates a ~5,000 tonnes/year green ammonia plant at Ramme, built with Topsoe process technology and Vestas renewable generation. Electrolysis and ammonia synthesis both follow fluctuating wind and solar output directly.

THE EDGE | Running synthesis dynamically off variable renewables removes the need for grid firming or storage, the largest cost item in most green ammonia designs.

PROGRESS | OPERATING — Plant brought into operation 16 December 2025.

WHY IT'S HOT | Demonstrated ammonia synthesis following variable wind and solar directly, removing the firm-power requirement shaping green ammonia economics.



06 — LanzaJet — Freedom Pines Fuels

Soperton, Georgia, USA | Alcohol-to-jet | Sustainable aviation fuel



THE PROJECT

Freedom Pines Fuels is LanzaJet's commercial-scale alcohol-to-jet facility converting ethanol into SAF and renewable diesel, the first commercial deployment of its ATJ platform and reference facility for larger licensed projects elsewhere.



THE EDGE

Establishes an operating commercial reference for an ATJ process intended for replication at substantially larger facilities, what licensees and lenders have been waiting for.



PROGRESS

OPERATING — Full operation and fuel production achieved November 2025.



WHY IT'S HOT

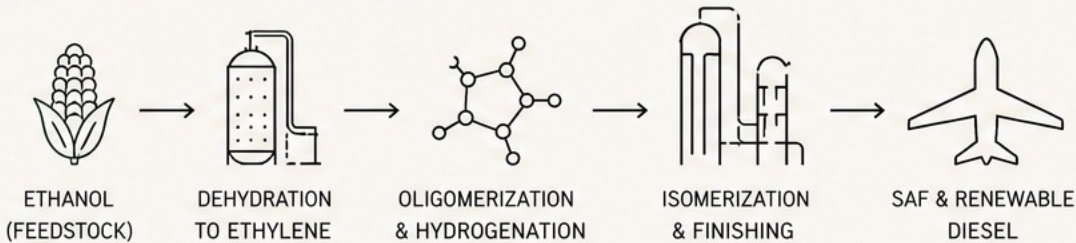
A first commercial deployment moved alcohol-to-jet from technology proposition toward an operating, replicable industrial platform.

LOCATION

Soperton,
Georgia, USA



PROCESS: ALCOHOL-TO-JET (ATJ)



FIRST COMMERCIAL
ATJ FACILITY



REFERENCE PLATFORM
FOR GLOBAL LICENSING



SAF & RENEWABLE
DIESEL OUTPUT

07 — Envision Energy — Green Ammonia Marine Bunkering

Chifeng, Inner Mongolia to Dalian, China | Green ammonia bunkering | *Green ammonia*



THE PROJECT

Green ammonia produced at Envision Energy's off-grid Chifeng plant was moved to COSCO's Dalian terminal and bunkered into a 5,500 horsepower port vessel, connecting production to a working port and ship.



THE EDGE

Production capacity has run ahead of delivery means; this closed the gap in practice, with producer, port operator and vessel operator executing together.



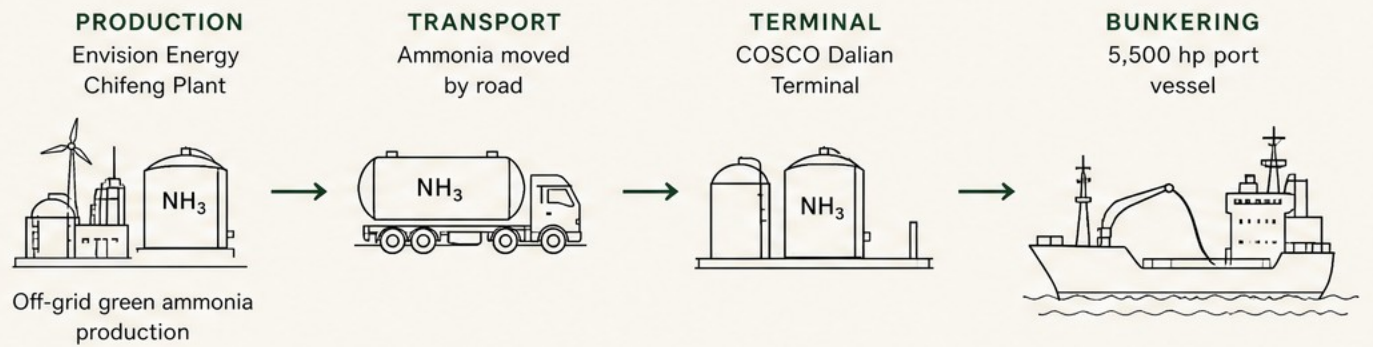
PROGRESS

OPERATING — Bunkering operation completed 28 July 2025.



WHY IT'S HOT

Ammonia moved from an operating plant into a working vessel, closing the gap between production capacity and maritime demand.



NH₃ **FIRST REAL-WORLD CHAIN:** Production → Transport → Terminal → Bunkering → Vessel
Connecting an operating plant to a working port and a working ship.

08 — BioCirc — Vesthimmerland Biogas CCS Plant

Vesthimmerland, Denmark | Biogas BECCS | *Captured biogenic CO₂*



THE PROJECT

BioCirc opened a carbon capture plant at its Vesthimmerland biogas facility, capturing ~32,500 tonnes of biogenic CO₂ a year for shipment to INEOS Greensand storage in the North Sea, first of five planned units across eight biogas plants.



THE EDGE

Biogas upgrading already separates near-pure CO₂, so capture needs little extra processing; applying it across an owned eight-plant fleet gives a repeatable template.



PROGRESS

OPERATING — Plant opened 24 June 2026; CO₂ shipping to North Sea storage under way.



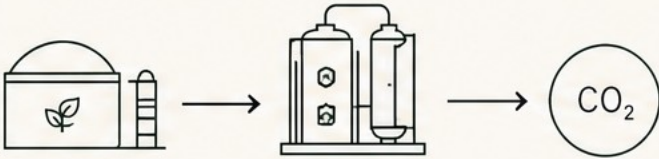
WHY IT'S HOT

The largest biogas-based capture plant yet built started up, first of five units across an operating fleet with contracted removal volumes.

PROJECT LOCATION VESTHIMMERLAND, DENMARK



THE PROCESS



BIOGAS PLANT

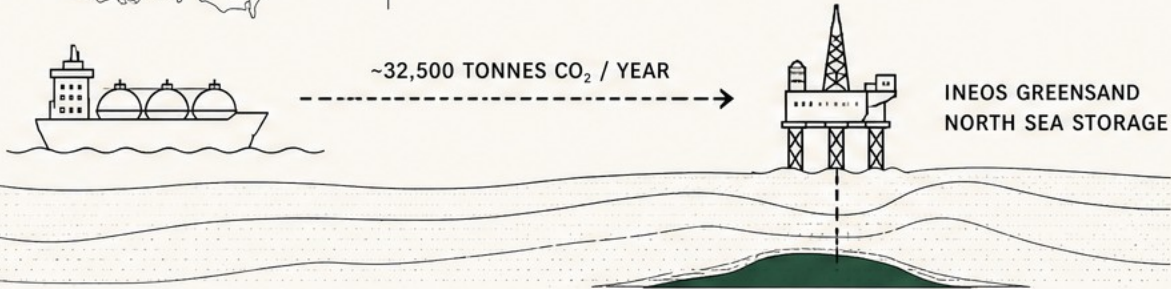
Upgrading separates near-pure CO₂

CARBON CAPTURE

Minimal additional processing

CO₂ SHIPMENT

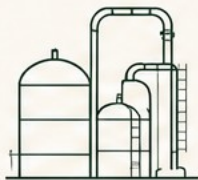
To INEOS Greensand storage in the North Sea



CAPTURE CAPACITY	UNITS PLANNED	CO ₂ QUALITY	SUPPORT
~32,500 TONNES CO ₂ / YEAR	5 ACROSS 8 PLANTS	~99% FROM UPGRADING	 DANISH NECCS PROGRAMME

09 — SkyNRG — DSL-01 SAF Plant

Delfzijl, Netherlands | HEFA sustainable aviation fuel | *Sustainable aviation fuel*



THE PROJECT

SkyNRG is building DSL-01 at Delfzijl chemical park, the Netherlands' first dedicated SAF facility, with KLM as partner. Financial close February 2026, construction started June 2026, startup targeted 2028. Feedstock is waste and residue fats processed by the HEFA route.



THE EDGE

Reaching financial close on a dedicated single-product SAF plant with a national flag carrier as offtaker separated this from a long queue of announced European SAF proposals.



PROGRESS

CONSTRUCTION — Financial close February 2026; construction started June 2026; startup targeted 2028.



WHY IT'S HOT

Financial close and construction start on a country's first dedicated SAF facility, with an airline partner committed.

LOCATION

Delfzijl,
Netherlands

NORTH
SEA

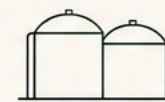
BELGIUM

GERMANY

HEFA SAF VALUE CHAIN



WASTE &
RESIDUE FATS



HEFA
PROCESSING



NEAT SAF



SUSTAINABLE
AVIATION FUEL

10 — Qore — QIRA Bio-Based 1,4-Butanediol Plant

Eddyville, Iowa, USA | Fermentation of dent corn | Bio-based 1,4-butanediol



THE PROJECT

Qore, a Cargill/HELM AG joint venture, produces QIRA bio-based 1,4-butanediol by fermenting dent corn at ~66,000 tonnes/year in Eddyville, Iowa — an intermediate for spandex, polyurethanes, plastics and coatings, previously supplied almost entirely from petrochemical routes.



THE EDGE

Sits inside Cargill's existing corn processing complex, so feedstock, utilities and logistics come from an operating site rather than new-build supply chains.



PROGRESS

OPERATING — Production began 10 July 2025; site formally opened later that month.

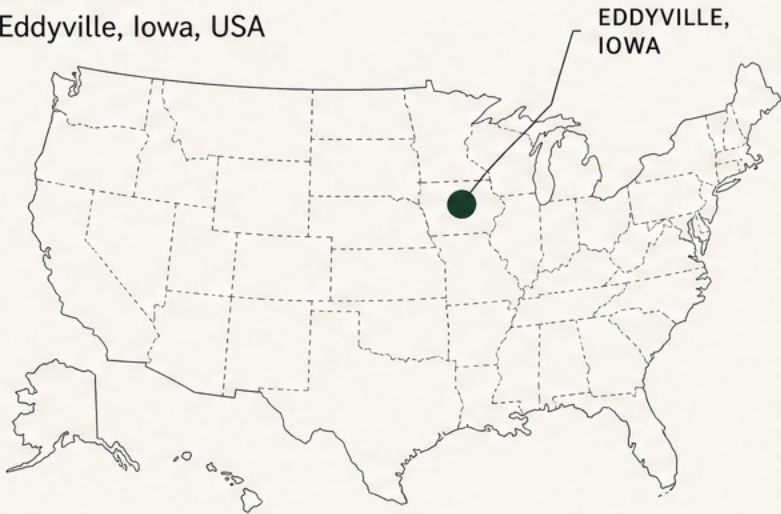


WHY IT'S HOT

Large-scale bio-based BDO entered production, putting fermentation into an intermediate chemical market previously served only by petrochemicals.

LOCATION

Eddyville, Iowa, USA



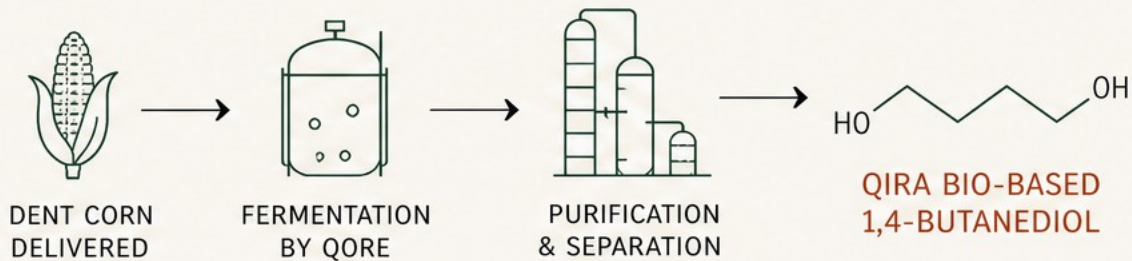
PROJECT FACTS

CAPACITY
~66,000
tonnes per year

PATHWAY
Fermentation of
dent corn

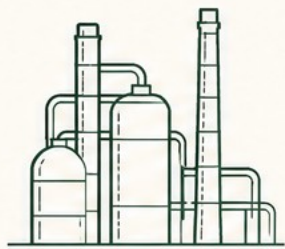
PRODUCT
Bio-based
1,4-butanediol

FROM CORN TO 1,4-BUTANEDIOL



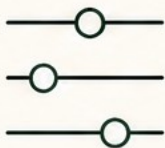
11 — ECOCERES — PASIR GUDANG RENEWABLE FUELS FACILITY

Pasir Gudang, Johor, Malaysia | HEFA biorefinery | SAF, renewable diesel and naphtha



THE PROJECT

EcoCeres operates a 420,000 tonnes/year renewable fuels facility at Pasir Gudang, split across SAF, renewable diesel and renewable naphtha — the first SAF plant in Malaysia, processing waste oils and agricultural residues for export across Asia and Europe.



THE EDGE

Multi-product flexibility lets output shift with relative pricing between three markets, useful where SAF mandates and demand are still forming.



PROGRESS

OPERATING — Startup achieved October 2025; facility formally inaugurated 26 January 2026.



WHY IT'S HOT

A 420,000-tonne multi-product renewable fuels plant started up, the first SAF production capacity in its country.



THREE PRODUCTS. THREE MARKETS.



SAF
SUSTAINABLE
AVIATION FUEL



**RENEWABLE
DIESEL**
ROAD TRANSPORT
FUELS



**RENEWABLE
NAPHTHA**
CHEMICALS AND
MATERIALS

420,000
TONNES PER YEAR
COMBINED CAPACITY

FEEDSTOCK



Waste oils
(UCO, animal fats)



Agricultural
residues

12 — AIR LIQUIDE — AMMONIA CRACKING UNIT, PORT OF ANTWERP-BRUGES

Port of Antwerp-Bruges, Belgium | Ammonia cracking | *Hydrogen from imported ammonia*



THE PROJECT

Air Liquide started up an industrial-scale ammonia cracking unit at the Port of Antwerp-Bruges, converting 30 tonnes a day of ammonia back into hydrogen. The unit is designed to prove the receiving end of an import chain in which hydrogen is shipped as ammonia and cracked at the port of arrival for industrial users.



THE EDGE

Every plan to import hydrogen as ammonia depends on cracking capacity at the destination, and almost none exists. Proving it at industrial scale inside a working port addresses the missing link rather than adding more production.



PROGRESS

OPERATING — Unit started up November 2025 at 30 tonnes per day.

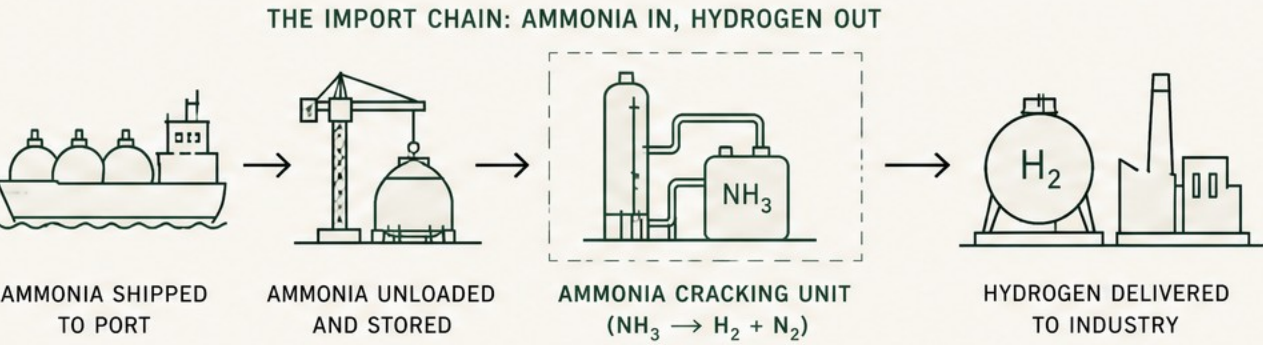


WHY IT'S HOT

Industrial-scale ammonia cracking started up inside a working port, proving the receiving end of a hydrogen import chain.



KEY FIGURES	
	30 TONNES PER DAY OF HYDROGEN
	HYDROGEN IMPORTED AS AMMONIA
	WORKING PORT INFRASTRUCTURE



13 — CIMC Enric — Zhanjiang Green Methanol Plant

Zhanjiang, Guangdong, China | Biomass-based green methanol | *Green methanol*



THE PROJECT

CIMC Enric began production at its first commercial-scale bio-based green methanol plant at Zhanjiang in Guangdong, rated at 50,000 tonnes a year and producing around 3,000 tonnes a month at 70 to 80% of design load within weeks of startup. The product carries ISCC EU certification for marine fuel use.



THE EDGE

Certified volume, not announced capacity, is what shipowners can actually contract against. Reaching most of design load quickly and holding ISCC EU certification puts this among the few plants able to supply that market now.



PROGRESS

OPERATING — Production began 16 December 2025 at 70–80% of design load.



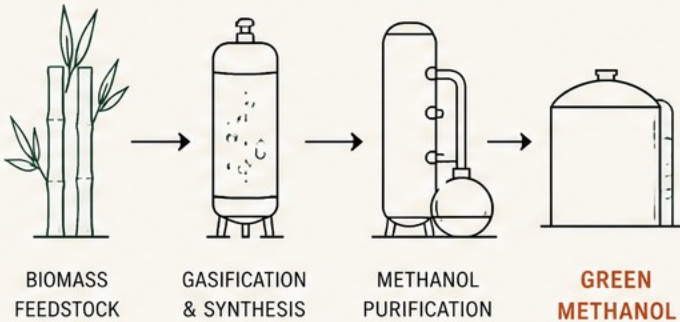
WHY IT'S HOT

A first commercial-scale bio-based green methanol plant reached most of design load within weeks of startup, with marine-fuel certification in place.

LOCATION



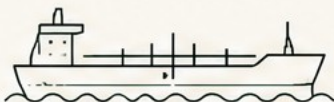
THE PROCESS



RATED CAPACITY
50,000
TONNES PER YEAR



MONTHLY PRODUCTION
~3,000
TONNES PER MONTH
AT 70–80% OF DESIGN LOAD



CERTIFICATION



FOR MARINE FUEL USE

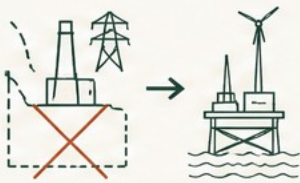
14 — China Energy — Offshore Hydrogen-Ammonia-Methanol Platform

Bohai Sea off Yantai, China | Offshore power-to-X | *Green methanol*



THE PROJECT

China Energy, with CIMC Raffles, built an offshore platform in the Bohai Sea off Yantai that produces hydrogen, ammonia and methanol at sea, running entirely off-grid on wind and solar generation. Hydrogen output is around five tonnes a day, and the platform produced its first green methanol in October 2025.



THE EDGE

Producing fuel at sea removes the land acquisition, grid connection and transmission constraints that limit onshore power-to-X, and places production next to offshore wind resource rather than requiring power to be brought ashore first.



PROGRESS

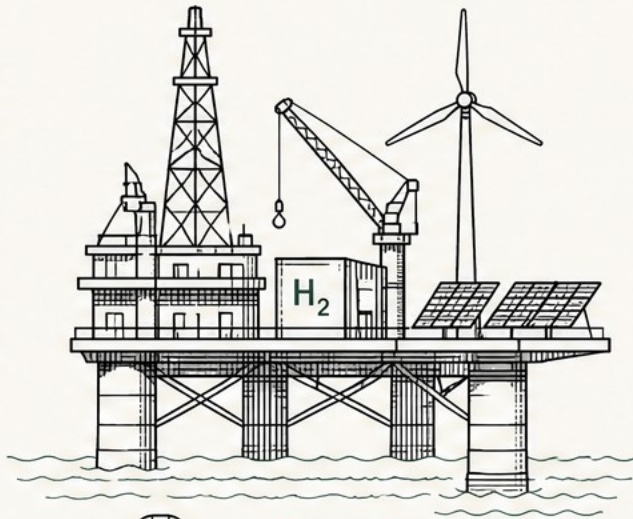
OPERATING — First green methanol produced October 2025; platform in trial and commercial operation.



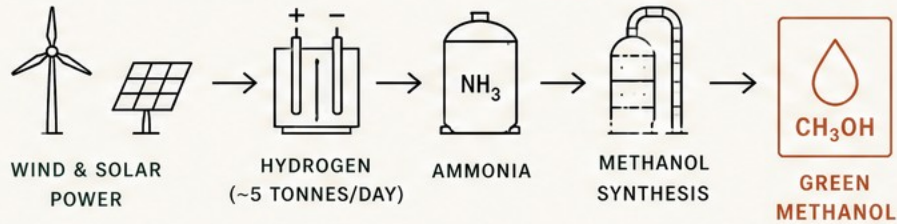
WHY IT'S HOT

First green methanol was produced from an off-grid offshore platform, establishing an entirely new deployment format for the pathway.

BOHAI SEA OFF YANTAI, CHINA



OFFSHORE POWER-TO-X



OFF-GRID
POWERED BY
WIND & SOLAR
AT SEA

~5

TONNES/DAY
HYDROGEN
OUTPUT



FIRST GREEN
METHANOL
PRODUCED
OCTOBER 2025

15 — Numaligarh Refinery — Bamboo-Based 2G Bioethanol Biorefinery

Golaghat, Assam, India | Bamboo-based cellulosic ethanol | *Ethanol and co-products*

THE PROJECT

Assam Bio-Ethanol, a Numaligarh Refinery venture with Finland's Fortum and Chempolis, built a biorefinery at Golaghat converting bamboo into ethanol alongside furfural, acetic acid, food-grade CO2 and 25 MW of power. Inaugurated September 2025, still commissioning, costs risen substantially.

THE EDGE

Bamboo is abundant, competes with no food crop; the co-product slate means ethanol revenue isn't the only thing paying for the plant, defeating factor for most cellulosic projects.

PROGRESS

COMMISSIONING — Inaugurated September 2025; technical success not yet achieved as of March 2026.

WHY IT'S HOT

A cellulosic biorefinery on a non-food regional feedstock reached inauguration with a co-product slate few second-generation projects have carried.

LOCATION
Golaghat, Assam, India







FEEDSTOCK
Bamboo

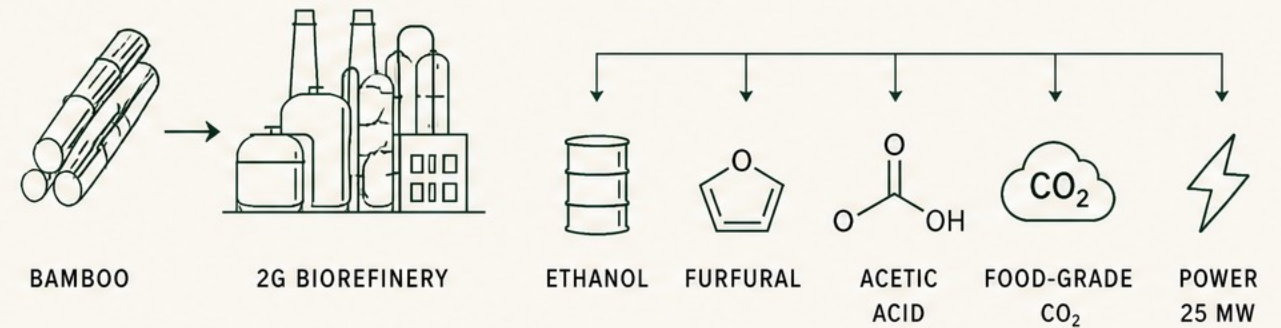


INAUGURATED
September 2025



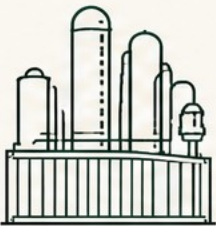
POWER OUTPUT
25 MW

FROM BAMBOO TO MULTIPLE PRODUCTS



16 — INERATEC — Era One Power-to-Liquid Plant

Frankfurt, Germany | Power-to-liquid Fischer-Tropsch | *e-Fuels and e-waxes*



THE PROJECT

INERATEC operates a power-to-liquid plant at the Höchst industrial park in Frankfurt producing up to 2,500 tonnes/year of synthetic e-fuels and e-waxes from CO₂ and renewable hydrogen, funded by a EUR 70 million package combining EIB venture debt and a Breakthrough Energy Catalyst grant.



THE EDGE

Modular, containerised reactors function as a manufacturing reference replicable to multiple locations instead of bespoke engineering each time.



PROGRESS

OPERATING — First e-fuels and e-waxes produced May 2025.



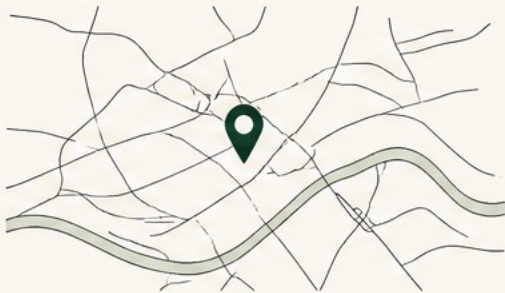
WHY IT'S HOT

Europe's largest power-to-liquid facility produced its first synthetic fuels, backed by combined public venture debt and catalyst grant funding.

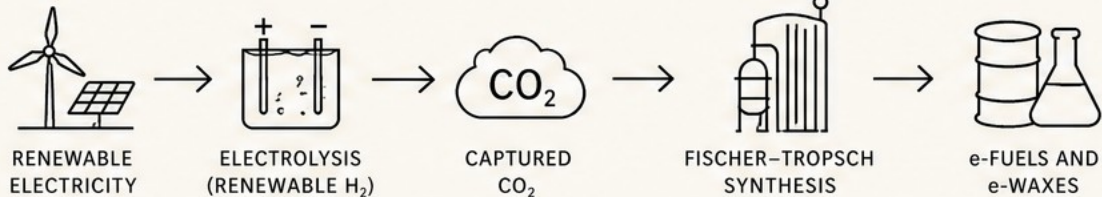
LOCATION
FRANKFURT, GERMANY



SITE
HÖCHST INDUSTRIAL PARK



POWER-TO-LIQUID FISCHER-TROPSCH PROCESS



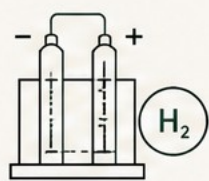
CAPACITY
2,500
TONNES PER YEAR

FEEDSTOCKS
CO₂ + H₂
CAPTURED CO₂ AND
RENEWABLE HYDROGEN

FUNDING
EUR 70m
EIB VENTURE DEBT +
CATALYST GRANT

17 — OMV — Bruck an der Leitha Green Hydrogen Plant

Bruck an der Leitha, Austria | 140 MW electrolysis | Green hydrogen



THE PROJECT

OMV is building a 140 MW electrolysis plant designed to produce up to 23,000 tonnes of hydrogen a year, connected by a 22-kilometre pipeline to the Schwechat refinery. Siemens Energy supplies technology, STRABAG civil works, operation targeted end-2027.



THE EDGE

The hydrogen has a committed industrial buyer at the far end of a dedicated pipeline, so the project doesn't depend on a hydrogen market forming around it.



PROGRESS

CONSTRUCTION — Foundation stone laid September 2025; operation targeted end-2027.



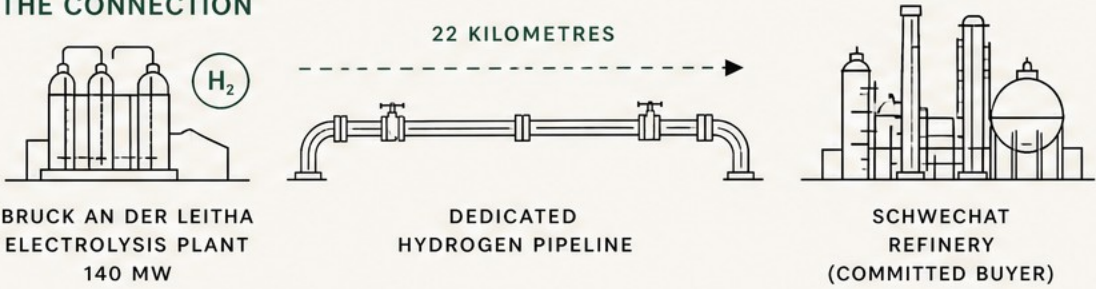
WHY IT'S HOT

A 140 MW electrolyser dedicated to a working refinery entered construction, followed by a state production-funding guarantee.

WHERE IT IS



THE CONNECTION



 UP TO 23,000 TONNES/YEAR HYDROGEN	 140 MW ELECTROLYSIS CAPACITY	 22 KM DEDICATED PIPELINE	 TARGETED OPERATION END-2027
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18 — Wagner Sustainable Fuels — SAF Blending Terminal

Wellcamp Airport, Toowoomba, Queensland, Australia | SAF blending and handling | *Blended sustainable aviation fuel*



THE PROJECT

Wagner Sustainable Fuels started up Australia’s first dedicated SAF blending terminal at Wellcamp Airport near Toowoomba, built with technology provider FlyORO. The terminal receives neat sustainable aviation fuel, blends it to specification with conventional jet fuel, and delivers the finished product into aircraft at the same site, making it the first airport-co-located SAF blending facility of its kind.



THE EDGE

Blending and certification infrastructure, not production, is what usually blocks SAF from reaching an aircraft in a new market. Siting the terminal at the airport itself removes the blended-fuel logistics step entirely.



PROGRESS

OPERATING — Terminal started up 15 October 2025.



WHY IT'S HOT

The first dedicated SAF blending terminal in its country started up, co-located with an airport so blended fuel reaches aircraft directly.

LOCATION

Wellcamp Airport,
Toowoomba,
Queensland, Australia



AT THE AIRPORT: BLEND AND DELIVER



SITE

Wellcamp Airport
Toowoomba,
Queensland, Australia



MARKET

Domestic and
international
aviation



SIGNIFICANCE

Australia's first
dedicated SAF
blending terminal

19 — TWELVE — AIRPLANT ONE

Moses Lake, Washington, USA | CO2 electrolysis to jet fuel | **E-Jet SAF and e-naphtha**



THE PROJECT

Twelve opened AirPlant One at Moses Lake, the first commercial-scale facility in the United States making jet fuel from captured CO2 and renewable electricity. The plant produces E-Jet sustainable aviation fuel and e-naphtha using the company's CO2 electrolysis platform, with Alaska Airlines contracted as offtaker and Microsoft as an investor and buyer.



THE EDGE

Power-to-liquid SAF has almost no operating commercial capacity anywhere. Reaching that point with an airline offtake already signed converts the pathway from a demonstration question into a supply question.



PROGRESS

COMMISSIONING — Plant opened 10 June 2026; ASTM-certified fuel produced.

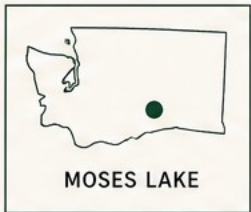


WHY IT'S HOT

The first US commercial-scale power-to-liquid jet fuel plant opened, with certified fuel and an airline offtake in place.

WHERE

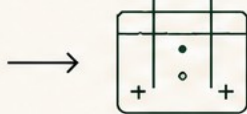
MOSES LAKE,
WASHINGTON, USA



CO2 ELECTROLYSIS TO JET FUEL



CAPTURED CO₂



CO₂ ELECTROLYSIS
WITH RENEWABLE
ELECTRICITY



FUEL SYNTHESIS
& UPGRADING



**E-JET SAF
AND E-NAPHTHA**

KEY PARTNERS



OFFTAKER

T W E L V E

TECHNOLOGY DEVELOPER



INVESTOR & BUYER

20 — BPCL — Bargarh 1G-2G Integrated Bioethanol Refinery

Bargarh, Odisha, India | Integrated first and second generation ethanol | Ethanol



THE PROJECT

Bharat Petroleum commissioned an integrated bioethanol refinery at Bargarh with 100 kilolitres/day capacity, combining 1G and 2G processing so rice grain and rice straw feed the same plant, under the national JI-VAN Yojana programme with Praj Industries technology.



THE EDGE

Running 1G and 2G lines on one site lets the plant fall back to grain when residue supply is seasonal or short, the failure mode that has idled standalone cellulosic plants.



PROGRESS

COMMISSIONING — Commissioned 20 March 2026 after a multi-year build.

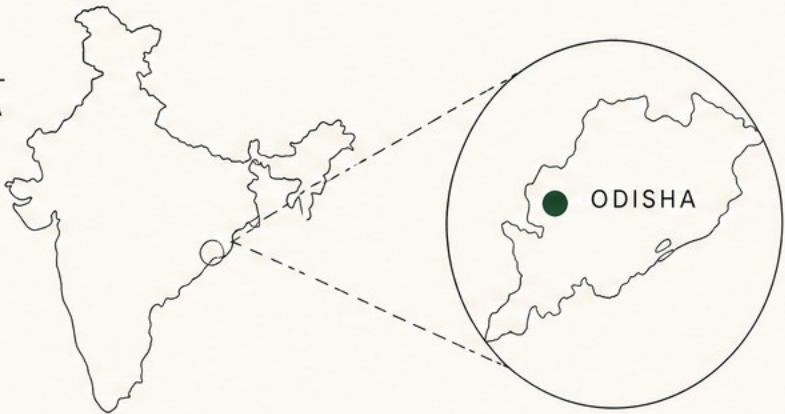


WHY IT'S HOT

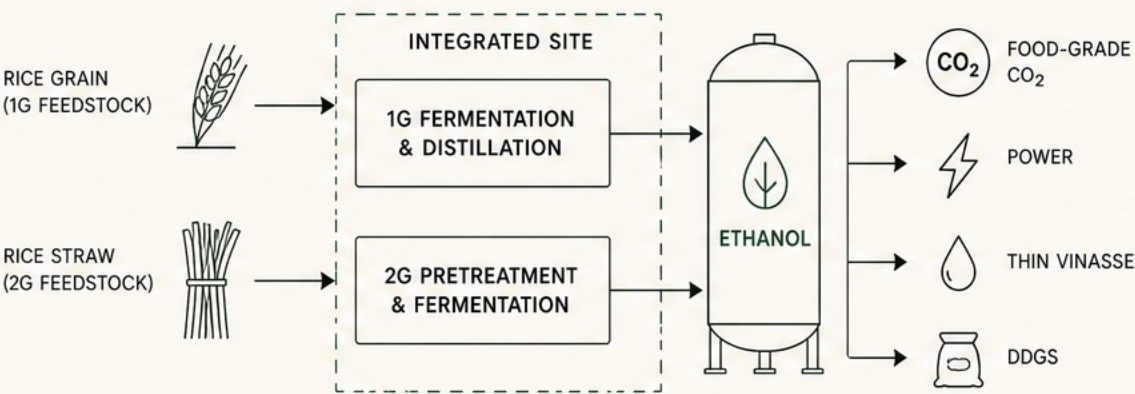
An integrated first and second generation refinery was commissioned, sharing one site between grain and agricultural residue feedstock.

LOCATION

BARGARH, ODISHA, INDIA



INTEGRATED 1G-2G PROCESS FLOW



21 — ORLEN — Płock HVO Plant

Płock, Poland | Hydrotreated vegetable oil | Renewable diesel



THE PROJECT

ORLEN started up a hydrotreated vegetable oil unit at its Płock refinery complex, rated at about 300,000 tonnes/year, built at a cost above PLN 800 million, running on domestically sourced feedstocks and lifting group biofuel output toward 700,000 tonnes/year.



THE EDGE

Feedstock drawn from domestic agricultural supply rather than imported waste oils insulates the unit from the tightening global used-cooking-oil market.



PROGRESS

OPERATING — Production started 27 May 2026.



WHY IT'S HOT

A 300,000-tonne HVO unit started up on domestic feedstock, lifting group biofuel output substantially in a single step.



LOCATION
PŁOCK, POLAND

CAPACITY



300,000

TONNES/YEAR

INVESTMENT



>PLN 800

MILLION

GROUP BIOFUEL OUTPUT TARGET



~700,000

TONNES/YEAR

DOMESTIC FEEDSTOCKS



RAPESEED OIL, OTHER
AGRICULTURAL OILS

HVO PROCESS



HYDROTREATMENT

RENEWABLE DIESEL



LOW-CARBON FUELS
FOR TRANSPORT

22 — HD Hyundai Oilbank — Domestic SAF Supply

Daesan, South Korea | Co-processed HEFA | Sustainable aviation fuel



THE PROJECT

HD Hyundai Oilbank began supplying domestically produced SAF in South Korea, the first company in the country to do so, based at the Daesan refinery complex processing renewable feedstock through existing assets, following regulatory work on blending and certification.



THE EDGE

Being first to supply a national aviation market sets the reference for the blending mandate and certification process everyone entering afterwards must work within.



PROGRESS

OPERATING — Domestic supply began 30 September 2025.



WHY IT'S HOT

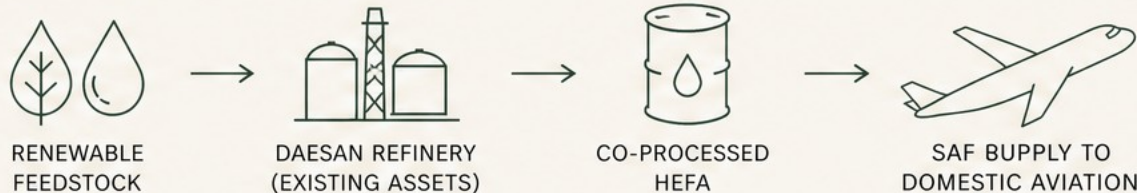
Domestically produced sustainable aviation fuel reached supply for the first time, establishing the reference point for a forming market.

LOCATION

Daesan, South Korea



FROM RENEWABLE FEEDSTOCK TO SAF



FIRST TO SUPPLY

HD Hyundai Oilbank is the first company to supply domestically produced SAF in South Korea.



SETTING THE REFERENCE

Establishes the benchmark for blending mandates and certification in the country's forming SAF market.

23 — Montana Renewables — Great Falls MaxSAF Expansion

Great Falls, Montana, USA | HEFA expansion | Sustainable aviation fuel

THE PROJECT

Montana Renewables, a Calumet subsidiary, expanded its Great Falls plant under the MaxSAF programme, lifting SAF capacity toward 150 million gallons/year, financed through a \$1.44 billion federally guaranteed loan facility with a first \$782 million tranche drawn in February 2025.

THE EDGE

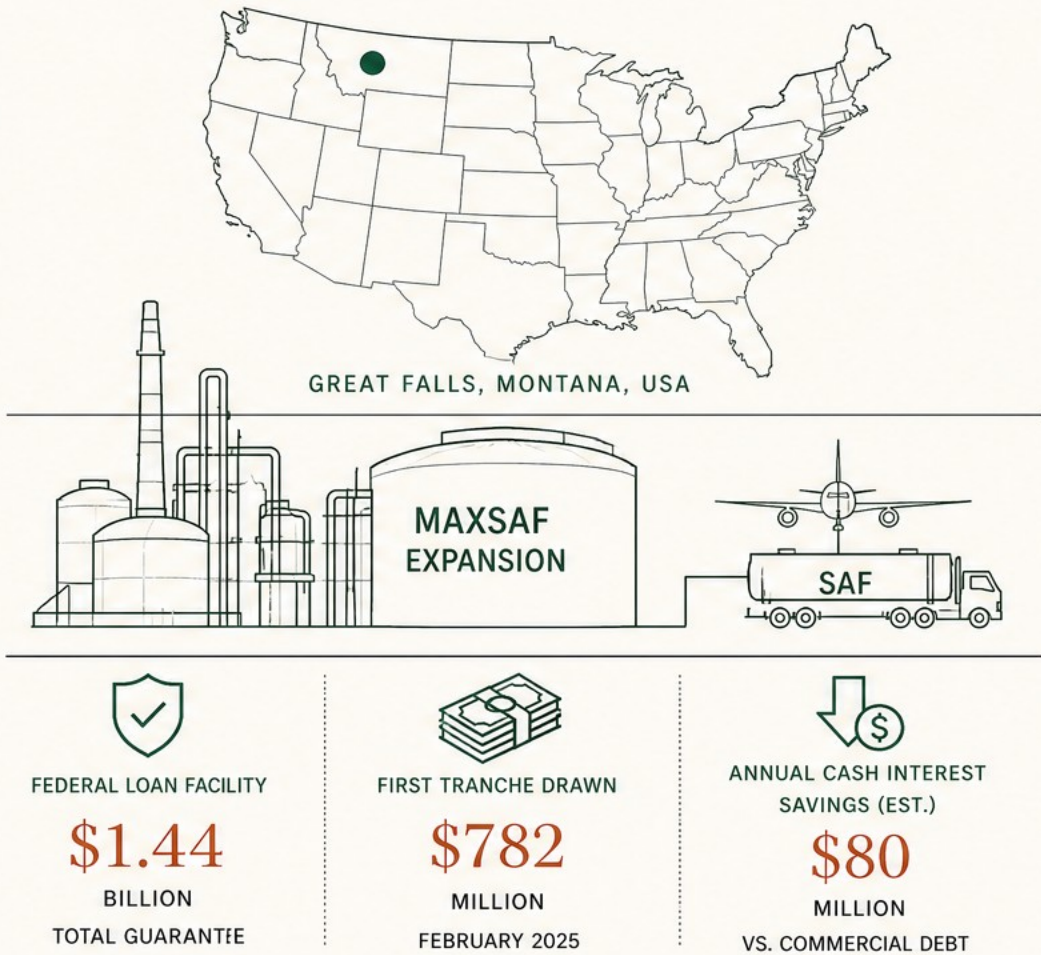
A federal loan guarantee at this scale cuts annual cash interest by roughly \$80 million against commercial project debt, a cost position no comparably sized SAF expansion currently holds.

PROGRESS

OPERATING — MaxSAF expansion completed and started up early May 2026.

WHY IT'S HOT

The SAF expansion started up after drawing the first tranche of a federally guaranteed loan, with a three-year supply agreement signed.



24 — 3tentos — Vale do Araguaia Corn Ethanol Plant

Porto Alegre do Norte, Mato Grosso, Brazil | Corn dry milling | **Ethanol, DDGS and corn oil**



THE PROJECT

3tentos started its first corn ethanol plant at Porto Alegre do Norte in the Vale do Araguaia region of Mato Grosso after receiving ANP authorisation. The plant processes 2,800 tonnes of corn a day, producing around 1,275 cubic metres of hydrated and 1,215 cubic metres of anhydrous ethanol daily alongside DDGS and corn oil.



THE EDGE

The company is an established agricultural input retailer and grain originator in the region, so corn supply comes through relationships it already holds rather than through a merchant market it would have to enter.



PROGRESS

OPERATING — Plant started operation May 2026 following regulatory authorisation.

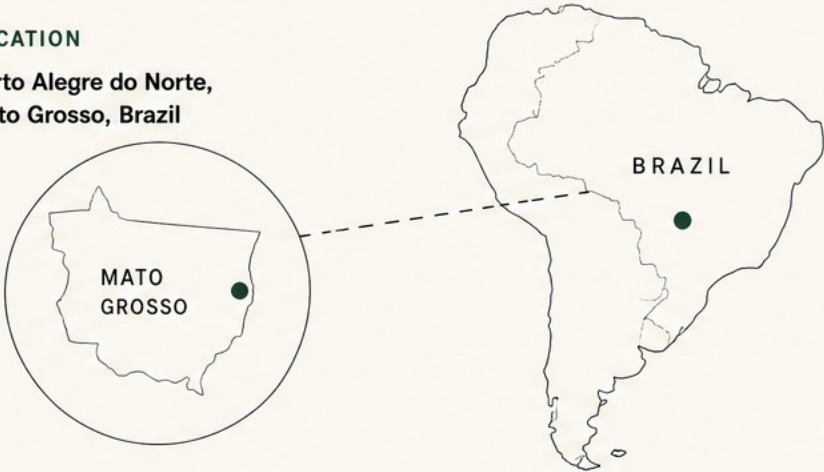


WHY IT'S HOT

A first corn ethanol plant entered operation on a 2,800 tonne-a-day feed rate, with co-product streams alongside fuel output.

LOCATION

Porto Alegre do Norte,
Mato Grosso, Brazil



PROCESS & OUTPUT



FEED RATE	ETHANOL OUTPUT (DAILY)		CO-PRODUCTS		STARTED
 2,800 TONNES OF CORN PER DAY	~1,275 m ³ HYDRATED	~1,215 m ³ ANHYDROUS	 DDGS	 CORN OIL	 MAY 2026

25 — REPSOL — PUERTOLLANO RENEWABLE FUELS PLANT

Puertollano, Ciudad Real, Spain | 100% renewable fuels unit | *Renewable diesel and SAF*



THE PROJECT

Repsol launched its second 100% renewable fuels plant, at Puertollano, adding 200,000 tonnes/year of capacity alongside the 250,000 tonnes already produced at Cartagena, both converting waste and residue feedstocks inside existing refinery complexes.



THE EDGE

A second unit at a different complex converts a single plant into a two-site production system, giving redundancy in feedstock routing and turnaround scheduling.



PROGRESS

OPERATING — Plant launched 26 May 2026.



WHY IT'S HOT

A second renewable fuels plant started up, adding 200,000 tonnes a year to an existing operating unit at a sister complex.

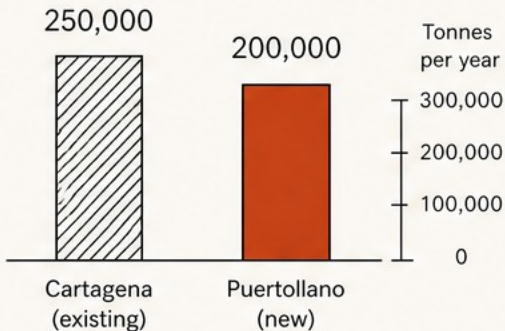
LOCATION

Puertollano,
Ciudad Real,
Spain

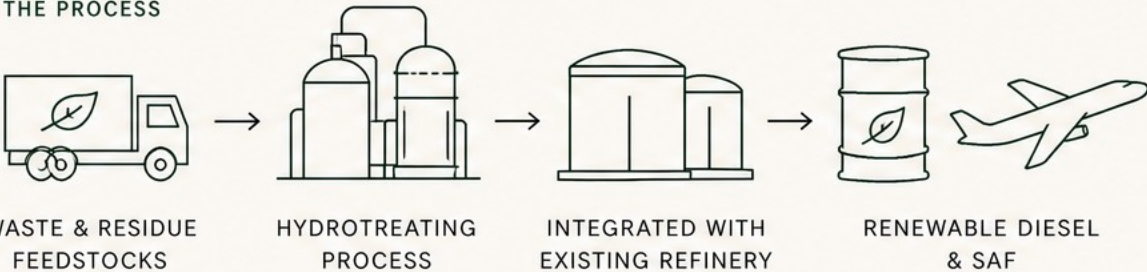


NEW CAPACITY ADDED

200,000
tonnes per year



THE PROCESS



26 — PETRONAS, Enilive and Euglena — Pengerang Biorefinery

Pengerang, Johor, Malaysia | HEFA biorefinery | SAF, renewable diesel and bio-naphtha



THE PROJECT

Joint venture building a biorefinery inside the Pengerang Integrated Complex, designed to process up to 650,000 tonnes of renewable feedstock a year into SAF, hydrotreated renewable diesel and bio-naphtha; FID reached August 2025, groundbreaking three months later.



THE EDGE

Location inside an existing integrated refining and petrochemical complex gives shared utilities, hydrogen supply, tankage and marine loading.



PROGRESS

CONSTRUCTION — FID August 2025; groundbreaking November 2025; startup targeted second half 2028.



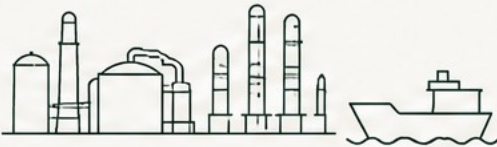
WHY IT'S HOT

A 650,000-tonne biorefinery moved from investment decision to first works within three months, integrated into an operating refining complex.

PROJECT LOCATION

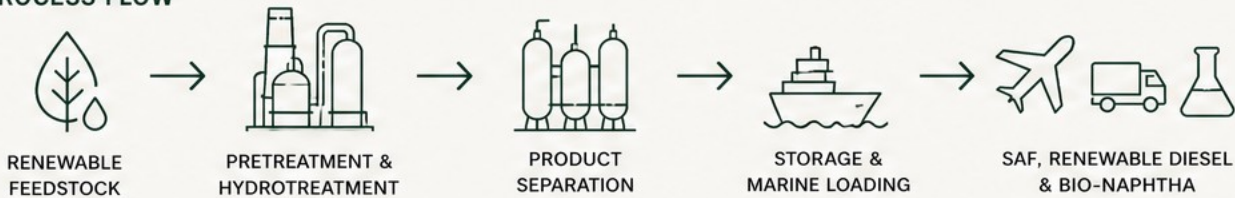


PENGERANG INTEGRATED COMPLEX



The biorefinery sits inside the Pengerang Integrated Complex, sharing utilities, hydrogen, tankage and marine loading.

PROCESS FLOW



650,000

TONNES PER YEAR
RENEWABLE FEEDSTOCK
CAPACITY

3

MONTHS
FROM FID TO
GROUNDBREAKING

3

PRODUCTS
SAF, RENEWABLE DIESEL
AND BIO-NAPHTHA

2H 2028

TARGET
STARTUP TARGETED
SECOND HALF 2028

27 — CEEC — Qing Hydrogen No. 1 Songyuan Complex

Songyuan, Jilin, China | Integrated green hydrogen, ammonia and methanol | *Green ammonia and methanol*



THE PROJECT

China Energy Engineering Corporation brought phase one of its Songyuan complex into operation, producing 45,000 tonnes/year green hydrogen and 200,000 tonnes combined green ammonia and methanol from 800 MW dedicated renewable generation; phase two launched the same day toward a planned build-out of 3,000 MW and 800,000 tonnes.



THE EDGE

Phase one holds ISCC EU certification and a signed green ammonia marine bunker fuel sales contract, giving output a certified export route.



PROGRESS

OPERATING — Phase one entered operation 16 December 2025; phase two launched the same day.



WHY IT'S HOT

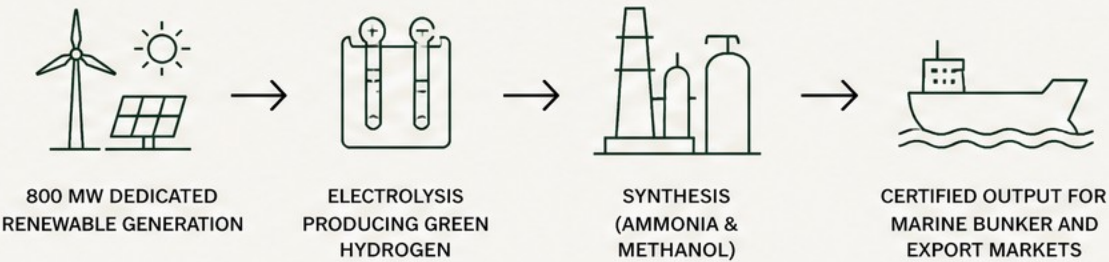
Phase one entered operation at 45,000 tonnes of hydrogen a year with certification and a marine fuel sales contract in place.

PROJECT LOCATION

Songyuan, Jilin, China



INTEGRATED PROCESS



45,000

TONNES/YEAR
GREEN HYDROGEN
(PHASE ONE)

200,000

TONNES/YEAR
GREEN AMMONIA +
METHANOL (PHASE ONE)

800

MW DEDICATED
RENEWABLE
GENERATION

3,000

MW PLANNED
BUILD-OUT
(PHASE TWO)

28 — Imperial Oil — Strathcona Renewable Diesel Facility

Strathcona, Alberta, Canada | Hydrotreatment with hydrogen and CCS | Renewable diesel



THE PROJECT

Imperial Oil completed construction and began producing renewable diesel at its Strathcona refinery near Edmonton, with capacity of up to 20,000 barrels a day. The unit uses locally sourced vegetable oils processed with hydrogen produced on site under carbon capture, and is the largest renewable diesel facility in Canada, supplying road fuel markets in western Canada and across the border.



THE EDGE

Hydrogen for the hydrotreater is generated at the refinery with carbon capture attached, so the plant does not depend on merchant hydrogen supply and carries a lower carbon intensity than units bought hydrogen would allow.



PROGRESS

OPERATING — Construction completed and production began August 2025.



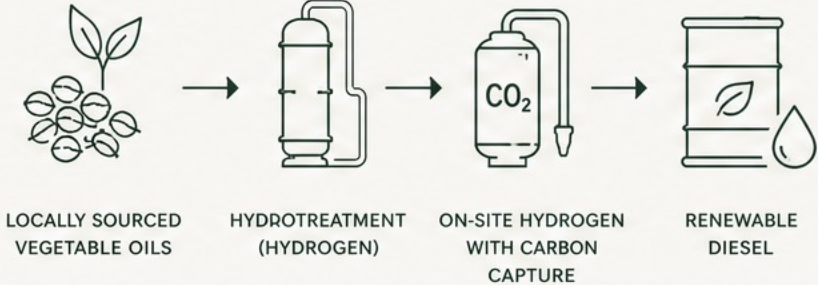
WHY IT'S HOT

Canada's largest renewable diesel unit began production, using on-site hydrogen with carbon capture rather than merchant supply.

PROJECT LOCATION



PROCESS OVERVIEW



20,000 BARRELS PER DAY CAPACITY (UP TO)	#1 LARGEST RENEWABLE DIESEL FACILITY IN CANADA	ON-SITE HYDROGEN WITH CARBON CAPTURE	AUG 2025 PRODUCTION BEGAN
--	--	---	--

29 — Colbún — Nehuenco Green Hydrogen Plant

Quillota, Chile | *Electrolysis at a thermoelectric complex* | **Green hydrogen**



THE PROJECT

Colbún inaugurated Chile's first industrial-scale green hydrogen plant at its Nehuenco thermoelectric complex in Quillota. The electrolysis facility is built inside an existing power generation site, drawing on the company's own renewable generation portfolio together with the grid connection, water supply and industrial services already present at the complex, and supplies hydrogen to regional industrial users.



THE EDGE

Building at an operating generation site removed the grid connection queue and land permitting that have delayed Chilean hydrogen projects for years, and gives the plant direct access to the developer's own renewable output.



PROGRESS

OPERATING — Plant inaugurated 30 October 2025.



WHY IT'S HOT

An industrial-scale green hydrogen plant was inaugurated, the first in the country, built inside an existing power generation complex.

PROJECT LOCATION



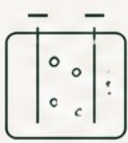
THE PROCESS: RENEWABLE POWER TO GREEN HYDROGEN



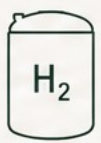
RENEWABLE
GENERATION



GRID CONNECTION
(ON-SITE)



ELECTROLYSIS
(WATER TO H₂)



GREEN HYDROGEN
TO INDUSTRY

1st
INDUSTRIAL-SCALE
GREEN HYDROGEN
PLANT IN CHILE

~10 MW
ELECTROLYSER
CAPACITY

100%
POWERED BY COLBÚN'S
RENEWABLE
GENERATION

2025
INAUGURATED
30 OCTOBER 2025

30 — PRO Industries — Luwero Ethanol Plant

Luwero District, Uganda | Molasses and cassava ethanol | Ethanol



THE PROJECT

PRO Industries commissioned an ethanol plant in Uganda's Luwero District, described as the largest in East Africa. The facility was commissioned by the President and is intended to process local agricultural feedstock, create industrial employment in the region and displace a portion of the country's imported fuel and alcohol volumes.



THE EDGE

It is the only ethanol capacity of this scale in the region, so it defines the local market rather than competing in one, and it converts crops that currently have thin and volatile routes to market into a fuel-grade offtake.



PROGRESS

COMMISSIONING — Plant commissioned 31 December 2025.



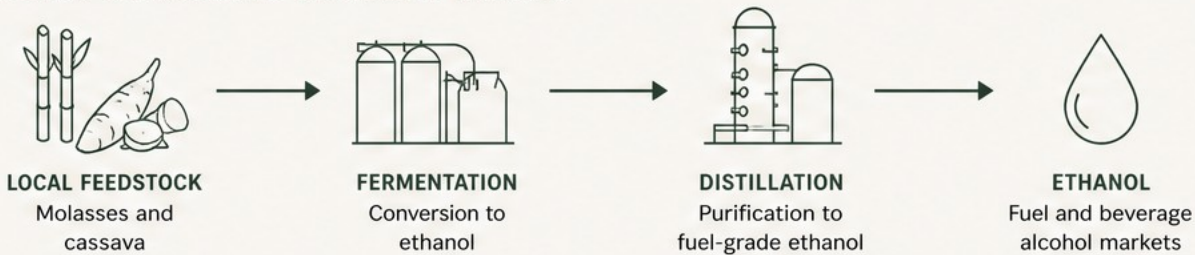
WHY IT'S HOT

The largest ethanol plant in its region was commissioned, creating regional processing capacity where none existed at this scale.

LOCATION: LUWERO DISTRICT, UGANDA



PROCESS: MOLASSES AND CASSAVA TO ETHANOL



100	1,000+	1ST	2025
MILLION LITRES/YEAR NOMINAL CAPACITY	DIRECT AND INDIRECT JOBS CREATED	LARGEST ETHANOL PLANT IN EAST AFRICA	COMMISSIONED 31 DECEMBER 2025

31 — BSR-BF — Dung Quat Bio-Ethanol Plant

Quang Ngai, Vietnam | Cassava ethanol | Ethanol



THE PROJECT

The Dung Quat bio-ethanol plant, operated by BSR-BF under Binh Son Refining within PetroVietnam, resumed production after an extended period of idleness. Reporting through early 2026 records the plant ramping from around 60 to 75 percent of capacity and producing a first batch of E100 as it works back toward full rates.



THE EDGE

Restarting an idled asset costs a fraction of building new capacity, and this plant is positioned to supply the national E10 blending mandate that has been constrained by a shortage of domestic ethanol production.



PROGRESS

OPERATING — Production resumed early 2026; ramping toward full capacity.



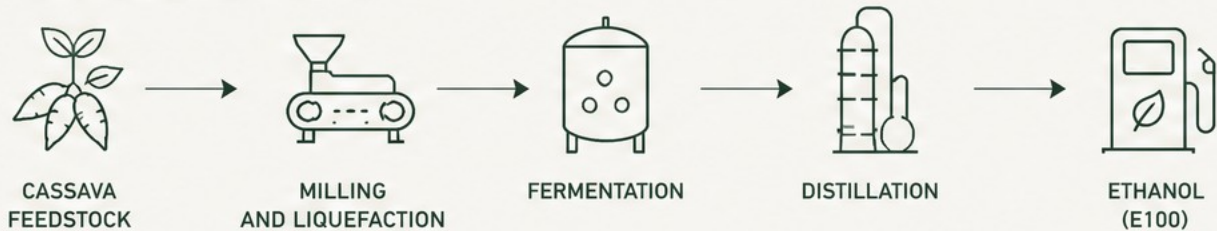
WHY IT'S HOT

An idled ethanol plant restarted and produced a first E100 batch, restoring domestic supply into a national blending mandate.

LOCATION: QUANG NGAI, VIETNAM



FROM CASSAVA TO ETHANOL



~60–75%

CAPACITY UTILISATION
(EARLY 2026)

E100

FIRST BATCH
PRODUCED

E10

SUPPORTS NATIONAL
BLENDING MANDATE

Idled

ASSET RESTARTED;
PRODUCTION RESUMED
EARLY 2026

32 – PTT Global Chemical – Co-Processed SAF Production

Rayong, Thailand | Co-processing of used cooking oil | *Sustainable aviation fuel*



THE PROJECT

PTT Global Chemical produces sustainable aviation fuel by co-processing used cooking oil through its existing Rayong refinery, reaching a first-phase rate of around 6 million litres a year with an expansion planned toward 24 million. The fuel has been supplied into commercial service with Bangkok Airways, making it the first sustainable aviation fuel produced anywhere in the country and putting certified fuel into commercial service from existing refinery assets.



THE EDGE

Co-processing requires no new plant, so capacity was created by modifying an operating refinery. That gets certified fuel into the market years earlier than a purpose-built unit, at a fraction of the capital.



PROGRESS

OPERATING — Co-processed SAF production began 15 January 2025; supplied to commercial flights.



WHY IT'S HOT

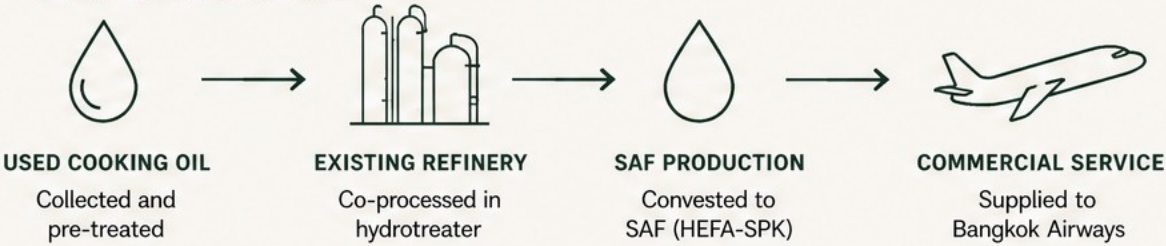
Co-processed SAF production started inside an existing refinery and reached commercial flights without new plant construction.

PROJECT LOCATION

Rayong,
Thailand



CO-PROCESSING FLOW



6M
LITRES/YEAR
First-phase rate

24M
LITRES/YEAR
Expansion target

15 JAN 2025
PRODUCTION START
Co-processed SAF production began


FIRST SAF
produced anywhere in Thailand

33 — SIAAP and SUEZ — Seine Aval Biogas Unit

Achères, Paris region, France | Wastewater sludge digestion | *Biomethane*



THE PROJECT

SIAAP and SUEZ inaugurated a biogas production unit at the Seine Aval wastewater treatment plant, the largest such plant in Europe, serving around six million residents of the Paris metropolitan area; digests sewage sludge already arriving at the site and upgrades resulting gas for use.



THE EDGE

Feedstock arrives regardless of gas prices or agricultural cycles, since the site exists to treat wastewater, making supply more predictable than agricultural digesters.



PROGRESS

OPERATING — Unit inaugurated 10 July 2025.



WHY IT'S HOT

A biogas unit was inaugurated at Europe's largest wastewater plant, converting an unavoidable sludge stream into usable gas.

LOCATION



Achères,
Paris region,
France



PROCESS: SLUDGE TO BIOMETHANE



WASTEWATER
SLUDGE ARRIVES



ANAEROBIC
DIGESTION



BIOGAS
UPGRADING



BIOMETHANE
TO GRID OR USE



6M

PEOPLE SERVED
Paris metropolitan area



LARGEST
WASTEWATER PLANT
IN EUROPE



BIOMETHANE
UPGRADED GAS
FOR USE



**TURNING WASTE
INTO VALUE**
From sludge to
renewable energy

34 — BASF — Ludwigshafen 54 MW PEM Electrolyser

Ludwigshafen, Germany | 54 MW PEM electrolysis | *Green hydrogen*



THE PROJECT

BASF brought a 54 MW PEM electrolyser into operation at its Ludwigshafen site, the largest of its type in Germany, producing up to one tonne an hour of hydrogen with no associated carbon emissions. The hydrogen feeds chemical production at the site and displaces a portion of the hydrogen previously made from natural gas.



THE EDGE

The hydrogen is consumed on site by a chemical complex that already uses it at industrial volume, so there is no offtake question and no transport requirement — the constraints that stall most electrolysis at this scale.



PROGRESS

OPERATING — Electrolyser began operation March 2025.



WHY IT'S HOT

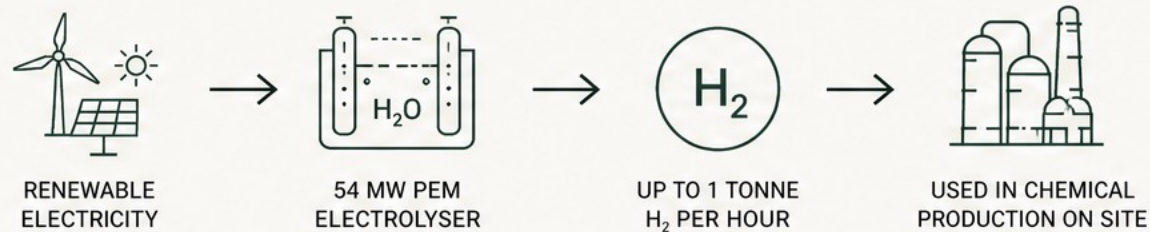
Germany's largest PEM electrolyser began operation, feeding hydrogen directly into chemical production at the site that consumes it.

LOCATION



Ludwigshafen,
Germany

PROCESS



54
MW
ELECTROLYSER
CAPACITY

1
TONNE/HOUR
HYDROGEN
OUTPUT

0
tCO₂
ASSOCIATED
CARBON EMISSIONS

MARCH
2025
BEGAN
OPERATION

35 — OCI Global — Beaumont New Ammonia Facility

Beaumont, Texas, USA | Low-carbon ammonia | Ammonia



THE PROJECT

The Beaumont New Ammonia facility, developed by OCI Global, produced its first ammonia and entered commissioning of a plant rated at 1.1 million tonnes a year. The asset was sold to Woodside Energy, with handover taking place in early 2026, and is designed to serve both conventional ammonia markets and emerging low-carbon fuel demand.



THE EDGE

At 1.1 million tonnes it is among the largest single ammonia trains built in the United States this decade, sited on the Gulf Coast with the export terminals, gas supply and CO₂ sequestration options that scale requires.



PROGRESS

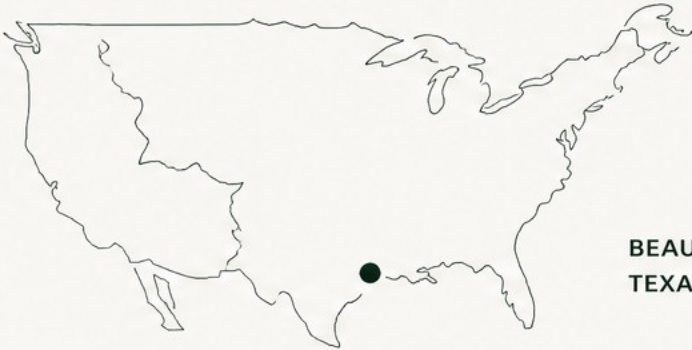
COMMISSIONING — First ammonia produced January 2026; handover to new owner in early 2026.



WHY IT'S HOT

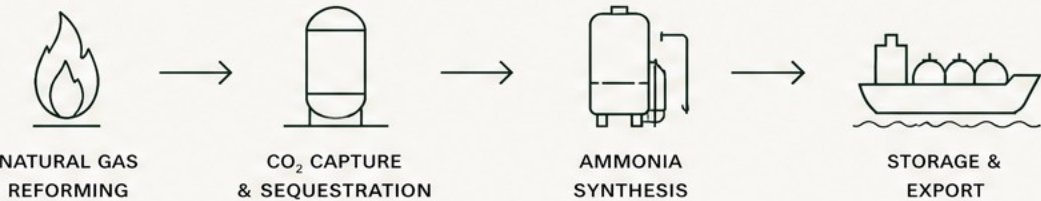
A 1.1 million tonne ammonia plant produced first product and entered commissioning ahead of transfer to its new owner.

LOCATION



BEAUMONT,
TEXAS, USA

PROCESS: LOW-CARBON AMMONIA PRODUCTION



1.1

MILLION TONNES
PER YEAR
PLANT CAPACITY



1

AMONG THE LARGEST
SINGLE TRAINS
BUILT IN THE US
THIS DECADE



CO₂

SEQUESTRATION
OPTIONS
INTEGRATED



2026

HANDOVER TO
NEW OWNER
EARLY 2026

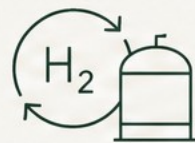
36 — Enilive — Gela Biorefinery SAF Unit

Gela, Sicily, Italy | HEFA-SPK unit at an operating biorefinery | Sustainable aviation fuel



THE PROJECT

Enilive commissioned its first dedicated SAF unit at the Gela biorefinery in Sicily, with capacity of 400,000 tonnes a year. The unit sits within a refinery already converted to renewable feedstock processing, and its output represents a substantial share of European sustainable aviation fuel supply at the time it entered service.



THE EDGE

Adding a SAF unit to an already converted biorefinery reuses hydrogen supply, tankage and marine loading, which is why 400,000 tonnes could be delivered on a timeline no greenfield SAF plant in Europe has matched.



PROGRESS

COMMISSIONING — SAF unit commissioned January 2025.



WHY IT'S HOT

A 400,000-tonne SAF unit was commissioned inside an operating biorefinery, a substantial share of European supply at the time.

PROJECT LOCATION

Gela, Sicily, Italy



PROCESS: FROM RENEWABLE FEEDSTOCK TO SAF



RENEWABLE
FEEDSTOCK



HYDROTREATING
(HEFA)



ISOMERISATION &
SEPARATION



SUSTAINABLE
AVIATION FUEL
(SAF)

400,000

TONNES PER YEAR
SAF CAPACITY

~10%

OF EUROPEAN SAF
SUPPLY AT ENTRY
INTO SERVICE

JAN 2025

SAF UNIT
COMMISSIONED



MARINE LOADING
FROM EXISTING
TERMINAL

37 — SSE Thermal — Tarbert Next Generation Power Station

County Kerry, Ireland | Biofuel-fired flexible generation | Dispatchable electricity



THE PROJECT

SSE Thermal is building the 300 MW Tarbert Next Generation Power Station in County Kerry, an investment of up to EUR 300 million designed to run on 100% sustainable biofuels with the option of later conversion to hydrogen. It is Ireland's first power station intended to operate on biofuels rather than fossil fuel.



THE EDGE

Flexible generation is usually the last thing to decarbonise because it must start and stop on demand. Building dispatchable capacity that runs on liquid biofuel creates a route to firm renewable power that batteries do not cover.



PROGRESS

CONSTRUCTION — Final investment decision February 2025; full construction from December 2025.



WHY IT'S HOT

Construction started on the country's first power station designed to run on sustainable biofuels rather than fossil fuel.

LOCATION

County Kerry, Ireland



PROCESS



SUSTAINABLE
BIOFUELS



FUEL STORAGE
ON SITE



300 MW FLEXIBLE
POWER STATION



DISPATCHABLE
ELECTRICITY

300_{MW}

PLANNED CAPACITY

€300_M

UP TO INVESTMENT

100%

SUSTAINABLE BIOFUELS

1st

POWER STATION IN
IRELAND TO RUN
ON BIOFUELS

38 – Green Plains – Nebraska Carbon Capture Programme

Central City, Wood River and York, Nebraska, USA | Bioethanol CCS | *Captured biogenic CO₂*



THE PROJECT

Green Plains completed carbon capture across all three of its Nebraska ethanol plants at Central City, Wood River and York. Biogenic CO₂ from fermentation at each site is compressed, piped on the Trailblazer system and permanently sequestered in Wyoming, lowering the carbon intensity of the ethanol produced at all three facilities.



THE EDGE

Capturing across three plants at once rather than one gives the company enough sequestered volume to sell low-carbon-intensity ethanol into premium markets as a portfolio rather than as a single-site product.



PROGRESS

OPERATING — Capture confirmed operating at all three plants December 2025.



WHY IT'S HOT

Carbon capture reached operation across three ethanol plants simultaneously, with all volumes piped to permanent sequestration.

PROJECT LOCATION



NEBRASKA, USA

- Central City
- Wood River
- York

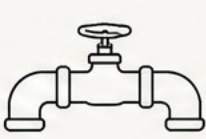
PROCESS OVERVIEW



FERMENTATION
Biogenic CO₂ from fermentation



COMPRESSION
CO₂ is captured and compressed



TRANSPORT
Piped on the Trailblazer system



SEQUESTRATION
Permanently stored in geologic formations in Wyoming



3

ETHANOL PLANTS
Central City, Wood River and York, Nebraska



1.2M+

TONNES CO₂/YEAR
Estimated biogenic CO₂ sequestered



~650

KILOMETRES
Trailblazer pipeline to Wyoming



↓ CI

LOWER CARBON INTENSITY
Lowering CI of ethanol across all three plants

39 – NatureWorks – Ingeo Biopolymer Plant

Nakhon Sawan, Thailand | Integrated lactic acid to PLA | *Ingeo biopolymer*



THE PROJECT

NatureWorks, a Cargill and PTT Global Chemical joint venture, opened a fully integrated Ingeo biopolymer plant at the Nakhon Sawan BioComplex in Thailand, rated at around 75,000 tonnes a year. The site combines sugarcane-based lactic acid production, lactide monomer manufacture and polymerisation of the finished Ingeo biopolymer in one location, supplying packaging, fibre and durable goods markets across Asia and beyond.



THE EDGE

Full integration on a single site from sugar through to finished polymer removes the intermediate shipping and third-party monomer purchases that have historically set the cost floor for polylactic acid.



PROGRESS

COMMISSIONING — Plant opened 29 April 2026 following completion of integrated production.

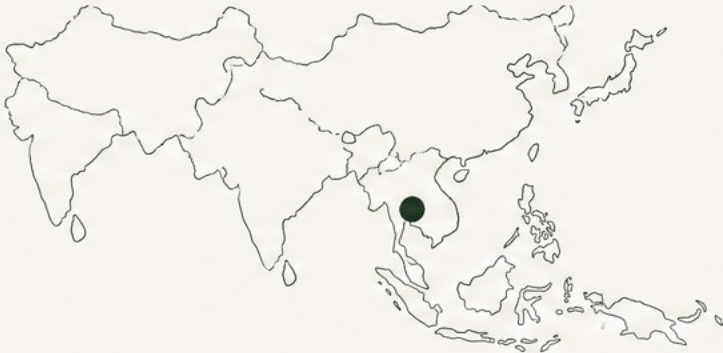


WHY IT'S HOT

An integrated sugar-to-polymer plant opened, combining lactic acid, monomer and polymerisation steps on one site.

LOCATION

Nakhon Sawan,
Thailand



INTEGRATED PROCESS



SUGARCANE
FEEDSTOCK



LACTIC ACID
PRODUCTION



LACTIDE MONOMER
MANUFACTURE



INGEO POLYMER
(POLYLACTIC ACID)

75,000

TONNES PER YEAR
PLANT CAPACITY

100%

INTEGRATED FROM
SUGAR TO POLYMER

3

INTEGRATED STEPS
ON ONE SITE

2026

PLANT OPENED
29 APRIL 2026

40 — Moeve — Onuba Phase 1, Andalusian Green Hydrogen Valley

Huelva, Andalusia, Spain | 300 MW electrolysis | *Green hydrogen*



THE PROJECT

Moeve took final investment decision on phase one of the Andalusian Green Hydrogen Valley near Huelva and commissioned thyssenkrupp nucera to supply 300 MW of electrolyzers in fifteen 20 MW modules, intended for own industrial and refining operations in the province as well as regional industrial users.



THE EDGE

A 300 MW electrolyser order placed immediately after investment decision locks in equipment supply at a time when electrolyser manufacturing slots are the practical constraint on European hydrogen timelines.



PROGRESS

CONSTRUCTION — Final investment decision March 2026; 300 MW electrolyser supply contracted the same month.



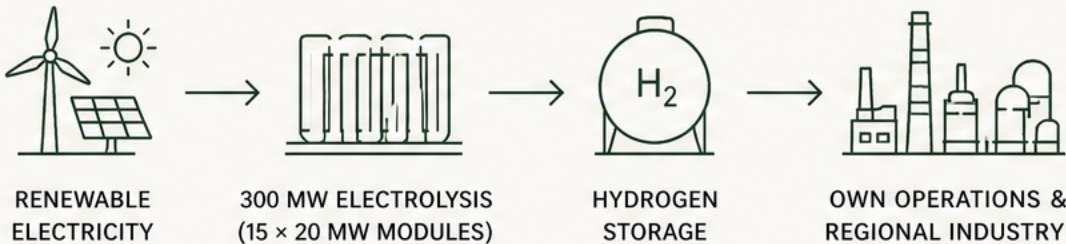
WHY IT'S HOT

Investment decision and a 300 MW electrolyser order landed within two weeks, securing equipment supply for phase one.

PROJECT LOCATION



PROJECT PROCESS: RENEWABLE ELECTRICITY TO GREEN HYDROGEN



300
MW
ELECTROLYSIS
CAPACITY

15
MODULES
20 MW PER
MODULE

2
WEEKS
BETWEEN FID AND
EQUIPMENT ORDER


MAR 2026
FID AND CONTRACT
SIGNED SAME MONTH

41 — Shenzhen Energy — EcoPark Energy of Astana

Astana, Kazakhstan | Grate-fired waste-to-energy | Electricity from municipal waste



THE PROJECT

Shenzhen Energy Group, through the project company East Hope LLP, began construction of a waste-to-energy plant in Astana under an investment contract with Kazakhstan's Investment Committee. Phase one comprises two 750 tonne-a-day incineration lines taking at least 1,500 tonnes of municipal waste daily and generating 50 MW, with commissioning scheduled for 2029.



THE EDGE

A signed investment contract with the national investment authority gives the project a defined waste supply and tariff framework, which is the arrangement that municipal waste projects usually fail to secure before construction.



PROGRESS

CONSTRUCTION — Phase one construction began April 2026; commissioning scheduled 2029.



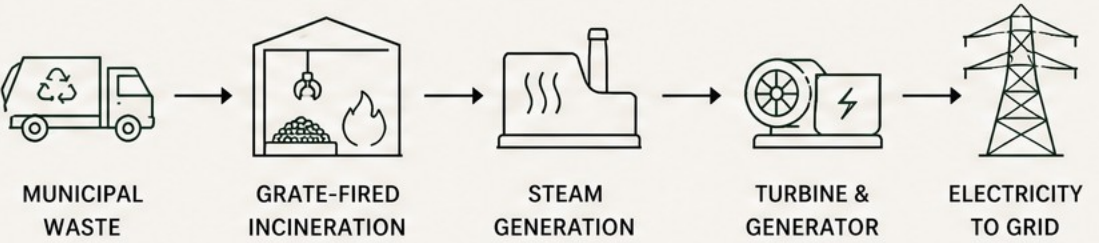
WHY IT'S HOT

Site works started on a 1,500 tonne-a-day waste-to-energy plant under a signed national investment contract.

PROJECT LOCATION



PROCESS: WASTE-TO-ENERGY (GRATE-FIRED)



1,500

TONNES PER DAY
Municipal waste capacity (minimum)

2

INCINERATION LINES
750 tonnes per day each

50

MEGAWATTS (MW)
Electricity generation

2029

COMMISSIONING
Scheduled for phase one

42 — OMV — Schwechat ReOil and Electrolyser Facilities

Schwechat, Austria | Chemical recycling and 10 MW electrolysis | *Pyrolysis oil and green hydrogen*



THE PROJECT

OMV inaugurated two facilities at its Schwechat refinery: the ReOil chemical recycling plant converting waste plastic into pyrolysis oil for reprocessing into new plastics, and a 10 MW electrolyser producing green hydrogen for refinery use, the largest electrolyser of its kind in Austria.



THE EDGE

Pairing plastic recycling with on-site hydrogen inside one refinery means recycled feedstock and processing hydrogen come from the same site, with existing units doing downstream conversion.



PROGRESS

OPERATING — Both facilities inaugurated May 2025.



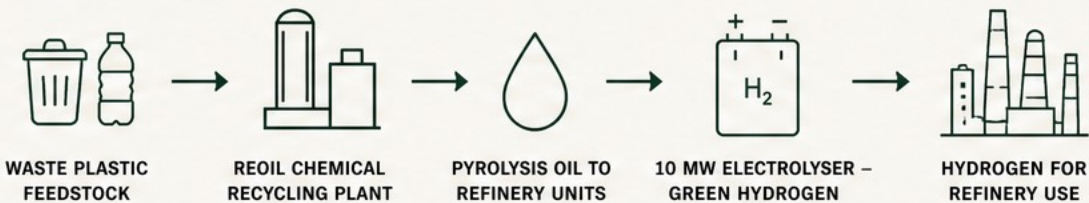
WHY IT'S HOT

A chemical recycling plant and the country's largest electrolyser were inaugurated together inside one operating refinery.

LOCATION: SCHWECHAT, AUSTRIA



HOW IT WORKS



2
FACILITIES
INAUGURATED

10 MW
ELECTROLYSER
CAPACITY

LARGEST ELECTROLYSER
OF ITS KIND IN AUSTRIA

PYROLYSIS OIL RETURNED
TO REFINERY UNITS

43 — Stockholm Exergi — Bio-CCS Project

Stockholm, Sweden | BECCS at a biomass CHP plant | *Durable carbon removal*



THE PROJECT

Stockholm Exergi took final investment decision on a large-scale bioenergy carbon capture project using Capsol capture technology at its biomass combined heat and power plant, designed to remove 800,000 tonnes of CO₂ a year from 2028. The project won just over SEK 20 billion of support in the Swedish Energy Agency's reverse auction for bio-CCS.



THE EDGE

A fifteen-year state contract awarded through competitive auction underwrites the removal volume, giving the project revenue certainty that voluntary carbon market buyers cannot currently provide at this scale.



PROGRESS

CONSTRUCTION — Reverse auction support won January 2025; final investment decision March 2025; removals from 2028.



WHY IT'S HOT

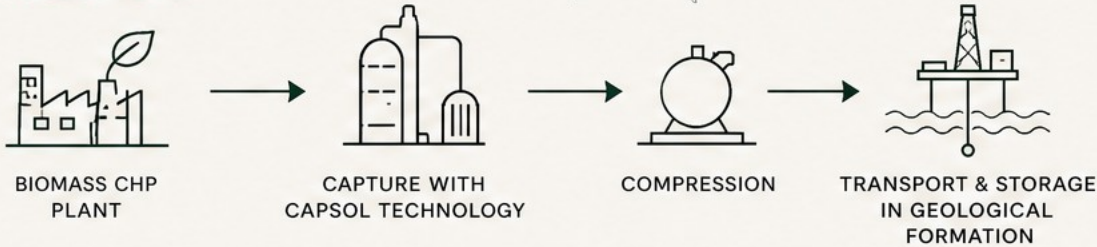
Investment decision followed a state reverse-auction award, underwriting 800,000 tonnes a year of durable carbon removal for fifteen years.

LOCATION

Stockholm, Sweden



PROCESS FLOW



800,000

TONNES CO₂
REMOVED PER YEAR
FROM 2028

15

YEAR STATE
CONTRACT
(2028–2042)

SEK 20+

BILLION SUPPORT
WON IN REVERSE
AUCTION

2028

FIRST REMOVALS
SCHEDULED
TO START

44 – Japan Suiso Energy– Kawasaki Liquefied Hydrogen Terminal

Ogishima, Kawasaki, Japan | Liquefied hydrogen receiving terminal | Imported liquid hydrogen



THE PROJECT

Japan Suiso Energy broke ground on a liquefied hydrogen receiving base at Ogishima in Kawasaki City. The terminal is designed to receive, store and distribute liquid hydrogen brought in by sea, forming the import-side infrastructure for a national supply chain that begins with hydrogen produced overseas and shipped in cryogenic carriers to Japanese industrial and power users.



THE EDGE

Japan's hydrogen strategy depends on imports, and imports depend on receiving terminals that do not yet exist. Building the landing infrastructure addresses the part of the chain that no producer can solve.



PROGRESS

CONSTRUCTION — Groundbreaking held 27 November 2025.



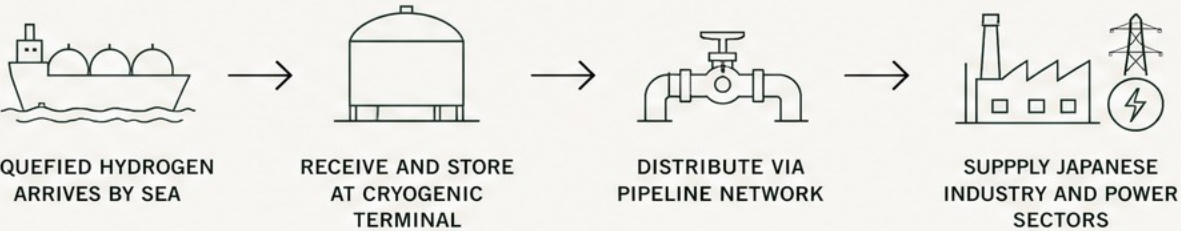
WHY IT'S HOT

First works began on a liquefied hydrogen receiving base, building the import-side infrastructure a national hydrogen strategy requires.

LOCATION: OGISHIMA, KAWASAKI, JAPAN



HOW IT WORKS



~90,000 TONNES OF LIQUID HYDROGEN STORAGE CAPACITY (PLANNED)	160,000 m³ CRYOGENIC STORAGE VOLUME (PLANNED)	2020s SUPPORTS JAPAN'S HYDROGEN IMPORT STRATEGY	27 Nov 2025 GROUNDBREAKING HELD 27 NOVEMBER 2025
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45 — Northern Lights — CO2 Transport and Storage

Norwegian North Sea | Offshore CO2 transport and storage | *Permanent CO2 storage*



THE PROJECT

Northern Lights injected its first CO2 volumes into the Aurora reservoir, 2,600 metres beneath the seabed of the Norwegian North Sea, delivered through a 100-kilometre pipeline from an onshore receiving terminal. The project provides open-access storage capacity for emitters across northern Europe, including biogenic CO2 from bioenergy and biogas sites.



THE EDGE

It is the storage endpoint that makes other projects bankable. Several capture projects across Europe, including biogenic ones, are contracted into this reservoir and could not have reached investment decision without it.



PROGRESS

OPERATING — First CO2 injected 25 August 2025.



WHY IT'S HOT

First CO2 injection began at an open-access offshore reservoir that other capture projects depend on to reach investment decision.

LOCATION NORWEGIAN NORTH SEA



HOW IT WORKS



2,600 m	100 km	1st	∞
DEPTH BELOW SEABED	PIPELINE LENGTH TO STORAGE	CO2 INJECTION 25 AUGUST 2025	OPEN-ACCESS STORAGE

46 — Shandong Shipping / Vale — Ethanol-Powered Guaibamax Ore Carriers

Brazil-China iron ore trade | Ethanol-fuelled very large ore carriers | *Low-carbon vessel capacity*



THE PROJECT

Shandong Shipping concluded 25-year contracts for the construction of two Guaibamax very large ore carriers designed to burn ethanol as their primary fuel, with an option for further vessels and delivery from 2029. Vale charts the ships across its Brazil to China iron ore route; the operator claims emissions reductions of around 90 percent against conventional fuel oil.



THE EDGE

Every other alternative-fuel newbuild programme in the market is methanol, ammonia or LNG. Committing hulls to ethanol opens a fuel with an established global production base and a supply chain that already exists at the loading end of this route.



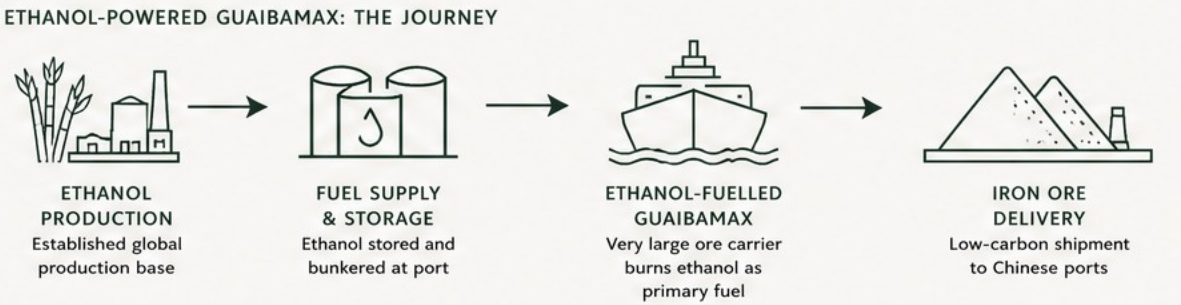
PROGRESS

CONTRACTED — 25-year construction contracts concluded April 2026; delivery from 2029.



WHY IT'S HOT

Construction was contracted for the first ocean-going vessels designed to run on ethanol as their primary fuel.



2 GUAIBAMAX VESSELS CONTRACTED	25 YEAR CHARTER AGREEMENTS	2029 DELIVERY FROM	~90% EMISSIONS REDUCTION VS FUEL OIL
---	---	---------------------------------	---

47 — POSCO International – Indonesian Palm Oil Refinery

Indonesia | Vegetable oil refining | *Refined palm oil for fuel and food*



THE PROJECT

POSCO International acquired Indonesian palm oil producer Sampoerna Agro and inaugurated a refinery, moving from trading and plantation ownership into processing; combination gives plantation supply, refining capacity and an established trading network across one integrated palm oil value chain



THE EDGE

Owning plantations and a refinery together secures physically traceable feedstock, required by regulated biofuel market buyers and hard for independent refiners to demonstrate



PROGRESS

COMMISSIONING — Refinery inaugurated November 2025 alongside completion of the plantation acquisition



WHY IT'S HOT

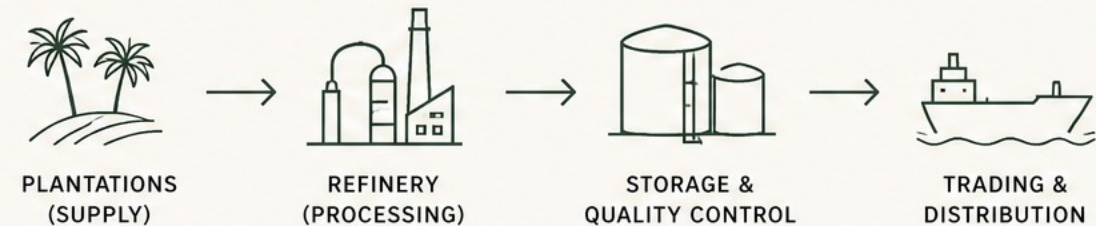
A refinery was inaugurated alongside a plantation acquisition, giving one owner traceable feedstock from field through to processing

LOCATION



Strategically positioned in Indonesia, the world's largest palm oil producing country, with direct access to global food and biofuel markets.

VALUE CHAIN INTEGRATION



1



INTEGRATED VALUE
CHAIN UNDER
ONE OWNER

Nov 2025



REFINERY
INAUGURATED

100%



PHYSICALLY TRACEABLE
FEEDSTOCK

Global



SUPPLYING FOOD
& BIOFUEL
MARKETS

48 — CEEC — Kangping Green Alcohol-Oil Demonstration Project

Kangping County, Shenyang, Liaoning, China | Wind, solar, hydrogen and biomass to fuels | *Green methanol and aviation fuel*



THE PROJECT

China Energy Engineering Corporation, through China Power Engineering Consulting Group, broke ground on a 500,000 tonne-a-year complex at Kangping combining wind and solar generation, hydrogen production and biomass conversion into green methanol, aviation fuel and ammonia. Phase one covers 100,000 tonnes of green methanol, supported by roughly 2 GW of wind and about 3 million tonnes a year of biomass feedstock.



THE EDGE

Combining biomass carbon with renewable hydrogen rather than relying on captured CO₂ alone gives the complex a domestic carbon source at scale, and reported emissions around 60 percent below the coal-to-methanol route it displaces.



PROGRESS

CONSTRUCTION — Framework agreement March 2025; groundbreaking 10 April 2026.



WHY IT'S HOT

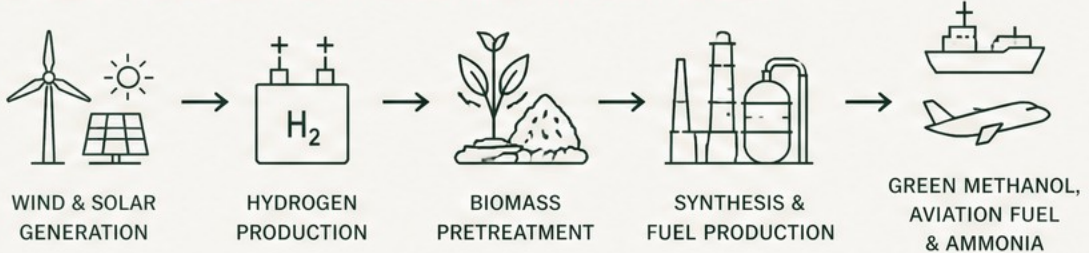
Ground was broken on a 500,000-tonne complex pairing biomass carbon with renewable hydrogen, the first of its kind in the country.

PROJECT LOCATION

Kangping County,
Shenyang, Liaoning,
China



PROJECT PROCESS: BIOMASS + RENEWABLE HYDROGEN TO FUELS



500,000	100,000	~2 GW	~3 Mt
TONNES PER YEAR	TONNES PER YEAR	WIND CAPACITY	BIOMASS FEEDSTOCK
TOTAL COMPLEX	PHASE ONE	TO BE DEPLOYED	PER YEAR
CAPACITY	GREEN METHANOL		

49 — LG-Eni BioRefining — Daesan HVO and SAF Plant

Seosan, Chungcheongnam-do, South Korea | HEFA biorefinery | SAF and renewable diesel



THE PROJECT

LG Chem and Enilive broke ground on South Korea’s first plant producing hydrotreated vegetable oil and sustainable aviation fuel, at the Daesan Chemical Complex; the LG-Eni BioRefining joint venture will process 400,000 tonnes of bio-feedstock/year, completion scheduled 2027, built inside an operating petrochemical site supplying utilities, hydrogen and product logistics.



THE EDGE

Pairs a domestic petrochemical operator holding site and utilities with a European biorefining company holding process technology and feedstock trading network.



PROGRESS

CONSTRUCTION — Groundbreaking August 2025; completion scheduled 2027.



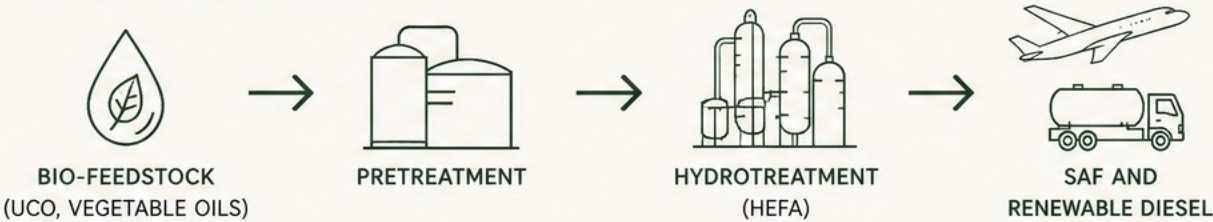
WHY IT’S HOT

Building started on the country’s first combined HVO and SAF plant, inside an operating petrochemical complex.

LOCATION: SEOSAN, CHUNGCHEONGNAM-DO, SOUTH KOREA



PROCESS: HEFA BIOREFINERY



400,000

TONNES/YEAR
BIO-FEEDSTOCK
PROCESSING CAPACITY

2027

COMPLETION
SCHEDULED

1st

SOUTH KOREA'S
FIRST HVO AND SAF
PLANT

JV

LG CHEM + ENILIVE
JOINT VENTURE

50 — Axens — 100% SAF Unit, Asian Site

Asia | HEFA-SPK unit | Sustainable aviation fuel



THE PROJECT

Axens started up a unit at an Asian site capable of converting 300,000 tonnes a year of renewable feedstock into 100% sustainable aviation fuel. The technology licensor supplied and commissioned the unit, which produces neat SAF rather than co-processed product and can therefore be blended to specification and certified independently for the regional aviation fuel pool. The startup gives the licensed process an operating commercial reference in Asia.



THE EDGE

As a licensor rather than an owner, the company converts each successful startup into commercial evidence for the next licence, so an operating reference unit propagates faster than an owned plant of the same size.



PROGRESS

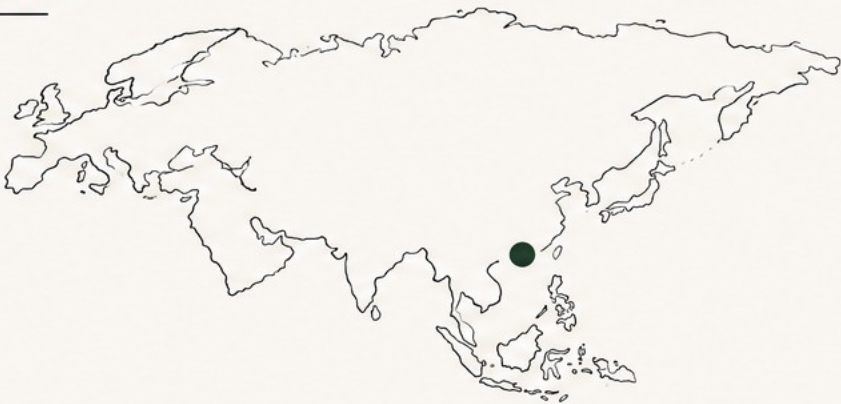
OPERATING — Unit started up September 2025 at 300,000 tonnes a year of feedstock capacity.



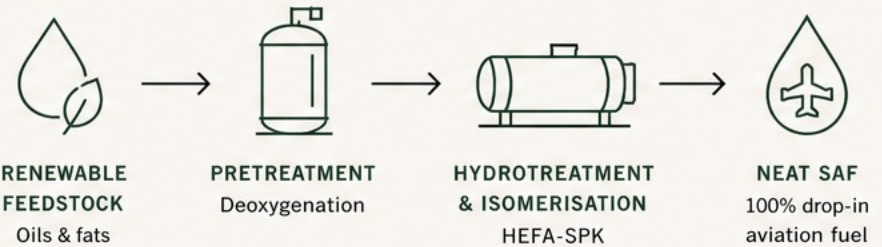
WHY IT'S HOT

A 300,000-tonne neat SAF unit started up successfully, giving the licensed technology an operating commercial reference in the region.

LOCATION



PROCESS: HEFA-SPK (NEAT SAF)



300,000

TONNES/YEAR

Feedstock capacity

100%

SAF

Neat product, not co-processed

SEP 2025

STARTUP

Unit started up September 2025

ASIA

REGION

Operating commercial reference in Asia

51 — ENVISION ENERGY — CHIFENG GREEN HYDROGEN AND AMMONIA PARK

51

Chifeng, Inner Mongolia, China | Off-grid electrolysis and ammonia synthesis | **Green ammonia**



THE PROJECT

Envision Energy commissioned a large off-grid green hydrogen and ammonia industrial park at Chifeng in Inner Mongolia, reported at 320,000 tonnes a year of ammonia. The site runs on dedicated wind and solar generation rather than a grid connection, and supplies the ammonia used in the company’s marine bunkering operation at Dalian.



THE EDGE

Running fully off-grid at this scale removes both the grid connection queue and the grid carbon intensity question, and gives the plant a power cost set by its own generation rather than by a regulated tariff.



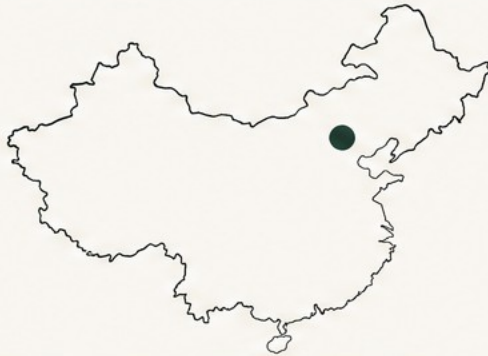
PROGRESS

OPERATING — Plant commissioned July 2025.



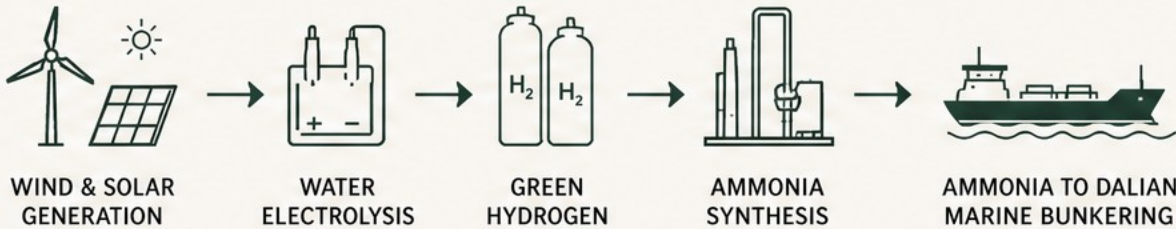
WHY IT’S HOT

A large off-grid green ammonia park was commissioned, supplying the volumes used in the operator’s marine bunkering operation.



CHINA
Inner Mongolia

Chifeng
Off-grid industrial park powered by dedicated wind and solar in Inner Mongolia.



320,000
TONNES PER YEAR
AMMONIA CAPACITY

100%
OFF-GRID POWER
WIND & SOLAR

2025
COMMISSIONED
JULY 2025

DALIAN
SUPPLIES MARINE
BUNKERING OPERATION

52 — Amber Flow Fuels — Port of Riga HVO and SAF Plant

52

Kundzinsala, Port of Riga, Latvia | HEFA biorefinery | **SAF and renewable diesel**



THE PROJECT

Amber Flow Fuels began construction of the Baltic states' first plant producing hydrotreated vegetable oil and sustainable aviation fuel, on Kundzinsala island in the Port of Riga. The EUR 120 million project is expected to create around 120 jobs and start production in 2027, processing waste and residue feedstocks into road and aviation fuels for Baltic and wider European markets.



THE EDGE

A deepwater port location gives the plant marine access for both feedstock imports and product exports, which matters in a region with limited domestic waste oil collection and no existing renewable fuels capacity.



PROGRESS

CONSTRUCTION — Construction started July 2025; production from 2027.



WHY IT'S HOT

Work started on the region's first HVO and SAF plant, sited in a deepwater port for feedstock import and product export.

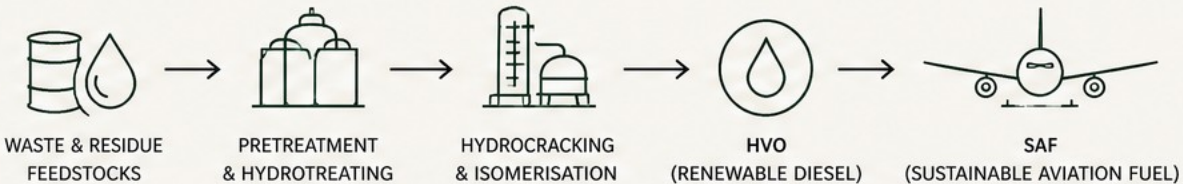


KUNDZINSALA ISLAND, PORT OF RIGA, LATVIA



Located on Kundzinsala island in the Port of Riga, a deepwater port on the Baltic Sea with direct access to international shipping lanes.

PATHWAY: HEFA BIOREFINERY



€120M

TOTAL INVESTMENT

~120

JOBS CREATED

2027

PRODUCTION START



DEEPWATER PORT
ADVANTAGE

53 — Stora Enso — Oulu Consumer Packaging Board Line

Oulu, Finland | Wood-fibre packaging board | *Folding boxboard and kraftliner*



THE PROJECT

Stora Enso brought a EUR 1.1 billion consumer packaging board line online at its Oulu mill in Finland, producing folding boxboard, kraftliners, bag material and unbleached softwood pulp. The investment converts former paper-making capacity at the site toward renewable fibre-based packaging materials, supplying converters serving food, retail and industrial packaging markets that are substituting away from plastic under European regulation.



THE EDGE

Converting an existing mill rather than building new gives access to fibre supply, workforce and infrastructure already in place, and the output substitutes directly for plastic packaging in markets where regulation is tightening.



PROGRESS

OPERATING — Line brought online August 2025.



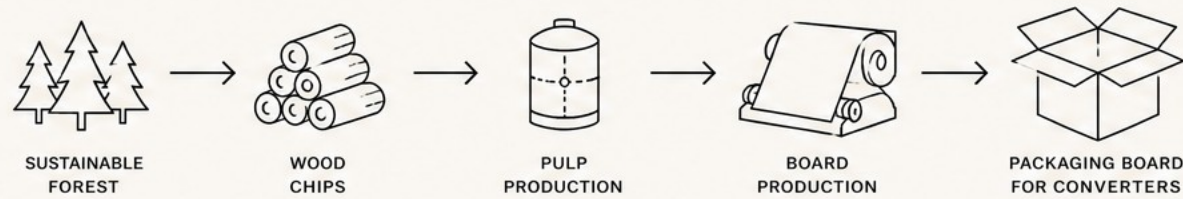
WHY IT'S HOT

A EUR 1.1 billion packaging board line came online, converting existing mill capacity toward renewable fibre-based materials.



FINLAND
Oulu,
Finland

THE PATHWAY: WOOD-FIBRE PACKAGING BOARD



**EUR 1.1
BILLION**

TOTAL INVESTMENT



**4
PRODUCTS**

FOLDING BOXBOARD,
KRAFTLINER, BAG
MATERIAL & PULP



**EXISTING
MILL**

CONVERSION OF
PAPER CAPACITY
AT OULU



**RENEWABLE
FIBRE**

SUBSTITUTING FOR
PLASTIC PACKAGING

54 – Eni – Sannazzaro de' Burgondi Biorefinery Conversion

54

Pavia, Lombardy, Italy | Refinery conversion to biorefining | *Renewable fuels*



THE PROJECT

Eni took final investment decision to convert certain units of its Sannazzaro de' Burgondi refinery in Lombardy into a biorefinery, and subsequently secured a EUR 500 million loan from the European Investment Bank against the project. The conversion applies the company's Ecofining process to produce renewable fuels from waste and residue feedstocks.



THE EDGE

Conversion reuses the reactors, hydrogen supply and logistics of a working refinery, and public-institution lending at this size lowers the cost of capital in a way commercial project debt for a greenfield plant would not.



PROGRESS

CONSTRUCTION — Final investment decision February 2026; EUR 500 million EIB financing signed April 2026.



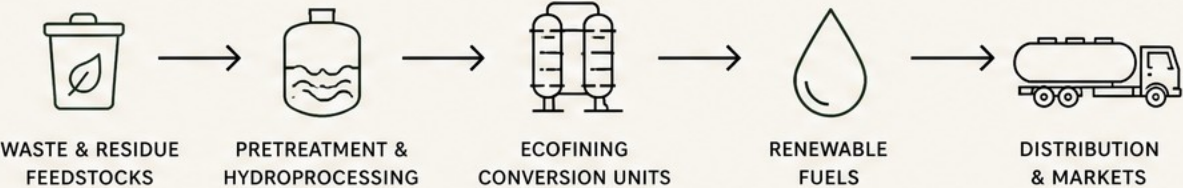
WHY IT'S HOT

Investment decision on a refinery conversion was followed within weeks by EUR 500 million of European Investment Bank lending.



PAVIA, LOMBARDY, ITALY
Sannazzaro de' Burgondi refinery,
Lombardy region.

FROM WASTE TO RENEWABLE FUELS — ENI ECOFINING PROCESS



EUR 500M	EUR 500M	2026	CO ₂
EIB LOAN SECURED APRIL 2026	INVESTMENT SUPPORTED	FINAL INVESTMENT DECISION FEBRUARY 2026	RENEWABLE FUELS CUT LIFE-CYCLE EMISSIONS

55 — Stream BioEnergy — Little Island Biomethane Plant

Little Island, Cork, Ireland | Anaerobic digestion | Biomethane

55



THE PROJECT

Stream BioEnergy is building an EUR 80 million biomethane plant at Little Island in Cork, designed to process around 90,000 tonnes of waste a year and deliver about 80 GWh of biomethane from 2027. Gas Networks Ireland has agreed the grid connection that allows the output to enter the national gas network.



THE EDGE

An agreed grid injection point is the binding constraint on Irish biomethane, not digester capacity. Securing it converts the project from a waste treatment plant into a gas supplier with a route to market.



PROGRESS

CONSTRUCTION — Construction under way from April 2026; operations expected 2027.



WHY IT'S HOT

An EUR 80 million digester entered construction with a grid connection agreed, giving its output a route into the national network.



IRELAND
Little Island,
Cork

ANAEROBIC DIGESTION TO BIOMETHANE



WASTE
COLLECTION



ANAEROBIC
DIGESTION



BIOGAS
UPGRADING



GRID
INJECTION

80

EUR MILLION
PLANT INVESTMENT

~90,000

TONNES PER YEAR
WASTE PROCESSED

~80

GWh PER YEAR
BIOMETHANE OUTPUT
FROM 2027

56 — Andritz — Erfurt Electrolyser Gigafactory

56

Erfurt, Germany | Electrolyser manufacturing | *Electrolyser stacks and modules*



THE PROJECT

Andritz opened an electrolyser manufacturing plant at Erfurt with initial annual output of around 1 GW, scalable as demand develops. Component production began in March 2025 ahead of the site’s formal opening. The factory supplies stacks and complete modules to hydrogen project developers rather than producing hydrogen itself, and the line is designed to scale further as order books allow.



THE EDGE

Electrolyser manufacturing slots, not project finance, are what currently set European hydrogen timelines. Adding a gigawatt of annual capacity addresses the bottleneck rather than adding another project queued behind it.



PROGRESS

OPERATING — Component production from March 2025; factory opened June 2025.



WHY IT’S HOT

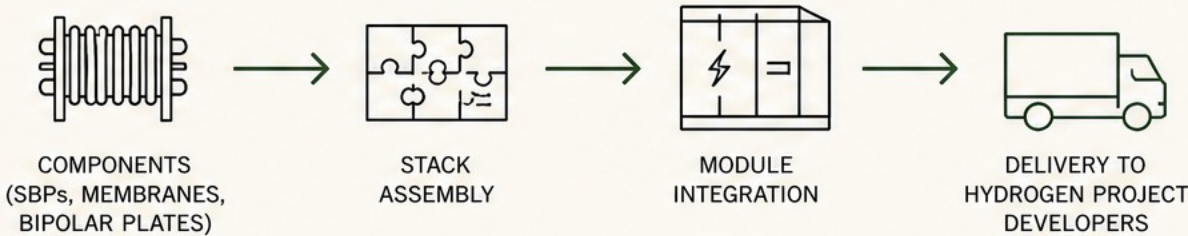
A gigawatt-scale electrolyser factory opened, adding manufacturing capacity to the constraint that governs hydrogen project schedules.



GERMANY

Erfurt, Thuringia

THE PATHWAY



~1 GW

INITIAL ANNUAL
OUTPUT CAPACITY

SCALABLE

CAPACITY DESIGNED
TO SCALE FURTHER

MAR 2025

COMPONENT PRODUCTION
BEGAN

JUN 2025

FACILITY
OPENED

57 — Hidrogenii — St. Gabriel Hydrogen Liquefaction Plant

57

St. Gabriel, Louisiana, USA | Hydrogen liquefaction | Liquid hydrogen



THE PROJECT

Hidrogenii, a joint venture between Plug Power and Olin, commissioned a hydrogen liquefaction plant at St. Gabriel, Louisiana, rated at 15 tonnes a day. The plant lifts Plug Power’s total liquid hydrogen capacity to 40 tonnes a day and draws on by-product hydrogen from Olin’s adjacent chlor-alkali operations, supplying material handling, transport and industrial customers across the United States through the partner’s distribution network.



THE EDGE

Feedstock is by-product hydrogen from an existing chemical plant next door, so the liquefier does not carry the cost of producing the hydrogen it liquefies — a materially different cost position from electrolysis-fed liquefaction.



PROGRESS

OPERATING — Plant commissioned April 2025 at 15 tonnes per day.



WHY IT’S HOT

A 15 tonne-a-day liquefier was commissioned on by-product hydrogen from an adjacent chemical plant, lifting network capacity substantially.

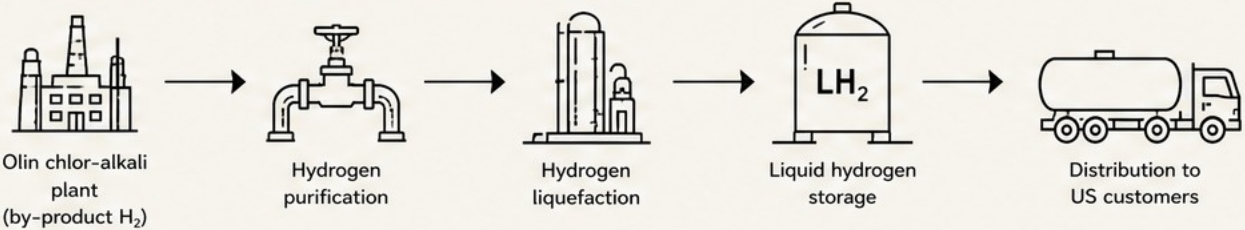


UNITED STATES

**St. Gabriel,
Louisiana**

On the Mississippi River
between Baton Rouge
and New Orleans.

PATHWAY: BY-PRODUCT HYDROGEN LIQUEFACTION



15

TONNES PER DAY
PLANT CAPACITY

40

TONNES PER DAY
TOTAL LIQUID H₂
CAPACITY (PLUG POWER)

APR 2025

PLANT COMMISSIONED
AND OPERATING



SUPPLYING MATERIAL
HANDLING, TRANSPORT
AND INDUSTRIAL
CUSTOMERS ACROSS
THE UNITED STATES

58 — NESTE — ROTTERDAM SAF PRODUCTION

58

Rotterdam, Netherlands | Refinery modification for SAF | *Sustainable aviation fuel*



THE PROJECT

Neste began sustainable aviation fuel production at its Rotterdam renewable products refinery following a modification allowing up to 500,000 tonnes a year of SAF output. The change lifted the company’s global sustainable aviation fuel capability to around 1.5 million tonnes a year across its refining system, and lets the Rotterdam site shift output between aviation and road fuels according to demand and mandate conditions.



THE EDGE

Modifying an operating renewable diesel refinery to swing toward SAF lets the company move volume between two products as relative pricing and mandates shift, rather than committing a plant to one output.



PROGRESS

OPERATING — SAF production began at the modified refinery April 2025.



WHY IT’S HOT

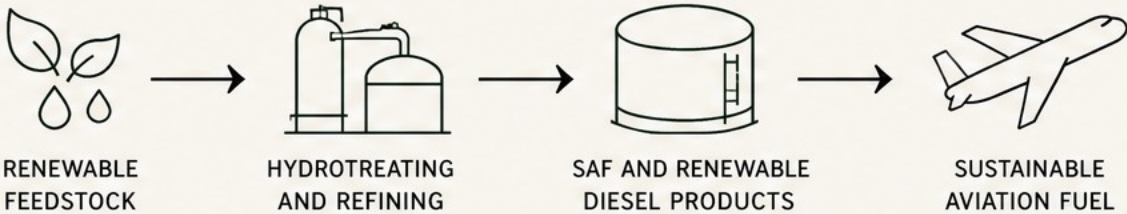
A refinery modification brought up to 500,000 tonnes a year of SAF capability online, lifting global capacity to 1.5 million tonnes.



NETHERLANDS

Rotterdam
Neste Renewable Products
Refinery

FROM RENEWABLE FEEDSTOCK TO SAF



500,000

TONNES/YEAR

SAF CAPABILITY ADDED
AT ROTTERDAM

1.5

MILLION TONNES/YEAR

GLOBAL SAF CAPABILITY
ACROSS NESTE SYSTEM



SITE CAN SWITCH BETWEEN
AVIATION AND ROAD FUELS
AS DEMAND SHIFTS

59 — POET — Shelbyville Bioprocessing Expansion

Shelbyville, Indiana, USA | Corn dry milling expansion | Ethanol

59



THE PROJECT

POET broke ground on an expansion of its Shelbyville bioprocessing plant in Indiana, roughly doubling capacity from 98 million to 193 million gallons a year at a cost of around \$200 million and adding 25 full-time positions. The expansion builds on an operating site rather than establishing a new one.



THE EDGE

Doubling an existing plant costs materially less per gallon than greenfield construction, because the grain handling, utilities, rail access and workforce are already in place and the permit is already held.



PROGRESS

CONSTRUCTION — Groundbreaking June 2026.



WHY IT'S HOT

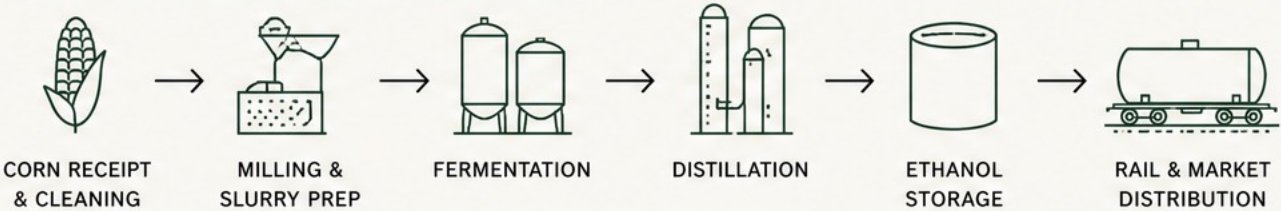
An expansion roughly doubling capacity at an operating ethanol plant entered construction, taking it from 98 to 193 million gallons.



LOCATION

Shelbyville,
Indiana, USA

CORN DRY MILLING PROCESS (EXPANSION)



CAPACITY (ETHANOL)	PROJECT COST	NEW JOBS	CAPACITY INCREASE
193 MILLION GALLONS PER YEAR (UP FROM 98 MGPY)	~\$200 MILLION	25 FULL-TIME POSITIONS	~2x IN ETHANOL PRODUCTION

60 — OMV Petrom — Petrobrazi SAF and HVO Unit

60

Petrobrazi, Romania | HEFA unit at an operating refinery | SAF and renewable diesel



THE PROJECT

OMV Petrom started construction of a 250,000 tonne-a-year unit producing sustainable aviation fuel and hydrotreated renewable diesel at its Petrobrazi refinery. It is the first significant sustainable fuels production capacity in southeastern Europe, built inside a refinery that continues to run conventional products alongside, and is intended to serve blending mandates across Romania and neighbouring markets in the region.



THE EDGE

No comparable capacity exists across southeastern Europe, so the unit is positioned to supply blending obligations across a region that would otherwise import every litre of its mandated renewable fuel.



PROGRESS

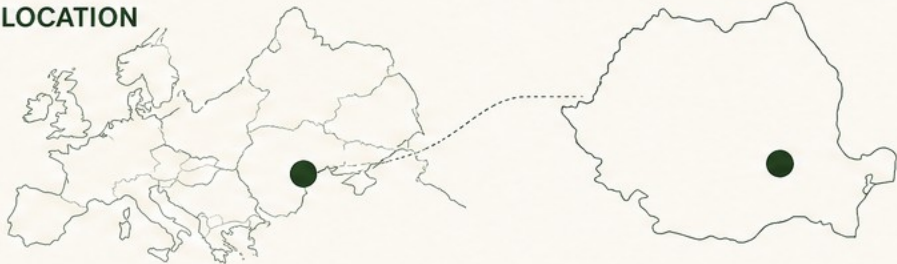
CONSTRUCTION — Construction started February 2025.



WHY IT'S HOT

The first major sustainable fuels unit in its region entered construction, at 250,000 tonnes a year inside an operating refinery.

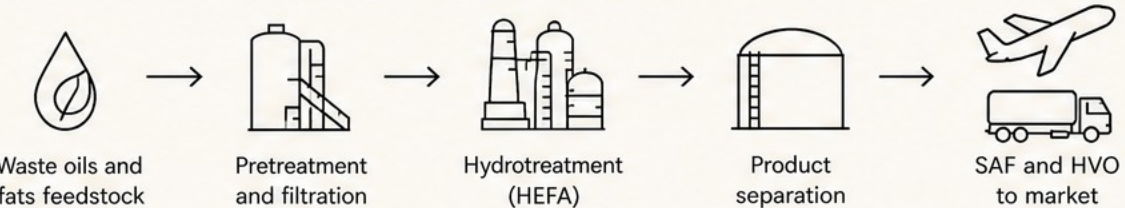
LOCATION



ROMANIA

Petrobrazi,
Prahova County

PATHWAY: HEFA (HYDROTREATED ESTERS AND FATTY ACIDS)



250,000

TONNES PER YEAR
SAF AND RENEWABLE
DIESEL CAPACITY

1st

MAJOR SUSTAINABLE
FUELS CAPACITY IN
SOUTHEASTERN EUROPE

HEFA

TECHNOLOGY
AT AN OPERATING
REFINERY

2025

CONSTRUCTION
STARTED
FEBRUARY 2025

61 — Avantium — FDCA Flagship Plant

Delfzijl, Netherlands | YXY plant-based FDCA | FDCA for PEF polymer

61



THE PROJECT

Avantium built a flagship plant at Delfzijl to produce FDCA, the building block for the PEF polymer, using its YXY conversion technology on plant-based sugars. The plant was opened in 2024 and has been in commissioning since, with startup rescheduled to mid-2026 after titanium weld defects were found in piping and repaired.



THE EDGE

FDCA has no other commercial-scale production anywhere, and offtake agreements for the polymer are already in place, so completion of this single plant determines whether an entire materials class reaches market.



PROGRESS

COMMISSIONING — Weld repair programme completed 30 April 2026; startup targeted mid-2026, first sales second half 2026.



WHY IT'S HOT

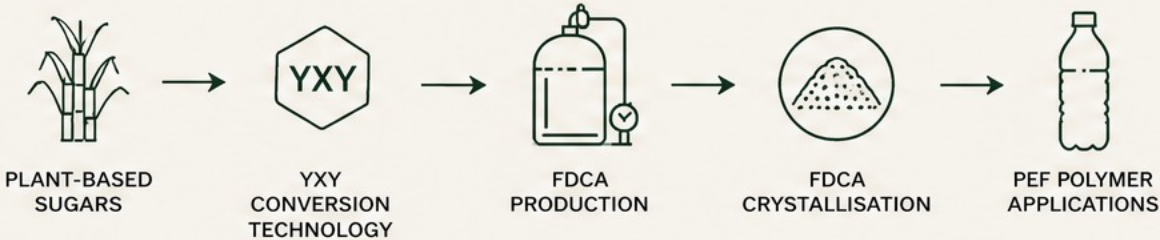
A first-of-a-kind FDCA plant completed its weld repair programme and held startup and offtake on the revised schedule.

PROJECT LOCATION



NETHERLANDS
Delfzijl

THE PATHWAY: YXY FDCA PRODUCTION



120 ktpa FDCA NAMEPLATE CAPACITY	2024 PLANT OPENED	1st COMMERCIAL-SCALE FDCA PLANT WORLDWIDE	H2 2026 FIRST SALES TARGETED
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62 — Saffaire Sky Energy — Japanese Domestic SAF Plant

Sakai, Osaka, Japan | HEFA from used cooking oil | SUSTAINABLE AVIATION FUEL

62



THE PROJECT

Cosmo Oil, JGC Holdings and Revo International, through the joint venture Saffaire Sky Energy, completed Japan’s first large-scale domestic SAF plant, targeting around 30,000 kilolitres a year from used cooking oil collected within the country. The plant sits within an existing Cosmo refinery site, drawing on refinery utilities and product distribution, and supplies domestic airlines working toward national aviation fuel blending requirements.



THE EDGE

Domestic used cooking oil has historically been exported from Japan for processing abroad. Collecting and converting it locally captures the value at home and shortens a supply chain that ran halfway around the world.



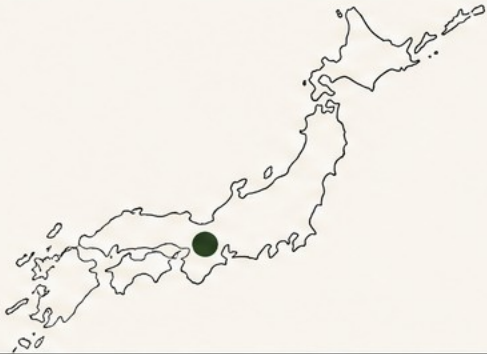
PROGRESS

COMMISSIONING — Plant completed 25 December 2024; production targeted at about 30,000 kilolitres a year.



WHY IT’S HOT

A first large-scale domestic SAF plant was completed, converting locally collected used cooking oil rather than exporting it.

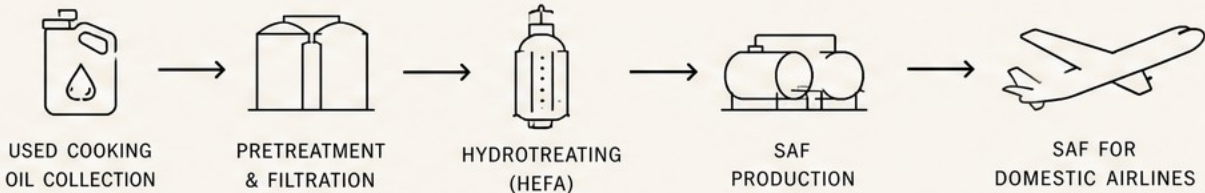


JAPAN

Sakai, Osaka

Located within an existing Cosmo refinery site

HEFA PATHWAY: USED COOKING OIL TO SAF



30,000 KILOLITRES/YEAR TARGETED SAF PRODUCTION CAPACITY	100% DOMESTICALLY COLLECTED USED COOKING OIL FEEDSTOCK	1st JAPAN'S FIRST LARGE-SCALE DOMESTIC SAF PLANT	Dec 25, 2024 PLANT COMPLETED AND COMMISSIONED
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63 — Copenhagen Infrastructure Partners — Cobirgy Biogas Plant

63

La Sentiu de Sió, Lleida, Catalonia, Spain | Agricultural anaerobic digestion | **Biomethane**



THE PROJECT

Copenhagen Infrastructure Partners took final investment decision through its Advanced Bioenergy Fund I on Cobirgy, one of the largest biogas plants in Spain, at La Sentiu de Sió in Lleida. Construction is scheduled to begin in the second half of 2026 with operations from the end of 2028. It is the fund’s fifth investment against EUR 727 million of committed capital.



THE EDGE

A dedicated bioenergy fund taking decisions across a portfolio can standardise engineering, procurement and financing across sites, which independent single-asset developers in Spanish biogas cannot replicate.



PROGRESS

CONSTRUCTION — Final investment decision June 2026; construction from second half 2026; operations end-2028.



WHY IT’S HOT

One of the country’s largest biogas plants was sanctioned, the fifth investment from a dedicated bioenergy fund.



SPAIN

La Sentiu de Sió, Lleida, Catalonia
Inland agricultural region with strong feedstock availability from livestock and crop residues.

AGRICULTURAL ANAEROBIC DIGESTION PATHWAY



~90,000

TONNES PER YEAR
OF FEEDSTOCK

5th

INVESTMENT FROM
EUR 727 MILLION
BIOENERGY FUND

2026 H2

CONSTRUCTION
SCHEDULED TO
BEGIN

2028

OPERATIONS
FROM END OF
2028

64— Eni — Loudima Vegetable Oil Extraction Plant

64

Loudima, Republic of the Congo | Oilseed extraction | Vegetable oil for biorefining



THE PROJECT

Eni inaugurated the Republic of the Congo's first vegetable oil extraction plant at Loudima, processing locally grown oilseeds into crude vegetable oil that is shipped as feedstock to Enilive biorefineries in Europe. The plant is part of an agri-feedstock programme using degraded and marginal land rather than displacing food production.



THE EDGE

It secures physical feedstock supply for the operator's own European biorefineries at a time when waste oil availability is tightening, and creates the origination step that competitors must buy on the open market.



PROGRESS

OPERATING — Plant inaugurated June 2025.



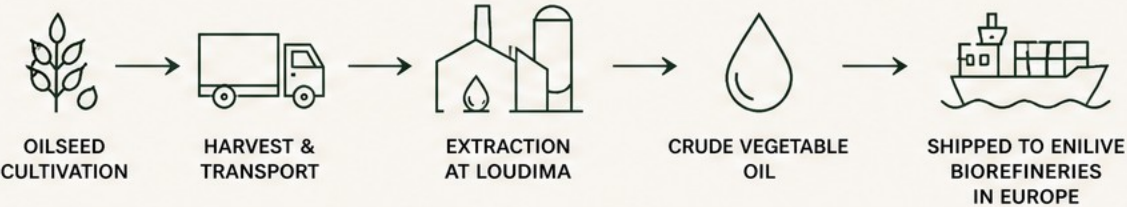
WHY IT'S HOT

The country's first vegetable oil extraction plant was inaugurated, feeding the operator's own European biorefineries with owned-origin feedstock.

REPUBLIC OF THE CONGO



PATHWAY: OILSEED EXTRACTION



1st

VEGETABLE OIL
EXTRACTION PLANT
IN THE REPUBLIC
OF THE CONGO

2025

PLANT
INAUGURATED

EUROPE

FEEDSTOCK SUPPLY TO
ENILIVE BIOREFINERIES
IN EUROPE



USING DEGRADED
& MARGINAL LAND

65 — Moeve and Apical — Second-Generation Biofuel Plant

Huelva, Spain | Second-generation HEFA biorefinery | **Renewable diesel and SAF**

65



THE PROJECT

Moeve and Apical are building what is described as Spain’s largest second-generation biofuel plant, awarding the electrical, piping and industrial mechanical works to Cobra IS subsidiaries Grupo Cobra and Masa in a package valued at \$1.4 billion. The plant processes waste and residue feedstocks rather than virgin vegetable oils, and will supply renewable diesel and sustainable aviation fuel into European markets where second-generation feedstock earns higher regulatory credit.



THE EDGE

Pairing a Spanish energy company with one of the largest Asian oleochemical processors gives the plant a feedstock supply relationship reaching directly into the origination markets that European waste-oil buyers compete over.



PROGRESS

CONSTRUCTION — Major construction contracts awarded August 2025.



WHY IT’S HOT

Construction contracts worth \$1.4 billion were awarded for the country’s largest second-generation biofuel plant.

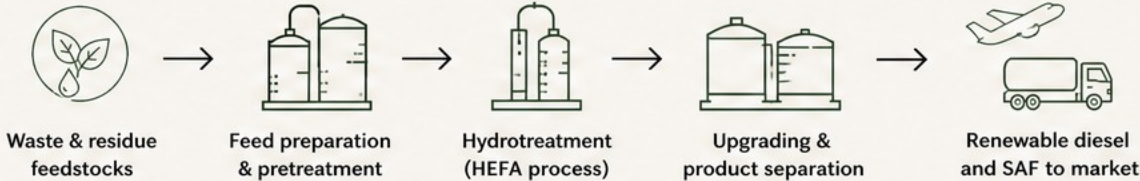


SPAIN

Huelva, Andalusia

Strategic Atlantic port location with refinery and export infrastructure.

SECOND-GENERATION HEFA BIOREFINERY PROCESS



\$1.4
BILLION
CONSTRUCTION
CONTRACTS AWARDED

LARGEST
SECOND-GENERATION
BIOFUEL PLANT
IN SPAIN

2
PRODUCTS
RENEWABLE DIESEL
AND SAF

EU
SUPPLYING EUROPEAN
MARKETS WITH HIGHER
REGULATORY CREDIT

66 — Cargill — Regina Canola Crush Plant

Regina, Saskatchewan, Canada | Oilseed crushing | **Canola oil and meal**



THE PROJECT

Cargill completed and brought into full operation a canola crush plant near Regina capable of processing up to one million tonnes of canola a year. The plant supplies crude canola oil into renewable fuel and food markets and canola meal into livestock feed, drawing on Saskatchewan’s canola production base, and gives growers in the province an additional local processing outlet rather than an export route.



THE EDGE

It came through a delay that halted two comparable crush projects in the same province, so it enters a regional market with materially less competing capacity than was planned when it was sanctioned.



PROGRESS

OPERATING — Plant opened 21 April 2026; reported fully operational by 21 May 2026.



WHY IT’S HOT

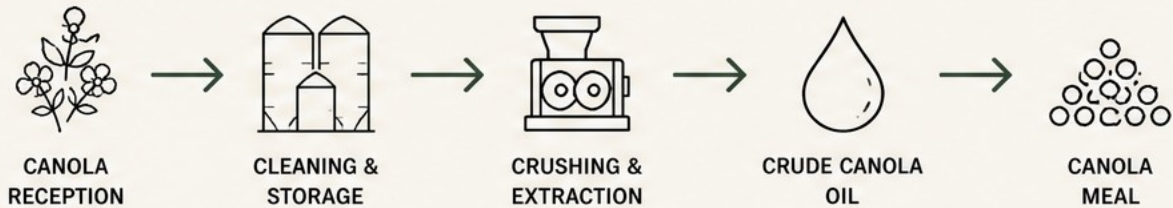
A one-million-tonne canola crush plant reached full operation after a weather and materials delay that did not stop the build.



CANADA

Regina,
Saskatchewan

THE PATHWAY: OILSEED CRUSHING



1,000,000
TONNES PER YEAR
CANOLA PROCESSING
CAPACITY (UP TO)

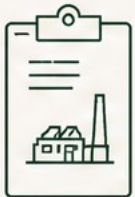
21 Apr 2026
PLANT OPENED

21 May 2026
REPORTED FULLY
OPERATIONAL

2
OTHER PROJECTS
IN PROVINCE
DID NOT PROCEED

67 — Air Liquide — ELYgator Electrolyser, Maasvlakte

Maasvlakte, Port of Rotterdam, Netherlands | 200 MW electrolysis | **Green hydrogen**



THE PROJECT

Air Liquide took final investment decision on ELYgator, a 200 MW electrolyser at Maasvlakte in the Port of Rotterdam, and began construction. The project forms part of an arrangement with TotalEnergies covering two Dutch electrolyzers producing around 45,000 tonnes of hydrogen a year between them for refinery use, together representing over \$1 billion of investment and cutting refinery CO₂ by up to 500,000 tonnes annually.



THE EDGE

Hydrogen is committed to refinery decarbonisation under an agreement signed before investment decision, so the plant is built against contracted industrial demand rather than an anticipated merchant market.



PROGRESS

CONSTRUCTION — Final investment decision July 2025; construction launched.



WHY IT'S HOT

Investment decision and construction start on a 200 MW electrolyser built against contracted refinery hydrogen demand.

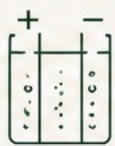


NETHERLANDS
Maasvlakte,
Port of Rotterdam

THE PATHWAY: ELECTROLYSIS TO REFINERY HYDROGEN



RENEWABLE
POWER



ELECTROLYSIS
(200 MW)



GREEN
HYDROGEN



TRANSPORT &
DELIVERY



REFINERY
USE

200
MW

ELECTROLYSER
CAPACITY

~45,000
TONNES/YEAR

HYDROGEN OUTPUT
(ARRANGEMENT TOTAL)

>\$1
BILLION

COMBINED
INVESTMENT

Up to
500,000
TONNES/YEAR

REFINERY CO₂
REDUCTION

68 — Danantara — Downstream Industrial Programme

68

Java, Indonesia | Bioethanol and SAF biorefining | Ethanol and sustainable aviation fuel



THE PROJECT

Indonesia's sovereign wealth fund Danantara began construction on six downstream industrial projects worth around \$7 billion in total, including a bioethanol plant at Glenmore in East Java and a SAF biorefinery at Cilacap in Central Java. The programme applies state capital directly to domestic processing, targeting fuel import substitution and building conversion assets the country has lacked despite holding the agricultural base to supply them.



THE EDGE

Sovereign capital deployed at programme scale removes the project finance step that stalls Indonesian biofuel developments, and the state can align feedstock policy and offtake mandates with the assets it is funding.



PROGRESS

CONSTRUCTION — Groundbreaking on six projects February 2026.

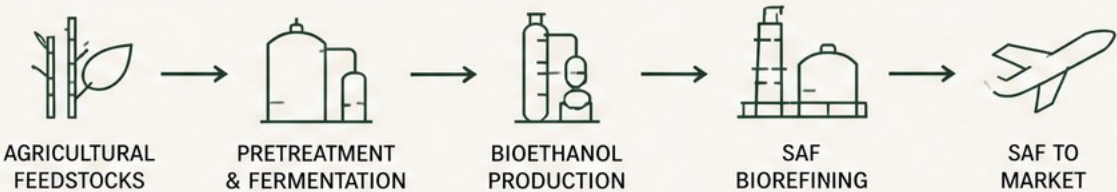


WHY IT'S HOT

A \$7 billion first phase of state-funded downstream projects entered construction, including bioethanol and SAF biorefining.



PATHWAY: BIOETHANOL AND SAF BIOREFINING



6

PROJECTS
IN PROGRAMME

~\$7B

TOTAL INVESTMENT
(USD)



EAST & CENTRAL
JAVA, INDONESIA



BIOETHANOL & SAF
CAPACITY BUILD

69 – NEPHIN, FLOGAS AND DCC – BALLINROBE BIOMETHANE PLANT

Ballinrobe, County Mayo, Ireland | Agricultural anaerobic digestion | Biomethane

69



THE PROJECT

Construction began on Ireland's largest agriculture-based biomethane plant near Ballinrobe in County Mayo, developed by Nephin with Flogas and its parent DCC involved in the project. The plant digests agricultural feedstock from the surrounding farming region and upgrades the gas for supply into the energy market, giving local farms a contracted outlet for slurry and crop residues that previously had no commercial route.



THE EDGE

Having an established fuel distributor in the ownership gives the output a route to customers from the start, which independent Irish digester developers have repeatedly failed to secure at commercial terms.



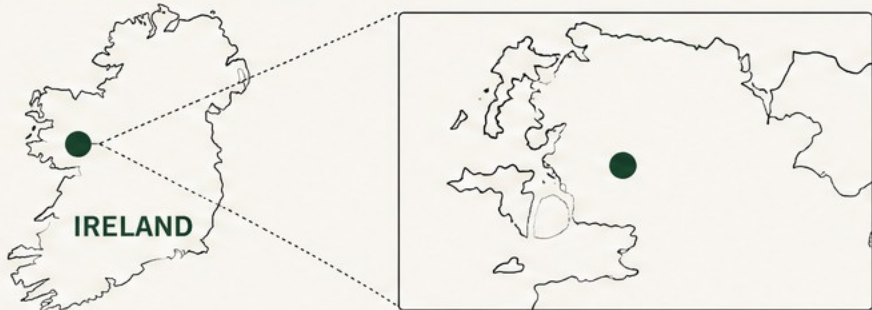
PROGRESS

CONSTRUCTION — Groundbreaking September 2025.



WHY IT'S HOT

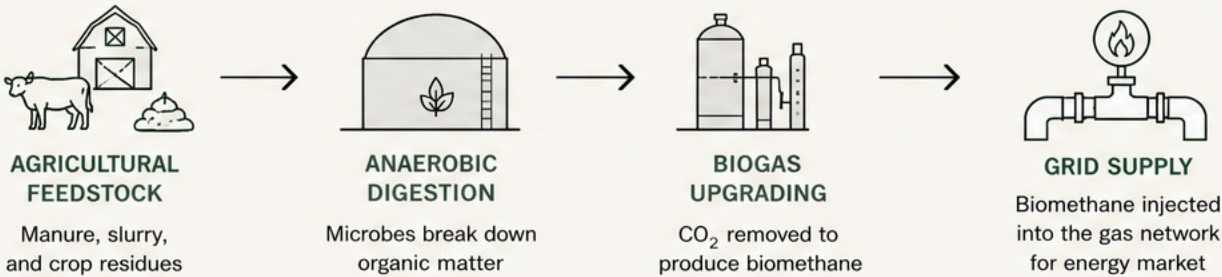
Work started on the country's largest agriculture-based biomethane plant, with a fuel distributor in the ownership group.



BALLINROBE, COUNTY MAYO

Located in the heart of Ireland's farming region, utilising agricultural feedstock from surrounding farms.

THE PATHWAY: AGRICULTURAL ANAEROBIC DIGESTION TO BIOMETHANE



IRELAND'S LARGEST

AGRICULTURE-BASED BIOMETHANE PLANT

~90,000

TONNES PER YEAR
AGRICULTURAL FEEDSTOCK FROM LOCAL FARMS

~80 GWh

BIOMETHANE OUTPUT
ANNUAL ENERGY EQUIVALENT

SUPPLYING

THE ENERGY MARKET
VIA IRELAND'S GAS NETWORK

70 — OOCL — 14 Methanol Dual-Fuel Container Ships

70

Dalian and Nantong COSCO KHI yards, China | Methanol dual-fuel newbuilds | *Low-carbon vessel capacity*



THE PROJECT

Orient Overseas Container Line placed a firm order worth about \$3.08 billion for fourteen methanol dual-fuel container ships of 18,500 TEU, split nine at Dalian COSCO KHI and five at Nantong COSCO KHI, with delivery between the third quarter of 2028 and the third quarter of 2029. The vessels can run on methanol or conventional fuel, and are priced at roughly \$220 million each.



THE EDGE

Fourteen firm hulls at 18,500 TEU is the largest single methanol newbuild commitment in the evidence period, and creates a block of contracted demand large enough to underwrite green methanol production capacity.



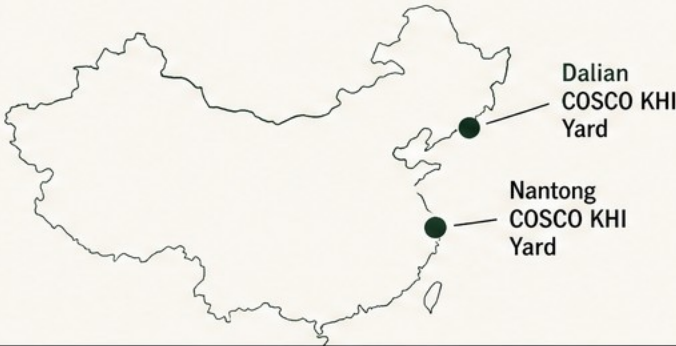
PROGRESS

CONTRACTED — Firm order placed April 2025; delivery Q3 2028 to Q3 2029.



WHY IT'S HOT

A firm \$3.08 billion order for fourteen methanol dual-fuel vessels created the largest single block of contracted methanol demand.



CHINA

Dalian and Nantong COSCO KHI yards
Shipbuilding for OOCL methanol dual-fuel newbuilds

PROJECT PATHWAY: METHANOL DUAL-FUEL NEWBUILD PROGRAMME



FIRM ORDER PLACED
April 2025



SHIPBUILDING
Dalian (9 ships)
Nantong (5 ships)



DELIVERY WINDOW
Q3 2028 to
Q3 2029



IN SERVICE
Methanol or
conventional fuel

14

VESSELS
ORDERED

18,500

TEU CAPACITY
PER VESSEL

~\$3.08

BILLION
ORDER VALUE

~\$220M

PRICE PER
VESSEL

71 – Kanadevia Inova – Louisville Township Renewable Gas Project

Louisville Township, Minnesota, USA | Anaerobic digestion with biochar | **Renewable natural gas and biochar**



THE PROJECT

Kanadevia Inova broke ground on a large-scale anaerobic digestion facility in Louisville Township, Minnesota, which will take source-separated organic waste and produce renewable natural gas alongside biochar. The plant is scheduled to begin receiving organics in 2027 and is the first organic-waste-to-biochar and renewable gas facility in the state, taking material that would otherwise be landfilled from municipal and commercial collection routes across the region.



THE EDGE

Producing biochar alongside gas gives the plant a second revenue line in soil amendment and durable carbon markets, so returns do not depend solely on renewable gas pricing and credits.



PROGRESS

CONSTRUCTION — Groundbreaking March 2026; waste intake expected 2027.



WHY IT'S HOT

Ground was broken on the state's first organic-waste facility producing renewable gas and biochar from the same feedstock.



LOUISVILLE TOWNSHIP, MINNESOTA, USA

First organic-waste-to-biochar and renewable gas facility in the state.

ANAEROBIC DIGESTION WITH BIOCHAR PATHWAY



2027

WASTE INTAKE
EXPECTED

1st

FIRST IN STATE FOR
ORGANIC WASTE TO
BIOCHAR & RNG

2

REVENUE STREAMS:
RENEWABLE GAS
+ BIOCHAR

100%

DIVERTS ORGANIC
WASTE FROM
LANDFILL

72 — XCF Global — New Rise Renewables SAF Facility

Storey County, Nevada, USA / HEFA neat SAF / Sustainable aviation fuel



THE PROJECT

XCF Global operates the New Rise Renewables facility near Reno in Storey County, Nevada, producing neat sustainable aviation fuel and renewable fuels from waste fats and oils. Production restarted in July 2026 after an interruption, and the company holds an irrevocable purchase order covering more than three million gallons of output.



THE EDGE

Very little neat SAF capacity is operating in the United States, so a plant that can physically produce and deliver it holds a position that announced projects cannot occupy regardless of their planned scale.



PROGRESS

OPERATING — Production restarted 9 July 2026; operator under lender forbearance and a going-concern qualification.



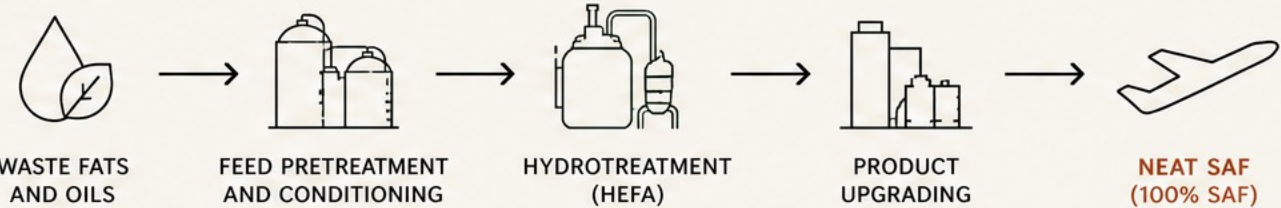
WHY IT'S HOT

Commercial neat SAF production restarted at the Nevada facility, though the operator remains under lender forbearance.



UNITED STATES
Storey County, Nevada
(near Reno)

PATHWAY: HEFA NEAT SAF



3M+

GALLONS

IRREVOCABLE PURCHASE
ORDER COVERING OUTPUT

100%

NEAT SAF

PRODUCT CAPABILITY
(HEFA)

9 JULY 2026

PRODUCTION RESTARTED

OPERATIONS RESUMED
AFTER INTERRUPTION



STRATEGIC LOCATION
NEAR RENO, NEVADA

73 — Carolina Renewable Products — Orangeburg Renewable Diesel Facility

Orangeburg County, South Carolina, USA | Hydrotreatment of waste fats and oils | Renewable diesel



THE PROJECT

Carolina Renewable Products began work on its first renewable diesel manufacturing facility in Orangeburg County, South Carolina, a \$280 million project expected to create around 155 jobs over five years. The plant converts waste fats, oils and greases collected regionally into renewable diesel for southeastern fuel markets that currently import the product.



THE EDGE

The southeastern United States has almost no renewable diesel production despite generating substantial waste fat volumes, so the plant converts a feedstock currently shipped out of the region into finished fuel close to demand.



PROGRESS

CONSTRUCTION — Site work began December 2025.



WHY IT'S HOT

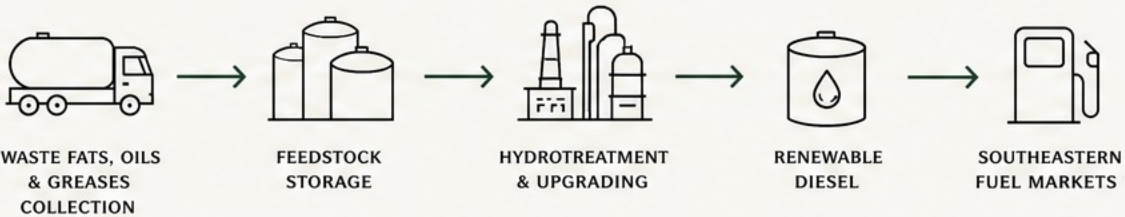
Construction started on a \$280 million renewable diesel plant in a region that produces feedstock but has almost no processing capacity.



UNITED STATES

Orangeburg County,
South Carolina

HYDROTREATMENT OF WASTE FATS AND OILS



\$280
MILLION

PLANT INVESTMENT

~155
JOBS

OVER FIVE YEARS

2025

SITE WORK BEGAN
DECEMBER 2025

**WASTE FATS,
OILS & GREASES**

REGIONALLY SOURCED
FEEDSTOCK

74 – Hyundai Motor Group – Ulsan Hydrogen Fuel Cell Plant

Ulsan, South Korea | Fuel cell manufacturing | *Hydrogen fuel cell systems*

74



THE PROJECT

Hyundai Motor began construction of a \$651 million hydrogen fuel cell manufacturing plant at Ulsan. The facility produces fuel cell systems for vehicles and stationary power applications, expanding the group's existing manufacturing base and supporting its commercial vehicle and power generation programmes. Output supplies both the group's own hydrogen vehicle lines and external customers, and the site is designed to scale as fuel cell demand develops.



THE EDGE

This is an enabling factory rather than a fuel project: fuel cell manufacturing capacity determines how fast hydrogen demand can actually grow, and very little new capacity of this size has been sanctioned anywhere.



PROGRESS

CONSTRUCTION — Construction began November 2025.



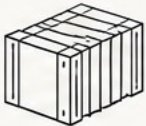
WHY IT'S HOT

A \$651 million fuel cell manufacturing plant entered construction, adding capacity to the equipment side of hydrogen deployment.



SOUTH KOREA
Ulsan

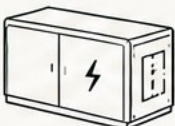
FUEL CELL MANUFACTURING PROCESS



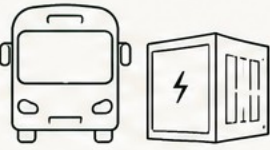
COMPONENT
PRODUCTION



STACK
ASSEMBLY



SYSTEM
INTEGRATION



VEHICLE AND
STATIONARY POWER
APPLICATIONS

\$651M

TOTAL INVESTMENT
USD

2025+

CONSTRUCTION
BEGAN NOV 2025

**VEHICLE &
STATIONARY**

APPLICATIONS
SERVED

SCALE

DESIGNED TO
SCALE WITH
DEMAND

75 — Carlton Power and Schroders Greencoat — Barrow Green Hydrogen Project

75

Barrow-in-Furness, Cumbria, United Kingdom | 30 MW electrolysis | Green hydrogen



THE PROJECT

The 30 MW Barrow Green Hydrogen project reached final investment decision, developed through the Green Hydrogen Energy Company joint venture between Carlton Power and Schroders Greencoat, with Plug Power supplying the electrolyzers. Hydrogen from the plant will supply Kimberly-Clark's manufacturing operations in Barrow-in-Furness, displacing natural gas in an industrial process load, and the project forms part of the UK's contracted hydrogen allocation programme for early production capacity.



THE EDGE

A named industrial offtaker was secured before investment decision, so the plant is built against a contracted manufacturing load rather than into the uncontracted demand that has stalled comparable UK projects.



PROGRESS

CONSTRUCTION — Final investment decision May 2026; moving into construction.



WHY IT'S HOT

A 30 MW electrolyser was sanctioned with a named manufacturing offtaker contracted before the commitment was made.



UNITED KINGDOM

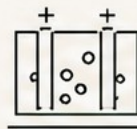
Barrow-in-Furness,
Cumbria

54.12° N, 3.23° W

PATHWAY: ELECTROLYSIS



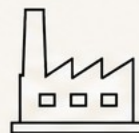
RENEWABLE
ELECTRICITY



ELECTROLYSER
(30 MW)



GREEN
HYDROGEN



OFFTAKE:
KIMBERLY-CLARK
MANUFACTURING

30
MW

ELECTROLYSER
CAPACITY

~5,000
TONNES PER YEAR

GREEN HYDROGEN
OUTPUT (EST.)

100%

CONTRACTED OFFTAKE
TO KIMBERLY-CLARK
MANUFACTURING

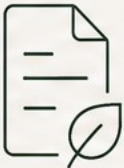
Plug
Power

ELECTROLYSERS
SUPPLIED

76 — Inpasa — Rondonópolis and Nova Mutum Corn Ethanol Investment

76

Mato Grosso, Brazil | Corn dry milling | Ethanol and co-products



THE PROJECT

Inpasa committed R\$3.48 billion across two Mato Grosso projects: a new biorefinery at Rondonópolis processing two million tonnes of corn a year for around a billion litres of ethanol, and an expansion at Nova Mutum adding a further million tonnes of corn capacity. Environmental licence applications were filed in December 2025 and the Rondonópolis site entered foundation-phase construction the following April.



THE EDGE

Building the tenth plant in an established fleet means engineering, procurement and operating practice are already standardised, which is why the company moves from announcement to foundations in months rather than years.



PROGRESS

CONSTRUCTION — Foundation-phase construction confirmed at Rondonópolis April 2026; first production targeted early 2027.



WHY IT'S HOT

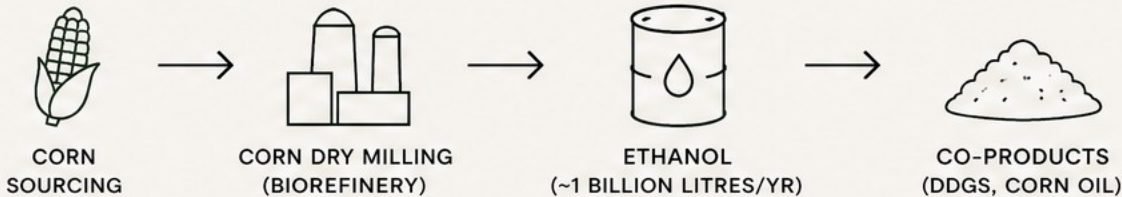
A R\$3.48 billion corn ethanol commitment moved into foundation-phase construction within four months of the licence filing.



BRAZIL

Mato Grosso
Rondonópolis and Nova Mutum
16.47° S, 54.64° W

PATHWAY: CORN DRY MILLING



R\$3.48
BILLION

COMMITTED ACROSS
TWO PROJECTS

2.0
MILLION TONNES

CORN/YEAR AT
RONDONÓPOLIS

~1.0
BILLION LITRES

ETHANOL/YEAR FROM
RONDONÓPOLIS

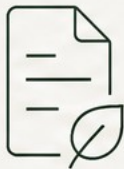
+1.0
MILLION TONNES

CORN CAPACITY ADDED
AT NOVA MUTUM

77 – Luxcara and Hamburger Energiewerke – Moorburg Electrolyser

Hamburg, Germany | 100 MW electrolysis | Green hydrogen

77



THE PROJECT

Luxcara and Hamburger Energiewerke began construction of a 100 MW electrolyser on the site of the former Moorburg coal-fired power station in Hamburg. The project reuses the grid connection, cooling water access and port location of the decommissioned plant, and will supply hydrogen to industrial users across the Hamburg region as well as to port operations and heavy transport in the surrounding area.



THE EDGE

A retired coal plant comes with a very large existing grid connection and port access. Reusing that infrastructure removes the connection queue that determines how quickly German electrolysers can be built.



PROGRESS

CONSTRUCTION — Construction began December 2025.



WHY IT'S HOT

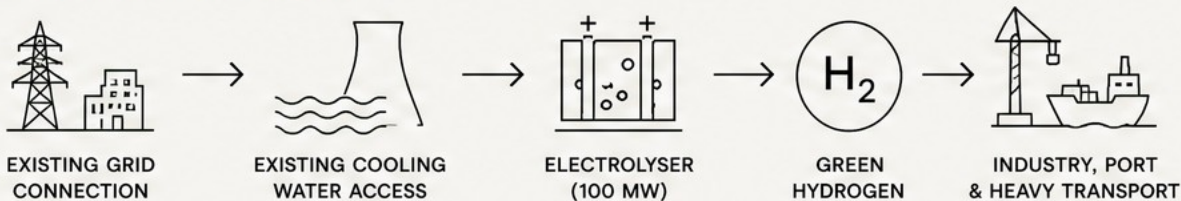
A 100 MW electrolyser entered construction, reusing the grid connection and port access of a retired coal plant.



GERMANY

Hamburg,
Hamburg
53.55° N, 10.00° E

PATHWAY: ELECTROLYSIS



100

MW

ELECTROLYSER
CAPACITY

~14,000

TONNES PER YEAR
GREEN HYDROGEN
OUTPUT (EST.)

100%

REUSES GRID
CONNECTION, COOLING
WATER & PORT ACCESS

SUPPLIES

INDUSTRY, PORT
OPERATIONS & HEAVY
TRANSPORT

78 — Delorean Corporation — NSW1 Horsley Park Bioenergy Facility

Horsley Park, New South Wales, Australia | Anaerobic digestion | Renewable gas

78



THE PROJECT

Delorean Corporation reached a positive final investment decision on the A\$62.1 million NSW1 bioenergy facility at Horsley Park, subject to A\$31.6 million of final funding. The plant will process around 120,000 tonnes a year of organic waste into renewable gas, backed by A\$20 million of New South Wales state support and A\$10.5 million from ARENA.



THE EDGE

Roughly half the capital comes from state and federal programmes, which lowers the equity requirement enough for a small developer to sanction a plant that would otherwise be beyond its balance sheet.



PROGRESS

CONSTRUCTION — Positive final investment decision April 2026, subject to completion of final funding.



WHY IT'S HOT

A positive investment decision was reached on a 120,000-tonne organics facility, with roughly half the capital from public programmes.

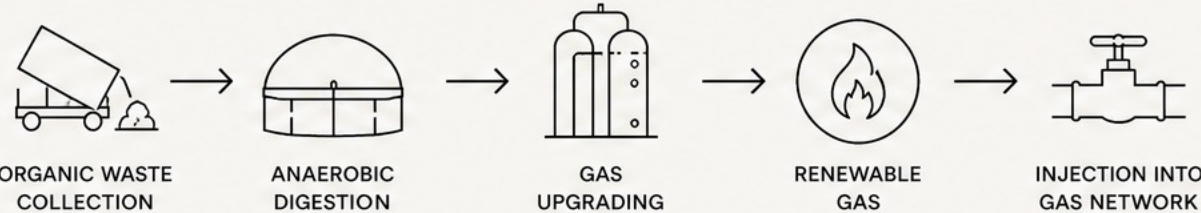


AUSTRALIA

Horsley Park,
New South Wales

33.83° S, 150.88° E

PATHWAY: ANAEROBIC DIGESTION



A\$62.1m

TOTAL PROJECT
INVESTMENT

~120,000

TONNES PER YEAR
ORGANIC WASTE
PROCESSED

A\$31.6m

FINAL FUNDING
REQUIRED

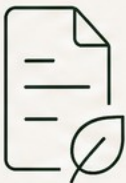
A\$30.5m

PUBLIC SUPPORT FROM
NSW AND ARENA

79 — Petrobras — Presidente Bernardes Refinery BioQAV and Renewable Diesel Plant

79

Cubatão, São Paulo, Brazil | Dedicated HEFA biorefinery | SAF and renewable diesel



THE PROJECT

The Petrobras board approved a \$1.2 billion final investment decision for a dedicated bioQAV and renewable diesel plant at the Presidente Bernardes refinery in Cubatão, designed for up to 15,000 barrels a day with a target of 2030. It is the company’s first dedicated renewable fuels unit rather than a co-processing arrangement.



THE EDGE

Brazil holds one of the deepest vegetable oil and ethanol feedstock positions anywhere but almost no dedicated aviation fuel capacity, so this sanction converts that feedstock advantage into finished-product capability at national scale.



PROGRESS

CONSTRUCTION — Final investment decision approved June 2026; target 2030.



WHY IT’S HOT

A \$1.2 billion investment decision sanctioned the operator’s first dedicated aviation and renewable diesel plant.



BRAZIL

Cubatão, São Paulo
23.89° S, 46.40° W

PATHWAY: DEDICATED HEFA BIOREFINERY



\$1.2
BILLION
FINAL INVESTMENT
DECISION

UP TO
15,000
BARRELS PER DAY
PLANT CAPACITY

2030
TARGET
COMMISSIONING

FIRST
DEDICATED RENEWABLE
FUELS UNIT (NOT
CO-PROCESSING)

80 — Enovos — LuxHyVal Electrolyser

80

Bascharage, Luxembourg | 5 MW electrolysis | Green hydrogen



THE PROJECT

Enovos, part of the Encevo group, approved the final investment decision for LuxHyVal, a 5 MW electrolyser at Bascharage developed with Luxenergie. The EUR 39.2 million project will produce around 650 tonnes of hydrogen a year, with construction from late 2026 and commissioning in 2027, supplying transport and industrial users in Luxembourg.



THE EDGE

It is the first hydrogen production of any scale in the country, so it establishes the regulatory, permitting and offtake precedent that any further Luxembourg project will build on rather than negotiate from scratch.



PROGRESS

CONSTRUCTION — Final investment decision June 2026; construction from late 2026; commissioning 2027.



WHY IT'S HOT

The country's first hydrogen production facility was sanctioned, moving a national hydrogen plan into implementation.



LUXEMBOURG

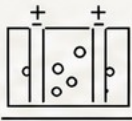
Bascharage,
Luxembourg

49.4925° N, 5.8826° E

PATHWAY: ELECTROLYSIS



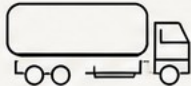
RENEWABLE
ELECTRICITY



ELECTROLYSER
(5 MW)



GREEN
HYDROGEN



TRANSPORT &
INDUSTRIAL USE

5

MW

ELECTROLYSER
CAPACITY

~650

TONNES PER YEAR

HYDROGEN
OUTPUT (EST.)

EUR 39.2M

TOTAL PROJECT
INVESTMENT

2026–2027

CONSTRUCTION FROM
LATE 2026; COMMISSIONING
IN 2027

81 — Orica — Hunter Valley Hydrogen Hub

81

Kooragang Island, New South Wales, Australia | Electrolysis integrated with ammonia | Green hydrogen for ammonia



THE PROJECT

Orica took final investment decision on the Hunter Valley Hydrogen Hub at Kooragang Island, with capital expenditure of A\$245 to 283 million and production targeted for early 2029. Renewable hydrogen from the project is integrated directly into the company’s existing ammonia manufacturing operations on the same site, displacing hydrogen currently made from natural gas and lowering the carbon intensity of ammonia supplied into Australian mining and agricultural markets.



THE EDGE

Hydrogen is consumed inside an operating ammonia plant next to the electrolyser, so there is no transport, no storage requirement and no need for a hydrogen market to develop before the project earns.



PROGRESS

CONSTRUCTION — Final investment decision July 2026; production targeted early 2029.



WHY IT’S HOT

Renewable hydrogen integrated directly into an operating ammonia plant on the same site was sanctioned for construction.



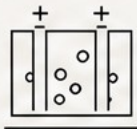
AUSTRALIA

Kooragang Island,
New South Wales
32.94° S, 151.77° E

PATHWAY: ELECTROLYSIS INTEGRATED WITH AMMONIA



RENEWABLE
ELECTRICITY



ELECTROLYSER
(ON-SITE)



GREEN
HYDROGEN



AMMONIA PLANT
(INTEGRATED USE)

**A\$245–283
million**

CAPITAL
EXPENDITURE

**EARLY
2029**

PRODUCTION
TARGETED

100%

HYDROGEN USED
IN EXISTING AMMONIA
OPERATIONS

**Lower
Carbon
Intensity**

FOR MINING AND
AGRICULTURAL MARKETS

#82 — Kraftringen – Ortofta Combined Heat and Power Plant

82

Ortofta, Eslöv, Sweden | Biomass combined heat and power | Heat and electricity



THE PROJECT

Kraftringen's board approved a SEK 2.4 billion biomass combined heat and power plant at Ortofta outside Eslöv, the largest energy production investment in the Skåne region in a decade, with commissioning scheduled for 2028. The plant supplies district heating and electricity to communities across southern Sweden, replacing older generating capacity and running on forestry residues and other biomass sourced from the surrounding region.



THE EDGE

District heating gives biomass generation a contracted, weather-correlated heat load alongside power revenue. That dual-revenue position is one that standalone biomass electricity plants competing in a wholesale power market simply do not hold.



PROGRESS

CONSTRUCTION — Board approval July 2025; commissioning scheduled 2028.



WHY IT'S HOT

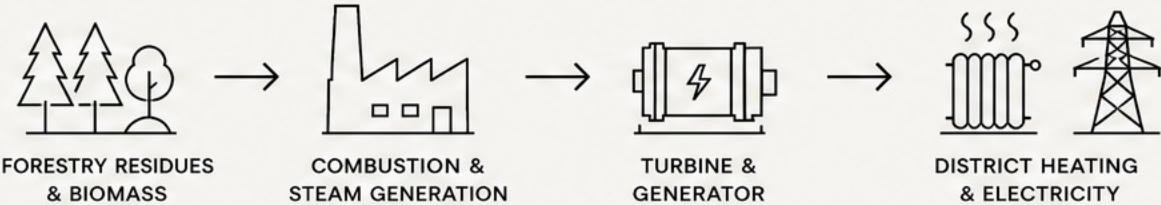
A SEK 2.4 billion biomass CHP plant was sanctioned, the largest regional energy investment in a decade.



SWEDEN

Ortofta, Eslöv,
Skåne Region
55.91° N, 13.29° E

PATHWAY: BIOMASS COMBINED HEAT AND POWER



SEK 2.4 BILLION TOTAL INVESTMENT	2028 COMMISSIONING SCHEDULED	BIOMASS FORESTRY RESIDUES & REGIONAL BIOMASS	HEAT & POWER DUAL REVENUE MODEL
--	--	--	---

83 — Hawaii Renewables — Kapolei Renewable Fuels Facility

83

Kapolei, Hawaii, USA | Refinery conversion to renewable fuels | Renewable diesel and SAF



THE PROJECT

Par Pacific closed the Hawaii Renewables joint venture covering a renewable fuels facility at its Kapolei refinery, with Mitsubishi and ENEOS taking a 36.5 percent stake for \$100 million through the Alohi Renewable Energy vehicle. The project converts existing refinery units to process renewable feedstock for the Hawaiian fuel market.



THE EDGE

Hawaii imports essentially all of its liquid fuel across the Pacific, so producing renewable diesel and aviation fuel on the island carries a freight advantage that mainland plants supplying the same market cannot match.



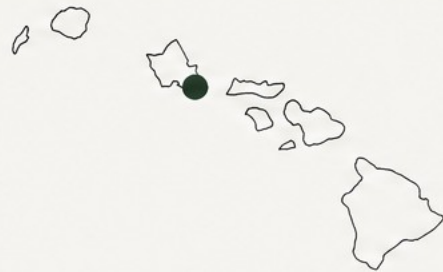
PROGRESS

CONSTRUCTION — Joint venture agreements signed July 2025; financing closed October 2025.



WHY IT'S HOT

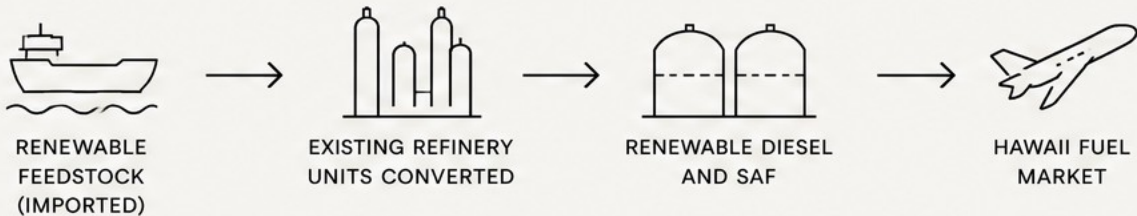
A joint venture closed with \$100 million of Japanese equity to convert refinery units for renewable fuels production.



UNITED STATES

Kapolei, Hawaii
21.335° N, 158.086° W

PATHWAY: REFINERY CONVERSION TO RENEWABLE FUELS



36.5%

STAKE TAKEN BY
MITSUBISHI AND
ENEOS

\$100M

JAPANESE EQUITY
INVESTMENT

CONVERTS

EXISTING REFINERY
UNITS TO PROCESS
RENEWABLE FEEDSTOCK

2 PRODUCTS

RENEWABLE DIESEL
AND SAF FOR THE
HAWAIIAN MARKET

84 — Copenhagen Infrastructure Partners — Nivalan Biokaasu

84

Nivala, Finland | Industrial-scale anaerobic digestion | Biomethane



THE PROJECT

Copenhagen Infrastructure Partners took final investment decision through its Advanced Bioenergy Fund I on Nivalan Biokaasu, set to be the largest industrial biogas plant in Finland. The plant digests agricultural and industrial organic feedstock from the surrounding region and upgrades the output to biomethane for the fuel and gas markets.



THE EDGE

Finland has abundant agricultural residue and a gas market that must be supplied largely by import, so domestic biomethane at industrial scale substitutes directly for imported molecules rather than competing with them.



PROGRESS

CONSTRUCTION — Final investment decision September 2025.



WHY IT'S HOT

What will be the country's largest industrial biogas plant was sanctioned, backed by a dedicated bioenergy fund.

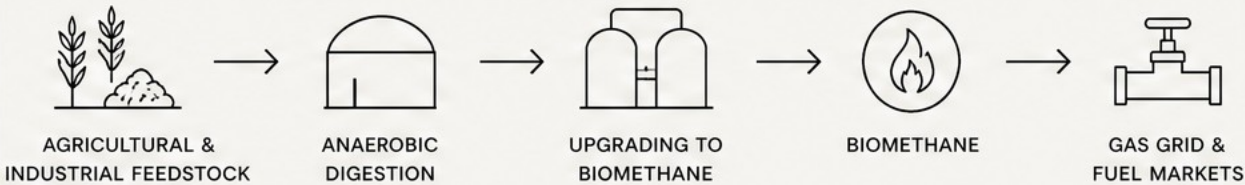


FINLAND

Nivala

64.42° N, 24.98° E

PATHWAY: ANAEROBIC DIGESTION TO BIOMETHANE



~300 GWh

BIOMETHANE OUTPUT
(EST. ANNUAL)

**FINLAND'S
LARGEST**

INDUSTRIAL BIOGAS
PLANT

100%

AGRICULTURAL &
INDUSTRIAL ORGANIC
FEEDSTOCK

**Advanced
Bioenergy
Fund I**

INVESTMENT VEHICLE

85 – MorGen Energy – Milford Haven Green Hydrogen Plant

85

Milford Haven, Wales, United Kingdom | 20 MW electrolysis | Green hydrogen



THE PROJECT

MorGen Energy, backed by Trafigura, took final investment decision on a 20 MW green hydrogen production facility at the Milford Haven Tax Site within the Celtic Freeport in Wales. The plant is located in an established energy port with existing industrial users and marine terminal infrastructure, and is intended to supply hydrogen into local industry and transport as the first production capacity of its kind in the region.



THE EDGE

Freeport tax status and an existing energy port cluster combine to improve project economics and shorten permitting, advantages a greenfield UK hydrogen site would have to build from nothing.



PROGRESS

CONSTRUCTION — Final investment decision March 2026.



WHY IT'S HOT

A 20 MW electrolyser inside a freeport energy cluster was sanctioned, with existing industrial users on the doorstep.



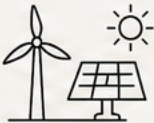
UNITED KINGDOM

Milford Haven, Wales

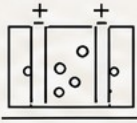
54.700° N, 5.045° W

Located at the Milford Haven Tax Site within the Celtic Freeport

PATHWAY: ELECTROLYSIS



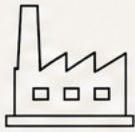
RENEWABLE
ELECTRICITY



ELECTROLYSER
(20 MW)



GREEN
HYDROGEN



INDUSTRY AND
TRANSPORT
USERS

20
MW

ELECTROLYSER
CAPACITY

~3,100
TONNES PER YEAR

GREEN HYDROGEN
OUTPUT (EST.)

Celtic
Freeport

TAX SITE LOCATION
ADVANTAGE

Trafigura

BACKING
AND SUPPORT

86 — Eni and Q8 — Priolo Biorefinery

86

Priolo, Sicily, Italy | Petrochemical site conversion to biorefining | Renewable fuels



THE PROJECT

Eni and Q8 Italy committed to a strategic investment converting the Priolo site in Sicily into a biorefinery, following board approval of the Versalis transformation plan by Eni and Kuwait Petroleum Corporation. The conversion repurposes petrochemical assets that were facing closure into renewable fuels production, retaining industrial employment on a site that has been central to Sicilian manufacturing and giving the operator additional biorefining capacity in southern Europe.



THE EDGE

Converting a site scheduled for closure preserves the workforce, permits and industrial infrastructure already there, which is what makes the economics work and what makes the decision politically durable in the region.



PROGRESS

CONSTRUCTION — Board approvals and investment commitment February 2026.



WHY IT'S HOT

Two shareholder boards committed to converting a petrochemical site facing closure into renewable fuels production.



ITALY

Priolo, Sicily

37.08° N, 15.20° E

PATHWAY: SITE CONVERSION TO BIOREFINING



EXISTING PETROCHEMICAL SITE

→



TRANSFORMATION PLAN APPROVED

→



ASSETS REPURPOSED

→



RENEWABLE FUELS PRODUCTION

→



SUPPLY TO TRANSPORT MARKETS

~1.0 Mt RENEWABLE FUELS CAPACITY (EST.)	2026 INVESTMENT COMMITMENT AND BOARD APPROVALS	100% CONVERSION OF EXISTING PETROCHEMICAL SITE	~1,000 INDUSTRIAL JOBS RETAINED
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87 — Zeon and Visolis — Bio-Isoprene and SAF Facility

87

United States, site selection under way | Fermentation to isoprene and jet fuel | Bio-isoprene and SAF



THE PROJECT

Zeon Corporation and Visolis signed a binding term sheet and took a final investment decision for a commercial-scale facility producing biobased isoprene monomer and sustainable aviation fuel from a shared fermentation platform. Feasibility work is complete and detailed engineering and permitting are proceeding while the site is selected from several candidates.



THE EDGE

One fermentation intermediate serves two markets at once — synthetic rubber and aviation fuel — so plant economics do not rest on a single product price, which is unusual in bio-based chemicals.



PROGRESS

PRE-CONSTRUCTION — Binding term sheet and investment decision February 2026; site not yet selected.



WHY IT'S HOT

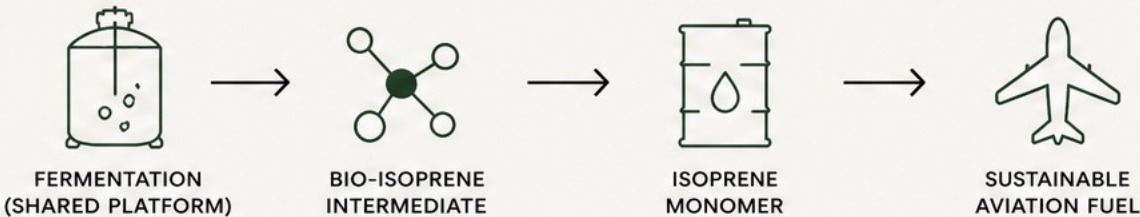
A binding term sheet and investment decision committed to commercial-scale production serving both rubber and aviation fuel markets.



UNITED STATES

Site selection under way
39.50° N, 98.35° W

PATHWAY: FERMENTATION TO ISOPRENE AND JET FUEL



TBD PLANT CAPACITY (TO BE DETERMINED)	TBD BIO-ISOPRENE OUTPUT (TO BE DETERMINED)	TBD SAF OUTPUT (TO BE DETERMINED)	2026 INVESTMENT DECISION FEBRUARY 2026
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88 — Repsol — Cartagena Renewable Hydrogen Electrolyser

88

Cartagena, Spain | 100 MW electrolysis | Green hydrogen



THE PROJECT

Repsol approved its first large electrolyser, at 100 MW, for the Cartagena industrial complex in Spain. The hydrogen supplies the company’s renewable fuels production at the same site, where a 250,000 tonne-a-year plant producing 100% renewable fuels is already operating. It is the first large electrolyser the company has sanctioned, and forms part of a wider programme of renewable hydrogen capacity across its Spanish industrial complexes.



THE EDGE

The electrolyser feeds a renewable fuels plant already running next door, so the hydrogen displaces purchased grey hydrogen in a process that is consuming it today rather than one that will exist later.



PROGRESS

CONSTRUCTION — Final investment decision October 2025.



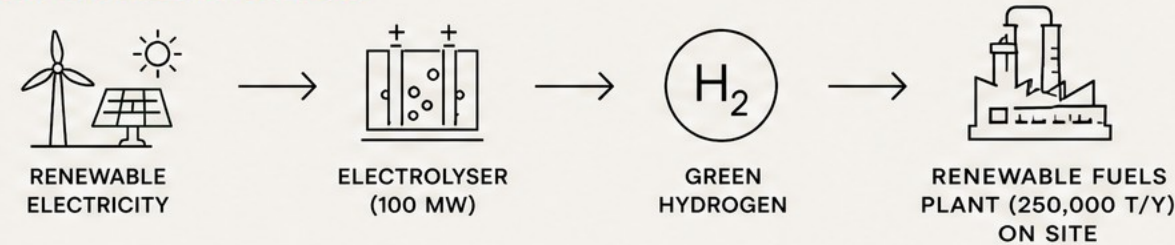
WHY IT’S HOT

A first 100 MW electrolyser was sanctioned to supply hydrogen into renewable fuels production already operating on the same site.



SPAIN
Cartagena, Region of Murcia
37.60° N, 0.99° W

PATHWAY: ELECTROLYSIS



100 MW ELECTROLYSER CAPACITY	~15,000 TONNES PER YEAR GREEN HYDROGEN OUTPUT (EST.)	250,000 TONNES PER YEAR RENEWABLE FUELS PLANT CAPACITY	100% RENEWABLE FUELS PLANT ALREADY OPERATING
---------------------------------------	---	---	---

89 — CF Industries, JERA and Mitsui — Blue Point Ammonia Complex

89

Ascension Parish, Louisiana, USA | Low-carbon ammonia with carbon capture | Ammonia



THE PROJECT

JERA, CF Industries and Mitsui took final investment decision on the Blue Point low-carbon ammonia complex in Ascension Parish, Louisiana, rated at 1.4 million tonnes a year at a cost of roughly \$4 billion. Production is targeted for 2029, with process carbon captured and permanently sequestered nearby. Output is intended for Japanese power generation as well as conventional Gulf Coast ammonia markets.



THE EDGE

The three partners span production, Japanese power-sector offtake and trading, so the project carries its own route to market in a fuel where demand is contracted between a small number of counterparts.



PROGRESS

CONSTRUCTION — Final investment decision April 2025; construction under way; production targeted 2029.



WHY IT'S HOT

A \$4 billion investment decision sanctioned 1.4 million tonnes a year of low-carbon ammonia with offtake partners in the ownership.

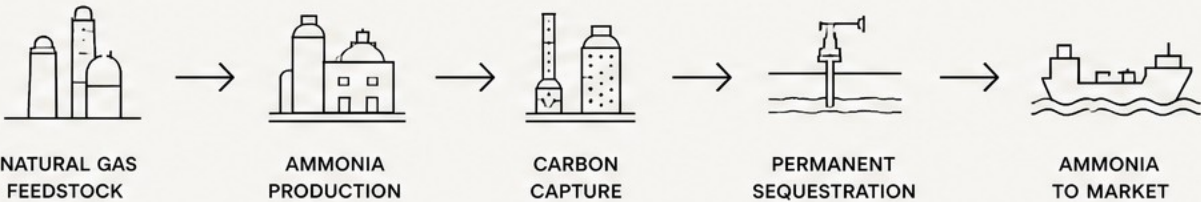


UNITED STATES

Ascension Parish,
Louisiana

30.07° N, 90.94° W

PATHWAY: LOW-CARBON AMMONIA WITH CARBON CAPTURE



1.4
MILLION TONNES
PER YEAR
AMMONIA
CAPACITY

~\$4
BILLION
PROJECT
COST

2029
TARGETED
PRODUCTION
START

CO₂
CAPTURED
AND PERMANENTLY
SEQUESTERED
NEARBY

90 – Navios Maritime Partners – Four Methanol-Ready Container Ships

90

Yeongdo, Busan, South Korea | Methanol-ready newbuilds | Low-carbon vessel capacity



THE PROJECT

Navios Maritime Partners committed \$460.4 million for four methanol-ready container ships of 8,850 TEU, at \$115.1 million each, built at HJ Shipbuilding and Construction’s Yeongdo yard in Busan. The vessels are scrubber-fitted, carry long-term charters at \$44,145 a day, and deliver between the second half of 2027 and the first quarter of 2028.



THE EDGE

Charters were attached at acquisition, so the vessels earn contracted revenue from delivery. Methanol readiness then provides fuel optionality without requiring the fuel to be available on day one.



PROGRESS

CONTRACTED — Four firm vessels; delivery H2 2027 to Q1 2028; charters in place.



WHY IT’S HOT

Four firm methanol-ready vessels were committed at \$460 million with long-term charters attached from delivery.

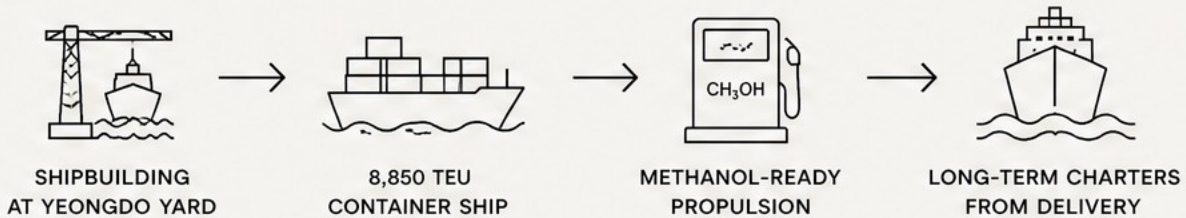


SOUTH KOREA

Yeongdo, Busan,
South Korea

35.10° N, 129.06° E

PATHWAY: METHANOL-READY SHIPPING



\$460.4M

TOTAL COMMITMENT
FOR FOUR VESSELS

8,850

TEU CAPACITY
PER VESSEL

\$44,145

DAILY CHARTER RATE
PER VESSEL

**H2 2027–
Q1 2028**

DELIVERY WINDOW

91 – Meadow Lake Tribal Council and Carbon Alpha – North Star BECCS

91

Saskatchewan, Canada | Bioenergy with carbon capture | Durable carbon removal



THE PROJECT

North Star is a bioenergy carbon capture project in Saskatchewan majority-owned by the Meadow Lake Tribal Council, with capture technology and pre-construction funding from Carbon Alpha, now a Svante subsidiary. Microsoft signed a fifteen-year offtake for 626,000 tonnes of durable carbon dioxide removal, with commercial operation targeted for 2029. The project is in design, with the technology partner funding pre-construction costs ahead of a construction decision.



THE EDGE

Majority Indigenous ownership of an industrial carbon removal asset is rare, and a fifteen-year corporate offtake at this volume gives the project revenue certainty most removal developers cannot obtain before construction.



PROGRESS

PRE-CONSTRUCTION — Fifteen-year offtake signed April 2026; commercial operation targeted 2029.



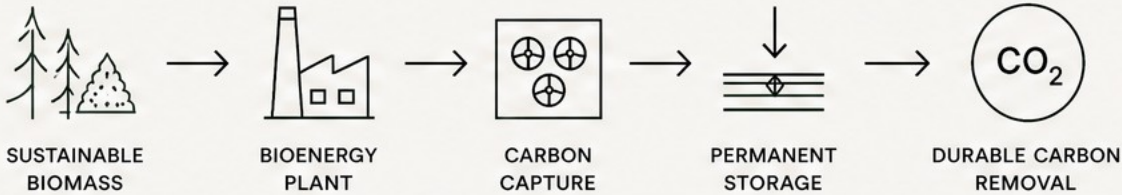
WHY IT'S HOT

A fifteen-year, 626,000-tonne removal offtake anchored a project majority-owned by a First Nations council.



CANADA
Saskatchewan
55.17° N, 106.67° W

PATHWAY: BIOENERGY WITH CARBON CAPTURE



626,000
TONNES

DURABLE CO₂ REMOVAL
OFTAKE OVER
FIFTEEN YEARS

15
YEARS

MICROSOFT OFFTAKE
AGREEMENT
DURATION

2029

TARGETED
COMMERCIAL
OPERATION

**Meadow Lake
Tribal Council**

MAJORITY OWNER
OF THE PROJECT

92 – Alpha Bio – Bio-Based Materials Plant

92

Hanko, Finland | Fermentation of plant sugars | *Biopolymers*



THE PROJECT

Alpha Bio, a joint venture between Kemira and IFF, is developing a EUR 130 million plant converting up to 44,000 tonnes of plant sugars into biopolymers. In June 2026 the partners moved the site from Kotka to IFF's Hanko location and re-phased commercial production to 2029, with engineering and permitting continuing.



THE EDGE

The two owners bring complementary positions — one supplies water treatment and paper chemicals markets, the other holds the fermentation technology — so the output has a route to established industrial customers on both sides.



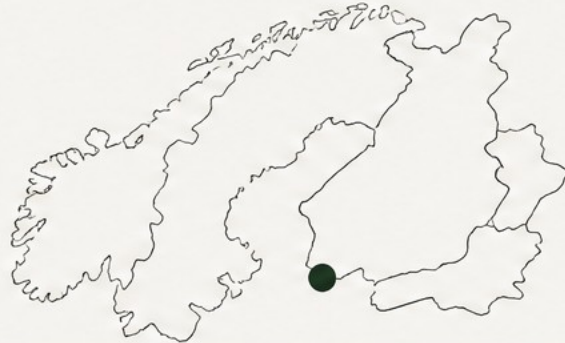
PROGRESS

PERMITTING AND ENGINEERING — Site relocated to Hanko June 2026; commercial production re-phased to 2029.



WHY IT'S HOT

A biopolymer joint venture advanced through engineering and permitting, relocating its site and re-phasing production to 2029.

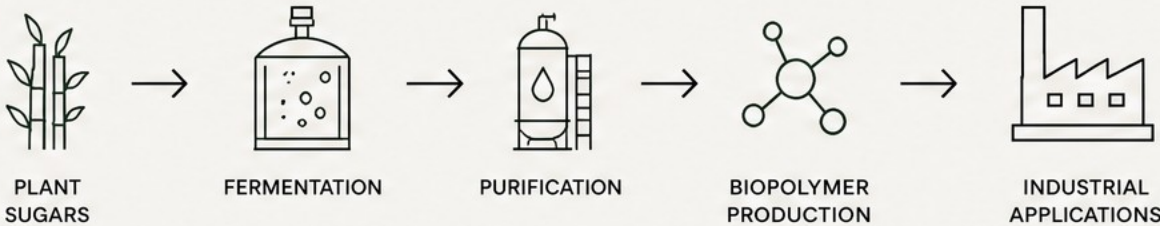


FINLAND

Hanko, Uusimaa

59.83° N, 22.97° E

PATHWAY: FERMENTATION OF PLANT SUGARS



€130
MILLION

PROJECT
INVESTMENT

44,000
TONNES PER YEAR

PLANT SUGARS
CONVERTED (UP TO)

2029

COMMERCIAL
PRODUCTION
TARGETED

JV

KEMIRA AND IFF
JOINT VENTURE

93 — SAF One — Bahrain SAF Production Facility

93

Kingdom of Bahrain | HEFA hydroprocessing of used cooking oil and waste fats | Sustainable aviation fuel



THE PROJECT

SAF One, a Dubai-based developer co-founded by Novus Aviation Capital, is building the first sustainable aviation fuel production facility in the Middle East, converting used cooking oil and waste fats by HEFA hydroprocessing to ASTM D7566 specification. Tata Projects was appointed engineering and construction contractor in January 2026, and DHL Express signed a ten-year offtake in May 2026. Production is planned from 2028.



THE EDGE

The offtake is written on a book-and-claim basis, so DHL can allocate the fuel across its network rather than uplift it in Bahrain, and the same plant design is under discussion for a second site in India.



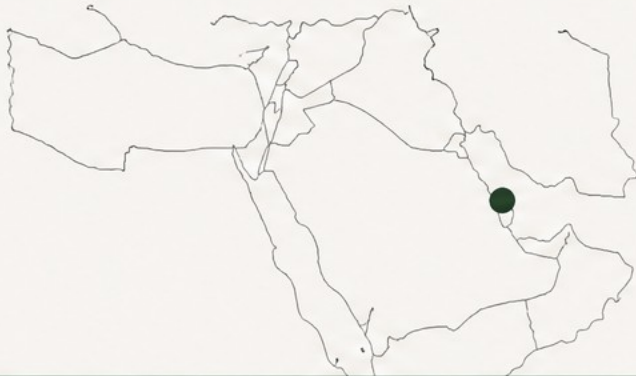
PROGRESS

PRE-CONSTRUCTION — EPC contractor appointed January 2026; ten-year DHL offtake signed May 2026; production planned from 2028.



WHY IT'S HOT

A ten-year, 250,000-tonne offtake anchors the first sustainable aviation fuel plant in the Middle East.



KINGDOM OF BAHRAIN

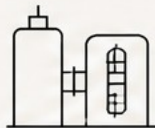
Manama, Bahrain

26.23° N, 50.58° E

PATHWAY: HEFA HYDROPROCESSING



USED COOKING OIL
AND WASTE FATS



HEFA
HYDROPROCESSING



SUSTAINABLE
AVIATION FUEL



AVIATION
MARKET

250,000
TONNES

TEN-YEAR OFFTAKE
VOLUME

~250
MILLION LITRES

SAF OUTPUT
PER YEAR (EST.)

2028

PRODUCTION
PLANNED
FROM

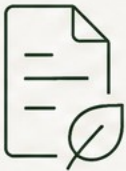
HEFA

TECHNOLOGY
HYDROPROCESSING
ASTM D7566 SAF

94 — Norwegian Hydrogen — Rjukan Hydrogen Plant

Rjukan, Norway | 25 MW electrolysis | Green hydrogen

94



THE PROJECT

Norwegian Hydrogen took the investment decision for a green hydrogen plant at Rjukan with 25 MW of electrolysis capacity, due for completion at the end of 2027. Rjukan is a historic hydropower and industrial hydrogen site, and the plant is intended to supply transport and industrial customers in Norway and neighbouring markets.



THE EDGE

Norwegian hydropower delivers firm, low-cost and low-carbon electricity around the clock, giving an electrolyser here a capacity factor and power cost that wind or solar-supplied projects elsewhere cannot approach.



PROGRESS

CONSTRUCTION — Final investment decision April 2025; completion targeted end-2027.



WHY IT'S HOT

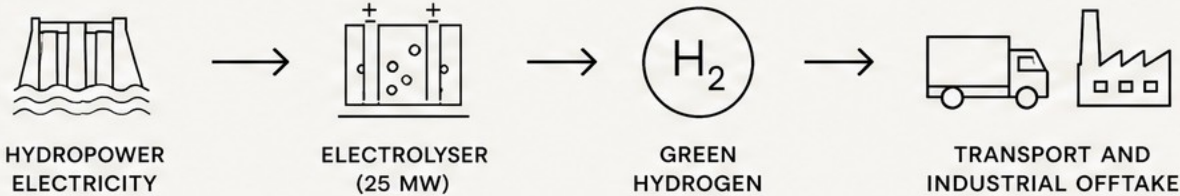
A 25 MW electrolyser was sanctioned at a hydropower site offering firm, low-cost renewable electricity around the clock.



NORWAY

Rjukan, Telemark
59.88° N, 8.61° E

PATHWAY: ELECTROLYSIS



25
MW
ELECTROLYSER
CAPACITY

~9,000
TONNES PER YEAR
GREEN HYDROGEN
OUTPUT (EST.)

2027
COMPLETION
TARGETED FOR
END OF 2027

Transport &
Industry
OFFTAKE IN NORWAY
AND NEIGHBOURING
MARKETS

95 — Hapag-Lloyd — Eight Methanol Dual-Fuel Container Ships

95

CIMC Raffles yard, China | Methanol dual-fuel newbuilds | Low-carbon vessel capacity



THE PROJECT

Hapag-Lloyd signed a contract with CIMC Raffles for eight container ships of 4,500 TEU equipped with dual-fuel methanol engines, at an investment above \$500 million, with delivery in 2028 and 2029. It is the operator’s first newbuild programme using methanol propulsion, and the vessels are reported as up to 30 percent more efficient than older ships in the same class.



THE EDGE

The order commits an operator whose existing alternative-fuel fleet is built around liquefied gas to a second and separate fuel pathway, which broadens where green methanol demand is likely to come from.



PROGRESS

CONTRACTED — Firm contract signed December 2025; delivery 2028 and 2029.



WHY IT’S HOT

A firm order above \$500 million committed eight methanol dual-fuel vessels, the operator’s first methanol newbuild programme.

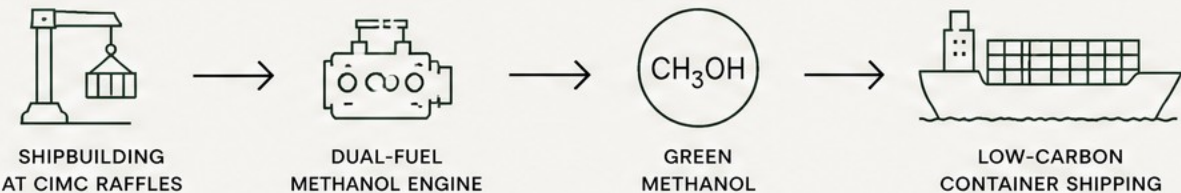


CHINA

CIMC Raffles yard,
China

31.23° N, 121.47° E

PATHWAY: METHANOL DUAL-FUEL SHIPPING



8
SHIPS

4,500 TEU
EACH

>\$500M

INVESTMENT
COMMITTED

2028-2029

DELIVERY
SCHEDULE

~30%

MORE EFFICIENT
THAN OLDER SHIPS
IN SAME CLASS

96 — Luxcara and GreenH — Bodø Hydrogen Project

96

Bodø, Norway | 20 MW electrolysis, phase one | Green hydrogen for maritime use



THE PROJECT

Luxcara and GreenH took final investment decision on the Bodø hydrogen project in northern Norway, a phase-one 20 MW electrolyser producing up to 3,100 tonnes of hydrogen a year with commercial operation targeted for 2026. The plant is designed principally to supply hydrogen-fuelled maritime traffic along the Norwegian coast, where ferry and coastal route operators face emissions requirements in their public service contracts that conventional fuels cannot satisfy.



THE EDGE

Hydrogen supply is committed to coastal shipping routes where vessel operators face specific regulatory requirements, so demand is anchored to a defined route network rather than a general industrial market.



PROGRESS

CONSTRUCTION — Final investment decision January 2025; commercial operation targeted 2026.



WHY IT'S HOT

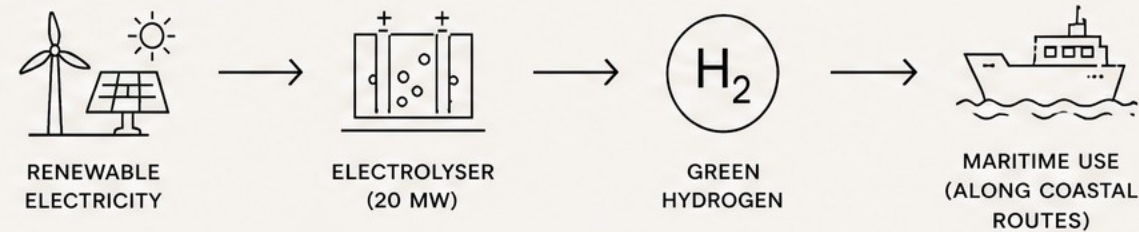
A 20 MW electrolyser was sanctioned to supply hydrogen-fuelled maritime traffic on defined coastal service routes.



NORWAY

Bodø, Nordland County
67.27° N, 14.39° E

PATHWAY: ELECTROLYSIS



20
MW
ELECTROLYSER
CAPACITY

~3,100
TONNES PER YEAR
GREEN HYDROGEN
OUTPUT (EST.)

2026
TARGETED
COMMERCIAL
OPERATION

**Maritime
Use**
DESIGNED FOR
COASTAL SHIPPING

97 — Acelen Renewables — Bahia SAF Biorefinery

97

Bahia, Brazil | Macaúba and vegetable oil biorefining | Sustainable aviation fuel



THE PROJECT

Acelen Renewables, backed by Mubadala, secured a \$1.5 billion financing package led by HSBC and the International Finance Corporation with ten institutions participating, for a biorefinery in Bahia designed to produce around a billion litres of sustainable aviation fuel a year. The project is developed alongside a macaúba cultivation programme supplying feedstock.



THE EDGE

Developing a dedicated feedstock crop in parallel with the plant addresses the constraint every large SAF project faces, and multilateral participation in the debt package signals the structure survived detailed lender diligence.



PROGRESS

CONSTRUCTION — \$1.5 billion financing package secured May 2026.



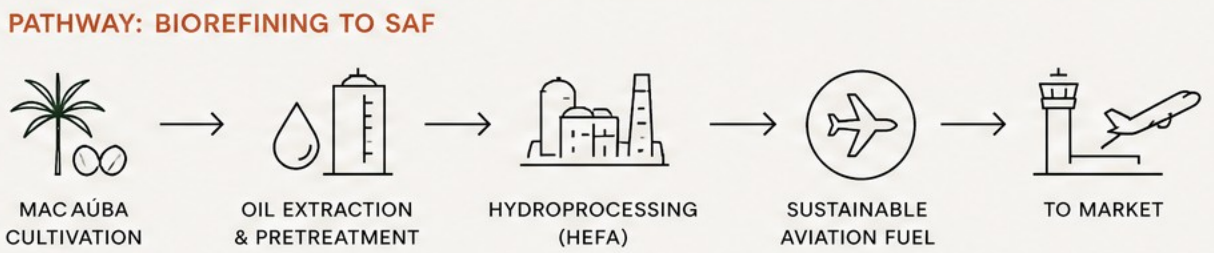
WHY IT'S HOT

A \$1.5 billion financing package closed with multilateral participation for a billion-litre aviation fuel biorefinery.



BRAZIL

Bahia
12.97° S, 38.51° W



~1 BILLION LITRES PER YEAR SAF PRODUCTION CAPACITY (EST.)	\$1.5BN FINANCING PACKAGE LED BY HSBC AND IFC WITH 10 INSTITUTIONS	100% SAF OUTPUT TARGETED	Macaúba DEDICATED FEEDSTOCK CROP PROGRAMME IN PLACE
--	---	---	--

98 — Verdalia Bioenergy — Spanish and Italian Biomethane Portfolio

98

Spain and Italy | Anaerobic digestion platform | Biomethane



THE PROJECT

Verdalia Bioenergy closed a EUR 671 million corporate financing, the largest recorded in European biomethane, to build out a portfolio of plants across Spain and Italy exceeding 3 TWh of annual capacity. The platform acquires and develops individual digesters under a single corporate structure rather than financing each asset separately.



THE EDGE

Corporate-level financing lets the platform move on acquisitions and construction without arranging project debt set by site, a speed advantage over single-asset developers competing for the same plants.



PROGRESS

CONSTRUCTION — EUR 671 million corporate financing closed October 2025; portfolio buildout under way.



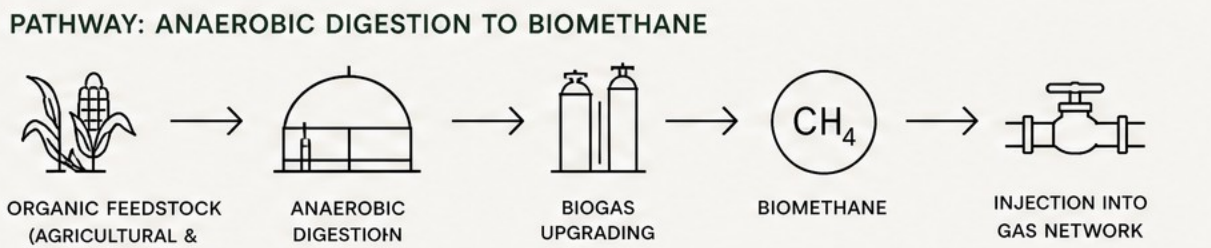
WHY IT'S HOT

The largest corporate financing in European biomethane closed, funding buildout of a portfolio exceeding 3 TWh of capacity.



SPAIN AND ITALY

Southern Europe
Spain: 40.0° N, 4.0° W
Italy: 42.0° N, 12.0° E



671 EUR MILLION CORPORATE FINANCING	>3 TWh ANNUAL BIOMETHANE CAPACITY (PORTFOLIO)	LARGEST CORPORATE FINANCING RECORDED IN EUROPEAN BIOMETHANE	SPAN & ITALY DIVERSIFIED PORTFOLIO UNDER SINGLE CORPORATE STRUCTURE
--	--	---	---

99 — ACME Group — Duqm Green Hydrogen and Ammonia Project

99

Duqm, Oman | Solar-powered electrolysis and ammonia | Green ammonia



THE PROJECT

ACME Group signed an investment agreement covering the second and third phases of its green hydrogen and ammonia project at Duqm in Oman. Phase one is under construction with commissioning expected during the year, and the site is designed to export green ammonia to Asian and European buyers from the adjacent port.



THE EDGE

Oman offers high solar irradiance, available land and a deepwater export port together, a combination that gives Duqm a delivered cost position most green ammonia locations cannot match.



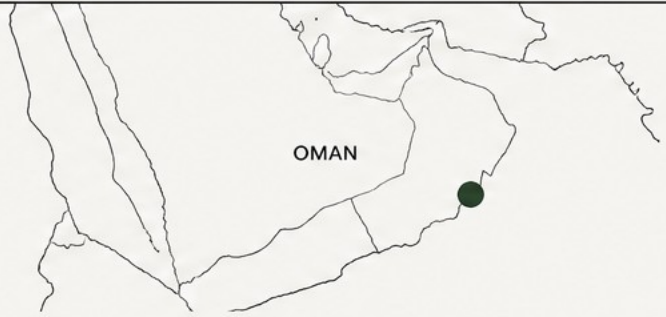
PROGRESS

CONSTRUCTION — Phase one under construction; investment agreement for phases two and three signed June 2026.



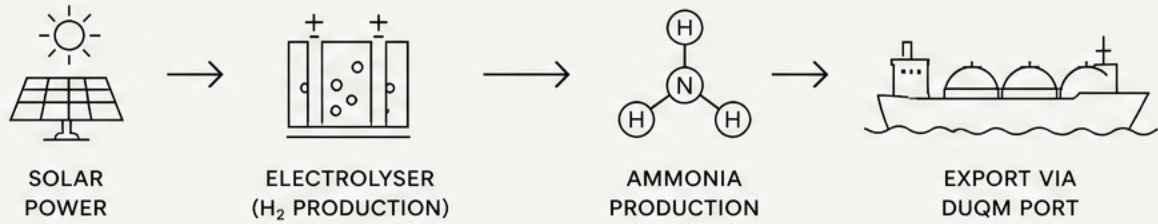
WHY IT'S HOT

An investment agreement was signed for the second and third phases while the first phase remained under construction.



OMAN
Duqm, Oman
17.03° N, 56.17° E

PATHWAY: SOLAR-POWERED ELECTROLYSIS AND AMMONIA



Phases 2 & 3 INVESTMENT AGREEMENT SIGNED	Phase 1 Under Construction COMMISSIONING EXPECTED THIS YEAR	Export Ready TO ASIAN AND EUROPEAN BUYERS	Duqm Advantage HIGH SOLAR, LAND AND DEEPWATER PORT
--	---	---	--

#100 — GMT Biogas — UK Biomethane Platform

United Kingdom | Anaerobic digestion platform | Biomethane

100



THE PROJECT

GMT Biogas secured a GBP 195 million project finance package from ING to build out its UK biomethane platform, which comprises one operating plant, three greenfield projects and eleven earlier-stage developments. The company is backed by SWEN Capital Partners and Rika Biotech and injects upgraded biomethane into the gas network.



THE EDGE

A single debt package covering a whole development pipeline rather than one asset lets the platform build sequentially without returning to lenders for each plant, which is how a portfolio gets built at pace.



PROGRESS

CONSTRUCTION — GBP 195 million project finance package secured April 2026; buildout under way.



WHY IT'S HOT

A GBP 195 million project finance package was secured to build out a pipeline of fifteen UK biomethane developments.



UNITED KINGDOM

54.12° N, 3.23° W

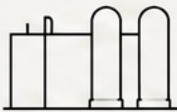
PATHWAY: ANAEROBIC DIGESTION TO BIOMETHANE



ORGANIC WASTE
INPUTS



ANAEROBIC
DIGESTION



BIOMETHANE
UPGRADING



GRID
INJECTION

GBP 195
MILLION

PROJECT FINANCE
SECURED

15

DEVELOPMENTS

PIPELINE COMPRISES
1 OPERATING, 3 GREENFIELD,
11 EARLIER-STAGE

BIOMETHANE

UPGRADED BIOMETHANE
INJECTED INTO THE
GAS NETWORK

BACKED BY

SWEN CAPITAL PARTNERS
AND RIKA BIOTECH