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# BioFuture2025

Academy Programme 2017 - 2020

Programme Memorandum



## 1. BACKGROUND

A biobased economy is evolving and strengthening alongside the fossil-fuelled economy, promising solutions that will help curb climate change and excessive natural resource consumption. This shift has major implications for society and culture. Economically, ecologically, socially and culturally sustainable biobased solutions must have broad public acceptance. A successful transition to a biobased society will require active involvement and interaction between the business sector, government and civil society.

In recent years, several international and national agencies and organisations have put forward their own visions and strategies for a biobased economy. Finland's 2014 bioeconomy strategy underscores the key importance of new sustainable economic growth, business invigoration and a solid skills and knowledge base. The Finnish Government's target is for Finland to become an international forerunner in bio- and circular economy and cleantech by 2025. The Government's strategy defines bioeconomy as follows:

*Bioeconomy refers to an economy that relies on renewable natural resources to produce food, energy, products and services. The bioeconomy strives to reduce our dependence on fossil natural resources, to prevent biodiversity loss and to create new economic growth and jobs in line with the principles of sustainable development.*

Increasing public resources are being committed to bioeconomy promotion. One of the key areas of strategic focus during the Government's 2015–2018 term in office is 'Bioeconomy and clean solutions'. Funding of 300 million euros has been earmarked for national and international R&D projects in this subject area in 2016–2018. In recent years, the Academy of Finland has awarded some six million euros a year in nonthematic competitive funding for research associated with bioeconomy. In October 2015, the Strategic Research Council (SRC) awarded additional funding of around 20 million euros for bioeconomy research in 2015–2017. Under the Green Growth programme (2011–2015) funded by the Finnish Funding Agency for Innovation Tekes, funding of 80 million euros was made available to businesses and research organisations committed to improving materials, resource and energy efficiency. In November 2015, Tekes announced a new type of call aimed at the business sector under the title 'Bioeconomy business spearheads and ecosystems'. Out of the budget allocated to the Government's analysis, assessment and research activities in 2015–2016, 3.6 million euros is earmarked for the bioeconomy and clean solutions theme. NordForsk has a budget of around 10 million euros to support centres of excellence in the Nordic Bioeconomy Programme, which is focused on the role of water in the bioeconomy. Under the EU's Research and Innovation Programme Horizon 2020, the societal challenges section includes several bioeconomy themes that will be funded. Horizon 2020 is pivotal to the implementation of the European Commission's bioeconomy strategy 'Innovating for Sustainable Growth' (2012).

The Finnish bioeconomy strategy emphasises the importance of a solid skills and knowledge base for an efficient bioeconomy and calls upon the Academy of Finland to launch research programmes in the bioeconomy field. The transition to a carbon-neutral society will significantly change consumers' living environment, behaviour and values. The future is genuinely open, but long-term and interdisciplinary research can help anticipate emerging opportunities and so prepare for the challenges and choices that lie ahead. New interactions and collaborations will help pave the way to new solutions. The BioFuture2025 Academy Programme is intended to create a foundation for scientific innovation and to promote long-term self-renewal in society.

## 2. OBJECTIVES

BioFuture2025 will aim to support the creation of a new knowledge base and to promote major scientific breakthroughs through new ways of doing science. The programme will seek out the best ideas, identify new opportunities and support research exploring new avenues for significant advances in the bioeconomy field. Ultimately the aim is to bring Finnish research to the international forefront by providing funding for ambitious and even risk-taking new research initiatives.

The Academy Programme's main objectives are as follows:

- increase understanding of the societal and environmental challenges flowing from the transition to a bioeconomy
- create a new knowledge base for the emergence of an economy founded on sustainable biobased solutions
- develop and strengthen multi- and interdisciplinary research collaboration and foster new ways of doing science in the field of bioeconomy research.

Other aims:

- strengthen Finland's position as a world leader in sustainable bioeconomy
- promote interaction and exchange between decision-makers in society, business and industry representatives, and citizens with a view to putting new knowledge to the best possible use
- pool existing research capacities by promoting research collaboration and improving infrastructure utilisation
- advance the international networking of Finnish bioeconomy research.

### 3. RESEARCH THEMES

Major areas of focus in the BioFuture2025 Academy Programme are to identify new research themes, to develop new methods, and to explore and study new theories. Steps are needed to more closely integrate interdisciplinary approaches and to advance the shared and diverse use of research methods and data sources.

Long-term research will be geared towards laying the foundation for next-generation bioeconomy solutions, practices and technologies. A major research focus will be to identify new biobased resources and to create new and more eco-efficient technologies. On the other hand, developing the bioeconomy will require research that explores the societal changes resulting from the bioeconomy transition and ways of controlling these changes. Success will depend on broad public acceptance of the raw materials, products and production technologies used and on access to economically and ecologically sustainable production processes.

The BioFuture2025 Academy Programme has two research themes.

#### **Smart biomass and high-value-added products, production technologies and services as part of the circular economy**

New value networks and associated new production technologies, products and services can pave the way to new kinds of operating concepts and practices in the biobased and circular economy. New bioeconomy solutions will require well-researched evidence from new perspectives about bioresources, bioresource availability, biomass properties, biomass production methods and use, and the impacts of biomass use on ecosystems, society and the economy. Different types of biomass, the identification of new raw materials and biomass source materials and the processing of these materials (by chemical, biotechnological, biochemical and biological methods) as well as their refinement provide the foundation for the diverse use of bioresources. Services play a growing role in new bioeconomy value chains.

Securing the sustainability of natural resource use will inevitably become a growing challenge with increased biomass use. Adverse environmental impacts can be reduced by the application of smart technologies in the development of new production methods and new uses of biobased raw materials.





Organic side streams and waste from production processes can be put to effective use in the bioeconomy as part of the circular economy. Smart biomass processing makes it possible to separate several different products from different stages of the production process. Research is needed on the properties of source materials, phenomena-based modelling of production processes and technology concepts to facilitate the development of high-value-added bioproducts and services. This will contribute to boosting overall economic value added.

### **Impact of societal changes, values, ethics and behaviour on the use of biobased natural resources**

The transition to biobased solutions will throw up new challenges for society. To understand what these challenges will involve and how they can be overcome, diverse research is needed that integrates the perspectives of business and industry, civil society and government. It is paramount to understand what forces are driving the transition to a bioeconomy and what kinds of solutions they will require.

The transition to a bioeconomy will require legal and societal regulation (incentives and restrictions). Research is needed to understand how these actions will promote change and how conflicting objectives can be managed and reconciled.

Seen as a broad societal phenomenon, an important aspect of the bioeconomy is the sustainable management of natural resources. The Academy Programme takes into account the ethical, legal, societal and cultural dimensions of bioeconomy research. Changing values and value choices impact the relationship between humans and the natural environment, which has ethical and societal consequences for the implementation of a sustainable bioeconomy.

Changing consumer behaviours, everyday practices and choices are shaping the consumer-driven bioeconomy. Research evidence is needed about user needs and values and about how user choices can be influenced and how those choices influence bioeconomy processes.

Biocommodities such as plant-based products, foods, medicines, health and welfare services, and recreation services and the methods used in producing them must have broad public approval: this has a major impact on the use of these products and services. Interdisciplinary research is needed to understand the meaning of immaterial values in the bioeconomy for the promotion of health and wellbeing and leisure services, for instance.

Projects seeking funding from the BioFuture2025 Academy Programme must:

- identify which future challenges the research proposes to address and answer, and how the project will contribute to the growth of new understanding
- demonstrate new ways of doing science and facilitate scientific breakthroughs
- establish a solid scientific foundation for the emergence of an economy founded on new biobased solutions
- demonstrate a multidisciplinary approach and integrate interdisciplinary research.

## **4. IMPLEMENTATION**

The BioFuture2025 Academy Programme aims to strengthen multi- and interdisciplinary research in the fields represented by the programme. Its themes cut across several of the domains of the Academy of Finland's research councils. All four Academy research councils have contributed to the preparation of the programme (Biosciences and Environment, Culture and Society, Health, and Natural Sciences and Engineering).

### **4.1 FUNDING**





## ACADEMY OF FINLAND

The BioFuture2025 Academy Programme is a four-year research programme (2017–2020) funded and coordinated by the Academy of Finland. Through the programme, funding is provided to multi- and interdisciplinary research conducted by research projects and consortia with a view to supporting national cooperation and networking. A research consortium is a collaboration of independent projects working under a joint research plan by combining different methods and research fields with a view to achieving greater added value than is achieved by normal project collaboration.

Funding will not be provided for research into energy, synthetic biology and sustainable use of aquatic resources, since these themes are currently the focus of other Academy Programmes. The BioFuture2025 Academy Programme will not fund themes related to water supply either.

The Academy Board has preliminarily decided to earmark 15 million euros for the new programme. The final funding budget will be confirmed in spring 2016.

### 4.2 NATIONAL COLLABORATION

The BioFuture2025 Academy Programme will include active collaboration with other ongoing thematic programmes by the Academy of Finland, such as the *Synthetic Biology Academy Programme* (FinSynBio), the *Arctic Academy Programme* (ARKTIKO), the *New Energy Academy Programme* and the *Mineral Resources and Material Substitution Academy Programme* (MISU). BioFuture2025 will also include cooperation with the programmes of the Strategic Research Council (SRC) at the Academy of Finland, specifically the *programmes A Climate-Neutral and Resource-Scarce Finland* and *Disruptive Technologies and Changing Institutions*. Cooperation will also be sought with Tekes' programmes. For instance, Tekes has launched an extensive programme on the bioeconomy, which will run between 2016 and 2018.

### 4.3 INTERNATIONAL COLLABORATION

The programme selectively aims to establish cooperation with foreign research funding agencies that are committed to supporting leading-edge scientific research in the field and that are recognised and attractive partners for Finnish research. Another aim is to collaborate with corresponding and relevant international programmes and projects as well as with leading foreign research organisations in the field.

In December 2015, NordForsk opened a call for proposals for Nordic Centres of Excellence within the Nordic Bioeconomy Programme, with water as a common denominator. The Academy of Finland's Research Council for Biosciences and Environment will co-fund the call with a total of 1.25 million euros.

The Academy of Finland participates in funding collaboration within Horizon 2020, the EU funding programme for research and innovation. The Academy's goal is to increase international research collaboration by, for example, funding joint calls for research projects.

### 4.4 SCHEDULE

Within the programme, funding will be provided to individual projects and consortium projects for a maximum of four years. The funding period starts on 1 January 2017 and ends on 31 December 2020. A detailed schedule for the call and the review of applications is given in section 5.0 of this memorandum. A kick-off seminar will be arranged in early spring 2017. The Academy will separately announce the funding partners, themes, schedules and application processes of any additional calls to be launched.

### 4.5 STEERING GROUP





## ACADEMY OF FINLAND

The programme is run by a steering group composed of members of the Academy's research councils and other expert members. The duties of the steering group are as follows:

- to prepare the programme and submit to the programme subcommittee a proposal on projects to be funded
- to propose possible additional calls and/or additional funding to Academy research councils and other funding bodies
- to manage and monitor the programme
- to steer programme coordination
- to be responsible for the final evaluation of the programme
- to promote the application of research results produced within the programme.

### 4.6 PROGRAMME COORDINATION

The programme strives to support and promote the development of the selected projects into a coherent and cohesive structure through active cooperation and exchange of information. Programme coordination is the responsibility of the steering group and the programme managers and project officer appointed by the Academy. They are responsible for ensuring this development, working closely with the projects to facilitate the attainment of the objectives set for the programme. The aim is to ensure that the projects reinforce each other and that the programme generates new multidisciplinary research knowledge. Consequently, the principal investigators of the projects will be required to commit themselves to the programme objectives and to cooperating actively throughout the programme and during the programme evaluation upon its completion.

The project PIs will:

- assume responsibility for and report on the scientific progress of the project and on the use of the funds in accordance with the instructions of the programme manager and relevant funding bodies
- see to that the whole research team attends all meetings, seminars and workshops organised by the programme coordination, and facilitate cooperation and exchange of information between the research teams within the programme
- take part in producing reviews, syntheses and information material around the programme, and actively disseminate information about the programme's progress and results on both public and scientific forums.

During the course of the programme, the research projects will participate in events arranged together with end-users of research results and in any other activities designed to disseminate information to different stakeholders.

### 4.7 FINAL EVALUATION

The implementation and results of the programme will be evaluated upon its completion. The implementation of the evaluation will be planned in detail as the programme progresses. The evaluation will consider issues such as the following:

- attainment of programme aims
- programme implementation (coordination, role of the steering group, project activity)
- evidence of impacts
- national and international cooperation
- publicity and visibility of the research.

The evaluation may be carried out as part of a more extensive evaluation of Academy programmes or other national programmes and in cooperation with other national and international actors.





The research teams receiving funding are required to report on the progress of their projects in accordance with the decision of the steering group and to submit a research report to the Academy upon project completion. The reports must include information on, for example, scientific publications produced and theses and doctoral dissertations completed within the programme.

## 5. APPLICATION GUIDELINES AND REVIEW CRITERIA

The BioFuture2025 Academy Programme has a two-stage call. At the first stage, applicants submit letters of intent including short plans of intent (see guidelines in the Academy's April 2016 call for applications). The non-negotiable deadline for letters of intent is **27 April 2016 at 16.15**. The steering group will make a proposal to the programme subcommittee appointed by the Academy Board on projects that would best fit in with the programme aims on the basis of the letters of intent. The projects selected to proceed to the second stage (to submit full applications) will be notified of the steering group's decision in June 2016.

Applicants requested to submit full applications must prepare a complete research plan and submit it in the Academy's online services by 1 September 2016 at 16.15. The deadline is non-negotiable. See the guidelines for full applications in the Academy's April 2016 call for applications. **The cost estimate must be realistic and justified by type of expenditure in the research plan.**

On the basis of the scientific review of the applications and considering the programme aims, the steering group will prepare a proposal to the programme subcommittee on the projects to be funded. The subcommittee will make the funding decisions in December 2016 at the latest. Any additional supplementary calls will be carried out under a separately agreed schedule.

The letters intent will be reviewed by a panel consisting of steering group members and possibly other experts. The full applications will be reviewed by a panel of international experts.

The applications will be reviewed in line with the Academy of Finland's general review criteria (read more at [www.aka.fi](http://www.aka.fi)> Review & funding decisions > How applications are reviewed > Guides for reviewers). Besides the general review criteria, focus will also be placed on the objectives specific to the programme, as described in Chapter 2 of this memorandum. This aspect will be considered under section "Relevance of the project to the research programme" on the review form.

## 6. MORE INFORMATION

This programme memorandum is available as a PDF download at [www.aka.fi/biofuture2025/en](http://www.aka.fi/biofuture2025/en)

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