The Value of Biosolutions: Growth and Prosperity to 2035

- Europe edition



June, 2025

This report has been prepared by ADC (Amsterdam Data Collective) and was commissioned by Novonesis.

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Disclaimer and acknowledgements

This report has been prepared by ADC (Amsterdam Data Collective) and was commissioned by Novonesis.

All the analysis in this report has been carried out by ADC with input from experts in the field of biosolutions including:

- Danish Industries Biosolutions
- European Biosolutions Coalition
- International Advisory Council on Global Bioeconomy
- Novonesis
- World Economic Forum

Insights on policies – including challenges, barriers and policy actions – builds on research conducted by Szpirt & Company and Dragoman.

We express gratitude to the biosolutions experts and contributors whose insights have enriched this work. We hope these findings ignite policy discussion, spur innovation, and pave the way for a more sustainable and prosperous future.

The contents, findings, and conclusions herein reflect the work and analysis conducted by ADC.

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Foreword

As I write this foreword, Europe stands at a critical juncture. We face unprecedented challenges: climate change, lack of energy and food security, and the need to maintain our competitive edge in a rapidly evolving global economy. Yet, within these challenges lies extraordinary opportunity—one that this report illuminates with remarkable clarity.

The biosolutions transformation is not coming; it is here. And the numbers in this report tell a story that should capture the attention of every policymaker, business leader, and citizen across Europe.

When we see that biosolutions already generate €60 billion in direct and indirect output value in the EU and support 278,000 jobs, we're witnessing the emergence of a sector that rivals traditional industries in scale and impact. And the future projection is remarkable significant: by 2035, we could see these numbers double to over €118 billion in combined direct and indirect value, supporting more than 543,000 jobs in the EU. This is almost twice as many jobs in just over a decade.

For my home country of Denmark, the story is equally compelling. From €5.3 billion in current direct and indirect output value to potentially €10.7 billion by 2035, with job creation growing from 17,300 to 34,700 jobs—these are not abstract numbers but real opportunities for real people in real communities.

While improving Europe’s competitiveness and strategic autonomy, biosolutions also address the defining challenges of our time. They offer pathways to food security through sustainable agriculture and food production, and industrial competitiveness through biological materials and processes. They represent what I call "smart solutions"—innovations that solve multiple problems simultaneously while creating economic value.

As a Member of the European Parliament, I have witnessed firsthand how policy can either accelerate or hinder transformative change. The biosolutions sector thrives when governments embrace innovation, streamline regulations, and create level playing fields between conventional and new, innovative and sustainable alternatives. EU’s leadership in this space didn't happen by accident—it resulted from strategic investments, forward-thinking policies, and collaborative partnerships between government, industry, and research institutions. That said, it is not certain it will stay this way forever.

Therefore, I am proud to champion the Parliamentary Interest Group on Biosolutions, bringing together like-minded parliamentarians across member states and political groups. We must build political momentum for a sector that can deliver on Europe's most pressing policy priorities: economic competitiveness, strategic autonomy, the green transition, energy diversification, and food security.

The path forward is clear, and this report provides a vision of the economic opportunity for the EU to take leadership. We must prioritize biosolutions by adopting a bold and broad Biotech Act, accelerate research and development, increase commercialization, modernize our regulatory frameworks to speed up time to market, and foster collaboration that drives innovation. Most critically, we must create the right incentives to ensure the EU is the best place in the world for biosolutions to grow and thrive.

The stakes could not be higher. As global competition intensifies and environmental pressures mount, Europe cannot afford to be a spectator in the biosolutions revolution. We must be leaders, setting standards and capturing the opportunities that will define the next generation of economic green growth.

The EU has shown before what's possible when ambition meets action. Now it's time to seize the opportunity and harness the full potential of biosolutions to build a more prosperous, sustainable, and resilient future for all our citizens.

The time for biosolutions is now. The question is not whether we can afford to invest in this transformation, but whether we can afford not to.

Morten Løkkegaard,
Member of the European Parliament, Chairman of Parliamentary Interest Group on Biosolutions.





1 Introduction and executive summary

This report examines the global economic footprint of biosolutions, projecting a potential production value of more than 778 billion EUR in 2035 and the support of more than 4.5 million jobs across the industry and its value chains. These figures highlight the significant benefits of biosolutions to drive economic prosperity.

Biosolutions encompass biologically based technologies and processes that harness natural systems to deliver sustainable products and services. Examples include biofuels, microbial solutions for soil health, probiotics, yeast, biofertilizers, etc. These solutions play a pivotal role creating jobs and fostering economic growth, in supporting energy self-sufficiency, in reducing food waste and addressing food security, in promoting better health.

"The Value of Biosolutions: Growth and Prosperity to 2035 - *Europe edition*" is the first report of its kind to examine the economic footprint of biosolutions. As part of a broader series, this edition presents global data and offers a focused analysis of **Europe**, including data for **Denmark**, **France, Germany, Italy**, **Poland**, and **Spain**, as well as data for the **United Kingdom**. Future editions will explore the economic footprint and the value of biosolutions in additional countries and regions.

The analysis offers fresh perspectives on the biosolutions landscape. First, it introduces a globally applicable definition of biosolutions, addressing the lack of a standardized classification across regions and facilitating clearer dialogue and collaboration. Second, to our knowledge, it is the first report to assess the economic contribution of biosolutions on a global scale which utilizes a diverse set of reliable data sources to ensure cross-regional comparability.

The report also maps key policies and trends shaping the biosolutions industry in Europe. This perspective reveals both opportunities and challenges in scaling biosolutions in the region, and the figures are staggering. For the European Union and the United Kingdom combined, the biosolutions industry supports an estimated **production output of 66 billion EUR and 313,000 jobs.** This is similar in size to the European wind industry, which supported about 300,000 jobs in the EU27 in 2022.[1]

The report's projections suggest a potential doubling of the total production value, **reaching 133 billion EUR by 2035 and the support of approximately 620.000 jobs** across the industry and

[1] Wind Europe (2023)



its value chain. With appropriate policy actions, countries can embark on a higher growth trajectory that increases total production value by 17 billion EUR and job creation by 70,000 jobs beyond the baseline scenario, reaching nearly 149 billion EUR in total output value and supporting 690,000 jobs.



2 Definition of biosolutions and methodology

In the landscape of bioeconomy, a variety of terms such as biotechnology, biomanufacturing, industrial biotechnology, and tech-driven bioeconomy are frequently used, sometimes interchangeably, to describe innovations rooted in biological systems. While some of the terms benefit from established definitions, such as the Organisation for Economic Co-operation and Development's (OECD) definition of biotechnology[2], the absence of a universal framework for biosolutions creates significant challenges. Notably, although the term biosolutions are used widespread in certain regions, their interpretation varies, highlighting the lack of a globally accepted definition. This inconsistency has historically hampered the ability to estimate the global economic impact of biosolutions, compare contributions across countries and regions, or benchmark progress against previous reports.

To address this critical need, this report introduces a comprehensive, globally applicable definition of biosolutions. By establishing a common definition, we provide a foundation for consistent and comparable assessments of the economic significance of biosolutions worldwide. This standardized approach not only enables cross-regional comparisons but also offers a reliable framework for tracking the evolution and expansion of the biosolutions industry over time. This chapter presents the definition of biosolutions used in the report. A detailed description of the definition is presented in Appendix 1.

This chapter also outlines the methodology behind the framework used to assess the current and future economic impact and potential of biosolutions. A more detailed description of the methodology is found in Appendix 1.

2.1 Defining biosolutions

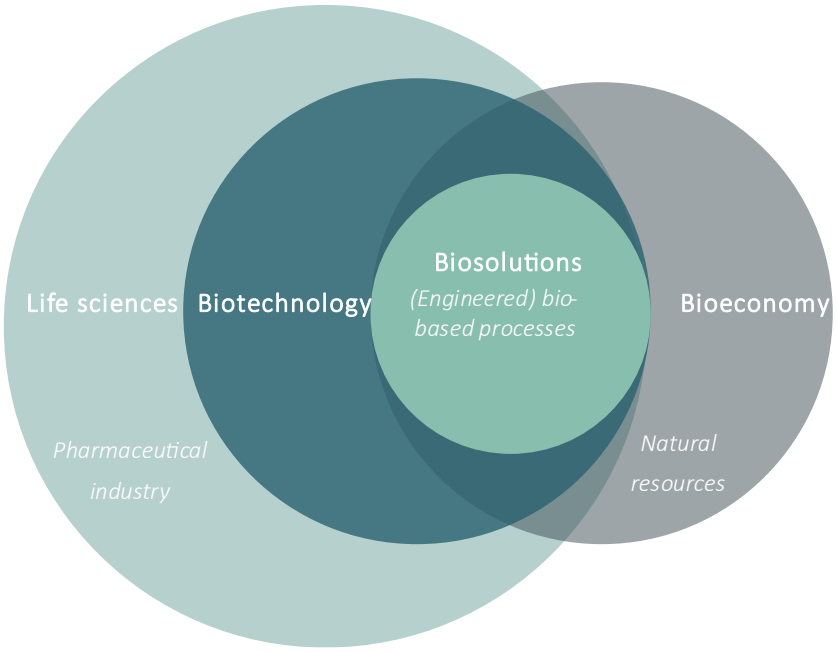
Biosolutions, as defined in this report, are biological products such as enzymes and micro-organisms, which serve as catalysts in subsequent (bio)manufacturing processes, excluding the pharmaceutical industry. This definition aligns with existing perspectives on biosolutions, however, is more narrowly defined, since the overall biosolutions definition usually includes the application and end products of the biological products. The narrower definition with focus on production is required to enable a standardized economic analysis as outlined in this report,

[2] Friedrichs, S. and B. van Beuzekom (2018), "Revised proposal for the revision of the statistical definitions of biotechnology and nanotechnology", *OECD Science, Technology and Industry Working Papers*, No. 2018/01, OECD Publishing, Paris, https://doi.org/10.1787/085e0151-en.

where economic impact and job creation is analyzed. Other reports, like Haaf and Sale (2025) use a similar approach when they analyze the economic footprint of the biotechnology industry in Europe.

An illustration of the differences between biotechnology, bioeconomy, and biosolutions according to our definition is shown in Figure 1.1. A more detailed description is presented in Appendix 1.

Figure 1.1 – Comparison of different terminology



Source: Illustration made by ADC. Note: The sizes of the circles do not represent the actual market values.

The bioeconomy leverages biological resources and processes to integrate sustainable growth, circularity, and ecosystem regeneration. In comparison, biotechnology involves technologies and processes leveraging biology to create products and services. While biosolutions are part of the bioeconomy, they overlap with biotechnology when engineered strains are used. Biotechnology, distinct from biosolutions, includes pharmaceutical applications such as the production of drug compounds from engineered yeast strains. Furthermore, bioeconomy also covers products such as biodegradable packaging produced from biomass e.g. farming waste, which do not utilize biosolutions as catalysts.

The biosolutions sector offers a dynamic array of applications that stretch across various industries. From agriculture to chemicals, food and beverages to biofuels, biosolutions are

pivotal in driving job creation, innovation and sustainability. Enzymes enhance grain processing and improve detergents, while yeast is essential in producing vitamins and brewing beer or wine. Yeast, fungi, and bacterial fermentation can provide advanced proteins, based on far less land-use than conventional proteins. These examples demonstrate the transformative power of biosolutions as key players in advancing sustainable and efficient manufacturing processes across sectors. As outlined in Table 1, these applications showcase the versatility and potential of biosolutions in shaping a sustainable future. A thorough definition of products, which are considered biosolutions, can be found in Appendix 1.

Table 1.1 - General overview of what is included in the current biosolutions definition with examples

	Agriculture	Chemicals	Food & beverages	Biofuels
Enzymes	e.g. grain processing	e.g. detergents	e.g. rennet (cheese)	e.g. bioethanol
Yeast cultures	e.g. biocontrols	e.g. vitamins	e.g. beer or wine	e.g. bioethanol
Bacterial cultures	e.g. fertilizers	e.g. amino acids	e.g. yogurt or dietary supplements	e.g. bioethanol

Source: Illustration made by ADC.

2.2 Methodology

This section describes the methodology that allows us to estimate current and future economic impact of biosolutions.

2.2.1 Economic impact

The data model is built on an economic framework that relies on two key features. First, it is production-based, meaning it evaluates the value of output generated within specific industries. Production is the stage where economic value is added, and jobs are primarily created. Second, the model incorporates economic structures that illustrate the interconnections between industries and countries through the exchange of goods and services. These structures allow the model to assess spillover effects between industries and countries and estimate indirect job creation in earlier stages of the value chain.

Finding a single database that meets both requirements—detailed production data and comprehensive economic structures—is challenging, especially on a global scale. To address this, we have integrated two credible sources into a unified model. Specifically, our model combines the production database from the United Nations Industrial Development Organization (UNIDO)[3] with product codes from the BACI (Comtrade database)[4], the economic structures and interdependencies provided by the OECD's Inter-Country Input-Output (ICIO) tables[5], and product growth rates from the Grand View Research Horizon database.[6] The ICIO tables are detailed economic datasets that map out the interconnections between industries across multiple countries. These tables extend the concept of national input-output tables, which show how the output of one industry within a single country serves as an input for another industry in the same country. In contrast, inter-country input-output tables incorporate international trade flows, revealing how industries in different countries are linked through the global economy. This approach enables a first-of-its-kind robust global analysis of biosolutions. Additionally, we have selected 19 key markets for in-depth studies, chosen to represent leading and emerging countries in the biosolutions sector, offering valuable insights

[3] INDSTAT Revision 4 Database (2025). BACI is a refined version of the Comtrade database that enhances international trade data through cleaning, harmonisation, and reconciliation of discrepancies to provide a more accurate basis for economic analysis.

[4] BACI International Trade Database (2025)

[5] OECD international IO model, Extended ICIO (2016-2020)

[6] Grand View Research Horizon database (2025)

into both established and expanding markets. For a thorough walkthrough of the model see Appendix 1.

Further, this methodology enables us to estimate total output and job creation by capturing two primary types of economic effects: direct and indirect.

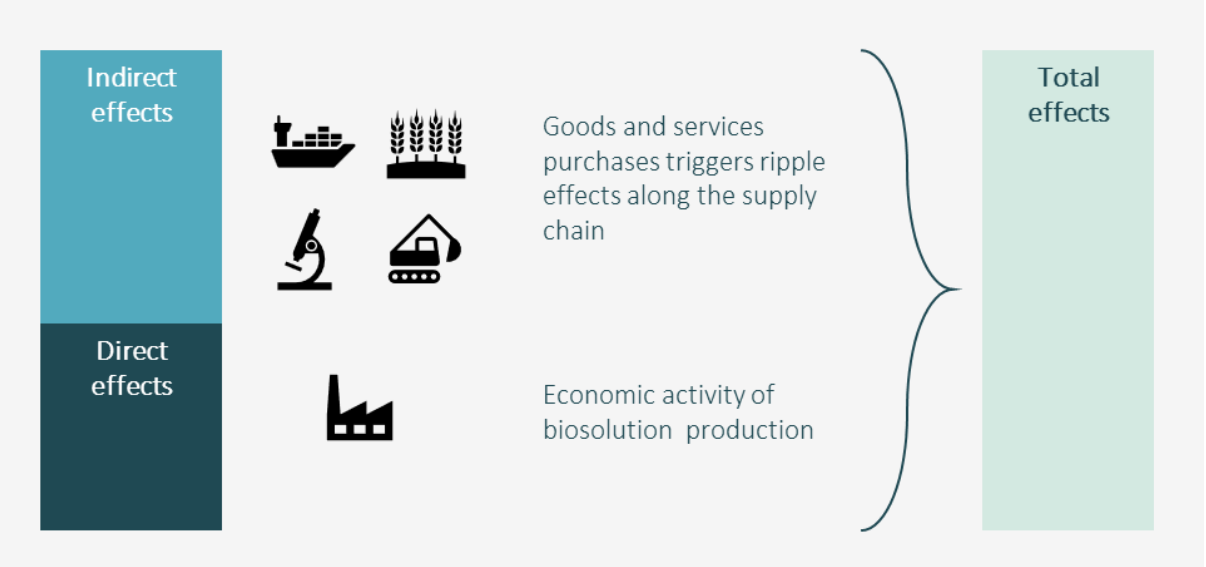
- Direct effects: The immediate economic effects directly generated by a company or industry.
- Indirect effects: When a company produces goods, it buys materials and services, boosting suppliers' business. These suppliers then buy more to meet demand, creating a ripple effect of increased jobs and economic value. This chain reaction is known as indirect effects.

In our model, direct effects refer to the immediate outcomes of producing biosolutions. For example, in the production of enzymes, jobs such as operating machinery or managing quality control are created directly by the manufacturing process. Indirect effects occur in the broader economy as a result of biosolutions production. Using the enzyme example, these might include constructing enzyme factories, producing necessary inputs like raw materials, or providing transportation and wholesale services that support the production process.

Indirect output and employment are predominantly generated in countries where: a) there is significant biosolutions production, b) the country is either geographically close to or engages in substantial trade with a country possessing a robust biosolutions industry, c) the country is integrated into the broader biosolutions value chain, often due to affordable labor and easy trade.

In addition to direct and indirect effects, ***induced effects*** are sometimes also included in input-output models. Induced effects are not included in this report, which is elaborated on in Appendix 1.

Figure 1.2 – Illustration of the economic impact of biosolutions, via direct and indirect effects



Source: Illustration made by ADC.

2.2.2 Model scenarios

To develop the scenarios for the specific markets for biosolutions, we utilized data from the Horizon Grand View Research database. This resource provides growth rates and market trends for a wide range of products across various countries and regions. We mapped these products to the production industries in various countries to facilitate the scenarios of industry production and the input-output model. Subsequently, we incorporated political discussions and trends to estimate a high growth scenario for each country. These high growth scenarios are predicated on the assumption that countries can enhance conditions and legislation for certain biosolutions products that are important in political discourse. Should a country succeed in these efforts, it will embark on a higher growth trajectory for this product (with an increase of min 2%-point), as illustrated in the high growth scenario.

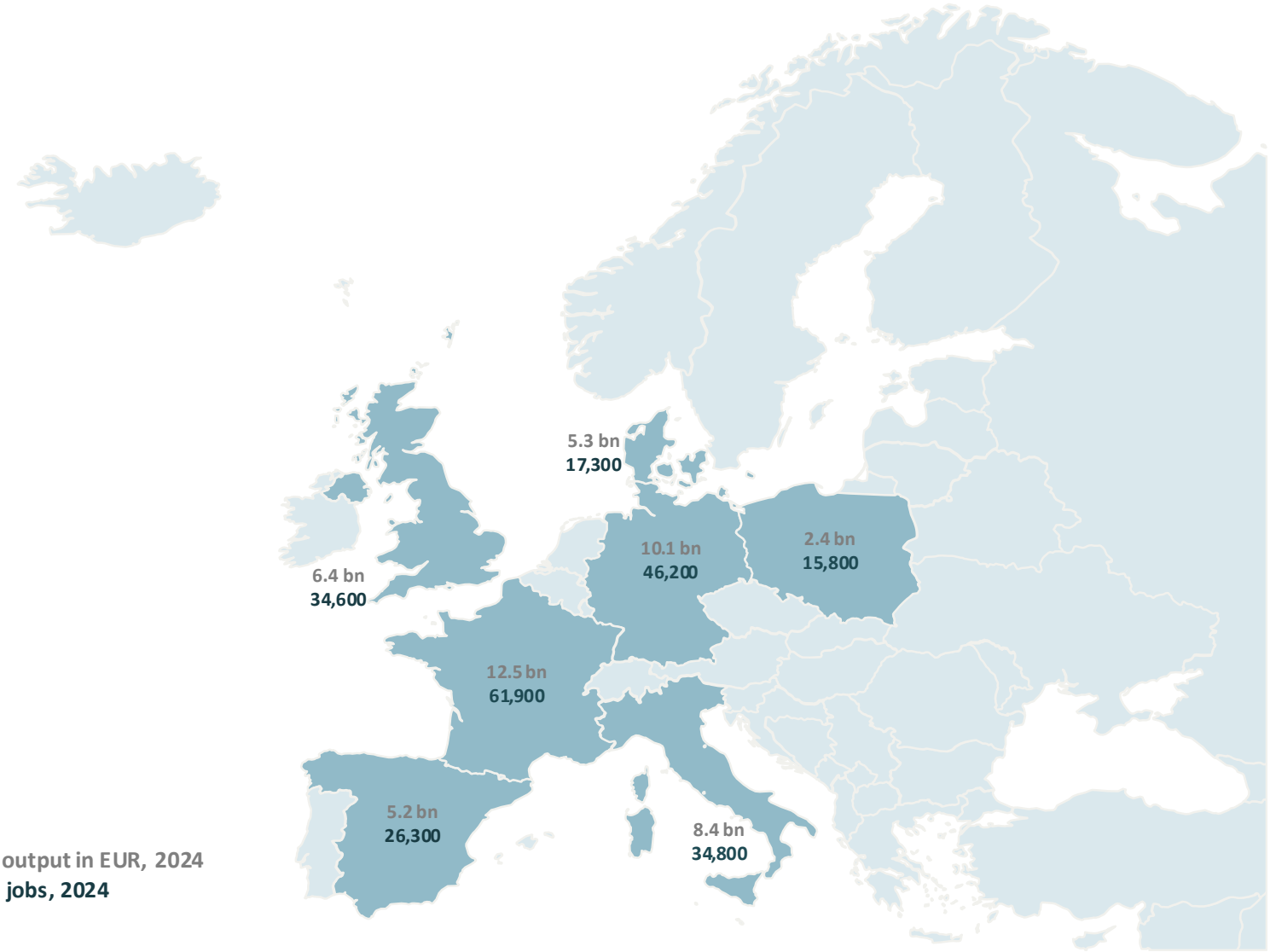
A comprehensive description of this methodology is provided in Appendix 1.



3 Economic impact and policy landscape

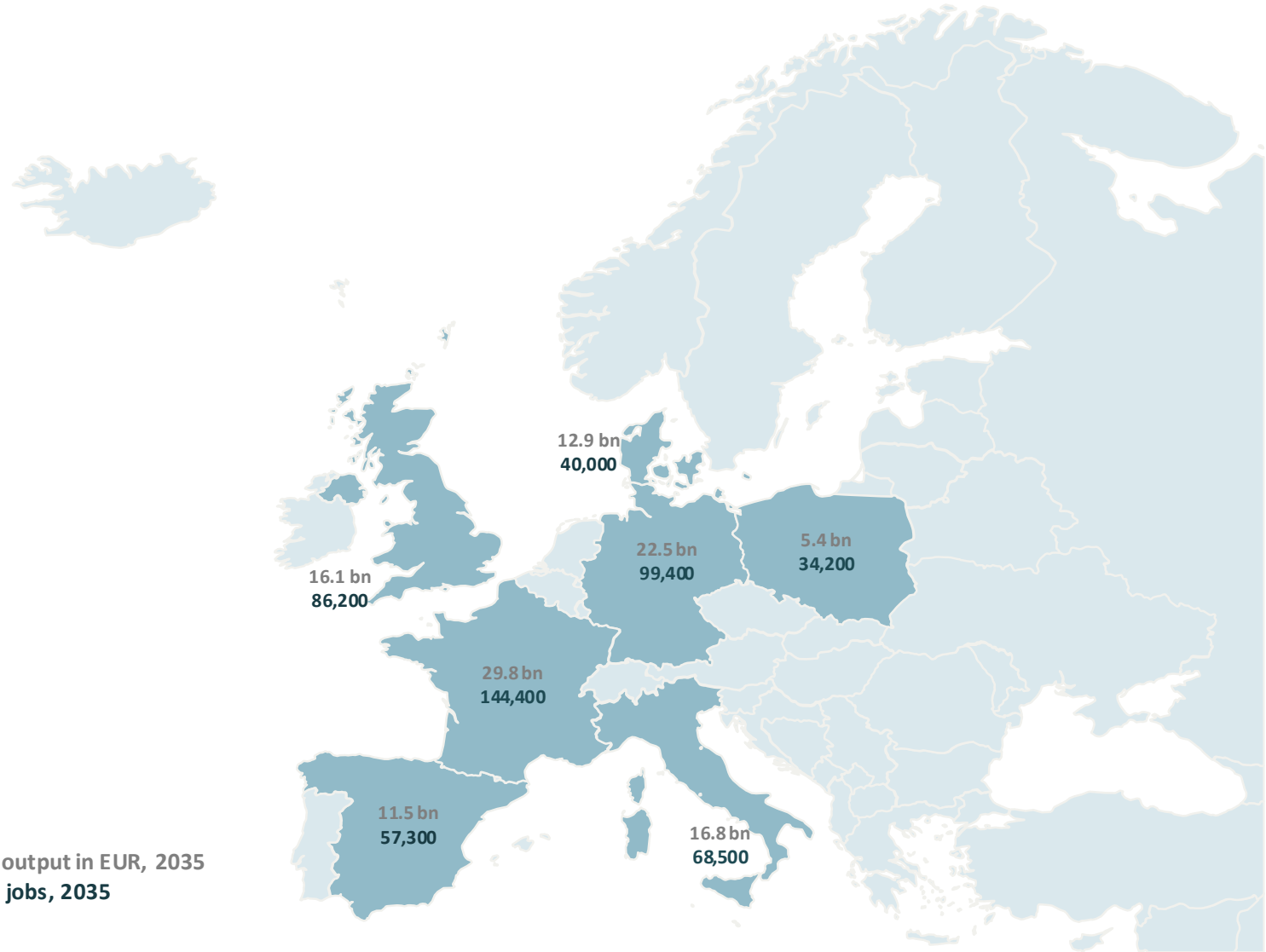
This chapter assesses the economic impact of biosolutions, exploring their current contribution to production value and job creation both globally and in the EU. The overview of the current numbers of total output value and job creation are shown in Figure 3.1.

Figure 3.1 – Direct and indirect biosolutions jobs per country, 2024



It also offers forward-looking scenarios for 2035, projecting future trends. Through this analysis, the economic potential of biosolutions to drive sustainable economic growth and employment opportunities is highlighted. The overview of the high-growth scenario, including figures for output value and job creation, is presented in Figure 3.2. This scenario is predicated on the assumption that the EU and European countries will successfully enhance policies to support the biosolutions industries.

Figure 3.2 – Direct and indirect biosolutions jobs per country, 2035



Note: The values shown on the map are from high-growth scenarios and conditioned on the right policy adjustments to enhance the market growth.



Alongside the economic assessment, the chapter explores the policy landscape, identifying key challenges and opportunities. To fully realize the potential of biosolutions and address these challenges, the chapter outlines targeted, actionable steps for policymakers tailored to each regional market.

Based on the economic trends and policy landscape, two scenarios for 2035 are presented: a baseline scenario assuming no actions are taken, and a high-growth scenario reflecting the outcomes of implementing these steps to foster a supportive ecosystem for biosolutions.

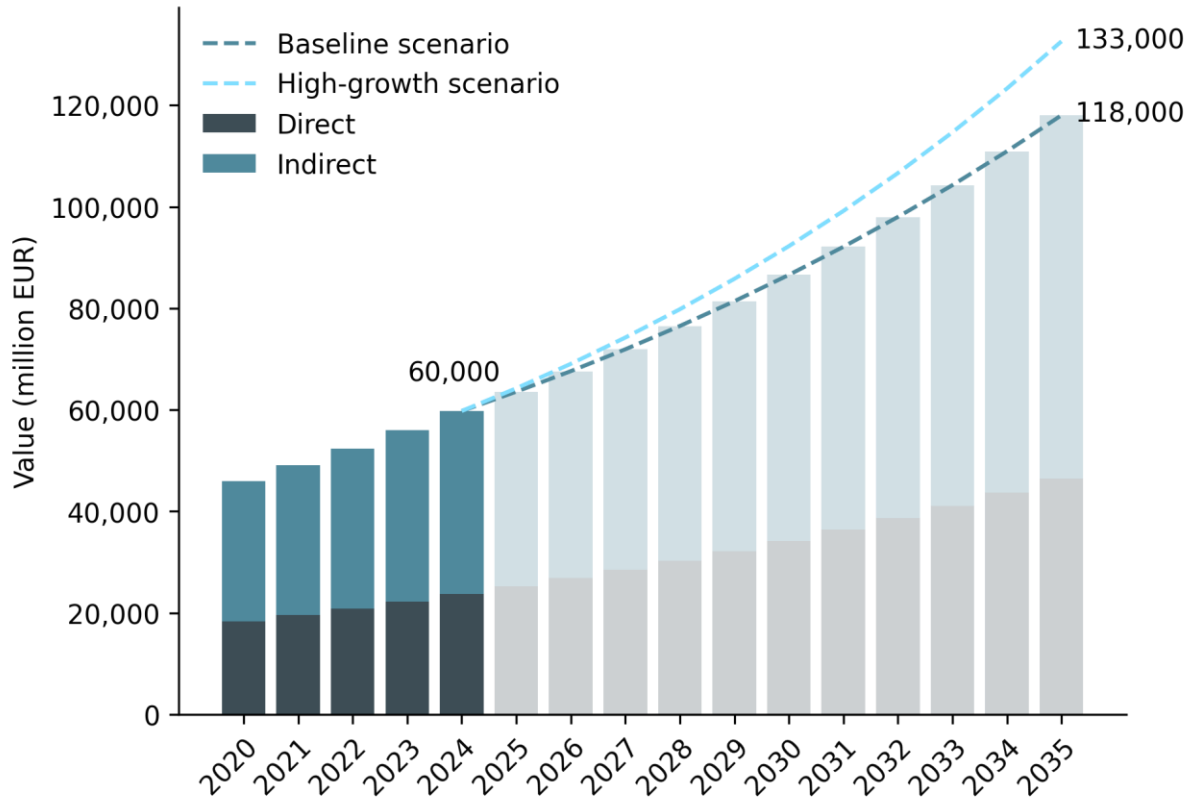
3.1 The European Union

3.1.1 EU – Economic footprint

The EU economic footprint of biosolutions production is approximately **60 billion EUR in output value**. This includes almost **24 billion EUR as the direct output value**, and **36 billion EUR as the indirect value** created by other industries in the value chain.

By 2035, the EU economic footprint of the biosolutions sector is expected to **reach 118 billion EUR.** In a **high growth scenario, where the right policies are put in place, production could reach 133 billion EUR**. Of this, more than 46 billion EUR will be direct output value from the biosolutions industry.

Figure 3.2 - EU economic footprint of biosolutions production: current and projected output



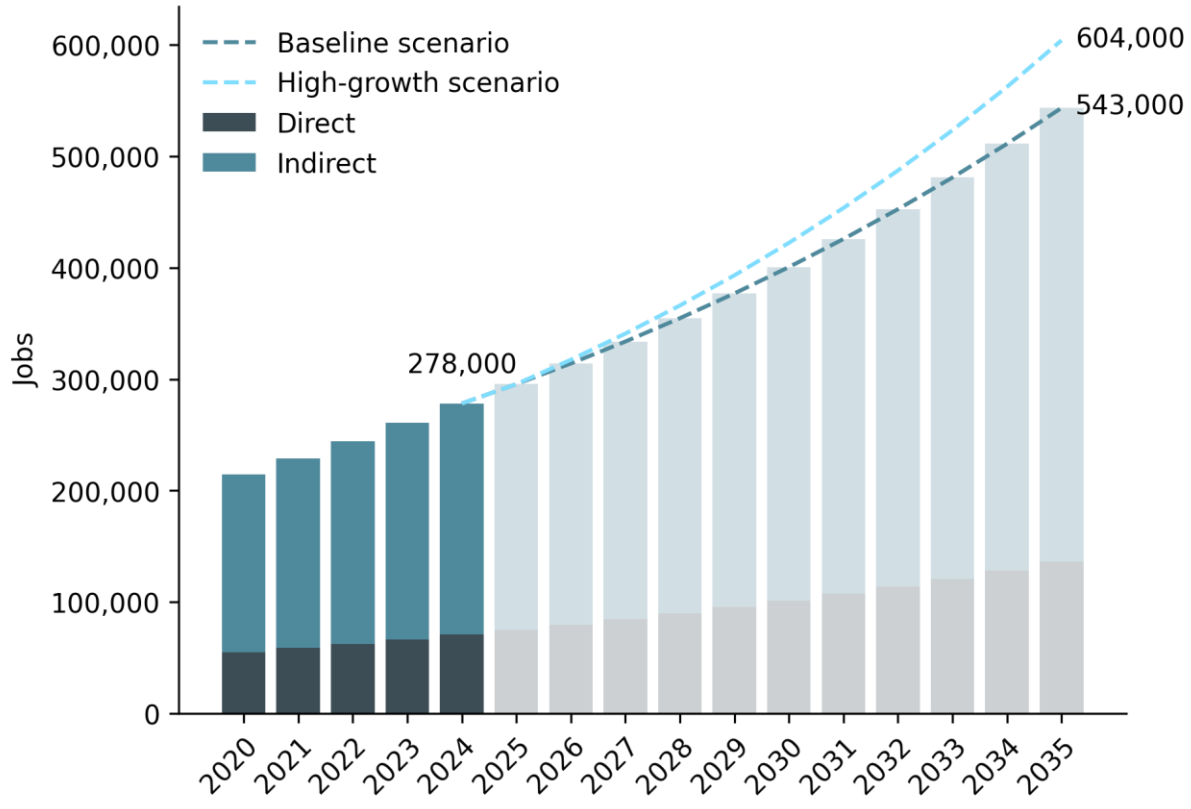
As of today, the biosolutions sector is expected to create **approximately 278,000 jobs** in total. Of these, nearly **71,000 are direct jobs** and **207,000 are indirect jobs** created in the value chain. These indirect jobs encompass roles such as providing inputs for production, servicing production facilities, transporting products worldwide, and constructing new factories. **This**

means that for every job, which is created in the European biosolutions industry, an additional 2.9 indirect jobs are created in the EU.

These employment figures are comparable to those of the wind industry in Europe, which in 2022 supported just under 300,000 jobs.

Looking ahead, the biosolutions sector's contribution to employment is expected to grow significantly: by 2035, **total job creation in the EU could reach 543,000, including around 136,300 direct jobs.** In a high-growth scenario, supported by targeted policy measures, total employment in the sector could **rise to 604,000 jobs by 2035**.

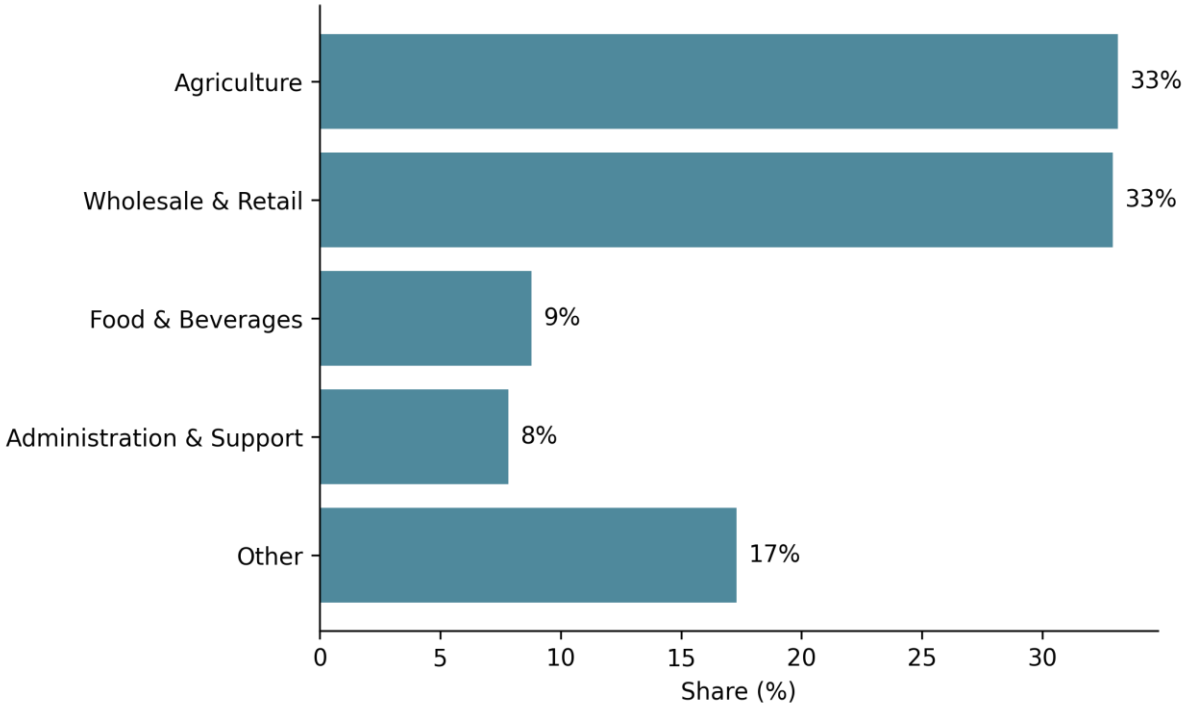
Figure 3.3 – EU employment in the biosolutions sector: current and projected



Modernizing legislation and improving business conditions for a few key biosolutions products could substantially increase the market value, **potentially reaching 133 billion EUR** by 2035. Achieving this would result in **a return on actions exceeding almost 15 billion EUR,** provided these actions improve business conditions, thereby enabling the biosolutions industry to attain higher growth. Reaching this elevated growth trajectory is expected to **create an additional 60,000 jobs** compared to the baseline scenario.

The EU biosolutions industry not only contributes directly to the economy but also generates substantial indirect employment across a range of sectors. When production takes place within the biosolutions industry, **33% of the resulting indirect jobs are found in the wholesale and retail sector**, highlighting the critical role of distribution and sales. Another **33% are in the agricultural sector**, underscoring the industry's strong link to farming and cultivation. **The Food & Beverages sector accounts for 9% of these jobs**, while **Administration and support** – including roles such as facility cleaning, security, warehouse support, and administrative assistance - **represent 8%.** The remaining 17% are spread across a variety of other industries, collectively grouped under 'Other'. This distribution reflects the broad and diverse economic footprint of the biosolutions industry within the EU.

Figure 3.4 – Sectoral distribution of indirect employment from biosolutions production



3.1.2 EU – Biosolutions policy landscape

Securing clean growth and competitiveness is a top priority for the EU.[7] The European Commission has recognized the biotechnology sector as a strategically important means to achieve the EU's strategic autonomy and resilience.[8] This recognition is reflected in policy plans such as the European Green Deal and the Clean Industrial Deal.

Currently, topics of interest to the biosolutions sector that are being discussed by the EU include:

1. The EU's bioeconomy strategy from 2018.[9]
2. The implementation of the Vision for Agriculture and Food, in which the EU envisions faster approval times for biocontrols.[10]
3. The EU Biotech Act.[11]
4. The execution of the Clean Industrial Deal, which includes the roll-out of carbon capture and storage projects to help reach the net zero target.[12]

Despite these encouraging EU policy milestones and ambitions, challenges remain, particularly with regards to a fast market access to innovation and the regulatory pathway for biosolutions. These challenges include bureaucratic hurdles, as well as lengthy and complex approval processes, and the (mis)classification of biosolutions. Biosolutions are often inaccurately placed within outdated chemical regulatory frameworks, rather than having dedicated pathways that accommodate their unique properties. The EU could benefit from looking to other countries, such as Brazil, which has implemented the Bioinputs regulation specifically for agricultural biosolutions. [13]

[7] European Commission (2024a).

[8] European Commission (2024b).

[9] The European Commission (2018)

[10] The European Commission (2025a) and The European Commission (2025b)

[11] European Commission (2024c)

[12] European Commission (2025c)

[13] Kasznar Leonardos (2024)

Furthermore, start-ups and Small and Medium-sized Enterprises (SMEs) struggle to secure funding for scaling up and for the infrastructure they need to expand their biosolutions production.[14]

Overall, it could be argued that the EU policy framework is not fit-for-purpose, as it slows down access to the market, has a disproportionate focus on risks and fails to keep up with the fast pace of innovation in the biosolutions sector.

The table below highlights some of the concrete sectoral challenges and opportunities at the policy level.

	Challenges	Opportunities
Industry 	Despite acknowledging biotechnology is a strategic sector, the EU is yet to fully prioritize biosolutions with a dedicated policy and within 'all relevant policies'. Enzymes are classified as "substances of concern", even though they are biodegradable and different from conventional chemicals in terms of safety, exposure, and environmental footprint. This (mis)classification creates spillover effects across EU legislation. Lack of infrastructure (e.g. fermentation tanks) that can potentially support start-ups and SMEs to be able to scale up their innovations and reach the market faster.	The EU Biotech Act has the potential to cover more than just pharmaceutical biotech and also cater for biosolutions specifically; potentially ensuring regulatory pathways cater for biosolutions' specificities and their innovative and sustainable components; removing biosolutions from the chemical pathway. In addition, the Act could ensure investment in infrastructure to support start-ups and SMEs as well as in creating a fair playing field between biosolutions and conventional solutions. New and revised EU legislation, could exempt biosolutions, such as enzymes, from the list of substances of concern,

[14] The European Biosolutions Coalition (2024a).

	Challenges	Opportunities
	Persistent incentives to conventional solutions undermining a fair playing field with new and more sustainable ones. The current EU policy framework is not fit-for-purpose to cater for innovations such as New Genomic Techniques (NGTs).	considering their true characteristics and benefits. New legislative proposal on plants produced by certain New Genomic Techniques (NGTs) is currently on the table, with an opportunity to improve businesses' access to the latest innovative technologies such as Clustered regularly interspaced short palindromic repeats (CRISPR).
Energy 	Limited policy support incentivizing sustainable biofuel uptake.	Biofuels can contribute to energy diversification mix, energy self-sufficiency, and CO2 reduction.
Climate 	Lower appetite for adopting/implementing climate regulation.	Biosolutions can contribute to reducing carbon footprint and the EU Biotech Act can be a vehicle to prioritize it. Roll-out of carbon capture and Storage projects are expected across the EU, of which enzymatic carbon capture can be part of.
Agriculture 	Regulatory approvals of biopesticides are lengthy in the EU, therefore delaying timely market access.	Expected policy proposal for revising the regulatory pathway and securing a fast-track system for biopesticides in the EU.

	Challenges	Opportunities
Food & Health 	A potential risk to classify food cultures for fermentation (e.g. bacteria and yeast) as additives, and subject to the EU Food Additives Regulation. This would mean bacteria and yeast would no longer be regarded as normal food ingredients but instead would require pre-market approval. The approval time is slow for novel foods.	The EU could become a fertile ground for food innovation that can help transform food systems, e.g. by ensuring that food cultures remain classified and labelled as normal food ingredients, by providing guidance in the pre-submission phase, and by shortening approval timelines.

To fully unlock the economic potential and put the EU biosolutions industry in a higher growth trajectory, the following policy recommendations could be actioned:

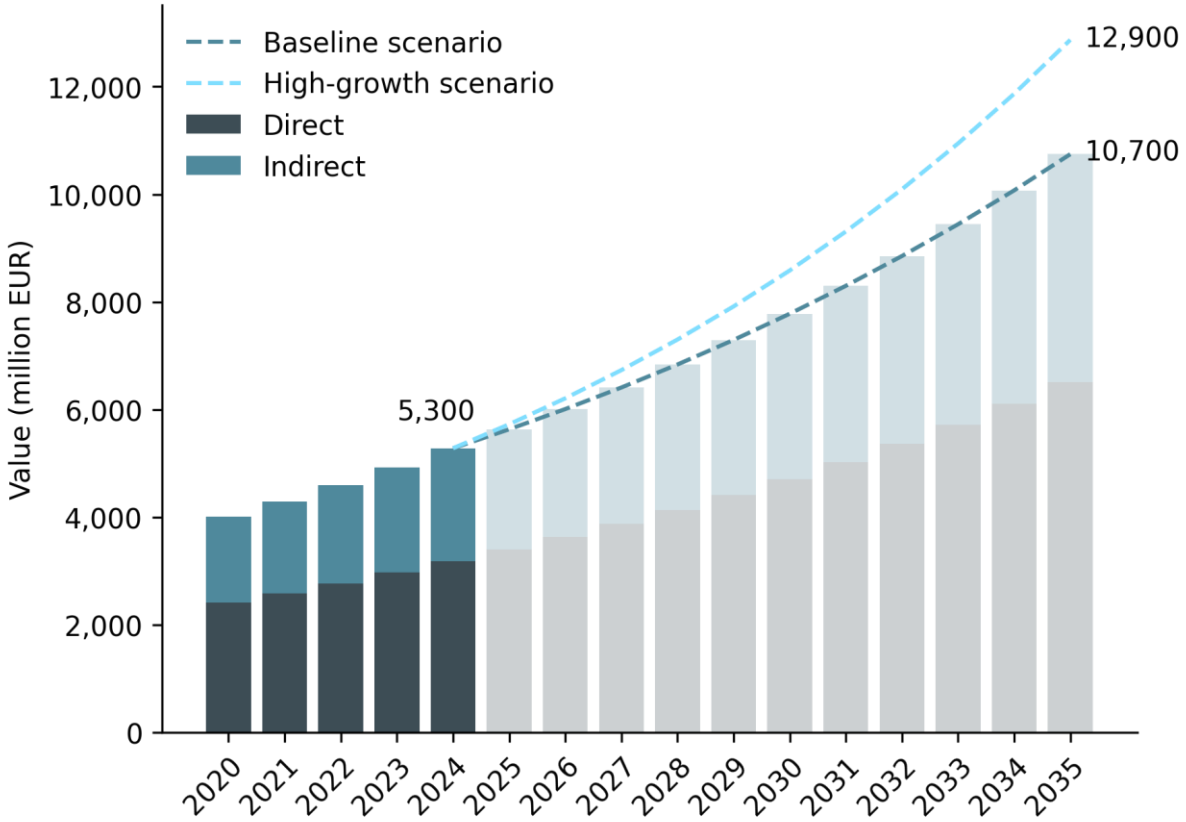
1. Adopt the EU Biotech Act, with specific provisions to cater for biosolutions and dedicated resources to secure execution.
2. Foster public-private partnerships to scale-up infrastructure capacity for biosolutions production in the EU, which will support SMEs and start-ups.
3. Modernize regulatory pathways for biosolutions in the EU that can cater to the specificities of biosolutions:
    a. Streamline regulatory approval processes and create fast-track pathways, especially for biopesticides and novel food products.
    b. Use a risk-based approach that is proportionate with the safety profile of biosolutions.
    c. Adopt a product-oriented approach to regulating biosolutions.
    d. Make a clear distinction between food cultures and chemical additives.
    e. Exempt biosolutions from requirements that do not consider their true characteristics and benefits but are designed for conventional chemicals.
4. Raise awareness of the value and the potential of biosolutions to achieve job creation, energy self-sufficiency, food security, amongst others.

3.2 Denmark

The Danish output value of biosolutions is currently estimated at **5.3 billion EUR.** Of these, **3.2 billion are direct output value** from the production of biosolutions products, while **2.1 billion EUR are indirect output value** created in the value chain across all industries in Denmark.

The Danish economic footprint of biosolutions is **expected to grow to between 10.7 billion and 12.9 billion EUR by 2035**, depending on the growth scenario. Of this, approximately 6.5 billion EUR is the direct output value in the biosolutions industry in the country.

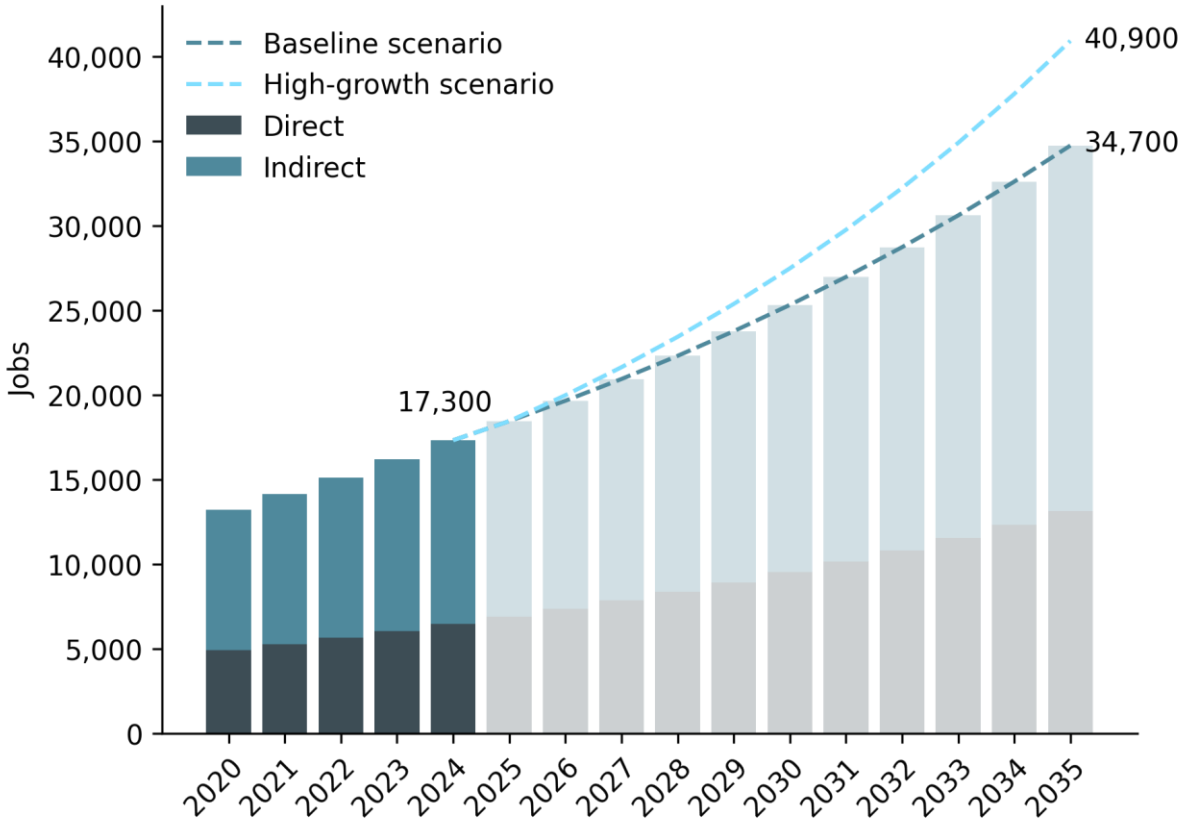
Figure 3.5 – Danish economic footprint of biosolutions production: current and projected output



In terms of job creation, as of today, the biosolutions sector is estimated to be responsible for **approximately 17,000 jobs**. Of these, **6,500 were direct jobs** involved in the production of biosolutions products, while **10,800 were indirect jobs** created in the value chain. These indirect jobs encompass roles such as providing inputs for production, servicing production facilities, transporting products, and constructing new factories. This means that for every job within the Danish biosolutions industry, **an additional 1.7 indirect jobs are created in the country**, which is lower than the global average of 2.4 indirect jobs per direct job. The lower ratio in Denmark indicates that Denmark has a substantial biosolutions production and thereby direct jobs in

Denmark, whereas many of the indirect jobs in the value chain are established in other countries. This aligns with the typical trend observed in Europe, where northern countries such as Denmark and the United Kingdom tend to have fewer indirect jobs per direct job compared to the European average.

Figure 3.6 – Danish employment in the biosolutions sector: current and projected

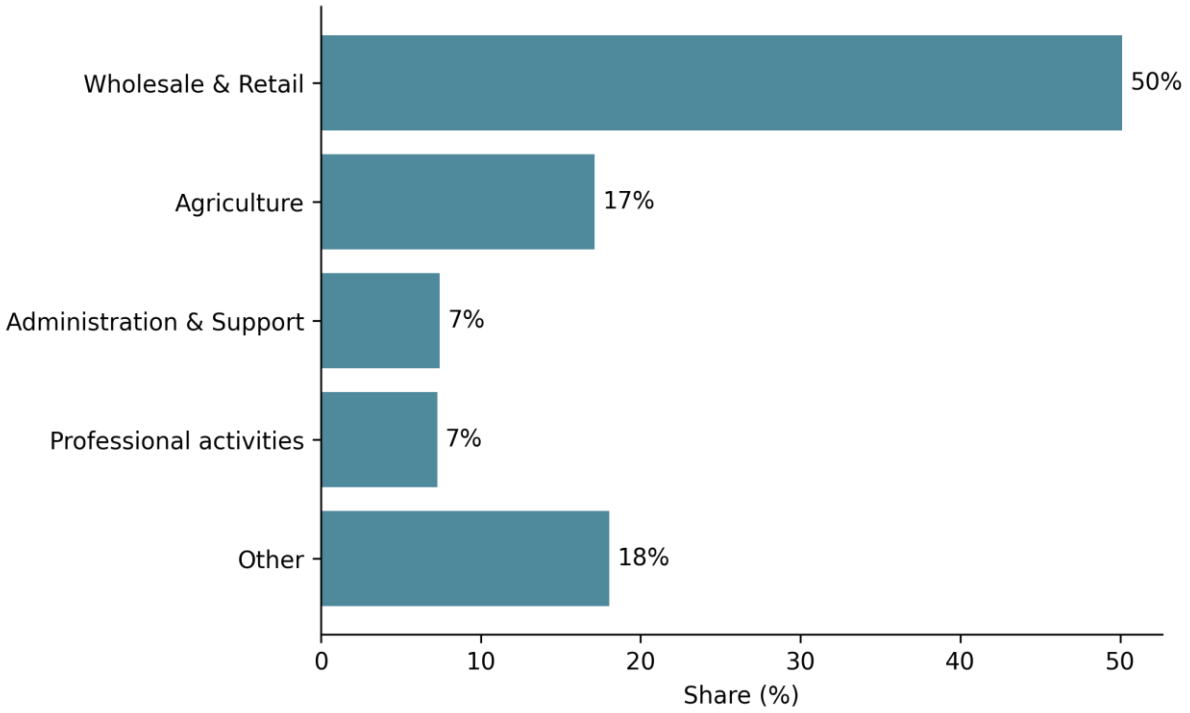


Both the direct and the indirect jobs in Denmark are expected to increase by 2035, with a **combined 34,700 jobs in 2035**. Of these, **approximately 13,000 are direct jobs**.

Modernizing legislation and improving framework conditions for a few key biosolutions products could support a stronger market growth trajectory: by 2035, **the biosolutions sector is estimated to reach a value of 12.9 billion EUR in total market output value**. These efforts could generate **more than 2 billion EUR in additional output value** for Denmark, assuming the improved conditions allow the biosolutions industry to grow further. This higher trajectory is also expected to create **an additional 6,200 jobs** in 2035 beyond the baseline scenario.

The production of biosolutions globally leads to the creation of indirect jobs across various Danish industries. When production of indirect output occurs in Denmark, **50% of these jobs are generated in the wholesale and retail sector**, followed by **17% in agriculture**. **Administration and support accounts for 7%** of indirect jobs**. Professional activities also account for 7%.** The remaining 18% are distributed across other industries.

Figure 3.7 - Sectoral distribution of indirect employment from biosolutions production

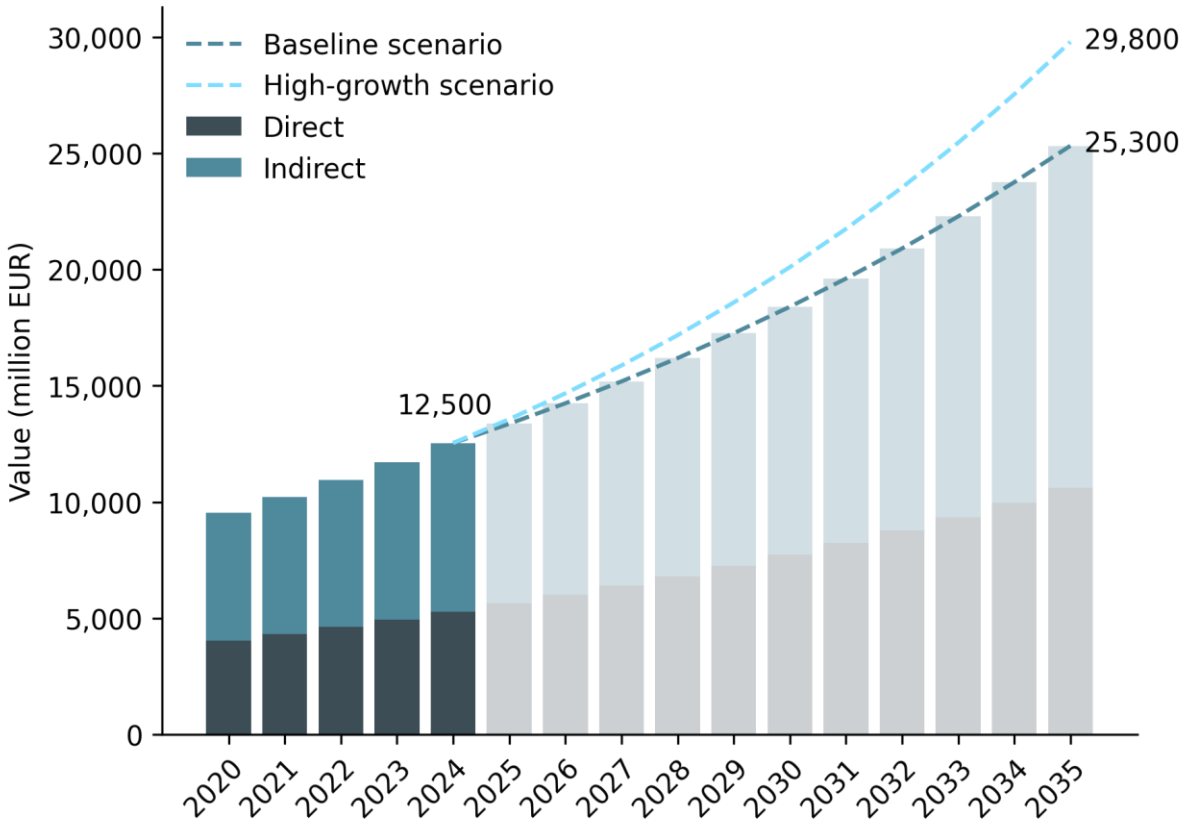


3.3 France

As of today, the total value of the biosolutions sector in France is estimated at **12.5 billion EUR.** Of these, **5.3 billion EUR was direct output value** from the production of biosolutions products, while **7.2 billion EUR was indirect output value** created in the value chain across all industries in France.

The French economic footprint of production of biosolutions is **expected to grow to between 25.3 and 29.8 billion EUR towards 2035**, depending on the growth scenario, which is impacted by the policy actions implemented. Of this, approximately 10.6 billion EUR is the direct output value in the biosolutions industry in the country.

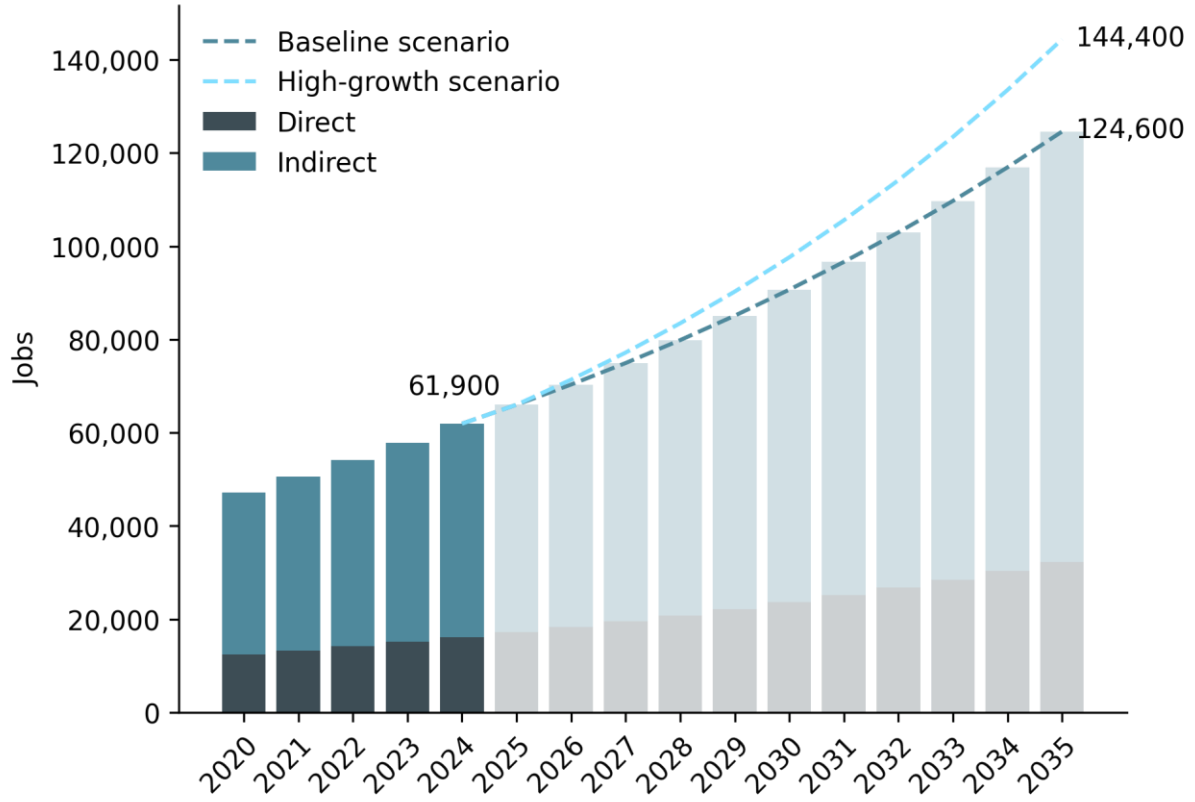
Figure 3.8 – French economic footprint of biosolutions production: current and projected output



In **terms of jobs, approximately 62,000 jobs** are associated as of today with biosolutions production and its value chain in France (i.e. direct and indirect jobs). Of these, **16,200 were direct jobs** involved in the production of biosolutions products, while **45,700 were indirect jobs** created in the value chain. These indirect jobs encompass roles such as providing inputs for production, servicing production facilities, transporting products, and constructing new

factories. This means that for every job within the French biosolutions industry, **an additional 2.8 indirect jobs are created in the country**.

Figure 3.9 – French employment in the biosolutions sector: current and projected

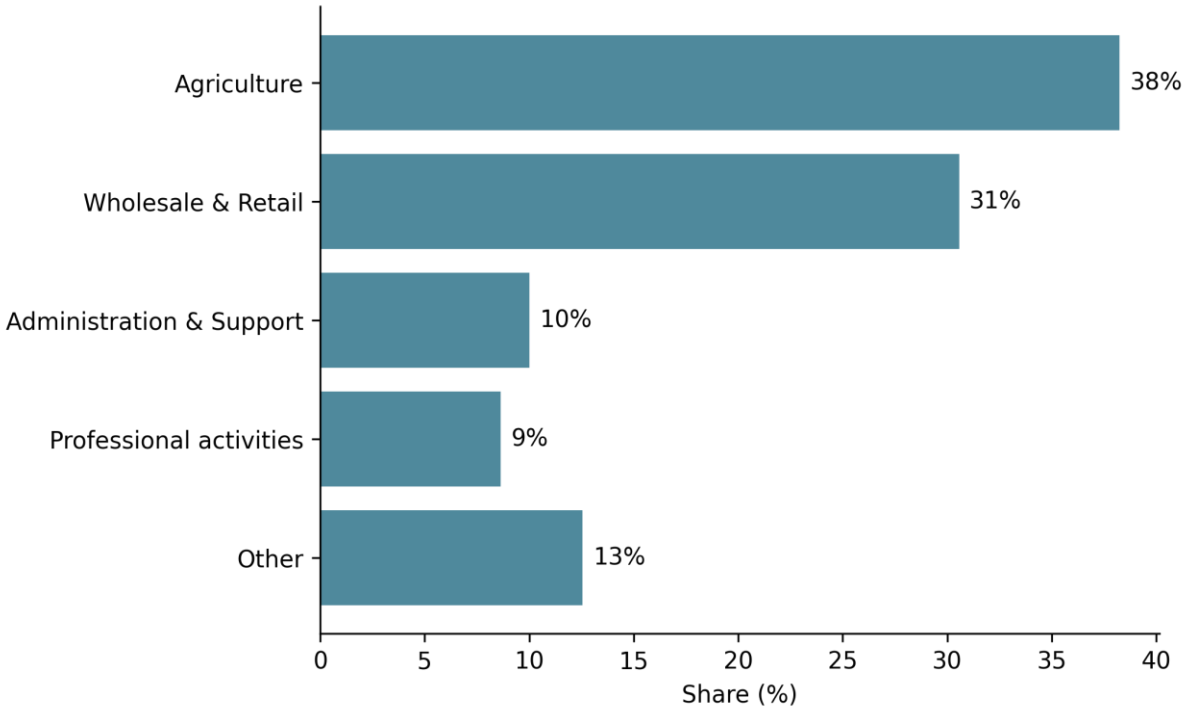


Both the direct and the indirect jobs in France are expected to increase towards 2035, with a **combined 124,600 jobs in 2035**. Of this, **approximately 32,000 are direct jobs**.

Refining legislation and improving business conditions for a few key biosolutions products could support a stronger market growth trajectory, **with a potential to reach a value of nearly 30 billion EUR in total market output value by 2035**. These efforts could deliver a return on actions of **approximately 4.5 billion EUR in increased output value** for France, provided the enhanced conditions enable the biosolutions industry to achieve greater growth. This higher trajectory is also expected to create **nearly 20,000 jobs** in 2035 beyond the baseline scenario.

The production of biosolutions globally leads to the creation of indirect jobs across various French industries. When production of indirect output occurs in France, **38% of these jobs are generated in the agricultural sector**, followed by **31% in the wholesale and retail sector. The Administration and support for 10%** of indirect jobs, while the **professional activities contribute 10%.** The remaining 13% is distributed across other industries.

Figure 3.10 - Sectoral distribution of indirect employment from biosolutions production

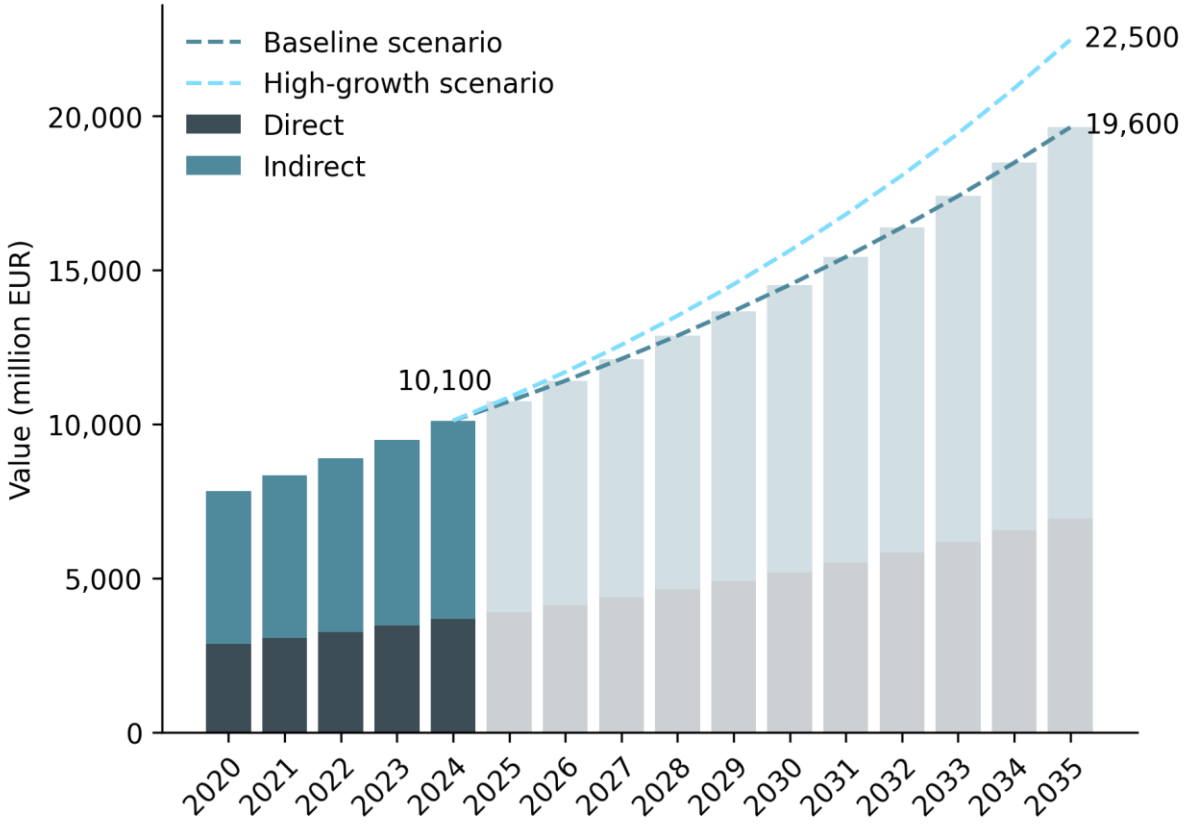


3.4 Germany

As of today, the German value of the biosolutions sector is estimated at more than **10.1 billion EUR.** Of these, **3.7 billion EUR is direct output value** from the production of biosolutions products, and **6.4 billion EUR is indirect output value** created in the value chain across all industries in Germany.

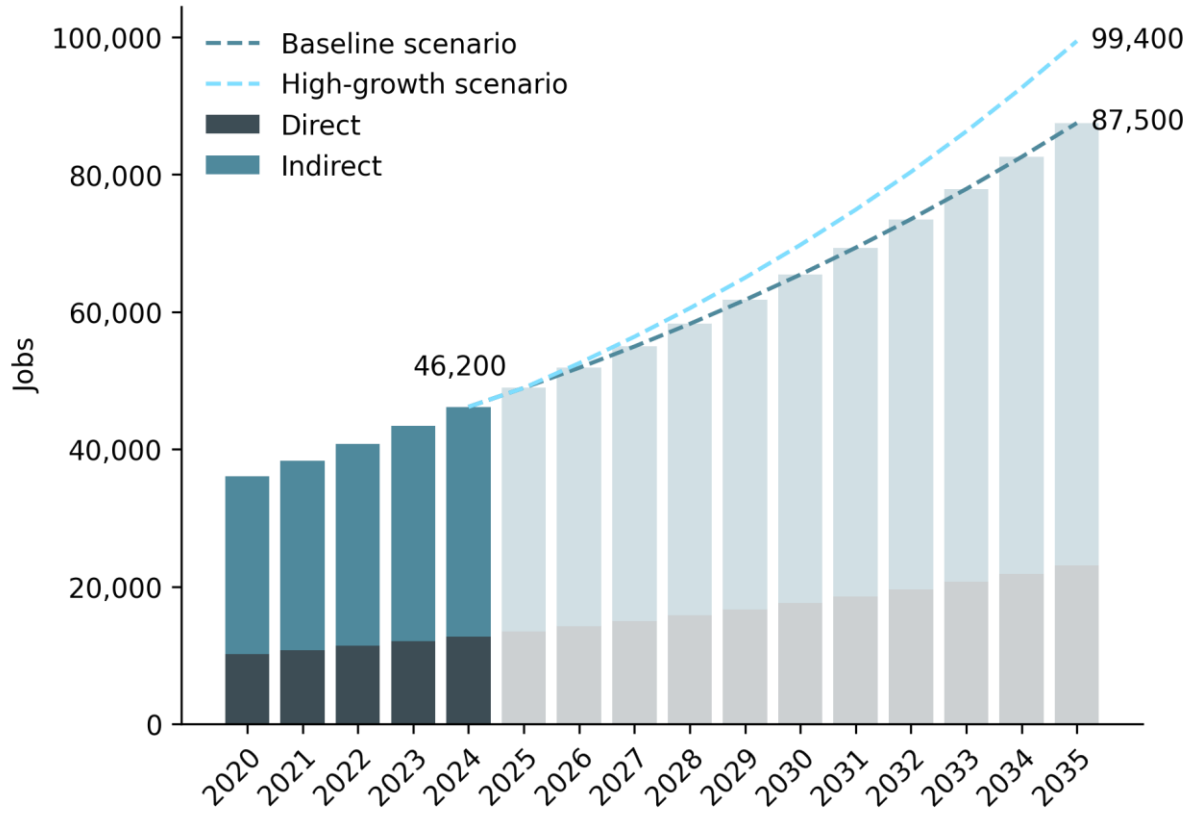
The German economic footprint of production of biosolutions is **expected to grow to between 19.6 and 22.5 billion EUR towards 2035**, depending on the growth scenario. Of this, approximately 7 billion EUR is the direct output value in the biosolutions industry in the country.

Figure 3.11 - German economic footprint of biosolutions production: current and projected output



In terms of job creation, **approximately 46,000 jobs** were associated with the biosolutions sector in Germany. Of these, **12,800 were direct jobs** involved in the production of biosolutions products, while **33,400 were indirect jobs** created in the value chain. These indirect jobs encompass roles such as providing inputs for production, servicing production facilities, transporting products, and constructing new factories. This means that for every job within the German biosolutions industry, **an additional 2.6 indirect jobs are created in the country**.

Figure 3.12 – German employment in the biosolutions sector: current and projected

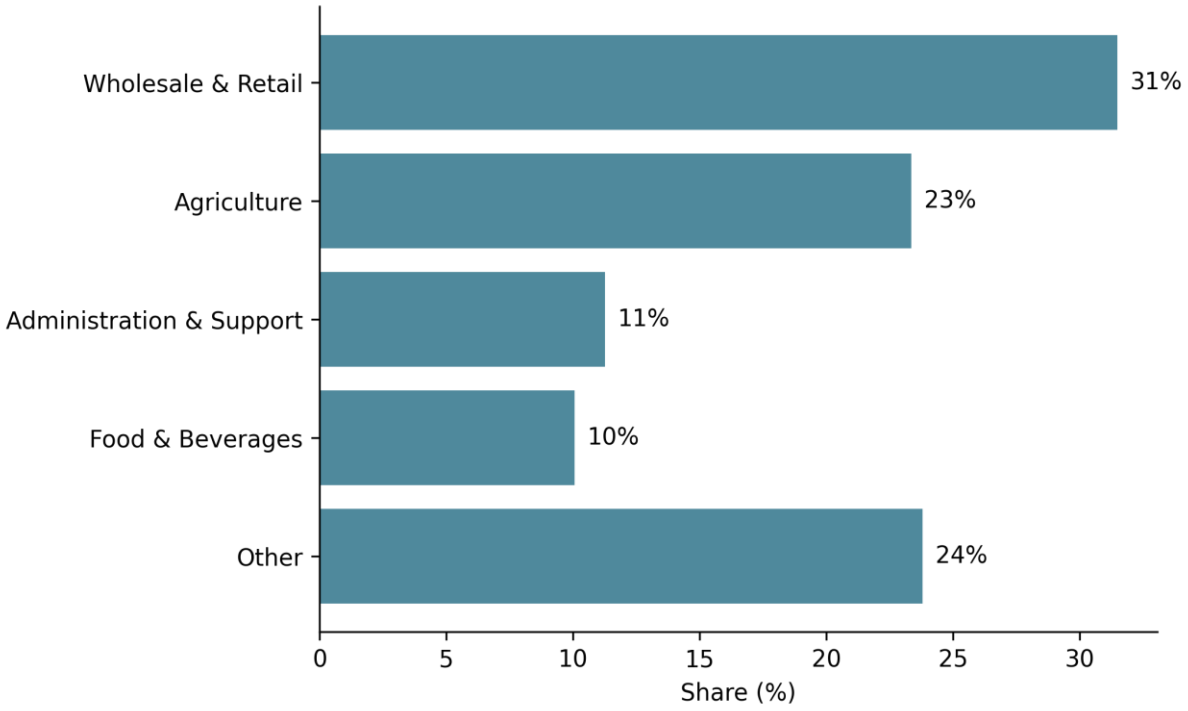


Both the direct and the indirect jobs in Germany are expected to increase by 2035, with a **combined 87,500 jobs in 2035**. Of these, **approximately 23,000 are direct jobs**.

Modernizing legislation and ensuring ideal framework conditions for a few key biosolutions products could support a stronger market growth trajectory, **with potential to reach a value of approximately 22.5 billion EUR in total market output value by 2035**. These efforts could deliver a return on actions of nearly **3 billion EUR in increased output value** for Germany, provided the enhanced conditions enable the biosolutions industry to achieve greater growth. This higher trajectory is also expected to generate **nearly 12,000 jobs** in 2035 beyond the baseline scenario.

The production of biosolutions globally leads to the creation of indirect jobs across various German industries. When production of indirect output occurs in Germany, **31% of these jobs are generated in the wholesale and retail sector**. **Agriculture accounts for 23% of these jobs**. **Administration and support represent 11%,** while **the Food & Beverages sector contributes 19%.** The remaining 24% of indirect jobs are spread across a range of other industries.

Figure 3.13 - Sectoral distribution of indirect employment from biosolutions production

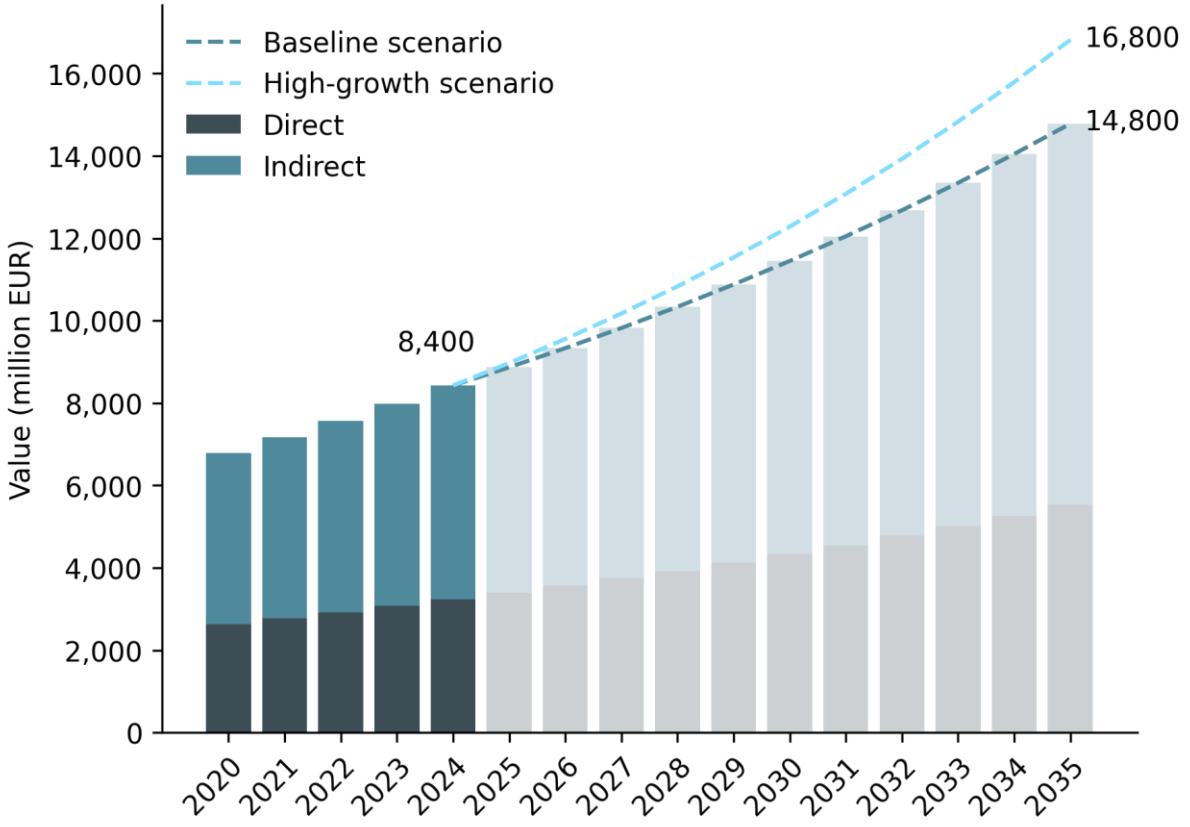


3.5 Italy

As of today, the Italian value of the biosolutions sector is estimated at **8.4 billion EUR.** Of these, **3.2 billion EUR is direct output value** from the production of biosolutions products, and **5.2 billion EUR is indirect output value** created in the value chain across all industries in Italy.

The Italian economic footprint of production of biosolutions is **expected to grow to between 14.8 and 16.8 billion EUR towards 2035**, depending on the growth scenario. Of this, approximately 5.5 billion EUR is the direct output value in the biosolutions industry in the country.

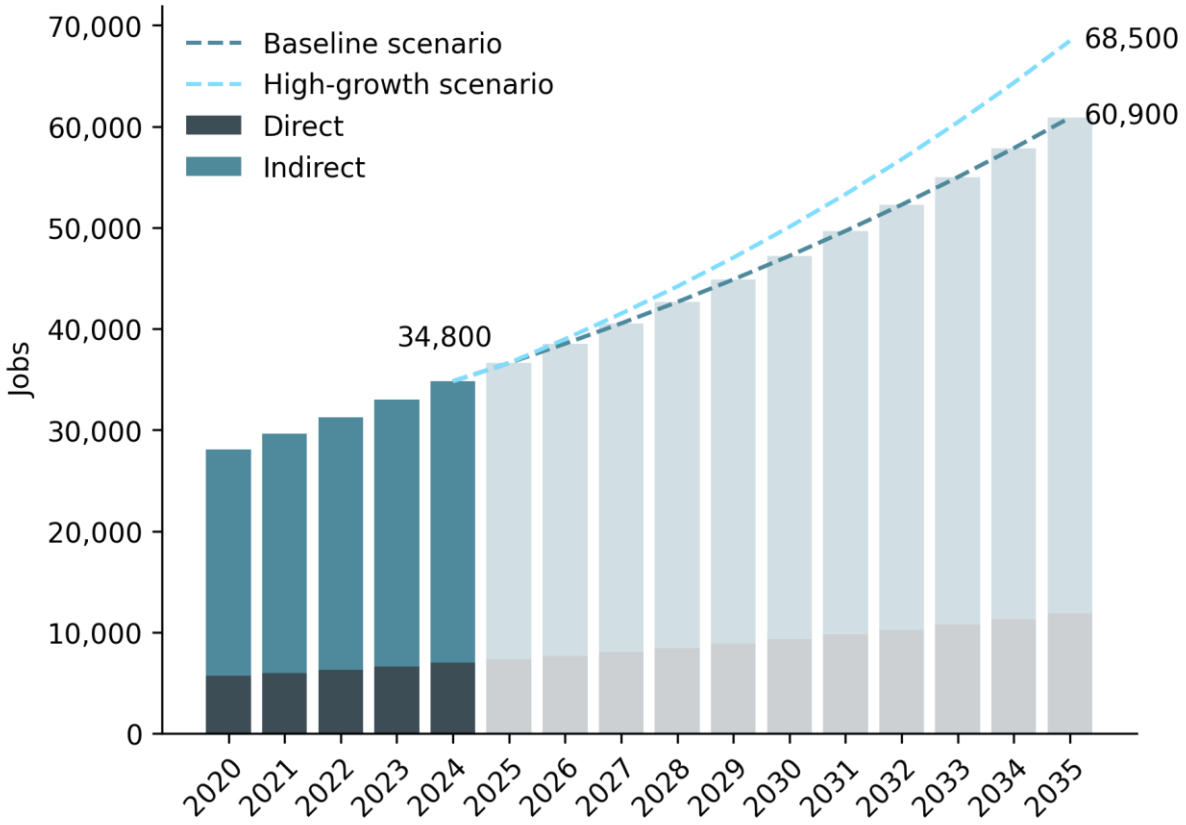
Figure 3.14 – Italian economic footprint of biosolutions production: current and projected output



In terms of job creation, **approximately 35,000 jobs** were associated with the biosolutions sector in Italy. Of these, **7,000 were direct jobs** involved in the production of biosolutions products, while **nearly 28,000 were indirect jobs** created in the value chain. These indirect jobs encompass roles such as providing inputs for production, servicing production facilities, transporting products, and constructing new factories. This means that for every job within the Italian biosolutions industry, **an additional 4 indirect jobs are created in the country.** This aligns

with the typical trend observed in Europe, where southern countries such as Italy and Spain tend to have more indirect jobs per direct job compared to the European average.

Figure 3.15 - Italian employment in the biosolutions sector: current and projected

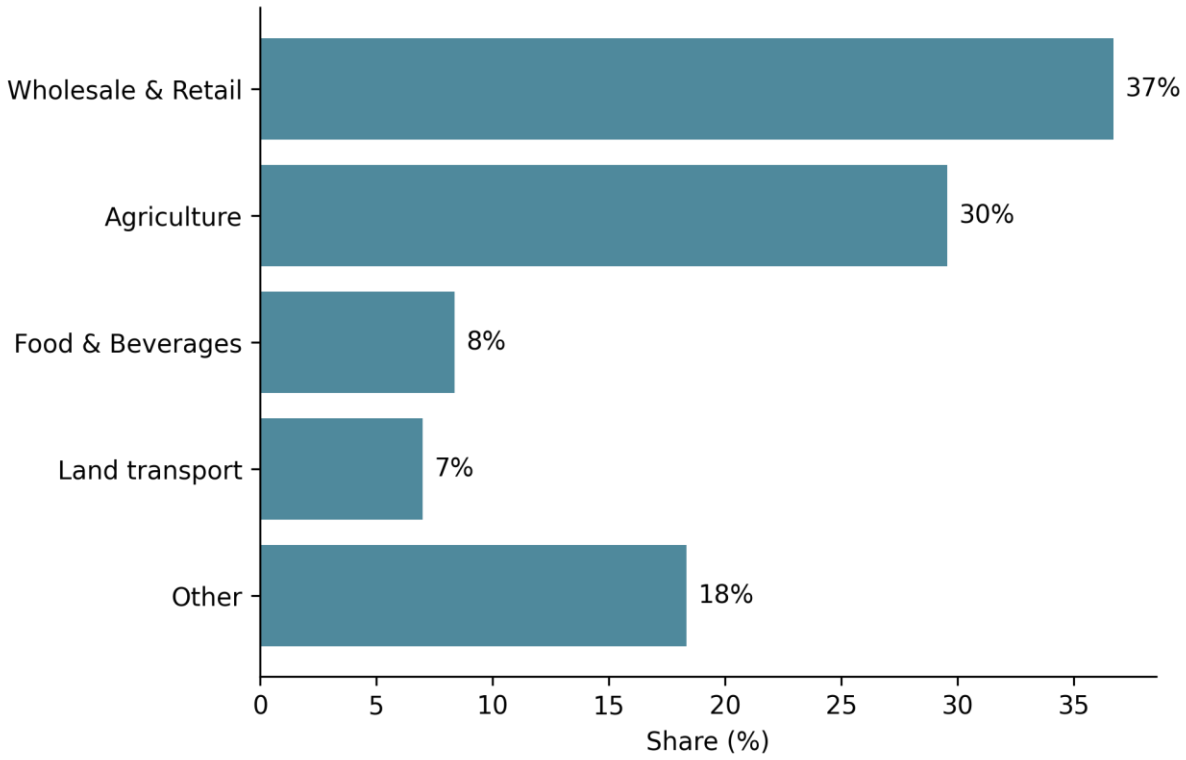


Both the direct and the indirect jobs in Italy are expected to increase towards 2035, with a **combined 60.900 jobs in 2035**. Of this, **approximately 12,000 are direct jobs**.

Modernizing legislation and ensuring ideal framework conditions for a few key biosolutions products could support a stronger market growth trajectory, **with potential to reach a value of 16.8 billion EUR in total market output value by 2035**. These efforts could deliver a return on actions of **approximately 2 billion EUR in increased output value** for Italy, provided the enhanced conditions enable the biosolutions industry to achieve greater growth. This higher trajectory is also expected to create **an additional 7,600 jobs** in 2035 beyond the baseline scenario.

The production of biosolutions globally leads to the creation of indirect jobs across various Italian industries. When production of indirect output occurs in Italy, **37% of these jobs are generated in the wholesale and retail sector**, followed by **30% in the agriculture sector. The food and beverages sector accounts for 8%** of indirect jobs, while the **land transport sector contributes 7%.** The remaining 18% are distributed across other industries.

Figure 3.16 - Sectoral distribution of indirect employment from biosolutions production

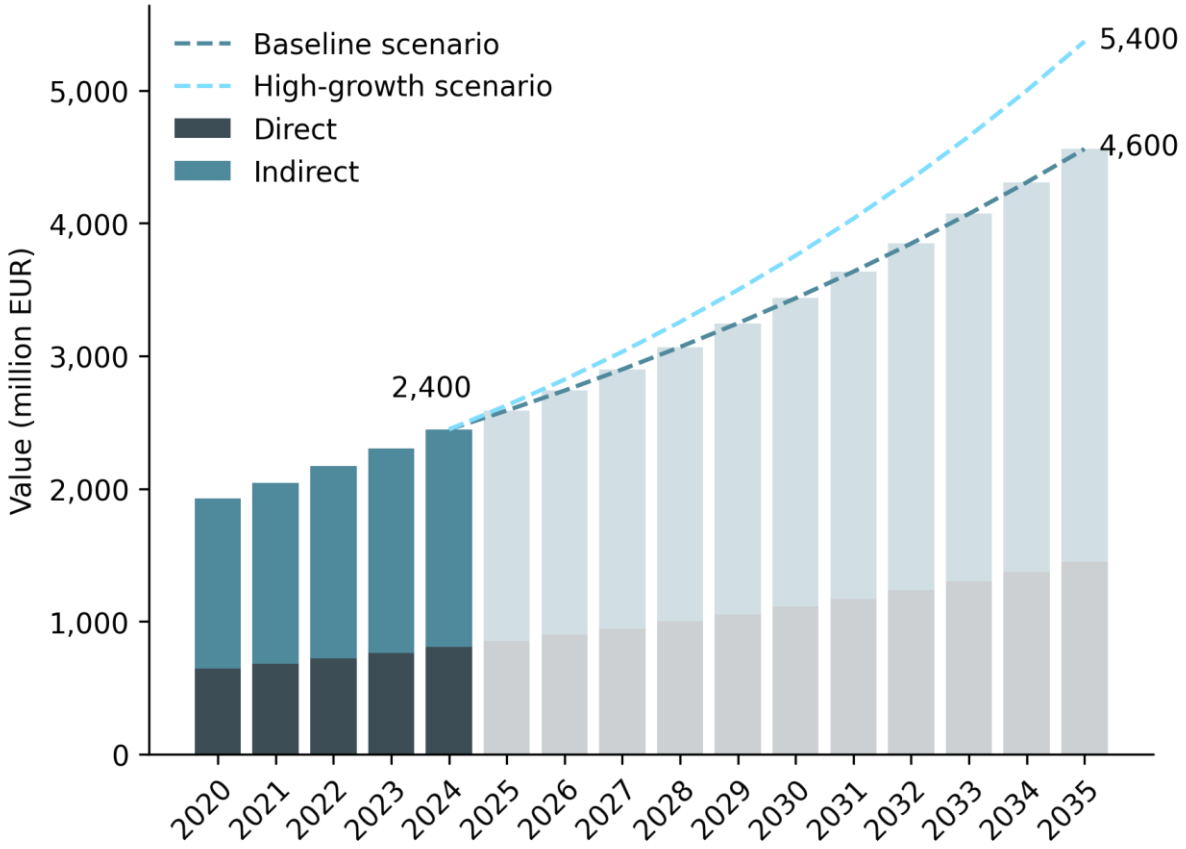


3.6 Poland

As of today, the Polish value of the biosolutions sector is estimated at **2.4 billion EUR.** Of these, **0.8 billion EUR is direct output value** from the production of biosolutions products, and **1.6 billion EUR is indirect output value** created in the value chain across all industries in Poland.

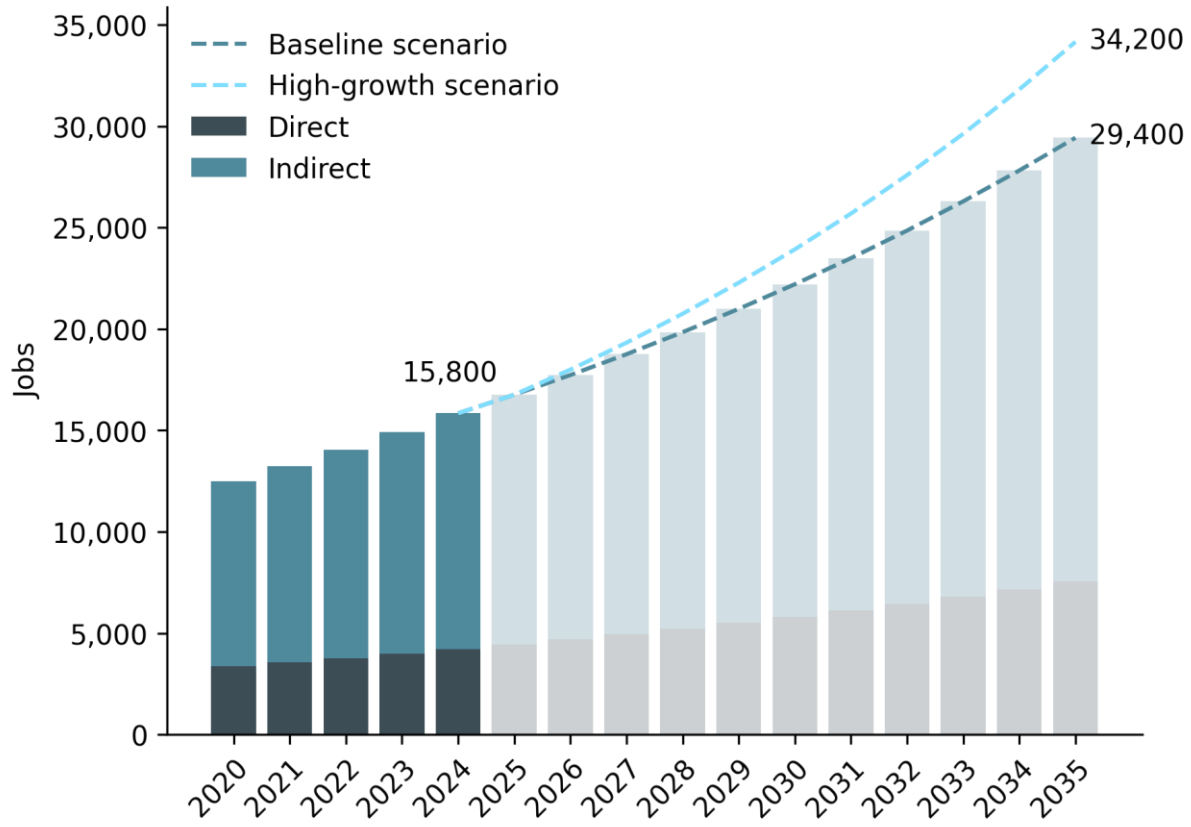
The Polish economic footprint of production of biosolutions is **expected to grow to between 4.6 and 5.4 billion EUR towards 2035**, depending on the growth scenario. Of this, approximately 1.4 billion EUR is the direct output value in the biosolutions industry in the country.

Figure 3.17 – Polish economic footprint of biosolutions production: current and projected output



In terms of job creation**, approximately 15,800 jobs** were associated with the biosolutions sector in Poland**.** Of these, **4,200 were direct jobs** involved in the production of biosolutions products, while **11,600 were indirect jobs** created in the value chain. These indirect jobs encompass roles such as providing inputs for production, servicing production facilities, transporting products, and constructing new factories. This means that for every job within the Polish biosolutions industry, **an additional 2.8 indirect jobs are created in the country**.

Figure 3.18 – Polish employment in the biosolutions sector: current and projected

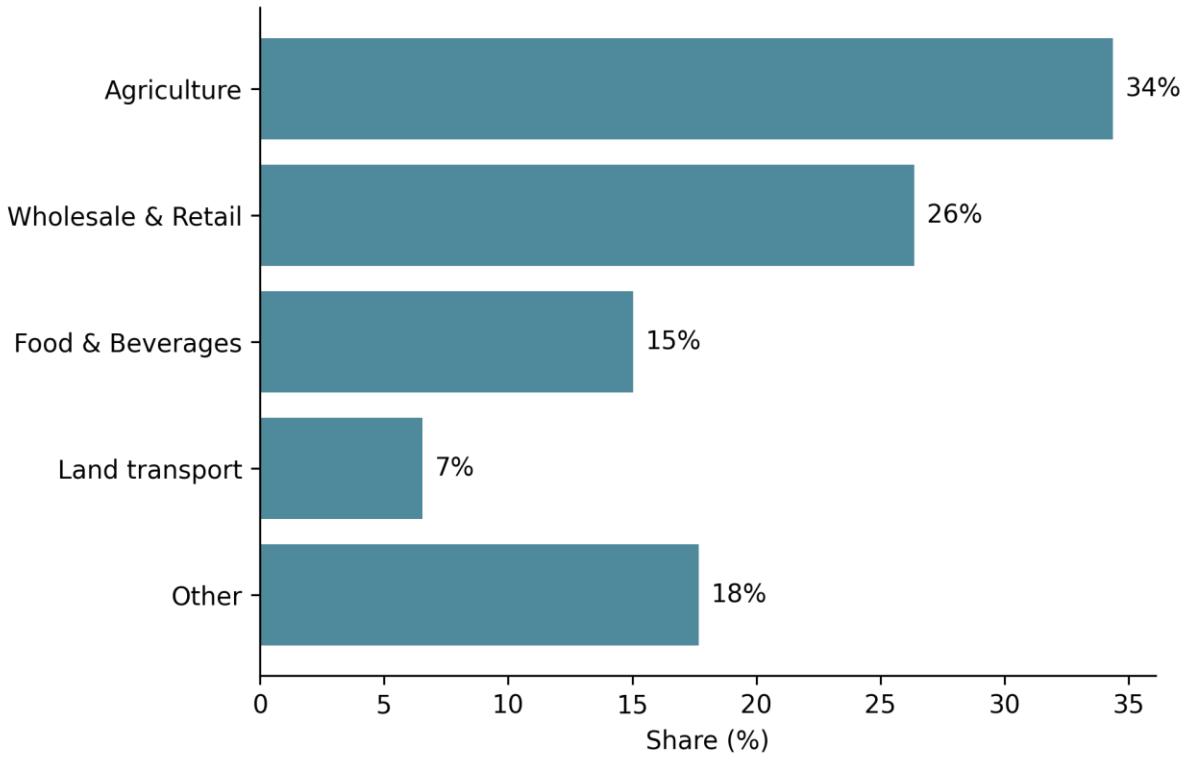


Both the direct and the indirect jobs in Poland are expected to increase towards 2035, with a **combined 29,400 jobs in 2035**. Of this, **approximately 7,600 are direct jobs**.

Modernizing legislation and ensuring ideal framework conditions for a few key biosolutions products could support a stronger market growth trajectory, **with potential to reach a value of 5.4 billion EUR in total market output value by 2035**. These efforts could deliver a return on actions of **approximately 0.8 billion EUR in increased output value** for Poland, provided the enhanced conditions enable the biosolutions industry to achieve greater growth. This higher trajectory is also expected to create **an additional 4,800 jobs** in 2035 beyond the baseline scenario.

The production of biosolutions globally leads to the creation of indirect jobs across various Polish industries. When production of indirect output occurs in Poland, **34% of these jobs are generated in the agriculture sector,** followed by **26% in the wholesale and retail sector. The food and beverages sector accounts for 15%** of indirect jobs, while the **land transport** accounts for **7%.** The remaining 18% are distributed across other industries.

Figure 3.19 - Sectoral distribution of indirect employment from biosolutions production

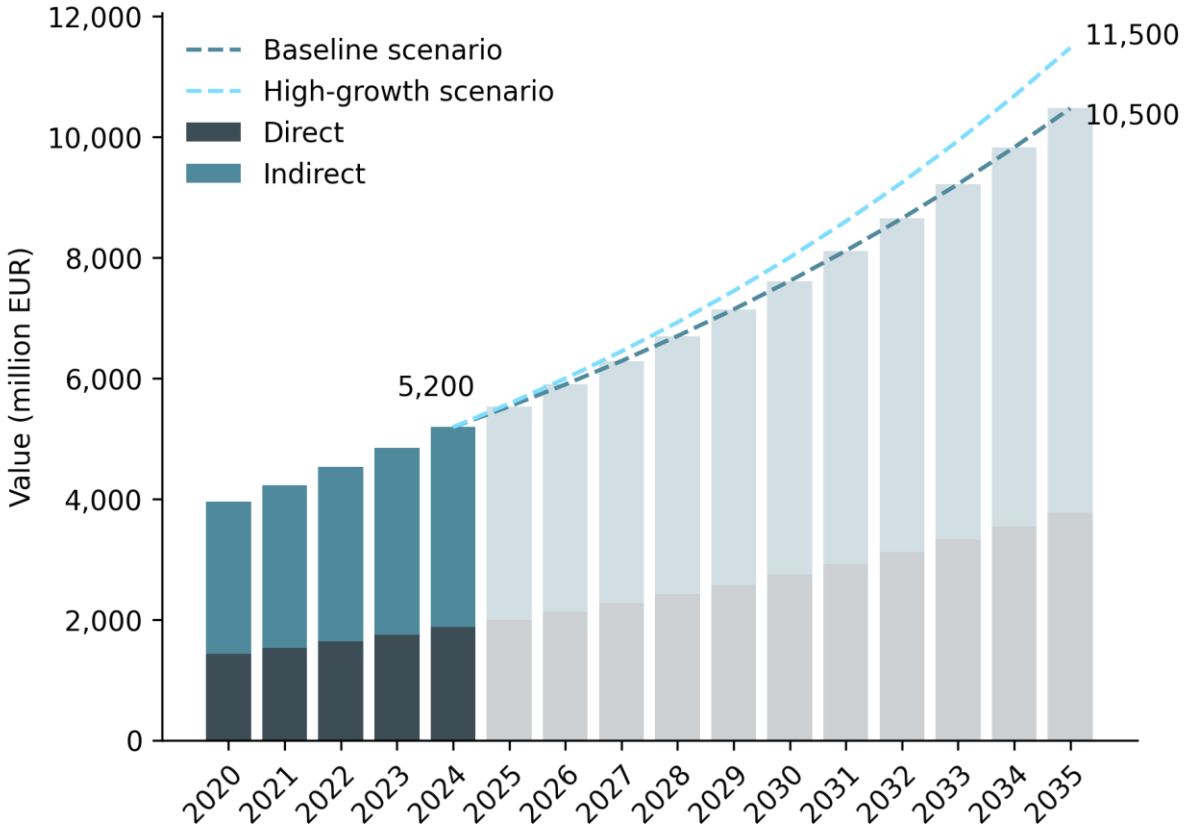


3.7 Spain

As of today, the Spanish value of the biosolutions sector is estimated at **5.2 billion EUR.** Of these, **1.9 billion EUR is direct output value** from the production of biosolutions products, and **3.3 billion EUR is indirect output value** created in the value chain across all industries in Spain.

The Spanish economic footprint of production of biosolutions is **expected to grow to between 10.5 and 11.5 billion EUR by 2035**, depending on the growth scenario. Of this, approximately 3.8 billion EUR is the direct output value in the biosolutions industry in the country.

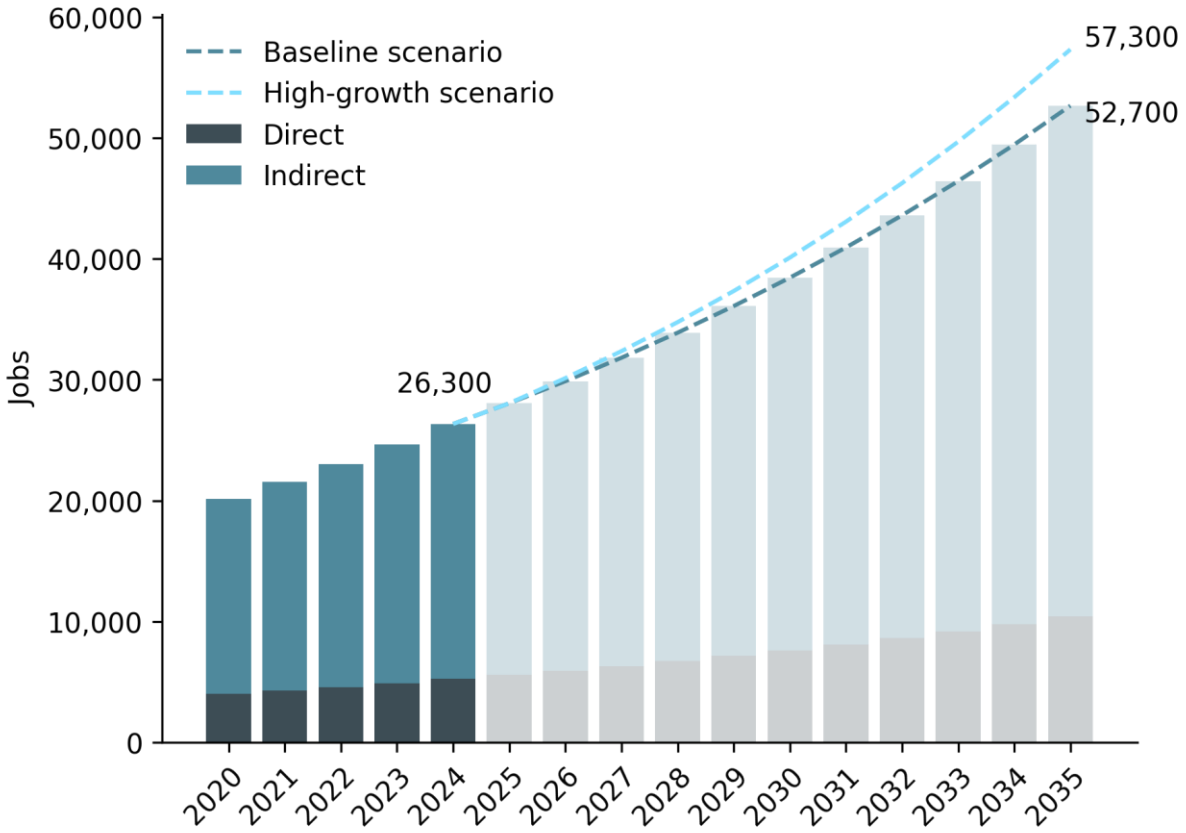
Figure 3.20 – Spanish economic footprint of biosolutions production: current and projected output



In terms of job creation**, approximately 26,300 jobs** were associated with the biosolutions sector in Spain. Of these, **5,200 were direct jobs** involved in the production of biosolutions products, while **21,100 were indirect jobs** created in the value chain. These indirect jobs encompass roles such as providing inputs for production, servicing production facilities, transporting products, and constructing new factories. This means that for every job within the Spanish biosolutions industry, **an additional 4.1 indirect jobs are created in the country**. This aligns with the typical trend observed in Europe, where southern countries such as Italy

and Spain tend to have relatively more indirect jobs per direct job compared to the European average.

Figure 3.21 – Spanish employment in the biosolutions sector: current and projected

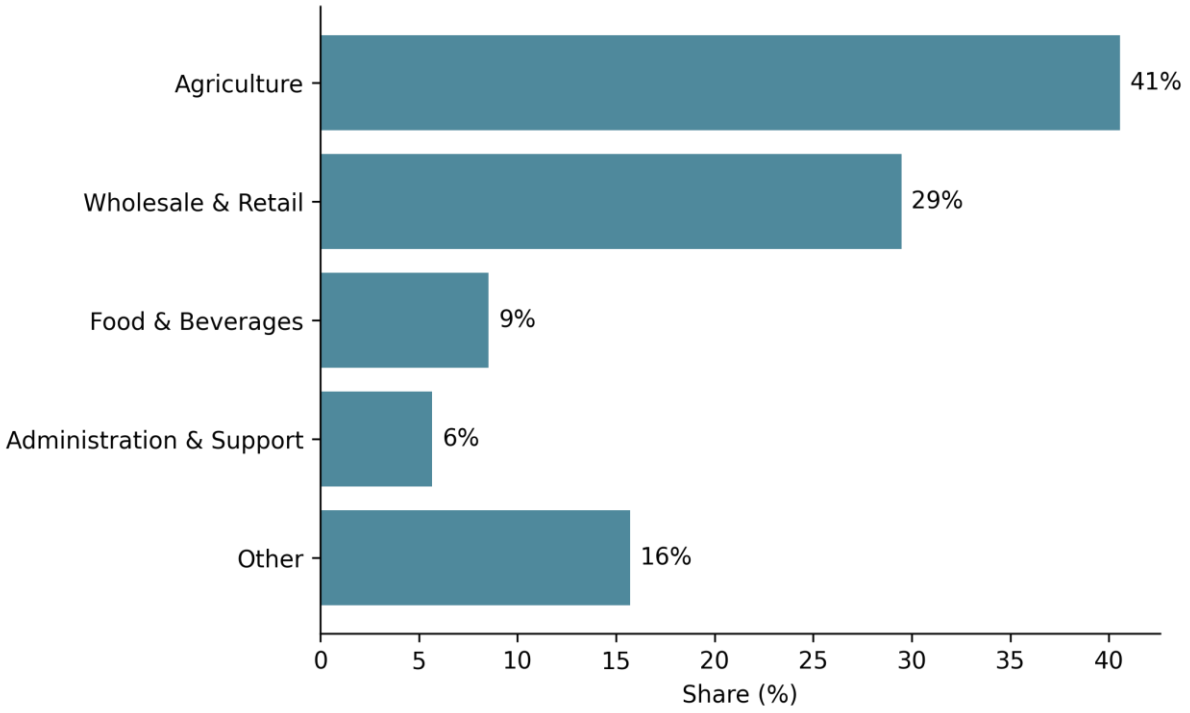


Both the direct and the indirect jobs in Spain are expected to increase towards 2035, with a **combined 52,700 jobs in 2035**. Of this, **approximately 10,400 are direct jobs**.

Modernizing legislation and ensuring ideal framework conditions for a few key biosolutions products could support a stronger market growth trajectory, **with potential to reach a value of 11.5 billion EUR in total market output value by 2035**. These efforts could deliver a return on actions of **approximately 1 billion EUR in increased output value** for Spain, provided the enhanced conditions enable the biosolutions industry to achieve greater growth. This higher trajectory is also expected to create **an additional 4,600 jobs** in 2035 beyond the baseline scenario.

The production of biosolutions globally leads to the creation of indirect jobs across various Spanish industries. When production of indirect output occurs in Spain, **41% of these jobs are generated in the agriculture sector**, followed by **29% in the wholesale and retail sector**. **The food and beverage industry accounts for 9% of indirect jobs, while administration and support accounts for 6%** of indirect jobs. The remaining 16% is distributed across other industries.

Figure 3.22 - Sectoral distribution of indirect employment from biosolutions production

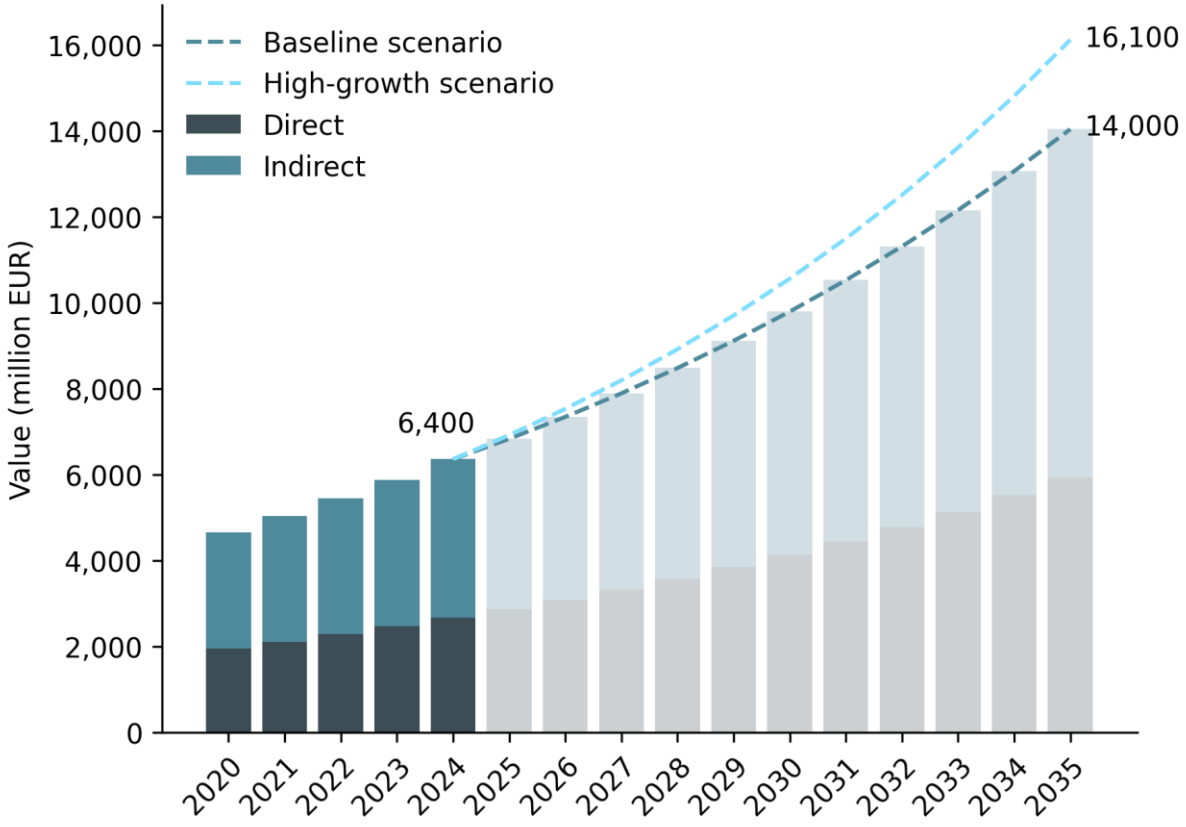


3.8 The United Kingdom

As of today, the UK value of the biosolutions sector is estimated at **6.4 billion EUR.** Of these, **2.7 billion EUR is direct output value** from the production of biosolutions products, and **3.7 billion EUR is indirect output value** created in the value chain across all industries in the United Kingdom.

The UK economic footprint of production of biosolutions is **expected to grow to between 14 and 16.1 billion EUR towards 2035**, depending on the growth scenario. Of this, approximately 6 billion EUR is the direct output value in the biosolutions industry in the country.

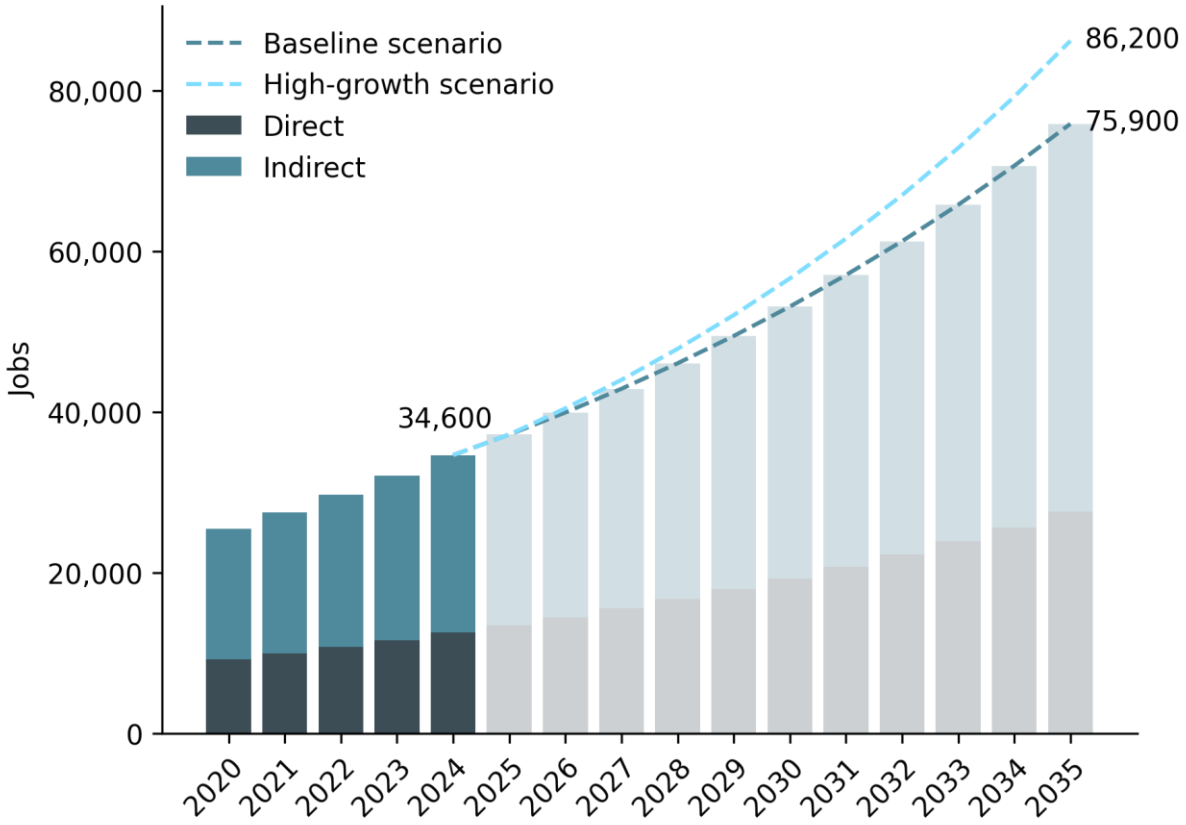
Figure 3.23 – UK economic footprint of biosolutions production: current and projected output



In terms of job creation, **approximately 34,600 jobs** were associated with the biosolutions sector in the United Kingdom. Of these, **12,600 were direct jobs** involved in the production of biosolutions products, while **22,100 were indirect jobs** created in the value chain. These indirect jobs encompass roles such as providing inputs for production, servicing production facilities, transporting products, and constructing new factories. This means that for every job within the UK biosolutions industry, **an additional 1.8 indirect jobs are created in the country**. This aligns with the typical trend observed in Europe, where northern countries such as Denmark and the

United Kingdom tend to have relatively fewer indirect jobs per direct job compared to the European average.

Figure 3.24 – UK employment in the biosolutions sector: current and projected

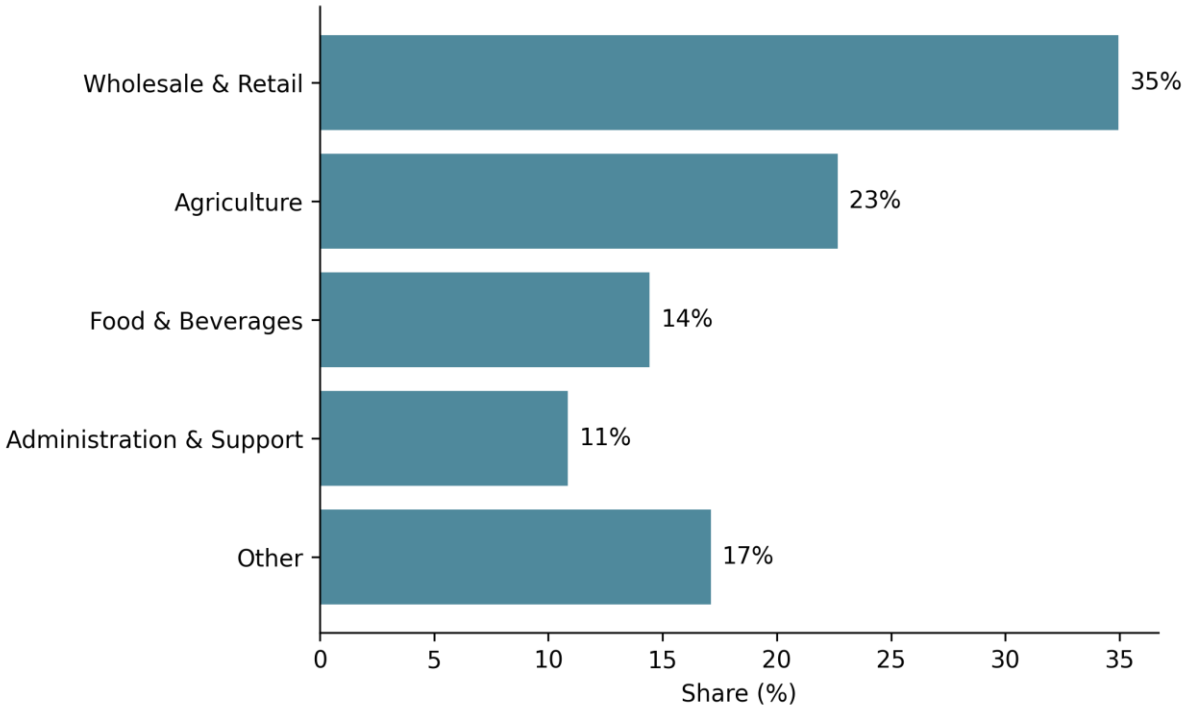


Both the direct and the indirect jobs in the United Kingdom are expected to increase towards 2035, with a **combined 75,900 jobs in 2035**. Of this, **approximately 27,600 are direct jobs**.

Modernizing legislation and ensuring ideal framework conditions for a few key biosolutions products could support a stronger market growth trajectory, **with potential to reach a value of 16.1 billion EUR in total market output value by 2035**. These efforts could deliver a return on actions of **approximately 2 billion EUR in increased output value** for the United Kingdom, provided the enhanced conditions enable the biosolutions industry to achieve greater growth. This higher trajectory is also expected to create **approximately 10,000 additional jobs** in 2035 beyond the baseline scenario.

The production of biosolutions globally leads to the creation of indirect jobs across various UK industries. When production of indirect output occurs in the United Kingdom, **35% of these jobs are generated in the wholesale and retail sector**, followed by **23% in the agriculture sector. The food and beverages sector accounts for 14%** of indirect jobs, while **administration & support contribute 11%.** The remaining 17% are distributed across other industries.

Figure 3.25 - Sectoral distribution of indirect employment from biosolutions production



3.8.1 United Kingdom – Biosolutions policy landscape

The United Kingdom adopted a "National Vision for Engineering Biology", which focused on the agriculture and food, including biosolutions.[15]

	Overview
Industry 	In 2023, the UK government at the time launched the National Vision for Engineering Biology. The current government has committed to uphold the vision and committed to invest EUR 118 million in R&D over the next 10 years. To bring the vision to life and transform the UK into a competitive market for the biosolutions sector, stakeholders are asking the government to adopt a specific policy framework, a budget beyond R&D and to build up new infrastructure to scale innovation to attract SMEs in the biosolutions sector.[16]
Agriculture 	The UK's National Vison for Engineering Biology includes a focus on developing less harmful biopesticides by investing in R&D. In 2025, the Precision Breeding Act[17] was implemented, which enables innovation within plant breeding and microorganisms using new genomic techniques.
Food & Health 	In 2025, the UK launched a regulatory sandbox focusing on cell-cultivated products[18], paving the way for new food products to enter the market faster.

[15] Department for Science, Innovation & Technology, Government of the United Kingdom (2023).

[16] UK BioIndustry Association (2025)

[17] UK Parliament (2024)

[18] UK Food Standards Agency (2025)

To fully unlock the economic potential and put the UK biosolutions industry in a higher growth trajectory, the following policy recommendations could be actioned:

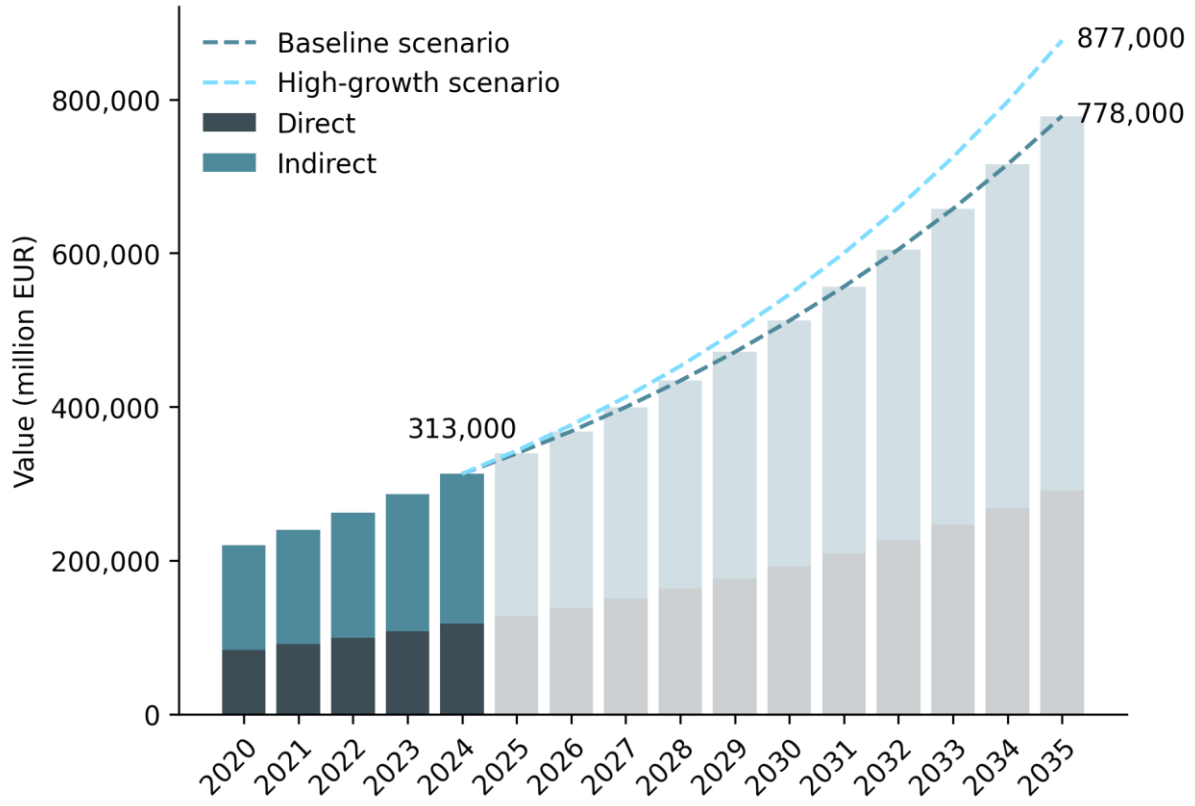
1. Focus on improving regulatory pathways for biosolutions, including biopesticides and novel foods.
2. Make public investments in and increase the availability of scale-up infrastructure.

3.9 Global

The Global output value of biosolutions is currently estimated at **313 billion EUR.** Of these, **118 billion is direct output value** from the production of biosolutions products, while **195 billion EUR is indirect value** created in other industries in the value chain.

The global economic footprint of biosolutions production is expected to **more than double by 2035, reaching approximately 778 billion EUR.** In a **high growth scenario, where the right policies are put in place, production could reach up to 877 billion EUR**. Of this, approximately 291 billion EUR will be direct output value from the biosolutions industry. Some of the major product categories within biosolutions include dietary supplements, detergent ingredients, alternative fuels, dairy products, and agriculture solutions.

Figure 3.26 – Global economic footprint of biosolutions production: current and projected output



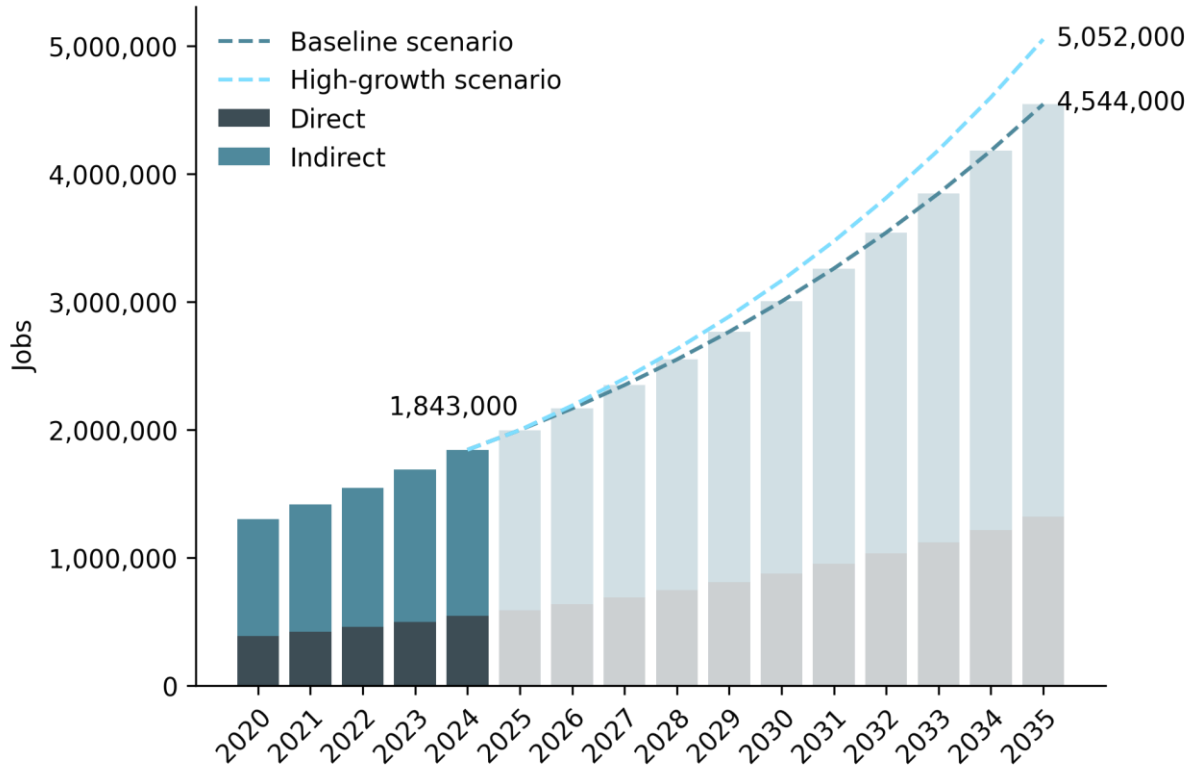
As of today, the research estimates that **the biosolutions sector creates approximately 1,840,000 jobs** globally. Of these, **545,000 were direct jobs** involved in the production of biosolutions products, while almost **1,300,000 were indirect jobs** created in the value chain. These indirect jobs encompass roles such as providing inputs for production, servicing production facilities, transporting products worldwide, and constructing new factories. This

means that for every job, there is created in the global biosolutions industry, an **additional 2.4 indirect jobs are created** in other industries.

The global biosolutions industry, with its 1,840,000 jobs, exceeds the employment figures of the global wind industry in 2023, as reported by the International Renewable Energy Agency (IRENA).[19] The wind industry accounts for just under 1,500,000 total jobs, highlighting the substantial employment impact of the biosolutions sector.

The global job creation from biosolutions production is expected to increase, reaching between approximately **4.5 million and 5 million jobs by 2035,** depending on the growth scenario and the policy framework. Approximately **1.3 million jobs are estimated to be direct jobs in the biosolutions industry.**

Figure 3.27 – Global employment in the biosolutions sector: current and projected



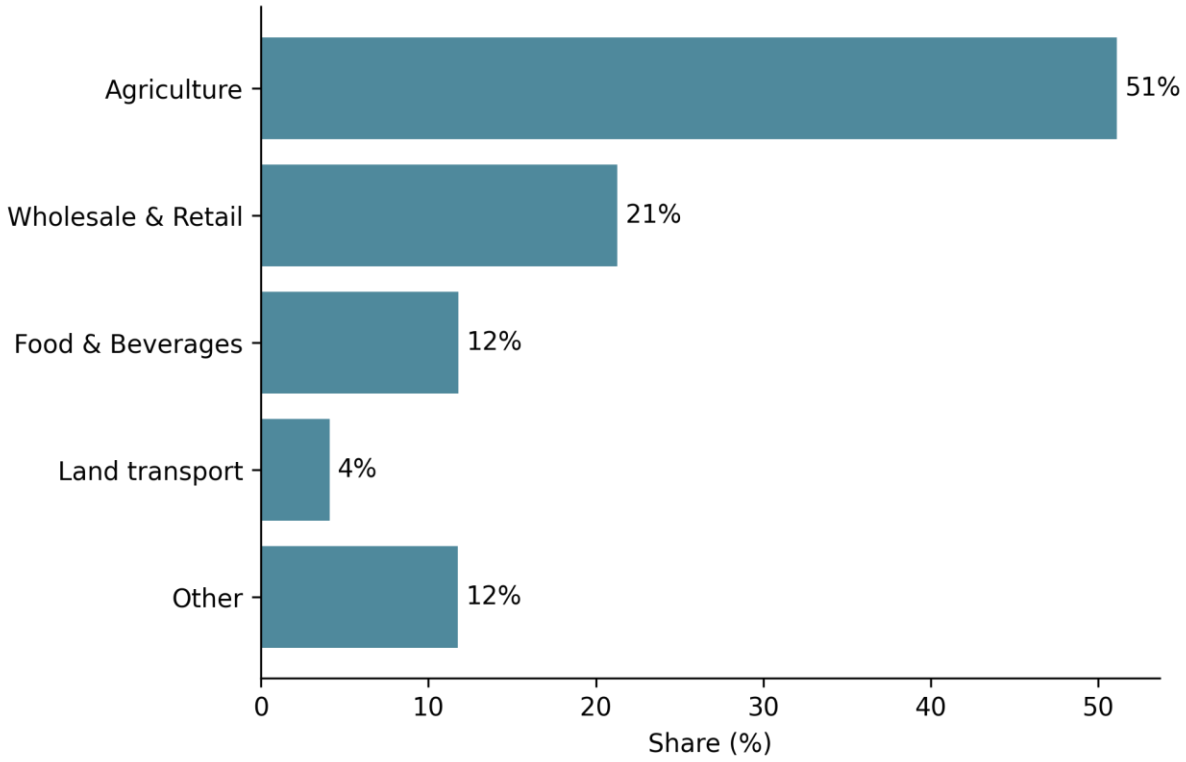
Modernizing legislation and ensuring ideal framework conditions for a few key biosolutions products could support a stronger market growth trajectory, **potentially exceeding 877 billion EUR in total market** output value for the biosolutions industries and the value chain by 2035. If these actions lead to improved business conditions, they could **generate a return of nearly 100**

[19] IRENA (2024). The global employment estimates for the Wind industry from Irena are based on both direct and indirect jobs, as it is also the case for the biosolution industry in this report.

billion EUR by enabling stronger growth in the biosolutions industry. Reaching this elevated growth trajectory is expected to **create an additional 500,000 jobs** compared to the baseline scenario.

The biosolutions industry globally not only directly contributes to the economy but also creates substantial indirect employment across various sectors. When production occurs within the biosolutions industry, **51% of indirect jobs are created in agriculture,** emphasizing its importance to agricultural activities. The **wholesale and retail sector accounts for 21%** of these jobs, reflecting its role in distribution and sales. **Food & Beverages sees 12%** of indirect employment**. Land transport contributes 4%**, while the remaining 12% are spread across other industries, collectively termed 'Other'. This distribution illustrates the extensive impact of the biosolutions industry on global employment.

Figure 3.28 - Sectoral distribution of indirect employment from biosolutions production





4 Conclusion

This report presents the first global and European economic impact model of the biosolutions industry, offering a comprehensive assessment of the economic footprint of biosolutions, including its value and job creation.

In the EU, we estimate the industry's **total value is 60 billion EUR**, of which 24 billion EUR are directly linked to the biosolutions sector and direct employment at 70.900 jobs. Beyond these direct contributions, the biosolutions industry supports an additional 36 billion EUR in indirect value and more than 207.000 indirect jobs through its value chain. This indicates that for **each direct job in the industry there is an additional 2.9 EU jobs** in related sectors. For comparison, previous analyses have estimated that there are 0.6 indirect jobs for each direct job in the European wind industry. [20]

Additionally, the biosolutions industry in the United Kingdom is estimated to have a **total value of 6.4 billion EUR**, of which 2.7 billion EUR are direct value with 3.7 billion EUR in indirect production value. This production supports circa 12.600 jobs in the industry and 22.100 additional jobs through the value chain amounting to an estimated total of **34.700** jobs created in the UK.

Looking ahead, biosolutions are positioned to play a critical role in achieving the most pressing policy ambitions within the fields of economic growth and job creation, energy self-sufficiency, food security, and sustainability.

However, it could be argued that the EU policy framework is not fit-for-purpose, as it slows down access to the market, has a disproportionate focus on risks and fails to keep up with the fast pace with innovations in the biosolutions sector.

The policy changes which could bring the biosolutions sector to a higher growth path in Europe include: policy leadership that prioritizes biosolutions, infrastructure capacity for biosolutions production, and modernization of the regulatory pathways for biosolutions in the EU that can cater for the specificities of biosolutions.

[20] Wind Europe (2023).

By addressing these policy challenges and seizing opportunities, Europe, as well as the global community can drive meaningful progress in the bioeconomy. European policymakers are in a unique and timely position to advance the biosolutions sector as a key enabler, to foster Europe's competitiveness.

Figure 4.1 – Summary tables of the economic footprint analysis for global, the EU and member states

	Values for 2024						
	Direct output (bn EUR)	Indirect output (bn EUR)	Total output (bn EUR)	Direct jobs	Indirect jobs	Total jobs	Indirect jobs per direct job
Global	118.3	194.6	312.9	544,000	1,299,000	1,843,000	2.4
EU	23.8	36.0	59.8	71,000	207,000	278,000	2.9
Denmark	3.2	2.1	5.3	6,500	10,800	17,300	1.7
France	5.3	7.2	12.5	16,200	45,700	61,900	2.8
Germany	3.7	6.4	10.1	12,800	33,400	46,200	2.6
Italy	3.2	5.2	8.4	7,000	27,800	34,800	4.0
Poland	0.8	1.6	2.4	4,200	11,600	15,800	2.8
Spain	1.9	3.3	5.2	5,200	21,100	26,300	4.1
United Kingdom	2.7	3.7	6.4	12,600	22,100	34,600	1.8

	Scenarios for 2035			
	Total output: Baseline scenario (bn EUR)	Total output: High-growth scenario (bn EUR)	Total jobs: Baseline scenario	Total jobs: High-growth scenario
Global	778	876.8	4,544,000	5,052,000
EU	118	136.3	543,000	604,000
Denmark	10.7	12.9	34,700	40,000
France	25.3	29.8	124,600	144,400
Germany	19.6	22.5	87,500	99,400
Italy	14.8	16.8	60,900	68,500
Poland	4.6	5.4	29,400	34,200
Spain	10.5	11.5	52,700	57,300
United Kingdom	14	16.1	75,900	86,200



5 Appendix 1: Model methodology

5.1 General modelling approach

The first step in measuring the economic footprint of an industry is to define what is analyzed. Since biosolutions is not a term which is well defined in the general taxonomy of universal industrial codes, a common understanding and definition of biosolutions is necessary for the report. In this report, we describe our definition of biosolutions along with examples in section 5.2.

When the definition is set, the following step focuses on creating a model for estimating the economic footprint of biosolutions across the globe. The model has two requirements: first, the model should be a production-based model, which estimates the value of the production output or value added created in the biosolutions industries, according to our definition. This is best practice, as the added value and the jobs are created directly in the production process. Second, the model needs to take the spillover to other industries (indirect effect) into account. Structuring the model like this lets us estimate how different industries and countries purchase goods and services from each other, making it possible to estimate how the biosolutions industry affects production and job creation earlier in the value chain.

Finding one database to fulfil both needs is difficult, and especially on a global scale. Instead, we have combined some of the most detailed databases from credible sources and combined them to fulfil the needs of our model. The model thus combines the production database from the United Nation Industrial Development Organization (UNIDO) with the economic structures and interdependencies from OECD's international Input-Output model. The model design is further explained in section 5.4.

The third step of our analysis includes the development of growth scenarios in specific biosolutions markets. The growth scenarios are in general demand-driven, while production is expected to follow and satisfy the changes in demand. Since our model is based on the production side, this creates a challenge. In order to connect demand and production we again make use of OECD's international input-output model. The model lets us understand how an increase in demand for a certain product in a certain country will affect production in each country and sector. This methodology and reasoning are described thoroughly in section 5.5.

5.2 Definition of biosolutions and shares

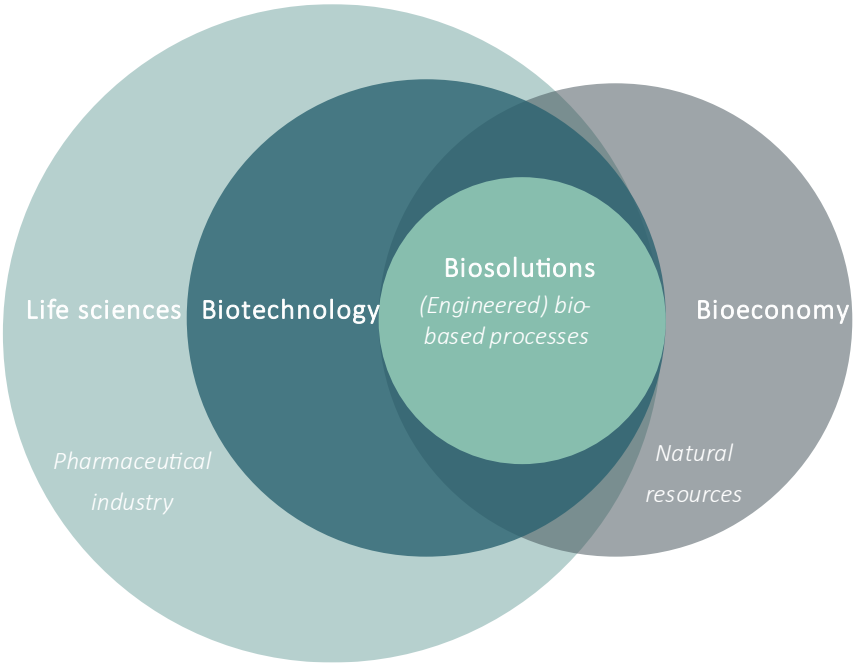
5.2.1 Definition of biosolutions

The definition of biosolutions used in this report is: *biological products which (are utilized as catalysts to) enable bio-based manufacturing, including enzymes and micro-organisms*.

To use this definition in the analysis we needed the specific products and corresponding industries which fit the biosolutions definition of this report. The full breakdown of products, which follow the HS product code classification, and industries, which follow the ISIC code system, can be found in Table 5.1.

While enzymes can be represented as a single HS product group (3507), this is challenging for microbial cultures, since there is no separate or specific HS product group for microbial cultures. Instead, biosolutions with microbial cultures are accounted for within the HS product group of which the microbial cultures are an integral part of the manufacturing process. For example, fermented dairy production is not possible without fermentation using a bacterial (microbial) culture.

Figure 5.1 - Comparison of different terminology



Source: Illustration made by ADC. Note: The sizes of the circles do not represent the actual market values.

Multiple examples of the intersections in the Venn diagram shown above:

- By our definition of biosolutions, all biosolutions are part of bioeconomy as we exclude the pharmaceutical industry. Furthermore, most of the bioeconomy also falls under biosolutions.
- Biosolutions and bioeconomy and biotechnology: for example, using an engineered yeast strain to produce bioethanol from sugar.
- Biosolutions and bioeconomy, not biotechnology: for example, using a naturally bacteria culture for yogurt production.
- Biotechnology, not biosolutions or bioeconomy: for example, production of active compounds for drugs using engineered yeast strain or mRNA vaccine production.
- Bioeconomy, not biosolutions or biotechnology: for example, biodegradable packaging from farming waste (only natural resources and no biosolutions used as catalysts in the manufacturing process).

Table 5.1 -Breakdown of biosolutions products and corresponding industries

HS code	Product name/category	ISIC code	Industry name	Product description
0403	Fermented dairy	1050	Dairy products	Yogurt, buttermilk, curdled milk and cream, kephir and other fermented or acidified milk and cream, whether or not concentrated or containing added sugar or other sweetening matter or flavored or containing added fruit, nuts or cocoa
0405	Butter	1050	Dairy products	Butter and other fats and oils derived from milk; dairy spreads
0406	Cheese	1050	Dairy products	Cheese and curd
190110	Infant nutrition/formula (milk proteins)	107	Other food products	Food preparations; of flour, meal, starch, malt extract or milk products suitable for infants or young children, put up for retail sale
2102	Baker's yeast	107	Other food products	Yeasts (active or inactive); other single-cell micro-organisms, dead (but not including vaccines of heading 3002); prepared baking powders

HS code	Product name/category	ISIC code	Industry name	Product description
210690	Dietary supplements, food colorings, food flavorings, and general food additives	107	Other food products	Food preparations; n.e.c. in item no. 2106.10
220820	Distilled alcoholic beverages	110	Beverages	Spirits obtained by distilling grape wine or grape marc
220830	Distilled alcoholic beverages	110	Beverages	Whiskies
220840	Distilled alcoholic beverages	110	Beverages	Rum and other spirits obtained by distilling fermented sugar-cane products
220850	Distilled alcoholic beverages	110	Beverages	Gin and geneva
220860	Distilled alcoholic beverages	110	Beverages	Vodka
220870	Distilled alcoholic beverages	110	Beverages	Liqueurs and cordials
220890	Distilled alcoholic beverages	110	Beverages	Spirits, liqueurs and other spirituous beverages; n.e.c. in heading no. 2208
2204	Wine	110	Beverages	Wine of fresh grapes, including fortified wines; grape must other than that of heading no. 2009
2205	Other fermented beverages	110	Beverages	Vermouth and other wine of fresh grapes, flavored with plants or aromatic substances
2206	Other fermented beverages	110	Beverages	Fermented beverages, n.e.c. in chapter 22; (e.g. cider, perry, mead, sake
2203	Beer	110	Beverages	Beer made from malt
220720	(Bio)ethanol	201	Basic chemicals,	220720 (Ethyl alcohol and other spirits, denatured, of any strength)

HS code	Product name/category	ISIC code	Industry name	Product description
			fertilizers, etc.	
2922	Amino acids	201	Basic chemicals, fertilizers, etc.	Oxygen-function amino-compounds
2936	Vitamins	201	Basic chemicals, fertilizers, etc.	Provitamins and vitamins, natural or reproduced by synthesis (including natural concentrates), derivatives thereof used primarily as vitamins, and intermixtures of the foregoing, whether or not in any solvent
3101	Fertilizers	201	Basic chemicals, fertilizers, etc.	Animal or vegetable fertilizers, whether or not mixed together or chemically treated; fertilizers produced by the mixing or chemical treatment of animal or vegetable products
3907	Plastics, mostly polymers	201	Basic chemicals, fertilizers, etc.	Polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms
3912	Plastics, mostly polymers	201	Basic chemicals, fertilizers, etc.	Cellulose and its chemical derivatives, not elsewhere specified or included, in primary forms
3913	Plastics, mostly polymers	201	Basic chemicals, fertilizers, etc.	Natural polymers and modified natural polymers (for example, hardened proteins, chemical derivatives of natural rubber), not elsewhere specified or included, in primary forms
3808	Pesticides	2021	Pesticides and other	Insecticides, rodenticides, fungicides, herbicides, anti-sprouting products

HS code	Product name/category	ISIC code	Industry name	Product description
			agrochemical products	and plant-growth regulators, disinfectants and similar products, put up in forms or packings for retail sale or as preparations or articles (for example, sulfur-treated bands, wicks and candles, and fly-papers)
3504	Peptone, peptides, and proteins	2029	Other chemical products n.e.c.	Peptones and their derivatives; other protein substances and their derivatives, not elsewhere specified or included; hide powder, whether or not chromed
3507	Enzymes	2029	Other chemical products n.e.c.	Enzymes; prepared enzymes not elsewhere specified or included, for a variety of applications, such as household care, agriculture, carbon capture, etc.
3826	Biofuel (biodiesel, etc.)	2029	Other chemical products n.e.c.	Biodiesel and mixtures thereof, not containing or containing less than 70 % by weight of petroleum oils or oils obtained from bituminous minerals

5.2.2 Shares

Based on literature research and domain knowledge, the biosolutions shares of each product market value were estimated. It was assumed that for industries which directly produce and sell biosolutions (e.g. enzymes), 100% of production is assigned to the biosolutions shares of the corresponding industry. On the other hand, it was assumed that for industries which produce and sell products where biosolutions are integral to the product (e.g. fermented dairy), 5% of production is assigned to the biosolutions shares of the corresponding industry, which is not purchased from the value chain. An overview can be found in Table 5.2.

The calculated biosolutions shares per product were multiplied with the corresponding product market value extracted from the BACI data for 2021 to obtain biosolutions product specific market values per country.

Table 5.2 - Overview of biosolutions products and corresponding shares.

HS code	Product name/category	Biosolutions shares (%)	Share of production (%)
0403	Fermented dairy	90% - 100%	5%
0405	Butter	90% - 100%	5%
0406	Cheese	90% - 100%	5%
190110	Infant nutrition/formula (milk proteins)	5% - 10%	5%
2102	Baker's yeast	90% - 100%	100%
210690	Dietary supplements, food colorings, food flavorings, and general food additives	5% - 15%	5%
220820	Distilled alcoholic beverages	90% - 100%	5%
220830	Distilled alcoholic beverages	90% - 100%	5%
220840	Distilled alcoholic beverages	90% - 100%	5%
220850	Distilled alcoholic beverages	90% - 100%	5%
220860	Distilled alcoholic beverages	90% - 100%	5%
220870	Distilled alcoholic beverages	90% - 100%	5%
220890	Distilled alcoholic beverages	90% - 100%	5%
2204	Wine	90% - 100%	5%
2205	Other fermented beverages	90% - 100%	5%
2206	Other fermented beverages	90% - 100%	5%
2203	Beer	90% - 100%	5%
220720	(Bio)ethanol	70% - 90%	5%
2922	Amino acids	70% - 80%	5%
2936	Vitamins	40% - 60%	5%
3101	Fertilizers	5% - 10%	5%
3907	Plastics, mostly polymers	1% - 2%	5%
3912	Plastics, mostly polymers	1% - 2%	5%
3913	Plastics, mostly polymers	1% - 2%	5%
3808	Pesticides	5% - 10%	5%
3504	Peptone, peptides, and proteins	40% - 50%	5%
3507	Enzymes, for a variety of applications	90% - 100%	100%
3826	Biofuel (biodiesel, etc.)	2.5% - 5%	5%

Note: The biosolutions shares used in the model are the high estimates.

Lastly, all biosolutions product specific market values from the BACI data of the same industry are summed and divided by the total market value of the industry. This is done to calculate the biosolutions shares for the overall industry for each country. The BACI data is based on country export, which is not ideal, but is to our knowledge the best data available on a product level on a global basis. This also means, that some minor imprecisions can occur, if the biosolutions products in the industry has a significantly different export rates compared to the non-biosolutions products.[21] The HS codes of the products included in each overall industry can be found in Table 5.3.

Table 5.3 - Overview of industries and corresponding HS products codes.

ISIC code	Industry name	HS codes
105	Dairy products	0401 - 0406
107	Other food products	19, 21
110	Beverages	2201 – 2209 (without 220720)
201	Basic chemicals, fertilizers, etc.	220720, 28, 29, 31, 39, 40
2021	Pesticides and other agrochemical products	3808
2029	Other chemical products n.e.c.	33, 35 - 38 (without 3808)

5.3 Comparison to literature

The aim of this report is to estimate the global and national economic impact of biosolutions. To the best of our knowledge, the global value of biosolutions has not been estimated before. Other reports have, however, estimated other parts of the biobased economy. A McKinsey report suggests the global bioeconomy (where biosolutions is a subset, as illustrated in Figure 1.1) will be valued at 4 trillion USD within the next 10-20 years.[22] Boston Consulting Group

[21] One place where we have adjusted for this is for Denmark, for which this method would mean a 39% biosolutions share in the Unido industry of 2029, where enzymes production is registered. The employment in Denmark in this industry was 5,069 in 2021 according to the Unido database. When comparing the 5,069 employees from the UNIDO database with the HBS Economic (2021) report about the biosolutions industry in Denmark, we see that the UNIDO number fits with the HBS Economics number for biosolutions employees in that industry code in Denmark, which is calculated on a firm level using official Danish Register data. Because of this, we have adjusted the Danish share of biosolutions in the industry 2029 to 100%, to align with the analysis from HBS Economics (2021).

[22] World Economic Forum and McKinsey (2021).



estimated that the biomanufacturing industry could reach 200 billion USD by 2040.[23] While biomanufacturing and the biosolutions industry mostly overlap, the biosolutions industry defined in this report does not consider production processes using solely bio-based inputs.

Other reports, such as those from Wife and BIO released in March 2025, assess the biotechnology industry's value in the EU and USA, respectively.[24] However, their focus differs from this report since biosolutions and biotechnology differs in terms of industries and products. Comparing figures across these reports is interesting but can be misleading. Variations in geographical scope, industry focus, and estimation methods often make direct value comparisons challenging.

5.4 Economic footprint

The global economic footprint is evaluated by integrating various data sources to leverage their unique strengths. This process begins with calculating the production value of biosolutions for each country, which then serves as input for the International Input-Output model. Data from BACI, UNIDO, and OECD are combined for this purpose, and the estimation methodology is detailed in this section.

5.4.1 Production value

To model the production value of biosolutions in terms of output, the UNIDO database Indstat Revision 4 is used. It contains economic data on industry sectors and is organized according to the International Standard Industrial Classification of All Economic Activities (ISIC) Revision 4. We utilize country level data for each industry for the years 2012 to 2021 (latest available data) and the monetary values are expressed in current prices.

As a first step to estimate the production value of biosolutions, the data is filtered on the ISIC-codes that was identified as containing biosolutions products. These ISIC codes are found in Table 3. The data coverage is good overall. However, missing values are addressed by three different estimation methods: historical data, residuals, and baseline values together with global biosolutions shares.

Estimation based on historical data

[23] Boston Consulting Group (2024).

[24] Haaf and Sale (2025) and BIO and Kerney (2025).



For country-ISIC code pairs missing data in 2021, we estimate output values using historical data. This involves taking the most recent recorded output value for each pair and applying a growth rate. The growth rate is derived by calculating the average annual growth rates for each ISIC code. To do this, we sum the global value of all countries with available data for a given industry in both 2021 and the reference year used to establish the growth rate. The growth rate for that year is then calculated as the total industry value in 2021 divided by the total industry value in the reference year:

$$Growth\ rate_{ij} = \left(Total\ value_{i,j=2021} / Total\ value_{ij}\right)$$

$$i = ISIC\ code, \qquad j = year$$

This growth rate is then applied for each missing country-ISIC code pair and for the latest year of available data.

$$Estimation2021_{ik} = Latest\ value_{ijk} * Growth\ rate_{ij}$$

$$i = ISIC\ code, \qquad j = year, \qquad k = country$$

By creating a growth rate based on the values of other countries, we assume that industries, on average, change at the same rate across all countries, thus not taking country-specific growth into consideration. The growth rate is also calculated based on the sum of the total values for the countries with available data, not an average growth rate per country. This approach prevents smaller economies to have an unproportionally large impact on the model.

Estimation based on residuals

There are still missing values after this estimation based on historic data and this is approached by using residuals to calculate missing data. The estimation of the missing values is made by using the same ISIC Indstat Revision 4 data by making use of available data on the two-digit level of the codes and what data is available on other three-digit codes that are under the same two-digit code as the available data. The sum of the available data on a three-digit level is subtracted from the amount from the two-digit level and the residual is split on the remaining missing data based on the global distribution of the three-digit codes relative to the corresponding two-digit code. This method is applied to estimate the missing values for the 3-digit codes (thus not 2021 and 2029) that have available data on the 2-digit level of 10 and/or 20 in the year 2021.

For example, Denmark lacks data for ISIC code 105 (which includes biosolutions) and ISIC code 104 (which does not). However, data is available at the two-digit level for ISIC code 10, totaling



$23.4 billion USD, and for the three-digit codes 101–103 and 106–108, summing to $15.4 billion USD. This leaves the remaining $8 billion USD to be distributed between codes 104 and 105. Based on global distribution averages, code 104 accounts for 9% of code 10, while code 105 represents 16%. To allocate the $8 bn, we calculate the relative shares of the two missing codes: 36% ($2.9 bn) is assigned to 104, and 64% ($5.1 bn) to 105. The $5.1 billion attributed to code 105 is then included in subsequent calculations for the value of biosolutions.

Estimations based on baseline values and global shares

To estimate values for the remainder of the missing values in the model we make use of the data that exist for each country together with global average shares of the industries. Firstly, the total amount of output from all ISIC codes is summed for each country. All countries with a complete coverage value for all ISIC codes in 2021 are then identified. By using these countries with complete coverage of ISIC codes, the share per industry is calculated and then the country industry share is used to estimate a global average of the distribution of output in these industries. The sum of the available data (including the data estimated by the model) is used as a baseline value for the country. The global average share of the respective ISIC code is then multiplied with the baseline to estimate a missing value. After this method of estimating missing values, all countries and industry pairs have an output value for 2021.

Shares of biosolutions and 2023 transformation

With the complete dataset for countries and the output per industry, the share of biosolutions within that industry for each country can now be accounted for. The total value in the country and industry pair is multiplied by the estimated share of biosolutions for the same country and industry pair. This leaves values for biosolutions in all included countries in the year 2021. To transform it into 2023 values, the values for each industry is multiplied by an average growth rate, calculated from BACI data for the industries since data is there is data available up until 2023.

5.4.2 Input-output model

The model that is used to finally estimate the current economic footprint is the OECD extended international input-output model, which provides a link between 45 industries in 77 countries (with one of them being “rest of the world”). This is essentially a 3465x3465 matrix of interdependence between industries and countries. This model is linked to the Unido model by mapping all the Unido industry codes with the 45 industries in the OECD input-output model. By utilizing this input-output model we can estimate direct and indirect effects of biosolutions production value and job creation.



Production value in the Input-Output model

We multiply the biosolutions direct output from the specific industries across all the countries (not only the selected countries) with the matrix of industry and country interdependence. By doing this, we get a measure of the direct and total output across industry and country combinations, which makes it possible to also calculate the indirect output.

Definition of direct and indirect output

The direct output is defined as the biosolutions output produced by the industries that directly produce biosolutions. This could e.g. be a biosolutions company producing enzymes, yeasts, microorganisms, or probiotics. Notice that this is the direct biosolutions part of the output.

The indirect output is defined as the output created in the value chain to fulfil the biosolutions production output. This could e.g. be input to biosolutions production, or the construction and maintenance of factories where the company produces biosolutions.

Example: Denmark industry C20 (production of chemicals) are producing 100 units if biosolutions output. Multiplying this with the IO matrix, we will get the total effect across industries and countries. If the output of 100 units only affects two industries in two countries to get the total output as follows:

Sweden, C20: 20 units

Sweden, C21: 30 units

Denmark, C20: 150 units

Denmark, C21: 40 units

Here the direct output is 100 units in DK_C20. The indirect output is 20 + 30 + (150 - 100) + 40 = 140 units, split across different industries in Sweden and Denmark.

Job creation in the IO model

For the job creation, we have calculated the jobs per output produced (job ratio) for all the industries in all the countries (a vector of 1x3465). Due to some missing data, we have calculated the job ratio with the following prioritization:

1) Using UNIDO data of jobs per output for the specific industry in the specific country, if there is data for both jobs and output, and if the industry is present in the UNIDO database.
2) Using UNIDO data of jobs per output for the world average for the specific industry, if the industry is present in the UNIDO database.
3) Using the USA average from the WIOD (World Input-Output Database) from 2014 to calculate the jobs per output for the specific industry in the specific country.

With this prioritization we get a job ratio vector, which we can multiply to our output from the model.

Definition of direct and indirect jobs:

In our model, we focus on direct and indirect effects. Direct jobs are those directly involved in the production of biosolutions within the manufacturing industries. Indirect jobs, on the other hand, are created in the industries that supply the necessary inputs or support services for biosolutions production. For example, these include positions in the value chain companies that provide raw materials, operate machinery for input production, or handle the construction and maintenance of the factories where enzyme production takes place. Indirect effects can sometimes be called upstream effects and are thus jobs generated along the value chain that contribute to the production process. In contrast to upstream effects, some models also include downstream activities. In our case with biosolutions, downstream activities would entail distribution and retail of the biosolutions. These types of downstream activities are sometimes included to estimate the induced effects. Induced effects arise when increased household income from the direct and indirect effects leads to further economic activity. For example, as employees in the biosolution industry spend their salary on local services and goods, additional demand and jobs are generated in the community. In our model, we have made the decision to not include induced effects. This decision is based on two main reasons: first, induced effects are difficult to measure accurately due to the complexities of consumer behavior and local economic variations in a global model; second, focusing only on the direct and indirect effects provides a clear and reliable estimate of the immediate economic impact of biosolutions.

Induced effects are not included in our model and estimations. By excluding induced effects, we can isolate the immediate, supply-chain-related employment impacts of biosolutions production.

Continued example: Denmark industry C20 (production of chemicals) are producing 100 units if biosolutions output, and it affects as described above. The job ratios for the four industries are, SE_C20 = 3, SE_C21 = 4, DK_C20 = 3, DK_C21 = 2. The job creation is then as follows:



Direct jobs: DK_C20 = 100 units * 3 jobs/unit = 300 jobs.

Indirect jobs1: DK_C20 = 50 units * 3 jobs/unit = 150 jobs.

Indirect jobs2: DK_C21 = 40 units * 2 jobs/unit = 80 jobs.

Indirect jobs3: SE_C20 = 20 units * 3 jobs/unit = 60 jobs.

Indirect jobs4: SE_C21 = 30 units * 4 jobs/unit = 120 jobs.

Indirect jobs total: 150 + 80 = 230 indirect jobs in DK and 60+120 indirect jobs in SE.

Understanding negative effects in the Inter-Country Input-Output Model

We use the OECD Inter-Country Input-Output (ICIO) model to analyze how an increase in production in one country impacts production levels in other countries around the world. This model maps out the flow of goods and services across global value chains, showing both direct effects and indirect effects as explained above.

Normally, when a country increases its production, it boosts demand for inputs like raw materials or components from its trading partners, leading to a positive effect on their production levels. For example, if Country A increases manufacturing, it might import more steel from Country B, increasing production in Country B. However, an increase in production in one country can also have a negative effect on production in another country.

The key lies in competition between countries. When Country A increases its production, it doesn't just demand more inputs —it also produces more goods to sell, either domestically or in global markets. If these goods compete directly with what Country B produces, Country A's increased output could take market share away from Country B.

In the OECD's ICIO model, these dynamics are captured through detailed trade relationships between countries and industries. While the model primarily tracks how production increases drive demand for inputs, it also reflects real-world trade patterns where countries compete. In some cases, the negative competitive effect can outweigh the positive value chain effect, resulting in a net decrease in production for certain countries.

5.5 Developing the growth scenarios

To develop the output scenarios, we employed a combination of HS codes (product codes), our UNIDO and input-output model, and the Grand View Research database (GVR).

1) We linked all products to an industry within the UNIDO and input-output model (refer to Table 1). This enabled us to estimate the production of specific products within each industry and country.
2) We associated all HS-coded products with those in the Grand View Research database (see Table 5 for the conversion). From GVR, we obtained country-specific growth rates for each product.
3) By combining steps 1 and 2, we effectively develop growth rates for biosolutions within specific countries and relevant industries. This formed the basis for our growth scenarios.

5.5.1 High-growth scenario

We also estimated high-growth scenarios for selected countries, grounded in the two to three most significant political discourses within each country, as outlined in the country chapters (see Table 5.5). If a country successfully navigates these discourses, it will follow a higher growth trajectory, similar to the country with the highest growth rate, as depicted in the high growth scenario, but with a minimum increase in the growth rate of 2 percentage point. For instance, enzymes are in the EU and Denmark categorized as a substance of concern. Should a policy succeed in removing enzymes from this list, we anticipate that Denmark will achieve a growth trajectory akin to countries with the highest expected growth rates for enzymes.

5.5.2 Return on Action:

The return on action is calculated as the difference in biosolutions output value in a country by 2035, depending on whether the country follows the high or normal growth trajectory. Essentially, the return on action estimates the potential increase in return if the country effectively implements policies that enhance the growth rate of certain biosolution products.

Table 5.4 - Overview of products and corresponding product markets from Grand View Research (GVR)

HS code	Product name/category	GVR product market
0403	Fermented dairy	Yogurt And Probiotic Drink
0405	Butter	Butter

HS code	Product name/category	GVR product market
0406	Cheese	Dairy Products
190110	Infant nutrition/formula (milk proteins)	Infant Nutrition
2102	Baker's yeast	Yeast Extract
210690	Dietary supplements, food colorings, food flavorings, and general food additives	Dietary Supplements; Natural Food Color; Flavors
220820	Distilled alcoholic beverages	White Spirits; Dark Spirits
220830	Distilled alcoholic beverages	White Spirits; Dark Spirits
220840	Distilled alcoholic beverages	White Spirits; Dark Spirits
220850	Distilled alcoholic beverages	White Spirits; Dark Spirits
220860	Distilled alcoholic beverages	White Spirits; Dark Spirits
220870	Distilled alcoholic beverages	White Spirits; Dark Spirits
220890	Distilled alcoholic beverages	White Spirits; Dark Spirits
2204	Wine	Wine
2205	Other fermented beverages	Vermouth; Cider, perry & rice wine alcoholic drinks; Kombucha
2206	Other fermented beverages	Vermouth; Cider, perry & rice wine alcoholic drinks; Kombucha
2203	Beer	Beer
220720	(Bio)ethanol	Bioethanol Yeast
2922	Amino acids	Amino Acids
2936	Vitamins	Vitamin Supplements
3101	Fertilizers	Biofertilizers
3907	Plastics, mostly polymers	Bioplastics
3912	Plastics, mostly polymers	Bioplastics
3913	Plastics, mostly polymers	Bioplastics
3808	Pesticides	Biopesticides
3504	Peptone, peptides, and proteins	Peptide And Oligonucleotide
3507	Enzymes	Enzymes
3826	Biofuel (biodiesel, etc.)	Biodiesel alternative fuels

Table 5.5 Overview of the Grand View Research products selected for the high-growth scenarios

Country	GVR product market
Australia	Biodiesel alternative fuels
Australia	Biopesticides
Australia	Dietary Supplements
Brazil	Biodiesel alternative fuels
Brazil	Enzymes
Brazil	Dietary Supplements
China	Biodiesel alternative fuels
China	Dietary Supplements
China	Biopesticides
Colombia	Biodiesel alternative fuels
Colombia	Biofertilizers
Colombia	Biopesticides
Denmark	Enzymes
Denmark	Biopesticides
Denmark	Dietary Supplements
EU	Enzymes
EU	Biopesticides
EU	Dietary Supplements
France	Enzymes
France	Biopesticides
France	Dietary Supplements
Germany	Enzymes
Germany	Biopesticides
Germany	Dietary Supplements
India	Dietary Supplements
India	Enzymes
India	Biofertilizers
Indonesia	Biodiesel alternative fuels
Indonesia	Biopesticides
Indonesia	Enzymes
Italy	Enzymes
Italy	Biopesticides

Country	GVR product market
Italy	Dietary Supplements
Japan	Biodiesel alternative fuels
Japan	Enzymes
Japan	Dietary Supplements
Mexico	Biodiesel alternative fuels
Mexico	Biopesticides
Mexico	Dietary Supplements
Poland	Enzymes
Poland	Biopesticides
Poland	Dietary Supplements
South Korea	Bioplastics
South Korea	Biodiesel alternative fuels
South Korea	Dietary Supplements
Spain	Enzymes
Spain	Biopesticides
Spain	Dietary Supplements
Turkey	Dietary Supplements
Turkey	Biodiesel alternative fuels
Turkey	Biopesticides
United Kingdom	Biopesticides
United Kingdom	Dietary Supplements
United States	Biodiesel alternative fuels
United States	Bioethanol Yeast
United States	Dietary Supplements

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