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Horizon Europe support for the European Green Deal

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The European Green Deal, aimed at making the EU climate-neutral by 2050, outlines a comprehensive approach to sustainability, requiring profound transformation across all industrial sectors. Horizon Europe, the EU's foremost research and innovation programme, can be a critical enabler, providing the necessary funding, framework and innovation pathways to support this transition.

Employing a combination of desk research and stakeholder consultations, this study evaluates Horizon Europe's alignment with the Green Deal, focusing specifically on Horizon's impact on European industry. The analysis sheds light on Horizon Europe's role in supporting research with a sustainability focus, and in facilitating industry participation in research projects. It reveals successes and identifies challenges such as administrative complexities, and the need for mechanisms to provide tailored support for small and medium-sized enterprises.

The report suggests three policy options to strengthen Horizon Europe's support for industry: enhancing the capabilities of National Contact Points, expanding the 'marketplace' concept for green technologies, and prioritising selected strategic industrial and technological goals within Horizon Europe.

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Executive summary

The European Green Deal sets the ambitious goal for Europe to become the world's first climate-neutral continent by 2050, requiring a shift towards sustainable business practices and technologies across various sectors of the economy. Horizon Europe can play an important role in the green transition, providing support for the European industry in navigating the path towards sustainability. This report delves into the intricacies of Horizon Europe's alignment with the Green Deal, evaluating its structure, the efficacy of its implementation and industry's perception of the support received.

Through a combination of desk research and consultations with different groups of stakeholders, the analysis sheds light on Horizon Europe's role in supporting sustainability projects and in facilitating industry players' engagement. The programme's initiatives, notably the European Innovation Council and thematic clusters, have effectively mobilised funding and engaged industry players from large firms to small and medium-sized enterprises (SMEs). We estimate, for instance, that Horizon Clusters have mobilised more than €9 billion for Green Deal-related projects.

Overall, we find that Horizon Europe plays a key role in financing research and innovation (R&I) projects that are relevant to achieving the European Green Deal. In addition, Horizon Europe is perceived by industry and other stakeholders as supporting the green transition and the greening of the EU's supply chains. However, the research also uncovers challenges that curtail the full realisation of Horizon Europe's potential. They include administrative hurdles and gaps in support of SMEs, which are crucial for the innovation ecosystem.

Industry stakeholders point out various barriers to accessing Horizon Europe – notably in terms of administrative requirements and the resources required to comply with them, which increase costs for participants. The primary obstacle is the administrative burden associated with applying for Horizon Europe calls, compounded by time constraints and the complexity of application requirements. Another barrier is a general lack of visibility and perceived complexity surrounding Horizon Europe, for which stakeholders require support.

To address these obstacles and optimise Horizon Europe's contributions to the Green Deal, the report proposes three strategic policy options:

- Enhancing the capabilities of National Contact Points, including by using artificial intelligence (AI) tools to facilitate access to information and support;
- Expanding the 'marketplace' concept to boost the dissemination and adoption of green technologies; and
- Ensuring that Horizon Europe's research calls prioritise the strategic directions of the Net-Zero Industry Act and the Strategic Technologies for Europe Platform (STEP).

These recommendations aim to streamline Horizon Europe's processes, increasing its impact on the green transition and ensuring it meets the evolving needs of EU industries.

Horizon Europe's role in fostering research, innovation and sustainability has never been more critical as the EU strides towards its goal of climate neutrality – an economy with net-zero greenhouse gas emissions – by 2050. Adopting the proposed policies could significantly enhance the programme's efficiency and impact, providing a robust framework for supporting sustainable development and alignment with the European Green Deal.

Table of contents

List of figures

List of tables

1. Introduction

The EU Member States pledged to reduce the continent's net greenhouse gas (GHG) emissions by at least 55 % by 2030, compared with 1990 levels. To reach this ambitious target, the European Green Deal provides a package of measures to make the European economy more resource-efficient. Research and innovation (R&I) is critical to achieving the Green Deal objectives – through new ways of decarbonising, reducing pollution and preserving natural ecosystems, including clean and low-carbon innovations.[1] In this context, the Green Deal supports 'industry to innovate and to become global leaders in the green economy'.[2]

Supporting the green transition is one of the aims of Horizon Europe, the EU's key funding programme for R&I. One of Horizon Europe's roles is to support and execute the Green Deal through sustainability R&I, by facilitating the development and dissemination of knowledge and technologies. It engages both research institutions and industry, the latter being an essential component for deploying and commercialising R&I projects in the market.

1.1. Objectives of the study

The Horizon Europe programme runs from 2021 to 2027. At the mid-point, it is crucial to assess its effectiveness in contributing to the objectives of the European Green Deal, particularly in supporting industry. Given EU Member States' ambitious 2030 climate commitments, it is imperative to explore ways in which the programme could further improve its support for industry and identify potential gaps – by answering these questions:

1. To what extent is the programming of Horizon Europe enabling industry to achieve the transitions envisaged in the Green Deal?
2. To what degree is the research funded over the past three years generating the necessary outcomes required by EU industry to reach the Green Deal goals?
3. What are different industries' perspectives on the support they have received to achieve the ambitions of the Green Deal, and what needs have not yet been met?

1.2. Report structure

This report is structured as follows.

Section 1 introduces the study. Section 2 presents the methodology and resources used for the study's desk research, surveys and interviews.

Section 3 consists of a synthesis of the desk research and the survey findings, complemented by interviews. The desk research looks into Horizon Europe's structure and ongoing implementation, analysing its programming, inspecting its Green Deal-related instruments and its relations with industry. The survey and interviews reflect the opinions of key industry and Horizon Europe stakeholders on the support offered and additional support required for the green transition.

Section 4 concludes this study, and Section 5 formulates policy options drawing from gaps and improvement areas analysed.

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[1] European Commission, R&I and the green transition, Publications Office of the European Union, 2021.

[2] European Commission, Press release, 2019.

2. Methodology and resources used

2.1. Desk research

The desk research indicates how the Horizon Europe programming supports European industry to achieve the objectives of the Green Deal. Drawing from a collection of Horizon Europe reports and online information, it provides an overview of the various Horizon Europe instruments and programmes. These selected components cover both industry and Green Deal topics, comprising:

- European Innovation Council (EIC)
- European Innovation Ecosystems
- Horizon Clusters & associated partnerships
- EU Missions
- European Institute of Innovation &Technology (EIT)
- The European Research Council
- Marie Skłodowska-Curie Actions
- Research Infrastructures

In tandem, the desk research analysed the implementation of each programme and instrument by considering the number of ongoing projects and associated funding. This involved analysis of data from the Horizon Dashboard, covering Green Deal-related projects, the participation of industry and the level of funding received. The findings show the current state of support provided to industry players by the Horizon Europe framework and identify potential gaps.

2.2. Stakeholder consultation

2.2.1. Stakeholder consultation through survey and interviews

The study consulted European industry players through a combination of a survey and semi-structured interviews to understand how the current research funded by Horizon Europe is helping them achieve the Green Deal goals. The survey respondents and interviewees offered an insider's viewpoint on the implementation of Horizon Europe, while revealing some of their unaddressed needs.

An online survey was initially disseminated to 495 industry bodies, focusing on whether there are any gaps in the implementation of Horizon Europe and on potential improvements.[3] The survey was structured into six sections:

- Respondents' profiles.
- Familiarity with Horizon Europe and the Green Deal.
- R&I funding practices and needs.
- Perceptions on the targets around technology readiness levels (TRLs) currently embedded in Horizon Europe calls.
- Insights on Horizon Europe's impacts, focusing on collaborations and industrial development.
- Horizon Europe's main areas for improvement

[3] Annex 1 provides further description on the selection process, rationale, and the exact number of entities sampled by stakeholder type. Annex 2 provides the survey questionnaire.

The survey received 111 responses.[4] To address the gaps identified in the survey, particularly the low response rate recorded among SMEs, the construction sector and the transport sector, we conducted complementary interviews to ensure that crucial information was not overlooked.

We conducted targeted 11 semi-structured interviews to obtain additional and detailed information into these gaps and potential areas of improvement. The interview discussions served to validate and consolidate a set of policy options, which were based on the study's findings and fed into three policy options. They suggest ways of improving the support Horizon Europe provides to industry to meet Green Deal objectives and beyond.

2.2.2. Approach to stakeholder selection

To obtain a variety of perspectives from industry players on Horizon Europe, the survey targeted firms of different sizes as well as industry-related Horizon Europe entities. The key industrial sectors were defined as the energy, transport, steel, cement, ICT, textiles and chemicals sectors. The survey primarily contacted the largest European industrial companies, selecting them proportionately to carbon emissions from each sector. The rationale for targeting major companies emitting the most greenhouse gases is rooted in the necessity to involve these stakeholders. Without the involvement of the most emitting companies, the Green Deal goals cannot be achieved.[5]

Understanding their perspectives and needs for a successful transition is therefore essential. This approach relies on the data from the European Environment Agency website to identify the main emitting sectors in Europe that we want to target.[6] Therefore, the survey first engaged with the highest-emitting sectors: energy and transport, each emitting 30% of greenhouse gases in Europe. The survey then contacted the largest companies in other sectors, as well as industrial SMEs.

The selection of SMEs relied on a random sample from across Europe, to obtain diverse viewpoints. With the same reasoning of learning from distinct experiences, the survey selected ensuring equitable representation from each sector. Therefore, the survey is designed to offer diverse viewpoints while getting insights from the stakeholders who will be directly involved in decarbonising their industry. Additionally, the survey addresses Horizon Europe's industry-related stakeholders by reaching out to European technology and innovation platforms (ETIPs), European Technology Platforms (ETPs) and European Institutes of Innovation and Technology (EITs), as well as stakeholders from the previous programme (Horizon 2020) in the case of Green Deal projects. Table 1 summarises the selection criteria for each stakeholder type.

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4 Survey respondent's profiles are presented in Annex 3.

5 Notably the energy sector, which accounts for approximately 30% of CO_2 equivalent emissions and the transport sector, contributing around 30%.

6 European Environment Agency. 'Data visualization: Greenhouse gas emissions by aggregated sector', website 2019.

Table 1 – Selection criteria per stakeholder type

Stakeholder type	Sample selection criteria[7]	Involvement
European technology and innovation platforms (ETIPs) and European Technology Platforms (ETPs)	- Experience in more than one European union programme including Horizon Europe - Link with industrial sectors	Survey
European industrial companies	- Proportionate selection reflecting each sector's GHG emissions share - Largest European companies	Survey
European industry associations	- Prioritised energy and transport sectors, reflecting higher emissions and resulting in more representation in these sectors.	Survey Interviews
European Institutes of Innovation and Technology (EITs)	- Relation to the third pillar of Horizon Europe 'Innovative Europe', ensuring relevance to industry.	Survey
Green Deal projects	- Experts involved in the evaluation of Horizon Europe and Horizon 2020	Survey
Industrial Small and medium-sized enterprises (SMEs)	- Link with industrial sectors - Top and mid-tier beneficiaries of Horizon Europe - Balanced coverage of the EU	Survey Interviews
European National Contact Points (NCP)	- Balanced coverage of the EU - Green Deal and industry-related expertise i.e., Digital, Industry and Space, or the European Innovation Council (EIC) and European Innovation ecosystems	Interviews

The survey results directed the selection of stakeholders for interviews, determining those that are the most relevant. The interviews first targeted Horizon Europe National Contact Points (NCPs) to offer further internal perspective on the functioning of the programme. Having recognised stakeholder types with low response rates, the survey specifically targeted them. Results also indicated minor discrepancies in terms of industrial sectors, with fewer responses from the transport and construction sectors than anticipated, therefore interviews focused on industry associations from these sectors.

[7] The sample size and precise selection steps are further described in Annex 1.

3. Synthesis of the research results and findings

3.1. Structure and implementation of Green Deal-related Horizon Europe instruments and programmes

The desk research analysed the structure of Horizon Europe and investigated its implementation progress, with the aim of improving understanding of how Horizon Europe is supporting industry players in achieving the Green Deal goals through its various instruments and programme.

3.1.1. Alignment of Horizon Europe's framework with the Green Deal and industry participation levels

The European Green Deal, which aims for EU climate-neutrality by 2050, encompasses a broad strategy including clean energy, circular economy, energy-efficient buildings, sustainable mobility, environmentally friendly food systems, biodiversity preservation and pollution reduction. It significantly influences Horizon Europe, particularly impacting three clusters (Digital, Industry and Space; Climate, Energy, Mobility; Food, Bioeconomy, Natural Resources, Agriculture and Environment) and four missions (Climate Adaptation, Climate-Neutral Cities, Soil and Oceans). Horizon Europe champions the Green Deal through various actions and funding opportunities, focusing on research, innovation and the commercialisation of green technologies.

By scrutinizing Horizon Europe's framework and allocations, using tools like the Horizon Dashboard for comprehensive data analysis, we pinpointed how its provisions align with Green Deal aims. Tables 2 and 3 show the results of this mapping exercise.

Table 2 – Mapping Horizon Europe programmes by theme

	Projects not directly related to the Green Deal			Green Deal-related projects[8]		
Horizon Europe programme/instrument	Number of projects	Funding (millions)	Average funding per project (millions)	Number of projects	Funding (millions)	Funding per project (millions)
Horizon Missions	40	€308.5	€7.7	111	€881.4	€7.9
Horizon Clusters	320	€1,076	€5.7	1681	€9,750	€5.8
European Innovation Council	587	€1,524	€2.9	202	522.5	€2.6
European Innovation Ecosystems	97	€202.4	€2	14	€2.7	€0.2

[8] This refers to projects tackling topics that are closely related to the Green Deal. They may form part of wider Green Deal related calls but, more often than not, they do not. We determined relatedness to the Green Deal through content analysis aiming to identify and map relevant projects. Horizon Europe project titles available in the Horizon Dashboard were assessed, initially via keyword matching using as keywords all the words describing the various Green Deal components (including, among other keywords, 'sustainability' and 'sustainable [energy; transport; energy; agriculture]'; 'climate'; 'just transition'; 'green transition'; 'circularity'; 'circular economy'; 'clean' and/or 'renewable energy'; 'zero-pollution'; 'waste'; 'net-zero'). At a second stage we carried out plain visual inspection of the titles in order to further hone in on the projects' thematic relevance to the Green Deal. In cases where the project title information was ambiguous, further inspection of the project abstract on Cordis was carried out.

	Projects not directly related to the Green Deal			Green Deal-related projects[8]		
Horizon Europe programme/instrument	Number of projects	Funding (millions)	Average funding per project (millions)	Number of projects	Funding (millions)	Funding per project (millions)
European Research Council[9]	2648	€4,809	€1.7	178	€261.1	€1.47
Research Infrastructures	100	€617.2	€6.2	35	€248	€7
Marie Skłodowska-Curie Actions	2758	€1500	€0.54	323	€220	€0.68

Source: Horizon Dashboard

Table 3 – Mapping Horizon Europe programmes: Industry participation

	Projects not directly related to the Green Deal			Green Deal-related projects		
Horizon Europe programme/instrument	PrC[10]s (% of total participants)	SMEs (% f total participants	Fuding per SME[11]	PrCs (of total participants)	SME (% of total participants)	Fundig per SME
Horizon Missions	17%	14.5 %	€501,000	24%	19%	€328,000
Horizon Clusters	24.6%	15.2%	€572,450	38.9%	24.5%	€359,000
European Innovation Council	39.2%	34.3%	€1,463,000	47.7%	40%	€1,474,000
European Innovation Ecosystems	35.6%	24%	€105,800	46%	32.4%	€95,450
European Research Council[12]	2.1%	1.7%	€593,783	2.5%	0.9%	€32,500
Research Infrastructures	10%	7.5%	€568,200	10%	8.7%	€381,600
Marie Skłodowska-Curie Actions	20.5%	11.5%	€194,610	27.1%	14.2%	€189,800

Source: Horizon Dashboard

According to these findings, industry participation in Green Deal-related projects is highest in the European Innovation Council and the European Innovation Ecosystems, where almost half of the participants stem from the private sector, followed by the Clusters and the associated partnerships with almost 40% industry participation. In addition to these quantitative findings, the desk research has investigated the main Horizon instruments and programmes for more insights.

9 For ERC, we have calculated the share of GD-related projects based on titles whose identification with the Green Deal objectives is relatively straightforward. If one were to include fundamental research projects that may one day lead to GD-related breakthroughs, the number of GD-related projects would double according to our estimates.

10 PrC: Private Companies

11 This is calculated by taking the SME-allocated part of each project's budged, summing over all projects in in the respective category (Green Deal vs. Non Green Deal) and dividing by the number of SMEs.

12 Owing to how we classified projects for ERC (see previous footnote), these figures are not fully accurate. The reason that the funding per SME for GD-related projects is lower than for other categories, is because the estimate is based on only two projects where SMEs were found to be involved and where the amount awarded to them was quite low.

3.1.2. European Innovation Council's support for the European industry

The European Innovation Council (EIC) is designed to promote and scale breakthrough technologies and innovations, focusing on startups and SMEs. With an emphasis on supporting business innovation and commercialisation, the EIC stands out by offering financial support through grants and investments, including direct equity or quasi-equity options, with a budget of €10.1bn.

The EIC operates through three primary instruments: the Pathfinder, which backs the exploration of innovative ideas for new technologies; the Transition, funding the advancement from experimental proofs to market-ready solutions; and the Accelerator, aimed at helping start-ups and SMEs to scale up innovative products or services. The support provided by these instruments consists of a combination of both open and challenge-driven funding. The latter is derived from calls with predefined topics, often linked thematically to the Green Deal. Projects that fall outside these predefined topics may apply for funding for any idea/topic (also related to the Green Deal) through the Open versions of these three instruments.

Furthermore, the EIC enriches its financial support with Business Acceleration Services, which are offered to beneficiaries of the three aforementioned EIC instruments, of the *Women TechEU*[13] and to companies receiving the *Seal of Excellence*.[14] The services on offer are:

- Access to coaches, mentors, expertise and training (through the EIC Coaching Programme, the EIC Women Leadership Programme and the EIC Tech to Market Programme).
- Access to global partners (leading corporates, investors, procurers, distributors, clients), through the EIC Corporate Partnership Programme, EIC Innovation Procurement Programme, EIC International Trade Fairs and Soft-Landing Programme 3.0, EIC Scaling Club, and the EIC co-investment support Programme; and
- Access to innovation ecosystem and peers, through the EIC Ecosystem Partnership Programme.

Industry support is also provided by the Enterprise Europe Network (EEN),[15] implemented by the European Innovation Council and the SMEs Executive Agency. As a support network for SMEs, the EEN has direct bearing on the Green Deal – aiming to help companies become more resilient and support them to develop more sustainable and digital business models.

3.1.3. European Innovation Ecosystems' support for the European industry

The European Innovation Ecosystems (EIE) aim to enhance interconnected, inclusive innovation ecosystems, complementing EIC and EIT actions, activities across Horizon Europe, as well as initiatives at the national, regional and local level. Focusing on deep-tech company scaling, experimentation spaces and addressing the EU's innovation divide, the EIE support the New European Innovation Agenda through three *destinations*: CONNECT, INNOVSMES, and SCALEUP.

CONNECT enhances ecosystem connectivity to tackle societal challenges and support transitions emphasised by the Green Deal. INNOVSMES backs innovative SMEs in international R&D via the European Partnership on Innovative SMEs/Eurostars. SCALEUP accelerates socially valuable

[13] Women TechEU, 'Supporting women leading deep tech startups from Europe to grow into tomorrow's tech leaders', website, (n.d.)

[14] European Commission, 'Seal of Excellence', website, (n.d.)

[15] The Enterprise Europe Network (EEN) helps businesses innovate and grow on an international scale. It is the world's largest support network for small and medium-sized enterprises (SMEs) with international ambitions. https://een.ec.europa.eu/about-enterprise-europe-network

business growth, including Women TechEU for female-led deep-tech startups, through coaching and mentoring, as well as targeted funding to help take their business to the next level.

3.1.4. Horizon Clusters' and Partnerships' support for the European industry

The Clusters in Horizon Europe were conceived to address major societal challenges. Three of them (Cluster 4: digital, industry and space, Cluster 5: climate, energy, mobility and Cluster 6: food, bioeconomy, natural resources, agriculture and environment) are highly relevant to the Green Deal and cover all its components through the various calls. With a budget of more than €39bn, funding for these three Clusters accounts for 41% of the entire Horizon Europe programme, underscoring the growing importance of Green Deal themes and objectives in the European R&I edifice. Industry is supported directly through calls for research activities.

Further support to industry is provided by European Partnerships, which bring the European Commission together with private and/or public partners. In particular, they aim to 'provide mechanisms to link R&I to policy needs, develop close synergies with national and regional programmes, bring together a broad range of innovation actors to work towards a common goal and turn research results into socio-economic impacts'.[16]

A comprehensive analysis of Horizon Partnerships' structure reveals their wide-ranging coverage of industrial sectors, incorporating Green Deal policies and measures. Within the initial Strategic Plan, a portfolio of 49 candidate partnerships has emerged, addressing the full spectrum of industrial sectors.[17] A closer examination of these sectors emphasises a strong focus on various aspects of information technology,[18] as well as attention to energy, chemicals and materials industries (including significant sectors such as steel, cement, and textiles). By contrast, interest in transportation technology appears relatively subdued.

Furthermore, the Green Deal objectives are effectively incorporated within the Partnerships. Of its 49 partnerships, 19 (39%) cover the green transition,[19] tackling essentially industry-related innovations: renewable energy solutions, clean hydrogen and battery technologies, decarbonising the transport sector, disruptive new aircraft technologies, circular business models in built environment, among others. These green transition partnerships can be found in the key partnerships' clusters supporting the Green Deal: Cluster 5 (climate, energy and mobility) and Cluster 6 (food, bioeconomy, natural resources, agriculture and environment). Additionally, about a third of the partnerships contributions to the green transition is coming from Cluster 4 (digital, industry & space), with its initiative about clean steel, sustainable manufacturing, 'made in Europe' and more.

The commitment of Horizon Europe towards Partnerships is estimated to be around €23.8bn. An additional €22.4bn commitment from industry players has been made for the launch of European Partnerships. This investment has exceeded the EU's contribution requirement for co-programmed partnerships and joint undertakings by €4.9 billion.

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16 ERA Learn, 'European Partnership', website, (n.d.)

17 European Commission, 'European Partnerships in Horizon Europe', *website*, 2023

18 European Commission, Directorate-General for Research and Innovation, 'Assessing European partnerships against European policy priorities – Developing and illustrating a methodology for assessing the relevance of European Partnerships as instruments to address current and future European policy priorities', Publications Office of the European Union, 2023.

19 European Commission, Directorate-General for Research and Innovation, 'Horizon Europe – The next generation of European partnerships – Contributing to a greener and more digital Europe', Publications Office of the European Union, 2021.

Next, we analysed the implementation of partnerships looking into the foreseen outcomes of the Clusters 4, 5 and 6, which are supporting Green Deal objectives, as previously noted. Our findings show that ambitious targets have been set to support the industry. In 2022, the Biennial Monitoring Report of Partnerships identified Cluster Specific Impact Pathways (CSIPs) indicating the targeted outcomes for each cluster. For each relevant cluster to the Green Deal objectives, in priority the Cluster 4, 5 and 6 we have selected the different outcomes planned for the green transition and related to the industry (see Table 4).

Table 4 – Outcomes per Cluster relating to industry and Green Deal objectives

Cluster 4 Digital, Industry and Space	Cluster 5 Climate, Energy and Mobility	Cluster 6 Food, Bioeconomy, Natural Resources, Agriculture and Environment
Technological Sovereignty, accelerated deployment of advanced manufacturing	Technological sovereignty, accelerated deployment of advanced zero emission technologies, reuse and recyclable materials	Sound tools and evidence to accelerate the transition to sustainable food system and on water for policy (harmonisation of monitoring schemes across Europe)
Integration of economic & innovation ecosystem, Strengthen role of SMEs	Strengthen role of start-up and SMEs demonstrating circular business model	Pilot 'green' products and services (including digital) for industrial scaleup
Reduction of carbon footprint, energy & resources efficiency	Improved H2 technologies cost-effectiveness	
Human and technology complementarity and excellence in manufacturing	Human and technology complementarity, trustworthy interaction between all traffic participants and CCAM	

These outcomes indicate that Partnerships can support industry in achieving Green Deal goals with broad sector coverage. However, the Biennial Monitoring Report highlights a gap in stakeholder and end-user engagement, affecting solution adoption. Despite substantial green investments and ambitious targets, enhancing end-user involvement remains crucial.

3.1.5. Horizon Missions' support for the European industry

Horizon Missions, unique to Horizon Europe, focus on demonstrator projects in five areas –cancer, climate adaptation, oceans, soil and climate-neutral cities – to tackle societal challenges. With the exception of the cancer Mission, all the other Missions support Green Deal goals. Missions include R&I actions and large-scale demonstration and pilot projects involving public and private stakeholders. Despite their innovative approach, initial assessments[20] cite governance, funding leverage and low private-sector involvement (just 22.4%) as challenges.

[20] European Commission, 'EU Missions two years on: An assessment of progress in shaping the future we want and reporting on the review of Mission Areas and areas for institutionalised partnerships based on Articles 185 and 187 TFEU', Commission Staff Working Document, 2023.

3.1.6. European Institute of Technology's support for the European industry

Of the Pillar III instruments, the European Institute of Innovation and Technology[21] (EIT) is perhaps the one most aligned with the Green Deal objectives. This is achieved through its Knowledge and Innovation Communities (KICs) that focus on tackling societal challenges. Six of the nine KICs are thematically closely related to the Green Deal: Climate Change, Future of Food, Sustainable Energy, Added-Value Manufacturing, Raw Materials and Urban Mobility.

The EIT funds KICs to a maximum of 25%. This is leveraged by the EIT by incentivizing Innovation Community partners to invest in innovation and provide the remaining 75% funding needed for their activities. With the 25% seed funding, the EIT enables KICs to attract capital from industrial partners and private investors.[22]

A distinct feature of EIT is that it operates in all stages of the R&I spectrum, from R&I generation to deployment and uptake. The mix of these activities differs across the various KICs, with each KIC allocating their resources according to their needs. The preliminary desk research has shown that the main focus is scaling up and commercializing R&I outcomes, although R&I generation and innovation uptake are also undertaken to varying degrees by the KICs.

A unique feature among the various Horizon instruments assessed by the desk research, is the concept of Marketplace, offered by KIC InnoEnergy, KIC Urban Mobility and KIC Manufacturing (called Access2Tech). Marketplace showcases market-ready and de-risked innovations offered to corporates and investors that wish to transition to more sustainable and green practices. Despite the potential of these initiatives to foster sustainable transitions, they are not offered by the other KICs for reasons that relate to the independent nature of the various KICs and an apparent lack of high-level coordination between them.

3.1.7. European Research Council's and Marie Skłodowska-Curie Actions' support for the European industry

The European Research Council (ERC) and Marie Skłodowska-Curie Actions (MSCAs) share a common trait in that they fund early-stage and often frontier research across all scientific areas. Without a specific Green Deal focus or dedicated calls, the support these two instruments offer to industry to achieve its Green Deal objectives comes from involving stakeholders in projects with a thematic relevance to the Green Deal. As Table 5 shows, among 2,826 ERC projects reviewed, only 178 (6.2%) are closely related to the Green Deal, with just five involving the private sector, indicating limited direct support and industry engagement. Analysis of 3,082 MSCA projects reveals a larger share of Green Deal related projects (10%) and a much higher level of private-sector participation (27%). A possible explanation for this discrepancy is that ERC has a stronger emphasis on fundamental research than MSCAs, part of which also involves training.

3.1.8. Research Infrastructures' support for the European industry

Research Infrastructures aim to boost Europe's R&I capacity through labs, datasets, technology and communication networks. They also aim to green their operations with eco-friendly technologies. Nevertheless, private-sector involvement in co-developing infrastructures is limited compared with other Horizon Europe instruments. Companies benefit from Research Infrastructures by having access to facilities for their own R&I activities, and, indirectly, by the eventual uptake of the downstream technological innovations. An example of RI's support to the Green Deal is a recent

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21 European Institute of Innovation and Technology, 'Global Challenges', website, (n.d.)

22 A recent example relates to EIT InnoEnergy, one of the KICs, which, at the end of 2023, secured a €140 million private placement to support its portfolio companies, including 3 European unicorns. Details are available at the following link.

call,[23] which aims to enable breakthrough R&I in energy storage systems and related materials across the value chain. It also aims to enhance the competitiveness of existing and emerging industries by providing access to the most advanced scientific infrastructure available in Europe and related services.

3.2. Perspectives on Horizon Europe's support for the European industry's efforts to achieve the Green Deal objectives

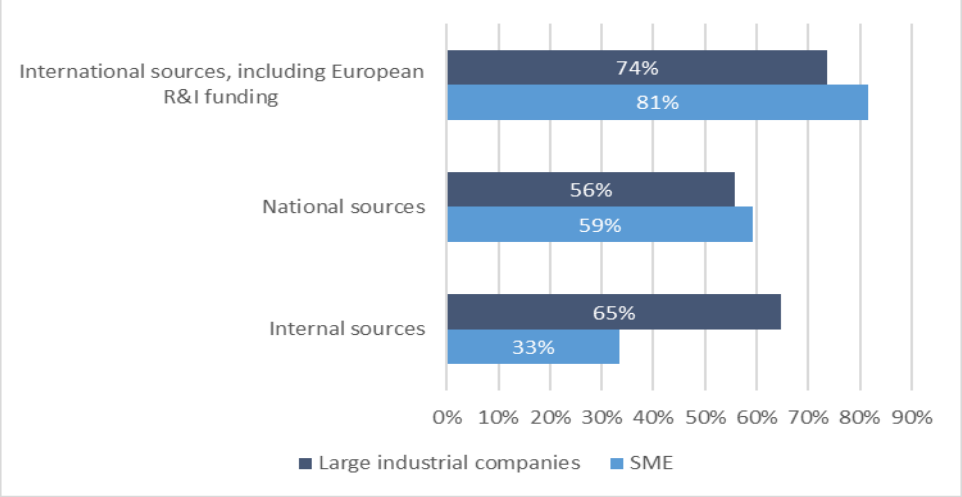
The survey findings and interview input offer perspectives on Horizon Europe's support given to the industry, including R&I funding for green projects, the fitness of the technology readiness level (TRL) requirements of calls and the facilitation of industry collaboration. Additionally, they offer perspectives to improve this support.

3.2.1. Horizon Europe's R&I funding and support for industry

Overall, Horizon Europe constitutes an important support for companies seeking R&I funding to achieve the objectives of the Green Deal, especially when it comes to pioneering research. The survey sheds light on the respondents' R&I funding experiences and indicates that the majority of the companies are pursuing sustainability initiatives through various sources, with international funding playing a key role. The surveyed companies, consisting of 27 SMEs and 27 large companies, indicated they often rely on international sources of funding (such as EU R&I programmes like Horizon Europe) to make their business more sustainable. See Figure 1.

Additionally, results show that large industrial companies rely on internal sources to a greater extent (65% of them) than SMEs (33% of them). This can be attributed to the limited availability of internal funding options for SMEs, which are more dependent on external funding for R&I activities.

Figure 1 – R&I funding for large companies and SMEs: Reliance on international, national and internal sources (%)



The interviews further complemented the survey findings, indicating that Horizon Europe's funding is predominantly utilised for cutting-edge research, pushing the boundaries of knowledge and technology. Interview exchanges suggested that most SMEs focus on adopting technologies to enhance their sustainability rather than developing them. This stems from the limited R&I capabilities of the majority of the EU's SMEs. The majority of SMEs appear to rely on European,

[23] European Commission, European Research Infrastructure capacities and services to address European Green Deal challenges, website, (n.d.)

national and regional funds to improve the sustainability of their business operations on a day-to-day basis, rather than rely on Horizon Europe for green R&I support.

Horizon Europe's financing has a ripple effect, its impact extending to its beneficiaries' partners; 51 companies indicated they collaborated with partners that previously received R&I funding under Horizon 2020 or Horizon Europe. Nearly half of these respondents (24) confirmed that they have largely or somewhat benefited from the technological advancements made by these partners. Conversely, seven respondents did not observe such benefits, while the remaining 20 did not express an opinion. The companies that benefited from European funding reported leveraging their partners' expertise, gaining faster technical understanding and building upon the outcomes of previous projects to advance their technologies, thus broadening their scope and achieving more efficient results.

Furthermore, there is the general perception that Horizon Europe complements national R&I funding. Almost half of the respondents (49%) feel that, to some extent, Horizon Europe R&I funding bolsters national funding for industries in achieving the Green Deal objectives. A smaller proportion of respondents (24%) believe it does only to a limited extent. We observed a geographical divide, with more positive responses hailing from respondents in Western and Northern Europe; and less positive responses from Eastern European countries, of six Eastern Europe respondents, five saw limited to no impact of Horizon Europe in that regard.

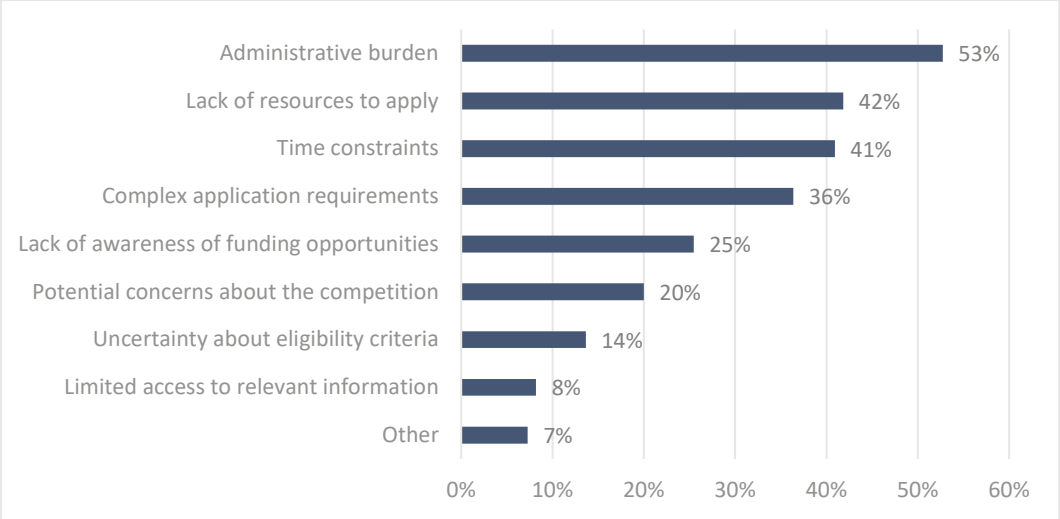
When queried about the potential impact of additional R&I funding on their business sustainability, responses from both SMEs and large companies were largely affirmative. Specifically, 52% believe that increased funding would significantly assist them, while 32% feel it would help to a moderate extent. The perception of moderate support may be linked to the understanding that business sustainability encompasses more than R&I. Interviews indicated that although R&I green projects receive support via Horizon Europe, companies seek other sources of funding for their operational transition. Additionally, the primary need of SMEs lies in assistance with their transition towards sustainable operations, R&I often being a minor aspect for them.

Nevertheless, a shared opinion is that Horizon Europe contributes to the ecological transition of the European industry's supply chain. A significant portion of the respondents (58%) believe that Horizon Europe's R&I funding somewhat contributes to a sustainable European industry supply chain. Smaller groups think it is largely contributing (18% of the respondents), or marginally contributing (16%). To support the ecological transition, interviews reported the innovation supported by Horizon Europe could not only focus on industrialisation efforts, but other type of innovations linked with day-to-day applications of companies.[24]

The findings also show there is no consensus regarding the sufficiency of funding provided by Horizon Europe to support companies' effort to improve sustainability within the scope of the Green Deal. Interviews revealed a general perception that many Horizon calls exist, yet the lack of awareness and challenges in accessing funding may account for the perceived insufficiency of support. One respondent noted that although numerous funding opportunities exist, intense competition significantly reduces the chances of securing funding. This issue is compounded by a resource-intensive application process, which hampers the effective implementation and scaling of successful projects. Another challenge that is frequently mentioned is the high administrative burden associated with these applications, juxtaposed with relatively low success rates. Additionally, a respondent highlighted that the budgets allocated for calls often fall short of what is required for the ambitious research envisioned by both the European Commission and the industry.

[24] BIM4Ren illustrates a Horizon 2020 call that directly supported SMEs on their renovation activities via digital innovation. 'BIM4ren', website, (n.d.)

Figure 2 – Barriers to receipt of R&I funding under Horizon Europe, survey respondents (%)



Although viewpoints differ on the sufficiency of Horizon Europe funding, respondents concur on the primary barriers to applying for funds, with the administrative burden being recognised as the most significant. Figure 2 illustrates that over half of the respondents (53%) identify the administrative burden as the primary obstacle to apply for Horizon Europe R&I funding, followed by a lack of resources for application preparation by applicants (42%), time constraints of calls (41%), and complex application requirements (36%). Notably, among non-beneficiaries, the most common challenges were a lack of awareness of funding opportunities and a lack of resources to applying, as indicated by four out of six responses for both of the barriers. The interviews corroborated this perceived lack of visibility into various European programmes and highlighted the need for further guidance and technical assistance in the application process. Representatives of SMEs who were interviewed explained they did not have the sufficient resources to apply in most cases. The study suggests in policy option #1 to tackle this issue, which impacts the support for funding green R&I projects, alongside other Horizon Europe initiatives.

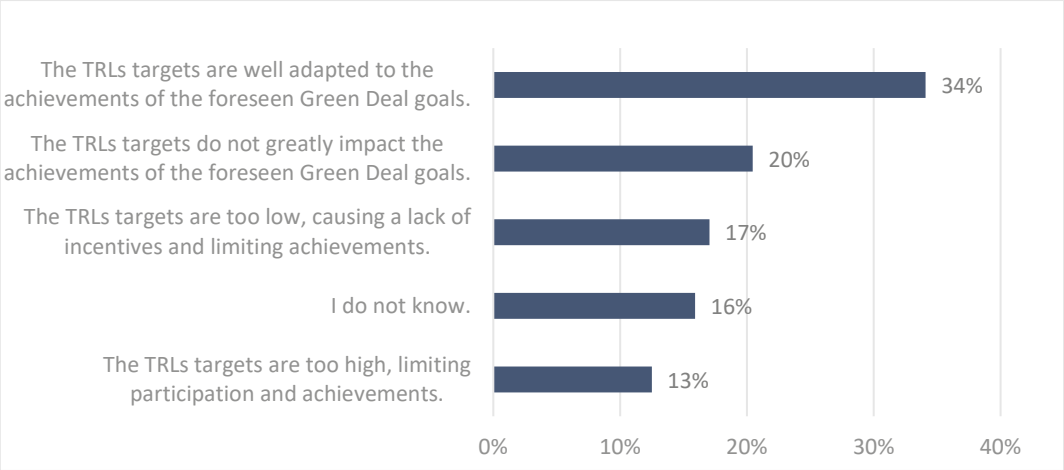
Survey comments provided additional insights on the barriers to applying. A recipient of funding from both Horizon Europe and Horizon 2020 highlighted the issue of limited resources, stating: '*Our resources are constrained, primarily due to immediate daily challenges and ongoing crises. The long-term and risky nature of projects often means that resources are absorbed by immediate commercial and market challenges. Furthermore, collaborative projects, even when publicly funded, require the investment of internal resources, which are scarce during crisis period.*'

An industry representative familiar with Horizon Europe shared insights on the issue of time constraints, mentioning specifically: '*The calls for applications occur only once a year, which limits flexibility. Moreover, the qualification process for applications can take up to a year.*'

3.2.2. Alignment of Horizon Europe's technology readiness level targets with industry

Regarding Horizon Europe's technology readiness level (TRL) targets and their alignment with industry needs and realities, most survey respondents hold either a positive or neutral perception. TRL targets are viewed as either well adapted to the respondents' expectations (34%) or not significantly impacting the achievement of Green Deal goals (20%). However, a smaller group reports that TRLs are either too low or too high, leading to a lack of consensus for a more general viewpoint. The large companies never mentioned the TRLs as being too high but often too low, for six out of 30 of them. SMEs mostly believe that TRLs do not greatly affect progress towards Green Deal goals (four answers) or are adapted to Green Deal ambitions (three answers).

Figure 3 – Views on Horizon Europe's TRL targets according to survey respondents (%)



Moreover, opinions vary regarding the necessity of modifying TRLs, 36% of respondents believe changing the required TRLs level of Horizon calls would create more incentives to apply, while 29% think it would not, and the rest of respondents do not know. The majority of respondents who believe that adjusting the TRL requirements would provide incentives are those who perceive that the current TRL requirements do not align well with the ambitions of the Green Deal or do not impact the achievement of its objectives. Conversely, those who do not see an impact of changing TRL requirements are mainly those who view the existing TRL criteria as effectively aligned with the objectives of the Green Deal.

Among those advocating for change, some stress the importance of ensuring continuity in research-to-market TRL requirements, covering all levels to prevent gaps in technology support. The lack of funding for low TRLs is seen as a threat to future prototype development, whereas insufficiently high TRL funding limits the commercialisation of innovations. Some respondents argue for lower TRL calls to encourage applications for emerging technologies, while others emphasise the necessity of high TRLs for risk-sharing in high capital expenditure projects and rapid market integration. Additionally, there is a call for including intermediate TRLs for testing and pilot phases, with some respondents facing challenges in securing funding to bridge the gap between low and high TRLs.

Interviewees agreed on the necessity for a seamless transition in research-to-market TRL requirements and for greater continuity between multi-level funding programmes like Horizon Europe's link with LIFE or Interreg. Policy option #2 focuses on supporting the upscaling of projects via a 'marketplace' concept, which answers the need for research-to-market continuity. In addition, there is a common observation that improved coordination is needed to offer continuous support and more clarity for the industry to navigate the programmes. The multitude of funding channels may contribute to creating confusion among companies. Policy option #1 aims to enhance information provision that is lacking. Horizon Europe's facilitation to the industry's collaboration for the Green Deal.

The principal viewpoint is that Horizon Europe contributes to fostering collaborations to a certain degree. Most of the respondents (51%) perceive that Horizon Europe moderately facilitates collaboration among EU industrial sectors and SMEs to achieve the Green Deal objectives. Meanwhile, 27% of respondents believe Horizon Europe significantly enables these collaborations, and 18% to a limited extent.

Furthermore, the majority opinion (49%) is that Horizon Europe somewhat promotes collaborations among EU industrial sectors. Similar proportions of respondents either feel that collaborations are marginally enabled (23%) or significantly enabled (22%). Interviews informed that the collaboration between sectors can be beneficial, such as renewable energies, which can be utilised across various

sectors. New technologies such as carbon capture in the construction sector could potentially benefit other sectors, such as the chemical industry. These existing connections could be reinforced by Horizon Europe. However, it is perceived as essential not to impose collaboration without examining the pre-existing needs of industry players and sectors.

3.2.3. Perspectives for improving Horizon Europe' support for industry towards Green Deal objectives

A key area identified for Horizon Europe to improve its support of the industry is the scope of its R&I funding. Each respondent provided up to three suggestions for areas where Horizon Europe could be enhanced to better support the industry in achieving the Green Deal objectives. Around half of the respondents (49%) identified as important the need to expand the scope of R&I funding to encompass a broader range of industry themes. Specific themes emerged, such as support for low-carbon technologies, investing in nuclear research and photovoltaics. A comment emphasised the importance of industry-driven research in Horizon Partnerships, advocating for a balance between the innovation needs of companies and political agendas.

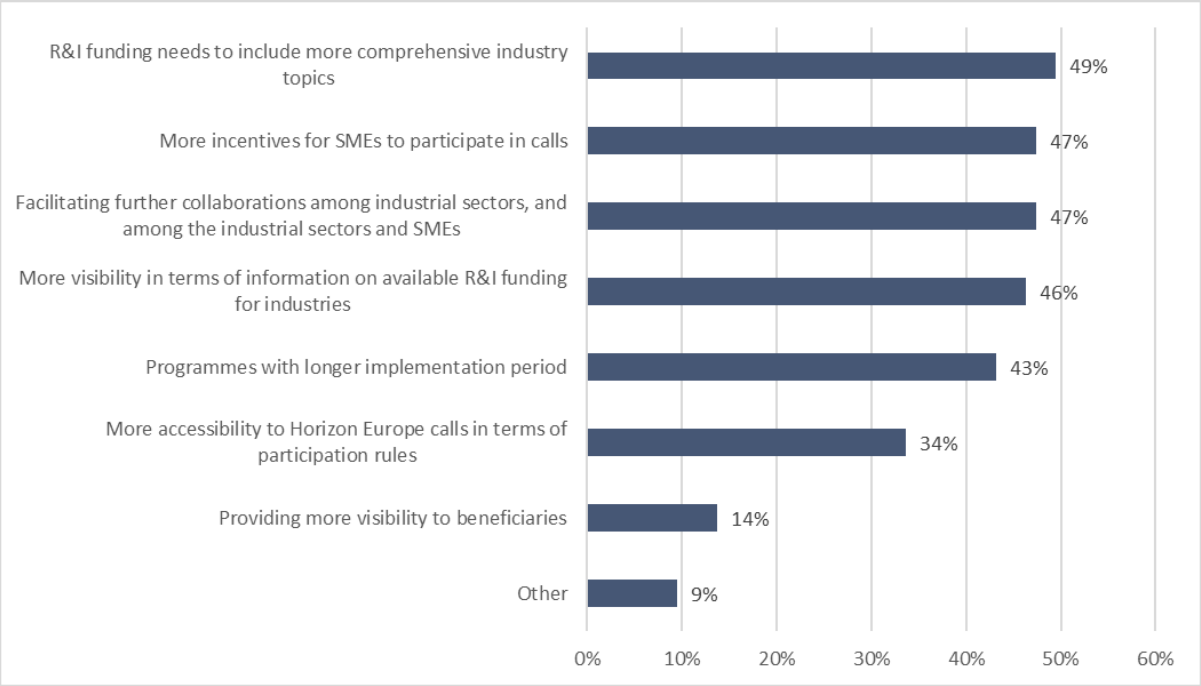
The interviews corroborated the idea of further supporting net-zero technologies, which feeds into Policy option #3. This explores a potential prioritisation of Horizon Europe with emerging net-zero technologies. Another suggestion is not centred on the expansion of the R&I funding scope *per se*, but rather on focusing on the lab-to-fab pipeline. It highlighted the need to enhance Horizon Europe's path to the commercialisation of new technologies beyond the R&D phase and providing accessible de-risking. Similarly, interviews largely referred to this need to coordinate programmes so the innovations supported under Horizon Europe could reach higher TRLs, via promoting accelerators for instance. This need is tackled by policy option #2 introducing marketplaces.

Nearly half of the respondents (47%) believe that creating more incentives for SMEs to participate in funding calls would be a key improvement. The interviews underlined that Horizon is presently not well-equipped to address the needs of SMEs in their decarbonisation efforts. SMEs oftentimes rely on different European, national and regional funding. Horizon Europe prioritises innovation and research frontrunners, while only a minority of SMEs have reached such an advanced level in their innovation endeavours. In addition, European SMEs do not all have full proficiency in English (see policy option #1 below).

Additionally, enhancing collaboration among industrial sectors and SMEs, and creating programmes with longer implementation periods are perceived as crucial areas for improvement. The importance of fostering partnerships between European-funded projects and complementary national and regional funding programmes was noted. Encouraging collaboration across different industrial sectors was also emphasised.

More than 30% of respondents identify the accessibility of Horizon Europe calls, in terms of participation rules, as a primary area for improvement, while almost half of the respondents (46%) see better information availability as a key concern. Suggestions include streamlining participation rules and application procedures, addressing complexities in the online funding & tenders' portal and considering administrative management costs in funding allocations. These insights strongly point to the need for mechanisms to provide better technical assistance.

Figure 4 – Potential areas for improvement in Horizon Europe's support for industry in reaching Green Deal objectives, according to survey respondents (%)



4. Conclusion

Horizon Europe has been instrumental in supporting the European Union's push towards becoming climate-neutral by 2050. Designed as the EU's main tool for funding R&I across different sectors and industries, the programme also increasingly provides support for the R&I actions that are aligned with, or relevant to, the objectives of the European Green Deal. This report has reviewed the existing literature and data, and analysed feedback from stakeholders, paying close attention to how private-sector engagement and collaborations between different sectors can be improved.

The report's findings suggest that Horizon Europe's funding contribution towards R&I projects has had a clear focus on sustainability and has been effective in encouraging industry participation. Horizon Europe funding plays an important supporting role in supporting sustainability R&I, in particular for large companies, as highlighted by responses to the survey and interviews. Just as importantly, the impact of Horizon's projects can have spillovers beyond its direct beneficiaries. Project partners can leverage the expertise of Horizon beneficiaries, building on the knowledge gained through funded projects.

Additionally, the industry stakeholders consulted through the survey appear to have a positive view of Horizon as actively supporting the greening and sustainable transition of supply chains. However, the findings from the survey and interviews with stakeholders also suggest that areas exist where Horizon Europe might benefit from some fine-tuning, especially in terms of fostering collaboration, improving the accessibility and visibility of Horizon calls, and easing the path from research to commercial success.

Feedback from stakeholders points to the need for Horizon Europe to continue facilitating collaboration between academia and businesses. According to the stakeholders we interviewed, obstacles to academia–business collaboration, an oft-cited difficulty in previous iterations of the programme, appear to remain an issue. Stakeholders suggested that collaboration should be

encouraged based on observed needs; and that Horizon Europe calls can comprise burdensome criteria, such as the need to include multiple industrial sectors.

Additionally, turning the results of research into products and services that can be sold and used continues to be a tough nut to crack. Horizon instruments such as the clusters, partnerships and the EIC are essential cogs in the Horizon Europe machine, each playing a unique role in the innovation ecosystem. Clusters aim to tackle societal challenges through collaborative research across Europe; partnerships bring together public and private sectors to drive innovation in specific fields; and the EIC focuses on breakthrough technologies and innovative startups. However, despite these instruments' potential, the transition from innovative ideas to market-ready solutions is a hurdle that many find difficult to overcome.

With regard to commercialisation, stakeholders point to the need for greater direct support from Horizon Europe for deploying and commercialising technologies. The need for a seamless transition in research-to-market TRL requirements is consistently recognised, underscoring the importance of comprehensive support across all stages of technology development. It appears challenging for applicants to navigate the changes in TRLs, which could result in the termination of a research project.

Similarly, interviewees agreed on the need for more continuity between different European funding programmes. They asked for greater continuity between funding programmes, at several levels: regional, national and European funding. This could be in terms of timeline and requirements, so that technologies could transition smoothly from one funding programme to another. Industry players underlined the need for more synergies between Horizon Europe and other programmes, such as LIFE or Interreg.

Furthermore, there is consensus that Horizon Europe could become more accessible, cutting through red tape, making opportunities more visible, and generally reducing the hassle involved in forming and maintaining partnerships. Survey respondents stated that they struggle with Horizon Europe's administrative burden, lack awareness and clarity regarding calls, and find application requirements too complex. Moreover, they explained that participation in calls often requires significant internal resources (time and administrative expertise), and that the success rate is low; this could be a barrier to funding the industry.

SMEs encounter challenges in participating in Horizon Europe's programme for various reasons, the main reason being that they do not have the capacity to overcome application barriers, primarily because of limited resources and lack of information. The language barrier in English exacerbates this issue. Owing to limited internal funding, SMEs depend the most on external sources for their business sustainability. However, the challenging access to Horizon Europe funding may hinder SMEs from engaging in R&I activities at all.

Moreover, SMEs tend to prioritise their day-to-day operations, with only few of them engaging in R&I projects, resulting in limited mobilisation in Horizon Europe. Additional technical assistance is necessary to boost SME participation in Horizon Europe, to initiate and support their R&I, in a context of significant financial limitations and limited means. Furthermore, interviews with SMEs suggested that Horizon Europe could cover further innovations that focus both on industrialisation and on improving daily operations within companies, making them more sustainable.

It is also suggested that Horizon Europe should be more flexible and responsive to feedback from its beneficiaries. Adjusting the focus of funding and making the application process smoother are deemed important steps. This flexibility is key for Horizon Europe – not only to fund research but also to ensure these innovations effectively find their way into the market.

In short, while Horizon Europe has been instrumental in the EU's climate neutrality efforts, there is room for improvement. By tackling the challenges identified, especially in improving accessibility,

collaborations, and supporting research at all technology readiness levels while improving the research-to-market pipeline, Horizon Europe can boost its impact. A commitment to ongoing improvement and responsiveness to industry needs will help ensure that Horizon Europe continues to play a vital role in the EU's transition to a sustainable, competitive and climate-neutral economy.

5. Policy options

The report has so far, through the desk research and the stakeholder consultations, pointed to a number of issues that merit attention and that, if addressed, would improve how Horizon Europe supports industry towards achieving the Green Deal objectives. Addressing all of them may not be feasible, however, as it boils down to resources. Providing more funding can help, but financial limitations mean choices must be made and priorities set. With this in mind, we developed a brief set of policy options that we hope can address some of the issues raised by maximising impact, while being pragmatic and standing a chance of being implemented. Each option aims to tackle challenges in three different domains. The first covers access to information and the high levels of complexity often associated with Horizon Europe. The second domain concerns the need to spread green innovation as widely as possible, while the third is about Horizon's role in relation to other Green Deal-minded European programmes.[25]

5.1. Policy option 1: Enhancing the capabilities of National Contact points, including by developing AI tools for enhanced information provision and technical assistance to end users

The complexity of Horizon's informational landscape is often cited by industry representatives, especially SMEs, as a problem. Navigating this can be time-consuming and overwhelming. The existence of National Contact Points (NCPs) and the assistance they provide mitigates this burden to an extent. However, NCPs have specialisations and can operate in a siloed way, rarely having a sufficiently broad grasp of the dimensions and nuances of Horizon Europe. The objective of this proposal is to enhance the capacity of existing NCPs in guiding SMEs and other companies through Horizon Europe's funding opportunities for green-transition R&I activities, by integrating AI-powered tools for information provision and technical assistance.

Policy proposal:

To develop a dedicated AI-powered service platform to enhance the capabilities of NCP staff. Such a platform would offer real-time, personalised guidance and support to NCPs and anyone seeking to navigate Horizon Europe's landscape, whether they are interested in getting involved in green-transition research projects, seeking information in their native language, exploring deployment and commercialisation opportunities for their innovations, or simply wishing to become more sustainable by adopting market-ready green technology developed through Horizon Europe.

Implementing such a policy involves a series of strategic steps. First, comprehensive training programmes are developed to upskill NCP staff, ensuring they are proficient in green-transition technologies, Horizon Europe funding mechanisms and the utilisation of AI tools. Next, an AI-powered service platform is meticulously crafted, capable of delivering customised information on funding opportunities, eligibility criteria, application processes and project matchmaking. This platform seamlessly integrates with existing NCP operations, empowering staff to enhance their

[25] Our process of formulating policy options: developing a longlist of potential options, followed by discussions with stakeholders through seven semi-structured interviews. Based on feedback, we refined the options, reformulated them, discussed them further in subsequent interviews and selected the three most popular.

advisory services. Continuous support and maintenance guarantee the platform's relevance and effectiveness, with regular updates based on user feedback and evolving Horizon Europe programmes.

The **benefits** of this policy option are manifold. Efficiency is significantly enhanced as AI-powered tools handle inquiries swiftly, freeing up staff to address more complex queries. Personalised assistance becomes the norm, with AI offering tailored advice based on specific company profiles and funding needs. Scalability is achieved effortlessly, ensuring the platform can accommodate increasing inquiries without a proportional increase in resources or costs. Moreover, the AI service acts as a centralised repository of information, ensuring consistency and accuracy in the guidance provided.

However, **challenges** must be acknowledged. Developing an AI-powered service and upskilling NCPs require resources and specialised expertise. There's a risk of over-reliance on technology, potentially overshadowing the crucial human element of NCP services. Data privacy and security concerns must be rigorously addressed, considering the sensitive information handled through an AI platform. Additionally, NCP staff may require significant training to effectively integrate an AI tool into their advisory services.

By upskilling NCP staff and incorporating AI-powered services, this policy option aims to significantly enhance the support mechanism for companies engaging with Horizon Europe's green-transition funding opportunities. While challenges related to technology development, data security, and human-technology integration exist, the potential benefits in terms of efficiency, scalability and personalised support make this an attractive approach to improving NCP effectiveness in fostering sustainable innovation.

5.2. Policy option 2: Expansion of the 'marketplace' concept for the European Green Deal

R&I tackling Green Deal challenges needs to become commercially viable and to be adopted by as wide a range of stakeholders as possible. At the same time, not all companies have the resources to innovate in order to meet these challenges. Most of them rely, to varying degrees, on solutions and green technologies developed by others. The **objective** is to facilitate the diffusion and wide uptake of innovative, market-ready and de-risked green technologies by the private sector, particularly focusing on SMEs and companies aiming to align with the European Green Deal objectives. This goal is being pursued by the *Marketplace* and Access*2Tech* instruments offered by EIT's InnoEnergy, Urban Mobility and Manufacturing KICs, but it is conspicuously lacking from other Horizon instruments and it does not cover the whole range of technological solutions that are relevant for the Green Deal.

Policy proposal:

Expand the 'marketplace' concept to encompass all aspects of the Green Deal. This would involve creating a centralised, EU-wide platform that serves as a hub for green technologies, connecting innovators with companies, investors and public-sector entities interested in sustainable solutions.

For this initiative to thrive, several key measures would be needed. Firstly, an assessment of the structures and successes of existing marketplaces would inform the development of the new Green Deal Marketplace, integrating best practices. Stakeholder engagement, involving potential users and suppliers early in the process, would tailor the marketplace to their needs. The platform would showcase a diverse array of green technologies, from renewable energy to circular economy solutions, while offering support services such as matchmaking and regulatory guidance to facilitate technology adoption. Continuous monitoring and evaluation mechanisms would ensure the marketplace remains relevant and effective over time.

The **benefits** of such a tool are significant. It would enhance the visibility of green technologies to a broader audience, simplifying the process for companies seeking sustainable solutions. Moreover, it would foster innovation by providing exposure to emerging technologies and supporting SMEs by connecting them with larger companies and public-sector entities.

However, several **challenges** must be addressed. Developing and maintaining a comprehensive EU-wide marketplace would require substantial resources, both financial and human. Ensuring the quality and readiness of listed technologies would necessitate robust vetting processes. Additionally, there's a risk of market saturation and adoption barriers, such as cost or regulatory hurdles, which the marketplace alone may not resolve.

Expanding the 'marketplace' concept to cover the Green Deal offers a promising avenue to accelerate the green transition by enhancing the visibility and accessibility of green technologies. While challenges exist, careful planning, stakeholder engagement and ongoing management can mitigate these risks, making the Green Deal Marketplace a cornerstone of Europe's sustainable future.

5.3. Policy option 3: Refocusing of Horizon Europe to better support the Net-Zero Industry Act and the Strategic Technologies for Europe Platform

Reaching the ambitious decarbonisation goals of the Green Deal requires not only wider deployment and adoption of existing green technologies by the European industry, but also the investment in technologies that are less developed and mature, as stipulated in the Net-Zero Industry Act (NZIA), but also in the Strategic Technologies for Europe Platform (STEP). The objective of this policy option is to accelerate the development of net-zero technologies in European industry while aligning with the NZIA and STEP.

Policy proposal:

Provide support, through more targeted calls, to the priorities identified in the Net-Zero Industry Act and the Strategic Technologies for Europe Platform (STEP), focusing on areas crucial for achieving net-zero emissions in European industry.

For the effective implementation of this policy, several measures need to be considered. Firstly, it is essential to integrate the priorities outlined in the NZIA into research calls, addressing key areas such as carbon capture and storage, renewable energy integration, CO2 transport and utilisation technologies and nuclear power. Furthermore, allocating funding for research calls that target the decarbonisation of critical components necessary for the deployment of new net-zero technologies, as stipulated by the NZIA, is crucial.

Additionally, aligning research calls with the strategic priorities identified by STEP, such as digitalisation, green technologies and industrial competitiveness, is paramount. This integration ensures that Horizon Europe supports the development and deployment of innovative technologies vital for Europe's transition to a low-carbon economy while bolstering its technological competitiveness globally.

The **benefits** of this policy are significant. By prioritising research calls to match the objectives of the NZIA and STEP, research investments can be directed towards areas crucial for achieving net-zero emissions in European industry, ultimately enhancing Europe's technological competitiveness. Moreover, targeting key priorities outlined in these frameworks can drive advancements in critical areas like carbon capture and storage, renewable energy integration, and sustainable

manufacturing practices, thus amplifying Europe's emissions reduction efforts and industrial transformation.

Again, as in the other policy options, there are certain **challenges** that should be acknowledged. Identifying and prioritizing research topics aligned with the objectives of the NZIA and STEP may introduce complexity and delays in decision-making. Moreover, aligning research calls too closely with specific priorities outlined in these frameworks may narrow the focus on certain technologies or sectors, potentially limiting innovation opportunities and diversity in the research portfolio. There is a trade-off that needs to be accounted for, between a too-focused approach and the need to finance low TRL technologies that may bear fruit in the future but whose viability is not easy to assess at the outset. Furthermore, ensuring effective alignment between research calls and the objectives of the NZIA and STEP requires clear communication, coordination, and monitoring mechanisms across various stakeholders and funding programmes, presenting challenges for implementation.

Aligning Horizon Europe research calls with the priorities of the Net-Zero Industry Act and the Strategic Technologies for Europe Platform (STEP) offers significant potential to accelerate the development and deployment of net-zero technologies in European industry. While this approach enhances strategic alignment, fosters collaboration and increases impact, it also poses challenges related to complexity in prioritisation, a potentially narrow focus and implementation. Balancing these factors will be crucial in maximizing the effectiveness of the policy in driving Europe's transition to a sustainable, low-carbon economy.

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7. Annexes

7.1. Annex 1 – Stakeholder selection process

This annex provides a description of the selection process for each stakeholder consulted during this study, including the selection rationale, size of samples, and collection methods.

Table 5 – Stakeholder selection process

Stakeholder Type	Number Sampled	Collection Method	Selection Criteria
ETIPs and ETPs	18	Desk Research	- Selected ETIPs and ETPs related to industrial sectors aligned with the Green Deal goals: energy, transport, steel, cement, ICT, textiles, and chemicals, resulting in six ETIPs and 12 ETPs. - Researched for representatives' information, including project managers, chairs, secretaries, board members and Working Group leaders, resulting in the collection of 34 contacts.
EU Industries	100	Desk Research	- Chose Europe's largest industry companies within Green Deal-relevant sectors (energy, transport, steel, cement, ICT, textiles and chemicals). - Aimed for a proportionate selection reflecting each sector's emissions share, e.g., 40 entities for energy, 30 for transport and 30 for other sectors[26]. - Strived for proportional representation of energy types but faced limitations, resulting in higher representation of renewables. - Successfully proportioned selection in the transport sector based on greenhouse gas emissions (road transport: 70%, aviation: 15%, maritime: 15%). - Successfully proportionated selection in the transport sector based on the greenhouse gas emission (road transport: 70%, aviation: 15%, maritime: 15%). - Allotted 6 entities each for steel, cement, ICT, textiles and chemicals sectors. Precise division was challenging due to limited emissions data. - Selected around three contacts per company with positions knowledgeable about the European Green Deal and Horizon Europe (e.g., Head of Sustainability, Head of Public Affairs, Director of Innovation and Sustainability, etc.) to enhance response chances. - Selected around three contacts per company with positions knowledgeable about the European Green Deal and Horizon Europe (e.g., Head of Sustainability, Head of Public Affairs, Director of Innovation and Sustainability etc.) to enhance response chances.
EU Industry Associations	40	Desk Research	- Chose main European industry associations related to Green Deal sectors, aiming for around 80 contacts (10 associations per sector). - Prioritised energy and transport sectors, reflecting higher emissions and resulting in more representation in these sectors. - Selections for each sector: six European general industry associations, 23 for European energy, 17 for European transport, five for European steel, 11 for European ICT, nine for European cement, seven for European textiles and six for European chemicals industry associations. - Researched contacts with positions knowledgeable about the European Green Deal and Horizon Europe, such as Policy directors, EU Policy Officers, Public Affairs managers or Sustainability officers, among others.

[26] The rationale of the selection was that the share of the 100 companies selected would be proportionate to each sector's emissions. Knowing the energy sector represents around 40% of the share of CO_2 equivalent emissions in Europe according to the European Environment Agency, we reflected this share when identifying energy industry companies obtaining 40 entities. The same principle was applied to the transport sector (30% of total emissions) and other industrial sectors (30%), which is 30 entities each.

Stakeholder Type	Number Sampled	Collection Method	Selection Criteria
EITs	5	Desk Research	- Chose European Institutes of Innovation and Technology (EITs) related to the third pillar of Horizon Europe 'Innovative Europe', ensuring relevance to industry. - Collected all available contacts from the selected EITs: EIT Raw Materials (seven contacts), EIT InnoEnergy (seven contacts), EIT Circular Economy (two contacts), EIT Manufacturing (seven contacts), and EIT Climate-KIC (three contacts).
Green Deal Projects	132	Internal Connections Desk research	- Selected projects associated with the Green Deal Support Office, with which Ecorys collaborates, resulting in the collection of 132 contacts, primarily project managers.
SMEs	200	Contact form on Cordis, Horizon Dashboard	- Utilised Horizon database with 14,362 entries related to Horizon 2020 and Horizon Europe projects. - Conducted a Country Proportion Analysis to ensure fair and accurate representation of SMEs across Member States. - Identified 2,320 unique SMEs, eliminating repetitions, and ensuring each SME in the sample is distinct. - Further refined the list to include 1,982 private for-profit SMEs, aligning with the focus on SMEs in Horizon. - Conducted random sampling with an emphasis on maintaining proportionality in terms of countries and Horizon Programmes.
National Contact Points[27]	13	NCP portal of Horizon Europe	- Selected National Contact Points (NCPs) for Horizon Europe from the Single Electronic Data Interchange Area (848 NCPs). - Main selection criteria focused on identifying relevant functions such as climate, energy, environment, mobility and industry. - Diversified the selection to obtain a broad geographical coverage of the EU

[27] Contacted for interviews only

7.2. Annex 2 – Survey questions

This annex consists of the anonymous survey questionnaire distributed online via EU survey to our stakeholder base.

Survey questions

BRIEF INTRODUCTION OF THE PROJECT SCOPE AND THE SURVEY'S GOAL AND CONTENT

This survey is carried out on behalf of the Panel for the Future of Science and Technology (STOA) of the European Parliament. The purpose of this survey is to collect data for an in-depth analysis of various aspects of the Horizon Europe Programme (HEU). As the European Union's key funding instrument for research and innovation, Horizon Europe plays a pivotal role in shaping the continent's scientific and technological landscape. The study to which this survey is contributing aims to offer insights into various key aspects of Horizon Europe, with a particular focus on its support for industries to help achieve the Green Deal objectives. As a stakeholder your experiences and opinions are crucial for this analysis.

The European Green Deal is a European Union strategy aimed at achieving climate neutrality by 2050. Introduced in December 2019, the Green Deal outlines a roadmap for a sustainable and inclusive economy, emphasising the need to address climate change, environmental degradation, and social inequality. Key pillars include cutting greenhouse gas emissions, enhancing energy efficiency, promoting clean and circular economies, and preserving biodiversity. The initiative aims to mobilise public and private investments to finance the transition towards a greener future while ensuring a just and socially fair transition for all EU citizens and industries.

The European Parliament is eager to hear your opinion, and your participation in this survey holds significance in understanding the support Horizon Europe provides for industry players to help them contribute to the Green Deal objectives. Your insights will help shed light on key weaknesses and strengths and will contribute to shaping policy direction, and funding approaches.

Your profile

Country*:

[List of European countries]

Organisation type*

Please select from the list the type of organisation you represent *(if fitting, multiple answers may be selected)*:

[Info box: "If you work both in an SME or a large industrial company as well as represent an EIT or ETPs, please select all answers"]

- ☐ SME
- ☐ Large industrial company
- ☐ Industry representative or working closely to the industry (for instance industry association)
- ☐ Representative of a European Institute of Innovation & Technology (EIT)
- ☐ Representative of a European Technology Platform (ETPs)
- ☐ Other (please specify) _____

Please select from the sector you operate in*

- ☐ Energy
- ☐ Transport
- ☐ ICT
- ☐ Cement
- ☐ Steel
- ☐ Textiles
- ☐ Chemicals
- ☐ Other ……

Please select your relevant experience (multiple responses possible)*:

- ☐ Beneficiary of Horizon Europe Programme
- ☐ Beneficiary of Horizon 2020
- ☐ Green Deal Call
- ☐ Other
- ☐ Not a beneficiary of either of the above
- ☐ Not applicable, but familiar with Horizon Europe and/or Horizon 2020
- ☐ Not applicable, no prior experience with Horizon Europe and Horizon 2020

In which Horizon Europe programme components have you participated (multiple responses possible)*?

- ☐ Research Infrastructures;
- ☐ Horizon clusters
- ☐ Health
- ☐ Culture, Creativity and Inclusive Society
- ☐ Civil Security for Society
- ☐ Digital, Industry and Space
- ☐ Climate, Energy and Mobility
- ☐ Food, Bioeconomy, Natural Resources, Agriculture and Environment
- ☐ European Innovation Council (EIC)
- ☐ European Innovation Ecosystems
- ☐ Partnership
- ☐ Not applicable
- ☐ Other: (please specify): _____

I. First branching: for beneficiaries of Horizon Europe Programme or/and Horizon 2020, and other stakeholders familiar with Horizon Europe and/or Horizon 2020 (for instance, ETIPs and EITs)

Familiarity with Horizon Europe and the Green Deal

1 *[for all beneficiaries]* How familiar are you with Horizon Europe's Missions?

- ☐ Very familiar
- ☐ Somewhat familiar
- ☐ I have heard of it
- ☐ Not familiar

2 *[for all beneficiary]* Below are the Missions of the Horizon Europe programme. Under which Mission(s) would you say that your organisation's activities fit best? (Up to three answers possible)

- ☐ **Climate Change**: The Mission is to prepare Europe for climate disruptions and accelerate the transformation to a climate resilient future.
- ☐ **Cancer**: The Mission is to understand, prevent and treat cancer.
- ☐ **Healthy Oceans, Seas, Coastal and Inland Waters**: The Mission is to understand, restore and protect our ocean and waters.
- ☐ **Climate-Neutral and Smart Cities**: The Mission is to ensure 100 European cities are climate-neutral by 2030.
- ☐ **Soil Health and Food**: The Mission is to ensure 75% of all soils in the EU are healthy for food, people, nature and climate by 2030.
- ☐ None of the above.

3 *[for all beneficiaries]* How familiar are you with the EU's Green Deal objectives?

- ☐ Very familiar
- ☐ Somewhat familiar
- ☐ I have heard of it
- ☐ Not familiar

4 *[for all beneficiaries]* Below are the main components/goals of the European Green Deal. Under which of these components/goals do your organisation's purpose and activities fit best? You may choose up to three:

- **Climate Action**: The goal is to achieve no net emissions of greenhouse gases by 2050
- **Clean Energy**: The plan includes a massive development of renewable sources and promotes energy efficiency
- **Sustainable Industry**: The aim is to decouple economic growth from resource use
- **Buildings and Renovations**: The focus is on improving energy efficiency in buildings
- **Sustainable Mobility**: The plan includes overhauling transportation and promoting electrification
- **Eliminating Pollution**: The goal is to move towards a zero-pollution ambition for a toxic-free environment
- **Farm to Fork**: This strategy aims to ensure a fair, healthy, and environmentally friendly food system
- **Preserving Biodiversity**: The plan includes measures to protect Europe's unique ecosystems and biodiversity
- **Research and Development**: The aim is to drive transformative change through research and innovation.
- None of the above

R&I funding

5 *[for representatives of SMEs or large industrial companies]* When it comes to R&I funding, on which sources does your company rely to make its business more sustainable (multiple answers possible)?

- Internal sources
- National sources
- International sources, including European R&I funding
- We have not invested yet in R&I
- We have no specific R&I requirements to make the business more sustainable
- Other, please specify (max 150 words)_____

6 *[for representatives of SMEs or large industrial companies]* Could additional R&I funding help make your business more sustainable?

- Yes, to a large extent
- Yes, to a fair extent
- Yes, to a limited extent
- No
- I do not know

7 *[for all non-beneficiaries]* In your opinion, with regard to your R&I needs for implementing Green Deal goals, what are the barriers to applying for funding under Horizon Europe? (up to three answers possible)

- Lack of awareness of funding opportunities
- Lack of resources to apply
- Uncertainty about eligibility criteria
- Administrative burden
- Time constraints
- Complex application requirements
- Limited access to relevant information
- Potential concerns about the competition
- Other (max 150 words)_____

8 *[for representatives of SMEs or large industrial companies]* Do you believe Horizon Europe offers sufficient R&I funding opportunities in support of your sector's effort to improve sustainability within the scope of the Green Deal?

- Yes
- No
- I do not know
- [If no] Please elaborate (max 150 words)_____

9 *[for representatives of SMEs or large industrial companies]* Have you collaborated with partners who have previously received R&I funding under Horizon 2020 or Horizon Europe?

- ☐ Yes
- ☐ Not that I am aware of
- ☐ No

If answered yes, the following question will follow:
To your knowledge, have you benefited from a technological advancement made by this partner as a result of European funding?

Technology leverage

10 *[for representatives of SMEs or large industrial companies]* To what extent do you believe new technological innovation could make your business more sustainable?

- ☐ To a great extent
- ☐ To some extent
- ☐ To a limited extent
- ☐ Not at all

11 *[for all beneficiaries]* How familiar are you with the technology readiness levels (TRLs)?

- ☐ Very familiar
- ☐ Familiar
- ☐ I have heard of it
- ☐ Not familiar

[If there is at least some familiarity with TRLs, questions 12 and 13 will follow; if not continue with question No 14]:

12 *[for all beneficiaries]* In effort to achieve the European Green Deal objectives, how do you view the TRLs targets by the various Horizon Europe calls?

- ☐ The TRLs targets are well adapted to the achievements of the foreseen Green Deal goals
- ☐ The TRLs targets do not greatly impact the achievements of the foreseen Green Deal goals
- ☐ The TRLs targets are too low, causing a lack of incentives and limiting achievements
- ☐ The TRLs targets are too high, limiting participation and achievements
- ☐ I do not know

13 *[for all beneficiary]* Do you think that changing the required level of TRLs would incentivise more industry players to seek R&I funding for Green Deal related activities?

- ☐ Yes, changing the required level of TRLs would create incentives
- ☐ No, changing the required levels of TRLs wouldn't create further incentives
- ☐ I do not know
- ☐ [If yes,] Please elaborate (max 150 words)_____

Horizon Europe impacts

14 *[for all beneficiaries]* To what extent do you believe Horizon Europe enables collaborations between industrial sectors and SMEs to reach the Green Deal objectives? It is:

- ☐ Largely enabling
- ☐ Somewhat enabling
- ☐ Enabling to a limited extent
- ☐ Not enabling
- ☐ I do not know

15 *[for all beneficiaries]* To what extent do you believe Horizon Europe enables collaborations among EU industrial sectors to reach the Green Deal objectives? It is:

- Largely enabling
- Somewhat enabling
- Enabling to a limited extent
- Not enabling
- I do not know

16 *[for all beneficiaries]* To what extent does Horizon Europe R&I funding contribute to the development of a sustainable European industry supply chains? It is:

- Largely contributing
- Somewhat contributing
- Marginally contributing
- No contribution observed
- I do not know

17 *[for all beneficiaries]* To what extent does Horizon Europe R&I funding further strengthen national funding for industries to achieve the Green Deal objectives?

- To a great extent
- To some extent
- To a limited extent
- Not at all
- I do not know

Horizon Europe areas of improvements

18 *[for all beneficiaries]* Can you select the most important areas where Horizon Europe support for industry's role in implementing the Green Deal objectives could be improved? (multiple answers possible)

- More visibility in terms of information on available R&I funding for industries
- More accessibility to Horizon Europe calls in terms of participation rules
- More incentives for SMEs to participate in calls
- Programmes with longer implementation period
- R&I funding needs to include more comprehensive industry topics
- Facilitating further collaborations among industrial sectors, and among the industrial sectors and SMEs
- Providing more visibility to beneficiaries
- Other(s).....

II. Second branching: for non-beneficiaries, and other stakeholders with no prior experience with Horizon Europe and Horizon 2020

Familiarity with Horizon Europe and the Green Deal

19 *[for all non-beneficiaries]* How familiar are you with Horizon Europe's Missions?

- Very familiar
- Somewhat familiar
- I have heard of it
- Not familiar

20 *[for all non-beneficiary]* Below are the Missions of the Horizon Europe programme. Under which Mission(s) would you say that your organisation's activities fit best? (Up to three answers possible)

- **Climate Change**: The Mission is to prepare Europe for climate disruptions and accelerate the transformation to a climate resilient future.
- **Cancer**: The Mission is to understand, prevent and treat cancer.
- **Healthy Oceans, Seas, Coastal and Inland Waters**: The Mission is to understand, restore, and protect our ocean and waters.
- **Climate-Neutral and Smart Cities**: The Mission is to ensure 100 European cities are climate-neutral by 2030.

- **Soil Health and Food**: The Mission is to ensure 75% of all soils in the EU are healthy for food, people, nature and climate by 2030.
- None of the above.

21 *[for all non-beneficiaries]* How familiar are you with the EU's Green Deal objectives?

- Very familiar
- Somewhat familiar
- I have heard of it
- Not familiar

22 *[for all non-beneficiaries]* Below are the main components/goals of the European Green Deal. Under which of these components/goals do your organisation's purpose and activities fit best? You may choose up to three:

- **Climate Action**: The goal is to achieve no net emissions of greenhouse gases by 2050
- **Clean Energy**: The plan includes a massive development of renewable sources and promotes energy efficiency
- **Sustainable Industry**: The aim is to decouple economic growth from resource use
- **Buildings and Renovations**: The focus is on improving energy efficiency in buildings
- **Sustainable Mobility**: The plan includes overhauling transportation and promoting electrification
- **Eliminating Pollution**: The goal is to move towards a zero-pollution ambition for a toxic-free environment
- **Farm to Fork**: This strategy aims to ensure a fair, healthy, and environmentally friendly food system
- **Preserving Biodiversity**: The plan includes measures to protect Europe's unique ecosystems and biodiversity
- **Research and Development**: The aim is to drive transformative change through research and innovation.
- None of the above

R&I funding

23 *[for representatives of SMEs or large industrial companies]* When it comes to R&I funding, on which sources does your company rely to make its business more sustainable (multiple answers possible)?

- Internal sources
- National sources
- International sources, including European R&I funding
- We have not invested yet in R&I
- We have no specific R&I requirements to make the business more sustainable
- Other, please specify (max 150 words)_____

24 *[for representatives of SMEs or large industrial companies]* Could additional R&I funding help make your business more sustainable?

- Yes, to a large extent
- Yes, to a fair extent
- Yes, to a limited extent
- No
- I do not know

25 *[for all non-beneficiaries]* In your opinion, with regard to your R&I needs for implementing Green Deal goals, what are the barriers to applying for funding under Horizon Europe? (up to 3 answers possible)

- Lack of awareness of funding opportunities
- Lack of resources to apply
- Uncertainty about eligibility criteria
- Administrative burden
- Time constraints
- Complex application requirements
- Limited access to relevant information
- Potential concerns about the competition
- Other (max 150 words)_____

26 *[for representatives of SMEs or large industrial companies]* Do you believe Horizon Europe offers sufficient R&I funding opportunities in support of your company's effort to improve sustainability within the scope of the Green Deal?

- ☐ Yes
- ☐ No
- ☐ I do not know

[If no] Please elaborate (max 150 words)_____

27 *[for representatives of SMEs or large industrial companies]* Have you collaborated with partners who have previously received R&I funding under Horizon 2020 or Horizon Europe?

- ☐ Yes
- ☐ Not that I am aware of
- ☐ No

If answered yes, the following question will follow:
To your knowledge, have you benefited from a technological advancement made by this partner as a result of European funding?

Technology leverage

28 *[for representatives of SMEs or large industrial companies]* To what extent do you believe new technological innovation could make your business more sustainable?

- ☐ To a great extent
- ☐ To some extent
- ☐ To a limited extent
- ☐ Not at all

European R&I funding impacts

29 *[for all non-beneficiaries]* To what extent does European R&I funding contribute to the development of a sustainable European industry supply chains?

- ☐ To a great extent
- ☐ To some extent
- ☐ To a limited extent
- ☐ Not at all
- ☐ I do not know

30 *[for all non-beneficiaries]* To what extent do you believe European R&I funding can further strengthen national funding for industries to achieve the Green Deal objectives?

- ☐ To a great extent
- ☐ To some extent
- ☐ To a limited extent
- ☐ Not at all
- ☐ I do not know

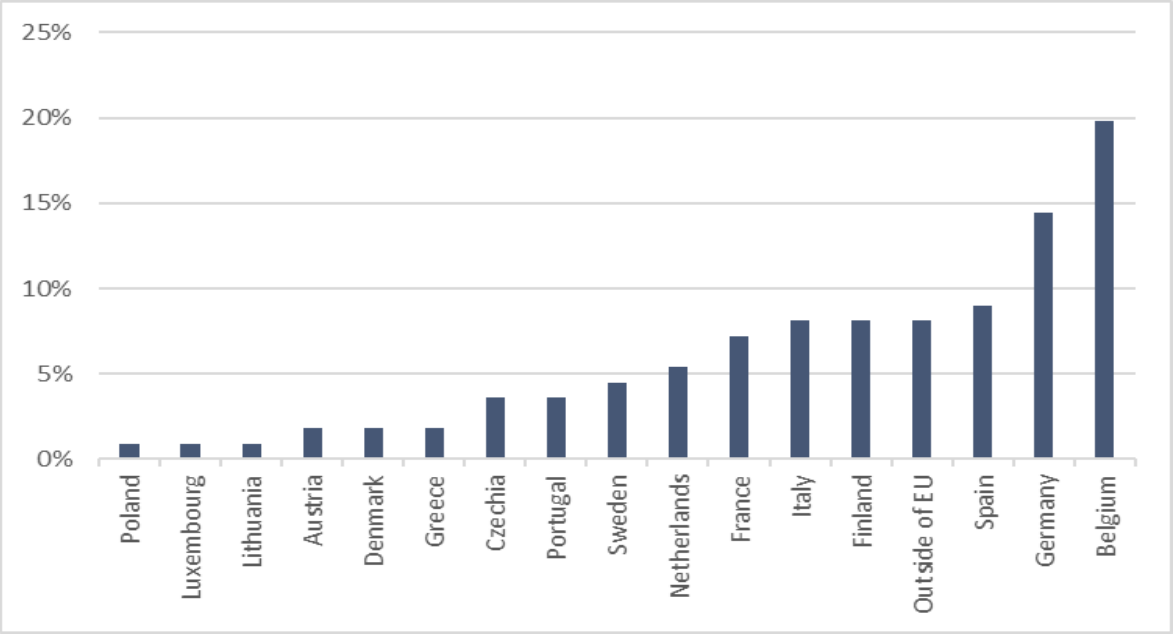
7.3. Annex 3 – Survey respondents' profiles

This annex provides information on the profiles of survey respondents, aiming to assess their coverage of European industry, as well as their familiarity with Horizon Europe and the Green Deal. It reveals that respondents offer a comprehensive coverage of industry sectors with some concentrations, along with a solid understanding of Horizon Europe and the Green Deal.

1. Coverage of the European Union

The 'Survey on Horizon Europe: supporting the industry to achieve the Green Deal objectives' garnered 111 responses, with participants hailing from 16 European countries. A significant concentration of respondents was observed in Belgium and Germany, as depicted in Figure 5 below. This distribution aligns with expectations, considering that industry associations, which represent a notable stakeholder group, often have their headquarters in Brussels. In addition, the large industrial companies responding were located in France, Brussels and Germany, amplifying this geographical focus.

Figure 5 – Geographical distribution of survey responses, EU Member States



2. Coverage of the industry

The coverage of the industry is consistent with the stakeholder's selection, where large companies represented a significant portion of the respondents, with a 27% share. The 'other' category, with an equal share of 27% of the respondents, included stakeholders focused on research. This group comprised essentially research institutes and centres, including Research and Technology Organisations (RTOs), which accounted for 15 responses. Universities also made a significant contribution with seven responses. Entities such as Authority and public agency, representatives of national ETPs (excluding the international level of European ETPs) and non-profit companies each provided two responses. Although only 10 SMEs participated in this survey, it was complemented

by four questions about R&I funding for companies included in the 'Survey on Horizon Europe: assessment of selected items'.[28] This yielded 16 more responses.

Figure 6 – Distribution of survey respondents, by type of organisation

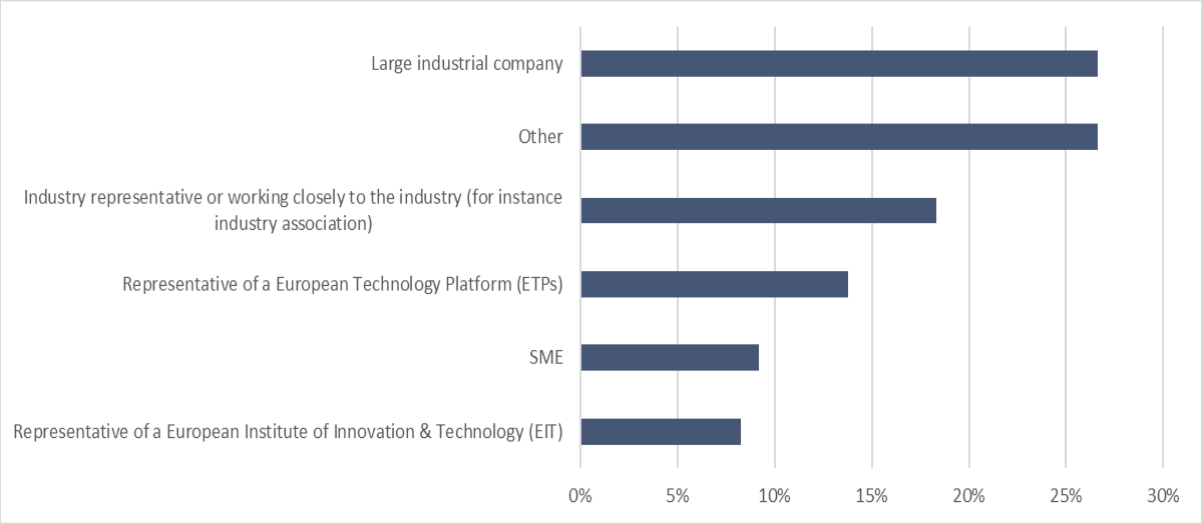


Figure 7 – Distribution of survey respondents, by industrial sector

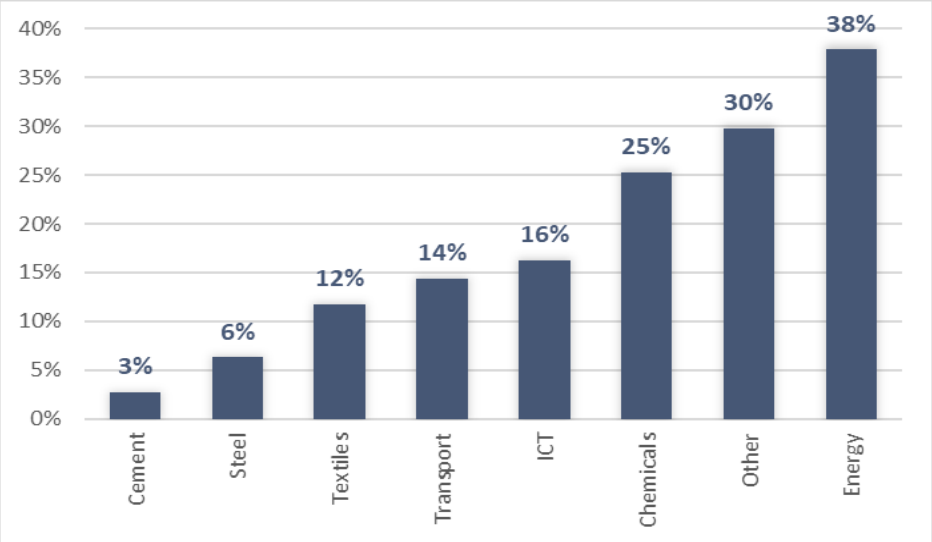


Figure 7 gives an overview of the industrial sectors represented by the survey respondents. In most cases, survey participants fell into several categories, offering multiple responses and contributing to a total of 160 answers for this question about industrial sectors. Predominantly, responses are from the energy sector (38%) and chemicals (25%). There are fewer responses from stakeholders in the steel (6%) and cement (3%) industries. Our analysis aimed for a diverse representation with approximately one-third of respondents from the energy sector, one-third from the transport sector and the remaining third from other industrial sectors. These include textiles, chemicals, cement,

[28] Al-Ajlani, H., Cvijanović, V., Mirambell Huguet, M., Novo, H., 'The Horizon Europe Programme: a strategic assessment of selected items', Panel for the Future of Science and Technology (STOA), European Parliament, 2024.

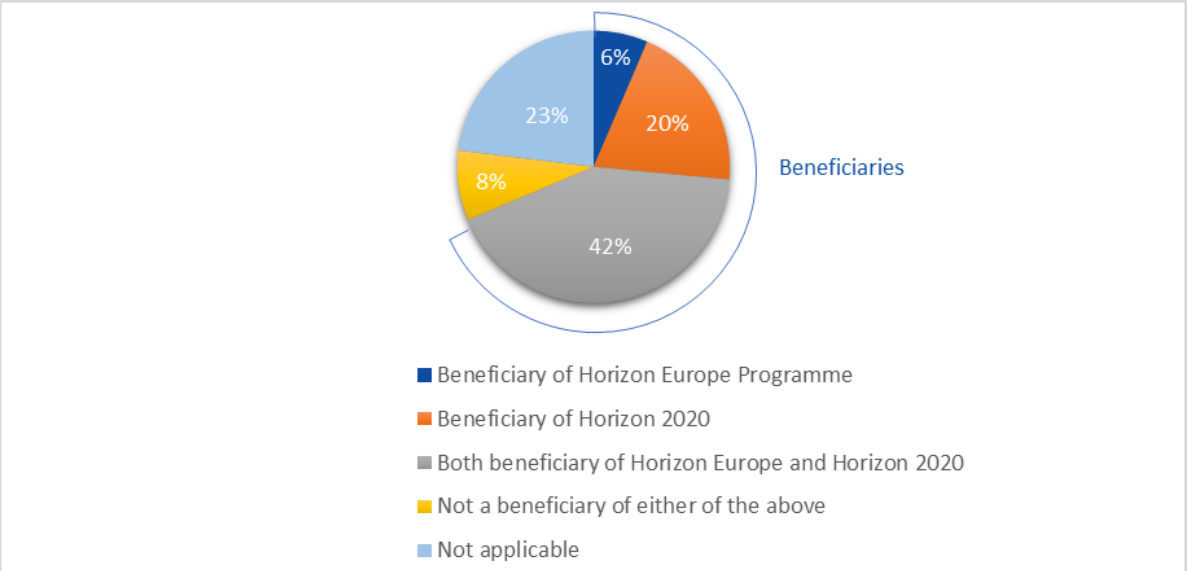
steel and ICT. The transport sector's representation was lower than anticipated, as only 14% of survey respondents work in this sector.

In terms of industrial stakeholders, the 'Other' category accounts for 21% of the responses, translating to 33 responses. This category encompasses various sectors: other manufacturing industries (four responses), the agriculture and food sector (4 responses), sustainability-related sectors (four responses), the plastics industry (two responses), and the raw materials industry (two responses). Of the remaining 17 responses, they either lack clear trends or are not distinctly categorised based on the information provided.

3. Coverage of Horizon Europe

The Figure 8 offers insights into the status of respondents as beneficiaries of Horizon Europe and/or Horizon 2020 programmes. Among the survey participants, 68% have benefited from either Horizon Europe or Horizon 2020. Notably, 47 respondents have gained from both programmes. The 'non-applicable' category encompasses organisations ineligible to apply, such as certain industry associations, European Technology Platforms (ETPs) and European Institute of Innovation and Technology (EIT) groups.

Figure 8 – Beneficiaries of Horizon Europe and Horizon 2020 programmes



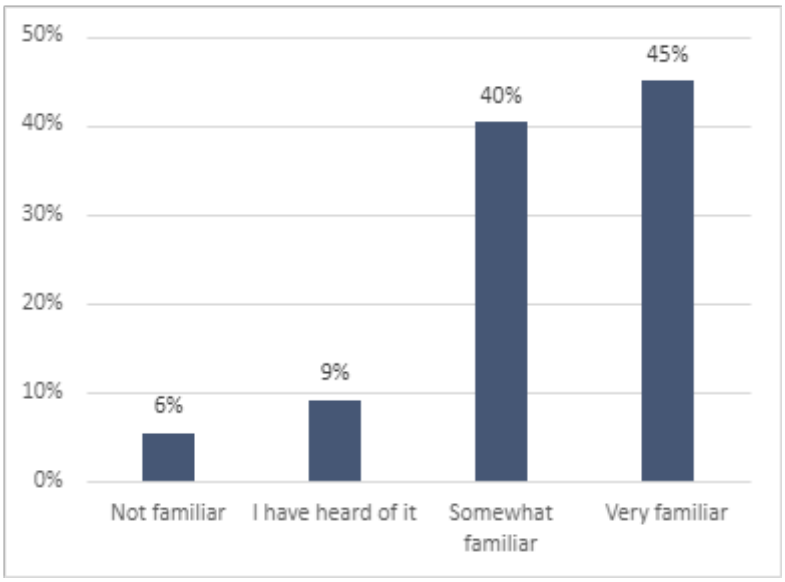
A close examination of the data reveals that 40% of respondents who participated in Horizon 2020 have benefited from a Green Deal call. This participation suggests a notable level of expertise in Green Deal objectives among the respondents. Table 8 details the specific components within Horizon Europe where respondents were most active, such as Horizon clusters. Among those engaged in Horizon clusters, the majority were involved in Cluster 5 (Climate, Energy, and Mobility), accounting for 11 responses, followed by Cluster 6 (Food, Bioeconomy, Natural Resources, Agriculture and Environment) with six responses, and Cluster 4 (Digital, Industry, and Space) with four responses. These clusters are especially pertinent to the objectives of the Green Deal, as identified through our desk research.

Table 6 – Involvement of survey respondents, by components of Horizon Europe

Component of Horizon Europe	Involvement of respondents
European Innovation Ecosystems	1%
European Innovation Council (EIC)	3%
Research Infrastructures	6%
Partnerships	10%
Horizon clusters	14%

Additionally, the survey indicates that respondents are highly familiar with Horizon Europe, as they demonstrate substantial knowledge of the Horizon Europe Missions, with close to half of them (45%) indicating a high degree of familiarity with Horizon Europe's Missions, while 40% possess some level of familiarity. The Climate Change Mission, with which 81% of survey respondents align, and the Climate-Neutral and Smart Cities Mission (49%) are particularly aligned with the activities of respondents.

Figure 9 – Survey responses, by level of familiarity with Horizon Europe's Missions



The survey results also underscore the relevance of these Missions to the respondents' activities, as detailed in the Table 6. The Climate Change Mission, with which 81% of the respondents align, and the Climate-Neutral and Smart Cities Mission, with 49% of responses, are particularly aligned with the activities of the respondents.

Table 7 – Horizon Europe's Missions; alignment with survey respondents' activities (%)

Horizon Europe's Missions for which respondents' activities fit the best	Share of respondents
None	6%
Cancer: The Mission is to understand, prevent, and treat cancer.	9%
Healthy Oceans, Seas, Coastal and Inland Waters: The Mission is to understand, restore, and protect our ocean and waters.	16%
Soil Health and Food: The Mission is to ensure 75% of all soils in the EU are healthy for food, people, nature, and climate by 2030.	27%
Climate-Neutral and Smart Cities: The Mission is to ensure 100 European cities are climate-neutral by 2030.	49%
Climate Change: The Mission is to prepare Europe for climate disruptions and accelerate the transformation to acclimate resilient future.	81%

4. Coverage of the Green Deal

Similarly, the survey indicates that a significant majority of survey respondents, 59%, are very familiar with the Green Deal, as shown in Figure 10 shows that stakeholders address all Green Deal goals comprehensively, with a pronounced focus on Research and Development (62%), Climate Action (58%) and Sustainable Industry (50%), as well as Clean Energy (41%). Preserving biodiversity and Building and Renovation goals are less frequently addressed, with only 8% and 9% of respondents focusing on them respectively.

Figure 10 – European Green Deal, levels of familiarity among survey respondents (%)

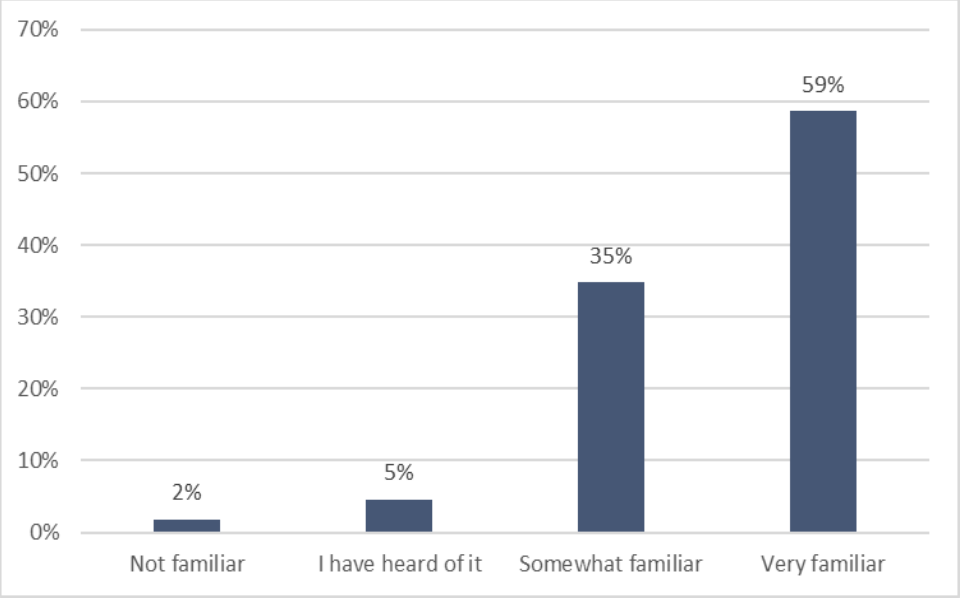


Table 8 – Alignment of Green Deal goals with survey respondents' purpose and activities (%)

Green Deal goals for which respondents' purpose and activities fit the best	Share of respondents
Preserving Biodiversity	8%
Buildings and Renovations	9%
Farm to Fork	13%
Eliminating Pollution	13%
Sustainable Mobility	19%
Clean Energy	41%
Sustainable Industry	50%
Climate Action	58%
Research and Development	62%

7.4. Annex 4 – Interview questions

This annex consists of the interview questionnaire used for the semi-structured interviews conducted to discuss the survey's findings, and potential policy options to improve Horizon's support for the industry in its green transition and decarbonisation.

Interviews about tools and methods for improving Horizon Europe's industry support to achieve the Green Deal goals

Context: Understanding the effectiveness of Horizon Europe's evaluation system is vital to ensuring the EU supports the most beneficial scientific and technological projects. In this interview, we focus on the support given to the industry to achieve the Green Deal goals. The aim of the interview is to validate the relevance and feasibility of proposed policy options to improve Horizon Europe's support to the industry.

Questions

Industry's needs to achieve the Green Deal goals

1 What are your principal needs of [your sector/the industry] to become more sustainable and decarbonise? Do the Horizon calls focus on these needs and how could Horizon Europe better answer these needs?

2 Do you think Horizon Europe provides sufficient tools and support for [your sector/the industry] to commercialise sustainability research and innovation activities?

3 Do you know a specific (typology of) call that would help you develop the necessary technology to achieve decarbonisation / the Green Deal?

Fostering more collaboration

4 How could Horizon Europe foster more collaboration between SMEs and larger players to achieve the Green Deal objectives? For instance, could it be by creating and supporting joint research and projects, networking platform, events and workshops?

Streamlining information

5 To what extent would the creation of a specialised Horizon portal dedicated to the Green Deal, enhance industry access to information about opportunities to engage in green- transition R&I as well as to commercialise green innovations?

6 Could National Contact Points be involved and serve as valuable means for industry and the Horizon programme to exchange additional information? For instance, do you see a role for Green Deal-dedicated National Contact Points?

Expanding the EIT Marketplace concept

7 Are you familiar with the marketplace concept developed by EIT's Knowledge Innovation Communities? Some of the EIT's Knowledge Innovation Communities have introduced a Marketplace concept, to display market-ready and de-risked innovations to corporates and investors. Do you think that a wider deployment of this concept, covering all the elements of the Green Deal, would help the industry to adopt green technologies?

A larger coverage of net-zero technologies

8 Recently the Net-Zero Industry Act (NZIA) was proposed, it identifies a list of net-zero technologies that should be promoted, some renewable energies and the nuclear sector that were until now not covered. Do you think there is potential for specialised Horizon calls tailored to particular net-zero technologies and components introduced by the NZIA (Net-Zero Industry Act)?

A comprehensive coverage by TRL requirements, from the research to the market

9 Horizon call participants noted that there is a lack of continuity in the TRL (technology readiness level) requirements provided. This implies gaps in Horizon support to technologies from their research stage to their development and launch. Against this backdrop,

- What is your view on the current TRL requirements in Horizon calls?
- How can we ensure a comprehensive integration of TRL requirements throughout the entire journey from research to market?

The European Green Deal, aimed at making the EU climate neutral by 2050, outlines a comprehensive approach to sustainability, requiring profound transformation across all industrial sectors. Horizon Europe, the EU's foremost research and innovation programme, can be a critical enabler, providing the necessary funding, framework and innovation pathways to support this transition.

Employing a combination of desk research and stakeholder consultations, this study evaluates Horizon Europe's alignment with the Green Deal, focusing specifically on Horizon's impact on European industry. The analysis sheds light on Horizon Europe's role in supporting research with a sustainability focus, and in facilitating industry participation in research projects. It reveals successes and identifies challenges such as administrative complexities, and the need for mechanisms to provide tailored support for small and medium-sized enterprises.

The report suggests three policy options to strengthen Horizon Europe's support for industry: enhancing the capabilities of National Contact Points, expanding the 'marketplace' concept for green technologies, and prioritising selected strategic industrial and technological goals within Horizon Europe.

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