



Financing the bio-based revolution: **crossing Europe's valleys of death**



Executive Summary

The bioeconomy is
valued at

€2.3T

and represents

8% of the
workforce,¹

offering Europe a unique
opportunity to assume a
leadership role if it can
achieve industrial-scale
growth.

Unlocking this potential
would not only strengthen
the Union's competitiveness
but also generate substantial
socioeconomic benefits.

Estimates suggest that by 2030,
the EU could create up to one
million new jobs in bio-based
industries alone² and help to
achieve Europe's climate and
environmental goals.

The EU bioeconomy forms an
industrial eco-system to develop
products, tools, and processes
at commercial scale, the so-
called "biomanufacturing".³
Biomanufacturing has the
potential to establish Europe as
a hub of industrial innovation,
reduce reliance on fossil fuels,
drive competitiveness, and
support the transition toward a
sustainable bioeconomy. Yet,
realising this potential requires
significant investment from
both public and private sources.
This paper identifies the barriers
currently impeding investment
and possible concrete actions to
unlock growth.

Despite Europe's strong
track record in research and

development, scaling up remains
a formidable challenge. High
capital costs for constructing
production facilities, difficulties
in accessing finance for scale-
ups, and protracted approval
processes all weigh heavily on
potential investors. In addition,
weak market incentives for bio-
based products make it harder
for companies to demonstrate
a viable return on investment.
Together, these factors have
created persistent financing
gaps.

At present, biomanufacturing
investment in Europe is
hindered by two critical "valleys
of death." These represent
stages in the innovation and
commercialisation pathway
where financing is most difficult
to secure, and where promising
technologies are at risk of
stalling. Reducing investment
risk and mobilising capital –
particularly venture financing
– will be essential if Europe is to



bridge these valleys, especially
the second, which is most
acute during the scale-up and
production phases.

This challenge is compounded
by Europe's relative
underperformance compared to
the United States. Between 2008
and 2021, nearly 30 percent of
European-founded "unicorns"
– startups that achieved a
valuation above USD 1 billion
– relocated their headquarters
abroad, with most moving to the
US.⁴ This migration underscores
the difficulties faced by
European firms in securing
sufficient funding and scaling
opportunities at home.

Addressing these barriers
requires a concerted policy effort
to reduce investment risks and
strengthen financial support,
particularly for the scale-up
and production phases of
biomanufacturing.

This document provides a concise list of the actions we have
identified that could be undertaken to improve access to finance
for biomanufacturing in Europe. It also outlines why these specific
actions are needed and provide further details on the targeted
actions themselves.

- ✓ **Improve awareness and accessibility of existing financial instruments**
- ✓ **Continue the CBE JU public-private partnerships under the new EU budget (2028-2034)**
- ✓ **Leverage first-of-a-kind projects, including CBE JU flagship projects, under the European Competitiveness Fund and other EU funding instruments**
- ✓ **Animate a network of funding suppliers and guide projects seeking funding**
- ✓ **Facilitate a more coordinated, blended use of current risk-sharing instruments**
- ✓ **Improve market framework conditions**
- ✓ **Commit additional public funds and risk-sharing instruments**
- ✓ **Sharpen investment regulations and mobilise pension funds**

Mobilising both public investment and venture/ private
(equity) capital will be vital to close Europe's financing gap.
Only by doing so can the EU capture the full promise of the
global bioeconomy and position itself as a global leader in this
rapidly expanding sector.

¹ European Investment Bank, *Scaling up Europe's Bio-based Industries*.

² EuropaBio, *Jobs & Growth Generated by Industrial Biotechnology in Europe*.

³ BIC definition "Biomanufacturing include all technologies, including biotechnology, for the use and conversion of biological resources. This include the use as well the production of biological systems—such as cells, enzymes, or micro-organisms".

⁴ European Commission, *The Future of European Competitiveness: A Competitiveness Strategy for Europe*.

Biomanufacturing: an opportunity for Europe

The bioeconomy stands at the core of Europe's transition toward a sustainable, low-carbon, and climate-resilient future. It demonstrates that economic growth and environmental protection are not opposing forces but complementary goals.


Globally, the bioeconomy is set to exceed €27_T by 2050, offering Europe a unique chance to capture value and lead in sustainable industries.⁵

At the heart of this opportunity is biomanufacturing: the conversion of biological resources into chemicals, materials, products and energy. Biomanufacturing is not just a technological process; it is the engine that powers the bioeconomy. Biomanufacturing has the potential to drive job creation, competitiveness and industrial resilience while accelerating the EU's climate and circular economy goals. Biomanufacturing also strengthens Europe's strategic autonomy. By building renewable feedstock supply chains within the EU, Europe reduces its reliance on imports. This independence fosters resilience in times of global disruption and ensures that products and materials are proudly "Made in Europe."

Global competition is intensifying. Countries such as the United States, Brazil, China and India have adopted strong policy frameworks and

incentives to support their bioeconomies, and similar efforts are being coordinated at the G20 level. While U.S. policy support has recently weakened, this creates a strategic gap Europe can seize to position itself as the world leader in bio-based industries.

To succeed, Europe must ensure that innovations developed here are also scaled and manufactured here, ensuring that that European ingenuity benefits Europe directly. Bio-based products made under Europe's high sustainability standards must not be placed at a disadvantage compared to imports from outside the EU.

Otherwise, Europe risks losing the economic and strategic benefits of its own innovation. Biomanufacturing is therefore not just an industrial opportunity – it is a strategic imperative.

With the right investments and policies, Europe can secure growth, leadership, and resilience in the global bioeconomy.

What's holding Europe back?

Biomanufacturing is capital intensive

Like many deep-tech sectors, biomanufacturing is characterised by long investment periods – often more than five years – and high R&D costs. This reality makes financing one of the most decisive factors for success.

There is the additional major challenge of having to compete with fossil industries as they have had many decades to perfect their processes for large markets, and receive still lots of subsidies.

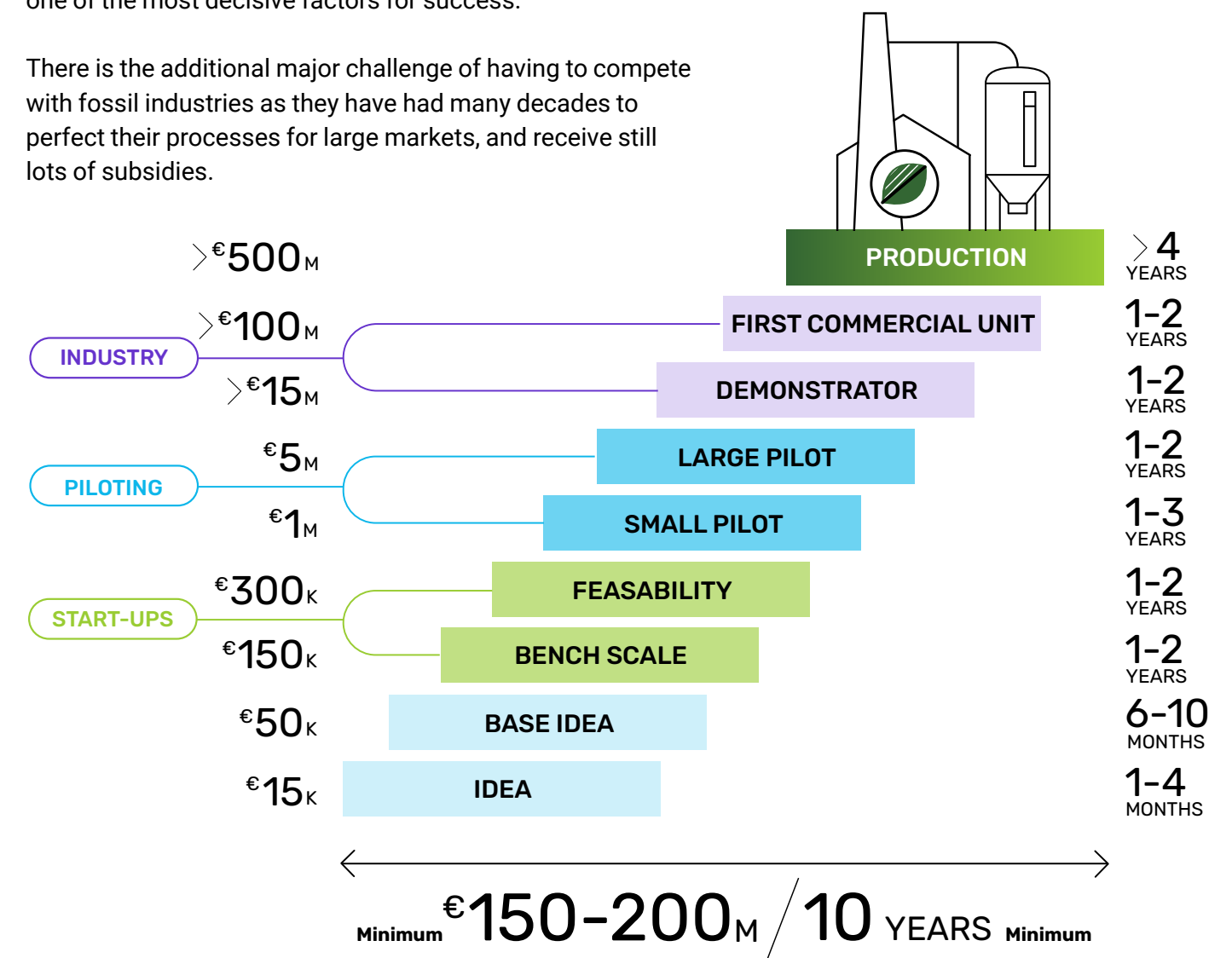


Fig.1 Investment needs across the Technology Readiness Level (TRL) scale (Source: VTT, Finland)

⁵ European Investment Bank, Scaling up Europe's Bio-based Industries.

Scaling biomanufacturing from the laboratory to the market follows a structured path, with each stage demanding different types of capital, infrastructure and support.

Addressing financial gaps along this pathway is essential to move promising innovations from early-stage concepts to commercial reality. Without appropriate support at each step, even the most advanced technologies risk stalling before reaching the market.

Investment needs to vary significantly across the TRL range. Early-stage research faces high technological risks, while later stages encounter challenges tied to regulatory approval, infrastructure and market access. The risk profile shifts along the way, requiring different types of investor – from public funders willing to back early innovation, to private capital needed for demonstration and scale-up.

The size and structure of companies also matters. Large firms have different funding needs than small and medium-sized enterprises (SMEs) and startups. These younger firms are often at the cutting edge of innovation, but lack the capital to advance beyond the lab stage without targeted support.

For new production units, a minimum of

€150–200M

is needed per large-scale project.



As commercial banks set strict loan conditions it becomes difficult to secure industrial production space. While public funding is available, it typically covers only part of the costs, leaving companies reliant on private co-financing. For many, securing the remaining equity is extremely difficult.

Investors consistently highlight two critical funding gaps in the biomanufacturing scale-up journey. The first arises when projects move from pilot to demonstration, requiring larger facilities to validate processes at scale. The second gap emerges during the transition from demonstration to flagship or first-of-a-kind plants, where industrial-scale investment – often involving hundreds of millions of euros – is needed.

Both of these phases carry significant financial risks, which makes traditional private equity reluctant to engage.

The shortage of investment in biomanufacturing is not solely financial. It is closely tied to uncertainty on multiple fronts: technological feasibility, regulatory requirements, and unpredictable market dynamics. This blend of risks makes investors hesitant and slows down growth in the sector.

To unlock Europe's biomanufacturing potential, long-term and tailored financing mechanisms are essential. These must reflect the unique risks and timeframes of the sector, while ensuring that SMEs and startups are not left behind – their promising innovations failing to reach commercial viability.

From lab scale to production: overcoming a double valley of death

The investment landscape for biomanufacturing shifts significantly along the innovation pathway. Early-stage R&D is relatively low-cost and lower risk, often supported by public funding. However, as technologies move from pilot to demonstration and eventually to commercial scale, both technological and financial risks increase sharply.

At commercial scale, challenges extend beyond process performance. Investors must

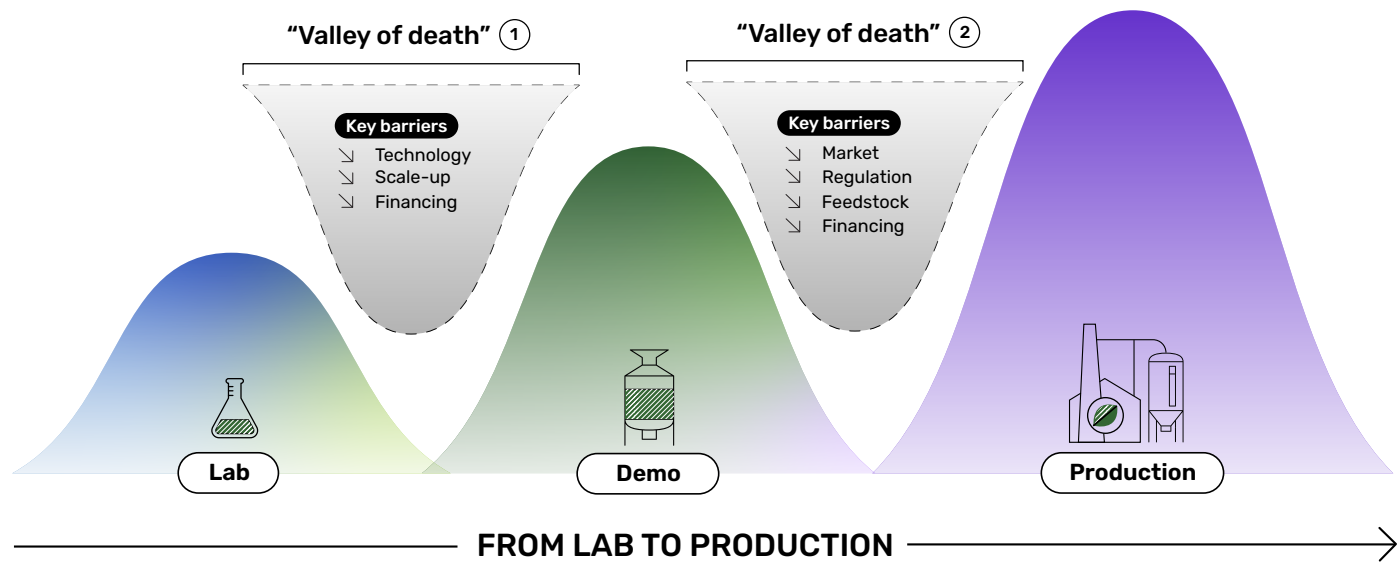
contend with feedstock supply uncertainty; market volatility; difficulties in securing long-term offtake agreements; and regulatory barriers. Competition from established, fossil-based

industries further complicates the business case.

Recognising and addressing these risks is essential for unlocking investment.

With targeted policies, regulatory clarity, and mechanisms that create stable demand, stakeholders can strengthen the viability of biomanufacturing and accelerate its contribution to the bioeconomy.

Fig.2 The biomanufacturing valleys of death

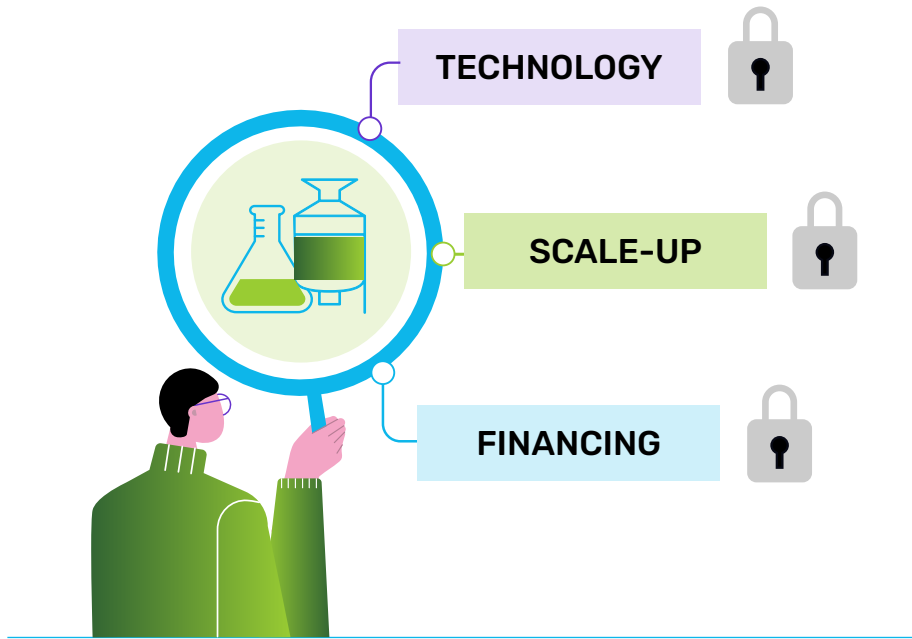


Scale-up: from lab to demo

While early-stage R&D benefits from a variety of funding instruments, access to diverse forms of financial support and capital for early-stage investment is key for the scaling-up phase, prior to becoming attractive to institutional investors.

At this stage, companies need significant capital to test processes at scale, optimise production and demonstrate viability to potential customers. A way to do this is by building a demo plant, but that too is capital-intensive. However, these investments are often perceived as too risky for private investors, who hesitate in the absence of proof of concept or clear market signals.

Public financial support plays an essential role in reducing technological risk and bridging this gap. Yet, existing mechanisms are often fragmented and constrained. Funding from Member States and/or regions typically comes with strict conditions.



A recent report from the EIB⁶ calculated that the funding gap for this so-called first valley of death is between

€470–750 M per year

For example, often the scaling up must be performed within the Member State or region, so it becomes difficult for companies to go to a pilot plant in another Member State or region. This creates inefficiencies and slows down the pace of innovation.

So to unlock the full potential of Europe's bioeconomy, stronger and more flexible financing mechanisms are needed. Public-private co-funding of scale-up infrastructure, particularly demo plants, will be key.

From demo to production

The significant difficulties in this phase are: access to capital; regulatory burdens; and difficulty accessing feedstocks and markets.

Access to capital

Scaling from R&D to mass production can require hundreds of millions of euros, with a slower return on investment than sectors like pharmaceuticals and ICT.. Combined with lengthy EU approvals, such as novel food regulation, this extended timeline makes the sector less attractive to investors.

Securing long-term buyers is also a major hurdle. Without binding rules at a European level to encourage or enforce the uptake of sustainable products, companies struggle to secure offtake agreements that would guarantee demand for future output. Bio-based products – including food, chemicals, and plastics – are left competing on uneven ground, often made worse by perverse fossil fuel and environmental subsidies.

Public support has so far focused mainly on grants for R&D, which has stimulated innovation but left gaps in the later stages

The EIB estimates that the funding gap for this second valley of death is between

€1.6–2.6 B per year

of scaling, production, and commercialisation. Access to more innovative financial instruments, such as guarantees or risk-sharing tools, remains

limited. Without these, many promising technologies risk being stuck at pilot stage, unable to reach the market at scale.

Regulatory burdens: delays in approvals and commercialisation

European companies, from startups to global leaders, need a more ambitious, predictable and innovation-friendly policy framework if the bioeconomy is to become a strategic sector of EU industry.

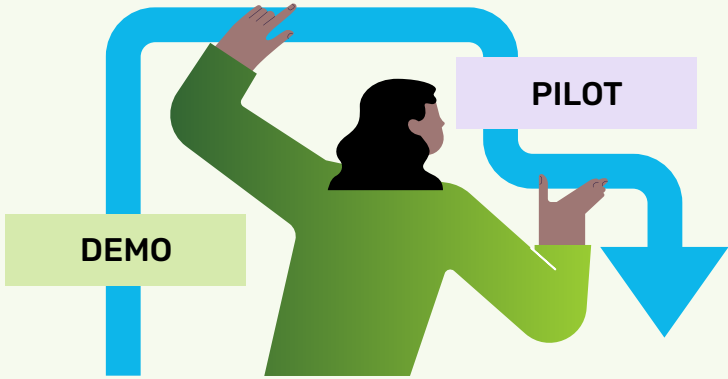
Despite rapid advances in biomanufacturing, Europe's

regulatory environment remains fragmented and inconsistent, creating confusion for businesses and slowing down investment.

Lengthy and complex pre-market approval processes often add years to the commercialisation of new

⁶ EIB (September 2025) – Investment gaps to achieve sustainable targets in the bioeconomy.

products, putting European firms at a disadvantage compared to global competitors. This delays returns on investment, and makes the sector less attractive to investors. The potential of the EU Single Market is therefore underexploited, as regulatory fragmentation and lack of coherence prevent companies from scaling innovations across borders. Administrative hurdles compound the problem.



Securing permits for new biomanufacturing sites in Europe is often complex, uncertain and slow, discouraging investment and delaying innovation.

To unlock the sector's potential, Europe must provide clarity about the market, regulations and the feedstock use.

Difficulty accessing feedstocks and markets

Uncertainty around the steady availability of sustainably sourced feedstock and reliable access to markets discourages long-term investment, as supply chains remain unpredictable.

The absence of clear regulation at European level mandating green and sustainable products, combined with a lack of incentives or financial support, makes it difficult for producers to secure a price premium for bio-based products and materials. Without such mechanisms, building a strong business case and finalising offtake agreements becomes a major

obstacle, further deterring capital investment. This lack of regulatory support acts as a structural bottleneck. Although sustainability is often a motivating factor, end-users are generally unwilling to bear the higher costs of bio-based materials, limiting demand. At the same time, investors view biogenic carbon as higher risk

than fossil alternatives, due to seasonal variation and the possibility of crop failures. Many of these hurdles have also been analysed in the EU Bioeconomy Strategy 2025.⁷

⁷ EU's Bioeconomy Strategy 2025.

Recommendations: what Europe needs to do

Finance related actions

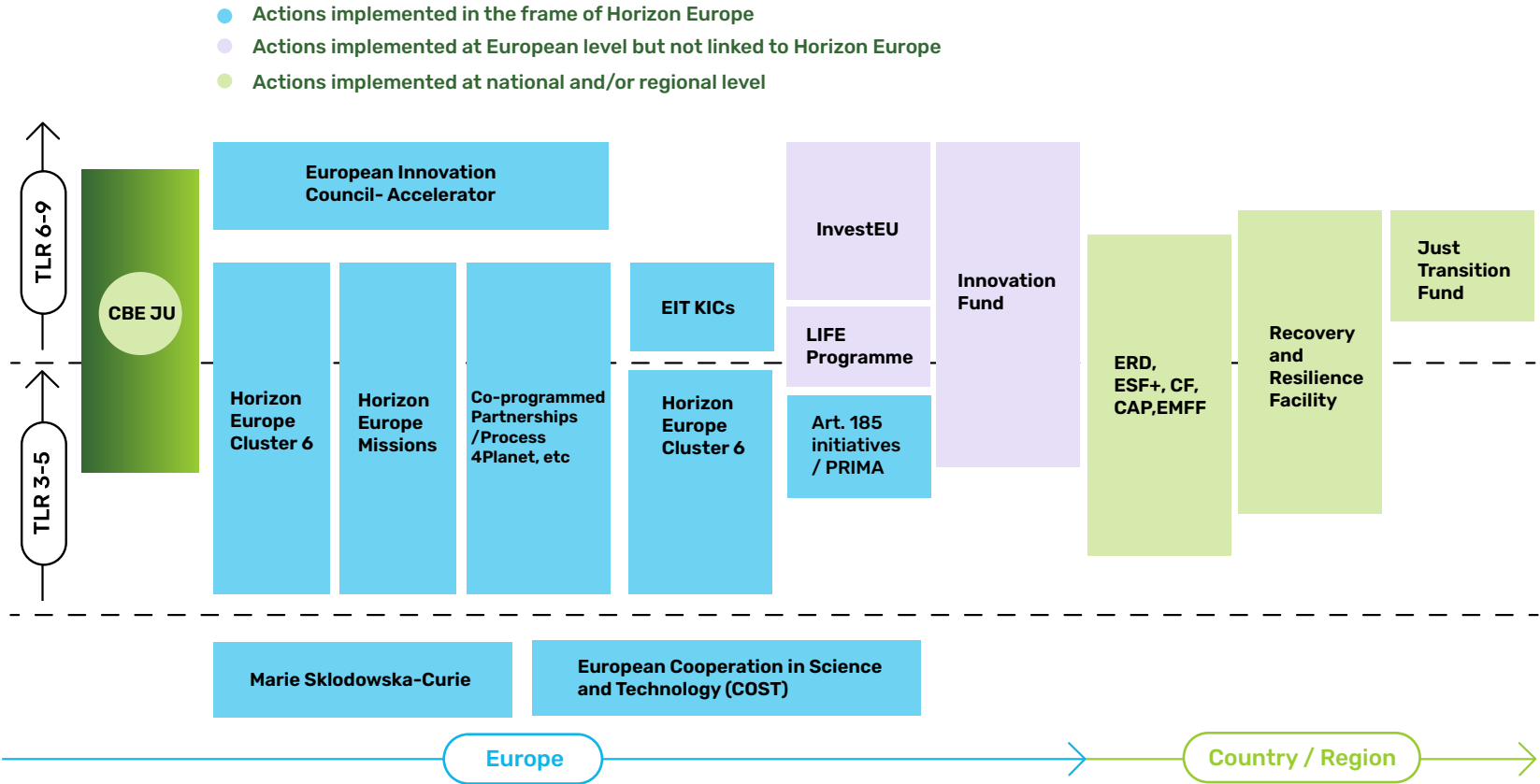
1.

The **first valley of death** can only be overcome by additional public support and unlocking more public-private funding.

There are several initiatives at EU and national level, but they

are complex and fragmented, often unknown by those who need it, and not always easy to access. This is illustrated by following overview of European initiatives, implemented at European and national and/or regional level.

Fig.3 Funding instruments for research and innovation in Europe (Source: CBE JU)



The first Valley of death / KEY ACTIONS



Awareness of the existing instruments has to be increased and the access has to be made easier and simpler. **Fragmentation must be overcome** and procedures need harmonisation.



Expand and harmonise existing piloting and demonstration initiatives to accelerate the translation of research into practice by strategically aligning public and private funding.



Prioritise public-private collaboration to enable commercialisation of new technologies and support the scaling up of production processes.

Leverage public-private partnerships, such as the Circular Bio-based Europe Joint Undertaking (CBE JU), to support scale-up across the European Union.



Improve and increase the national and/or regional support mechanisms. Late-stage funding should be made available for innovative biomanufacturing companies to support scale-up across Member States.

Members States and regions should be able to support their companies to scale up in existing pilot & demo plants in another region.

2.

For the **second valley of death**, beyond the conventional commercial financing channels, there are a host of existing 'sustainable finance' instruments that can be deployed for financing the bioeconomy.

However, an integrated approach is needed – one that links financing and funding with market development, policies, public awareness and enabling fiscal measures.

In the short term, existing instruments should be activated and simplified and funding programmes could be better coordinated, in the longer term, the market framework should be improved and hurdles to attract long-term capital such as pension funds should be removed.

The second Valley of death / KEY ACTIONS



Improve awareness of existing European and Member State public investment instruments, such as ERDF⁸, RRF⁹, EIC¹⁰, EIB¹¹ and InvestEU for bio-based industries. Make the current instruments easier to access and less complex, and avoid fragmentation.



Guide projects seeking funding to scale funding and deployment with scouting, advisories, roadshows, communications, compliance, learnings, etc.



Improve market framework conditions, e.g. remove bottlenecks in state aid rules including the General Block Exemption Regulation and launch an Important Project of Common European Interest (IPCEI) for biomanufacturing and the bio-based industries.



Continue public-private partnerships (such as the CBE JU) to de-risk first-of-a-kind flagship facilities across the EU under the new FP10/ Competitiveness Funds.



Facilitate a more coordinated, blended use of current risk-sharing instruments across funding sources and agencies (regional, national and EU).



Sharpen investment regulations and motivate pension funds and other asset managers to invest in biomanufacturing as a sustainable, long-term and stable-return asset class.

As an example, US pension funds invest 100 times more in VC than EU¹², representing a huge gap when it comes to the funding of innovative companies in Europe.



Animate a network of funding suppliers offering a range of blended finance (grants, loans, guarantees, equity, advisory) across the regional, national and EU levels.



Facilitate European loan guarantees to de-risk investments by private partners. A European loan guarantee commits the guarantor to cover a private borrower's debt if the borrower defaults. While similar to traditional project finance, loan guarantees accept technology risk and provide a backed loan.



Commit additional public funds and risk-sharing instruments, e.g. establish public green investment banks at Member State/regional level, thematic investment platform specifically for bio-based products and materials.

⁸ European Regional Development Fund.
⁹ Recovery and Resilience Facility.
¹⁰ European Innovation Council.
¹¹ European Investment Bank.
¹² Jacques Delors Centre (2024), Europe ventures forward: Getting the scaleup of cleantech right.

Additional actions needed outside of finance

Access and availability of funding and finance is only one of the hurdles European companies face when scaling up and bringing innovation to market.

Particularly in the second valley, overcoming regulatory hurdles, having reliable access to bio-based feedstock at competitive prices and efficient market pull measures for bio-based products must be ensured in the EU.¹³

¹³ BIC position paper on the 2025 EU Bioeconomy Strategy | Bio-based Industries Consortium (BIC)

Europe can't afford to wait!

Europe stands at a pivotal moment to solidify its position as a global leader in sustainable manufacturing. Strengthening the continent's industrial competitiveness through bio-based industries not only enhances Europe's strategic autonomy but also unlocks enormous economic potential.

The global bioeconomy is projected to reach over €27 trillion by 2050, representing an unprecedented market opportunity for European innovators and investors alike. Scaling biomanufacturing can also create millions of new green jobs, fostering inclusive economic growth while supporting the transition to a low-carbon, circular economy.

Bio-based production reduces Europe's reliance on fossil-fuel-derived materials and chemicals, enhancing resilience against global supply chain disruptions and geopolitical risks. By embracing biomanufacturing at scale, Europe gains a distinct competitive edge, positioning itself as a leader in the sustainable industries of the future.

While biomanufacturing projects offer high long-term returns, investors often perceive them as risky due to technological uncertainties, market volatility, challenges in securing off-take agreements, and the absence of comprehensive regulatory frameworks.

These barriers must be addressed to transform bio-based production from a niche innovation into mainstream industrial practice.

Realising this potential, however, requires substantial investment. Accelerating investment will demand a coordinated approach that combines accessible financial instruments with supportive policy and regulatory measures.

By fostering an integrated ecosystem that aligns funding, regulation and market development, Europe can fully realise the capabilities of biomanufacturing for fuelling economic growth, advancing sustainability and strengthening its global impact.

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