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Technology Collaboration Programme

Biomass and waste gasification in Sweden

Country Report Sweden

IEA Bioenergy: Task 33

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Biomass and waste gasification in Sweden

Country report for Sweden

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EXECUTIVE SUMMARY

As of October 2026, Sweden only has one commercial-scale industrial biomass gasifier in operation. This is the Meva Energy's cyclone gasification plant at Sofidel's tissue mill in Kisa, which converts wood pellets into producer gas for tissue drying. The plant has a rated producer gas output of 4.5 MW and produces biochar as a co-product. Meva is also developing projects for Elcowire in Helsingborg and IKEA Industry in Poland. A small-scale gasification plant for combined heat and power (CHP) production is installed at Svinnegarn Huseby Säteri near Enköping. The status of an earlier small-scale CHP installation at Emåmejeriet is unknown. No commercial Swedish gasification plant producing upgraded fuels such as biomethane or methanol is operating. The former Cortus WoodRoll gasifier installed at the steel plant in Höganäs is no longer operating. However, the company Nordic BioPower restarted biochar production at the site in 2026.

Several Swedish projects aim to extend gasification beyond heat production. VärmlandsMetanol proposes a forest-residue gasification plant in Hagfors producing biomethanol. Green Birch in Umeå proposes to convert residual waste into methanol and then sustainable aviation fuel, boosting with renewable hydrogen. SCA and St1's Biorefinery Östrand project combines biomass gasification, electrolysis and Fischer–Tropsch synthesis, with site preparation under way. Plagazi's proposed waste-to-hydrogen project received an EU grant, but the company's bankruptcy has left its funding and future uncertain. FerroSilva's biomass-based iron-reduction project also remains under development.

Sweden's present activity builds on a substantial history of research, piloting and demonstration. The Swedish Gasification Centre (2011–2021) linked universities and industry through three technology-focused research nodes, with a budget of €54 million. Facilities at Chalmers, KTH, LTU Green Fuels and RISE ETC supported work on biomass and waste conversion, synthesis-gas cleaning and upgrading.

Public funding, including the Swedish Energy Agency's Industriklivet and the EU Innovation Fund, may support development and demonstration. Overall, Sweden retains strong research expertise and an active pipeline of projects, while commercial gasification remains concentrated in industrial heat and the proposed fuel-production plants have yet to reach operation.

CURRENT GASIFICATION PLANT STATUS AT A GLANCE

Table 1 summarizes the present status of biomass and waste gasification projects and commercial actors in Sweden.

Table 1. Current status of biomass and waste gasification initiatives in Sweden.

Facility or initiative	Feedstock and route	Status at October 2026
Meva Energy at Sofidel, Kisa	Cyclone gasification of wood residues/pellets. The producer gas output is 4.5 MW and used for tissue drying	Operating since 2024.
Höganäs site, formerly Cortus Energy's WoodRoll® concept	WoodRoll® converted biomass into synthesis gas through three separate stages: drying, pyrolysis and indirect steam gasification of the resulting char. Producer gas replaced LPG at Höganäs steel plant.	The gasifier is shut down. The site is now operated by Nordic Bio Power for biochar and heat production via the pyrolysis unit. Production restarted 11 May 2026.
Biorefinery Östrand, Timrå (SCA and St1)	Gasification of forest residues with supply of renewable H_2 for Fischer–Tropsch fuels (SAF & naphta)	Development and site preparation. Permitted for up to 300,000 t/y renewable fuels. No FID announced.
Green Birch, Umeå (Braathens Renavia, Mena, Umeå Energi)	Gasification of residual waste to methanol followed by jet fuel production. Additional supply of renewable H_2.	Pre-FEED. Target start-up around 2032.
FerroSilva at Ovako, Hofors	Gasification of forest residues. Synthesis gas used in a shaft-furnace for reduction of iron ore.	Industrial development project. An earlier announced demonstration target 2026 is not confirmed as achieved. No FID announced.
BioShare projects	Residual biomass, boiler integration; gasification and related thermochemical routes	Feasibility studies and pilot verification are active. No commercial Swedish gasification plant in operation.
VärmlandsMetanol, Hagfors	Gasification of forest residues to biomethanol.	Environmental permit application submitted in June 2025. Court notice published December 2025 with consultation deadline in February 2026. No final permit or FID announced.

Background

Biomass is an important part of Sweden's energy system. In 2024, the total supply of biomass was approximately 135 TWh, or about 26% of total energy supply (512 TWh), see Figure 1. The biomass supply fell by around 15 TWh from 2023, mainly because of lower use in transport (Swedish Energy Agency, 2026a).

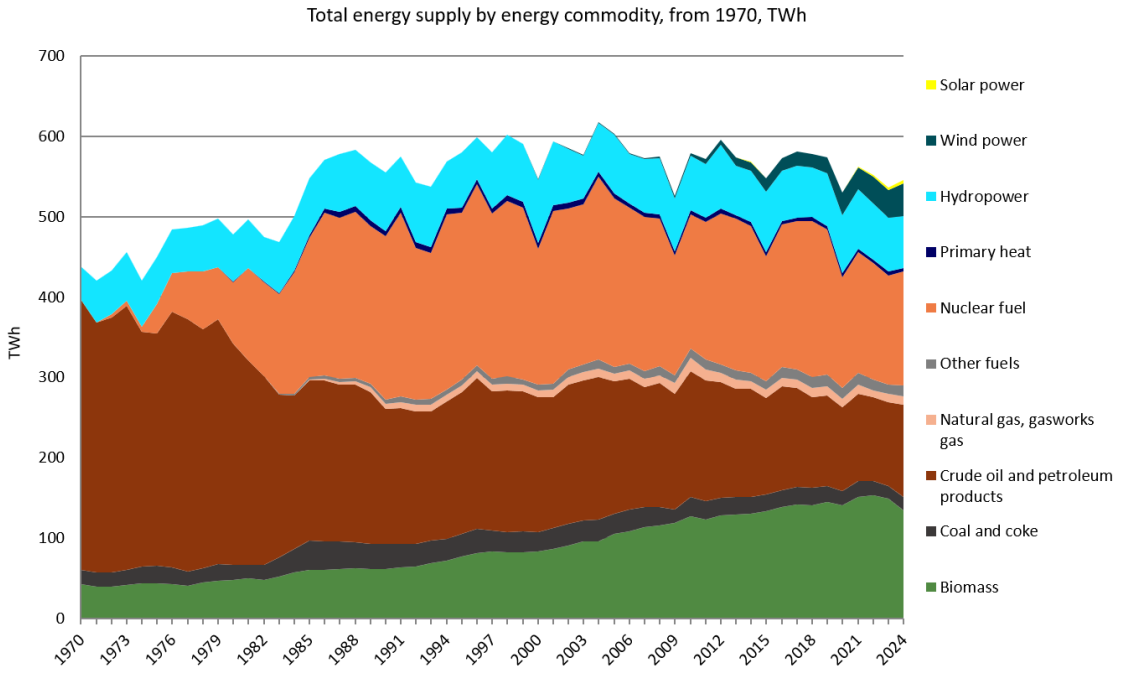


Figure 1. Total energy supply by energy commodity, 1970-2024, TWh per year

Biomass is a particularly important energy commodity in Swedish industry, where their use approached 60 TWh in 2024 (Swedish Energy Agency, 2026b). Domestic supplies include by-products and residues from forestry, forest industries and agriculture. Sweden also currently imports biomass feedstocks (Swedish Energy Agency, 2026a).

Swedish forests primarily supply raw material for products such as sawn timber, pulp and paper. Preliminary statistics for 2025 show that just under half of net fellings consisted of coniferous sawlogs and 44% of pulpwood (Swedish Forest Agency, 2026). Energy conversion of forest biomass draws substantially on logging residues, including branches and tops, and on forest-industry by-products such as bark and sawdust (Swedish Energy Agency, 2026a).

The 2025 release from the Swedish National Forest Inventory, based on field data collected from 2020 to 2024, estimated mean annual volume increment at 122.4 million m^3_{sk} and mean annual total drain at 94.9 million m^3_{sk}. Total drain comprises 81.7 million m^3_{sk} of harvested living trees and 13.2 million m^3_{sk} of natural losses. Sweden has a net tree growth and the country's standing timber volume currently exceeds 3.6 billion m^3_{sk} (Swedish University of Agricultural Sciences [SLU], 2025, 2026).

Sweden has a long history of research, piloting and demonstration in biomass and waste gasification. From 2011 to 2021, the Swedish Gasification Centre (SFC) connected universities and industry through a national programme for research, development and postgraduate education in thermal gasification. The centre had a total budget of SEK 540 million and three research nodes focused on gasification technologies with industrial relevance. Its work drew on pilot facilities, including Chalmers' indirect dual-fluidised-bed biomass gasifier and the

entrained-flow gasifiers at RISE ETC and LTU Green Fuels in Piteå. These facilities supported research on biogenic feedstocks, gasification, and the upgrading and use of synthesis gas. The programme also strengthened Sweden's expertise in the field ((Adeoye et al., 2026; Thunman et al., 2018).

This report reviews biomass and waste gasification in Sweden, including operating facilities, completed demonstrations, projects under development, research capacity and relevant policy instruments. The status date is October 2026. Project capacities and schedules reflect information published by project owners or public partners.

INDUSTRIAL GASIFICATION FACILITIES AND TECHNOLOGY DEVELOPERS

This section summarises commercial gasification activity and technology development in Sweden.

Meva Energy and the Kisa installation

Meva Energy's modular, on-site cyclone gasification system converts prepared biomass residues into producer gas for industrial heat applications. Biochar is produced as a co-product.

At Sofidel's tissue mill in Kisa, the plant gasifies wood pellets and supplies producer gas to replace fossil LPG in tissue drying. The unit has a rated producer-gas output of 4.5 MW. It was inaugurated in 2024, followed by commissioning and operational optimisation (Meva Energy, 2024a, n.d.). The plant consumes approximately 1,300 kg of wood pellets per hour and also produces biochar.

During a full-scale AgRawGas test, the Kisa plant processed 15 tonnes of oat husks continuously over 17 hours. The test showed that this agricultural residue could be gasified. Compared with standard wood pellets, however, gasification efficiency and biochar yield were lower, pressure drop increased in part of the gas-cleaning system, and the particle load was higher. These results indicate that operating conditions may need to be adjusted for different feedstocks (Kayser, 2025).

Meva has announced a 15-year agreement to supply 9 MW of renewable gas to Elcowire's Helsingborg facility. Under the agreement, Meva is to design, own and operate the planned on-site plant; it is a development project and is not yet operating (Meva Energy, 2024b). In October 2025, the European Investment Bank signed a €40 million venture-debt agreement to support Meva's expansion and the construction or optimisation of plants in eligible countries (European Investment Bank, 2025).

Meva Energy is also developing an on-site gasification and power plant at IKEA Industry's Zbąszynek factory in Poland. The project is intended to convert wood residues from furniture and board production into renewable gas for heat and power, with biochar as a co-product. Although the company initially communicated a start-up in 2026, the plant remains under construction; operation is now expected in 2027.



Figure 2. Photo of the first piece of paper dried using gas from the Meva Energy gasification plant at Sofidel tissue mill in Kisa.

BioShare

BioShare develops boiler-integrated thermochemical conversion concepts, including fluidised-bed configurations intended to add products such as biomethane, biochar or renewable gases to existing heat and power infrastructure. Its project portfolio includes feasibility studies on boiler conversion, pilot verification of a dual-chamber-bed concept, and studies of biomass-to-methane and biomass-to-methanol pathways.

BioShare has also introduced CEREX™ (Carbon Efficient Recycling with Electricity to X) as an alternative to conventional biomass CHP, see Figure 3. The concept is designed to convert biomass into renewable gases including biomethane and e-methane as well as biochar, while also producing some heat and electricity. The process captures CO_2 during post-treatment and uses electrolysis to provide operational flexibility. The company proposes that CEREX could be retrofitted to existing CHP infrastructures. For a 40 MW fuel-input plant with an annual operation of 8,200 hours, BioShare estimates reduced CO_2 emissions of up to 80,000 tonnes of CO_2-equivalent (BioShare AB, 2025).

These activities currently remain at the feasibility or pilot stage (BioShare AB, 2026).

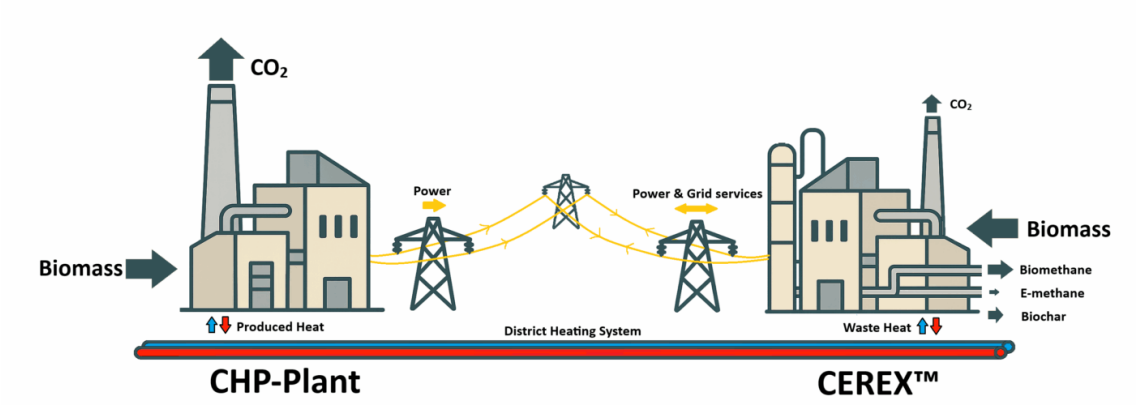


Figure 3. The CEREX™ Process by BioShare (Illustraion from BioShare, 2026)

Höganäs and the former Cortus WoodRoll® project

Cortus Energy developed the staged pyrolysis and gasification process WoodRoll® and built a 6 MW_{th} installation at Höganäs AB's steelworks. The project aimed to supply renewable gas to industrial furnaces, but commercial start-up was delayed. Cortus Energy announced its decision to file for bankruptcy in March 2025. Nordic Bio Power acquired the site and assets in October 2025 and restarted biochar production in May 2026. Its current public description focuses on biochar and renewable heat (Cortus Energy, 2025; Nordic Bio Power, 2025, 2026).

Other Swedish technology developers

Scanarc Plasma Technologies AB develops industrial plasma systems that convert electricity into hot gas. Their connection to gasification comes principally from its earlier pyroarc waste-treatment development. Pyroarc combined a counter-current shaft gasifier, where solid waste was converted with preheated air into pyrolysis gas and vitrified slag, with a plasma-assisted reactor that decomposed the gas into fuel-gas components. The European Commission's LIFE project record says the process components were tested at 200–400 kg/h in short 6–8-hour runs. No current operating Swedish biomass- or waste-gasification facility involving Scanarc technology has been identified. (European Commission, n.d.; Scanarc Plasma Technologies AB, n.d.).

The gasification developer Phoenix Biopower filed for bankruptcy in February 2025 (Phoenix biopower, 2025).

SMALL-SCALE BIOMASS GASIFIERS FOR COMBINED HEAT AND POWER (CHP) PRODUCTION

The latest small-scale biomass-gasification CHP installation is at Svinnegarn Huseby Säteri near the city of Enköping. Here, a Volter system gasifies wood chips, for producer gas use in an engine-generator. It is rated at 50 kW_e and 130 kW_{th} and was reported to be operating in June 2024. No data on operating hours or annual generation has been found. (Anläggningsvärlden, 2024).

An earlier Volter gasification system operated at Emåmejeriet in Hultsfred from 2015. The downdraft fixed-bed unit used dried wood chips and was rated at 40 kW_e and 100 kW_{th}. Emåmejeriet paused their production in 2024. The site and equipment were sold before the company later became insolvent. The gasifier's current location and operating status are unknown (Dagens Hultsfred, 2024; SVT Nyheter, 2024).

PROJECTS UNDER DEVELOPMENT

Biorefinery Östrand

The Swedish timber, pulp and paper manufacturer SCA and the energy company St1 are developing a biorefinery next to SCA's Östrand pulp mill. The concept combines solid-biomass gasification, Fischer–Tropsch synthesis and electrolysis to produce sustainable aviation fuel (SAF) and renewable naphtha. SCA reports that the project has a permit for up to 300,000 tonnes of renewable fuels per year and that site preparation is under way. No final investment decision has yet been announced (Biorefinery Östrand, 2026; SCA, n.d.).



Figure 4. Illustration of the planned Biorefinery Östrand plant. (Illustration by Gatun Arkitekter found at https://www.biorefineryostrand.com/en/the-biorefinery/)

The Green Birch project by Braathens Renavia, Umeå

The Green Birch project is being developed by the companies Braathens Renavia and Mana, with Umeå Energi and Umeå Eco Industrial Park as regional partners. The Green Birch project proposes gasifying mixed residual waste, cleaning the resulting synthesis gas, adding renewable hydrogen to produce methanol, and upgrading the methanol to sustainable aviation fuel (SAF). In January 2026, the partners announced continued collaboration and €1 million in Swedish Energy Agency support for project development. Planned product outputs are about 100,000 tonnes per year of SAF, diesel and naphtha, alongside more than 500 GWh per year of residual heat for district heating. The project remains at the pre-FEED and development stage, with an investment decision targeted for around 2028 and production start expected in 2031–2032 (Umeå Eco Industrial Park, 2026; Furusjö, 2026).



Figure 5. Illustration of the planned Green Birch project in Umeå (https://www.greenbirch.info/the-site-in-umea)

VärmlandsMetanol in Hagfors

VärmlandsMetanol proposes a forest-residue gasification plant in Hagfors to produce biomethanol. The planned plant capacity is 111 MW of biomass input and 74 MW of methanol output (about 315 tonnes per day). There are already expansion discussions to produce an additional 200 tonnes per day by combining the surplus biogenic CO_2 with renewable hydrogen. The company reports that biomass and power are secured and that it has signed offtake agreements with an international shipping company. The estimated investment is approximately €400 million. The environmental permit application was submitted in June 2025, and the Land and Environment Court invited comments on the application and environmental impact assessment in December 2025, with a deadline of 18 February 2026. No final permit or investment decision has yet been reported. (SVT Nyheter, 2025; Vänersborg District Court, 2025; VärmlandsMetanol AB, n.d., 2026).

Plagazi plasma-gasification at Gävle Circular Park

Plagazi projected a plasma-gasification facility at Forsbacka, near Gävle, to convert non-recyclable waste into fuel-cell-grade hydrogen. At full capacity, the design was intended to process up to 74,000 tonnes of waste and produce 10,600 tonnes of hydrogen per year. In May 2025, the European Climate, Infrastructure and Environment Executive Agency (CINEA) awarded the project a €29.5 million grant from the EU Innovation Fund (Plagazi AB, 2025).

Plagazi was declared bankrupt on 27 May 2026. CINEA subsequently announced its intention to discontinue the grant. The funding could be reconsidered if the bankruptcy administrator or a purchaser presents a viable proposal to continue the project; its status is therefore uncertain (MAQS Advokatbyrå, 2026).

FerroSilva and biomass-based iron reduction

FerroSilva plans to combine biomass gasification with shaft-furnace reduction of high-grade iron-ore pellets and carbon capture, producing direct-reduced iron and a biogenic carbon stream. The proposed first industrial demonstration is associated with Ovako's Hofors site. Previous company communications referred to a demonstration plant with a capacity of 50,000 tonnes per year and a planned start-up in 2026. Current information available does not confirm that the gasifier has been commissioned. The project therefore seems remaining under development (FerroSilva AB, n.d.).

Research, development and demonstration capacity

Sweden's gasification research is distributed across different university groups. The institutional descriptions below summarize current expertise and selected projects.

Swedish Centre for Biomass Gasification (2011–2021)

SFC was a national Centre-of-Excellence launched in 2011 to coordinate biomass-gasification research and postgraduate training and connect universities with industry. Luleå University of Technology (LTU) coordinated the centre that consisted of three gasification technology "nodes" led by LTU, Chalmers and KTH, covering entrained-flow, indirect and direct fluidized bed gasification. The centre ran in three phases (2011–2012, 2013–2016 and 2017–2021) and had a total budget of €54 million. SFC ended in 2021 and the activities described below are now separate institutional work.

Chalmers University of Technology

Chalmers has a long-running research programme on indirect dual-fluidised-bed gasification, synthesis-gas cleaning and upgrading, tar conversion, process integration, and system analysis for biofuels and chemicals. **The** 2–4 MW biomass gasifier at Chalmers Power Central has supported research on integration with heat and power production. Research includes the conversion of condensable hydrocarbons in dual-fluidised-bed gasification and thermochemical recycling of mixed waste. Chalmers also contributed **strongly** to the GoBiGas demonstration (Chalmers University of Technology, n.d[a], n.d[b]; Thunman et al., 2018).

KTH Royal Institute of Technology

KTH **performs research on** high-temperature air and steam gasification of biomass and waste, fuel pretreatment, reactor and process modelling, fluidised-bed experiments, and catalysts for conversion and upgrading. Its work links gasification with renewable-fuel production, plasma treatment of municipal solid waste, and industrial fuel switching. A project running from 2025 to 2028 examines the use of biogenic hydrogen-rich synthesis gas, including gas from sorption-enhanced gasification, in steel production (KTH Royal Institute of Technology, n.d.).

Luleå University of Technology (LTU) and LTU Green Fuels

LTU's thermochemical energy-conversion research covers gasification, pyrolysis and combustion, including solid-fuel reaction kinetics, char and tar formation, ash transformation, emissions, reacting-flow experiments, and computational fluid-dynamics models. The LTU Green Fuels pilot site in Piteå includes a 3 MW_{th} entrained-flow black-liquor gasifier and downstream fuel-synthesis equipment. LTU also studies gasification for steel-industry reducing agents and integration with fossil-free hydrogen. In 2026, the LTU Green Fuels acquired a 1.25 MW electrolyser demonstration unit for testing at the site. Other work addresses waste and residue gasification and gas cleaning (Luleå University of Technology, 2026, n.d[a], n.d[b]).

Mid Sweden University

Mid Sweden University (Mittuniversitetet) has a bioenergy research group focused on biomass gasification and synthesis-gas production for fuels, chemicals and power. Its work has included dual-fluidised-bed gasification and biological or catalytic routes to biomethane, as well as process integration and system-level assessment (Mid Sweden University, n.d.).

Mälardalen University (MDU)

MDU's Future Energy Center studies modular and decentralised conversion systems, gas cleaning and process control. The EU-funded SUPREMAS project (2024–2028) is developing mobile systems to produce and clean synthesis gas from sewage sludge, digestate and municipal

solid waste. MDU contributes to waste sorting and gas cleaning, whole demonstrations are planned in Spain and Portugal. Researchers also model biomass co-gasification in downdraft reactors and investigate tar removal from sewage-sludge gasification (Mälardalen University, 2026a, 2026b).

RISE ETC, Piteå

RISE ETC provides gasification test infrastructure for applied research, from fundamental studies to pilot-scale testing. Its FOX oxygen-blown fixed-bed unit has a fuel input of approximately 20 kW. The VAFF unit can convert pulverised, liquid and gaseous fuels at roughly 100–200 kW and is complemented by a drop-tube furnace for controlled studies. Current topics include biomass-synthesis-gas characterisation and chemical recycling of plastic waste. The facilities support fuel testing, gas-cleaning research and validation of process concepts (RISE, n.d.).

Umeå University

Umeå University's Thermochemical Energy Conversion Laboratory (TEC-Lab) investigates biomass and other solid and liquid fuels, with a focus on fuel-conversion chemistry, high-temperature transformations of ash and trace metals, emissions, and operational performance. Its research combines engineering, chemistry, physics and environmental science. Current topics include fluidised-bed conversion, bed-particle design, ash recycling, and the use of underused fuels and residues. The group's contribution is primarily experimental and analytical (Umeå University, n.d.).

POLICY, FUNDING AND MARKET CONDITIONS

The Swedish Energy Agency's Industrial Leap (Industriklivet) is a central public funding programme for industrial transition projects, covering research, feasibility studies, pilot and demonstration projects, and investment. In 2026, the programme has an allocation of SEK 653 million and can fund projects running through 2033. It is technology-neutral, so gasification projects compete with other industrial transition options and must meet the programme's eligibility and impact criteria. The Swedish Energy Agency also supports applied energy research and demonstration, while EU programmes such as the Innovation Fund can support first-of-a-kind projects (CINEA, 2025; Swedish Energy Agency, 2026c).

The clearest market case is where gasification replaces a fossil fuel in an existing industrial process, as at Kisa. Fuel-synthesis projects depend on several linked conditions, including electricity and renewable-hydrogen supply, product qualification, transport infrastructure, long-term offtake agreements, and stable policy frameworks for aviation and industrial fuels. Biomass projects also compete with established heat, pulp, pellet and materials markets for sustainable residues. Waste projects require reliable sorting and permitting, public acceptance, and compliance with the waste hierarchy.

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