



IEA Bioenergy

Task 33

“Gasification of Biogenic and Waste Feedstocks for a Sustainable Future”

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CEBC 21.01.2026, PS3

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IEA Bioenergy Task 33

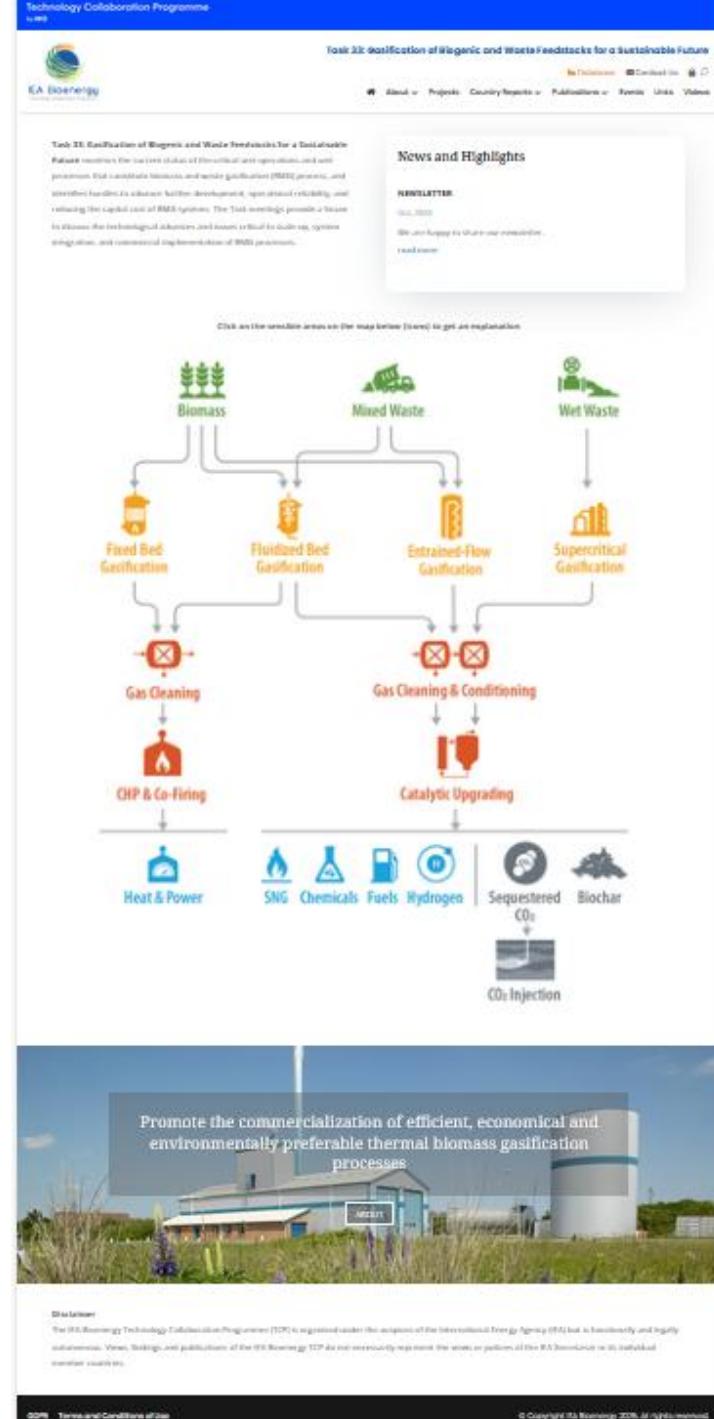
Gasification of Biogenic and Waste Feedstocks for a Sustainable Future

<https://task33.ieabioenergy.com/>

Task 33: Gasification of Biogenic and Waste Feedstocks for a Sustainable Future **monitors the current status** of the critical unit operations and unit processes that constitute biomass and waste gasification (BMG) process, and **identifies hurdles to advance further development**, operational reliability, and reducing the capital cost of BMG systems. The Task meetings **provide a forum to discuss the technological advances and issues critical to scale-up, system integration, and commercial implementation of BMG processes.**

13 member countries (2025-2027):
AT, BE, CA, CN, DE, FI, FR, IT, IN, NL, SE, UK, USA

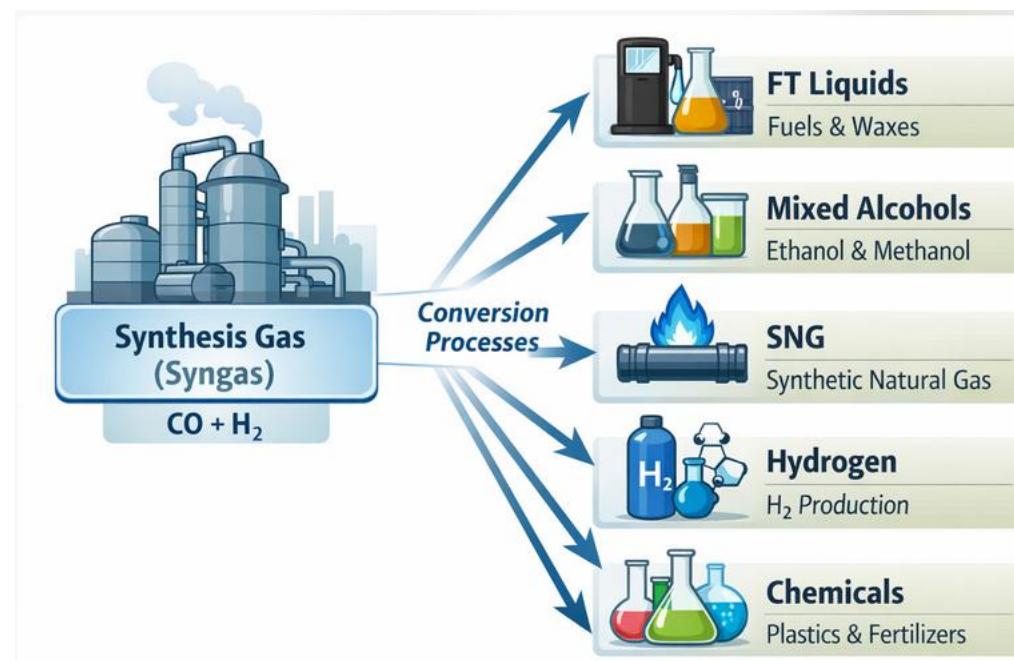
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Task Co-lead: Joakim Lundgren, LTU, SE



Biomass and waste gasification

Thermochemical gasification converts biomass and waste-based feedstocks into an energy-rich gas at high temperatures with a limited supply of oxygen and/or steam.

Input	Output	Gas/syngas utilization
Biomass (woody, agricultural)	Producer gas (after cleaning called syngas)	Heat
Waste (RDF/SRF, MSW, industrial Fractions)	Heat and usable process energy	Combined heat and power (CHP)
Process media: oxygen/air/steam	Co-products: Biochar /char	Hydrogen, SNG, Fuels, Chemicals



Transportation fuels through gasification

Status in T 33 member countries*

*source: IEA Bioenergy Task 33 Country reports

Status in Europe

In Europe, **France, Sweden, Finland, Germany, the UK, and the Netherlands** are the key players in gasification-based biofuels, with **SAF clearly emerging as the dominant growth market**.

France – Strong support for advanced biofuels, focusing on **SAF and synthetic fuels** (BioTJet)

Germany – Leading gasification R&D and pilot plants, shifting toward **SAF and hydrogen**.

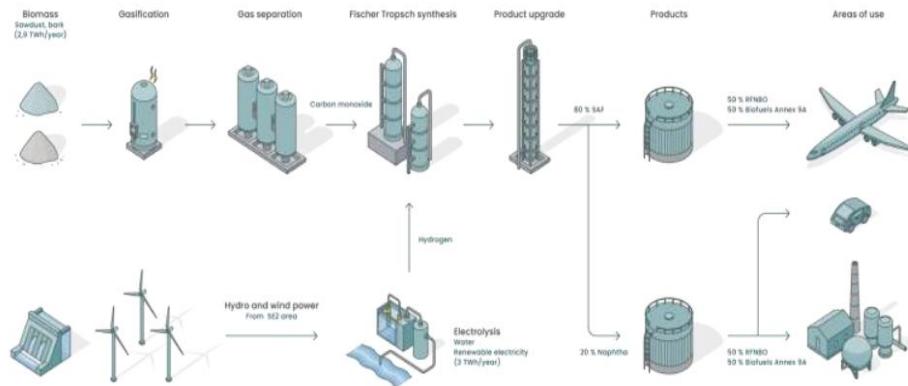
Sweden – Advanced biomass chains and pulp integration, focusing on **SAF, transport fuels** and biorefineries (Östrand)

Finland – Expertise in forest biomass gasification, linking biofuels to industrial use.

UK – Policy-driven **SAF** deployment, scaling waste-to-fuel pathways.

Netherlands – Hub for **SAF**, e-fuels, and fuel upgrading, emphasizing import, blending, and market access, SNG

Transportation fuels through gasification - Status in EU



Östrand Biorefinery Project
300 000 t SAF and naphtha/year

Project FUREC: Hydrogen production (54 000 t/y)

AGROUNDBREAKING ALLIANCE TO HELP DRIVE END-TO-END PRODUCTION OF SAF FROM BIOMASS

SOLUTION CAN REDUCE TIME FROM FEASIBILITY STUDY TO FACILITY STARTUP BY MORE THAN 15%, AND RESULT IN A 5-10% CAPITAL COST SAVINGS¹

GIDARA ENERGY

- GIDARA's HTW[®] Gasification Technology delivers a proven, reliable, and high-conversion solution for transforming waste-based feedstocks into syngas at commercial scales.
- Enables customers to access a flexible, scalable pathway for realizing the potential of waste in the production of sustainable fuels and chemicals.

JM Johnson Matthey

- JM's FT CANS[™] technology, co-developed with bp, offers a simple way to convert syngas into FT crude and provides up to a 50% reduction in energy and a three-fold increase in production for the same size reactor².
- JM's cutting-edge reforming and HydroGen[™] technologies can boost SAF production without increasing solid feedstock demand³.

Honeywell UOP

- Honeywell's FT Unocracking[™] process transforms FT crude from waste sources into fuel and can produce 3-5% more SAF⁴ and reduce costs by up to 20% compared to other commonly used FT-hydrocracking methods.¹⁰
- Honeywell digital solutions help enhance operational efficiency and bankability, maximizing production uptime and minimizing risk for SAF producers.

SAMSUNG E&A

- Delivers end-to-end integrated solutions across a wide range of technologies, enhancing competitiveness, minimizing risk.
- Serves as a single point of execution for customers.

1) Based on historical capital cost data when the technology is adopted in the EPC stage. Schedule and cost based on industry-wide experience.

2) JM's cutting-edge reforming and HydroGen[™] technologies help reduce capital costs for FT production.

3) JM's cutting-edge reforming and HydroGen[™] technologies help reduce capital costs for FT production.

4) JM's cutting-edge reforming and HydroGen[™] technologies help reduce capital costs for FT production.

<https://www.prnewswire.com/news-releases/honeywell-johnson-matthey-gidara-energy-and-samsung-ea-form-saf-technology-alliance-302473527.html>

Status of gasification in USA and Canada

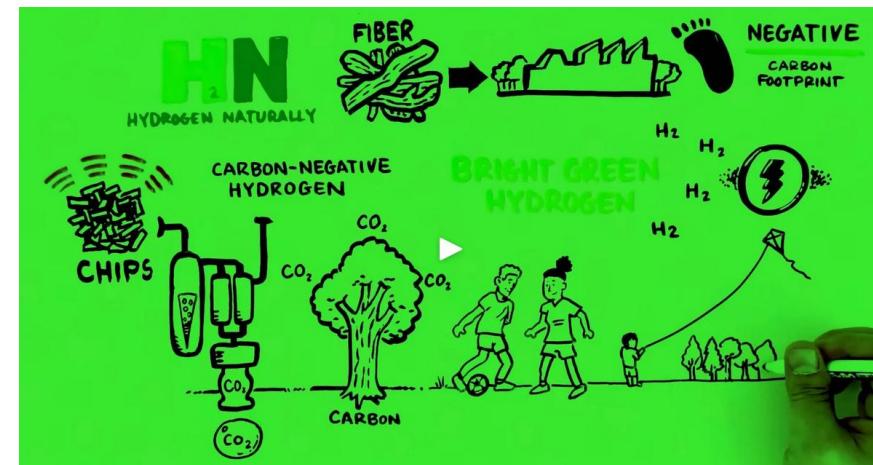
Products focus: Biofuels (SAF), Methanol, Hydrogen



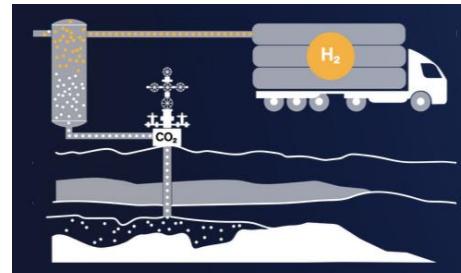
USA: SunGas Renewables
Output: 500 000 t/y methanol



USA: MOTE – hydrogen production



Canada: Project Hydrogen Naturally (coupled with CCS)



Status of gasification in China und India

China

Serial No.	Project Name	Major Investors	Main Technical Parties	Location and Size	Current Progress and Contact Status
1	Goldwind Technology Xing'an League Wind Power Coupling 500,000 Tons of Green Methanol Project	Goldwind Green Energy Chemical Technology (Jiangsu) Co., Ltd.	Sai Ding Engineering (EPC Contractor), Yangmei Chemical Machinery Group Co., Ltd. (Gasifier Manufacturer)	Xing'an League, Inner Mongolia. Planned Investment: 13.665 billion yuan. Annual Production: 500,000 tons of green methanol, 2 million kilowatt wind power plant, 92,200 tons hydrogen production, 118-ton hydrogen storage facility, 160,000-kilowatt/2-hour energy storage facility, biomass power and gasification equipment.	Civil engineering completed, gasifier installed, methanol synthesis section's desulfurization tank hoisted. Expected production start: Q4 2025.
2	Zhongsheng Inner Mongolia Pilot Project	Jiangsu Zhongsheng New Energy Holdings Co., Ltd.	Shanghai Puhe Green Carbon Clean Energy Technology Co., Ltd. (Pure Oxygen Pressurized Fluidized Bed Gasification Technology)	Inner Mongolia, exact location unknown. Daily Processing: 100 tons of biomass, Annual Output: 10,000 tons/year of green synthesis gas.	Project debugging ongoing, pilot test expected completion: June 2024.
3	Shanghai Electric Taonan Wind Power Coupling Biomass Green Methanol Integration Project	Shanghai Electric Group	Shanghai Boiler Factory Co., Ltd., Shanghai Hydrogen Era Technology Co., Ltd.	Taonan, Jilin Province. Total Investment: 5.6 billion yuan. Project Scale: 250,000 tons of green methanol annually coupled with 680,000 kilowatts of new energy.	Phase 1 (50,000 tons/year green methanol) underway, trial production expected by end of June 2025.

- More than 80 large-scale operational biomass gasification plants
- Input mostly 500 t/y to 100,000 t/y
- Output: Syngas, hydrogen, methanol

India



2G ethanol plant

Feedstock: 200 000 t straw/y (606 t/day)
 Product: 100 000 l bioethanol /day
 Owner: Indian Oil Corporation Limited
 Start up: 2022

IEA Bioenergy Task 33 - Status Report 2025

<https://task33.ieabioenergy.com/projects/>

- [!\[\]\(ef9d0f80c5c0f7b4bed9fcc98d310922_img.jpg\) Annex1_CHP_Plants_Status_Heat_and_Power](#)
- [!\[\]\(999a5e3fc9b7a6ab64b477dbcd2c0571_img.jpg\) Annex2_CHP_Plants_Status_SNG](#)
- [!\[\]\(4a22a098f67aa2577f972ec4d67f1799_img.jpg\) Annex3_CHP_Plants_Status_Hydrogen](#)
- [!\[\]\(cc98cec0bccb74dd8513e7d4ab71b1e8_img.jpg\) Annex4_CHP_Plants_Status_Chemicals](#)
- [!\[\]\(387c11e31cceec9930b7807a52410275_img.jpg\) Annex5_CHP_Plants_Status_Fuels](#)



IEA Bioenergy
Technology Collaboration Programme

Status report on gasification in member countries

IEA Bioenergy: Task 33

September 2025



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Database

Filter Projects

Country == show all ==

Type	Technology	Status	Raw Material	Output
<input type="checkbox"/> TRL 1-3 Research	<input type="checkbox"/> Circulating Fluidized Bed	<input type="checkbox"/> no status	<input type="checkbox"/> agricultural residues	<input type="checkbox"/> clean syngas
<input type="checkbox"/> TRL 4-5 Pilot	<input type="checkbox"/> Fluid Bed	<input type="checkbox"/> planned	<input type="checkbox"/> biomass / biomass coal blends	<input type="checkbox"/> DME
<input type="checkbox"/> TRL 6-7 Demonstration	<input type="checkbox"/> Fuel Gas (Heat)	<input type="checkbox"/> under construction	<input type="checkbox"/> forest residues	<input type="checkbox"/> ethanol
<input type="checkbox"/> TRL 8 First-of-a-kind commercial	<input type="checkbox"/> Fuel Synthesis	<input type="checkbox"/> operational	<input type="checkbox"/> lignocellulosics	<input type="checkbox"/> FT liquids
<input type="checkbox"/> TRL 9 Commercial	<input type="checkbox"/> Gasification	<input type="checkbox"/> non operational	<input type="checkbox"/> organic residues and waste streams	<input type="checkbox"/> heat
	<input type="checkbox"/> Other Gasification Technology	<input type="checkbox"/> cancelled	<input type="checkbox"/> other	<input type="checkbox"/> hydrogen
	<input type="checkbox"/> Power / CHP	<input type="checkbox"/> idle	<input type="checkbox"/> unknown	<input type="checkbox"/> methanol
	<input type="checkbox"/> dry torrefaction	<input type="checkbox"/> on hold		<input type="checkbox"/> other

Submit

Projects

Search Owner/Name/Input Submit

Owner	Name	Location
Advanced Biofuels Solutions Ltd	Swindon Advanced Biofuels Plant	United Kingdom Info
Advanced Biofuels Solutions Ltd	ABSL bio-SNG demonstrator	United Kingdom Info
Aemetis/Lanzatech	Project Aemetis Riverbank	United States Info
Aerni Pratteln	CHP Pratteln	Switzerland Info
AEW Energie AG	Pelletvergasser AEW Rheinfelden	Switzerland Info
AEW UK	Hoddesdon Advanced Thermal Treatment	United Kingdom Info
Agnion Technologies GmbH	CHP Agnion Biomasse Heizkraftwerk Pfaffenhausen	Germany Info
ARBRE Energy Limited (AEL)	IGCC ARBRE Energy Eggborough	United Kingdom Info
ATCG	BIOGAS Gardanne	France Info

Map

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News and Highlights

NEWSLETTER

IEA Bioenergy Newsletter

IEA Bioenergy is a global, multi-disciplinary, and cross-sectorial

[View the sustainable areas in the map below \(here\)](#) to get an explanation.

Task 33: Identification of Biomass and Waste Feedstocks for a Sustainable Future

Table 33: Identification of Biomass and Waste Feedstocks for a Sustainable Future monitors the current status of biofuel plant operations and unit processes. It also contains biomass and waste feedstocks (BWF) processes, and identifies feedstocks to advance further development, operational reliability, and reducing the capital cost of BWF systems. The Task 33 activities provide a forum to discuss the technological advances and issues critical to scaling up, system integration, and commercial implementation of BWF processes.

News and Highlights

NEWSLETTER

IEA Bioenergy Newsletter

IEA Bioenergy is a global, multi-disciplinary, and cross-sectorial

Promote the commercialization of efficient, economical and environmentally preferable thermal biomass gasification processes

Promote the commercialization of efficient, economical and environmentally preferable thermal biomass gasification processes

Statement

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Conclusions

Large-Scale Biomass Gasification – Global Status & Outlook

• Europe & North America

- Small-scale gasification is mature (in EU), but **large-scale projects have struggled**
- Multiple flagship plants stopped last year due to **financial, technical, and regulatory risks**
- Current focus on **high-value products**:
Sustainable Aviation Fuel (SAF) and **(carbon-negative) hydrogen**

• Asia (China & India)

- **China leads globally** in large-scale deployment (>80 operating plants; >90 renewable methanol projects underway)
- Growth driven by **renewable methanol and liquid biofuels**
- **India** advancing gasification via **2G ethanol** aligned with national blending targets

Thank you!

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Technology Collaboration Programme

www.ieabioenergy.com