D4.3 Innovative Financing Solutions Report

BOOST

Bioeconomy projects accelerator

Funded by the European Union

PROJECT INFORMATION

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Executive Summary

Bioeconomy plays a central role in Europe's transition toward a more sustainable and circular economy. It is an economic model that utilizes renewable, locally sourced biological resources to produce goods and services across all sectors, while promoting the preservation of healthy ecosystems. By shifting away from the traditional linear economy, the bioeconomy fosters systemic change and tackles major sustainability challenges, such as climate change, rural depopulation, and biodiversity loss. As demand for bio-based solutions increases, there is a growing **need for strong financing mechanisms to support research, innovation, and market deployment**. The bioeconomy drives Europe's shift to sustainability but faces key investment gaps that hinder innovation and market growth.

In Catalonia, the bioeconomy represents a strategic opportunity to drive sustainable economic growth, enhance territorial cohesion, and address pressing environmental issues. However, the region faces a range of interconnected challenges in its transition to a competitive and resilient bioeconomy. **While barriers related to structure, technology, regulation, and governance are all important, this deliverable specifically focuses on the investment challenges** that impede the sector's growth and long-term sustainability, and how to overcome them with **innovative risk-sharing financing solutions.**

Public and private investments are crucial for advancing bio-based industries, making a well-structured and accessible funding ecosystem essential. Bioboost highlights the importance of stronger collaboration between public and private sectors, risk-mitigation strategies, and milestone-based financing to promote a thriving bioeconomy.

In this deliverable, we present **innovative financing and risk-sharing solutions to foster the growth of the Catalan bioeconomy, building on the insights gathered in Deliverable - *D4.2 Investors Database*.** Our approach involves collaboration with stakeholders across both the public and private sectors to create financial mechanisms that reduce transaction costs through standardization and aggregation, while enhancing investor confidence through risk-sharing strategies. This work aligns closely with regional government initiatives, aiming to leverage synergies and explore opportunities for publicly-backed credit or guarantees.

To achieve this, we have conducted an **investment mapping analysis** to identify **potential private investors (Table 3).** Following this, we reached out to these investors and organized **one-on-one meetings** to obtain their feedback and insights on bioeconomy projects (see **Section 5.1.1**). Additionally, we distributed a survey to collect further feedback (**Section 5.1.1 and Annex I**). Moreover, for the **public sector,** we have attended various **workshops, webinars, and info days**, where we gathered valuable data on current investment practices in the bioeconomy sector across Europe, and we have included the Catalan Government (Department of Agriculture, Livestock, Fisheries and Food) and the Lleida Provincial Council in our External Advisory Committee.

Furthermore**, in some of the Bioboosters projects**, we **have deployed the proposed solutions to mobilise investment, the mitigation strategies proposed (Section 6.2) and have analysed their** results (see **Section 6.3**).

1 Introduction

1.1 Bioeconomy in Catalonia

In 2021, the Catalan Government approved the Bioeconomy Strategy of Catalonia 2030 (EBC2030), which seeks to foster the sustainable development of the Catalan economy by promoting the use of local, renewable biological resources. The strategy provides a strategic framework based on a shared, territory-linked vision, aligned with both European and national policies. The first Action Plan (2022–2024) outlines initiatives in four key value chains: (i) sustainable use of forest resources; (ii) resilient agroforestry landscapes and ecosystem services; (iii) valorization of livestock manure and organic waste; and (iv) the reuse of by-products from the food supply chain. Addressing the challenges of adding value and sustainability to agriculture, livestock, and forestry production, as well as fostering landscapes resilient to socio-economic and environmental changes, are core objectives of the strategy.

Catalonia already has a robust bioeconomy sector, providing a solid economic foundation for the transition ahead. However, it is essential that this transition is both fair and inclusive, generating prosperity and well-being, particularly in rural areas, which are the primary stewards of these resources.[1]

Catalonia's Bioeconomy Strategy 2030 (EBC2030) defines a forward-looking framework aligned with European and national policy objectives, aiming to promote the sustainable use of local, renewable biological resources across all economic sectors.[2] However, its implementation continues to face systemic limitations, such as decentralised forest ownership, outdated processing infrastructure, inefficient logistics, and insufficient coordination between research and industry. Among these, investment remains one of the most decisive factors for enabling the sector's growth and unlocking its potential.

Achieving this transformation will require close collaboration between public administration, academia, businesses, investors, and civil society. This transformation requires close collaboration and alignment between public administration, academia, businesses, investors and civil society, all working towards a shared vision. This is precisely the aim of the Bioeconomy Hub of Catalonia (BioHubCat), a territorial instrument to be established in 2023, designed as a one-stop shop to promote and coordinate bioeconomy initiatives across Catalonia, which is also part of Bioboost's External Advisory Committee.

1.2 Barriers to achieving the bioeconomy transformation

The transformation towards a bioeconomy is a complex, systemic process that requires simultaneous and coordinated action across multiple, interdependent domains. It involves overcoming a wide range of technical, economic, regulatory, and operational challenges that currently hinder investment and implementation.

For example, a company seeking to replace fossil-based raw materials or energy sources must first assess the availability, quality, and logistics of bio-based alternatives. This includes evaluating suitable technologies, their maturity levels, and the implications for production processes and product characteristics. However, it is also very important to consider market acceptance, amortization periods, and the overall financial viability of the transition, as these factors directly influence the availability and

[1] https://bioregions.efi.int/wp-content/uploads/2023/03/DT127-Towards-a-circular-bioeconomy-in-Catalonia.pdf
[2] https://www.interregeurope.eu/sites/default/files/good_practices/EBC2030_EN_0.pdf

likelihood of securing investment. Furthermore, access to appropriate financial instruments that recognize the unique characteristics and risks of the bioeconomy is essential to de-risk investments and enable companies to move from pilot stages to commercial-scale deployment.

1.2.1 Investment Key Challenges in Advancing the Bioeconomy Sector

Unlocking the bioeconomy's full potential in Catalonia depends on improving the financial conditions for its development. Currently, the sector faces multiple investment-related barriers, including:

- Limited access to capital, especially for SMEs and start-ups developing innovative bio-based solutions.
- High upfront investment needs for infrastructure, processing facilities, and demonstration-scale projects, often beyond the capacity of smaller stakeholders.
- A perceived lack of profitability for bio-based ventures compared to fossil-based alternatives, driven by market failures and unaccounted environmental externalities.
- Insufficient public incentives to de-risk early-stage innovation, scale-up activities, or industrial transitions.
- Lack of dedicated investment vehicles and financial instruments to attract both public and private capital.
- Long ROI horizons and regulatory uncertainty, which deter private investment.
- Weak coordination between funding institutions and bioeconomy stakeholders, limiting coherent investment pipelines.
- Scarce infrastructure investment in rural areas, hindering regional bioeconomy development.
- Few financial tools adapted to the specific bioeconomy innovation cycles and risk profiles of bio-based business models.
- Limited consumer demand and insufficient market-pull mechanisms (e.g. green procurement or subsidies) to support uptake.
- Fragmented or outdated regulatory frameworks, which add financial risk and complexity.

These financial challenges severely restrict the commercialization of innovative bio-based solutions and delay the development of critical infrastructure, such as local biorefineries and first transformation facilities, which are key to generating territorial value and employment.

Within the Bioboost project, we have not only identified these challenges but also begun to explore and test potential solutions, policy improvements (explained in another deliverable, *D5.3. 2nd CCRI Policy Brief and* support mechanisms that could address them (see Section 6.2 and 6.3).

Before presenting these, the following sections explain the methodology we used to collect investor insights and map current public and private investment options relevant to the bioeconomy sector.

2 Methodology

Our objective was to analyze the current landscape of investment in bioeconomy and circular projects across Europe, with a special focus on Catalonia. This included working closely with public and private sector stakeholders to develop innovative financing solutions that facilitate greater investment into the Catalan bioeconomy. These solutions aim to reduce transaction costs through standardization and aggregation, while offering risk-sharing mechanisms to improve investor confidence and foster public and private investment in bioeconomy projects.

To capture a comprehensive picture of public investment trends and practices, we applied a qualitative research approach combining desk research and participatory observation.

2.1 Public investment

To map public investment trends in the European bioeconomy, we applied a qualitative research approach based on desk research and participatory observation. We gathered data from:

- Workshops, webinars, and info days organised by EU institutions and circular economy initiatives.
- Presentations from financial institutions (e.g. EIB, EBRD, national development banks) on tools and mechanisms to support circular and bio-based investments.
- Policy-focused sessions addressing barriers and enablers of public funding in the sector.

In parallel, we conducted a targeted search for public funding instruments that directly or indirectly support investments in bioeconomy and circular economy projects. This included EU-level funds (e.g. Innovation Fund, European Regional Development Fund (ERDF), European Agricultural Fund for Rural Development (EAFRD), Horizon Europe, EIC, LIFE) as well as national and regional schemes with a bio-based or sustainability focus.

As active members of the Circular Cities and Regions Initiative (CCRI), we regularly receive targeted invitations and internal updates on relevant events and activities. Furthermore, since our consortium includes four organisations actively involved in EU-funded bioeconomy and circular economy projects, we also benefit from privileged access to knowledge-sharing opportunities across related initiatives.

Events and sources were selected based on their relevance to investment in circular bioeconomy solutions, diversity of stakeholders, and inclusion of EU-level and regional perspectives. We systematically analysed the content to identify recurring themes, such as investment instruments, public-private collaboration models, risk mitigation strategies, and regulatory frameworks.

These insights fed into the identification of public investment mechanisms and gaps, as presented in the mapping section.

2.2 Private investment

To engage the private investment community and better understand how to increase their participation in the bioeconomy, identify investment requirements, and address their specific needs, we designed and implemented a multi-step approach.

Investor Mapping and Profiling

As a first step, we conducted a mapping analysis to identify and categorise the main types of private investors potentially interested in bioeconomy-related projects. This allowed us to understand their investment profiles, target sectors, risk appetite, and preferred financing instruments.

One-on-One Meetings with Investors

Based on this mapping, we contacted selected and potential investors and conducted **one-on-one meetings** to collect qualitative insights. These discussions focused on financing needs, risk perceptions, due diligence challenges, and what would improve the bankability and investment-readiness of bioeconomy ventures. The insights gathered helped us identify key gaps and potential risk mitigation measures (**Table 5**).

Investor Survey

Additionally, to collect deeper insights from the investment community, we employed a multi-phase approach for our investor survey. This **survey was developed to collect further insights from a broader group of private investors or other stakeholders interested in investing in bioeconomy projects** (such as technologies developers, innovation hubs, business accelerators… etc)**.** Their input has helped us understand the current barriers to investment and the kinds of financial mechanisms that could encourage greater participation in the sector.

The survey was shared in successive rounds, starting with Tier 1 and Tier 2 investors, followed by Tier 3, and finally Tier 4 (explained in **Section 4.1.1**). This staged strategy allowed us to prioritize engagement with key stakeholders while gradually expanding outreach across the broader financing ecosystem.

The types of investors who responded to the survey include impact funds, venture capital firms specialized in CleanTech, corporate venture capital, climate tech impact funds, corporate investors, impact investors/venture capitalists, angel investors, family offices, and investment advisors.

The survey was designed to fulfil several core objectives:

- **Raise awareness** about the Bioboost project among the investment and financing community.
- **Gain insight** into the challenges faced by investors and decision-makers when financing bioeconomy projects.
- **Build strong, trust-based relationships** with investors interested in sustainability and circular economy opportunities.
- **Create a reliable investor database**, segmented by investment type, preferences, and risk tolerance.
- **Support the development of innovative financing solutions** that can unlock greater investment into the Catalan bioeconomy.
- **Capture investor preferences and expectations,** including key financial aspects such as minimum investment ticket, expected return on investment (ROI), risk appetite, preferred financing instruments (e.g. equity, convertible loans, blended finance), investment horizon, exit strategies, and sector-specific priorities within the bioeconomy.
- **Understand investment barriers** in the bioeconomy sector.
- **Explore interest in specific financing mechanisms and project types.**
- **Help build a database of relevant investors** for future matchmaking.

Moreover, a key purpose of the survey was to **better understand the needs, expectations, and investment criteria** of different investor profiles. This will enable us, once a pipeline of investable projects is ready under Bioboost, to **curate and match projects to the right investor,** ensuring targeted and relevant dealflow rather than sending out undifferentiated portfolios and projects that they are not interested in.

This investor mapping and needs assessment lays the groundwork for more strategic matchmaking between project developers and financiers, ultimately helping to mobilize capital more efficiently into high-potential bioeconomy initiatives.

Application of Insights our Bioboosters Projects

In addition, within some of the Bioboost pilot projects, we began applying selected investment facilitation tools and mechanisms. The results of these pilot implementations have been analysed to assess their potential for broader replication (see Section 6.3.3).

3 Public Investment

3.1 Public Investment Mapping

We have identified and listed public bodies separately from private investors (which are presented in the next section). A total of **15 public funding instruments** have been mapped and are numbered below.

The table includes major public funding instruments supporting bioeconomy and circular economy projects at both European and regional levels. Some of these funds are exclusive to Catalonia, managed by regional authorities, while others are European-wide instruments accessible across member states. This combined overview highlights the diverse sources of public investment available to foster innovation and sustainable development in the bioeconomy sector.

Table 1. Public Investment Mapping for bioeconomy and circular projects in Europe and in Catalonia.

Name	Investment Focus	Description	Stage	Region
European Investment Bank	CleanTech	The EU's financing institution, supporting large-scale environmental and clean technology projects worldwide.	Late Stage	EU
European Regional Development Fund (ERDF)	CleanTech-AgTech-FoodTech	Supports regional development, innovation, and competitiveness in multiple sectors including bioeconom	Seed	EU
European Energy Efficiency Fund	CleanTech	Fund focused on energy efficiency projects with investment at growth and expansion stage	Series A	EU
European Agricultural Fund for Rural development (EAFRD)	AgTech	Supports rural development and sustainable agriculture, including agri-tech and bioeconomy projects	Seed	EU
European Maritime and Fisheries Fund (EMFF)	CleanTech	Funds sustainable maritime and fisheries activities, promoting blue economy and circular solutions	Seed	EU
Cohesion Fund (CF)	CleanTech	Provides financial support for environment and infrastructure projects in less developed EU regions.	Seed	EU
InnovaTion Fund	CleanTech	EU fund supporting innovative low-carbon technologies and sustainable energy projects	Seed	EU
Agricultural and Bioeconomy Programme Loans	CleanTech-AgTech-FoodTech	Provides financing for late-stage bioeconomy and agricultural projects, including infrastructure and scale-up	Late Stage	EU
InnovFin - EU Finance for Innovators	CleanTech	Supports early-stage innovation through loans and guarantees for research and innovation projects	Seed	EU

Natural Capital Financing Facility (NCFF)	CleanTech	Provides financing for projects that protect natural capital and promote sustainable resource use	Series A	EU
Institut Català de Finances (ICF), also called Nactiva	Bioeconomy and circular economy	Catalonia's public financial institution offering loans, guarantees, and equity to support innovation and sustainability projects	Seed – Late Stage	CAT
Agència de Residus de Catalunya (ARC)	Waste management, circular economy	Regional agency focused on waste management policies and funding circular economy projects in Catalonia	Project Implementation	CAT
Catalonia Circular Programme	Circular economy	Regional initiative supporting startups and projects in circular economy with funding, acceleration, and networking	Seed - Growth	CAT
ACCIO – Generalitat de Catalunya	Innovation, bioeconomy	Catalan agency promoting business competitiveness through grants and support for R&D and innovation projects	Seed - Growth	CAT
Programa de desenvolupament rural 2023-2027	AgTech	Regional program associated with EU rural development funds to support sustainable agriculture and bioeconomy projects.	Seed-Development	CAT

In this deliverable, we will provide detailed descriptions of the first two public funding instruments, the EIB and the ERDF. The remaining instruments listed continue to play a crucial role in financing bioeconomy projects across various stages, from seed to late-stage investments. These public bodies and funds support a wide range of bio-based sectors including clean technologies, agriculture, and food tech, contributing to Europe's transition towards a sustainable and circular economy by providing targeted financial mechanisms, risk-sharing tools, and enabling frameworks to foster innovation and market uptake in the bioeconomy.

3.2 The European Investment Bank (EIB)

The EIB supports environmental investment worldwide by aligning all its financing activities with the objectives of the Paris Agreement and by prioritising sustainability in every project it undertakes. As the EU's financing arm and the world's largest multilateral lender, the EIB channels long-term funds into initiatives that promote climate change mitigation, sustainable development and green innovation. Some 90% of its lending takes place within the EU, with the remainder supporting environmental and development projects in more than 160 countries worldwide. The Bank focuses on sectors such as renewable energy, sustainable infrastructure and resource-efficient technologies.[3]

To improve the environmental impact and risk assessment of its operations, the EIB applies robust environmental due diligence and integrates environmental considerations into project appraisal and monitoring. It offers a range of financial instruments (such as loans, guarantees and advisory services) on favourable terms to support green investment. Through the EIB Group, which includes the European

[3] https://www.eib.org/en/publications/20220213-eib-environment-framework

Investment Fund (EIF), which supports SMEs and venture capital, the Bank also helps smaller players to move towards more sustainable practices. Its commitment to mobilise €1 trillion in green investment by 2030 underlines its central role in advancing global environmental goals.[4]

The EIB Group signed a total of €89 billion in financing in 2024, helping to trigger around €350 billion of investment in the real economy. It saw record investments in several sectors in 2024, providing €51 billion, almost 60% of the year's total investments to support the green transition, climate action and environmental sustainability. The EIB Group signed agreements worth €38 billion to promote social and regional cohesion. In 2025, the EIB Group plans to increase its investments to €95 billion, with flagship initiatives supporting European technology champions, critical raw materials, water management, energy efficiency of small and medium-sized enterprises and a dedicated platform to promote sustainable and affordable housing.[5]

3.2.1 EIB Financing Instruments for Circular Projects

The EIB supports the transition to a circular economy through a range of financial instruments, including direct loans for large projects, intermediated loans through local banks for smaller projects, equity investments through the EIF and guarantees to reduce investment risk. In addition, the EIB provides advisory services to develop bankable circular economy projects and works with the European Commission to combine EU grants with EIB financing. Between 2019 and 2023, the EIB will co-finance 132 circular economy projects, committing €3.83Bn to sectors such as sustainable production, recycling, the bio-economy and urban development.

The EIB has launched several key initiatives to accelerate the transition to a circular economy. Among these are the **Joint Initiative on the Circular Economy** and the **Circular City Funding Guide**, both designed to promote investment and provide guidance for circular economy projects. Additionally, the **Circular City Centre (C3)** provides support to EU cities in implementing circular practices and strategies.

Meeting the objectives of the **European Green Deal** and **REPowerEU** is estimated to demand approximately **€620 billion annually**.[6] In this context, the EIB Group continues to mobilize funding at scale. In **2024 alone**, the EIB provided **€6.4 billion** to support **innovative financing solutions** in the **agriculture and bioeconomy** sectors—key areas for enabling circularity and sustainable growth.[7]

Table 2. EIB financing instruments for circular projects.

Instrument	Key Characteristics	Applicability
Investment loans	- Direct loan for a specific investment project or program - All investments components identified and evaluated beforehand	- Projects > €50M (with flexibility) - Up to 50% of the project cost - Wide sector and project type applicability - Applicable to CAPEX and RDI
Framework loans	- Direct loan for multi-component investment programs (3-5 years)	

[4] https://www.eib.org/en/index.htm
[5] https://www.eib.org/en/press/all/2025-033-eib-group-in-italy-nearly-eur11-billion-speeding-up-green-transition-digitalisation-and-economic-growth-in-2024
[6] https://www.eib.org/en/publications/20230323-investment-report-2023
[7] https://www.eib.org/en/projects/topics/energy-natural-resources/agriculture/index

	- Projects not defined at signing time - Evaluation based on project size at time of allocation from the credit line	
Project finance	- Non-recourse financing for projects with high certainty in future cash flows - Long-term purchase contracts	- Multi-country operations possible
Venture debt	- Quasi-equity financing for innovative or early-stage projects - Target return commensurate to the risk and may include compound interest, warrants, profit participation	- Projects > €30M (with flexibility) - Max EIB loan amount: Up to 50% of the project cost - Applicable to CAPEX and RDI
MBILs and guarantees	- Intermediated financing through banks or NPBs that EIB funds lent to SMEs, Mid-Caps, and municipalities at reduced rates -The intermediary bank and beneficiaries benefit from reduced cost of funding -EIB monitors on-lending	- Eligible sectors/projects defined case-by-case basis - Possibility to define thematic windows (e.g., circular economy)

3.3 European Bank for Reconstruction and Development (EBRD)

The EBRD is an international financial institution whose primary objective is to support the transition of former communist countries in Central and Eastern Europe to open market economies. Over time, its operations have expanded to cover more than 30 countries in Europe, Central Asia and parts of the southern and eastern Mediterranean. The EBRD is owned by 72 countries, as well as the European Union and the European Investment Bank, which guide its strategic direction and lending priorities.

The EBRD provides financial investments such as loans, equity and guarantees to support projects that promote private sector development, improve infrastructure and promote sustainability. It also provides policy advice to improve economic governance and the business climate in the countries where it operates. Key areas of focus include green energy, digital transformation, gender equality and inclusive economic growth. Through its work, the EBRD aims to build competitive, resilient and environmentally sustainable economies.[8]

[8] https://www.ebrd.com/home.html

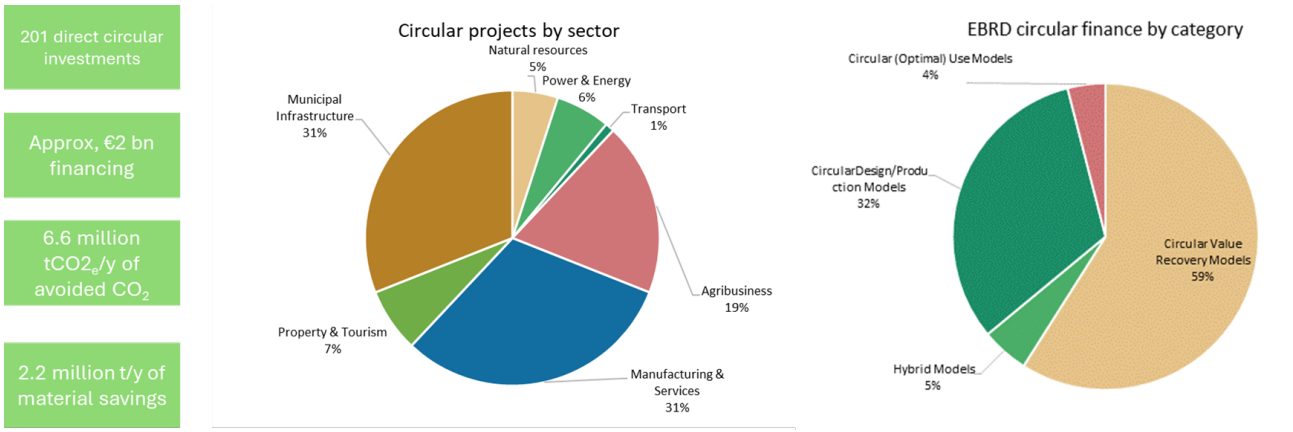


Figure 1. EBRD circular investments. Reference: CCRI Circular Investing: Pitching Investment Opportunities for Circular Solutions.

3.4 Catalonia Public Investment

The **Catalan Bioeconomy Strategy (EBC2030)** aims to foster a circular and sustainable economic model capable of addressing key societal challenges such as climate change, rural depopulation, and biodiversity loss. The strategy supports sustainable agricultural, livestock, and forestry practices while ensuring a just transition that benefits rural communities. Aligned with EU, national, and regional policies, the **2022–2024 action plan** is supported by more than **€200M in funding** and includes specific actions, annual reporting, and monitoring mechanisms structured around 10 strategic objectives.[9]

Catalonia is actively promoting anaerobic digestion technologies to meet its bioeconomy and sustainability objectives, particularly by making these technologies more attractive to the livestock and industrial sectors. In this context, the "**Departament d'Acció Climàtica, Alimentació i Agenda Rural (DACC)**" has announced plans to support the installation of biogas plants and the treatment of organic waste through **up to €80M in public aid** between **2024 and 2026**. However, beyond financial support, other barriers remain, notably, the need to streamline environmental and urban planning authorisation procedures.[10]

The Catalan Bioeconomy Strategy (EBC2030) promotes a circular and sustainable economic model to tackle challenges like climate change, rural depopulation, and biodiversity loss. It supports sustainable agricultural, livestock, and forestry practices, aiming for a fair transition that benefits rural areas. Aligned with EU, national, and regional policies, the 2022–2024 plan is backed by over €200M and includes detailed actions tracked by annual reports and guided by 10 key targets.[11]

3.4.1 Conferences Attended

For the **public sector,** we have attended various **workshops, webinars, and info days**, where we gathered valuable data on current investment practices in the bioeconomy sector across Europe.

- CCRI Circular Investing: Pitching Investment Opportunities for Circular Solutions, on Thursday, 20th of March from 11:00 to 12:00 CET

[9] Catalan Bioeconomy Strategy 2030
[10] https://bioregions.efi.int/wp-content/uploads/2023/03/DT127-Towards-a-circular-bioeconomy-in-Catalonia.pdf
[11] Catalan Bioeconomy Strategy 2030

Organised by the Circular Cities and Regions Initiative Coordination and Support Office (CCRI-CSO), the Congress opened with a welcome and introduction, followed by a presentation on strategies to channel investment into CSS. Key financial institutions, including the European Investment Bank, Cariplo Factory and the European Bank for Reconstruction and Development, presented their tools and investment opportunities to support circular economy initiatives. An interactive Q&A session allowed participants to engage with the speakers, and the event concluded with closing remarks and key takeaways from the CCRI-CSO.

- Policies Boosting Investment in the Circular Economy, on Thursday, 3rd of April

Organised by the InvestCEC and RESOURCE projects, the e-Workshop featured insights from the European Commission and a panel of experts from Climate KIC, the European Investment Bank, the European Environmental Bureau and Aptki Global Partners. Discussions focused on improving investment readiness for circular business models, with key themes including investor risk, project credibility and supportive policies. Participants highlighted circular taxation and public procurement as priority policy tools, and proposed solutions such as simplified regulations and blended finance mechanisms.[12]

- CCRI Final Conference, on Wednesday, 9th of April from 14:30 to 20:00 CET

Organised by the CCRI-CSO, the Final Conference opened with a welcome and introduction, followed by a series of presentations and discussions highlighting the achievements and lessons learned from the Initiative. Key stakeholders, including representatives from participating cities and regions, shared their experiences in implementing circular economy strategies. The conference included thematic sessions on policy development, investment opportunities and collaborative approaches to circularity. Interactive workshops allowed participants to engage with experts and peers, fostering knowledge sharing and networking. The event concluded with closing remarks that summarised key takeaways and outlined future directions for advancing circular economy practices across Europe.

3.5 Public Investment Recommendations

One key recommendation is that the European Union should continue to provide funding through programs like Horizon Europe and through financial instruments from the EIB. These instruments have proven essential in supporting high-risk, early-stage innovation projects that aim to decarbonize and transform critical sectors such as agri-food and bio-based industries.

Moreover, it is recommended that public investment mechanisms prioritize projects that promote circular economy principles, rural development, and local value chains. Ensuring access to blended finance, combining grants with concessional loans or guarantees, is crucial to de-risking private capital involvement, especially in cooperative-led and community-based initiatives. Finally, the EU and national governments should consider simplifying access procedures and administrative requirements for small and medium-sized enterprises (SMEs), cooperatives, and rural actors to ensure broader participation and equitable distribution of public funds across regions and sectors.

12 https://resource-invest.eu/wp-content/uploads/2025/04/PRESS-RELEASE-Policies-Boosting-Investment-in-the-Circular-Economy-e-workshop.pdf

4 Private Investment

Private investment plays a critical role in supporting the growth and development of the bioeconomy sector. Different types of investors target various stages of project development, each bringing distinct expertise and capital structures.

As we mentioned in the Methodology Section, we identified the **main types of investors** that could be interested in bioeconomy-related projects. This **mapping** allowed us to better **understand their profiles, investment preferences**, and the conditions under which they would consider engaging with such initiatives. Based on this analysis, we **contacted selected investors and held one-on-one meetings** to collect their feedback on **financing needs, perceived risks (Table 4),** and key factors that could improve the investment-readiness of bioeconomy venture to propose **mitigation strategies** (see **Table 5**).

Type of Investors

Based on our mapping and stakeholder engagement process, we identified several types of investors relevant to the bioeconomy sector. Each plays a different role depending on the maturity stage of the project, the level of associated risk, and the capital requirements (**Table 3**).

Table 3. Type of investors relevant to the bioeconomy sector.

Type of investor	N# identified	Description (investor profile)	Typical investment stage
Banks	6	Provide debt financing (loans, credit lines) usually to more mature projects with predictable cash flows and lower risk profiles.	Late-stage/Commercial scale
Venture Capital (VC)	41	Focus on early to growth-stage companies with high innovation potential. VCs often require high returns and clear exit strategies.	Early to growth stage (Pre-seed to Series B)
Angel Investors	11	Invest personal capital in early-stage ventures, often providing mentoring, networks, and strategic guidance in addition to funding.	Early stage (Pre-seed, Seed)
Private Equity (PE) Firms	9	Typically invest in more established companies, often through buyouts or growth capital. They may help restructure or scale businesses before exiting.	Growth/Expansion/Pre-exit stage (Series B, Series C)
Impact Investors and Impact Funds	36	Seek both financial returns and measurable environmental or social impact. Bioeconomy projects are attractive due to climate and rural development benefits.	Early to mid-stage/Thematic funds (Pre-seed to Series A)

Corporate Investors/Strategic Partners	25	Companies investing in start-ups or smaller firms for strategic reasons, such as innovation acquisition or supply chain security.	Varies (Strategic fit-dependent)
Family Offices	17	Private wealth managers with more flexibility to invest in long-term or high-impact projects aligned with family values.	Early to late stage (Pre-seed to Series C)

Once we identified and mapped relevant private investors and other stakeholders potentially interested in supporting bioeconomy-related initiatives, we compiled a list based on specific investment criteria. These included the investment stage (pre-seed, seed, series A, series B, series C); minimum ticket size; geographic focus; type of investor (e.g., VC, PE, corporate, family office, bank, impact fund, innovation hub, etc.) and investment focus.

Our initial list included **145 investors and investment-oriented stakeholders**. Based on the analysis of the criteria collected for each, we then created a prioritisation system to guide our outreach efforts. Each investor or stakeholder was ranked from Tier 1 to Tier 4 according to their strategic fit and likelihood of engagement:

- **Tier 1 (39 investors selected):** We prioritised investors who actively invest in projects in Spain, and show a clear interest in sectors related to the bioeconomy or sustainability. These investors were considered most relevant due to their geographical alignment with our project, their familiarity with the local regulatory and market context, and the higher likelihood of follow-up collaboration.
- **Tier 2 (33 investors selected):** This group includes investors with a broader focus on European Bioeconomy markets. While not exclusively focused on Spain, these investors have a regional interest that aligns with the project's geographical scope and could provide valuable support.
- **Tier 3 (17 investors selected)**: These are primarily corporate venture capital investors. They typically bring strategic value and industry expertise, often investing to complement their core business activities, although their investment approach may be more selective.
- **Tier 4 (56 investors selected)**: This tier comprises investors who invest in Europe as well as other global regions such as Latin America (LATAM) and Asia-Pacific (APAC). Their investment approach is more geographically diversified, which may affect their level of focus and engagement with European bioeconomy projects.

It is important to clarify that when we refer to investors in this context, we also include other types of stakeholders that, while not traditional financial investors, have an interest in supporting or co-investing in bioeconomy ventures, such as technology developers, innovation networks, and business accelerators.

5 Investors Analysis

5.1 Investors Bioeconomy Survey Results

As we mentioned, as part of our efforts to understand investment dynamics in the bioeconomy, we distributed a targeted survey to the investors identified in our database. Despite proactively reaching out to **50 stakeholders** across various levels, we received only **20 completed responses** (see **Annex I**).

In parallel, we conducted **20 one-on-one interviews** with selected Tier 1 investors, those most strategically aligned with the project's geographical scope and thematic priorities. These included **private investors** and **impact-driven financial stakeholders**. The interviews provided valuable direct feedback on existing investment barriers, preferences in financing instruments, and the relevance and effectiveness of the risk mitigation strategies proposed by the Bioboost project.

These discussions generated qualitative insights in the following areas:

- Core barriers preventing investment in bioeconomy-related ventures.
- Investor preferences regarding financial structures, instruments, and risk-return profiles.
- Constructive feedback and suggestions on the proposed de-risking mechanisms and investment facilitation tools.

The combined input from the survey and interviews has been instrumental in shaping a set of targeted recommendations to enhance **investment readiness** and **mobilise capital** towards bioeconomy and circular economy initiatives in Catalonia.

Disclaimer:
Due to confidentiality agreements and the sensitive nature of financial data, we are unable to disclose the specific identities or classifications of the investors consulted throughout this process.

5.1.1 Key Findings Analysis from the Investor Feedback

Feedback from both the survey and the individual meetings has been collected. The survey provided valuable **quantitative data,** which we complemented with **qualitative insights** obtained through 20 one-on-one meetings with additional investors. The feedback obtained from both channels has been analysed and used to inform the development of targeted recommendations, financial mechanisms, and bioeconomy investment strategies, which are further detailed in the next sections of this deliverable. The insights were organised according to the subgroups previously defined such as investment criteria and risk tolerance, ticket size and instruments, geographic scope, and collaboration preference, to ensure a structured and thematically coherent analysis.

5.1.1.1 Sector Preferences and Technological Focus

Many investors expressed strong interest in energy-related technologies, particularly **bioenergy, biogas, biomethane, carbon capture, and renewable energy storage**. Projects focused on the industrial sector and energy production were viewed as more viable, as they often align with internal expertise and strategic priorities.

The bioeconomy projects considered under Bioboost are defined as those focused on the **sustainable production and use of biological resources** and the development of **bio-based, added-value products**, especially in sectors such as agriculture, waste management, and circular bioindustries.

Although other areas like **biopharmaceuticals and biochemistry** also fall under the broader umbrella of the bioeconomy, **these are not the focus of the Bioboost initiative**, as they typically require distinct regulatory frameworks, longer development timelines, and specialised investor profiles.

5.1.1.2 Investment Criteria and Risk Tolerance

Insights gathered through **one-on-one interviews** revealed key criteria and concerns shaping investment decisions in the bioeconomy:

- Most focus on **TRL 7-9** projects, with some investing exclusively in commercial-stage companies (TRL 9).
- Multi-actor cooperative models in the agricultural/livestock sector were seen as challenging due to diffuse governance, lack of guarantees, and weak credit ratings.
- Investors prefer projects led by a single legal entity able to manage permitting, offtake agreements, and feedstock supply.

Survey insights:

Surveyed investors reported a moderate-to-high risk tolerance, particularly when aligned with long-term environmental or social impact. While financial profitability remains central, ESG criteria are considered very important, and many respondents are open to projects that do not aim solely for economic return. The integration of carbon credit revenues into business plans was seen as a positive element. However, multi-stakeholder projects were still perceived as inherently riskier due to operational and governance complexity.

5.1.1.3 Ticket Size and Financial Instruments

Interviewed participants described a range of financial structures and preferences for investment instruments:

- Ticket sizes ranged from **€250k to €3M**, with several investors offering pre-seed or seed-stage capital for impact-driven startups.
- Investment preferences vary significantly across funds: some explicitly prefer to **co-invest, avoiding the responsibilities of leading a round, while others consistently act as lead investors**, taking a more active role in shaping the governance and strategic direction of the investee company. However, lead investors often express **reluctance to engage in opportunities where the business structure involves cooperatives or multi-stakeholder governance models, where they will not have the majority of the shares**. These complex structures, common in bioeconomy and primary sector projects, are perceived as challenging for effective decision-making, particularly when there is no clearly defined leadership or when strategic control is distributed among various actors (e.g. farmers, research institutions, public entities). Such setups can create friction around governance, slow down execution, and dilute accountability, which in turn increases perceived risk. Consequently, many lead investors shy away from these opportunities, favouring ventures with centralised management, clear equity ownership, and streamlined decision-making frameworks.
- Large investors (e.g., those funding and operating projects end-to-end) generally engage in **€1M+ EPC projects** over 10–15 years.

- Collaborative investment platforms exist to support **early-stage renewable energy projects** with small citizen-based contributions and short return windows (2–3 years). However, this is not the scope of Bioboost project.

Survey insights:

Survey respondents confirmed similar patterns, with most reporting typical investments below €1M. Equity instruments were strongly preferred, especially in the form of minority stakes, with medium involvement such as board participation and involvement in strategic decisions. Investors also indicated a preference for co-investment alongside other partners, and a focus on companies at or near the commercialization stage, particularly when supplier and buyer relationships are already established.

5.1.1.4 Geographic Scope and Impact Orientation

Interviewed investors placed strong emphasis on environmental and social impact, often tied to regional mandates. Most investors have a strong **Spanish market focus**, with some tied to regional mandates (e.g., in Catalonia) due to public funding participation. In evaluating opportunities, they typically rely on specific impact indicators, including CO_2 emissions reduction, water use efficiency, substitution effects, waste reduction, and carbon storage potential.

Survey insights:

Survey results showed an equal interest in local and global solutions. Public co-financing was welcomed by many, though a number of investors flagged the lack of regulatory clarity as a persistent barrier. Overall, public sector support was perceived as insufficient to catalyse large-scale private investment in the bioeconomy.

5.1.1.5 Collaborative Opportunities and Constraints

Interviews revealed that while there is openness to collaboration, certain limitations apply:

- Some intermediaries are open to **facilitating project-investor matchmaking**, though constrained by data protection rules that prevent disclosing investor identities.
- Several investors expressed willingness to evaluate impactful projects even if these fall slightly outside the defined scope of initiatives like Bioboost.
- Key expectations for participation include demonstrated **market traction**, robust **multi-year KPIs**, and sound governance. Single-founder ventures or poorly coordinated initiatives tend to be avoided.

Survey insights:

Survey data reinforced this trend: investors are interested in co-investment opportunities and participation in accelerator programmes as a way to build trust and visibility. Many respondents had previously encountered barriers to investing in bioeconomy projects, noting that administrative or legal hurdles, whether real or perceived, can delay decision-making. There was no consistent expectation of higher IRRs in bioenergy projects, with financial return levels often perceived as uncertain.

6 Accelerating EU Bioeconomy Development in Bioboost Project

6.1 Understanding Barriers and Opportunities: Lessons from Investor Feedback

Through one-on-one interviews and survey responses, we gained valuable firsthand insights into the main barriers restricting private investment in the bioeconomy. This understanding helped identify priority areas for Bioboost to address going forward. Additionally, the feedback enabled us to outline potential strategies to reduce investment risks, improve project bankability, and boost investor engagement in the sector.

6.1.1 Risks and Barriers

Throughout the Bioboost project and based on insights gathered from stakeholder meetings and investor surveys, we identified a range of key risks and barriers hindering investment in the bioeconomy. Some of these risks have been observed across multiple Bioboosters projects, highlighting common challenges faced in the bioeconomy investment.

Table 4. Key risks identified.

Type of Risk	Description	Biobooster related*
R1. Market Risk	Uncertainty about whether the final product can be sold and at what price. Investors evaluate whether there is a reliable market for the product.	All Bioboosters but more specifically in Alcarràs Bioproductors, Wool processing plant, Ecotros, EPACAT – Protein Plant, Casa Ametller, Compost Segrià
R2. Technological and Scalability Risk	Concerns regarding the efficiency and reliability of the technology, especially for early-stage or innovative bio-based solutions. - Risks related to the scalability and consistent performance of emerging bioeconomy technologies. - Potential delays in technology development or deployment that could affect project timelines and expected returns.	Casa Ametller, Wool processing plant, EPACAT – Protein Plant, Ecotros

R3. Feedstock/Supply Chain Risk	Lack of guarantees regarding the continuous availability of required materials or biomass. Dependence on a limited number of suppliers may cause price volatility and disrupt supply chains. For projects reliant on biomass or other bio-based feedstocks, securing a reliable and sustainable supply is critical to project success.	Alcarràs Bioproductors, Ecotros, Labin Products
R4. Funding Continuity and Financial Risk	Uncertainty about the project's ability to generate sufficient returns or maintain liquidity. Risk of funding shortfalls or interruptions throughout the project, often due to mismatched or uncoordinated funding.	Alcarràs Bioproductors, Casa Ametller, Wool processing plant,
R5. Regulatory and Administrative Risk	Regulatory uncertainty can delay or hinder innovation, especially when faced with complex or fragmented regulations, lengthy approval procedures, or the absence of harmonised standards. Potential legislative changes may also impact the project's viability, while ambiguous legal interpretations further increase uncertainty for both investors and project promoters. In addition to regulatory challenges, innovation-related barriers can also emerge, including limitations in technological maturity or insufficient support mechanisms. Moreover, securing suitable land can be particularly complex, especially in areas with competing land uses or restrictive planning frameworks, adding another layer of risk that can negatively affect investment decisions.	Ecotros, Alternative Protein Plant, Coopirenaica, Plana de Vic Cooperative, Insectius
R6. Investment Readiness Risk	Entrepreneurs or innovators may lack the financial skills to attract private capital due to weak networks or poor business development. Additionally, investment structures are frequently unclear or underdeveloped, further hindering investor engagement. Compounding this challenge, the scale and complexity of many bioeconomy projects demand innovative public-private funding formulas that go beyond traditional grant schemes, enabling more flexible, blended, or staged financing approaches to early-stage or territorially rooted initiatives.	Coopirenaica, Casa Ametller, Alcarràs Bioproductors, Wool processing plant, Compost Segrià

* *Bioboosters status:* ***Coopirenaica*** *(suspended);* ***Alcarràs Bioproductors SAT*** *(finished);* ***Casa Ametller*** *(ongoing);* ***Wool processing plant*** *(nearly finished);* ***Compost Segrià*** *(suspended);* ***EPACAT – Protein Plant*** *(paused);* ***Plana de Vic Cooperative*** *(ongoing);* ***Labin Products SL*** *(ongoing);* ***Insectius*** *(ongoing);* ***Ecotros*** *(ongoing).*

As a final reflection on the risks outlined above, it becomes clear that overcoming these financial and structural barriers is essential to unlocking the full potential of the bioeconomy. While market uncertainty, technological scalability, and supply chain vulnerabilities continue to hinder investment, additional challenges such as regulatory ambiguity and low investment readiness compound the difficulty for early-stage initiatives. These risks not only deter private investors but also highlight the urgent need

for specific support mechanism, such as de-risking instruments, blended finance models, and improved investor matchmaking that can bridge the gap between innovation and capital. Addressing these issues systematically will be key to scaling up viable bio-based solutions and fostering a more resilient, circular, and sustainable economy.

6.2 Innovative Financing Solutions Proposed - Opportunities

The following table outlines key **opportunities and mitigation strategies** designed to address the main investment risks identified in the bioeconomy sector.

Table 5. Opportunities and mitigation strategies proposed.

Mitigation Strategies & Partner Involved	Risk related
To reduce uncertainty around product demand, securing off-take agreements, including **pre-sales and long-term off-take contracts**, is essential (**Inveniam** and **Simbiosy** are helping in this strategy). Pre-sales enable buyers to make advance payments, thereby lowering the upfront capital requirements of the project, although this can also reduce overall profitability. Additionally, **encouraging producers to act as consumers** within the value chain creates stronger integration and stability. Offering pre-sale agreements with discounts can also help secure early demand and reduce financial risk. Finally, implementing stricter **CO_2 taxes alongside direct subsidies for bio-based products** can help level the playing field and drive demand toward sustainable alternatives.	R1 & R3
Ensure that innovations progress through defined stages with measurable success. Early-stage innovations benefit from pre-seed and seed funding, coupled with mentorship to accelerate development. The use of **industry experts** to assess scalability adds credibility and technical insight (**Aeris**), while proactive portfolio management helps monitor and guide technology progress from concept to scale.	R2
Integrating **biomass suppliers into financial frameworks** to ensure consistent feedstock availability (**Simbiosy**). This can ensure a stable feedstock supply, align incentives, and enhance long-term project viability. Entrepreneurial scaling programmes provide value chain support, while efforts to harmonise feedstock-related regulations make sourcing more predictable. Coordinated financing pipelines are also being established to ensure continuity in the supply chain.	R3
In Bioboost, we are focusing on improving and analysing new scenarios for the Biobooster in order to develop the most profitable and resilient business models. This involves evaluating different combinations of biomass sources and technological pathways. This approach has already been applied in pilots such as **Alcarràs** and is currently being implemented in ongoing projects in **Tagamanent** and with **Ametller**. These efforts are being made possible through the services provided by the Bioboost partners: **Simbiosy (mapping of biomass availability and value chain synergies)**, **Aeris** (**technology analysis and support**) and **Inveniam (business models)**.	R4

Simplify and harmonise regulations across jurisdictions. A standardised taxonomy and nomenclature for bioeconomy technologies will support clearer regulatory pathways, while fast-track procedures will allow timely updates to funding mechanisms in response to sector needs. To this end, the law firm **Roca Junyent (Bioboost partner),** as legal experts, has supported the removal of key legal barriers and helped accelerate the development of bioeconomy projects. This experience highlights the **critical importance of involving legal experts from the early stages**. Their involvement enables the simplification and harmonization of regulatory frameworks across jurisdictions, the advancement of a standardised taxonomy and nomenclature for bioeconomy technologies, and the implementation of fast-track procedures that allow funding mechanisms to be swiftly adapted to the sector's evolving needs.	R5
In BioBoost, **we have helped connect various entities** with each other and with Catalonia's regional hub, **BioHubCat** (member of Bioboost External Advisory Committee), **to enhance early-stage mentoring and business development support**. Through this collaboration, financial training sessions and targeted programs have been organized to strengthen entrepreneurs' strategic networks and improve their ability to engage with investors, thereby increasing their capacity to attract private capital. **Public and/or private partnerships** (e.g. **output-based financing, joint ventures**) are instrumental in de-risking entry into emerging bioeconomy markets, while regional bioeconomy hubs enhance market access and foster strategic linkages.	R6

Effective investment frameworks often blend these instruments with public co-financing, guarantees, or de-risking mechanisms to attract private capital.

6.3 Financial Schemes Deployed in our Bioboosters - Best Practices & Lessons Learnt

6.3.1 Line of Actions in the Bioboost project

To implement mitigation strategies and accelerate investment in our Bioboosters and other bioeconomy initiatives, we have carried out a series of targeted actions designed to facilitate capital flow into the sector. These efforts have centered on identifying and reducing key investment risks, improving conditions for early-stage financing, and enhancing investor engagement through Bioboost support services. Our investment-focused activities have been structured around the following key lines of action:

- Line of action 1 – Services for risk reduction:
    - We have supported bioeconomy ventures in improving their investment readiness through specialized business support services. These included specific mentoring, advisory on financial structuring, and guidance on how to articulate a compelling value proposition to investors. Through the regional hub in Catalonia (BioHubCat), which is one of our advisors and other entities such as Diputació de Lleida, Departament d'Agricultura, Ramaderia, Pesca i Alimentació, Rector de la Universitat Autònoma de Barcelona and Suma Capital we have facilitated networking and matchmaking between entrepreneurs and potential funders to strengthen financial preparedness.

- Line of action 2 – RDi System and early-stage financing:

- Under this line, we have contributed to the development of financial tools and support mechanisms for early-stage innovators. Our work involved the design and validation of potential financial instruments (e.g. blended finance, capped guarantees, public-private co-investment, output-based financing uncapped guarantees, equity co-investment platforms), as well as direct support to projects in structuring their funding strategies. We also promoted the use of SPVs (Special Purpose Vehicles) to finance collaborative innovation projects, addressing investor concerns about risk-sharing, leadership structure and liability management.

- Line of action 3 – Financial innovation and investment facilitation:
  - As part of our efforts to de-risk and structure investments in bioeconomy ventures, we have proposed designed and currently validating various financing mechanisms. These models are designed to respond to the specific needs of bio-based projects, including long time-to-market, high CAPEX, multiple stakeholders, or regulatory uncertainty (mentioned hereunder).

6.3.2 Financial Structures

In the context of the Bioboost project, "**risk-sharing instruments**" are defined as **financial mechanisms** that allocate a portion of investment risk to public or institutional actors, thereby reducing the exposure of private investors and increasing the attractiveness of early-stage or high-impact bioeconomy projects. These instruments typically involve public guarantees, subordinated capital, or blended finance structures, where public funds are used to absorb potential losses or provide credit enhancement.

The goal is to **de-risk private capital participation** by improving the risk-return profile of bioeconomy ventures, especially those with long payback periods, uncertain market conditions, or multi-stakeholder governance models.

We have identified five risk-sharing instruments developed that can be applied in bioeconomy projects:

- **SPV:** Serves as an independent legal entity designed to separate the new project's assets, liabilities, and operations from those of its parent organizations. This separation facilitates clearer governance, improves financial transparency, and reduces risk exposure for the main stakeholders. It can include public institutions.
- **Output-based financing:** Provides upfront capital backed by future revenue from measurable environmental outcomes, such as carbon credits or ecosystem services. It complements the SPV structure by linking funding to specific results or milestones. This scheme has seen a great development over the past decades, levering the development of environmental commodities such as green certificates or carbon credits. These commodities can act as a collateral of financing structures, and in some cases, they can even act as the currency to repay the financing, for environmental commodities are valuable assets where traders can extract a surplus.[13] Thus, financing is linked to the delivery of measurable environmental or social outcomes (e.g., **carbon credits, biodiversity gains**), which can serve as collateral or repayment mechanisms.
- **Public Guarantees (Capped and Uncapped):** Both capped and uncapped guarantees provided by public institutions such as the EIF or ICO are considered. **Capped guarantees** cover a predefined percentage of potential losses (e.g., up to 20%) on a portfolio of loans or equity investments, encouraging financial intermediaries to support higher-risk projects by limiting their downside exposure. **Uncapped guarantees,** on the other hand, offer full or partial coverage without a loss

[13] For instance, https://carbonaires.com/ offers debt financing in exchenge of receiving the carbon credits that the projects generate.

cap and are typically used in strategic sectors. While more generous, they require strong public backing and careful risk assessment.**Blended finance instruments**: Combines concessional public finance (e.g., grants, subordinated debt) with commercial capital. Public funds absorb first losses or offer lower return expectations, making the investment more attractive to private investors.

- **Equity co-investment platforms**: Public entities (e.g., EIF) co-invest alongside private investors in early-stage ventures, sharing both risk and return. This is particularly useful for SMEs and start-ups in the bioeconomy.

Together, these financial structures are designed to address the traditional barriers of small-scale project financing by offering the flexibility and scalability needed to attract diverse capital sources, align stakeholder incentives, and develop credible, investment-ready projects in the bioeconomy sector. **One of our key Biobooster success cases demonstrates this approach in action:** we are employing a **combination of the SPV model** (explained hereunder) and/or the **financing mechanism of output-based financing** (detailed above). Each of these mechanisms can be used independently to tackle specific project management and funding challenges or integrated to form a comprehensive financial framework. This integrated approach supports project scalability, broadens funding opportunities, and strengthens collaboration between public and private stakeholders in the bioeconomy.

6.3.3 Relevant Institutions for Risk-sharing Instruments

To operationalize these instruments, the following institutions and programs are particularly relevant:

- **European Investment Fund (EIF):** As a subsidiary of the EIB Group, the EIF specializes in supporting SMEs through equity and guarantee instruments. It manages several EU-backed risk-sharing programs, including:
- **InvestEU Sustainability Guarantee:** Offers guarantees to financial intermediaries for green and sustainable investments.
- **EIF-NPI Equity Platform:** Co-investment platform with national promotional institutions.
- **Instituto de Crédito Oficial (ICO):** Spain's national promotional bank, which collaborates with the EIF and manages EU-funded instruments. ICO could act as a key intermediary for deploying guarantees or co-investment schemes tailored to the needs of Bioboosters.
- **MicroBank (part of CaixaBank Group):** A social bank that channels EU-backed guarantees (e.g., under InvestEU) to support micro and small enterprises. It could be a relevant partner for financing smaller-scale bioeconomy projects.
- **InvestEU Programme:** The EU's flagship investment program that consolidates various financial instruments under a single framework. It includes thematic windows for sustainability and circular economy, offering guarantees, equity, and advisory support.

Comparative Table of Risk-Sharing Instruments for Bioboosters

INSTRUMENT	TYPE	MANAGING ENTITY	APPLICABILITY TO BIOBOOSTERS	KEY ADVANTAGES	LIMITATIONS

INVEST EU SUSTAINABILITY GUARANTEE	Capped/uncapped guarantee	EIF / ICO / local banks	Suitable for sustainable projects with environmental impact	De-risks lending; improves access to credit	Requires accredited financial intermediaries
EIF-NPI EQUITY PLATFORM	Equity co-investment	EIF + National Promotional Institutions (e.g., ICO)	Startups or SMEs with growth potential	Public-private alignment; flexible co-investment	Requires strong business case and scalability
MICROBANK EU-BACKED GUARANTEES	Microcredit guarantee	MicroBank (CaixaBank)	Small-scale or rural projects	No need for traditional collateral; accessible	Limited ticket size and scope
BLENDED FINANCE (E.G., HORIZON EUROPE, LIFE)	Grant + equity/debt	EU Commission + EIF/EIB	High-impact projects with low initial returns	Absorbs first losses; attracts private capital	Complex eligibility and administrative burden
OUTPUT-BASED FINANCING (E.G., CARBON CREDITS)	Results-based financing	Public-private (e.g., LIFE, Carbonaires)	Projects with measurable environmental outcomes	Monetizes impact; alternative revenue stream	Requires verification and functioning markets
SPV WITH PUBLIC GUARANTEE	Investment vehicle + guarantee	Project sponsor + ICO/EIB	Cooperative or multi-stakeholder projects	Isolates risk; enables co-investment	Legal and structuring costs
ICO GREEN LOANS / BONDS	Green loans	ICO	Projects with climate-positive impact	Direct financing with favourable terms	Must meet green taxonomy criteria

6.3.4 Deployed Solutions

Drawing on the Bioboost implementation experience, we present our case as a practical example of an **SPV** structure or **output-based financing.** This approach has been successfully applied, especially in multi-stakeholder initiatives, to organise, manage, and finance complex bioeconomy projects.

6.3.4.1 Strategic Rationale for Establishing an SPV in the Alcarràs Bioproductors Biobooster

Key Considerations for the Creation of a SPV

To structure a bioeconomy project effectively, promoted by a local agri-food cooperative, we carefully evaluated several legal and financial mechanisms. The decision to propose a SPV was based on key considerations aimed at enhancing project viability, transparency, and future scalability. Specifically, we took into account the following elements:

- **Separation of operations:** The SPV allows the biomass valorisation project to be managed independently from the cooperative's regular business activities, ensuring operational clarity and focus.
- **Facilitating access to financing (public and private)**: A dedicated legal entity enables more straightforward access to grants, subsidised loans, and future private investments, providing clear financial records and limited liability.
- **Risk sharing and mitigation**: The SPV structure isolates financial and operational risk, protecting the cooperative from wider exposure.
- **Scalability and future partnerships**: The structure is designed to accommodate the future integration of additional stakeholders, such as municipalities, R&D centers, or private investors, without major reconfiguration.
- **Clear governance:** Even in a single-member structure, establishing robust governance mechanisms is essential to avoid confusion between the cooperative (as sponsor) and the SPV (as independent entity).
- **Replicability in rural and cooperative contexts:** This model provides a replicable framework to rural environments, especially effective when supported by simplified legal and administrative procedures.

Stakeholders Landscape in the SPV Framework

In designing the SPV, we also considered the broader stakeholder ecosystem that may engage with or be impacted by the project over time. At present, **Alcarràs Bioproductors cooperative stands as the sole funding sponsor/promoter and shareholder**. However, as the project scales, potential **equity investors** could include VC or private equity funds, family offices, and development finance institutions, for future developments of the project. Financing partners may also involve commercial lenders and public development banks (e.g. EIB), especially those with mandates supporting green investments.

Feedstock will be sourced from **cooperative family members and local farmers**, while downstream **offtakers** will likely include companies purchasing the project's bioproducts, such as bioenergy and biofertilizers. Technical execution will depend on **partnerships with EPC contractors and operations and maintenance (O&M) providers.**

Regulatory and **public authorities** are crucial, particularly for permitting, compliance, and funding eligibility. Meanwhile, local communities and NGOs play a significant role in shaping the project's social and environmental legitimacy. **Legal, tax, and financial advisors** as well as **insurance providers** to manage project risks and compliance.

Implementation of the SPV Model in the Alcarràs Bioproductors Biobooster

The **Alcarràs simulation** allowed us to explore the practical value of the **SPV** even in the absence of external investors. The proposed vehicle would be fully owned by the cooperative, operating as a standalone entity to oversee biomass valorisation activities and maintain financial and managerial separation from the cooperative's day-to-day business. This arrangement enhances transparency, simplifies access to public support mechanisms, and limits the parent entity's liability. It also builds a scalable foundation, ready to incorporate future partners and investment rounds.
Key takeaways from the simulation highlighted the need for clear governance, alongside the importance of legal tools to rural cooperative contexts. While attracting capital remains a medium-term goal, the SPV already adds value by improving strategic planning, risk management, and project visualization.

To date, the cooperative has committed around **€5M** to the project, supported by public funding. However, to reach the estimated **€7.4M** total investment, a funding gap of **€2.4M** remains. **This funding gap creates an entry point for private capital**, especially as public funds alone may not suffice to support

future scaling. In this context, the **SPV emerges not only as a useful administrative tool but as a strategic vehicle to ensure long-term financial sustainability, institutional flexibility, and growth potential.**

6.3.4.2 Theorical Case Studies –

6.3.4.2.1 Results/Output-based Financing

Output-based financing includes a range of financing mechanisms where financing is linked and provided after the delivery of pre-agreed and verified outputs. This model enables access to upfront capital based on future revenue from measurable environmental outcomes or products. In this way, it complements the SPV's revenue streams and hence enables funding linked to specific results or milestones. This scheme has seen a great development over the past decades, hand-in-hand with the development of environmental commodities such as green certificates or carbon credits.

Output-based financing tends to be structured in medium to long-term agreements where an environmental commodity or service is generated, so that services such as **CO_2 reduction** can be monetized (e.g., through **carbon removal credits** from biochar production or other removal technologies) and **ecosystem services** (e.g., **grazing for fire prevention and land management**). These revenue streams can then be used as collateral to secure early-stage financing. This advance funding can help cover CAPEX and initiate the project. Output-based financing complements the SPV structure by tying investment to the achievement of specific results or milestones, aligning funding with impact.

For example, in Catalonia we have Grants for Ecosystem Services on Forest Properties under Sustainable Management. In 2023, the "Centre de la Propietat Forestal de Catalunya" introduced a new grant scheme aimed at incentivising ecosystem services derived from sustainable forest management.[14] The initiative has a dual purpose: i) To promote silvicultural practices that enhance forest biodiversity, such as identifying and maintaining target trees, generating deadwood, or compensating for foregone timber income. ii) To establish forest reserves composed of mature, overmature and ageing stands, based on biodiversity-related criteria. These reserves are valued for the ecosystem services they provide, including carbon sequestration, recreational use and game provision.

6.3.4.2.2 Blended Finance Instruments

As part of our financial innovation efforts, the Bioboost project has explored and supported the design of blended finance instruments, hybrid financial structures that combine public and private funding to reduce investment risk and make projects more attractive to market-based investors.

In collaboration with key innovation stakeholders, we have helped structure proposals that mix non-repayable public grants (e.g., Horizon Europe or national/regional R&D programmes) with subordinated debt or equity instruments from public financial institutions, such as national promotional banks. These subordinated instruments typically bear higher risk or offer concessional terms (e.g., below-market interest rates), enabling private capital to enter under more favorable conditions by enhancing the risk-return profile of the overall investment.

The public contribution in these blended structures acts as a first-loss buffer, meaning it absorbs initial losses in case the project underperforms. This catalytic effect encourages the crowding-in of private investors, especially in early-stage or unproven bioeconomy ventures.

[14] https://lifebiorgest.eu/docs/Guia%20eines%20finan%C3%A7ament%20i%20incentius_LifeBiorgest_cat_HR.pdf

Although full deployment is ongoing, Bioboost has already supported several beneficiaries in structuring blended finance proposals, particularly where there is a strong potential for cooperative bioeconomy innovation but limited access to traditional financing.

6.3.4.2.3 Guarantees

In parallel, Bioboost is also facilitating the use of guarantee-based financial instruments, especially for micro and small-scale circular bioeconomy projects. These instruments aim to reduce the credit risk for financial intermediaries (such as banks or microfinance institutions), thereby making it easier for bioeconomy entrepreneurs to access loans under improved conditions.

Specifically, we are working with institutions such as ICO and MicroBank to explore the application of capped guarantees backed by InvestEU. These guarantees cover a predefined portion of potential losses (e.g. around 20%) on a loan portfolio, encouraging lenders to take on more risk than they normally would. By reducing the potential downside for lenders, guarantees help unlock longer loan tenors, lower interest rates, or relaxed collateral requirements, all of which are critical for early-stage bioeconomy ventures that often lack strong financial track records or fixed assets.

These guarantee mechanisms are currently being designed and proposed in partnership with local financial institutions, with the aim of piloting their implementation during the scale-up phase of Bioboost. The aim is to build a more enabling financial ecosystem where innovative, impact-driven projects, particularly in rural or cooperative contexts.Lessons Learnt & Best Practices

Throughout the Bioboost project, several key lessons and best practices have emerged, highlighting the complex dynamics between early-stage bioeconomy initiatives and investor expectations. These insights offer valuable guidance for developing more effective, inclusive, and realistic investment strategies:

Lesson 1. Investors need clearer information and more developed projects

Despite **targeted outreach and personalised engagement, investor response has remained limited.** A key barrier is the early-stage nature of many Bioboosters, with **unclear business models**, **unfamiliar risk profiles**, or **long timelines for ROI**. Investors tend to favour well-established opportunities, such as large-scale biogas plants and **often expect minimum ticket sizes of €0.5–€1M**. This threshold frequently exceeds the scale and capacity of most small bioeconomy pilot projects, **e.g. wool processing plants and others we have had to discard due to this limitation** (company's names cannot be disclosed). Building stronger, data-backed business cases and demonstrating real-world results are critical to increasing investor confidence.

Additionally, **perceived risk is one of the main impediments for investors**.

Demonstration pilots, public co-funding, risk-sharing mechanisms, and robust technical and financial validation are crucial tools for building credibility and reducing uncertainty.

Lesson 2. Public-private collaboration holds potential, but must be carefully structured

Engaging **both public and private actors is promising for unlocking funding and technical support**, but the **alignment of interests can be challenging.** Private investors often seek control and rapid returns, whereas public and community stakeholders prioritise long-term impact and local shared ownership. Successful partnerships must ensure mutual trust, clear governance, and respect for the territorial and social values at stake. Nonetheless, it remains essential to establish well-defined governance models that provide transparent leadership and decision-making structures. Additionally, more effective risk-sharing mechanisms are needed to better align incentives between public and private stakeholders.

Lesson 3. Flexible financing instruments are essential

Conventional funding mechanisms are often inadequate for the realities of small-scale or community-driven (e.g. cooperatives). There is a need for innovative financial models, such as SPVs, blended finance, co-investment schemes, or outcome-based funding, that better reflect the developmental stage and risk profile of these initiatives, while facilitating access to capital.

SPVs can serve as powerful tools to consolidate resources, balance stakeholder priorities, and structure investment flows in bioeconomy projects. However, their effectiveness depends on thoughtful design to the local context. Standardised yet flexible legal frameworks, clear governance rules, and mechanisms for risk-sharing and accountability are essential to build trust among actors. Moreover, regional capacity to initiate, manage, and scale SPVs remains limited, highlighting the need for targeted support, legal templates, and training. Properly structured SPVs can act as enablers of long-term investment and replication across regions.

Lesson 4. Multi-actor partnerships enhance legitimacy and resilience

Collaboration across sectors, combining the strengths of research institutions, SMEs, primary producers, and public authorities, reinforces the legitimacy of the project and diversifies its support base. Participatory governance and co-creation processes are strong enablers of long-term success.

6.3.5 Next Steps

To align with these opportunities, the Bioboost consortium will:

- Engage actively with public financing institutions such as the EIF, ICO and the EIB to present the Bioboosters initiative and explore potential avenues for collaboration. Specifically, we aim to assess the feasibility of deploying capped or uncapped guarantee instruments that could de-risk investments in Biobooster projects and facilitate greater private sector participation. These guarantees could be instrumental in supporting early-stage or higher-risk projects, providing the necessary confidence to private investors and ensuring a smoother path to market deployment. Engaging with these institutions will allow us to identify existing financial instruments or co-design new ones tailored to the specific needs of the Bioboosters portfolio. Going forward, more emphasis will be placed on establishing structured dialogues with public investors, both at national and European levels, to build strategic partnerships and unlock blended finance opportunities that combine public support with private capital.
- Develop a standardised termsheet template for each financing solution created, to serve as a product template that can be replicated and adapted across different contexts within the Bioboosters initiative.
- Assess the eligibility of Bioboosters under the InvestEU Sustainability Guarantee and other relevant EU instruments.
- Explore partnerships with local financial intermediaries (e.g., MicroBank) to facilitate access to risk-sharing finance for rural and cooperative-led initiatives.
- Develop a pipeline of investment-ready projects that meet the criteria of public co-investment platforms.

7 Conclusions

To accelerate investment in the bioeconomy, innovative and financial instruments are essential. Through the Bioboost project, we have not only piloted concrete financing mechanisms but also generated valuable insights on how to align public support, reduce investor risk, and structure collaborative ventures. The lessons learnt highlight the importance of legal expertise, early and continuous investor dialogue, and governance models that balance innovation with bankability.
Despite this progress, several barriers continue to limit investor commitment, particularly in early-stage or highly innovative projects. One of the most significant challenges is the **lack of perceived ROI**. Many investors view these projects as too risky or lacking clarity, especially when long-term profitability is uncertain. At the same time, external funders **often seek influence over strategic decisions**, which may conflict with the interests of primary producers, cooperatives, and local stakeholders, who are keen to retain control over land, operations, and long-term outcomes.

Another key difficulty lies in the **unfamiliarity with multi-actor governance models**. Investors tend to be cautious about frameworks involving diverse actors, which they perceive as potentially inefficient or difficult to manage. This is compounded by a general **preference for mature, low-risk technologi**es such as bioenergy, which offer well-established business models and more predictable returns. In contrast, novel approaches, such as those focused on materials reuse, ecosystem regeneration, or circular value chains, are often viewed as less secure from an investment perspective.

Beyond these dynamics, structural barriers to investment remain. High **perceived risk, long payback periods**, and **decentralised project structures** continue to deter potential funders, especially in the case of low-TRL innovations. Investment thresholds often in the range of €0.5 to €1M, exceed what most early-stage Bioboosters can absorb, making smaller or pilot-scale initiatives less appealing to investors. This situation frequently leads to a higher number of investors per project, which can complicate governance. Many investors are reluctant to share equity or decision-making authority, similar to what happens in cooperatives or larger investment projects, especially those who are also project developers.

Furthermore, there is a **persistent mismatch between** the **financial metrics typically used by investors and the broader system-level impacts that bioeconomy projects deliver**. Benefits such as enhanced ecosystem services, soil regeneration, or territorial resilience do not easily translate into conventional KPIs, limiting their attractiveness in traditional investment frameworks.
Moreover, **difficulties in securing suitable land** for implementation can pose a major bottleneck. Identifying appropriate sites is not always straightforward, especially in areas where land-use planning is restrictive, fragmented, or subject to competing interests. **These limitations can significantly delay project development and increase uncertainty for both investors and promoters**. Furthermore, **public funding,** though crucial, often comes with its own set of limitations. **Complex application procedures, long timelines, and narrow eligibility criteria create additional friction.** Many Bioboosters face a challenging gap where **their projects are too developed to qualify for early-stage public funding but still considered too immature or risky to attract private investment**. Overcoming this funding gap is essential to enable scalable and sustainable solutions in the bioeconomy.
Reluctance **among primary producers to engage directly with external investors** also plays a role. Often driven by concerns about losing control over their land, operations, or governance models, this hesitation leads many to favour incremental improvements financed through internal resources. While this preserves autonomy, it often results in slower innovation and limits the scalability of transformative approaches. Additionally, many often **lack the expertise or do not know where to turn to find investors**.

Looking ahead, balancing innovation with local ownership and governance remains key. Financial models such as **SPVs**, **cooperative investment structures**, **capped guarantees**, **output-based financing**, and **blended finance** are all essential tools to align investor expectations with the values and long-term vision of primary sector actors.

While **SPVs**, **cooperative investment mechanisms**, and **guarantees** are well-established instruments in the broader financial world, their use in small-scale, decentralized, or community-driven bioeconomy initiatives remains limited and often unexplored. By contrast, **output-based financing** and **blended finance** represent **more innovative and transformative approaches**, particularly in this context. These mechanisms allow financial structuring to be directly linked to environmental performance and multi-actor value creation, characteristics that are critical to regenerative and circular bioeconomy models.

Although these instruments are not entirely novel from a financial theory standpoint, their **application in the bioeconomy is still at an early stage**. They are rarely implemented in practice, especially in rural areas, cooperative-led projects, or initiatives involving low-TRL technologies. Their effective deployment requires significant time, stakeholder coordination, and a high degree of contextual adaptation. Each Biobooster operates within a unique socio-economic, territorial, and institutional environment, which makes standardized financial models impractical.

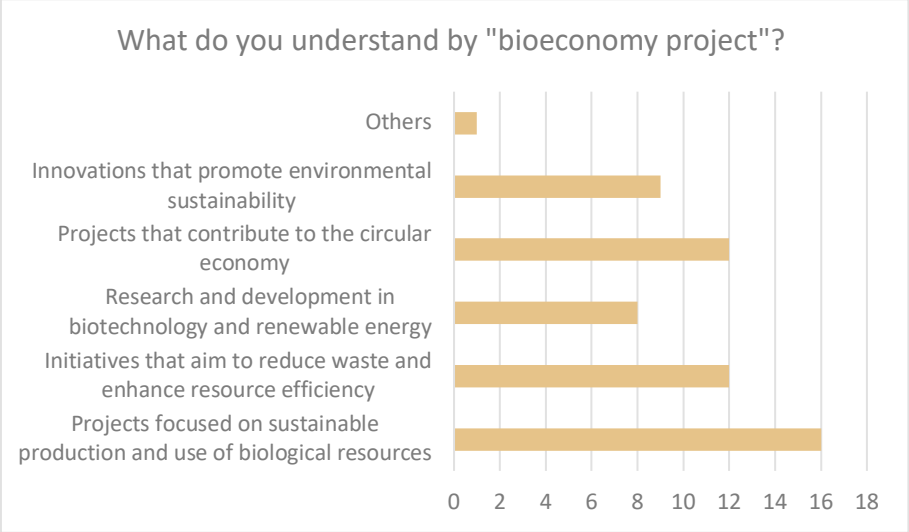
In this light, the less than 30-month implementation window of the Bioboost pilot phase has been insufficient to fully deploy and consolidate these mechanisms. However, the project has successfully **laid the groundwork**, validated critical design elements, and initiated key dialogues with financial institutions and investors. What we offer through Bioboost is not a ready-made solution, but a **tested and adaptable financial blueprint** for advancing systemic innovation in the bioeconomy.

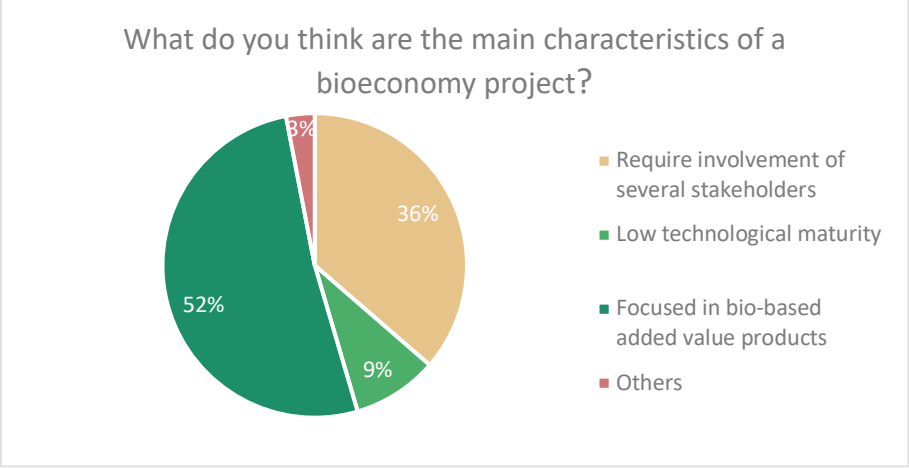
What we offer through Bioboost, therefore, is not just an academic proposal, but a field-tested roadmap for gradual integration of sophisticated financial tools in bioeconomy innovation pipelines.

In parallel, we must continue to develop and refine viable business models for the Bioboosters. This involves enhancing and evaluating different deployment scenarios that integrate various biomass sources and technological solutions, as outlined in Table 4 (Biobooster-related challenges) and Table 5 (mitigation strategies).

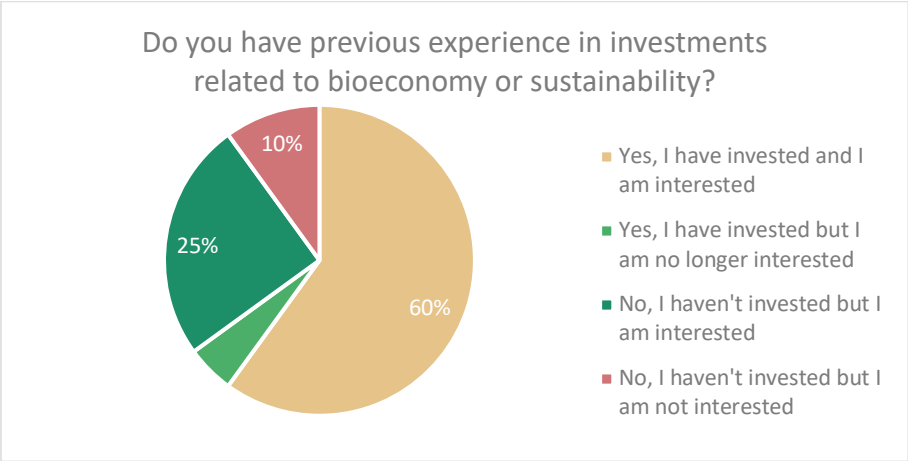
ANNEX I – SURVEY FORM RESULTS

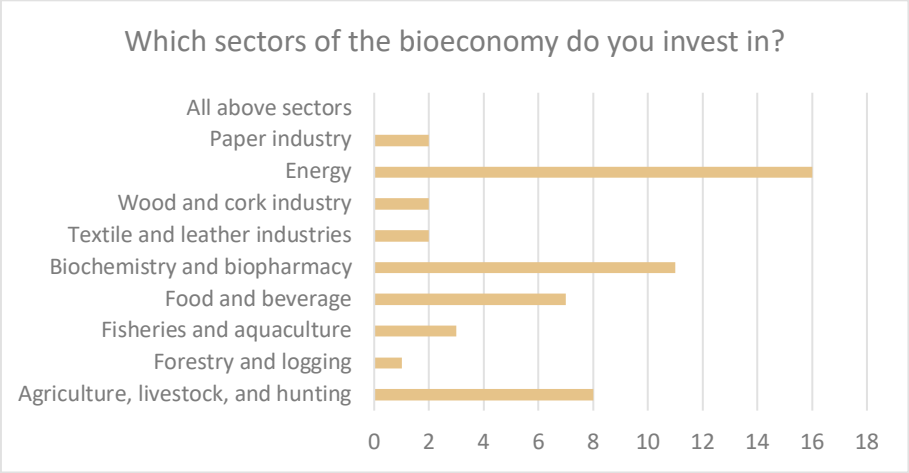
About Bioeconomy

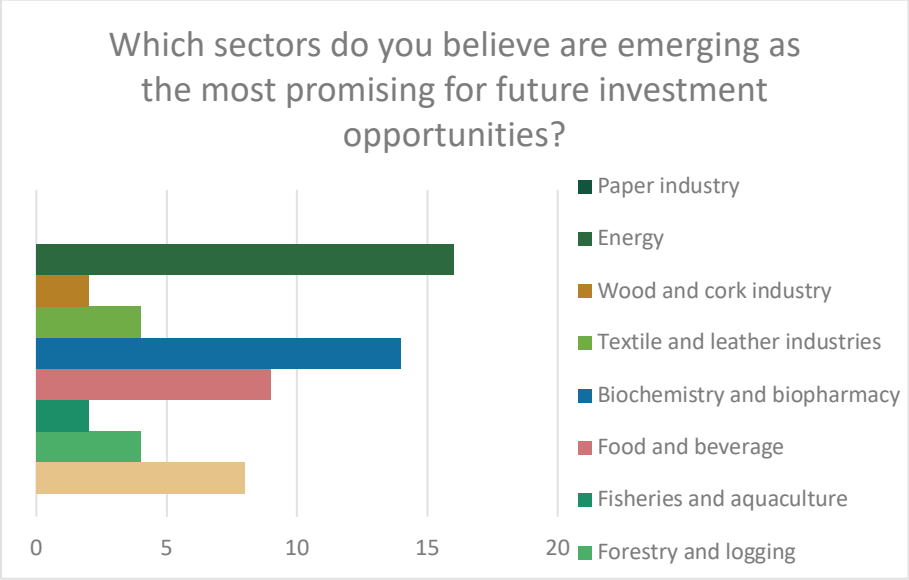


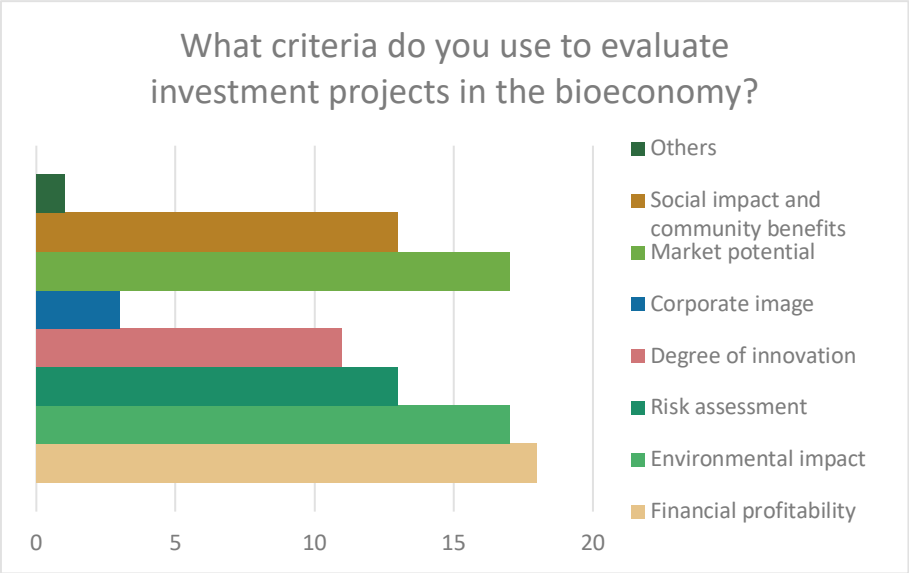


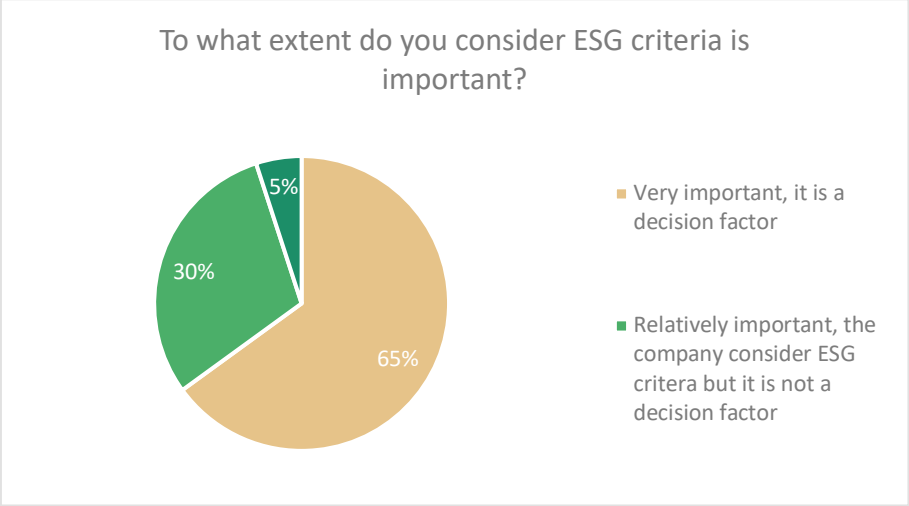
Interest and Investment in Bioeconomy

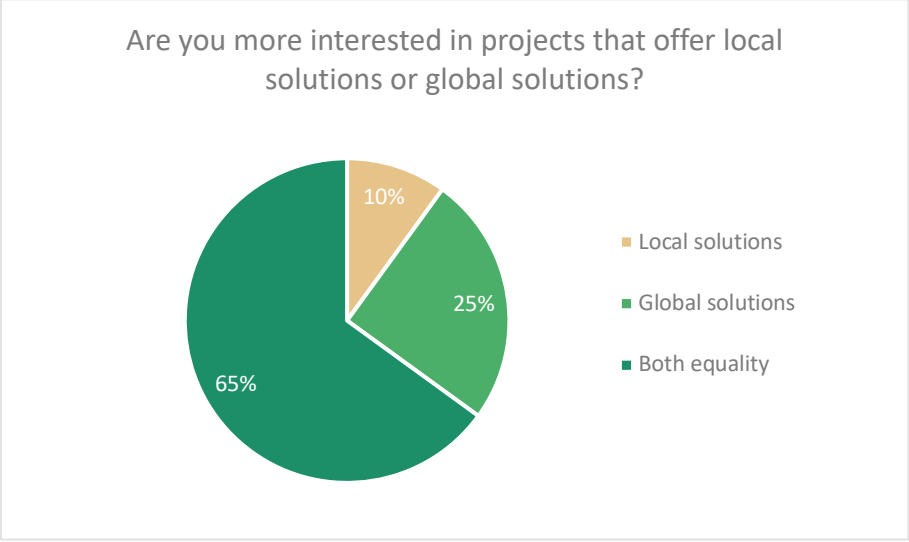




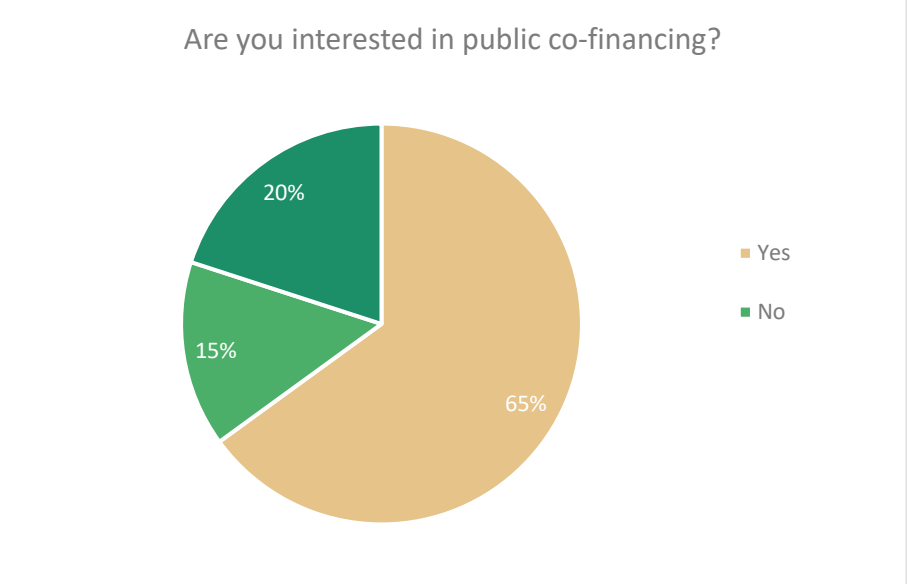


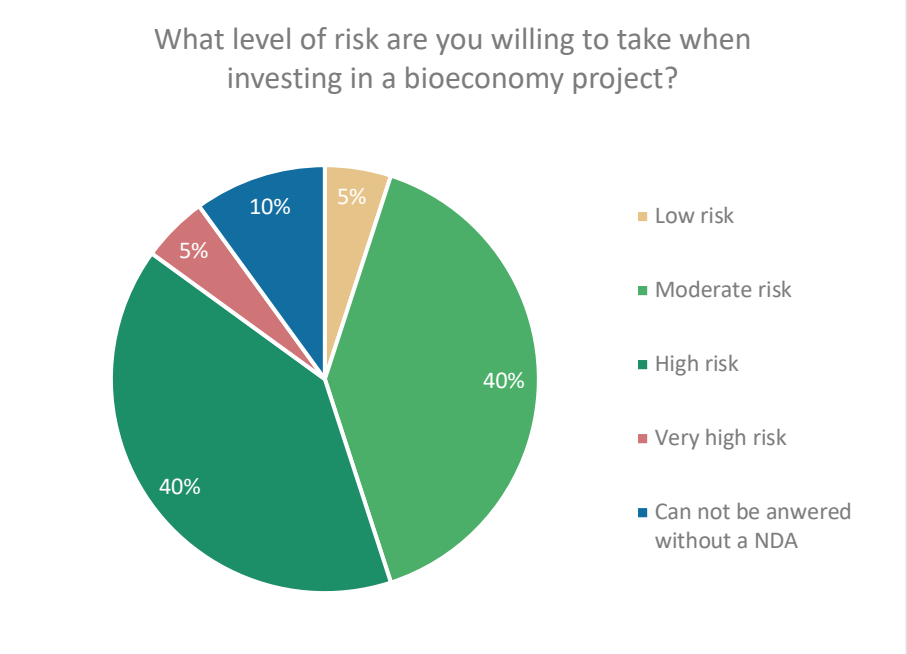

What criteria do you use to evaluate investment projects in the bioeconomy?
Others
Social impact and community benefits
Market potential
Corporate image
Degree of innovation
Risk assessment
Environmental impact
Financial profitability
0
5
10
15
20

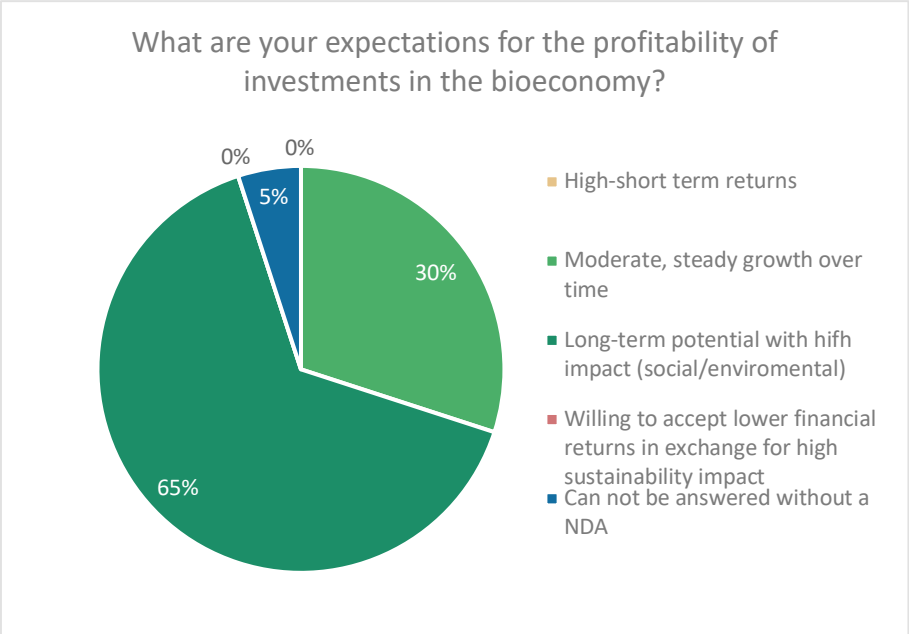

To what extent do you consider ESG criteria is important?
5%
30%
65%
Very important, it is a decision factor
Relatively important, the company consider ESG critera but it is not a decision factor


Are you more interested in projects that offer local solutions or global solutions?
10%
25%
65%
Local solutions
Global solutions
Both equality

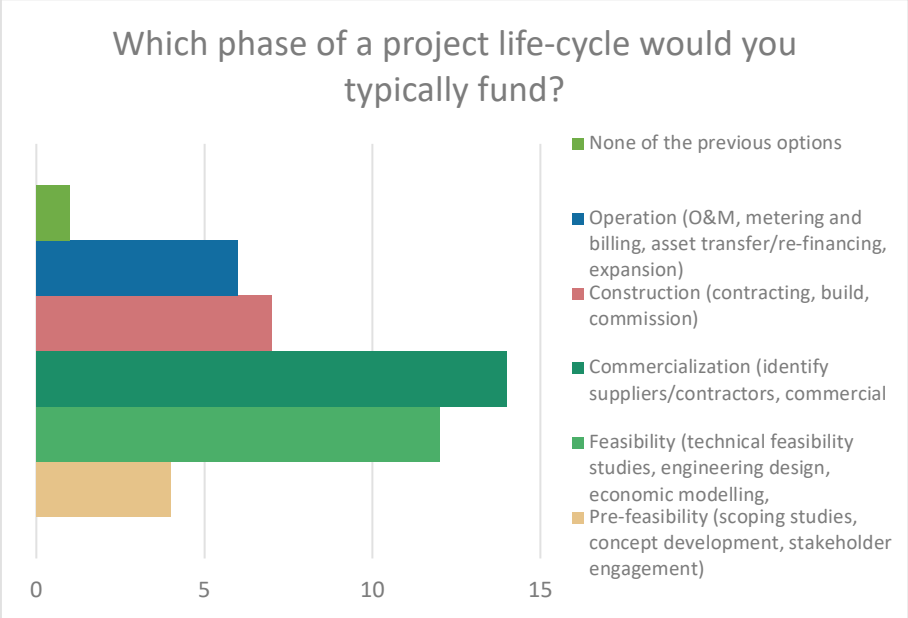
Investment Preferences

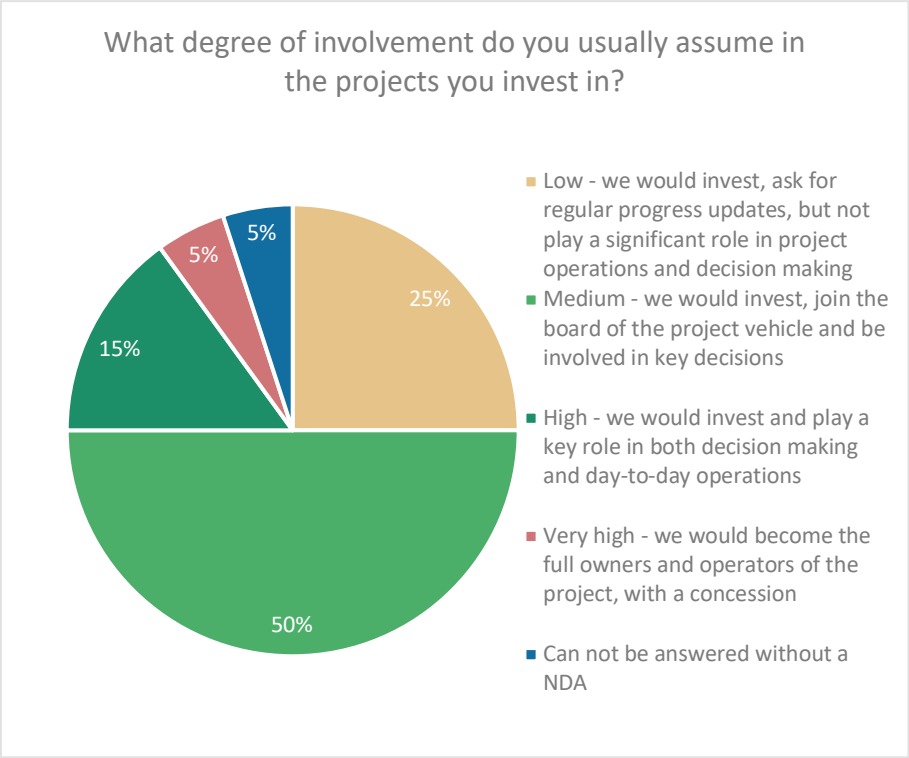


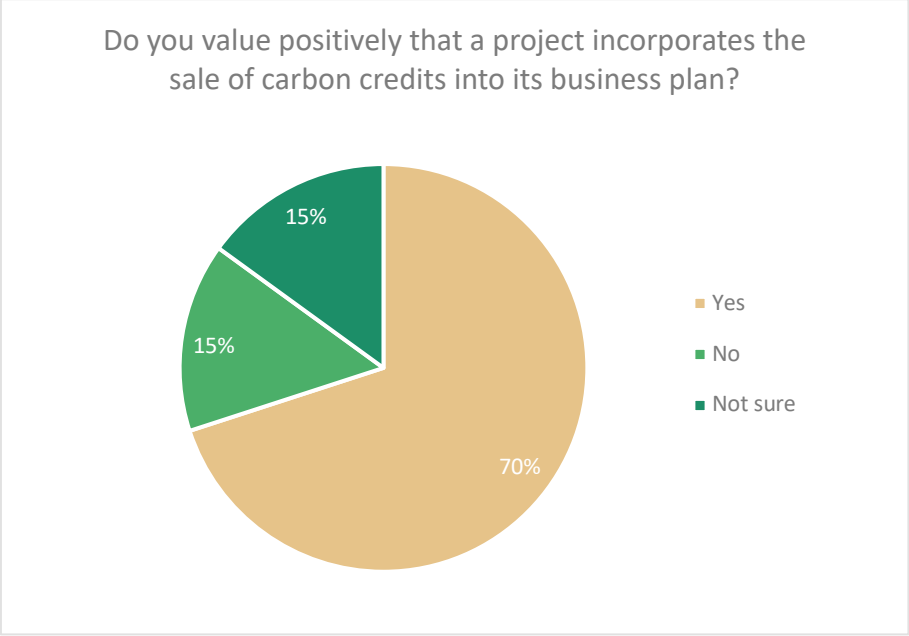


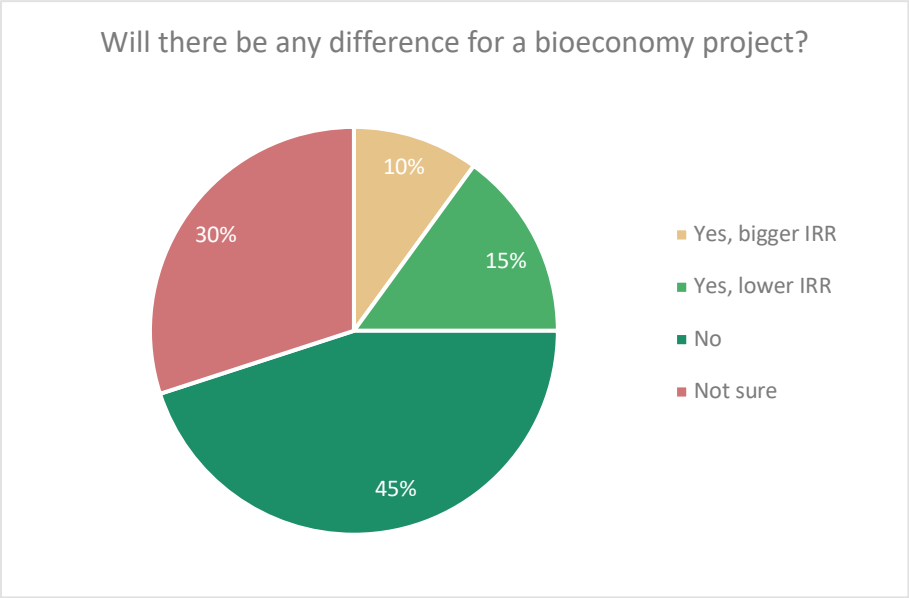


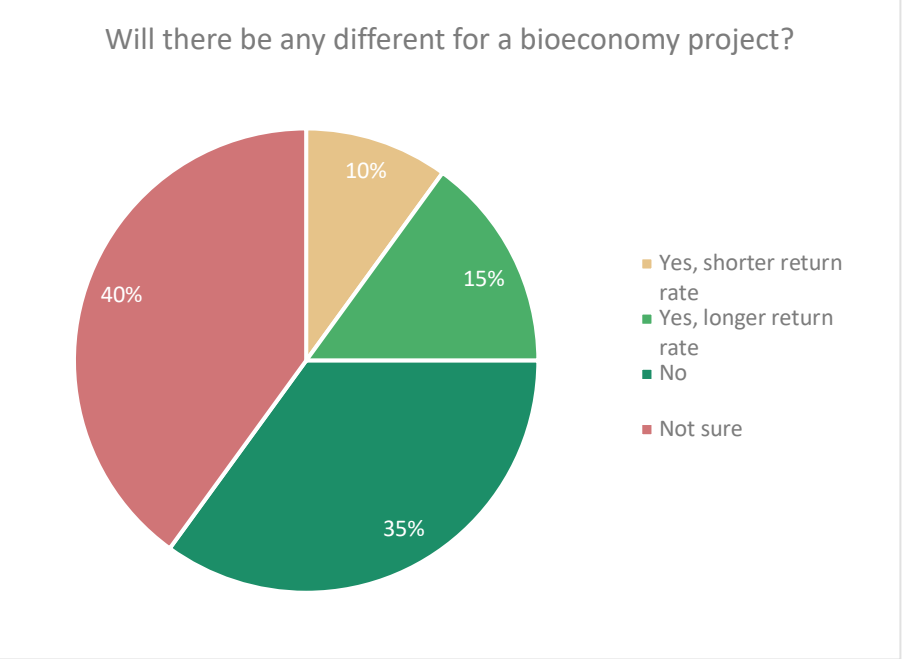
Financial Instruments & Expected Returns

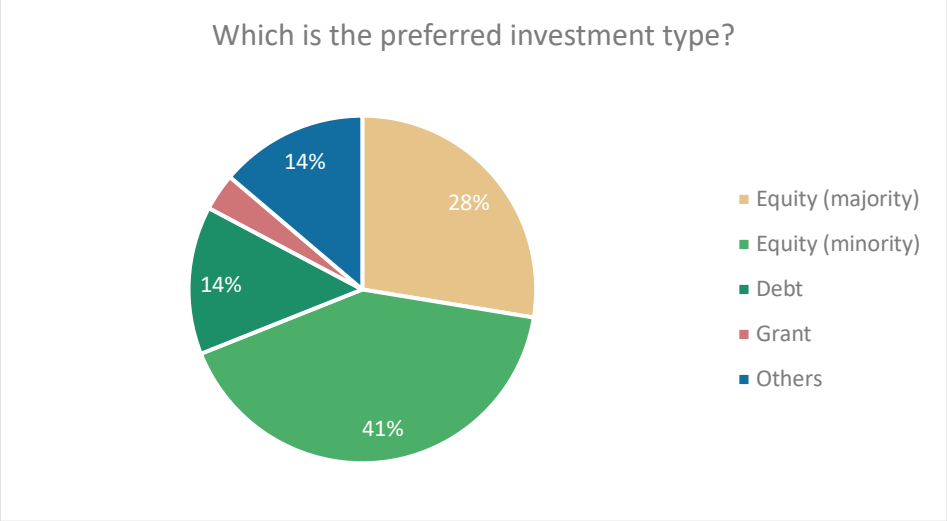


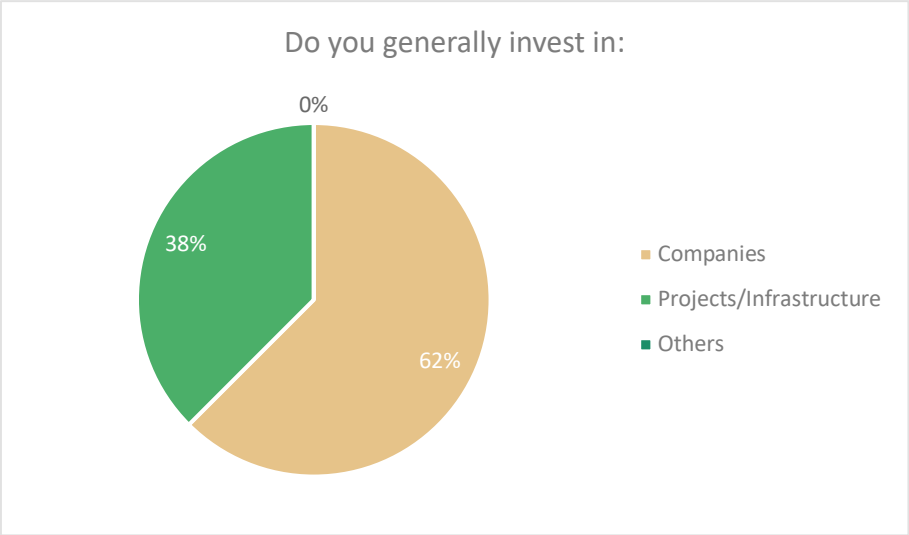

What degree of involvement do you usually assume in the projects you invest in?
25%
50%
15%
5%
5%
Low - we would invest, ask for regular progress updates, but not play a significant role in project operations and decision making
Medium - we would invest, join the board of the project vehicle and be involved in key decisions
High - we would invest and play a key role in both decision making and day-to-day operations
Very high - we would become the full owners and operators of the project, with a concession
Can not be answered without a NDA

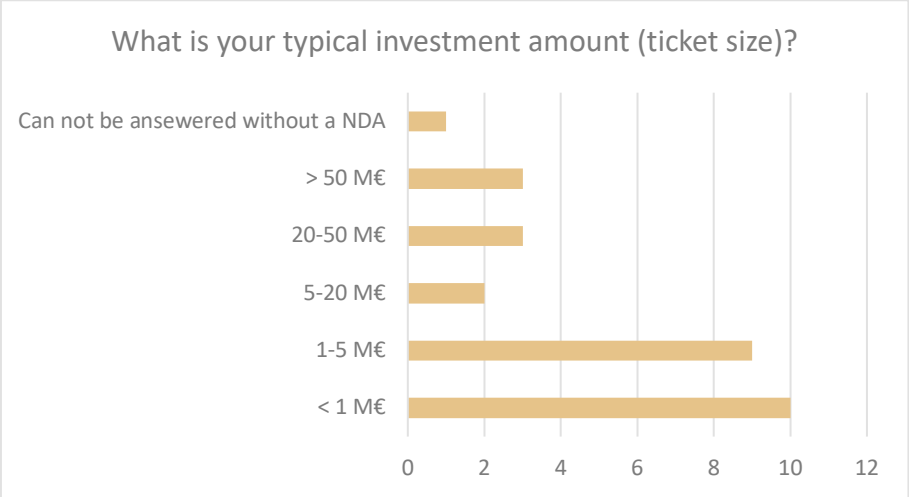

Do you value positively that a project incorporates the sale of carbon credits into its business plan?
70%
15%
15%
Yes
No
Not sure

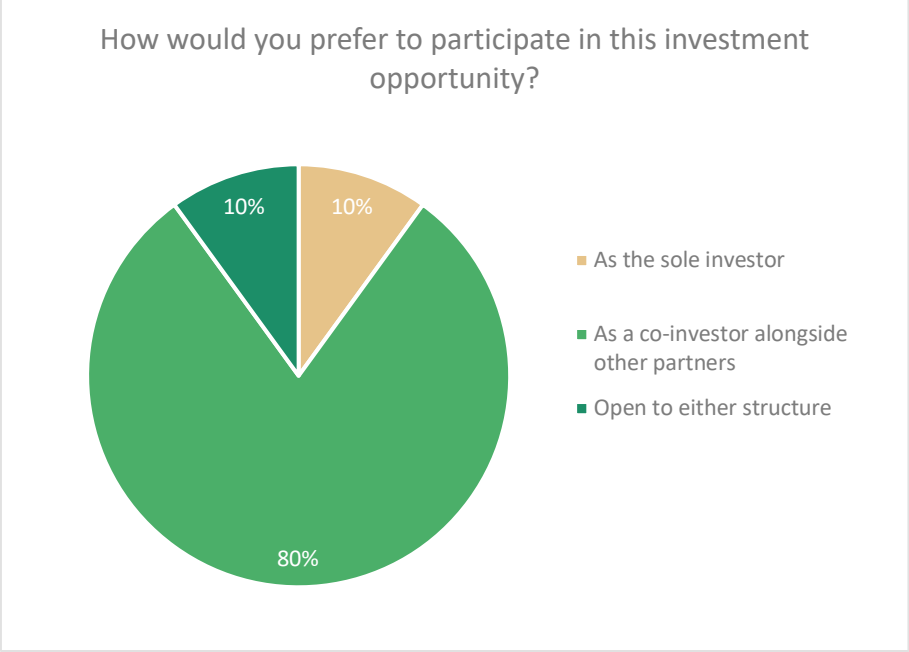

Will there be any difference for a bioeconomy project?
10%
15%
45%
30%
Yes, bigger IRR
Yes, lower IRR
No
Not sure

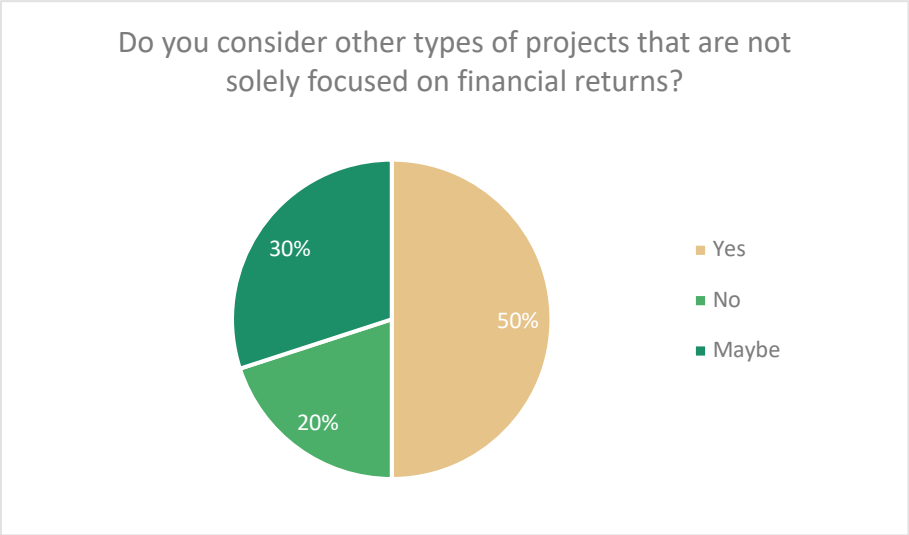

Will there be any different for a bioeconomy project?
10%
15%
35%
40%
Yes, shorter return rate
Yes, longer return rate
No
Not sure

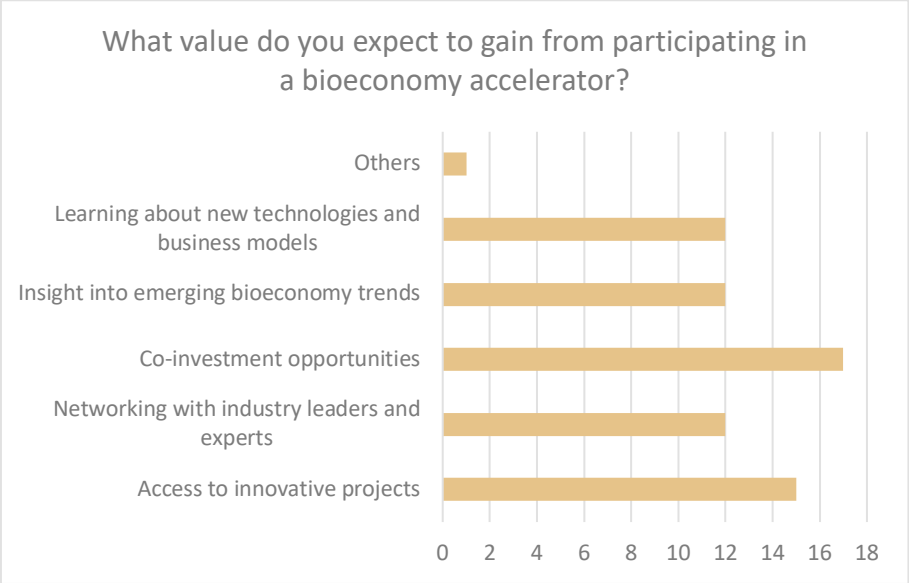

Which is the preferred investment type?
28%
41%
14%
14%
Equity (majority)
Equity (minority)
Debt
Grant
Others


Do you generally invest in:
0%
38%
62%
Companies
Projects/Infrastructure
Others


What is your typical investment amount (ticket size)?
Can not be ansewered without a NDA
> 50 M€
20-50 M€
5-20 M€
1-5 M€
< 1 M€
0
2
4
6
8
10
12

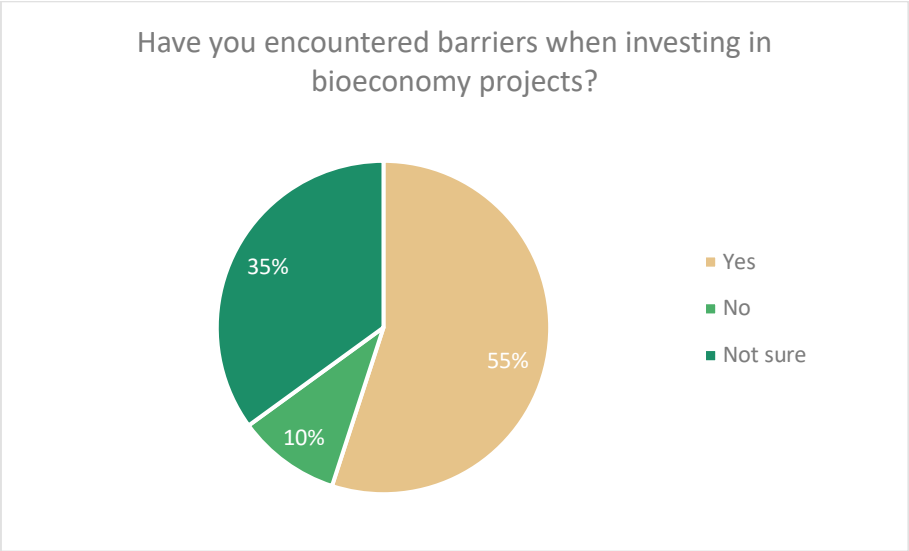

How would you prefer to participate in this investment opportunity?
10%
10%
80%
As the sole investor
As a co-investor alongside other partners
Open to either structure

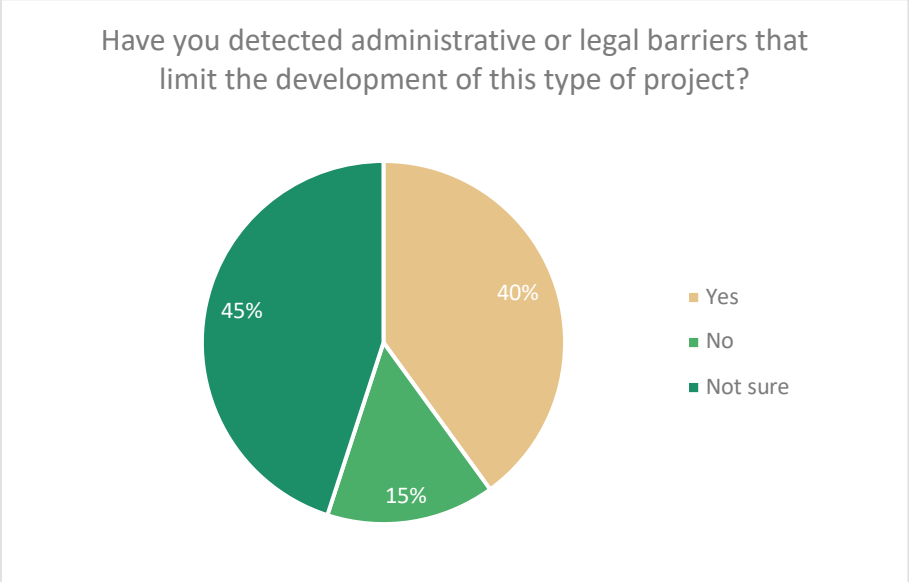

Do you consider other types of projects that are not solely focused on financial returns?
30%
50%
20%
Yes
No
Maybe

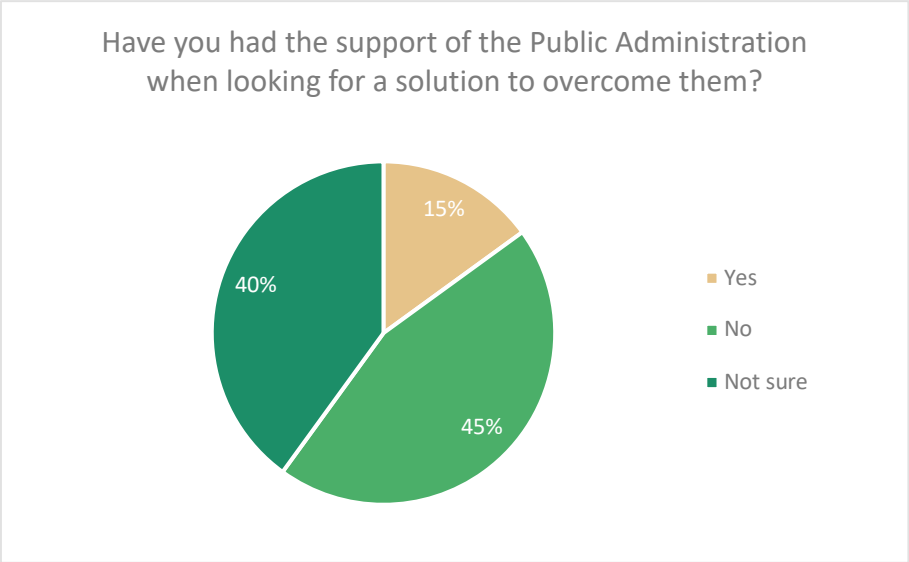

What value do you expect to gain from participating in a bioeconomy accelerator?
Others
Learning about new technologies and business models
Insight into emerging bioeconomy trends
Co-investment opportunities
Networking with industry leaders and experts
Access to innovative projects
0 2 4 6 8 10 12 14 16 18

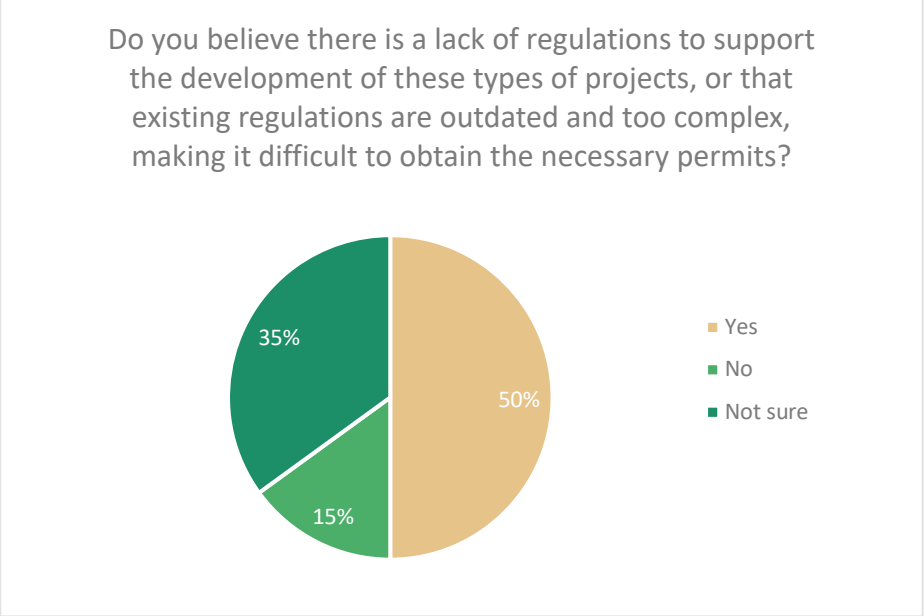

Would you be interested in collaborating with accelerator projects beyond financial investment?
None of the previous options
Assisting with marketing and outreach
Partnering on pilot projects or trials
Offering industry insights or technical...
Participating in networking events
Providing strategic advice
Mentoring project teams
0 2 4 6 8 10 12 14

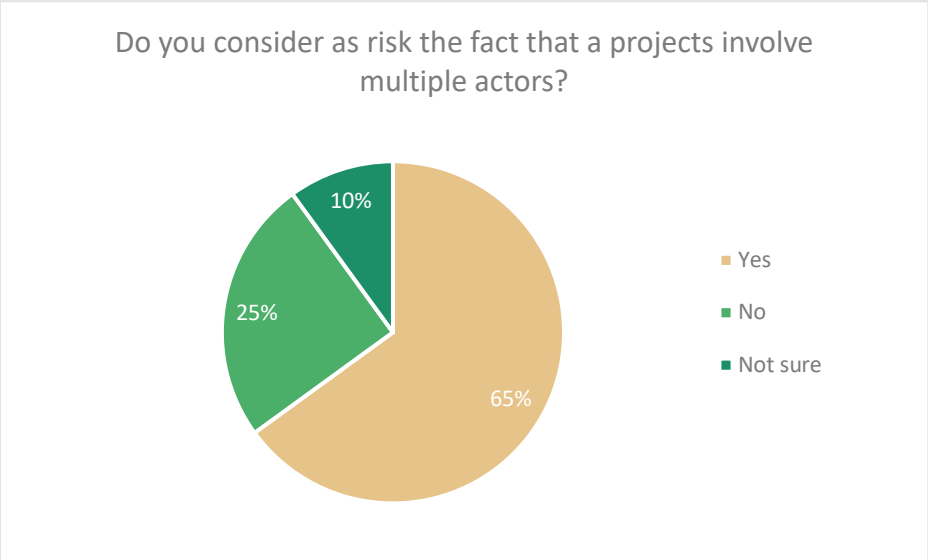
Barriers in Bioeconomy



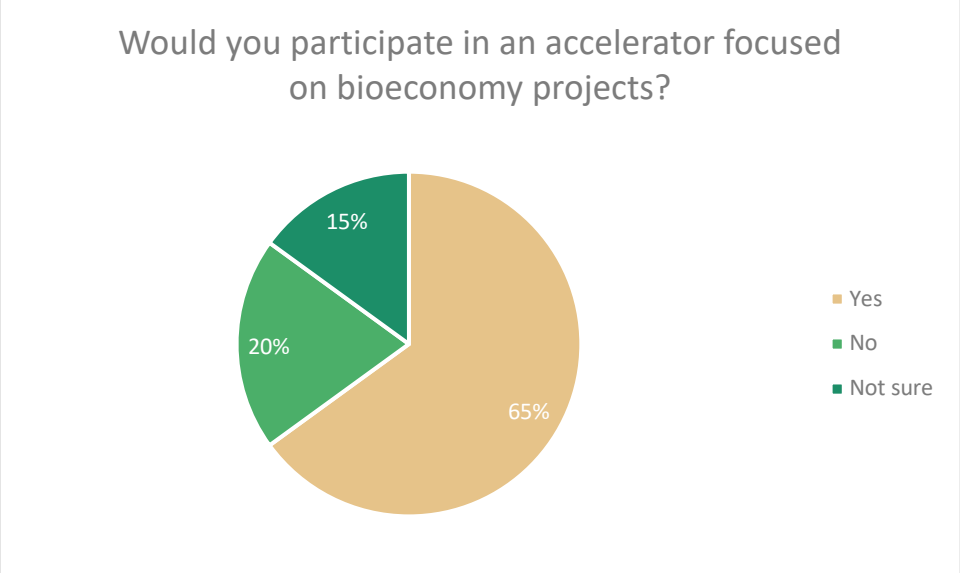


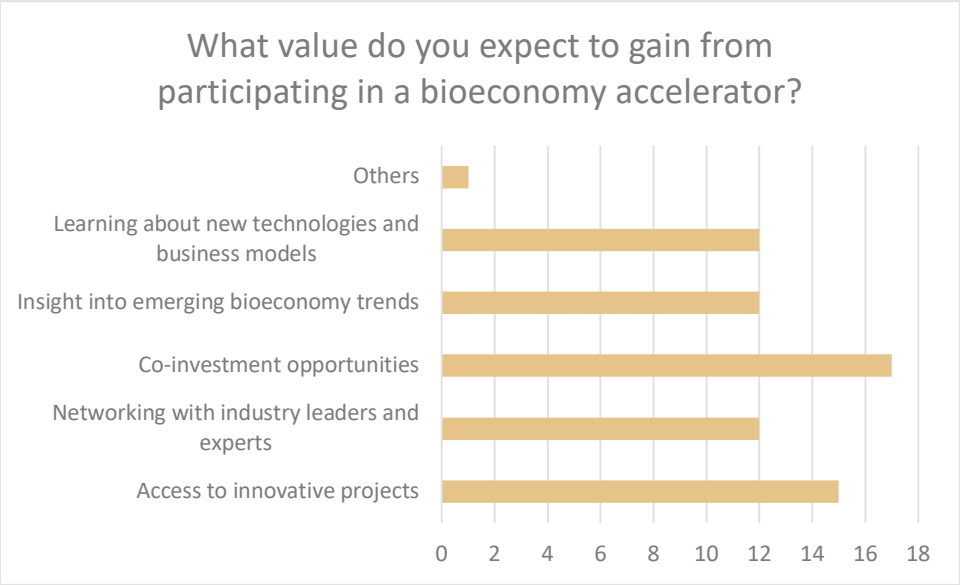

Have you had the support of the Public Administration when looking for a solution to overcome them?
15%
40%
45%
Yes
No
Not sure


Do you believe there is a lack of regulations to support the development of these types of projects, or that existing regulations are outdated and too complex, making it difficult to obtain the necessary permits?
35%
50%
15%
Yes
No
Not sure



Participation in Bieoconomy Accelerator




What value do you expect to gain from participating in a bioeconomy accelerator?
Others
Learning about new technologies and business models
Insight into emerging bioeconomy trends
Co-investment opportunities
Networking with industry leaders and experts
Access to innovative projects
0
2
4
6
8
10
12
14
16
18


Would you be interested in collaborating with accelerator projects beyond financial investment?
None of the previous options
Assisting with marketing and outreach
Partnering on pilot projects or trials
Offering industry insights or technical...
Participating in networking events
Providing strategic advice
Mentoring project teams
0
2
4
6
8
10
12
14


BOOST
Bioeconomy
projects
accelerator