



A Green Covid-19 Recovery  
and Resilience Plan for Europe

Summary report

September 2020



**EY**

Building a better  
working world

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- ▶ The analysis and conclusions of this report are those of EY
- ▶ They are a summary of the contributions collected from stakeholders interviewed and desktop research.
- ▶ The set of policy recommendations do not necessarily reflect the opinion of all stakeholders consulted.
- ▶ EY is solely responsible for the content of this report



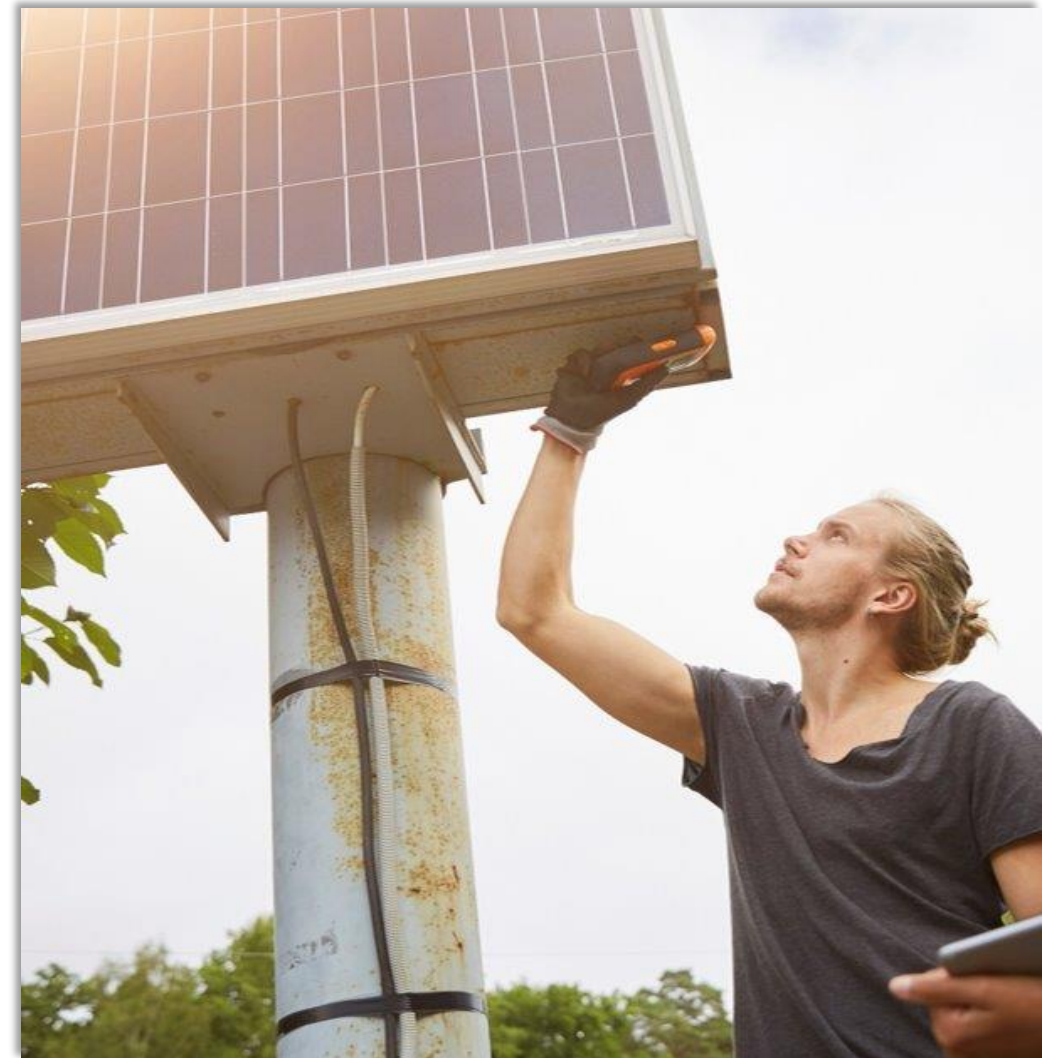
# Acknowledgements



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The authors would also like to thank all survey respondents and stakeholders that accepted to share project information with the project team, as well as the following organizations for their valuable guidance and input:

- ▶ Eurelectric
- ▶ European Association for Electromobility (AVERE)
- ▶ European Construction Industry Federation (FIEC)
- ▶ European Investment Bank (EIB)
- ▶ Hydrogen Europe
- ▶ Solar Heat Europe
- ▶ Solar Impulse Foundation
- ▶ Solar Power Europe
- ▶ Wind Europe





# 1. Executive summary



# Executive Summary

## The objective of the project is to support the development of green recovery plans by providing a list of 'shovel-ready' investment opportunities

EY teams in all 27 EU Member States identified projects that can 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).

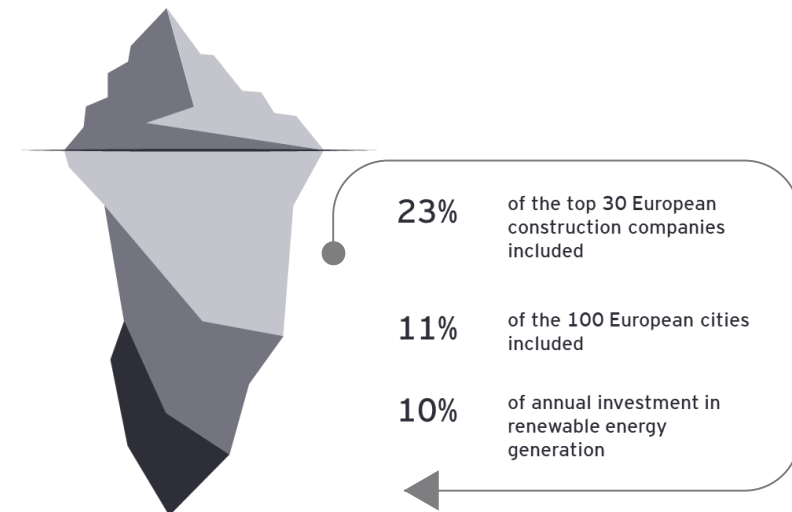
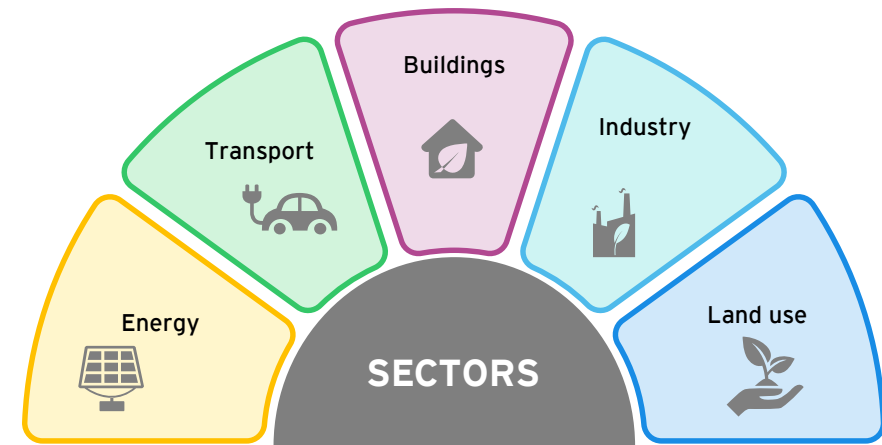
The 2,000+ "shovel-ready" opportunities offered were reviewed and 1,000 selected\* all having the potential to create social, environmental and economic value in the next 2 years. These opportunities are developed and just need a last push (which could be additional financing, or overcoming other barriers) to be realized.

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

This list of projects EY has uncovered was put together in just over 4 weeks, and illustrates the huge project pipeline that exists across all European countries to underpin a green and resilient recovery from the Covid-19 economic crisis. This is only a fraction of all projects with climate benefits under development in Europe at various levels of maturity, as we have focused on short-term opportunities, i.e. projects that will reach financial close in the next 24 months. Overall, we consider that we are capturing only 10% of green projects currently under development.

This means that the entire EU pipeline of green projects could be as high as €1 trillion and return all and more of the 12 million full-time workers lost to Covid-19 into green and productive activity.

\* The list is illustrative and inclusion of particular projects in the list should not be read as a full policy/commercial endorsement.



Sources - EY & Associés



# Executive Summary

## Projects were identified in all Member States, with Central and Eastern European countries performing well

Central and Eastern European countries perform very well in identifying 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.

The investment requirements of the selected projects would represent a sizeable portion of the EU stimulus grants. These financing needs could represent between 10% and 50% of the stimulus grants for the five countries receiving the largest shares of the Next Generation EU instrument.

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

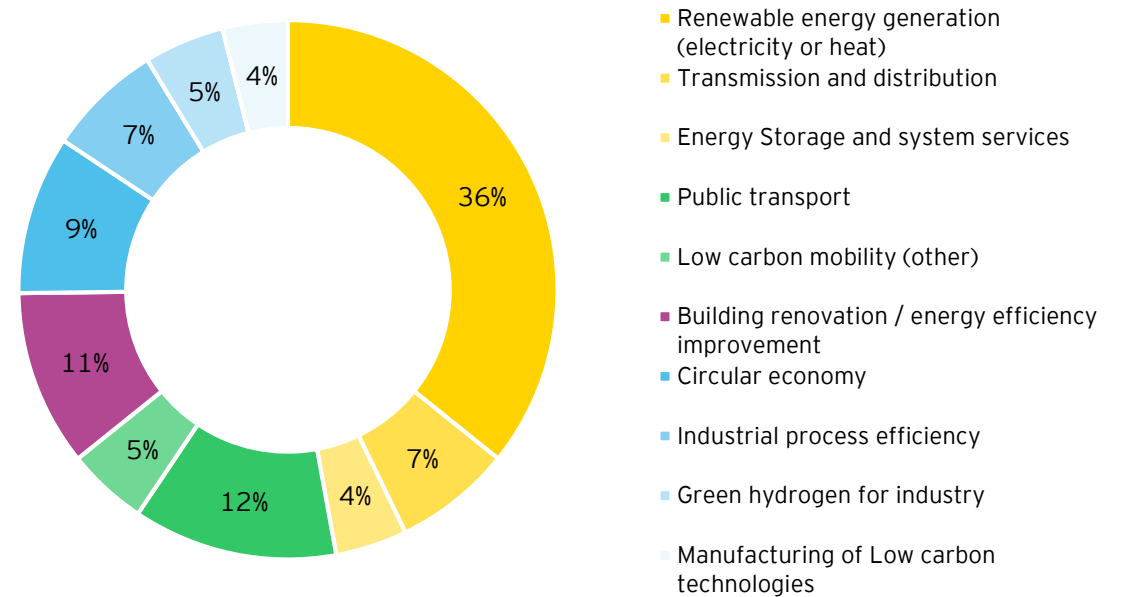
Energy and transport stand as two sectors where investment pipelines are well structured and identified. In sectors such as industry, buildings and land-use, the diffuse and smaller nature of projects and the fact that these sectors are less well structured at EU level explain partly the lower share of projects identified. In the case of buildings in particular the number of projects is low due to concerns on confidentiality and climate impacts which are more difficult to assess.

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

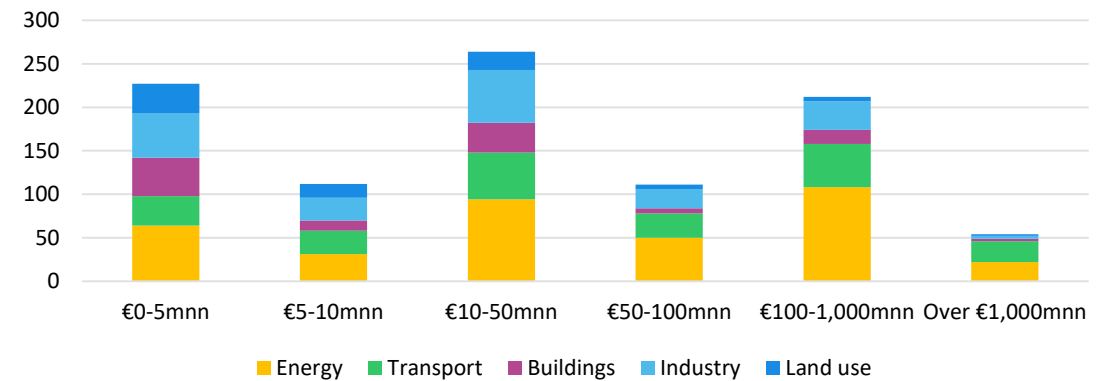
More than 20% of projects identified are small and require investments of up to €5 million. Some 30% of projects selected are innovative and developed by start-ups and SMEs, such as sustainable mobility solutions, green hydrogen, land remediation and low carbon construction materials. Supporting these innovations will build future European markets for green products and services in which these EU companies can lead.



TOP10 subsectors represent 76% of the 1,000+ green projects selected



Breakdown of the number of projects by sector and by investment range



Sources - EY & Associés



# Executive Summary

## These projects will require around €200 billion of public and private investment evenly distributed across all EU27 countries, and have the potential to support 2,8 million jobs

The list of 1,000+ projects that have been selected represents an aggregate investment of €200 billion, distributed evenly in all EU27 countries. We estimate that taken together, these investment opportunities will support some 2.8 million jobs (headcount) or 2.3 million FTEs (Full Time Equivalents). This represents nearly a quarter of job losses due to the economic consequences of the Covid-19 crisis in Europe.

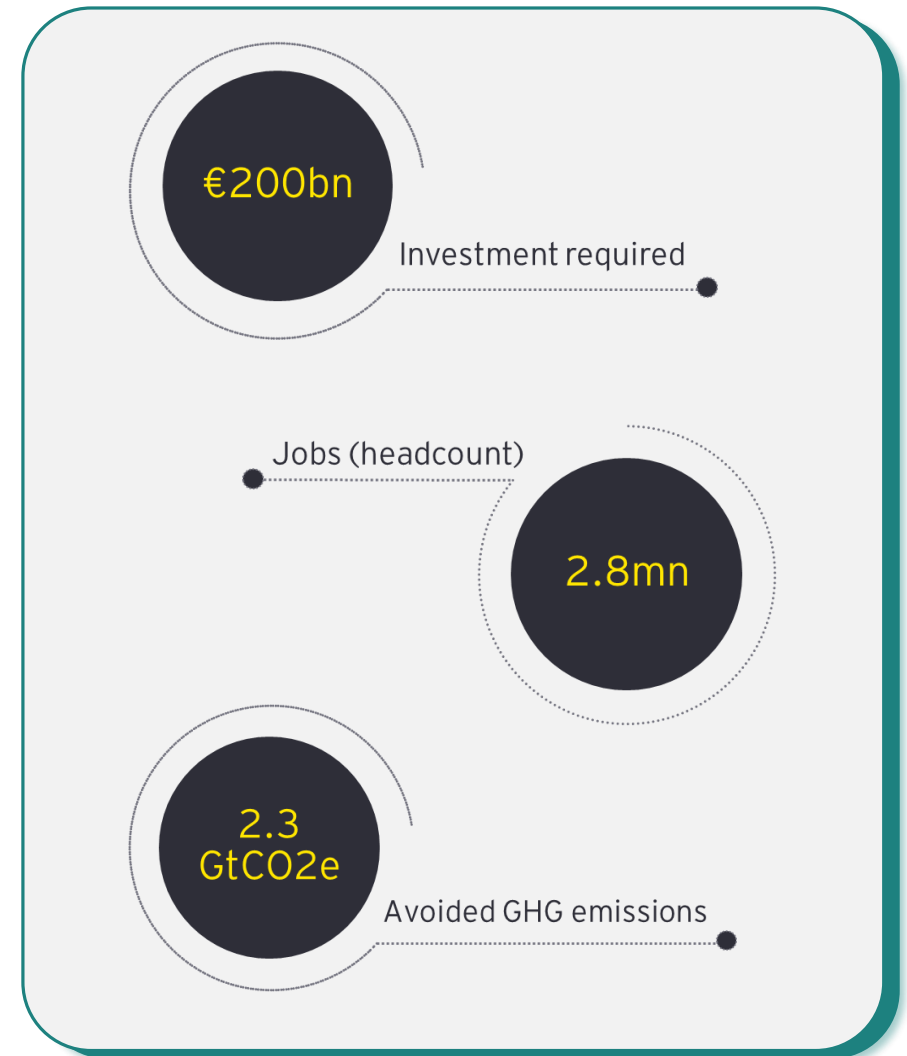
With a higher job-intensity ratio than in most other traditional and fossil-based industries, the low carbon projects we have uncovered can have a major contribution to a green and just economic recovery in Europe. Our analysis indicates that on average, €1 million invested in the list of opportunities we have 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 circular economy action plan. Depending on the technology, size and context of the projects, the aggregated green-house gas emissions avoided if the 1,000 projects selected are deployed are estimated at around 2.3 GtCO<sub>2</sub>e over the projects' lifetime.

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

Other potential benefits such as improved air quality, reduction of 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 deliver.





# Executive Summary



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

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

Financing is only one of the aspects holding back the deployment of green projects. For 49% of the projects we have selected, the main barrier is non-financial (regulatory, administrative, commercial...). This means that beyond financing instruments, policy and regulatory measures will also be required in order to deliver environmental and social value. The stakeholder consultations we have carried out reveals several key recommendations to support a green and resilient recovery in Europe.

Going forward, EY and partners will be presenting this list to the teams in the most covid-19 impacted Member States preparing their recovery and resilience plans, and engage with them to provide clear inputs and perspectives to support a green recovery that delivers strong environmental and social value, by sharing this list of ready-to-invest green and circular projects and our associated recommendations.







# Executive Summary



## Energy



- ▶ Energy is responsible for an important share of the EU's GHG emissions. As policies to decarbonize energy generation are deployed, reaching the EU's carbon reduction targets will require substantial investments.
- ▶ A large number (374) of projects have been identified, in areas such as renewable energy generation, energy storage, transmission and distribution as well as district heating and cooling. The aggregated investment required amounts to €75 billion spread over small, decentralized projects to large scale infrastructure projects (renewable energy generation or electricity transmission projects).

### Recommendations

- ▶ Simplify and shorten where possible permitting procedures so as to maintain high-quality projects while ensuring a fast, cost efficient, environmentally respectful and long-termed focused process.
- ▶ Prioritize public investments in the extension of power transmission and distribution networks, with the support of the CEF and TEN-E initiatives.
- ▶ Provide better visibility on auctions : indicating the volume of MW expected per year and per country)will provide clarity for project developers and equipment manufacturers.

**374** projects

**€75 bn** Investment

**1,029,000** Headcount

**867,000** FTEs

**464** MtCO2e lifetime emissions avoided

**11.05** Job intensity (FTE/€mn)

## Transport



- ▶ The Covid-19 situation has had a severe impact on the transport sector, which is an important contributor to EU's carbon emissions. With lockdowns across Europe, public transport operators, charge point operators for EV and equipment manufacturers, have seen their revenues drop.
- ▶ 217 projects in the transport sector have been selected in areas such as electrification of transport, recharge infrastructure for low carbon mobility, public transport, autonomous vehicles & connectivity or low carbon logistics. Taken together, these projects represent €87 billion of investments.

### Recommendations

- ▶ Financing support will be key in the short term to address the financial impact of the Covid-19 crisis and in the long run to support the roll-out of recharge infrastructure for battery-powered EVs and for hydrogen powered mobility. The support should be "Green" targeted.
- ▶ Regulatory measures at local level (cities and regions) will contribute to accelerate the penetration of low carbon mobility (air quality standards, for example).
- ▶ Common standards are needed at EU level to ensure the deployment and inter-operability of mobility solutions.

**217** projects

**€87 bn** Investment

**1,098,000** Headcount

**993,000** FTEs

**1,490\*** MtCO2e lifetime emissions avoided

**11.6** Job intensity (FTE/€mn)

\* Considering the methodology used, we compare the impact of investing €1 million in a clean transport alternative rather than in a conventional thermal car. As an example on urban railways, because we can have about 375 passengers per million invested in urban railways compared to 48.7 passengers for cars, the reduction potential is very high from a life-cycle point of view.



# Executive Summary



## Buildings

- ▶ The Energy Performance of Buildings Directive (EPBD) requires the development of stronger long-term national renovation strategies to decarbonize national building stocks by 2050. Renovation will be an important development area, as the Covid-19 has impacted the demand for new construction projects in the residential and commercial sector.
- ▶ 125 projects have been identified, in areas such as building energy management, building renovation, energy efficiency improvement, construction process and Innovative building material, for an aggregated investment need of €13 billion. The number of shovel ready projects is likely far greater as some projects initially considered had to be excluded from the study for confidentiality reasons.

### Recommendations

- ▶ Focus public financial support on energy renovation projects (existing construction).
- ▶ Intensify funding for research and innovation, especially in new construction materials and energy efficient technologies (smart-buildings, building envelope, digitalization, heating & cooling, lighting).
- ▶ Improve circular economy, as large-scale initiatives should be implemented in order to meet the targets from the European Waste Directive aiming to recover 70% of construction waste by 2020.
- ▶ A further cooperation between different actors is necessary to overcome the big sectorial obstacle, the market fragmentation.

**125** projects

**€13 bn** Investment

**237,000** Headcount  
**184,000** FTEs

**85** MtCO<sub>2</sub>e lifetime emissions avoided

**13.3** Job intensity (FTE/€mn)



## Industry

- ▶ In the current market uncertainty, industrial companies are particularly risk adverse and not keen to invest in new technologies and processes. The Covid situation has strongly impacted industrial output and a number of companies are prioritizing margin protection over new investments.
- ▶ 201 projects have been selected in the industry sector, for a total investment requirement of €19 billion, mostly in areas such as circular economy (40% of all projects identified) and industrial process improvement. The list also includes green hydrogen and CCUS projects.

### Recommendations

- ▶ Promote formal and informal innovation platforms to support new partnerships. Enable regulatory sandboxes to test innovations on a small scale.
- ▶ Create a level-playing field for sustainable solutions and support competitiveness of low carbon technologies in comparison with conventional alternatives.
- ▶ Develop a guarantee mechanism, a project development capital and early stage equity for first market commercialization of innovative low carbon technologies to support the uptake of new technologies.
- ▶ Financing of the projects has to go hand in hand with getting in place a policy framework that creates markets for zero carbon materials (e.g. product standards, contract for differences), but also ensures that the competitiveness of the investing industrial actors is ensured.

**201** projects

**€19 bn** investment

**292,000** Headcount  
**226,000** FTEs

**133** MtCO<sub>2</sub>e lifetime emissions avoided

**11.8** Job intensity (FTE/€mn)



# Executive Summary



## Land use

- ▶ The overall number of projects identified in the land-use sector is 85, for an aggregated investment need close to €5 billion. The projects identified are mostly in areas such as agricultural technologies, biodiversity and natural capital, as well as land remediation projects or afforestation and reforestation projects.
- ▶ The fact that the land-use sector is still an emerging sector with such an important share of projects carried by municipal players has implications for the access to project-level data. Access to project-related information is therefore difficult to obtain as projects are diffuse and as projects are dispersed between many small organizations.

## Recommendations

- ▶ The upcoming “Farm to Fork” and biodiversity strategies should contribute to support resilient models for agriculture, forest and land management.
- ▶ Support the emergence of projects via technical assistance and capacity building in order to support the emergence of a strong land-use sector.
- ▶ Innovative remuneration can 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.

**85** projects

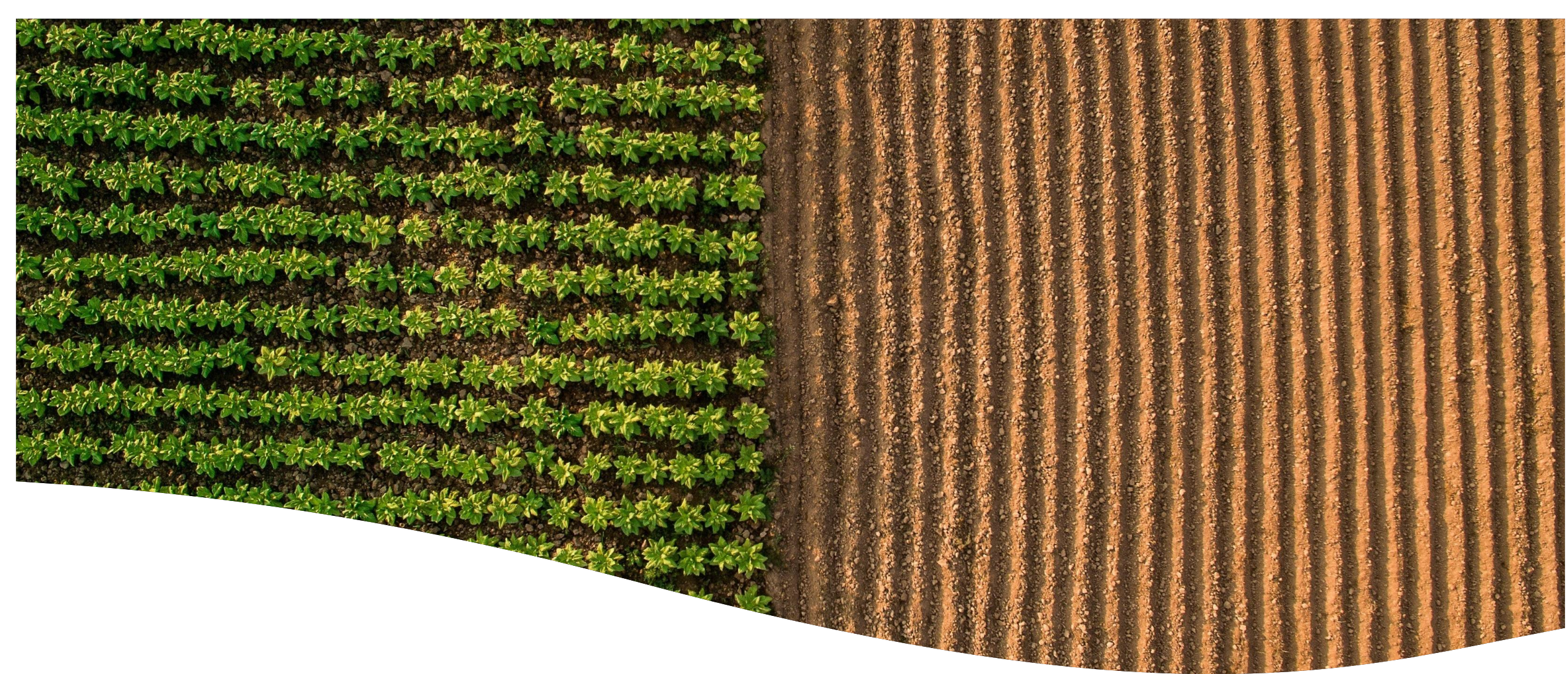
**€5 bn** investment

**88,000** Headcount  
59,000 FTEs

**87\*** MtCO<sub>2</sub>e lifetime emissions avoided

**12.4** Job intensity (FTE/€mn)

\*The GHG emissions reduction linked to land remediation were not included in our analysis, given the lack of available data. The GHG emissions reduction potential is thus underestimated given the potential for carbon capture of remediated land.



## 2. Context, objectives and methodology



# Context

*As EU Member States shape their recovery plans in post-Covid environment, the extent to which economic stimulus measures will focus on accelerating the transition to net-zero emission economies remains to be decided*



## An unprecedented sanitary and economic crisis

- ▶ The Covid-19 crisis marked a turning point in our modern history, questioning the exposure of our economies to severe events.
- ▶ The lockdown period has caused a drop in the activity of entire sectors of the economy such as the construction sector, the automotive sector or the tourism industry.
- ▶ The European Commission expects a drop of 8,3% of GDP in 2020, driven by spending collapse, supply chain distortion, and credit tightening.
- ▶ Due to a recovery of industrial output, a rebound of consumer spending could lead to a 5,8% growth of GDP in 2021. Nevertheless, historic job losses are expected in 2020. Restricted supply chains will continue to impact labor markets.
- ▶ Credit tightening, rating downgrades, and market volatility are already impacting access to capital and debt issuance for companies. For start-ups and SMEs with a limited track record (and therefore with limited access to corporate finance), the drop in revenues due to the Covid crisis 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 long-term objective of becoming carbon neutral by 2050. In this perspective, the Green Deal was announced early 2020 aiming at developing a strategy to protect the environment and to shift to a green economy.
- ▶ EU leaders are currently in the process of defining recovery plans, with the aim to support growth and job creation. The Green Deal will be one of the drivers to shape the choices of allocation of recovery efforts.
- ▶ The European Commission proposed in May to deploy a package of €750 bn to support economic recovery. This financial instrument, Next generation EU, will complement the EU budget for the period 2021-2027, bringing the EU's commitments to €1,850 bn the total financial capacity of the EU.
- ▶ As the EU leaders and Member States work on the preparation of economic stimuli plans, it is critical that environmental and social criteria are taken into account in the choices of budget allocations. Green conditionality and incentives could be incorporated into traditional financial instruments such as conditional loans issued by the European Safety Mechanism, guarantees or recapitalization, with the emerging EU Taxonomy serving as potential guidelines to set guidelines which will have a positive climate impact
- ▶ 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.



# Context

EY teams in EU 27 Member States have worked to uncover a list of 1,000 shovel-ready opportunities\* in 4 weeks

## Over a short period of time, close to 2,000 shovel-ready projects were identified in all EU Member States

- ▶ The list we have established focuses on five main sectors (energy, transport, buildings, industry, Land use), and includes both infrastructure and innovative projects. The investment opportunities we have selected are “shovel-ready” , i.e. at an advanced stage of development and expecting a financial close within the next 2 years.
- ▶ Project-level information has been collected from different sources: interviews with external stakeholders (government entities, project developers, investors, and industrial companies), data collection via an online survey, review of external databases.
- ▶ The analysis ultimately enabled to identify the scope of the projects, as well as investment requirements, environmental and social benefits, maturity and risk level.
- ▶ All opportunities have been reviewed and prioritized based on criteria such as technology relevance, project timeline, climate benefits, social value, strategic value for net zero trajectories, etc. This process has led to the selection and characterization of 1,000 projects balanced across sectors and Member States.
- ▶ Impacts from the project list have been expressed in terms of impact on jobs (headcount and FTE - full time equivalent) and of tCO2e of avoided emissions over the selected projects lifetimes, based on a model designed for this study.



## Reference to EU Taxonomy

- ▶ Climate benefits of projects identified were evaluated in reference with the EU taxonomy report and its technical annex dating March 2020.
- ▶ This document provides practical guidance and methodology for developing technical screening criteria for climate change mitigation objectives, adaptation objectives and ‘do 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 or Land use sectors, where compliance depends on the level of foreseen energy saving performance or global environmental analysis.
- ▶ This work underlined that a majority of project developers neither refer to this recent framework to demonstrate their projects’ climate benefits, nor disclose information that can prove compliance.
- ▶ Besides, the EU taxonomy guidelines cover the majority - but not all - of the economic activities which contribute to climate change mitigation. Uncovered activities - which could not be confirmed as “Taxonomy compliant” include several manufacturing activities (especially eco-design and reduction of material losses, hazardous waste management, etc.).
- ▶ A rigorous use of EU taxonomy guidelines led us to differentiate priority 1 projects (projects are aligned with EU taxonomy and have a clear climate benefit) and priority 2 projects (projects with clear environmental benefits but for which we could not check compliance with EU taxonomy with available information).

\* The list is illustrative and inclusion of particular projects in the list should not be read as a full policy/commercial endorsement.



# Approach

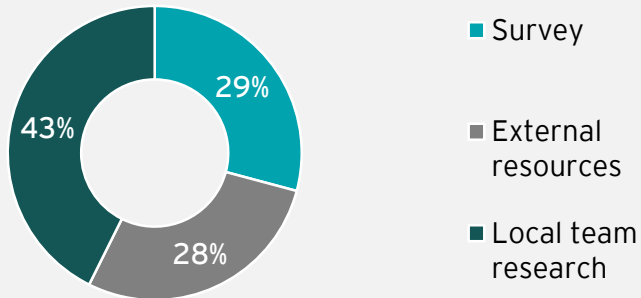
These 1,000 shovel-ready projects represent a fraction of green projects under development across the EU

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

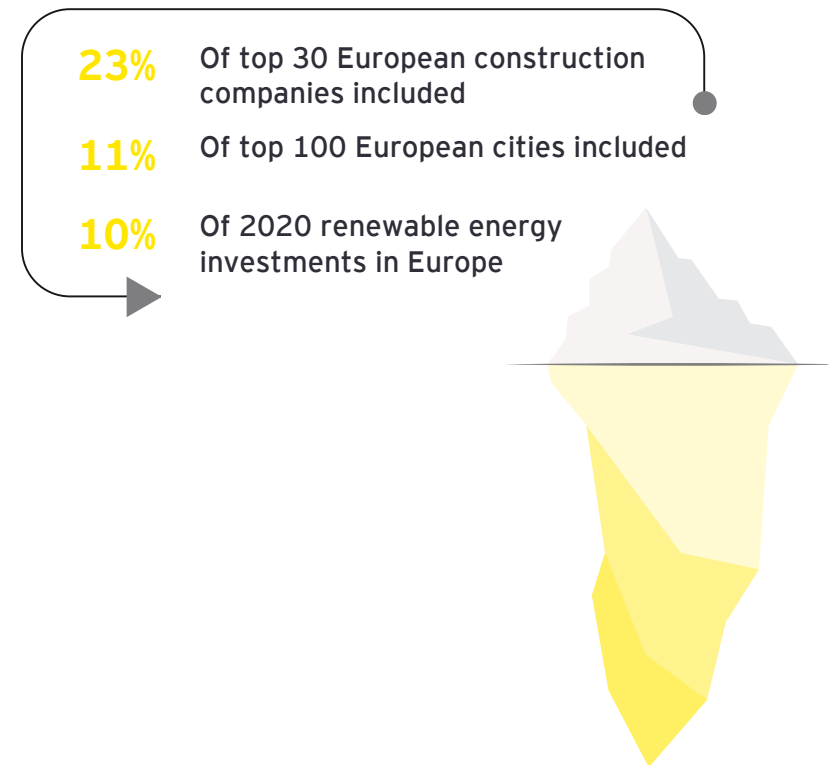
The identification of projects has been carried out on the basis of several information collection tools:

- ▶ 169 interviews have been carried out with diverse stakeholders : industrial companies, public entities, investors, project developers, start-ups, professional associations, etc.
- ▶ Analysis of available project databases
- ▶ An online platform enabled our team to collect information on 362 projects

Database constitution sources



As the purpose of the project is to uncover a pipeline of ready-to-invest projects, we have focused on projects that are expecting financial close in the short term. As these projects are not all public, some developers have considered that confidentiality matters prevented them to share project information. For this reason, and because the research has been carried out in 4 weeks, we estimate that the list of projects selected represents only a fraction (the “tip of the iceberg”) of projects under development in the EU. For example, in the building sector only 23% of the top European construction companies have presented projects.



Sources - EY & Associés



### 3. 1,000 project list presentation



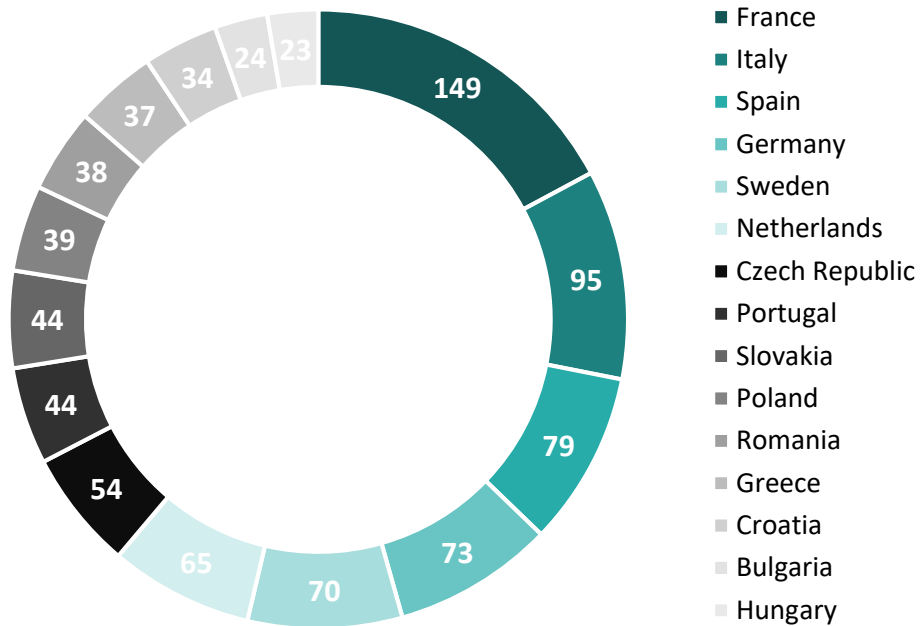


# 1,000 project list overview

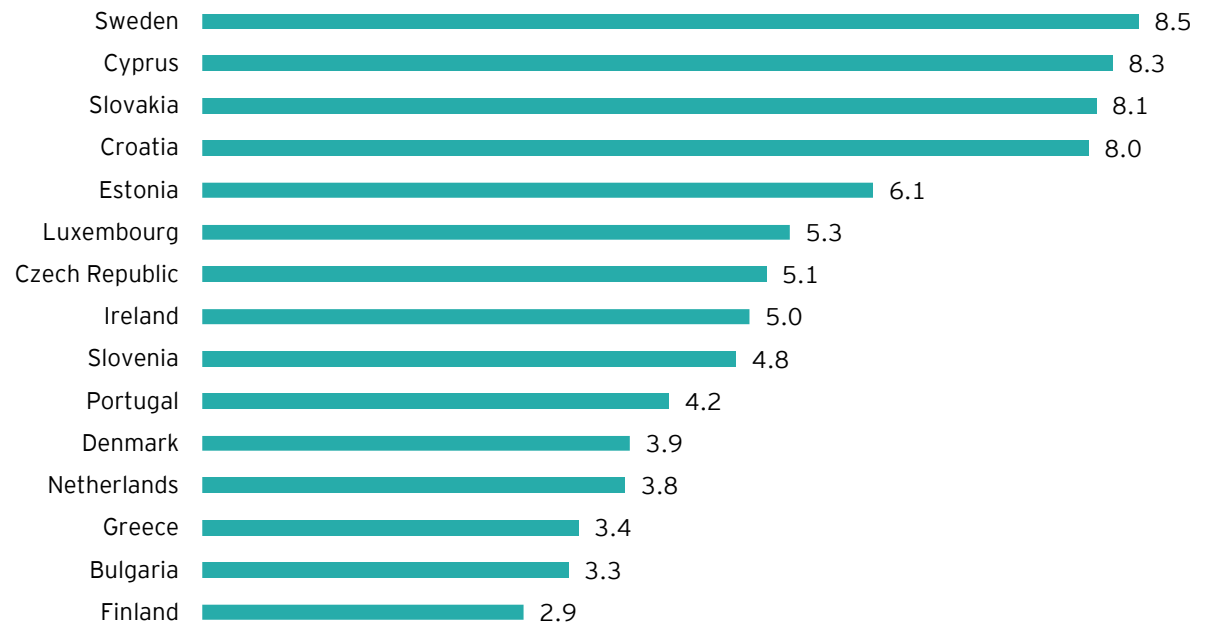
Projects have been identified in all EU countries



Top 15 Countries (number of projects)



Top 15 countries (number of projects per million inhabitants)



Sources - EY & Associés

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

- ▶ France, Italy, Spain, Germany and Sweden are the top 5 countries in terms of number of projects, and represent together 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.
- ▶ The breakdown of projects per country has also been analyzed in relative share to population. The result indicates that a high relative 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 need to 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.



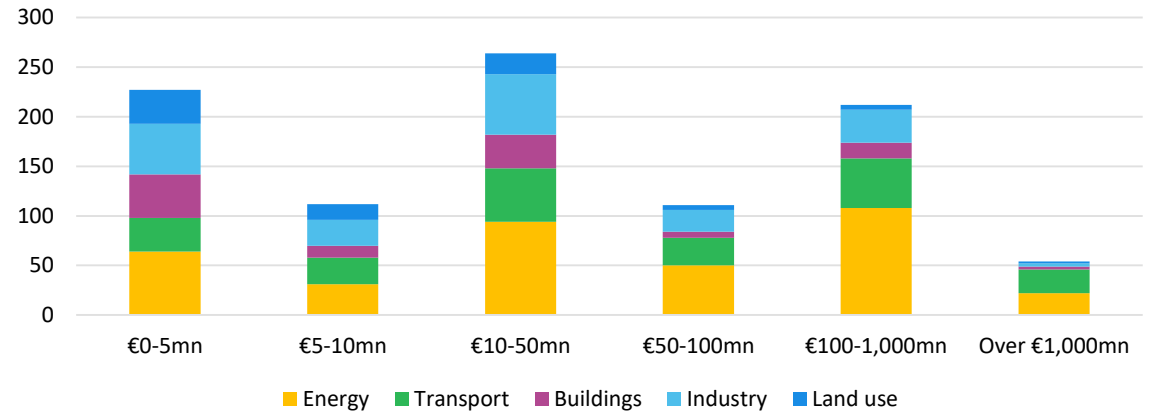
# 1,000 project list overview

Infrastructure projects in the transport and renewable energy generation segments rank first in terms of investments

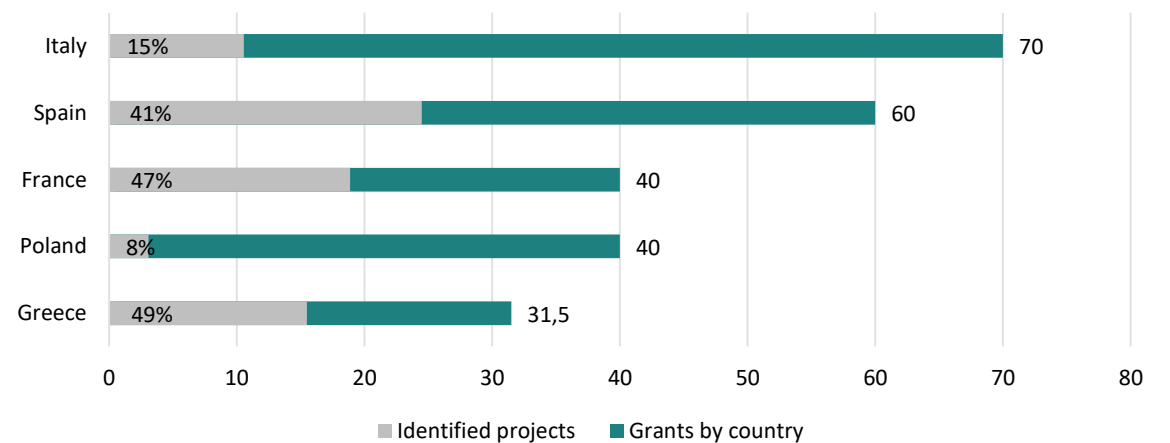
## Energy and transport stand out as two sectors where investment pipelines are well structured and identified

- ▶ The strong representation of the energy sector in the 1,000+ green project list illustrates the dynamism of European and Member State energy policies, which support the growth of additional capacities in the next years. Within the energy sector, renewable energy generation accounts for 70% of 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 €1 billion), due to the large-scale infrastructure nature of public transportation projects.
- ▶ Projects sized at over €1 billion often are 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 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 important presence in the list of infrastructure projects in the energy and transport sectors, is also linked to the fact that many of these projects are spotted as they make their way through permitting procedures and tender processes.
- ▶ 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 Recovery and Resilience Facility (RRF) within Next Generation EU.
- ▶ The main barrier was identified for 58% of all projects. For 49% of projects the main barrier is non-financial (regulatory, administrative, commercial), and financial for the remaining 51%.

Breakdown of the number of projects by sector and by investment range



Investment requirements of projects identified relative to Recovery and Resilience Facility (RRF) grant allocations



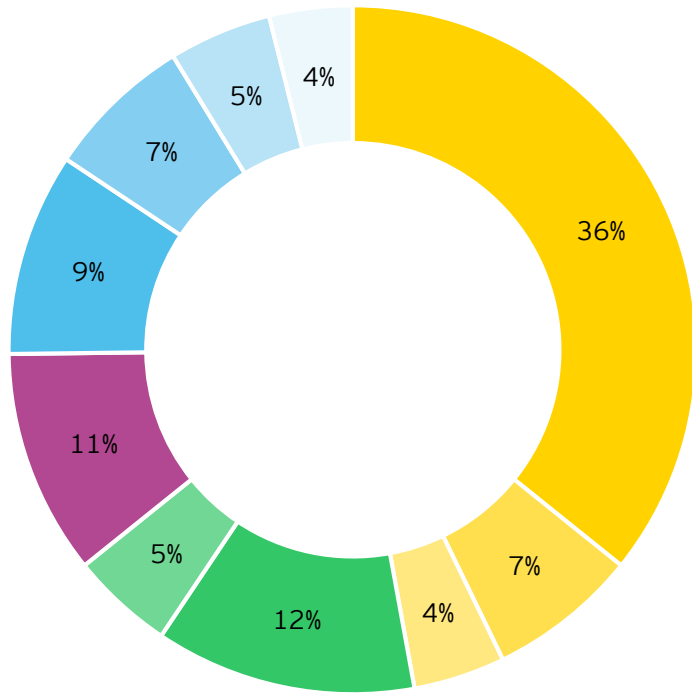
Sources - EY & Associés



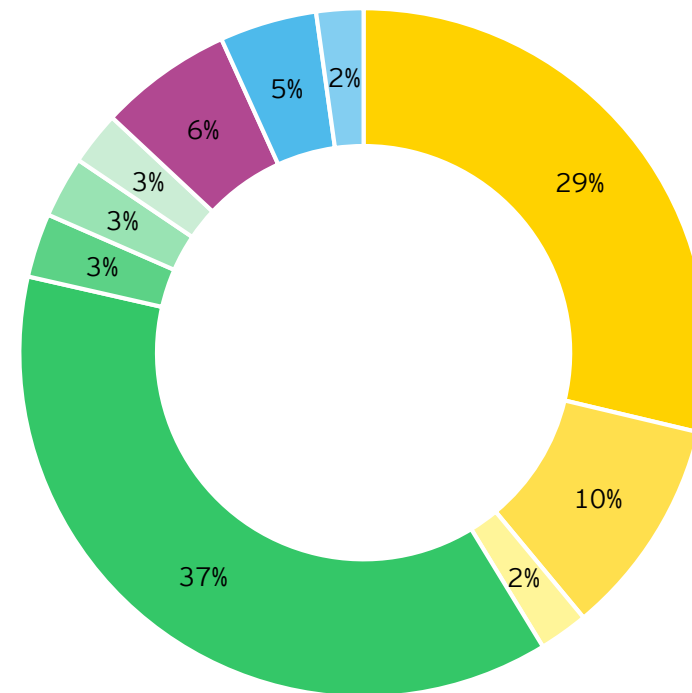
# 1,000 project list overview

Infrastructure projects in the transport and renewable energy generation segments rank first in terms of investments and projects number

TOP10 subsectors represent 76% of the 1,000+ green projects selected



TOP10 subsectors represent 90% of the total investment need for the 1,000+ green projects selected



- Renewable energy generation (electricity or heat)
- Energy Storage and system services
- Low carbon mobility (other)
- Circular economy
- Green hydrogen for industry

- Transmission and distribution
- Public transport
- Building renovation / energy efficiency improvement
- Industrial process efficiency
- Manufacturing of Low carbon technologies

- Renewable energy generation (electricity or heat)
- Energy Storage and system services
- Recharge infrastructure for Low carbon mobility
- Low carbon logistics
- Green hydrogen for industry

- Transmission and distribution
- Public transport
- Electrification of transport - equipment manufacturing
- Building renovation / energy efficiency improvement
- Industrial process efficiency

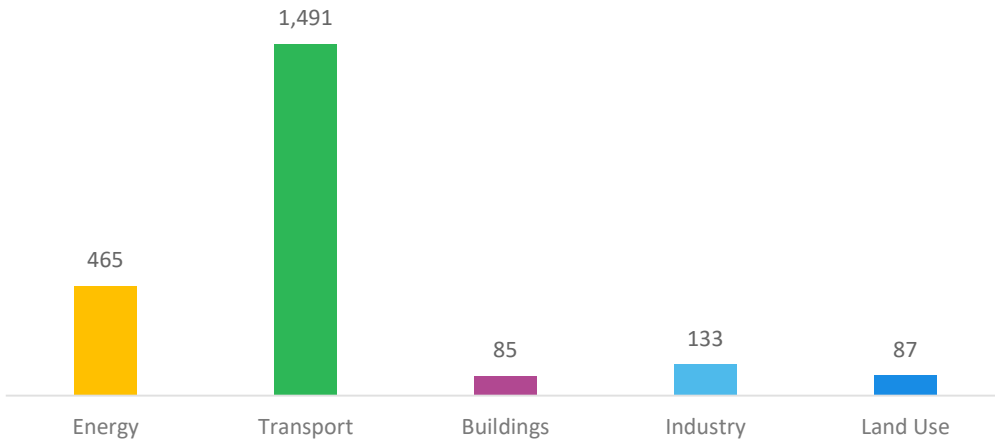
Sources - EY & Associés



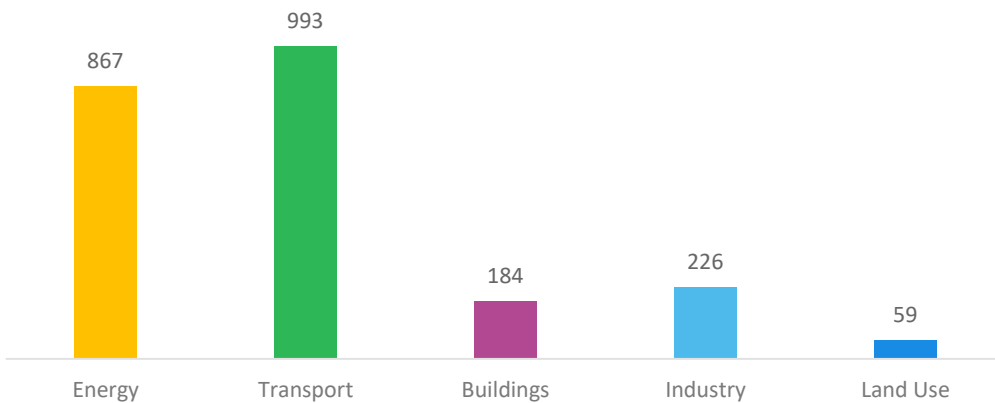
# Environmental and social impacts

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

Projects pipeline - avoided GHG emissions (MtCO<sub>2</sub>e)



Projects pipeline - Jobs supported per sector (thousand FTEs)



Sources - EY & Associés



- 1,000** Investment opportunities identified
- €200 billion** Investment required
- 2.8 million** Jobs (headcount)
- 2.3 million** FTEs supported
- 2.3 GtCO<sub>2</sub>e** Avoided GHG emissions

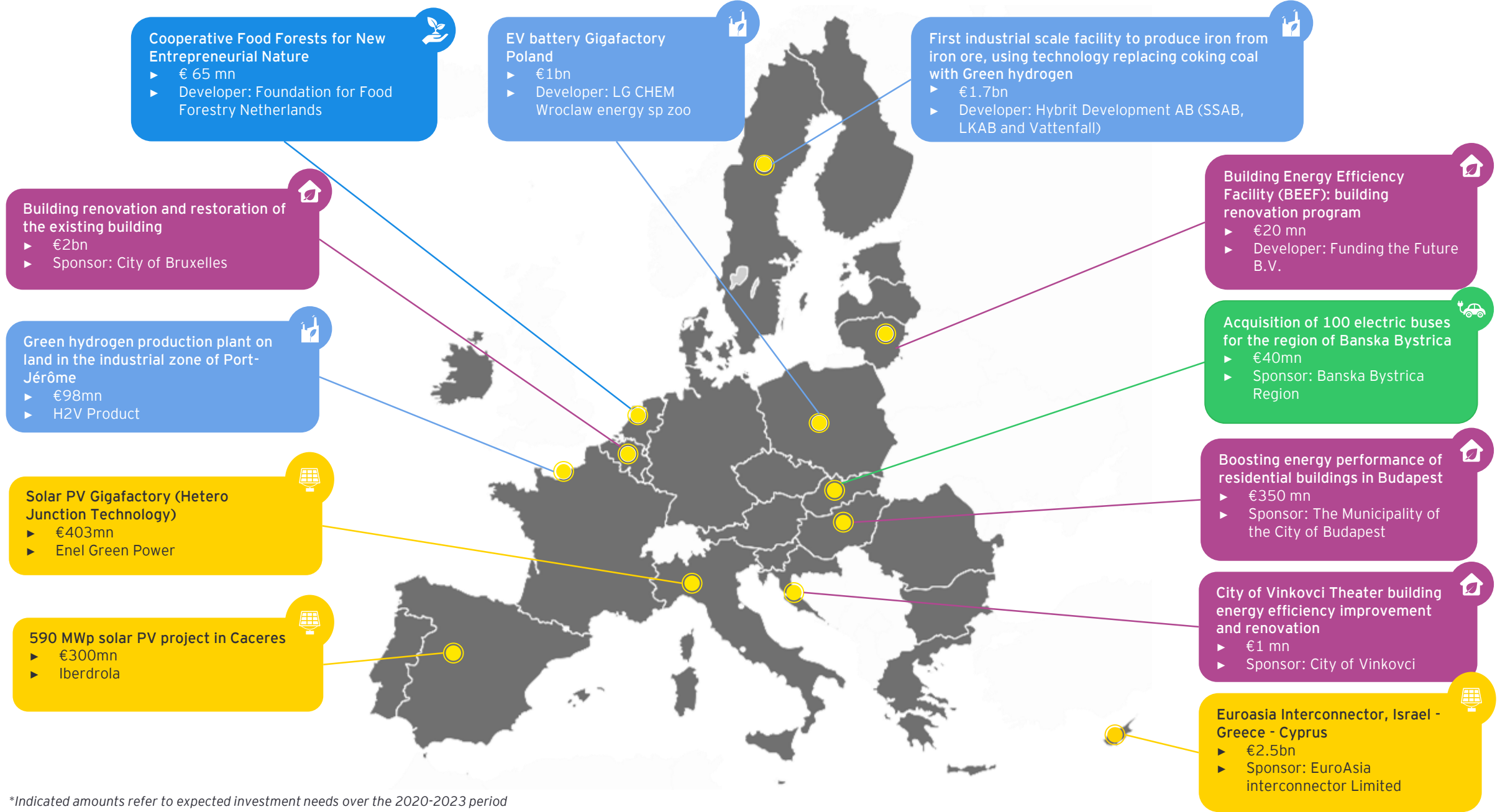
- ▶ Among the initial project list, the selected 1,000 projects represent an overall investment of € 200 billion.
- ▶ These 1,000 projects have the potential to support 2.8 million jobs (headcount) across Europe (representing a 2.3 million FTEs) and represent 20% of the total number of jobs that are expected to be suppressed in 2020 because of the Covid-19 crisis.
- ▶ In average, €1 million invested in selected 1,000 projects support a headcount 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 (including natural gas exploitation) (4 FTEs per €1 million) and petroleum refining (6 FTEs per €1 million), suggesting that Climate transition shall be considered as 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 recommendations that could be implemented to raise regulatory, administrative or commercial barriers encountered by climate transition project developers.

\* EY calculations

\* Considering the methodology used, we compare the impact of investing €1million in a clean transport alternative rather than in a conventional thermal car. As an example on urban railways, because we can have about 375 passengers per million invested in urban railways compared to 48.7 passengers for cars, the reduction potential is very high from a life-cycle point of view.



# Examples of selected projects (category 1)



\*Indicated amounts refer to expected investment needs over the 2020-2023 period

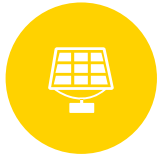


## 4. Sector analysis



# Energy

## Review of selected projects



Energy

Projects identified

374

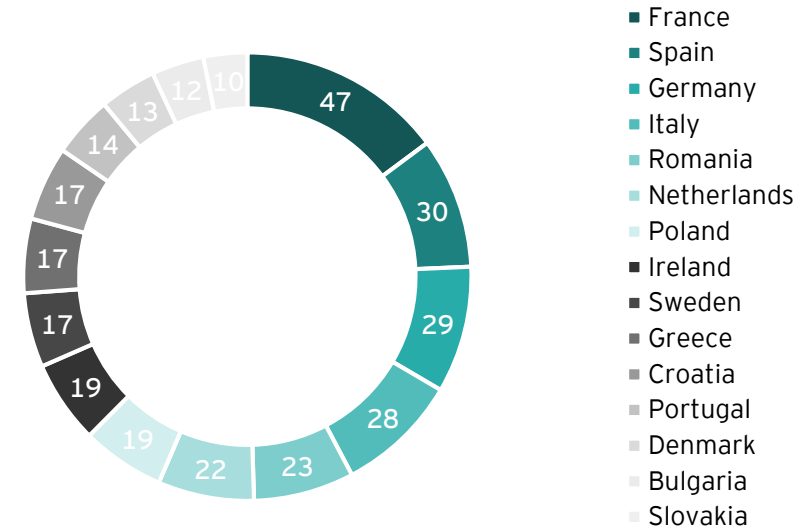
Investment required

€75 billion

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

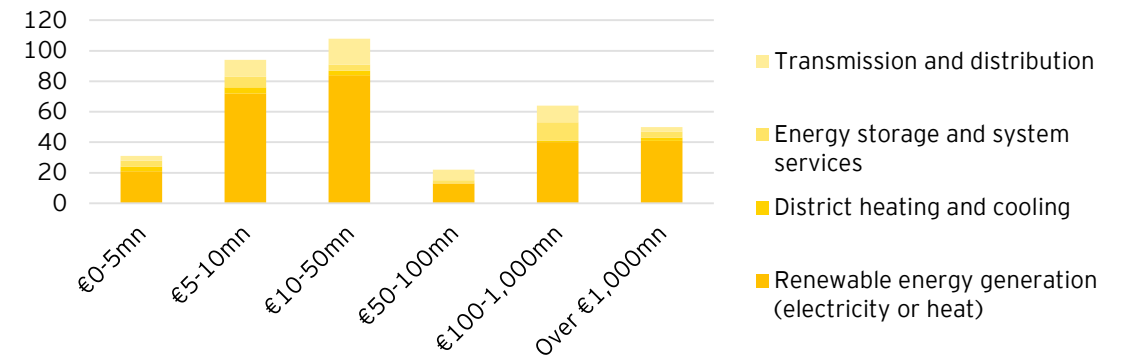
- ▶ The overall number of projects in the energy sector is 374, in areas such as renewable energy generation, energy storage, transmission and distribution as well as district heating and cooling. The aggregated investment required amounts to €75 billion (for identified projects). The average size of projects (€ 202 million of investment) covers a great diversity of projects, varying from small, decentralized projects to large scale infrastructure projects (renewable energy generation or electricity transmission projects).
- ▶ 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, SMEs) are frequent in order to develop large, CAPEX-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, as well as a strong eco-system of middle-market players and technology developers.

### Top 15 Countries for Energy Sector (number of projects)



- ▶ 7 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 Netherlands. Not all projects under development are captured, due the time constraints of this study or to confidentiality concerns.

### Investment needs per subsector (number of projects)



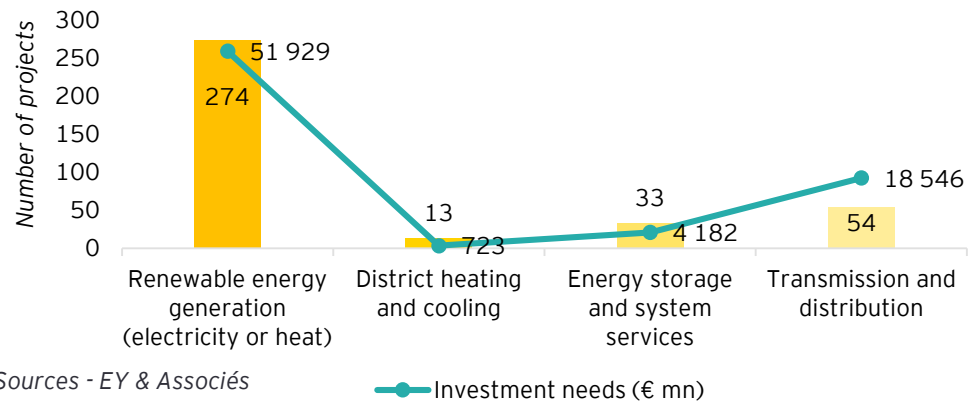
Sources - EY & Associés



# Energy

## Review of selected projects

Projects distribution per subsector



Sources - EY & Associés

- ▶ 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 3 groups of similar number of projects depending on the size of the investment required : a third of up to €10 million, another third between €10 million and €100 million and the last third requiring €100 million and above.
- ▶ The project category that comes second in number of projects are transmission and distribution (14% of projects selected) followed by energy storage and system services (. The average size of transmission projects is substantially higher, as a number of grid extension projects are large infrastructure projects. Taken together, the 54 transmission projects represent over €18 billion 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. It is to be noted that the selection includes several projects of large scale manufacturing of advanced solar PV modules (in Germany, Italy, France) and 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.

Examples of selected projects (priority 1 projects) :

Country	Project Developer	Investment	Project Description
Cyprus - Greece	EuroAsia interconnector Limited	€2.5bn	Euroasia Interconnector, Israel - Greece - Cyprus - Stage I
Estonia	Tuuletraal	€553mn	Tuuletraal Offshore Wind Power Project (380MW)
Finland	Valorem	€300mn	Viatti onshore wind power project (250-300MW)
Germany	EcofinConcept GmbH	€98mn	70 MWp floating solar system on an open-cast lake (formerly used for brown coal mining)
Greece	Power Transmission Operator (IPTO or ADMIE)	€1bn	Interconnection Athens - Crete
Ireland	Codling Wind Park Ltd	€1962mn	The 1,100MW Codling Wind Park is an offshore wind farm located 16.7km off the coast of Ireland
Slovakia	Energy Development GmbH	€12mn	Development of PV power plants in Slovakia, revitalization of brown fields and former mining areas
Spain	Iberdrola	€300mn	590 MWp solar PV project located in Cáceres
Sweden	Skanska Sweden & Gothenburg Energy	€60mn	Skanska TES is a thermal seasonal energy storage solution that can balance energy systems in a city or district





# Energy

## Potential impacts of selected projects



**1,029,000 headcount**

(867,000 FTEs)



**465 MtCO2e**

GHG reduction potential over the projects' lives

### Key impacts and value added

- ▶ Energy projects selected have the potential to support over 1 million jobs (headcount). This indicates that the job intensity of projects in the energy sector is on average 13.3, in other words investing in the energy projects selected would support on average 13.3 jobs (headcount) per million invested (11 FTE)
- ▶ Total GHG impact : In the same way, the emissions abatement potential of the projects identified is estimated at 465 MtCO2e avoided over the projects' lifetimes, with an average GHG reduction intensity of 7.1 MtCO2e per €1 million invested.
- ▶ Considering that the 374 "shovel-ready" projects that are identified are only 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 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 and on estimates for future market sizes, the total carbon abatement potential at the market segment level would reach 1.1 GtCO2e in 2030 (annual emission reductions) and 2.6 million jobs sustained in 2030.



### Comments on the share of energy projects in the 1,000 project list

The energy sector is very dynamic in all EU markets, and is a well structured industry sector. The European renewable energy landscape includes large utilities, some of which are part of the largest renewable energy project developers globally, with 2 to 3 GW of new installed capacity each year and as well as dynamic middle-market developers. As many projects in the energy sector are infrastructure projects which go through a sometimes lengthy development process, an important 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 in the course of this initiative. However, we estimate that the projects selected represent no more than 5 to 10% of projects currently under development in Europe.



# Energy Recommendations

*This section provides an overview of recommendations to accelerate the deployment of projects identified, based on feedback received from stakeholders consulted in the context of this analysis*

## Challenges for deployment

- ▶ Many respondents to our survey and interview requests express the will to build and invest in projects that deliver environmental value. They encourage the EU leaders to continue to develop new initiatives to support such projects and initiative and to stay in leading role worldwide.
- ▶ Accelerating the development of renewable energy projects will also require to overcome barriers related to grid connection timeline and to insufficient power transmission capacity. Infrastructure expansions are needed in order 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 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 next months and will postpone or cancel investments, for example in the manufacturing of low carbon technologies.

## Recommendations

### *Transmission and distribution networks*

- ▶ Prioritize public investments in the extension of power transmission and distribution networks, with the support of the CEF and 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/national authorities in charge of permitting processes
- ▶ Simplify and shorten permitting procedures where possible, so as to maintain high-quality projects which respect environmental considerations, while ensuring a fast, cost efficient and long-term focused process

### *Market framework conditions*

- ▶ Provide better visibility on auctions : indicating the volume of MW 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 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 third countries. Other measures to support industrial relocation in EU countries should be developed.
- ▶ Contract-for-Difference schemes 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 Power Purchase Agreements, PPAs, with a dedicated guarantee scheme : as the economic downturn will affect commercial and industrial, a counterparty risk guarantee will be needed to support corporate PPAs.



# Transport

## Review of selected projects



Transport

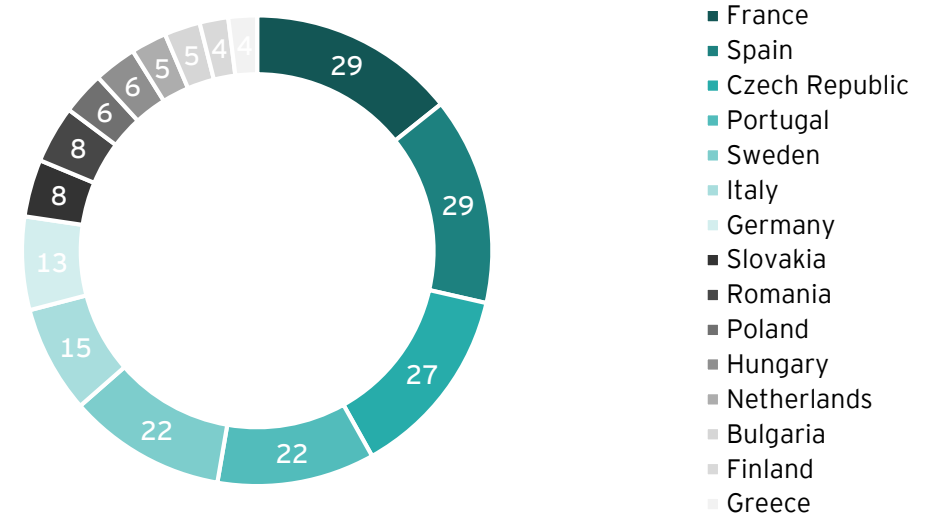
Projects identified **217**  
 Investment required **€87 billion**

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

- ▶ The overall number of projects in the transport sector is **217**, in areas such as electrification of transport, recharge infrastructure for low carbon mobility, public transport, autonomous vehicles & connectivity or low carbon logistics. The aggregated investment required amounts to €87 billion (for identified projects). The average “ticket size” of investments per project (€403 million) 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.).
- ▶ 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, alone, more than 40% of projects in number and investment needs, with several large rail and metro projects, which can reach several billions of investment per project. Probably due to the size and high capital-intensity of transport projects selected, consortia represent 16% of projects and 24% of investment needs.

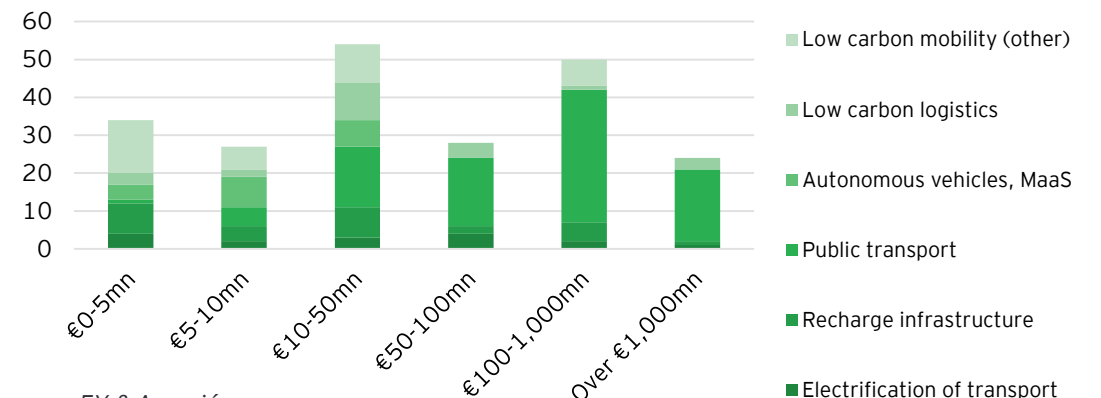


### Top 15 Countries for Transport Sector (number of projects)



- ▶ Countries where most projects have been identified are France (13% of projects), Spain (13%) and 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.

### Investment needs per subsector (number of projects)



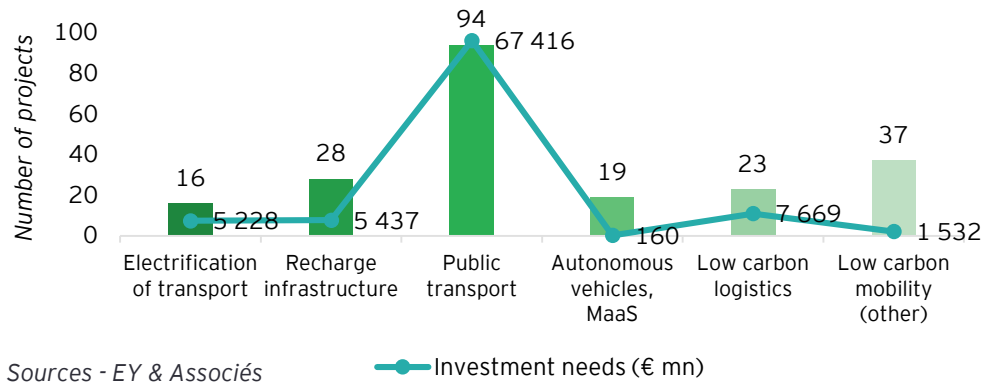
Sources - EY & Associés



# Transport

## Review of selected projects

Projects distribution per subsector



Sources - EY & Associés

- ▶ Public transportation projects represent the largest group, with 94 projects, representing 77% of investment needs for the transport sector. This group includes projects such as tramway and metro links or extensions and fuel switch projects for railways and presents a very high average investment size (approximately €717 million). low carbon mobility comes second in terms of 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 €3 and €5.5 billion of investments each (low carbon logistics, recharge infrastructure, equipment for electrification of mobility). These amounts cover a variety of projects, some of which (cycling trails, deployment of electric buses,...) represent over €1 billion 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 first phases of projects that will require much more substantial investments in the next years.
- ▶ Out of 217 projects, 106 projects have indicated barriers. For 54%, the main barrier is financing.

## Examples of selected projects (priority 1 projects) :

Country	Project Developer	Investment	Project Description
Bulgaria	Sofia municipality	€50 mn	Acquisition of e-buses
Croatia	iCat d.o.o.	€5 mn	SolarCat - self-sustaining solar passenger ship
Czech Republic	City of Hradec Kralove	€26 mn	Replacement of fleet of buses by electro buses
France	FM Logistics	€20 mn	H2HUB project is aimed at the production of green hydrogen from on-site solar PV panels in order to fuel trucks and heavy-duty vehicles
Germany	Munich City	€700 mn	Munich U-Bahn Line 5 Extension Project, Laimer Platz - Pasing, Bayern
Hungary	NKM Mobilitás Kft.	€70 mn	Development of an alternative charging station network
Italy	Comune di Milano	€1.5 bn	Acquisition of new electric buses to replace diesel fleet
Poland	Cracow Municipality / ZIKIT	€110mn	4.5km fast tram line between Czyżyny and Mistrzejowice, in the city of CraCow
Slovakia	Region Banska Bystrica	€40 mn	Modernization of public transportation, 100 electric buses
Spain	Iberdrola	€150 mn	Deployment infrastructure for electric vehicle recharging
Sweden	Katla Aero	€9 mn	Developing drone network for electrical air distribution.



# Transport

## Potential of selected projects



**1,098,000 headcount**  
(992,000 FTEs)



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

GHG reduction potential over the projects' lives



### Key impacts and value added

- ▶ Due to their size, transport projects selected have substantial impacts on job Beyond the list creation if they are implemented. Estimation of jobs supported by transport projects identified is estimated above 1 million (headcount), with a job intensity of 11.6 jobs (headcount) per million Euro 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>2</sub>e avoided over the projects' lifetimes, with an average GHG reduction intensity of 11.8 tCO<sub>2</sub>e per €1 million invested.
- ▶ Of the 217 "shovel-ready" projects that have been identified in the course of this work and will contribute to accelerate the transition to low carbon transport technologies, we have also estimated the potential impacts of low carbon mobility market segments. Based on available data on growth trends, we estimate that the total carbon abatement potential at the market segment level would reach 1.8 million jobs sustained in 2030.



The Covid-19 situation has had a severe impact on the transport sector, due to the lockdowns across Europe. As 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 has also been very strong on manufacturers of equipment (cars, buses, fuel-cell drive trains, etc.) as their clients (public transport operators or residential clients) have reduced purchasing.

For operators in the EV charging sector, the lockdown situation has caused installation of infrastructure to stop, while revenues have dropped as road traffic reduced. This in turn impacts the capacity of EV or hydrogen mobility players to access finance, especially for start-ups that don't 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.



# Transport Recommendations

*This section provides an overview of recommendations to accelerate the deployment of projects identified, based on feedback received from stakeholders consulted in the context of this analysis.*

## Recommendations

### *Financing instruments*

- ▶ Financing support will be required in the short run to support reductions in transport companies' turnover due to the lockdown period, 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) will be required on the long run to accelerate the deployment of low carbon mobility, and in particular capex-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 €40 billion by 2030. Financing support should support in priority new technologies which 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 (VC and PE) in Europe are too few to cover financing gaps for industrial scale-up.
- ▶ Include electric charging networks as a component of wider, strategic investments as part of future strategies of national power networks.
- ▶ Define specific instruments to support cities and regions in their programs to modernize public transportation.

## Regulatory measures

- ▶ Regulatory measures at local level (cities and regions) can play a strong role in phasing out the most pollutant vehicles and in accelerating the market for innovative mobility solutions, for example in terms of air quality standards for heavy-duty vehicles, taxis, etc. 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 it will be in 2030 for Sweden.
- ▶ Set standards and regulations common to all EU countries to secure that technologies such as electric charging infrastructure apply in every country and to ensure inter-operability.

## 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 train sector, for passengers and freight, in particular via the introduction of green hydrogen-powered trains.
- ▶ Provide visibility on upcoming tenders in the transport sector and on the incentives for low carbon mobility solutions.
- ▶ Training and awareness raising need to be enhanced in order to ensure behavioral change.
- ▶ Avoiding subsidies of fossil fuel technologies (i.e. internal combustion engine vehicles) with public funding in recovery packages.



# Buildings

## Review of selected projects



Buildings

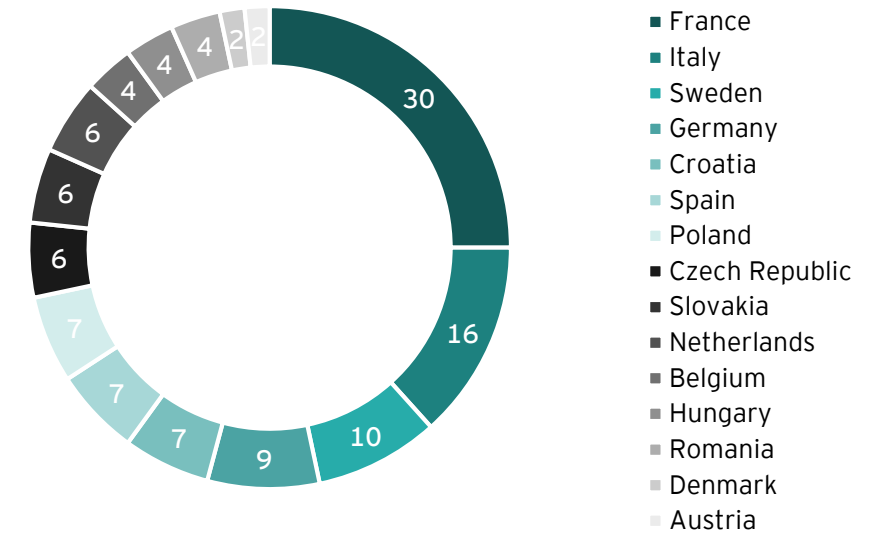
Projects identified **125**  
 Investment required **€13.3 billion**

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

- ▶ The overall number of projects in the buildings sector is **125**, in areas such as building energy management, building renovation / energy efficiency improvement, construction process and Innovative building material.
- ▶ The aggregated investment required amounts to €13.3 billion (for identified projects). Apart from one multi-billion project, the aggregated investment needs are €7.6 billion and the average size of projects (€61 million of investment) covers a great diversity of projects, varying 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 projects. On the contrary, if Public organizations account for roughly 35% of projects in number, they represent 64% of investment needs. Interestingly, consortia (bringing together public entities, utilities, SMEs) account only for 8% of investments required and large corporates for 16%.

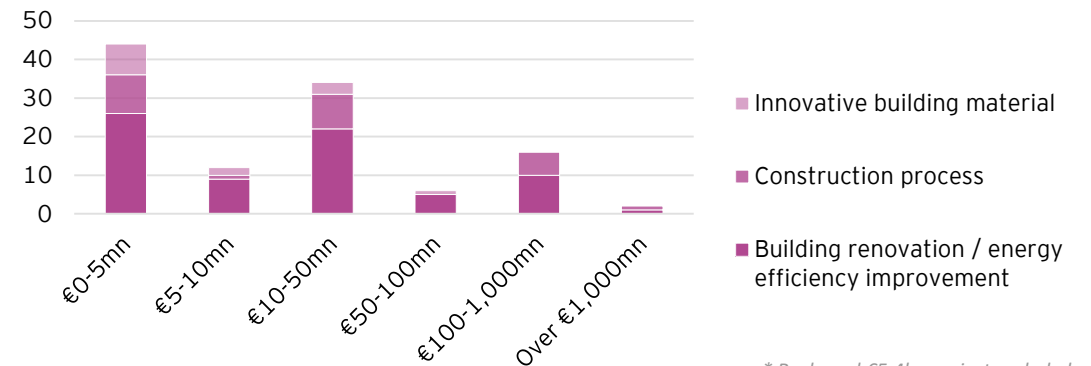


### Top 15 Countries for Buildings Sector (number of projects)



- ▶ 4 countries represent more than 50% of all projects selected: France (24%), Italy, Sweden and Germany. The distribution by investment needs shows however a different breakdown with a predominance of small projects with investment needs inferior to €5 million due to the market fragmentation. Large investment needs appear to be more frequent for renovation projects.

### Investment needs per subsector (number of projects)\*



Sources - EY & Associés

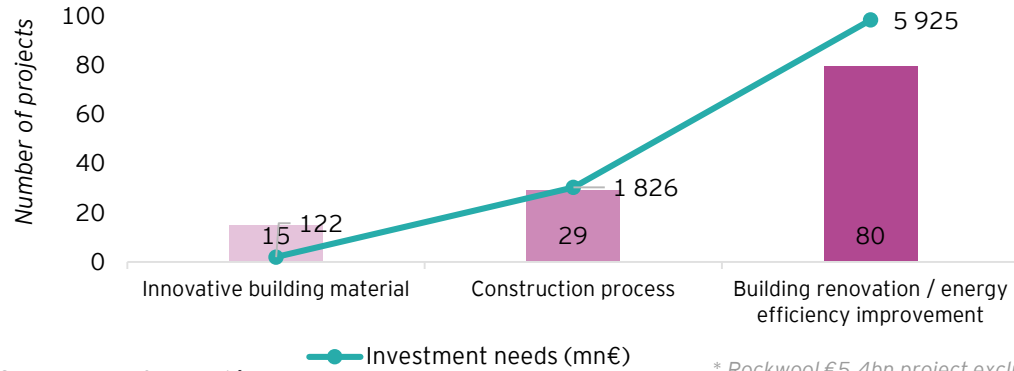
\* Rockwool €5.4bn project excluded



# Buildings

## Review of selected projects

Projects distribution per subsector\*



Sources - EY & Associés

—●— Investment needs (mn€)

\* Rockwool €5.4bn project excluded

- ▶ In terms of project categories, about 65% of projects submitted and 75% of investment needed relate to building renovation, with an average investment size of roughly €74 million (Rockwool project excluded). The two other project categories are rather equivalent in terms of number of projects submitted, although the average size of construction process projects is substantially higher (€68 million versus €9 million for innovative building materials). Taken together, the 81 renovation projects represent €5.9 billion of investment (Rockwool project excluded). Other categories represent smaller shares of project numbers and investment requirements.
- ▶ Some projects included in the list correspond to first phases of projects that will lead to a second phase which will require much more substantial investments.
- ▶ The number of projects considered for the final list is lower than expected due to initially considering a number of confidential projects which had to be excluded from the study or having projects for which the climate benefits were unclear, in greater proportion than in other sectors. The real number of shovel ready projects is likely greater.
- ▶ For 60% of the projects identified\*, the main barrier is financing, while non-financial barriers (regulatory for example) come first for 40% of project.

\*Out of 125 projects, we identified the main barrier for 96 projects.

### Examples of selected projects (priority 1 projects) :

Country	Project Developer	Investment	Project Description
Czech Republic	City of Prague	€111 mn	Accelerated reduction of energy intensity of Prague buildings
France	Eiffage	€50 mn	New process developed by research facilities at Eiffage Route, represents a low carbon innovation on two level.
Germany	KMLS GmbH	€100 mn	Replacement of gas consumption from heating and processes in Siemens facilities Germany to electricity from renewable sources
Hungary	The Municipality of the City of Budapest	€350 mn	Boosting energy performance of residential buildings in Budapest
Italy	Comune di Milano	€1 mn	EnergieSprong is a project for public buildings in Milan which will use "disruptive" and "market ready" industrialized building deep renovation packages
Netherlands	City of Amsterdam	€5 mn	Resilio project - Resilience nEtnetwork of Smart Innovative cLIimate-adapative rOOftops
Poland	Lubelskie przedsiębiorstwo energetyki ciepłej SA	€25 mn	Retrofit and extension of the district heating (DH) network in the city of Lublin
Slovakia	Čiernohronská železnica, n.o.	€45 mn	Construction of the electrified narrow gauge line to the tourist center Chopok - south.
Spain	Inditex	€100 mn	Construction of a new building in Inditex headquarters, with the highest standards in terms of energy efficiency and performance
Sweden	Skanska Sweden AB	€3 mn	Build a climate neutral office building producing energy





# Buildings

## Potential of selected projects



**237,000 headcount**  
(184,000 FTEs)



**207 MtCO<sub>2</sub>e<sub>q</sub>**

GHG reduction potential over the projects' lives

### Key impacts and value added

- ▶ Deploying all projects selected would support an estimated 237 thousand jobs (headcount). This indicates that the job intensity of the buildings sector is higher than the average with a ratio of 18 jobs (headcount) per million euro invested (14 FTEs). As many projects have a strong replicability potential and a high job intensity, low carbon buildings 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>2</sub>e avoided over the projects' lifetimes, with an average GHG reduction intensity of around 4.3 tCO<sub>2</sub>e per €1 million invested.
- ▶ Considering that the 1,000 "shovel-ready" projects that are identified are only 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 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 sizes, the total carbon abatement potential at the market segment level is estimated at 379 MtCO<sub>2</sub>e in 2030 (annual emission reductions) and 1.2 million jobs sustained in 2030.



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) in order to decarbonize national building stocks by 2050. Covid-19 crisis calls into question the demand for new construction projects and the future of tertiary real estate (generalization of flexible working and home office).



# Buildings Recommendations

*This section provides an overview of recommendations to accelerate the deployment of projects identified, based on feedback received from stakeholders consulted in the context of this analysis.*

## Recommendations

### **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 (existing construction) and continue efforts to increase building energy performance, particularly for residential buildings. Massive programs, covering a significant number of housing units, are 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 will be needed to support the implementation of large scale renovation programs (e.g. grants, guarantees)
- ▶ Large construction companies need more visibility on the trajectory to follow to orient their activities portfolio towards a green transition and encourage them to invest even more on these topics.
- ▶ The buildings sector is a changing industry facing a digitalization challenge. With the implementation of smart buildings technologies and the development of new tools more adapted to energy transition, efforts need to be made to foster transversal skills development and workforce adaptation to new technologies.
- ▶ Addressing the demand for renovation will require programs for skills development or adaptation in order to deploy new materials, processes and technologies

### **Research and innovation**

- ▶ Investments in research and innovation from the state and the private sector must be intensified further, especially in energy efficient components and technologies (smart-buildings / electrification areas, digitalization, building envelope, heating & cooling, lighting, artificial intelligence....) to modernize technical buildings systems with smart-ready technologies.
- ▶ Innovation in new materials and in renovation business models should be increased.
- ▶ Given that air quality has become a major health stake for indoor area, especially in the context of Covid-19, solutions allowing to avoid ventilation losses, while maintaining good indoor air quality should be investigated. Building companies must give priority to low-emission and low toxicity materials and products.

### **Collaborative approaches**

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



# Industry

## Review of selected projects



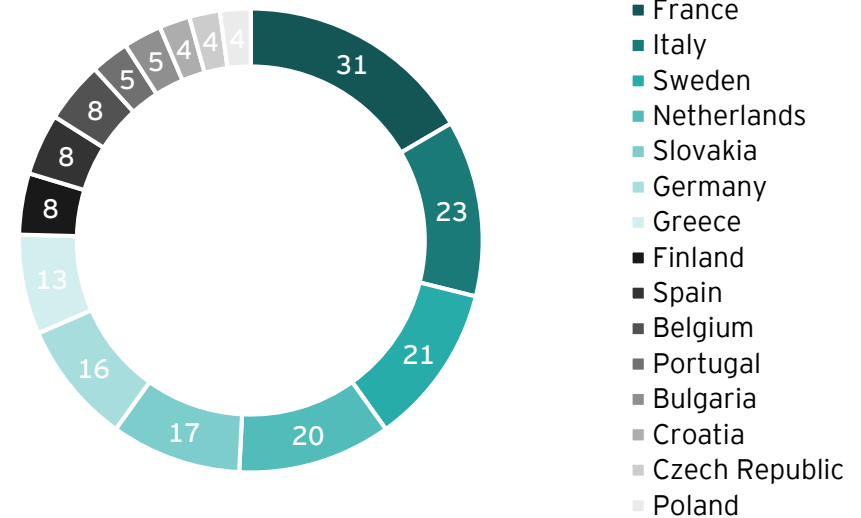
Industry

Projects identified **201**  
 Investment required **€19.1 billion**

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

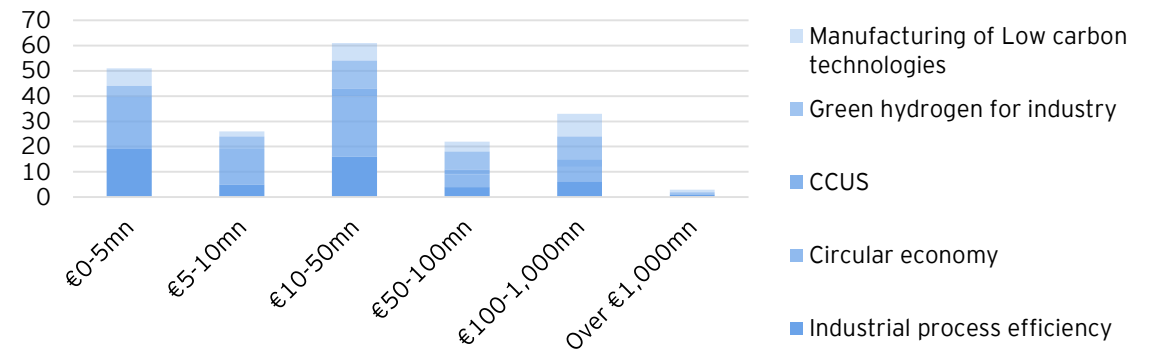
- ▶ **201** projects have been selected in the industry sector, for a total investment requirement of €19.1 billion. Approximately 36% of the projects identified are related to circular economy, and a third focus on industrial process improvement. The list also includes 37 projects (18% of the total) aimed at producing green hydrogen for industrial purposes, and 8 CCUS projects, for a total investment requirement close to €737 million. Overall, the average project size is about €98 million
- ▶ Around 40% of 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 €38 million. Large corporations (30% of projects selected) and consortia bringing together 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 €166 million, with 15 projects submitted by large corporates over the €100 million mark, while 20 projects require less than €10 million, indicating a large spread of project sizes.

Top 15 Countries for Industry Sector (number of projects)



- ▶ Projects identified in the industry sector are spread across all EU countries. Nevertheless, 4 countries make up 50% of projects identified ; France (15%), Italy (11%), Sweden and the Netherlands. In terms of investment needs, countries that concentrate the largest projects are Portugal, Sweden, the Netherlands and Germany.

Investment needs per subsector (number of projects)



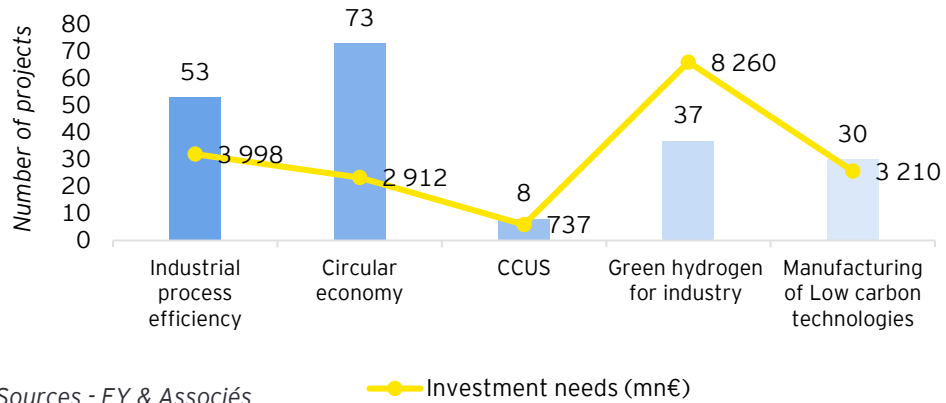
Sources - EY & Associés



# Industry

## Review of selected projects

Projects distribution per subsector



Sources - EY & Associés

Investment needs (mn€)

- ▶ In terms of project categories, a large third (36%) of projects submitted concern circular economy although this corresponds to only 16% of investment needs of the industrial 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 last category represents the largest share of industry investment needs with a 43% share and an average project value of € 223 million.
- ▶ 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 201 projects, the main project barrier was identified for 130 projects (65%). For 52% of these projects, the most important barrier is financial, while the barrier is non-financial for 49% of them.

## Examples of selected projects (priority 1 projects) :

Country	Project Developer	Investment	Project Description
Austria	Verbund	€6 mn	Demonstration of a 6MW electrolysis power plant to produce steel
Belgium	Calix limited	€20 mn	LEILAC (Low Emissions Intensity Lime And Cement) will pilot a breakthrough technology that has the potential to enable both Europe's cement and lime industries to reduce their emissions
France	H2V Product	€98 mn	Green hydrogen production plant on land in the industrial zone of Port-Jérôme
Germany	Meyer Burger	€170 mn	Build-up of a GW scale European solar PV cell and module manufacturing plant in Germany
Italy	Hydro2Power SRL	€1 mn	Creating a new generation of effective hydrogen storage devices at low pressure, safe and very efficient and easy absorption and desorption profiles
Italy	Enel Green Power and partners	€403 mn	3SUN Gigafactory: an Italian sustainable Gigafactory for PV modules"
Netherlands	Port of Rotterdam, Energie Beheer Nederland B.V. (EBN) and N.V. Nederlandse Gasunie	€50 mn	Rotterdam CCUS project Porthos
Poland	LG Chem Wroclaw Energy SP ZOO	€1 bn	EV battery Gigafactory
Portugal	Iberdrola	€4.8 bn	Sines Green Hydrogen Plant (1GW electrolysis)
Sweden	LKAB, SSAB, Vattenfall	€1.7 bn	Develop and commercialise a fossil free value chain for steel production.



# Industry

## Potential of selected projects



**292,000 headcount**

(226,000 FTEs)



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

GHG reduction potential over the projects' lifetime



### Key impacts and value added

- ▶ The implementation of all projects selected in the list would support about 292,000 jobs (headcount). This indicates that investing in the industry projects selected would support on average 15.6 jobs (headcount) per million invested jobs (11.8 FTEs).
- ▶ Total GHG impact : In the same way, 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 €1 million invested.



### Comments on the share of industry projects in the 1,000 project list

As a number of projects identified are related to industrial process improvement and to the extension or revamping of existing plants, identifying projects in the industry sector in a short lapse 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.



# Industry Recommendations

*This section provides an overview of recommendations to accelerate the deployment of projects identified, based on feedback received from stakeholders consulted in the context of this analysis.*

## Recommendations

### **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, in order to allow companies to quickly test their innovations on a small scale.

### **Facilitating the build-up of local eco-systems**

- ▶ Stimulate local ecosystems combining local communities, universities, and companies and facilitating their access to funding for the implementation of innovative projects. Projects currently under deployment in the green hydrogen sector have succeeded because of a favorable eco-system bringing together research centers, industrial companies and users.
- ▶ For circular economy, developing decentralized approaches 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 adverse and not keen to invest in new technologies and processes.
- ▶ Support competitiveness of low-emissions technologies relative to conventional alternatives, for example by providing incentives for renewable heat in industry in order 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 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 EU's climate neutrality target.

### **Financing support**

- ▶ Develop a guarantee mechanism, a project development capital and early stage equity for first market commercialization of innovative low carbon technologies (covering the costs of loss of operational revenue for example) to support the uptake of new technologies.
- ▶ Support the development of circular economy and green projects by deploying grants or risk-coverage instruments for innovative technologies.
- ▶ Financing of the projects has to 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), whilst ensuring the competitiveness of investing industrial actors.



# Land use

## Review of selected projects



Land use

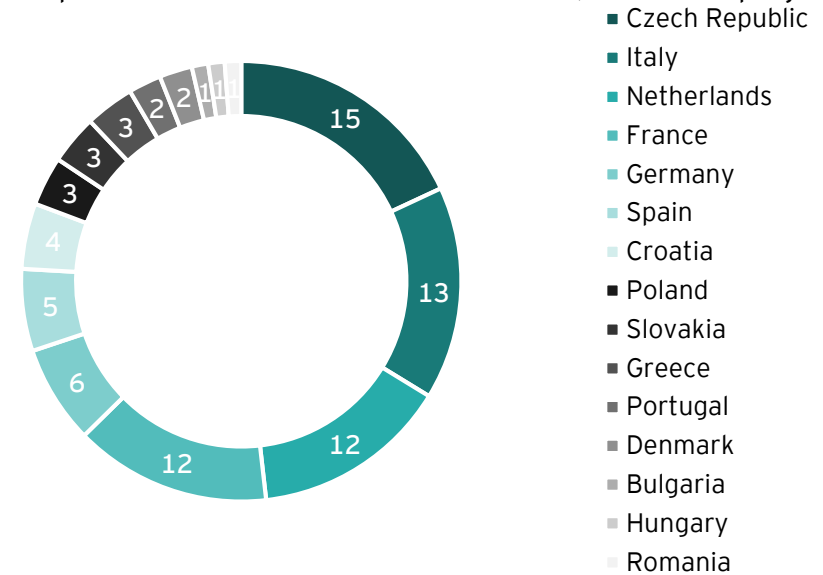
Projects identified **85**  
 Investment required **€5 billion**

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

- ▶ 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.
- ▶ 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 investment required.
- ▶ The fact that the land-use sector is still an emerging sector with such a significant share of projects carried by municipal players has implications for access to project-level data. Access to project-related information is difficult to obtain as projects are diffuse and dispersed between many 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 years.

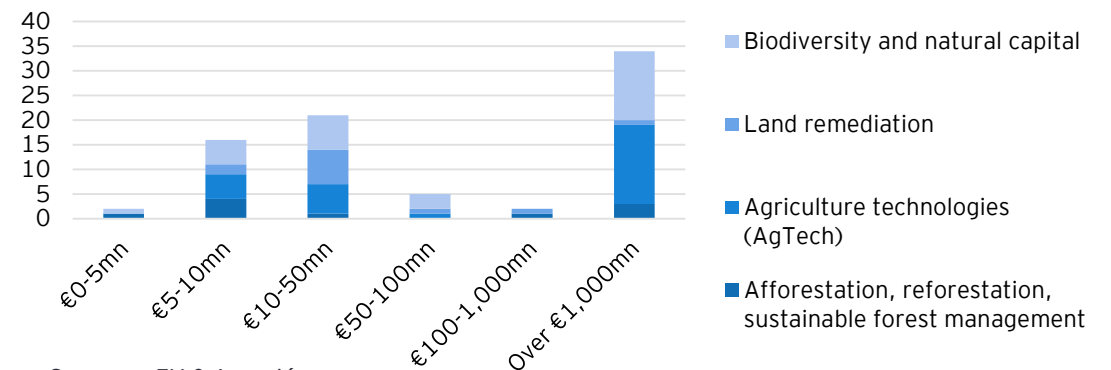


Top 15 Countries for Land use Sector (number of projects)



- ▶ For Land use, almost 50% of projects identified are concentrated in 3 countries: Czech Republic (18%), Italy (13%) and the Netherlands (12%). We find exactly the same distribution of projects in terms of investment amounts, showing that these three countries may be ahead of other EU member states for Land use development, or more structured.

Investment needs per subsector (number of projects)



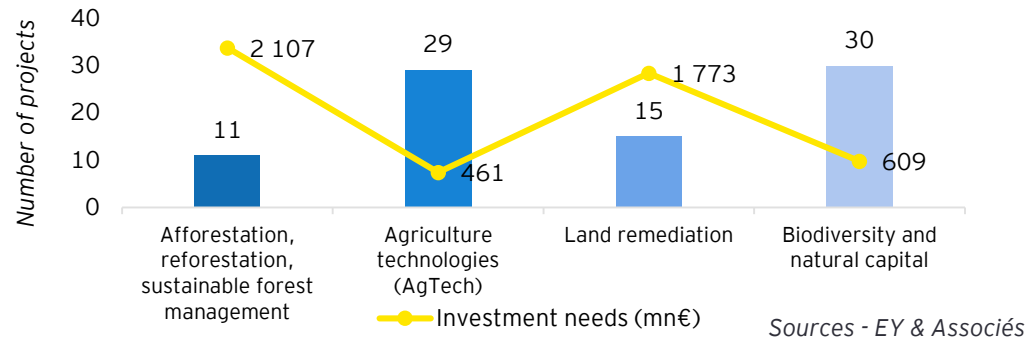
Sources - EY & Associés



# Land use

## Review of selected projects

Projects distribution per subsector



- ▶ The overall number of projects in the land-use sector reaches **85**, for an aggregated investment need of €5 billion. The average size of projects (€61 million of investment) covers a diverse typology of projects. In particular, projects in the agriculture technology and biodiversity segments present a much smaller average size (€16 million and €21 million respectively), and are often pilot projects focusing for example on urban farming, software solutions for farming, eco-system management or behavioral change. 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 represent each more than a third of 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 in these categories.
- ▶ The bulk of the investment needs stem from afforestation, reforestation and land remediation projects, for which the average investment required is €211 million.
- ▶ For 58% of the projects\*, financing is the most important barrier.

\*Out of 85 projects, we identified the main barrier for 55 projects.

## Examples of selected projects (priority 1 projects) :

Country	Project Developer	Investment	Project Description
Croatia	Agrivi d.o.o.	€0.3 mn	Agrivi Agriculture sustainable practices based on the deployment of Farm Management Software (FMS), which factors in a carbon emission calculator
Germany	City of Munich	Confid	A pioneering facade design with vertical greenery improving microclimate
Italy	Comune di Milano	€2 bn	Innovative afforestation project in urban context, with the final aim of planting 3 million trees within the Metropolitan City of Milan by 2030
Netherlands	Stichting Voedselbosbouw Nederland	€65 mn	Cooperative development and management of at least 200 hectares new natural areas consisting of food forests in the province of North-Brabant
Poland	Regionalny Zarząd Gospodarki Wodnej w Krakowie	€10 mn	Restoration of ecological continuity of flowing surface waters
Spain	Madrid City Council, Ferrovial, Universidad Politécnica de Madrid	€15 mn	Green infrastructure and health co-benefits of urban greening in the city of Madrid.





## Land use

### Potential of selected projects



**88,000 headcount**  
(59,000 FTEs)



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

GHG reduction potential over the projects' lifetime



### Key impacts and value added

- ▶ The projects identified in the land-use sector have the potential to support about 88 thousand jobs (headcount). This indicates that investing in the selected land-use projects could support 19 jobs (headcount) per €1 million invested (12.5 FTEs).
- ▶ If implemented, the selected land-use projects have the potential to offset around 87 MtCO<sub>2</sub>e over the projects' lifetimes, with an average GHG reduction intensity of 5.6 tCO<sub>2</sub>e per €1 million invested.
- ▶ GHG emissions reduction linked to land remediation could not be included in our 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 Land use projects in the 1,000 project list

Due to the very dispersed structure of the land-use sector, the projects identified during the short timeframe of this study 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 a high potential for replicability (respondents consider that 50% of projects submitted are replicable across the EU).



# Land use Recommendations

*This section provides an overview of recommendations to accelerate the deployment of projects identified, based on feedback received from stakeholders consulted in the context of this analysis.*

## Recommendations

### **Market framework conditions and support schemes**

- ▶ Taking the opportunity of the upcoming “Farm to Fork” and Biodiversity 2030 Strategies in order to focus food sovereignty as a common long-term goal with climate neutrality and to adapt the Common Agriculture Policy framework. Efforts need to be refocused efforts on skills development and on support to innovative and transformational projects for the agriculture sector, in order to promote regenerative and resilient models for agriculture, forest and land management.
- ▶ Providing clarity on the framework conditions for production of forest/agriculture industry products by, for example, removing the uncertainty with respect to views about forestry, taxes and fees linked to biobased products, transportation etc.
- ▶ Increase intra-EU collaboration to protect and value local agriculture, to identify schemes strengthening innovation and local production.
- ▶ Ensure that biodiversity and carbon performance are included in public procurement criteria for agricultural products.

### **Research and innovation**

- ▶ Investments in research and innovation from the state and the private sector must be intensified further, as reflected by the high technology intensity of some projects identified (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.
- ▶ Promote enhanced cooperation between all public agencies at local, regional and national level to support the development of Land use projects.
- ▶ Support the emergence of projects via technical assistance, awareness raising and capacity building in order to support the emergence of a strong land-use sector.

### **Financing instruments**

- ▶ Regions and local authorities lack substantial financial sources to scale land-use projects, which have the potential to contribute to job creation in marginalized areas, to food self-sufficiency and to carbon offsetting
- ▶ Several innovations in the financing sector can 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 eco-system restoration projects, as well as risk coverage mechanisms to support the transition towards more resilient practices.

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**Contacts**

**Alexis Gazzo**

Partner

[alexis.gazzo@fr.ey.com](mailto:alexis.gazzo@fr.ey.com)

**Jean-Gabriel Robert**

Senior Manager

[jean-gabriel.robert@fr.ey.com](mailto:jean-gabriel.robert@fr.ey.com)

**Clément Jarreau**

Manager

[clement.jarreau@fr.ey.com](mailto:clement.jarreau@fr.ey.com)



# Appendix 1

## List of sub-sectors considered



*This section provides an overview of the sub-sectors considered.*

### **Energy**

- ▶ Renewable Energy generation (electricity or heat)
- ▶ Renewable Energy based district heating or cooling
- ▶ Energy storage and system services
- ▶ Transmission and distribution

### **Transport**

- ▶ Low carbon logistics
- ▶ Public transport
- ▶ Recharge infrastructure for low carbon mobility
- ▶ Transport electrification - equipment manufacturing
- ▶ Autonomous vehicle, connectivity, Mobility as a service
- ▶ low carbon mobility (other)

### **Buildings**

- ▶ Building renovation/ energy efficiency improvement
- ▶ Construction process
- ▶ Innovative building material

### **Industry**

- ▶ Circular economy
- ▶ Carbon Capture, Utilization and Storage
- ▶ Green hydrogen for industry
- ▶ Industrial process efficiency
- ▶ Manufacturing of low carbon technologies

### **Land-use**

- ▶ Afforestation, reforestation, sustainable forest management
- ▶ Agriculture technologies (AgTech)
- ▶ Biodiversity and natural capital
- ▶ Land remediation



# Appendix 2

## Focus on 50 illustrative projects



**€32 bn** Investment

**450,000** Headcount  
385,000 FTE

**345** MtCO2e lifetime emissions avoided

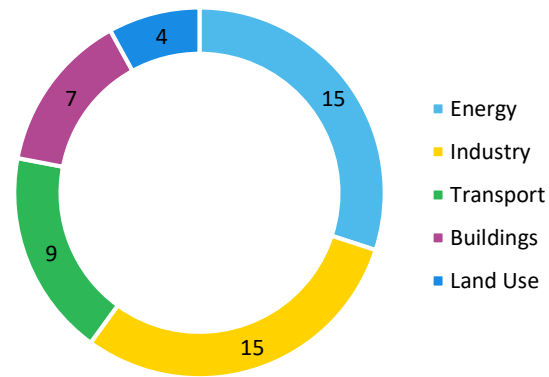
Spread across **25** EU countries

### A selection of projects illustrating the diversity of opportunities identified

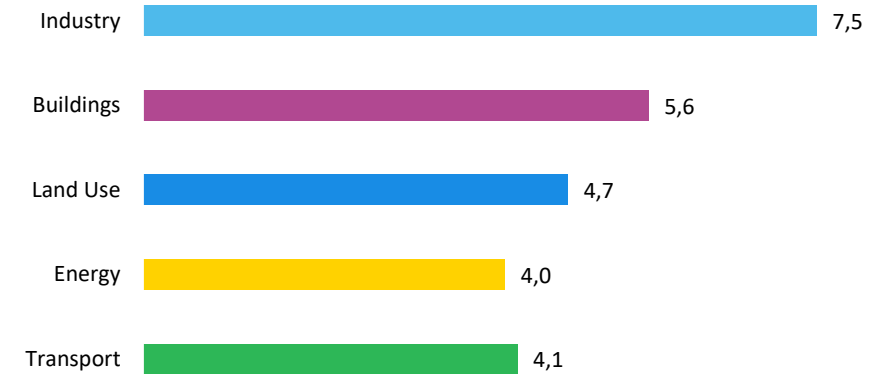
- ▶ Further investigation was conducted on a selection<sup>(1)</sup> of 50 illustrative projects for which more information is presented in following slides.
- ▶ They are spread across 25 EU countries (Luxembourg and Malta are the only EU27 countries not represented).
- ▶ They represent 16% of total investment needs, 17% of total job impacts and 15% of total CO2 abatements calculated.
- ▶ Individual investment needs range from €0.4mn to €4.9bn.

<sup>(1)</sup> Selection criteria included geographic and sector representativeness, data availability, consent from project sponsors, economic impact and the innovative nature of projects. Industry is more represented in this selection because of a greater diversity of projects in this sector.

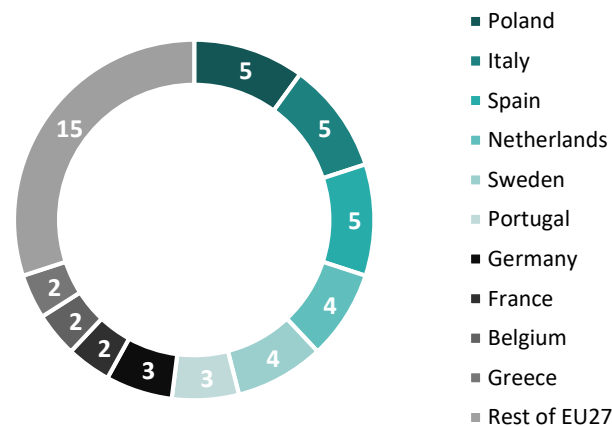
Sector distribution



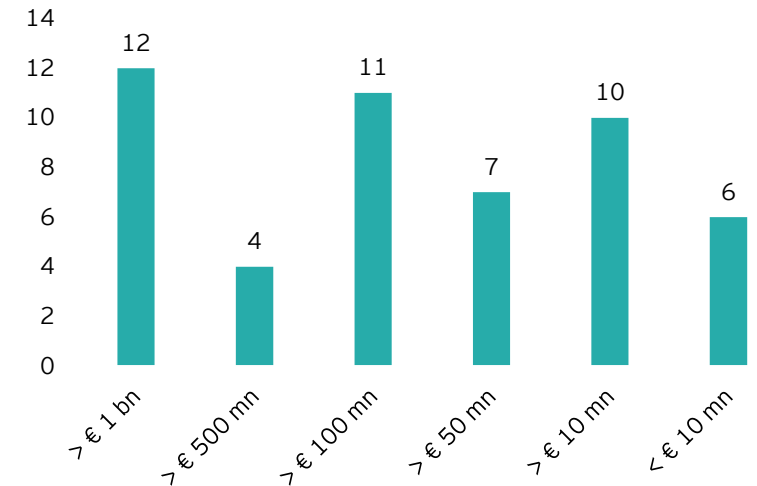
Number of illustrative projects selected for 100 projects identified



Country distribution



Breakdown per investment need





# Appendix 2

## Focus on 50 illustrative projects - Industry (1/2)



Country	Project Developer	Investment	Project Title	Project Description
Austria	VERBUND Solutions GMBH	€ 6 mn	H2Future - Sub project 1	Demonstration of the 6MW electrolysis power plant installed at the VOESTALPINE LINZ plant (Austria) to produce steel and provide grid-balancing services such as primary, secondary or tertiary reserves.
Belgium	European Union	€ 20 mn	LEILAC (Low Emissions Intensity Lime And Cement)	Breakthrough technology that has the potential to enable both Europe's cement and lime industries to reduce their emissions dramatically while retaining, or even increasing international competitiveness, using Direct Separation with CO2 capture.
France	H2V Product	€ 98 mn	H2V Normandy	100MWel green hydrogen production plant on land in the industrial zone of Port-Jérôme, between Le Havre and Rouen.
Germany	Meyer Burger	€ 170 mn	Project Indium	Build-up of a GW scale European solar PV cell and module manufacturing plant in Germany based on patent-protected heterojunction/smartwire technology. Start of project in first half of 2021: first step is a yearly production capacity of 400MWfocusing on roof top systems. Long-term goal of a yearly production capacity of 5 GW.
Italy	Enel Green Power and partners	€ 403 mn	3SUN Gigafactory: an Italian sustainable Gigafactory for PV modules	Giga Factory based in Italy, scaling-up the 3SUN current production from 200 MW/y to more than 3GW/y, leveraging the unique window of opportunity driven by heterojunction.
Italy	Hydro2Power SRL	€ 1 mn	Hydrogen storage system	Creating a new generation of effective hydrogen storage devices at low pressure, safe and very efficient and easy absorption and desorption profiles
Netherlands	Port of Rotterdam, Energie Beheer Nederland B.V. and N.V. Nederlandse Gasunie	€ 50 mn	Rotterdam CCUS project Porthos	Project to transport CO2 from industry in the Port of Rotterdam and store this in empty gas fields beneath the North Sea (Port of Rotterdam CO2 Transport Hub and Offshore Storage). Total length of the CO2 infrastructure = 55 km, storage will take place 21 km off the Dutch coast.
Netherlands	Ministry of Economic Affairs and Climate Policy/ FME	€ 2 mn	Hydrogen Fieldlab	The Fieldlab Industrial Electrification aims to be an environment in which Power-2-X technologies are developed, tested and made ready for use. A pilot project experiments small-scale generation of hydrogen on companies using solar and wind energy produced at the same location.



# Appendix 2

## Focus on 50 illustrative projects - Industry (2/2)



Country	Project Developer	Investment	Project Title	Project Description
Poland	LG Chem Wroclaw Energy SP ZOO	€ 1.5 bn	EV Battery gigafactory in Poland	Innovative large-scale integrated lithium-ion battery cells-to-packs manufacturing facility for the supply of European automotive manufacturers with advanced 3rd generation li-ion batteries for electric vehicles.
Portugal	Dutch government, EDP, Galp Energia	€ 4.9 bn	Sines Green Hydrogen Plant	Green hydrogen plant using electrolysis process to produce hydrogen – reaching 1GW capacity by 2030
Portugal	Smart Energy Lab, EDP	€ 15 mn	H2 Fuel Switching at industrial facilities	Demonstration project aiming to prove possible use of green hydrogen in 10 industrial facilities. This project is focused on the operating infrastructure, financing a local deposit, the construction of the ducts, flaring equipment and respective control, as well as the appropriate training for operators.
Spain	Enagas	€ 266 mn	Green Crane - La Robla – Rotterdam	Green hydrogen for export to north-western Europe. Hydrogen will be produced in the town of La Robla (Castilla y León) from 150 MW of PV solar energy and 32 MW of electrolysis. This hub includes the construction of a hydrogenation plant with the capacity to store 12 tons of hydrogen per day in the organic carrier, as well as the development of associated logistics.
Sweden	Hybrit Development AB (JV between LKAB, SSAB and Vattenfall)	€ 1.8 bn	HYBRIT (fossil free value chain for steel production)	HYBRIT's first industrial scale facility - a demonstration plant - is pending the necessary funding and permits and thus presents a shovel-ready opportunity. The plant will produce iron from iron ore, using new technology to replace coking coal with hydrogen produced from fossil free electricity. Construction is scheduled to start in 2022 and operations in 2025.
Sweden	Svensk Plaståtervinning i Motala AB	€ 8 mn	Improved sorting for increased plastic recycling	Extension of an existing sorting facility to allow sorting of new types of plastics fractions (colored PET bottles, PP, PVC, PS, EPS).
Sweden	NITIU AB	€ 10 mn	First ever fossil and emissions free steel plant and rolling mill.	Use of a novel technique of combustion, where both the hydrogen and oxygen are used in the metallurgical process, resulting in steel produced with zero emissions or use of fossil-based fuels.



# Appendix 2

## Focus on 50 illustrative projects - Energy (1/2)



Country	Project Developer	Investment	Project Title	Project Description
Cyprus	EuroAsia interconnector Limited	€ 2.5 bn	Euroasia Interconnector Stage I	2 GW electricity interconnector between Israel, Cyprus and Greece via the world's longest submarine power cable. Project Stage 1 consists in the construction of the electricity interconnection between Israel, Cyprus and Greece with initial transmission capacity of 1 GW, with the financial cost estimated at € 2.5 bn.
Estonia	Tuuletraal	€ 553 mn	Tuuletraal Offshore Wind Power Project (380MW)	Wind Offshore power plant of 380MW. It is planned to be located about 30km from the coast, near Saaremaa, Kihnu and the mainland of Parnu County. The projects is expected to be completed by 2025
Finland	Valorem	€ 300 mn	Viiatti wind power project	250-300 MW onshore wind project located in Finland
Germany	EcofinConcept GmbH	€ 95 mn	Floating Solar farm	Planning, building and operating a 70 MWp floating solar system on an open-cast lake (formerly used for brown coal mining)
Greece	Independent Power Transmission Operator / Ariadne Interconnection	€1 bn	Interconnection Athens – Crete	Interconnection Athens – Crete
Ireland	Codling Wind Park Ltd	€ 2 bn	Codling Offshore Wind Farm (1.1 GW)	1.1 GW fixed offshore wind farm located 16.7km off the coast of Ireland.
Italy	Prysmian PowerLink	€ 10 mn	High Depth Submarine Cable Systems	Submarine cables project contributing to strengthening interconnections and energy transition for integration of renewable sources such as offshore windfarms. The aim of the project is to make submarine cables lighter and stronger, replacing the steel armor with high performance fibers.
Lithuania	UAB Windfarm Akmenė one	€ 318 mn	Akmene Wind Farm II (325MW)	Wind Onshore project of 325MW. The construction and commissioning of the windfarm support the targets of the Lithuanian government to strengthen the domestic energy production and to decrease the dependency on energy imports.





## Appendix 2

### Focus on 50 illustrative projects - Energy (2/2)



Country	Project Developer	Investment	Project Title	Project Description
Poland	Mirova	€ 198 mn	Onshore wind project in Poland (132MW)	The plants were awarded in the renewable energy auction launched by the Polish government in 2018. With a capacity of 132 MW, the three power plants will have a total of 53 turbines supplied by manufacturer Vestas and will be operated by Akuo's local teams.
Portugal	Save-e	€ 2 mn	Save-e	Establishment of energy communities (20 already active in Portugal) investing in self-consumption technology (using solar PV, wind, batteries, and monitoring devices) and supported by the Save-e app, helping users save energy, and grow their communities with gamification incentives.
Romania	Hidroelectrica	€ 596 mn	Black Sea offshore wind farm	Offshore wind project with a total capacity comprised between 300 and 500 MW depending on the final configuration
Slovenia	Elektro Slovenija, Terna SpA	€ 755 mn	Divaca-Bericevo (Slovenia) - Salgareda (Veneto, Italy) Transmission Line	New HVDC link between Salgareda (Italy) and Divaca/Bericevo (Slovenia) which will strengthen the connection between Slovenia and Italy.
Spain	Iberdrola	€ 305 mn	Francisco Pizarro Solar PV Plant (590MW)	590MW Francisco Pizarro solar farm in Extremadura, Spain. The Francisco Pizarro project will occupy a 1,300 hectare site between Caceres' municipal areas of Torrecillas de la Tiesa and Aldeacentenera. The plant is to be commissioned in 2021.
Spain	Endesa	€ 1.4 bn	Teruel	Substitution and reconversion of coal power plant by solar and wind power plants with Battery Energy Storage Systems. Dimensions: Solar power plant 1.585 MW, Wind power plant 140 MW, Battery Energy Storage Systems 160 MW
Sweden	Arise AB	€ 280 mn	Onshore wind plant in Kõlvallen (282 MW)	47 wind power turbines are planed to be built in Ljusdal region in the north of Sweden, representing a total capacity of 282MW.



# Appendix 2

## Focus on 50 illustrative projects - Transport



Country	Project Developer	Investment	Project Title	Project Description
Bulgaria	Sofia Municipality	€ 50 mn	Acquisition of e-buses	Purchase of electric buses to reduce the negative environmental effects caused by currently used diesel and natural gas buses.
Denmark	Government of Sweden, Government of Denmark	€ 4 bn	Copenhagen - Malmo Metro Line Project	Metro line between Copenhagen and Malmö with departures every 1½ minutes and a travel duration of approximately 20 minutes. Constructions could begin in 2028 and commissioning in 2035.
France	SNCF	€ 50 mn	EMA Program	EMA Program is a program implemented by the French national railways operator (SNCF) to enhance multimodality around train stations in France, through the development of secure bike shelters, self-service electric scooters, enhanced information to travelers, etc.)
Greece	Attiko Metro SA	€ 1.8 bn	Athens Metro Line 4	Athens Metro Line 4, 33,5 km long, including 30 stations. The construction should be launched in 2019 and will take 8 years to be completed. It is estimated that just one of its section (section A) will serve approximately 220,000 passengers on a daily basis.
Italy	Seri Industrial SpA (FAAM) and others	€ 505 mn	IPCEI (Important Project of Common European Interest)	FAAM project has been approved for the production of beyond the state of the art li-ion cells and recycling of end-life li-ion batteries, through the realization of a Gigafactory with a 2,5/3 GWh/year capacity in Teverola, focused on the production of innovative li-ion cells and modules for automotive applications ("mass market").
Italy	Comune di Milano	€ 1.5 bn	Strengthening of public transport	Acquisition of new electric buses and dismissal of the existing ones powered by diesel and renewal of depots for charging and maintenance stations.
Poland	ZIKIT	€ 90 mn	Krakow Fast Tram PPP Project	4.5km fast tram line between Czyżyny and Mistrzejowice, in the city of Krakow, Poland.
Slovakia	Banska Bystrica Self-governing region	€ 40 mn	E-mobility development	Modernisation of public transportation system - 100 electric buses for the region
Spain	Seville City Council, Andalusian Government and Spanish State	€ 1.5 bn	Seville Metro Line 3 PPP Project	Seville Metro Line 3 will go through the city from north to south, from the Pino Montano neighborhood to Los Bermejales, with a future expansion to the Bellavista neighborhood. It is expected to have 14 million annual travelers, and to serve a population of about 120,000 inhabitants. It will be connected to key local infrastructures including hospital and stadium.



# Appendix 2

## Focus on 50 illustrative projects - Building



Country	Project Developer	Investment	Project Title	Project Description
Belgium	City of Bruxelles	€ 2 bn	Brussels Building renovation program	Program launched by Brussels-Capital Region on April 25 with the objective of achieving 100kWh / m <sup>2</sup> / year in primary energy on average for residential buildings by 2050, i.e. an average level performance equivalent to a PEB C +.
Croatia	City of Vinkovci	€ 0.4 mn	City of Vinkovci Theater building energy efficiency improvement and renovation	Energy renovation of the city theater building of 900 m2 owned by the city of Vinkovci. The renovation includes the insulation of the facade, replacement and insulation of the roof, installation of a heat pump and energy-saving LED lighting, replacement of worn-out cables, installation of lightning rods.
Czech Republic	City of Prague	€ 111 mn	Accelerated reduction of energy intensity of Prague buildings	The City of Prague owns and operates over 6,000 buildings. They mostly serve as various public buildings (schools, retirement homes, children's and youth centers, office buildings, sports facilities, swimming pools, etc.) and differ greatly in their energy intensity, thermal technical parameters of building envelopes and energy efficiency of technical building systems (lighting, ventilation, heating circulation pumps, etc). The proposed investment programme will focus on improving the energy intensity of the municipal building stock.
Germany	KMLS GmbH	€ 100 mn	Building automatization controls in existing warehouse buildings	Replace existing lighting by LED Luminaires with presence and daylight harvesting control in a German warehouse space and install a building management system that regulates lighting, heating, aircon and air quality.
Hungary	The Municipality of the City of Budapest	€ 350 mn	Establishing the Budapest Home Refurbishment Fund	Boosting energy performance of residential buildings in Budapest, thus improving air quality and citizens' well being, while respecting the city's historical heritage. The Municipality of Budapest aims to refurbish at least 30% of homes (ca. 282,500) during the next 10 years, saving 10% of the overall CO2 emissions in Budapest.
Latvia	Funding for Future B.V.	€ 20 mn	Building Energy Efficiency Facility (BEEF)	Private sector initiative on Advanced Renovation of multifamily and public buildings to deliver Real Estate Value guaranteed by Energy Savings, with first facility, implemented in Latvia ("LABEEF"), chosen as best practice example of private finance initiative for deep renovation of buildings by the Federal Ministry for the Environment in Germany for sustainable finance Funding.
Poland	Malopolska Region Municipality of Kraków	€ 23 mn	Clean Air 2020	Replacement of old solid-fuel stoves and boilers and the modernization of single-family houses to effectively manage energy. The programme targets private persons who are owners or co-owners of single-family houses or persons with permission to start construction.



# Appendix 2

## Focus on 50 illustrative projects - Land Use



Country	Project Developer	Investment	Project Title	Project Description
Netherlands	Foundation for Food Forestry Netherlands	€ 10 mn	Sustainable Breakthrough Food Forestry!	Programme aiming to realize at least 300 hectare of new food forests on agricultural land in the Netherlands in 5 years' time, in close cooperation with farmers and other stakeholders with access to agricultural land.
Netherlands	Foundation for Food Forestry Netherlands - Green Development Fund	€ 65 mn	Cooperative Food Forests for New Entrepreneurial Nature	Cooperative development and cost-effective management of at least 200 hectares new natural areas consisting of food forests as icons of 'Entrepreneurial Nature' in the province of North-Brabant.
Poland	Regionalny Zarząd Gospodarki Wodnej w Krakowie	€ 10 mn	Restoration of the ecological continuity of the Vistula	Restoration of ecological continuity of flowing surface waters and coherence of the Natura 2000 network of areas in the section covered by the Project. Goals are: (i) Improved conservation prospects for natural habitats and adaptation to climate change and increase ecosystem resilience to natural disasters; (ii) ensured continuity of rivers and streams by removing obstacles to the migration of fish more accessible; and (iii) restored permeability of streams important for maintaining morphological continuity.
Spain	Madrid City Council	€ 15 mn	Green infrastructure and health co-benefits of urban greening in the city of Madrid.	Experiment of Nature-based Solutions (NBS), across several layers (employment and training, technology and data, health and climate resilience, ...), sets out to create insights in these questions through a place-based approach, in a segment of the city where several existing projects can be combined to explore and test how to deepen systemic impact.