NextFuel

News & Updates
02/2026

Advancing Industrial Electrified Biomethanol Production for Maritime Decarbonisation

The **NextFuel** project (**Grant Agreement No. 101136225**) officially started on 01 December 2023 and will run for a total duration of 60 months. Over this five-year period, the consortium — composed **of Gasnor/Molgas, Topsoe, NTNU, CERTH, Topeka, WEGEMT and FlexFuels** — is working to industrialise an electrified Steam Methane Reforming (eSMR) concept that enables large-scale production of renewable biomethanol for the maritime sector.

At the core of the project lies the eREACT-based eSMR technology, an innovative electrified reforming process that replaces conventional fossil-fired reformers with electrically heated reforming. Unlike traditional SMR units, which rely on combustion of natural gas and result in direct CO_2 emissions, the electrified approach enables compact reactor designs, improved energy integration, and elimination of combustion-related emissions.

NextFuel aims to demonstrate that this technology can be matured from laboratory validation to full industrial readiness, creating a scalable and cost-competitive pathway for renewable methanol production in Europe, directly supporting maritime decarbonisation objectives.

Technical Developments and Engineering Progress

Advanced Process Simulation and System Optimisation (WP3)

A major technical focus of the first fifteen months was the development of a comprehensive process modelling framework. Using **Aspen Plus**, the consortium established a flexible and scalable simulation platform capable of representing the entire biomethanol production chain, from feedstock input to final methanol output forms.

The modelling work went beyond a simple base case. It included fundamental thermodynamic and stoichiometric analysis to allow operation on multiple feedstock compositions, including biomethane, raw biogas, and carbon dioxide streams. Sensitivity analyses and scenario studies were conducted to optimise operating parameters and ensure that the plant concept remains technically robust under varying boundary conditions.

Special attention was given to hydrogen management and syngas balancing, as well as to quantifying renewable electricity demand across electrolysis, reforming, and methanol synthesis steps. The resulting simulations provided detailed insights into mass and energy balances, utility demand profiles, carbon utilisation efficiency, and overall process energy efficiency. These outputs form the scientific backbone for the project's long-term objective of developing an ecosystem simulation platform capable of predicting plant energy performance with more than 80% accuracy.

Engineering Maturation to FEED Level (WP4)

The most significant technical achievement is the complete engineering maturation of the 150 MTPD biomethanol plant to **Front-End Engineering Design (FEED)** level forms.

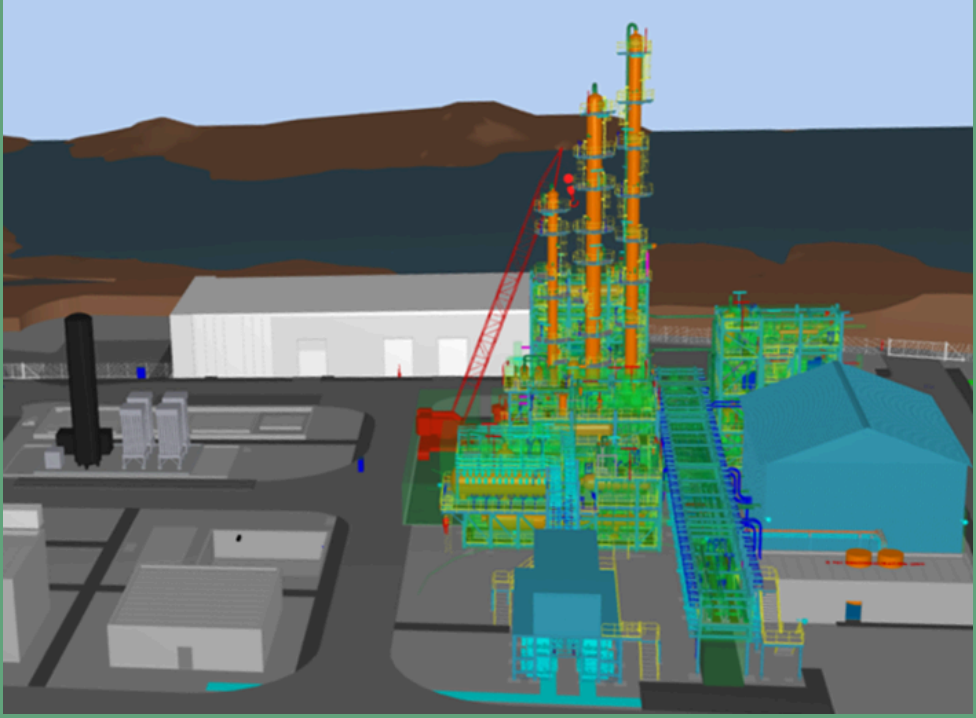
The engineering progression followed a structured methodology: Feasibility Study, Design Basis definition, Basic Engineering Design Package (BEDP), and Front-End Engineering Design (FEED).

The Design Basis established the technical, operational and regulatory boundary conditions for the plant. It defined feedstock specifications, product quality requirements, utility assumptions, effluent handling principles, safety margins, reliability targets and applicable design codes.

Building on this foundation, the BEDP phase delivered complete Process Flow Diagrams (PFDs), detailed equipment sizing and specification, preliminary safety philosophies and operational concepts. A total of 241 BEDP documents were generated during this stage.

The FEED phase further refined the design into an investment-ready engineering package. This included full Piping and Instrumentation Diagrams (P&IDs), control and safety instrumented system philosophy (DCS/PLC/SIS), electrical single-line diagrams and power distribution concepts, mechanical drawings and piping layouts, development of a 60% 3D plant model, and integration of preliminary HAZID/HAZOP findings. By the end of FEED, 252 documents from Topsoe and 312 from sub-suppliers had been produced.

This level of engineering maturity significantly reduces technical risk and demonstrates that the eREACT-based process is technically robust and industrially deployable.



3D model rendering of the Nextfuel Biomethanol plant

During FEED some 25,000+ engineering hours were spent by Topsoe and the engineering carried out during FEED has enabled Topsoe to also present a firm bid proposal for the plant.

Flexible Feedstock Integration and Carbon Efficiency Pathway

One of the distinguishing characteristics of the NextFuel plant design is its feedstock flexibility. The engineered concept allows operation on combinations of biogas or biomethane, grid-based methane streams, and captured carbon dioxide.

This flexibility is essential for deployment across heterogeneous European biogas sites. Although operational carbon efficiency can only be validated during plant operation, the engineering and modelling framework established in RP1 provides the necessary mass and energy balance basis for achieving carbon efficiencies significantly above conventional fossil methanol production, and defines a pathway toward 70% and eventually 90% carbon efficiency.

Transition from Concept to Investment-Ready Project

Beyond technical design, project has achieved a crucial shift in project maturity: the consolidation of engineering outputs into a structured EPC contracting and execution model.

The FEED documentation was integrated into a procurement and contracting framework together with the selected EPC contractor. Risk allocation structures were defined, subcontracted engineering scopes were consolidated, and a firm bid basis for core plant modules was established.

This transition marks the movement of NextFuel from conceptual feasibility to an investment-ready industrial project, positioning it for Final Investment Decision (FID) in the next reporting period.

Consortium Alignment and Industrial Site Visit – Bergen 2025

NextFuel Annual Consortium Meeting 2025 – Successful Completion in Bergen

The NextFuel consortium successfully held its Annual Meeting in Bergen on 18–19 November 2025, bringing together partners from Molgas Energy, FlexFuels, CERTH, WEGEMT, NTNU, and TOPSOE. The meeting opened with a full workshop at Hotel Norge, where each Work Package leader presented progress, achievements, and planned activities for the upcoming year. The sessions provided a productive platform for exchange, coordination, and strategic planning across all work packages.

On the second day, the consortium visited the Kollsnes industrial site, including Northern Lights (which is a JV of Equinor, Shell and Total Energies) carbon transport and storage facilities, the Gasnor/Molgas LNG plant, and the FlexFuels site. Topsoe, technology partner for the process modules consisting of eREACT-based syngas generation and downstream methanol process, were pleased to see that FlexFuels have chosen a plant site with very suitable infrastructure and required utility provisions well planned up to this point in time. These technical visits offered valuable insights into the infrastructures supporting NextFuel's objectives and fostered constructive discussions on future developments.

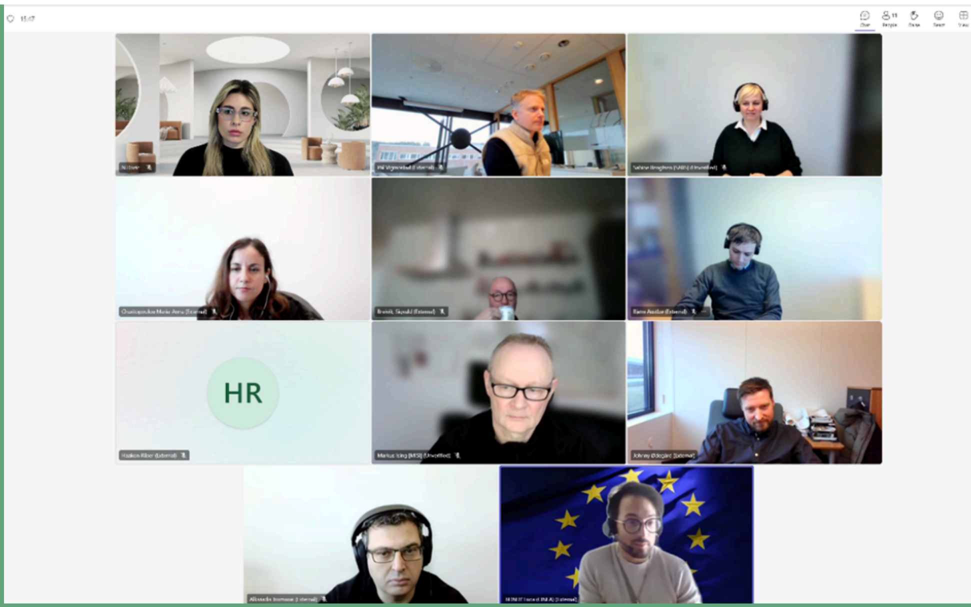
Thank you to all partners for their active participation, collaboration, and continued commitment to driving the NextFuel project forward under Horizon Europe. Your contributions are vital to our shared progress.

NextFuel Annual Consortium Meeting 2025

Consortium visit - Kollsnes industrial site

EU Horizon NextFuel 1st Review Meeting – 30 January 2026

Following the Annual Consortium Meeting in Bergen, the project also successfully held the EU Horizon NextFuel **1st Review Meeting on 30 January 2026**. During this meeting, the consortium met with the Project Officer and representatives from CINEA to present the overall progress of the project. The review began with an introduction of participants, followed by a brief presentation of the review objectives by CINEA. The project coordinator then provided a consolidated overview of the major achievements, technical results, challenges encountered, resource utilisation (person-months and costs), and any deviations from the Description of Action during the reporting period. Each Work Package was subsequently presented in detail, covering tasks and deliverables submitted, milestones achieved, methodologies implemented, key challenges, and principal conclusions, as well as justification of any deviations where applicable. The session allowed for questions and clarifications from CINEA throughout the review. The meeting concluded with initial feedback from CINEA and an outline of the next steps for the project's continued implementation.



EU Horizon NextFuel 1st Review Meeting

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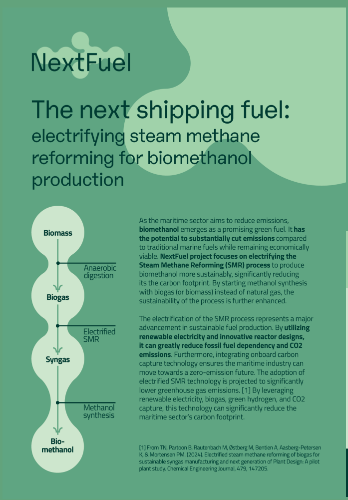

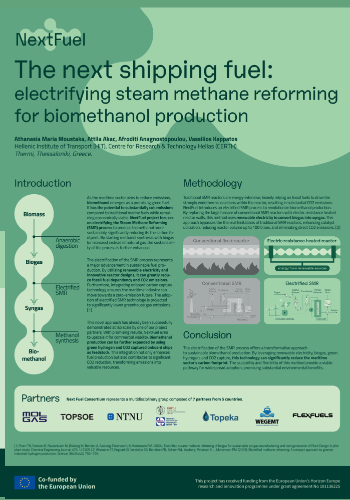

Switching to eREACT™ has the potential of reducing total global emissions by 1%

Project updates

Partners Profile: NTNU Role in the NextFuel

The Norwegian University of Science and Technology (NTNU), based in Trondheim, Ålesund and Gjøvik, represents academic excellence in technology and the natural sciences, while also spanning disciplines such as humanities, social sciences, medicine, architecture, arts and design.

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