Biobased Tomorrow

Call for proposals

GATE 21

DTU

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Co-funded by the European Union

Öresund-Kattegat-Skagerrak

Do you have an innovative idea to use biomass waste to create a better Biobased Tomorrow?

Join us on this exciting journey and submit your proposal no later than **January 31, 2024**.

If your circular solution can create local impact for local communities in Denmark and Sweden, by:

- Unveiling novel applications of biomass, spanning several industries.
- Discovering new and innovative products that can be made from biomass wastes.
- Helping create local resource loops among businesses and municipalities.
- Create **value** locally by delivering social, environmental, and economic benefits.

.. Then you're the one we are looking for!

We strive for a circular bioeconomy where:

- businesses and municipalities work together to upcycle and create value from biomass streams.
- upcycling of biomass creates social, environmental, and economic benefits locally.

Is that your lane?

Submit your idea at **www.gate21.dk/bio-challenge**.

Content

Thematic framing

Biobased Tomorrow (BBT) is an Open Innovation Challenge and part of the project Power Bio (gate21.dk/powerbio) which aims to increase the supply of biomass for high-value products and green energy production through efficient uses of unused residual biomass. We focus on exploring municipal biowaste in the Öresund-Kattegat-Skagerrak (OKS) region.

Green and blue biomasses, such as grass clippings, and seaweed and seagrass from beach wrack, are promising and valuable biomass resources, although often just considered wastes. They contain a myriad of components that can be used, for instance, in the construction, food, pharmaceutical, chemical, and bioenergy industries. These biomasses are naturally renewed every year, and they can contribute to fulfilling market needs providing several biomass components used in existing products. With just enough innovation, these biomasses might be used to make entirely new products that replace existing ones made from non-renewable resources, or that meet societal needs in a whole new way.

Moreover, we live on a planet with finite resources, and we need to learn how to live within planetary boundaries, thus by acting locally, we seek to promote more sustainable production and consumption systems.

Innovation Challenges

Innovation Challenge 01 — Grass

Grass is an abundant resource, and roadside grass renews itself spontaneously, thus there is no need for supplementation for its growth and development.

When the grass is cut by the municipality, sometimes it is collected and assembled in bales for further use, but often the grass is just sent to a landfill. The composition of grass allows for its utilisation for a range of purposes. Examples are: biodegradable tape, fabric, biofuels, biochemicals (e.g., fertiliser), and many others.

The challenge is to find opportunities of utilising roadside grass clippings to create value (environmental, social, economic) for the local community (e.g., public authorities, citizens, businesses). We focus on potential utilisation options that allow for a sustained use, now and in the future, and create value locally in a broad sense. The more local and resilient, the better.

Therefore, we ask the question: **How can we create value locally by utilising roadside grass clippings?**

Innovation Challenge 02 — Seaweed and eelgrass

Seaweed and eelgrass from beach wrack in the coastal municipalities accumulate at the shore, slowly degrading, becoming smelly, and keeping away visitors from the coastal area. The municipalities have the responsibility to collect the waste biomass and find an adequate destination for it. Today, a large portion of this biomass is, for instance, collected and sent to farms to be buried as fertiliser or sent to landfill.

It is known that seaweed and eelgrass have many properties (physical/mechanical, chemical) and contain elements in their composition which are valuable for several uses. Examples are: biofuels, animal feed, fertiliser, adsorbent for water treatment, platform chemicals, biocomposites.

This challenge wants to unveil the opportunities to make use of seaweed and eelgrass to create value (environmental, social, economic) to the local community (e.g., public authorities, citizens, businesses). We focus on potential utilisation options that allow for a sustained use, now and in the future, and create value locally in a broad sense. The more local and resilient, the better.

Therefore, we ask the question: **How can we create value locally by utilising residual seaweed and eelgrass that is washed up on the beach?**

Who can participate?

We invite and encourage all bio-innovators to apply. Such as, Micro and small companies, start-ups, large companies, academicians, and citizens alike can form teams and participate. This is a wide call to action towards finding answers to how we can build a Biobased Tomorrow.

Organisations who are partners of the project Power Bio cannot submit proposals.

Why should you participate?

If you are among the winners of Biobased Tomorrow, you will be offered a package of benefits. Two prize packages will be offered, one for each challenge. Each package is made up of a voucher for 50 points.

The packages will comprise of a range of possibilities offered by Danish Technological Institute, Business Lolland Falster and the Technical University of Denmark. The winning teams will be able to assemble their package according to their needs and in agreement with the organisation team of BBT, according to availability. The possibilities within the packages include (see complete list in Appendix 2):

Danish Technological Institute

Professional laboratorial analysis and prototype-testing with the consultation and facilities of Danish Technological Institute (DTI). DTI offers test and consultancy within biosolutions and can provide you with professional laboratorial and pilot plant analysis within biorefining and biofermentation. DTI does prototype-testing and helps you go further in your green business model. DTI works with all kinds of biomasses.

Business Lolland-Falster

Personalised, intensive business counseling from Business Lolland-Falster (BLF). BLF offers unparalleled insights beyond the Danish capital region, equipping your organisation for national and northern European network expansion, geared towards large scale growth.

The Technical University of Denmark

Business development and finance assistance, and environmental assessment assistance by the Technical University of Denmark (DTU). DTU is among the best ‘Engineering and Technology’

universities in the world, and the team delivering the benefits in the package has extensive experience in business development and environmental assessment.

Besides the chance to win one of the prize packages and use them to develop and test your solution, you will be able to:

- Develop partnerships with the stakeholders involved in the particular innovation area.
- Share and gain knowledge from other entrepreneurs within the field of circular bioeconomy.
- Establish a network both with the stakeholders involved in the project and other participants, as during the process you will be among peers and other potential partners, which you can meet along the way and network with.

How will it run?

Biobased Tomorrow will run from November 2023 to May 2024. The innovation challenge has two phases.

Phase 1 (Nov-Feb):

- You will submit an application containing the information described in Appendix 1 (Information required during submission – Phase 1).
- You will get chance to participate in a Q&A webinar on January 19, 2024. Here, you can ask questions to key partners of the project and thereby receive valuable knowledge on the barriers and needs within each of the innovation challenges.
- **You'll submit your idea at www.gate21.dk/bio-challenge before January 31, 2024.**
- The submitted proposals will be evaluated by a judging committee, according to a set of criteria (see more information under the heading "Evaluation Criteria"). The judging committee will be made up of partners of the project Power Bio. The judging committee can seek professional assistance from external experts when needed.
- At the end of the evaluation, at least the top 20% (or 2, whichever is greater) proposals submitted to each challenge will be invited to participate in Phase 2.

Phase 2 (Feb-May):

The teams with the selected proposals will be given time to further develop their ideas and will go through the following steps:

- An initial meeting with the Challenge Teams (each challenge is represented by a Challenge team, composed of 1 biomass representative, 1 technical representative, 1 business representative, and 1 communication representative), where they can ask questions about the specifics of the challenge, and get specific information needed to further develop their idea.
- Innovation workshops directed at guiding their innovation journey to further develop the idea presented at the end of phase 1. The workshops will take place in March/April.
- **At the end of Phase 2, the teams will submit a more detailed version of their solution containing the following: A technical description of the product, a summary of the quality of the biomass needed to make the product, a summarised business case and a prototype (e.g., visual, proof-of-principle, user experience, working, or functional prototype).**

Further details on submissions for phase 2 will be provided directly to the participating teams. The submission of the detailed solution is due on **9 May 2024**.

At the end of Phase 2, the BBT final event will be held on **24 May 2024**, where the teams will pitch their solutions and present their prototypes to the judging committee.

Evaluation Criteria

All received proposals (both in phases 1 and 2) will be evaluated based on:

1. Suitability (Does it make sense?)

It is assessed whether the strategy aligns with the external environment and the team's strengths. Under suitability we consider.

- Market Potential: Overview of expected revenue streams.
- Resource and Cost Efficiency: Ensuring biomass sources are suitable and checking whether they align with environmental concerns and the strengths of the processing technology; also an initial idea about production cost.
- Sustainability: The chosen biomass and the overall process should be in line with global sustainability objectives and local environmental guidelines.

2. Feasibility (Can it be done?)

It is evaluated whether the organisation has the resources and capabilities to execute the strategy. Under feasibility we consider:

- Resource Efficiency & Product Value: The team should have the capability and resources to efficiently execute the strategy and process the biomass in order to produce high value-added products.
- Resource Availability: Quantity, access, and “timing” of needs for biomass.
- Technical Feasibility: What areas are still to be tested and developed.
- Scalability & Reproducibility: An assessment of the capacity, financial strength, and technological capability to scale operations and reproduce them elsewhere.

3. Acceptability (Will stakeholders accept it?):

It is assessed whether stakeholders (such as shareholders, employees, authorities, and the community) will support the strategy. Under acceptability we consider:

- Socio-Economic Impact: For stakeholders to accept the strategy, it must lead to tangible benefits like job creation and positive community impact.
- Environmental Impacts: Stakeholder acceptance today greatly hinges on eco-friendly and sustainable operations.
- Potential for partners and partnerships.
- Risk assessment: Major risks should be acknowledged.

Property Rights on Background and Foreground Knowledge

Any non-public knowledge, technology, know-how, materials, information, and other results, including inventions, improvements, discoveries, data, software, etc., whether patentable, registerable, or copyright protected, which is produced or controlled by you prior to participation is defined as your "Background Knowledge". The rights to your Background Knowledge remain with you and is not diluted by being part of the Innovation Challenge.

On the other hand, technology, know-how, materials, information, and other results, including inventions, improvements, discoveries, data, software, etc., whether patentable, registerable, or copyright protected, that are produced as part of the participation in the innovation challenge is considered as "Foreground Knowledge".

The innovation challenge is carried out in an open manner, which means that generated Foreground Knowledge is made available to the public on an ongoing basis. Consequently, the Parties understand that it may therefore not be possible to protect the foreground knowledge of the project as inventions.

Contact

If you have any questions, do not hesitate to contact us.

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Appendix 1 - Information required during submission – Phase 1

This appendix presents the information you will be required to provide during the submission in Phase 1. The submission is made by filling out a form which link is contained on BBT's website: **www.gate21.dk/bio-challenge**

During the submission for Phase 1 you will be required to provide the following information:

1. **Identifying information**: name, date of birth, address, telephone, email, and short background of those involved.

2. **Short summary** of the business idea.

3. **Describe the most important customers and end users**: who will be willing to pay for the new product, the new service, or the new process?

4. **Value to the customer**: what value will the product/service add to customers?

5. **Next activities**: what key activities must be carried out in order to realise the idea? What areas are still to be examined and developed?

6. **Partners and stakeholders**: which partners and partnerships are key to the success of the business idea?

7. **Costs**: What investments and operational costs need to be incurred in order for the idea to be realized?

8. **Financial potential**: provide an estimate of the economic potential of the idea. What are the estimated revenue and costs?

9. **Scalability**: how do you see the possibilities for scaling up the business idea?

10. **Sustainability**: how would you describe the sustainability impact of your business idea?

Appendix 2 – Benefits that can be used to assemble the prize packages

Options to be included in the package offered by the Danish Technological Institute (DTI)
DTI can provide advice and testing both before and after the development of "a product". This means testing biomass' usability, purity, etc., to assess where the greatest value of biomass lies, where the product is then tested in relation to, for example, compostability, durability, etc.

Item	Value of item (in points)
Grass	
Analysis of ingredients in grass (dry matter, ash etc.)	**0,2** / sample
Analysis of ingredients in grass (carbohydrates, organic acids, lignin etc.)	**2** / test (min. 5 tests)
Refining of fibers on a pilot scale	**25** / day (min. 2 days)
Testing of refined grass fibers as material for paper	**2,5** / test
Fermentation of grass fractions in relation to e.g. test of storage capacity (pilot scale)	**25** / day (min 2 days)
Heat pressing of sheets, demonstrative tests regarding e.g. evaporating water from materials	**15** / sample
Test of compostability - how a given material breaks down	**19** and up
Setting up collection scenarios, storage and technical-economic analyses	**To** be further specified
Methane potential determinations (Environmental technology)	**8** per sample
Analysis of ingredients	To be further specified
Access to laboratories (biorefining and fermentation)	**3** / day
Seaweed	
Heat pressing of sheets, demonstrative tests regarding e.g. evaporating water from materials	**15** / sample
Analysis of ingredients in grass (dry matter, ash)	**0,2** / sample
Analysis of ingredients in grass (carbohydrates, organic acids, lignin)	**2** / test (min. 5 tests)
Fermentation of seaweed fractions, e.g. in relation to looking at preservation if, for example, further testing is to be done at a later date or looking at excretion of toxins	**25** / day (min. 2 days)
Refining of fibers on a pilot scale	**25** / day (min. 2 days)
Test of compostability - how a given material breaks down	**19** and up
Setting up collection scenarios, storage and technical-economic analyses	To be further specified
Methane potential determinations (Environmental technology)	**8** per sample
Analysis of ingredients	To be further specified
Access to laboratories (biorefining and fermentation)	**3** per day
Biochar	
Production of biochar, handling and use, scenarios and technical-economic analyses	To be further specified
Biogas	

Mapping potentials for biogas production based on the biomass	To be further specified
Advice on construction projects	To be further specified
Economic analysis of biogas production/plant etc.	To be further specified
Advice on optimization of production and operation of plants	To be further specified
Analysis of the gas potential in a given biomass (BMP analysis)	To be further specified
Plant and cultivation trials	
For example, testing of cultivation media	To be further specified
General advice	
Get access to DTI's experts. Buy a five-hour clip card for DKK 6,250	**6** for five hours of expert access
Workshops	
Workshop in biorefining or biofermentation	**6** per participant

The options described as "to be further specified" are to be agreed with the organisation, depending on the size of the order, number of samples, tools and materials to be used, staff required, etc.

Options that can be included in the package offered by Business Lolland-Falster (BLF)

- 1h Intense business-inside counselling tailored to the participants' case (**5 points**). This includes:
    - Construction and Planning Matters
    - Recruitment
    - Accounting Advice
    - Legal Advice
    - Business Models and Strategy
    - Sales and Marketing
    - Financing and Funding

Options that can be included in the package offered by the Technical University of Denmark (DTU)

- Business development training by DTU (**10 points**)

Workshop for building the business case and assessing the financial needs. We will work with building up your business case and you will be guided through the process of using Business Canvas and our Business Case model. We will go through investments, sales forecasts, costing and finally financing of your business case.
Day 1 (4h) – Introduction to business case model and business canvas;
Day 2 (2h) – Follow-up day;
Day 3 (4h) – Financing;
Day 4 (2h) – Follow-up day.

- Environmental assessment training by DTU (**10 points**)

Workshop on Life Cycle Assessment (LCA). You will do an LCA for a relevant scope of your solution. Format: 2 workshop days + 2 follow up days.
Day 1 (4h) – Introduction to LCA, data collection, and modelling of life cycle;
Day 2 (2h) – Follow-up day;

Day 3 (4h) – Life cycle impact assessment;
Day 4 (2h) – Follow-up day.
During these days you will be guided through the process of conducting an environmental assessment for the product system you are working with, and at the end of the fourth day you will have an accountancy of the environmental impacts of the product system.