

# Perspectives on a European green recovery from the COVID-19 pandemic

Summary report

**April 2021**

The EY logo consists of the letters 'EY' in a bold, white, sans-serif font. A yellow diagonal bar is positioned above the 'Y'.

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## Disclaimer

- ▶ The analysis and perspectives in this report are those of the EY organization.
- ▶ They are a summary of the contributions collected from stakeholder interviews and desktop research.
- ▶ The perspectives do not necessarily reflect the opinion of all stakeholders consulted.

# Acknowledgements

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- ▶ Hydrogen Europe
- ▶ Solar Heat Europe
- ▶ Solar Impulse Foundation
- ▶ Solar Power Europe
- ▶ Wind Europe

## One giant leap to a green recovery

When the European Commission announced a “Green Deal” in December 2019, it was described as “Europe’s man on the moon moment.” Setting a goal to become the first carbon-neutral continent by 2050, the ambitious package involved investment in green technologies and sustainable solutions to make Europe the leader in tackling climate change.

The subsequent economic impact of the COVID-19 pandemic has reinforced this imperative, with the commission announcing a €750b “Next Generation” fund to support recovery. Thirty percent of this has been pledged for climate action, while a do-no-harm clause rules out investments that are deemed to be environmentally damaging.

Given the scale of Europe’s climate ambition, the question to be asked is: are there enough green projects across Europe to achieve the targets? This report, commissioned by the European Climate Foundation, indicates that climate-positive investment projects are widely available and could help to stimulate a green recovery in a post-COVID-19 pandemic world.

EY teams across the 27 EU member states undertook more than 150 interviews with government representatives, project developers, investors and manufacturing companies. They identified 2,000 projects and, of these, selected 1,000 that are “shovel-ready” and have the potential to create significant social, environmental and economic value.

In these pages, we provide a summary of the research findings, an overview of the 1,000 projects identified and a sectoral analysis – covering energy, transport, buildings, industry and land use. There is also a listing of EY contacts at the end of the report should you wish to follow-up on any of the issues raised.

The projects highlighted will likely require around €200b of public and private investment but, crucially, they could support close to 3 million jobs. With a higher job-intensity ratio than traditional and fossil-based industries, the low-carbon projects can make a major contribution to a European green recovery.

There is huge potential here, but it is only the tip of the iceberg. The EY analysis suggests the green projects identified represent only 10% of those under development in Europe. This means that the value of the entire EU pipeline of green projects could be well over €1t, with the potential to make substantial reductions in emissions and return all and more than the 12 million full-time jobs previously lost to the COVID-19 pandemic.

The economic recovery from the crisis has the potential to accelerate a socially just transition to a sustainable future – and this research shows that enough environmental projects are available. There is a window of opportunity to seize something positive from the severe health and economic experiences of the crisis. It’s an opportunity that should not be wasted.

**Alexis Gazzo**

EY & Associés Climate Change Leader



# 2

# Context and approach





### An unprecedented health and economic crisis

- ▶ The COVID-19 pandemic has caused a fall in activity across entire sectors of the European economy with infrastructure companies facing a collapse in revenues as capital projects are put on hold.
- ▶ Historic job losses occurred in 2020. Restricted supply chains will continue to impact labor markets during 2021.
- ▶ Credit tightening, rating downgrades and market volatility are impacting access to capital and debt issuance for companies. For start-ups and SMEs with a limited track record (and with limited access to corporate finance), the reduction in revenues, combined with tightened capital markets, is putting their survival at risk.

### Articulating short-term recovery measures with long-term climate commitments

- ▶ The EU has endorsed the objective of becoming carbon-neutral by 2050. In this context, the Green Deal was announced in December 2019 with the aim of developing a strategy to protect the environment and shift to a green economy.
- ▶ EU leaders are in the process of defining recovery plans, with the aim of supporting growth and job creation. The Green Deal will be one of the drivers to shape the choices of recovery allocation efforts.
- ▶ In May 2020, the European Commission proposed to deploy a package of €750b to support economic recovery.<sup>1</sup> The Next Generation EU fund was formally adopted in July 2020 and will complement the EU budget for the period 2021-2027, bringing commitments to €1,850b.
- ▶ As EU leaders and member states work on the preparation of economic stimulus plans, it is critical that environmental and social criteria are taken into account in the choice of budget allocations.

### A green recovery from the COVID-19 pandemic?

- ▶ The purpose of this analysis is to demonstrate the availability of a substantial pipeline of projects across Europe that have the potential to support jobs and to contribute to the EU's climate objectives.
- ▶ EY teams in the 27 EU member states have worked to compile a list of 1,000 opportunities.

- ▶ The list focuses on five sectors (energy, transport, buildings, industry and land use), and includes both infrastructure and innovation projects. The investment opportunities selected are “shovel-ready”, i.e., they are at an advanced stage of development and expecting financial close within the next two years.
- ▶ Project-level information has been collected through interviews with external stakeholders such as government entities, project developers, investors and industrial companies, via an online survey and a review of external databases.
- ▶ The analysis enabled EY teams to identify the scope of the projects, as well as investment requirements, environmental and social benefits, maturity and risk levels.
- ▶ Opportunities have been reviewed and prioritized based on criteria such as technology relevance, project timeline, climate benefits, social value and strategic value for net-zero trajectories.
- ▶ Impacts from the project list have been expressed in terms of the effect on jobs and of tCO<sub>2</sub>e of avoided emissions over the lifetimes of selected projects compared to a baseline (without the projects).

### Reference to the EU Taxonomy

- ▶ Climate benefits of the projects identified were evaluated in reference to the EU Taxonomy report and its technical annex of March 2020. The taxonomy is a classification framework that helps to identify to what degree economic activities can be considered environmentally sustainable.
- ▶ This document provides practical guidance for developing technical screening criteria based on the climate change mitigation and climate change adaptation objectives, as well as the principle of doing “no significant harm” to other environmental objectives.
- ▶ Demonstrating compliance with the EU Taxonomy turned out to be a difficult exercise in several domains, especially in the buildings and land-use sectors, where compliance depends on the level of foreseen energy-saving performance or global environmental analysis.
- ▶ This work underlined that many project developers neither refer to this framework to demonstrate their projects' climate benefits, nor disclose information that aligns to taxonomy requirements.

<sup>1</sup> Recovery plan for Europe, European Commission, accessed via [https://ec.europa.eu/info/strategy/recovery-plan-europe\\_en](https://ec.europa.eu/info/strategy/recovery-plan-europe_en), 18 March 2021.

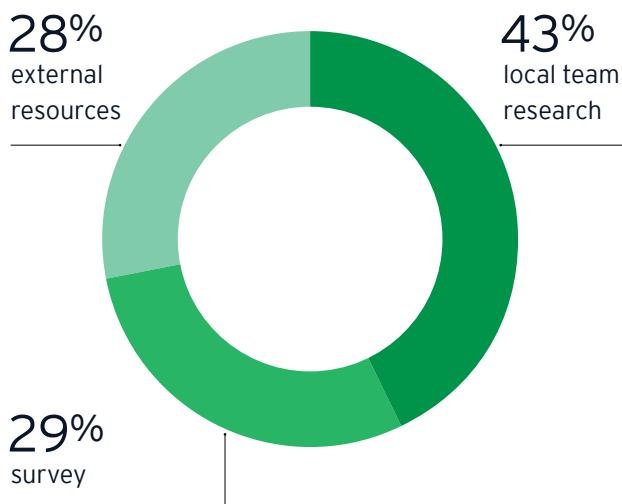
- ▶ The EU Taxonomy guidelines also do not cover all the economic activities that contribute to climate change mitigation. Uncovered activities that could not be confirmed as “Taxonomy compliant” include several manufacturing activities (especially eco-design and reduction of material losses, and hazardous waste management).
- ▶ A rigorous use of EU Taxonomy guidelines led to the differentiation of Priority 1 projects (those that are aligned with the EU Taxonomy and have a clear climate benefit) and Priority 2 projects (those with clear environmental benefits but where compliance with the EU Taxonomy could not be confirmed).

**A project informed by extensive stakeholder interviews and desktop research**

The identification of projects has been carried out on the basis of:

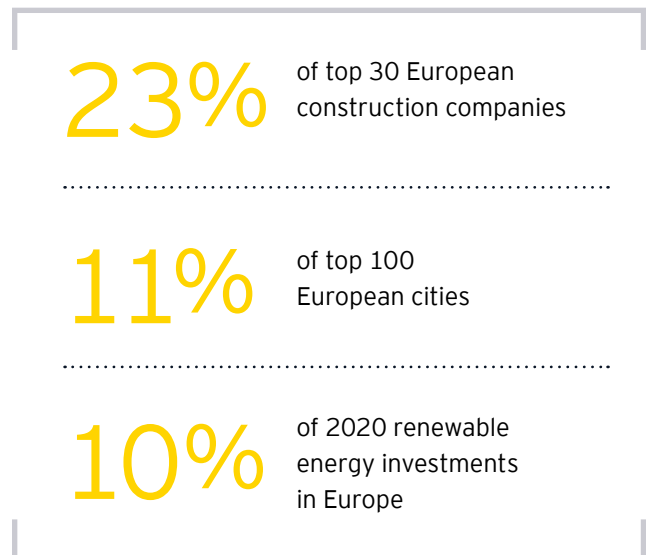
- ▶ 169 interviews with diverse stakeholders including industrial companies, public entities, investors, project developers, start-ups and professional associations.
- ▶ Analysis of available project databases.
- ▶ An online platform that enabled the collection of information on 362 projects.

Figure 1. Database constitution sources



As the purpose was to uncover a pipeline of ready-to-invest projects, the focus has been on projects that are expecting financial close in the short term. Some developers have considered that confidentiality matters prevented them from sharing project information. For this reason, we estimate that the list selected represents only the “tip of the iceberg” of projects under development in the EU.

Figure 2. Breadth of research involved





# 3

# Research findings

## **The objective is to support a green recovery by providing shovel-ready investment opportunities**

EY teams in all 27 EU member states identified projects that could support jobs in the short term and contribute to the EU's climate objectives. Projects were identified in 5 sectors (energy, building, transportation, industry and land use), using an online survey, databases and consultations with around 170 stakeholders (governments, public organizations, investors, project developers, start-ups and industrial corporations).

More than 2,000 shovel-ready opportunities identified were reviewed and 1,000 selected with all having the potential to create social, environmental and economic value in the next two years. These opportunities are developed and have the potential to close within the next 24 months after overcoming certain barriers (such as complex administrative procedures).

## **The projects identified represent a fraction of the green projects under development in Europe**

This list of projects was put together in just over four weeks and illustrates the huge project pipeline that exists across all European countries to underpin a green and resilient recovery from the COVID-19 pandemic economic crisis. This is only a fraction of all projects with climate benefits under development in Europe at various levels of maturity, as the focus was on short-term opportunities, i.e., projects that will reach financial close in the next 24 months. Overall, it is estimated that only 10% of green projects currently under development have been captured.

This means that the entire EU pipeline of green projects could be well over €1t and could return all and more of the 12 million full-time jobs lost to COVID-19 pandemic into green and productive activity.



### Projects were identified in all member states, with Central and Eastern European countries performing well

Central and Eastern European countries perform very well in availability of green projects: Cyprus, Croatia and Slovakia have the highest ratio of projects per million inhabitants and outperform large economies in producing projects. In addition, several projects are located in areas transitioning from coal.

The distribution of projects for all sectors covered per country shows a strong representation of large economies (France, Germany, Spain or Italy), as these countries host mature industries in most sectors. However, in terms of projects per capita, the list is balanced across Europe. Not all projects under development are captured, due to the time constraints of this study or to confidentiality concerns.

### Renewable energy comes first in terms of number of projects

Energy and transport are two sectors where investment pipelines are well-structured and identified. In sectors

such as industry, buildings and land use, the diffuse and smaller nature of projects and the fact that these sectors are less well-structured at EU level explain partly the lower share of projects identified. In the case of buildings, the number of projects is low due to concerns over confidentiality and climate impacts that are more difficult to assess. With building projects, much of the climate impact relates to use over a long lifetime rather than during construction, and so the analysis can be more complex.

### The projects selected show a diversity of investment size

More than 20% of projects identified are small and require investments of up to €5m. Thirty percent are innovative and developed by start-ups and SMEs, such as sustainable mobility solutions, green hydrogen, land remediation and low-carbon construction materials. Supporting these innovations can help build future European markets for green products and services in which these EU companies can lead.

Figure 3. Top 10 subsectors represent 76% of the 1,000+ green projects selected

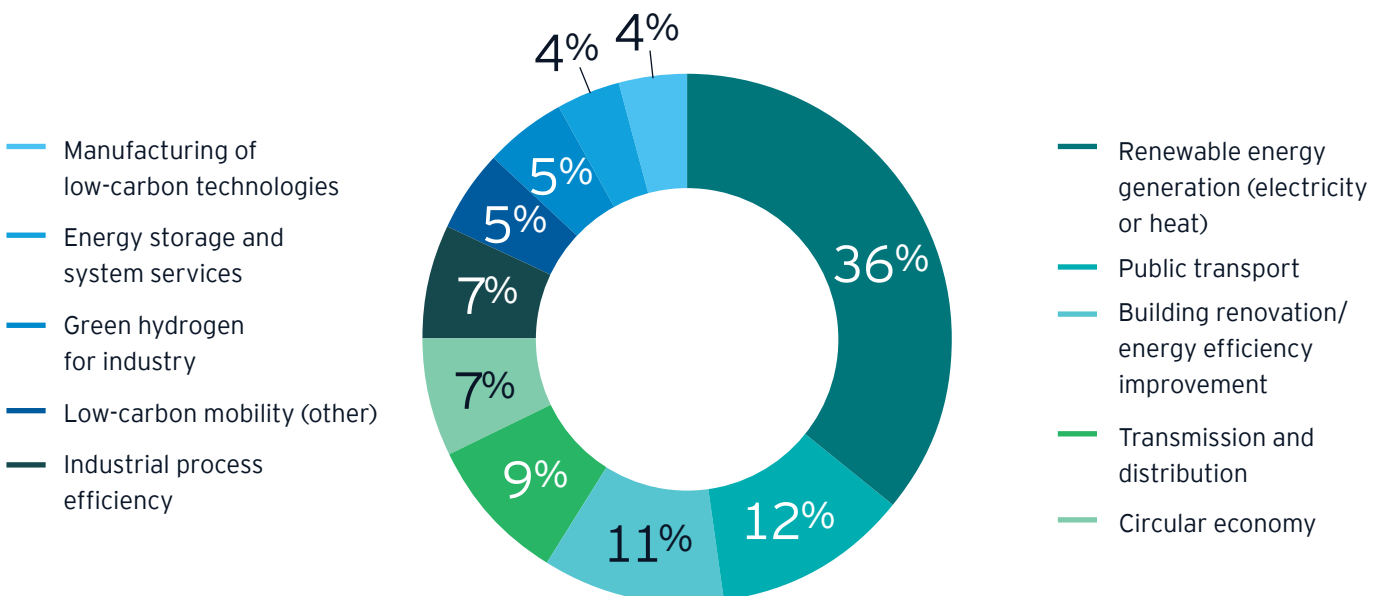
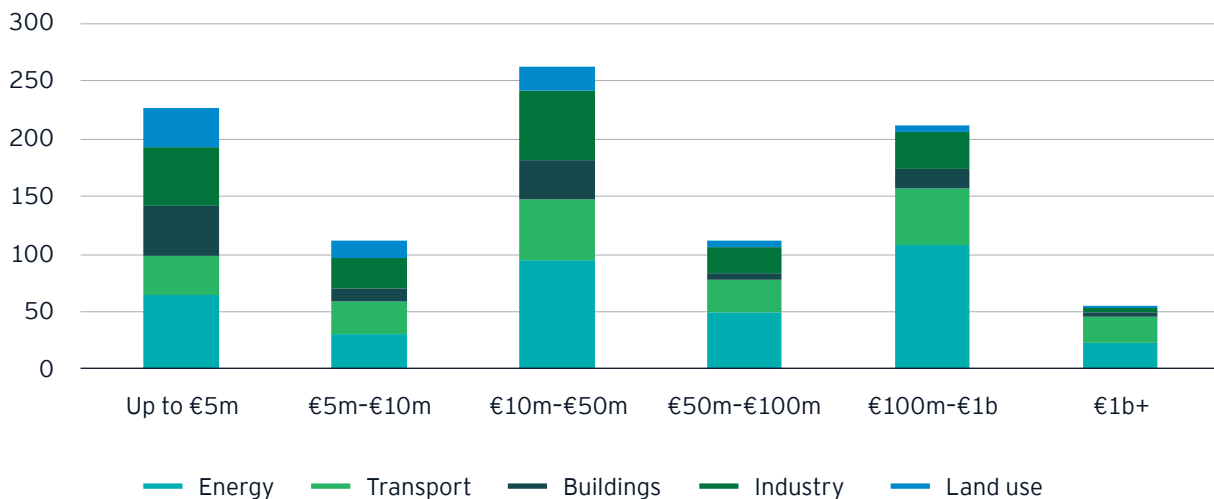




Figure 4. Breakdown of the number of projects by sector and by investment range



### These projects will require around €200b of public and private investment evenly distributed across all EU countries and have the potential to support 2.8m jobs

The list of 1,000+ projects that have been selected represents an aggregate investment of €200b, distributed evenly in all 27 EU countries. We estimate that taken together, these investment opportunities will support some 2.8m jobs (head count) or 2.3m full-time equivalents (FTEs). This represents nearly a quarter of the job losses due to the economic consequences of the COVID-19 pandemic in Europe.

With a higher job-intensity ratio than in most other traditional and fossil-based industries, the low-carbon projects uncovered can have a major contribution to a green and just economic recovery in Europe. Our analysis indicates that on average, €1m invested in the list of opportunities uncovered will support 12 FTEs, or 15 jobs.

### The projects selected have the potential to unlock positive environmental value and to contribute to carbon neutrality

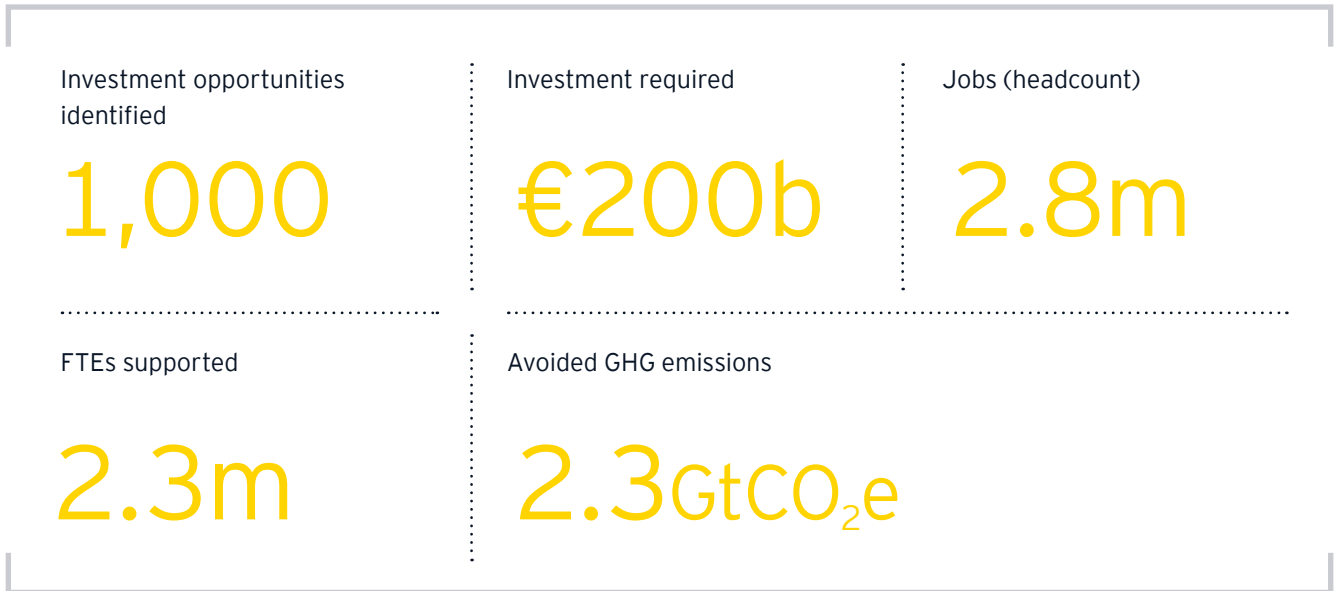
The projects reviewed were compared with the EU Taxonomy and the circular economy action plan, which aims to transition Europe's economy from a linear "take-make-dispose" model to a circular "repair-reuse-remake" approach. Depending on the technology, size and context of the projects, the aggregated greenhouse gas emissions avoided if the 1,000 projects selected are deployed are estimated at around 2.3 GtCO<sub>2</sub>e over the lifetime of the projects.

Given their high replicability, the roll-out of the projects like those identified will contribute positively to progress toward climate neutrality by 2050.

Other potential benefits such as improved air quality, reduced noise pollution, energy independence or food safety were not assessed at the same level of detail at this point but are also part of the value that the projects selected will likely deliver.



Figure 5. Summary of overall findings



**Deploying the 1,000 projects identified will require adequate financing instruments**

The roll-out of the more than 1,000 projects identified will require the use of public and private financial instruments and some regulatory measures. Access to adequate financing varies between sectors, developers and project types. Nevertheless, all are potentially impacted by risk concerns from investors in a post-COVID-19 pandemic environment, potentially increasing financing costs or leaving a shortage of capital for innovative new ventures.

**Nonfinancial barriers to project deployment**

Financing is only one of the aspects holding back the deployment of green projects. For 49% of the projects selected, the main barrier is nonfinancial (regulatory, administrative or commercial). This means that beyond financing instruments, policy and regulatory measures will also be required to deliver environmental and social value. The stakeholder consultations carried out reveal several key opportunities across the five sectors identified (energy, transport, buildings, industry and land use) to support a green and resilient recovery in Europe.







# 4

# Project list overview

## **In relative terms, several Eastern or South-Eastern Europe countries outperform the largest EU economies**

- ▶ France, Italy, Spain, Germany and Sweden are the top five countries in terms of number of projects, and together represent 466 projects.
- ▶ The distribution of projects for all sectors, covered per country, shows a strong representation of large economies (France, Germany, Spain or Italy), as these countries host mature industries in most sectors.
- ▶ A breakdown of projects per country relative to population size indicates that a relatively high proportion of projects has been reached in Sweden, Cyprus, Slovakia, Croatia, Estonia, Luxembourg and the Czech Republic. This may reflect the dynamism of investors and of project or technology developers active in the sectors covered by the analysis.
- ▶ Results should be analyzed taking into account the fact that, for sectors where competition intensity is high, project developers or investors are reluctant to share project-level information.

## **Energy and transport are the two sectors where investment pipelines are the most well-structured and identified**

- ▶ The strong representation of the energy sector in the 1,000+ green project list illustrates the dynamism of European and member state energy policies. Within the energy sector, renewable energy generation accounts for 70% of the total energy investment needs identified.
- ▶ Transport and sustainable mobility are also well represented in terms of investment volumes. A number of opportunities identified represent substantial investments (over €1b) due to the large-scale infrastructure nature of public transportation projects.
- ▶ Projects sized at over €1b are often large public-private partnerships or government programs such as municipal public transportation projects, grid extensions and interconnections.



► In sectors such as industry, buildings and land use, the diffuse nature of most projects, and the fact that the industry sectors are less structured at the EU level, explain partly the lower share of projects identified. The number of shovel-ready projects in the buildings sector is likely far greater as some projects initially considered had to be excluded from the study for confidentiality reasons.

► The investment requirements of the selected projects would represent a sizeable portion of the EU stimulus grants. These financing needs could represent roughly between 10% and 50% of the stimulus grants for the five countries receiving the largest shares of the Recovery and Resilience Facility (RRF), which is the largest funding mechanism within Next Generation EU.

► The main barrier was identified for 58% of all projects. For 49% of projects the main barrier is nonfinancial (regulatory, administrative or commercial), and financial for the remaining 51%.

Figure 6. Top 15 countries identified in the report (number of projects)

Projects have been identified in all EU countries

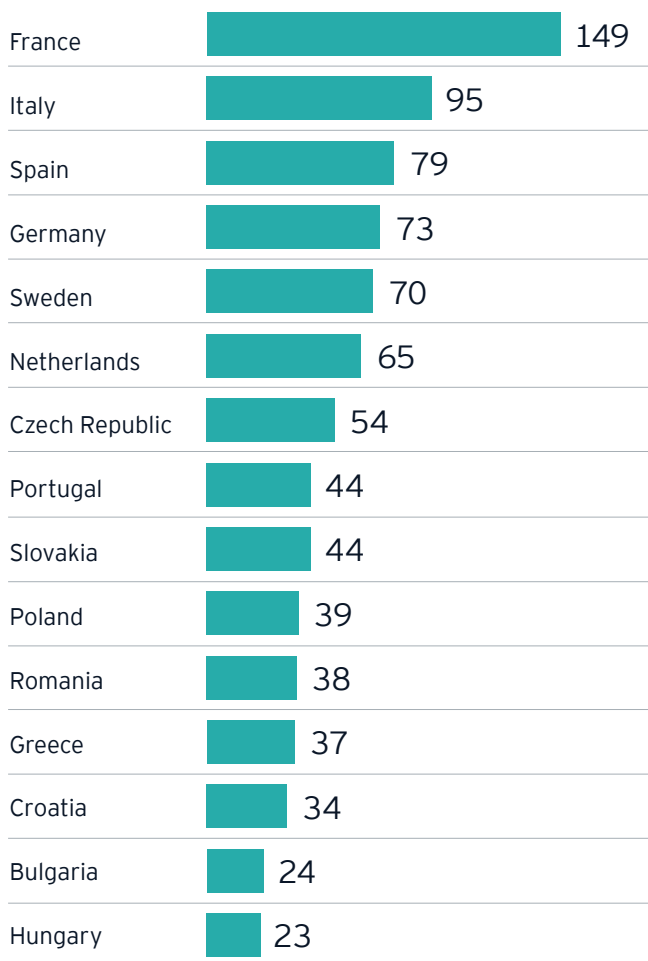


Figure 7. Top 15 countries (number of projects per million inhabitants)

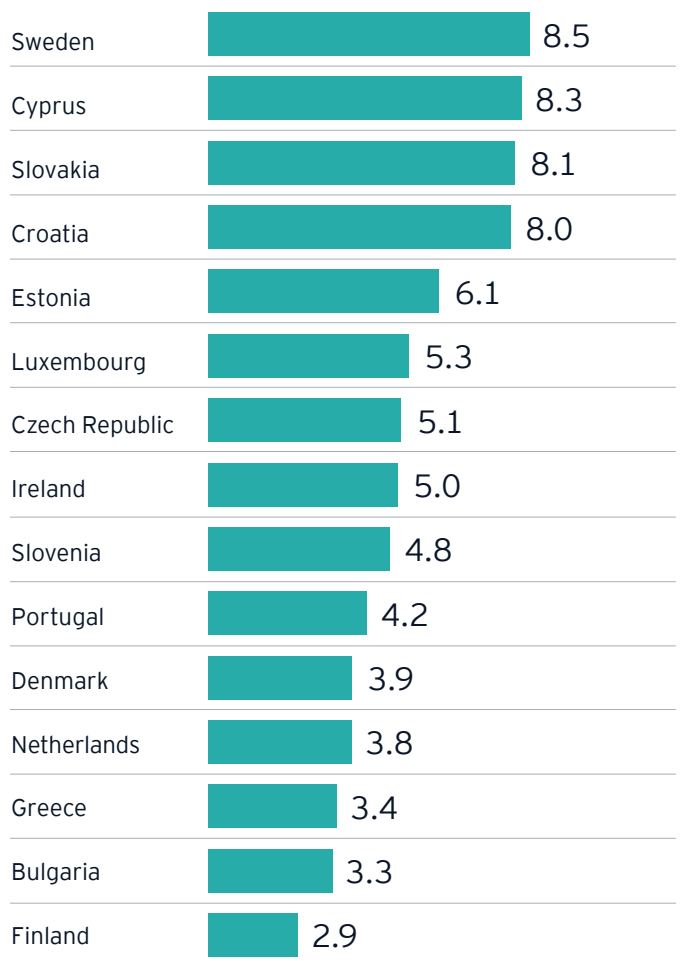


Figure 8. Investment requirements of projects identified relative to EU Recovery and Resilience Facility grant allocations

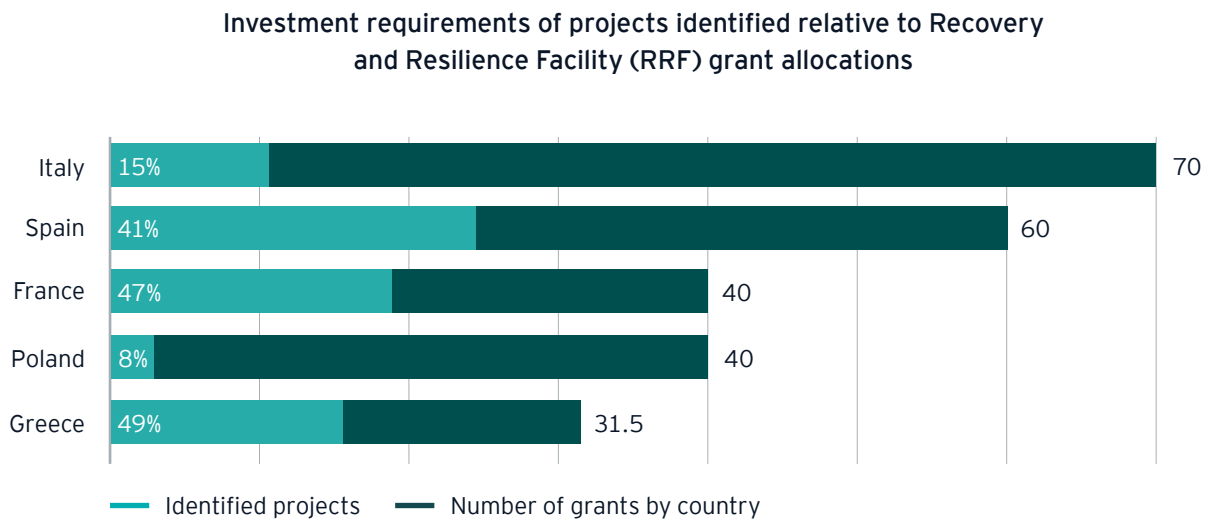
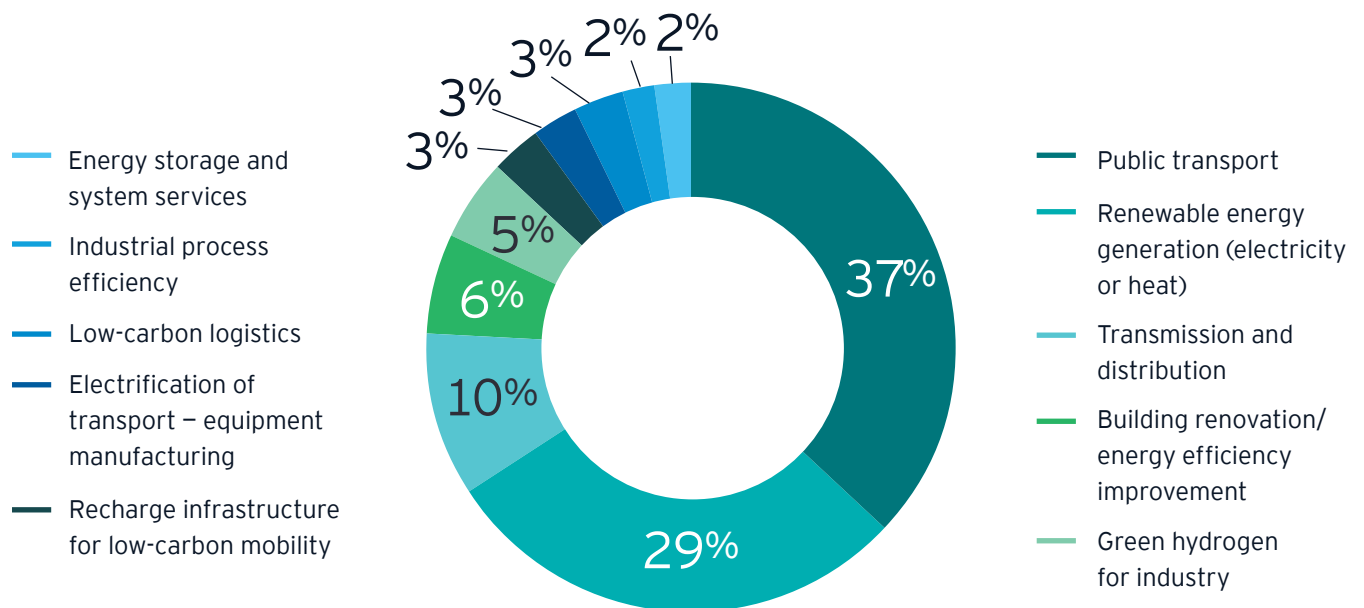


Figure 9. Top 10 subsectors represent 90% of the total investment need for the 1,000+ green projects selected





### Environmental and social impacts

The list of investment opportunities has the capacity to support jobs in the short term and to contribute in the longer run to climate neutrality.

Figure 10. Project pipeline – avoided GHG emissions (MtCO<sub>2</sub>e)

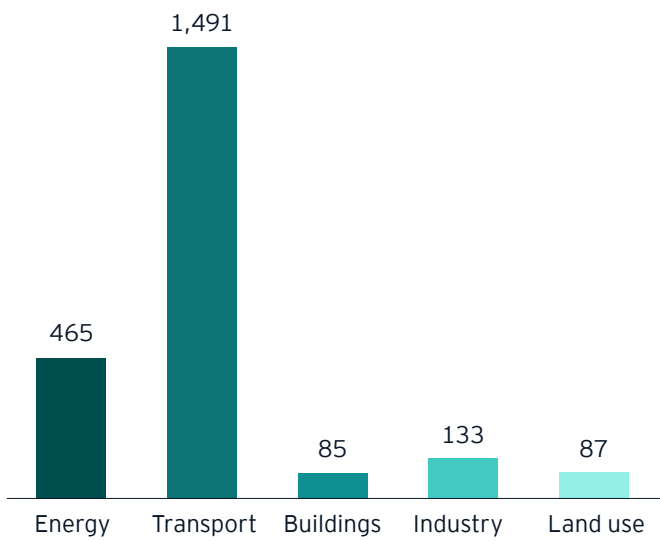
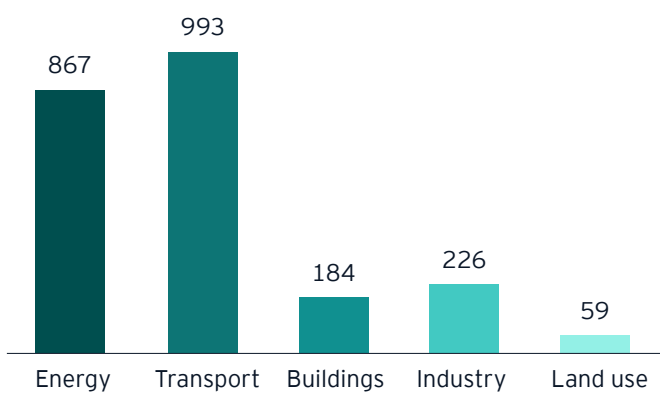
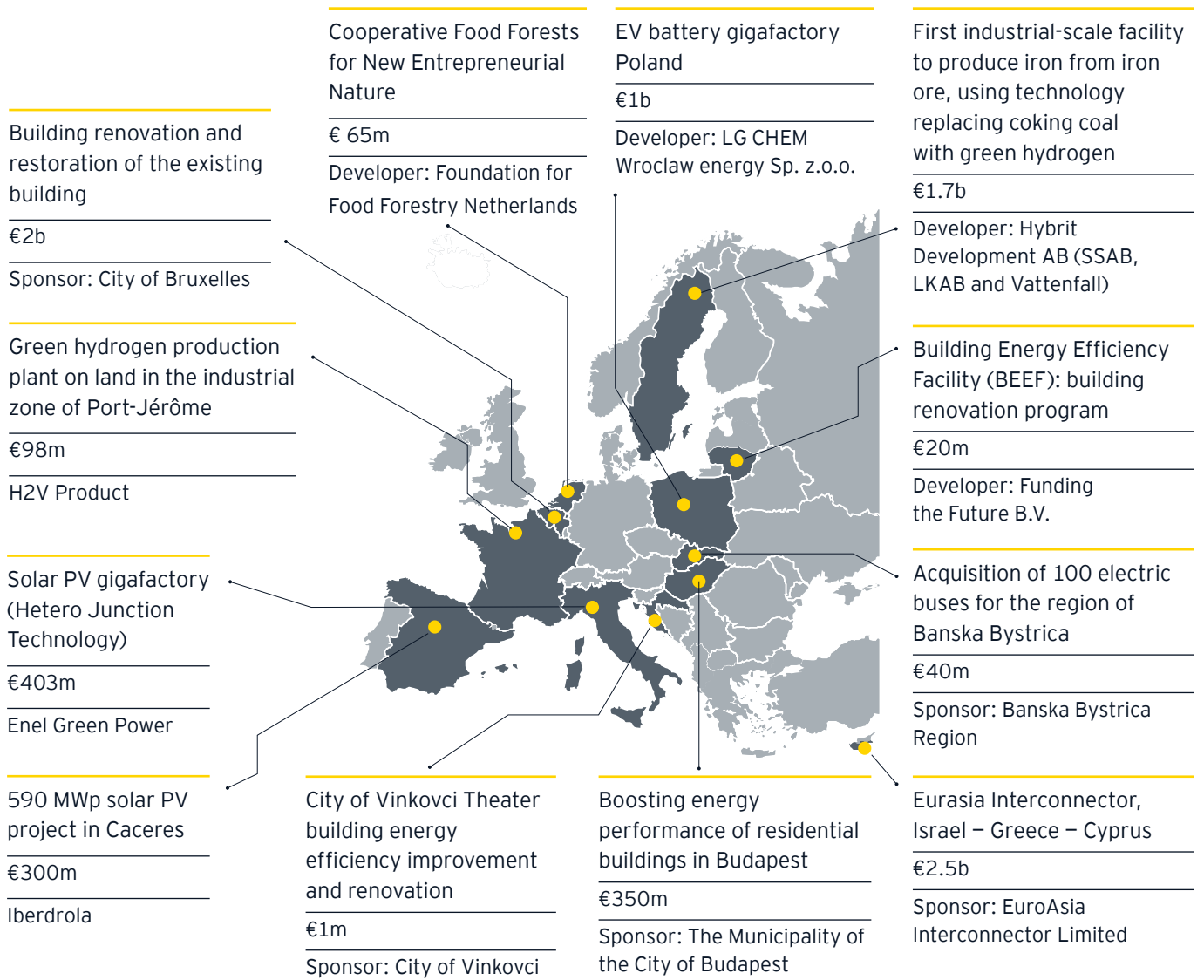


Figure 11. Project pipeline – jobs supported per sector (thousand FTEs)



- ▶ Among the initial project list, the selected 1,000 projects represent an overall investment of €200b.
- ▶ These 1,000 projects have the potential to support 2.8 million jobs (head count) across Europe (2.3 million FTEs) and represent 20% of the total number of jobs expected to have been suppressed in 2020 because of the COVID-19 pandemic.
- ▶ On average, €1m invested in the selected 1,000 projects supports a head count of 13.8 in Europe (11.7 FTEs). Local job intensity is higher than those encountered in several GHG-emitting sectors such as mining and quarrying (4 FTEs per €1m) and petroleum refining (6 FTEs per €1m), suggesting that climate transition should be considered a priority for sustaining job recovery in Europe.
- ▶ The 1,000 projects selected would save the emission of 2.3 GtCO<sub>2</sub>e and actively contribute to building pathways to climate neutrality by 2050.
- ▶ This work also revealed several opportunities that could be implemented to raise regulatory, administrative or commercial barriers encountered by climate transition project developers.

Figure 12. Examples of selected projects





5

# Sectoral analysis







1 Energy

2 Transport

3 Buildings

4 Industry

5 Land use



# Sectoral analysis

## 1 Energy

### Review of selected projects

Projects identified

374

Investment required

€75b

### A robust pipeline of projects developed by a mature renewable energy sector

- ▶ The analysis identified 374 projects that occur in areas such as renewable energy generation, energy storage, transmission and distribution, as well as district heating and cooling. The aggregate investment required amounts to €75b (for identified projects). The average size of project (€202m of investment) varies from small, decentralized projects to large-scale infrastructure projects (involving renewable energy generation or electricity transmission). Not all projects under development are captured due to the time constraints of this study or confidentiality concerns.
- ▶ Project developers include mostly large corporations, in particular, utilities, SMEs and start-ups, as well as public entities, local authorities and cooperatives. In the list of projects selected in the energy sector, over 40% are developed by large corporations, representing 61% of investment requirements for this sector, while start-ups and SMEs represent close to 30% of projects identified, with only 10% of investment needs, indicating a smaller average project size. In the energy sector, consortia (bringing together public entities, utilities, and SMEs) are used frequently to develop large, capital-intensive projects or to deploy new technologies. They account for 16% of investments required. This reflects the dynamism of large utilities in the European renewable energy market.

Figure 13. Top 15 Countries for the energy sector (number of projects)

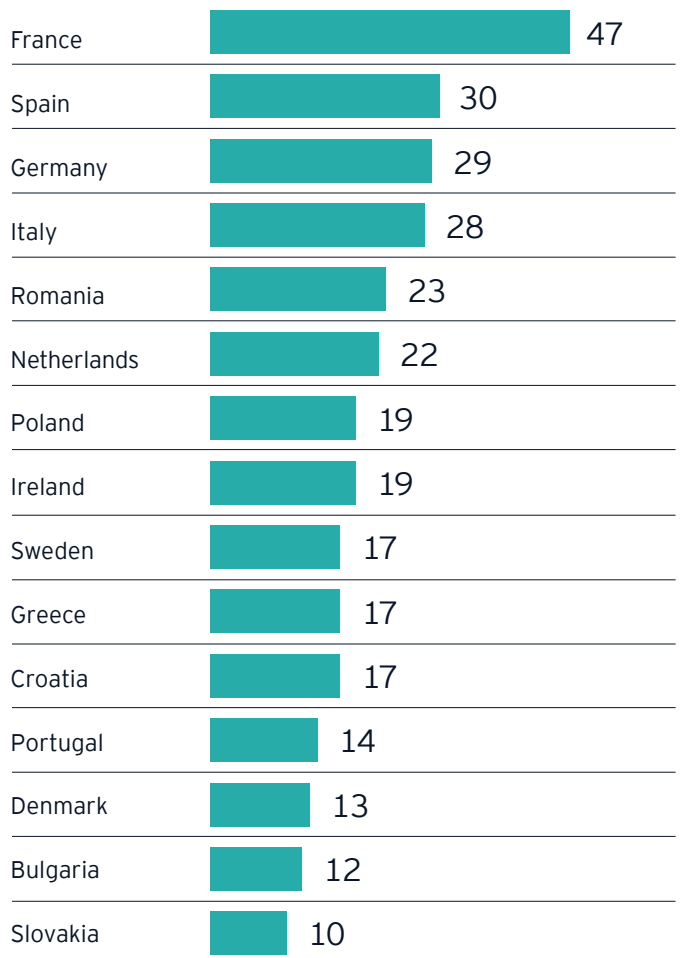
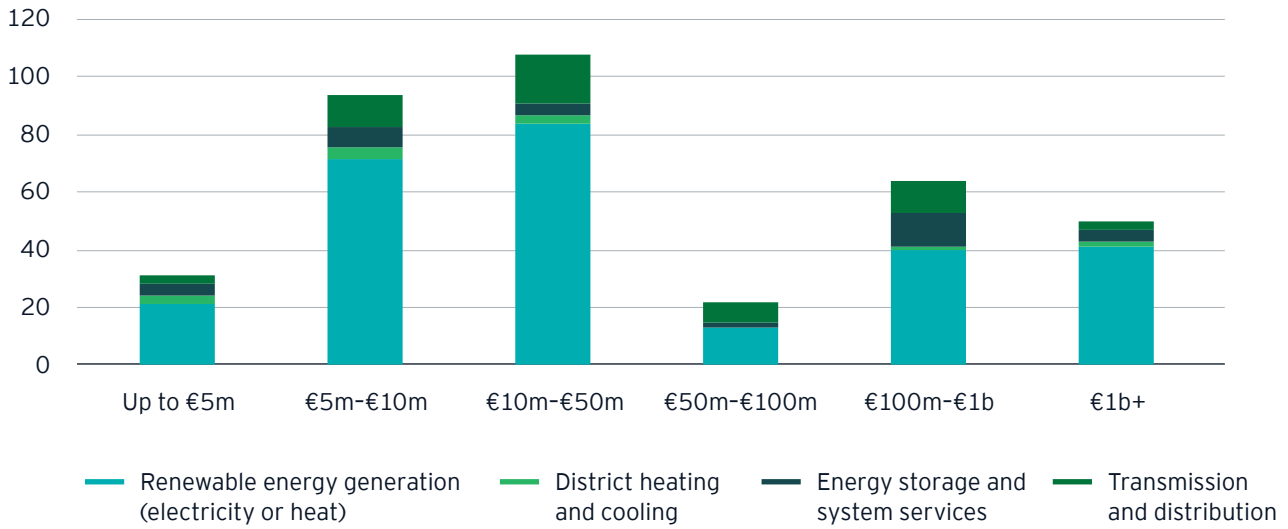


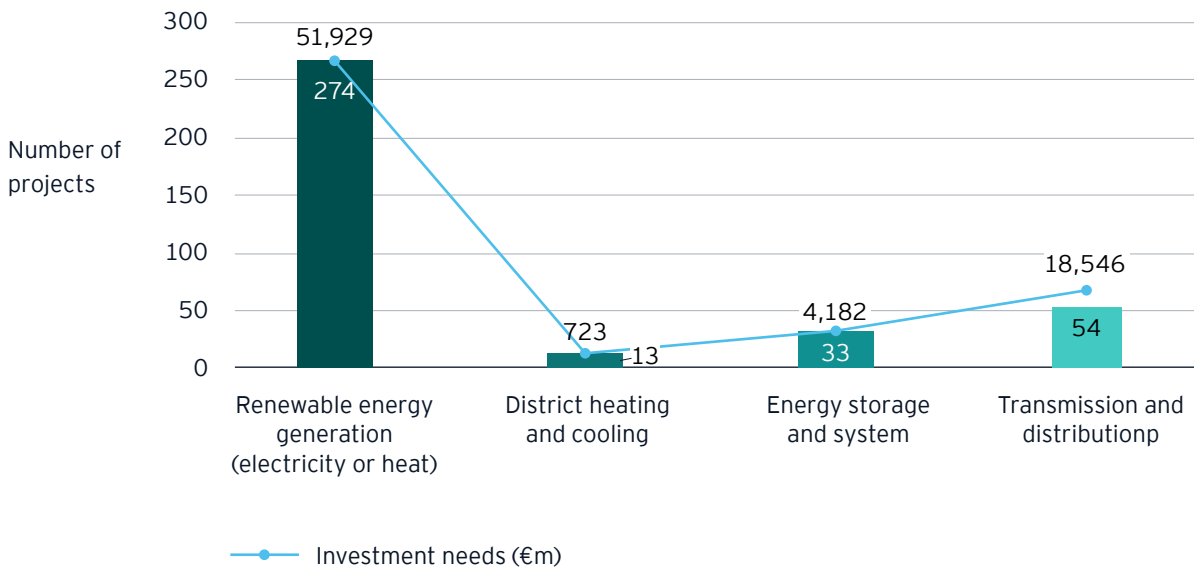
Figure 14. Investment needs for energy subsector (number of projects)



Seven countries concentrate over 50% of all projects selected: France (13%), Spain (8%), Germany (8%), Italy (7%), Romania (6%), the Netherlands (6%) and Poland (5%).

The distribution by investment needs shows, however, a different breakdown due to large grid infrastructure projects located in Hungary and the Netherlands.

Figure 15. Project distribution for energy subsector





- ▶ In terms of project categories, 73% of projects submitted and 69% of investment needed relate to renewable energy generation. These projects can be split into three groups of similar number of projects depending on the size of the investment required: a third of up to €10m, another third between €10m and €100m and the final third requiring €100m and above.
- ▶ The project category that comes second in the number of projects is transmission and distribution (14% of projects selected) followed by energy storage and system services. The average size of transmission projects is substantially higher, due to the large infrastructure projects involved in grid extensions. Taken together, the 54 transmission projects represent over €18b of investment, about a quarter of the total for the energy sector. Other categories, such as district cooling and heating, represent smaller shares of project numbers and investment requirements. The selection includes several projects of large-scale manufacturing of advanced solar PV modules (in Germany, Italy and France), of batteries (in Poland and Sweden), and of electrolyzers (in Spain).
- ▶ Out of 374 projects, 193 have indicated main barriers. For 43% of these projects, the most important barrier is financial.

### Key impacts and value added

- ▶ The selected energy projects have the potential to support over 1 million jobs (head count). This indicates that the job intensity of projects in the energy sector is, on average, 13.3, i.e., investing in the energy projects selected would support on average 13.3 jobs (head count) per €1m invested (11 FTEs).
- ▶ Total GHG impact: the emissions abatement potential of the projects identified is estimated at 465 MtCO<sub>2e</sub> avoided over the projects' lifetimes, with an average GHG reduction intensity of 7.1 MtCO<sub>2e</sub> per €1m invested.
- ▶ Considering that the 374 shovel-ready projects identified are a fraction of energy projects currently under development, their contribution is only an illustration of how the overall market segments (energy storage, renewable energy generation, etc.) will likely contribute to the reduction of carbon emissions in Europe and to job creation. Based on the average job and carbon intensity calculated for the projects, we have identified the total carbon abatement potential at the market segment level would reach 1.1 GtCO<sub>2e</sub> in 2030 (annual emission reductions) and 2.6 million jobs sustained in 2030.

### Comments on the share of energy projects in the project list

The energy sector is very dynamic in all EU markets and is well structured. The European renewable energy landscape includes large utilities, some of which are part of the largest renewable energy project developers globally, with 2 GW to 3 GW of new installed capacity each year as well as dynamic middle-market developers. As many projects in the energy sector are infrastructure projects that go through a lengthy development process, a significant part of project-level information is available or public. This may explain why energy sector projects are an important component of the list of 1,000 projects identified. However, we estimate that the projects selected represent no more than 5% to 10% of projects currently under development in Europe.

Potential impacts of selected projects

**1,029,000** head count

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**(867,000 FTEs)**

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**465 MtCO<sub>2e</sub>**

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GHG reduction potential over the lifetime of the projects

## Challenges for deployment

- ▶ Many respondents to the survey and interview requests expressed the will to build and invest in projects that deliver environmental value. They encourage EU leaders to continue developing new initiatives to support such projects and to stay in a leading role worldwide.
- ▶ Accelerating the development of renewable energy projects will also require overcoming barriers related to grid connection timelines and insufficient power transmission capacity. Infrastructure expansions are needed to take into account the EU's climate target. For example, the transmission network has been saturated in Spain with strong capacity additions (4 GW) over a single year, while in the Netherlands the saturation of the distribution network prevents new additions of rooftop solar.
- ▶ Current challenges in Europe include the fact that in many countries the permitting process is long and complex, and is increasingly becoming a bottleneck.
- ▶ Tax exemptions or subsidies for conventional fuels limit the penetration of more recent green energy technologies.
- ▶ A number of project developers consider that the post-COVID-19 situation may create more restrictive and constraining financing terms from debt lenders, which would, as a consequence, impact the financial feasibility of their projects. Some corporations have also indicated the need to focus on margin protection in the coming months and will likely postpone or cancel investments, for example in the manufacturing of low-carbon technologies.

## Opportunities

There are a number of ways that deployment of the projects identified could be accelerated with support from EU, national and local bodies.

### Transmission and distribution networks

- ▶ Prioritize public investments in the extension of power transmission and distribution networks, with the support of the Connecting Europe Facility (CEF) and the Trans-European Network in the Field of Energy (TEN-E) initiatives, in line with the EU's long-term climate neutrality objective.

### Permitting process

- ▶ Facilitate administrative procedures and set clear and enforceable deadlines.
- ▶ Support capacity-building for local and national authorities in charge of permitting processes.
- ▶ Simplify and shorten permitting procedures where possible to maintain high-quality projects that respect environmental considerations, while ensuring a fast, cost-efficient process focused on the long term.

### Market framework conditions

- ▶ Provide better visibility on auctions: indicating the volume of megawatts expected per year and per country will provide clarity for project developers and equipment manufacturers. Similarly, deploying European-wide procurement schemes via auctions or corporate Power Purchase Agreements (PPAs) will contribute to improving the visibility on market deployment.
- ▶ Renewable energy supply chains should be considered as strategic sectors, given the strong competition from countries outside of the EU. Other measures to support industrial relocation in EU countries should be developed.
- ▶ Contract-for-Difference schemes – which guarantee a fixed price for eligible generators of renewable energy – have proven useful and should be deployed widely in the EU.
- ▶ Support capacity building at the municipal level to enhance the emergence of projects.
- ▶ Support the deployment of corporate PPAs with a dedicated guarantee scheme: as the economic downturn will affect commerce and industry, a counterparty risk guarantee will be needed to support corporate PPAs.





## 2 Transport

### Review of selected projects

Projects identified

217

Investment required

€87b

Public transport infrastructure and innovative mobility technology-based projects drive development of the sector.

- ▶ The analysis identified 217 projects in the transport sector and they occur in areas such as electrification of transport, recharge infrastructure for low-carbon mobility, public transport, autonomous vehicles and connectivity or low-carbon logistics. The aggregate investment required amounts to €87b (for identified projects). The average “ticket size” of investments per project (€403m) is substantially higher than for other sectors due to the fact that many transport projects represent significant investments for the purchasing of equipment (acquisition of electric bus fleets, for example) or for the deployment of transport infrastructure (electric vehicle recharge networks, tramway lines, etc.). Not all projects under development are captured due to the time constraints of this study or to confidentiality concerns.
- ▶ Start-ups and SMEs represent roughly 20% of projects identified and less than 5% of investment needs, mainly for projects related to innovations in sustainable mobility (development of electric ships, hydrogen taxis, enhance charging stations, etc.). Public organizations represent more than 40% of projects in number and investment needs, with several large rail and metro projects, which can reach several billions of euros in investment per project. Potentially due to the size and high capital-intensity of transport projects selected, consortia represent 16% of projects and 24% of investment needs.

Figure 16. Top 15 countries for the transport sector (number of projects)

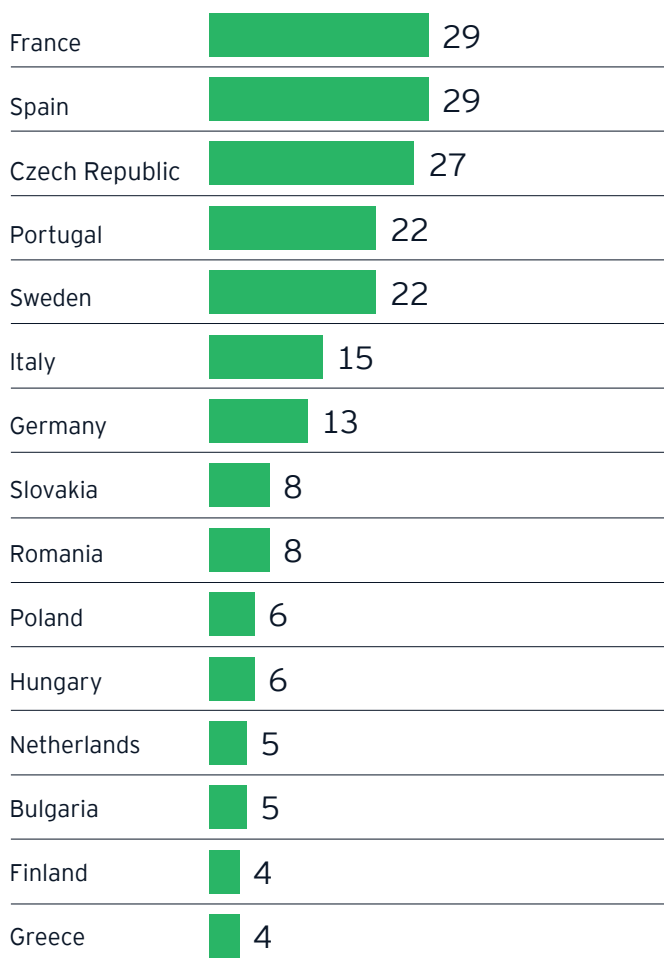
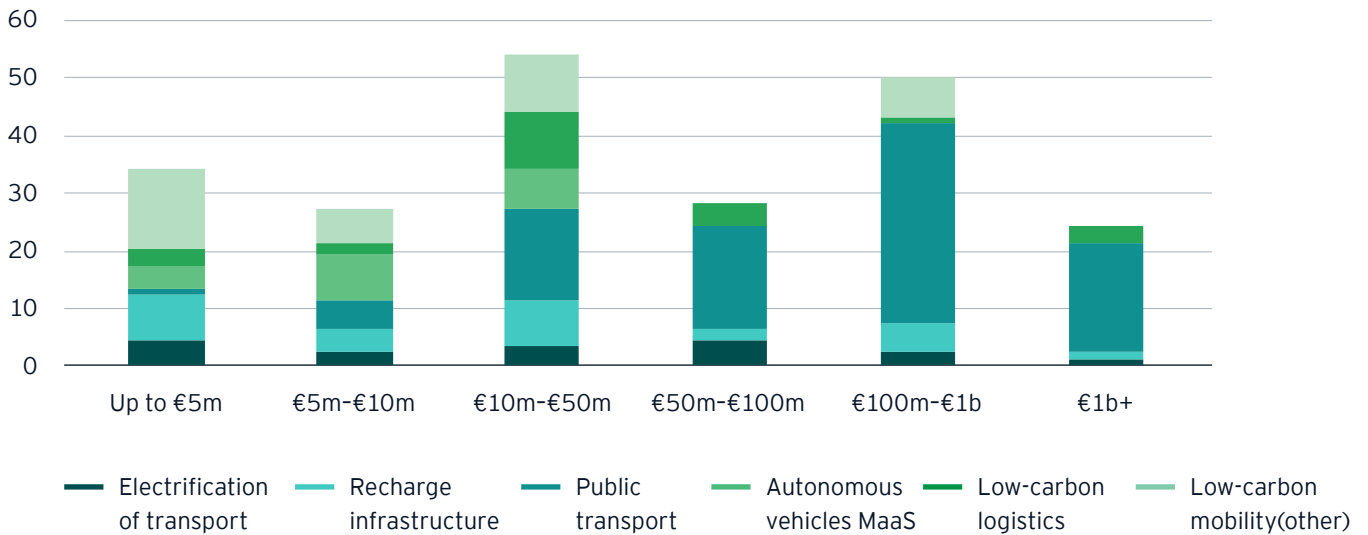


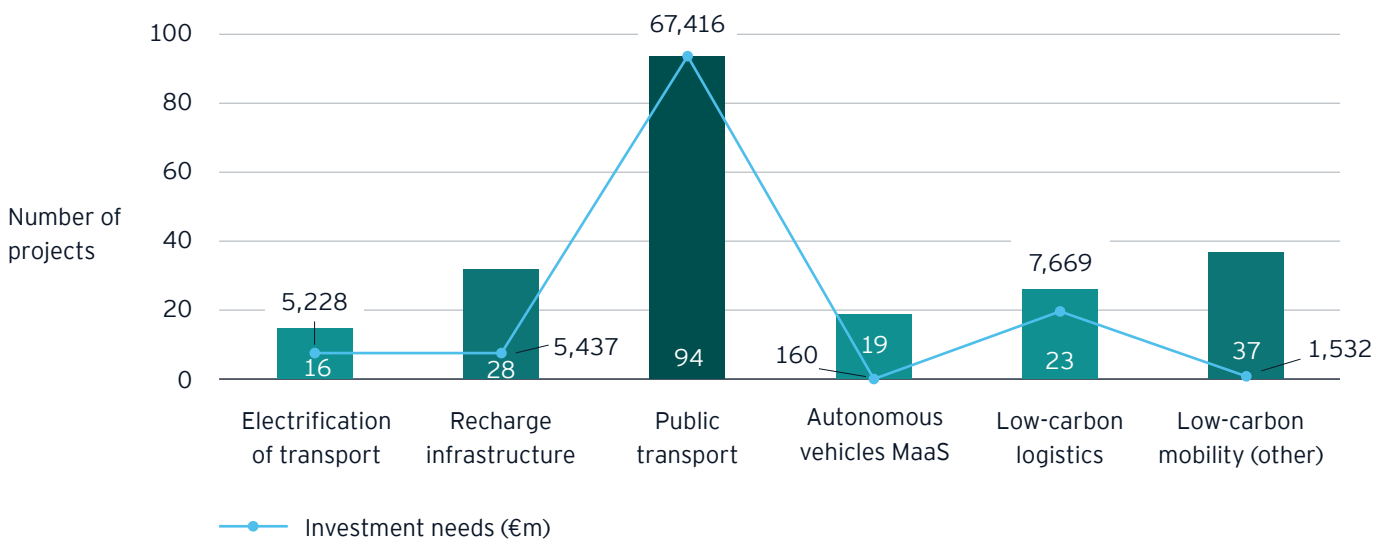
Figure 17. Investment needs per subsector (number of projects)



Countries where most projects have been identified are France (13% of projects), Spain (13%), Czech Republic (12%), Portugal (10%), Sweden (10%), Italy (7%), Germany

(6%) and Slovakia (4%). Demography is one of the factors explaining this distribution of projects.

Figure 18. Project distribution for transport subsector





- ▶ Public transportation are the largest group, with 94 projects, representing 77% of the sector's investment needs. This group includes tramway and metro links or extensions and fuel-switch projects for railways and presents a very high average investment size (approximately €717m). Low-carbon mobility comes second in terms of the number of projects, with more than 17% of projects submitted, but only 2% of investment requirements as most of these projects related to innovative sustainable mobility approaches. Other project categories each represent between €3b and €5.5b of investments (low-carbon logistics, recharge infrastructure, equipment for electrification of mobility). These amounts cover a variety of projects, some of which, for example, cycling trails and deployment of electric buses, represent over €1b of investments, while others require small-scale investments to launch an innovative transport technology. Lastly, although projects in e-mobility represented 9% of collected projects, they count for less than 1% of investment due to their small size.
- ▶ Some projects correspond to the first phases of projects that will require more substantial investment in the coming years.
- ▶ Out of the 217 projects, 106 projects have indicated barriers. For 54%, the main barrier is financing.

### Key impacts and value added

- ▶ Due to their size, the transport projects selected will have a substantial impact on jobs if they are implemented. The number of jobs supported by the transport projects identified is estimated above 1 million (head count), with a job intensity of 11.6 jobs (head count) per €1m invested (13.4 FTEs).
- ▶ Total GHG impact: the emissions abatement potential of transport projects identified through fuel switch and decarbonization of mobility is estimated at 1.5 GtCO<sub>2e</sub> avoided over the projects' lifetimes, with an average GHG reduction intensity of 11.8 tCO<sub>2e</sub> per €1m invested.

### Comments on the share of transport projects in the project list

The COVID-19 pandemic has had a severe impact on the transport sector due to the lockdowns across Europe. As a consequence, a number of public transport operators are under strong financial pressure as their activity has come to a partial or total halt for several months and revenues have dropped.

The impact of COVID-19 pandemic has also been very strong on manufacturers of equipment (cars, buses, fuel-cell drive trains, etc.) as their clients (public transport operators or residential customers) have reduced purchasing.

For operators in the EV charging sector, the lockdowns have caused installation of infrastructure to stop, while revenues have dropped because of the reduction in road traffic. This, in turn, impacts the capacity of EV or hydrogen-mobility players to access finance, especially for start-ups that do not have stable cash flows yet, as investors are reluctant to invest in emerging mobility technologies if uncertainties over traffic negatively impacts growth and profitability perspectives.

#### Potential impacts of selected projects

**1,098,000** head count

**(992,000 FTEs)**

**1.5 GtCO<sub>2e</sub>**

GHG reduction potential over the lifetime of the projects

## Opportunities

There are a number of ways that deployment of the projects identified could be accelerated with support from EU, national and local bodies.

### Financing instruments

- ▶ Financing support could be required in the short run to compensate for the reductions in transport companies' turnovers during the lockdown periods, and to allow the continuation of a number of electrical recharge infrastructure projects.
- ▶ Investment support and financing instruments providing grants, loans and guarantee mechanisms (for instance, to cover traffic risk) could help in the long run to accelerate the deployment of low-carbon mobility, and, in particular, capital-intensive projects such as EV recharge infrastructure and green hydrogen refueling stations. As an example, investments in green hydrogen fuel cell systems and storage tanks, plus the necessary distribution infrastructure to transport hydrogen, add up to about €40b by 2030. Financing support should prioritize new technologies that have not reached commercial maturity yet and first commercializations of innovative systems and technologies.
- ▶ Dedicated funding programs for industrialization and scale-up of existing technologies are needed as private investors (venture capital and private equity) in Europe are too few to cover financing gaps for industrial scale-up.
- ▶ Electric charging networks should be included as a component of wider, strategic investments as part of future strategies of national power networks.
- ▶ Specific instruments should be defined to support cities and regions in their programs to modernize public transportation.

### Regulatory measures

- ▶ Regulatory measures at the local level (cities and regions) can play a strong role in phasing out the most polluting vehicles and accelerating the market for innovative mobility solutions, for example in terms of air-quality standards for heavy-duty vehicles and taxis. Some countries have already announced phase-out dates for fossil fuel engines. France has announced that new sales of gasoline and diesel cars will be completely phased out by 2040 while this will happen in 2030 for Sweden.
- ▶ Regulations should be common for all EU member states and standards must be set in such a way that electric charging technologies are interoperable.

### Market incentives

- ▶ Support fuel-switching of bus fleets by considering that only electric buses (battery or fuel-cell powered) can be purchased for cities above a certain threshold.
- ▶ Support, via dedicated tenders, fuel-switch initiatives in the rail sector, both for passengers and freight, via the introduction of green hydrogen-powered trains.
- ▶ Provide visibility about upcoming tenders in the transport sector and on the incentives for low-carbon mobility solutions.
- ▶ Training and awareness raising should be enhanced to encourage behavioral change.
- ▶ Avoid subsidies for fossil fuel technologies in public funding recovery packages.





# Sectoral analysis

## 3 Buildings

### Review of selected projects

Projects identified

125

Investment required

€13.3b

### A majority of small- to medium-sized projects are driven by renovation targets across Europe

- ▶ The analysis identified 215 projects in the buildings sector and they occur in areas such as building energy management, building renovation and energy efficiency improvements, construction processes and innovative building materials. Not all projects under development are captured due to the time constraint of this study or to confidentiality concerns.
- ▶ The aggregate investment required amounts to €13.3b (for identified projects). Apart from one multi-billion-euro project, the aggregate investment needs are €7.6b and the average size of projects (€61m of investment). They range from public initiatives to large-scale private infrastructure projects, and from renovation projects to true architectural innovations.
- ▶ Project developers include mostly start-ups and SMEs, as well as public entities, large corporates, local authorities and cooperatives. More than 35% of selected projects are developed by start-ups and SMEs, yet representing only 9% of investment requirements, indicating a smaller average size of project. On the contrary, public organizations account for roughly 35% of projects in number, yet they represent 64% of investment needs. Interestingly, consortia (bringing together public entities, utilities and SMEs) account for only 8% of investments required and 16% for large corporates.

Figure 19. Top 15 countries for the buildings sector (number of projects)

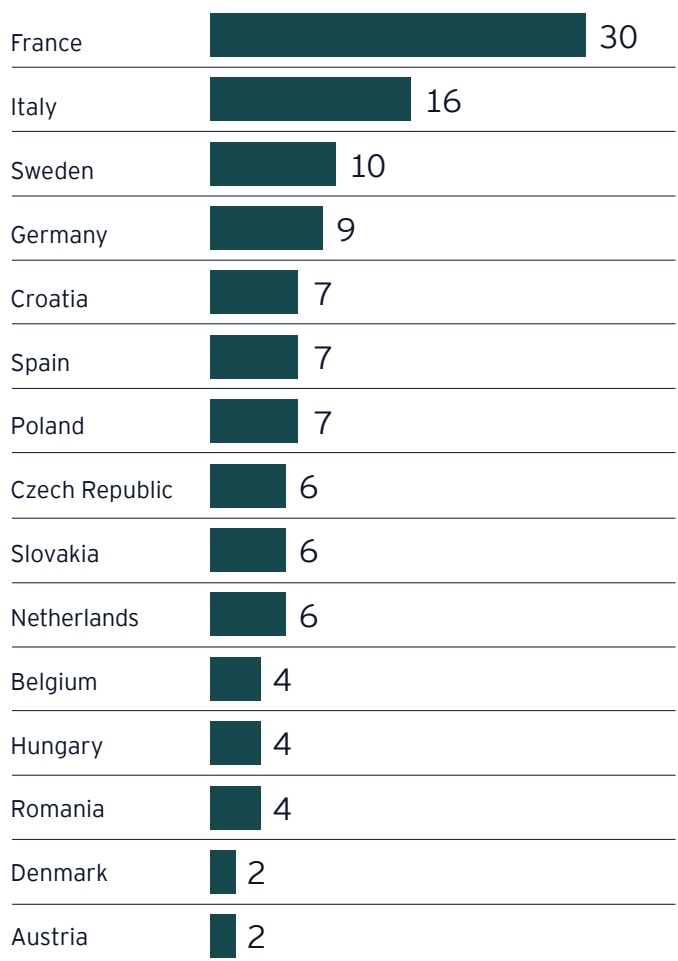
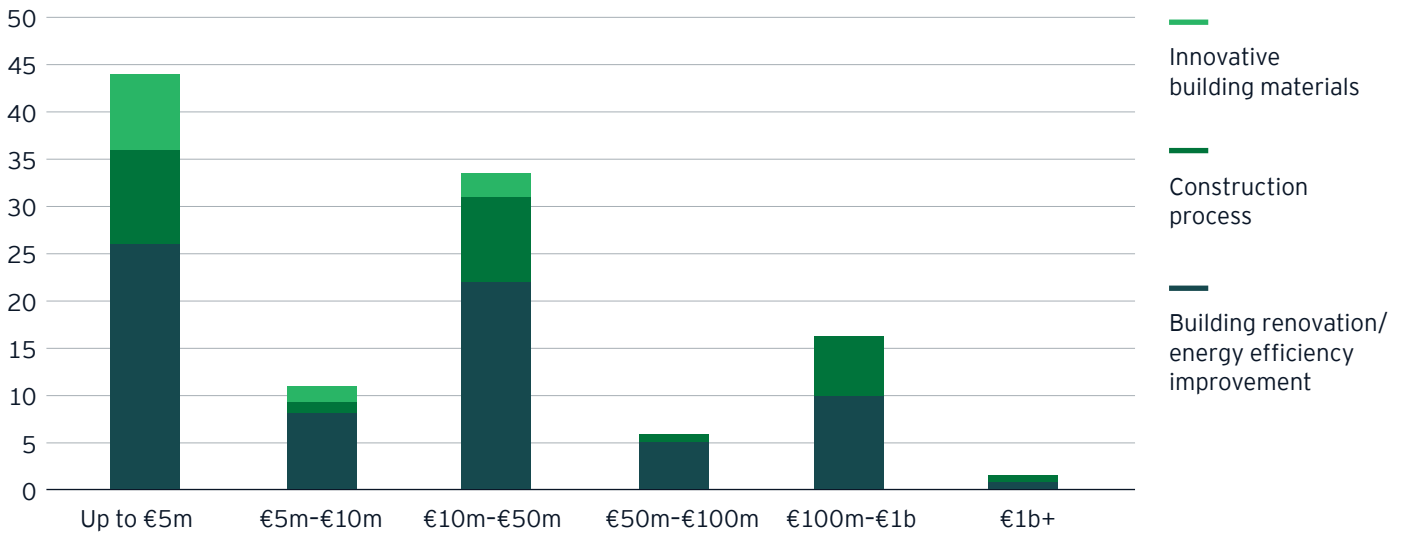


Figure 20. Investment needs for buildings subsector (number of projects)<sup>2</sup>

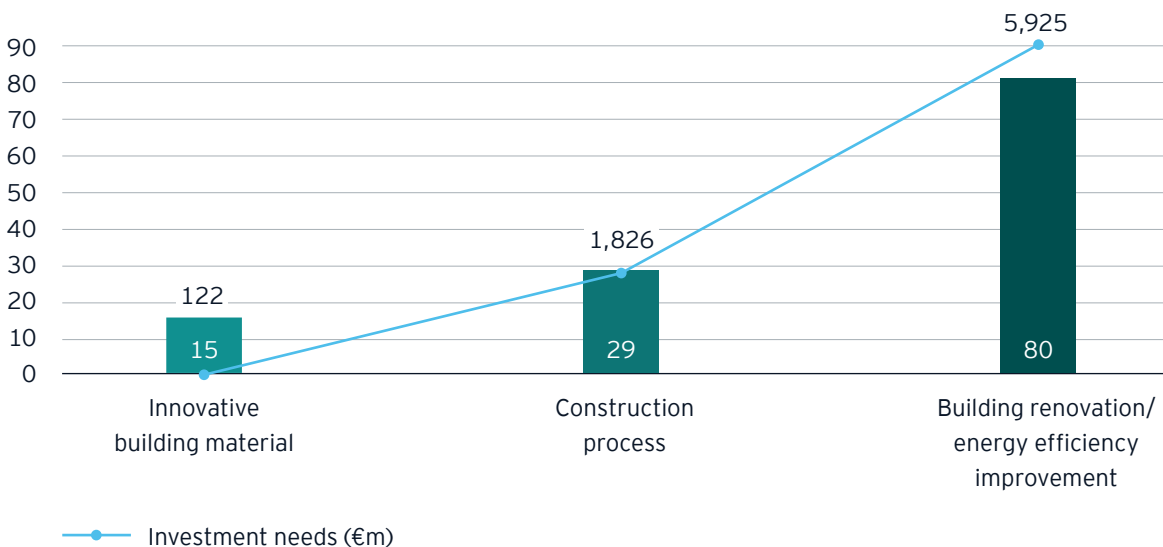


France has the most projects identified in the buildings sector (24%), followed by Italy (13%), Sweden (4%) and Germany (4%). The distribution by investment needs shows, however, a different breakdown with

a predominance of small projects with investment needs below €5m due to market fragmentation. Large investment needs appear to be more frequent for renovation projects.

### Review of selected projects

Figure 21. Project distribution for buildings subsector<sup>3</sup>



<sup>2,3</sup> Out of the 125 projects, we identified the main barrier for 96 projects.

- ▶ In terms of project categories, about 65% of projects submitted and 75% of the investment needed relate to building renovation, with an average investment size of roughly €74m. The two other project categories are equivalent in terms of the number of projects submitted, although the average size of construction process projects is substantially higher (€68m versus €9m for innovative building materials). Taken together, the 81 renovation projects represent €5.9b of investment. Other categories represent smaller shares of project numbers and investment requirements.
- ▶ Some projects included in the list correspond to the first phase of projects that will lead to a second phase that will require much more substantial investments.
- ▶ The main project barrier was identified for 96 of the 125 projects (77%). For 60% of these projects, the main barrier is financing, while nonfinancial barriers (regulatory, for example) came first for 40% of projects.

#### Potential impacts of selected projects

237,000<sub>head count</sub>

(184,000 FTEs)

207 MtCO<sub>2e</sub>

GHG reduction potential over the lifetime of the projects

#### Key impacts and value added

- ▶ Deploying all the projects selected would support an estimated 237,000 jobs (head count). This indicates that the job intensity of the buildings sector is higher than the average, with a ratio of 18 jobs (head count) per €1m invested (14 FTEs). As many projects have a strong replicability potential and a high job intensity, low-carbon building projects represent a significant opportunity to support job creation.
- ▶ Total GHG impact: in the same way, the emissions abatement potential of the projects identified is estimated at 207 MtCO<sub>2e</sub> avoided over the projects' lifetimes, with an average GHG reduction intensity of around 4.3 tCO<sub>2e</sub> per €1m invested.
- ▶ Considering that the 1,000 shovel-ready projects that have been identified are a fraction of building projects currently under development, their contribution is only an illustration of how the overall market segments (building renovation, construction process, etc.) will likely contribute to the reduction of carbon emissions in Europe and to job creation. Based on the average job and carbon intensity calculated for the projects identified and on estimates for future market size, the total carbon abatement potential at the market segment level is estimated at 379 MtCO<sub>2e</sub> in 2030 (annual emission reductions) and 1.2 million jobs sustained in 2030.

#### Comments on the share of building projects in the project list

The Energy Performance of Buildings Directive (EPBD) requires the development of stronger long-term national renovation strategies to renovate existing buildings into nearly zero-energy buildings (NZEB) to decarbonize national building stocks by 2050. The COVID-19 pandemic calls into question the demand for new construction projects and the future of tertiary real estate (generalization of flexible working and home office).



## Opportunities

There are a number of ways that deployment of the projects identified could be accelerated with support from EU, national and local bodies.

### Market framework conditions and support schemes

- ▶ To meet the EU's climate and energy objectives, the current rates of renovations should at least double. Public support should focus on energy renovation projects and continued efforts to increase building energy performance, particularly for residential buildings. Significant programs, covering a large number of housing units, are likely needed to mobilize the fragmented ecosystem, allow early-stage investments and develop solutions on an industrial scale. The regulatory framework should also be adapted to ease the deployment of renovation projects. Dedicated financing instruments could support the implementation of large-scale renovation programs (e.g., grants and guarantees).
- ▶ Large construction companies need more visibility on the trajectory to follow to orient their activities portfolio toward a green transition.
- ▶ The buildings sector is facing a digitalization challenge. With the implementation of smart building technologies and the development of new tools more adapted to energy transition, efforts should be made to foster transversal skills development and workforce adaptation to new technologies.
- ▶ Addressing the demand for renovation will likely require programs for skills development or adaptation to deploy new materials, processes and technologies.

### Research and innovation

- ▶ Investments in research and innovation from the state and the private sector should be intensified, especially in energy-efficient components and technologies to modernize technical building systems with smart technologies.



- ▶ There should be an increase in the innovation of new building materials and renovation business models.
- ▶ Given that air quality has become a major health issue for indoor areas, especially in the context of COVID-19 pandemic, solutions that avoid ventilation losses while maintaining good indoor air quality should be investigated. Building companies should give priority to low-emission and low-toxicity materials and products.

### Collaborative approaches

- ▶ Enhanced cooperation between various actors would support various actors to support the development of large-scale green building projects and strengthen relationships and discussions with local authorities.
- ▶ Waste management and the circular economy are key topics for the buildings industry that require structure and further investigation. Best practice sharing, large-scale initiatives and reinforced investments should be implemented to meet the ambitious goals of the European Waste Directive (2008) aiming to recover 70% of construction waste by 2020.
- ▶ Awareness-raising campaigns should be pursued to educate industry players on good practices before and after construction or renovation work.
- ▶ Stronger cooperation between market players is necessary to overcome inefficiencies due to fragmentation of the sector.

# Sectoral analysis

## 4 Industry

### Review of selected projects

Projects identified

201

Investment required

€19.1b

### A diversified pipeline of projects with a focus on the circular economy and process efficiency

- ▶ The analysis identified 201 projects in the industry sector, for a total investment requirement of €19.1b. Approximately 36% of the projects identified are related to the circular economy, and another third focus on industrial process improvement. The list also includes 37 projects (18% of the total) aimed at producing green hydrogen for industrial purposes, and 8 Carbon Capture, Utilization and Storage (CCUS) projects, for a total investment requirement close to €737m. Overall, the average project size is about €98m. Not all projects under development are captured due to time constraints of this study or to confidentiality concerns.
- ▶ Around 40% of the projects selected are developed by SMEs and start-ups. However, they account for 17% of total investment needs, with an average investment per project close to €38m. Large corporations (30% of projects selected) and consortia of large and smaller companies (13% of projects selected) represent together 77% of total investment needs. For large corporations, the average investment size per project is substantial: it reaches €166m, with 15 projects submitted by large corporates over the €100m mark, while 20 projects require less than €10m, indicating a large spread of project sizes.

Figure 22. Top 15 countries for industry sector (number of projects)

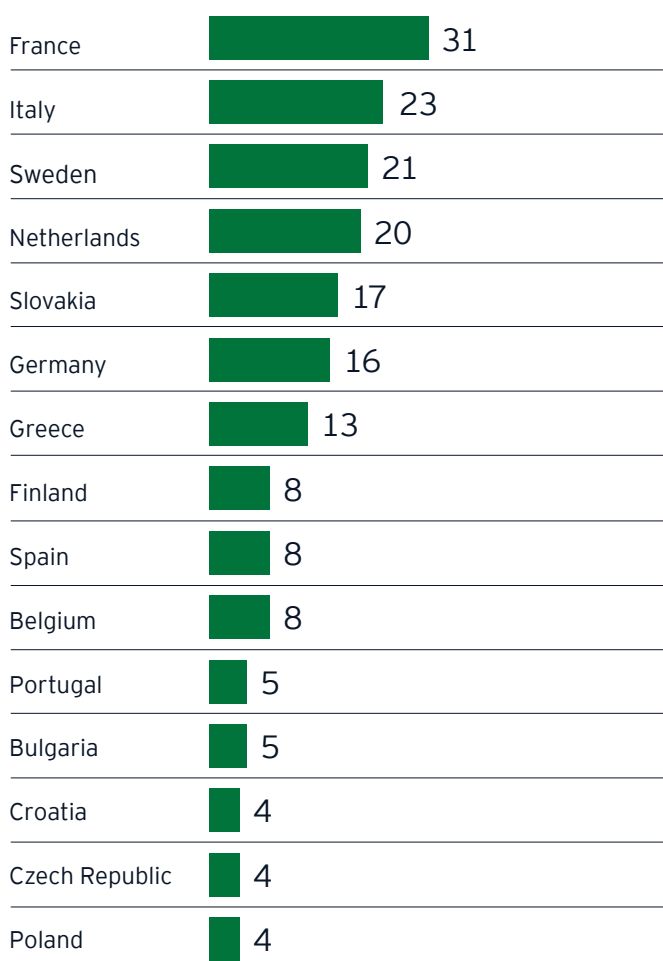
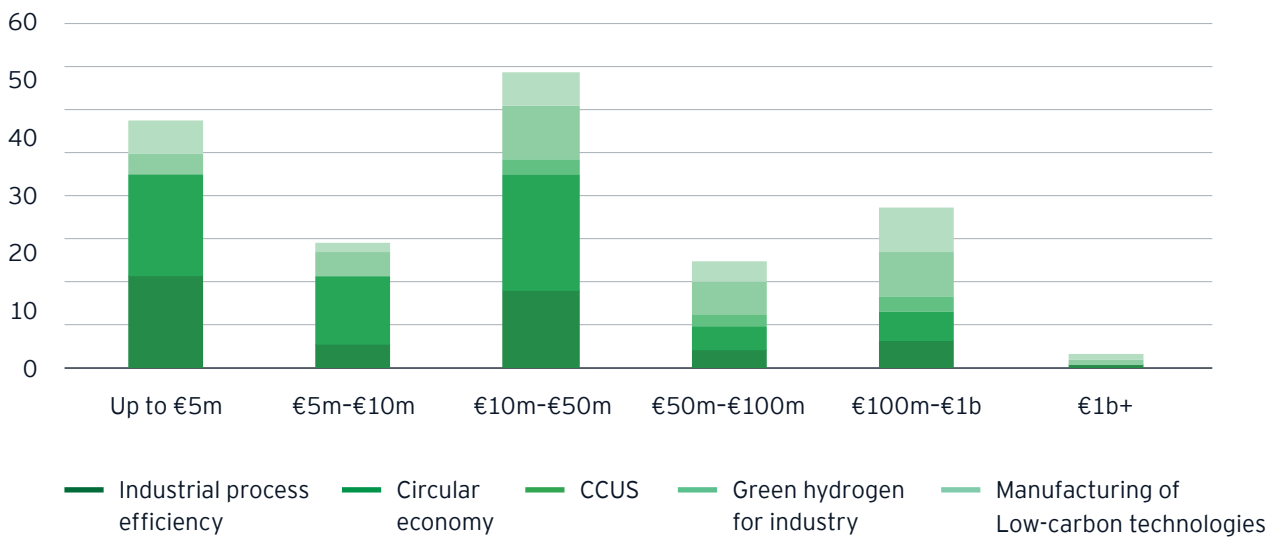


Figure 23. Investment needs for industry subsector (number of projects)

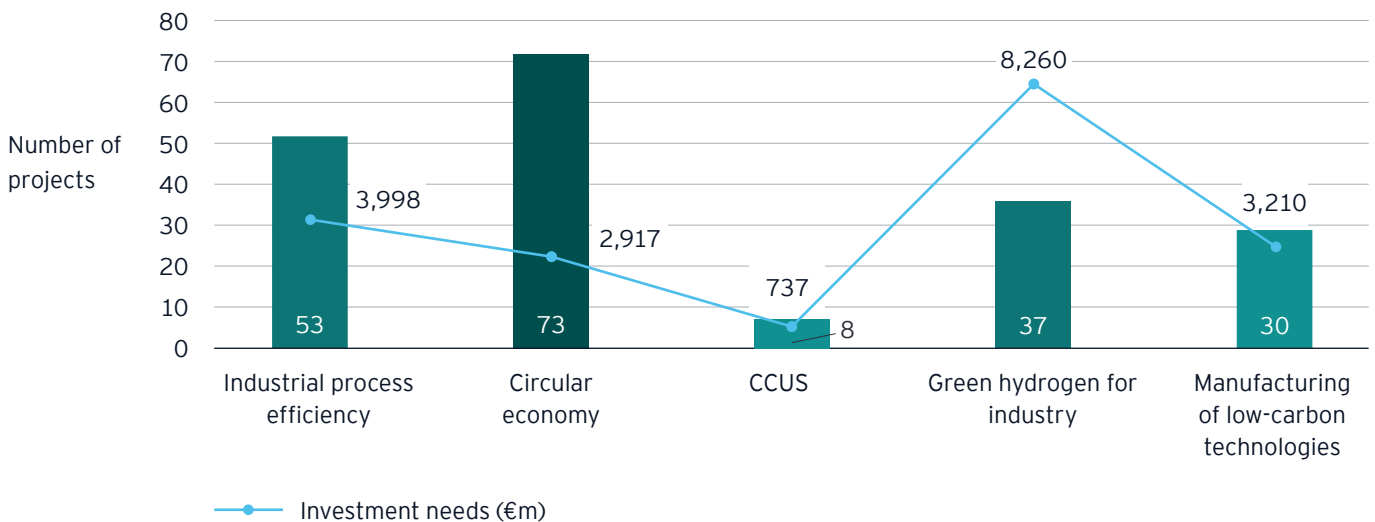


The projects identified in the industry sector are spread across all EU countries. Nevertheless, five countries make up more than 50% of projects identified: France (15%), Italy (11%), Sweden (10%), the Netherlands (10%) and

Slovakia (8%). In terms of investment needs, the countries with the largest projects are Portugal, Sweden, the Netherlands and Germany.

## Review of selected projects

Figure 24. Project distribution for industry subsector





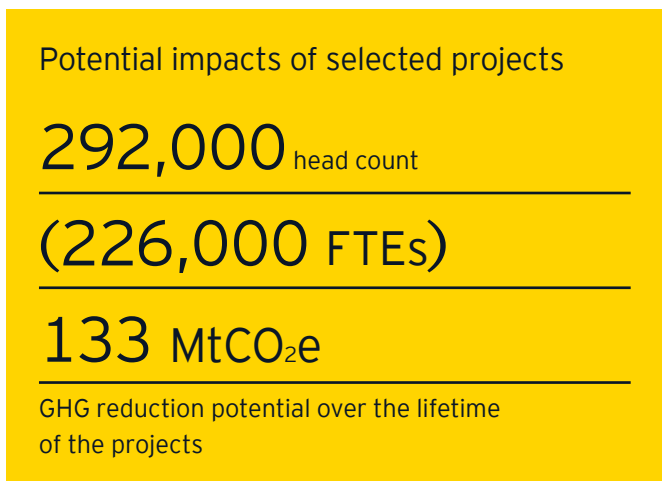
- ▶ In terms of project categories, a third (36%) of projects submitted concern the circular economy although this corresponds to only 16% of the investment needs of the industry sector.
- ▶ The two other project categories that are well represented in terms of number of projects submitted are industrial process efficiency (26%) and green hydrogen for industry (18%). This latter category represents the largest share of industry investment needs with a 43% share and an average project value of €223m.
- ▶ Other categories, such as manufacturing of low-carbon technology and CCUS represent smaller shares of project numbers and investment requirements (within identified projects, as not all CCUS projects are included).
- ▶ Out of the 201 projects, the main project barrier was identified for 130 projects (65%). For 49% of these projects, the most important barrier is nonfinancial.

### Key impacts and value added

- ▶ The implementation of all projects selected in the list would support about 292,000 jobs (head count). This indicates that investing in the industry projects selected would support on average 15.6 jobs (head count) per €1m invested (11.8 FTEs).
- ▶ Total GHG impact: The emissions abatement potential of the projects identified is estimated at around 133 MtCO<sub>2</sub>e avoided over the projects' lifetimes, with an average GHG reduction intensity estimated at 5.8 tCO<sub>2</sub>e per €1m invested.

### Comments on the share of industry projects in the project list

As a number of projects identified are related to industrial process improvement and the extension or revamping of existing plants, identifying projects in the industry sector in a short span of time is a challenge. We expect that the list of 1,000 shovel-ready projects only captures a small share of low-carbon projects in the industry sector.



## Opportunities

There are a number of ways that deployment of the projects identified could be accelerated with support from EU, national and local bodies.

### Support to industrial innovation

- ▶ Promote formal and informal innovation platforms to support new partnerships and cross-fertilization of ideas.
- ▶ Enable regulatory sandboxes to accelerate innovation not anticipated by the current legislative and regulatory framework, to allow companies to quickly test their innovations on a small scale.

### Facilitating the build-up of local ecosystems

- ▶ Stimulate local ecosystems by combining communities, universities and companies, and facilitating their access to funding for the implementation of innovative projects.



- ▶ For the circular economy, decentralized approaches should be developed, bringing together local stakeholders (local authorities, industries, etc.).

### Market and regulatory incentives

- ▶ Create a level-playing field for environmentally sustainable solutions. In the current market uncertainty, industrial companies are particularly risk-averse and not keen to invest in new technologies and processes.
- ▶ Support competitiveness of low-emission technologies relative to conventional alternatives, for example, by providing incentives for renewable heating in industry to improve its competitiveness with coal and natural gas.
- ▶ Prioritize continued public investment in fossil-free, competitive industrial processes that can reduce industrial greenhouse gas emissions. Increased environmental requirements in public procurement also have a role to play.
- ▶ Clarify conditions and incentives for the implementation and scaling of carbon capture and storage.
- ▶ Reduce total number of emission allowances in line with the EU's climate neutrality target.

### Financing support

- ▶ Develop a guarantee mechanism, project development capital and early-stage equity for first market commercialization of innovative low-carbon technologies to support the uptake of new technologies.
- ▶ Support the development of the circular economy and green projects by deploying grants or risk-coverage instruments for innovative technologies.
- ▶ Financing of the projects should go hand in hand with establishing a policy framework that creates markets for zero-carbon materials (e.g., product standards, contracts for differences, public procurement rules), while ensuring the competitiveness of investing industrial actors.

# 5 Land use

## Review of selected projects

Projects identified

85

Investment required

€5b

### An emerging sector that combines substantial reforestation projects and innovative land management and farming technologies

- ▶ The analysis identified 85 projects in the land-use sector, for an aggregate investment need of €5b. The land-use sector is much less structured than the other sectors covered by this analysis. This is reflected in the fact that about 40% of projects identified have been proposed by start-ups and SMEs, while representing around 12% of financing needs. This also explains the low overall investment needs identified. Not all projects under development are captured due to the time constraints of this study or to confidentiality concerns.
- ▶ From the investment perspective, over 75% of investment needs identified are related to projects developed by public organizations. Taken together, large corporates and consortia represent 24% of projects and 12% of the investment required.
- ▶ The fact that land use is still an emerging sector, with a significant share of projects carried by municipal players, has implications for data access. Access to project-related information is difficult to obtain as projects are dispersed among small organizations. Currently, sectors such as agriculture technologies are increasingly identified by investors as emerging market segments. With the initiation of biodiversity strategies in several member states, and the implementation of the EU’s biodiversity strategy and “Farm to Fork” initiative, it is expected that the pipeline of land-use projects will rapidly develop in the next few years.

Figure 25. Top 15 countries for land-use sector (number of projects)

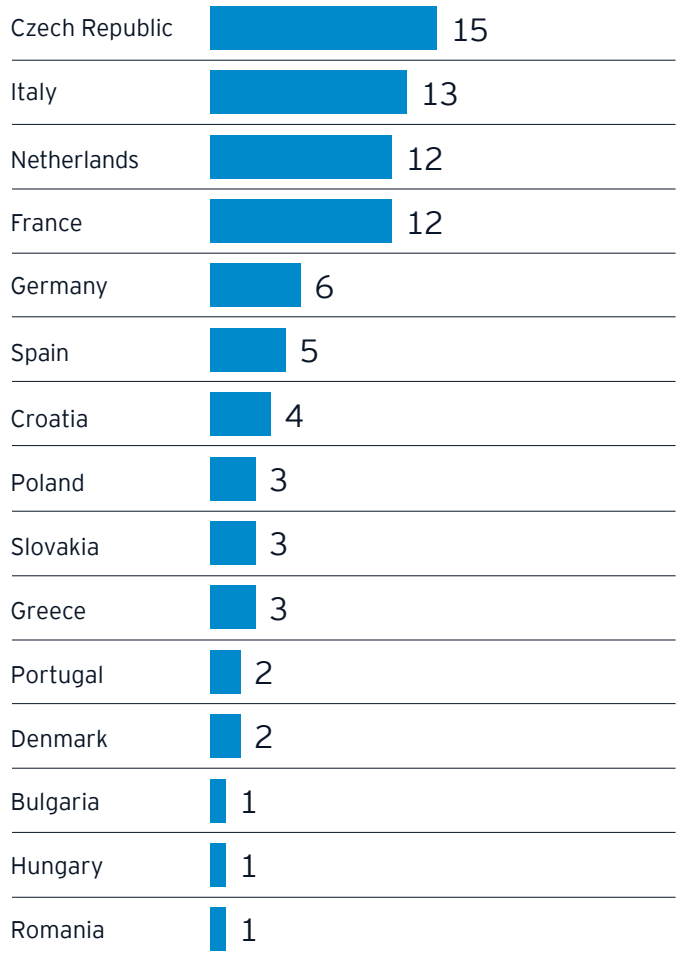
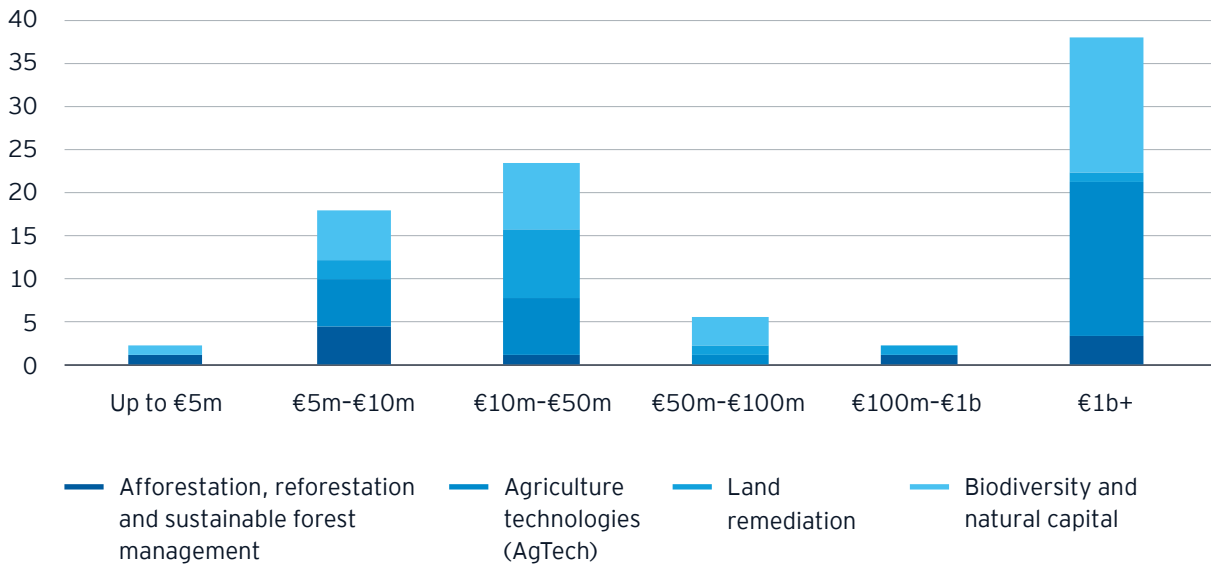




Figure 26. Investment needs for land-use subsector (number of projects)

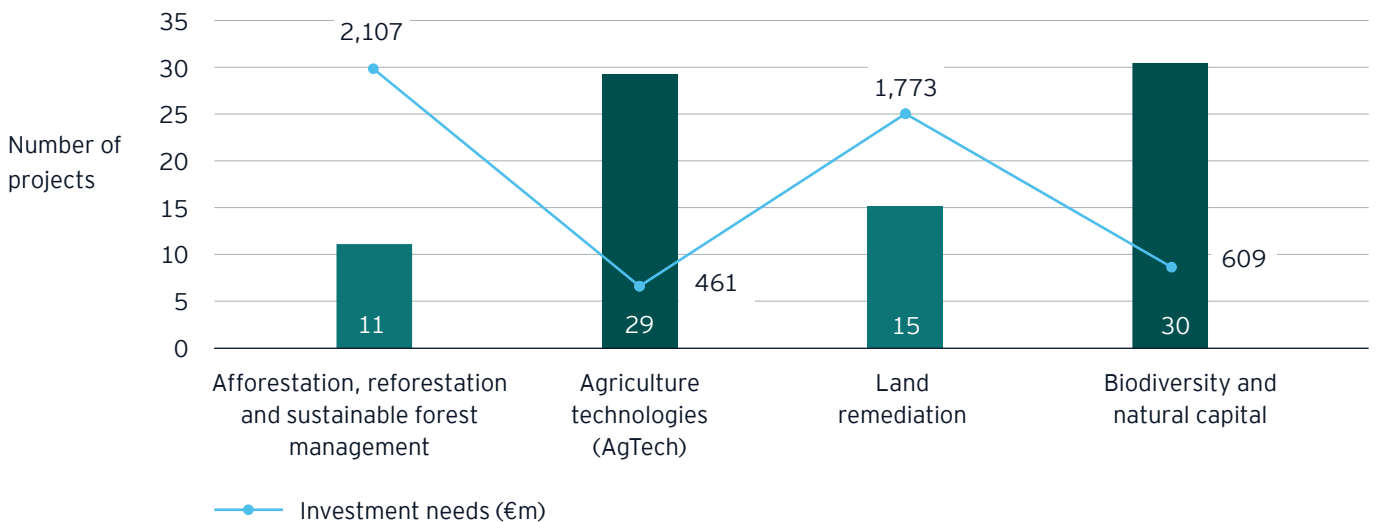


For land use, almost 50% of the projects identified are concentrated in three countries: Czech Republic (18%), Italy (13%) and the Netherlands (12%). Exactly the same distribution of projects is seen in terms of investment

amounts, showing that these three countries may be ahead of other EU member states for land-use development, or are more structured.

### Review of selected projects

Figure 27. Project distribution for land-use subsector



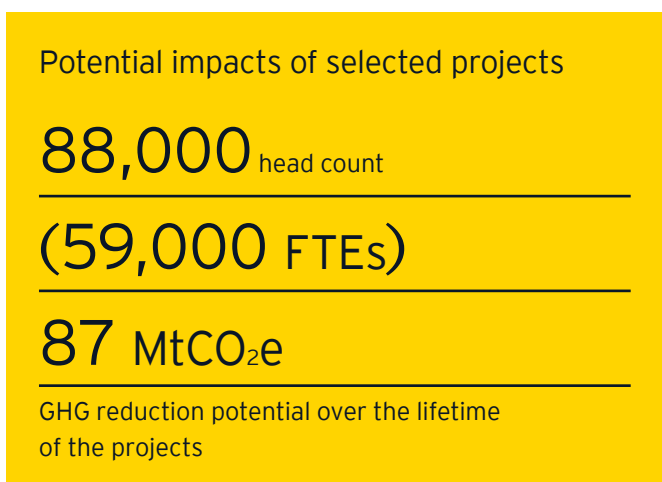
- ▶ The average size (€61m of investment) covers a diverse range of projects. In particular, projects in the agriculture technology and biodiversity segments present a much smaller average size (€16m and €21m respectively), and are often pilot projects. At the other end of the spectrum (fewer projects identified but much bigger investment sizes) are land remediation, afforestation and reforestation projects.
- ▶ In terms of project categories, agriculture technology projects, and biodiversity and natural capital, each represent more than a third of the projects submitted. However, taken together these two categories represent only 21% of the overall investment requirement of all land-use sector projects identified, revealing the small, innovative nature of most of the projects that fall into these categories.
- ▶ The bulk of the investment needs stem from afforestation, reforestation and land remediation projects, for which the average investment required is €211m.
- ▶ For 58% of the projects, financing is the most important barrier.

### Key impacts and value added

- ▶ The projects identified in the land-use sector have the potential to support about 88,000 jobs (head count). This indicates that investing in the selected land-use projects could support 19 jobs (head count) per €1m invested (12.5 FTEs).
- ▶ If implemented, the selected land-use projects have the potential to offset around 87 MtCO<sub>2e</sub> over the projects' lifetimes, with an average GHG reduction intensity of 5.6 tCO<sub>2e</sub> per €1m invested.
- ▶ GHG emissions reduction linked to land remediation could not be included in the analysis because of the lack of available data, especially regarding the potential for carbon capture of remediated land. The GHG emissions reduction potential for land use is thus underestimated.

### Comments on the share of industry projects in the project list

Due to the dispersed structure of the land-use sector, the projects identified reflect only a small proportion of all projects under development. It is notable that many of the projects uncovered, of which 40% are proposed by start-ups and SMEs, are innovative, and have high potential for replicability (respondents consider that 50% of projects submitted are replicable across the EU).



## Opportunities

There are a number of ways that deployment of the projects identified could be accelerated with support from EU, national and local bodies.

### Market framework conditions and support schemes

- ▶ Taking the opportunity of the upcoming “Farm to Fork” and Biodiversity 2030 strategies to adapt the Common Agriculture Policy framework. Efforts should be refocused on skills development and on providing support to innovative and transformational projects for the agriculture sector, to promote regenerative and resilient models for agriculture, forest and land management.
- ▶ Providing clarity on the framework conditions for production of forest and agriculture industry products by, for example, removing uncertainty with respect to views about forestry, taxes and fees linked to bio-based products and transportation.
- ▶ Increasing intra-EU collaboration to protect and value local agriculture, to identify schemes strengthening innovation and local production.
- ▶ Including biodiversity and carbon performance in public procurement criteria for agricultural products.

### Research and innovation

- ▶ Intensifying investment in research and innovation from the state and the private sector, as reflected by the high-technology intensity of some of the identified projects (in particular, in agricultural technology and land remediation).

### Collaborative approaches and capacity building

- ▶ Developing a citizen-farmer collaboration and discussion for sustainable growth of agriculture by involving and committing farmers, society and government toward the same objective.
- ▶ Promoting enhanced cooperation between all public agencies at local, regional and national level to support the development of land-use projects.
- ▶ Supporting the emergence of projects via technical assistance, awareness raising and capacity building to support the emergence of a strong land-use sector.

### Financing instruments

- ▶ Innovating the financing sector – regions and local authorities lack substantial financial resources to scale land-use projects, which have the potential to contribute to job creation in marginalized areas, food self-sufficiency and carbon offsetting. Innovations in the financing sector could support the transition to improved agricultural and land-use practices, such as including a carbon component in the pricing of agricultural products to reflect the soil carbon sequestration performance, payments based on carbon sequestered via sustainable practices and ecosystem restoration projects.











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