Table of Contents

1 Aim

1.1 The Bio-based Innovation Student Challenge – Europe (BISC-E) aims at stimulating entrepreneurship in bio-based industrial sectors (the 'bio-based economy'[1]), through curricula at educational institutions at all levels. Through its execution, BISC-E provides opportunities to students with entrepreneurial mindset to put their talent to work and benefit from the process.

1.2 BISC-E challenges graduating students at universities of Applied Sciences and at research universities to propose and pitch innovative bio-based solutions to issues regarding the environment, economy, or society. These solutions should realise net-zero (or negative) greenhouse gases emissions, zero pollution, protection and enhancement of biodiversity and environmental sustainability in general to contribute to a sustainable and circular economy.

1.3 BISC-E stimulates cooperation between industry, academia, and government to foster innovation and entrepreneurship for a climate-neutral Europe.

1.4 BISC-E drives multidisciplinary[2] teamwork, working in an interdisciplinary[3] fashion to increase opportunities for innovative ideas. Students are hence encouraged to form teams including members enrolled in different disciplines. While STEM disciplines are a must, integrating knowledge and methods from non-technical disciplines are not excluded. BISC-E positions itself as an extracurricular training exposing students to different disciplines, cultures, innovative insights, etc.

2 Structure and responsibilities

2.1 The model of BISC-E, set up by its owner, the Bio-based Industries Consortium (BIC), is bottom-up, driven by annual national BISC-E competitions. The target countries for national BISC-E programmes are the EU Member States (MS) and the Associated Countries[4] (AC).

2.2 BIC nominates a National Coordinator (NC) in each country to set up and run a national BISC-E based on this Regulation. In Germany this NC is the University of Hohenheim

2.3 BIC provides guidance and (non-financial) assistance to the NCs to establish cooperation at national level between academia, industry, and government to support national BISC-Es.

2.4 Winners of national BISC-E competitions participate at the European level. BIC sets up and runs the European BISC-E rounds that will lead to the annual European winners of BISC-E.

3 The National Coordinator, tasks, and support

3.1 The NC is a legal entity and could be either a university, a Research and Technology Organisation (RTO), a company, a cluster of universities or companies, a trade organisation, or a combination of any of the aforementioned. The NC needs to appoint a contact person to serve as the focal point for BIC. This contact person is further referred to as the 'NC' in this Regulation.

3.2 BIC appoints the NC on a rotational basis, to share this responsibility among different actors in the country. The rotation frequency is 2-4 years, starting from 2023, the base year of BISC-E on the current model.

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[1] The 'bio-based economy' is defined as the bioeconomy excluding agriculture, forestry, fishery, food products, beverages, and tobacco products (see on BIC website: 'European Bioeconomy in Figures', annual edition by nova Institute and BIC, comparing annual bioeconomy and bio-based economy performances to 2008).

[2] Involving multiple disciplines, looking at the challenge from own discipline's perspective. Findings are supplementary to each other.

[3] Integrating information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines to solve problems whose solutions are beyond the scope of a single discipline: disciplines interact and work collaboratively.

[4] Associated to the European framework programmes.

3.3 The key task of the NC is to organise the national BISC-E and inviting all national universities to participate with student team(s), see Art 4. The NC should therefore set up a clear system for student teams to register for participation. See Art. 3.10.

3.4 A national BISC-E is a competition among student teams from at least two different universities, evaluated by a national jury. A competition among two or more teams from the same university does not qualify as a national BISC-E. See Art. 4.3.

3.5 The NC must test if a student team's dossier (the business case and proposed solution) meets the requirements as set forth in this Regulation. The NC can ask a student team to make corrections if needed. The NC's test is not an evaluation of the quality of the proposal, or a comparison with other submitted proposals. This is the jury's responsibility. See Art. 8.

3.6 The NC should set up a team to assist him/her in implementing the key task. It is advisable to include partners in the national team. These partners could be other stakeholders, such as industry, the national representative in the States Representatives Group of the CBE JU[5], etc.

3.7 The NC must maintain regular contact with BIC for updates of the national BISC-E and in case of any issue that may impact BISC-E or BIC. See Art. 3.12.

3.8 The NC is free to select the format of the national BISC-E. Depending on the number of participating student teams, the NC can organise (a) first round(s) to select the student teams for the national final. A national BISC-E (final) could be run as part of an existing relevant (international) event in the country. The first round(s) if any, and the final could be either virtual, physical, or hybrid.

3.9 The NC forms a national jury to evaluate the proposals by the student teams. The jury should include academia and industry representatives, and preferably also a government representative (e.g., the country's SRG representative).

3.10 The NC should create a national BISC-E website to share information with BISC-E to students, universities, industry, government, and society at large. The website should also include the invitation and possibility for student teams to register. The website should include a link to the European BISC-E website (see Art. 3.16). See **Annex 1** for general guidelines for a national website/webpage.

3.11 BIC assists the NCs through stimulating cooperation and engagement by national BIC industry and associate members, and the national representative in the States Representative Group (SRG) of the CBE JU.

3.12 BIC will communicate with the NC primarily via the 'Bio-based Innovation Student Challenge – Europe (BISC-E) room' in the member area of the BIC website. The NC has access to this 'room' to retrieve documents, communicate with BIC as well as with other NCs.

3.13 BIC will stimulate industry actors in the country (especially BIC industry full members if any) to support the national BISC-E content-wise (providing candidate-challenges for the student teams), financially (prizes, logistics), and in the evaluation of proposals (as jury member).

3.14 The BISC-E back office (part of BIC staff) provides administrative support to the BISC-E programme, including communication and publicity through its media channels.

3.15 The NC reports the **national participation in BISC-E 2024** to BIC at the conclusion of the competition. (See **Annex 2** for a template.)

3.16 The NC is responsible for submitting the required documents and information of the **national BISC-E winner** to BIC **15 July 2024 latest**.

3.17 BIC maintains a European BISC-E website, with hotlinks to the national BISC-E websites.

[5] The Circular Bio-based Europe Joint Undertaking: the partnership between bio-based industries represented by BIC and the European Union represented by the European Commission.

4 Student teams

4.1 Student teams for the national BISC-E competition must consist of at least 3 students and maximally 6. Participation in BISC-E is free of charge.

4.2 All team members should be enrolled in a programme at an institute for higher education in Europe. These include students in their graduating years at universities of Applied Sciences, and at universities for fundamental research.

4.3 A university can participate in the national BISC-E with more than one team.

4.4 Because BISC-E's character is multidisciplinary teams working in an interdisciplinary way, it is highly advisable that the teams include students enrolled in curricula in different disciplines. STEM (science, technology, engineering, and mathematics) disciplines are a must in any student team, but other disciplines (e.g., education, arts, etc.) are not excluded.

4.6 Each team must appoint one student as the team leader. The team leader will be the contact person with the NC and with BIC as needed.

4.7 Each team must be supported by a supervisor employed at the host institution, or at one of the host institutions if the team includes students from more than one institution. The supervisor should be employed as e.g., lector, Postdoc, assistant professor, associate professor, or professor. Each student team can seek support from any/more staff member(s) at the institution, but these will have no official role in the national BISC-E.

4.8 Students and supervisors can only join one team participating in the national BISC-E.

4.9 At least 2 team members should participate in meetings called by the NC, and the national final round(s).

5 Indicative timeline for the national BISC-E 2024 competitions

Target dates

30 November 2023	Registration deadline
8 December 2023	Kick-off with all national participants
19 May 2024	Submission deadline for video presentations and supporting documents
End of May 2024	Selection of the best teams by the jury
14 June 2024	German final at Universtiy of Hohenheim

The European BISC-E2024 final rounds will take place on:

6 September '24	First round with all national winners.
27 September '24	Final round with top-5 student teams from the first round.

6 Registration

6.1 The registration for the national BISC-E will be set up by the NC.

6.2 The team registration must include:

a) The name.
b) The leader (one of the team members).
c) Names and coordinates of the other team members.
d) A max. 150-word description of the bio-based (business) case and the proposed innovative solution.

6.3 The NC verifies that the teams comply with this Regulation (see Art. 4) and communicates with a team as needed for clarification and/or correction to approve the registration.

7 Challenge

7.1 In this programme, student teams are challenged to develop an innovative bio-based product or process to help resolve technological, environmental, or societal challenges. The proposed solution will gain in the evaluation if it has been tested in a lab (or beyond lab) to provide an insight into its potential for integration in the current (or near future) bio-based industry and bioeconomy.

7.2 Within the scope of this programme, a **bio-based product is a product wholly or partly derived from renewable biological sources[6].** These sources can be plant-, forestry-, animal-, or marine/aquatic-based, and derived from gaseous biogenic carbon, or bio-waste[7]. The bio-based product could be based on a 'drop-in chemical'[8], or a 'dedicated chemical'[9] resulting from a bio-based process. It can be an intermediate material, a semi-finished or a final product.

7.3 Within the scope of this programme, a **bio-based process is a process using only bio-based feedstock**, applying biotechnology, chemical, mechanical, physical, or any other appropriate technology, or combination of technologies. Bio-based feedstock is defined in Art. 7.2. The process may yield intermediate or final products, preferably with a higher economic value than fossil-based alternatives.

7.4 The innovation may, but does not have to, replace a fossil-based product or fossil-based process.

7.5 **Aspects related to enhancing biodiversity and circularity, and to climate change mitigation will add value to the proposed solutions**.

7.6 This programme will not negatively affect the food chain. If food and feed residual (or excess) streams are used as a resource for bio-based products, the envisaged process should help increase effectiveness and competitiveness of the food/feed industry. The development of a new food or feed **ingredient** from these or other sources is allowed in this programme. However, the **development and production of a food and/or feed final product** as such, are excluded from this programme.

7.7 Individual work, done in the framework of a MSc-thesis, is not eligible for this programme. Further development of a subject/theme as part of such a thesis in a participating team is eligible, provided it is a clear team effort.

7.8 The student teams document their business case and proposed solution in a **dossier** that will be sent to the jury members by the NC. In addition, the teams are to make a **presentation** to **pitch** their case and proposed solution to the jury.

7.9 The student teams can follow two tracks for their solution:

1. For innovations regarding a bio-based product and application.
2. For innovations regarding a bio-based process or improvements of a bio-based process step. Also, services or other innovations that will strongly advance the bio-based economy but not leading to a tangible (prototype) product are included in this track.

7.10 The teams must submit their final dossiers to the NC more than two weeks before the 1st round of the national competition.

[6] See definition in EN 16640:2017.
[7] See https://environment.ec.europa.eu/topics/waste-and-recycling/biodegradable-waste_en
[8] Chemically identical to an existing fossil-based chemical that has established markets.
[9] Produced via a dedicated pathway and does not have an identical fossil-based counterpart.

The dossier (see **Annex 3** for a template) should contain the following sections (with basic calculations to support any claimed benefits):

1. Short description of the innovation.
2. Introduction and explanation of the innovative aspect (supported by illustrations), including its sustainability aspects (of which positive environmental impacts detailed as per point 4 hereunder).
3. Technical explanation of the innovation, e.g.:
   - Production process of a product or process scheme of a process.
   - Mass balances.
   - The bio-based materials used.
   - (Production)process energy use estimation.
4. Elaboration of the positive environmental impact of the innovation, e.g.:
   - Product life cycle / process resource chain.
   - Input, output, and residual streams.
   - Comparison with conventional product or process (if applicable).
5. Economic viability, e.g.:
   - Business model canvas with explanation.
   - SWOT analysis.
   - Quantitative and qualitative market analysis and a cost benefit analysis.

7.11 Student teams must produce their presentation's visuals and their dossier in English to enable their use (or improved versions thereof) in the European final rounds should the team become the national BISC-E winner. Dossiers for the European final rounds and pitching to the juries in these rounds must be in English.

7.12 The presentation and the submitted dossier should contain work of the team members only. Included work by others should be properly referenced.

8 Jury and assessment at national level

8.1 The jury should consist of several experts in the fields of e.g., bio-based economy, process technology, primary and market applications sectors, environmental impact assessment. Members of the jury should be from both academia and industry.

8.2 Jury members cannot be involved in any way with any of the participating student teams.

8.3 The NC decides when the jury members will be announced.

8.4 The NC must send the dossiers to the jury well in advance to allow the jury members to prepare themselves. This should be at least one week in advance of the evaluation session(s).

8.5 The jury will evaluate the presented cases and proposed solutions by the following criteria (see added-value aspects mentioned in 7.5):

- Innovation
  How creative and novel is the concept? What's 'new' versus existing alternatives? Does it solve an existing problem, or does it replace a fossil-based product? In case of a product, does it demonstrate a better (functional) performance than alternatives?
- Sustainability impact
  First, is the innovation truly bio-based? Is it also environmentally friendly, i.e., does it have a better environmental performance, a more environmentally friendly production process compared to the product it replaces? Or does it enhance the sustainability of a process on total life cycle basis? Does it protect and enhance biodiversity? How big is the estimated positive impact for the environment if the product or process would be widely applied?
- Technical feasibility

In case of a product, the technical feasibility of the proposed production process must be considered. In case of a process innovation, the feasibility of the claimed advantages must be considered.

- Economic viability
  Is there a market for the proposed product? Is there an economic incentive to apply the proposed product or process innovation? Is the product or process economically viable?
- Presentation and prototype product / process animation
  The presentation is judged on content and presentation skills together with the quality of the answers offered to the jury's questions.
  Also, the appearance and professionality of the prototype product / process animation are considered under this point.

8.6 The jury's decision is final and cannot be contested.

9 Awards

9.1 The NC must publish the winners and the awarded prizes.

9.2 In case of a monetary award, it is provided 'as is' (any taxation should be paid by the receiving party) and is divided equally between the team members.

9.3 In case the winning team declines the prize, the NC will decide if it can be awarded to another participating student team.

9.4 The NC covers the costs of the prizes but should seek sponsorship (financial or material) from national industry or government.

9.5 The national winner can proceed to the European final rounds, representing its country. Costs for participating at the European level (e.g., pitching and video production training), and prizes for European winners are covered by BIC. (See separate Regulations for BISC-E European finals.)

9.6 If the national winning team declines the offer to participate in the European final rounds, the NC can have another team represent the country at the European finals.

10 Intellectual property

10.1 Only the jury and the NC have access to the presentation and submitted dossiers, and to personal/private information for matters related to BISC-E only.

10.2 All IP and know-how in the submitted materials of the teams remain the property of the original owners. Information submitted in the dossiers will not result in any transfer of ownership to the organisers, jury nor sponsors of BISC-E. Foreground IP and know-how generated by the students during BISC-E rest with the students and can be protected or published in close consultation with the supervisor at the host institution.

11 General

11.1 All deadlines mentioned in these regulations are 23:59 CET that day.

11.2 The NC can exclude a team member, or a full student team when not complying with this Regulation, acting against existing laws, or otherwise acting immorally.

11.3 The NC team reserves the right to amend, postpone or cancel the national BISC-E or to change the dates and conditions without incurring liability if circumstances beyond his/her control require to do so.

11.4 All participants (student team members and supervisors) grant permission to the NC to use submitted information for promotional purposes. This excludes private and proprietary information. The useable information can include the designed innovative solution targeting a

specified challenge. It can also include the awarded prizes and sponsors. Also, pictures and other contributions provided in the context of BISC-E can be used free of charge for promotion via different communication channels.

11.5 In all situations not foreseen in this Regulation or in case of a dispute, the NC shall decide how to resolve the issue.

Nelo Emerencia
Director Human Capital and Stakeholder Relations, Bio-based Industries Consortium (BIC)
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