

RESEARCH PROGRAMME

BIOENERGY

The sustainable and efficient use of biomass is a strategic component of Switzerland's energy transition and an integral element of a resilient, net-zero-compatible energy system. Increasing biomass use has been recognized as key to reducing net greenhouse gas emissions – not only in the energy sector, but also in other sectors such as construction, where biomass can substitute energy-intensive materials like cement and contribute to biogenic carbon storage, and chemical industries, where biogenic carbon can be converted into platform chemicals such as methanol and other bio-based products.

As a limited resource, biomass requires targeted, coordinated, and system-level management. In the energy sector, biomass offers versatile, carbon-based solutions, providing electricity, heat, as well as gaseous and liquid energy carriers. Unlike intermittent

renewables, some biomass types are storable and transportable – either in raw form or as transformed products such as biomethane. This enables bioenergy to contribute to the flexibility, resilience, and the renewable share of the energy system. This contribution can be further enhanced through advanced conversion processes, improved system integration, and the exploitation of synergies across sectors. In combination with carbon capture and storage technologies, bioenergy can also enable negative emissions, strengthening its potential role in climate mitigation strategies.

Research projects should be guided by the strategic added value of biomass use for the Swiss energy transition, and aligned with the Federal Energy Research Masterplan 2025–2028.

PERSISTENT CHALLENGES

The sustainable mobilization of biomass in Switzerland is constrained by limited domestic availability, competing uses (food, feed, materials), and complex supply chains. Its increasing use requires careful prioritization and strategic allocation, including consideration of cascading use and sector interactions in line with the Swiss biomass strategy. These must be carefully assessed, while opportunities and synergies should be identified and exploited. At the same time, conversion of biomass into energy carriers often re-

mains suboptimal, leaving significant potential for efficiency gains across the value chain. Ensuring the economic viability of bioenergy pathways is an additional challenge. The integration of bioenergy into broader energy systems – including sector coupling and the provision of resilience and flexibility services – requires further innovation. Questions of overall sustainability, environmental impact, and social acceptance need to be considered to avoid trade-offs and guide evidence-based decision-making.

RESEARCH PROGRAMME OBJECTIVES

The Bioenergy research programme promotes application-oriented innovations relevant to Switzerland, strengthens national cooperation, and embeds research in an international context.

A key principle of the programme is holistic system thinking: the targeted use of different biomass fractions, improved conversion technologies, cascading use in line with the circular economy, and the efficient valorisation of by-products (e.g., CO₂, nutrients), including the monetization of resulting added value and services. Research projects may focus on specific technologies or processes, but should place these in a system context, compare them with relevant alternatives, and clearly demonstrate their strategic relevance and added value for the Swiss energy system.

The integration of digital technologies – including data analytics, process monitoring, and modelling tools – is encouraged, for

example, to assess scaling potential, identify synergies, improve efficiency, support optimisation, and strengthen evidence-based decision-making.

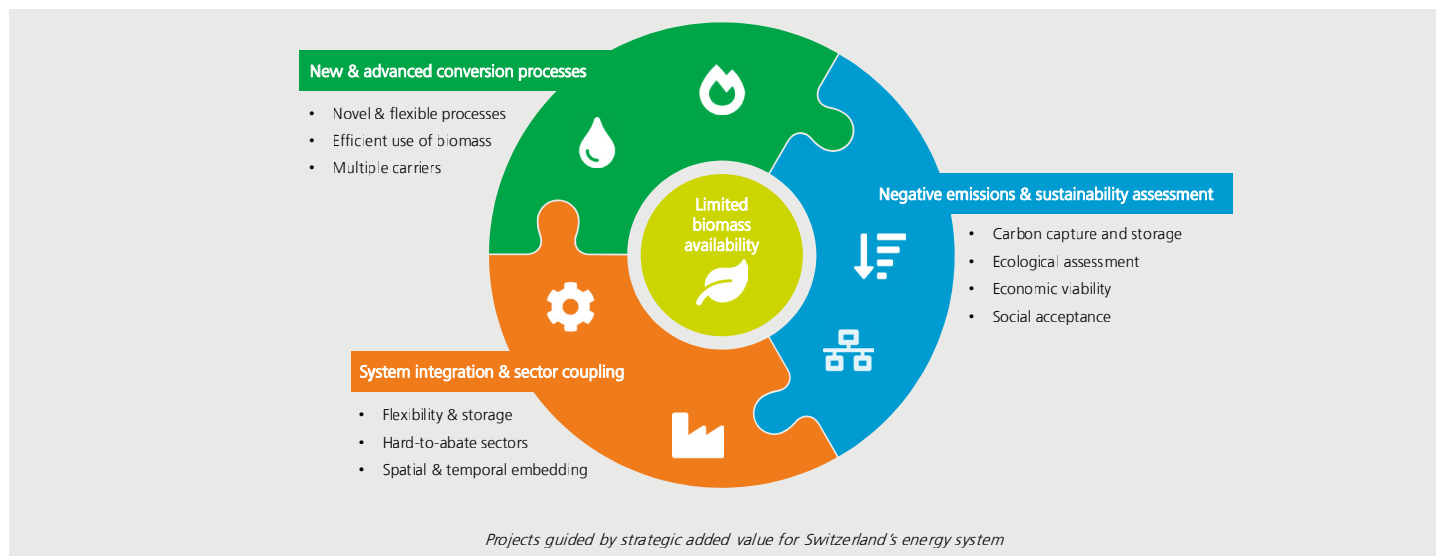
RESEARCH PRIORITIES 2025–2028

New and advanced conversion processes: Efficient mobilization and use of sustainable biomass fractions; further development of existing and novel conversion processes, with particular attention to underutilized or residual biomass streams, overall process efficiency, and the flexibility of energy carrier production.

System integration and sector coupling: Spatial and temporal embedding of bioenergy plants into local and national energy systems; provision of different energy carriers, flexibility, and storage. Focus is placed on applications where bioenergy offers

clear system-level added value. Recognising that sustainably available biomass is scarce and valuable, priority should be given to hard-to-abate sectors and uses where direct electrification is not feasible.

Negative emissions and sustainability assessment: BECCUS (Bioenergy with Carbon Capture, Utilization and Storage), life cycle assessment, economic viability, and social acceptance. Research in this area aims to quantify the climate mitigation potential of bioenergy pathways, assess trade-offs and co-benefits, and develop frameworks to support evidence-based policy and public engagement.



FUNDING PROCEDURE

Research funding is provided on a subsidiary basis through an open bottom-up procedure as well as through thematic calls for proposals (top-down). Project proposals may generally be submitted at any time, provided they are clearly in line with the objectives of the research programme and the federal energy strategy, and not covered by an ongoing call.

Interested applicants are encouraged to email an expression of interest with a project outline (max. 2–3 pages; see Project Outline Template) to the programme management (contact below), stating the subject area, project scope, project partners, and relevance to Switzerland. Following an initial assessment of content and strategic fit, and subject to the availability of funds, suitable applicants will be invited to prepare a more complete application ([SFOE-specific full proposal](#) and [financial sheet](#)). Please note that an invitation to submit a full proposal does not

guarantee acceptance or funding of a project. Applicants should follow the provisions of the [Directive on the submission and evaluation of applications](#).

Projects are expected to demonstrate a clear pathway towards practical implementation and impact. Collaboration with industry, associations, and cantonal or municipal authorities is encouraged. Applicants are encouraged to consult information on ongoing projects in ARAMIS to identify potential synergies and, in particular, avoid duplication within the research programmes and other federal initiatives.

Projects funded by the SFOE are expected to be made accessible in line with open science principles, including open access to data, code (where applicable), and publications, subject to justified restrictions.

COOPERATION

The Bioenergy Research Programme actively fosters synergies and collaboration across national and international R&D networks. At the national level, the programme maintains close ties with universities, universities of applied sciences, and, where relevant, sector associations. International cooperation is pursued in particular through active engagement in the IEA Bioenergy Technology Collaboration Programme, where Switzerland is represented in the Executive Committee (ExCo) and participates in Task 37 (Energy from biogas), Task 40 (Sustainable international bioenergy trade), and Task 45 (Climate and sustainability effects of bioenergy).

CONTACTS

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