MOOI-ECOOVALUE
Progress Report Year 1

Smart and dynamic bioproduction with integrated CO_2 valorization
MOOI324009

Authors: M. Verhoeven

Institute: WFBR

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Summary of the starting points and objective of the project

The ECOOVALUE project starts with the observation that today's energy and industrial systems are undergoing rapid transformation, driven by the increasing share of renewable electricity and the urgent need to reduce greenhouse gas emissions. While renewable power sources such as wind and solar are expanding quickly, their variable and location-dependent nature is placing growing pressure on the electricity grid. At the same time, biomanufacturing is emerging as a key pillar of a sustainable, circular economy, converting renewable carbon sources, including CO_2, into value-added products. However, conventional fermentation and bioprocessing technologies are typically designed for steady, uninterrupted operation and therefore struggle to align with fluctuating electricity availability and grid constraints.

As a result, promising new bioprocesses risk being delayed or limited by grid congestion, rising energy prices, or the need for costly grid reinforcements. There is a clear need for industrial processes that are not only energy-efficient, but also flexible and responsive to changing energy system conditions. The objective of ECOOVALUE is to address this challenge by fundamentally rethinking how biomanufacturing processes are designed and operated. Rather than treating electricity as a fixed and always-available input, the project explores how fermentation and CO_2 conversion processes can actively adapt to variations in renewable electricity supply, energy prices, and grid capacity. This includes dynamic control of key process parameters, integration of electrochemical CO_2 conversion as an energy and carbon buffer, and the development of monitoring, modelling, and techno-economic tools to support decision-making.

By bringing together industrial partners, technology developers, and knowledge institutes, ECOOVALUE aims to demonstrate that flexible, dynamically operated bioprocesses can reduce peak electricity demand, improve the economic viability of bio-based production, and accelerate deployment without additional strain on the electricity grid. In doing so, the project positions biomanufacturing not as a burden on future energy systems, but as an enabling and stabilizing component of a renewable, low-carbon energy landscape.

The progress achieved in the first year of ECOOVALUE directly supports this ambition by establishing the scientific, technical, and system-level foundations required for dynamic biomanufacturing. Initial modelling and laboratory studies demonstrated that key fermentation parameters, such as temperature, feeding strategies, and aeration, can be varied dynamically while maintaining process stability and predictability. In parallel, industrial CO_2 streams were mapped and evaluated, and viable electrochemical conversion and upgrading routes were identified, showing how renewable electricity and CO_2 utilization can be coupled in practice. Complementary work on energy system modelling, grid constraints, and techno-economic feasibility ensured that these process innovations are grounded in real-world energy and regulatory contexts. Together, these first-year results confirm that flexible, energy-responsive bioprocess operation is technically feasible and provide a clear pathway for scaling, integration, and demonstration in subsequent project phases.

1 Activities

Result 1 Dynamically operated fermentation processes

The aim of Result 1 is to make industrial fermentation processes more flexible, so they can better respond to the fluctuating availability of renewable energy and grid capacity throughout the day. Instead of operating under fixed conditions, these processes are being adapted to dynamically adjust key parameters such as temperature, feeding strategies, aeration, and processing time. This flexibility is essential to reduce peak electricity demand, make better use of renewable energy, and strengthen the resilience and sustainability of the bio-based industry.
Across the reporting period, several partners contributed complementary activities, ranging from literature studies and laboratory experiments to pilot- and demo-scale trials. Together, these activities lay the groundwork for dynamic fermentation as an integral part of future industrial bioprocesses.

Identifying strategies for flexible operation

WFBR initiated this work with a comprehensive literature study to identify promising strategies for making fermentation processes more flexible. Three main approaches were selected for further investigation. The first is dynamic operation, where the duration or intensity of certain process steps can be extended or reduced depending on external conditions, such as energy availability. This approach relies on advanced process monitoring and control. The second strategy is buffering, which involves temporarily delaying cultivation or downstream processing steps. While buffering can reduce energy peaks, its effects on product quality must be well understood. The third strategy focuses on peak shaving, aiming to flatten electricity demand by optimizing energy-intensive operations such as cooling, drying, and steam-based treatments.
These strategies provided the conceptual foundation for subsequent experimental work.

Understanding temperature effects in fermentation

Building on the literature study, WFBR established a model fermentation system using *Kluyveromyces lactis* to study how temperature affects microbial growth and energy demand. A series of controlled fermentations were carried out across a range of temperatures to determine how growth rate, oxygen consumption, and biomass yield respond to temperature changes.
Online measurements of key process parameters were combined with manual sampling to ensure reliable data. The resulting datasets are being used to determine temperature–growth relationships and to develop modelling tools that predict optimal temperature profiles for large-scale fermentations. These tools incorporate thermodynamic principles and are intended to support dynamic temperature control in industrial settings, helping operators adapt fermentation conditions without sacrificing productivity.

Dynamic biomass production from CO_2-derived feedstocks

Farmless focused on dynamic production of microbial biomass using CO_2-derived feedstocks. At bench scale, three experimental workstreams were carried out to understand how operational flexibility affects both metabolism and process stability.
First, fermentations were conducted at different temperatures to identify conditions that maximize carbon uptake while maintaining biomass robustness. Second, feeding strategies were optimized, not only to support growth but also to reduce operational issues such as foaming. Third, air sparging strategies were evaluated to simulate the increased oxygen availability found in large industrial fermenters. Farmless developed a scalable approach to maintain sufficient dissolved oxygen levels, an important step toward industrial deployment.

Exploring bacterial and vinegar fermentations

Burg Group contributed by Co-investigating together with WFBR in defining process boundaries for experimentation on vinegar production. During the reporting period, the focus was on scoping and jointly identifying suitable process conditions, including early laboratory trials conducted together with WFBR to grow vinegar cultures. This work established practical constraints and opportunities for introducing dynamic operation into these traditionally stable processes.

Laying the foundation for dynamic mycoprotein production

ENOUGH concentrated on preparing the experimental and collaboration framework needed for dynamic mycoprotein fermentation. Key activities included finalizing material transfer agreements, coordinating technology transfer with partners, and shipping essential materials. At the same time, in-house development work began on online monitoring solutions, such as testing optical backscatter sensors to track biomass growth in real time. These monitoring tools are an important enabler for future dynamic control of large-scale fermentations.

Optimizing fermentation concepts for protein production

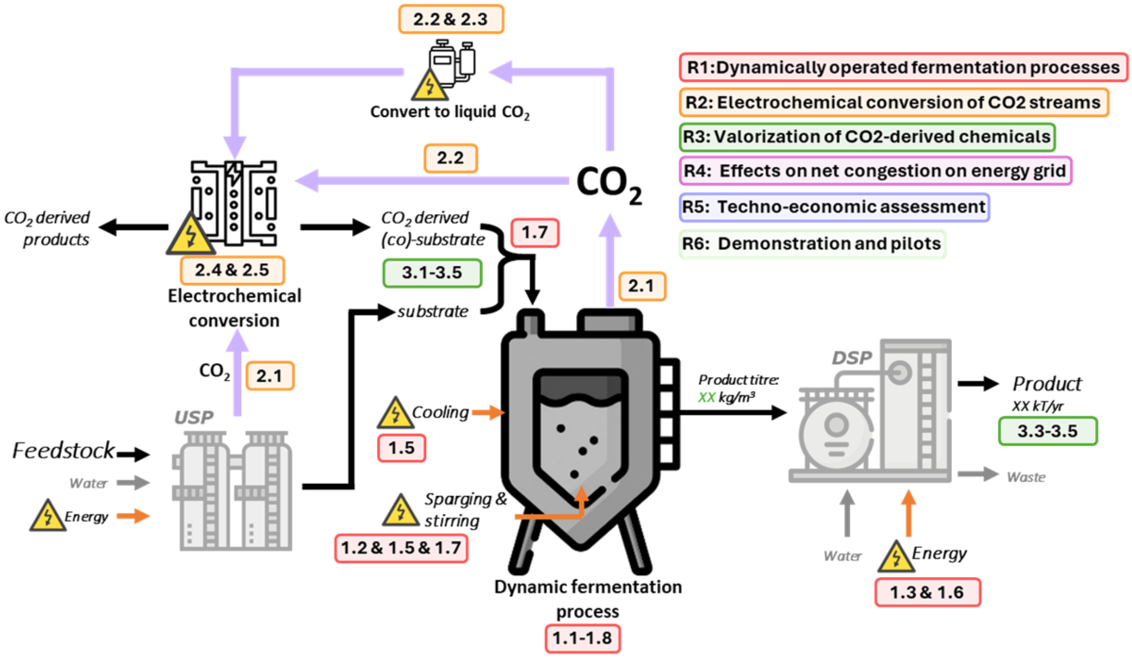
Vivici continued to evaluate how variables such as temperature, methanol feed rate, mixing speed, and gas flow influence fermentation performance. Work focused primarily on the company's most recent production strains, while also developing new strain lineages designed for innovative fermentation concepts.
A central theme in Vivici's work is optimizing methanol feeding. Methanol functions both as a nutrient and as a trigger for protein production in their platform. Building on strategies described in the scientific literature, Vivici developed and refined mixed feeding protocols that combine methanol and glucose during the production phase. These protocols are being tested and further optimized at both laboratory and pilot scales. In parallel, experiments are being planned to explore constant temperatures, phase-specific temperatures, and temperature profiles over the course of fermentation runs.

Dynamic operation of Chain elongation at demo scale

ChainCraft contributed practical experience from both laboratory and demonstration-scale operations. At the DEMO plant, trials were carried out to stabilize fermentation performance by deliberately delaying or accelerating the process under different conditions. In the laboratory, experiments focused on adjusting retention times to assess their impact on product quality and process stability. These activities provided valuable insights into the challenges and opportunities of dynamic fermentation in an operational environment. More targeted research on dynamic operation is planned for the coming period.

Overall progress

Together, these activities demonstrate steady progress toward making fermentation processes more flexible, energy-aware, and resilient. By combining fundamental studies, applied experiments, and real-world testing, the project is building the scientific and operational knowledge needed to integrate dynamic fermentation into future sustainable biomanufacturing systems.



Result 2 Electrochemical conversion of CO_2 streams

Activities under Result 2 focused on understanding which CO_2 streams are suitable for electrochemical conversion, how these streams can be captured and purified, and how they could be reliably coupled to downstream chemical and biological production processes. The work combined industrial data, literature analysis, and process modelling to create a realistic foundation for CO_2 utilization within the project.

Cosun contributed by gathering detailed data on CO_2 streams originating from its sugar production and ethanol fermentation processes. This included information on volumes, compositions, and seasonal availability. In parallel, Cosun consulted internal sustainability experts to assess how future changes in production processes and emission profiles could influence the relevance of CO_2 capture, electrolysis, and co-feeding strategies for meeting corporate emission reduction targets.

FeyeCon carried out an extensive literature review of biogenic CO_2 sources such as biogas, fermentation off-gas, and biomass combustion. These sources were evaluated based on CO_2 concentration, the annual biogenic potential in Europe, and the nature of impurities present in each stream. Understanding impurities is critical, as they directly affect process design, operating costs, and compatibility with electrochemical conversion technologies.

Building on this review, the most relevant CO_2 upgrading technologies for the project were selected for further analysis: water scrubbing, pressure swing adsorption, and membrane separation. These technologies were compared based on CO_2 and methane recovery, product purity, and energy demand.

Detailed process models were then developed for biogenic CO_2 recovery from ethanol fermentation gas and from biogas streams. For fermentation gas, water scrubbing was identified as a particularly suitable option due to the low level of problematic impurities, allowing for a relatively simple and efficient separation process. For biogas, multiple configurations and operating scenarios were evaluated across different technologies, capturing a wide range of realistic industrial conditions. From these analyses, representative process configurations were selected that combine very high CO_2 purity and recovery with acceptable methane recovery.

In addition, preliminary concepts for CO_2 liquefaction were developed, including basic flow schemes and energy estimates based on the modelled CO_2 outputs. While these designs are still being refined, they represent a first step toward integrating CO_2 capture, conditioning, and electrochemical conversion into a coherent system. To enable high-pressure electrochemical conversion, FeyeCon also provided technical specifications for several high-pressure vessel options suitable for housing electrochemical cells. These inputs support future system design and scale-up activities.

In parallel WFBR has conducted a detailed review on how to setup formic acid production from CO2 both at high pressure and ambient conditions. Based on this study a setup was designed for ambient pressure conversion of CO_2 into formic acid. All components have been ordered, and laboratory activities are expected to start in second half of 2026.

Result 3 Valorization of CO2-derived chemicals

Result 3 focuses on enabling the practical use of CO_2-derived hydrocarbons, such as formic acid or short-chain alcohols, as substrates in industrial fermentation processes. The underlying objective is to adapt bioprocess designs so that a meaningful fraction of the carbon in biopolymers and novel food products can be sourced directly from CO_2, while maintaining industrial relevance and process robustness.

During the current reporting period, activities concentrated on the early, enabling phase of microorganism selection, which is a critical prerequisite for the successful integration of CO_2-derived compounds into biomanufacturing processes. Rather than starting from trial-and-error experimentation, the project adopted a systematic, data-driven *in-silico* screening approach to identify promising microbial hosts.
The starting point for this work was the identification of metabolic pathways that enable microorganisms to co-consume formic acid alongside conventional substrates. These pathways are being mapped in detail, focusing on enzymatic steps that allow assimilation of C1 molecules without compromising growth or product formation. Based on this pathway analysis, reference datasets will be constructed, and Hidden Markov Model (HMM) profiles are going to be developed for key enzymes involved in formate and related C1 metabolism. These activities are aimed at being completed in Q2 2026.

Using curated genomic reference datasets, large numbers of microbial genomes will be screened for the presence of these pathway-specific genes. This genome-wide screening will allow the consortium to assess not only whether relevant pathways are present, but also how complete and potentially functional they are across different organisms. By comparing occurrence patterns, multiple candidate microorganisms will be identified that inherently possess the genetic capacity to co-utilize CO_2-derived formic acid together with other industrial substrates.
The outcome of this *in-silico* screening is a shortlist of high-potential microbial candidates that are suitable for subsequent laboratory validation. These organisms form the basis for the next phase of Result 3, in which experimental screening will confirm growth performance, co-feeding behavior, and compatibility with targeted bioprocesses. Through this structured approach, the project ensures that laboratory effort is focused on the most promising hosts, accelerating progress toward fermentation processes that are partially or fully derived from CO_2-based carbon streams.

Result 4 Electrical analysis and dynamic energy availability

Result 4 addresses the question of how fermentation and electrochemical processes can be aligned with the dynamic availability of renewable electricity. Activities in this result focused on analysing energy systems, data sources, and modelling tools needed to realistically simulate grid conditions and energy-driven process control.

Hogeschool Windesheim evaluated the existing hardware and software of the HAN University of Applied Sciences Smart Grid Table. This analysis showed that supporting realistic grid reconfigurations and congestion scenarios would require a new system design. In particular, interfaces for weather data, energy-related emissions, electricity volumes, and power capacity need to be clearly specified and integrated. The work also identified that purely numerical load-flow models are insufficient, as visual and scenario-based interfaces are essential for meaningful system analysis.

Initial explorations were conducted to link historic weather data from KNMI to energy and power availability. These analyses showed that the relationship between weather conditions and electricity availability or price is complex and cannot be derived directly without further data integration and modelling. This insight guides future work toward more sophisticated data coupling approaches.

In parallel, work started on developing Matlab Simulink models of a generic, fictive industrial plant. These models provide a neutral starting point for future, plant-specific simulations, enabling the analysis of how dynamic energy availability can influence production planning, operation, and control before applying the approach to real industrial cases.

Result 5 Techno-economic assessment

Activities under Result 5 focused on establishing the knowledge base required for a techno-economic evaluation of CO_2-based value chains. During the first project year, Tielo-Tech concentrated on gathering and structuring basic technical and economic information rather than producing full assessments.

Two main CO_2 conversion routes were analyzed. The first is the direct route, based on microbial electrosynthesis, where electro-active microorganisms convert CO_2 directly into products at the electrode surface. The second is an indirect, two-stage route, where CO_2 is first electrochemically converted into simpler C1 or C2 molecules, such as formate or methanol, which are subsequently used as substrates in established fermentation processes. For the Ecoovalue project, formate/formic acid and methanol were identified as particularly relevant intermediates, especially for the production of biopolymers such as polyhydroxyalkanoates (PHA).

The information gathering covered several aspects, including the current technology readiness of different synthesis routes, the types of electrochemical cells and catalysts used, typical operating conditions for temperature and pressure, and reported efficiencies for carbon conversion. This provided a structured comparison of direct versus indirect CO_2 utilization pathways and highlighted trade-offs between technical complexity, scalability, and integration with existing fermentation technologies.
In addition to CO_2 conversion routes, Tielo-Tech evaluated alternative cooling technologies that could be integrated into fermentation processes, particularly for acetic acid (vinegar) production at one of the partner sites. Cooling is a key cost and energy factor and is closely linked to the possibility of dynamic operation explored elsewhere in the project.

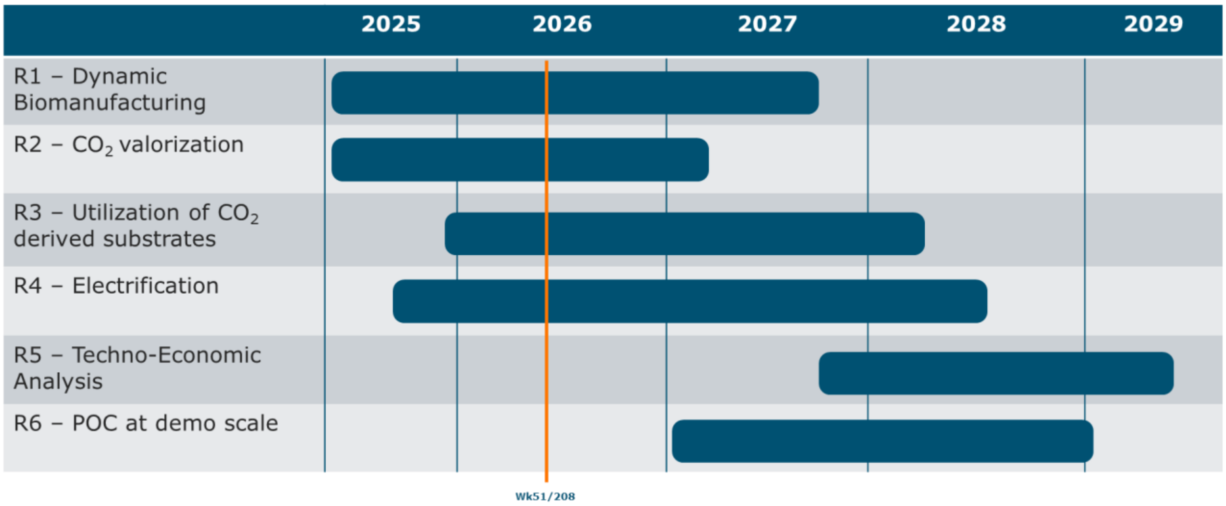
Burg Group supported the techno-economic work through coordination and alignment activities, including a joint kick-off to define scope. In this meeting, Burg Group provided input so that the techno-economic assessment remains grounded in real industrial practice.

Other activities

Activities scheduled for Results 6 have not yet started and are scheduled for end of 2027 onwards. Beyond the formal result structures, several partners contributed activities that supported overall project coherence. Farmless engaged actively in consortium meetings and aligned technical targets, reporting formats, and documentation practices. Tielo-Tech developed questionnaires to align CO_2 conversion, cooling, renewable electricity use, and dynamic operation across partners. ENOUGH continued internal evaluations of inline biomass monitoring technologies, supporting future implementation of dynamic process control.

2 Results & Bottlenecks

The activities carried out under Result 1 have generated a first set of tangible results that demonstrate how fermentation processes can be made more flexible, predictable, and compatible with fluctuating renewable energy availability. Across modelling, laboratory studies, economic assessments, and pilot-scale insights, partners produced new knowledge, validated concepts, and removed key uncertainties that currently limit dynamic operation in industrial biomanufacturing.



Predictive models and temperature-driven flexibility in fermentation

WFBR developed a first-generation predictive model that links microbial growth, substrate consumption, and heat generation in fermentation processes. The model combines established biological growth principles with thermodynamic calculations to estimate how much heat is produced by microorganisms under different operating conditions. This allows temperature profiles in large-scale fermenters to be simulated realistically, including the impact of cooling system limitations.
By integrating laboratory measurements on microbial growth at different temperatures, the model can predict growth profiles under dynamically changing conditions. These predictions were experimentally validated in lab-scale bioreactors using *Kluyveromyces lactis* as a model organism. In these experiments, temperature profiles representative of industrial biomanufacturing were successfully mimicked while continuously monitoring biomass, pH, gas exchange, and dissolved oxygen.
Importantly, the simulations also incorporated realistic energy demand and supply scenarios based on historical electricity data. This demonstrated, for the first time within the project, that temperature can be used as an effective “control handle” to align fermentation activity with periods of higher renewable energy availability, without compromising key performance indicators such as growth or productivity.
These results confirm temperature modulation as a viable and scalable strategy for dynamic fermentation.

Improved stability and predictability in CO_2-based biomass production

Farmless generated a robust experimental dataset that translated directly into reduced process risk and improved operational predictability. One key outcome was demonstrating that their fermentation process remains stable and productive at optimized operating temperatures.
Significant progress was also made in optimizing feeding strategies. Two feeding profiles were identified that completely eliminated foaming, a major operational challenge. This substantially increases process reliability, which is essential when introducing dynamic control.
Finally, Farmless successfully implemented a precise oxygen enrichment strategy that reproduces oxygen transfer levels expected at industrial scale. Achieving this at bench scale validates both the scalability of the process and its readiness for coupling to large fermenters operated under dynamic

conditions. During execution, key process-stability constraints were identified, highlighting the strong interdependence between feeding strategies and physical system behaviour. These insights directly informed subsequent redesigns of feed and oxygen-supply strategies to improve robustness.

Vinegar fermentation improvements prepared on paper

Early assumptions regarding the representativeness of model systems were reconsidered, leading to a transition toward working with production-relevant cultures. Some experimental and data-collection steps experienced delays and will be addressed beyond the current reporting period.

Economic viability of dynamically coupled electrochemical and fermentation processes

Tielo-Tech delivered important insights into the economic and energetic feasibility of coupling electrochemical CO_2 conversion with fermentation processes. Using realistic assumptions for renewable electricity from solar and offshore wind, the levelized cost of electricity was calculated across different capacity factors. These analyses confirmed that intermittent renewable power can be economically integrated into electrochemical conversion routes.
An initial cost evaluation of converting CO_2 into formate or formic acid showed that this two-electron electrochemical pathway is energetically efficient and well suited for dynamic operation. A major advantage identified is that formate-containing electrolyte solutions can be used directly as feedstock for microbial fermentation, avoiding costly intermediate purification steps. The work also highlighted alternative pathways, such as methanol-based fermentation for producing short-chain carboxylic acids.
Overall, two critical operational aspects were addressed: the feasibility of dynamically operating electrochemical conversion units in response to fluctuating electricity supply, and the identification of cooling technologies relevant for temperature-sensitive fermentations such as acetic acid production.

System-level insights into CO_2 utilization and sustainability accounting

Cosun contributed system-level results by mapping the main CO_2 streams from sugar production facilities, including their flows, compositions, and seasonal availability. This provided a clear overview of where and when CO_2 is available for conversion into bio-based products.
Equally important were insights into regulatory and sustainability frameworks. The work showed that while using biogenic CO_2 improves overall sustainability, it does not count as a formal CO_2 emission reduction under current accounting rules. Conversely, using fossil-derived CO_2 in bioprocesses only generates credits if the carbon is permanently stored, which is not the case for food ingredients or most bioplastics. These insights are critical for aligning technical innovation with real-world climate policy incentives.
Additionally, the consortium identified that CO_2 captured upstream of biogas grid injection is particularly attractive, as it is more concentrated and avoids methane leakage risks.

Tools and data for smart energy–bioprocess integration

Hogeschool Windesheim delivered enabling results for linking fermentation control to energy system dynamics. A new printed circuit board was designed for the Power Table, enabling flexible grid configurations and future modelling of grid congestion or location-based electricity pricing. In addition, analyses of historical weather and energy pricing data were carried out, providing datasets that can be used to simulate realistic energy-driven control strategies for fermentation processes. Access to sufficiently detailed energy and power consumption data proved challenging within the project timeframe. This limits the resolution of process-level energy analyses at this stage.

Preparation for dynamic mycoprotein fermentation

ENOUGH demonstrated the feasibility of online biomass monitoring using optical backscatter sensors in lab-scale fermentations. Initial datasets confirmed that this approach can track biomass development and serve as a foundation for real-time process control. In parallel, all essential administrative and logistical steps for collaboration were completed, clearing the way for accelerated experimental progress and dynamic control studies in the next phase. Implementation of advanced online monitoring in an industrial environment was constrained by production scheduling and technology integration timelines. Consequently, data collection during active production was more limited than initially planned.

Toward tailored dynamic fermentation concepts for protein production

Vivici made progress in understanding how different microbial strains respond to dynamic process conditions. Results showed that methanol induction, feeding rates, temperature, mixing, and aeration must be tailored to each strain lineage. Mixed-feed fermentation protocols combining methanol and glucose were successfully established at both 1-liter and 15-liter scales, providing a stable base for further optimization.

Although results varied when combining feeding strategies with dynamic stirring and gas flow profiles, incremental improvements were achieved. These findings underline that dynamic fermentation concepts must be developed in close interaction with strain selection, a key insight guiding future work. Maintaining stable oxygen availability was identified as a critical operational constraint influencing process safety and performance. Short- and long-term mitigation strategies are being explored, combining feed-rate optimization, strain development, and planned hardware upgrades to enhance oxygen transfer capacity.

Operational learnings from demo-scale chain elongation fermentation

ChainCraft generated initial but not yet fully consolidated results from lab and demo-scale operations, indicating that dynamic adjustments to fermentation timing can improve process stability. While these results will be reported in more detail in the next period, they already provide practical evidence that dynamic operation is feasible beyond the laboratory environment.

3 Perspective for application

The results generated within this project point toward a new generation of flexible, energy-aware biomanufacturing systems that can play a key role in the transition to a sustainable and resilient bio-based economy. By combining dynamic fermentation operation, electrochemical CO_2 conversion, and real-time energy system insights, the project demonstrates how biological production processes can be actively aligned with the availability of renewable electricity rather than being constrained by it. A key application perspective lies in industrial fermentation facilities with significant energy demand, such as those producing proteins, organic acids, biomass, or biopolymers. The validated ability to modulate process conditions (particularly temperature, feeding strategies, and aeration) without losing process stability opens opportunities to reduce peak electricity demand, avoid grid congestion, and increase the uptake of locally generated renewable energy. This is especially relevant for existing industrial sites facing grid capacity limitations, where dynamic operation can unlock production growth without major grid upgrades.

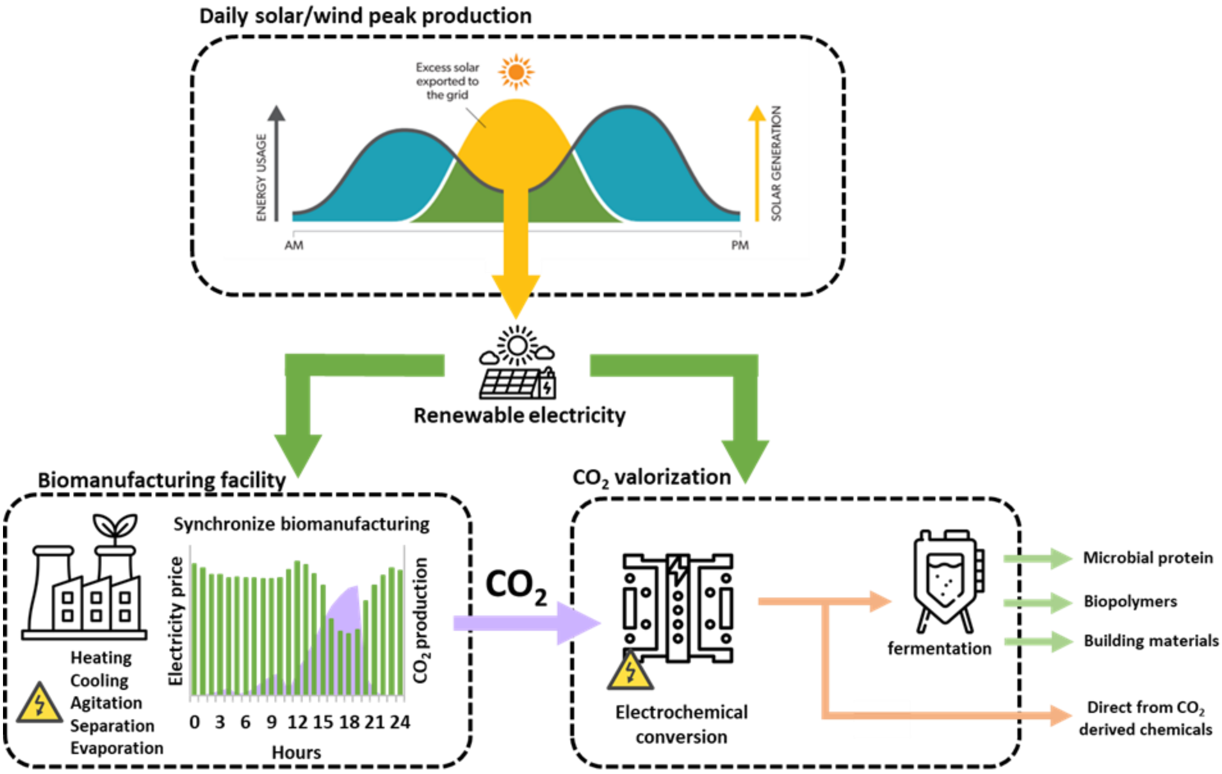
The integration of electrochemical CO_2 conversion further strengthens this perspective. Converting concentrated biogenic or industrial CO_2 streams into fermentation-ready intermediates such as formate or methanol enables carbon recycling while also acting as an energy buffer for intermittent renewable power. In practical terms, this allows industrial sites to store renewable electricity in chemical form and deploy it flexibly in downstream biological processes. Such hybrid electro-bio systems are well suited for regions with high solar or wind penetration and variable electricity pricing.

At system level, the project’s insights into energy markets, grid behavior, and sustainability accounting highlight that technical feasibility alone is not sufficient. Successful application will depend on aligning process design with regulatory frameworks, CO_2 credit schemes, and energy pricing mechanisms. The tools and modelling approaches developed in the project provide a basis for companies to evaluate site-specific business cases, balancing environmental benefits with economic viability.

Looking ahead, the strongest application potential lies in modular, scalable concepts that can be retrofitted into existing plants or deployed as new facilities co-located with renewable energy generation and CO_2 sources. By enabling fermentation and CO_2 conversion processes to respond dynamically to energy availability, the project contributes to a more integrated and adaptive industrial landscape—one in which biomanufacturing not only reduces emissions but actively supports the stability and efficiency of future energy systems.

4 Contribution of the project to the goals of the subsidy

ECOOVALUE aims to incorporate the grid capacity and renewable energy dynamics into the current biomanufacturing processes while at the same time integrating cost-effective valorization of CO_2 emissions originating from involved unit operations. The project supports the goals of Mission C – Industrie which has the mission to facilitate the industrial production of sustainable products and ensuring the sustainability of current manufacturing processes. Activities within the ECOOVALUE project fit those mentioned in both subthemes 1) on system innovation for electrification within industry and 2) on production of sustainable commodities and products derived from CO2 and CO. As shown in schematically in Figure 2, ECOOVALUE will focus on development of technologies and methodologies to interconnect peak production of solar and wind energy, biomanufacturing facilities and CO2 valorization to reduce carbon emissions, and eliminate the requirement of fossil-based energy supply.



5 Spin-offs

Since the project has just started no substantial results that lead to commercially viable spin-offs have been generated yet.

6 Overview of publications

- General information about the project can be found on the project page: https://projecten.topsectorenergie.nl/projecten/ecoovalue-smart-and-dynamic-bioproduction-with-integrated-co2-valorization-39396

- In spring 2026 the project was presented at the BioKET conference in Fribourg.