SYSTEMIQ

SEIZING THE ECONOMIC OPPORTUNITY OF ALTERNATIVE PROTEINS IN EUROPE

Delivering prosperity from farm to factory

JANUARY 2026

SYSTEMIQ

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SOURCES USED FOR THIS ANALYSIS

The analysis is based on a range of assumptions, gathered from:

A review of scientific studies and industry reports – A comprehensive list of key sources is provided in the Technical Annex, while specific uses are listed in the end notes

Interviews with 50 experts from various stakeholder groups in the food and alternative protein sector. A full list is provided to the end of this report.

CITATION

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EXECUTIVE SUMMARY

We are on the cusp of a new era in how food is produced, and the EU has the opportunity to lead the way. Building a robust domestic alternative protein industry would enable the EU to unlock major economic opportunities while strengthening its strategic autonomy. Over the next 15 years, this emerging sector could deliver substantial industrial and rural growth, high-quality employment, and greater resilience.

ALTERNATIVE PROTEINS AS AN INDUSTRIAL PRIORITY

Alternative proteins involve using plant-based, cultivated, precision and biomass fermentation technologies to recreate the experience of meat, dairy, eggs and seafood. This approach could deliver foods that are as delicious and nutritious as the meat and dairy people enjoy today, at a fraction of the environmental impact. If they were to reach price parity with conventional animal protein, these more sustainable options would also become widely accessible. This would help to strengthen the resilience of Europe's arable agriculture sector, reduce reliance on industrial animal agriculture and associated feed imports, whilst delivering significant environmental and planetary health benefits.

The development of the EU's alternative protein sectors is also a strategic industrial opportunity: their production draws on capabilities deeply interconnected with the EU's existing industrial base, from biotechnology and other innovative industries to its manufacturing sectors. These capabilities give the EU a natural advantage in scaling production and driving innovation. By making alternative proteins a strategic priority, the EU can take the lead globally in this emerging sector.

THE BENEFITS FOR DOMESTIC MARKETS AND TRADE

With supportive policies, alternative proteins could meet 10% of the EU's meat and 25% of its dairy demand by 2040. In our scenario, demand for alternative protein food and ingredients in the EU could be worth **€53 billion by 2040 – more than the European chocolate market (€47.3 billion).**

Beyond food end products, the sector would drive value chains in crops, feedstocks, bioreactors, and processing equipment – areas where the EU already has strong industrial capabilities. When the full value chain is accounted for, the total market opportunity could reach **€79 billion**, **comparable to Lithuania's GDP in 2024. Export potential would also reach €60 billion by 2040**, positioning the EU as a global biomanufacturing hub.

EMPLOYMENT POTENTIAL & GVA

By 2040, alternative proteins could contribute **€111 billion** to the EU's economy each year by creating demand across the supply chain. Within 15 years, the sector could support almost **half a million jobs**, spanning arable agriculture, R&D, manufacturing, logistics, and marketing, boosting both industrial competitiveness and local livelihoods.

STRENGTHENING EU ARABLE AGRICULTURE

Alternative proteins could create three enabling factors for strengthening the resilience of the EU's arable agricultural sector over the long term.

Credit: Planted

ENABLING FACTOR 1: GROWING THE MARKET FOR LEGUMES AND PULSES.

A strong domestic plant-based meat and dairy sector would boost demand for food-grade legumes and pulses, which could serve as an enabling condition for farmers interested in shifting to these crops. Such shifts could, over the long term, reduce critical import dependencies and enrich soils through nitrogen fixation, while diversifying farm incomes.

ENABLING FACTOR 2: INCREASING SELF-SUFFICIENCY IN HIGH-PROTEIN CROPS.

A shift towards alternative proteins could help shrink the EU's protein trade deficit in two ways: by supporting an expansion of domestic protein crop supply as described above, and by reducing demand for high-protein feed imports in the first place.

ENABLING FACTOR 3: MOVING FROM FEED TO FOOD-GRADE CROPS.

A scaled alternative protein sector in Europe could create demand for cereals, sugar and starch crops, pulses, soy, and oilseeds as feedstock, offsetting the decline in demand for biofuel and feed crops. With the right market conditions and support in place, this shift could offer farmers future-proof market opportunities and potentially economic benefits.

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UNLOCKING THE OPPORTUNITY

1. POLICY AND REGULATION

A more predictable, harmonized, and transparent regulatory framework is needed to spur innovation and increase investor confidence in order to bring innovative products to market more efficiently.

2. INFRASTRUCTURE

The current production base needs to scale up through greenfield development and retrofitting. Fortunately, the EU has proven through sectors like renewable energy that rapid scale-up is possible when industry and policy move in sync.

3. INVESTMENT

Public investment will be essential for unlocking private finance. Targeted annual public support for both R&D (€690 million) and scale-up (€720 million) can bring alternative proteins closer to taste and price parity and de-risk scale-up, catalysing private investments and paving the way for an innovative European food industry.

CALL TO ACTION

*The EU has a **unique opportunity** to lead global protein diversification. With coordinated action on **regulation, infrastructure, and investment**, alternative proteins can create major benefits for the EU economy by 2040. The question is not whether the EU can afford to invest, but whether it can afford not to. **With the right policies, the EU can deliver prosperity from farm to factory, shaping a sustainable and innovative food future.***

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TABLE OF CONTENTS

SYSTEMIQ

1. INTRODUCTION

We are on the cusp of a new era in how food is produced, and the EU has the opportunity to lead the way. Alternative proteins are emerging as a powerful tool to diversify protein production, creating new industrial and arable farming opportunities that could deliver economic growth, high-quality jobs, and greater strategic independence.

Alternative proteins use plant-based, cultivated, biomass and precision fermentation ingredients to create foods that aim to be as delicious and nutritious as the meat, dairy, eggs and seafood that people enjoy today, at a fraction of the environmental impact.[1]

Credit: Squeaky Bean

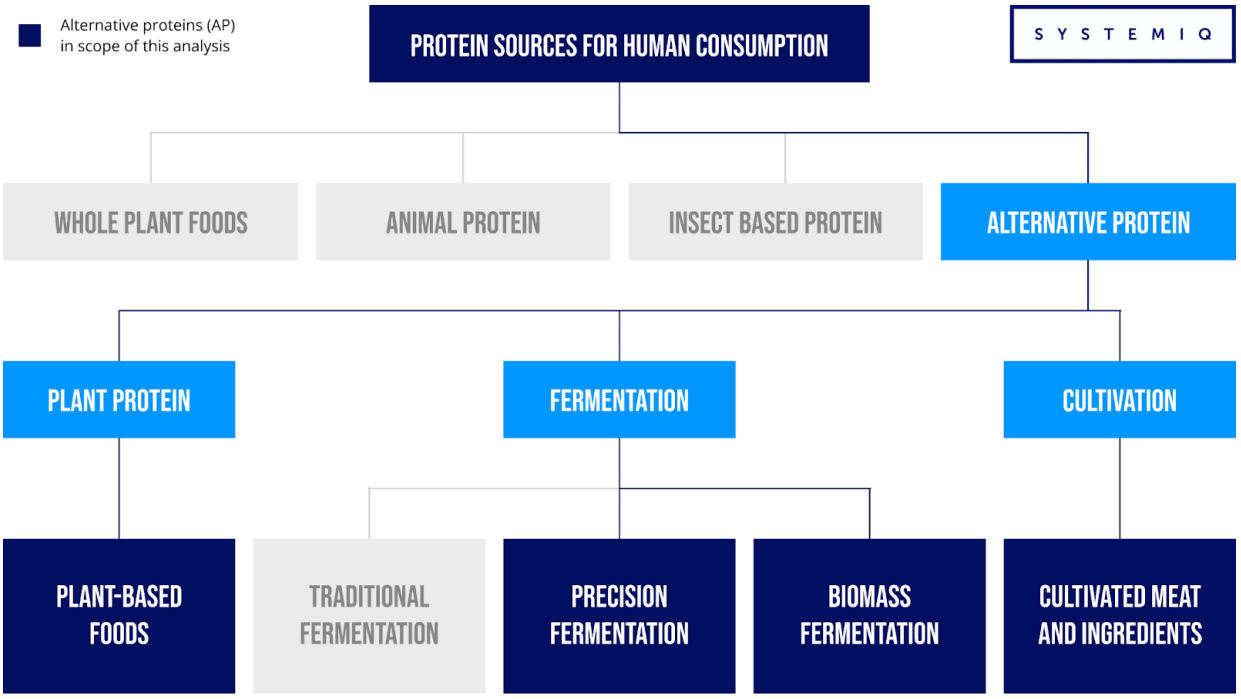
If they were to reach price parity with conventional animal protein, these more sustainable options would also become widely accessible. This would help to reduce Europe's reliance on industrial animal agriculture and associated feed imports whilst delivering significant environmental and planetary health benefits.

The development of the EU's alternative protein sector is a strategic industrial opportunity: their production draws on capabilities deeply interconnected with the EU's existing industrial base, from biotechnology and other innovative industries to its manufacturing sectors. These existing industrial capabilities, combined with the EU's cutting-edge scientific ecosystem, give the EU an advantage in scaling production and driving innovation.

The development of alternative proteins is also an opportunity to strengthen the resilience of the EU's arable agricultural sector over the long term. Provided the right market and policy incentives are in place, a growing domestic industry for plant-based meat and dairy could support expanded and more diversified EU production of legumes, whilst reducing the need for protein imports for feed. At the same time, scaling the fermentation and cultivated sectors would drive demand for sugar and starch crops, which could ensure sustained demand for crops whose uses in biofuels and animal feed might otherwise fall as vehicles electrify and diets shift to meet climate goals.

By prioritising alternative proteins, the EU can take a leading role in this emerging sector, unlocking significant economic opportunities while strengthening the resilience of its arable farming base.

[1] Source: Good Food Institute (2023) Environmental benefits of alternative proteins



Source: adapted from: FAIRR, 2024: Protein Diversification: A Tool to Address Climate, Nature, and Public Health Risks

Figure 1: The four main types of alternative proteins covered in this analysis

THREE PATHWAYS FOR GROWTH

The trajectory of alternative proteins in the EU will depend on the choices policymakers make today. **We have constructed three possible scenarios for the coming 15 years with different levels of policy support.**[2] While the High Ambition scenario illustrates the full potential of the sector, this report focuses on the Moderate Policy Support scenario as a robust, within-reach route for the EU to realise the economic opportunities of alternative proteins.

Figure 2: Overview of alternative protein types

PLANT-BASED FOODS	Foods derived from crops such as soy, peas, or beans, processed to mimic texture, flavor, and nutritional profile of animal-based products
CULTIVATED MEAT AND INGREDIENTS	Made from animal cells which are cultivated in fermentors (similar to those used for brewing beer), and mixed with plant ingredients
PRECISION FERMENTATION	Uses microbes such as yeasts as "cell factories" for producing specific functional ingredients, such as rennet and egg white
BIOMASS FERMENTATION	Leverages the fast growth and high protein content of many microorganisms to efficiently produce large quantities of protein

[2] For further detail on the assumptions underpinning each scenario, please refer to our Technical Appendix.

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1. BUSINESS AS USUAL

In a ***Business as Usual*** scenario, regulatory processes stay slow and unpredictable, and fragmented public investment leaves large gaps in technical progress and commercial scale-up, which prevent products from reaching taste and price parity in a timely manner, restricting consumer interest. In this scenario, the EU falls behind global competitors.

2. MODERATE POLICY SUPPORT

In a ***Moderate Policy Support*** pathway, consumer appetite grows steadily as products improve in taste and reduce in price. Regulatory processes become more predictable and inefficiencies are reduced, while targeted public R&D investment maintains the EU's position as a global innovation hub. Pilot infrastructure expands in leading countries, attracting more private capital.

3. HIGH AMBITION

In a ***High Ambition*** scenario, strong R&D activity, regulatory support, and robust public-private investment quickly propel alternative proteins to taste and price parity, leading to widespread consumer adoption. The EU emerges as a global leader in innovation, exports, and jobs.

2. THE ECONOMIC POTENTIAL OF ALTERNATIVE PROTEINS IN THE EU

2.1 GROWING THE DOMESTIC AND EXPORT MARKETS

In our Moderate Policy Support scenario, alternative proteins could make up between 8 and 25% of EU meat, dairy, eggs and seafood demand by 2040.

Moreover, they would generate economic activity well beyond end consumer products, building on parts of the value chain where the EU already has strong capabilities – making this a broader industrial opportunity.

Alternative proteins would create demand for protein crops for plant-based meat, and sugar and starch crops for fermentation and cultivated feedstocks. In addition, they would create demand for more specialised inputs like amino acids, and specific production infrastructure (e.g. bioreactors, dryers and fermentors).

To do this, the sector must be supported with a smooth regulatory pathway, as well as public investment in R&D to catalyse technical progress, and targeted public support to derisk private sector-driven scale-up of infrastructure.[3] If this were to happen, most of Europe's future demand for alternative proteins could be met domestically, limiting imports.

Under our scenario, EU demand for alternative protein food and ingredients would be worth **€53 billion by 2040, bigger than the European chocolate market (€47.3 billion).**[4] When the full value chain is accounted for, the total market opportunity could be worth **€79 billion**, **comparable to Lithuania's GDP in 2024**[5]**.**

A similar trend would be visible in export potential. The EU is already a global leader in exporting agrifood produce, advanced machinery, industrial equipment and specialised inputs.[6] If the right conditions were in place, alternative proteins would represent an opportunity to extend that leadership into food biomanufacturing.

Under our scenario, trade opportunities for the alternative protein value chain would reach ***€60 billion*** *annually by 2040, comparable to the size of total EU exports to South Korea in 2024 (€56 billion), when it was the EU's third largest trading partner in the Asia-Pacific region.*[7]

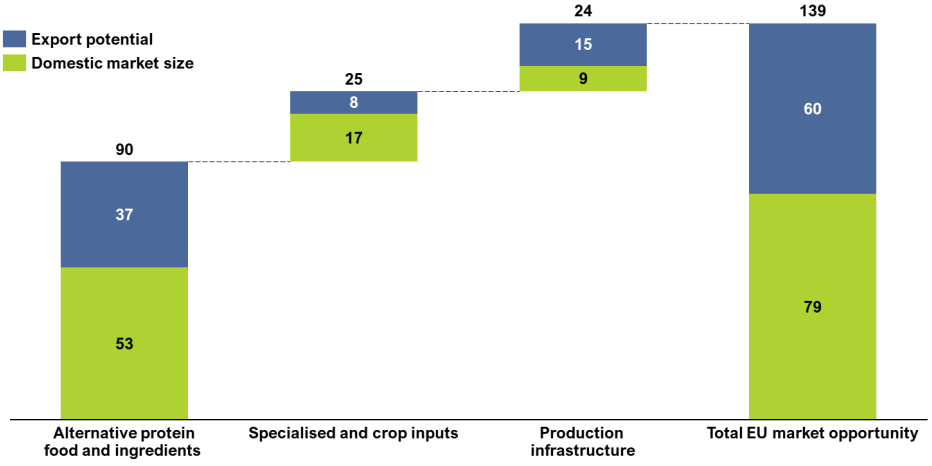

Figure 3: Domestic market size and export potential of alternative proteins by 2040 in € billions, Moderate Policy Support scenario

[3] See Technical Appendix for methodology
[4] Source: Mordor Intelligence Europe Chocolate Market
[5] LRT (2025) Lithuania's economy grew 3% in 2024, revised data show

[6] For example, in 2024 the EU had a €194 billion trade surplus in medicinal and pharmaceutical products : Source: Eurostat (2025) International trade in medicinal and pharmaceutical products
[7] Source: European Commission (2025) European Union, Trade in goods with South Korea

2.2 EMPLOYMENT POTENTIAL

The alternative protein sector has the potential to support employment spanning a wide spectrum of skills, from agricultural and manufacturing jobs to science and engineering. **Under a Moderate Policy Support scenario, alternative proteins would support almost half a million jobs**.

Arable agriculture will play an important role in this: 16% of the necessary roles would be in arable farming through supplying pulses, oilseeds, cereals, sugar and starch crops (see Chapter 3).

In manufacturing, the sector would fuel a new generation of jobs, from machine operators to production technicians, who turn innovation into tangible products.

And at the frontier of science and business, skilled technical professionals like microbiologists, bioprocess engineers, supply chain managers, and strategy experts would shape the sector's growth, delivering lasting value to Europe's economy.

Together, these findings show how alternative proteins could support **future-proof employment**, enhancing both industrial competitiveness and local livelihoods.

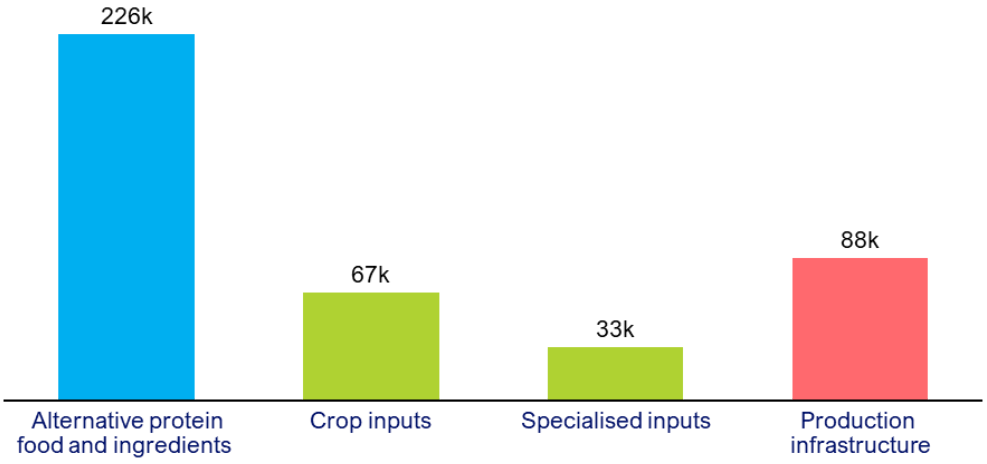

Figure 4: Number of jobs supported by alternative proteins, Moderate Policy Support scenario, 2040[8]

2.3 CONTRIBUTION TO THE EU ECONOMY

Overall, alternative proteins could contribute **€111 billion annually** to the EU economy by 2040, once indirect effects are included. This is a sizeable value-add, comparable to the GDP contribution of Europe's wine sector.[9]

More than 20% of this GVA would come from the broader value chain beyond the final consumer goods. Activities such as growing pulses, sugar and starch crops, producing growth media,

[8] Average wage levels use Germany as a proxy for EU countries with significant alternative protein industries. Source: Systemiq (2025) "A Taste of Tomorrow: How protein diversification can strengthen Germany's economy"
[9] Source: European Committee of Wine Companies (2024) Economic, Social and Environmental Importance of the wine sector in the EU

manufacturing bioprocessing equipment, building facilities, and providing logistics and retail services all expand the sector's potential. This demonstrates the catalysing role of alternative proteins in driving growth well beyond food production, reinforcing the EU's industrial base and creating opportunities across adjacent sectors.

Job category	Description	Examples	Average wages
Alternative protein production	Employees in alt. protein companies, across roles	**Production as well as business roles**, incl., strategy & sales; supply chain managers	45 – 55k
Crop inputs	Farmers to supply agricultural produce at scale	**Farmers** supplying crops and feedstock for media (e.g., sugars); **agronomists**	30 – 45k
Specialised inputs	Scientists for sophisticated technical processes	**Microbiologists** and **food technologists**, general **lab technicians**	75 – 80k
Food processing equipment	General processing machinery manufacturers	**Operators scaling outputs** & increasing automation, ongoing **quality assurers**	60 – 70k
Specialised equipment	Highly specialized machinery manufacturers	**Bioprocess engineers** and specialists	65 – 75k

Figure 5: Type of jobs supported by alternative proteins, Moderate Policy Support scenario, 2040

With strong domestic and export potential, €111 billion in added economic value, and 414,000 future-proof jobs, alternative proteins could become a cornerstone of a competitive, prosperous, and resilient EU economy by 2040.

Our modelling suggests that the potential economic benefits of alternative proteins could be even more substantial in the high ambition scenario. In this scenario, by 2040, the domestic market could grow to €205 billion, or €333 billion when accounting for the full value chain. Likewise, the sector could support 1 million jobs, create €128 billion in export value and contribute €260 billion annually to the EU economy. Achieving this, however, would require significantly higher levels of annual public investment in both R&D and CAPEX (€2.7 billion each).

3. POTENTIAL IMPLICATIONS FOR EU ARABLE AGRICULTURE

3.1 MACRO TRENDS RESHAPING AGRICULTURE

Agriculture is both culturally and economically significant to the EU, providing livelihoods for farmers and putting food on the tables of European citizens. However, the sector faces mounting pressures:

➔

Negative protein trade balance: In 2024, the EU had a plant protein deficit of nearly 19 million tonnes of crude protein, mostly from soy meal and other oilseeds used for feed (for pigs and poultry primarily).[10] In the face of mounting geopolitical instability, this exposes the EU to environmental and supply-chain risks.

➔

Environmental and climate impact: Practices such as over-stocking and poor pasture management expose farmers to climate risks, as degraded soils are less resilient to droughts and floods.[11] It has been estimated that broader climate risks are costing EU farmers, particularly those in southern Europe, more than €28 billion a year.[12]

➔

Changing employment: 2009-2024 saw a trend of farm consolidation across Europe, with the number of people working in agriculture falling by around 30% (3.5 million jobs), while incomes for the remaining workers grew in real terms to a level nearly 40% higher than in 2015.[13] As fewer young people take up farming, employment in EU agriculture is expected to continue to fall.[14]

➔

Declining demand for biofuel: Biofuel is currently a growth sector for EU agriculture, but the electrification of transport is expected to reduce demand for biofuel crops in the long run. EU projections suggest a 45-50% decline in crop-based biofuel demand by 2035,[15] with demand for first-generation biofuels derived directly from food and feed-grade crops falling close to zero by mid-century.

[10] Source: European Commission (2024) Reducing the plant protein deficit of the European Union
[11] Source: EPRS (2020) Desertification and agriculture
[12] Source: European Investment Bank and European Commission (2025) Insurance and Risk Management Tools for Agriculture in the EU

[13] Sources: 1) FAOStat; 2) Eurostat, Performance of the agricultural sector, 2024
[14] Source: European Commission (2025) Strategy for generational renewal in agriculture
[15] EU Agricultural Outlook 2024-2035

3.2 HOW ALTERNATIVE PROTEINS COULD ENABLE A MORE RESILIENT ARABLE AGRICULTURAL SECTOR

Arable and animal agriculture are both important to Europe's economy, rural jobs and livelihoods. This report focuses on how the growth of alternative proteins might affect arable farming. At the same time, we acknowledge that protein diversification will not affect all farmers equally. Estimating the economic consequences for animal agriculture would require assumptions about export markets and customer choices beyond the scope of this report.
Looking at European arable agriculture, alternative proteins have the potential to strengthen the resilience of the sector over the long term through three enabling factors.

With the right market and policy incentives in place, the demand created by alternative proteins for protein, sugar and starch crops could create more favorable conditions for EU arable farmers to adapt their production practices – strengthening the bloc's protein self-sufficiency, improving soil health, and helping farmers diversify and potentially increase their income.

A growing domestic plant-based market could support expanded and more diversified EU production of legumes. At the same time, scaling up fermentation and cultivated meat and dairy would drive demand for sugar and starch crops, thereby offsetting declines in biofuel use, as vehicles electrify, and feed demand as diets evolve under our scenario to meet climate goals. See Figure 6 for a breakdown of the shift in consumption that would result from our modelled scenario across a selection of protein, sugar and starch crops.

ENABLING FACTOR 1: GROWING THE MARKET FOR LEGUMES

For many European farmers today, growing crops for food is not always an attractive prospect. A range of interconnected factors contribute to this, including uncertain demand, limited infrastructure, the risks and costs of departing from established practices, and competition from countries with a longer tradition of producing such crops, often at lower costs.

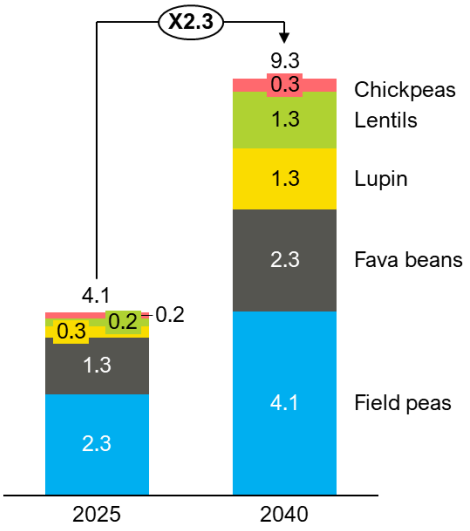

Figure 6: Growth in EU pulse and legume production, Moderate Policy Support scenario (**2040, MMT**)[16]

[16] Systemiq analysis, based on Eurostat "Crop production in EU standard humidity" dataset. Conversion rates from plant-based products to crop volumes based on GFI, "Comparative life cycle assessment of plant-based meats and conventional animal meats".

A robust market for plant-based meat and dairy would boost demand for food-grade legumes – the primary ingredients of these products.

In our Moderate Policy Support scenario, higher consumption of plant-based meat and dairy leads to a significant increase in demand for a variety of pulses, approximately doubling demand for field peas, fava beans and chickpeas, and a seven-fold increase in demand for lentils. This elevated demand could serve as an enabling condition for arable farmers interested in shifting to these crops.

Facilitating an expanded and more diverse production of legumes on EU farmland would align with the EU's goals for a more self-sufficient and sustainable protein supply.[18] With the right conditions in place, this shift could also help reduce critical dependencies, diversify farm incomes, enrich soils through nitrogen fixation and potentially contribute to long-term yield improvements.[19]

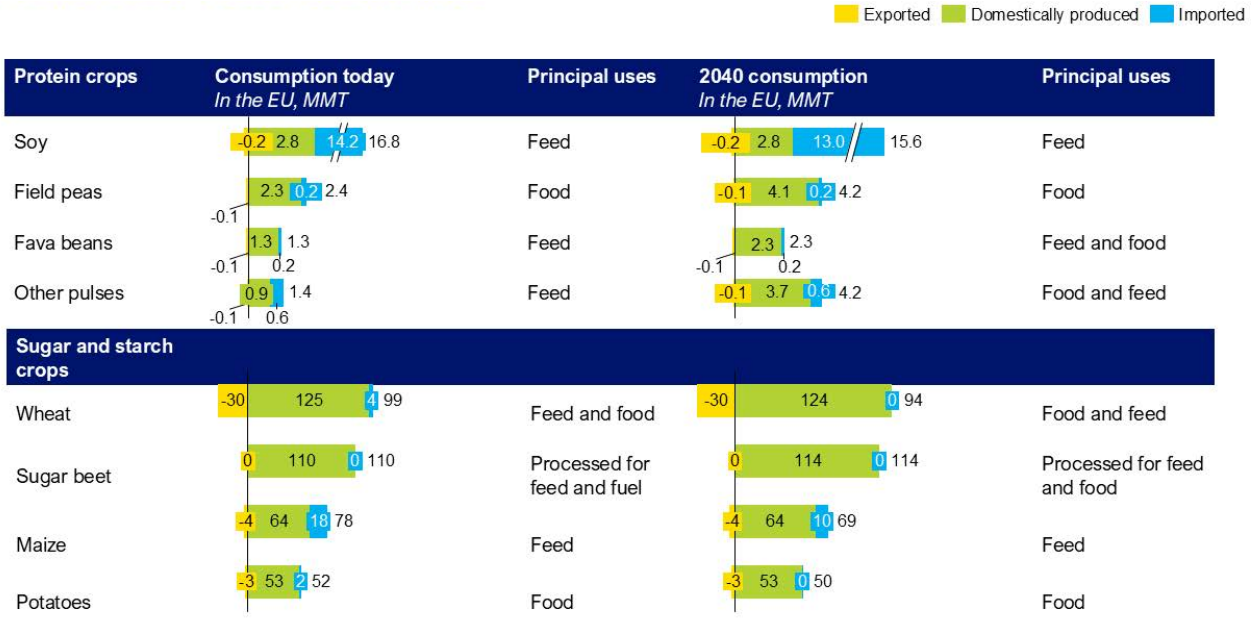

Figure 7: Overview of crop consumption shift in 2040 Moderate Policy Support scenario[17]

[17] See Technical Appendix for methodology

[18] European Commission (2025) A Vision for Agriculture and Food

[19] EASAC (2022) Regenerative agriculture in Europe

ENABLING FACTOR 2: INCREASING SELF-SUFFICIENCY IN HIGH-PROTEIN CROPS

Dependency on imported feed makes the EU livestock sector vulnerable to events in global markets, caused by geopolitical (e.g. conflicts, trade disruptions), climate (e.g. weather-related), or market factors (e.g. price volatility).[20]

Two routes are possible to reduce the protein trade deficit: increasing domestic supply of protein crops, and decreasing demand for them in the first place.

The previous section discusses how increased demand for plant-based meat and dairy could enable an expanded production of protein crops on EU soil. This could accompany the efforts of existing EU initiatives to increase domestic soy production.[21]

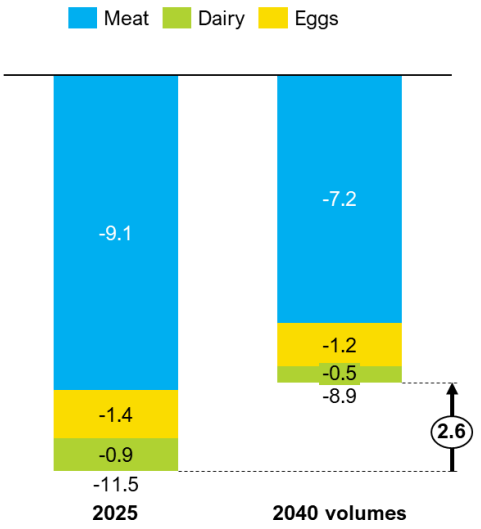

Figure 8: Future soybean meal import volumes under a Moderate Policy Support scenario (2040, MMT)

In our model, the need to import soy for high-protein animal feed would decrease by around 2.6 MMT, significantly lowering the EU's deficit in this category (see Figure 8). When including all types of feed (e.g. domestically grown grains), overall demand for feed would reduce by 23 MMT (see Figure 9).

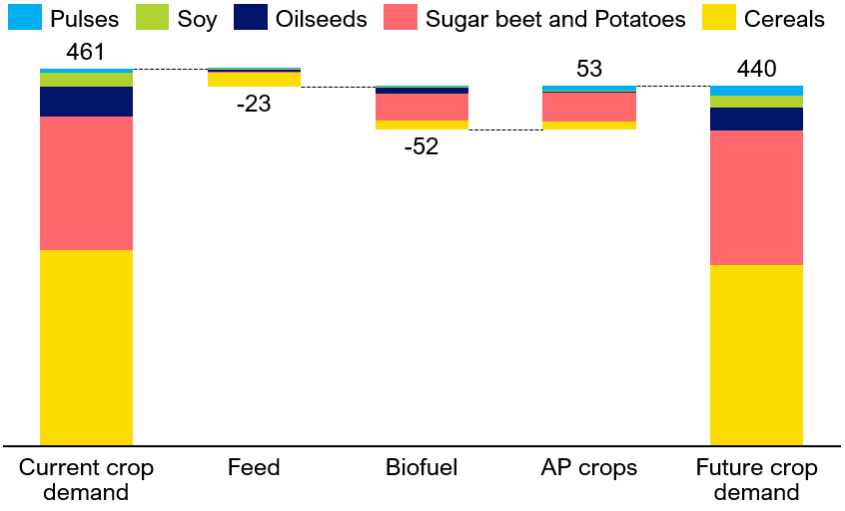

Figure 9: Crop demand for alternative protein production under a Moderate Policy Support scenario (2040, MMT)

[20] EPRS (2023) EU feed autonomy, Closing the gaps in European food security; Policy Department for Structural and Cohesion Policies (2024) The dependency of the EU's food system on inputs and their sources

[21] EU Agricultural Outlook 2024-2035

ENABLING FACTOR 3: MOVING FROM FEED- TO FOOD-GRADE CROPS

In addition to any possible shift towards greater protein diversification, other changes affecting crop demand are already underway. The **electrification of transport** is expected to reduce demand for **biofuel crops by** 45-50% decline **by 2035**,[22] with demand for first-generation biofuels derived directly from food and feed-grade crops falling close to zero by mid-century.[23]

The demand created by a scaled alternative protein market for cereals, sugar and starch crops, pulses, soy, and oilseeds as feedstock could therefore compensate for declining demand for biofuels, potentially providing farmers with future-proof market opportunities, whilst helping realise the numerous environmental benefits discussed above.

POTENTIAL PRICE PREMIUM FOR FOOD-GRADE CROPS

Food-grade crops in the EU tend to command higher prices, averaging a 15-20% premium over feed-grade crops. Applied to the changes modelled in our scenario, this suggests that, under the right conditions, EU arable farmers could generate up to **€5 billion** in additional annual income by 2040.

Realising this potential, however, would require significant support and changes across the value chain. While food-grade crops offer higher market value, they are subject to stricter quality and safety standards, including specific protein or moisture content and tighter residue limits. Transitioning from feed to food-grade production therefore demands investment in research, infrastructure, and training, as well as adjustments in on-farm practices. Policy choices will determine how these costs and responsibilities are distributed.

Regional conditions will also shape the transition. Soil health, climate, and agronomic factors will affect where food-grade crops can be grown and how feasible such shifts are. Tailored crop-breeding programmes could help expand the range of viable regions and improve performance under different conditions.

[22] EU Agricultural Outlook 2024-2035
[23] CI Consulting (2025) Study on the potential evolution of Refining and Liquid Fuels production in Europe

MANAGING THE TRANSITION

Successfully managing this transition to ensure farmers are rewarded for the switch to food crops would entail:

➔

Financial and technical assistance and knowledge exchange to help farmers adapt their practices to meet higher quality and safety standards. This would include greater investment in crop-breeding programmes to develop varieties suited to food-grade specifications under current and future climatic conditions across Europe. In addition, investment in distribution would be essential to ensure farmers can access markets for food-grade produce.

➔

Developing the necessary equipment, both on-farm and for food processing. Existing supply chains must adapt to new crop types and quality through improved storage and handling, and processing facilities capable of managing food-grade inputs, while new infrastructure would be needed where gaps exist.

➔

Market development. These crops are not yet produced at scale, in part because demand has been limited and uncertain. Clearer visibility of future demand, along with demand-pull measures such as procurement commitments and offtake agreements, would be vital to stimulate early market growth and support the establishment of new value chains.

➔

Managing the transition for livestock farmers. In our scenario, EU meat and dairy production would adjust gradually over the next 15 years, with meat production falling by around 13% and dairy production by 25% (with seafood and eggs somewhat lower at 8%). Livestock farmers will continue to play a vital role in any future food system. Alongside demand shifts, climate change and reliance on feed imports will pose challenges to the sector. Managing these shifts will require targeted and proactive policy support to minimise any negative impacts and help these farmers adapt. Adaptation could mean focusing on premium, sustainably farmed meat and dairy products; diversifying into legume or sugar and starch production; providing environmental services, or a mix of these approaches to strengthen rural economies

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4. UNLOCKING THE OPPORTUNITY

The opportunity is clear, but to capture it, the EU must act decisively. Despite rapid innovation, the alternative protein sector still faces hurdles that limit its growth, including regulatory uncertainty, insufficient infrastructure capacity, and underinvestment in R&D and infrastructure scale-up. Addressing these three challenges will be critical for unlocking the full potential of alternative proteins, driving industrial and agricultural growth and resilience, and enabling the EU to secure its place as a global leader in the future of food.

4.1 REGULATORY BARRIERS

A supportive and predictable regulatory environment will be the cornerstone of the EU's success in alternative proteins. The EU has already established a strong foundation for food safety and innovation, but there is room to further streamline processes, increase clarity, and ensure consistency across member states.

PLANT-BASED	CULTIVATED	FERMENTATION
1. Streamline regulatory approval Establish clear, predictable, and well-resourced approval pathways, with EFSA capacity strengthened and efficient timelines	**1. Develop technique-specific guidance for approval pathways** Tailor EFSA guidance to the unique production methods of cultivated meat, with regular updates co-designed with industry	**1. Strengthen regulatory dialogue and guidance** Foster collaboration between regulators, academia, and industry; expand EFSA guidance; and formalize pre-submission consultations to clarify data and testing requirements
2. Enable proactive regulatory support Provide structured scientific pre-submission consultations and ensure flexibility to update dossiers as innovations evolve	**2. Provide early-stage scientific support** Create dedicated pre-submission consultations for companies to validate testing approaches and data requirements prior to dossier submission	**2. Increase transparency and shared knowledge** Build on open-access databases of approved substances, processes, and ingredients to accelerate innovation and reduce duplication
3. Foster EU-wide consistency Harmonize how member states interpret ingredient/process approvals to avoid national-level bottlenecks and create clear EU guidelines	**3. Accelerate timelines with regulatory sandboxes** Pilot cutting-edge regulatory tools to shorten assessments and test novel risk evaluation methods specific to cultivated meat and ingredients	**3. Support responsible innovation pathways** Enable structured pre-market tastings and flexible dossier review processes to adapt to fast-evolving technologies
4. Standardize naming and labeling Rule out restrictive denominations on plant-based meat and adopt common terminology to improve consumer recognition and trust	**4. Ensure EU-wide political backing** Secure explicitly support from the European Commission and Member States for cultivated meat approvals, reducing uncertainty and boosting investor confidence	**4. Enhance international collaboration and efficiency** Harmonize standards, clarify review timelines, and accept evidence from trusted regulators abroad to improve predictability and reduce redundant work

Figure 10: Recommendations to ensure a supportive and predictable regulatory environment

By building on what already works and introducing targeted improvements to reduce bureaucracy, policymakers can provide companies with the confidence to invest, scale, and bring high-quality products to market more quickly.

4.2 INFRASTRUCTURE BUILD-OUT

Scaling infrastructure is one of the most important hurdles to unlocking the full potential of alternative proteins. Each alternative protein pillar will require significantly more processing facilities to meet future demand.[24]

We focus on the following production facilities, which form the most important parts of the infrastructure needed for each alternative protein pillar:

➔
Plant-based foods: structured plant-protein (SPP) extrusion facilities.

➔
Cultivated meat and ingredients: proliferation bioreactors for bulk cell production.

➔
Precision and biomass fermentation: fermenters for microbe replication to produce target molecules or biomass.

Meeting projected demand would require capacity increases of **20%** each year for plant-based, **26%** for biomass, **21%** for precision fermentation and **60%** for cultivated.

These figures illustrate the scale of the challenge, but history shows that exponential growth is possible. Solar photovoltaic capacity grew 100-fold over a 15-year period (from 15GW in 2008 to over 1,600 GW in 2023), and has even reached a CAGR rate of 94% in the last few years.[25] This shows how quickly industrial build-out can

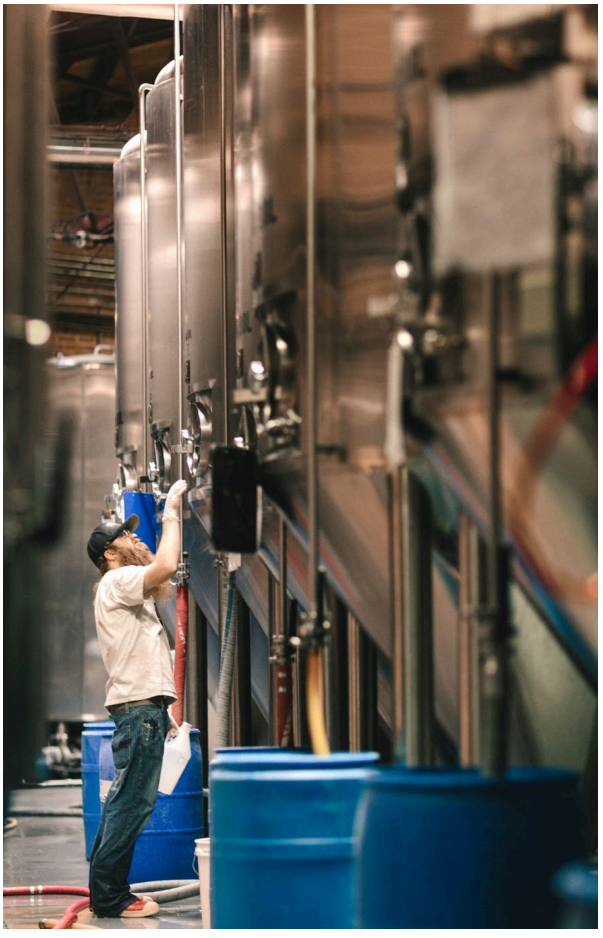
	Current capacity (2025)	Required capacity in 2040
Plant-based foods	205,000 tonnes	3 million tonnes
Cultivated meat and ingredients	74 tonnes	82,000 tonnes
Precision fermentation	4.5 million litres	83 million litres
Biomass fermentation	3 million litres	93 million litres

Figure 11: Infrastructure capacity needed to meet 2040 demand, Moderate Policy Support scenario

[24] For detailed analysis and sources see Technical Appendix

[25] Solar Power Europe (2024) New analysis reveals European solar battery storage market increased by 94% in 2023

be achieved when identified by policymakers as a strategic priority.[26] This transformation was also highly capital-intensive, requiring substantial upfront investment in manufacturing capacity, infrastructure, and innovation. Yet the payoff has been immense, delivering long-term economic value, job creation, and sustainability benefit.



Retrofitting potential

Repurposing facilities from other sectors can play an important role in scaling alternative protein production. Retrofitting existing infrastructure could reduce capital expenditure, with potential savings of up to 78% compared to greenfield builds (see Figure 11).[27]

➔

For plant-based foods, facilities with potential for retrofitting include those involved in producing pet food, pasta, breakfast cereals and dry snacks.

➔

For biomass fermentation, breweries, ethanol plants, and wineries could provide equipment and infrastructure that can be repurposed, offering savings in both capital expenditure and lead times.

➔

For the cultivated and precision fermentation sectors, there are no retrofitting options today, as most bioreactors in use are designed for pharmaceuticals or chemicals rather than food. In the future, we expect that some companies entering the market may be able to repurpose equipment from others leaving it, but do not expect this to have a major impact on costs.

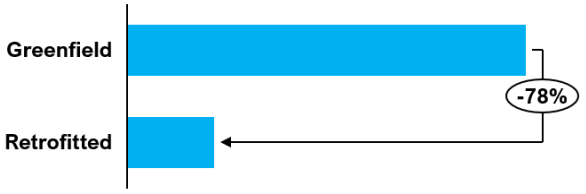


Figure 12: Retrofitting cost reduction

4.3 TOTAL PUBLIC AND PRIVATE INVESTMENTS REQUIRED

R&D investments

Targeted investment in research and development is essential to overcome technical bottlenecks, bringing products closer to taste and price parity with their animal counterparts and thereby unlocking commercial competitiveness.

[26] IEA (2025) Snapshot of Global PV markets
[27] GFI (2023) Manufacturing capacity landscape and scaling strategies for fermentation-derived protein

Our analysis, based on proxy industries, suggests around **€1.7 billion in total R&D investment (public and private) would be needed each year to** propel the EU alternative protein sector forward**.** R&D efforts would include, for example:

➔
Developing reliable and affordable feedstocks through agricultural waste valorisation.

➔
Advancing novel texturisation methods to improve taste and texture.

➔
Creating robust cell lines and microbial strains that can deliver the experience of meat and dairy at competitive, accessible price points.

CAPEX investments
Alongside R&D, CAPEX investments would also be needed to enable scale-up and commercialisation of alternative proteins.

Building large-scale cultivated meat and precision fermentation facilities is particularly capital-intensive, as food-grade bioreactors and supporting systems must be developed and deployed at scale. Over time, as facilities grow larger, economies of scale will drive down the cost per kilogram of protein.

Investments are also required to support **infrastructure for both commodity crops and specialised inputs**. Facilities that can produce microbial strains, process feedstocks at scale, and integrate these into supply chains will be critical to ensure reliable and cost-effective production.

We estimate that scaling production infrastructure in Europe to reach the modelled market share for the alternative protein sector would cost around **€2.7 billion per year**.

While this is a substantial sum, it is a fraction of European investment directed toward other green technologies. The European electric vehicle sector secured **€3.3 billion in 2022**.[28] European wind and solar received **€48 billion**[29] and **€55 billion**[30] in CAPEX investments in 2023 alone, whilst **€100 billion is** expected to flow into EU data centres in the next five years.[31] With the right public-private balance, alternative proteins can attract comparable returns on investment and deliver outsized returns for the EU's economy and society.

[28] S&P Global (2023) Private equity investment in European EV industry up in Q1
[29] Wind Europe (2024) Rebound in wind energy financing in 2023 shows that the right policies attract investors
[30] SolarPower Europe (2024) SolarPower Europe's annual EU Market Outlook for Solar Power
[31] European Data Centre (2025) State of European Data Centers

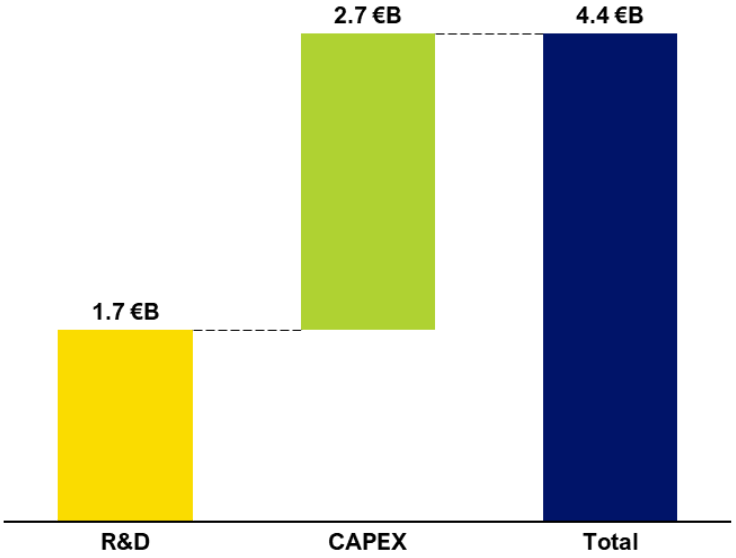
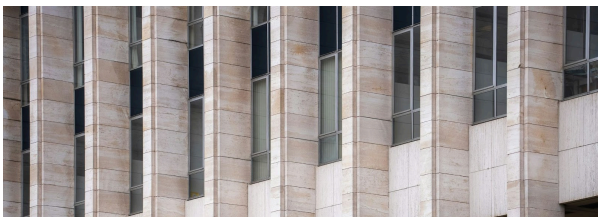


Figure 13: Annual public and private investment requirements to scale the alternative protein sector, Moderate Policy Support scenario

4.4 THE ROLE OF PUBLIC R&D AND CAPEX INVESTMENT

Public funding for research and development is crucial to accelerate emerging technologies. When research results are made openly accessible, they benefit all companies – enabling faster progress and avoiding duplication of effort. Public investment in R&D can also serve a distinct role from private funding by exploring foundational research areas that can help the entire sector over the long term, rather than the short-term goals of individual companies. The history of solar and wind technology demonstrates that strategic government investment in green innovation accelerates diffusion rapidly.[32]



[32]Zapata, S., Uriona-Maldonado, M., & Herrera, M. M. (2024). The role of renewable energy policy and R&D in renewables diffusion. *Electricity, 5*(3), 526–545. https://doi.org/10.3390/electricity5030026

Public funding plays an equally crucial role in unlocking private capital for CAPEX investments, enabling new industries to scale. In CAPEX-intensive sectors that involve emerging technologies, government support gives companies the opportunity to innovate and expand, and private investors the confidence to invest.

The experience of renewable energy and electric vehicles shows how targeted public investment can change the trajectory of an industry, helping new technologies move from niche to mainstream. By using public resources to share risk and attract private finance, policymakers can create the conditions for a thriving market and economic growth. Evidence from existing EU funding programmes, such as the European Innovation Council's accelerator, shows that the return on this kind of investment can be significant; crowding in two to four times the amount of private investment.[33]

For alternative proteins, instruments such as co-funding, guarantees, and blended finance

[33] European Innovation Council (2025) EIC Impact Report 2025

can help unlock investment that would not otherwise flow into the sector, accelerating progress and positioning the EU at the forefront of sustainable food production. As detailed in Chapter Two, the long-term economic benefits to be gained from such investment would be substantial.

Our analysis suggests that each year **€690 million** would be needed in public R&D investment to improve taste and lower costs. **€720 million** each year would be needed for targeted public CAPEX investments to help derisk scale up.

Again, this level of public investment in emerging green technologies is not unheard of. Batteries received nearly **€3 billion** via a single initiative in 2021,[34] and **€3.3 billion** was recently mobilised from the EU budget to support the development of semiconductors.[35] Two funding initiatives committed **€10.6 billion** in public funding to green hydrogen in 2022 alone.[36]

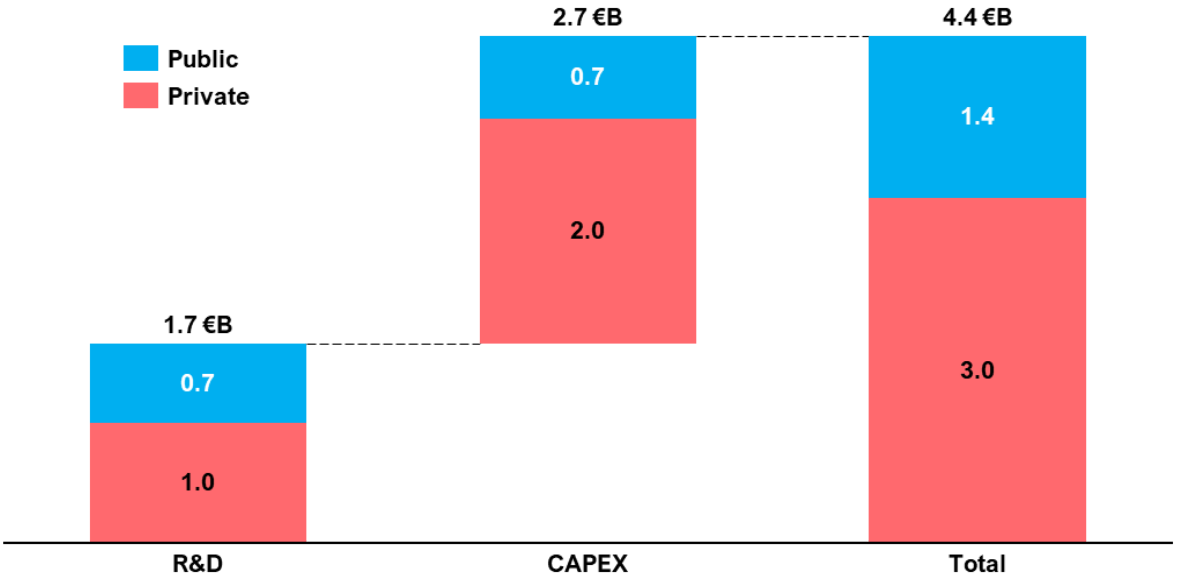


Figure 14: Yearly public and private investment requirements to scale the alternative protein sector, Moderate Policy Support scenario

[34] European Commission (2021) State aid: Commission approves €2.9 billion public support by twelve Member States for a second pan-European research and innovation project along the entire battery value chain
[35] Council of EU (2023) Chips Act: Council gives its final approval
[36] European Commission (2022) State Aid: Commission approves up to €5.2 billion of public support by thirteen Member States for the second Important Project of Common European Interest in the hydrogen value chain

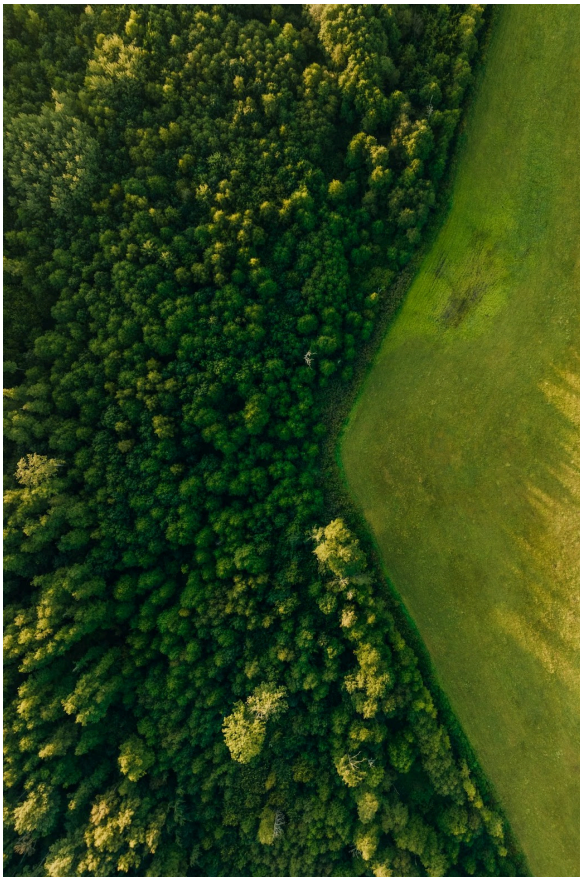
SYSTEMIQ

CALL TO ACTION: THE EU MUST ACT NOW TO REAP THE BENEFITS OF PROTEIN DIVERSIFICATION

Europe stands at the threshold of a new era in how food is produced – one that offers not only environmental and public health gains but also major economic and strategic advantages. By making the alternative protein sector a strategic industrial priority, the EU has a unique opportunity to lead the world in this emerging sector, while boosting economic growth and building greater agricultural resilience at home.

A robust domestic alternative protein industry could become a cornerstone of the EU's food system and industrial base, driving sustainable growth, high-quality employment, and competitiveness. By 2040, the sector could contribute **€111 billion** in added value annually to the EU economy, a domestic market worth up to **€79 billion**, a trade potential of **€60 billion**, and support almost **half a million jobs** across the EU.

For European agriculture, protein diversification offers tangible long-term benefits. A thriving plant-based meat and dairy sector could boost demand for legumes and pulses, expanding and diversifying their production while helping to reduce the EU's protein deficit and improve soil health through nitrogen fixation. In parallel, the growth of the fermentation and cultivated protein sectors would create new markets for sugar and starch crops, whose demand is likely to otherwise decline as transport electrifies and diets evolve to meet climate targets. Taken together, these shifts could diversify and potentially increase arable farm incomes, offering farmers more stable and future-proof market opportunities within a changing agricultural landscape.



Yet this vision will not be realised automatically. It requires decisive action by policymakers today to address barriers and deliver the necessary investment, infrastructure and value chain shifts.

Credit: Quorn

1. The regulatory framework must be streamlined to provide clarity, consistency, and efficiency. A supportive policy environment will give companies the confidence to invest and scale, while ensuring consumers benefit from safe, high-quality products.

2. The EU must prepare its industrial base for exponential growth by building and retrofitting the infrastructure needed to produce alternative proteins at scale. This is not only about food production but establishing a new industrial strategy for the EU as a hub for biomanufacturing, engineering, and advanced manufacturing.

3. Public funding must be deployed strategically to de-risk innovation and unlock private investment. With **€690 million** annually in targeted support for R&D to overcome the key technical hurdles to taste and price parity, and **€720 million** annually to derisk and scale production facilities, the EU can attract the capital needed to build a thriving sector.

THE QUESTION IS NOT WHETHER THE EU CAN AFFORD TO INVEST, BUT WHETHER IT CAN AFFORD NOT TO. BY ACTING NOW, THE EU CAN SET ITSELF ON COURSE TO UNLOCK THE FULL POTENTIAL OF ALTERNATIVE PROTEINS – DRIVING INDUSTRIAL AND AGRICULTURAL GROWTH AND RESILIENCE, AND SECURING ITS PLACE AS A GLOBAL LEADER IN THE FUTURE OF FOOD.

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APPENDIX

ECONOMIC POTENTIAL PER PILLAR AND ACROSS SCENARIOS

Moderate Policy Support

	2040					2050				
	Plant based	**Cultivated**	**Precision**	**Biomass**	**All AP**	**Plant based**	**Cultivated**	**Precision**	**Biomass**	**All AP**
Unit	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*
Gross Value Added	89.6	0.0	1.4	20.3	**111.3**	89.9	14.4	7.0	20.5	**131.9**
Domestic market size	67.0	0.0	0.8	11.4	**79.2**	66.2	7.8	3.9	11.3	**89.2**
Export opportunity	51.4	0	0.6	8.0	**60**	52.4	6.4	2.9	8.3	**69.9**
Total market opportunity	118.4	0.0	1.4	19.4	**139.2**	118.5	14.2	6.8	19.6	**159.1**

Unit	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*
Total jobs	350,000	17	5,000	59,000	**414,000**	351,000	50,000	24,000	60,000	**485,000**

High Ambition

	2040					2050				
	Plant based	**Cultivated**	**Precision**	**Biomass**	**All AP**	**Plant based**	**Cultivated**	**Precision**	**Biomass**	**All AP**
Unit	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*	*EUR bn*
Gross Value Added	157.1	3.2	32.2	67.4	**260.0**	156.9	49.6	34.2	67.2	**307.8**
Domestic market size	142.6	1.9	20.0	40.2	**204.7**	139.7	29.2	20.8	39.6	**229.3**
Export opportunity	84.0	1.5	13.6	28.7	**127.8**	85.7	23.0	14.7	29.0	**152.4**
Total market opportunity	226.6	3.4	69.0	332.6	**332.6**	225.4	52.2	35.5	68.6	**381.7**

Unit	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*	*Jobs (FTE)*
Total jobs	670,000	12,000	120,000	209,000	**1,010,000**	666,000	184,000	126,000	208,000	**1,184,000**

Source: Systemiq analysis
Note: Totals can deviate slightly due to rounding