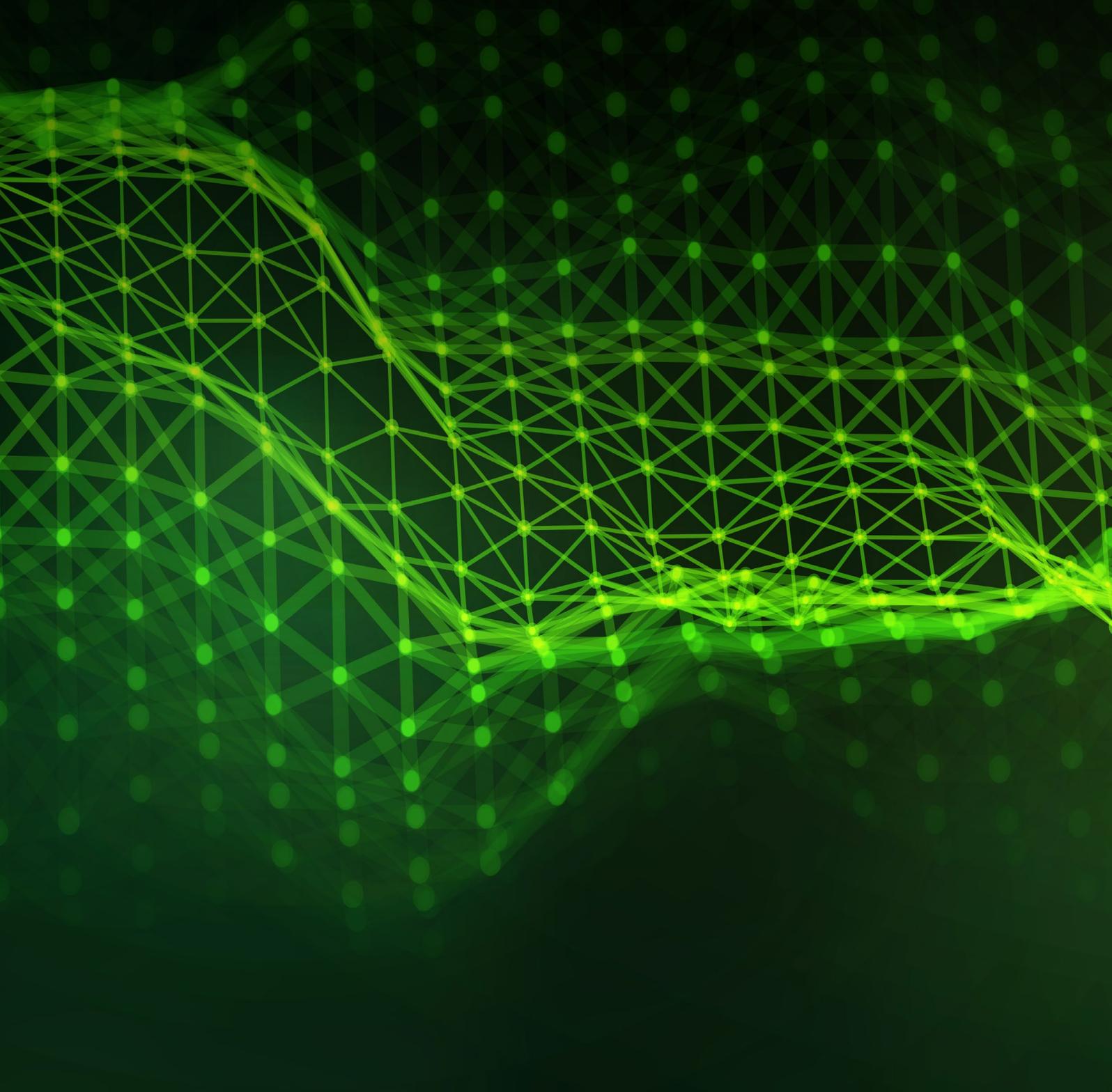


In collaboration with
members of the CEO Action Group
for the European Green Deal



Innovating for the European Green Deal

WHITE PAPER
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Foreword



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The world today is at an inflection point. The war in Ukraine has further disrupted an already fragile global economic system deeply unsettled by the COVID-19 pandemic. The multitude of convergent crises with interconnected causes are affecting millions around the world, hitting the most vulnerable. In such a global context, the European Union is facing many challenges, from managing energy shortages to high inflation levels (9.3% at the time of writing) – while also tackling the climate crisis and accelerating the transition to greener and more resilient energy systems.

While the current economic headwinds have led to heated debates on the probability and the depth of a global recession, actions from central banks coupled with resilient labour markets and a potential reconfiguration of supply chains will be defining factors in this period of “transition” and in shaping a new economic order. For this reason, coordinated action between policy-makers and business leaders is necessary to shape a new economic trajectory for Europe that is decoupled from resource depletion and energy consumption, and focuses on the dual endeavours of fostering its digital and green imperatives.

The European Commission’s flagship policies, the [European Green Deal](#) (reflecting the ambition of becoming the first carbon-neutral continent by 2050) and [Europe’s Digital Decade](#) (focusing efforts on supporting business and society in the context of the digital transition) are intricately intertwined, have shaped most of the recent policies undertaken by the European Commission and will define the future economic trajectory of the bloc and its long-term competitiveness.

Europe can successfully position itself at the forefront of the global green and digital transitions. For Europe to achieve its ambition, fostering its innovation ecosystem will be of paramount importance. Producing 9% of the world’s emissions and with the largest single market, the EU is well placed to inspire through action, demonstrating how the twin transition can be fast, secure and economically prosperous.

We are witnessing other economies, such as the [US and China](#), making big leaps forward through innovation. We must urgently nurture public-private cooperation to ensure that Europe regains its competitive edge in the global innovation race.

This white paper builds on the work of the World Economic Forum’s long-standing [CEO Action Group for the European Green Deal](#) – a community of more than 50 chief executive officers that aims to spur positive climate action. Endorsed by Frans Timmermans, Executive Vice-President for the European Green Deal, the group serves as a platform for business leaders and policy-makers to accelerate progress on the green transition. At the Forum’s Annual Meeting in May 2022, a few months after Russia’s invasion of Ukraine, the CEO Action Group published the [Manifesto on Implementing the European Green Deal](#), underscoring the renewed importance of this long-standing community to further accelerate progress in Europe’s green transition. The manifesto, which [was also endorsed by key policy-makers](#) from Europe, highlighted the need for public-private cooperation in “strengthening the innovation ecosystem in Europe”.

In this white paper, which contains insights from members of the CEO Action Group for the European Green Deal and the Forum’s [Global Innovators](#), we will look more broadly at the concept of innovation – both from a product standpoint (i.e. technology breakthroughs) and from a business process standpoint (i.e. in relation to the methods that enable corporations to find new ways of doing business in a more efficient and sustainable way). The objective of the white paper is to encourage further discussions and explorations on the topic to make sure innovation becomes the compass for both business and governments in Europe.

Executive summary

Globally, if the world is to achieve its climate commitments, significant investment will be needed in new technologies that can help speed the uptake of renewable energy and move towards clean economies. For any innovation or new technology to take shape and be commercial at scale, there is a need for stronger public-private cooperation that can enable innovation and the broader adoption of tangible solutions.

Looking at the European Union, the current geopolitical context has put the bloc's green transition on an accelerated timeline. While, in the short term, Europe has been successfully finding alternative ways to secure the energy it requires, in the long term the need to move from hydrocarbons to a clean economy will call for significant investments and close collaboration between the private and public sectors. At the same time, addressing the current fragmentation of regulations across member states and ensuring that companies can easily transfer their knowledge and innovations across the continent will be fundamental in positioning Europe as a leader in the global innovation race.

Empirical evidence, collected through interviews for this white paper, have shown how policies play a crucial role in fostering innovation and ensuring that innovation is deployed at scale within a specific sector or across sectors. In this context, close collaboration between corporations – which are

mostly “hubs for innovation” – and policy-makers is of the utmost importance to make sure the regulation is modular, agile and reflective of the dynamic needs of the economy. Additionally, enhancing cross-border data cooperation across sectors will be vital in encouraging data-driven business decisions that can further support organizations in crafting their sustainability strategies.

Integrating the green and digital transitions is of paramount importance to ensure the long-term competitiveness of European industries and to spur sustainable economic growth. On one side, deploying digital solutions can help with better monitoring of energy consumption, reducing costs and increasing renewable energy integration into the grid. On the other, embedding sustainability principles in the ICT sector is crucial in reducing its overall energy consumption.

As the world's largest single market, Europe can become a leader in the acceleration of the green and digital transitions and serve as an inspiration to other economies. However, as many European companies operate globally, it is important that European sustainability standards are harmonized with global ones to channel private flows towards green projects. Finally, making sure all societies can benefit from innovation is crucial in ensuring that none is left behind in the drive to achieve Europe's twin transition objectives.

1

Realizing Europe's twin transition

Globally, in order to transition to [net zero by 2050](#), the world needs to drastically grow its deployment of renewable energy. The International Energy Agency estimates that, to achieve net zero, the rate at which renewable energy capacity is added [must increase from 134GW a year in 2020 to 630 GW a year in 2030](#).

Currently, around 80% of the world's energy comes from fossil fuels.¹ Meeting ambitious climate commitments will be possible only if new technologies and new business models are adopted at scale. Shifting the paradigm to a clean-energy economy would mean completely changing the way that companies make and commercialize products, while significantly altering society's habits and behaviour.

As stated in the IEA's report in September 2022,² meeting the 2030 climate goals will require \$1 trillion in investment every year to develop new technologies. There is an urgent need for governments and private companies to work together to create and scale markets for clean-energy technologies.

Looking at Europe specifically, it is estimated that €584 billion investment in electricity infrastructure is needed between 2030 and 2050 to reach the objectives of the [Fit for 55](#) package and [REPowerEU](#). Renewable energy is on course to become the foremost source of electricity generation [by 2025](#). [Concerns about energy security](#), stemming from Russia's invasion of Ukraine, have steeply accelerated wind and solar power installation and generation, providing tangible proof that the green transition timeline could be expedited if public-private cooperation is enhanced. It is expected that the world will add more renewable energy in the next five years than

it did in the past 20 years. This substantial uptake of renewable energy will help the energy mix, with 90% of global electricity expansion occurring over the next five years.

At the same time, digital solutions such as smart buildings and internet of things (IoT) devices can monitor energy consumption, increase renewable integration and reduce costs. [Innovative data services, apps and energy management systems have a large untapped potential for energy users, but they need a further boost and adequate policy support measures to become ubiquitous](#).

Looking at the building sector specifically, its contribution to the overall global carbon footprint is among the most significant. Buildings account for 30% of global final energy consumption and 27% of total energy sector emissions (with 8% being direct emissions from buildings and 19% indirect emissions from the production of electricity and heat used in buildings).³ In light of this, real-time data for industrial processes and mechanisms for energy optimization can significantly increase building efficiency and consequently reduce the sector's carbon footprint. New building technologies, both those in development and those yet to come on the market, could help the sector improve its efficiency by 60%, while at the same time incentivizing more sustainable choices by consumers.⁴

Recent studies have also confirmed that corporations that adopt a strategic combination of digital and green solutions can benefit from an increase in profitability compared to others lacking such a double focus.⁵ These strategies, which could make a real difference to services and final products for end consumers and produce positive business results, will need to be delivered across companies' value chains in a systemic

way to ensure that overall sustainability and digital objectives are integrated into business operations.

While the “Renovation Wave” in Europe,⁶ focused both on public and private buildings, is driving significant improvements in terms of energy efficiency, much still needs to be done to nurture the development of new technologies in order to embed energy-efficiency principles in the buildings sector across Europe and reduce its overall greenhouse emissions.

Rethinking investment priorities in Europe could help spur positive climate action globally and allow the bloc to achieve its climate-neutrality targets. One example that could serve as a blueprint for how policies can help to unlock private capital investments is the European Commission’s European Battery Alliance.⁷ Recognizing the limited availability of “capable” batteries in a world that is increasingly electric and therefore faced with successively larger battery demand, the European Commission launched the alliance in 2017 to address this industrial challenge. To advance the clean-energy transition and strengthen Europe’s competitiveness, the establishment of a European battery ecosystem is instrumental. [The EU is set to meet 69% and 89% of its increasing demand for batteries by 2025 and 2030 respectively, and should be capable of producing batteries for up to 11 million cars per year.](#)

Looking at the digital and green transitions, the objectives set for both are well defined by the Commission and in most cases also by member states. However, there is still not enough clarity on the tools and paths needed to achieve those

objectives. In light of the concrete benefits that both transitions could bring to European industrial competitiveness, the private sector has called for more digital policies to be included in regulatory proposals focusing on sustainability, while green policies need to guide new regulatory frameworks adopted by the digital sector.

Small and mid-sized enterprises (SMEs) are a vibrant engine of growth for the European Union: [99.8% of companies in Europe are classified as SMEs](#), employing more than two-thirds of the EU labour force and contributing more than half of the EU value-add. They should not be overlooked in the move to reduce the risks of de-industrialization.

The information and communications technology (ICT) sector, which accounts [for 8–10% of overall electricity consumption in Europe and up to 4% of its total carbon emissions](#), has a big role to play in reducing energy consumption.

If deployed at scale, digital solutions available today could help energy, food, mobility and buildings systems to become more intelligent and more efficient, emit less carbon and be more accessible. In parallel, common methods to measure the lifetime carbon footprint of digital devices could ensure the reduction of overall carbon emissions. European companies could have even greater positive impacts on the planet if they adopt digital-enabled business models, including as-a-service or circular models.

This section was written after consultations with Schneider Electric, a member of the CEO Action Group for the European Green Deal.

2

Innovating for the green transition



In December 2022, the European Commission adopted the [Horizon Europe](#) work programme, deploying around [€13.5 billion](#) (\$14.4 billion) to research and innovation as part of the broader scheme with a budget of [€95.5 billion](#) adopted in March 2021. Of the €13.5 billion, 54% will be dedicated to fund climate innovation projects, from emissions reduction to adaptation to protection of biodiversity, and 33% (€4.5 billion) will be used for digital projects, while the rest will be allocated to creating resilient, inclusive economies.

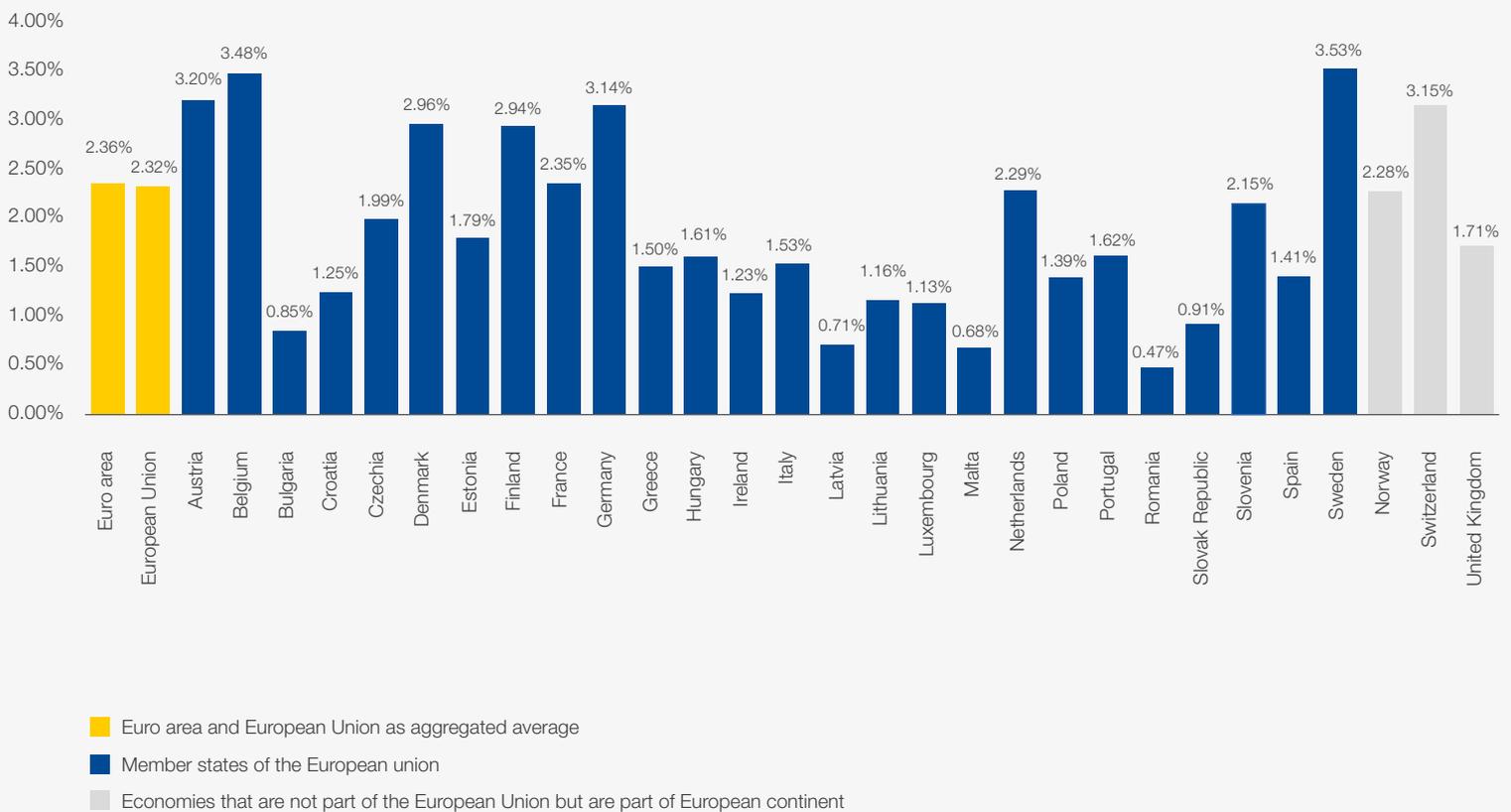
Europe remains a global research and innovation powerhouse, producing around 20% of global scientific and technological output. However, other global players are rapidly bridging the gap: China has increased its volume of scientific output, publishing around [23.4% of the world's scientific papers between 2018 and 2020](#). There is significant room for improvement to drive Europe's innovation systems and reach the 3% of GDP for research and innovation targeted by the Commission.⁸ Currently, Europe deploys only 2.3% of its total GDP to research and innovation, which is slightly lower than the world's average of 2.66% and is significantly lower than the more aggressive R&D investment of

the US (3.4% of GDP), South Korea (4.81%) and Israel (5.44%).⁹

The European innovation landscape is fragmented: some economies such as Sweden (3.53% of GDP) or Belgium (3.48%) invest heavily in innovation, while others such as Romania (0.47% of GDP) and Malta (0.68%) lag behind. Looking at national R&D trajectories more closely, Belgium has experienced significant growth, jumping from 2.06% of GDP in 2010 to 3.4% in 2020, an increase of 1,400 basis points (1.4% overall), while Greece showed an increase of 900 basis points (0.9% overall), and Poland and the Czech Republic had an increase of 700 basis points (0.7% overall) from 2010 R&D levels.

Those jumps are directly linked to policies that encourage innovation, such as Belgium's [tax relief incentives](#), which led the private sector to invest heavily in R&D, contributing to Belgium's overall R&D budget of €18 billion in 2020, or Sweden's investments in its educational system and tax relief schemes.¹⁰

FIGURE 1 R&D as % of GDP (European Union)



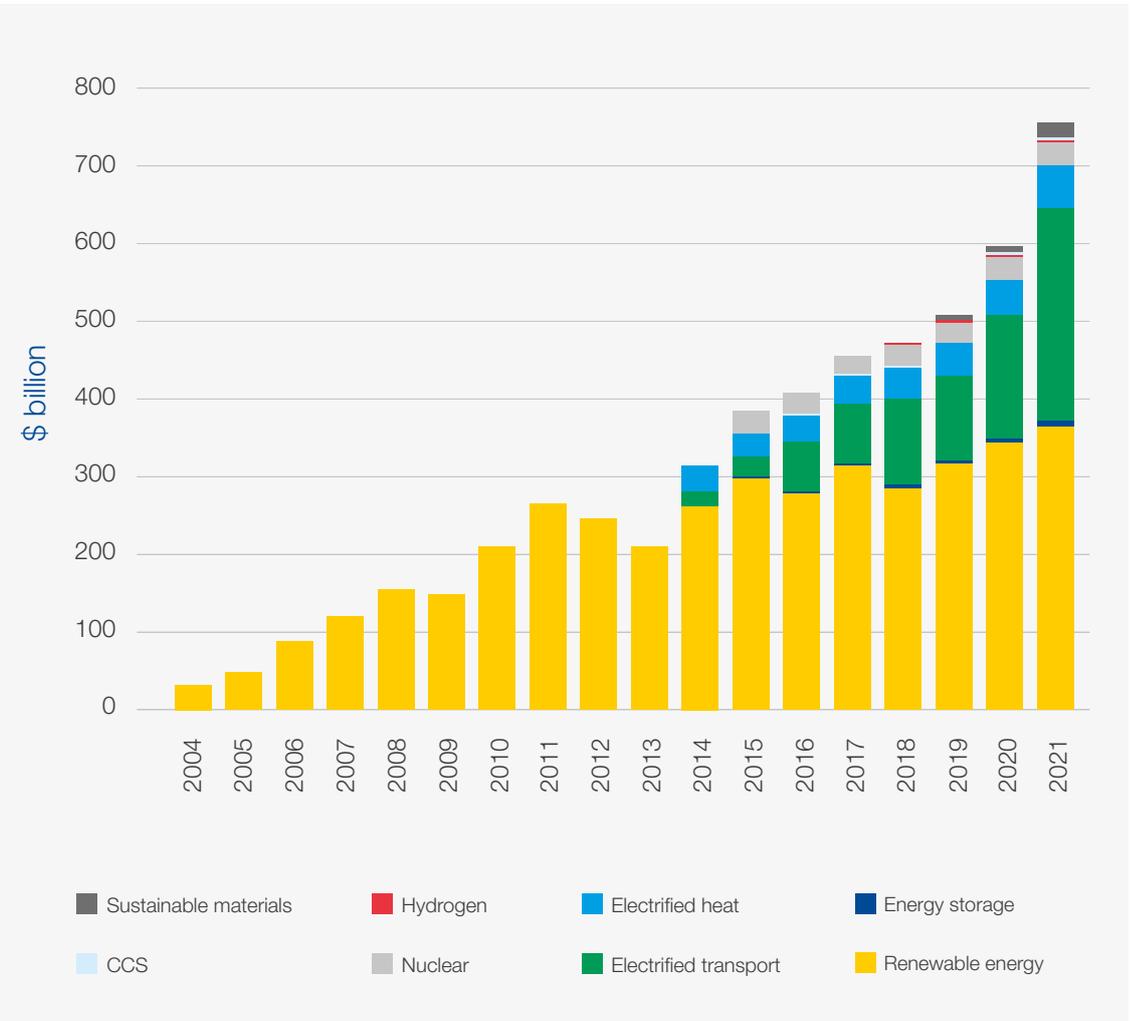
Source: Compiled using data from the World Bank

The important role of governments

Governments are key to preserving economic stability and to ensuring that market rules are followed and respected, so they might not have the necessary tools to forecast potential innovations stemming from private companies, and their policies might not be up to date enough to allow innovation to flourish.

However, the European Green Deal and [US climate change investment plans](#) are examples of how the public sector could play a vital role in encouraging investment in green projects. For example, technology-specific and sector-specific policies help accelerate green transitions in critical sectors such as transport and energy.

FIGURE 2 Global investment in the energy transition by sector



Note: Start-years differ by sector but all sectors are present from 2019 onwards; see Appendix for more detail. CCS = carbon capture and storage

Source: BloombergNEF

Notwithstanding this, the private sector continues to be the main driver of climate innovation. In 2021, global investment in low-carbon energy transition accounted for \$755 billion,¹¹ with a heavy focus on renewable energy, hydrogen and nuclear. On top of investments in energy transition (which are focused on innovative processes using existing technologies), around \$170 billion was directed at specific climate-tech technologies for renewable energy (financing the development of ground-breaking technologies).

From channelling funds towards riskier green projects, to shaping innovation-ready policies, to encouraging greener consumption, to creating regulatory frameworks that can disincentivize less-sustainable projects towards greener ones, governments play a crucial role. For these reasons, public-private cooperation is of paramount importance to ensure that all stakeholders work together to fully realize Europe's innovation potential.

3

Case studies





CASE STUDY 1

Innovation in Flanders

Flanders is Belgium's leader in exports of agricultural products, a major innovation hub for biopharming and green biotechnology (with almost 24,000 agri-business companies generating €38.4 billion in agricultural exports).¹² The area is a fertile ground for innovation, with two major research centres, [VIB](#) and [flanders.bio](#), and [dedicated incentives](#), [tax reliefs](#) and [labour cost reductions](#). Many of Flanders' academic institutions are focused on innovative agribusiness, and this

supporting infrastructure creates a virtuous circle in which innovation is encouraged, supported by a multistakeholder collaboration of public-sector, private-sector and academic institutions. Flemish government policies have attracted innovators: for example, [Inari](#) has relocated its R&D operations to Belgium, and [Bovaer](#), an ingredient in cattle feed that reduces 30% of methane emissions for dairy cows and 45% for beef cattle, was piloted in Flanders.



CASE STUDY 2

Making renewable energy affordable and accessible to all*

In the context of geopolitical developments and rising energy prices, it is of crucial importance to ensure that innovation is available to all. As access to credit still remains a major struggle for lower-income families, the initial out-of-pocket cost of purchasing solar panels hinders their wider adoption. A green innovation that could be worth enhancing is one that could allow households, even those that don't own the hardware, to produce their own electricity.

[Energy Vision](#), a Belgian start-up, provides affordable clean energy to vulnerable communities otherwise overlooked in the green transition sprint. Its business model is based on Energy Vision owning the technology (solar panels) and the end customers paying only for the exact amount of electricity consumed, thus guaranteeing a lower price than the energy rate on the market.

However, some circumstances and regulations might hinder deployment of this model at scale.

1. *Limited scope for tax incentives:* In most EU countries, a [deduction of value-added tax \(VAT\)](#) is granted when purchasing solar panels (currently at 0%), but there are no benefits for those "renting" the technology, impeding its wider uptake.

2. *Link to property:* Solar panels are contractually linked to the house; it becomes quite costly to revise real-estate legal contracts to detach solar panels from the house.
3. *Storage capacity:* Europe is not prepared to store unused renewable energy. Solar energy not immediately consumed will revert to the grid – at a lower price and with a negative margin for the producer.
4. *Energy system fragmentation across Europe:* For example, Spain, which is [ranked third](#) in Europe after the Netherlands and Germany in terms of electricity produced by solar power, still has challenges in exporting most of its production that is not consumed domestically.
5. *Insufficient cross-sectoral collaboration:* Lack of collaboration among various stakeholders along the supply chain could hamper the technology's reach.

In considering the future of energy in Europe, partnerships with North African countries could be assessed as potential avenues to expand the production of solar energy that could be ultimately transferred to Europe. The recent [Green Partnership](#) between the EU and Morocco could be a source of inspiration for similar efforts to diversify energy sources in Europe.

* This case study was written after consultations with Energy Vision, a member of the Forum's community of Global Innovators.



CASE STUDY 3

The case for precision farming*

The war in Ukraine and the consequent disruption of global food supply chains has brought food security to the top of leaders' priority agenda. Within the global food system, the fertilizer industry plays a crucial role in ensuring proper food supplies. Fertilizers are required to grow 50% of food worldwide and their production accounts for roughly 2% of global emissions.

In the new geo-economic context, the affordability of everyday foods is being significantly affected by sudden price increases. The price of the average basket of food in Europe increased by 7.5% in May 2022 – the highest increase since the establishment of the euro zone.¹³ Such a price increase, which is highly significant for most households, is also coupled with the skyrocketing cost of living.

In this gloomy scenario, sustainable practices, and in particular the use of sustainable fertilizers, could help guard against the spike in prices, while at the same time reducing the overall carbon emissions of the agricultural sector. Currently, ammonia is the main component of fertilizers (accounting for up to 70% of total raw materials).¹⁴ Most of the ammonia used in industrial processes is made using the Haber-Bosch process, with natural gas as a key component, which is highly polluting. Clean ammonia, a new approach that Yara International was among the first to pilot,¹⁵ aims to use solar, wind and hydropower to replace natural gas to create ammonia. The switch to low-carbon ammonia, as highlighted in the two scenarios of the IEA, has the potential to reduce the industry's overall carbon emissions by 70% by 2050 in the "Sustainable Development Scenario" and by up to 95% in the "Net-Zero Emissions by 2050 Scenario".¹⁶

However, as with every new technology, if not produced at scale, this could lead to a price premium on the final product (estimated at around €0.05 per agricultural product).

For clean ammonia to be deployed across the fertilizer industry at scale, this will require collaboration between the private sector and governments to be stepped up. A first step will be to create the business coalitions needed to further expand the use of sustainable fertilizers across the industry, and a second step will be to incentivize companies to undertake such a switch, while offering potential subsidies to compensate for the initial price premium that end consumers

might have to pay and raise awareness through public sensitivity campaigns about sustainable food choices.

Clean ammonia can be used to improve not just the agricultural sector, but can also be adopted in the production of cleaning supplies and for water treatment applications. Precision farming, if applied at scale, could help deliver overall efficiencies in the use of plant nutrients, land, water and other resources.

For smaller farmers especially, adequate incentives and capacity building will be needed to demonstrate the benefits of adopting precision farming techniques and taking a more conscious approach to the use of natural resources, continuously building a virtuous cycle of investment and innovation in agriculture through a forward-leaning regulatory framework.

Possible hurdles that could hinder the broader adoption of sustainable practices include:

1. *Lack of broadband access across all rural areas globally, with more limited though remaining issues in Europe.* While there is a high penetration of smartphone and internet use among farmers, ensuring uninterrupted/full internet access in rural areas will be critical to encouraging the widespread adoption of precision farming tools.
2. *Access to credit.* This still hinders the adoption of more sustainable and innovative projects by farmers. At the same time, internet adoption and wider technological developments could actually provide creative credit solutions through digital payment methods and capabilities to reach rural areas and underserved communities. Access to credit becomes an important component of the deployment of new technologies as the cost of precision farming tools has a high barrier for small farmers who cannot afford significant out-of-pocket costs.¹⁷
3. *Identification of regulatory hurdles.* It is crucial for companies to work closely with policy-makers to flag which regulatory hurdles need to be addressed to ensure that those technologies can be adopted and deployed at larger scale.

* This case study was written after consultations with the Executive Vice-President for Europe of Yara International, a member of the Forum's CEO Action Group for the European Green Deal.



CASE STUDY 4

Feeding a growing global population*

Combatting climate change and meeting the nutritional needs of a growing population without exhausting the planet's resources are two of the biggest challenges of these times. Biotechnology could hold solutions to both, but much remains to be done in order to fully realize its potential to deliver on the green transition.

Global protein demand hit 202 million tons in 2018 and it is projected to double by 2050.¹⁸ In 2060, the world population will have grown to 10 billion people, which means an increased amount of protein will be needed. Today, meat from livestock is by far the largest protein source. Its production accounts for about 35% of all global greenhouse emissions¹⁹ and uses up to 60% of all ice-free land on Earth for grazing and livestock feed production.²⁰

As a consequence of world population growth, the imbalance in food systems will increase, straining the planetary boundaries further and putting even more people at risk of going without safe and nutritious food, which in many cases will lead to fatal undernourishment.

Fermentation-produced proteins can help cut emissions and deliver better protein solutions. Switching to plant-based diets could reduce consumers' carbon footprint by up to 73%.²¹

Replacing animal-based protein with protein produced by fermentation also requires 90% less land and water than is required by the production of conventional meat.²² Proteins produced by fermentation can enhance the taste, texture and nutritional profile of everything from plant-based meats to oat-based drinks.

The protein industry is developing quickly and gaining more and more traction around Europe. However, there is still room for improvement to ensure this market grows further. Both public and private investments in research and innovation have led to increased sustainability and scalable solutions in the agri-food system. Unfortunately, these research results are often not translated into viable products that can easily be commercialized due to regulations in Europe that are not as agile as the innovation might require.

To overcome the protein challenge in Europe, policy changes are essential in the following areas: first, reduce the market approval process time and complexity for novel protein solutions; second, increase private and public investments in research and innovation; third, de-risk investments in new technologies, especially for small and medium enterprises, e.g. by public-private funding of scale-up facilities.



Without a high level of ambition and trust in science, we will not be able to achieve our European and international climate objectives. We see the daunting impact of climate change. Biosolutions hold the power to reverse this development and accelerate the green transition. Now we need regulatory frameworks that do not hinder the penetration of the green, sustainable solutions that are already available. The decisions we make today will shape the future of our societies, our industries and our planet.

Ester Baiget, President and Chief Executive Officer, Novozymes; Co-Chair of the Forum's CEO Action Group for the European Green Deal



In today's rapidly evolving global context, it is more important than ever to continue implementing the European Green Deal while we tackle the ongoing climate crisis and accelerate the transition to a greener, more circular and more resilient economy. This will allow Europe to remain future-proof and maintain its competitiveness. To achieve this, it is vital that we continue to strengthen innovation ecosystems. Ultimately, it will make Europe a cleaner and more sustainable continent, contributing to the health and livelihoods of people today and generations to come.

Feike Sijbesma, Chairman of the Supervisory Board, Royal Phillips; Co-Chair of the Forum's CEO Action Group for the European Green Deal

* This case study was written after consultations with Novozymes, a member of the Forum's CEO Action Group for the European Green Deal.



CASE STUDY 5

Integrating the digital and green imperatives*

Carbon footprint identifies the total amount of greenhouse gases generated by the activity of an individual or an organization (such as driving a vehicle or the functioning of a business production line). Carbon handprint, on the other hand, measures the positive effect that actions have on carbon emissions. In an ideal scenario, companies' carbon handprints should be bigger than their carbon footprints in order to drive sustainable business models.

Digitalization in Europe could increase organizations' carbon handprints. Data can address information gaps, drive sustainable choices, help shape future business strategies and support governments in understanding the impact of their policies. Recognizing the importance that data plays in addressing climate change, [G20 leaders](#) have designed a full workplan that looks specifically at bridging the data gap to ultimately help both companies and governments make informed decisions on sustainability mitigation and adaptation.

Companies base their business models on the information they have available. Nowadays, cross-data collaboration among industries is becoming even more urgent. With diversified supply chains and numerous actors, data is crucial to fully understanding the carbon impact of business processes and will be vital in shaping the path forward. Transparency is important not only to shape market efficiency and lead to better-informed decisions but also to encourage innovation and open new investment avenues, with greater benefits for society as a whole.

The wider application of “digital twins” is taking shape with regard to energy networks – in this case, virtual, real-time representations of physical grids. Like flight simulations, they could help in improving planning and forecasting, while providing more efficient and more effective training for employees. An example is [Nokia's Network Digital Twin](#) project, which allows the creation of a virtual replica of factories and business processes. By providing full visibility of the performance of networks and devices, gaps and issues could be identified beforehand and could lead to significant reductions of waste and, more broadly, carbon emissions from industrial processes.

While the European single market has undoubtedly brought great benefits for all member states, there are still some significant limitations when it comes to innovating at scale. For example, the lack of spectrum bandwidth has hampered the simultaneous deployment of 5G and wireless technologies across all member states. As 5G could enable better data sharing, the fact that it cannot be enabled at speed could hinder the EU's capacity to innovate. Enabling cross-border data flows is not only vital for knowledge transfer between economies but can allow a cross-pollination of innovation between sectors or areas that might not be directly in contact with each other.

“ **With the European Green Deal, the Commission has ambitious climate neutrality targets, positioning itself as a global leader of climate diplomacy. Against the backdrop of a challenging economic and geopolitical context, it is all the more important to ensure our climate commitments are not derailed and we continue to foster concrete solutions through public-private cooperation to decarbonize our economies, especially in the context of the Fourth Industrial Revolution. The green and digital transitions must go hand in hand, shaping Europe's future growth and long-term competitiveness.**

Mirek Dušek, Managing Director, World Economic Forum

* This case study was written after consultations with Nokia, a member of the Forum's CEO Action Group for the European Green Deal.



CASE STUDY 6

Using data to drive sustainability*

Process-mining technologies apply data science to discover, validate and improve workflows. By combining data mining and process analytics, companies can strive for more efficient and leaner business processes. However, data-mining systems are often not synchronized with existing analytic systems, thus hindering their potential.

When looking at European regulation, specifically the [EU Taxonomy for Sustainable Activities](#), there is still a need to align with global standards. European companies that operate globally have already encouraged the European Financial Reporting Advisory Group (EFRAG) to consider cross-border standards when approaching the disclosure of new reporting standards on a number of occasions. They have voiced the need for business stakeholders to be part of the decision-making process to ensure that the EU taxonomy is designed to encourage sustainable investments and European companies' competitiveness.

Currently, businesses are approaching sustainability with limited connections with the operational workforce. This dichotomy of business operations versus sustainability pledges often leads to limited actions on the operational side, as overarching sustainability targets might compete with operational priorities. Hence, synchronizing those two fundamental components will be critical to ensuring not only that sustainability key performance indicators (KPIs) are met but also that innovative and creative solutions on how to make business processes more efficient and reduce resource waste are easily identified. Such a proactive approach will also move sustainability from a corporate exercise to a true enabler for business processes.

Another challenge companies currently face is the lack of transparency on emissions. While Scope 1 emissions (those issued directly by the company's operations) are easily traceable, Scope 3 emissions (those arising from the indirect value chain) become much more difficult to trace as they rely on data that requires the input of various stakeholders across the supply chain. Companies, asset owners and SMEs can exchange learnings on high-impact use cases and methodologies to accelerate their energy and climate transition journeys. Enabling policies to promote data sharing and data interoperability, along with wider awareness and adoption of related business innovations, can be a vital lever to improving energy efficiency, circularity and Scope 3 transparency.

Emissions data is granular and complicated to acquire. Sometimes this cumbersome process leads companies to avoid investing in data gathering as it could appear – especially

in the case of smaller-sized companies – to be an unjustified business expense. Transport, which sometimes accounts for the lion's share of a company's emissions, could benefit from more precise data; gathering this might require no more than simple modifications to the overall transport systems used. Introducing a unified carbon accounting system would necessitate a dedicated cost/benefit analysis that would enable all stakeholders to benefit from the decision without affecting the level of service provided to the customer.

Data protection regulations in Europe could be perceived as a hurdle when it comes to sharing data. Data protection, as it is now, does not foster the wider use and sharing of data across companies. The lack of availability of data undermines the capacity of corporations to make informed decisions about their carbon emissions and pursue sustainable business decisions. Companies with a limited understanding of how data might be shared and the implications of doing so may believe that sharing data could jeopardize their competitive positioning.

At the same time, looking externally at the European Union and specifically at its main partners, it is evident how both the European Green Deal and Europe's Digital Decade objectives could shape its trading relations.

As the European Union aims to position itself as a major player on climate diplomacy, its relations with its major trade partners could be shaped by new principles. There is therefore a need to continue to keep trade agreements modern and up to speed with climate commitments and to encourage trade partners to undertake a similar journey towards the green transition. As an example, in Türkiye – which imports 3.6% of total EU exported goods and exports 3.7% of total EU imported goods²³ – there is a need for a comprehensive and holistic governance framework that allows more capital to be invested in green projects, while at the same time inspiring Turkish industries to undergo transformations towards greener production systems.

In this context, cooperation between the EU and its key trading partners plays a crucial role in shaping inclusive regulatory frameworks and encouraging the adoption of international best practices for a fair and just transition. It will also be pivotal to identifying what is required, and the steps necessary, to implement a green taxonomy, particularly in terms of non-financial reporting arrangements for companies. In this regard, the World Economic Forum's [Stakeholder Capitalism Metrics](#) are critical. Furthermore, fostering innovative financial mechanisms, such as the green bonds issued by one of the subsidiaries of Koç Holding Group,²⁴ would be key to encouraging partner countries to direct private funds towards green projects.

* This case study was written after consultations with Koç Holding, a member of the Forum's CEO Action Group for the European Green Deal, and Celonis, a member of the Forum's Global Innovator community.



CASE STUDY 7

Delivering high sustainability and performance standards to consumers*

In September 2020, Unilever launched its [Clean Future strategy](#) for its homecare products, aiming to introduce more sustainable methods of designing, manufacturing and packaging products while maintaining their expected performance.

Most cleaning products contain surfactants, compounds that create foam and enable the product to break down and remove oil, grease and soil, and remove it. These surfactants are typically made from petrochemicals using fossil fuels. Through dedicated R&D, Unilever is now using surfactants derived from sugar, maintaining equal degreasing performance while reducing the petrochemicals in its products. Using biotechnology, a similar process could be also applied to corn and maize to produce cleaner chemicals.

In line with the objective of the European Green Deal, another campaign from Unilever (“Dirt is Good”) launched a new product designed to reduce carbon emissions and plastic waste. This innovation – which enabled the production of capsules that are 65% derived from plant sources – reduced manufacturing greenhouse emissions by 16%, while helping consumers increase their energy efficiency across their cleaning chores.²⁵ This was also supported by a similar move in regards to packaging, with the company reducing its use of plastics by 6,000 tonnes on a year-on-year comparison.

To continue on this pathway and scale up innovations, policies need to drive investments in technologies that can deliver significant benefits for end consumers and the planet.

** This case study was written after consultations with Unilever, a member of the Forum’s CEO Action Group for the European Green Deal.*



CASE STUDY 8

Finance and risk balancing in the context of the European Green Deal*

Achieving the goals of the European Green Deal requires the redirection of large amounts of public and private capital. Investment will be needed in all sectors to enable low-carbon innovation and the transformation of the economy.

The lack of upfront incentives and financing solutions is often the biggest hurdle to creating positive change. This is where public-sector and impact investment can provide support, to enable innovation and scaling of lower-carbon technologies. In addition, addressing risk at the planning and design stage increases financial assurance and helps to attract private investment – for instance, insurance solutions improve the certainty of project delivery and return on investments.

Spreading the costs and risks of the transition across value-chain players in a fair and transparent manner is also important as climate change, and the necessary solutions, are a multisectoral issue.

For the CEO Action Group for the European Green Deal, finance and risk-sharing is thus a cross-cutting topic for its different sectoral initiatives. One example is the [Carbon+ Farming Coalition](#): based on interviews with farmers, the project group identified economic challenges as a significant barrier to the adoption of climate-smart practices. The coalition is therefore investigating a transformation programme that benefits from innovative finance and risk-sharing solutions, to help inspire and sustain positive change.

** This case study was written after consultations with Swiss Re, a member of the Forum’s CEO Action Group for the European Green Deal.*



CASE STUDY 9

Upskilling and reskilling for Europe's green and digital transitions

The climate-neutral economy is causing a fundamental change in the job market by creating new professions and skills while disrupting or replacing others. [According to the International Labour Organization \(ILO\)](#), as the global economy continues to move towards a more sustainable reality, 24 million green jobs will be created by 2030, with a net increase of 18 million versus the current job market. Without skills development, it is estimated that the global economy could shed as many [as 71 million jobs in its move towards becoming circular](#).

Aware of such an imperative, the European Union has initiated a set of ambitious yet concrete initiatives to address the need for green skills, including the [European Skills Agenda](#) – which identified concrete targets by 2025 – and the [Pact for Skills](#), and supporting industry ecosystems.

To ensure that skills owned by the current and future workforces meet the industry requirements of a green economy, there is a need for a clear definition of what are identified as “green skills” to guide governments, the private sector and academic institutions in their strategies.²⁶ Defining what green skills are can ensure that the right training and academic infrastructure are developed to keep pace with changing policies and industry requirements in the field. At the same time, as the Fourth Industrial Revolution continues to shape daily lives and the way companies do business, companies should look at how both emerging green and digital skills can be quickly adopted by their workforce and ensure lifelong learning paths. A comprehensive enabling framework, harmonizing skills accreditation and aligning national standards with qualifications, improving working conditions and creating an engagement model that brings stakeholders together are all important pieces of the puzzle.

Europe is also facing intense competition in the global race for talent. Europe's ambition to lead the digital age and the green transition will be realized only if it remains attractive to talent

from outside Europe. According to the World Talent Ranking 2022,²⁷ recently published by the International Institute for Management Development, European countries fill the top-ten rankings in terms of attracting and retaining talent. However, if Europe's education and training systems cannot stay up to date with the changing industry needs, the continent could significantly lose its attractiveness in the future.²⁸ At the same time, looking at Europe's job market – which has a 6%²⁹ unemployment rate – the supply of talent might not match the demand from companies, leaving many positions still unfilled and leading companies to recruit outside of Europe.

The war in Ukraine, rising inflation and disruptions in the job market are adding more pressure on the labour market. In this context, the European Commission launched the EU Talent Pool pilot initiative³⁰ in October 2022, an online tool to help those fleeing Russia's invasion of Ukraine to find jobs in the European market. However, Europe needs to attract talent from all over the world to match demand.

Innovative solutions must be used for skills funding. The new European Social Fund Plus (ESF+, worth €98.5 billion) will remain the main EU instrument for investing in people, including reskilling and upskilling for the transition to a green and digital economy. However, a significant role can be played by large businesses adjusting their supply chain to create more opportunities for SMEs and promote an ecosystem for entrepreneurship.

The current post-pandemic context underscores the importance of having a robust and agile skills and training ecosystem, focused on breaking down silos and changing mindsets. Among the targeted interventions that could in turn inform an action agenda, the following have been identified as the most relevant: lifelong learning and upskilling; skills anticipation and job-market insights; proactive redeployment and re-employment; and innovative skills-funding models.

4

From ideas to deployment – how policy-makers can help enable innovation



While the European Union has made great progress in keeping up with the latest industry changes, there is still some room for improvement to ensure that regulations are forward-leaning and supportive of the wider adoption of innovation across all industries. Therefore, select members of the CEO Action Group for the European Green Deal, who were consulted for this white paper, shared their views on how deepened public-private cooperation can help innovation flourish across Europe.

Focusing on the end goal of transforming the European Union into a global hub for innovation, the following list contains some guiding principles that private companies would like regulators to stress:

1. Regulation should be consistent and should reflect current industry needs. Innovation needs agile regulations that can easily be adapted and do not pose obstacles to the full potential of new products or new processes, while continuing to ensure high-quality health and safety standards for end consumers.
2. There is a need for more impactful incentive schemes that could enable innovation at a systemic level. Sometimes, given the high level of regulations in some specific sectors, companies might find it difficult to innovate. At other times, as innovation is resource consuming, only the biggest corporations can invest capital and human resources in experimenting with new business models and new products, hindering the innovation capacity of smaller firms. Incentives for the commercialization of innovative companies could help companies achieve scale as well as reduce the final price for end consumers.
3. There is also a need for auditing processes and checks at specific points of the policy-making process to ensure consistency across regulations and business viability. Mechanisms for assessing environmental impacts need to be established in all areas to ensure that the end goal of reducing carbon emissions and resource depletion is met.
4. A continuous multistakeholder dialogue, including governments, private sector, consumers and academia needs to be nurtured. Start-ups should be included in the discussions to ensure that regulations encourage the proliferation of such ventures. Academic institutions, which sometimes fund the biggest R&D schemes, need to be able to rely on regulations that encourage the industrial use of their discoveries. It is important that end consumers have a voice to make sure their needs are regarded when innovating.
5. Policies should be proportionate and science-based to encourage business innovations for the benefit of societies and the planet. Having such policies will aid significantly in ensuring innovative solutions are clearly identified and deployed to help the EU meet its ambitious climate targets set out by the European Green Deal. This will also help to ensure that the most effective innovations are available to contribute to the EU's sustainability ambitions.
6. Transparency along the value chain is vital to accelerate uptake of innovation. Growth without resource depletion is a generation-defining task and needs a significant lifestyle change for end consumers. Making sure full emissions are actually reflected and recorded on a product's packaging can help consumers make informed decisions.
7. As the European Commission and EFRAG continue their work ensuring that reporting standards lead to sustainable investment, it is important that these are harmonized with global standards.
8. The EU's economic landscape is still quite fragmented among member states. For innovation to thrive, there is an urgent need to ensure that best practices are shared and regulations harmonized. Less fragmentation and more collaboration among member states could also lead to a better transfer of knowledge across countries and create opportunities for cross-pollination.

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