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Annual Report on European SMEs 2021/2022

SMEs and environmental sustainability

Background document

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ACRONYMS

BEEPS	Business Environment and Enterprise Performance Survey
CBAM	Carbon Border Adjustment Mechanism
CH_4	Methane
CO_2	Carbon dioxide
COVID-19	Coronavirus disease 2019
EBRD	European Bank for Reconstruction and Development
ECB	European Central Bank
EIB	European Investment Bank
EIDSME	Environmental Impact Database for SMEs
ETS	Emissions Trading System
EU	European Union
GHG	Greenhouse gas
HFC	Hydrofluorocarbon
ICT	Information and communication technology
ISIC	International Standard Industrial Classification
kWh	Kilowatt-hour
N_2O	Nitrous oxide
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne
NF_3	Nitrogen trifluoride
PFC	Perfluorocarbons
SF_6	Sulphur hexafluoride
SME	Small-and medium-sized enterprise
UK	United Kingdom
US	United States

Executive Summary

SMEs are critical to the success of the green transition in the EU, since SMEs are currently responsible for around 60 % of all greenhouse gas emissions by enterprises. An increasing proportion of SMEs is embarking on the transition to sustainability, investing in transformation processes and viewing sustainability as an opportunity to be seized.

A significant share of SMEs has already started the sustainability transition. More and more SMEs are investing in sustainable technologies and are acquiring the skills and knowledge to transform their businesses to become more sustainable and remain competitive. More than half of all SMEs have already invested or are planning to invest in reducing emissions and tackling the impact of climate change. More than two-thirds of SMEs are already engaged in resource efficiency activities, mostly by minimising waste or saving energy. Furthermore, the majority of SMEs have also already invested or are planning to invest in tackling the impact of climate change and reducing emissions.

Furthermore, SMEs may benefit from the synergistic effects of the green and digital "twin transition". Digitalisation offers the potential to make SMEs more productive and to reduce their environmental impact. While the aggregate environmental benefit of digitalisation remains difficult to assess, some solutions, for example, ICT tools to reduce the need to travel, provide significant co-benefits to the sustainability transition. To fully leverage the potential of digital solutions for SMEs, both public and private actors should provide technical advisory services and knowledge platforms that enable SMEs to better understand the opportunities of digital solutions and how to implement them in their specific business.

Despite the good progress SMEs have made in their sustainability transition, it should be noted that **some of the key characteristics of SMEs**, such as limited resources (financial and human), operation in economic or geographic niches and in uncertain markets and policy environments, **present challenges for their sustainability transition.** Insufficient access to finance (including payment delays, constrained liquidity, and access to loans) limits the ability of SMEs to finance investments into cleaner technologies. SMEs have limited human resources (including expertise and skills), which may imply a lack of information and awareness of opportunities, environmental regulations and support options. The fact that SMEs often operate in niche markets implies that SMEs must build their own transition paths, which are specific to their niche market, and can only to a limited extent rely on best practices established by firms in other markets. Uncertainties about the feasibility of adopting sustainable technologies and about the policy environment may cause SMEs to under-invest in sustainable technologies.

Moreover, the sustainability transition of SMEs is made more complex by the fact that financing the green economy is generally capital intensive and/or risky. As a result, SMEs report access to finance as a key barrier, although several solutions are currently available. These are via the market (mostly loans and bank overdraft facilities) and via the public sector, at both Member State and EU levels (e.g., through the 'Innovate to Transform' platform and the Recovery and Resilience Facility (RRF)).

Given the urgency of the need to reduce emissions and reach the goal of climate neutrality as quickly as possible, SMEs should be supported by public policies, both at EU and national levels, to accelerate their sustainability transition. The European Commission has undertaken

several policy initiatives aimed at fostering the sustainability transition of SMEs. Firstly, the European Commission's transition pathways framework represents an excellent example of a bottom-up approach to designing SMEs' sustainability policies for each ecosystem. The European Commission also manages a key initiative, the European Enterprise Network (EEN), which provides technical assistance and tailored advisory services to SMEs. As of 2022, the EEN is also equipped with Sustainability Advisors, who will guide SMEs in their sustainability transition. Additionally, measures supporting research and development and simplifying the regulatory framework for SMEs, such as the SME Test, will have positive spillover effects in enabling the economic and legal environment for the sustainability transition of SMEs. Finally, the Commission, in partnership with the EIB Group and National Promotional Banks, funds a wide range of financial instruments aimed at supporting access to finance for SMEs, including measures addressing the sustainability transition.

SMEs in different industrial ecosystems differ significantly in their environmental impact, as well as their potential contributions towards the sustainability transition. While SMEs across all ecosystems must be involved in the sustainability transition to reach the goal of climate neutrality, public policy should pay special attention to those ecosystems with the greatest potential for emission reduction. In particular, out of all the ecosystems, those of 'energy-intensive industries', 'agri-food', and 'mobility, transport and automotive' generated the highest shares of GHG emissions in the EU in 2019 and thus offer substantial emission reduction potential. Moreover, some of the most emission-intensive ecosystems, such as 'agri-food' and 'mobility, transport and automotive', are also expected to be particularly challenged in terms of engaging successfully in the sustainability transition, providing another rationale for specifically targeting these ecosystems.

Based on the analysis of SMEs' needs and challenges in the sustainability transition and a review of existing support policies, **a set of policy recommendations have been derived, aimed at improving policy support to accelerate the sustainability transition of SMEs.**

Firstly, there is a need for policies to specifically focus on SMEs. A review of 113 energy efficiency schemes in eight EU Member States found that only two were focused on SMEs. At a minimum, sustainability policies should take note of the unique and specific challenges faced by SMEs.

Secondly, the regulatory framework should facilitate the sustainability transition of SMEs and strengthen their resilience, while minimising the administrative burden of reporting requirements. New proposals need a solid SME test to ensure that the obligations are proportionate and manageable for SMEs.

Thirdly, SMEs also need technical assistance and capacity building programmes to support them in adopting sustainable business models, a circular economy approach and new ways to boost resource efficiency. In particular, policymakers should consider leveraging and expanding the capabilities and resources of the Sustainability Advisors of the European Enterprise Network.

Fourthly, it is important to consider that SMEs differ across ecosystems and are often part of supply chains. Policies addressing large enterprises within these supply chains also impact SMEs. This has two implications. First, the indirect impact of reporting obligations for large enterprises should be properly managed in order to avoid that these requirements are unfairly passed on in the supply chain to SMEs (this can range from requests of sustainability information to a shifting of liability). Secondly, while exempting SMEs from specific obligations can be justified in some cases, legislation should consider simplified voluntary tools and mitigating measures that allow SMEs to demonstrate their sustainability commitments. Such policies could include simplified and proportionate standards

for SMEs, non-binding model contractual clauses, lower frequency for certain obligations, tailor-made guidance, one-stop-shops, or helpdesks).

Fifthly, by providing incentives for SMEs to tap into green markets through innovative products and services, SMEs can become an important driver of the sustainability transition. Examples of such incentives include green prizes and certifications, e.g. the Maltese Sustainable Enterprise Award.

Some policies supporting SMEs in the sustainability transition may create win-win scenarios.

Firstly, support for energy efficiency measures, green certifications and prizes, and technical assistance not only accelerate the sustainability transition but also provide benefits in the form of business cost reductions, reputation improvements and capacity building.

Secondly, self-assessment and diagnostic tools help SMEs to understand their environmental footprint and the means available to reduce it. At the same time, these tools establish a much broader database that can serve as a basis for future policy decisions.

However, other policies face trade-offs between accelerating SMEs' sustainability transition and other policy goals.

Firstly, sustainability reporting requirements for SMEs facilitate the sustainability management of SMEs, raise awareness of sustainability issues, and promote credible monitoring processes. However, at the same time, reporting requirements might introduce additional costs and overwhelm SMEs with limited capacity. By ensuring that these reporting requirements are consistent and that the reported data is available to all relevant stakeholders in line with the "Once-Only Principle", the administrative burden on SMEs can be limited.

Secondly, regulatory measures introduce both benefits and drawbacks, depending on their specific nature. While measures such as environmental production standards might lead to the universal adoption of sustainable practices, they might also reduce the international competitiveness of SMEs. In contrast, regulatory measures could also take the form of tax incentives, reduction of the administrative burden, or simplified intellectual property rights for sustainability-related innovations. While these measures all contribute to an increase in SME competitiveness and incentivise sustainability action, they might also lead to legal uncertainties and challenges in the classification of sustainable innovations and investments.

Thirdly, financial support should ideally be combined with technical assistance, awareness raising and advisory services, since SMEs often do not possess the necessary skills and knowledge to undertake green transformation processes. Including technical assistance in financial instruments can thus enable SMEs to better exploit the opportunities of the sustainability transition, but might also make financing more expensive and complex to implement.

The Russian war of aggression against Ukraine might impact the transition pathway of SMEs via different channels. Firstly, rising energy prices change the economic considerations of resource efficiency actions and potentially raise the ambitions of SMEs to become carbon or climate neutral. Secondly, while SMEs in the 'energy – renewables' and 'aerospace and defence' ecosystems might benefit from increased demand, SMEs in the 'energy intensive industries' ecosystem will face rising production costs.

Introduction

This special study serves as a background document to the Annual Report on European SMEs 2021/22 and assesses the situation of SMEs in the sustainability transition. This special study is structured as follows:

Chapter 1 provides a review of general trends, challenges and opportunities for SMEs.

Chapter 2 specifically focuses on digitalisation as a tool for addressing the challenge of the sustainability transition.

Chapter 3 specifically focuses on access to finance as a key challenge for financing the investments needed to become more sustainable.

Chapter 4 provides an overview of the sustainability transition in fourteen industrial ecosystems.

Chapter 5 provides policy options to facilitate the sustainability transition for SMEs.

Chapter 6 concludes and provides recommendations.

1 SMEs and sustainability: general trends, challenges, and opportunities

The European Union has embarked on an ambitious transition towards a greener, cleaner economy. The European Green Deal responds to climate change and environmental degradation, as the key challenges of our time, by ensuring the decarbonisation of the economy and promoting more efficient resource use. The Green Deal requires "*economic and societal transformations […] engaging all sectors of the economy and society*" and aims for a transition that "*enhances the competitiveness of [the] EU economy and industry on global markets*".[1]

In this sense, the definition of sustainability is best understood by a quote from Executive Vice President of the European Commission, Frans Timmermans: "*We propose a green and inclusive transition to help improve people's well-being and secure a healthy planet for generations to come.*"[2] Following this definition, this report specifically focuses on efforts by SMEs (small and medium-sized enterprises) to improve resource efficiency and curb greenhouse gas emissions.

This sustainability transition is, and will be, a challenge for businesses, as they will have to adapt their business model and way of working. This transition includes SMEs, which constitute about 99.8% of all European enterprises and which contribute about 65% of overall employment in the business economy.[3] SMEs are thus a key part of the economy, and their participation and inclusion is therefore critical to the success of the sustainability transition.

SMEs feel the pressure to become more sustainable, with the 2021-2022 SME associations survey finding that more than 90% of SME associations reported SMEs experiencing strong or very strong external pressure to achieve climate neutrality.[4] External pressure is particularly felt from society and the EU, and to a slightly lesser extent from investors, national governments, customers, and supply chain partners.

SMEs are highly heterogeneous, ranging from one-person retail stores to export-oriented manufacturing enterprises with up to 250 employees. Nonetheless, some key defining characteristics can be identified that hold true across a wide range of SMEs and distinguish SMEs from large enterprises:

1. SMEs tend to operate in a geographic and product niche, with limited diversification.

2. SMEs have limited access to resources, including access to finance, expertise, skills and human resources.

3. SMEs are often owned and managed by the same person, and consequently depend on the ambitions, beliefs and values of the owner-manager.

[1] See European Commission, A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy, Communication from the Commission, COM/2018/773.
final, 2018, available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0773&from=EN, page 5
[2] European Commission. 2019. What is the European Green Deal?. https://ec.europa.eu/commission/presscorner/detail/en/fs_19_6714.
[3] DIW-Econ calculations, based on Eurostat Structural Business Statistics.
[4] The 2021-2022 SME association survey was conducted within the framework of this Annual SME Performance Review. This special study also relies on findings of the 2020-2021 SME association survey, which was conducted within the framework of the previous Annual SME Performance Review.

4. SMEs have limited influence on the wider business environment (e.g., through lobbying or advocacy activities) and supply chains.

These characteristics shape whether and how SMEs embark on the sustainability transition. For example, the first and third characteristics would imply a highly heterogeneous response to the sustainability transition, highly dependent on the specific niche of an SME and individual owner-managers. In contrast, due to these defining characteristics, SMEs are potentially an important driver of sustainable innovations. As highlighted in previous OECD research, smaller firms take advantage of market opportunities neglected by larger, more established firms, due to differing market incentive structures between the two firm types.[5]

1.1 *The European Green Deal*

The sustainability transition envisioned by the European Green Deal is multidimensional, covering various aspects of environmental sustainability, while maintaining reductions in greenhouse gas (GHG) emissions as the overarching goal. Consequently, the focus of this study is on SMEs and greenhouse gas emissions, whilst also touching on other aspects of environmental sustainability, such as the circular economy and resource efficiency.

The European Green Deal aims to make Europe climate neutral by 2050. To this end, various actions and plans are implemented or proposed. Most of these are ambitious and far-reaching and consequently also impact SMEs. Particularly worth highlighting, for their impact on SMEs, are the following EU climate actions and elements of the European Green Deal:

The **EU Emissions Trading System** (EU ETS) predates the European Green Deal and was one of the first emissions trading schemes. The ETS caps participants' total emissions but permits them to trade emissions allowances. The ETS currently covers only specific sectors, namely, electricity and heat generation, energy-intensive industries, and commercial aviation, and provides exceptions for small enterprises.6 Consequently, most SMEs are not included in the ETS.[7] However, they are still affected, for example, through their supply chains, either as customers or as suppliers.

The proposed **Carbon Border Adjustment Mechanism** (CBAM) is an element of the Emissions Trading System. The mechanism would ensure a level playing field for domestic products and imports by taxing emissions-intensive imports in order to protect the EU's carbon objectives from being undermined by production shifts to countries with less stringent climate polices. [8] While the direct impact on SMEs would be limited, they would still be affected indirectly through their supply chains.

The **Circular Economy Action Plan** envisions the transformation of industry towards circular economy principles. Currently, the action plan focuses on the key product value chains of electronics and information and communication technology (ICT), batteries and vehicles, packaging, plastics, textiles, construction and buildings, and food, water and nutrients. In these particular value chains and related industrial ecosystems, the impact of the action plan on SMEs is potentially strong and widespread. Various instruments are available to SMEs to support the adoption of circular economy activities, such as the

[5] OECD (2013), Green Entrepreneurship, Eco-Innovation and SMEs, OECD, Paris. available at https://one.oecd.org/document/CFE/SME(2011)9/FINAL/en/pdf.
[6] See https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets_en.
[7] According to our own calculations, based on the EBRD BEEPS dataset, only about 4% of SMEs participated in the ETS. However, as this dataset is not fully representative of the population of SMEs in the EU, this figure should be seen as an approximation. Furthermore, the 2021-2022 survey of SME associations showed that the majority of SME associations do not see greenhouse gas trading and offsetting schemes as widely used by SMEs.
[8] See https://ec.europa.eu/taxation_customs/green-taxation-0/carbon-border-adjustment-mechanism_en.

Circular Economy Finance Support Platform (facilitating access to finance), along with Enterprise Europe Network and the European Resource Efficiency Knowledge Centre (providing cluster collaboration and knowledge transfer).

Other policies and actions are also relevant but are often highly sector-specific. Examples of such actions include the Farm to Fork Strategy, affecting mainly agri-food SMEs, and the Hydrogen Strategy, affecting mainly SMEs in the hydrogen value chain.

Also noteworthy is the **European Industrial Strategy**[9], whose aims include supporting the sustainable and digital transition ("twin transition"). The industrial strategy is accompanied by a dedicated SME strategy,[10] which emphasises the sustainability transition, acknowledging the challenges SMEs face and providing the instruments to overcome these challenges. Among these instruments are the Enterprise Europe Network, promoting cluster collaboration and knowledge transfer, the European Innovation Council, promoting green tech innovation, and the SME policy windows of InvestEU, which include promoting access to finance in the area of sustainability.

In short, the concrete impact of the European Green Deal, related policies and actions on SMEs is currently fairly limited. Where the impact is felt, it is typically localised or sector-specific. However, indirect impacts through the supply chains of SMEs are potentially significant. Furthermore, as more sectors, enterprises and production facilities are included in policies and actions, for example in the EU ETS, SMEs will be increasingly affected.

1.2 *Trends in the CO_2 emissions of SMEs*

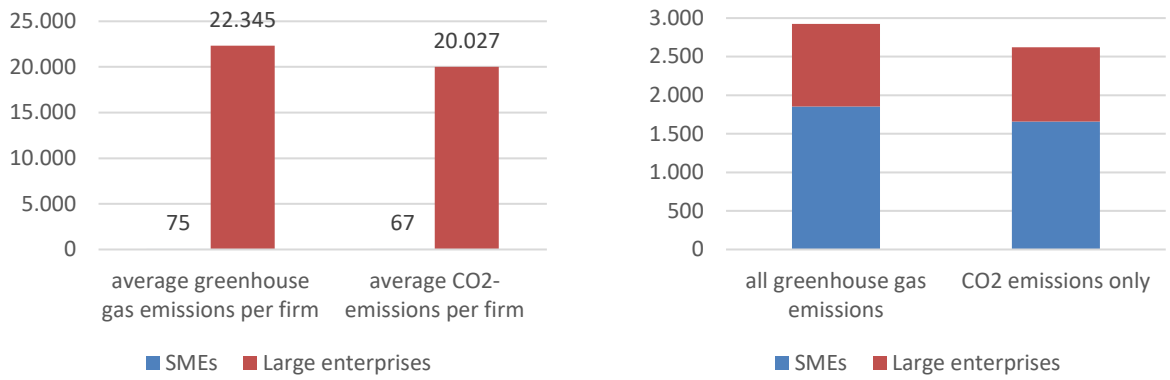
Only limited quantitative evidence is available on the environmental footprint of SMEs, as environmental statistics are collected and estimated at the level of countries or economic sectors. Consequently, little statistical data is available on the environmental footprint of enterprises by size class and thus this footprint typically has to be estimated. In what follows we mainly focus on the CO_2 and greenhouse gas emissions footprint of SMEs.

Before 2014 the now-terminated Environmental Impact Database for SMEs (EIDSME) provided such estimates. The estimates are based on combining environmental statistics with structural business statistics, under the assumption that environmental pollution is proportional to the number of employees. Under this assumption, environmental pollution at the aggregate and sectoral level can be apportioned to the number of employees, and hence to enterprises by size class. This study partially updates the EIDSME database for CO_2 emissions, based on recent data.

The average SME emits only 67 tons of CO2 and 75 tons of greenhouse gases, a very small amount, especially if compared to respective emissions of 20,027 and 22,345 from the average large enterprise. However, due to their large number, the collective share of SMEs in total enterprise emissions is high, at 63.3% of all CO2 and greenhouse gas emissions by enterprises. (Figure 1) This estimate mirrors the EIDSME estimate of 64%.

[9] European Commission, A New Industrial Strategy for Europe, Communication from the Commission, COM/2020/102 final, 2020.
[10] European Commission, An SME Strategy for a sustainable and digital Europe, Communication from the Commission, COM/2020/103 final 2020.

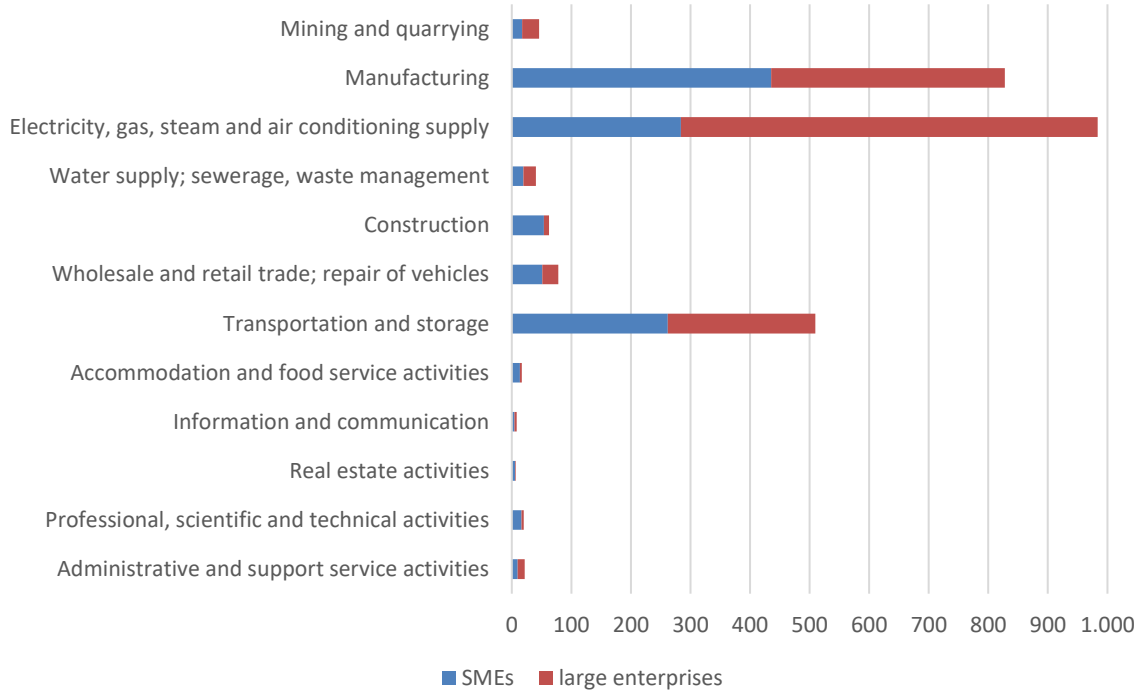
Figure 1 Emissions, in tons (left) and million tons (right), 2018



Source: DIW-Econ calculations, based on Eurostat Structural Business Statistics [SBS_SC_SCA_R2] and Air emissions accounts [ENV_AC_AINAH_R2]
Note: SMEs are defined as all enterprises with less than 250 employees; greenhouse gas emissions are defined as CO_2 and N_2O, CH_4, HFC, PFC, SF_6 and NF_3 in CO_2 equivalent.

The size and relative share of SME emissions vary by sector, reflecting both the CO_2 emission intensity of the sector itself, as well as differences in the prevalence of SMEs in the sector. Manufacturing, electricity, gas, steam and air conditioning supply, and transportation and storage are by far the highest emitting sectors. In contrast, service sectors tend to emit far less CO_2. SMEs tend to be more prevalent in sectors with relatively less CO_2 emissions, partially explaining why SMEs tend to emit less than large enterprises. For example, the share of SME's emissions in the total emissions of a sector varies between only 29% for electricity, gas, steam and air conditioning supply and 86% for construction. (Figure 2)

Figure 2 CO_2 Emissions by sector, EU-27, in million tons, 2018



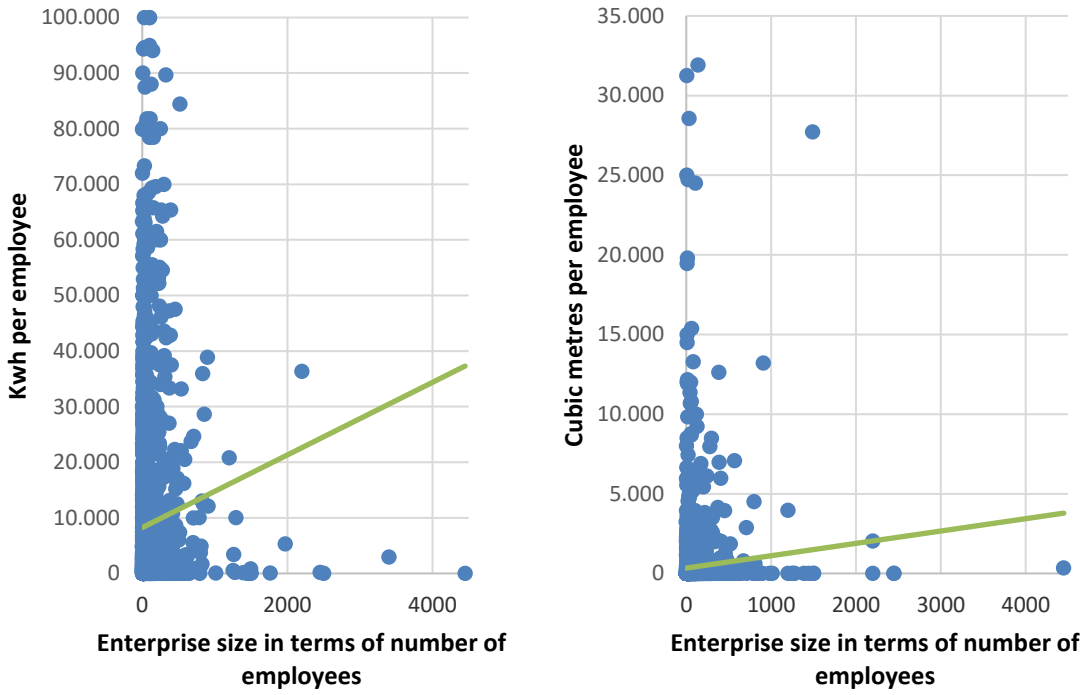
Source: DIW-Econ calculations, based on Eurostat Structural Business Statistics [SBS_SC_SCA_R2] and Air emissions accounts [ENV_AC_AINAH_R2]

Note: SMEs are defined as all enterprises with less than 250 employees, sectors correspond to NACE Revision 2 sectors.

While these figures are based on estimates, additional evidence is provided by the **Business Environment and Enterprise Performance Survey** (BEEPS) of the European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB) and World Bank. This representative survey of both SMEs and large enterprises covers non-financial enterprises in the business economy, excluding agricultural, mining, utilities, and professional, scientific and technical activities. BEEPS is focused on Eastern Europe and the Mediterranean, as well as countries in the EU neighbourhood and Central Asia. BEEPS is thus not fully representative of SMEs across the whole EU.

While BEEPS does not provide quantitative evidence on CO_2 emissions themselves, electricity and natural gas consumption can serve as proxies. We find that electricity and natural gas consumption increases as enterprise size increases but is constant in terms of average consumption per employee. However, there is also considerable variance in the average electricity and natural gas consumption by employee across enterprises. (Figure 3)

Figure 3 Average electricity and natural gas consumption by employee, 2018 to 2020



Source: EBRD BEEPS, DIW-Econ calculations
Note: In both figures the trend line is statistically not significantly different from a slope of zero.

Evidence on the greenhouse gas footprint of SMEs is also available from the proprietary **Urgentem dataset,**[11] as **reported by the European Central Bank (ECB)**.[12] This dataset is derived from a statistical model and aimed at the financial services industry and provides data on the emissions of more than 4,500 large enterprises, collected from public sources, and more than 30,000 publicly listed companies. In cooperation with the ECB,

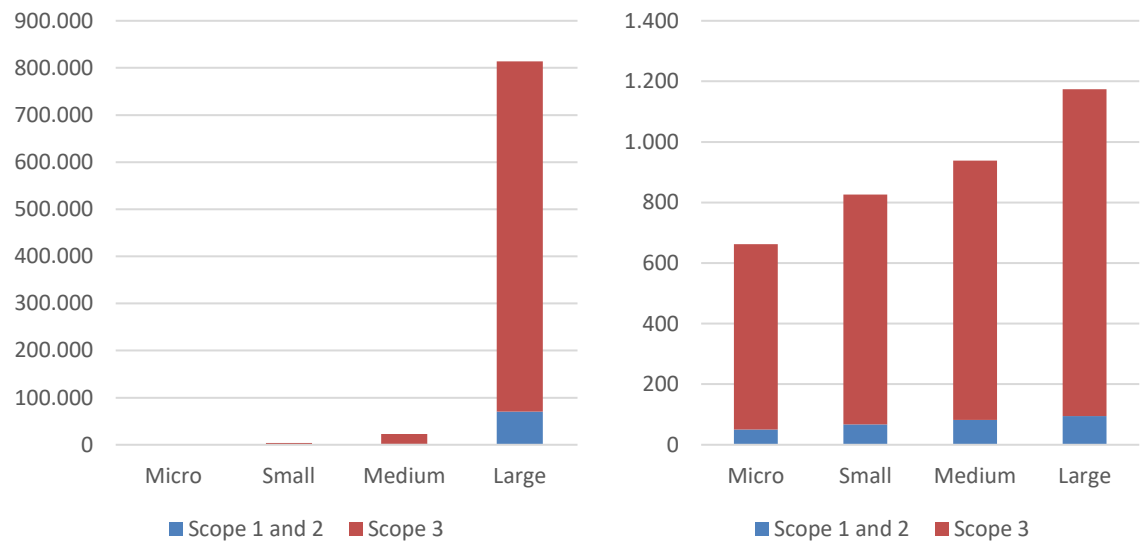
[11] See https://www.urgentem.net/data.
[12] Alogoskoufis, Spyros, Nepomuk Dunz, Tina Emambakhsh, Tristan Hennig, Michiel Kaijser, Charalampos Kouratzoglou, Manuel A. Muñoz, Laura Parisi, Carmelo Salleo, ECB economy-wide climate stress test: Methodology and results, European Central Bank, Occasional Paper Series No. 281, 2021, available at https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op281~05a7735b1c.en.pdf.

this dataset was expanded, using statistical modelling, to include more than four million public and private enterprises, most of them being SMEs.

The dataset reports direct emissions (scope 1), indirect emissions created in the production of electricity consumed by the enterprise (scope 2), and all other indirect emissions in the supply chain, for example in transportation, the production of intermediate inputs or the use of final products (scope 3).[13] In contrast to the data discussed so far, SMEs are defined not according to the number of employees but by their balance sheet total. All enterprises with less than EUR 43 million in total assets are classified as SMEs.[14] Furthermore, the data includes enterprises from both the EU and from outside the EU.

Several findings emerge. First, scope 3 emissions vastly exceed scope 1 and 2 emissions. While there are overlaps – the scope 3 emissions of one enterprise are the scope 1 or 2 emissions of another – this also indicates that supply chains and their emissions are an important aspect of the sustainability transition. Second, emissions by large enterprises vastly exceed emissions by SMEs. This cannot just be attributed to the larger scope of supply chains of large enterprises, as even scope 1 and 2 emissions are vastly smaller for SMEs. Third, the smaller size alone can also not fully explain this difference in emissions. Even adjusting emissions by the revenue of the enterprise shows that smaller companies emit proportionally fewer emissions. (Figure 4)

Figure 4 Emission intensity, absolute (left-hand side) and relative, in tons of CO_2 per Euro revenue (right-hand side), 2018



Source: Alogoskoufis et al. (2021), based on data from the European Central Bank and Urgentem
Note: Definition of enterprise size classes is based on the balance sheet total, with all enterprises with less than EUR 43 million in total assets classified as SMEs.[15]

This finding is somewhat at odds with the previous assumption and finding of emissions being proportional to enterprise size. However, enterprise size is now measured in terms of assets or revenue, and not in terms of employees. As assets and revenue are not

[13] The definition of the three levels of scope follows the Greenhouse Gas Protocol. See World Business Council for Sustainable Development and World Resources Institute, The greenhouse gas protocol: A corporate accounting and reporting standard, 2004, available at https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf.
[14] See https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:124:0036:0041:en:PDF, Annex, Article 2 for the EU definition of SMEs based on the balance sheet total.
[15] See https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:124:0036:0041:en:PDF, Annex, Article 2 for the EU definition of SMEs based on the balance sheet total.

necessarily proportional to the number of employees these two findings can, however, coexist.

Finally, the OECD conducted a literature review of the environmental footprint of SMEs and entrepreneurs in its "No net zero without SMEs" report[16]. While the scope of the review extends beyond Europe, studies focusing on the EU generally mirror the results presented in the prior paragraphs. Moreover, studies with a different geographical scope generally add validity to the findings for SMEs in the EU.

In summary, individual SMEs have a small emissions footprint, but given their large numbers, they contribute significantly to overall emissions. This poses a challenge, as any reduction in CO_2 emissions critically depends on SMEs, while SMEs – as discussed previously – face substantial barriers in reducing their emissions. Some of these barriers take the form of fixed costs, such as the investment needed to study, understand, and address complex administrative or legal procedures. The large number of SMEs thus implies the high cost, across the European Union, of reducing CO_2 emissions.

Moreover, given the urgency of climate change, mitigation and adaptation measures need to be rapidly implemented across the EU economy, including by SMEs. Given the time pressure and the significant environmental footprint of SMEs, efficient and effective policy support is therefore needed to accelerate SMEs' transition to sustainability (see section 5).

1.3 *Challenges faced by SMEs*

The sustainability transition is and will be a challenge for all businesses, including SMEs.[17] Some of these challenges and opportunities are specific to SMEs, driven by the unique characteristics of SMEs and their differences from large enterprises. These challenges include having more limited human resources, their lack of access to finance, and their focus on niche markets in terms of products and geography. These characteristics shape how SMEs embark on the sustainability transition. For example, insufficient access to finance limits the ability of SMEs to finance investment in cleaner technologies, while a focus on niche markets implies that the transition paths of SMEs are idiosyncratic, depending on the market in which the SME is established.

In what follows, we assess the challenges faced by SMEs, based on data from various enterprise surveys. This assessment includes Eurobarometer surveys, providing representative coverage of SMEs across the EU. Three special (flash) surveys on the circular economy, resource efficiency and green markets are particularly relevant, and were conducted in 2016, 2017 and 2021. In addition, the European Investment Bank Investment Survey also provides representative coverage of SMEs across the EU and covers financial and investment aspects. Since the latest wave in 2020, the survey also includes a climate module among its survey questions, with questions on climate investments and the decarbonisation of businesses.

In contrast, the Business Environment and Enterprise Performance Survey provides representative coverage only in a subset of EU Member States, namely Eastern Europe and Mediterranean countries.[18] However, BEEPS is also more far-reaching in its thematic coverage, encompassing topics such as labour, finance, and the business environment.

[16] OECD (2021), "No net zero without SMEs: Exploring the key issues for greening SMEs and green entrepreneurship", OECD SME and Entrepreneurship Papers, No. 30, OECD Publishing, Paris, https://doi.org/10.1787/bab63915-en.

[17] However, not embarking on this transition is hardly an alternative, as it would mean even more challenging adjustments to a world of escalating climate change.

[18] BEEPS covers all of Eastern Europe as well as Cyprus, Greece, Italy, Malta and Portugal.

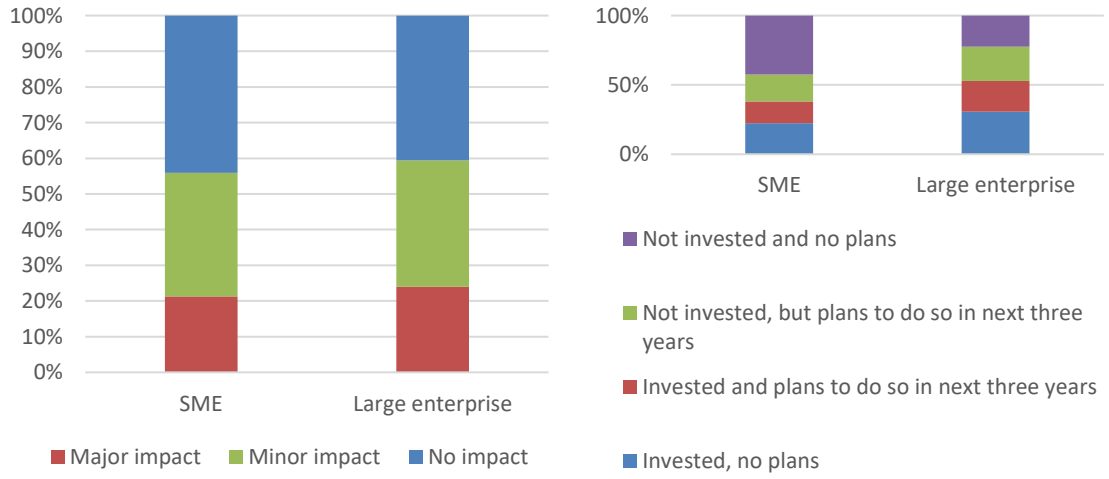
Since the latest 2018 to 2020 wave, BEEPS includes a green economy module, focused on environmental standards and practices.

1.3.1 SMEs and sustainability: Climate change

Climate change policies and climate change affect the bottom line of SMEs in four different ways. First, there are costs associated with climate change policies, such as adherence to regulations and standards. Second, SMEs have to bear rising energy costs, due to carbon taxes and other pricing mechanisms. Third, SMEs face changing demand patterns, as consumers and customers change their purchasing patterns and behaviours. And lastly, there is the impact of climate change itself, which is also felt by SMEs.[19] In turn, these challenges establish several opportunities for co-benefits arising from the sustainability transition of SMEs. For instance, resource efficiency actions not only improve the environmental performance of SMEs, but can potentially lower production costs in the future. Moreover, adapting to changing demand patterns might allow SMEs to serve additional customers.

Currently, a slight majority of SMEs and large enterprises are already experiencing major or minor climate change impacts (Figure 5, left). Furthermore, the majority of SMEs and large enterprises have invested or plan to invest in tackling the impact of climate change and to reduce emissions (Figure 5, right). However, while both SMEs and large enterprises are experiencing the current impact of climate change, SMEs are lagging behind large enterprises in terms of their actual and planned investments.

Figure 5 Current impact of climate change (left) and climate investment plans (right)

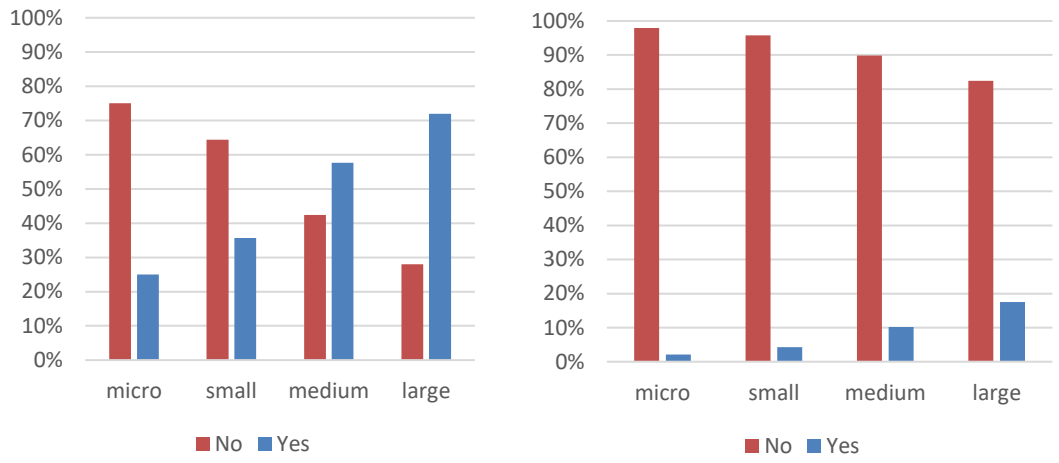


Source: EIB Investment Survey, 2020
Note: Q57. *"Thinking about climate change and the related changes in weather patterns, would you say these weather events currently have a major impact, a minor impact or no impact at all on your business?"* and Q59. *"Now thinking about investments to tackle the impacts of weather events and reduction in carbon emissions, which of the following applies?"*

This lag in climate investments starts at a fundamental level, with smaller enterprises being far less likely to audit or monitor their own CO_2 emissions and those of their supply chain. This difference is more pronounced the smaller the SME, with very few micro-enterprises auditing their CO_2 emissions and virtually none monitoring CO_2 emissions along their supply chain. (Figure 6)

[19] Vickers, Ian, Vaze, Prachant, Corr, Leah, Kasparova, Eva, Lyon, Fergus: SMEs in a Low Carbon Economy, Final Report for the BERR (Department of Business Enterprise & Regulatory Reform) Directorate, 2009.

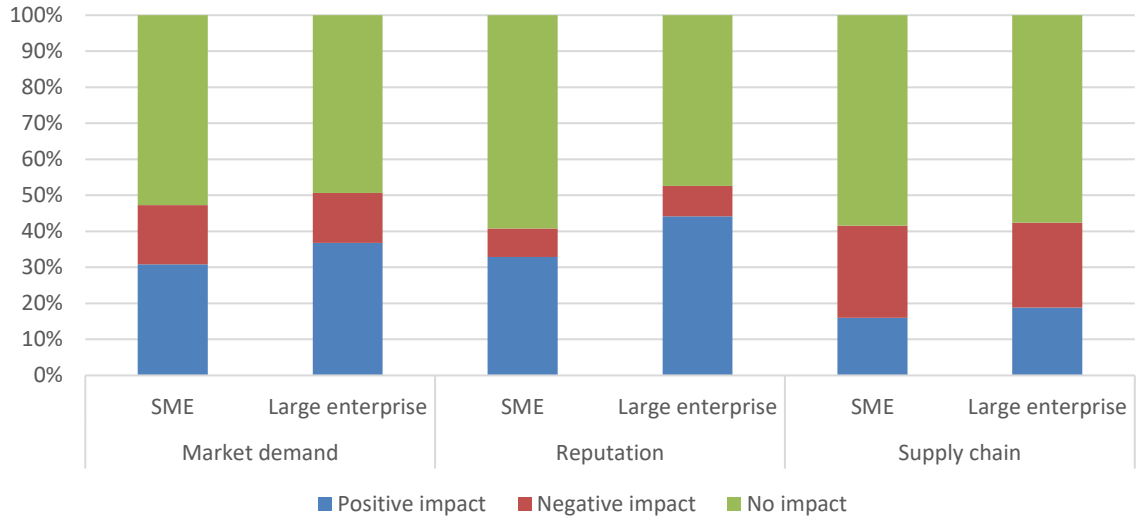
Figure 6 External audit of CO_2 emissions (left) and monitoring of CO_2 emissions along the supply chain (right)



Source: EBRD BEEPS, 2018-2020
Note: Question BMGC.10: *"Over the last three years, did this establishment complete an external audit of its CO2 emissions?"* And Question BMGC.11: *"Over the last three years, did this establishment monitor CO2 emissions along its supply chain?"*

Why do SMEs lag behind and fail to audit or monitor CO_2 emissions? On the one hand, SMEs could perceive the sustainability transition as less urgent, consequently depressing the demand for investments by SMEs. On the other hand, SMEs could face barriers when trying to invest. In general, large enterprises were more positive about the impact of the sustainability transition. SMEs largely saw no impact on their reputation from the transition and no impact or a negative impact on market demand. However, SMEs and large enterprises agreed with regard to the impact of the transition on supply chains, possibly because SMEs and large enterprises are linked through these and thus share the same perceptions. (Figure 7)

Figure 7 Impact of the sustainability transition

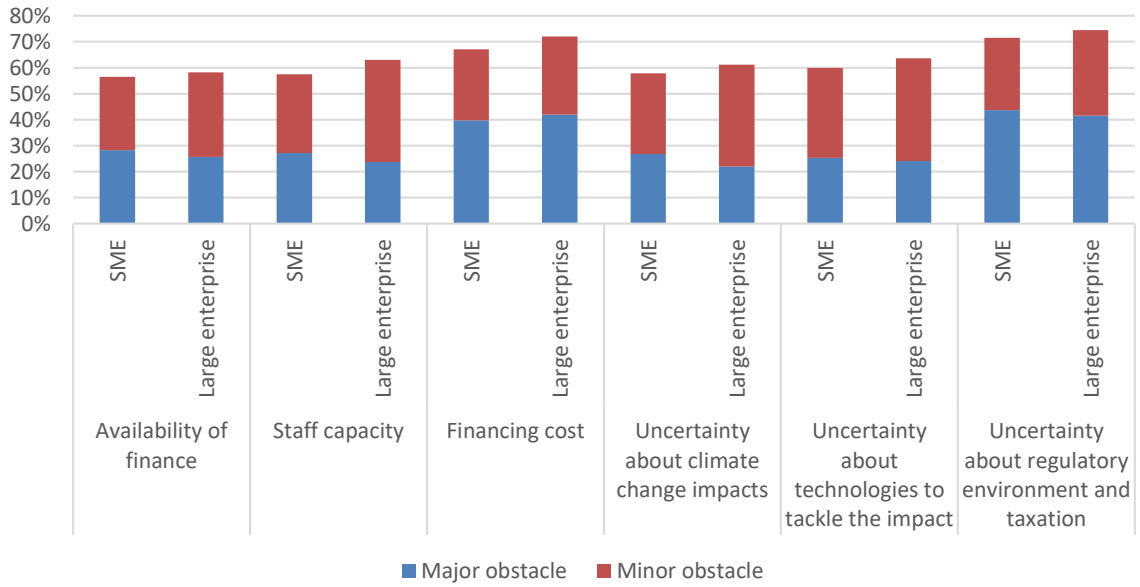


Source: EIB Investment Survey, 2020
Note: Q58. *"Limiting global warming requires a reduction of carbon emissions over the next decades. What impact, if any, will this transition to a reduction in carbon emissions have on the following aspects of your business over the next five years?"*

To effectively incorporate climate change mitigating measures into their business model, some SMEs have started to implement concrete strategies to reduce their carbon footprint to become climate neutral or negative. 39% of SMEs reported that they already had such a strategy in place or were expecting to develop one. However, the extent of SMEs' strategic planning pales in comparison to that of large enterprises. These entities report to have a climate strategy in place or to be developing one in 67% of cases. Nonetheless, when it comes to the outcomes of such strategies, SMEs and large enterprises fared similarly, with 4% of SMEs and 5% of large enterprises stating that they were already climate neutral.[20] However, ambitions to achieve carbon or climate neutrality might rise due to the increase in fossil fuel prices resulting from the war in Ukraine. These price hikes might add an economic incentive to the sustainability efforts of EU firms and potentially reduce the costs of low carbon solutions to lower levels than the costs of fossil-fuel based solutions.

Furthermore, there was no pronounced difference between SMEs and large enterprises with regard to the obstacles to tackling climate change investments. SMEs and large enterprises perceived the same obstacles as the most important. To some extent, all obstacles mattered to most enterprises. The cost of financing and uncertainty about the regulatory environment and taxes stand out in particular, with at least 39% of SMEs citing these as major obstacles. (Figure 8)

Figure 8 Factors impacting investment in activities to tackle the impacts of weather events and emissions reduction



Source: EIB Investment Survey, 2020
Note: Q60. *"And to what extent, if at all, is each of the following an obstacle to investing in activities to tackle the impacts of weather events and emissions reduction? Is it a major obstacle, a minor obstacle or not an obstacle at all?"*

To summarise, while there were differences in the perceptions of climate change between SMEs and large enterprises, these differences are rather nuanced. Differences were more pronounced with regard to investments that mitigate or reduce CO_2 emissions, and the auditing or monitoring of CO_2 emissions. A range of factors explain these differences. For instance, access to finance and uncertainty about regulation and taxes stand out. Given

[20] European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021.

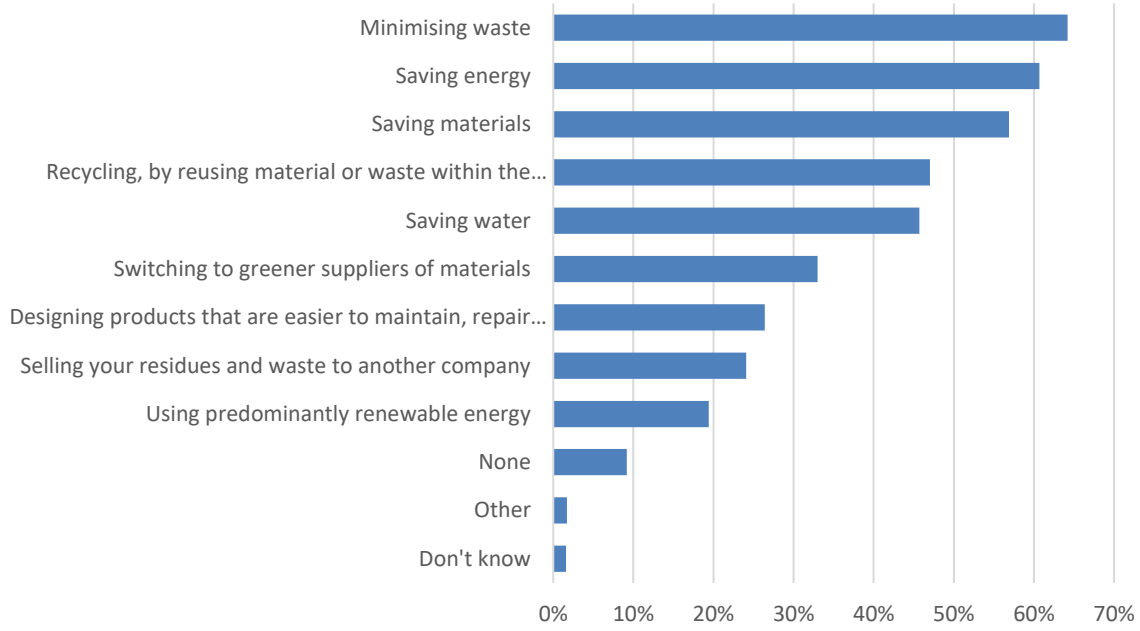
the rapid decarbonisation needed to achieve EU climate objectives, policies should primarily address these issues to support SMEs in their sustainability transition.

1.3.2 SMEs and sustainability: Circular economy and resource efficiency

A circular economy and resource efficiency are key elements of the sustainability transition. The two are closely related, with resource efficiency being an important element of the circular economy. While the circular economy especially emphasises the re-use of energy, water and raw materials, resource efficiency especially emphasises their efficient use.

More than two-thirds of SMEs had undertaken at least some resource efficiency activity, and larger SMEs were more likely to undertake more resource efficiency activities.[21] In most cases this was restricted to one or a few activities and did not entail a complete revamp of products and processes. Most SMEs minimised waste and saved energy and materials. However, comparatively fewer SMEs design products that were easier to maintain, use or repair, recycled, switched to greener suppliers of materials, sold scrap material to other companies, or used renewable energy. (Figure 9)

Figure 9 Resource efficiency activities of SMEs, 2021



Source: European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021

The larger an SME, the more likely it was that resource efficiency related activities were undertaken, particularly with regard to less commonly adopted activities. For example, while only 19% of micro-enterprises (less than 10 employees) used renewable energy, the share rose to 32% for medium-sized enterprises (50 to 249 employees).[22]

However, actual investment in resource efficiency measures remains low, with 35% of SMEs reporting having invested more than 1% of their turnover in such measures over the past two years. This figure, nonetheless, represents an improvement compared to

[21] European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021.
[22] See European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021.

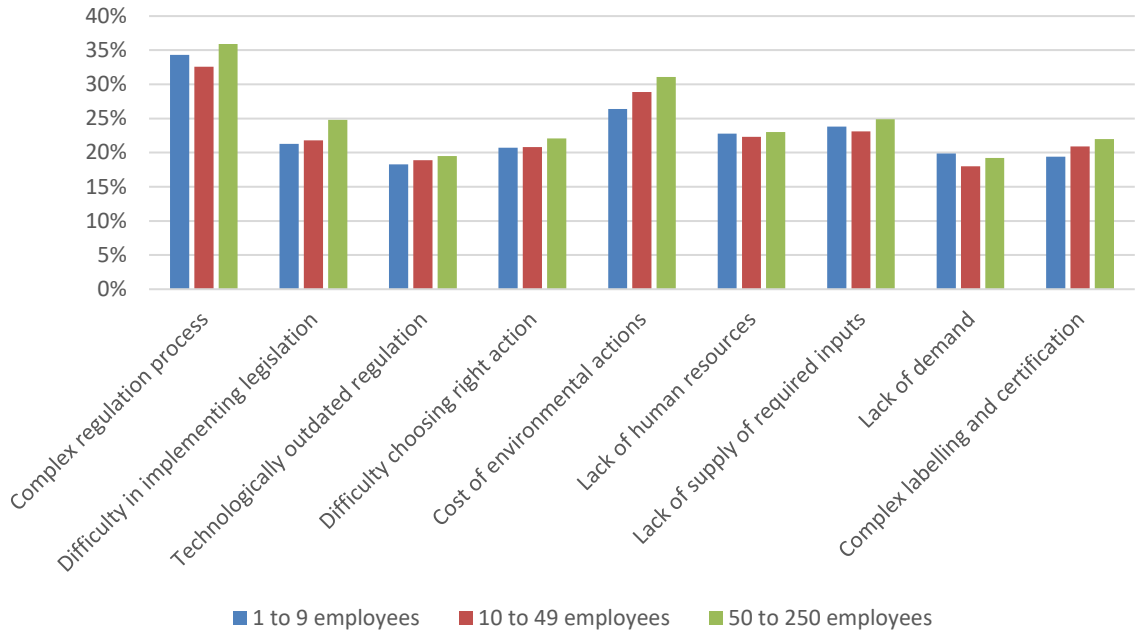
2017 (31%). Furthermore, 11% of SMEs stated that they had invested more than 5% of their turnover over the same period.[23]

Moreover, there seems to be a strong path dependency between SMEs taking prior resource efficiency actions and future planned activities. Only 15% of SMEs already undertaking resource efficiency actions did not plan to implement additional measures in the next 15 years. In contrast, of the SMEs which had not yet undertaken resource efficiency measures, 73% reported that they were not planning to pursue such measures in the next two years.[24] This gap between the two types of SMEs showcases an increasing gap between potentially sustainable SMEs and SMEs that are not progressing along the transition pathway. Such a dichotomy between SMEs is especially relevant considering the first-mover opportunities the sustainability transition entails, both in terms of SMEs setting benchmarks as well as differentiating themselves from competitors.[25]

There are a variety of reasons why SMEs do not undertake resource efficiency related activities. SMEs that had undertaken at least one resource efficiency related activity reported the costs of environmental action as well as difficulties arising from legislative and regulatory requirements as key challenges. To a slightly lesser extent other challenges were reported, such as a lack of human resources, as well as a lack of necessary materials, parts, products, or services, and also insufficient demand for resource-efficient outputs. Differences between smaller and larger SMEs emerged mostly in the extent to which these challenges and barriers occurred, with larger SMEs facing each of the challenges more frequently. Compared to 2017, the current supply chain bottlenecks stand out as an emerging issue. While in 2017 only 14% of SMEs reported lacking required materials, parts, products, or services, this share rose to 24% in 2021. Furthermore, the share of SMEs facing at least one of the mentioned barriers increased, with the share of SMEs which reported facing none of these challenges decreasing by 5% from 2017 to 2021 (Figure 10).[26]

[23] European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021.
[24] Ibid.
[25] See European Commission, Annual Single Market Report 2022, 2022, available at https://ec.europa.eu/growth/news/commission-presents-2022-single-market-report-and-updated-depth-review-europes-strategic-2022-02-23_en.
[26] European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021.

Figure 10 Challenges to the adoption of resource efficiency activities, 2021



Source: European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021
Note: Responses are: *"Complexity of administrative or legal process"*; *"Difficulty in adapting environmental legislation to your company"*; *"Technical requirements of the legislation not being up to date"*; *"Difficulty in choosing the right resource efficiency actions for your company"*; *"Cost of environmental actions"*; *"Lack of specific environmental expertise"*, *"Lack of supply of required materials, parts, products or services"*, *"Lack of demand for resource efficient products or services"*; *"Complexity associated with environmental labelling and certification"*.

A particularly stark distinction between SMEs and large enterprises emerges from the analysis of the lack of human resources, a unique challenge for SMEs as identified in chapter 1. According to the Flash Eurobarometer 498, 58% of SMEs did not employ any employees in "green jobs",[27] while that share was only 26% for large enterprises. Additionally, this lack of human resources for the sustainability transition does not seem to have been mitigated over the past years, as the share of SMEs not employing any employees in green jobs rose by 4% compared to 2017.

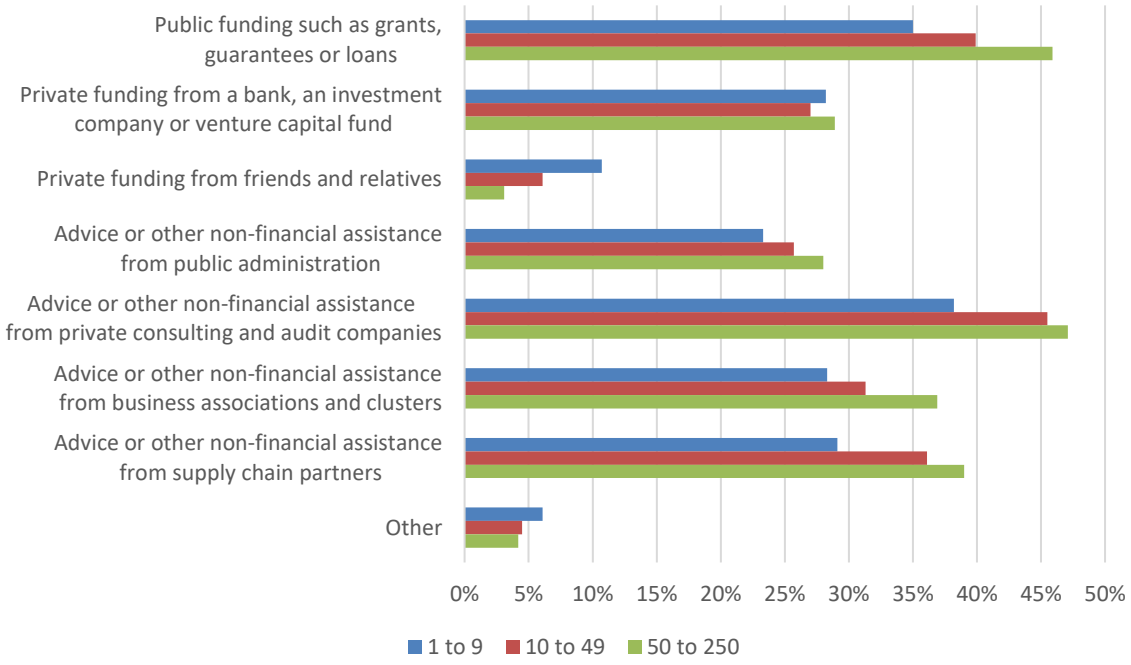
Furthermore, the identified challenges support conclusions by the OECD, which highlight a lack of awareness about the cost benefits of environmental action as a key limit to sustainability measures by SMEs.[28] The OECD's literature review also supports the Porter Hypothesis,[29] thereby concluding that a lack of clarity regarding the costs and benefits of resource efficiency measures becomes doubly burdensome to SMEs.

To overcome cost challenges, financial incentives in government support programmes could play a critical role. Such support programmes are the predominant form of external funding support across all SME company sizes. In contrast, when it comes to advice or other non-financial assistance, the private sector provides significantly more external support than the public sector. In the light of the previously mentioned challenge of dealing with complex regulation, this finding particularly highlights the increased contributions the public sector could provide. Finally, large enterprises receive more of all forms of external

[27] The Flash Eurobarometer 498 defines a green job as "one that directly deals with information, technologies, or materials that preserves or restores environmental quality. This requires specialised skills, knowledge, training, or experience ...".
[28] OECD (2021), "No net zero without SMEs: Exploring the key issues for greening SMEs and green entrepreneurship", OECD SME and Entrepreneurship Papers, No. 30, OECD Publishing, Paris. https://doi.org/10.1787/bab63915-en.
[29] The Porter Hypothesis states that environmental improvements by SMEs also improve their financial and business performance.

support, except for funding from friends and relatives (Figure 11). This is in line with the previously highlighted enterprise size effects on human resources, capacity, and inter-economy relationships.

Figure 11 Types of external support that SMEs rely on, 2021



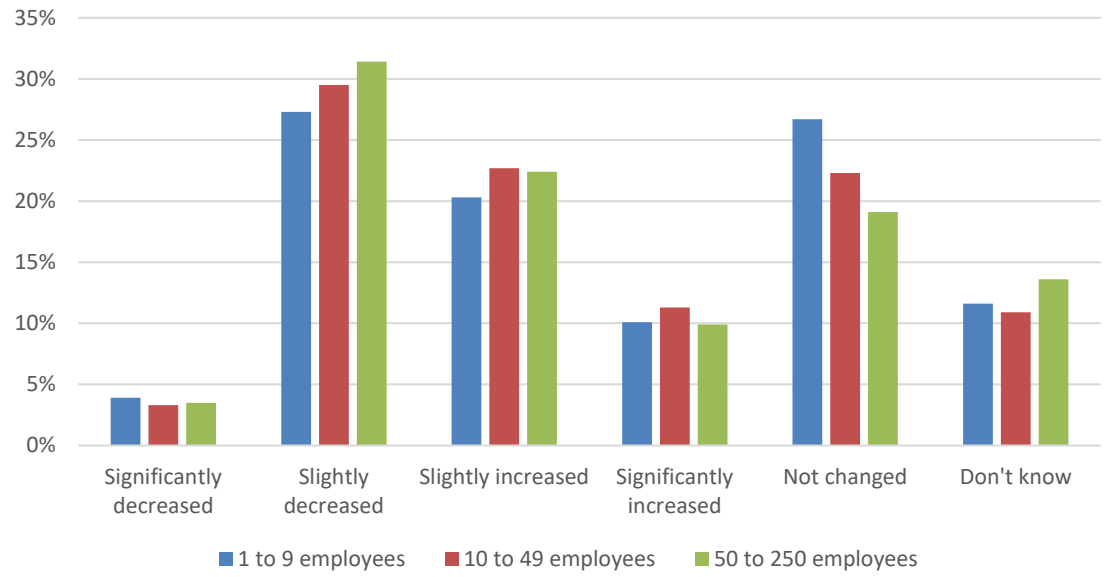
Source: European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021

Note: Question is "*More precisely, which type of external support is it?*", only if SMEs had stated in the prior question that they had received external support.

As far as resource efficiency is concerned, investments and costs incurred could be at least partially self-financed through reduced production costs. However, there was an equal split between SMEs reporting that after the implementation of resource efficiency activities their production costs had fallen, and SMEs reporting the opposite. This is a marked difference from the last instance of the Flash Eurobarometer, in which most SMEs reported cost reductions. For instance, compared to 2017, there was a decrease of 11% in the share of SMEs stating that production costs had slightly decreased as a result of resource efficiency activities. In contrast, the shares of SMEs reporting that production costs had slightly or significantly increased as a result of resource efficiency actions had increased by 8% and 6%, respectively, since 2017 (Figure 12).[30]

[30] European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021.

Figure 12 Impact of resource efficiency activities on production costs in the preceding two years, 2021



Source: European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021

However, the relationship between resource efficiency actions and production costs might change in future due to the economic effects of the war in Ukraine. As inflation is increasing, and is being felt especially in rising energy costs due to rising fossil fuel prices, the economic calculus of resource efficiency activities could tip in the direction of such measures reducing future production costs. More precisely, if each unit of resource input is priced higher, input reductions due to more resource-efficient processes will reduce production costs more and offset cost increases due to changing technological processes.

Finally, the saving opportunities vary significantly from sector to sector and even from enterprise to enterprise. Hence, while the marginal benefit of resource efficiency measures is not necessarily higher for resource-intensive firms or sectors, the incentive to act might be larger for these entities.[31]

To summarise, while SMEs have undertaken circular economy related or resource efficiency activities in selected areas, they have rarely transformed themselves along circular economy principles. This lack of transformation is particularly the case for smaller SMEs, who tend to lag behind larger SMEs. A range of factors explain these facts, in particular that SMEs are challenged by regulations, lack the expertise to implement measures or cannot access finance.

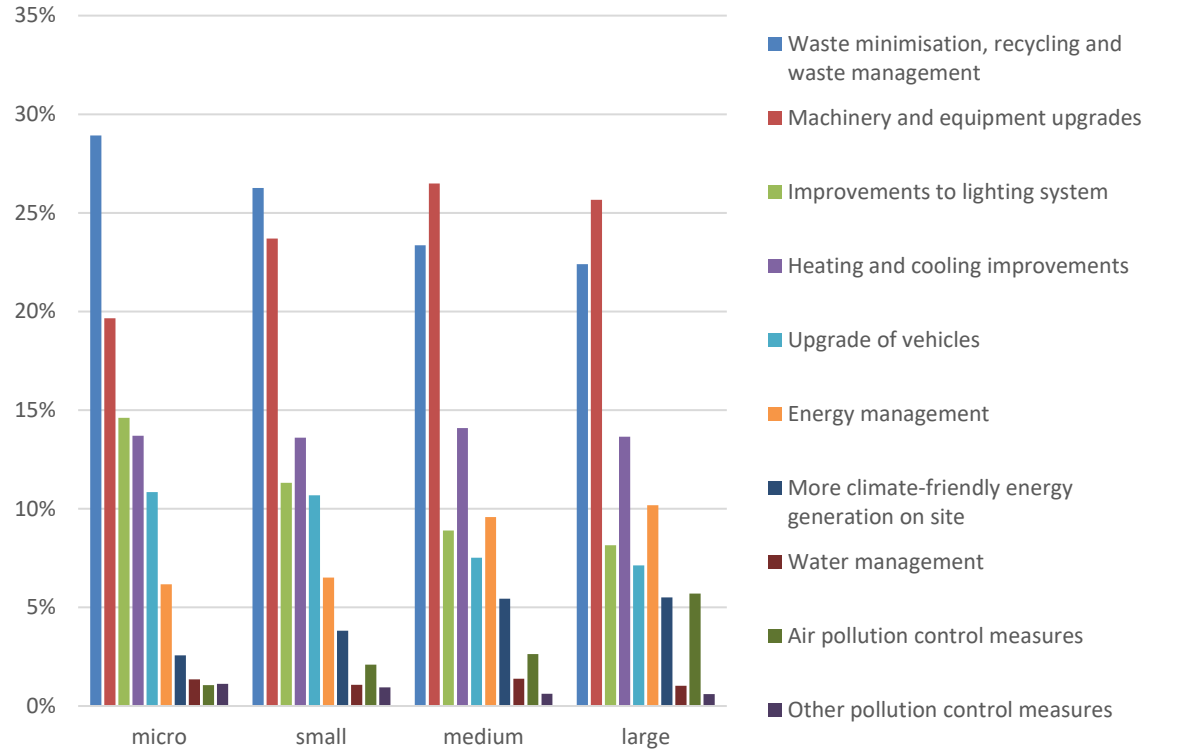
1.4 *Addressing challenges*

How do SMEs address these challenges and reduce their environmental footprint? A variety of measures are available to them, including measures that could reduce CO_2 emissions, improve the resource efficiency or strengthen the circular economy of the SME. According to enterprises themselves, the key measures are machinery and equipment upgrades, and waste minimisation, recycling and waste management. To a lesser extent, other measures matter, such as heating and cooling improvements, improvements to lighting systems and

[31] See also OECD (2021), "No net zero without SMEs: Exploring the key issues for greening SMEs and green entrepreneurship", OECD SME and Entrepreneurship Papers, No. 30, OECD Publishing, Paris, p. 20. https://doi.org/10.1787/bab63915-en.

vehicle upgrades. Air pollution control measures, or energy generation on-site (micro-generation) are less important, and are mainly deployed by larger enterprises. (Figure 13)

Figure 13 Measures that most contribute to reducing environmental impacts, by enterprise size class



Source: EBRD BEEPS, 2018-2020
Note: Question BMGC.24: *"Out of the measures adopted over the last three years, which one has contributed the most to reducing this establishment's environmental impacts, if any?"*

These findings are confirmed by the Flash Eurobarometer 498, in which 49% of SMEs with a concrete strategy to reduce carbon emissions reported that they were adopting or purchasing new technical solutions to reduce emissions. Furthermore, 34% stated that they were developing such solutions themselves.[32]

As a whole, 91% of SMEs had adopted at least one form of environmental or social sustainability action, with large shares of SMEs being active in recycling or reusing materials (61%) and resource consumption (52%).[33]

What compels SMEs to adopt these measures? According to a study by the Bocconi School of Management[34], strong motivators are individual beliefs, principles and values, but also a strong social identity embedded in local communities and the wider socio-cultural environment. Other factors are the legislative framework, for example mandating or encouraging certain measures, as well as organisational benefits, such as savings from energy-efficiency measures. However, external drivers seem to play a pivotal role as well. As indicated by the Flash Eurobarometer 456, about 50% of SMEs stated that consumer

[32] European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021.
[33] Flash Eurobarometer on SMEs, start-ups, scale-ups and entrepreneurship (September 2020), available at https://europa.eu/eurobarometer/surveys/detail/2244.
[34] Bocconi School of Management, Fostering Sustainability in Small and Medium-sized Enterprises, Generali SME EnterPRIZE White Paper, 2021.

demand and commercial benefit were their main motive for offering more sustainable products.

2 Digitalisation – a Swiss army knife for sustainability?

The digitalisation of their activities affords opportunities to SMEs, but is, likewise, also an urgent challenge. SMEs face not only the sustainability, but also a digital transition challenge. The two transitions are closely related ("twin transition"), as digital solutions are "*powerful enablers for the sustainability transition, [and advance] the circular economy, support the decarbonisation of all sectors and reduce the environmental and social footprint of products placed on the EU market*".[35]

2.1 *Digital solutions and sustainability*

While there is no question that the ICT sector has a considerable environmental footprint, this footprint is comparable or smaller than that of other industrial ecosystems. Furthermore, digital solutions are critical instruments for the reduction of environmental footprints, especially for CO_2 emissions. [36] Among these digital solutions are ICT tools as alternatives to travel, smart appliances to control or reduce energy consumption, ICT solutions to reduce paper consumption, self-generated renewable energy (storage) solutions, and cloud computing solutions.

All these technologies are of relevance for SMEs and are, to varying degrees, already adopted. **ICT tools,** such as video conferencing, can serve **as an alternative to travel**, thereby reducing transport-related CO_2 emissions. The COVID-19 pandemic has been transformational in this regard, as both business travel and travel to work have been replaced by video conferencing and remote work on an unprecedented scale. This poses a challenge for any forward-looking analysis, as it is unclear whether there will simply be a return to the pre-pandemic situation, or whether the pandemic in fact accelerated existing trends or has even led to a lasting transformation.[37]

Whether and how business travel will return to its pre-pandemic levels is unclear. In the US, slightly more than 50% of companies expect travel to return to 2019 levels by the end of 2022, with smaller enterprises being more likely to resume travel than larger enterprises.[38] In a survey of mostly larger European businesses, about one-fifth cited a permanent reduction in business travel due to video conferencing.[39] However, in a global survey of business travellers, opinions were divided about the ability of video conferencing to permanently replace travel.[40]

Should video conferencing substantially reduce business travel, it could lead to significant reductions in CO2 emissions. Video conferencing tools only cause about 0.2% to 0.9% of the emissions of the average face-to-face conference meeting and the widespread adoption of such tools could, by one estimation, reduce emissions from business travel by between 9% and 88%.[41]

[35] See European Commission, Shaping Europe's digital future, Communication from the Commission, COM/2020/67final, 2020.
[36] Colin Cunliff, Beyond the Energy Techlash: The Real Climate Impacts of Information Technology, 2020, available at https://itif.org/publications/2020/07/06/beyond-energy-techlash-real-climate-impacts-information-technology.
[37] A challenge is also that most research on the impact of video conferencing on business travel dates back to the early 2000s. Possibly this is indicative of video conferencing being a new and still relatively rare technology in the early 2000s, and an every-day and widely adopted technology today. The analysis in what follows should be read with this caveat in mind.
[38] See Caputo, Peter, Anthony J. Jackson, Ramya Murali, Maggie Rauch and Bryan Terry, Return to a world transformed, Deloitte Insights, 2021, available at https://www2.deloitte.com/us/en/insights/focus/transportation/future-of-business-travel-post-covid.html.
[39] Maqui, Eduardo, and Richard Morris, The long-term effects of the pandemic: Insights from a survey of leading companies, ECB Economic Bulletin, Issue 8/2020.
[40] See https://www.oliverwyman.com/our-expertise/insights/2020/oct/anticipating-the-travel-recovery.html.
[41] Seidel, Andres, Nadine May, Edeltraud Guenther, and Frank Ellinger, Scenario-based analysis of the carbon mitigation potential of 6G-enabled 3D videoconferencing in 2030, Telematics and Informatics 64(101686), 2021.

Smart appliances and more general **smart technologies** offer the potential for significant energy savings and reductions in CO_2 emissions. Smart technologies include smart appliances, smart meters, smart lighting systems, smart buildings, and fleet management through big data. Only limited research is available on the impact of the adoption of smart technologies with regard to SMEs.[42] Research from the UK estimates that smart technologies could lead to energy savings of 17% of the overall energy expenditure of SMEs. The most significant potential for energy savings is due to improved fleet management, integrated building management systems and smart meters.[43]

Self-generated renewable energy solutions and energy storage solutions ("micro-generation") can potentially reduce CO_2 emissions. However, SMEs face significant barriers to adoption, with a survey of UK SMEs identifying the cost of the initial set-up, the technical feasibility and planning permissions as key challenges.[44]

ICT solutions to reduce paper consumption also offer the potential to reduce the environmental footprint of SMEs. The net energy savings from using electronic paper instead of printed paper have been estimated to amount to 52%, while the net CO_2 emissions savings are 85%.[45] Given technological progress (these estimates are based on an assessment of the 2007 state of the technology) these savings are likely to be even more pronounced today.

Lastly, **cloud computing solutions** also offer the potential for energy savings and thus for reducing CO_2 emissions. While cloud computing services consume considerable energy in comparison to the decentralised provision of computing solutions, they can save energy in two ways. First, by relying on economies of scale, using more energy-efficient hardware than would be feasible in a decentralised model. Second, by achieving higher utilisation rates through the efficient sharing of computing resources. These savings can be substantial, with one US study estimating that widespread adoption of cloud computing solutions could reduce CO_2 emissions by up to 50%.[46]

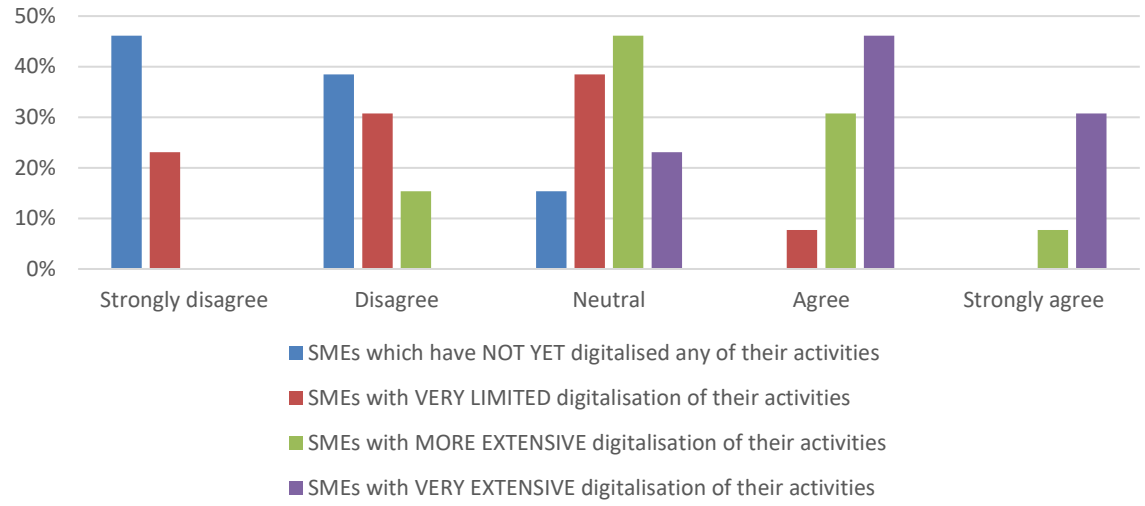
2.2 *Adoption of digital solutions by SMEs*

These and other digital solutions can reduce the environmental footprint of SMEs and deliver significant CO_2 reductions. However, there is no guarantee that they will be adopted by SMEs. Evidence on the adoption of digital solutions by SMEs, and the barriers they face, is provided by the 2020-21 survey, which was part of the previous version of the SME Performance Review. This survey covered all 27 Member States of the European Union and, through SME and digitalisation support associations, provided comprehensive coverage of European SMEs. It distinguished SMEs by their extent of digitalisation, ranging from no digitalisation to very extensive digitalisation.

There is a significant gap in the digitalisation readiness of SMEs. Those that have already extensively digitalised their activities tend to have strategies or action plans to digitalise in place. In contrast, SMEs that have not yet or have only to a limited extent digitalised their activities, tend to have no strategy or action plan in place. This dichotomy poses the risk that some SMEs are left behind, not having digitalised their activities and having no clear path towards digitalisation. (Figure 14)

[42] Most research is focused on energy efficiency measures, which include, but are not limited to smart technologies.
[43] Warren, Peter: The potential of smart technologies and micro-generation in UK SMEs, Energies 10(17), 2017.
[44] Ibid.
[45] Counsell, Thomas A.M., and Julian M. Allwood, Reducing climate change gas emissions by cutting out stages in the life cycle of office paper, Resources, Conservation and Recycling 49(4), pages 340–352, 2007.
[46] Carbon Disclosure Project Study, Cloud Computing: The IT Solution for the 21st Century, 2011, available at https://www.att.com/Common/about_us/files/pdf/cdp_us_cloud_computing.pdf.

Figure 14 Presence of strategies or action plans, 2020 to 2021



Source: Survey of SME Associations, European Commission, Annual Report on European SMEs 2020/2021: Digitalisation of SMEs, 2021
Note: Agreement with the statement "Most SMEs have a strategy or action plan to digitalise"; excludes digitalisation support organisations.

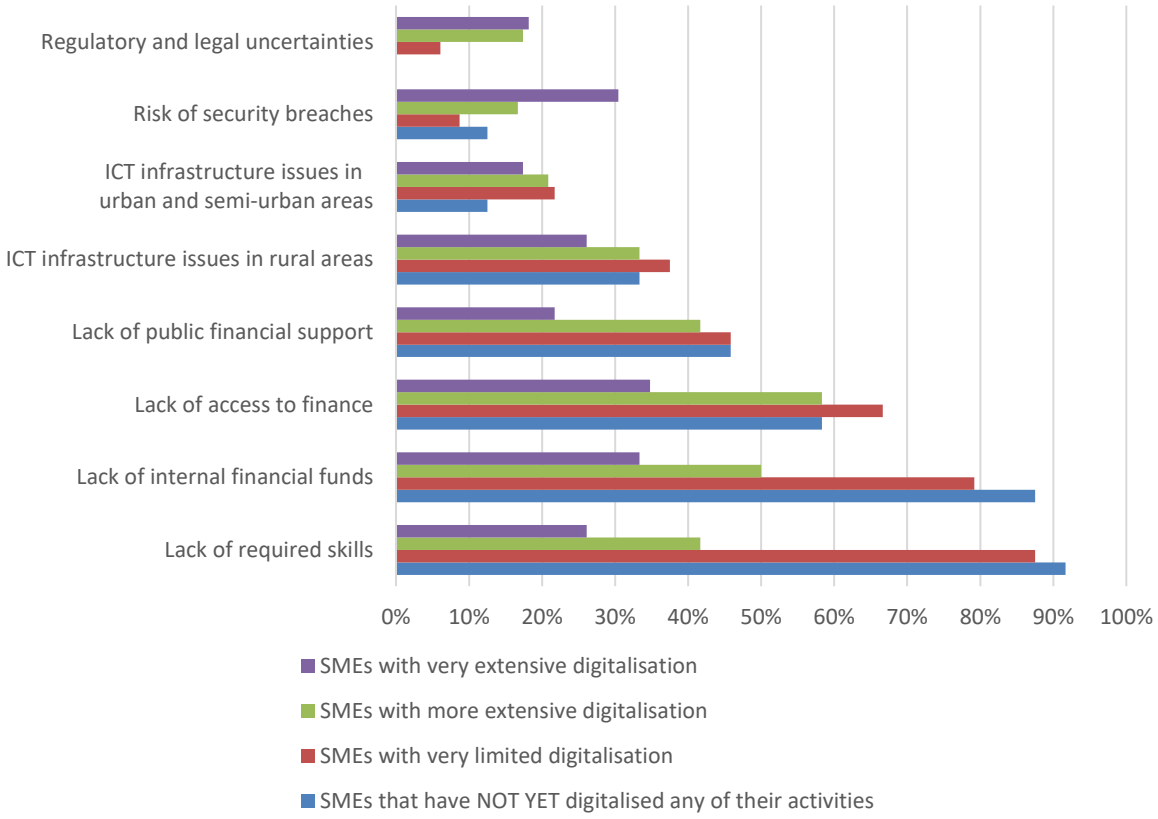
Digitalisation does not only provide potential co-benefits for the sustainability transition of SMEs but also increases the crisis resiliency of SMEs. Amid the ongoing COVID-19 pandemic, SMEs in the digital sector only experienced a decrease in value added of 0.5%, whereas other SMEs' value added fell by 8% in 2020. An increased crisis resilience and swift recovery strengthen the ability of SMEs to respond to investment needs for the sustainability transition, among others.[47]

Investments in digitalisation also differ between the industrial ecosystems. In response to the COVID-19 pandemic, over 50% of firms in the cultural and creative, energy and renewables, health, electronics, and digital ecosystems have invested in digitalisation. In contrast, less than 35% of firms in the textile ecosystem did so.[48]

Key factors explaining why SMEs are not digitalising their activities include a lack of required skills, such as internal ICT expertise or managerial knowledge, or financing challenges, such as a lack of internal financial funds, access to (external) finance or public financial support. In contrast, SMEs that have digitalised their activities tend to perceive infrastructure or cybersecurity challenges as key barriers. (Figure 15)

[47] See European Commission, Annual Single Market Report 2022, 2022, available at https://ec.europa.eu/growth/news/commission-presents-2022-single-market-report-and-updated-depth-review-europes-strategic-2022-02-23_en.
[48] See European Commission, Annual Single Market Report 2022, 2022, available at https://ec.europa.eu/growth/news/commission-presents-2022-single-market-report-and-updated-depth-review-europes-strategic-2022-02-23_en.

Figure 15 Barriers to the digitalisation of SMEs, 2020 to 2021

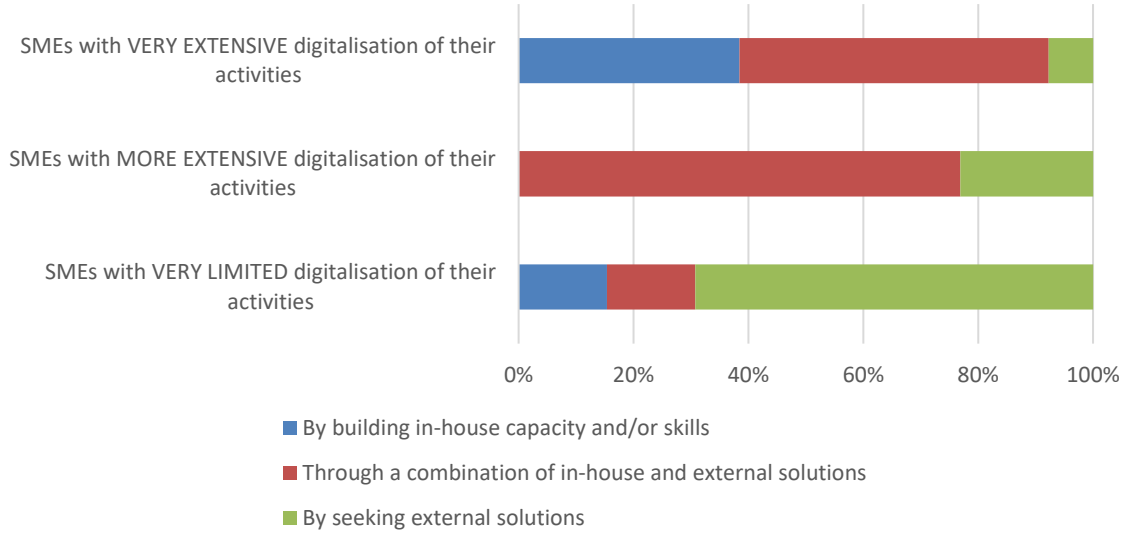


Source: Survey of SME Associations, European Commission, Annual Report on European SMEs 2020/2021: Digitalisation of SMEs, 2021.

Access to finance is a challenge with more general implications. SMEs facing this challenge will not only find it difficult to digitalise their activities but will also find it difficult to finance investments into sustainability and other, more general investments. Consequently, these SMEs risk being left behind in both dimensions.

How do SMEs pursue digitalisation? In principle, they can follow two strategies or a mix thereof, either relying on in-house capacity and skills, or by utilising external solutions. Our survey indicates that there is a clear transition path. SMEs with very limited digitalisation of their activities start out with external solutions. As the extent of their digitalisation and thus their experience grows, they increasingly rely on in-house capacity and skills, or a mix of external solutions and internal capacity. (Figure 16)

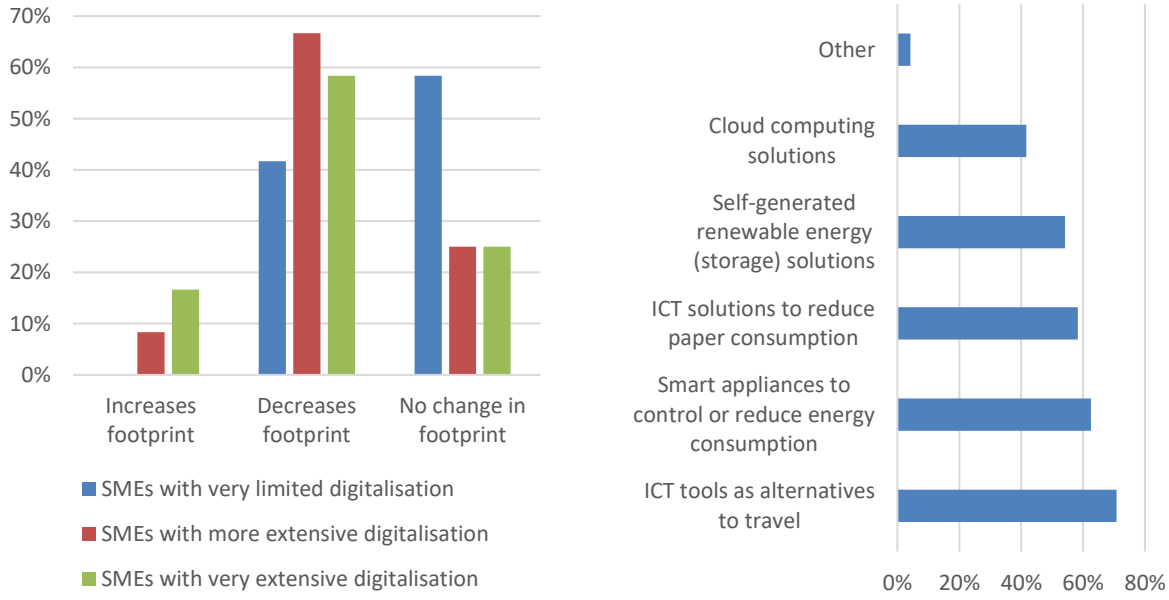
Figure 16 Pathways into digitalisation, 2020 to 2021



Source: Survey of SME Associations, European Commission, Annual Report on European SMEs 2020/2021: Digitalisation of SMEs, 2021

In general, the perception of stakeholders is that digitalisation will not increase the environmental footprint of SMEs but instead will either reduce it or leave it unchanged (Figure 17, left). This would indicate that digitalisation and sustainability go together, and that digitalisation is one way for SMEs to manage the sustainability transition. The ways in which digitalisation reduces the environmental footprint are diverse, including, for example, using ICT tools to reduce travel and using smart appliances to control energy consumption (Figure 17).

Figure 17 Impact of digitalisation on the environmental footprint (left-hand side) and ways in which digital technologies reduce the environmental footprint (right-hand side), 2020 to 2021



Source: Survey of SME Associations, European Commission, Annual Report on European SMEs 2020/2021: Digitalisation of SMEs, 2021
Note: (right-hand side chart) Question asked: *"Please select the TOP THREE ways in which SMEs in your country could most effectively use digital technologies to REDUCE their environmental footprint?"*

However, there is still significant uncertainty regarding the holistic impact of digitalisation on the environment. For instance, the mining and extraction of minerals such as cobalt or lithium for digitalisation equipment, is one of the main contributors to fossil resource depletion and detrimental biodiversity impacts. Furthermore, digitalisation potentially increases energy use during the use stage of products.[49]

2.3 *Supporting SMEs in the digital transition*

While the potential for digitalisation is clear, SMEs face real challenges in the adoption of digital solutions, ranging from challenges related to skills and expertise to the financing of ICT investments, among other factors. Policy support can play a critical role in addressing and overcoming these challenges. For example, technical advisory services and knowledge platforms can address shortages of skills and expertise, and public financial support such as grants or subsidised loans can address access to finance challenges. Furthermore, public support is critical for creating the needed ICT infrastructure and an enabling regulatory environment.

However, there are two further important considerations for the adoption of digital solutions beyond public support. First, the availability of off-the-shelf digital solutions that meet the needs of SMEs is critical. Given the size of SMEs, they are not always in a position to develop their own bespoke digital solutions and are thus reliant on digital solutions available on the market. Second, digital solutions need to fit the business processes and models of SMEs, and vice versa. This often requires SMEs to adapt their business processes to digital solutions that are available on the market. The true cost of adopting digital solutions is thus often hidden, not being the cost of purchase but rather the cost of reorganising and adapting business processes.

The changes induced by the COVID-19 pandemic are instructive. A drastic reduction in business travel and widespread adoption of remote work led to a boom in video conferencing. This boom was enabled by the adaption of business practices by enterprises, out of necessity, in response to lockdowns. The resulting increase in market demand fostered the introduction of new and improved video conferencing tools.[50]

All of the above has policy implications. A straightforward recommendation would be to address the challenges cited by SMEs, such as access to finance (through financial support programmes) or a lack of expertise and skills (through technical advisory services). However, policy support also needs to consider the availability of relevant digital solutions. In this regard, policymakers could promote the creation and functioning of markets for digital solutions. This market promotion could include demand creation, by providing financial and technical support to SMEs. Moreover, policies that promote supply, for example, through grants and publicly funded research, are necessary. Finally, the right framework conditions, such as the regulatory environment and standard setting, facilitate the creation of markets for digital solutions.

Furthermore, policymakers also need to consider the fact that the effective deployment of digital solutions might require changes or adjustments to business processes. Sometimes this deployment might be a question of extra financial resources being made available to finance the cost of digital transformation.[51] At other times it might be a question of the necessary expertise being made available to manage this digital transformation. And

[49] Impacts of the digital transformation on the environment and sustainability. Öko-Institut e.V., 2019.
[50] Bloom, Nicholas, Steven J. Davis, and Yulia Zhestkova, COVID-19 Shifted Patent Applications toward Technologies That Support Working from Home, AEA Papers and Proceedings 111, pages 263-266, 2021.
[51] In other words, merely seeing the purchase price of a digital solution would undercount its true cost.

lastly, it might also be a question of the right regulatory and legal framework being in place to support this digital transformation.[52]

3 Liquidity and finance – money drives the sustainability transfer

3.1 *Current issues with access to finance for sustainability for SMEs*

3.1.1 The link between access to finance and sustainability

The transition towards a low carbon, and eventually net zero, economy will require unprecedented levels of investments. Europe alone will need an estimated EUR 350 billion in additional investments per year over the 2020-2030 decade to meet its 2030 emissions-reduction target in energy systems alone, alongside the EUR 130 billion it will need for other environmental goals.[53] In total, the additional investments needed to achieve the objectives of the twin transition are estimated to be EUR 650 billion annually until 2030, 80% of which are apportioned to the green transition.[54]

As governments and businesses increase their efforts to meet the climate targets, many SMEs are struggling to participate in and contribute to the green transition. Accessing financial resources is a key prerequisite for SMEs to green their business models and drive the transition through eco-innovations. However, many small businesses lack the human and financial resources to undertake green actions.[55]

Traditionally, targeted policy initiatives have been necessary to boost SMEs' financing and to support their innovation and growth. The sustainability transition represents a similar challenge. In fact, at all stages of development, small businesses struggle more than large enterprises to get finance.[56] The nature of sustainability investments, which are normally capital intensive and with long payback periods, is an additional obstacle for SMEs to obtain the financing they need. To this end, targeted policy interventions addressing this market failure might be necessary.

This section will explore the link between SMEs' access to finance and their transition towards sustainability. It will first provide a brief overview of the wider access to finance situation of SMEs, and will then assess the issues involved in obtaining funding for the specific purpose of financing the sustainability transition. Finally, exemplary policy initiatives, both at EU and Member State level, will be analysed and conclusions will be provided.

3.1.2 Overview of access to finance of SMEs in the EU

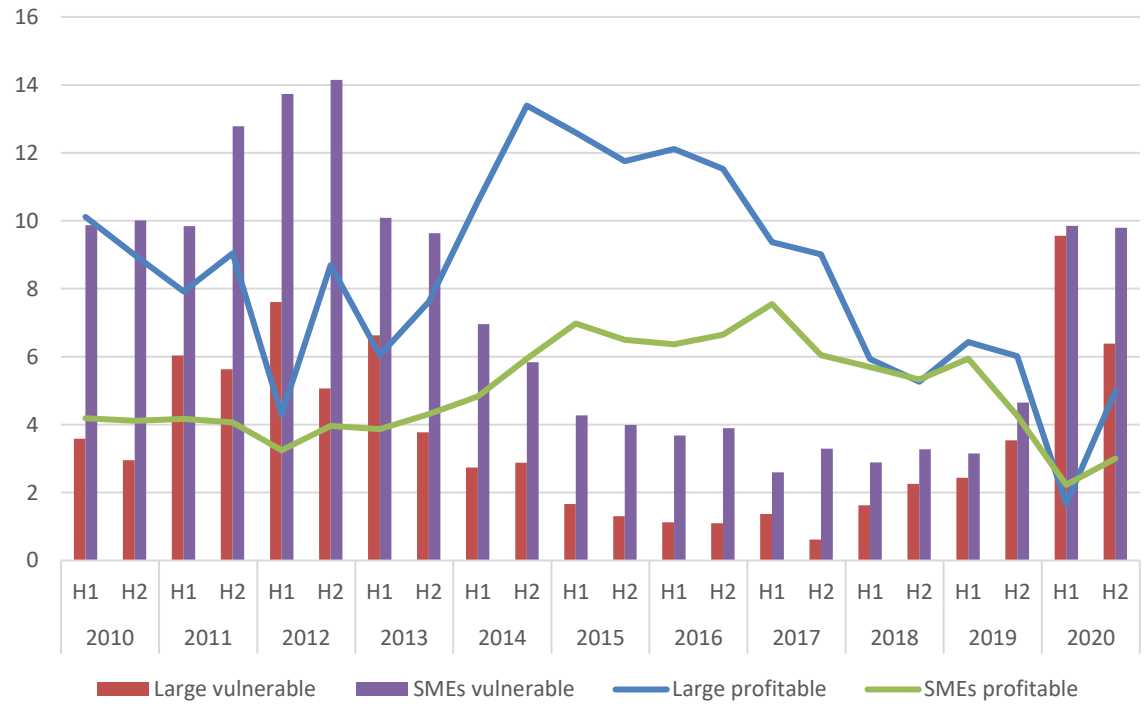
The tightening of financial conditions as a result of the 2009 global financial crisis and the subsequent sovereign debt crisis in the euro area has led to severe difficulties for SMEs in accessing finance. Since then, developments in SMEs' access to finance in the EU have

[52] For example, a shift to micro-generation would require an enabling regulatory framework, regulating feed-in tariffs, among others.
[53] Communication From the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Strategy for Financing the Transition to a Sustainable Economy, COM/2021/390 final
[54] See European Commission, Annual Single Market Report 2022, 2022, available at https://ec.europa.eu/growth/news/commission-presents-2022-single-market-report-and-updated-depth-review-europes-strategic-2022-02-23_en.
[55] OECD, Financing SMEs for sustainability, intervention at COP26, 2021, available at https://oecd-events.org/cop26/onlinesession/f1b0800c-2b2c-ec11-ae72-a04a5e7d345e.
[56] European Commission, Access to finance for SMEs, available at https://ec.europa.eu/growth/access-finance-smes_en.

been closely monitored by the ECB and European Commission with the semi-annual Survey on the Access to Finance of Enterprises (SAFE).[57]

As reported by SAFE, after the 2009 and 2011 financial crises, monetary policy measures, including non-standard ones, have contributed to improving access to finance for euro area non-financial corporations. The situation worsened again with the economic crisis triggered by the COVID-19 pandemic, which initially had a major impact on the access to finance of SMEs. The chart below shows the general financial vulnerability of SMEs and large enterprises as well as the share of companies defined as vulnerable,[58] which increased substantially in 2020.

Figure 18 Profitable and vulnerable firms (SMEs and large enterprises) in the euro area (%)



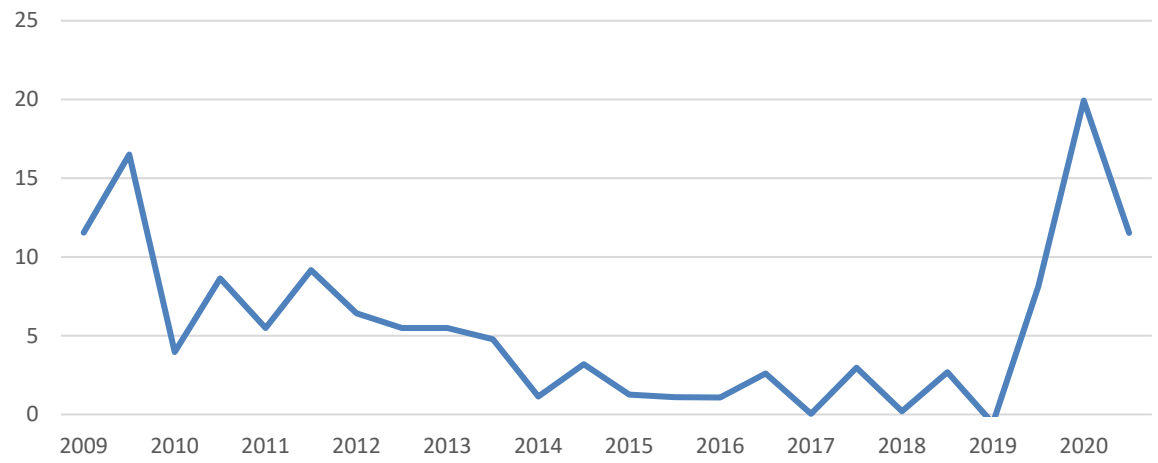
Source: European Central Bank, Survey on the Access to Finance of Enterprises (SAFE), 2021, https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html

In parallel, in 2020 the need for bank loans rose sharply while their availability decreased, as shown in Figure 19 This trend reflects the liquidity need of SMEs to stay afloat during the economic downturn as a result of lockdowns and the disruption of supply chains. Simultaneously, the decrease in bank loan availability signals the unwillingness of banks to lend to SMEs in a phase of such economic uncertainty.

[57] ECB, Katarzyna Bańkowska, Annalisa Ferrando and Juan Angel Garcia, Access to finance for small and medium-sized enterprises since the financial crisis: evidence from survey data, 2020, available at https://www.ecb.europa.eu/pub/economic-bulletin/articles/2020/html/ecb.ebart202004_02~80dcc6a564.en.html.

[58] Vulnerable firms are defined as firms that simultaneously report lower turnover, decreasing profits, higher interest expenses and a higher or unchanged debt-to-assets ratio, while profitable firms are those that simultaneously report higher turnover and profits, lower or no interest expenses and a lower or no debt-to-assets ratio. The third (and typically largest) group consists of firms that satisfy some, but not all, conditions of the vulnerable and profitable categories.

Figure 19 Net change in SMEs' need for loans over the preceding six months (%)



Source: European Central Bank, Survey on the Access to Finance of Enterprises (SAFE), 2021, https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html

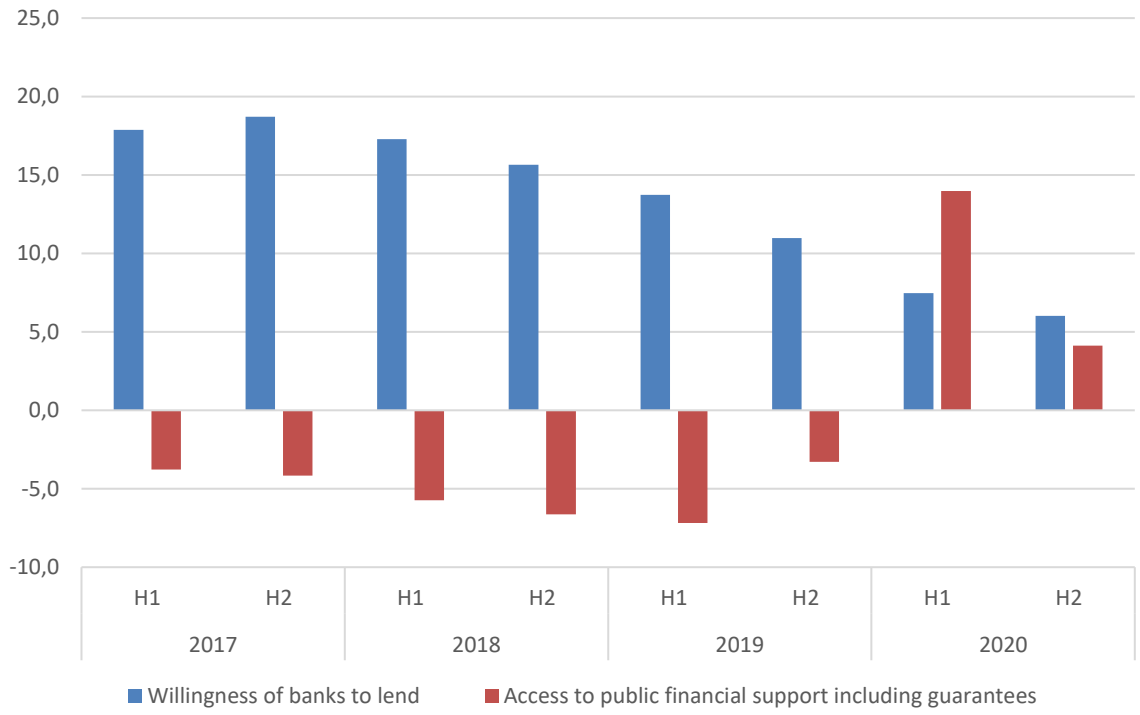
Note: Question: "For [bank loans], please indicate if your needs increased, remained unchanged or decreased over the past six months".

Nonetheless, the swift and prompt policy response at Member State and EU level seemed to have contained the crisis' impact on SME's liquidity. The importance of policy interventions to tackle SMEs' liquidity constraints is reflected in the SAFE 2020 results. According to the survey results, grants and subsidised loans were considered to be significantly more relevant than in previous years and their use increased drastically in 2020 compared to 2019.[59] It is likely that the increased importance of grants and subsidised loans is the result of policies aiming to support enterprises, given the COVID-19 pandemic. Most SMEs responding to SAFE had accessed government support schemes introduced in response to the pandemic over the previous 12 months and stated that these schemes had helped them to meet their immediate and short-term obligations (with measures aimed at alleviating wage bills, tax cuts and tax moratoria being particularly highlighted).[60]

At Member State level, the highest net percentages of SMEs reporting improvements in access to public financial support were seen in Austria (26%), Greece (17%) and France (16%). In contrast, negative net percentages were seen in Portugal (-4%), Belgium (-4%) and Slovakia (-5%).[61]

[59] European Commission, SAFE Report 2020, available at https://ec.europa.eu/docsroom/documents/43872.
[60] European Central Bank, Survey on the Access to Finance of Enterprises in the euro area - October 2020 to March 2021, 2021, available at https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html#toc9.
[61] Ibid.

Figure 20 Change of availability of external sources of financing for SMEs



Source: European Central Bank, Survey on the Access to Finance of Enterprises (SAFE), 2021, https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html

With the rebound of the global economy, the access to finance situation of SMEs in Europe has started to improve. Firstly, the availability of external sources of finance seems to have started a normalisation process, with government support schemes becoming significantly less important. Indeed, in the latest edition of SAFE, only 4% of SMEs reported that access to public financial support was a contributing factor in their access to finance (i.e., a decrease of 14% from the previous round).

Secondly, the latest SAFE data from June 2021 report that SMEs are still facing a significant number of challenges in terms of profitability but access to finance is among the least concerning obstacles. As reported by the ECB, concerns about access to finance were relatively low in the euro area as a whole. Only 9% of SMEs participating in SAFE reported access to finance as a major obstacle, with the only exception being SMEs in Greece, where the percentage was 18%.[62]

Although the access to finance situation of SMEs now looks relatively positive, in order to link access to finance and sustainability, it is necessary to disentangle the specific features and needs of SMEs in financing their transition.

3.1.3 Access to finance as an obstacle to SMEs' sustainability

Financing the sustainability transition of SMEs requires not only the availability of financial resources but also the potential and the willingness of firms to use these resources to invest. In fact, the sustainability transition of SMEs translates into various types of

[62] Ibid.

investments, that can be broken down into the following two main categories, with their related implications for obtaining the necessary financial resources:[63]

- **Energy and resource efficiency**: Investments in climate mitigation, such as upgrading obsolete machinery and facilities (e.g. energy retrofitting of buildings). These types of investments do not embed an innovative aspect, but they are capital intensive.

- **Innovation and development of new products**: Investments in research and development to create new products, processes or services that could have a positive climate impact. In addition to being potentially capital intensive, these investments embed the typical risks related to innovation. In fact, innovation is normally considered a risky venture due to the uncertainties inherent in both the innovations themselves and their commercialisation. The introduction of new products by a firm – an important type of innovation – involves high and often sunk development and production costs that may fail to bring a sufficiently high payoff to recover those costs.[64] For these reasons, in order to finance these investments, firms could also rely on equity financing or venture capital instead of bank loans, which are the source of financing most used by SMEs.

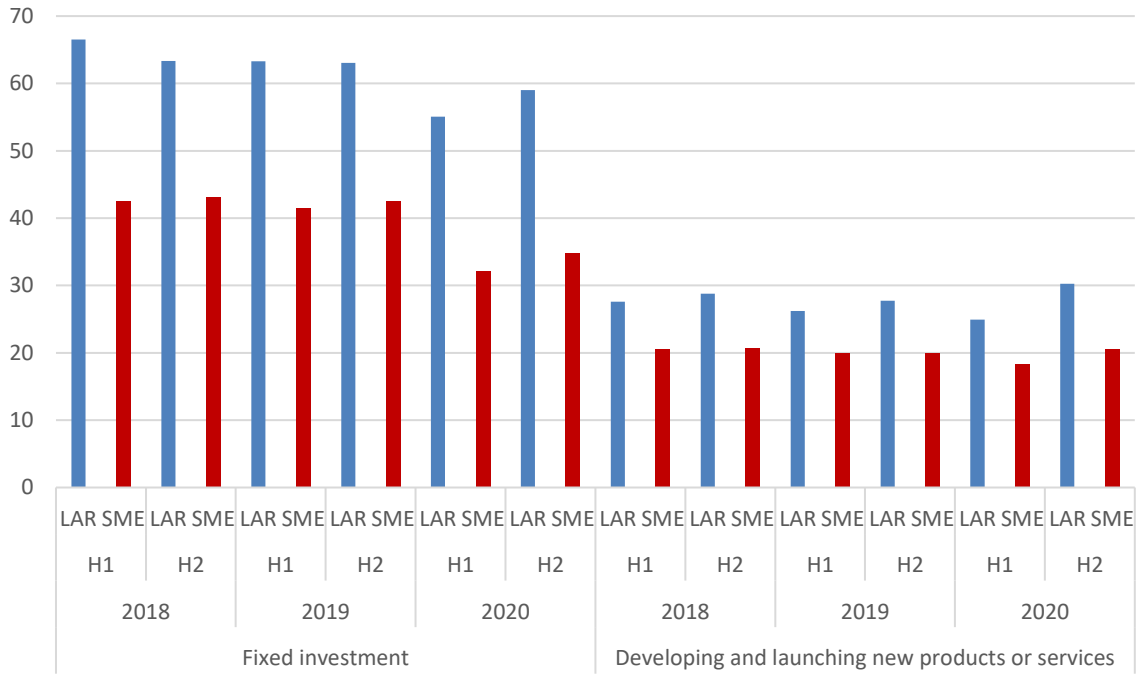
For the reasons listed above, it can be concluded that financing the green economy is generally capital intensive and/or risky and thus may involve long payback periods,[65] adding an additional layer of complexity for SMEs in terms of obtaining the financing they need.

Following this logic, it is necessary to first assess if SMEs are currently able to finance their investments in a broad sense. In the latest edition of SAFE, 35% of SMEs (up from 32%) reported using financial resources for fixed investment, up from 32% in the previous editions of SAFE. Fixed investment has declined overall since the onset of the pandemic but rebounded somewhat in this latest SAFE round despite continued high uncertainty.

Figure 21 shows that indeed the advent of the pandemic initially significantly hampered the use of external financing for the fixed investments of firms of all sizes. Such a trend is to be expected in a period of high economic uncertainty and financial distress, as investments are normally very sensitive to these fluctuations. Nonetheless, the use of external financing for fixed investments, as well as for developing and launching new products, quickly rebounded in medium-sized and large firms, while remaining at lower than pre-pandemic levels for small and micro firms. This trend signals that smaller firms are still struggling in the aftermath of the pandemic-induced economic crisis. In particular, smaller firms appear less able to channel external funds primarily towards investments, thus potentially hampering their future growth and their transition towards sustainability.

[63] Interview with the European Investment Fund, 2021.
[64] The World Bank Development Research Group, The Risks of Innovation: Are Innovating Firms Less Likely to Die?, 2012, available at https://openknowledge.worldbank.org/handle/10986/9310.
[65] Green Policy Platform, Green SMEs and Access to Finance:The Role of Banking Diversity, 2015, available at https://www.greengrowthknowledge.org/research/green-smes-and-access-finance-role-banking-diversity.

Figure 21 Purpose of financing reported by firms in the euro area (%)

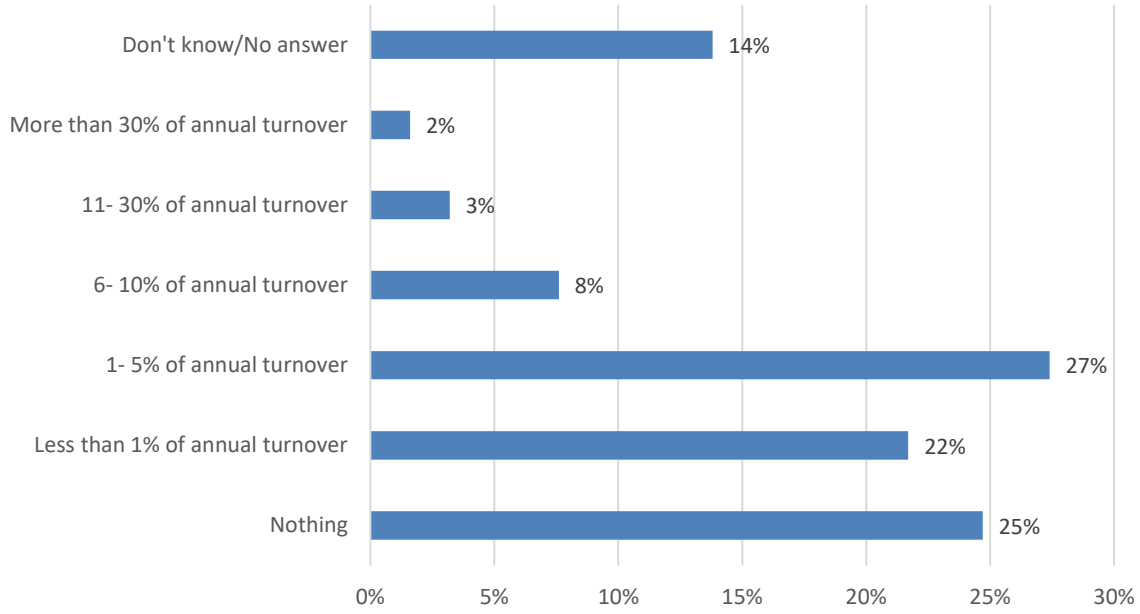


Source: European Central Bank, Survey on the Access to Finance of Enterprises (SAFE), 2021, https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html
Note: LAR – large enterprises; SME – small and medium-sized enterprises

Although SAFE provides a uniquely insightful picture of the financial and economic health of European SMEs, it does not provide specific information on access to finance which is related to sustainability. To this end, further analysis will be needed to assess the extent to which access to finance is an obstacle in financing SMEs' sustainability transition.

As discussed previously in section 1.3.2, SMEs vary in the extent of their investments into resource efficiency activities, according to the Flash Eurobarometer 498. A quarter of the SMEs surveyed in the Eurobarometer reported having invested nothing in resource efficiency. Another 22% reported having invested less than 1% of their annual turnover in resource efficiency. The percentage rose to 27% when the investment was between 1% and 5% of the annual turnover (Figure 22).

Figure 22 Over the past two years, how much have you invested on average per year to be more resource efficient?



Source: Flash Eurobarometer 498, SMEs, green markets and resource efficiency

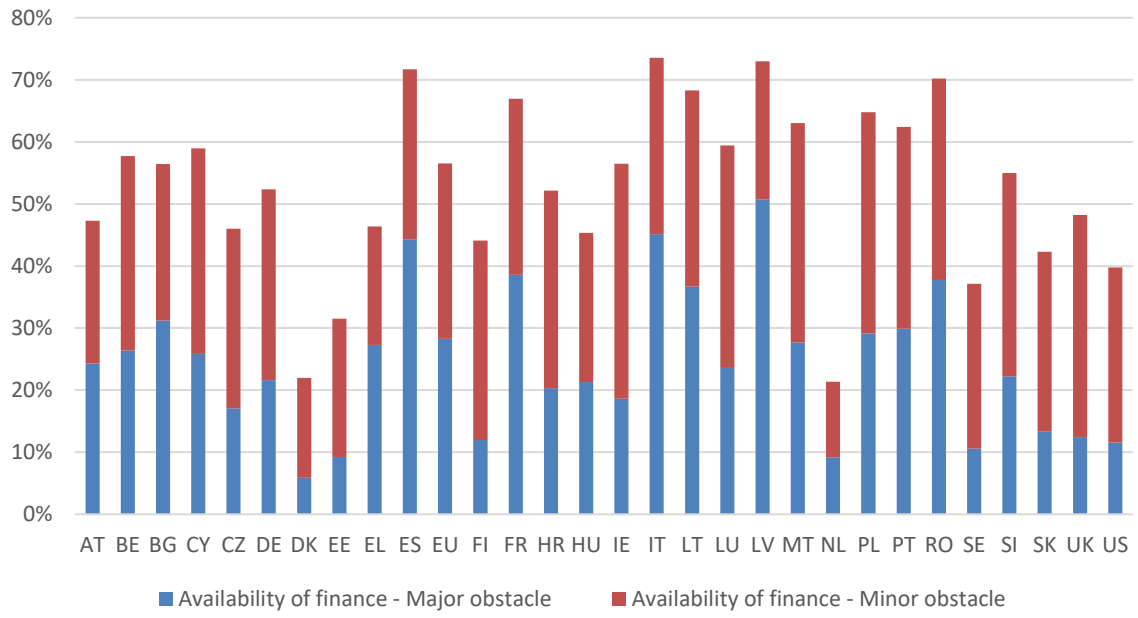
The annual European Investment Bank Investment Survey (EIBIS) is an EU-wide survey that gathers qualitative and quantitative information on the investment activities of small and medium-sized businesses and large enterprises, their financing requirements, and the difficulties they face. The survey thus provides a wealth of unique firm-level information about investment decisions and investment finance choices.[66]

Among the aspects covered by the EIBIS, the survey also investigates the factors affecting firms' investment in activities to tackle the impacts of weather events and achieve emissions reduction, allowing the results to be broken down by firm size. Among the SMEs that took part in the survey, the percentage of SMEs in the EU considering access to finance as a major obstacle to their sustainability investments was 28.3% (in line with the 27% of respondents to the Flash Eurobarometer 486 which will be extensively analysed later in this section) and it further increased to 28.8% and 31.7% for small and micro firms, respectively. For comparative purposes, this percentage dropped to 25.3% for large enterprises. This trend clearly shows that smaller firms face major issues in obtaining financial resources for their investments to reduce emissions and mitigate weather events. Moreover, it is worth recalling that in the most recent edition of SAFE quoted in the introduction of this section, only 9% of SMEs reported access to finance (in the mainstream sense, rather than related to sustainability) as an obstacle, signalling that when it comes to sustainability the availability of financial resources becomes drastically more critical.

In terms of geographical trends, over 37% of SME respondents from Latvia, Spain, Italy, France and Romania considered finance a major obstacle to sustainability (10% more than the EU average), with this percentage peaking at 50.1% in Latvia. In contrast, Danish, Finnish, Swedish and Dutch SMEs were generally not struggling to access finance for their investments in activities to reduce emissions and mitigate weather events. (Figure 23)

[66] The survey covers some 13 500 firms in all European Union Member States, the United Kingdom and the United States.

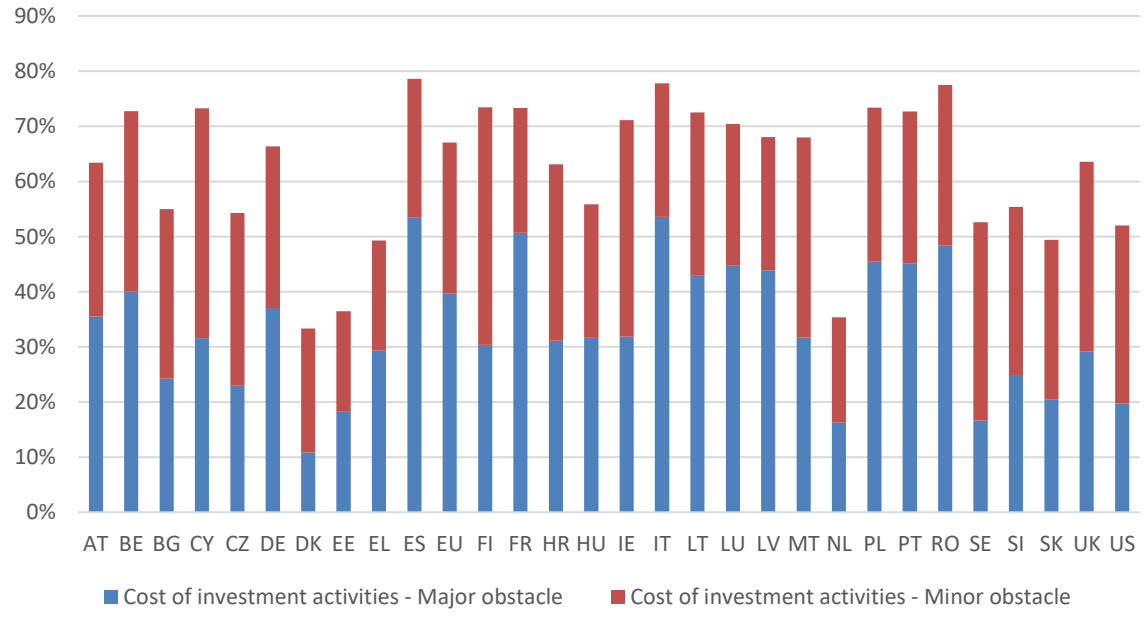
Figure 23 Factors impacting SMEs' investment in activities to tackle the impacts of weather events and emissions reduction: availability of finance



Source: European Investment Bank (EIB), Investment Survey (EIBIS), 2020, https://www.eib.org/en/publications/econ-eibis-2020-eu

Therefore, according to EIBIS data, access to finance appears to be among the top three obstacles for firms' sustainability investments, with the cost of such investments and the uncertainty around regulations and taxation being the main two obstacles reported. Indeed, Figure 24 shows that 40% of EU SMEs regard the cost of investment activities as a major obstacle to their transition, although cross-country differences also persist in this case.

Figure 24 Factors impacting SMEs' investment in activities to tackle the impacts of weather events and emissions reduction: cost of investment activities



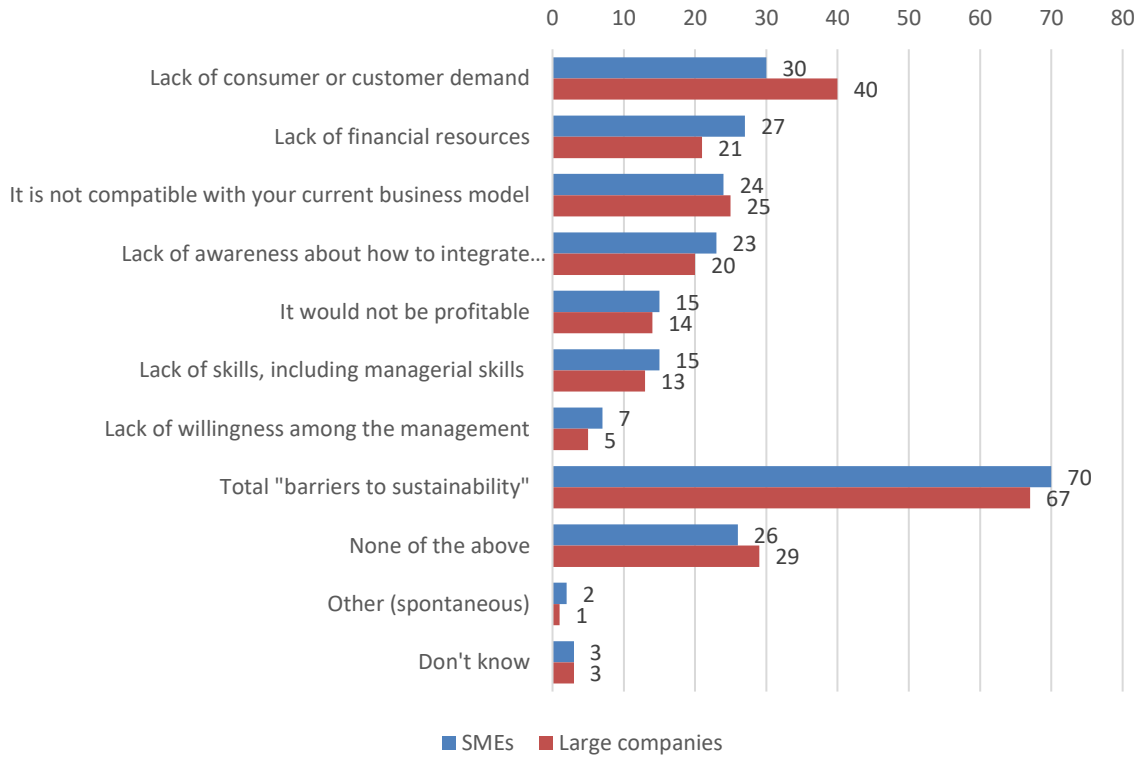
Source: European Investment Bank (EIB), Investment Survey (EIBIS), 2020, https://www.eib.org/en/publications/econ-eibis-2020-eu

SMEs are therefore generally concerned by the cost of investing in their sustainability transition and, in parallel, they struggle to obtain the finance to do so. These results reinforce the hypothesis that financing the sustainability transition embeds higher risks for banks and/or longer payback periods.

Findings from the EIBIS are confirmed by other studies. According to the Flash Eurobarometer on SMEs, start-ups, scale-ups and entrepreneurship (September 2020),[67] 27% of the SMEs involved in the study mentioned lack of financial resources as one of the main barriers preventing them from becoming sustainable (i.e., combining long-term success and profitability with a positive impact on society and the environment, as defined in the Eurobarometer). Additionally, more than one in ten SMEs stated that becoming sustainable would hinder their profitability, given the massive investments required to upskill and, in parallel, the lack of consumer demand for sustainable products (reported by 30% of SMEs as the main obstacle).

Notably, only 21% of large enterprises considered lack of financial resources an obstacle to making their business model sustainable, which was 6% less than for SMEs, signalling that access to finance to foster sustainability particularly affects SMEs. This percentage jumped to 38% of firms when it came to start-ups, as this type of firm is traditionally more affected by issues concerning access to finance (Figure 25).

Figure 25 Obstacles preventing SMEs from becoming sustainable. Percentage of respondents at EU-27 level



Base: all SMEs in EU27 (n=12,615)

Source: European Commission, Eurobarometer Flash Eurobarometer on SMEs, start-ups, scale-ups and entrepreneurship, 2020, (Q26: "Which of the following, if any, are currently preventing your enterprise from becoming sustainable?"). https://europa.eu/eurobarometer/surveys/detail/2244

[67] Flash Eurobarometer on SMEs, start-ups, scale-ups and entrepreneurship (September 2020), available at https://europa.eu/eurobarometer/surveys/detail/2244.

In addition, interesting trends can be observed when linking access to finance as an obstacle to firms' sustainability transition and the firms' innovativeness and sustainability maturity. In this sense, higher percentages of firms that can be considered innovative and sustainable report finance as an obstacle to sustainability, as summarised in Table 1 , which provides a breakdown of the data from Figure 25, by company characteristics.

Table 1 Lack of financial resources as an obstacle preventing SMEs from becoming sustainable. Breakdown by company characteristics. Percentage of respondents at EU-27 level

Company characteristics		Lack of financial resources as an obstacle to sustainability (% of respondents)
Patent(s)	Yes	36%
	No	27%
Innovation	Innovated[68]	30%
	Did not innovate	24%
Digitalisation plan	Yes	30%
	No	27%
Sustainable actions	Yes	29%
	No	15%

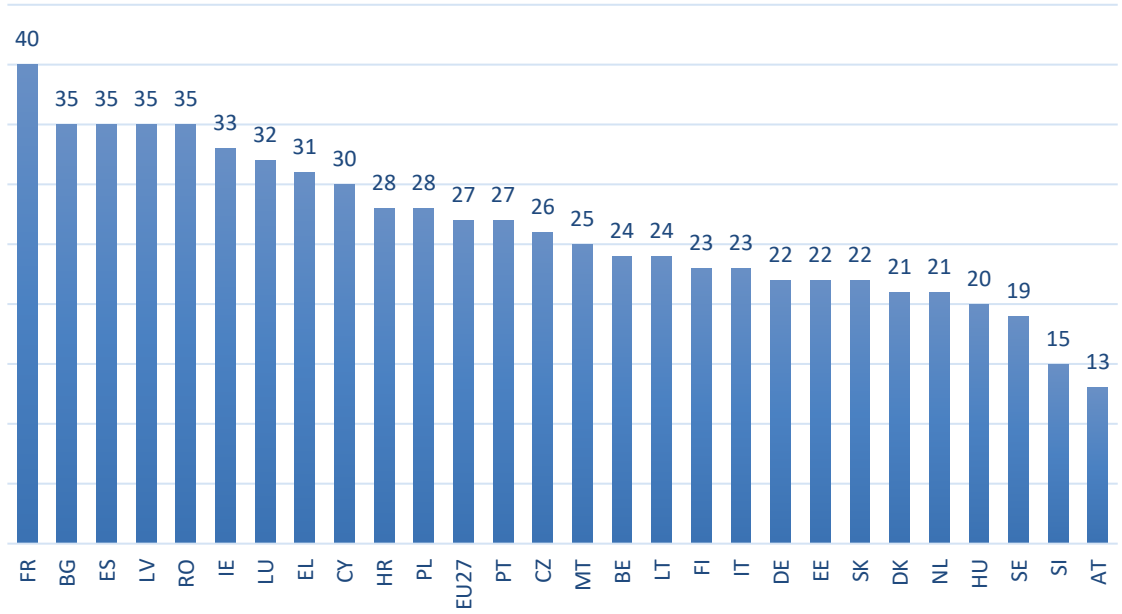
Source: European Commission, Eurobarometer Flash Eurobarometer on SMEs, start-ups, scale-ups and entrepreneurship, 2020. (Q26 "Which of the following, if any, are currently preventing your enterprise from becoming sustainable?") https://europa.eu/eurobarometer/surveys/detail/2244

The explanation behind such a trend might be that innovative firms which are planning to digitalise and are already undertaking sustainability actions, feel a more acute lack of finance compared to those which are not, simply because they are more aware of these obstacles and have potentially already experienced them. On the other hand, non-innovative SMEs might not see these obstacles as they only have been financing traditional investments so far.

In terms of geographical trends, the data observed in the EIBIS are confirmed by the survey conducted in the context of the Flash Eurobarometer. As Figure 26 shows, insufficient financial resources are considered as a major obstacle to the sustainability transition by over 35% of SMEs in Romania, Latvia, Spain, and Bulgaria, with a peak of 40% in France. On the contrary, finance does not represent a particular issue in financing sustainability investments for SMEs in Austria, Slovenia, and Sweden.

[68] Methodological note: The Flash Eurobarometer did not provide a definition of SME that innovated.

Figure 26 Lack of financial resources as an obstacle to SMEs' sustainability in the EU-27 (% of respondents)



Base: all SMEs in EU27 (n=12,343)

Source: European Commission, Eurobarometer Flash Eurobarometer on SMEs, start-ups, scale-ups and entrepreneurship, 2020. (Q26: "Which of the following, if any, are currently preventing your enterprise from becoming sustainable?"). https://europa.eu/eurobarometer/surveys/detail/2244

Although the country-level trends that emerge from EIBIS and the Eurobarometer are quite aligned, there are some relevant discrepancies with SAFE. For instance, according to SAFE, SMEs in France, Latvia, and Bulgaria did not consider "mainstream" access to finance as a major obstacle (Bulgaria and Latvia were the third and second "less affected" countries in this sense), whereas access to finance became a major obstacle for a large share of SMEs when it comes to sustainability. Similarly, in Luxembourg, less than 5% of SMEs considered access to finance to be a major obstacle, as per SAFE, while the percentage jumped to 32% when access to finance was linked to sustainability.

In sum, the Flash Eurobarometer confirms that the lack of financial resources is a major obstacle for firms' sustainability transition and that SMEs are more acutely affected than large enterprises.

3.2 *Available financing solutions for SMEs' sustainability transition*

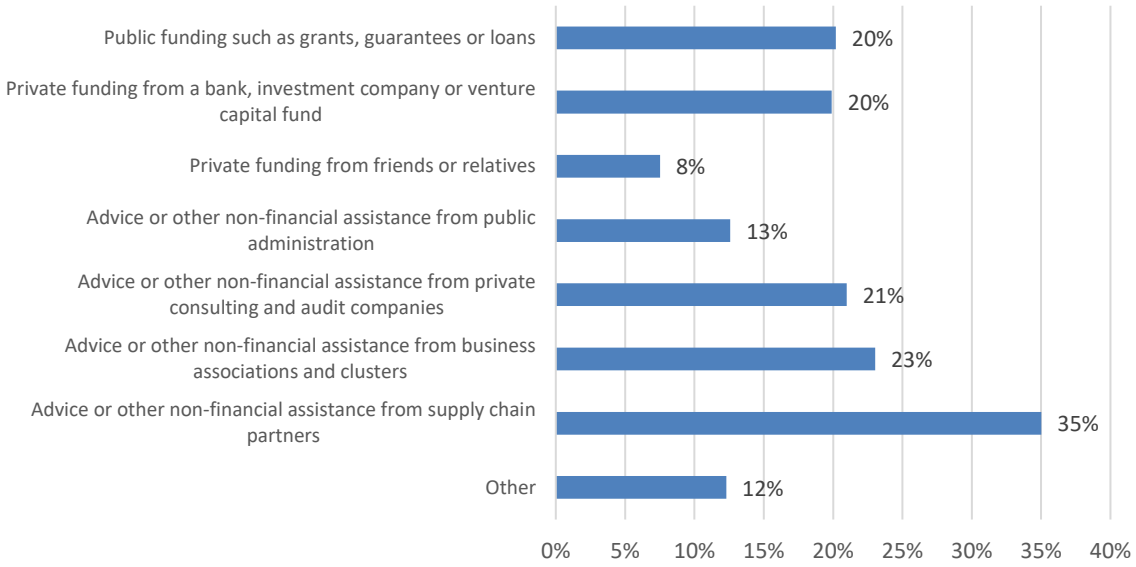
The analysis conducted so far reveals that access to finance generally represents one of the main issues that companies, and SMEs in particular, face in financing their sustainability transition. The issue particularly affects smaller firms and start-ups, and is not homogeneously distributed across the EU.

In order to disentangle the access to finance obstacles faced by SMEs, it is important to go a step further and assess the solutions available for SMEs to finance their sustainability transition.

Section 1.3.2 has already outlined the different kinds of external support different types of SMEs are relying upon in their efforts to become more resource efficient. On an aggregate level, the Flash Eurobarometer 498 showcases that the external support used most frequently by SMEs in their sustainability transition was advice and non-financial assistance by supply chain partners. In addition to the relevance of non-financial

assistance, 20% of SMEs used private funding for these purposes and 20% relied on public sources of funding (Figure 27). The following sub-sections will assess the private and public financing solutions available to SMEs to finance their sustainability transition.

Figure 27 Type of external support used by SMEs for the production of their green products or services (% of respondents)



Source: Flash Eurobarometer 498 on "SMEs, green markets and resource efficiency"

3.2.1 Market solutions

The Flash Eurobarometer 498 from 2021 on SMEs, resource efficiency and green markets[69] reviews the levels of resource efficiency actions and the state of the green market amongst Europe's SMEs and offers a preliminary view of how SMEs are currently financing such actions.

The survey reports that, when it comes to financing resource efficiency, amongst SMEs that have taken resource efficiency actions, 64% have relied on their own financial resources. Additionally, out of the SMEs that relied on external support, 36% have done so in the form of public grants or subsidies. In all EU Member States, SMEs were most likely to say they relied on their own financial resources in their efforts to be more resource efficient. SMEs in Romania (92%), Cyprus (79%), and Austria (79%) were the most likely to rely on their own financial resources, compared to 50% in Italy, 48% in France and 45% in Denmark.

The conclusion is that, in financing resource efficiency interventions, SMEs mostly rely on their own financial capacity, although to a lesser extent in some Member States. Notably, the share of SMEs relying on their own resources has been increasing since 2017, as reported in the Eurobarometer, in some cases drastically, such as in Spain (+32%) and Sweden (+13%).

On the other hand, when turning to external support for resource efficiency, the Eurobarometer reports that SMEs were more likely to have sourced their support (both financial and advisory) from the private rather than public sector. Moreover, 28% of the surveyed SMEs relied on commercial funding, while 10% relied on funding from friends

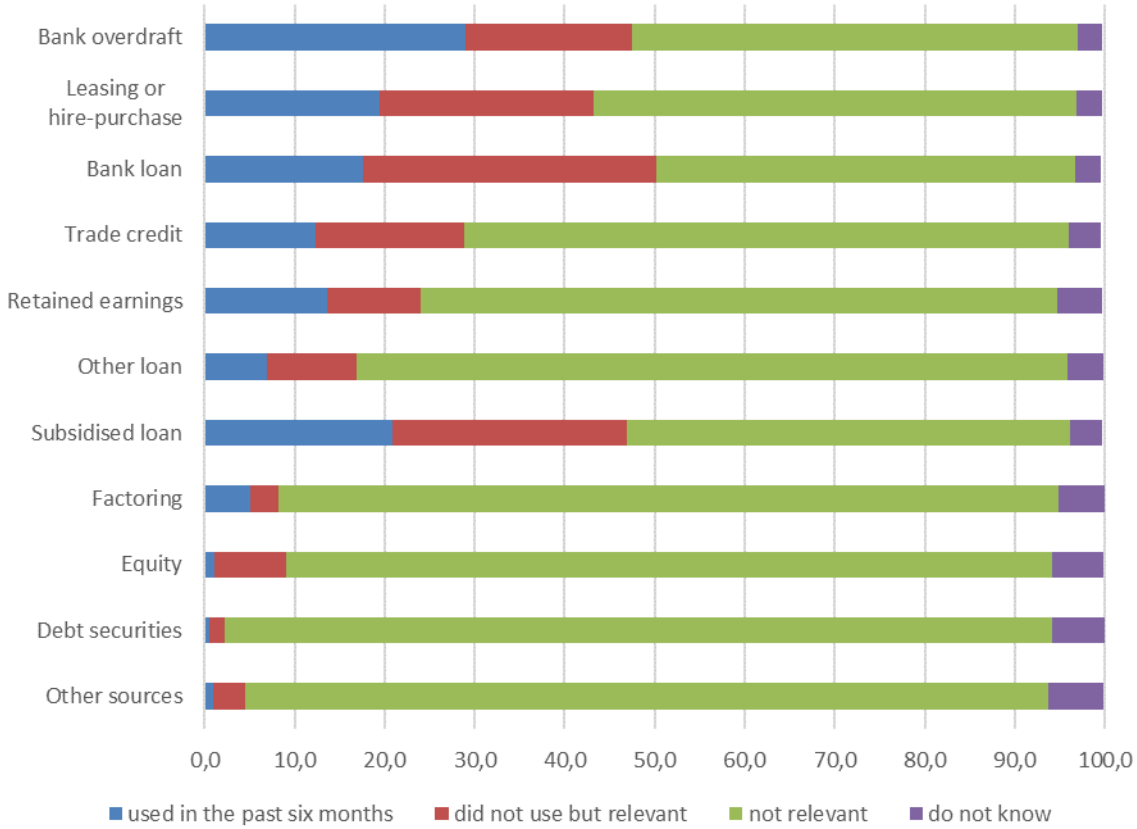
[69] Flash Eurobarometer 456, SMEs, resource efficiency and green markets, available at https://op.europa.eu/en/publication-detail/-/publication/3e0eeaef-0259-11e8-b8f5-01aa75ed71a1/language-en.

and relatives, 39% received advice from private consulting and auditing firms, 29% from business associations and clusters, and 30% from supply chain partners. In contrast, only 23% relied on advice from public sector institutions. Therefore, SMEs largely relied on financing (both internal and external) and on advice from the private sector. This suggests a lack of financing and/or advisory services from the public sector.

From the assessment conducted so far, SMEs rely quite extensively on their own financial resources for their sustainability investments and when they do not, they seek support from private financial intermediaries. It is therefore necessary to assess the available private financing options for SMEs' sustainability transition.

Firstly, the main external source of financing for SMEs is traditionally bank loans, and this is confirmed by the latest data reported by SAFE (Figure 28). Half of the euro area SMEs reported that bank loans had been an important financing source over the previous six months. Credit lines (i.e., bank overdrafts) were also a crucial source of financing, with almost half of SMEs continuing to regard them as important. Figure 28 outlines the relevance and frequency of use of different sources of financing by SMEs.

Figure 28 Relevance of financing sources for euro area SMEs between October 2020 and March 2021



Source: European Central Bank, Survey on the Access to Finance of Enterprises (SAFE), 2021, https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html

The link between the need to channel funds for the sustainability transition and the prevalence of bank loans as a source of funding for SMEs is represented by green loans.

Green loans, as defined by the Loan Market Association,[70] are any type of loan instrument made available exclusively to finance or re-finance, in whole or in part, new and/or existing eligible green projects. They function like any other bank loan but the borrower must use the financing received for pre-agreed projects with a certifiable positive environmental impact. In this sense, green loans function exactly like green bonds, but the latter are a form of debt market security, and as shown Figure 28 from SAFE, such securities are an irrelevant source of financing for SMEs.

However, as reported by SME United,[71] it is a relatively common practice that banks build large portfolios of green loans for securitisation purposes. In this sense, green bonds also offer a range of sustainable financing options, including from banks that aggregate SME loans, and securitise SME loans into asset-backed securities.[72]

Nonetheless, despite their straightforwardness, green loans represent a challenge for SMEs, as in order to obtain one they need to:

1. Identify eligible green assets, which might be complicated in terms of having the capabilities for such assessment, and/or
2. Have a sufficient value of green assets to justify the issuance of the loan.

3.2.2 Public sector financing solutions

Public financial institutions such as national governments, international organisations and state-owned development banks have often been the first to fill the access to finance gaps of SMEs. These institutions can support SMEs' broader green banking environment via direct financing through low-cost credit lines linked to targeted green lending programmes.

These entities can also establish public-private partnership facilities and help unlock capital for startups and SMEs through liquidity support instruments, such as green loan guarantees.[73]

Interestingly, among SMEs which had not yet taken resource efficiency measures, 55% stated that neither public/private financial support, nor public/private non-financial assistance would help them become more resource efficient. However, public grants and subsidies were the only category deemed helpful by a significant share (18%) of SMEs in this subsample.[74] This distinction further highlights the need for public finance schemes to advance resource efficiency activities, while also showcasing the demand for additional policies or structural reform outside of the existing support schemes.

3.2.3 European Union Financing Schemes and Initiatives

This section aims to provide an overview of the existing financing schemes available at EU level, mostly from the European Commission and the European Investment Bank Group. Notably, most of the schemes analysed aim to improve the access to finance of SMEs – or specifically of innovative SMEs – but they do not focus solely on SMEs' sustainability transition.

[70] Loan Market Association, Green Loan Principles, 2018, available at https://www.lma.eu.com/application/files/9115/4452/5458/741_LM_Green_Loan_Principles_Booklet_V8.pdf.
[71] Interview with SME United, 2021.
[72] Asian Development Bank Blog, Small Businesses Can Help Drive a Green Recovery from the Pandemic, 2021, available at https://blogs.adb.org/blog/small-businesses-can-help-drive-green-recovery-pandemic.
[73] Ibid.
[74] European Commission, Flash Eurobarometer 498: SMEs, green markets and resource efficiency, 2021.

'Innovate to transform' support for SME's sustainability transition (CSA) (part of Horizon Europe Framework Programme - HORIZON)[75]

This programme aims to support and mobilise SMEs in achieving the European Green Deal objectives, and most notably to contribute to a climate neutral and resource-efficient economy. The programme also aims to address the disruption that the COVID-19 pandemic caused to companies' supply chains and to improve the competitive sustainability of SMEs through the utilisation of novel and advanced technologies.

"'Innovate to transform' support for SME's sustainability transition" will build on and further connect existing EU specialised business support networks and centres – such as the Enterprise Europe Network, the European industry clusters registered under the European Cluster Collaboration Platform, and the Centres for Advanced Technologies for Industry. The support networks and centres will work in complementarity and close interaction with Open Innovation Test Beds, European Digital Innovation Hubs, Startup Europe, etc., and also with academia, social partners, and other social innovation actors.

Projects are expected to contribute to the following outcomes:

3. Support the objectives of the European Green Deal and the EU SME Strategy for a sustainable and digital Europe;
4. Increase the resilience of SMEs, by fostering technological and social innovation in SMEs to support their transition to more sustainable business models and more resource-efficient and circular processes and infrastructures;
5. Increase the competitive sustainability of SMEs through the uptake of advanced technologies;
6. Strengthen the innovation support ecosystems supporting the green, social and economic transition of SMEs, by leveraging synergies between existing EU networks and SME support initiatives.

Actions will consist of:

A. Advisory services

Dedicated innovation and capacity building support will be provided to SMEs to assess their ability to transform their business models and increase their resilience.

This support will consist of an assessment of SMEs' innovation and sustainability practices as well as the elaboration of recommendations, notably in view of the uptake of advanced technologies and/or social innovations.

Based on these recommendations, SMEs could receive further advisory services according to their level of preparedness, such as help and advice on proof of concept, investment readiness, intellectual property (in cooperation with EU funded IP support), technology transfer, adaptation to standards, adaptation to environmental rules, design management, skill development, partner search (including social partners). SMEs will receive targeted assistance for the uptake of advanced technologies.

Social innovation should be recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership, or market uptake.

[75] Available at https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl4-2021-resilience-01-29.

This action will also include the set-up of a community, building on the SME Alliance projects, in which best practices can be exchanged, enabling SMEs to benefit from dedicated peer-learning activities in order to learn from leaders (SMEs or large enterprises) from their own sector. Incentives for leaders to share their best practices with peers should be identified in the context of EU support to industrial ecosystems.

B. Financial support in the form of 'Third-party financing'

As a result of the advisory services and initial assessments, SMEs will receive financial support through calls for SMEs to implement the elaborated recommendations.

This financial assistance should support, amongst other activities, the financing of a feasibility study, prototyping, pilot testing, demonstrating, procurement of further specialised consultancy services and coaching services that cannot be provided directly by the project partners, the adaptation of business processes, free access and support to use testing facilities, the introduction of new IT solutions, etc.

The Commission estimates that at least half of the budget should be allocated to financial support to SMEs in the form of third-party financing.

Single Market Programme[76]

The Single Market Programme is an EU funding programme aiding the single market to reach its full potential and supporting the recovery from the COVID-19 pandemic. With a EUR 4.2 billion package from 2021-2027, the Single Market Programme pools several other previous programmes. Among these predecessor programmes is COSME, an EU programme for the Competitiveness of Small and Medium-sized Enterprises, which was active from 2014 to 2020. Under the Single Market Programme, 24% of the budget is specifically allocated to increase the competitiveness of businesses, especially SMEs.

In detail, this SME pillar aims to facilitate market access, promote entrepreneurship and the acquisition of entrepreneurial skills, and contribute to the modernisation of industry and address global and societal challenges. As such, the programme is a continuation of the grants and contracts parts of COSME. For example, through various sub-initiatives, like the Enterprise Europe Network or the Joint Clusters Initiatives, circa EUR 105 billion are reserved for grants in 2022. Moreover, the budget for procurement contracts under this programme is around EUR 47 billion in 2022.

InnovFin SME Guarantee

InnovFin SME Guarantee is a guarantee or counter-guarantee for debt financing that the European Investment Fund (EIF) provides to financial intermediaries in order to improve access to finance for innovative SMEs and Small Mid-caps (enterprises with up to 499 employees). Thanks to the InnovFin SME Guarantee, financial intermediaries, i.e., banks and other lending institutions, guarantee schemes or debt funds, which are selected by the EIF, and can provide debt financing on favourable terms to innovative SMEs and Small Mid-caps in EU Member States and Associated Countries. InnovFin SME Guarantee is part of the "InnovFin - EU Finance for Innovators" programme, which is a joint European Investment Bank (EIB) Group and European Commission (EC) initiative under Horizon 2020, the EU framework for Research and Innovation (R&I) 2014-2020. InnovFin – EU Finance for Innovators offers a range of tailored financing products and advisory services to companies of different sizes, ranging from SMEs to large enterprises and other entities.

[76] See https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/single-market-programme/overview_en.

EIF – Sustainable Development Umbrella Fund

The Sustainable Development Umbrella Fund (SDUF) is part of the EIF's objective of addressing increasing institutional demand for access to European Private Equity markets, also driven by the recognition of increased investor awareness on environmental, social and governance (ESG) principles and the United Nation's Sustainable Development Goals (SDGs).

SDUF is an umbrella structure combining investment themes which have greater strategic appeal to investors who are looking for a mixed impact- and economic-driven return, rather than having a pure economic return maximisation objective. Alongside the generation of risk-adjusted, market-level financial returns to investors, SDUF commits to ESG standards by measuring its ESG impact.

SDUF leverages the EIF's proven fund of funds model and further enhances it with a strategic value proposition for both managers of venture capital funds and investors. It also has the additional support of the European Union through a cornerstone investment commitment of up to EUR 150 million under the European Fund for Strategic Investments.

The EIF acts as an investment adviser to SDUF, leveraging the long-standing track record of investments in Europe. The strategic investment areas will form the umbrella fund's individual compartments, of which the Health Compartment is the first in line.

InvestEU

The InvestEU programme builds on the successful model of the Investment Plan for Europe (the "Juncker Plan").[77] It will bring together, under one comprehensive umbrella, the European Fund for Strategic Investments (EFSI) and 13 other EU financial instruments available during the period 2014 – 2020. The European Investment Bank Group – comprised of the European Investment Banks (EIB) and the European Investment Fund (EIF) – is the main implementing partner of InvestEU, but other financial institutions will be involved. InvestEU is expected to stimulate more than EUR 372 billion of public and private investment, and it is endowed with an EU budget guarantee of EUR 26.2 billion.

InvestEU aims to finance a broad range of policy goals, including recovery, green growth, quality jobs and wellbeing. At least 30% of the investment within the programme is dedicated to the objectives of the European Green Deal.

It also includes a dedicated 'window' for facilitating access to finance for SMEs. This includes capital support for businesses that were negatively affected by the Covid-19 crisis. Within the EIB Group, the European Investment Fund will implement the major share of InvestEU financing for smaller companies. The EIF financing for SMEs under InvestEU will provide funding for a broad range of projects, including financing the sustainability transition of SMEs and supporting them in their sustainability-related research and development expenditure.

Box 1 Use of EFSI to finance green SMEs

Nordea and EIB Group to offer new support for green SMEs in the Nordics thanks to European Fund for Strategic Investments financing

Nordea has signed, as the first of its kind in the region, an agreement with the EIB Group to support the sustainable transformation of businesses in the Nordics.

[77] See https://www.eib.org/en/products/mandates-partnerships/efsi/index.htm.

The EIB Group will guarantee a portfolio of EUR 1.8 billion of Nordea lending, freeing up capital for new attractive lending for green investments in Sweden and Finland.

The project is supported by the European Commission under the auspices of the European Fund for Strategic Investments,[78] part of the Investment Plan for Europe.

Source:https://www.eif.org/what_we_do/guarantees/news/2021/nordea-eib-group-new-support-green-sme-nordics.htm

Recovery and Resilience Facility

Significant financial incentives will also be disbursed through the **Recovery and Resilience Facility (RRF)**, set-up by the European Commission and the Council of the EU as an exceptional response to the COVID-19 pandemic crisis. The RRF will disburse to EU Member States over EUR 700 billion in loans and grants, in order to finance their green and digital transitions, as laid out in their **National Recovery and Resilience Plans (NRRPs)**. As the green transition is at the core of the RRF objectives, the investments planned within the NRRPs represent a unique opportunity to provide public financial support to SMEs' green transition. Such measures are generally included in investments and reforms under the policy pillar of 'Smart, sustainable and inclusive growth'. The European Commission estimates that, within this pillar, the 22 currently approved NRRPs contain investments and reforms worth EUR 44 billion which are identified as supporting SMEs, representing approximately 10% of the total estimated RRF expenditure.[79] NRRPs include measures supporting the sustainability transition of SMEs, such as calls for projects supporting R&I in the green and digital areas and financial instruments open to all companies. Nonetheless, not all these investments and interventions will have a direct impact on supporting the sustainability transition of SMEs. Rather, they might target broad interventions, such as investments in the energy efficiency of buildings or in the circular economy, that will also involve SMEs, but not necessarily make their operations more sustainable. As per estimates of the European Economic and Social Committee (EESC), currently only 5% of the investments planned by Member States in their NRRPs directly target the green transition of SMEs. In addition to the allocated funding, the EESC underlines that the delivery model for different NRRP interventions is relevant for the achievement of the expected impacts. Namely, funds allocated via intermediated financial instruments always have to carefully consider whether the partner financial intermediaries are extending financing to micro and small enterprises. These enterprise classes bear a higher risk and are less investment-ready and advanced in sustainability matters, compared to large firms, and thus risk being left out even by public financial support measures.

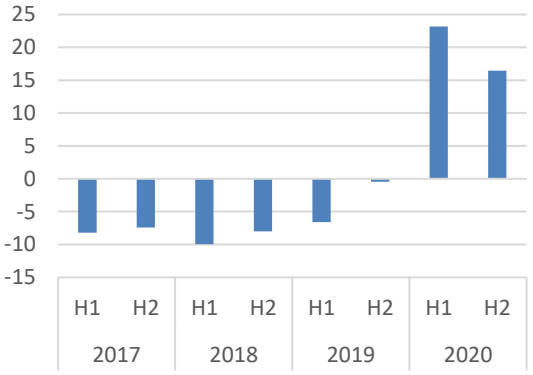
[78] Now known as the InvestEU Programme.
[79] See https://ec.europa.eu/economy_finance/recovery-and-resilience-scoreboard/assets/thematic_analysis/3_SME.pdf.

3.2.3.1 Member State level schemes

This section provides an overview of the opportunities and challenges in terms of access to finance for SMEs across EU Member States, as well as a selected sample of available financing schemes. As in the case of EU-level programmes, most of the schemes provided by Member States generally focus on easing access to finance for SMEs and only indirectly focus on supporting their sustainable transition.

In **France**, the 24th edition of the SAFE[80] demonstrated an increased level of trust from SMEs with regard to the action of public actors in providing support to access finance, particularly after the negative consequences of the pandemic. French SMEs' response to the question "*For each of the following factors/items, would you say that they have improved/increased, remained unchanged or deteriorated/decreased over the past six months?*"[81] shows that firms perceived a clear increase in public support in 2020, as presented in the graph on the right.

Figure 29 Change in access to public financial support in France

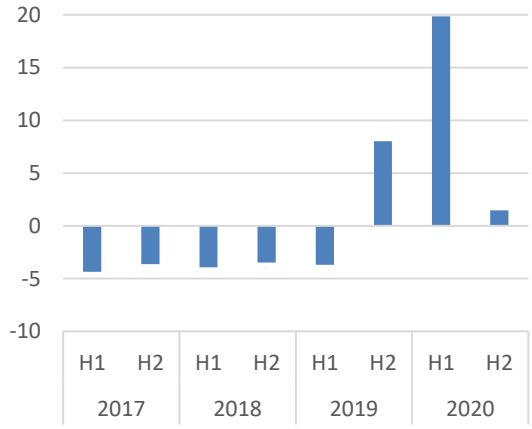


Source: European Central Bank, Survey on the Access to Finance of Enterprises (SAFE), 2021, https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html

An interesting example of the commitment rom the French government in supporting SMEs in their sustainable and digital transition is represented by the **France Num Loan Guarantee**,[82] a guarantee programme launched by Bpifrance - the French Public Investment Bank – in agreement with the European Investment Fund, under the auspices of the COSME programme. The initiative aims to support the sustainable and digital transition of French SMEs, by providing a guarantee rate of 80%.

In **Germany**, the response of German SMEs to the previously stated question[83] was similar to the one provided by French SMEs, as shown in Figure 30. German SMEs perceived public financial support as having increased/improved in 2020, most likely as a consequence of the pandemic.

Figure 30 Change in access to public financial support in Germany

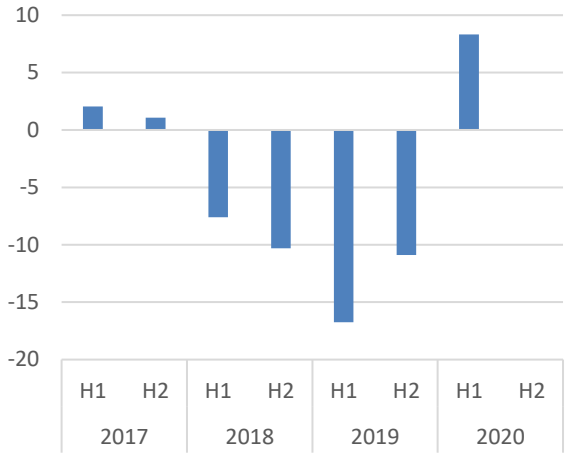


Source: European Central Bank, Survey on the Access to Finance of Enterprises (SAFE), 2021, https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html

[80] More information available at this link: https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html.
[81] More information available at this link: https://ec.europa.eu/docsroom/documents/43869.
[82] More information available at this link: https://www.eif.org/what_we_do/guarantees/news/2020/european-union-french-state-unlock-715-million-for-french-businesses.htm.
[83] "For each of the following factors/items, would you say that they have improved/increased, remained unchanged or deteriorated/decreased over the past six months?"; 24th edition of the SAFE.

The KfW, the German development bank, is promoting several programmes for SMEs and large enterprises, in order to support their sustainability transition. Notably, the **KfW Renewable Energies Programme**[84] is a loan programme for SMEs, large enterprises and organisations, which aims to support investment in electricity or heat plants powered by renewable energy sources. The loan can cover up to 100% of the financeable costs of investment, up to a value of EUR 25 million, and includes particularly favourable interest rates for SMEs, along with attractive repayment terms. Additionally, the KfW also promotes grant programmes, e.g., through the **Energy-Efficient Construction and Refurbishment Initiative**[85] for non-residential buildings, available to SMEs, large enterprises and organisations. The initiative provides support in the form of grants and loans to finance investments in energy efficiency measures, up to a value of EUR 15 million per project.

Figure 31 Change in access to public financial support in Spain

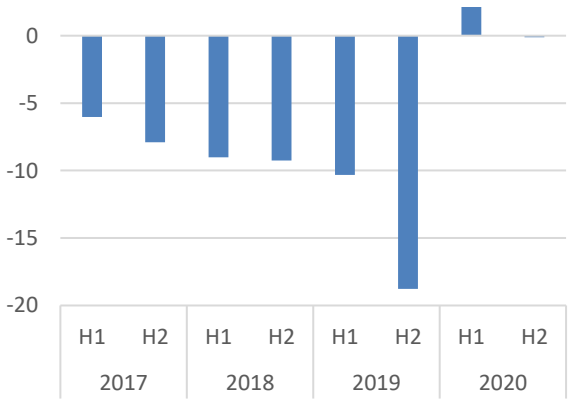


Source: European Central Bank, Survey on the Access to Finance of Enterprises (SAFE), 2021, https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html

Similarly, the government of **Spain** has promoted several solutions to provide financial support for Spanish SMEs. However, the SAFE survey reports that Spanish SMEs perceived the trend in public financial support differently from SMEs in France and Germany, as in 2020 the commitment to providing public funding increased only slightly in the first half of the year, as shown Figure 31.

One exemplary Spanish initiative is the creation of **Enisa**,[86] a state-owned company under the management of the General Directorate of Industry and SMEs, itself integrated into the Spanish Government's Ministry of Industry, Commerce and Tourism. Enisa provides Spanish SMEs with financial support in order to promote their sustainable, innovative and competitive development in the market. It promotes various programmes with a maximum duration of 9 years, and with a budget of up to EUR 1 500 000.

Figure 32 Change in access to public financial support in Italy



Source: European Central Bank, Survey on the Access to Finance of Enterprises (SAFE), 2021, https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html

In **Italy**, trust in public financial support is still low, with Italian SMEs perceiving public support as having only slightly increased in the first half of 2020 and not improved in the second half of the year, as shown in Figure 32. Additionally, approximately

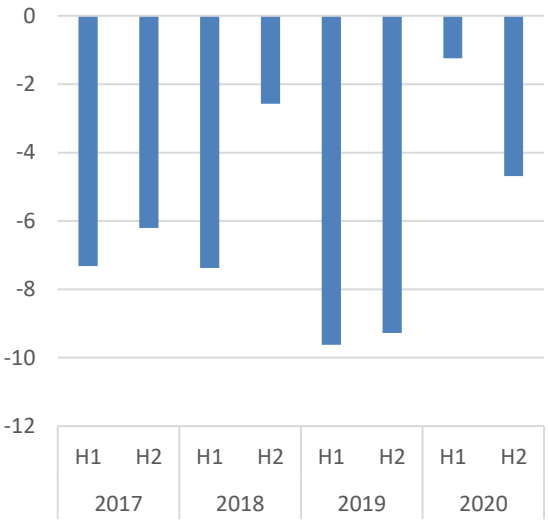
[84] More information available at this link: https://www.kfw.de/inlandsfoerderung/Companies/Energy-and-the-environment/.
[85] Ibid.
[86] More information available at this link: https://www.enisa.es/.

15% of Italian SMEs perceived access to finance as the most important issue in the previous year, thus increasing the demand for financial incentives.

One recent initiative is a **guarantee programme for SMEs**[87] launched by the Italian development bank Cassa Depositi e Prestiti (CDP), together with the European Investment Fund and Mediocredito Centrale (MCC), manager of the SME Guarantee Fund. The programme aims to leverage EUR 5 billion in new lending from the banking system to Italian SMEs, through one of the largest guarantee operations in Italy. The programme will guarantee facilitated access to finance for SMEs, in order to support their development in the sustainability transition after the negative consequences of the COVID-19 pandemic.

In **Slovakia**, the 24th SAFE demonstrates that access to finance was the least important issue to SMEs, which, however, reported a sharp deterioration in the Slovak economic environment in 2020. With regard to public financial support, Slovakian SMEs perceived public initiatives as having decreased since 2014, as reported in Figure 33.

Figure 33 Change in access to public financial support in Slovakia



Source: European Central Bank, Survey on the Access to Finance of Enterprises (SAFE), 2021, https://www.ecb.europa.eu/stats/ecb_surveys/safe/html/ecb.safe202106~3746205830.en.html

Despite these results, one interesting measure promoted by the Slovak Government is the introduction of Act 67/2020 for **financial aid to support SMEs** in the country.[88] The initiative, which is managed by the Slovak Ministry of Finance (MoF), assumes the form of (i) guarantees for loans provided by the Export - Import Bank of the Slovak Republic (EXIMBANKA SR) and the Slovak Guarantee and Development Bank (SGDB); and (ii) the payment of a portion of interest on a loan provided by EXIMBANKA SR or the SGDB.

Another option for financial incentives is represented by subsidised or low-interest loans. In Germany, the KfW, together with the Federal Ministry for Economic Affairs and Climate Action (BMWK), is managing a programme called **Climate action campaign for SMEs**.[89] The initiative supports German SMEs in transitioning to greater climate change mitigation, environmental protection and resource conservation through low-interest loans and grants for investment in climate-friendly products, technologies and processes. Additionally, the programme uses the EU Taxonomy standards as an eligibility requirement for the measures to be financed. Similarly, the Italian Ministry of Economic Development (MISE) supports SMEs and large enterprises through the **Research and development for circular economy programme**,[90] in the context of the Fund for sustainable growth (Fondo per la crescita sostenibile). The initiative provides subsidised loans for investment in innovations and

[87] More information available at this link: https://www.eif.org/what_we_do/guarantees/news/2021/cdp-eif-and-mcc-5-billion-euro-in-new-lending-to-smes-through-one-of-the-largest-guarantee-operations.htm.
[88] More information available at this link: https://www.jdsupra.com/legalnews/covid-19-slovak-government-financial-73129/.
[89] More information available at this link: https://www.kfw.de/About-KfW/Newsroom/Latest-News/Pressemitteilungen-Details_573120.html.
[90] More information available at this link: https://www.mise.gov.it/index.php/it/incentivi/impresa/r-s-economia-circolare.

improvements in products, processes and services, which will eventually promote the circular economy.

3.2.3.2 Extra-European schemes

In addition to these initiatives promoted across EU Member States, there are **extra-European programmes** that represent examples of the efforts made by public entities to support SMEs in the international environment.

Malaysia

The **Credit Guarantee Corporation Malaysia**[91] provides expertise, loan guarantees, financing facilities and credit ratings to SMEs. While not focused explicitly on green investments, the corporation aims to provide support to low carbon projects. Additionally, the Green Technology Financing Scheme provides soft loans guaranteed by financial guarantee insurer Danajamin to encourage the issuing of sustainable and responsible Sukuk[92] investments, which help achieve green, social, and sustainable standards.

Kazakhstan (EU financed)

In 2015, the European Investment Bank financed the **DAMU Green Loans for SMEs**,[93] allocating approximately EUR 150 million. The facility is a dedicated loan to the Kazakh state-owned DAMU Fund, for lending on to SMEs and Mid-Caps investing in projects eligible under the Bank's Climate Action and Environment Facility (CAEF).

3.3 *What can be done to better meet SMEs' needs for financing their sustainability transition*

The findings outlined in the previous sections stress the importance of finance in SMEs' sustainability transition. However, finance alone cannot deliver the SMEs' transition. The findings of the previous sections can be summarised in the following conclusions and recommendations:

1. Financial resources should always be combined with technical assistance, awareness-raising and advisory services, as SMEs may not only lack financial resources as a primary obstacle but may also often be unaware of the benefits of the sustainability transition (versus the elevated costs) and lack the necessary skills and knowledge.
2. Financial instruments should be properly designed and monitored, as they may work for larger and more developed SMEs but may not be fit for smaller SMEs. Banks normally find it burdensome and risky to identify and finance young and smaller firms, even when there is a public guarantee. For this reason, even some public guarantee schemes fail in pushing banks to reach out to the underserved segments of the market and vulnerable and small firms. For instance, the Greek Confederation of Professionals, Craftsmen & Merchants (GSEVEE) assessed that very few Greek companies (less than 5%) have access to EU financial instruments and less than 20% have access to bank credits.[94]
3. These considerations are particularly relevant in the context of the design and delivery of the Recovery and Resilience Facility. First, the national Recovery and Resilience Plans currently allocate an average of only 5% of their resources to direct

[91] More information available at: https://www.cgc.com.my/overview/.
[92] Sukuk are financial products whose terms and structures comply with Sharia, with the intention of creating returns similar to those of conventional fixed-income instruments like bonds. Unlike a conventional bond, which represents the debt obligation of the issuer, a sukuk technically represents an interest in an underlying funding arrangement, structured according to Sharia, entitling the holder to a proportionate share of the returns generated by such an arrangement and, at a defined future date, the return of the capital.
[93] More information available at: https://www.eib.org/en/projects/pipelines/all/20140755.
[94] According to a representative of The European Economic and Social Committee.

support for the SME green transition, as per the estimates of The European Economic and Social Committee. Secondly, most of the financing within the Recovery and Resilience Plans is planned to be channelled via financial instruments provided by financial intermediaries. As previously mentioned, policymakers should carefully design these instruments and monitor their implementation, in order to make sure that they also reach smaller and riskier firms.

4. A wide range of well-targeted financial instruments should be deployed, specifically:
5. Financial instruments to support SMEs in financing their 'climate adaptation' investments, such as upgrading facilities and machinery. These investments are quite traditional CAPEX investments, but they are capital intensive and might have long payback periods. Financial instruments to address these 'traditional' market gaps would be needed.
6. Financial support for SMEs' investments in sustainable innovation: via financial instruments, funds, funds of funds, drawing on the work currently being done by some public financing institutions, such as the EIF. These instruments should be targeted at innovative SMEs and the public sector financing should de-risk the investments, taking on more risk and attracting private sector capital (e.g., venture capital).

4 Sustainability transition by industrial ecosystem

Sustainability is a sector-specific issue, as the ecological footprint and challenges associated with the sustainability transition vary substantially across sectors. For example, a key source of emissions in the agri-food sector are emissions from the rearing of livestock.[95] In contrast, emissions in various service sectors, such as professional services, mainly stem from the sector's own supply chain and purchases of intermediate inputs such as transport services.

Traditional economic analysis would focus on sectors, precisely defined by statistical classification systems and bound together by input-output linkages. In contrast, in what follows, we have adopted an approach that holistically defines sectors as ecosystems, consisting of interrelated and connected subsectors. All ecosystems are defined in terms of traditional economic sectors. For example, the health ecosystem includes human health and residential care activities, and the manufacture of pharmaceuticals and medical technology. Some ecosystems also overlap, for example, the digital and electronics ecosystems. Table 2 provides an overview of the analysed ecosystems.

Table 2 Ecosystem overview

Industrial ecosystems		
Aerospace and defence ecosystem	Electronics ecosystem	Proximity, social economy and civil security ecosystem
Agri-food ecosystem	Energy-intensive industries ecosystem	Retail ecosystem
Construction ecosystem	Energy–renewables ecosystem	Textile ecosystem
Cultural and creative industries ecosystem	Health ecosystem	Tourism ecosystem
Digital ecosystem	Mobility, transport and automotive ecosystem	

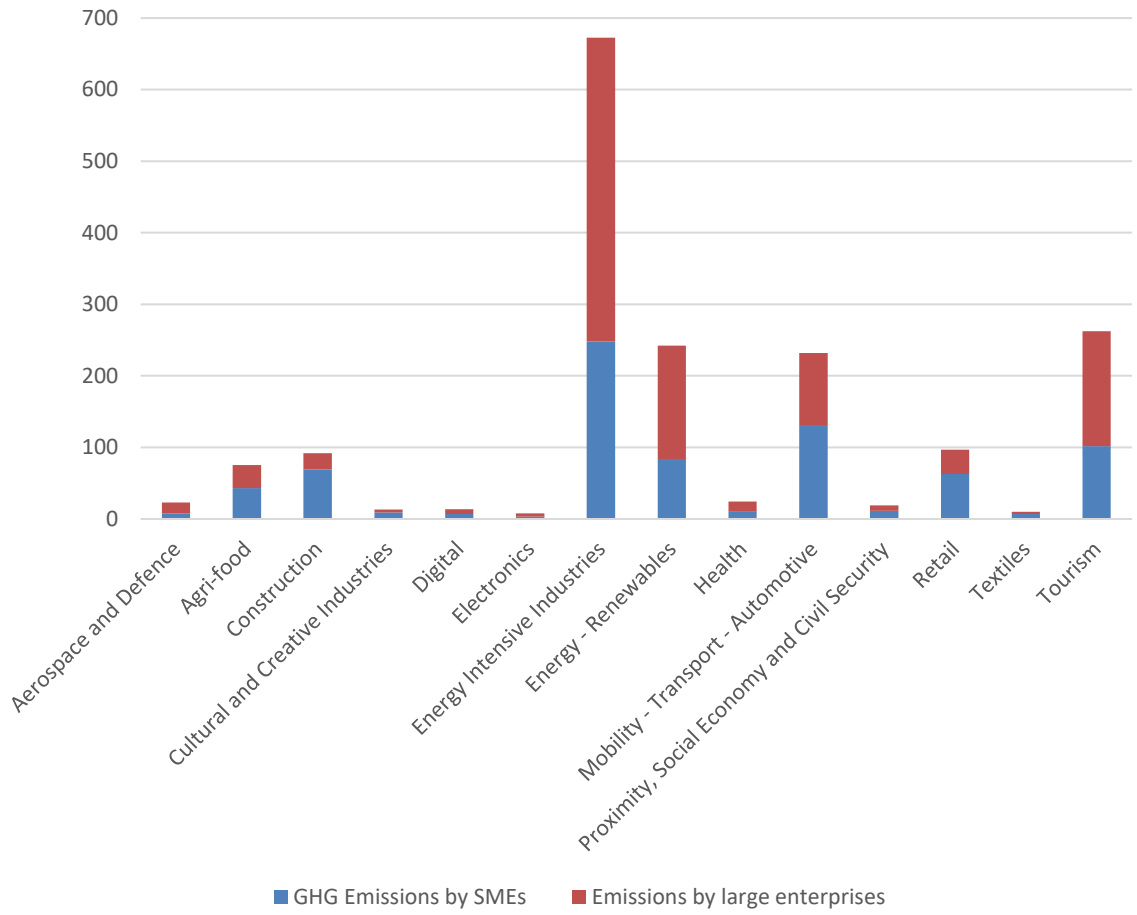
Note: For the source and detailed definitions see European Commission (2021a), *Annual Single Market Report 2021*, Commission Staff Working Document SWD (2021)351.

Ecosystems differ significantly in their emissions. Among other factors, these differences reflect the different sizes of the ecosystems. For example, 'aerospace and defence' is a much smaller ecosystem than the 'mobility, transport and automotive' ecosystem. At the same time, these differences also represent structural differences, with, for example, 'energy-intensive industries' and 'tourism' emitting more than 'cultural and creative industries' and 'health'. The highest emissions are caused by the ecosystems of 'energy-intensive industries', 'energy – renewables',[96] 'tourism' and 'mobility, transport and automotive'. (Figure 34)

[95] See Opio, Carolyn, Pierre Gerber, Anne Mottet, Alessandra Falcucci, Guiseppe Tempio, Michael MacLeod, Theun Vellinga, Benjamin Henderson, and Henning Steinfeld, Greenhouse gas emissions from ruminant supply chains – A global life cycle assessment, Food and Agriculture Organization of the United Nations (FAO), Rome, 2013.

[96] Emissions by the ecosystem 'energy – renewables' are very likely significantly overestimated. The reason is that this ecosystem is constructed from the NACE sector 'electricity, gas, steam and air conditioning supply', without differentiating between electricity generated by renewables and non-renewables. While this is a fair assumption if one is interested in the size of the ecosystem in terms of employment or value-added, it is also a problematic assumption if one is interested in the ecosystem's greenhouse gas emissions.

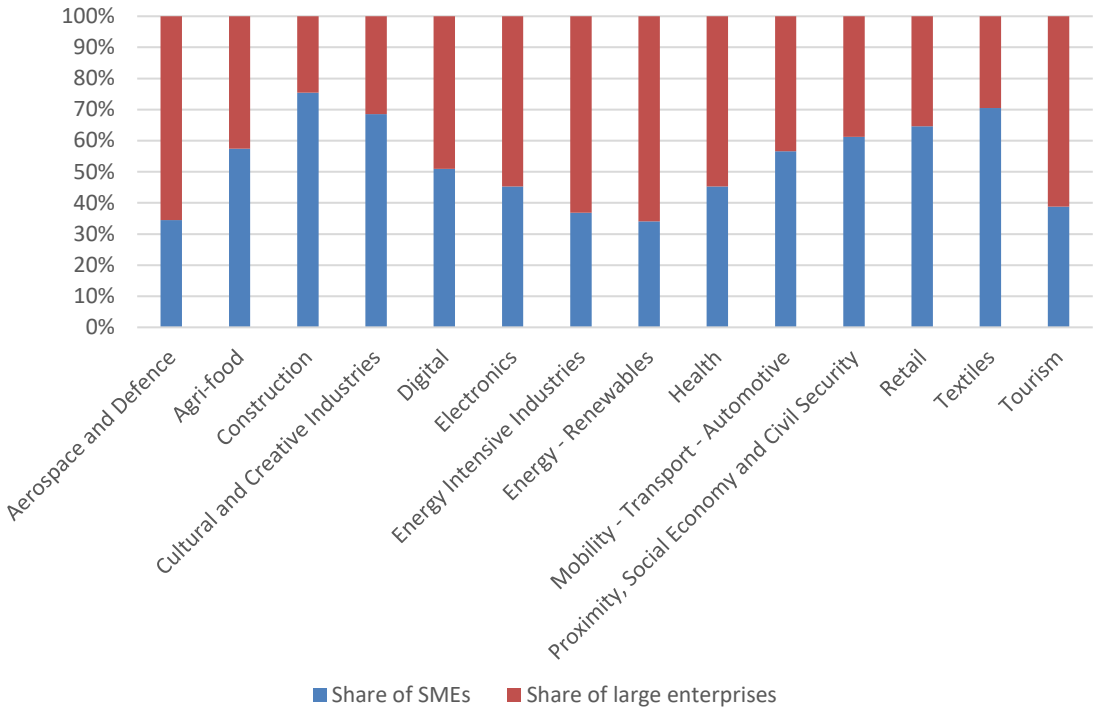
Figure 34 GHG emissions in million tons by ecosystem, 2019



Source: Eurostat Structural Business Statistics and Air Emissions Accounts, DIW-Econ calculations

As SMEs are not evenly represented in the various ecosystems, the actual share of SMEs in each ecosystem's total emissions varies. This share is particularly low in 'aerospace and defence', 'energy intensive industries' and 'renewable energy', reflecting the relatively low number of SMEs in these ecosystems. Conversely, the share is relatively high in 'construction', 'cultural and creative industries', and 'textiles', reflecting the relatively high number of SMEs in these ecosystems. (Figure 35)

Figure 35 Share of SMEs and large enterprises in total GHG emissions, 2019

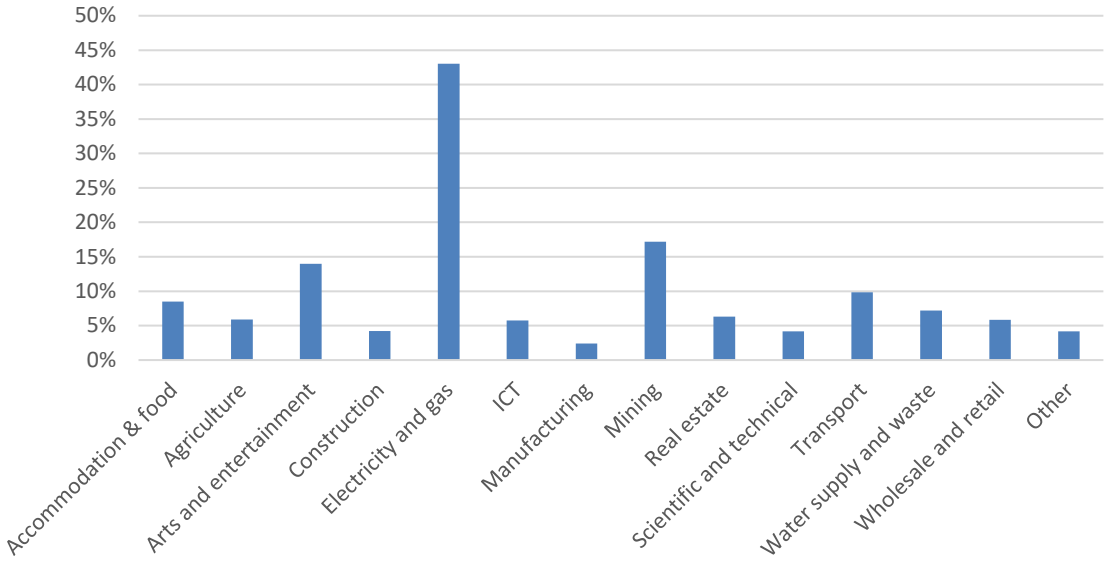


Source: Eurostat Structural Business Statistics and Air Emissions Accounts, DIW-Econ calculations

Ecosystems also differ with regard to the extent of emissions caused by direct emissions (scope 1), indirect emissions created in the production of electricity consumed by the enterprise (scope 2), and all other indirect emissions in the supply chain (scope 3).[97] While data is only available for first-level NACE sectors (and thus no indicators can be calculated for the ecosystems themselves), this level of detail already offers insights into how ecosystems would differ in their scope 1,2, and 3 emissions. For all sectors, indirect emissions in the supply chain exceed direct emissions and emissions related to electricity consumption. For some sectors, notably 'electricity and gas', and 'mining', the share of scope 1 and 2 emissions in total emissions is relatively high, reflecting the relatively small supply chain of these sectors as well as their high direct emissions. (Figure 36)

[97] The definition of the three levels of scope follows the Greenhouse Gas Protocol. See World Business Council for Sustainable Development and World Resources Institute, The greenhouse gas protocol: A corporate accounting and reporting standard, 2004, available at https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf.

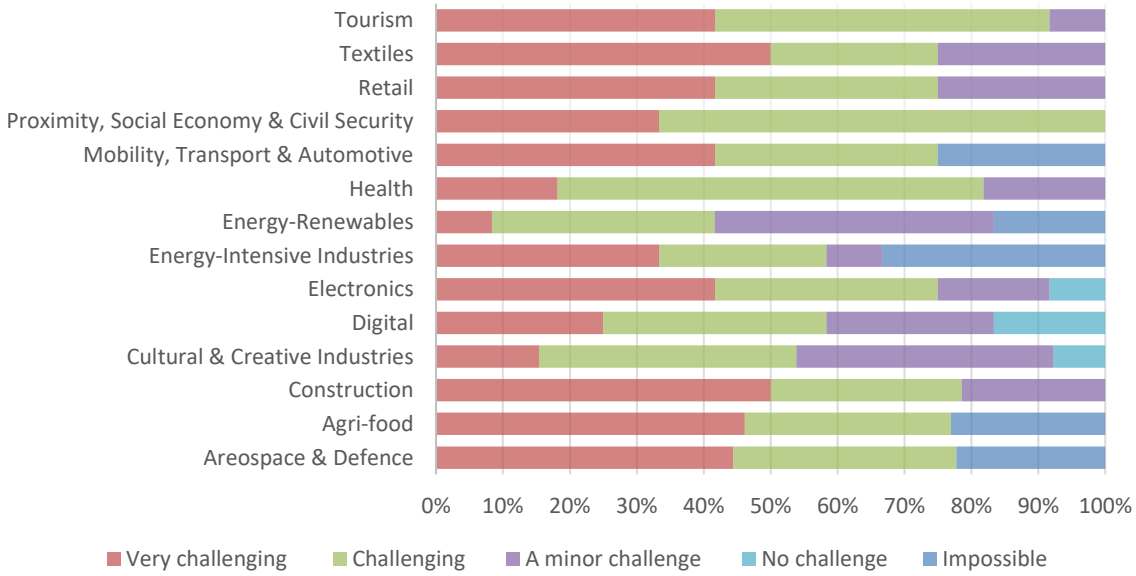
Figure 36 Share of scope 1 and 2 emissions in total emissions, 2018



Source: Alogoskoufis et al. (2021), based on data from the European Central Bank and Urgentem.
Note: Emissions are reported for first level NACE sectors.

With different emissions footprints and ecosystem-specific environments, the ability of ecosystems to contribute to the EU-wide emissions reduction target of 55% by 2030 also differ. The 2021-2022 survey of SME associations found that the highest emitting ecosystems (i.e., 'agri-food', 'energy-intensive industries' and 'mobility, transport and automotive', as well as 'aerospace and defence') are also expected to be the most challenged by meeting the emissions target. Conversely, service sectors such as 'cultural and creative industries', 'digital', 'health' and 'retail' are expected to be more likely to achieve the target. (Figure 37)

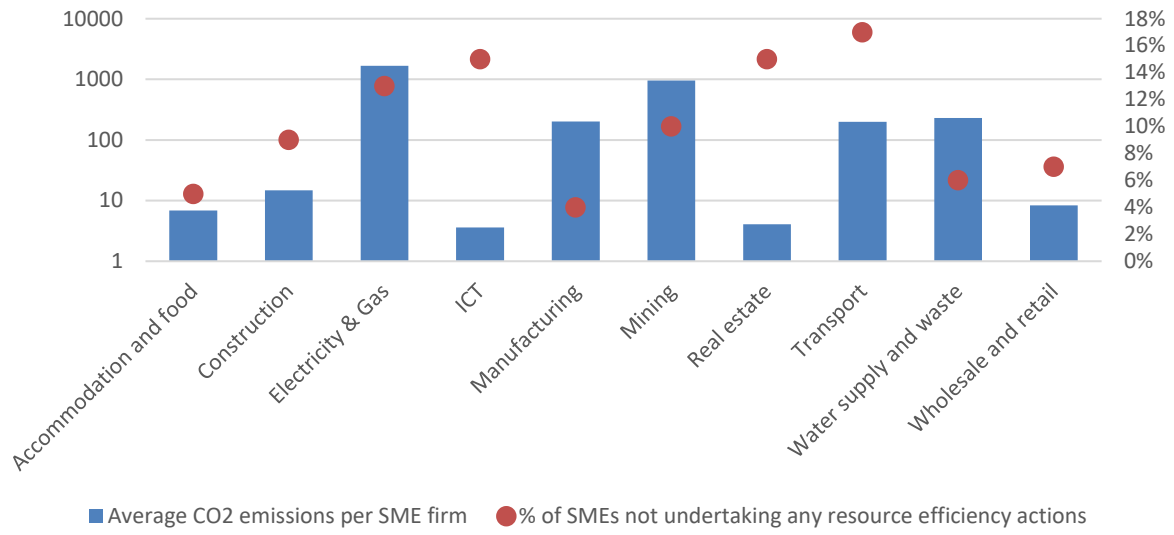
Figure 37 Challenge of reaching the 2030 emission target



Source: 2021-2022 SME association survey
Note: Question: *"How challenging will it be for SMEs to reduce greenhouse gas emissions by 55% by 2030?"*. Number of total responses varies between 9 and 14.

Figure 38 showcases that the differing emissions footprints do not necessarily link up with the current actions being taken by SMEs in the different sectors. While lower emitting sectors, like 'accommodation and food' and 'wholesale and retail', have lower shares of SMEs which are not undertaking any resource efficiency actions, higher emitting sectors, like 'electricity and gas' and 'transport', exhibit some of the highest shares of SMEs not taking action. This stark contrast further demonstrates the extent to which efforts are needed to sustainably transform SMEs in all sectors.

Figure 38 Average CO2 emissions per SME (left axis) & Share of SMEs not undertaking activities (right axis)



Sources: Flash Eurobarometer 498, 2021 (share of SMEs). Eurostat Structural Business Statistics and Air Emissions Accounts, DIW-Econ calculations (emissions).
Note: Emissions have been displayed on a logarithmic scale to allow for easier comparability.

The EIB Investment Survey 2021 provides additional insights into the actions taken in the different ecosystems, although not only restricted to SMEs. At the lower end, less than 30% of enterprises in the 'digital', 'tourism', and 'cultural and creative' ecosystems have already invested in climate adaptation or mitigation. In contrast, over 50% of firms in the energy and renewables ecosystem are already pursuing such investments.[98] While these numbers generally reflect the data shown in Figure 38, differences partially emerge both from the sector-overlapping classification of ecosystems and from the inclusion of large enterprises.

Structural differences between ecosystems, as well as their different emissions reduction pathways, are also reflected in the emissions developments of recent years. While the 'tourism' and 'mobility, transport, and automotive' ecosystems increased their GHG emissions by more than 5% from 2015 to 2019, the 'retail' and 'energy-renewables' ecosystems decreased their GHG emissions by more than 5% in the same period.[99]

These differences between ecosystems stem from inherent structural differences. Ecosystems differ not only in their size, their share of SMEs and the extent and nature of

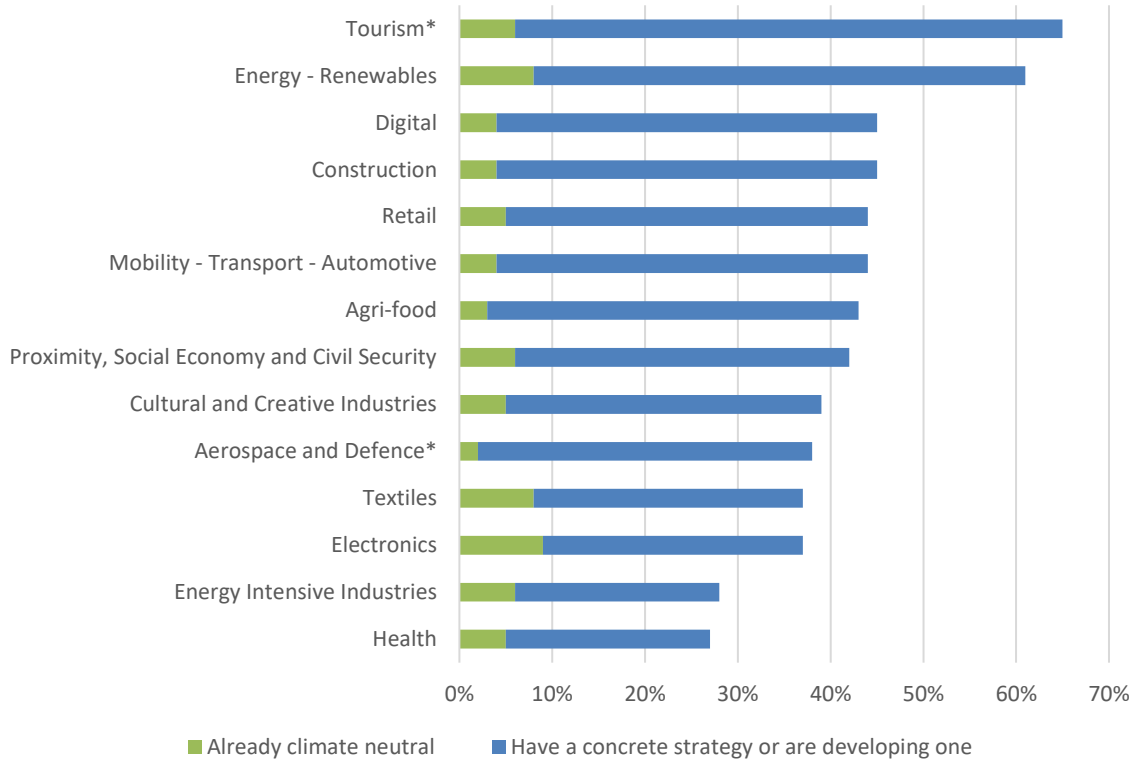
[98] See European Commission, Annual Single Market Report 2022, 2022, available at https://ec.europa.eu/growth/news/commission-presents-2022-single-market-report-and-updated-depth-review-europes-strategic-2022-02-23_en.
[99] See European Commission, Annual Single Market Report 2022, 2022, available at https://ec.europa.eu/growth/news/commission-presents-2022-single-market-report-and-updated-depth-review-europes-strategic-2022-02-23_en.

supply chains, but also in terms of market structure, technologies, skills and expertise, among many other factors.

The Flash Eurobarometer 498 also provides insights into the current state of sustainability activities in the different ecosystems, both in terms of the extent to which activities are undertaken and the challenges described in the prior chapters.

Firstly, the ecosystems differ in terms of their progress towards formulating concrete strategies for becoming climate neutral or negative. Already, more than 50 % of SMEs in the 'tourism' and 'energy-renewables' ecosystems have such strategies in place, are developing them, or are already climate neutral. In contrast, this share was less than 30% for SMEs in the 'energy intensive industries' and 'health' ecosystems. Moreover, although the total share of SMEs with strategies was comparatively low in the ecosystems of 'textiles' and 'electronics', in fact 8% and 9%, respectively, of SMEs in these ecosystems are already climate neutral. (Figure 39)

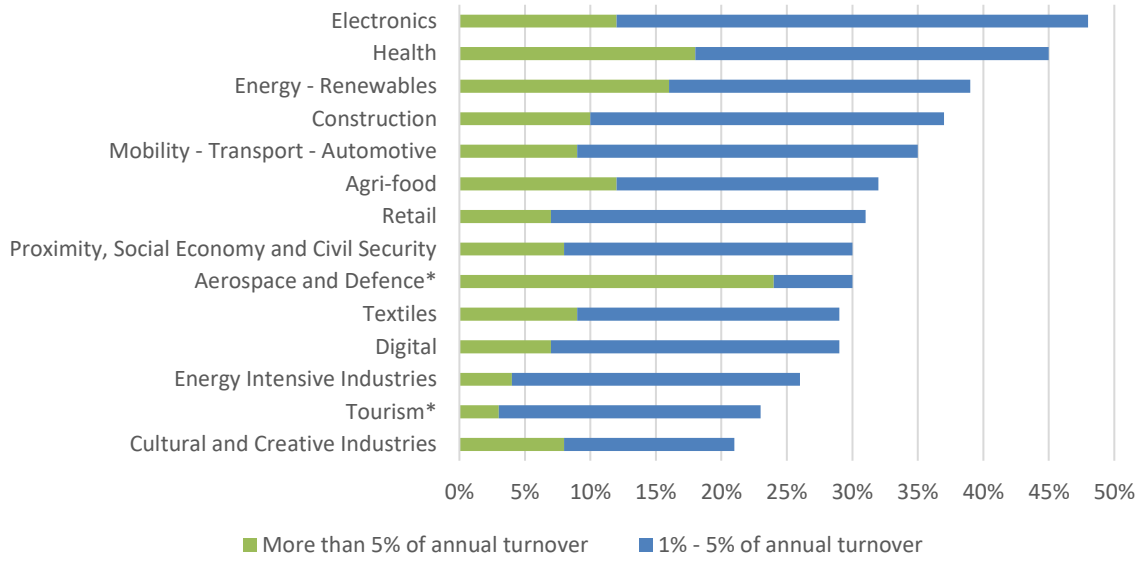
Figure 39 - Share of SMEs that are already climate neutral, have a strategy to become climate neutral in place or are developing one, by industrial ecosystem, 2021



Source: Flash Eurobarometer 498, 2021.
Note: Question: *"Does your company have a concrete strategy in place to reduce your carbon footprint and become climate neutral or negative?";* * denotes ecosystems with less than 100 interviews.

Moreover, ecosystems differ in the extent to which SMEs are investing in the sustainability transition. Although about 45% or more of SMEs in the 'electronics' and 'health' ecosystems had invested at least 1% of their annual turnover, less than 25% of SMEs had done so in the 'tourism' and 'cultural and creative industries' ecosystems. However, the 'tourism' ecosystem displayed the greatest share of SMEs taking resource efficiency action, with 79% of SMEs doing so, although 56% were investing less than 1% of their annual turnover in the sustainability transition. Moreover, while the 'aerospace and defence' ecosystem fared similarly to other ecosystems on the aggregate level, the SMEs which were investing were doing so with markedly higher relative investments, as evidenced by 24% of SMEs investing at least 5 % of their annual turnover. (Figure 40)

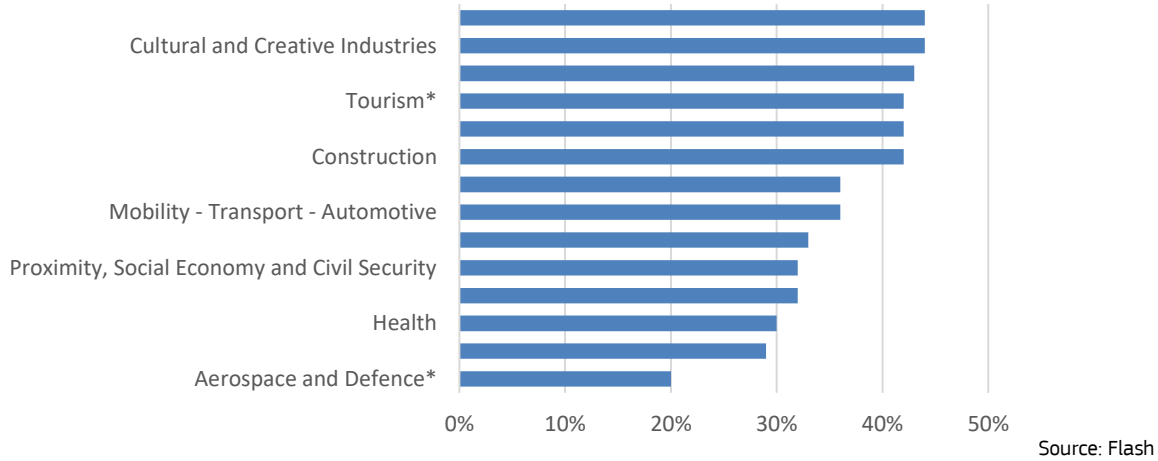
Figure 40 – SMEs' investment in resource efficiency actions in the past two years, expressed as share of annual turnover, by industrial ecosystem, 2021



Source: Flash Eurobarometer 498, 2021.
Note: Question: *"Over the past two years, how much have you invested on average per year to be more resource efficient?"*; * denotes ecosystems with less than 100 interviews.

Finally, in terms of internal capacity to deal with the sustainability transition, ecosystems differ in the extent to which they employ the necessary human capital for the transition. In comparison to the other ecosystems, the 'energy-renewables', 'cultural and creative industries', 'agri-food', 'tourism', 'textiles', and 'construction' ecosystems exhibit more specialised human resources, as more than 40% of SMEs in these ecosystems reported employing at least one person in a green job. On a further positive note, in the 'aerospace and defence' ecosystem, SMEs reported that almost one-fifth of SMEs employed at least one person in a green job. (**Error! Reference source not found.**)

Figure 41 – Share of SMEs with at least one employee in a "green" job, 2021



Source: Eurobarometer 498. 2021
Note: Question: *"In your company, how many of your full-time employees, including yourself, work in green jobs some or all of the time?"*; *denotes ecosystems with less than 100 interviews.

5 Designing policies for the sustainability transition of SMEs

5.1 *Introduction*

As the need for companies to transition to more environmentally sustainable business models is becoming increasingly urgent, legislators at both the national and European level have to leverage their role in speeding up this transition. A major bottleneck for such a policy-based solution is that the main targets of such policies over recent decades have mostly been large enterprises, while SMEs have received less attention, especially when it comes to the reduction of their emissions.[100] While this dichotomy has been decreasing in recent years, with more EU policies specifically addressing the sustainability transition of SMEs, there is still a considerable gap in terms of the number of policies targeting SMEs, as well as the potential to further optimise such policies. This optimisation is especially needed in the adjustment of policies towards the specificities that SMEs present.

Targeting SMEs more consistently is vital in order to achieve EU targets for the green transition, as the previously mentioned data from Eurostat shows that they produce the majority of enterprise-created emissions, reaching over 60% in some EU Member States. Moreover, as previously discussed, because of several characteristics inherent in SMEs, such enterprises are less likely to engage in a transition towards sustainable practices on their own initiative. Hence, regulations targeted at increasing their engagement are both necessary and potentially even more effective than those targeted at large enterprises. Nonetheless, while policies could be very effective in stimulating the green transition of SMEs and, by extension, of the economy as a whole, policymakers need to remain mindful of the burden that drastic policy changes can represent for such enterprises. SMEs have less capacity than large enterprises to (pro)actively monitor the policymaking process, as well as to implement regulations that pose additional requirements upon them. Consequently, SMEs have to be kept well informed of potential new legislation and the complexity of such new legislation has to remain within manageable levels. As such, analysing the possible effects of policies on SMEs, through methods such as the SME Test, must be a crucial step in the successful design of additional new policies to foster a green transition among these enterprises.

The literature on how to speed up the green transition of SMEs often employs a drivers and barriers approach, adopted by, among others, L.L.J. Meijer et al. (2019)[101] and H.T.S. Caldera et al. (2019).[102] This approach consists of identifying a comprehensive list of the drivers which entice SMEs towards reducing their emissions and the barriers which are keeping them from doing so. In addition to providing such a list, researchers sometimes also suggest types of policies that could reduce barriers and/or strengthen drivers. The benefit of this approach is the provision of a clear and structured way to identify both the main obstacles and their solutions. A detailed chart of the most commonly identified barriers and drivers for SMEs, divided by internal and external origin, is provided by Blundel and Hampton[103] and shown in Table 3:

[100] Johansson, I.; Mardan, N.; Cornelis, E.; Kimura, O.; Thollander, P. Designing Policies and Programmes for Improved Energy Efficiency in Industrial SMEs. Energies , 12, 1338, 2019.
[101] L.L.J. Meijer; J.C.C.M. Huijben; A.van Boxstael; A.G.L. Romme: Barriers and drivers for technology commercialization by SMEs in the Dutch sustainable energy sector. School of Industrial Engineering, Eindhoven University of Technology, the Netherlands, 2019.
[102] H.T.S. Caldera; C.Desha; L.Dawes; Evaluating the enablers and barriers for successful implementation of sustainable business practice in 'lean' SMEs. Journal of Cleaner Production, 2019.
[103] Blundel, Richard and Hampton, Sam. How Can SMEs Contribute to Net Zero?: An Evidence Review. Enterprise Research Centre, Warwick, 2021.

Table 3 Common barriers and drivers for the green transition of SMEs

Primary focus	Common barriers	Common drivers
Internal/intra-organisational level	– Lack of awareness – Lack of specialist knowledge/technical skills – Limitations in absorptive capacity/organisational learning – Competing priorities/lack of time – Resource constraints – Access to capital – Short term tenancy agreements – Lack of strategic alignment	– Cost savings – Risk mitigation – Pro-environmental values – Reputation and image – Staff morale
External/inter-organisational level	– Lack of trusted brokers/intermediaries – Information deficit regarding opportunities – Principal-agent/split-incentive problem	– Compliance – Competitive advantage – New market opportunities – Corporate reputation – Public subsidy

While this model of informing policymaking is the one most commonly used, researchers have increasingly noted its limitations and have advocated for the use of a more holistic approach.[104] These limitations are outlined as follows:

First, there is often a mismatch between the barriers and drivers which are outlined by researchers evaluating the topic independently and those identified through surveying SMEs.[105] Specifically, SME owner-managers consistently rank external barriers as more present than internal barriers. In terms of internal barriers, respondents view lack of resources and knowledge as the main barriers to the green transition, whereas lack of interest and misalignment of values are rarely considered to be barriers. On the other hand, according to independent analysis, lack of interest in/low prioritisation of green transition activities are among the biggest barriers. Such a drastic difference between what should be considered as key barriers for the green transition of SMEs poses an important obstacle for the barrier-driver model. An additional issue raised by some researchers is that even when analyses are complemented with feedback collected from SMEs, the latter only takes into account the views of owners and managers, while missing the unique perspective of lower-level workers.[106]

Second, an important shortcoming of the barrier and driver model is that it assumes a constant level of importance of these two factors over time. However, research reveals that in fact the importance of different factors can increase or decrease from the early to the late stages of the decision-making process of SME owners and managers.[107]

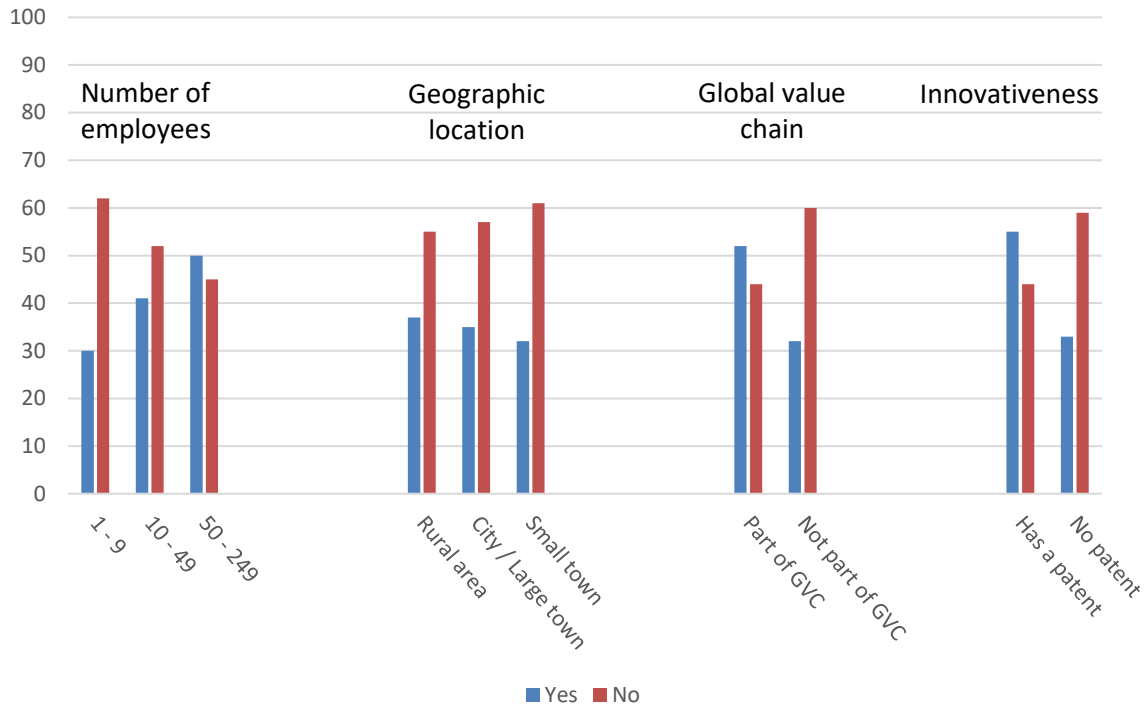
[104] Hampton, S.; Fawcett, T. Why & how energy efficiency policy should address SMEs. Energy Policy 140, 2020.
[105] Trianni, A.; Cagno, E.; Worrell, E.; Pugliese, G. Empirical investigation of energy efficiency barriers in Italian manufacturing SMEs. Energy 49, 444–458, 2013.
[106] Smith, K.M., Wilson, S. & Hassall, M.E. Could focusing on barriers to industrial energy efficiency create a new barrier to energy efficiency? Journal of Cleaner Production, 310, 2021.
[107] Trianni, A.; Cagno, E.; Farné, S. Barriers, drivers and decision-making process for industrial energy efficiency: A broad study among manufacturing small and medium-sized enterprises. Applied Energy 162, 1537–1551, 2016.

Third, this model of thinking about incentivising a green transition in SMEs is strongly based on rationality and considers that providing SMEs with sufficient financial resources or knowledge will automatically lead to the adoption of a more environmentally sustainable business model. However, researchers increasingly warn about the potential inaccuracy of such an approach, as SMEs, especially smaller ones, do not base their decisions on purely rational calculations. Rather, to a degree, decisions are based on the owner's/manager's values and emotions, and are considerably influenced by the company culture.[108]

Finally, another issue is that legislators often address all SMEs as a homogeneous group. Such an approach is both intuitive, as it would vastly facilitate the provision of one stop shop type services for all SMEs, and logical, as the creation of green transition policies targeting SMEs in particular is a relatively recent occurrence. However, a homogeneous treatment is based on an inaccurate understanding of the functioning of SMEs,[109] as SMEs are a very broad group, including companies with only a few employees alongside those with over 200 employees. Moreover, there are several other differences among SMEs, which also impact their readiness to engage in emission reduction initiatives and their approach in doing so. Examples of such differences include the sector of activities, geographic positioning (in a big city, small town or rural area), complexity of supply chain, existing infrastructure (especially in terms of the building in which they are headquartered), and the level of innovativeness. Some of these differences are visualised in Figure 42, based on Eurobarometer data. In this figure, participation in the global value chain is taken as a proxy for a complex supply chain, and whether or not the company holds a patent is taken as a proxy for innovativeness. It should be noted that the question used in the survey had a broader definition of sustainability, including not only an environmental but also a social component, and therefore partially expands beyond the scope of this report.

Figure 42 Difference of SME rates of becoming sustainable enterprises, along selected characteristics

[108] Hampton, S. Making Sense of Energy Management Practice: Reflections on Providing Low Carbon Support to Three SMEs in the UK. Energy Efficiency 12, 1473–1490, 2018.
[109] Hampton, S.; Fawcett, T. Why & how energy efficiency policy should address SMEs. Energy Policy 140, 2020.



Source: European Commission, Eurobarometer Flash Eurobarometer on SMEs, start-ups, scale-ups and entrepreneurship, 2020, https://europa.eu/eurobarometer/surveys/detail/2244
Note: Question: *"Do you have a strategy or action plan to become a sustainable enterprise, i.e., combine long-term success and profitability with a positive impact on society and the environment?"*

It is highly recommended that future policymaking takes the challenges outlined above into consideration and attempts to mitigate them to the best extent possible. Several concrete steps can be taken in order to improve the process of policy design.

The way policymakers are informed about the issues to be solved can be improved by creating a more holistic data collection process. Specifically, it is important that inputs are collected through both objective data and statistics on the performance of SMEs, as well as through feedback directly received from SMEs. Furthermore, the latter should aim to include not only the opinions of owners and managers but also of lower-level workers. Such a data collection strategy would ensure that policy design is based on a complete understanding of the issue in question.

In addition to this, the "one size fits all" approach taken towards SMEs should be reconsidered and revised, in light of the variation among this group. This is not to say that policies should be offered for every single combination of SME characteristics. Such an overly fragmented policy landscape would present its own barrier for SMEs who would have to navigate it. A compromise needs to be found, in which there is enough variance in the provided policies to target all SMEs adequately, while remaining easy and quick to navigate by SMEs.

Finally, policies aimed at SMEs should attempt to target the emotional aspect of SMEs' decision-making process alongside the rational aspect. As research shows that smaller business structures are especially likely to make decisions based on feelings and values, policy should attempt to leverage this phenomenon by fostering an emotional attachment by SME owners/managers towards the green transition. Indeed, there has already been an ongoing cultural shift in this direction throughout the EU, evidenced by the fact that in 2021, for the first time, EU citizens ranked climate change as the most serious problem

facing the world.[110] Policymakers should take advantage of this trend by not focusing purely on the economic aspect of policies when targeting SMEs.

5.2 *Policies promoting the sustainability transition*

This section presents examples of policies and support schemes addressed at promoting sustainable practices across SMEs. These policies have been divided into the following categories: (i) regulatory measures provided by public actors, which can support SMEs in their path towards sustainability, (ii) green certifications and green prizes, aimed at incentivising good practices among companies, (iii) financial support in the form of grant incentives, provided to help SMEs with sustainability-related investments, and (iv) technical assistance, to support SMEs in their capacity building processes for sustainable activities.

For each of these categories, this section presents successful measures and examples from EU countries, which have the potential to be replicated in other countries in order to increase support for SMEs in their transition to sustainability. In addition, most policies aimed at SMEs do not specifically target the sustainability transition. Therefore, the following examples represent exceptions, since they are explicitly aimed at helping with the sustainability transition and are targeted mainly at SMEs in the selected countries. Given the difficulty in finding Member State level policies in this context, the chapter indeed illustrates the policies that combine the targets of both sustainability and SMEs.

5.2.1 Regulatory measures

Regulatory measures are crucial, as their impact can support SMEs in different forms. For instance, such measures include the simplification of procedures and/or reduction of the administrative burden for sustainability-related activities, tax incentives (e.g., deferral, exemption, reduction), special/simplified intellectual property rights for sustainability-related innovations, and incentives for environmental management certifications.

The first interesting measure to explore is the option of **tax incentives** for SMEs that address sustainability issues and/or integrate sustainability into their workflows and processes. SME tax incentives are a commonly used measure among European policymakers.

The use of tax incentives for SMEs is intended to motivate and reward companies that act sustainably and finance sustainable projects. These incentives can take the forms of tax deferral, exemption or reduction. These options can be classified based on three key dimensions:[111]

1. Level of taxation – whether it is applied at the level of the enterprise or benefits the owner upon extracting income;
2. Tax liability and compliance costs – whether they are linked to tax liability or the compliance costs of tax liability;
3. Input/output-based incentives – whether the incentive is based on the input used to create value or the output of the investments in the company.

Based on these elements, policymakers create tax incentives that they define as most appropriate in each of the EU countries.

[110] Special Eurobarometer 513: Climate Change (2021), available at https://europa.eu/eurobarometer/surveys/detail/2273.
[111] Bergner et al. The Use of SME Tax Incentives in the European Union. Discussion Paper No. 17-006, 2017. Available at https://ftp.zew.de/pub/zew-docs/dp/dp17006.pdf.

In this context, different typologies of incentives are applied across EU Member States. One example is the **Accelerated Capital Allowance (ACA)** promoted by the Sustainable Energy Authority of Ireland (SEAI).[112] The ACA is a tax incentive scheme that promotes investment in energy efficient products and equipment, including electric and alternative fuel vehicles and refuelling equipment. It allows for capital depreciation to be compensated through a reduction in an organisation's tax liability. As a result, the reduction in tax paid by the organisation is currently 12.5% of the value of capital expenditure. The ACA can be claimed in the first year in which the asset is used in the business.

This measure adopted in Ireland represents an interesting initiative since it has the double effect of supporting SMEs in their sustainability-related investments by promoting more sustainable business operations in the country, and simultaneously spurring demand for energy efficient products and equipment from SMEs.

Similarly, another example of good practice is demonstrated in the case of Italy and its **Environmental Incentives system for Italian SMEs** (Law 388/2000).[113] More specifically, the law has introduced tax exemptions for SMEs that invest in sustainability and specifies that the environmental and sustainability-related investments are excluded from the taxable income for income tax purposes. In this way, sustainability investments become more attractive as they provide an attractive fiscal advantage compared to other types of investments.

Apart from tax incentives provided by governments in different forms, there are also other types of regulatory measures to consider. In the area of **public procurement,** Spain has adopted the law on Public Sector Contracts (Law 9/2017),[114] which introduced specific award criteria for public tenders, based on sustainability, and environmental, social and governmental aspects in relation to the contracts. Specifically, contracting bodies may establish these considerations as qualitative award criteria for evaluating the best price-quality ratio or as special performance conditions. As a result, SMEs and large enterprises that have implemented sustainability or ESG-related measures are better positioned to win public procurement contracts with the Spanish Government.

Overall, these regulatory measures represent efforts by public actors in EU countries to promote sustainability-related actions from across national SMEs.

5.2.2 Green certifications and green prizes

Another useful measure widely adopted in EU Member States is the provision of green certifications, which prove the sustainability of SMEs' workflows. These certifications seek to ensure a common approach to sustainability among SMEs and support resource efficiency and sustainable development. Moreover, green certifications are another way that companies can show consumers and investors their commitment to sustainable growth, thus also enhancing the reputation of the business. Therefore, such certifications help companies to differentiate themselves from others and to achieve a competitive advantage in the future. The majority of certifications are usually granted by third party organisations, such as non-profits or industry associations.

In the context of global certifications, the **ISO 14001**[115] is the international standard for Environmental Management Systems (EMS) and the most widely used EMS in the world, with over 360,000 ISO 14001 certificates issued globally. ISO 14001 is the principal management system standard that specifies the requirements for the formulation and

[112] More information available at this link: https://www.seai.ie/business-and-public-sector/business-grants-and-supports/accelerated-capital-allowance/.
[113] More information available at this link: https://www.mise.gov.it/index.php/it/incentivi/impresa/agevolazioni-ambientali-l-388-2000.
[114] More information available at this link: https://www.boe.es/eli/es/l/2017/11/08/9/con.
[115] More information available at this link: https://www.iso.org/iso-14001-environmental-management.html.

maintenance of an EMS. This type of environmental certification is extremely beneficial for companies and for the overall economy from different perspectives: (i) it supports companies in reducing their environmental impacts and efficiently using their resources, (ii) it supports businesses with the legal requirements and compliance with sustainability-related regulations, (iii) it reduces operating costs by promoting energy and resource efficiency, as well as better waste management, and (iv) it provides global recognition, thus supporting business growth.

In relation to SMEs specifically, one well-known international example is the **Green Small Business Certification scheme**,[116] promoted by Green Small Business. It provides a low cost way for SMEs to manage the environmental impacts of their businesses with tailored environmental policies and plans, green certification, and support for becoming a net zero business. It has been specifically developed for SMEs as a faster and less expensive alternative to the ISO 14001 certification. As for ISO, this system ensures that SMEs align their business models with sustainable practices, resulting in a reduced impact on the environment and improving the overall business performance.

In addition to certifications, green prizes are also used as awards to SMEs that implement good practices in terms of sustainable practices and operations. Obtaining recognition for sustainability efforts is indeed important to showcase the commitment of a business to be green and increase its credibility compared to companies which instead simply practice 'greenwashing'.[117]

At individual country level, one example is the **Sustainable Enterprise Award,**[118] promoted by the Ministry for the Economy and Industry in Malta. "*The Award serves to reward Maltese Enterprises, in particular micro, small and medium-sized enterprises (MSMEs), (or foreign enterprises operating in Malta) for their efforts to change their practices with the aim of increasing economic, social and environmental sustainability. The ultimate aim of the award is to highlight actions that clearly point out that improving environmental sustainability is directly related to the improvement of economic efficiency and social conditions*." [119] This prize is open to all business sectors across the Maltese economy and provides the winning company with a recognised certification and financial reward, thus serving a demonstration function to showcase best practices from which to learn.

Similarly, "the **"Impresa Ambiente" Award**[120] is the highest Italian award for companies, public and private entities that have made an innovative contribution to processes, systems, partnerships, technologies and products with a view to sustainable development, respect for the environment and social responsibility. It is organised by the Chamber of Commerce of Venice in Italy, together with UnionCamere and the Italian Ministry for Ecological Transition. It is open to Italian SMEs across business sectors and, since its establishment in 2006, has functioned as an incentive for Italian companies to implement sustainable processes by providing recognition as the winner of one of the main sustainability-related prizes in Italy.

Both green certifications and green prizes, therefore, are different from financial incentives or regulatory measures, in that they do not provide – at least not directly -tangible results.

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[116] More information available at this link: https://greensmallbusiness.com/green-small-business-certification/.
[117] Greenwashing refers to the practice of communicating or promoting environmental efforts of organisations, while not actually or only to a lesser extent engaging in environmentally sound practices. (Adopted from Becker-Olsen K., Potucek S. (2013) Greenwashing. In: Idowu S.O., Capaldi N., Zu L., Gupta A.D. (eds) Encyclopedia of Corporate Social Responsibility. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-28036-8_104).
[118] More information available at this link: https://economy.gov.mt/en/Awards/Pages/Sustainable-Enterprise-Awards.aspx.
[119] More information available at this link: https://economy.gov.mt/en/Awards/Documents/Guidelines%20-%20Sustainable%20Enterprise%20Award%202016%20-%2023-03-16.pdf.
[120] More information available at this link: https://www.premioimpresambiente.it/.

However, they are extremely relevant for reputational benefits in the short term and performance improvement in the long term.

5.2.3 Grant incentives

In the context of policies promoting the reduction of emissions, financial incentives play a key role in helping SMEs to obtain the necessary resources for the transition to sustainability. As extensively presented in Chapter 3, SMEs indeed face financial challenges when dealing with sustainability-related investments, and EU Member States use financial support measures to incentivise companies to promote sustainability in their business models. Access to and availability of finance still represent a significant obstacle to the efficient transition, and public actors can facilitate the process, through grants or guarantees. Therefore, the goal of this type of measure is to encourage SMEs to engage in sustainable and climate-related investments for their business directly and thus advance their sustainability agenda. Considering public sources, local authorities may provide some grant opportunities, but more funding measures are usually promoted by national governments.

Among these measures at country level, in Greece, the Hellenic Development Bank is managing a programme called **Greek Green Funds**,[121] with a grant of EUR 400 million from the Ministry of Development and Investments. The programme has the objective of supporting venture capital and private equity funds to finance SMEs in the sectors of renewable energy production and technology, energy conservation infrastructure, sustainable development, and the circular economy (e.g., recycling, biomass/biogas for energy production). The aim of the programme is thus to increase and incentivise investment in SMEs that operate sustainably and contribute to the EU climate objectives and that otherwise would have few financial resources.

Another interesting grant programme is promoted by the Environmental Protection Agency in Ireland, which manages an annual grant aid funding call named **Green Enterprise: Innovation for a Circular Economy**.[122] The programme directly supports businesses that develop and demonstrate innovative practical applications and solutions to prevent waste and stimulate the circular economy. This programme is therefore an extremely appealing and direct financial incentive measure for SMEs, given the absence of intermediaries.

Finally, most of the EU Member States promote different forms of guarantees, mainly through national promotional banks (e.g., the guarantee programme of Cassa Depositi e Prestiti in Italy, the guarantee programme of BPI France for riskier investments in sustainable SMEs), which serve to fill the gaps in financial resources for SMEs investing in sustainability. As with tax incentives, this type of measure provides direct financial benefits for the SMEs involved, which can then support their performance improvement.

5.2.4 Technical Assistance

The final set of policies analysed in this context is the provision of technical assistance and capacity building programmes for SMEs in the field of sustainability, in order to support companies in adopting sustainable procedures and training to address skills shortages. Most small business owners need technical assistance programmes to sustain and strengthen their businesses,[123] and this is particularly evident in the field of sustainability, in which SMEs often lack sector-specific knowledge. Technical assistance programmes have the objective of strengthening the development of sustainable practices by providing

[121] More information available at this link: https://hdbi.gr/en/call-for-proposals-green-greek-funds-en/.
[122] More information available at this link: https://www.epa.ie/our-services/research/epa--research-funding/.
[123] More information available at this link: https://sgp.fas.org/crs/misc/R43083.pdf?ieNocache=665.

tools, skills and methodologies to SMEs, which is especially important in this context for two reasons. As discussed previously in this chapter, transitioning towards environmental sustainability is a complex challenge for a business, that can require knowledge and skills which are not always represented in enterprise managers and owners. Second, this issue of missing expertise is typically more difficult to mitigate for SMEs, as smaller companies are less likely to be able to afford either the time or the financial resources to develop this expertise within their structure, or to hire an external consultant. As such, providing easily available guidelines and training can remove a significant barrier to the sustainability transition of SMEs in particular.

Technical assistance in the form of capacity building and the provision of tools and guidelines can remove a significant barrier to the sustainability transition of SMEs in particular. It also plays an important role in allowing SMEs to access finance. As previously mentioned, banks are reluctant to lend to smaller firms due to their riskiness and lack of readiness. This issue is exacerbated in the context of sustainability investments, which bear an extra layer of complexity. A well-designed technical assistance programme has the potential to upgrade and upskill the SME itself and to ease its access to finance as a secondary effect. However, providing free or grant-based technical assistance cannot always be a long term or large scale solution, due to public budget constraints. Consequently, an eventual transition to fee-based technical assistance, involving private sector actors in the delivery of the services, is required. In turn, this transition raises the question of whether SMEs would be able to afford such services. A well-designed technical assistance programme should identify i) subsets of SMEs and specific investments that could only be financed by grant-based assistance, due to particular financial or technical constraints and ii) the conditions, on a case-by-case basis, for a gradual phasing out of the free technical assistance for those SMEs whose business model becomes sustainable and financially self-sufficient.

The following proposed examples represent a sample of EU Member State level initiatives that support SMEs in their path to sustainability.

A good example of technical assistance for SMEs is the Joint R&D Project - The Industry of Tomorrow: Green, Human & Smart – which is promoted by the Brussels Institute for Research and Innovation (INNOVIRIS) to encourage collaboration between the academic and industrial worlds through the provision of capacity building. "*It allows SMEs and large enterprises to integrate the latest innovations in technology and sustainability, and researchers to meet practical cases for applying their discoveries*."[124] Hence, the programme promotes good practices for innovation and sustainable activities by Belgian SMEs, while also supporting academic research in the country.

Another pair of interesting programmes were developed in Denmark, under a grant which was launched by the Danish Business Authority (Erhvervsstyrelsen). The grant provides new and future entrepreneurs from Danish SMEs with the knowledge and skills needed to purposefully and strategically implement corporate social responsibility to achieve Sustainable Development Goals.

The first programme with a focus on sustainability, which was a beneficiary of this grant pool, is the **Painters Must Choose Green** (Malerne skal vælge grønt). It attempts to solve the issue of the difficulties experienced by small paint companies in navigating the complex landscapes of environmental certifications and various types of products with different levels of reusability and recyclability, while simultaneously being increasingly pressured by customers to prove the sustainability of their products and services. The project attempts to solve this by developing guides on various topics, such as the green

[124] More information available at this link: https://ecobuild.brussels/joint-rd-project-the-industry-of-tomorrow-green-human-smart/#pll_switcher.

transition, social responsibility, the working environment and health, in addition to promoting examples of companies which have already used these guides for their own successful sustainable transition, in order to foster more interest from potential beneficiaries. This promotion of success stories is important for capacity building in entrepreneurs, as it reduces the perceived lack of skills and knowledge which acts as a major barrier in the green transition of SMEs.

The second environmentally focused programme, which benefited from the grant in question, is **Climate Heroes to Create More Danish Sustainable Entrepreneurs** (Klimahelte skal skabe flere danske bæredygtige iværksættere), which takes this principle of fostering green transition by example a step further by putting success stories at the centre of the project. Specifically, it consists of creating an ambassador corps of so-called "climate heroes", i.e., Danish entrepreneurs who have successfully developed a green and social SME and are therefore able to share their knowledge and experience with other aspiring green and social entrepreneurs. The benefit of such an approach is that the climate heroes are able to both provide relevant practical knowledge and also give their fellow entrepreneurs confidence, resulting in a two-pronged solution to the SME barrier of lacking expertise and confidence for participating in the green transition. An additional strength of this programme lies in the diversity of the climate heroes, consisting of men and women leading companies throughout various sectors and geographic regions.

These Member State level measures are extremely helpful for SMEs, since they mainly fill the skills gap that prevents them from advancing their sustainability agenda. Considering the high impact of SMEs on the European economy, these programmes can provide a crucial contribution to EU climate objectives.

At EU level, a relevant initiative is the **Call for Sustainability Partnerships for SMEs**[125] offered by the **European Enterprise Network**. In March 2022, the European Innovation Council and SMEs Executive Agency (EISMEA)[126] opened a call for proposals for Sustainability Partnerships for SMEs adopting more sustainable practices. The call leverages the expertise of Non-Governmental Organisations (NGOs) and Civil Society Organisations (CSOs) to assist SMEs in their transition to more sustainable business models. It aims to enhance the collaboration between SMEs and NGOs/CSOs active in the same regions, while funding operational projects able to influence the environmental and/or social performance of SMEs. This call builds on the mission of the Enterprise Europe Network (EEN) and provides EEN members with an additional tool to assist SMEs in their transition to more sustainable business models. An active EEN member will coordinate the projects and actions. The projects will be implemented by consortia composed of interested SMEs, NGOs/CSOs and other relevant parties. Moreover, as of 2022, **Sustainability Advisors** are fully operational within the EEN. These advisors will help all types of SMEs in their transition to more sustainable business models by identifying sustainability challenges and opportunities and advising on new sustainable business models, the circular economy and resource efficiency.

Finally, the 2021-2027 Multiannual Financial Framework (MMF) included the **Technical Support Instrument (TSI)**. Endowed with overall funding of over EUR 800 million for the 2021-2027 period, the TSI aims to support Member States in designing and implementing reforms within the framework of the European Semester and the National Recovery and Resilience Plans. TSI will provide technical assistance on a broad range of policies and reforms, with a particular focus on the green and digital transitions. It represents a powerful instrument to support Member States in delivering policies that are

[125] More information available at this link: https://een.ec.europa.eu/news/dont-miss-call-sustainability-partnerships-smes-few-weeks-left-apply.
[126] https://eismea.ec.europa.eu/index_en.

well-designed to help SMEs with their sustainability transition. The European Commission has supported the Spanish national promotional bank (ICO) through TSI, in the design of a Strategic Action Plan for direct financing of more sustainable (green and social) activities and projects.[127] National promotional banks are crucial actors in channelling intermediated public financing to SMEs. Supporting the development of more green financing instruments can potentially create a positive impact in terms of financing SMEs' sustainability transition.

5.3 *Measuring data on emissions footprint*

Following the action of policymakers on climate and environmental objectives for the coming years, industry giants have pledged to cut emissions along their entire supply chains, which mainly include small and medium enterprises that account for over 99% of companies across Europe.[128] As a result, attention has gradually shifted from large enterprises to SMEs, which have usually been subject to less environmental scrutiny and regulation,[129] but are now required to effectively measure their impact on the environment.[130]

The measurement of this type of environmental information is extremely relevant from different perspectives. First, policymakers need access to information about the emissions footprint of SMEs to evaluate the effectiveness of the legislation in place, since in this way they can measure the impact of the adopted policies in the light of climate objectives. Second, measurement of the emissions footprint quantifies the advancement towards environmental objectives in Europe and assesses SMEs' alignment with existing standards. Third, emissions footprint information is relevant for investors and the overall financial industry for tailoring investment strategies and risk management and efficiently responding to reporting requirements.

5.3.1 Tools and standards to measure the emissions footprint

Among the existing standards to measure the emissions footprint, the following are the most globally used. The **Greenhouse Gas Protocol** (GHG Protocol)[131] is convened by the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI). The GHG Protocol is the most widely used greenhouse gas accounting standard for companies, both directly by organisations and indirectly by third parties. In addition, the **CDP global environmental disclosure system**[132] is widely used by companies, cities, states, and regions to measure and manage the risks and opportunities of their environmental impact.

As explored in Chapter 1, across Europe, SMEs contribute to approximately 63.3% of overall CO_2 and greenhouse gases emissions,[133] but the efficient measurement of their emissions footprint still presents some difficulties, despite existing standards. Only limited data are available at EU level, but some evidence from non-EU countries indicates the overall trends. For instance, a survey conducted by O2 and the British Chamber of Commerce (BCC) on 1072 SMEs based in the UK, reveals that only 11% of SMEs regularly

[127] See https://ec.europa.eu/reform-support/sustainable-finance-action-plan-spanish-national-promotional-bank-instituto-de-credito-oficial-ico_en.
[128] More information available at this link: https://www.businesslive.co.za/bd/world/europe/2020-10-21-initiatives-by-europes-smes-show-they-take-carbon-emission-reduction-seriously/.
[129] Aguilar-Fernandez M. and Otegi-Olaso J., Firm Size and the Business Model for Sustainable Innovation. Sustainability 10, 4785, 2018. Available at https://www.mdpi.com/2071-1050/8/9/898/pdf.
[130] See section 5.4 on sustainability reporting for SMEs.
[131] More information available at this link: https://ghgprotocol.org/about-us.
[132] More information available at this link: https://www.cdp.net/en/info/about-us/what-we-do.
[133] Reference to Figure 1, Chapter 1.

measured their emissions footprint, while the share fell to 9% for small enterprises and 5% for micro enterprises.[134] In the context of the poll, SMEs indicated that the main challenge preventing them from efficiently measuring and reporting on their emissions and aligning with the previously mentioned standards was the cost of this activity, in terms of financial capital, tools, methodologies and human capital. The second most-cited barrier was the lack of in-house understanding or expertise regarding this type of activity, which therefore required capacity building and technical assistance.[135] Furthermore, even if SMEs measure their emissions footprint, such data are not necessarily made readily or publicly available to stakeholders such as investors, clients or other actors in the supply chain who would need to access the data.

As most SMEs do not independently audit or monitor their emissions footprint because of the required costs and knowledge gaps, they tend to rely on existing auditing and monitoring standards and tools provided by external companies.

More specifically, some companies provide carbon footprint calculators for SMEs. Among these providers, for instance, **Carbon Trust**[136] supports UK-based SMEs in the measurement of their emissions following GHG Protocol guidance, including direct emissions from fuel and processes (Scope 1 emissions) and emissions from purchased electricity (Scope 2 emissions) for the assets they operate. Specifically, the tool requires the SME to insert data on fuel consumption, energy consumption and top-ups made to air conditioning units for a specific reporting year and provides an evaluation of the organisational footprint based on these data.

An interesting national example, with a focus on agriculture and farming, is the **Origin Green – Carbon Navigator** developed in Ireland. The tool embeds a process of measurement, feedback, and continuous improvement, against which farms are assessed in key efficiency areas (resource efficiency and sustainability of production processes, emissions, waste management, energy efficiency of facilities, etc.). The ability to generate a carbon footprint for farms on an individual basis has also been aided by collaboration with the Irish Cattle Breeding Federation (ICBF) and the Department of Agriculture, Food and the Marine (DAFM), who, with a farmer's consent, share data with the Irish Food Board (Bord Bia) to aid in the footprinting process.

These are just a few of many examples, as such tools are provided by several companies. Their scope can vary from universal, i.e., offering measurement of emissions for any enterprise, to specialisation within a specific sector, featuring improved functionality relevant to companies within the sector. Such tools also vary in their geographical scope, with some being global, while others specialise in a specific country and provide more detailed contextual data for that country. Other differences exist as well, as both free and paid tools exist, and some of them offer additional functionalities such as benchmarking against other companies in the sector, a broader range of standards, additional insights based on big data, and additional corporate indicators such as consumption of water and alignment with social responsibility. The following table shows a non-exhaustive list of existing tools that SMEs can use to measure their emissions footprint.

Table 4 Examples of existing tools that SMEs can use to measure their emissions footprint

Company	Scope	Region

[134] More information available at this link: https://www.edie.net/news/6/Just-one-in-ten-UK-SMEs-measuring-their-carbon-emissions--survey-finds/.
[135] Ibid.
[136] More information available at this link: https://www.carbontrust.com/resources/sme-carbon-footprint-calculator.

Normative: Industry CO_2 Insights and forthcoming calculator	Universal	Global
The Carbon Trust: Footprint Manager		Global
Carbon Footprint: Free calculator		Global
Compare your footprint		Global
Footprinter		Global
Greenstone environmental reporting software		Global
Ecometrica: Sustainability Reporting & Management Software		Global
Carbon Desktop		Global
Accuvio: SECR software		Global
ENGIE: Impact - Energy and Sustainability Management Platform		Global
Manufacture 2030		Global
Farm Carbon Cutting Toolkit	Agriculture Forestry Fishing	UK
Origin Green – Carbon Navigator		Ireland
AgRE Calc		Not specified
Global Livestock Environmental Assessment Model: GLEAM-i		Global
AllTech E-CO_2		Global
Aluminium Tool - from the GHG Protocol	Manufacturing	Global
Iron and Steel tool from the GHG Protocol		Global
Pulp and Paper tool – from the GHG Protocol		Global
Asphalt Pavement Embodied Carbon Tool (asPECT)	Construction	Global
eTool		Global
One Click LCA		Global
ADW Developments		Global

Build Carbon Neutral		USA
Hotel Carbon Measurement Initiative	Hotel Industry	Global
Rail Carbon Tool	Transportation	UK
EcoTransIT		Global
Greenshoot's carbon calculator and START tool		Global
ClimateCalc tool		Global
SAT-S (ICT Footprint)		Global
SAT-O (ICT Footprint)		Global
The Carbon Footprint and Project Register	Public Administration	Scotland
SCATTER		UK
The Creative Green Tools - Julie's Bicycle	Entertainment	Global

The existence of such a broad range of tools can be beneficial to SMEs, as companies can find the tool which is best suited to their individual needs and offers more tailored support. However, the fragmented landscape of emission measuring tools also presents a challenge, as it requires additional effort from SMEs to find the one which best suits their needs. This issue could potentially lead to beneficiaries either not finding the optimal tool for their purpose, or even giving up, due to the frustrating lack of clarity. With that in mind, providing comprehensive information on the available tools for measuring emissions, available in a centralised location, could be a potential avenue for increasing their use among SMEs.

Other companies adopt a different approach to using a measuring tool, by directly calculating the emissions footprint instead, to provide to the finance industry. The company **Urgentem**,[137] as previously discussed in Chapter 1, is an independent provider of transparent carbon emissions data and climate risk analytics. It offers a comprehensive dataset of the GHG Protocol defined scope 1,2, and 3 emissions of the largest 5500 global companies, by collecting information from public sources such as Annual Reports, Financial Reports, Sustainability Reports and information sourced from company websites. As a result, Urgentem can directly provide customers with both the emissions data and the assumptions which inform the methodologies adopted for the calculations. Finally, the methodology adopted by Urgentem is based on a series of widely accepted **Assurance Standards**,[138] including ERT Corporate GHG Verification Guidelines, ERM GHG Performance Data Assurance Methodology, SGS Sustainability Report Assurance, and EU ETS (verification under the EU Emissions Trading Scheme Directive and EU ETS related national implementation laws).

[137] More information available at this link: https://www.urgentem.net/.
[138] The exhaustive list of accepted Assurance Standards used for the methodology adopted by Urgentem is available at this link: https://eb1ce22d-5d00-4905-8cb9-b6e593ea327e.filesusr.com/ugd/1b942e_8601a0f5a5a04ae3924a5d87a5797f21.pdf.

5.4 *Sustainability reporting for SMEs*

Sustainability reporting is the disclosure and communication of sustainability information (until recently called non-financial information) related to environmental, social and governance factors.[139] Being transparent about the environmental, economic, and social impacts of its activities demonstrates the credibility of a business and enables it to build consumer confidence and corporate reputation. Reporting requirements indirectly encourage businesses to identify areas for improving their sustainability performance, which can also lead to identifying business opportunities and efficiency improvement options, boosting their innovation, and even improving their risk management. There is also a growing awareness among investors that sustainability issues can put the financial performance of companies at risk.[140] In the last decade, sustainability reporting regulatory instruments have been on the rise and large enterprises have been under increasing public scrutiny regarding their sustainability impacts. The effect of SMEs has largely been overlooked, despite representing over 99% of businesses in the EU,[141] and playing a crucial role in global supply chains.

While sustainability reporting can potentially generate substantial business benefits for SMEs, helping to build trust and reputation with their potential clients and with the larger companies they supply, it also represents an important burden for many of them. The process of sustainability data gathering can be extremely challenging and costly for SMEs, which often face limited financial, technical and human resources, due to the complexity of existing private reporting frameworks, involving a huge array of KPIs and competing requests from financial institutions, investors, large enterprises and other stakeholders in the supply chain. Aside from the data gathering, SMEs also often lack the knowledge and resources to ensure the monitoring and measurement of appropriate sets of sustainability indicators.

Currently, policies on sustainability reporting often address SMEs indirectly (notably by requiring supply chain diligence to large and listed enterprises for example) and there are no specific EU requirements for SMEs to produce sustainability reports. As they have a key role in the economy and corporate transparency is more important than ever in addressing pressing global challenges, sustainability requirements obligations will in future be progressively extended to cover SMEs, as demonstrated by the adoption of the recent Corporate Sustainability Reporting Directive (CSRD)[142] proposal by the European Commission.

5.4.1 SMEs sustainability reporting requirements: EU level

The EU **Sustainable Finance Taxonomy Regulation**[143] entered into force on 12 July 2020 and provides a common language for environmentally sustainable activities and financial instruments. It enables investors, financial institutions, companies and other

[139] Environmental factors include climate change mitigation, climate change adaptation, water and marine resources, resource use and the circular economy, pollution, biodiversity and ecosystems. Social factors include equal opportunities for all, working conditions, respect for human rights, fundamental freedoms, democratic principles and standards. Governance factors include the role of the enerprise's administrative, management and supervisory bodies, business ethics and corporate culture, political engagement of the enterprise, the management and quality of relationships with business partners, the enterprise's internal control and risk management systems.
[140] European Commission, Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, Explanatory Memorandum, 2021, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189.
[141] European Commission, SME definition, 2021, available at https://ec.europa.eu/growth/smes/sme-definition_en.
[142] European Commission, Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, Explanatory Memorandum, 2021, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189.
[143] European Parliament and Council, Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088, 2020, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32020R0852.

stakeholders to collect accurate, consistent, and comparable sustainability indicators. Article 8 of this Regulation sets out requirements for the publication of information "*on how and to what extent the undertaking's activities are associated with economic activities that qualify as environmentally sustainable*",[144] therefore aiming to prevent 'greenwashing', to encourage the development of a responsible approach to business and to increase transparency in the market.

Currently, under article 8(1) of this Regulation, only large public interest listed companies with more than 500 employees (including listed companies, banks, insurance companies and other companies designated by national authorities as public interest entities) are required to publish non-financial information pursuant to Directive 2014/95/EU, also called the Non-Financial Reporting Directive (NFRD).[145,146] Since 2016, EU Member States have actively adopted new laws and regulations transposing this directive into national law.

On the other hand, SMEs are not required to proceed to sustainability reporting, but can do so voluntarily, notably by building upon internationally recognised frameworks such as the Global Reporting Initiative (GRI) and the International Integrated Reporting Council (IIRC).[147] While sustainability reporting is optional for SMEs, they may be forced to do so, in order to meet the reporting requirements of financial institutions and significant clients in their value chain.

On April 21st 2021, the Commission presented its proposal for a CSRD,[148] which extends the EU's sustainability reporting requirements to all large enterprises and listed companies, including SMEs with securities listed on regulated markets, but excluding listed micro enterprises and SMEs with transferable securities listed on SME growth markets or multilateral trading facilities (MTFs). The Directive introduces more detailed reporting requirements, and a requirement to report according to mandatory EU sustainability reporting standards.[149]

With the aim of improving the flow of sustainability information in the corporate world and "*to progressively bring sustainability reporting on a par with financial reporting*",[150] this directive represents a considerable reinforcement and enlargement of the scope of reporting obligations, with now more than 50,000 enterprises which will be required to

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[144] European Parliament and Council, Regulation (EU) 2020/852 of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088, article 8, 2020, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32020R0852.

[145] European Parliament and Council, Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups, 2014, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014L0095.

[146] On 20 December 2021, the Commission published a FAQs on how financial and non-financial undertakings should report taxonomy-eligible economic activities and assets in accordance with the Taxonomy Regulation Article 8 Disclosures Delegated Act (European Commission, FAQs: How should financial and non-financial undertakings report Taxonomy-eligible economic activities and assets in accordance with the Taxonomy Regulation Article 8 Disclosures Delegated Act?, 2021 (updated in 2022), available at https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/sustainable-finance-taxonomy-article-8-report-eligible-activities-assets-faq_en.pdf).
An additional Draft Commission notice was released on 2 February 2022 to complement the FAQs (European Commission, Draft Commission notice on the interpretation of certain legal provisions of the Disclosures Delegated Act under Article 8 of EU Taxonomy Regulation on the reporting of eligible economic activities and assets, 2022, available at https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/sustainable-finance-taxonomy-article-8-report-eligible-activities-assets-faq-part-2_en.pdf).

[147] EFAA, What SMPs and SMEs Need to Know About Sustainability Reporting, 2021, available at https://efaa.com/wp-content/uploads/2021/08/EFAA-Sustainability-Reporting-SMPs-SMEs.pdf.

[148] European Commission, Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, 2021, available at https://eur-lex.europa.eu/legal- content/EN/TXT/?uri=CELEX:52021PC0189.

[149] European Commission, Corporate sustainability reporting, 2021, available at https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en.

[150] European Commisson, Press release - Sustainable Finance and EU Taxonomy: Commission takes further steps to channel money towards sustainable activities, 2021, available at https://ec.europa.eu/commission/presscorner/detail/en/ip_21_1804.

cover sustainability reporting in their annual management report, including listed SMEs (compared to the 11,700 that are now subject to the NFRD).[151]

Through the CSRD proposal, the European Commission has set out a simplified reporting regime for SMEs, with different measures aimed at placing a more proportionate burden on SMEs, reflecting the more limited capacities and resources of such companies.[152]

The European Financial Reporting Advisory Group (EFRAG) is responsible for developing these draft standards, which should be adopted by October 31, 2023. As mentioned in the CSRD proposal, the sustainability reporting standards that will be developed by EFRAG will specify the information that enterprises must disclose, which will cover the following aspects:

environmental factors including climate change mitigation, climate change adaptation, water and marine resources, resource use and the circular economy, pollution, biodiversity and ecosystems.
social factors including equal opportunities for all, working conditions, respect for human rights, fundamental freedoms, democratic principles and standards
governance factors including the role of the enterprise's administrative, management and supervisory bodies, business ethics and corporate culture, the political engagement of the enterprise, the management and quality of its relationships with business partners, the enterprise's internal control and risk management systems.[153]

Under the provision in the CSRD proposal, EFRAG is currently developing draft standards following a comprehensive architecture often described as the 'rules of three'.[154] According to this target architecture, "*the standard-setter should elaborate standards from a target architecture based upon three layers of reporting, three reporting areas and three topics.*"[155] This architecture will result in sustainability-related disclosures to be presented under an appropriate reporting structure, proposed to be named 'sustainability statements'. (Table 5)

Table 5 Architecture currently used by EFRAG to develop draft standards[156]

Three layers	Three reporting areas	Three topics
– sector agnostic – for maximum comparability;	– strategy – implementation, and – performance measurement	– environment (including climate) – social

[151] Cleary Gottlieb, The Corporate Sustainability Reporting Directive: From "Non-Financial" to "Sustainability" Reporting, 2021, available at https://www.clearygottlieb.com/-/media/files/alert-memos-2021/the-corporate-sustainability-reporting-directive.pdf.
[152] European Commission, Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, 2021, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189.
[153] European Commission, Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, 2021 – Article 1, Paragraph 4 amending Article 19b of the Accounting Directive, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189.
[154] EFRAG, Project Task Force On European Sustainability Reporting Standards (PTF-ESRS), Status report, 2021, available at https://www.efrag.org/Assets/Download?assetUrl=%2fsites%2fwebpublishing%2fSiteAssets%2f20211015%2520PTF-ESRS%2520status%2520report%2520(final).pdf.
[155] EFRAG, Proposal for a relevant and dynamic EU sustainability reporting standard-setting, 2021, available at https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FSiteAssets%2FEFRAG%2520PTF-NFRS_MAIN_REPORT.pdf.
[156] EFRAG, Project Task Force On European Sustainability Reporting Standards (PTF-ESRS), Status Report, 2021, available at https://www.efrag.org/Assets/Download?assetUrl=%2fsites%2fwebpublishing%2fSiteAssets%2f20211015%2520PTF-ESRS%2520status%2520report%2520(final).pdf.

– sector-specific – for maximum relevance; – and entity-specific – for additional flexibility, relevance and responsibility		– and governance+ collectively referred to as 'ESG+'

As laid out in the NFRD, as a minimum, SMEs will have to report information on environmental, social and employee matters, respect for human rights, and anti-corruption and bribery matters.[157] Under each of those categories, non-financial statements must include a range of information, as outlined in Table 6:

Table 6 Sustainability information to be contained in non-financial statements (CSRD proposal)[158]

a brief description of the undertaking's business model and strategy, including
the resilience of the undertaking's business model and strategy to risks related to sustainability matters;
the opportunities for the undertaking related to sustainability matters;
the plans of the undertaking to ensure that its business model and strategy are compatible with the transition to a sustainable economy and with the limiting of global warming to 1.5 °C in line with the Paris Agreement;
how the undertaking's business model and strategy take account of the interests of the undertaking's stakeholders and the impacts of the undertaking on sustainability matters;
how the undertaking's strategy has been implemented with regard to sustainability matters;
a description of the targets related to sustainability matters set by the undertaking and of the progress the undertaking has made towards achieving those targets;
a description of the role of the administrative, management and supervisory bodies with regard to sustainability matters;
a description of the undertaking's policies in relation to sustainability matters;
a description of:
the due diligence process implemented with regard to sustainability matters;
the principal actual or potential adverse impacts connected with the undertaking's value chain, including its own operations, its products and services, its business relationships and its supply chain;
any actions taken, and the result of such actions, to prevent, mitigate or remediate actual or potential adverse impacts;
a description of the principal risks to the undertaking related to sustainability matters, including the undertaking's principal dependencies on such matters, and how the undertaking manages those risks;
indicators relevant to the disclosures referred to in points (a) to (f).

To alleviate the reporting burden generated by the CSRD, SMEs will also be given **additional time** to comply, as they will be required to start reporting in accordance with the CSRD 3 years after it comes into effect.[159] Non-listed SMEs may still choose to report on a voluntary basis.

[157] European Commission, Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, 2021 – Article 1, Paragraph 4 amending Article 19b of the Accounting Directive – recital (6), available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189.

[158] European Commission, Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, 2021 – Article 1, Paragraph 4 amending Article 19b of the Accounting Directive – Article 1, Paragraph 2, amending Article 19a of the Accounting Directive, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189.

[159] European Commission, Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, 2021, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189.

In February 2022, the Council agreed its position ('general approach')[160] on the Commission proposal for a CSRD, amending the scope proposed by the Commission to "*ensure that reporting requirements are not too burdensome for listed SMEs (since the obligations do not apply to other SMEs) and that they have sufficient time to adapt to the new rules*".[161] Completing the negotiating position agreed by the Council, the general approach provides the Council presidency with a mandate for further discussions with the European Parliament, which are expected to start in spring 2022.

Box 2 General approach adopted by the Council on the European Commission proposal for the CSRD[162]

Following discussions in the Council and more specifically within the Working Party on Company Law, the Presidency of the Council has notably strengthened in its compromise text the possibility of allowing SMEs to limit the information to be provided (except for SMEs which are also parent companies of large undertakings) (in Article 19a of the Accounting Directive).

On 16 February 2022, the Committee of Permanent Representatives (Coreper) supported the compromise text presented by the Presidency, which was approved as it stood, with the addition of a sentence in Article 29b(2b), proposed by one delegation and supported by several others, which is intended to provide for a transitional period during which flexibility would be granted to SMEs for the provision of information on value chains. The new text reads as follows: "*Furthermore, for the first three years of application of this Directive, in the event that not all the necessary information about the business relationships and the supply chain is available, the undertaking shall include the information in its possession and a statement indicating that the business relationships and the undertakings in its value chain did not make the necessary information available*."

Even though the CSRD does not cover all SMEs, companies which are not obliged to report under the directive might still face some trickle-down effects from these new requirements through the supply chains. Moreover, increasing pressure from intermediaries to prepare standardised sustainability information might emerge, as well as reporting requests from banks and investors.[163]

Complementing the CSRD proposal, in February 2022 the EC adopted a **Proposal for a Directive on corporate sustainability due diligence (CSDD)** which aims to foster sustainable and responsible corporate behaviour and to anchor human rights and environmental considerations in companies' operations and corporate governance. Establishing a corporate due diligence duty, this proposal sets out new rules ensuring that businesses address any adverse impacts of their actions, including within their value chains inside and outside Europe. The core elements of this duty are identifying, bringing to an end, preventing, mitigating and accounting for negative human rights and environmental impacts in the company's own operations, their subsidiaries and their value chains. In addition, certain large enterprises are required to have a plan in place to ensure that their

[160] The Council sometimes uses a 'general approach' to give the Parliament an idea of its position on the legislative proposal submitted by the Commission. This political agreement is usually used to speed up the legislative procedure and to make it easier to reach an agreement between the Parliament and the Council at the first reading. (Council of the EU, The ordinary legislative procedure, 2021, available at https://www.consilium.europa.eu/en/council-eu/decision-making/ordinary-legislative-procedure/).

[161] Council of the European Union, Council adopts its position on the corporate sustainability reporting directive (CSRD), 2022, available at https://www.consilium.europa.eu/en/press/press-releases/2022/02/24/council-adopts-position-on-the-corporate-sustainability-reporting-directive-csrd/.

[162] Council of the European Union, General approach – proposal for a directive as regards corporate sustainability reporting (6292/22), 2022, available at https://data.consilium.europa.eu/doc/document/ST-6292-2022-INIT/en/pdf.

[163] Euractiv, The EU taxonomy can strengthen SMEs in the green transition, 2021, available at https://www.euractiv.com/section/energy-environment/opinion/the-eu-taxonomy-can-strengthen-smes-in-the-green-transition/.

business strategy is compatible with limiting global warming to 1.5 °C in line with the Paris Agreement. The Directive also introduces duties for the directors of the EU companies covered. These duties include setting up and overseeing the implementation of the due diligence processes and integrating due diligence into the corporate strategy. In addition, when fulfilling their duty to act in the best interest of the company, directors must take into account the human rights, climate change and environmental consequences of their decisions.

While SMEs are not included in the scope of the CSDD proposal, the new rules will indirectly affect them. SMEs will be exposed to some of the costs and burdens through business relationships with companies in scope (estimated to be around 13,000 EU and 4,000 non-EU companies) as large enterprises are expected to pass on demands to and through their direct business relationships. As far as business relationships between SMEs and financial institutions are concerned, SMEs receiving loans, credits, financing, insurance or reinsurance will not be considered part of the value chain of large financial sector companies in order to protect SMEs' ability to access finance.

In light of the potential impact on SMEs through supply chains, support will be necessary to help SMEs build operational and financial capacity. This support will come from both the private and public sectors.
As laid out in the proposal, companies whose established business partner is an SME are required to support them in fulfilling the due diligence requirements, in case such requirements would jeopardize the viability of the SME.[164]
Further support will be provided by the Commission and Member States, through non-binding model contractual clauses, guidelines, accompanying measures (including the facilitation of joint stakeholders initiatives). This may be further complemented by EU development cooperation instruments to support third country governments and upstream economic operators in third countries.[165]

The transformation to a sustainable economy is a key political priority of the EU. Hence, various proposals of the EC address this issue and will continue to do so in the future, sometimes directly addressing some categories of SMEs and impacting most SMEs indirectly through their participation in global supply chains.

Additionally, sustainability is becoming a key determinant for the success of all businesses and their ability to demonstrate sustainability commitments is considered a competitive advantage in the market. Since a large proportion of SMEs are innovative by nature and seek to contribute to sustainability goals, many will have an intrinsic interest in developing a strong narrative with regard to their sustainability credentials.

The challenges faced by SMEs due to the trickle-down effect therefore call for measures to support the adoption of tailored reporting standards and facilitate their implementation.

5.4.2 SMEs' sustainability reporting requirements: Member State level

The state of play in terms of sustainability reporting is quite heterogeneous among European countries and worldwide, the very definition of SMEs varying from one country to another.

[164] European Commission, Article 7.2 (d) of the Proposal for a directive of the European Parliament and of the Council on Corporate Sustainability Due Diligence and amending Directive (EU) 2019/1937, 2022, available at https://ec.europa.eu/info/sites/default/files/1_1_183885_prop_dir_susta_en.pdf.
[165] European Commission, the Proposal for a directive of the European Parliament and of the Council on Corporate Sustainability Due Diligence and amending Directive (EU) 2019/1937, 2022, p. 17, available at https://ec.europa.eu/info/sites/default/files/1_1_183885_prop_dir_susta_en.pdf.

In many countries, reporting instruments target mainly large and listed companies, with this trend being supported by the development of new listing requirements by stock exchanges. Sector-specific requirements are also becoming more common but are mostly aimed at targeting high impact sectors.[166] New laws of recent years also include topic-specific reporting provisions, such as the pay equity laws adopted in the Netherlands in 2020. On the other hand, Member States have not currently adopted many measures targeting SMEs specifically.

As some countries at international level, such as the United Kingdom, are progressively moving towards economy-wide reporting, many governments are exempting SMEs, to avoid burdening them with compliance costs while their sustainability regime is yet to mature.[167] In France, for example, there has been some momentum as the Grenelle II law of 2010 encouraged SME reporting. However, as of August 2018, the law no longer applies to SMEs. "*The requirement for SMEs was revoked following an analysis of the application of this law that showed SMEs had difficulties doing the reporting exercise*".[168]

Generally, governments tend to adopt policies empowering SMEs, encouraging them to report their sustainability impacts by utilising, for example, voluntary reporting frameworks, guidance, procurement policies or national strategies.[169] They also seek to strengthen the quality, comparability and uptake of sustainability reporting, notably through the setup of complementary policies to build SME capabilities and expertise in sustainability reporting.[170]

The CSRD addresses the lack of harmonisation and common practices among Member States and will have to be transposed into national law. When implementing the directive into domestic law, the proposed CSRD provides less room for manoeuvre to Member States than the NFRD as it notably introduces far more detailed reporting requirements and mandatory EU sustainability reporting standards. It also requires Member States to introduce penalties for infringements of reporting duties,[171] as is similarly required by the NFRD. While some countries, such as Germany, have already criminalised false non-financial reporting,[172] the CSRD goes further by specifically requiring that Member States also impose the following administrative sanctions:

- a public statement outlining the nature of the violation and indicating the responsible person/entity;
- a cease-and-desist order against the responsible person/entity; and

[166] USB, Carrots & Sticks – Sustainability Reporting Policy: Global trends in disclosure as the ESG agenda goes mainstream, 2020, available at https://www.usb.ac.za/wp-content/uploads/2020/08/Carrots-Sticks-2020-Report-FIN-21.07.2020.pdf.
[167] Ministry of Business, Innovation and Employment (New Zealand), International Developments in Sustainability Reporting, 2021, available at https://www.mbie.govt.nz/dmsdocument/15110-international-developments-in-sustainability-reporting-pdf.
[168] GRI, Empowering Small Business: Recommendations for policy makers to enable corporate sustainability reporting for SMEs, 2018, available at https://www.globalreporting.org/search/?query=Empowering+Small+Business.
[169] GRI, Empowering Small Business: Recommendations for policy makers to enable corporate sustainability reporting for SMEs, 2018, available at https://www.globalreporting.org/search/?query=Empowering+Small+Business.
[170] Ministry of Business, Innovation and Employment (New Zealand), International Developments in Sustainability Reporting, 2021, available at https://www.mbie.govt.nz/dmsdocument/15110-international-developments-in-sustainability-reporting-pdf.
[171] European Commission, Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, 2021 – Article 1, Paragraph 4 amending Article 19b of the Accounting Directive – Article 1, Paragraph 12, amending Article 51 of the Accounting Directive, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189.
[172] Freshfields, Expanding ESG reporting: European Commission publishes draft for new Corporate Sustainability Reporting Directive, 2021, available at https://sustainability.freshfields.com/post/102gyk3/expanding-esg-reporting-european-commission-publishes-draft-for-new-corporate-su.

- administrative pecuniary sanctions.[173]

5.4.3 How best to minimise reporting requirements and other administrative burdens for SMEs, when implementing sustainability-oriented regulations/legislations?

The standardisation of sustainability reporting requirements supports investors, consumers, policymakers, and civil society organisations in the evaluation of the non-financial performance of companies and encourages the development of a responsible approach to business. However, additional reporting requirements generate administrative burdens for SMEs, which could potentially inhibit their growth and competitiveness. In order to ensure the mobilisation of SMEs, it is essential that policies are designed to facilitate and encourage these companies in the development of sustainability reporting and diminish to the greatest extent possible the burden they could possibly generate. To reach this balance, policymakers should give full consideration to SMEs at the early development stage of the policy, following the **"think small first"** principle.[174]

As the SME market sector is made up of a variety of businesses of varying sizes, which operate in a variety of industries, policymakers should first **make sure that SMEs are properly defined**, to ensure that the policies are targeting the right structures and that the mitigating measures are applied only to the enterprises that genuinely need them. Currently, SMEs are defined based on the staff headcount and either the turnover or the balance sheet total. Meeting the staff headcount criterion is mandatory in order to be considered an SME, while an enterprise may choose to meet either the turnover or the balance sheet total ceiling.[175] Using the staff headcount as the leading criteria leads to a lot of artificial medium and large enterprises, which have high headcounts, but small additional resources. Conversely, a company may be very small in terms of headcount, but if it has access to significant additional resources (for example, because it is owned by, or is partnering with, a large enterprise), it might not be eligible for SME status.

Policymakers often use the public ownership criteria when defining the scope of reporting entities. For example, the NFRD applies at present to "large public-interest entities" with more than 500 employees, including listed companies, banks, insurance companies but also other companies designated by national authorities as public-interest entities. As many small companies are publicly owned, it is important to ensure in the policymaking process that the use of such a criterion does not lead to additional requirements for this type of SME.

When policies are applied to SMEs, they should always aim to guarantee the **proportionality** of the measures adopted for this type of structure. Any adoption of reporting requirements for SMEs should therefore be preceded by a mandatory assessment of its potential impact on SMEs, through the **SME Test,** which comprises the following four steps[176]:

- preliminary assessment of businesses likely to be affected
- consultation with SMEs and SME representative organisations (SMEs, envoys, Enterprise Europe Network, etc)
- measurement of the impact on SMEs (cost-benefit analysis)

[173] European Commission, Proposal for a directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, 2021 – Article 1, Paragraph 4 amending Article 19b of the Accounting Directive – Article 1, Paragraph 12, amending Article 51 of the Accounting Directive, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021PC0189.
[174] European Commission - DG Enterprise and Industry, Evaluation of the application of the Think Small First principle in EU legislation and programmes, 2014, available at https://op.europa.eu/en/publication-detail/-/publication/0d2d1386-4086-4849-85fb-0bd541509886.
[175] European Commission, SME definition, 2021, available at https://ec.europa.eu/growth/smes/sme-definition_en.
[176] European Commission, SME Test, 2021, available at https://ec.europa.eu/growth/smes/sme-strategy/sme-test_en.

- use of mitigating measures, if appropriate.

Mitigating measures notably include adapting the reporting requirement proportionally to the capacities of SMEs, which implies the **simplification** of sustainability reporting standards targeting SMEs, the inclusion of relevant sustainability indicators that they can reasonably report, and simplified measurement principles. The requirements should also focus on the disclosure of information from readily available data sources. For SMEs to truly benefit from this simplified regime, it is, of course, of primary importance that large enterprises in the supply chain abide by these rules, enabling SMEs to provide them with reports using only the simplified standards.

Additionally, the standards developed by policymakers should preferably be based on **globally recognised sustainability reporting standards** to facilitate the transition for organizations who are currently reporting or prepared themselves to report on these standards, as well as the development of internal capacities for companies which are new to ESG reporting.[177]

Special attention should also be given to **coordinating the reporting requests** from different entities to ensure that the requirements are similar, as well as ensuring the availability of the data publicly reported to other stakeholders, therefore embedding the "Once-Only Principle".[178] This can notably be facilitated through the setup of a platform on which publicly reported data can be accessed by the requesting organisation. In this regard, the EC is currently considering making publicly reported data required by various EU regulations and directives more accessible via a common data platform, the European Single Access Point (ESAP).[179]

As the compliance costs of sustainability reporting are significant for SMEs, it is also important to consider the business threshold for which sustainability reporting remains worthwhile. To avoid an excessive administrative burden for SMEs, **voluntary** sustainability reporting standards should be preferred when the application of the sustainability reporting requirements are considered excessive for SMEs, as this progressively creates incentives for more responsible business conduct without inhibiting the development of the company.

When setting up new reporting requirements applicable to SMEs, policymakers should also consider the introduction of a **transition period** allowing for voluntary reporting for a set amount of time, therefore providing the framework for these companies to develop the necessary capability for the reporting until it becomes mandatory.[180]

Besides ensuring the proportionality of the measures developed, special attention should also be given to the setup of **measures facilitating the reporting process for SMEs**, which would, in turn, reduce the administrative burden.

[177] The Malta Chamber, Sustainability Reporting: Change Must Be Proportionate, 2021, available at https://www.maltachamber.org.mt/en/blogs/271.
[178] For more details on the "Once-Only Principle" see https://ec.europa.eu/digital-building-blocks/wikis/display/CEFDIGITAL/Once+Only+Principle.
[179] European Commission, Targeted consultation document: Establishment of a European Single Access Point (ESAP) for financial and non-financial information publicly disclosed by companies, 2021, available at https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/2021-european-single-access-point-consultation-document_en.pdf.
[180] The Malta Chamber, Sustainability Reporting: Change Must Be Proportionate, 2021, available at https://www.maltachamber.org.mt/en/blogs/271.

SME reporting could notably be supported by the development of a tailored, simplified and standardised sustainability reporting **template**.[181] Sustainability **language** used to address SMEs should also be less technical, to encourage and facilitate the reporting.

SMEs often face data availability issues, therefore obliging them to rely on averages and to develop proxies, which are not always seen as accurate and reliable.[182] Compliance costs for SMEs could, in such a case, be reduced by **improving their access to relevant data and information**. This could be supported through the development of automated data collection/processing systems.

To support SMEs in the reporting exercise, public institutions could also set up **tailor-made guidance** for small businesses to help them to report more frequently and effectively.[183] This could be done through the development of online guidance tools, which offer consistency of advice, anonymity and time and cost savings.[184] Other examples of possible support could include the provision of face-to-face advice on audits of SMEs' reporting, as well as the development and dissemination of methodological materials, and the implementation of training programmes and financial support for consultancy services.

At Member State level, efforts have already been made to reduce administrative burden for SMEs as a whole. Significant progress has been made under the "**Think small first and better regulation principle"**, with EU Member States widely consulting and taking into consideration the views of SME stakeholders on new legislative proposals. Regulatory impact assessments and the 'SME Test' are being progressively more widely used and applied. For example, the Federal Government of Austria formally announced the Anti-Gold-Plating-Law in April 2019. The law aims to avoid excessive national regulatory additions to EU law. In the first round of evaluation of national legislation, 11 laws focusing on obligations for reporting, notification and authorisations were modified and adjusted. The government also plans a second, broader round of evaluations. However, despite this progress, the SME Test is still not effectively implemented across the EU.

Nonetheless, 55% of SMEs[185] still complain that regulatory obstacles and administrative burdens remain the biggest problem they are facing. As SMEs have mostly been excluded from mandatory sustainability requirements up to the present time, and given the forthcoming increase in the burden on SMEs with the CSRD proposal, it will be of utmost importance for policymakers to **set up mitigating measures to provide support to SMEs in preparing and meeting the forthcoming new sustainability reporting requirements**.

[181] SME EnterPRIZE, Fostering Sustainability in Small and Medium-sized Enterprises, 2021, available at https://www.sme-enterprize.com/wp-content/uploads/2021/09/SME-EnterPRIZE-White-Paper.pdf.
[182] European Commission, Development of tools and mechanisms for the integration of environmental, social and governance (ESG) factors into the EU banking prudential framework and into banks' business strategies and investment policies, 2020, available at https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/201214-interim-study-esg-factors-banking_en.pdf.
[183] Eurochambre, Eurochambre's position on the proposal for a corporate sustainable reporting directive, 2021, available at https://www.eurochambres.eu/publication/eurochambres-position-on-the-proposal-for-a-corporate-sustainable-reporting-directive/.
[184] OECD, Environmental Policy Toolkit for Greening SMEs in EU Eastern Partnership countries, 2015, available at https://www.oecd.org/environment/outreach/Greening-SMEs-policy-manual-eng.pdf.
[185] European Commission press release, Survey confirms the need to support small and medium-sized businesses on their path towards digitalisation and sustainability, 2020, available at https://ec.europa.eu/growth/news/survey-confirms-need-support-small-and-medium-sized-businesses-their-path-towards_en.

6 Conclusion and recommendations

SMEs are critical to the success of the sustainability transition in the EU. The analysis shows that SMEs are responsible for more than 60% of all greenhouse gas emissions by enterprises. Therefore, it is important that SMEs increase investments in sustainable technologies and acquire the skills and knowledge to transform their businesses to become more sustainable and remain competitive.

A significant share of SMEs has already started the sustainability transition. More and more SMEs are building human resources for the sustainability transition, have invested in transformation processes and see sustainability as an opportunity to seize. This momentum faces a number of challenges, ranging from access to finance to limited expertise and skills, as well as regulatory and administrative barriers. These challenges are more prevalent for SMEs than for large enterprises.

Financing the sustainability transition is generally capital intensive and involves long payback periods. As a result, SMEs are cautious about accessing the necessary financial resources to adopt sustainability measures. However, a host of market solutions, as well as public sector initiatives at EU and Member State level, provide examples of how access to finance might be improved.

SMEs may benefit from synergistic effects in the digital and green "twin transition". Digitalisation offers the potential to make SMEs more productive and reduce their environmental impact. While the aggregate environmental benefit of digitalisation remains difficult to assess, some solutions, for example, ICT tools to reduce the need to travel, provide significant co-benefits to the sustainability transition. Significant challenges to the adoption of digital solutions include the availability of relevant digital solutions on the market, as well as adoption costs related to restructuring business processes. To fully leverage the potential of digital solutions for SMEs, technical advisory services and knowledge platforms can help SMEs to better understand the opportunities of digital solutions and how to implement them in their specific business.

SMEs in different industrial ecosystems differ significantly in their environmental impact, as well as their potential contributions towards the sustainability transition. Therefore, sustainability policies in the EU should take into account the specific challenges for SMEs in different ecosystems and target ecosystems with high potential for emission reduction. In particular, the ecosystems of 'energy-intensive industries', 'agri-food' and 'mobility, transport and automotive', have the potential to contribute to a substantial emissions reduction, since they produced the highest shares of GHG emissions in the EU in 2019 out of all the ecosystems. Moreover, some of the most emission-intensive ecosystems, such as 'agri-food' and 'mobility, transport and automotive', are also expected to be particularly challenged in terms of engaging successfully in the sustainability transition, which provides another rationale for specifically targeting these ecosystems.

Given the urgency to reduce emissions and reach carbon neutrality as soon as possible, SMEs should be supported by public policies, both at EU and national level, to accelerate their transition to sustainability. In general, there is a need for policies which specifically focus on SMEs. For example, a review of 113 energy efficiency schemes in eight EU Member States found that only two were focused on SMEs.[186] At a minimum, sustainability policies should take note of the unique and specific challenges faced by SMEs. Based on the previous analysis of the challenges faced by SMEs and the existing support policies for

[186] Fawcett, Tina, and Hampton, Sam (2020) Why & how energy efficiency policy should address SMEs, Energy Policy 140 (111337).

SMEs at EU and Member State level, three sets of policy recommendations are therefore proposed.

The first set of recommendations concerns the need to **conduct further research** and to **fill gaps in the availability of data and information**. These recommendations are addressed to the research community at large, including academic researchers, think tanks and EU research institutions, as well as to statistical offices.

- No data are readily available on greenhouse gas emissions produced by SMEs. Even the calculations in this study should be interpreted with caution, as they are based on extrapolations. Similarly, no data are available on the energy use of EU SMEs. Such data could be used to approximate the environmental footprint of SMEs and would be critical for monitoring progress towards emissions targets.

  Data on the greenhouse gas emissions of large enterprises are already routinely collected in the framework of emission trading schemes or by private data providers. However, most SMEs do not audit or monitor their greenhouse gas emissions (see Figure 6) and would thus not be able to provide such data. In contrast, data on energy use could be collected through an enterprise survey, as part of regular data collection efforts. One example is the Energy, Water and Environment Survey of the Australian Bureau of Statistics, which collects statistics on energy use by enterprise size class.[187]

- Only limited systematic research is available on the challenges faced by SMEs in the sustainability transition. Some evidence is presented in this study, in particular, findings from various enterprise surveys on perceived and real challenges. However, this can only be the first step, as more research is needed on how these challenges slow down the sustainability transition and what needs to be done to overcome them.

The second set of recommendations concerns **policy support to boost the momentum of SMEs taking on the sustainability transition**.

- It is essential that policies are designed to facilitate the sustainability transition of SMEs and to reduce, as far as possible, any bureaucratic burdens. Minimising reporting requirements and other administrative burdens for SMEs is of key importance to encourage compliance with sustainability obligations by SMEs. New proposals need a solid SME test to ensure that the obligations are proportionate and manageable for SMEs. The cumulative effect of the various reporting and transparency requirements as well as the trickle-down effects (through the value chain obligations) should also be taken into account.

- While the introduction of sustainability reporting requirements will provide an opportunity for SMEs to demonstrate their sustainability achievements, policymakers should ensure that the requirements are consistent and that the reported data is available to all relevant stakeholders in line with the "Once-Only Principle".

- SMEs are often part of supply chains and, thus, policies addressing large enterprises within these supply chains also impact SMEs. Specifically, commercial ties with larger enterprises, which have to comply with more extensive obligations, result in the need to manage the indirect impact of those obligations on SMEs. For example, reporting requirements of large enterprises linked to the sustainability impacts of their supply chains might lead to large enterprises setting sustainability

[187] See https://www.abs.gov.au/statistics/industry/energy/energy-use-and-electricity-generation-australia/2017-18#data-download.

performance or reporting requirements for their SME supply chain partners. Firstly, the indirect impact of reporting obligations for large enterprises should be properly managed in order to avoid that these requirements are unfairly passed on in the supply chain to SMEs (this can range from requests of sustainability information to a shifting of liability). Secondly, exemptions of SMEs from specific obligations may be justified in some cases. However, taking into account the trickle-down effects from new requirements through the supply chains as well as the fact that the ability to demonstrate sustainability commitments is becoming a competitive advantage, it is important to consider simplified voluntary tools and mitigating measures that allow SMEs to comply. Such policies could include simplified and proportionate standards for SMEs, non-binding model contractual clauses, lower frequency for certain obligations, tailor-made guidance, one-stop-shops, or helpdesks).

- SMEs also need technical assistance and capacity-building programmes to support them in adopting sustainable business models, a circular economy approach and in finding new ways to boost resource efficiency. In particular, policymakers should consider leveraging and expanding the capabilities and resources of the Sustainability Advisors of the European Enterprise Network. This initiative is a very relevant example of a policy response which addresses the issue of the sustainability skills gap of SMEs via technical assistance. While the existing network is already quite extensive, further resources and geographical coverage may be needed to effectively address the need for technical assistance for SMEs across the EU. In addition, it would be useful to conduct further targeted surveys to pinpoint i) the geographical areas in which skills shortages are the greatest, and ii) the skills which are most lacking, to ensure that the services provided meet the specific needs of SMEs.

- An important lesson to be learned from the implementation of the Recovery and Resilience Facility (RRF) is that special attention should be paid to whether funds allocated via financial intermediaries (private or public) reach small and micro enterprises. Since lending to smaller firms is riskier from the perspective of the lender, even public financing schemes often tend to avoid lending to smaller firms. To counter this tendency, the proportion of funds allocated to SMEs should be monitored closely and, if necessary, adjustments should be made to the financing scheme to improve access for SMEs.

- SMEs have significant innovative capabilities. Hence, by providing incentives for SMEs to tap into green markets through innovative products and services, SMEs can become an important driver of the sustainability transition. Examples of such incentives include green prizes and certifications.

- To fully leverage the potential of digital solutions for SMEs, public policies should encourage SMEs to use technical advisory services and knowledge platforms that can help SMEs to better understand the opportunities of digital solutions and how

Good Practice Example:
Examples of these interlinkages can be found in the National Recovery and Resilience Plans (NRRPs) of the Recovery and Resilience Facility (RRF), which often connect efforts aimed at digitalisation with sustainability co-benefits. For example, digital measures which improve the energy-efficiency of buildings, such as smart thermostats, or R&D on efficient cloud infrastructure not only facilitate the digital performance of SMEs, but also improve their resource efficiency. Hence, vast potential for the sustainability transition can be realised if the sustainability transition of SMEs is also considered in initiatives primarily targeting other policy objectives.

to implement them in their specific business. This will enable SMEs to exploit the interlinkages of the green and digital "twin transition".

Several policy recommendations provide **potential win-win scenarios**, for example:

- Firstly, green certifications and green prizes fulfil various objectives simultaneously. On the one hand, they incentivise SMEs to strengthen their sustainability efforts. In the case of green certifications, SMEs receive a framework for their sustainability measures, reducing the need for internal human resources and capacities. On the other hand, prizes and certifications also serve a signalling function, providing a reputational boost to SMEs.

- Secondly, the provision of technical assistance supports SMEs in their sustainability transition in two ways. On the one hand, such services provide external resources for SMEs which do not have the internal capacity to develop or implement sustainability measures. On the other hand, by being facilitated through expert advisors, awareness of neglected opportunities in the sustainability transition could be potentially raised.

- Thirdly, self-assessment and diagnostic tools help SMEs to understand their environmental footprint and the means available to reduce it. At the same time, these tools establish a much broader database that could serve as a basis for future policy decisions.

> Good Practice Example:
> There are already several private-sector tools to measure the carbon footprint of SMEs, such as the Carbon Trust: Footprint Manager and Carbon Footprint: Free calculator. An interesting national example, with a focus on agriculture and farming, is the Origin Green – Carbon Navigator developed in Ireland. The tool embeds a process of measurement, feedback, and continuous improvement, against which farms are assessed in key efficiency areas (resource efficiency and sustainability of production processes, emissions, waste management, energy efficiency of facilities, etc.). The ability to generate a carbon footprint for farms on an individual basis has also been aided by collaboration with the Irish Cattle Breeding Federation (ICBF) and the Department of Agriculture, Food and the Marine (DAFM), which, with the consent of farmers, can share data with the Irish Food Board (Bord Bia) to aid in the footprinting process. Raising awareness of existing tools and

However, some policy recommendations aimed at facilitating the sustainability transition come with varying **trade-offs** for SMEs, for instance:

- Firstly, sustainability reporting requirements for SMEs facilitate the sustainability management of SMEs, raise awareness of sustainability issues, and promote credible monitoring processes. Moreover, reporting requirements provide an opportunity for SMEs to demonstrate their sustainability achievements. However, at the same time, reporting requirements might introduce additional costs and overwhelm SMEs with limited capacity. Such detrimental effects might depress sustainability ambitions and lead to the communication of faulty market signals. Nonetheless, by ensuring that these reporting requirements are consistent and that the reported data is available to all relevant stakeholders in line with the "Once-Only Principle", the administrative burden on SMEs could be limited.

- Secondly, regulatory measures introduce both benefits and drawbacks, depending on their specific nature. While measures such as environmental production

standards might lead to the universal adoption of sustainable practices, they might also reduce the international competitiveness of SMEs. In contrast, regulatory measures could also take the form of tax incentives, reduction of the administrative burden, and simplified intellectual property rights for sustainability-related innovations. However, while these measures all contribute to an increase in SME competitiveness and incentivise sustainability action, they might also lead to legal uncertainties and challenges in the classification of sustainable innovations and investments.

- Thirdly, financial support should ideally be combined with technical assistance, awareness raising and advisory services, because although SMEs might lack financial resources as a primary obstacle, they might also be unaware of the benefits of the sustainability transition (compared to the potential costs involved) and often do not possess the necessary skills and knowledge to undertake green transformation processes. Including technical assistance within financial instruments would therefore enable SMEs to better exploit the opportunities of the sustainability transition. However, on the downside, it might also make financing more expensive and complex to implement.

Finally, for some policy recommendations, it is **highly uncertain whether they would lead to win-win scenarios or trade-offs**, highlighting the need for further research. Such recommendations include:

- Firstly, promoting the digitalisation of SMEs through the various avenues mentioned throughout the report might potentially lead to reductions in the environmental impact of SMEs. However, the direction of the holistic impact of digitalisation on sustainability is highly uncertain and dependent on the concrete measures supported.

- Secondly, support programmes for resource efficiency and circular economy measures are assumed to not only improve the sustainability performance of SMEs but also to contribute to future cost savings. However, previous analysis has shown that some SMEs also faced increases in production costs following the adoption of such measures.

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ANNEX 1: DATA SOURCES

Investment Survey

Organisation	European Investment Bank
Subsectors	Construction (NACE F), Infrastructure (NACE D, E, H, J), Manufacturing (NACE C), Services (NACE G, I)
Frequency	annual
Years	2016–2020 (Climate since 2020)
Last/next update	2021, next update in 2022
Country coverage	EU27 and the UK and US
Web address	https://data.eib.org/eibis/graph
Technical documentation	https://www.eib.org/attachments/eibis-methodology-report-en.pdf

Business Environment and Enterprise Performance Survey (BEEPS)

Organisation	EBRD, EIB and World Bank
Subsectors	Manufacturing (ISIC group D), construction sector (ISIC group F), services sector (ISIC groups G and H), and transport, storage, and communications sector (ISIC group I)
Frequency	on average every four years
Years	1999–2020 (Green economy module since 2018–2020)
Last/next update	2018–2020, unknown
Country coverage	Mediterranean and Eastern European countries
Web address	https://www.beeps-ebrd.com/data
Technical documentation	https://www.beeps-ebrd.com/wp-content/uploads/2020/04/beeps_vi_es_r_oct20.pdf

Environmental Impact Database for SMEs (EIDSME)

Organisation	Teknologisk Institut and Planet
Subsectors	NACE Level 2
Frequency	irregular
Years	2010–2014
Last/next update	2014, discontinued
Country coverage	EU
Web address	https://ec.europa.eu/environment/archives/sme/publications
Technical documentation	https://op.europa.eu/s/tw7Q

European Central Bank and Urgentem

Organisation	European Central Bank and Urgentem
Subsectors	NACE Level 1, 12 sectors
Frequency	irregular
Years	2018
Last/next update	2018, unknown
Country coverage	Global
Web address	https://www.urgentem.net/data
Technical documentation	https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op281~05a7735b1c.en.pdf

ANNEX 2: NACE CODES

Agriculture, Forestry and Fishing
B: Mining and quarrying
C: Manufacturing
D: Electricity, gas, steam and air conditioning supply
E: Water supply; sewerage, waste management and remediation activities
F: Construction
G: Wholesale and retail trade; repair of motor vehicles and motorcycles
H: Transportation and storage
I: Accommodation and food service activities
J: Information and communication
K: Financial and Insurance Activities
L: Real estate activities
M: Professional, scientific and technical activities
N: Administrative and support service activities
O: Public Administration and Defence; Compulsory Social Security
P: Education
Q: Human Health and Social Work Activities
R: Arts, Entertainment and Recreation
S: Other Service Activities
T: Activities of Households as Employers; Undifferentiated Goods and Services Producing Activities of Households for Own Use
U: Activities of Extraterritorial Orga

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