



IEA Bioenergy  
Technology Collaboration Programme

# Biomass gasification news

Highlights from IEA Bioenergy Task 33

## Newsletter III

IEA Bioenergy: Task 33: September 2025

### INTRODUCTION

IEA Bioenergy Task 33 just started its new triennium for the years 2025-2027 also with a new task management. Former co-task leader, Dr. Jitka Hrbek at BOKU in Austria takes over the role as a task leader from Mr Berend Vreugdenhil at TNO, the Netherlands. Dr Hrbek will be assisted by Prof. Joakim Lundgren at Luleå University of Technology, Sweden, who will act as co-task leader.



*Figure 1. New task leader Jitka Hrbek, BOKU, and former task leader Berend Vreugdenhil, TNO. (Photo: Joakim Lundgren, LTU)*

On behalf of all task members, the new management would like to express our sincere gratitude and great appreciation for Berend's work and efforts as task leader during the last six years. We are also happy that Mr Vreugdenhil will remain in the task as the national task representative of the Netherlands.

The title of Task 33 is now "**Gasification of biogenic and waste feedstocks for a sustainable future**" (formerly "Gasification of biogenic residues and its application"). The scope of the task is the entire process chain, from feedstock feeding, the conversion process, required downstream upgrading to the potential products and their applications, such as combined heat and power (CHP), synthetic natural gas (SNG), and other biofuels and biochemicals, including sustainable aviation fuels (SAF) and hydrogen (H<sub>2</sub>). An important aspect is also the opportunity for co-production of biochar and CO<sub>2</sub> for CCUS-purposes.

The upcoming triennium will keep focus on the large variety of potential gasification products and their utilization, while exploring potential synergies with other technologies and industrial applications such as CCUS.

IEA Bioenergy Task 33 held its first meeting of the new triennium, June 3-5 in Luleå, Sweden. The meeting started with a full-day workshop for specially invited gasification experts, followed by study visits at the crude tall-oil production company Sunpine and the gasification pilot plant LTU Green Fuels in the city of Piteå. On the final day, the task business meeting was held.

This newsletter shortly summarizes the most important outcomes of the last task meeting, upcoming task reports, events and projects to be carried out in the new triennium.

## **TASK 33 WORKSHOP - OVERCOMING CHALLENGES FOR GASIFICATION TECHNOLOGY DEPLOYMENT**

On June 5, 43 specially invited stakeholders from industry, academia and technology companies from 15 different countries in Europe, Asia and North America gathered for a workshop in Luleå. The purpose of the workshop was to discuss how to mitigate and overcome challenges related to commercial deployment of biomass gasification technologies and its various applications such as fuels, chemicals and other value-added products.

By sharing learnings and insights from successful as well as failed projects around the world, the intention was to develop a shared understanding of how deployment challenges can be mitigated or even overcome.

The workshop consisted of three sessions, technical learnings, policy and regulatory issues and finance and market issues, with eleven presentations in combination with three round-table discussions from different perspectives concerning deploying biomass gasification technologies. Photos from the event are shown in Figure 2.



*Figure 2. Photos from the workshop in Luleå and the study visits in Piteå.*

## SHORT HIGHLIGHTS FROM SELECTED TASK MEMBER COUNTRIES

In the following, highlights from some of the country reports are presented. For more information, please reach out to your country representative (see “Participants and Country Reports” in <http://task33.ieabioenergy.com/>)

### Austria

The Advanced Bioenergy Lab (ABL) located in Zeltweg, Austria, is a state-of-the-art research facility dedicated to the development and testing of advanced renewable energy carriers. Founded in May 2024 with a planned budget of around €60 million, the ABL aims to accelerate the commercialization of cutting-edge gasification technologies.

At the facility, biomass residues and waste streams from wood processing and food production will be used as feedstock, with an input capacity of approximately 1.55 tonnes per hour (dry biomass). The gasification process, originally developed at TU Vienna, will be advanced further in collaboration with several universities, research institutes, and industrial partners.

The ABL will operate under real, industry-like conditions, targeting continuous operation of at least 8,000 hours per year on a pre-industrial scale. For the first time, products such as Fischer-Tropsch (FT) liquids and high-purity gases—including synthetic natural gas (SNG) and hydrogen—will be produced in this setting. Commissioning and operation of the facility are scheduled for 2026/27.

### China

Shanghai Electric has achieved a major milestone in China’s renewable fuel sector with the production of its first batch of green methanol at their plant in Taonan, Jilin province, see Figure 3. The facility, which officially began operations on July 14, 2025, is the world’s first commercial-scale project to integrate renewable electrolytic hydrogen and biomass gasification for methanol production.

During the demonstration phase in 2025, the plant is targeting 50,000 tonnes per year of green methanol, before expanding to an annual capacity of 250,000 tonnes of e-methanol and 10,000 tonnes of green aviation fuel by 2027. The first phase of the plant infrastructure consists of two 300 tonnes per day pressurised oxygen-blown biomass fluidized-bed gasifiers and an 8,200 Nm<sup>3</sup> per hour hydrogen production unit. The feedstock is corn stover pellets. The green methanol produced will be shipped to Shanghai Port for use in maritime shipping and industrial applications.



Figure 3. The Shanghai Electric bio-electro-methanol plant in Taonan, China (Photo: Joakim Lundgren, LTU)

## Germany

The companies BtX energy GmbH, Burkhardt GmbH and ProMethan GmbH successfully tested an innovative water-gas shift reactor (BtX GmbH) with raw gas produced from residual wood, see Figure 4. Wood chips gasifiers from ProMethan GmbH and Burkhardt GmbH, covering the size range from 200 to 1000 kW and 500 kW to 6 MW, respectively, were used. Figure 4 shows the process schematically. The innovative concept of the reactor was funded by BMWK (project BiDRoGen).

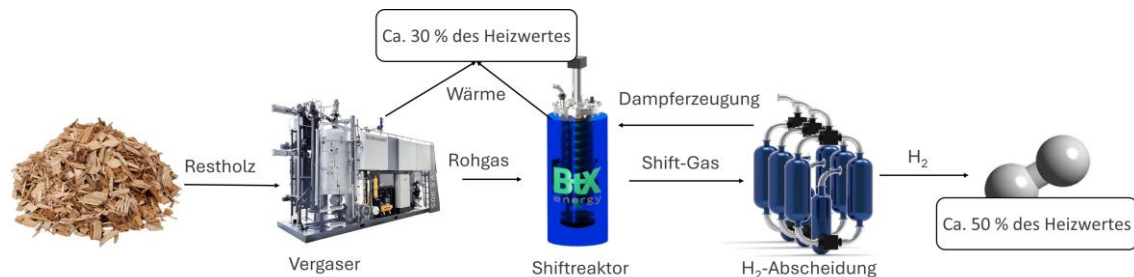


Figure 4. Process flow of woody biomass gasification to hydrogen: residual wood (Restholz) is fed into a gasifier (Vergaser) producing raw syngas (Rohgas), which enters a shift reactor (Shiftreaktor) (steam generation, Dampferzeugung, ~30 % of heating value) and then a hydrogen separator (H<sub>2</sub>-Abscheidung) to yield H<sub>2</sub> (~50 % of heating value).

## India

Indian Institute of Science has in collaboration with Indian Oil Ltd demonstrated the production of fuel-cell quality biohydrogen produced in a small-scale woody-biomass gasifier and Vacuum Pressure Swing Absorption (vPSA). The production capacity is 5 kg of hydrogen per hour and an average yield of 100-105 g hydrogen per dry kg biomass was reported. The hydrogen recovery in the vPSA was in the range of 70-72 %. The fuel-cell system was operated in more than 250 hours using the produced biohydrogen. A scaled-up plant to 2 tons of hydrogen per day is planned at one of the Indian Oil refineries.

## United Kingdom

There has been a lot of support from the government linked to its ambitions to become Net Zero by 2050, including commitments reported in the most recent UK autumn budget.

- Several gasification projects moving from pilot to commercial scale with success stories.
- Most plants are processing waste biomass and producing energy, hydrogen or methane. Some are already looking at incorporating carbon capture technologies.
- The operational plants have demonstrated reliability and the ability to integrate into local energy systems, paving the way for future developments in the field.
- Biomethane market is evolving rapidly in parallel to ongoing decarbonising strategies; its market is linked to Global trends. Ongoing challenges (technologies & scale-up) are currently being addressed.

More information on ongoing projects and activities is found see here: [Hydrogen BECCS Innovation Programme: Phase 2 projects - GOV.UK](#)

## USA

SunGas Renewables has several bio-methanol production projects that are at various stages of planning and execution. In the US, the Beaver Lake Renewable Energy Project in Pineville Louisiana will repurpose the former International Paper site that closed in 2009 and will convert woody biomass to approximately 500,000 metric tonnes of bio-methanol annually for use as marine fuel. This \$2.4B (USD) project will use SunGas' pressurized oxygen-blown fluid bed gasifier for biomass conversion to syngas and Johnson Matthey technology for methanol synthesis. This project is in advanced stages of engineering with operations scheduled to start in 2028; major partners include C2X and Maersk. A second project involves the Australian green hydrogen and methanol project developer, ABEL Energy, to supply green methanol for a new \$1.4 billion facility in Northern Tasmania, Australia. A feature of this facility will be use of renewable hydrogen produced via water electrolysis. The plant is expected to produce 300,000 tonnes of green methanol per year. This amount is three times Australia's current methanol consumption and is the shipping fuel equivalent of removing 540,000 tonnes of carbon dioxide from the atmosphere annually.

## Sweden

Meva Energy (<https://mevaenergy.com/>) has entered into a 15-year agreement with Elcowire, a leading European copper wire manufacturer, to supply 9 MW of biomass-based producer gas to Elcowire's production facility in Helsingborg. This will be the world's first copper wire producer to fully replace fossil gas with fossil-free energy. This agreement represents Meva Energy's largest contract to date valued at 50 million Euro.



Figure 5. Representatives of MEVA Energy and Elcowire (Photo from MEVA Energy, 2025).

Also in Sweden, a new small-scale biomass gasifier (Volter) for combined heat and power production was installed at the Svinnegarn Husby farm outside the city of Enköping. The fuel is wood-chips, and the production capacity is 130 kW heat and 50 kW electricity. This is one of very few small-scale biomass gasifiers for CHP installed in the country.

## The Netherlands

Several biomass and waste gasification projects are developing in the Netherlands as summarized in Table 1. They mostly relate to methanol, methane and hydrogen. SAF production via gasification is currently not being developed in the Netherlands

*Table 1. Announced gasification projects in the Netherlands*

Name	Feedstock	Product
FUREC RWE	Waste	Hydrogen
BRIGH2 Torrgas	Biomass	Hydrogen
Torranol Torrgas	Biomass	Methanol
Eemsgas Perpetual Next/Gasunie	Biomass	Green Gas
Lowlands MeOH	Waste	Methanol
BEN	Wood chips	Green Gas
DeltaNor Perpetual Next	Biomass	Methanol
AMA Gidara	Waste	Methanol
STERCORE	Manure	Green Gas

## Recently published task reports

### *Status report on gasification in member countries*

IEA Bioenergy Task 33 has recently released its triennial status report on thermochemical gasification of biomass and waste, providing an overview of technologies, markets, and regional trends. Some key insights are:

- Gasification for small-scale CHP is well-established in Europe, but scaling up to advanced fuels like SAF and hydrogen faces a critical valley of death—many technically proven projects (e.g., Gaya, Bioliq®, ABSL, KEW) stalled due to financial barriers.
- In North America, ambitious projects struggle with cost and policy uncertainty—Energkem and Fulcrum closures highlight risks, while new entrants (SunGas, DG Fuels, Mote) are advancing green methanol and carbon-negative hydrogen.

- In Asia, China is taking the lead with >80 large-scale biomass gasification plants in operation and >90 renewable methanol projects planned, projected to deliver 60% of global green methanol demand by 2028.

It is concluded that gasification is a flexible and technically viable pathway for renewable fuels, hydrogen, SAF, and chemicals—and a key enabler of carbon-negative solutions. But widespread deployment in Europe and North America hinges on bridging the financing gap for first-of-a-kind plants with stable long-term policy support and investment.

[https://task33.ieabioenergy.com/wpcontent/uploads/sites/33/2025/09/Status\\_Report\\_final2.pdf](https://task33.ieabioenergy.com/wpcontent/uploads/sites/33/2025/09/Status_Report_final2.pdf)

### ***Gas Cleaning from Gasification for Production of Biofuels and Biochemicals***

This report presents a review of syngas cleaning technology including formation and identification of contaminants, and the current state of gas cleaning methods (removal and elimination of particulate matter, metals, tar, sulphur, ammonia, and chlorine). The review includes recent advancements in gas cleaning technologies, with a focus on innovative methods for selectively optimizing syngas quality. These cutting-edge approaches aim to enhance the efficiency and effectiveness of gas purification and conditioning processes. It is important to note that the field of gas cleaning and conditioning for synthesis processes is continually evolving. Ongoing research and technological advancements are expected to drive further innovations, offering new solutions and improvements to meet the ever-increasing demands of industrial applications.

[https://task33.ieabioenergy.com/wp-content/uploads/sites/33/2025/04/Gas-cleaning-from-gasification-for-production-of-biofuels-and-biochemicals\\_final.pdf.pdf](https://task33.ieabioenergy.com/wp-content/uploads/sites/33/2025/04/Gas-cleaning-from-gasification-for-production-of-biofuels-and-biochemicals_final.pdf.pdf)

### ***Biomass gasification for hydrogen production***

In this report, it was concluded that biomass gasification is a techno-economically and environmentally beneficial technology well suited for producing climate-positive hydrogen. It is highly likely that negative carbon emissions will be essential to reach global climate targets. Hydrogen produced via biomass gasification is one of few hydrogen production pathways that can result in negative emissions. As the CO<sub>2</sub>-separation process is an integral part of the gasification system, CCS can be applied. LCA-studies show that combined with CCS, the greenhouse gas emission for hydrogen produced via biomass gasification can be as low as -15 to -22 kg CO<sub>2eq</sub> per kg produced hydrogen.

In the report, it is estimated that the current production cost for a large-scale gasification plant would be approximately 4 € per kg hydrogen at a biomass price of 20 € per MWh. With assessed process improvements and utilisation of CCS resulting in an economic credit for negative emissions, the production cost may reduce to around 2.7 € per kg hydrogen at the same biomass price.

[https://task33.ieabioenergy.com/wp-content/uploads/sites/33/2025/04/IEA-Bioenergy\\_T33\\_Bio-H2\\_Final\\_v3.pdf](https://task33.ieabioenergy.com/wp-content/uploads/sites/33/2025/04/IEA-Bioenergy_T33_Bio-H2_Final_v3.pdf)

### ***Synergies of green hydrogen and bio-based value chains deployment - Report WP2: Case studies on hydrogen produced from biomass***

In the Inter-Task project Synergies of Green Hydrogen and Bio-Based Value Chains Deployment, Task 33 led the work package on biomass-based hydrogen production in which six case studies are presented. The report illustrates how low-emission, biomass-based hydrogen can be produced via several different conversion technologies, with a large variety of biogenic feedstocks and in wide capacity ranges. Feedstocks can be of lower grade, such as biogenic wastewater, forest- and agricultural residues, improving the economic performance, but also higher quality feedstocks like bioethanol and biomethane, allowing for more convenient

feedstock logistics and storage.

Many of the presented biomass-based hydrogen production concepts also generates additional value-added commodities such as biochar, biocarbon, biomethane etc, which adds flexibility, resilience and improved economic performance.

<https://task44.ieabioenergy.com/inter-task-project-on-hydrogen-and-bio-based-value-chains/>

## Webinars

### ***Decarbonising the Steel Sector, June 18, 2025***

The webinar was jointly organised by the projects BioRECAST (BIObased REsidues Conversion to Advanced fuels for sustainable STEel production) and H2Steel (Green H2 and circular bio-coal from biowaste for cost-competitive sustainable Steel) in close cooperation with IEA Bioenergy Task 33. The webinar presented and discussed activities and results of the two European projects BioRECAST and H2Steel aiming to find promising solution for the defossilization of the steel sector based on renewable carbon and green hydrogen. Furthermore, an overview on recent activities performed within IEA Bioenergy Task 33 on biocarbon production and usage in metallurgical industries on a global scale was given by Prof. Kentaro Umeki at Luleå University of Technology.

[Decarbonising the Steel Sector - Bioenergy](#)

### ***Synergies of renewable hydrogen and bio-based value chains: case studies, September 26, 2024***

This webinar shed light on promising bio-based value chains that could deploy synergies between the hydrogen economy and the bio-based economy by focusing on recent concepts for

1. Hydrogen production from biomass
2. Use of renewable hydrogen in bio-based processes, considered in different parts of the world

Co-task leader Prof. Joakim Lundgren, Luleå University of Technology presented several case studies on biomass-based hydrogen production pathways.

[IEA BIOENERGY WEBINAR - Synergies of renewable hydrogen and biobased value chains: case studies - Bioenergy](#)

## Planned task projects 2025-2027

### ***Implementation pathways for biomass gasification - Overcoming technology deployment challenges***

This project aims to increase the understanding of opportunities and challenges for advanced biomass gasification technology deployments by providing learnings and insights from projects around the world and discuss how the various challenges can be mitigated or even overcome.

The project will describe success stories where initial barriers were managed, and projects realized, but also analyse and explain gasification deployment failures. In addition, the project will discuss how to overcome barriers related to commercial deployment of biomass gasification technologies and its various applications such as fuels, chemicals and other value-added products, for example issues related to technology, policy and regulations as well as finance and market.