

EX POST EVALUATION

OF THE EUROPEAN REGIONAL
DEVELOPMENT FUND AND THE
COHESION FUND

 **2014
2020**

WORK PACKAGE 7 EUROPEAN GREEN DEAL

FINAL REPORT



EUROPEAN COMMISSION

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European Commission

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Ex-post evaluation of cohesion policy programmes 2014-2020 financed by the ERDF and CF

Work Package 7 – European Green Deal

Final report

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Manuscript completed in June 2025

1st edition

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Luxembourg: Publications Office of the European Union, 2025

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List of abbreviations

AAQDs	Ambient Air Quality Directives
AQPs	Air Quality Plans
CAP	Common Agricultural Policy
CEAP	Circular Economy Action Plan
CEE	Central and Eastern Europe
CF	Cohesion Fund
CFP	Common Fisheries Policy
CPR	Common Provisions Regulation
CRII	Coronavirus Response Initiative
CSO	Civil Society Organisation
DWD	Drinking Water Directive
EAFRD	European Agricultural Fund for Rural Development
ECA	European Court of Auditors
EED	Energy Efficiency Directive
EGD	European Green Deal
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EEA	European Environmental Agency
EMFF	European Maritime and Fisheries Fund
EPBD	Energy Performance of Buildings Directive
ERDF	European Regional Development Fund
ESF	European Social Fund
ETC	European Territorial Cooperation
EU	European Union
FI	Financial Instrument

GDP	Gross Domestic Product
GHG	Greenhouse Gas
GPP	Green Public Procurement
IAS	Invasive Alien Species
ICT	Information and Communication Technologies
IF	Intervention Field
IP	Investment Priorities
ITI	Integrated Territorial Investment
LCE	Low Carbon Economy
MA	Managing Authority
MFF	Multiannual Financial Framework
NAPCP	National Air Pollution Control Programmes
NBS	Nature-Based Solutions
NECD	National Emissions Reduction Commitment Directive
NECP	National Energy and Climate Plan
NGO	Non-Governmental Organisation
NREAP	National Renewable Energy Action Plans
OP	Operational Programme
PA	Partnership Agreement
PI	Policy Instrument
PPP	Purchasing Power Parity
RBMP	River Basin Management Plan
RDP	Rural Development Programme
RES	Renewable Energy Sources
RRF	Recovery and Resilience Facility
SEA	Strategic Environmental Assessment
SET	Strategic Energy Technology

SMEs	Small and Medium-sized Enterprises
SUMP	Sustainable Urban Mobility Plan
TA	Technical Assistance
TC	Territorial Cooperation
TO	Thematic Objective
ToC	Theory of Change
TBIE	Theory-Based Impact Evaluation
TEN-E	Trans-European Networks for Energy
TEN-T	Trans-European Transport Network
UPT	Urban Public Transport
UWWTD	Urban Wastewater Treatment Directive
WFD	Water Framework Directive
WMP	Waste Management Plan
WNE	Western and Northern Europe
WP	Work Package
WPP	Waste Prevention Programme

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Glossary of terms

Cohesion Fund (CF)	The CF provides support to the poorer regions of Europe to stabilise their economies with a view to promoting growth, employment and sustainable development. The CF contributes to financing environmental measures and trans-European transport networks – particularly high-priority projects of European interest – in the 13 Member States that have joined the EU since 2004, as well as in Greece and Portugal. CF may also be used to finance the priorities under the EU's environmental protection policy.
European Regional Development Fund (ERDF)	The ERDF provides financial support for the development and structural adjustment of regional economies, economic change, enhanced competitiveness and territorial cooperation throughout the EU. The ERDF supports projects under the five policy objectives of EU cohesion policy, focusing in particular on objective 1 (a more competitive and smarter Europe) and objective 2 (a greener Europe, low-carbon transition towards a net zero carbon economy), as well as on sustainable urban development. Operations supported by the ERDF are expected to contribute 30% of the overall ERDF financial envelope to climate objectives. The ERDF also funds cross-border, interregional and transnational projects under the European Territorial Cooperation objective.
Thematic objective	Defined in the Common Provisions Regulation (Regulation (EU) No 1303/2013) as objectives to guide the implementation of the ESI Funds during the 2014-2020 programming period. Eleven thematic objectives were stipulated.
Specific objective	Defined in the Common Provisions Regulation (Regulation (EU) No 1303/2013) as the result to which an investment priority or Union priority contributes in a specific national or regional context through actions or measures undertaken within such a priority.
Intervention field	Defined in the category of expenditure under the cohesion funds that can be programmed by managing authorities.
Operation	Defined in the Common Provisions Regulation (Regulation (EU) No 1303/2013) as a project, contract, action or group of projects selected by the managing authorities of the programmes concerned, or under their responsibility, that contributes to the objectives of a priority or priorities; in the context of financial instruments, an operation is constituted by the financial contributions from a programme to financial instruments and the subsequent financial support provided by those financial instruments.
Policy instrument	Defined in the current evaluation as a consistent set of activities aimed at achieving a policy goal, i.e. addressing the same market/systemic failures and challenges and having the same expected impact(s). The same policy instrument may cover one or multiple intervention fields and may be delivered in various ways (for instance, through direct support or through intermediary organisations) and via various forms of finance. Twelve policy instruments were defined.
Ex-ante conditionality	Defined in the Common Provisions Regulation (Regulation (EU) No 1303/2013) as a concrete and precisely pre-defined critical factor that is a prerequisite for and has a direct and genuine link to, and direct impact on, the effective and efficient achievement of a specific objective for an investment priority or a Union priority in the 2014-2020

		programming period. These critical factors are linked to policy and strategic frameworks or regulatory frameworks that are compliant with the EU acquis.
Enabling conditions		Defined in the Common Provisions Regulation (Regulation (EU) No 2021/1060) as one of the key elements of the cohesion policy for 2021-2027. These build on the ex-ante conditionalities from the 2014-2020 period to ensure that the necessary conditions for the effective and efficient use of the funds are in place. These necessary conditions are linked to policy and strategic frameworks or regulatory frameworks that are compliant with the EU acquis. There are four horizontal enabling conditions linked to the horizontal aspects of programme implementation and 16 thematic enabling conditions, which set out sector-specific conditions for relevant investment areas eligible for support under cohesion policy (specific objectives).
EU-13		Defined in this evaluation as comprising the following countries: Bulgaria, Czechia, Cyprus, Estonia, Croatia, Hungary, Lithuania, Latvia, Malta, Poland, Romania, Slovenia and Slovakia.
EU-14 + UK		Defined in this evaluation as comprising the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.
Less developed regions		Defined by Commission Implementing Decision (EU) 2021/1130 as regions with GDP/head of less than 75% of the EU-27 average.
More developed regions		Defined by Commission Implementing Decision (EU) 2021/1130 as regions with GDP/head of above 100% of the EU-27 average.
Transition regions		Defined by Commission Implementing Decision (EU) 2021/1130 as regions with GDP/head of between 75% and 100% of the EU-27 average.
European Territorial Cooperation (ETC)		ETC is a cohesion policy goal aimed at addressing challenges across borders and jointly developing the potential of diverse territories. Cooperation actions are supported by the ERDF through three key components: cross-border cooperation, transnational cooperation and interregional cooperation.

Abstract

This evaluation assesses the contribution of European Regional Development Fund (ERDF) and Cohesion Fund (CF) investments during the 2014-2020 programming period to the objectives under the European Green Deal. While the overall achievements fell short of the targets, meaningful progress was made across all key sectors, including decarbonisation, adaptation, clean transport and resource efficiency. Notable successes include strong performance in household energy efficiency (with 97% of the target achieved) and biodiversity protection (with 127% of the target achieved in territorial cooperation), although investments in public building efficiency and clean transport lagged behind. Barriers included administrative capacity constraints, skill shortages and complex project implementation processes, particularly at the local level. Ex-ante conditionalities, while partially effective, often lacked ambition or were not fulfilled in a timely manner, limiting their transformative potential. Traditional grey infrastructure dominated investment portfolios, with limited uptake of nature-based or circular economy solutions. Financial instruments were underutilised due to administrative burdens, market conditions and low perceived attractiveness. Cross-sectoral coordination and the integration of sustainability principles proved beneficial but were inconsistently applied. Strategic recommendations include prioritising high-impact and transformative investments, strengthening administrative and technical capacities, stepping up support for innovation and climate adaptation and promoting Green Public Procurement. The evaluation highlights the meaningful role of the ERDF and CF in aligning cohesion policy with the European Green Deal – despite the challenges – underscoring the need for more ambitious, sustainable and systemic investment approaches going forward.

Résumé

Cette évaluation analyse la contribution des investissements du Fonds européen de développement régional (FEDER) et du Fonds de cohésion (FC) au cours de la période de programmation 2014-2020 aux objectifs du Pacte vert pour l'Europe. Bien que les résultats globaux soient inférieurs aux objectifs fixés, des progrès significatifs ont été réalisés dans tous les secteurs clés, notamment la décarbonation, l'adaptation au changement climatique, les transports propres et l'efficacité des ressources. Parmi les succès notables figurent les bonnes performances en matière d'efficacité énergétique des ménages (avec 97% de l'objectif atteint) et de protection de la biodiversité (avec 127% de l'objectif atteint dans la coopération territoriale), même si les investissements dans l'efficacité énergétique des bâtiments publics et les transports propres ont pris du retard. Les principaux obstacles rencontrés comprenaient des contraintes de capacité administrative, une pénurie de compétences et des processus de mise en œuvre de projets complexes, en particulier au niveau local. Les conditionnalités ex ante, bien que partiellement efficaces, manquaient souvent d'ambition ou n'étaient pas remplies dans les délais impartis, limitant ainsi leur potentiel transformateur. Les infrastructures grises traditionnelles ont dominé les portefeuilles d'investissement, avec une adoption limitée des solutions fondées sur la nature ou de l'économie circulaire. Les instruments financiers ont été sous-utilisés en raison de lourdeurs administratives, des conditions de marché et d'une faible attractivité perçue. La coordination intersectorielle et l'intégration des principes de durabilité se sont révélées bénéfiques, mais leur application a été inégale. Les recommandations stratégiques incluent la priorité aux investissements à fort impact et de nature transformative, le renforcement des capacités administratives et techniques, un soutien accru à l'innovation et à l'adaptation climatique, ainsi que la promotion des marchés publics écologiques. L'évaluation souligne le rôle important du FEDER et du Fonds de cohésion dans l'alignement de la politique de cohésion sur les objectifs du Pacte vert pour l'Europe — malgré les défis rencontrés — et met en évidence la nécessité d'approches d'investissement plus ambitieuses, durables et systémiques à l'avenir.

Kurzfassung

Die vorliegende Evaluierung untersucht den Beitrag der Investitionen aus dem Europäischen Fonds für regionale Entwicklung (EFRE) und dem Kohäsionsfonds (KF) im Programmplanungszeitraum 2014–2020 in Bezug auf die Ziele des Europäischen Grünen Deals. Wenngleich die Gesamtergebnisse hinter den gesteckten Zielen zurückblieben, wurden in allen wichtigen Sektoren – darunter Dekarbonisierung, Anpassung an den Klimawandel, sauberer Verkehr und Ressourceneffizienz – bedeutende Fortschritte erzielt.

Besondere Erfolge zeigten sich bei der Förderung der Energieeffizienz von Wohngebäuden (mit einer Zielerreichung von 97%) und dem Schutz der Biodiversität (mit einer Zielerreichung von 127% im Rahmen der territorialen Zusammenarbeit), während Investitionen in die Energieeffizienz öffentlicher Gebäude und in den sauberen Verkehr zurückblieben.

Hemmnisse bestanden unter anderem in Form begrenzter administrativer Kapazität, Fachkräftemangel sowie komplexen Projektumsetzungsprozessen, insbesondere auf lokaler Ebene. Ex-ante-Konditionalitäten waren nur teilweise wirksam, da sie häufig nicht ambitioniert genug formuliert oder nicht rechtzeitig erfüllt wurden, wodurch ihr transformatives Potenzial eingeschränkt war.

Investitionen in konventionelle „graue“ Infrastruktur dominierte die Investitionsportfolios der Operationellen Programme, während naturbasierte oder zirkuläre Lösungen nur begrenzt Anwendung fanden. Finanzinstrumente wurden aufgrund administrativer Hürden, ungünstiger Marktbedingungen und einer (subjektiv wahrgenommenen) geringen Attraktivität nur unzureichend genutzt.

Eine sektorübergreifende Koordination und die Integration von Nachhaltigkeitsprinzipien erwiesen sich als vorteilhaft, wurden jedoch uneinheitlich umgesetzt.

Zu den strategischen Empfehlungen zählen die Priorisierung von Investitionen mit hoher Wirkung und transformativem Potenzial, der Ausbau administrativer und technischer Kapazitäten, die verstärkte Unterstützung von Innovationen und Klimaanpassungsmaßnahmen sowie die Förderung grüner öffentlicher Beschaffung.

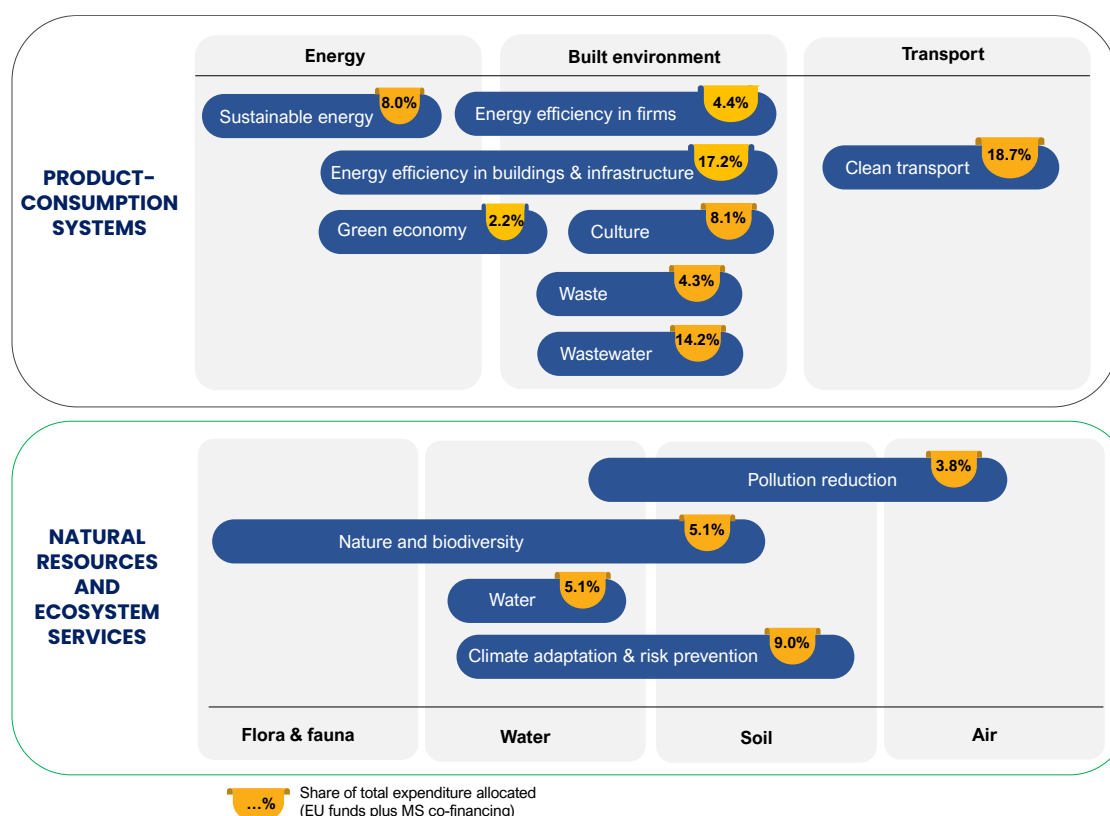
Die Evaluierung unterstreicht die bedeutende Rolle von EFRE und dem Kohäsionsfond bei der Ausrichtung der Kohäsionspolitik am Europäischen Grünen Deal – trotz bestehender Herausforderungen – und hebt die Notwendigkeit ambitionierterer, nachhaltigerer und systemischer Investitionsansätze für die Zukunft hervor.

Executive Summary

This evaluation presents the findings of the ex-post evaluation of cohesion policy programmes 2014-2020 and their contribution to the European Green Deal. It assesses the support provided by the European Regional Development Fund (ERDF) and Cohesion Fund (CF) for environmental and climate objectives during the 2014-2020 programming period. Conducted in line with the Better Regulation Guidelines, the evaluation forms part of a broader package of assessments examining the performance of cohesion policy across specific sectors and themes over the same timeframe.

Expenditure and measures classified under 34 intervention fields¹ and 12 policy instruments under the ERDF and the CF are covered. The concept of 'policy instrument' is used as a key unit of analysis. It is defined as a consistent set of activities aimed at achieving a policy goal, addressing the same market failures and having the same or similar expected impact(s).² These instruments were identified through a combination of literature review and in-depth analysis of expenditure data, operations and beneficiaries. An overview of the policy instruments is presented in the figure below.

Figure 1 – Policy instruments



¹ The 34 intervention fields were defined by the Tender Specifications of the study.

² The same policy instrument may cover one or multiple IFs and may be delivered in various ways (for instance, through direct support or through intermediary organisations) and via various forms of financing.

The policy context and theory-based impact evaluation approach

Improving the environmental and climate performance of Member States was a key goal of the 2014-2020 programming period. Throughout this period, the ERDF/CF intervention areas were closely aligned with the objectives of the sustainable growth pillar of the Europe 2020 strategy, which prioritised the transition to a low-carbon, resource-efficient and climate-resilient economy. This flagship EU policy laid the groundwork for embedding sustainability into the EU's core activities – a commitment reflected in thematic objectives 4, 5 and 6 of the Common Provisions Regulation (Regulation (EU) No 1303/2013) governing ERDF/CF spending. Collectively, thematic objectives 4 (low-carbon economy), 5 (promotion of climate change adaptation) and 6 (environment and resource efficiency) and more specifically the 34 intervention fields considered in this evaluation accounted for the largest ERDF/CF allocation for the 2014-2020 programming period. The European Green Deal (EGD – launched at the end of 2019 – built on this trajectory by setting more ambitious goals and introducing new aspirations.

While investments in climate and environment under the ERDF/CF targeted diverse needs, they shared some common features across the target countries and regions. In the 2014-2020 period, the most pressing and widespread needs across all EU countries and regions included lowering GHG emissions through energy efficiency in buildings, green production processes and greening urban public transport. The preservation of natural resources and biodiversity, along with the prevention and effective response to extreme events caused by climate change, were also frequent needs. However, specific investment needs related to nature protection, climate adaptation and risk prevention largely depend on regional geomorphology and human pressures, including uncontrolled urbanisation. The scope of the various programmes is also influenced by the level of development of each region or country, with some areas still facing challenges in complying with EU targets. For example, most of the less developed regions continue to require improved infrastructure for wastewater treatment and waste management.

The theory of change underpinning the ERDF/CF interventions supporting climate and environment is complex due to the wide array of policy instruments involved. Given the breadth of policy instruments deployed, the aim was for a range of outputs, outcomes and impacts to emerge, ultimately contributing to the Europe 2020 strategy's sustainable growth pillar and the EGD objectives. More precisely, sustainable energy, energy efficiency of enterprises, buildings and infrastructure and clean urban transport investments were intended to contribute to decarbonisation of specific sectors; adaptation and risk management were designed to mitigate climate risks; water and wastewater investments were expected to increase connectivity to water and wastewater services; waste management investments were designed to improve prevention and recycling rates; pollution prevention investments were aimed at reducing pollution and rehabilitate contaminated sites; biodiversity and nature investments were intended to improve the state of the environment; and, finally, investments in green economy were expected to promote resource efficiency and circularity (and, by extension, emissions reduction).

Various preconditions, supporting factors and risks were expected to either support or negatively impact investments. As acknowledged in the relevant

literature and evaluations of the previous programming periods, the progress of cohesion policy investments often hinges on several preconditions, supporting factors and risks. Preconditions for successful investments include: the presence of conducive national frameworks (e.g. legislation and plans); ex-ante conditionalities as levers for compliance; availability of administrative capacity and skills; and the quality of the projects prepared and selected. Furthermore, the relevant literature reports several supporting factors that may enhance the effects of investments, including coordination between authorities and sectors, as well as the effective use of financial instruments combined with grants. The risks that often materialise and negatively impact investments include complex and time-consuming national processes, as well as external factors affecting market conditions (such as the Russian war of aggression against Ukraine and the COVID-19 pandemic).

A theory-based impact evaluation approach was applied to structure the evaluation. The evaluation used theory-based impact evaluation to understand and test the *what* (what achievements were generated by different types of policy instruments), the *how* (whether certain types of interventions were more relevant or successful in producing results) and the *why* (what preconditions, supporting factors and risks influenced the presence or lack of achievements for a given policy instrument and within a given policy context).

The theory-based impact evaluation method was applied systematically at two levels:

First, *12 specific theories of change for each of the 12 policy instruments* were defined, including their specific expected outputs, outcomes and impacts, along with the specific pre-conditions, supporting factors and risks. This was based on a literature review and preliminary interviews. For each policy instrument, the theory of change and underlying hypotheses (defined based on the literature review) were tested in the context of a case study covering three selected Member States. The case study investigation was conducted based on a literature review (including statistical data) and field research. The field research on the 12 policy instruments involved over 190 interviews with managing authorities, intermediate bodies, final beneficiaries, thematic experts and other stakeholders, covering 24 Member States.³ Eleven technical expert workshops, involving a total of 123 participants, were used to discuss and validate the emerging findings. A mix of methods was used for each case study. Quantitative analysis, i.e. analysis of data on expenditures, beneficiaries and operations for each specific policy instrument, was combined with analysis of statistics on needs and macro-indicators. This was supplemented by qualitative analysis of literature data, alongside process tracing of implementation of the policy instrument investments in three selected Member States, to understand the specific factors and context impacting them.

Second, an *overarching ERDF/CF theory of change for climate and environment* was defined based on a literature review and connected to the specific theories of change developed for each policy instrument. The analysis at this level was

³ Member States covered in the case studies: Austria, Belgium, Bulgaria (x2), Czechia (x2), Croatia (x2), Estonia, France (x2), Finland, Greece (x3), Germany (x3), Hungary, Italy (x5), Ireland, Latvia (x2), Lithuania (x2), Malta, Poland, Portugal (x2), Poland (x2), Romania (x3), Slovenia, Spain, Sweden, Slovakia. Some countries were covered by several PI case studies, which are marked in brackets.

performed by triangulating, aggregating and comparing data at multiple levels. Quantitative analysis of the portfolio of investments and statistical analysis were used to understand patterns and trends and to investigate specific elements of the theory of change. This analysis supported understanding of the *'what'* and achievements relative to needs. Qualitative data from a review of literature at EU level and all national evaluation reports, in-depth analysis of 70 operational programmes and the 12 policy instrument-specific case studies were systematised and triangulated to identify trends and patterns regarding the *'how'* and the *'why'*. Structurally, investigation of the *'why'* was linked to the preconditions, supporting factors and risks that emerged from the initial literature review and supported the formulation of hypotheses. However, the detailed investigations also revealed aspects that were not included in the initial theory of change but emerged from the data collected (e.g. behavioural aspects were reported as a key risk impacting the success of investments).

Important lessons can be drawn from the limitations of this evaluation to inform future evaluations of cohesion policy programmes. First, there are trade-offs between the comprehensiveness of the thematic and sector coverage and the analytical depth of large-scale evaluations. This evaluation covers 12 policy instruments and a variety of outputs, outcomes and impacts, while also addressing the Better Regulation Guidelines criteria and additional policy questions. Future evaluations would benefit from a narrower and more thematic scope. Second, while national thematic evaluations are an important input for EU-level assessments, their availability was limited for this evaluation. National thematic evaluations should therefore be conducted in advance of the overall evaluation to ensure better access to data. Finally, the limited availability of systematic data measuring outcomes posed another challenge in this evaluation and should be addressed in the future. For example, the outcome of climate adaptation investments in cohesion policy is measured in terms of flood protection and forest fires, with a focus on the number of people covered by the protective measure. However, the actual impact is much wider and could include co-benefits, such as positive effects on biodiversity, air quality, water management and reduction in greenhouse gas emissions, which would be difficult to capture using a monitoring system. The efforts and costs of collecting the relevant data should be balanced carefully against the utility of these data.

The interventions supported

As of 2020, 98,639 operations were supported by the ERDF/CF, mostly through non-repayable grants, under the 12 policy instruments covered.⁴ These operations reached 73,021 beneficiaries, the majority of whom were enterprises and public administrations at the local level. The average expenditure per operation varied significantly depending on the type of policy instrument and programme, with the disparity reflecting the nature of the investments supported. Operations lasted an average of 2.4 years. The longest-lasting operations were typically those involving a significant infrastructure component, such as wastewater and water projects.

⁴ WP 2 Single Database.

The overall allocation for climate and environmental investments by the end of 2023 was slightly lower than initially expected. This allocation remained stable until the end of 2019. The COVID-19 pandemic prompted a slight decrease, with some funds redirected towards business support and healthcare instruments. However, this reduction was largely offset by the injection of REACT-EU resources, which were mostly used to support mature investments in the pipeline or interventions with quick implementation. Following post-pandemic growth, the planned allocation decreased again in 2023, with funds generally redirected to intervention fields with higher absorption rates and with committed funds significantly exceeding planned ones in 2022. Programmes that reduced their budgets generally had above-average initial allocations for climate and environmental objectives. Despite the overall downward trend, allocations for investments in solar renewable energy, energy efficiency in public infrastructure, clean urban transport and cycling paths increased substantially over the 2014-2020 programming period.

A total of 267 programmes, including 195 operational programmes and 71 territorial cooperation programmes, allocated resources to support the environment and climate with varying degrees of intensity. As of 2023, 85% of the total eligible expenditure is concentrated in 77 programmes across 20 Member States, while 85% of the total EU contribution is allocated to just 66 programmes. In terms of total eligible expenditure, the top five Member States are Poland, France, Czechia, Hungary and Italy. Regarding the total planned allocation for climate and environment as of 2023, the largest programmes in absolute terms are the Polish 'Infrastructure and Environment ERDF/CF' programme and the 'Multi-regional Spain – ERDF' programme. The 'Infrastructure and Environment ERDF/CF' operational programme in Poland has the highest relative allocation for climate and environmental investments, followed by the 'Large Infrastructure Programme – RO – ERDF/CF' in Romania. On average, each programme allocated 30% of its total budget to climate and environment, but there are large variations in the sample (ranging from 3% to 100% of funds devoted to the 34 environmental intervention fields selected for this evaluation). EU-13 countries represent 54.0% of all CF and ERDF resources allocated to the 34 intervention fields, while EU-14+UK countries allocated 41.7%. The remaining 4.3% of planned funding was allocated through territorial cooperation programmes.

The use of different ERDF/CF policy mixes (i.e. combinations of policy instruments) varied according to national/regional contexts and policy choices. Investments in the policy instrument on energy efficiency of buildings and the policy instrument on clean urban transport featured strongly in the policy mixes of many countries. Policy instruments related to water, wastewater and waste management were represented in approximately half of all programmes. However, these instruments were consistently included in the operational programmes of EU-13 countries, except for programmes specifically focused on competitiveness, growth or innovation. The policy instrument on energy efficiency in enterprises and the policy instrument on green economy accounted for only a small share of the total environment and climate expenditure. They were mainly implemented by EU-14+UK countries, especially in programmes where growth and enterprise competitiveness are central to the intervention approach.

Three main drivers behind the selection of policy instruments in programmes were identified: i) compliance with European directives is a key driver that

determines the selection of policy instruments (especially in the areas of water, wastewater and waste); ii) infringement procedures act as a catalyst, speeding up certain investments; iii) the focus on specific types of investments also depends on the available ERDF/CF funding in alignment with national priorities and funding. The policy mix tends to be similar in regions and countries where the starting conditions – i.e. initial environmental performance and the role of the ERDF/CF relative to government expenditure – are similar.

Findings of the evaluation

While achievements fell short of the targets, meaningful progress was made across all Green Deal-related areas

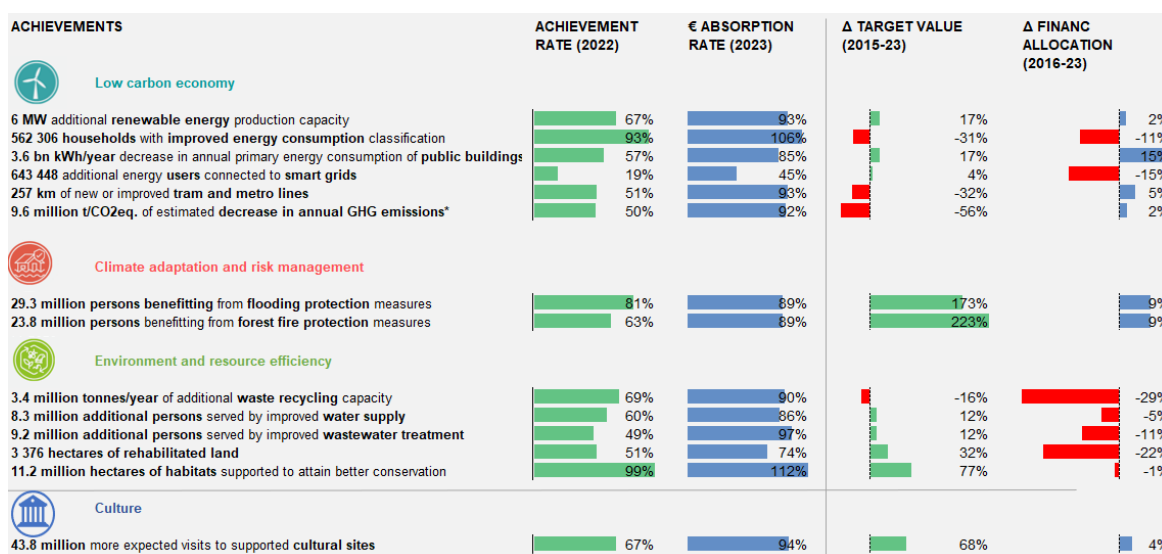
ERDF/CF investments made a meaningful contribution to decarbonisation objectives across all sectors. However, additional investments are needed to meet the higher ambitions. Varying levels of achievement were recorded across the key types of policy instruments aimed at supporting decarbonisation.

First, 67% of the target set for additional renewable energy capacity was achieved. Achievement rates were relatively similar across different types of regions, although they were lower in national programmes. The overall achievement rate also needs to be considered in the overall context of the increase in the target values and financial allocations over the programming period, as well as challenges related to the implementation of renewable energy investments (permitting, state aid, capacity and skill gaps).

Second, investments in energy efficiency succeeded in achieving the set targets for households (97%) but were somewhat less successful in reaching the targets set for energy consumption in public buildings (57%). Less developed regions stand out in terms of achievement rates. However, the achievement rate should be considered in the context of a decreased target and financial allocation for households, whereas there was an increase in the target and allocations for public buildings.

Third, 51% of the target set for improving tram and metro lines was achieved through clean transport investments, reflecting a positive but more moderate contribution to the decarbonisation of transport. The modest achievement rate is mainly attributable to the complexity of such projects, which require long implementation times. Such investments were predominantly found in Member States with transition regions and less developed regions.

Finally, decarbonisation investments led to an estimated decrease of 9.6 million t/CO₂ eq in annual greenhouse gas emissions (50% of the initial target). However, this target also needs to be viewed against the background of a reduction in the overall target value by 56%, which can be explained by corrections for errors in the initial targets for some programmes.

Figure 2 – Achievements of ERDF/CF investments

* This achievement is based on indicator 034 (official name: GHG reduction: Estimated annual decrease of GHG) and is the reduction in GHG emissions per year by operations. That implies that it is not cumulative. It calculates the estimated annual savings "by the end of the period". Some estimates will be calculated for operations finalized in year 4 of the programme period whereas others will concern operations finalized in another year of the programme period. Once operations are finalized, the estimate is not revisited.

Source: Author's illustration based on Cohesion Open Data Platform data on achievements and categorisation, retrieved from <https://cohesiondata.ec.europa.eu>. Data cut-off years: 2022 and 2023.

Investments in adaptation and risk management helped build resilience, although achievements fell short of the target. Adaptation investments cumulatively resulted in approximately 29 million people protected against flood risks and 24 million protected against fire risks. Across all programmes, 81% of the planned target for flood protection and 63% of the target for fire protection was achieved. The higher achievement rates can be partly attributed to the strong performance and ambitious targets set for flood prevention within territorial cooperation programmes. However, the indicators used (number of people benefiting from protective measures) lack nuance, as adaptation investments may encompass both softer measures (e.g. awareness building and cooperation) and infrastructure investments. Additionally, risk exposure varies significantly by location. As a result, the relationship between the reported outputs and the actual impacts delivered is not entirely proportional.

Despite high absorption rates, achievements of investments in water, waste and wastewater fell short of the targets. However, they still made a positive contribution. Despite high absorption rates, achievement rates in wastewater and water supply are low, at 49% and 60%, respectively, for the indicators measuring the number of people served by improved wastewater treatment and water supply. Investments have primarily focused on addressing compliance gaps and modernisation needs, particularly in EU-13 Member States. The low achievement rate in wastewater is largely influenced by seven countries in Southern and Southeastern Europe, with Slovenia, Hungary, Greece, Spain, Croatia, Malta and Bulgaria experiencing significant shortfalls. Overall, high absorption rates indicate a greater likelihood of achieving the expected final outputs. Macro-level indicators and regression analyses suggest that ERDF/CF investments have a positive impact on increasing the number of people connected to water and wastewater facilities and enhancing resource efficiency, including waste recovery through recycling and

energy recovery. Notably, the achievement rate for the output indicator related to additional waste recycling capacity stands at 69%.

A positive contribution to biodiversity and nature is evident, with high achievement rates. The nature and biodiversity policy instrument represents the most significant allocation within territorial cooperation programmes, resulting in a notably higher target compared to other programmes. As a result, an achievement rate of 126.9% in territorial cooperation has positively influenced the overall achievement. When comparing different types of regions, the highest achievement rates are observed in developed regions, followed by transition regions and then less developed regions. However, as with the policy instrument for adaptation, an assessment of the impact at macro-level is not possible, due to a lack of relevant data.

More transformative⁵ and ambitious investments are needed to increase impact

Conventional investments are the preferred type of investment across Member States and are essential for ensuring compliance with the environmental acquis. The portfolio of investments selected by Member States and regions predominantly consists of traditional types of ‘grey’ infrastructure investments and conventional solutions. For example, investments in resource efficiency focus on reducing material use but are still based on a linear model (produce, use, dispose), rather than supporting the shift towards a circular model. Investments in flood protection typically consist of grey infrastructure rather than nature-based solutions, which would also have benefits for water availability, nature, biodiversity and wellbeing. Nevertheless, conventional investments continue to be needed, especially in less developed and transition regions, where significant investment is needed to achieve compliance with water, wastewater and waste legislation.

Transformative investments are urgently needed to match the level of ambition of the European Green Deal. It is necessary to balance conventional types of investments with more transformative ones that focus on innovative and sustainable solutions aimed at long-term benefits and systemic change. Such solutions may include nature-based solutions, circular economy initiatives and renewable energy. However, despite their well-documented potential and co-benefits, they are presently underutilised.

Investments focused on delivering long-term results were more challenging to implement but are more impactful. This is illustrated by examples from several policy instruments. Investments in deep renovations to improve energy efficiency in buildings, for instance, deliver better results in terms of energy performance, but were implemented by regions and Member States less often due to their technical complexity, funding challenges and stakeholder acceptance (e.g. multi-ownership structures). Similarly, where implemented, investments in green public transport (e.g. replacing public transport fleets) led to immediate results in terms of reduced pollution and lower greenhouse gas emissions. However, such investments also require behavioural changes, i.e. a modal shift, to maximise their impact. An

⁵ Transformative investments are defined in footnote no. 120.

approach used successfully by some regions for increasing the ambition level of investments – and one that needs to be scaled up – has been to combine different objectives within a single investment. Examples of this approach include combining energy efficiency and renewable energy investments in sectors such as transport; linking wastewater management to biogas production investments; and combining flood protection measures with investments in power generation from water flows.

Delayed fulfilment and low national ambition regarding thematic ex-ante conditionalities limited their impact on investments

The ex-ante conditionalities on energy were less challenging to implement but have not realised their full potential as levers for change. The high fulfilment rates at the time of adoption of the operational programmes for the ex-ante conditionalities for energy indicate that Member States and regions did not encounter major challenges in their implementation. In the case of the ex-ante conditionality on renewable energy, several regions exceeded the targets set at national level. However, the authorities attributed this primarily to the ex-ante conditionality on renewable energy being perceived as a ‘box-ticking exercise’, without the potential to drive real change.

The ex-ante conditionalities on wastewater and waste were challenging to fulfil but laid important foundations. These conditionalities impacted the regulatory and strategic frameworks governing the sectors and cohesion funding. However, delays and challenges in fulfilling the ex-ante conditionalities reduced this impact. The ex-ante conditionality on water strengthened the regulatory framework with regard to cost recovery. However, water services still fall short of full cost recovery in most Member States. Two key challenges were reported in this regard: methodological issues and affordability concerns. The ex-ante conditionality on waste management also posed challenges. The quality of the waste management plans was insufficient in many Member States and failed to properly address mandatory elements of the legislation (e.g. on municipal waste or recycling targets).

The ex-ante conditionality on adaptation was largely fulfilled but delays and quality issues limited its impact. The requirement to adopt a national adaptation plan was not fulfilled in a timely manner by 15 Member States, meaning that operational programmes were prepared without a strategic framework to guide investments. Furthermore, the quality of the adaptation plans and risk management plans varied across Member States. Delays and gaps in fulfilling the ex-ante conditionality have been identified as impacting the quality of investments supported by programmes financed by the ERDF/CF.

Factors impacting investments vary across regions, but limited administrative capacity and skills are particularly significant

Limited administrative capacity negatively affected all types of investments and regions but is an issue that is most pronounced at the local level. Previous studies⁶ widely acknowledged that the progress of planned cohesion policy actions is often hindered by limited administrative capacity. This evaluation confirms that the issue persisted during the 2014-2020 programming period. Capacity problems are particularly prevalent at the local administration level and affect small

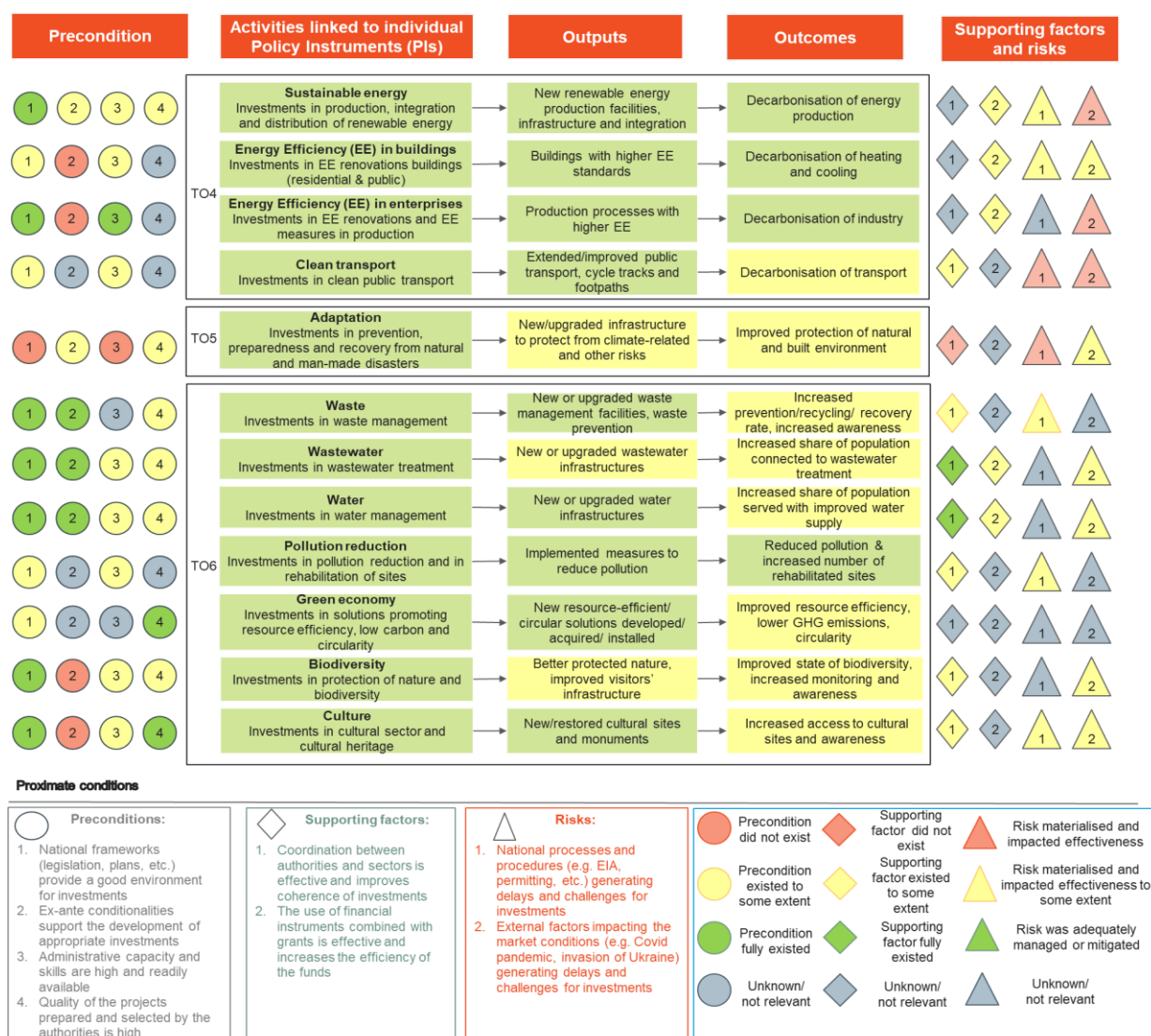
⁶ See [link](#).

municipalities, regardless of whether they are in less developed, transition or more developed regions. Bottlenecks arise when responsibilities are delegated to local administrations, which are responsible for a significant portion of implementation of the policy instruments, especially in the fields of clean urban public transport, waste, water and wastewater. Limitations in administrative capacity were reported to affect the frameworks governing investment decisions negatively, which, in turn, impacted actual investments. For example, in the cases analysed, the quality of adaptation plans, waste management plans and SUMP's directly influenced the quality of investments.

A shortage of skilled experts delayed investments, but this issue is specific to certain policy instruments and Member States or regions. Availability and access to skills were reported as key challenges impacting the ability of Member States to prepare and implement projects across several of the policy instruments, particularly those requiring technical expertise (e.g. construction or engineering). Availability of skilled professionals affected all regions but was more often reported in transition regions and less developed regions. Furthermore, certain types of project promoters (such as SMEs) faced greater challenges in their capacity to implement investments and required advisory support.

Administrative capacity impacts the ability of authorities to handle complex procedures, such as permitting, procurement and EIAs, effectively, leading to delays in implementation. Shortages of capacity and expertise within public administrations at all levels – especially at the local level – resulted in procurement, EIAs and permitting procedures negatively affecting the ability of local administrations to advance major investments and utilise funding effectively. Fragmented governmental structures across national/regional/local levels also affected the ability of authorities to manage complex procedures.

External factors also impacted implementation of the investments, notably the COVID-19 pandemic, the Russian war of invasion on Ukraine and issues around citizen awareness and acceptance. Policy instruments related to construction and infrastructure projects were more directly and severely affected by both crises (such as clean transport, energy efficiency in buildings, sustainable energy, wastewater, waste and water). Policy instruments that rely on citizen awareness, acceptance and behavioural change are at risk of rebound effects that diminish their impact (e.g. a 'not-in-my-backyard' attitude towards investments in renewable energy; or a shift from use of private transport to public transport among citizens).

Figure 3 – Tested theory of change: preconditions, supporting factors and risks

Source: Authors, based on case studies of policy instruments.

The use of financial instruments must be further incentivised for energy efficiency and the green economy

The use of financial instruments for climate and environmental investments remains limited and focused under thematic objective 4. By the end of 2022, the allocation (considering only the European Union contribution) for thematic objectives 4, 5 and 6 to financial instruments amounted to only EUR 1.5 billion, representing 6.5% of the total allocation to financial instruments, with 86.8% of the planned resources directed towards thematic objective 4. Projects that support the shift to a low carbon economy, especially investments in energy efficiency and renewable energy, are well-suited to repayable financial instruments. However, the nature and characteristics of projects,⁷ as well as the profile of beneficiaries (often local public authorities), limit the possibility to use financial instruments under

⁷ The capacity to generate cost savings or revenue, the scope for timely exits and repayments and the insufficient numbers and scale of viable projects that are not commercially funded.

thematic objectives 5 and 6. This suggests that further efforts to promote financial instruments should focus on areas with at least a revenue-generating or cost-reducing impact. This includes energy efficiency and renewable energy but could also apply to other fields, such as waste, water and wastewater, where the use of financial instruments is very limited.

The uptake of financial instruments was influenced by several factors, including the macro-economic environment, expertise and the perceived complexity or administrative burden. First, the macro-economic environment in which financial instruments were implemented affected their attractiveness. The credit conditions and low-interest-rate environment that dominated the 2014-2020 period lowered the attractiveness of financial instruments compared to other financing options available on the market (e.g. in Bulgaria, Germany, Portugal and Slovenia). Second, the creditworthiness and credit limits imposed on local authorities restricted their borrowing capacity, limiting their ability to use debt instruments (e.g. in Spain and Italy). Third, financial instruments must meet a market need and not compete with other favourable offerings. Accordingly, in certain cases, ex-ante assessments did not recommend the use of ERDF financial instruments due to other market offerings that sufficiently met demand (e.g. in Germany). Finally, limited experience and capacity, along with administrative costs, also influenced the uptake of financial instruments. Managing authorities continue to perceive the complexity and administrative burden associated with financial instruments as disproportionate to the role of ERDF/CF funding in their country or region. The establishment and implementation of financial instruments generally involve a series of well-documented challenges, including lengthy setup periods, a steep learning curve and inflexibility in national public procurement procedures. Technical assistance (such as JESSICA, ELENA and fi-compass), ex-ante assessments and the past experience of authorities were positive factors supporting the uptake of financial instruments.

Investments were impacted by insufficient cross-sector coordination and conflicting objectives at local level

The use of horizontal principles and ex-ante conditionalities contributed to the coherence of investments at the programming stage. Horizontal principles (such as sustainable development, the polluter-pays principle, the use of green public procurement (GPP) as a good practice and application of the Strategic Environmental Assessment Directive and the Environmental Impact Assessment Directive) were instrumental in ensuring the alignment of investments with EU policies and legislation.

Where effective coordination and cooperation across authorities and sectors were in place, they improved the quality of programmes and investments. Horizontal cooperation in cohesion policy was facilitated by integrating operational programmes into wider coordination forums, helping to harness the potential synergies from an institutional standpoint. The importance of such coordination mechanisms in ensuring internal coherence depended on the scope of the operational programmes: internal coordination played a greater role in cross-sectoral programmes than in programmes specifically dedicated to environment and climate, which relied more strongly on mechanisms to ensure external coherence. Additionally, guiding documents were developed to promote coherence across various programmes and investments (for example, in Bulgaria, the Guidelines on

the Mainstreaming of Environmental and Climate Change Policy in the 2014-2020 programme served as a basis for coordination).

The integration of environmental criteria into the selection of projects contributed to mainstreaming sustainability but involved certain challenges. Several factors were particularly important for ensuring the successful integration of sustainability through appraisal and selection of projects: specific and quantifiable selection criteria, including clarity on the type of information needed to demonstrate compliance; an appropriate scoring system that assigns sufficient weight to environmental criteria; capacity and expertise of the managing authorities to ensure that proper consideration is given to the greening process and related project selection and implementation procedures; and the involvement of stakeholders through a collaborative approach.

Lessons and policy implications in relation to the European Green Deal

Cohesion policy has made a positive contribution to the European Green Deal objectives. While the investment priorities of the ERDF/CF during the 2014-2020 period were largely consistent with the European Green Deal objectives, some areas, such as energy production (TO4), TEN-T infrastructure (TO7) and SME competitiveness (TO3), showed misalignment. Better alignment of cohesion policy with the European Green Deal goals is necessary. Missed opportunities include the possible exclusion of fossil fuel investments, a focus on supporting environmentally conscious businesses and promotion of innovative investments. ERDF/CF investments have contributed to zero-pollution objectives and ecosystem protections, but more integrated solutions are required. While regions have gained expertise, a balance between replication and ambition is needed to achieve a decisive impact.

Based on the findings of the evaluation, several strategic lessons can be drawn:

Shift the focus beyond compliance: Cohesion policy needs to balance the needs of less developed and transition regions, while evolving beyond ensuring compliance with EU legislation.

Support non-infrastructure projects: Recognise the importance of non-infrastructure and behavioural aspects, emphasising the promotion of behavioural changes alongside physical investments to support cohesion policy.

Prioritise high-impact investments: Adopt a 'do significant benefit' principle to optimise the impact of investments, ensuring they generate substantial positive outcomes.

Increase the strategic use of public procurement (Green Public Procurement): Prioritise practices to support sustainable investments and prioritise impactful projects like deep renovations. The CPR for 2014-2020 encourages the use of GPP in the selection of projects. However, its use by managing authorities is still limited.

Increase support to business, innovation and circularity: Increase targeted support for context-specific innovations to foster the development of place-based solutions.

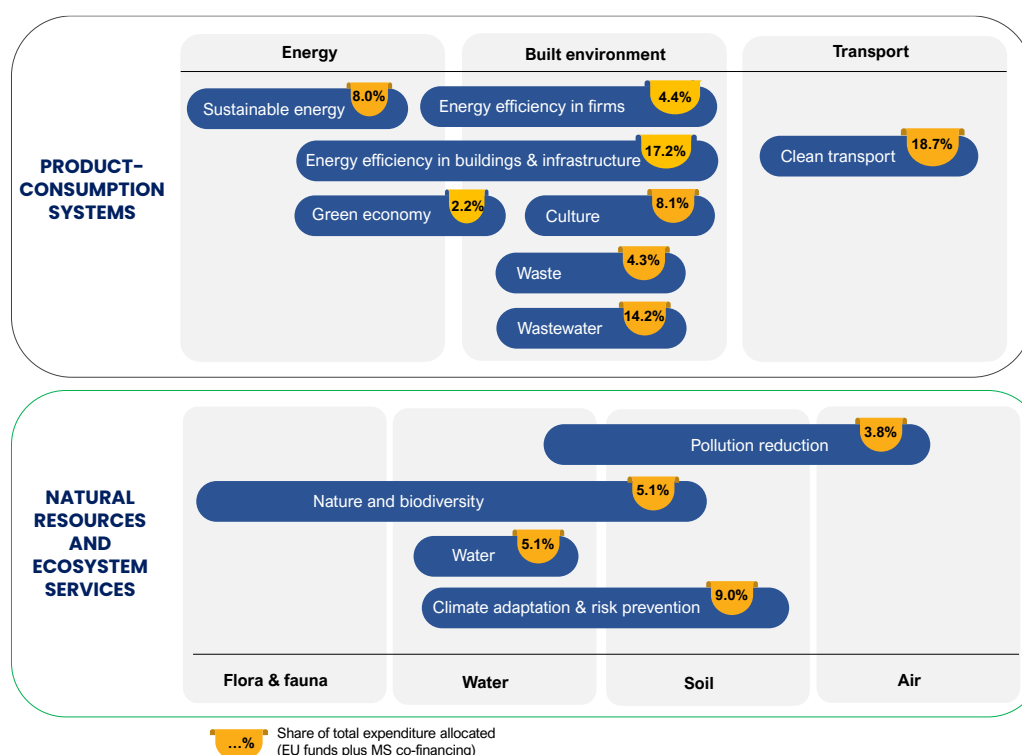
Increase the allocation for climate adaptation, nature protection and biodiversity: The growing investment needs for EU climate change adaptation call for additional support for innovative, climate-proofing efforts aligned with the objectives of the EGD, particularly those involving nature-based solutions.

Synthèse

Cette évaluation présente les résultats de l'évaluation ex post des programmes de la politique de cohésion 2014-2020 et de leur contribution au Pacte vert pour l'Europe. Elle analyse le soutien apporté par le Fonds européen de développement régional (FEDER) et le Fonds de cohésion (FC) aux objectifs environnementaux et climatiques au cours de la période de programmation 2014-2020. Réalisée conformément aux Lignes directrices pour une meilleure réglementation, cette évaluation s'inscrit dans un ensemble plus large d'analyses examinant la performance de la politique de cohésion à travers différents secteurs et thématiques sur la même période.

Les dépenses et mesures classées dans 34 domaines d'intervention⁸ et 12 instruments de politique publique relevant du FEDER et du Fonds de cohésion sont couvertes. Le concept d'« instrument de politique publique » est utilisé comme unité d'analyse clé. Il est défini comme un ensemble cohérent d'activités visant à atteindre un objectif politique, à répondre aux mêmes défaillances de marché et à avoir les mêmes effets attendus ou des effets similaires.⁹ Ces instruments ont été identifiés grâce à une combinaison d'analyse documentaire approfondie et d'analyse détaillée des données relatives aux dépenses, aux opérations et aux bénéficiaires. Un aperçu des instruments de politique publique est présenté dans la figure ci-dessous.

Figure 1 – Instruments de politique publique



⁸ Les 34 domaines d'intervention ont été définis dans le cahier des charges de l'étude.

⁹ Le même instrument de politique publique peut couvrir un ou plusieurs domaines d'intervention et être mis en œuvre de différentes manières (par exemple, par un soutien direct ou via des organisations intermédiaires) et sous diverses formes de financement.

Le contexte politique et l'approche d'évaluation d'impact fondée sur la théorie

Améliorer la performance environnementale et climatique des États membres constituait un objectif clé de la période de programmation 2014-2020. Tout au long de cette période, les domaines d'intervention du FEDER et du Fonds de cohésion ont été étroitement alignés sur les objectifs du pilier de la croissance durable de la stratégie Europe 2020, qui privilégiait la transition vers une économie bas carbone, économe en ressources et résiliente face au changement climatique. Cette politique phare de l'UE a jeté les bases de l'intégration du développement durable au cœur des activités de l'Union – un engagement reflété dans les objectifs thématiques 4, 5 et 6 du Règlement portant dispositions communes (Règlement (UE) n° 1303/2013) régissant les dépenses du FEDER et du Fonds de cohésion. Collectivement, les objectifs thématiques 4 (économie bas carbone), 5 (promotion de l'adaptation au changement climatique) et 6 (environnement et efficacité des ressources) — et plus spécifiquement les 34 domaines d'intervention pris en compte dans cette évaluation — ont représenté la plus grande part des allocations du FEDER et du Fonds de cohésion pour la période 2014-2020. Le Pacte vert pour l'Europe, lancé fin 2019, s'est appuyé sur cette trajectoire en fixant des objectifs plus ambitieux et en introduisant de nouvelles aspirations.

Bien que les investissements en faveur du climat et de l'environnement réalisés via le FEDER et le Fonds de cohésion aient visé des besoins diversifiés, ils présentaient certaines caractéristiques communes dans les pays et régions ciblés. Durant la période 2014-2020, les besoins les plus urgents et les plus répandus dans l'ensemble des États membres et régions de l'UE concernaient la réduction des émissions de gaz à effet de serre grâce à l'amélioration de l'efficacité énergétique des bâtiments, aux processus de production plus verts et à la transition écologique des transports publics urbains. La préservation des ressources naturelles et de la biodiversité, ainsi que la prévention et la gestion efficace des événements extrêmes liés au changement climatique, figuraient également parmi les besoins fréquents. Toutefois, les besoins spécifiques en matière d'investissements pour la protection de la nature, l'adaptation au changement climatique et la prévention des risques dépendent largement de la géomorphologie régionale et des pressions humaines, notamment l'urbanisation non contrôlée. Le périmètre des différents programmes est également influencé par le niveau de développement de chaque région ou pays, certaines zones rencontrant encore des difficultés à atteindre les objectifs européens. Par exemple, la majorité des régions les moins développées nécessitent encore des infrastructures améliorées pour le traitement des eaux résiduaires et la gestion des déchets.

La théorie du changement sous-jacente aux interventions du FEDER et du Fonds de cohésion en matière de climat et d'environnement est complexe, en raison de la diversité des instruments de politique publique mobilisés. Compte tenu de la variété des instruments déployés, l'objectif était de générer un large éventail de réalisations, de résultats et d'impacts, contribuant in fine au pilier de la croissance durable de la stratégie Europe 2020 ainsi qu'aux objectifs du Pacte vert pour l'Europe. Plus précisément : les investissements dans l'énergie durable, l'efficacité énergétique des entreprises, des bâtiments et des infrastructures, ainsi que dans les transports urbains propres, visaient à décarboner certains secteurs ; les investissements en adaptation et en gestion des risques devaient atténuer les risques climatiques ; les investissements dans l'eau et les eaux usées visaient à accroître l'accès aux services de distribution d'eau potable et d'assainissement ; les

investissements dans la gestion des déchets avaient pour objectif d'améliorer la prévention et les taux de recyclage ; les investissements dans la prévention de la pollution visaient à réduire la pollution et à réhabiliter les sites contaminés ; les investissements en faveur de la biodiversité et de la nature devaient améliorer l'état de l'environnement ; enfin, les investissements dans l'économie verte visaient à promouvoir l'efficacité des ressources et la circularité, contribuant ainsi indirectement à la réduction des émissions.

Diverses conditions préalables, facteurs de soutien et risques étaient susceptibles soit de favoriser, soit de freiner les investissements. Comme le reconnaissent la littérature spécialisée et les évaluations des périodes de programmation précédentes, les progrès des investissements de la politique de cohésion dépendent souvent de plusieurs conditions préalables, facteurs de soutien et risques. Les conditions préalables au succès des investissements incluent : l'existence de cadres nationaux favorables (par exemple, législation et plans stratégiques), les conditionnalités ex ante comme leviers de conformité, la disponibilité de capacités administratives et de compétences adéquates, ainsi que la qualité des projets préparés et sélectionnés. Par ailleurs, la littérature identifie plusieurs facteurs de soutien susceptibles de renforcer les effets des investissements, notamment la coordination entre autorités et secteurs, ainsi que l'utilisation efficace des instruments financiers combinés aux subventions. Les risques susceptibles de se matérialiser et d'impacter négativement les investissements comprennent les processus nationaux complexes et chronophages, ainsi que des facteurs externes influençant les conditions de marché (tels que la guerre d'agression menée par la Russie contre l'Ukraine et la pandémie de COVID-19).

Une approche d'évaluation d'impact fondée sur la théorie a été appliquée pour structurer l'évaluation. Cette approche a permis de comprendre et de tester : le « *quoi* » (quels résultats ont été générés par les différents types d'instruments de politique publique), le « *comment* » (si certains types d'interventions se sont révélés plus pertinents ou efficaces pour produire des résultats), et le « *pourquoi* » (quelles conditions préalables, quels facteurs de soutien et quels risques ont influencé la présence ou l'absence de résultats pour un instrument de politique donné, dans un contexte politique donné).

La méthode d'évaluation d'impact fondée sur la théorie a été appliquée de manière systématique à deux niveaux :

- Premièrement, *12 théories du changement spécifiques, correspondant chacune à un des 12 instruments de politique publique, ont été définies*, incluant leurs résultats, effets et impacts attendus, ainsi que les conditions préalables, facteurs de soutien et risques spécifiques. Cela s'est appuyé sur une revue de la littérature et des entretiens préliminaires. Pour chaque instrument de politique publique, la théorie du changement et les hypothèses sous-jacentes (définies sur la base de la revue de la littérature) ont été testées dans le cadre d'une étude de cas couvrant trois États membres sélectionnés. L'étude de cas a été menée sur la base d'une revue documentaire (y compris l'analyse de données statistiques) et de travaux de recherche sur le terrain. La recherche sur le terrain relative aux 12 instruments de politique publique a impliqué plus de 190 entretiens avec des autorités de gestion, des organismes intermédiaires, des bénéficiaires finaux, des experts thématiques et d'autres

parties prenantes, couvrant 24 États membres.¹⁰ Onze ateliers techniques d'experts, réunissant au total 123 participants, ont été organisés pour discuter et valider les résultats émergents. Une combinaison de méthodes a été utilisée pour chaque étude de cas. L'analyse quantitative — c'est-à-dire l'analyse des données relatives aux dépenses, aux bénéficiaires et aux opérations pour chaque instrument spécifique — a été combinée à l'analyse de statistiques sur les besoins et d'indicateurs macroéconomiques. Cette analyse a été complétée par une analyse qualitative des données issues de la littérature, ainsi que par une analyse de la chaîne causale (process tracing) du déploiement des investissements liés aux instruments de politique publique dans trois États membres sélectionnés, afin de comprendre les facteurs spécifiques et le contexte ayant influencé leur mise en œuvre.

- Deuxièmement, *une théorie du changement globale du FEDER et du Fonds de cohésion* pour le climat et l'environnement a été définie sur la base d'une revue de la littérature, et reliée aux théories du changement spécifiques élaborées pour chaque instrument de politique publique. L'analyse à ce niveau a été réalisée par triangulation, agrégation et comparaison des données à plusieurs niveaux. Une analyse quantitative du portefeuille d'investissements et une analyse statistique ont été utilisées pour comprendre les tendances et les évolutions, ainsi que pour examiner des éléments spécifiques de la théorie du changement. Cette analyse a permis de mieux comprendre le « *quoi* », c'est-à-dire les réalisations par rapport aux besoins identifiés. Les données qualitatives issues d'une revue de la littérature à l'échelle européenne, de l'ensemble des rapports d'évaluation nationaux, d'une analyse approfondie de 70 programmes opérationnels ainsi que des 12 études de cas spécifiques aux instruments de politique publique ont été systématisées et triangulées pour identifier des tendances et des modèles concernant le « *comment* » et le « *pourquoi* ». Structurellement, l'exploration du « *pourquoi* » a été liée aux conditions préalables, facteurs de soutien et risques identifiés lors de la revue de la littérature initiale, qui ont également servi de base à la formulation des hypothèses. Cependant, les investigations détaillées ont aussi mis en évidence certains aspects qui n'étaient pas intégrés dans la théorie du changement initiale, mais qui ont émergé des données collectées (par exemple, des aspects comportementaux ont été signalés comme un risque clé influençant la réussite des investissements).

Des enseignements importants peuvent être tirés des limites de cette évaluation afin d'éclairer les futures évaluations des programmes de la politique de cohésion. Premièrement, il existe des arbitrages entre l'exhaustivité de la couverture thématique et sectorielle et la profondeur analytique des évaluations de grande ampleur. Cette évaluation couvre 12 instruments de politique publique ainsi qu'une variété de réalisations, de résultats et d'impacts, tout en répondant aux critères des Lignes directrices pour une meilleure réglementation et

¹⁰ États membres couverts par les études de cas : Autriche, Belgique, Bulgarie (x2), Tchéquie (x2), Croatie (x2), Estonie, France (x2), Finlande, Grèce (x3), Allemagne (x3), Hongrie, Italie (x5), Irlande, Lettonie (x2), Lituanie (x2), Malte, Pologne (x2), Portugal (x2), Roumanie (x3), Slovaquie, Espagne, Suède, Slovaquie. Certains pays ont été couverts par plusieurs études de cas relatives aux instruments de politique publique, comme indiqué entre parenthèses.

à d'autres questions politiques complémentaires. Les évaluations futures bénéficieraient d'un périmètre plus restreint et d'un champ thématique plus ciblé. Deuxièmement, bien que les évaluations thématiques nationales constituent une source importante pour les évaluations au niveau européen, leur disponibilité a été limitée pour cette évaluation. Les évaluations thématiques nationales devraient donc être réalisées en amont de l'évaluation globale afin d'assurer un meilleur accès aux données. Enfin, la disponibilité limitée de données systématiques mesurant les résultats a représenté un autre défi dans cette évaluation et devra être mieux pris en compte à l'avenir. Par exemple, les résultats des investissements en matière d'adaptation au changement climatique dans le cadre de la politique de cohésion sont mesurés en termes de protection contre les inondations et les incendies de forêt, en mettant l'accent sur le nombre de personnes couvertes par les mesures de protection. Cependant, l'impact réel est beaucoup plus large et pourrait inclure des co-bénéfices tels que des effets positifs sur la biodiversité, la qualité de l'air, la gestion de l'eau et la réduction des émissions de gaz à effet de serre — des éléments difficiles à saisir à travers un système de suivi. Les efforts et les coûts liés à la collecte des données pertinentes devront donc être soigneusement mis en balance avec l'utilité effective de ces données.

Les interventions soutenues

En 2020, 98 639 opérations étaient soutenues par le FEDER et le Fonds de cohésion, principalement sous forme de subventions non remboursables, dans le cadre des 12 instruments de politique publique couverts.¹¹ Ces opérations ont bénéficié à 73 021 bénéficiaires, principalement des entreprises et des administrations publiques locales. La dépense moyenne par opération variait considérablement selon le type d'instrument de politique publique et de programme, reflétant la nature des investissements soutenus. La durée moyenne des opérations était de 2,4 ans. Les opérations les plus longues impliquaient généralement une composante d'infrastructure importante, telles que les projets d'assainissement et d'approvisionnement en eau.

L'allocation globale pour les investissements climatiques et environnementaux à la fin de 2023 était légèrement inférieure aux prévisions initiales. Cette allocation est restée stable jusqu'à fin 2019. La pandémie de COVID-19 a entraîné une légère diminution, certains fonds ayant été redirigés vers le soutien aux entreprises et les instruments de santé. Toutefois, cette réduction a été en grande partie compensée par l'injection des ressources du programme REACT-EU, principalement utilisées pour soutenir des investissements mûrs dans le pipeline ou des interventions à mise en œuvre rapide. Après la reprise postpandémie, l'allocation prévue a de nouveau diminué en 2023, les fonds étant généralement réorientés vers des domaines d'intervention affichant des taux d'absorption plus élevés, avec des engagements financiers dépassant nettement les prévisions dès 2022. Les programmes ayant réduit leur budget avaient en général des allocations initiales supérieures à la moyenne pour les objectifs climatiques et environnementaux. Malgré la tendance générale à la baisse, les allocations en faveur des investissements dans l'énergie solaire renouvelable, l'efficacité énergétique des infrastructures publiques, les transports urbains propres

¹¹ WP 2 Single Database.

et les pistes cyclables ont augmenté de manière substantielle au cours de la période de programmation 2014-2020.

Un total de 267 programmes — comprenant 195 programmes opérationnels et 71 programmes de coopération territoriale — ont alloué des ressources pour soutenir l'environnement et le climat, avec des degrés d'intensité variables. À l'horizon 2023, 85% du total des dépenses éligibles étaient concentrés dans 77 programmes répartis dans 20 États membres, tandis que 85% de la contribution totale de l'UE étaient alloués à seulement 66 programmes. En termes de dépenses éligibles totales, les cinq premiers États membres sont la Pologne, la France, la Tchéquie, la Hongrie et l'Italie. Concernant l'allocation totale prévue pour le climat et l'environnement en 2023, les plus grands programmes en valeur absolue sont le programme polonais « Infrastructures et Environnement FEDER/Fonds de cohésion » et le programme espagnol « Espagne plurirégionale – FEDER ». Le programme opérationnel « Infrastructures et Environnement – Pologne » présente la plus forte part relative consacrée aux investissements climatiques et environnementaux, suivi du programme roumain « Programme Infrastructures majeures – RO – FEDER/Fonds de cohésion ». En moyenne, chaque programme a consacré 30% de son budget total au climat et à l'environnement, mais des variations importantes existent (allant de 3% à 100% des fonds dédiés aux 34 domaines d'intervention environnementaux sélectionnés pour cette évaluation). Les pays de l'UE-13 représentent 54,0% de l'ensemble des ressources du FEDER et du Fonds de cohésion affectées aux 34 domaines d'intervention, tandis que les pays de l'UE-14+Royaume-Uni en ont alloué 41,7%. Les 4,3% restants de financements prévus ont été attribués par le biais des programmes de coopération territoriale.

L'utilisation de différents ensembles de politiques FEDER/Fonds de cohésion (c'est-à-dire des combinaisons d'instruments d'intervention) a varié en fonction des contextes nationaux/régionaux et des choix politiques. Les investissements dans l'instrument de politique publique sur l'efficacité énergétique des bâtiments ainsi que dans l'instrument de politique publique sur les transports urbains propres ont été fortement représentés dans de nombreux pays. Les instruments liés à l'eau, aux eaux usées et à la gestion des déchets étaient présents dans environ la moitié de tous les programmes. Toutefois, ces instruments étaient systématiquement inclus dans les programmes opérationnels des pays de l'UE-13, sauf pour ceux spécifiquement axés sur la compétitivité, la croissance ou l'innovation. Les instruments de politique publique sur l'efficacité énergétique des entreprises et l'économie verte représentaient seulement une petite part du total des dépenses en environnement et climat. Ils étaient principalement mis en œuvre dans les pays de l'UE-14+Royaume-Uni, en particulier dans les programmes où la croissance et la compétitivité des entreprises sont au cœur de l'approche d'intervention.

Trois grands facteurs expliquant la sélection des instruments de politique publique dans les programmes ont été identifiés : i) le respect des directives européennes constitue un moteur clé dans le choix des instruments (en particulier dans les domaines de l'eau, des eaux usées et des déchets) ; ii) les procédures d'infraction jouent un rôle d'accélérateur pour certains investissements ; iii) l'orientation vers certains types d'investissements dépend également des financements disponibles via le FEDER/Fonds de cohésion, en cohérence avec les priorités nationales et le financement national. Le panachage des politiques tend à être similaire dans les régions et pays où les conditions de départ — c'est-à-dire la

performance environnementale initiale et le rôle du FEDER/Fonds de cohésion par rapport aux dépenses publiques — sont comparables.

Résultats de l'évaluation

Bien que les résultats aient été inférieurs aux objectifs fixés, des progrès significatifs ont été réalisés dans tous les domaines liés au Pacte vert.

Les investissements du FEDER et du Fonds de cohésion ont apporté une contribution significative aux objectifs de décarbonation dans tous les secteurs. Toutefois, des investissements supplémentaires seront nécessaires pour atteindre des ambitions plus élevées. Des niveaux de réussite variables ont été observés selon les principaux types d'instruments politiques visant à soutenir la décarbonation.

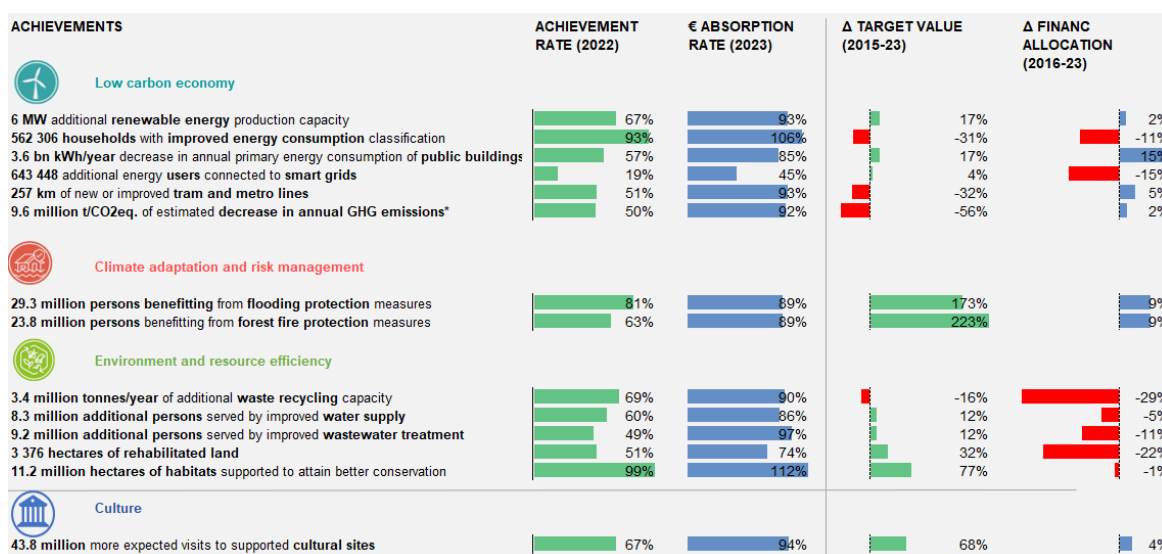
Premièrement, 67% de l'objectif fixé pour la capacité supplémentaire en énergies renouvelables a été atteint. Les taux de réalisation étaient relativement similaires entre les différents types de régions, bien qu'ils soient inférieurs dans les programmes nationaux. Le taux global de réalisation doit également être interprété dans le contexte de l'augmentation des valeurs cibles et des allocations financières au cours de la période de programmation, ainsi que des défis liés à la mise en œuvre des investissements dans les énergies renouvelables (autorisations, aides d'État, lacunes en matière de capacités et de compétences).

Deuxièmement, les investissements en efficacité énergétique ont permis d'atteindre les objectifs fixés pour les ménages (97%), mais ont été moins performants concernant la consommation d'énergie dans les bâtiments publics (57%). Les régions les moins développées se distinguent par des taux de réalisation supérieurs. Toutefois, ce taux doit être considéré en tenant compte de la diminution de l'objectif et des allocations financières pour les ménages, tandis qu'une augmentation de l'objectif et des allocations a été enregistrée pour les bâtiments publics.

Troisièmement, 51% de l'objectif d'amélioration des lignes de tramway et de métro a été atteint grâce aux investissements dans le transport propre, traduisant une contribution positive mais plus modérée à la décarbonation du transport. Ce taux modeste s'explique principalement par la complexité de ce type de projets, qui nécessitent des délais de mise en œuvre longs. Ces investissements ont été principalement réalisés dans des États membres comprenant des régions en transition et des régions moins développées.

Enfin, les investissements en faveur de la décarbonation ont conduit à une réduction estimée à 9,6 millions de tonnes d'équivalent CO₂ par an des émissions de gaz à effet de serre (50% de l'objectif initial). Cependant, cet objectif doit également être replacé dans le contexte d'une réduction de 56% de la valeur cible globale, due à des corrections d'erreurs dans les objectifs initiaux de certains programmes.

Figure 2 – Résultats des investissements du FEDER/Fonds de Cohésion



* Cette réalisation est basée sur l'indicateur 034 (nom officiel : Réduction des GES : Diminution annuelle estimée des GES) et correspond à la réduction des émissions de GES par année par les opérations. Cela implique qu'il n'est pas cumulatif. Il calcule les économies annuelles estimées « d'ici la fin de la période ». Certaines estimations seront calculées pour les opérations achevées au cours de l'année 4 de la période de programmation, tandis que d'autres concerneront des opérations achevées au cours d'une autre année de la période de programmation. Une fois les opérations finalisées, l'estimation n'est pas réexaminée.

Source : basée sur les données de la plateforme Cohesion Open Data concernant les réalisations et la catégorisation, voir : <https://cohesiondata.ec.europa.eu>. Années de clôture des données : 2022 et 2023.

Les investissements dans l'adaptation et la gestion des risques ont contribué à renforcer la résilience, bien que les résultats soient restés en deçà des objectifs fixés. Les investissements en matière d'adaptation ont permis de protéger environ 29 millions de personnes contre les risques d'inondation et 24 millions contre les risques d'incendie. Tous programmes confondus, 81% de l'objectif prévu pour la protection contre les inondations et 63% de celui concernant la protection contre les incendies ont été atteints. Les taux de réalisation plus élevés peuvent être partiellement attribués à la bonne performance et aux objectifs ambitieux fixés dans les programmes de coopération territoriale en matière de prévention des inondations. Toutefois, les indicateurs utilisés (nombre de personnes bénéficiant des mesures de protection) manquent de nuances, car les investissements d'adaptation peuvent comprendre à la fois des mesures « douces » (par exemple, sensibilisation et coopération) et des investissements dans les infrastructures. De plus, l'exposition aux risques varie fortement selon les localisations. Par conséquent, la relation entre les résultats déclarés et les impacts réels obtenus n'est pas entièrement proportionnelle.

En dépit de taux d'absorption élevés, les réalisations des investissements dans l'eau, les déchets et les eaux usées n'ont pas atteint les objectifs, bien qu'ils aient tout de même apporté une contribution positive. Les taux de réalisation pour les indicateurs mesurant le nombre de personnes desservies par un traitement des eaux résiduaires amélioré et par un meilleur approvisionnement en eau sont respectivement de 49% et 60%. Les investissements ont principalement ciblé la réduction des écarts de conformité et les besoins de modernisation, en particulier dans les États membres de l'UE-13. Le faible taux de réalisation dans le domaine des eaux usées est largement influencé par sept pays d'Europe du Sud et du Sud-Est, notamment la Slovénie, la Hongrie, la Grèce, l'Espagne, la Croatie,

Malte et la Bulgarie, où d'importants déficits ont été constatés. Globalement, les taux élevés d'absorption indiquent une plus grande probabilité d'atteindre les résultats finaux attendus. Les indicateurs macroéconomiques et les analyses de régression suggèrent que les investissements du FEDER/Fonds de cohésion ont un impact positif sur l'augmentation du nombre de personnes raccordées aux infrastructures d'eau potable et d'assainissement, ainsi que sur l'amélioration de l'efficacité des ressources, notamment à travers la valorisation des déchets par le recyclage et la récupération d'énergie. Il est à noter que le taux de réalisation pour l'indicateur lié à la capacité de recyclage des déchets supplémentaire atteint 69%.

Une contribution positive à la biodiversité et à la nature est également évidente, avec des taux de réalisation élevés. L'instrument de politique publique en faveur de la nature et de la biodiversité représente l'allocation la plus importante au sein des programmes de coopération territoriale, ce qui a permis d'atteindre un objectif sensiblement plus élevé que dans les autres programmes. Par conséquent, un taux de réalisation de 126,9% dans la coopération territoriale a positivement influencé les résultats globaux. En comparant les différents types de régions, les taux de réalisation les plus élevés sont observés dans les régions développées, suivies des régions en transition, puis des régions moins développées. Toutefois, comme pour l'instrument de politique publique en matière d'adaptation, une évaluation de l'impact au niveau macroéconomique n'est pas possible, en raison d'un manque de données pertinentes.

Des investissements plus ambitieux et transformateurs¹² sont nécessaires pour accroître l'impact

Les investissements conventionnels sont le type d'investissement privilégié dans l'ensemble des États membres et sont essentiels pour garantir le respect de l'acquis environnemental. Le portefeuille d'investissements sélectionné par les États membres et les régions est majoritairement composé de types traditionnels d'infrastructures « grises » et de solutions conventionnelles. Par exemple, les investissements dans l'efficacité des ressources se concentrent sur la réduction de l'utilisation des matériaux, mais restent basés sur un modèle linéaire (produire, utiliser, jeter), plutôt que de soutenir la transition vers un modèle circulaire. Les investissements dans la protection contre les inondations consistent généralement en des infrastructures grises, plutôt qu'en des solutions fondées sur la nature, qui offriraient également des avantages en matière de disponibilité de l'eau, de nature, de biodiversité et de bien-être. Néanmoins, les investissements conventionnels restent nécessaires, en particulier dans les régions les moins développées et en transition, où des investissements importants sont requis pour se conformer à la législation sur l'eau, traitement des eaux résiduelles et les déchets.

Des investissements transformateurs sont urgentement nécessaires pour être à la hauteur du niveau d'ambition du Pacte vert pour l'Europe. Il est nécessaire d'équilibrer les types d'investissements conventionnels avec des investissements plus transformateurs, axés sur des solutions innovantes et durables visant des bénéfices à long terme et un changement systémique. De telles solutions peuvent inclure des solutions fondées sur la nature, des initiatives d'économie circulaire et

¹² Les investissements transformateurs sont définis dans la note de bas de page n° 120.

les énergies renouvelables. Cependant, malgré leur potentiel bien documenté et leurs co-bénéfices, ces solutions sont actuellement sous-exploitées.

Les investissements axés sur la production de résultats à long terme sont plus difficiles à mettre en œuvre, mais ils sont plus percutants. Cela est illustré par des exemples issus de plusieurs instruments de politique publique. Les investissements dans les rénovations profondes pour améliorer l'efficacité énergétique des bâtiments, par exemple, donnent de meilleurs résultats en termes de performance énergétique, mais sont moins fréquemment mis en œuvre par les régions et les États membres en raison de leur complexité technique, des défis de financement et de l'acceptation des parties prenantes (par exemple, les structures de copropriété). De même, lorsqu'ils sont mis en œuvre, les investissements dans les transports publics verts (par exemple, le remplacement des flottes de transports publics) ont permis d'obtenir des résultats immédiats en termes de réduction de la pollution et des émissions de gaz à effet de serre. Toutefois, de tels investissements nécessitent également des changements de comportement, c'est-à-dire un report modal, pour maximiser leur impact. Une approche utilisée avec succès par certaines régions pour accroître le niveau d'ambition des investissements – et qui doit être intensifiée – a consisté à combiner plusieurs objectifs au sein d'un même investissement. Parmi les exemples de cette approche figurent la combinaison des investissements en efficacité énergétique et en énergies renouvelables dans des secteurs tels que les transports ; le lien entre la gestion des eaux usées et les investissements dans la production de biogaz ; et la combinaison des mesures de protection contre les inondations avec des investissements dans la production d'énergie à partir des flux d'eau.

L'exécution retardée et le faible niveau d'ambition nationale concernant les conditionnalités ex ante thématiques ont limité leur impact sur les investissements.

Les conditionnalités ex ante dans le domaine de l'énergie ont été moins difficiles à mettre en œuvre, mais n'ont pas pleinement réalisé leur potentiel en tant que leviers de changement. Les taux élevés de conformité au moment de l'adoption des programmes opérationnels pour les conditionnalités ex ante en matière d'énergie indiquent que les États membres et les régions n'ont pas rencontré de difficultés majeures dans leur mise en œuvre. Dans le cas de la conditionnalité ex ante sur les énergies renouvelables, plusieurs régions ont dépassé les objectifs fixés au niveau national. Toutefois, les autorités ont attribué cela principalement au fait que la conditionnalité ex ante sur les énergies renouvelables était perçue comme un simple « exercice de case à cocher », sans véritable potentiel pour induire un changement réel.

Les conditionnalités ex ante en matière d'eau et de déchets ont été difficiles à remplir, mais ont posé des bases importantes. Ces conditionnalités ont eu un impact sur les cadres réglementaires et stratégiques régissant les secteurs et le financement de la cohésion. Cependant, les retards et les difficultés rencontrés dans la réalisation de ces conditionnalités en ont réduit l'impact. La conditionnalité ex ante sur l'eau a renforcé le cadre réglementaire en matière de recouvrement des coûts. Toutefois, les services de l'eau n'atteignent toujours pas une couverture complète des coûts dans la plupart des États membres. Deux défis majeurs ont été signalés à cet égard : des problèmes méthodologiques et des préoccupations liées à l'abordabilité. La conditionnalité ex ante sur la gestion des déchets a également posé des difficultés. La qualité des plans de gestion des déchets était insuffisante

dans de nombreux États membres et n'abordait pas correctement les éléments obligatoires de la législation (par exemple, en ce qui concerne les déchets municipaux ou les objectifs de recyclage).

La conditionnalité ex ante sur l'adaptation a été largement remplie, mais des retards et des problèmes de qualité en ont limité l'impact. L'obligation d'adopter un plan national d'adaptation n'a pas été respectée en temps voulu par 15 États membres, ce qui signifie que les programmes opérationnels ont été préparés sans cadre stratégique pour orienter les investissements. En outre, la qualité des plans d'adaptation et des plans de gestion des risques variait selon les États membres. Les retards et les lacunes dans la mise en œuvre de la conditionnalité ex ante ont été identifiés comme ayant un impact sur la qualité des investissements soutenus par les programmes financés par le FEDER/Fonds de cohésion.

Les facteurs influençant les investissements varient selon les régions, mais la capacité administrative limitée et le manque de compétences sont particulièrement déterminants.

La capacité administrative limitée a eu des effets négatifs sur tous les types d'investissements et dans toutes les régions, mais ce problème est particulièrement marqué au niveau local. Des études antérieures ont largement reconnu que le progrès des actions prévues dans le cadre de la politique de cohésion est souvent entravé par une capacité administrative insuffisante. Cette évaluation confirme que ce problème a persisté pendant la période de programmation 2014-2020. Les problèmes de capacité sont particulièrement fréquents au sein des administrations locales et affectent les petites municipalités, qu'elles se trouvent dans des régions moins développées, en transition ou plus développées. Des goulets d'étranglement apparaissent lorsque les responsabilités sont déléguées aux administrations locales, qui sont responsables d'une part significative de la mise en œuvre des instruments de politique publique, notamment dans les domaines du transport public urbain propre, des déchets, de l'eau et des eaux usées. Les limites en matière de capacité administrative ont été signalées comme ayant un effet négatif sur les cadres régissant les décisions d'investissement, ce qui a, à son tour, impacté les investissements eux-mêmes. Par exemple, dans les cas analysés, la qualité des plans d'adaptation, des plans de gestion des déchets et des Plans de Mobilité Urbaine Durable (PMUD) a directement influencé la qualité des investissements.

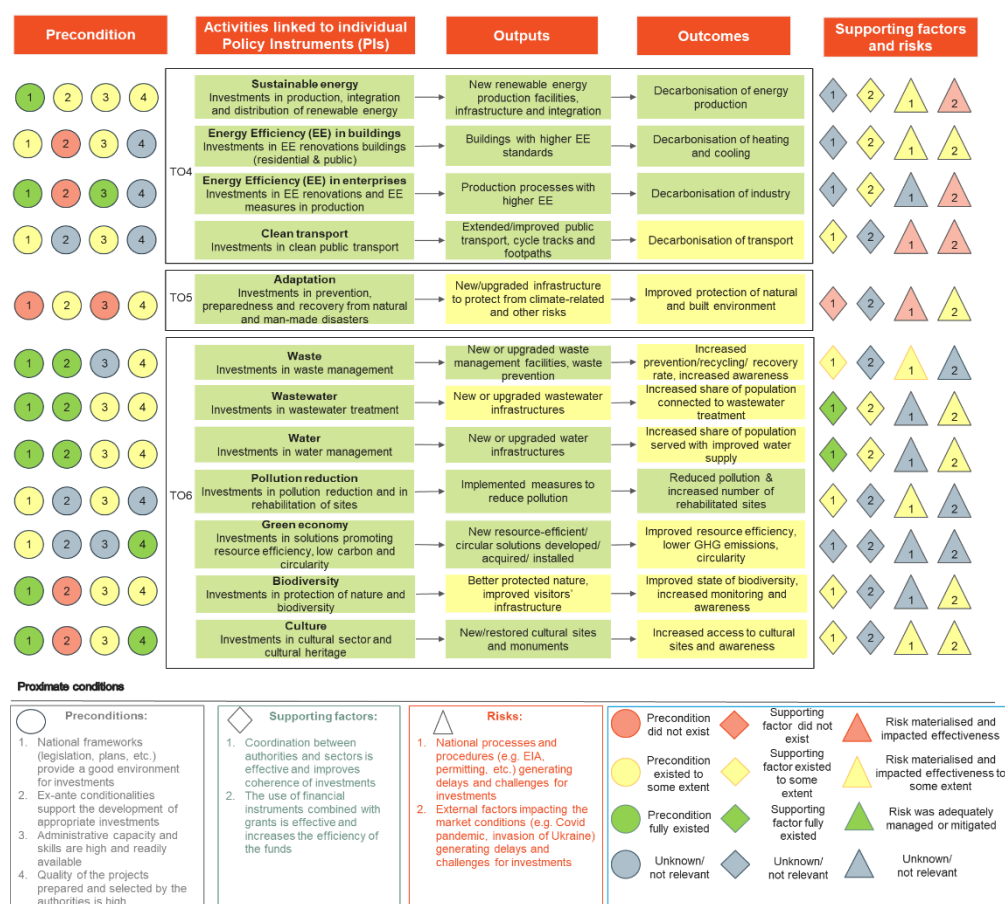
Une pénurie d'experts qualifiés a retardé les investissements, mais ce problème est spécifique à certains instruments de politique publique et à certains États membres ou régions. La disponibilité et l'accès aux compétences ont été identifiés comme des défis majeurs influençant la capacité des États membres à préparer et mettre en œuvre des projets dans plusieurs instruments politique, en particulier ceux nécessitant une expertise technique (par exemple dans la construction ou l'ingénierie). La disponibilité de professionnels qualifiés a affecté toutes les régions, mais elle a été signalée plus fréquemment dans les régions en transition et les régions moins développées. En outre, certains types de porteurs de projets (comme les PME) ont rencontré davantage de difficultés dans leur capacité à mettre en œuvre les investissements et ont eu besoin d'un soutien en matière de conseil.

La capacité administrative influence la capacité des autorités à gérer efficacement des procédures complexes telles que les autorisations, les marchés publics et les évaluations d'impact environnemental (EIE), ce qui

entraîne des retards dans la mise en œuvre. Les pénuries de personnel et d'expertise au sein des administrations publiques à tous les niveaux – en particulier au niveau local – ont eu pour effet que les procédures de passation de marchés, d'EIE et de délivrance de permis ont freiné la capacité des administrations locales à faire avancer les investissements majeurs et à utiliser les fonds de manière efficace. Les structures gouvernementales fragmentées aux niveaux national, régional et local ont également affecté la capacité des autorités à gérer des procédures complexes.

Des facteurs externes ont également influencé la mise en œuvre des investissements, notamment la pandémie de COVID-19, la guerre d'invasion menée par la Russie contre l'Ukraine, ainsi que des questions liées à la sensibilisation et à l'acceptation par les citoyens. Les instruments de politique publique liés à la construction et aux projets d'infrastructure ont été plus directement et sévèrement affectés par ces deux crises (par exemple le transport propre, l'efficacité énergétique dans les bâtiments, l'énergie durable, les eaux usées, les déchets et l'eau). Les instruments politique qui reposent sur la sensibilisation, l'acceptation et le changement de comportement des citoyens sont difficiles à mettre en œuvre et peuvent limiter l'impact des mesures (par exemple, une attitude de type « pas dans mon arrière-cour » vis-à-vis des investissements dans les énergies renouvelables, ou une réticence des usagers à abandonner les transports privés au profit des transports publics).

Figure 3 – Théorie du changement éprouvée : préconditions, facteurs de soutien et risques



Source: Auteurs, sur la base d'études de cas des instruments de politique publique.

L'utilisation des instruments financiers doit être davantage encouragée pour l'efficacité énergétique et l'économie verte.

L'utilisation des instruments financiers pour les investissements climatiques et environnementaux reste limitée et concentrée sous l'objectif thématique 4. Fin 2022, les allocations (en ne considérant que la contribution de l'Union européenne) aux instruments financiers pour les objectifs thématiques 4, 5 et 6 ne s'élevaient qu'à 1,5 milliard d'euros, soit 6,5% de l'allocation totale destinée aux instruments financiers, dont 86,8% des ressources prévues étaient orientées vers l'objectif thématique 4. Les projets favorisant la transition vers une économie bas carbone, en particulier les investissements dans l'efficacité énergétique et les énergies renouvelables, se prêtent bien à l'utilisation d'instruments financiers remboursables.

¹³ Toutefois, la nature et les caractéristiques des projets, ainsi que le profil des bénéficiaires (souvent des autorités publiques locales), limitent les possibilités d'utilisation d'instruments financiers dans le cadre des objectifs thématiques 5 et 6. Cela suggère que les efforts visant à promouvoir les instruments financiers devraient se concentrer sur les domaines présentant au moins un impact en matière de génération de revenus ou de réduction des coûts. Cela inclut l'efficacité énergétique et les énergies renouvelables, mais pourrait aussi s'appliquer à d'autres secteurs comme les déchets, l'eau et les eaux usées, où l'utilisation des instruments financiers reste très limitée.

Le recours aux instruments financiers a été influencé par plusieurs facteurs, notamment l'environnement macroéconomique, l'expertise et la complexité perçue ou la charge administrative. Tout d'abord, l'environnement macroéconomique dans lequel les instruments financiers ont été mis en œuvre a affecté leur attractivité. Les conditions de crédit et le contexte de faibles taux d'intérêt ayant dominé la période 2014-2020 ont réduit l'attrait des instruments financiers par rapport à d'autres options de financement disponibles sur le marché (par exemple en Bulgarie, en Allemagne, au Portugal et en Slovaquie). Ensuite, la solvabilité et les limites d'endettement imposées aux autorités locales ont restreint leur capacité d'emprunt, limitant ainsi leur capacité à utiliser des instruments de dette (par exemple en Espagne et en Italie). Par ailleurs, les instruments financiers doivent répondre à un besoin du marché sans concurrencer d'autres offres avantageuses. Ainsi, dans certains cas, les évaluations ex ante n'ont pas recommandé l'utilisation d'instruments financiers du FEDER en raison d'offres de marché répondant déjà suffisamment à la demande (par exemple en Allemagne). Enfin, le manque d'expérience et de capacités, ainsi que les coûts administratifs, ont également freiné le recours aux instruments financiers. Les autorités de gestion continuent de percevoir la complexité et la charge administrative liées aux instruments financiers comme disproportionnées par rapport au rôle du financement FEDER/Fonds de cohésion dans leur pays ou leur région. La mise en place et la mise en œuvre des instruments financiers impliquent généralement une série de défis bien documentés, notamment des délais de démarrage longs, une courbe d'apprentissage importante et une certaine rigidité des procédures nationales de passation de marchés publics. L'assistance technique (telle que JESSICA, ELENA

¹³ La capacité à générer des économies ou des revenus, la possibilité de sorties et de remboursements en temps opportun, ainsi que le nombre et l'ampleur insuffisants de projets viables non financés commercialement.

et fi-compass), les évaluations ex ante et l'expérience passée des autorités ont constitué des facteurs positifs soutenant le recours aux instruments financiers.

Les investissements ont été affectés par une coordination intersectorielle insuffisante et des objectifs contradictoires au niveau local.

L'utilisation des principes horizontaux et des conditionnalités ex ante a contribué à la cohérence des investissements lors de la phase de programmation. Les principes horizontaux (tels que le développement durable, le principe du pollueur-payeur, l'utilisation des marchés publics écologiques comme bonne pratique, ainsi que l'application des directives sur l'évaluation environnementale stratégique et l'évaluation de l'impact environnemental) ont joué un rôle déterminant pour garantir l'alignement des investissements avec les politiques et la législation de l'UE.

Lorsque la coordination et la coopération entre autorités et secteurs étaient efficaces, elles ont permis d'améliorer la qualité des programmes et des investissements. La coopération horizontale dans la politique de cohésion a été facilitée par l'intégration des programmes opérationnels dans des forums de coordination plus larges, ce qui a permis de tirer parti des synergies potentielles d'un point de vue institutionnel. L'importance de tels mécanismes de coordination pour assurer la cohérence interne dépendait de la portée des programmes opérationnels : la coordination interne jouait un rôle plus important dans les programmes transversaux que dans les programmes spécifiquement dédiés à l'environnement et au climat, qui reposaient davantage sur des mécanismes assurant une cohérence externe. De plus, des documents d'orientation ont été élaborés pour promouvoir la cohérence entre les différents programmes et investissements (par exemple, en Bulgarie, les Lignes directrices sur l'intégration des politiques environnementale et climatique dans le programme 2014-2020 ont servi de base à la coordination).

L'intégration de critères environnementaux dans la sélection des projets a contribué à l'intégration transversale de la durabilité, mais a posé certains défis. Plusieurs facteurs ont été particulièrement importants pour garantir une intégration réussie de la durabilité dans l'évaluation et la sélection des projets : des critères de sélection spécifiques et quantifiables, y compris des précisions sur les informations nécessaires pour démontrer la conformité ; un système de notation approprié attribuant un poids suffisant aux critères environnementaux ; la capacité et l'expertise des autorités de gestion pour garantir une prise en compte adéquate du verdissement et des procédures associées de sélection et de mise en œuvre des projets ; et la participation des parties prenantes dans le cadre d'une approche collaborative.

Enseignements tirés et implications politiques en lien avec le Pacte vert pour l'Europe.

La politique de cohésion a apporté une contribution positive aux objectifs du Pacte vert pour l'Europe. Bien que les priorités d'investissement du FEDER et du Fonds de cohésion pour la période 2014-2020 aient globalement été cohérentes avec les objectifs du Pacte vert pour l'Europe, certains domaines, tels que la production d'énergie (OT4), les infrastructures RTE-T (OT7) et la compétitivité des PME (OT3), ont montré un certain décalage. Une meilleure harmonisation entre la politique de cohésion et les objectifs du Pacte vert est nécessaire. Parmi les occasions manquées figurent l'exclusion possible des investissements dans les

énergies fossiles, un soutien accru aux entreprises respectueuses de l'environnement et la promotion d'investissements innovants. Les investissements du FEDER/Fonds de cohésion ont contribué aux objectifs de pollution zéro et à la protection des écosystèmes, mais des solutions plus intégrées sont requises. Bien que les régions aient renforcé leur expertise, il est nécessaire de trouver un équilibre entre la reproduction de projets existants et l'ambition pour obtenir un impact décisif.

À partir des résultats de l'évaluation, plusieurs enseignements stratégiques peuvent être tirés :

Aller au-delà de la conformité : La politique de cohésion doit répondre aux besoins des régions en transition et moins développées, tout en dépassant la simple mise en conformité avec la législation européenne.

Soutenir les projets non liés aux infrastructures : Il est essentiel de reconnaître l'importance des aspects non liés aux infrastructures et des changements de comportement, en mettant l'accent sur leur promotion en complément des investissements physiques.

Prioriser les investissements à fort impact : Adopter un principe de « bénéfice significatif » afin d'optimiser l'impact des investissements et de garantir des retombées positives substantielles.

Renforcer l'utilisation stratégique des marchés publics (marchés publics écologiques) : Promouvoir les pratiques de marchés publics durables et prioriser des projets à fort impact, comme les rénovations lourdes. Le Règlement portant dispositions communes 2014-2020 encourageait l'utilisation des marchés publics écologiques dans la sélection des projets, mais leur adoption par les autorités de gestion reste limitée.

Renforcer le soutien aux entreprises, à l'innovation et à la circularité : Accroître le soutien ciblé à des innovations adaptées au contexte local, en favorisant le développement de solutions territorialisées.

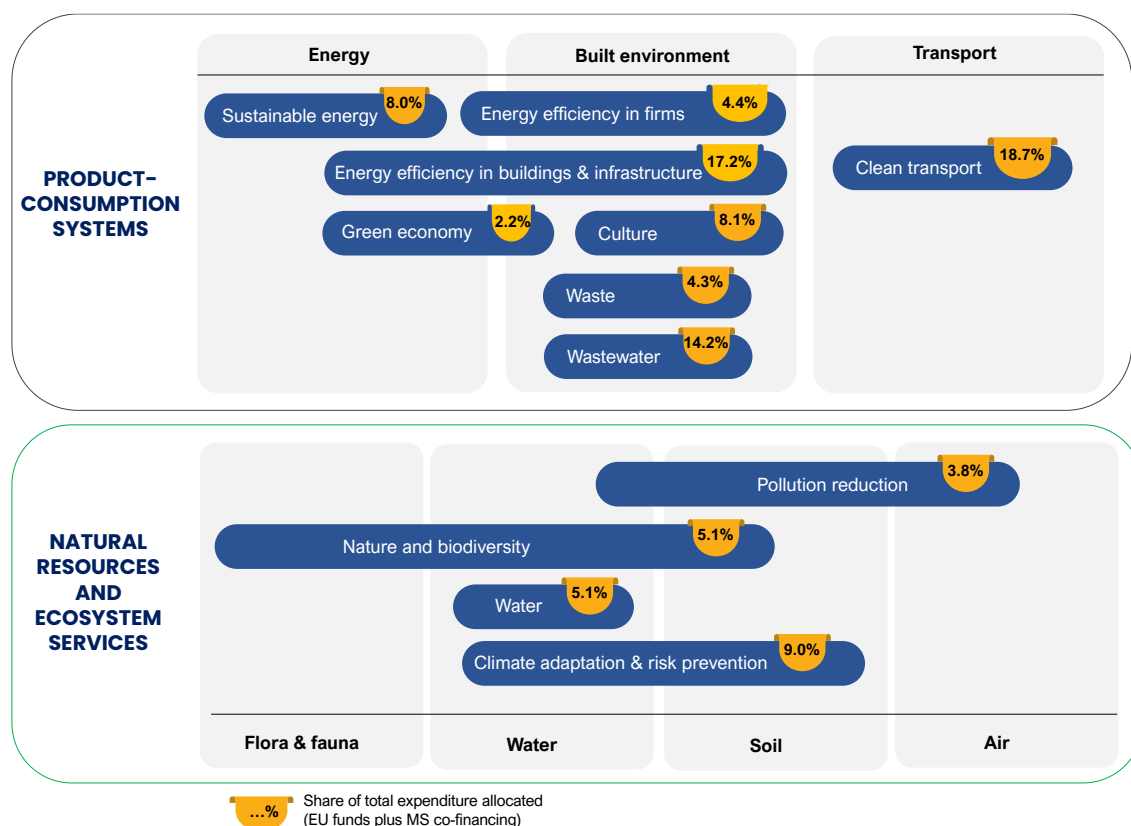
Augmenter les allocations pour l'adaptation au changement climatique, la protection de la nature et la biodiversité : Les besoins croissants en matière d'adaptation climatique dans l'UE exigent un soutien accru aux efforts innovants de résilience climatique, en particulier ceux fondés sur des solutions fondées sur la nature, conformément aux objectifs du Pacte vert.

Zusammenfassung

Dieser Bericht stellt die Ergebnisse der Ex-post-Evaluierung der Kohäsionspolitikprogramme 2014–2020 und deren Beitrag zum Europäischen Grünen Deal vor. Sie bewertet den Beitrag, den der Europäische Fonds für regionale Entwicklung (EFRE) und der Kohäsionsfonds (KF) während der Programmplanungsperiode 2014–2020 für Umwelt- und Klimaziele geleistet haben. Die Evaluierung wurde im Einklang mit den Leitlinien für bessere Gesetzgebung (Better Regulation Guidelines) durchgeführt und ist Teil eines umfassenderen Pakets von Bewertungen, das die Leistung der Kohäsionspolitik in verschiedenen Sektoren und Themenbereichen im gleichen Zeitraum untersucht.

Ausgaben und Maßnahmen, klassifiziert in 34 verschiedene Interventionsfelder¹⁴ und 12 Politikinstrumente im Rahmen des EFRE und des Kohäsionsfonds werden abgedeckt. Das Konzept des „Politikinstrumentes“ wird als zentrale Analyseeinheit verwendet. Es wird definiert als ein Set von Aktivitäten, das die Erreichung eines übereinstimmenden politischen Ziels beabsichtigt, dieselben Marktversagen adressiert und dieselben oder ähnliche erwartete Wirkungen entfaltet. Diese Instrumente wurden durch eine Kombination aus Literaturrecherche und quantitativen In-depth-Analyse von Ausgabendaten, Maßnahmen und Begünstigten identifiziert. Eine Übersicht über die Politikinstrumente ist in der nachstehenden Abbildung dargestellt.

Abbildung 1 – Politikinstrumente



¹⁴ Die 34 Interventionsfelder wurden in den Ausschreibungsunterlagen der Studie festgelegt.

Der politische Kontext und der theoriebasierte Ansatz der Wirkungsbewertung.

Die Verbesserung der Umwelt- und Klimaleistungen der Mitgliedstaaten war ein zentrales Ziel der Programmplanungsperiode 2014–2020. Während dieses Zeitraums waren die Interventionsbereiche des EFRE/KF eng an den Zielen der Säule „nachhaltiges Wachstum“ der Europa-2020-Strategie ausgerichtet, die die Transformation zu einer kohlenstoffarmen, ressourceneffizienten und klimaresilienten Wirtschaft priorisierte. Diese wegweisende EU-Politik legte den Grundstein dafür, Nachhaltigkeit in den Kernaktivitäten der EU zu verankern – eine Verpflichtung, die sich in den thematischen Zielen 4, 5 und 6 der Allgemeinen Verordnung (Verordnung (EU) Nr. 130/2013) über die Mittelverwendung des EFRE/KF widerspiegelt. Zusammen genommen stellten die thematischen Ziele 4 (kohlenstoffarme Wirtschaft), 5 (Förderung der Anpassung an den Klimawandel) und 6 (Umwelt und Ressourceneffizienz) – und speziell die 34 Interventionsfelder, die in dieser Bewertung berücksichtigt wurden – den größten Anteil der EFRE/KF-Mittelzuweisungen für die Programmperiode 2014–2020 dar. Der Europäische Grüne Deal (EGD) – der Ende 2019 gestartet wurde – knüpfte an diese Entwicklung an, indem er ehrgeizigere Ziele setzte und neue Bestrebungen einführte.

Wenngleich die Investitionen in Klima- und Umweltschutzmaßnahmen unter dem EFRE/KF auf unterschiedliche Bedarfe ausgerichtet waren, wiesen sie in den Zielländern und -regionen gemeinsame Merkmale auf. In der Programmperiode 2014–2020 gehörten die Senkung der Treibhausgasemissionen durch Energieeffizienz in Gebäuden, grüne Produktionsprozesse und die Förderung des umweltfreundlichen städtischen öffentlichen Verkehrs zu den dringendsten und am weitesten verbreiteten Bedarfen in allen EU-Mitgliedstaaten und Regionen. Auch der Erhalt natürlicher Ressourcen und der Biodiversität sowie die Prävention und wirksame Reaktion auf klimabedingte Extremereignisse waren häufige Zielstellungen. Allerdings hängen spezifische Investitionsbedarfe im Bereich Naturschutz, Klimaanpassung und Risikoprävention in hohem Maße von der regionalen Geomorphologie und den zivilisationsbedingten Belastungen, wie etwa unkontrollierter Urbanisierung, ab. Der Umfang der verschiedenen Programme wird zudem vom Entwicklungsstand der jeweiligen Region oder des Landes beeinflusst, wobei einige Gebiete weiterhin vor Herausforderungen bei der Einhaltung der EU-Ziele stehen. Beispielsweise benötigen die meisten weniger entwickelten Regionen weiterhin eine verbesserte Infrastruktur für die Abwasserbehandlung und Abfallbewirtschaftung.

Die Wirkungslogik, die der Unterstützung von Klima- und Umweltzielen durch EFRE/KF-Interventionen zugrunde liegt, ist aufgrund der Vielzahl der eingesetzten Politikinstrumente komplex. Angesichts der Breite der eingesetzten Politikinstrumente war es das Ziel, eine Vielzahl von Outputs, Outcomes und Impacts zu erreichen, die zur Säule „Nachhaltiges Wachstum“ der Europa-2020-Strategie sowie zu den Zielen des Europäischen Grünen Deals (EGD) beitragen sollten. Konkret sollten Investitionen in nachhaltige Energie, die Energieeffizienz von Unternehmen, Gebäuden und Infrastrukturen sowie in den sauberen städtischen Verkehr zur Dekarbonisierung bestimmter Sektoren beitragen; Maßnahmen zur Anpassung und zum Risikomanagement sollten dazu dienen, Klimarisiken zu mindern; Investitionen in Wasser- und Abwasserinfrastruktur sollten die Anbindung an Wasser- und Abwasserdienste

verbessern; Investitionen in die Abfallwirtschaft sollten die Vermeidungs- und Recyclingquoten steigern; Investitionen in die Vermeidung von Umweltverschmutzung sollten die Schadstoffbelastung verringern und kontaminierte Flächen sanieren; Investitionen in Biodiversität und Naturschutz sollten den Zustand der Umwelt verbessern; und schließlich sollten Investitionen in die Green Economy die Ressourceneffizienz und die Kreislaufwirtschaft fördern (und damit indirekt auch die Emissionsreduzierung).

Verschiedene Grundvoraussetzungen, unterstützende Faktoren und Risiken wurden als Elemente identifiziert, die Investitionen entweder fördern oder negativ beeinflussen können. Wie in der einschlägigen Literatur und in Evaluierungen früherer Programmperioden betont wird, hängt die erfolgreiche Umsetzung von Investitionen im Rahmen der Kohäsionspolitik häufig von mehreren Grundvoraussetzungen, unterstützenden Faktoren und Risiken ab. Zu den Voraussetzungen für erfolgreiche Investitionen gehören: das Vorhandensein günstiger nationaler Rahmenbedingungen (z. B. Gesetzgebung und Pläne); Ex-ante-Konditionalitäten als Hebel zur Einhaltung; die Verfügbarkeit administrativer Kapazitäten und Kompetenzen; sowie die Qualität der vorbereiteten und ausgewählten Projekte. Darüber hinaus nennt die einschlägige Literatur verschiedene unterstützende Faktoren, die die Wirkung von Investitionen verstärken können, darunter die Koordination zwischen Behörden und Sektoren sowie die effektive Nutzung von Finanzinstrumenten in Kombination mit Zuschüssen. Zu den Risiken, die sich häufig materialisieren und Investitionen negativ beeinflussen, gehören komplexe und zeitaufwendige nationale Prozesse sowie externe Faktoren, die die Marktbedingungen beeinträchtigen (wie der russische Angriffskrieg gegen die Ukraine und die COVID-19-Pandemie).

Ein theoriebasierter Ansatz der Wirkungsbewertung wurde angewandt, um die Evaluierung zu strukturieren. Die Evaluierung nutzte den theoriebasierten Ansatz, um das „Was“ (welche Ergebnisse durch verschiedene Arten von Politikinstrumenten erzielt wurden), das „Wie“ (ob bestimmte Arten von Interventionen relevanter oder erfolgreicher bei der Erzielung von Ergebnissen waren) und das „Warum“ (welche Voraussetzungen, unterstützenden Faktoren und Risiken das Vorhandensein oder Fehlen von Erfolgen bei einem bestimmten Politikinstrument und in einem bestimmten politischen Kontext beeinflussten) zu verstehen und zu überprüfen.

Die theoriebasierte Wirkungsbewertungsmethode wurde systematisch auf zwei Ebenen angewandt:

- Zunächst wurden 12 spezifische Wirkungslogiken bzw. Theories of Change für jedes der 12 Politikinstrumente definiert, einschließlich der jeweils erwarteten Outputs, Outcomes und Impacts sowie der spezifischen Grundvoraussetzungen, unterstützenden Faktoren und Risiken. Dies geschah auf Basis einer Literaturrecherche und erster Interviews. Für jedes Politikinstrument wurden die Theory of Change und die zugrunde liegenden Hypothesen (im Rahmen einer Fallstudie getestet, die drei ausgewählte Mitgliedstaaten abdeckte. Die Fallstudienuntersuchung basierte auf einer Literaturrecherche (einschließlich statistischer Daten) sowie auf Feldforschung. Im Rahmen der Feldforschung zu den 12 Politikinstrumenten wurden über 190 Interviews mit Verwaltungsbehörden, zwischengeschalteten Stellen, finalen Fördernehmern, themenspezifischen Experten und anderen Stakeholdern in 24

Mitgliedstaaten durchgeführt.¹⁵ Elf Expertenworkshops mit insgesamt 123 Teilnehmenden wurden genutzt, um die entstehenden Erkenntnisse zu diskutieren und zu validieren. Für jede Fallstudie wurde eine Mischung verschiedener Methoden angewandt. Eine quantitative Analyse – d. h. die Auswertung von Daten zu Ausgaben, Fördernehmern und Maßnahmen für jedes spezifische Politikinstrument – wurde mit einer statistischen Analyse zu Bedarfen und Makroindikatoren kombiniert. Ergänzt wurde dies durch eine qualitative Analyse relevanter Literatur sowie durch Process Tracing der Umsetzung der Investitionen in Politikinstrumente in drei ausgewählten Mitgliedstaaten, um die spezifischen Faktoren und Kontexte, die deren Entwicklung beeinflussten, zu ergründen.

- Anschließend wurde eine übergreifende EFRE/KF-Theory of Change für Klima und Umwelt definiert, ebenfalls auf Basis einer Literaturrecherche und in Verbindung mit den spezifischen Theories of Change, die für die spezifischen Politikinstrumente entwickelt wurden. Die Analyse auf dieser Ebene erfolgte durch Triangulation, Aggregation und den Vergleich von Daten auf mehreren Ebenen. Quantitative Analysen des Investitionsportfolios sowie statistische Auswertungen wurden genutzt, um Muster und Trends zu erkennen und spezifische Elemente der Theories of Change zu untersuchen. Diese Analysen unterstützten das Verständnis des „Was“ und der erreichten Ergebnisse im Verhältnis zu den jeweiligen Bedarfen. Qualitative Informationen aus der Literaturschau auf EU-Ebene und aus allen nationalen Evaluierungsberichten, der eingehenden Analyse von 70 Operationellen Programmen sowie den 12 spezifischen Fallstudien zu Politikinstrumenten wurden systematisch aufbereitet und trianguliert, um Trends und Muster in Bezug auf das „Wie“ und das „Warum“ zu identifizieren. Die Untersuchung des „Warum“ fokussierte sich auf die Grundvoraussetzungen, unterstützenden Faktoren und Risiken, die aus der ersten Literaturrecherche hervorgingen und die Formulierung von Hypothesen unterstützten. Im Rahmen der detaillierten Untersuchungen traten jedoch auch Aspekte zutage, die in der ursprünglichen Theory of Change nicht enthalten waren, sich jedoch aus den erhobenen Daten ergaben (z. B. wurden Verhaltens- und Akzeptanzaspekte als ein wesentlicher Risikofaktor für den Erfolg von Investitionen identifiziert).

Aus den methodischen Herausforderungen der vorliegenden Evaluierung lassen sich wichtige Lehren ziehen, um Voraussetzungen für die zukünftige Evaluierungen im Bereich der Kohäsionspolitik zu verbessern. Zunächst ist zu konstatieren, dass die von vornherein angelegte thematische und sektorale Breite der Evaluierung einerseits und ihre gewünschte analytische Tiefe andererseits in einem Zielkonflikt miteinander stehen. Diese Evaluierung deckt 12 Politikinstrumente sowie eine Vielzahl von Outputs, Outcomes und Impacts ab und berücksichtigt dabei gleichzeitig, die Kriterien der Leitlinien für bessere Gesetzgebung (Better Regulation Guidelines) sowie zusätzliche politische Fragestellungen einzuhalten. Zukünftige Evaluierungen würden von einem engeren

¹⁵ In den Fallstudien abgedeckte Mitgliedstaaten: Österreich, Belgien, Bulgarien (×2), Tschechien (×2), Kroatien (×2), Estland, Frankreich (×2), Finnland, Griechenland (×3), Deutschland (×3), Ungarn, Italien (×5), Irland, Lettland (×2), Litauen (×2), Malta, Polen, Portugal (×2), Rumänien (×3), Slowenien, Spanien, Schweden, Slowakei. Einige Länder wurden in mehreren Fallstudien zu Politikinstrumenten berücksichtigt; diese sind in Klammern angegeben.

und thematisch stärker fokussierten Ansatz profitieren. Des Weiteren sind bereits vorliegende nationale thematische Evaluierungen eine wichtige Grundlage für Bewertungen auf EU-Ebene, jedoch war ihre Verfügbarkeit in dieser Evaluierung begrenzt. Nationale thematische Evaluierungen sollten daher im Vorfeld der Gesamtevaluierung durchgeführt werden, um einen besseren Zugang zu den erforderlichen Daten sicherzustellen. Schließlich stellte die begrenzte Verfügbarkeit systematischer Daten zu Ergebnissen eine weitere Herausforderung dar, die künftig angegangen werden sollte. Beispielsweise wird der Erfolg von Investitionen in die Klimaanpassung im Rahmen der Kohäsionspolitik anhand des Schutzes vor Überschwemmungen und Waldbränden gemessen, wobei der Fokus auf der Anzahl der durch Schutzmaßnahmen abgedeckten Personen liegt. Die tatsächlichen Auswirkungen sind jedoch deutlich umfassender und könnten auch Kobenefits wie positive Effekte auf die Biodiversität, die Luftqualität, das Wassermanagement und die Reduzierung von Treibhausgasemissionen umfassen, die schwer in einem Monitoring-System zu erfassen sind. Der Aufwand und die Kosten für die Erhebung der relevanten Daten sollten sorgfältig gegen den Nutzen dieser Daten abgewogen werden.

Die unterstützten Interventionen

Bis 2020 wurden im Rahmen der 12 abgedeckten Politikinstrumente 98.639 Maßnahmen durch den EFRE/KF unterstützt, hauptsächlich in Form von nicht rückzahlbaren Zuschüssen.¹⁶ Diese Maßnahmen erreichten 73.021 finale Fördernehmer, wobei es sich bei der Mehrheit um Unternehmen und lokale öffentliche Verwaltungen handelte. Die durchschnittlichen Ausgaben pro Maßnahme variierten erheblich in Abhängigkeit vom Typ des Politikinstrumentes und des Programms, wobei die Unterschiede die Art der unterstützten Investitionen widerspiegeln. Die Maßnahmen dauerten im Durchschnitt 2,4 Jahre. Die am längsten andauernden Maßnahmen waren typischerweise solche mit einem bedeutenden Infrastrukturbestandteil, wie beispielsweise Abwasser- und Wasserprojekte.

Die Gesamtzuweisung für Klima- und Umweltinvestitionen war Ende 2023 etwas niedriger als ursprünglich erwartet. Diese Zuweisung blieb bis Ende 2019 weitgehend stabil. Die COVID-19-Pandemie führte zu einem leichten Rückgang, da einige Mittel zugunsten von Unternehmensförderung und Gesundheitsinstrumenten umgeleitet wurden. Dieser Rückgang wurde jedoch weitgehend durch die Bereitstellung von REACT-EU-Mitteln ausgeglichen, die größtenteils zur Unterstützung reifer Investitionsprojekte mit fortgeschrittenen Planungsstand oder schnell umsetzbarer Maßnahmen verwendet wurden. Nach dem Wachstum unmittelbar nach der Pandemie ging die geplante Zuweisung im Jahr 2023 erneut zurück, wobei die Mittel im Allgemeinen auf Interventionsfelder mit höheren Mittelbindungsraten umgelenkt wurden und die gebundenen Mittel 2022 die geplanten Mittel deutlich überstiegen. Programme, die ihre Budgets reduzierten, wiesen in der Regel überdurchschnittlich hohe ursprüngliche Zuweisungen für Klima- und Umweltziele auf. Trotz des allgemeinen Abwärtstrends stiegen die Mittelzuweisungen für Investitionen in Solarenergie, Energieeffizienz in öffentlicher

¹⁶ WP 2 Single Database.

Infrastruktur, sauberen städtischen Verkehr und Radwege während der Programmplanungsperiode 2014–2020 erheblich an.

Insgesamt stellten 267 Programme – darunter 195 Operationelle Programme und 71 Programme der territorialen Zusammenarbeit – Mittel zur Unterstützung von Umwelt- und Klimazielen in unterschiedlichem Umfang bereit. Bis 2023 konzentrierten sich 85% der gesamten förderfähigen Ausgaben auf 77 Programme in 20 Mitgliedstaaten, während 85% des gesamten EU-Beitrags auf nur 66 Programme entfielen. Bezogen auf die gesamten förderfähigen Ausgaben gehören Polen, Frankreich, Tschechien, Ungarn und Italien zu den fünf führenden Mitgliedstaaten. Hinsichtlich der insgesamt für Klima und Umwelt geplanten Mittelzuweisungen im Jahr 2023 sind die größten Programme in absoluten Zahlen das polnische Programm „Infrastruktur und Umwelt – EFRE/KF“ sowie das spanische Programm „Multiregionales Spanien – EFRE“. Das polnische Operationelle Programm „Infrastruktur und Umwelt – EFRE/KF“ weist die höchste relative Mittelzuweisung für Klima- und Umweltinvestitionen auf, gefolgt vom rumänischen Programm „Großinfrastruktur – RO – EFRE/KF“. Im Durchschnitt widmete jedes Programm 30% seines Gesamtbudgets Klima- und Umweltzielen, wobei die Spannweite innerhalb der Stichprobe erheblich war (von 3% bis 100% der Mittel für die 34 Umwelt-Interventionsfelder, die für diese Evaluierung ausgewählt wurden). Die EU-13-Länder stellten 54,0% aller EFRE- und KF-Mittel für die 34 Interventionsfelder bereit, während die EU-14+UK-Länder 41,7% zuwiesen. Die verbleibenden 4,3% der geplanten Mittel wurden über Programme der territorialen Zusammenarbeit bereitgestellt.

Die Nutzung unterschiedlicher EFRE/KF-Policy Mixes (d. h. Kombinationen von Politikinstrumenten) variierte je nach nationalem bzw. regionalem Kontext und politischen Entscheidungen. Investitionen in das Politikinstrument „Energieeffizienz von Gebäuden“ und das Politikinstrument „Sauberer städtischer Verkehr“ waren in den Policy Mixes vieler Länder besonders stark vertreten. Politikinstrumente in den Bereichen Wasser, Abwasser und Abfallwirtschaft waren in etwa der Hälfte aller Programme enthalten. In den Operationellen Programmen der EU-13-Länder wurden diese Instrumente jedoch durchgängig berücksichtigt, mit Ausnahme von Programmen, die speziell auf Wettbewerbsfähigkeit, Wachstum oder Innovation ausgerichtet waren. Das Politikinstrument „Energieeffizienz in Unternehmen“ sowie das Politikinstrument „Green Economy“ machten nur einen kleinen Anteil der gesamten Klima- und Umweltausgaben aus. Sie wurden hauptsächlich von den EU-14+UK-Ländern umgesetzt, insbesondere in Programmen, bei denen Wachstum und Wettbewerbsfähigkeit von Unternehmen im Mittelpunkt des Interventionsansatzes standen.

Drei Haupttreiber für die Auswahl von Politikinstrumenten in Programmen wurden identifiziert: i) Die Einhaltung europäischer Richtlinien ist ein zentraler Faktor, der die Auswahl von Politikinstrumenten bestimmt (insbesondere in den Bereichen Wasser, Abwasser und Abfall). ii) Vertragsverletzungsverfahren wirken als Katalysator und beschleunigen bestimmte Investitionen. iii) Der Fokus auf bestimmte Investitionstypen hängt auch von der Verfügbarkeit von EFRE/KF-Mitteln in Abstimmung mit nationalen Prioritäten und Fördermitteln ab. Der Policy Mix ist oft ähnlich in Regionen und Ländern, in denen die Ausgangsbedingungen – also die anfängliche Umweltleistung und die Rolle des EFRE/KF im Verhältnis zu den staatlichen Ausgaben – vergleichbar sind.

Ergebnisse der Evaluierung

Wenngleich die Zielvorgaben nicht vollständig erreicht wurden, konnten in allen Bereichen im Zusammenhang mit dem Grünen Deal bedeutende Fortschritte erzielt werden.

EFRE/KF-Investitionen haben in allen betrachteten Themenfeldern einen bedeutenden Beitrag zu den Dekarbonisierungszielen geleistet. Allerdings sind zusätzliche Investitionen erforderlich, um die höheren Ambitionen zu erreichen. Je nach Art der Politikinstrumente zur Unterstützung der Dekarbonisierung wurden unterschiedliche Erfolgsniveaus verzeichnet.

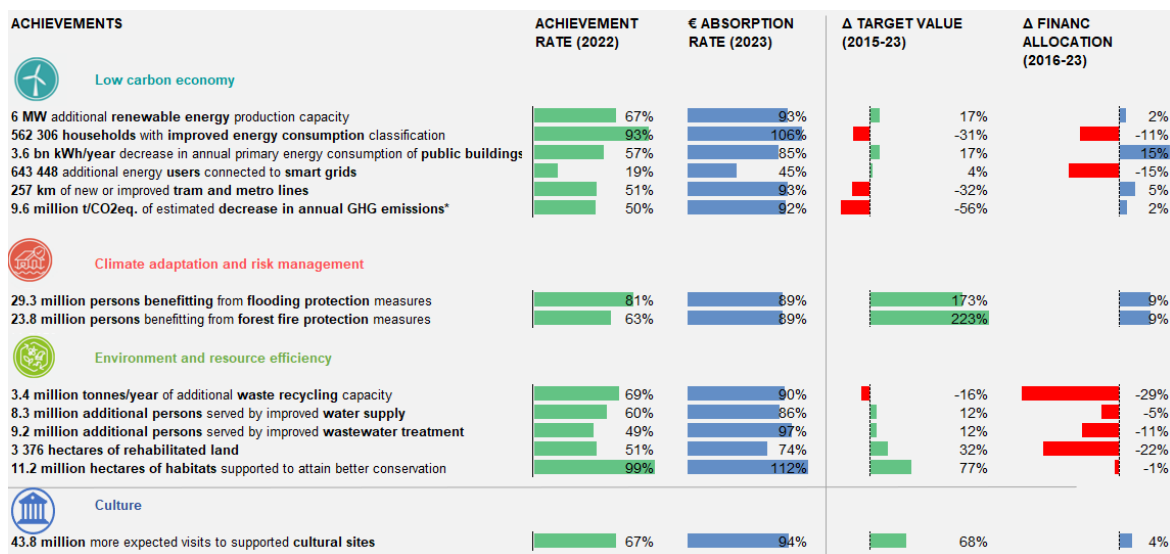
Zum Einen wurden 67% des gesetzten Ziels für die zusätzliche Kapazität erneuerbarer Energien erreicht. Die Erfolgsquoten waren in den verschiedenen Regionstypen relativ ähnlich, fielen jedoch in nationalen Programmen niedriger aus. Die Gesamt-Erfolgsquote muss im Kontext der im Laufe der Programmperiode erhöhten Zielwerte und Mittelzuweisungen sowie der Herausforderungen bei der Umsetzung von Investitionen in erneuerbare Energien (z. B. Genehmigungsverfahren, Beihilferecht, Kapazitäts- und Kompetenzlücken) betrachtet werden.

Des Weiteren gelang es bei den Investitionen in Energieeffizienz, die gesetzten Ziele für Wohngebäude zu 97% zu erreichen, während die Zielvorgaben für den Energieverbrauch in öffentlichen Gebäuden nur zu 57% erfüllt wurden. Besonders hervorzuheben sind weniger entwickelte Regionen, die überdurchschnittliche Erfolgsquoten aufwiesen. Auch hier sollte die Erfolgsquote im Kontext der veränderten Zielvorgaben und finanziellen Zuweisungen betrachtet werden: Bei den Wohngebäuden kam es zu einer Reduzierung der Zielwerte und Mittel, während für öffentliche Gebäude eine Erhöhung der Ziele und Mittelzuweisungen erfolgte.

Überdies wurden 51% des gesetzten Ziels zur Verbesserung von Straßenbahn- und U-Bahn-Linien durch Investitionen in den sauberen städtischen Verkehr erreicht, was auf einen positiven, jedoch eher moderaten Beitrag zur Dekarbonisierung des Verkehrssektors hinweist. Die bescheidene Erfolgsquote ist hauptsächlich auf die Komplexität solcher Projekte zurückzuführen, die lange Umsetzungszeiten erfordern. Solche Investitionen fanden sich überwiegend in Mitgliedstaaten mit Übergangsregionen und weniger entwickelten Regionen.

Schließlich führten Dekarbonisierungsinvestitionen zu einer geschätzten Reduktion der jährlichen Treibhausgasemissionen um 9,6 Millionen Tonnen CO₂-Äquivalent (50% des ursprünglichen Zielwertes). Auch dieses Ergebnis muss im Kontext einer Reduzierung des Gesamtzielwertes um 56% betrachtet werden, die sich durch Korrekturen von Fehlern in den ursprünglichen Zielen einiger Programme erklären lässt.

Abbildung 2 – Ergebnisse der EFRE/KF-Investitionen



* Diese Errungenschaft basiert auf dem Indikator 034 (offizielle Bezeichnung: THG-Reduktion: Geschätzte jährliche Verringerung der THG-Emissionen) und entspricht der Reduzierung der THG-Emissionen pro Jahr durch den Betrieb. Das bedeutet, dass sie nicht kumulativ ist. Er berechnet die geschätzten jährlichen Einsparungen "bis zum Ende des Zeitraums". Einige Schätzungen werden für Vorhaben berechnet, die im Jahr 4 des Programmzeitraums abgeschlossen wurden, während andere sich auf Vorhaben beziehen, die in einem anderen Jahr des Programmzeitraums abgeschlossen wurden. Sobald die Vorgänge abgeschlossen sind, wird die Schätzung nicht erneut überprüft.

Quelle: Eigene Darstellung auf Basis von Daten der *Cohesion Open Data Platform* zu Ergebnissen und Kategorisierung, abrufbar unter: <https://cohesiondata.ec.europa.eu>. Stichtage der Daten: 2022 und 2023.

Investitionen in Klimaanpassung und Risikomanagement haben zur Stärkung der Resilienz beigetragen, auch wenn die Zielvorgaben nicht vollständig erreicht wurden. Investitionen in Klimaanpassung führten in der Summe dazu, dass rund 29 Millionen zusätzliche Personen gegen Überschwemmungsrisiken und 24 Millionen zusätzliche Personen gegen Brandrisiken geschützt wurden. Insgesamt wurden 81% des geplanten Ziels für den Hochwasserschutz und 63% des Ziels für den Brandschutz erreicht. Die höheren Erfolgsquoten lassen sich teilweise auf die gute Umsetzung und die ehrgeizigen Zielvorgaben für den Hochwasserschutz im Rahmen der territorialen Kooperationsprogramme zurückführen. Die verwendeten Indikatoren (Anzahl der Personen, die von Schutzmaßnahmen profitieren) sind jedoch wenig differenziert, da Anpassungsinvestitionen sowohl weiche Maßnahmen (z. B. Sensibilisierung und Kooperation) als auch Infrastrukturmaßnahmen umfassen können. Zudem variiert die Risikobelastung je nach Standort erheblich. Daher ist die Beziehung zwischen den berichteten Outputs und den tatsächlich erzielten Wirkungen nicht vollständig proportional.

Trotz hoher Mittelbindungsraten blieben die Ergebnisse der Investitionen in Wasser-, Abfall- und Abwasserprojekte hinter den Zielvorgaben zurück, auch wenn sie einen positiven Beitrag leisteten. Die Zielerreichungsraten im Bereich Abwasserentsorgung und Wasserversorgung sind mit 49% bzw. 60% relativ niedrig. Die Investitionen konzentrierten sich vorrangig auf die Beseitigung von Defiziten bei der Einhaltung von Vorschriften und den Modernisierungsbedarf, insbesondere in den EU-13-Mitgliedstaaten. Das niedrige Ergebnis im Bereich Abwasser ist maßgeblich auf sieben Länder in Süd- und Südosteuropa zurückzuführen: Slowenien, Ungarn, Griechenland, Spanien, Kroatien, Malta und Bulgarien wiesen erhebliche Defizite auf. Jedoch deuten hohe Mittelbindungsraten auf eine relativ

hohe Wahrscheinlichkeit hin, dass die Zielerreichungsraten in den kommenden Jahren deutlich gesteigert werden. Makroökonomische Indikatoren und Regressionsanalysen legen nahe, dass EFRE/KF-Investitionen einen positiven Einfluss auf die Erhöhung der Anzahl der Menschen haben, die an Wasser- und Abwasserinfrastruktur angeschlossen sind. Dies gilt ebenso für die Verbesserung der Ressourceneffizienz, einschließlich der Rückgewinnung von Abfällen durch Recycling und Energierückgewinnung. Bemerkenswert ist, dass die Zielerreichungsrate bezogen auf den Output-Indikator zur zusätzlichen Recyclingkapazität bei 69% liegt.

Ein positiver Beitrag zum Schutz der Biodiversität und der Natur ist erkennbar, verbunden mit hohen Erfolgsquoten. Das Politikinstrument für Natur und Biodiversität stellt die bedeutendste Mittelzuweisung innerhalb der Programme der territorialen Zusammenarbeit dar, was zu einem deutlich höheren Zielwert im Vergleich zu anderen Programmen führte. Infolgedessen hat eine Erfolgsquote von 126,9% in der territorialen Zusammenarbeit die Gesamtergebnisse positiv beeinflusst. Beim Vergleich unterschiedlicher Regionstypen werden die höchsten Zielerreichungsraten in entwickelten Regionen beobachtet, gefolgt von Übergangsregionen und schließlich weniger entwickelten Regionen. Wie beim Politikinstrument für Klimaanpassung ist jedoch eine Bewertung der Auswirkungen auf Makroebene aufgrund fehlender relevanter Daten nicht möglich.

Es sind mehr transformative¹⁷ und ambitionierte Investitionen erforderlich, um die Wirkung zu erhöhen.

Konventionelle Investitionen sind die bevorzugte Investitionsart in den Mitgliedstaaten und entscheidend für die Einhaltung des Umweltrechtsbestands der EU. Das von den Mitgliedstaaten und Regionen ausgewählte Investitionsportfolio besteht überwiegend aus „grauer“ Infrastruktur und konventionellen Lösungen. Beispielsweise konzentrieren sich Investitionen im Bereich Ressourceneffizienz auf die Reduzierung des Materialverbrauchs, basieren jedoch weiterhin auf einem linearen Modell („produce, use, dispose“), anstatt den Übergang zu einem zirkulären Modell zu unterstützen. Investitionen in den Hochwasserschutz bestehen typischerweise aus grauer Infrastruktur anstelle naturbasierter Lösungen, die gleichzeitig Vorteile für Wasserverfügbarkeit, Natur, Biodiversität und Wohlbefinden bringen könnten. Dennoch bleiben konventionelle Investitionen insbesondere in weniger entwickelten und Übergangsregionen notwendig, da dort erheblicher Investitionsbedarf besteht, um die Einhaltung der Wasser-, Abwasser- und Abfallvorschriften zu gewährleisten.

Transformative Investitionen sind dringend erforderlich, um dem Ambitionsniveau des Europäischen Grünen Deals gerecht zu werden. Es ist notwendig, neben konventionellen Investitionen stärker auf transformativere Ansätze zu setzen, die auf innovative und nachhaltige Lösungen mit langfristigen Vorteilen und systemischen Veränderungen abzielen. Solche Lösungen können naturbasierte Ansätze, Initiativen der Kreislaufwirtschaft sowie Investitionen in erneuerbare Energien umfassen. Trotz ihres gut dokumentierten Potenzials und ihrer vielfältigen Mehrwert werden diese derzeit jedoch noch unzureichend genutzt.

¹⁷ Transformative Investitionen sind in Fußnote Nr. 120 definiert.

Investitionen, die auf langfristige Ergebnisse abzielen, waren schwieriger umzusetzen, entfalten jedoch eine größere Wirkung. Dies wird durch Beispiele aus mehreren Politikinstrumenten veranschaulicht. Investitionen in umfassende Gebäudesanierungen zur Verbesserung der Energieeffizienz liefern beispielsweise bessere Ergebnisse hinsichtlich der Energieperformance, wurden jedoch aufgrund technischer Komplexität, Finanzierungsschwierigkeiten und Akzeptanzproblemen (z. B. bei geteilter Eigentümerschaft von Wohngebäuden) seltener von Regionen und Mitgliedstaaten umgesetzt. Ebenso führten Investitionen in grünen öffentlichen Verkehr (z. B. Erneuerung von öffentlichen Fahrzeugflotten) dort, wo sie realisiert wurden, unmittelbar zu einer Verringerung von Umweltverschmutzung und Treibhausgasemissionen. Solche Investitionen erfordern jedoch auch gesellschaftliche Verhaltensänderungen, etwa eine Verlagerung des Verkehrsverhaltens, um ihre Wirkung zu maximieren. Ein Ansatz, der von einigen Regionen erfolgreich genutzt wurde, um das Ambitionsniveau der Investitionen zu erhöhen – und der künftig stärker skaliert werden sollte –, besteht darin, verschiedene Ziele innerhalb einer einzigen Investition zu kombinieren. Beispiele hierfür sind die Verbindung von Energieeffizienz- und Erneuerbare-Energien-Investitionen im Verkehrssektor, die Verknüpfung von Abwasserbewirtschaftung mit Investitionen in die Biogasproduktion sowie die Kombination von Hochwasserschutzmaßnahmen mit Investitionen in die Energiegewinnung aus Wasserströmen.

Die verzögerte Umsetzung und geringe nationale Ambition im Hinblick auf thematische Ex-ante-Konditionalitäten begrenzten deren Wirkung auf Investitionen.

Die Ex-ante-Konditionalitäten im Energiebereich waren weniger herausfordernd in der Umsetzung, haben jedoch ihr volles Potenzial als Hebel für Veränderungen nicht ausgeschöpft. Die hohen Zielerreichungsraten zum Zeitpunkt der Annahme der Operationellen Programme bei den Ex-ante-Konditionalitäten für Energie deuten darauf hin, dass Mitgliedstaaten und Regionen bei der Umsetzung nur geringe Schwierigkeiten hatten. Im Fall der Ex-ante-Konditionalität für erneuerbare Energien übertrafen mehrere Regionen die auf nationaler Ebene gesetzten Ziele. Die Behörden führten dies jedoch hauptsächlich darauf zurück, dass die Ex-ante-Konditionalität für erneuerbare Energien als reine „Box-Ticking Exercise“) wahrgenommen wurde, ohne wirklich als Motor für Veränderungen zu dienen.

Die Ex-ante-Konditionalitäten im Bereich Abwasser und Abfall waren schwieriger zu erfüllen, legten jedoch wichtige Grundlagen. Diese Konditionalitäten beeinflussten die regulatorischen und strategischen Rahmenbedingungen in den Sektoren sowie die Steuerung der Kohäsionsförderung. Verzögerungen und Herausforderungen bei der Erfüllung der Ex-ante-Konditionalitäten minderten jedoch deren Wirkung. Die Ex-ante-Konditionalität im Bereich Wasser stärkte den regulatorischen Rahmen hinsichtlich der Kostendeckung. Dennoch erreichen Wasserdienstleistungen in den meisten Mitgliedstaaten noch immer keine vollständige Kostendeckung. Zwei zentrale Herausforderungen wurden in diesem Zusammenhang genannt: methodische Probleme und Bedenken hinsichtlich der Bezahlbarkeit. Auch die Ex-ante-Konditionalität im Bereich Abfallwirtschaft stellte eine Herausforderung dar. Die Qualität der Abfallbewirtschaftungspläne war in vielen Mitgliedstaaten unzureichend und erfüllte die verbindlichen Elemente der Gesetzgebung (z. B. in Bezug auf kommunale Abfälle oder Recyclingziele) nur unzureichend.

Die Ex-ante-Konditionalität im Bereich Klimaanpassung wurde größtenteils erfüllt, doch Verzögerungen und Qualitätsprobleme minderten ihre Wirkung. Die Anforderung, einen nationalen Anpassungsplan zu verabschieden, wurde von 15 Mitgliedstaaten nicht rechtzeitig erfüllt, sodass die Operationellen Programme ohne einen strategischen Rahmen zur Steuerung der Investitionen vorbereitet wurden. Darüber hinaus variierte die Qualität der Anpassungspläne und Risikomanagementpläne zwischen den Mitgliedstaaten erheblich. Verzögerungen und Lücken bei der Erfüllung der Ex-ante-Konditionalität wirkten sich negativ auf die Qualität der Investitionen aus, die durch Programme des EFRE/KF unterstützt wurden.

Die Faktoren, die sich auf die Investitionen auswirken, variieren zwischen den Regionen. Allerdings sind begrenzte Kapazitäten in der Verwaltung und fehlende Fachkompetenzen besonders ausschlaggebend.

Begrenzte Verwaltungskapazitäten beeinträchtigten alle Arten von Investitionen und Regionen, wobei das Problem auf lokaler Ebene besonders ausgeprägt ist. Frühere Studien haben bereits vielfach gezeigt, dass die Umsetzung und der Erfolg geplanter kohäsionspolitischer Maßnahmen häufig durch begrenzte Verwaltungskapazitäten behindert wird.¹⁸ Die vorliegende Evaluierung bestätigt, dass dieses Problem auch während der Programmperiode 2014–2020 fortbestand. Kapazitätsprobleme traten insbesondere auf Ebene der lokalen Verwaltungen auf und betrafen kleine Gemeinden, unabhängig davon, ob sie in weniger entwickelten, Übergangs- oder stärker entwickelten Regionen lagen. Engpässe entstanden insbesondere dort, wo Aufgaben an lokale Verwaltungen delegiert wurden, die für einen erheblichen Teil der Umsetzung von Politikinstrumenten verantwortlich waren – insbesondere in den Bereichen sauberer städtischer öffentlicher Verkehr, Abfallwirtschaft sowie Wasser- und Abwasserbewirtschaftung. In Interviews wurde erläutert, dass begrenzte Verwaltungskapazitäten die Rahmenbedingungen für Investitionsentscheidungen negativ beeinflussten, was sich wiederum auf die tatsächlich getätigten Investitionen auswirkte. In den analysierten Fällen zeigte sich beispielsweise, dass die Qualität von Anpassungsplänen, Abfallbewirtschaftungsplänen und nachhaltigen urbanen Mobilitätsplänen (SUMP) einen direkten Einfluss auf die Qualität der Investitionen hatte.

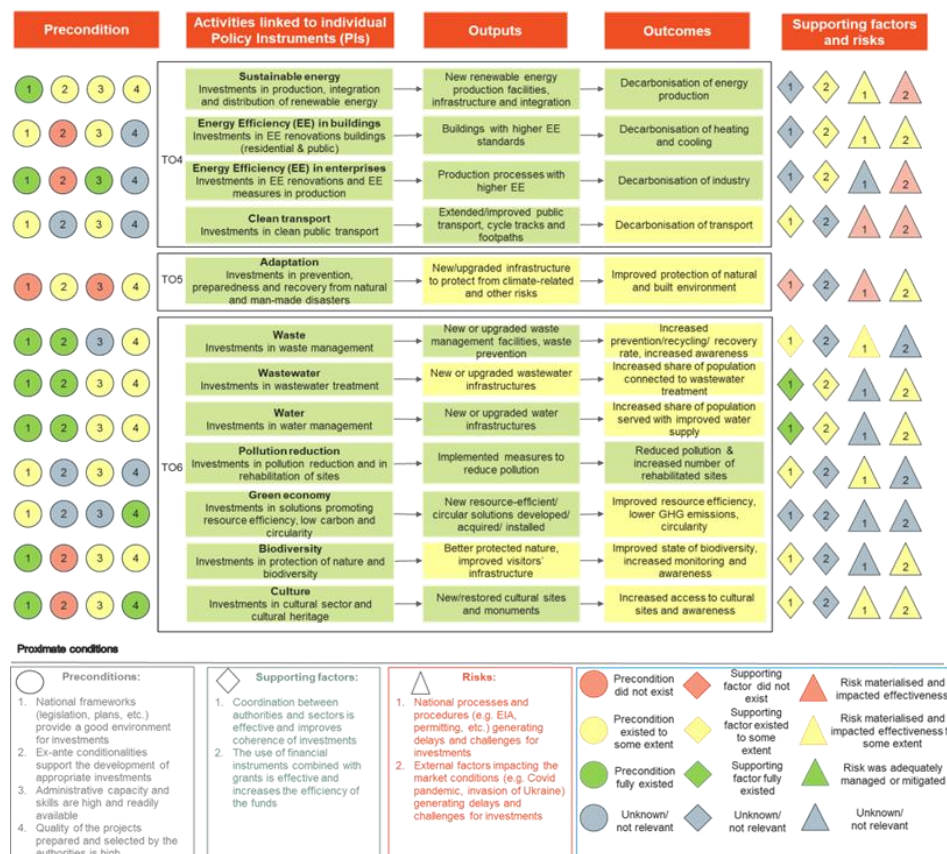
Ein Mangel an qualifizierten Fachkräften führte zu Verzögerungen bei Investitionen, wobei dieses Problem spezifisch für bestimmte Politikinstrumente sowie einzelne Mitgliedstaaten oder Regionen ist. Die Verfügbarkeit und der Zugang zu Fachkompetenzen wurden als zentrale Herausforderungen genannt, die die Fähigkeit der Mitgliedstaaten beeinträchtigten, Projekte in mehreren Politikinstrumenten – insbesondere in technisch anspruchsvollen Bereichen wie Bauwesen oder Ingenieurwesen – vorzubereiten und umzusetzen. Obwohl der Fachkräftemangel in allen Regionen auftrat, wurde er häufiger in Übergangsregionen und weniger entwickelten Regionen berichtet. Darüber hinaus hatten bestimmte Arten von Fördernehmern, wie kleine und mittlere Unternehmen (KMU), größere Schwierigkeiten bei der Umsetzung von Investitionen und benötigten Beratungsunterstützung.

¹⁸ Weitere Informationen siehe [link](#).

Die Verwaltungskapazitäten beeinflussen die Fähigkeit der Behörden, komplexe Verfahren wie Genehmigungen, Vergaben und Umweltverträglichkeitsprüfungen (UVP) effektiv zu bearbeiten, was zu Verzögerungen bei der Umsetzung führt. Kapazitäts- und Fachkräftemangel in öffentlichen Verwaltungen auf allen Ebenen – insbesondere auf lokaler Ebene – führten dazu, dass Vergabeverfahren, UVP und Genehmigungsprozesse die Fähigkeit der lokalen Verwaltungen beeinträchtigten, größere Investitionen voranzutreiben und Fördermittel wirksam zu nutzen. Zudem beeinträchtigten fragmentierte Verwaltungsstrukturen auf nationaler, regionaler und lokaler Ebene die Fähigkeit der Behörden, komplexe Verfahren effizient zu steuern.

Externe Faktoren beeinflussten ebenfalls die Umsetzung der Investitionen, insbesondere die COVID-19-Pandemie, der russische Angriffskrieg gegen die Ukraine sowie Herausforderungen im Bereich der Awareness und Akzeptanz bzgl. bestimmter Investitionen. Politikinstrumente im Zusammenhang mit Bau- und Infrastrukturprojekten waren von beiden Krisen – wie etwa im Bereich sauberer Verkehr, Energieeffizienz in Gebäuden, nachhaltige Energie, Abwasser, Abfall und Wasser – direkter und stärker betroffen. Politikinstrumente, die auf das Bewusstsein, die Akzeptanz und das Verhalten der Bürger angewiesen sind, sind besonders schwierig umzusetzen und können die Wirkung der Maßnahmen begrenzen (z. B. eine „Not-in-my-backyard“-Einstellung gegenüber Investitionen in erneuerbare Energien oder eine Zurückhaltung der Nutzer, vom privaten Verkehr auf öffentliche Verkehrsmittel umzusteigen).

Abbildung 3 – Überprüfte Theory of Change: Voraussetzungen, unterstützende Faktoren und Risiken



Quelle: Eigene Analyse der Autoren auf Basis von Fallstudien zu Politikinstrumenten.

Der Einsatz von Finanzinstrumenten für Energieeffizienz und die Green Economy muss weiter gefördert werden.

Der Einsatz von Finanzinstrumenten für Klima- und Umweltinvestitionen bleibt begrenzt und konzentriert sich überwiegend auf das thematische Ziel 4. Bis Ende 2022 belief sich die Zuweisung (nur unter Berücksichtigung des EU-Beitrags) zu Finanzinstrumenten für die thematischen Ziele 4, 5 und 6 auf lediglich 1,5 Milliarden Euro, was 6,5% der gesamten Zuweisung zu Finanzinstrumenten entspricht, wobei 86,8% der geplanten Mittel auf das thematische Ziel 4 entfielen. Projekte, die den Übergang zu einer kohlenstoffarmen Wirtschaft unterstützen – insbesondere Investitionen in Energieeffizienz und erneuerbare Energien – eignen sich gut für rückzahlbare Finanzinstrumente. Die Art und die Charakteristika der Projekte sowie das Profil der Begünstigten (oftmals lokale Behörden) schränken jedoch die Einsatzmöglichkeiten von Finanzinstrumenten im Rahmen der thematischen Ziele 5 und 6 ein.¹⁹ Dies deutet darauf hin, dass künftige Anstrengungen zur Förderung von Finanzinstrumenten auf Bereiche fokussiert werden sollten, die mindestens einnahmensteigernde oder kostenreduzierende Wirkungen erzielen. Dazu gehören Energieeffizienz und erneuerbare Energien, aber potenziell auch andere Bereiche wie Abfallwirtschaft, Wasser- und Abwasserbewirtschaftung, in denen der Einsatz von Finanzinstrumenten bislang sehr begrenzt ist.

Die Inanspruchnahme von Finanzinstrumenten wurde durch mehrere Faktoren beeinflusst, darunter das makroökonomische Umfeld, Fachkompetenz sowie die subjektiv wahrgenommene Komplexität bzw. der administrative Aufwand. Zum Einen beeinflusste das makroökonomische Umfeld, in dem Finanzinstrumente implementiert wurden, deren Attraktivität. Die günstigen Kreditkonditionen und das Niedrigzinsumfeld während der Programmperiode 2014–2020 verringerten die Attraktivität von Finanzinstrumenten im Vergleich zu anderen verfügbaren Finanzierungsoptionen (z. B. in Bulgarien, Deutschland, Portugal und Slowenien). Des Weiteren schränkten die Kreditwürdigkeit und die Kreditgrenzen für lokale Behörden deren Verschuldungsmöglichkeiten ein und begrenzten damit die Nutzung von Fremdfinanzierungsinstrumenten (z. B. in Spanien und Italien). Überdies müssen Finanzinstrumente einen tatsächlichen Marktbedarf decken und dürfen nicht mit anderen günstigen Marktangeboten konkurrieren. Daher empfahlen Ex-ante-Evaluierungen in bestimmten Fällen (z. B. in Deutschland) den Einsatz von EFRE-Finanzinstrumenten nicht, da bestehende Marktangebote die Nachfrage bereits ausreichend abdeckten. Schließlich wirkten sich begrenzte Erfahrung und Kapazitäten sowie administrative Kosten ebenfalls auf die Nutzung von Finanzinstrumenten aus. Verwaltungsbehörden nahmen die Komplexität und den administrativen Aufwand im Zusammenhang mit Finanzinstrumenten weiterhin als unverhältnismäßig im Vergleich zur Rolle der EFRE/KF-Finanzierung in ihrem Land oder ihrer Region wahr. Die Einrichtung und Umsetzung von Finanzinstrumenten ist im Allgemeinen mit bekannten Herausforderungen verbunden, darunter lange Einrichtungszeiten, Komplexität und mangelnde Flexibilität bei nationalen Vergabeverfahren. Technische Unterstützungsangebote (wie JESSICA, ELENA

¹⁹ Die Fähigkeit, Kosteneinsparungen oder Einnahmen zu erzielen, die Möglichkeit für rechtzeitige Ausstiege und Rückzahlungen sowie die unzureichende Anzahl und Größenordnung tragfähiger Projekte, die nicht kommerziell finanziert werden.

und fi-compass), Ex-ante-Bewertungen sowie frühere Erfahrungen der Behörden waren positive Faktoren, die die Nutzung von Finanzinstrumenten unterstützten.

Investitionen wurden durch unzureichende sektorübergreifende Koordination und widersprüchliche Zielsetzungen auf lokaler Ebene beeinträchtigt.

Die Anwendung horizontaler Prinzipien und Ex-ante-Konditionalitäten trug in der Programmplanungsphase zur Kohärenz der Investitionen bei. Horizontale Prinzipien (wie nachhaltige Entwicklung, das Verursacherprinzip, die Nutzung von Green Public Procurement (GPP) als bewährte Praxis sowie die Anwendung der Strategischen Umweltprüfungsrichtlinie und der Umweltverträglichkeitsprüfungsrichtlinie) waren entscheidend dafür, Investitionen an den EU-Politiken und -Gesetzgebungen auszurichten.

Wo eine effektive Koordination und Zusammenarbeit zwischen Behörden und Sektoren bestand, verbesserte sich die Qualität der Programme und Investitionen. Horizontale Zusammenarbeit innerhalb der Kohäsionspolitik wurde durch die Integration der Operationellen Programme in umfassendere Koordinationsforen erleichtert, wodurch institutionelle Synergien besser genutzt werden konnten. Die Bedeutung solcher Koordinationsmechanismen für die Sicherstellung interner Kohärenz hing vom Umfang der operationellen Programme ab: Interne Koordination spielte eine größere Rolle in sektorübergreifenden Programmen als in Programmen, die speziell auf Umwelt- und Klimathemen ausgerichtet waren und stärker auf Mechanismen zur Sicherstellung externer Kohärenz angewiesen waren. Zusätzlich wurden Leitdokumente entwickelt, um die Kohärenz zwischen verschiedenen Programmen und Investitionen zu fördern (zum Beispiel in Bulgarien, wo die „Leitlinien zur Integration von Umwelt- und Klimapolitik in die Programme 2014–2020“ als Grundlage für die Koordination dienten).

Die Integration von Umweltkriterien in die Projektauswahl trug zur Verankerung von Nachhaltigkeit bei, war jedoch mit bestimmten Herausforderungen verbunden. Mehrere Faktoren waren besonders wichtig, um eine erfolgreiche Integration von Nachhaltigkeit bei der Bewertung und Auswahl von Projekten sicherzustellen: spezifische und quantifizierbare Auswahlkriterien, einschließlich klarer Vorgaben hinsichtlich der benötigten Informationen zur Nachweisführung; ein geeignetes Bewertungssystem, das Umweltkriterien ausreichend gewichtet; die Kapazität und Fachkompetenz der Verwaltungsbehörden, um sicherzustellen, dass die Aspekte der ökologischen Nachhaltigkeit im Auswahl- und Umsetzungsprozess der Projekte angemessen berücksichtigt werden; sowie die Einbindung von Interessenträgern durch einen kollaborativen Ansatz

Lehren und politische Implikationen im Zusammenhang mit dem Europäischen Grünen Deal.

Die Kohäsionspolitik hat positiv zu den Zielen des Europäischen Grünen Deals beigetragen. Obwohl die Investitionsprioritäten des EFRE/KF in der Programmperiode 2014–2020 weitgehend mit den Zielen des Europäischen Grünen Deals übereinstimmten, zeigten sich in einigen Bereichen – wie der Energieerzeugung (thematisches Ziel 4), der TEN-T-Infrastruktur (thematisches Ziel 7) und der Wettbewerbsfähigkeit von KMU (thematisches Ziel 3) – Abweichungen. Eine bessere Ausrichtung der Kohäsionspolitik an den Zielen des Europäischen Grünen Deals ist notwendig. Versäumte Chancen betreffen unter anderem den

möglichen Ausschluss von Investitionen in fossile Brennstoffe, die stärkere Unterstützung umweltbewusster Unternehmen sowie die Förderung innovativer Investitionen. EFRE/KF-Investitionen haben zu den Zielen der Null-Schadstoff-Strategie und zum Schutz von Ökosystemen beigetragen, doch sind stärker integrierte Lösungen erforderlich. Während die Regionen an Fachwissen gewonnen haben, ist es notwendig, ein Gleichgewicht zwischen Nachahmung bewährter Praktiken und der Steigerung des Ambitionsniveaus zu finden, um eine entscheidende Wirkung zu erzielen.

Auf Grundlage der Ergebnisse der Evaluierung lassen sich mehrere strategische Lehren ziehen:

Schwerpunktsetzung über reine Compliance-Aspekte hinaus: Die Kohäsionspolitik sollte neben der Adressierung der Bedarfe weniger entwickelter und Übergangsregionen auch ambitioniertere Ziele verfolgen, die über die bloße Einhaltung von EU-Rechtsvorschriften hinausgehen.

Stärkere Förderung von Nicht-Infrastrukturprojekte: Die Bedeutung behavioraler und nicht-infrastruktureller Aspekte sollte anerkannt werden, insbesondere durch die Förderung gesellschaftlicher Verhaltensänderungen parallel zu physischen Investitionen im Rahmen der Kohäsionspolitik.

Priorisierung von Investitionen mit nachgewiesener hoher Wirkung: Das Prinzip des „erheblichen Nutzens“ sollte Anwendung finden, um die Wirkung von Investitionen zu optimieren und sicherzustellen, dass sie klare positive Ergebnisse erzielen.

Strategische Nutzung öffentlicher Beschaffung (Green Public Procurement, GPP): Nachhaltige Beschaffungspraktiken sollten gefördert und wirkungsstarke Projekte – etwa umfassende Gebäudesanierungen – priorisiert werden. Die Gemeinsamen Bestimmungen (CPR) für 2014–2020 fördern den Einsatz von GPP bei der Projektauswahl, jedoch ist deren Anwendung durch die Verwaltungsbehörden bislang begrenzt.

Ausbau der Unterstützung für Unternehmen, Innovation und Kreislaufwirtschaft:

Die gezielte Förderung kontextspezifischer Innovationen sollte ausgebaut werden, um die Entwicklung ortsbezogener Lösungen zu stärken.

Erhöhung der Mittel für Klimaanpassung, Naturschutz und Biodiversität: Angesichts des steigenden Investitionsbedarfs zur Klimaanpassung in der EU ist zusätzliche Unterstützung für innovative, klimaresiliente Maßnahmen erforderlich – insbesondere für naturbasierte Lösungen, die mit den Zielen des Europäischen Grünen Deals im Einklang stehen.

1. Introduction

The general objective of the study is to perform an ex-post evaluation of cohesion policy programmes 2014-2020 to examine their contribution to the European Green Deal. The evaluation assesses the investment support provided by the European Regional Development Fund (ERDF) and Cohesion Fund (CF) for the environmental and climate objectives of cohesion policy during the 2014-2020 period. Furthermore, the evaluation aims to assess the contribution of these investments to broader strategic goals and frameworks (such as the European Green Deal (EGD) and the Europe 2020 strategy). The evaluation focuses on understanding the key factors and conditions that have contributed to the successes and failures of specific investments. The evaluation is conducted in line with the Better Regulation Guidelines and forms part of a broader package of evaluations aimed at assessing the performance of cohesion policy funds in specific areas and sectors during the 2014-2020 programming period.

1.1. Objectives and scope

The evaluation has both a summative and formative character. First, the evaluation focuses on analysing the different ways in which Member States made use of the ERDF and CF to advance environmental and climate objectives. More specifically, the study assesses the impacts and achievements of cohesion policy support, as well as the relevance, efficiency, coherence and EU added value. Second, based on the insights drawn from the implementation of cohesion policy investments for environmental and climate objectives, the study also aims to provide reflections that can inform the future design of cohesion policy measures.

1.2. Outline of the report

This final report presents a synthesis of findings from the evaluation of cohesion policy programmes for the 2014-2020 programming period. The report is structured as follows:

- Chapter 2 presents the evaluation methodology applied and limitations of the study.
- Chapter 3 presents the rationale and policy context, including investment needs and differences across countries and regions.
- Chapter 4 provides an overview of the interventions supported through the ERDF and CF.
- Chapter 5 presents findings on key achievements related to cohesion policy investments and their contribution to environmental and climate objectives.

- Chapter 6 presents the key success factors and challenges to the implementation of cohesion policy programmes and their contribution to environmental and climate objectives.
- Chapter 7 presents the lessons learned and policy implications arising from the evaluation.

The report includes several annexes containing additional supporting information.

2. Methodology

This chapter presents the methodological approach used in this evaluation. The box below summarises the key considerations and methods applied.

The evaluation analyses the contribution of ERDF/CF interventions and policy instruments to climate and environmental objectives during the 2014-2020 programming period. Expenditure classified under 34 intervention fields of the ERDF/CF is covered by the evaluation. The concept of 'policy instrument' is used as a key unit of analysis throughout the evaluation. A policy instrument (PI) is defined as a consistent set of activities aimed at achieving a policy goal, i.e. addressing the same market/systemic failures and challenges and having the same expected impact(s). The evaluation covers 12 policy instruments, namely sustainable energy, energy efficiency in buildings, energy efficiency in industry, green economy, clean transport, water, wastewater, waste, nature and biodiversity, pollution reduction, climate adaptation and risk prevention and culture.

A theory-based impact evaluation approach was used to structure the evaluation. This approach was used to assess the effectiveness of the programme by mapping and testing the underlying theories or mechanisms through which the programme is expected to achieve its desired outcomes. The approach was applied at two levels: 1) at the level of individual policy instruments; 2) at an overarching level focusing on all cohesion policy instruments related to climate and environment.

The 2020-2024 ERDF/CF programmes were expected to have positive impacts in the fields of decarbonisation, adaptation/risk management and environment/resource efficiency. Investments in sustainable energy production, energy efficiency and clean transport were designed to decarbonise the energy production, industry, heating and cooling and transport sectors. Investments in adaptation and risk management were aimed at improving the natural and built environment. Investments in nature and environment were intended to yield a wide range of outcomes, including water and wastewater investments to increase the number of people connected to water and wastewater treatment systems; waste-related investments to improve prevention/recycling rates and raise awareness; investments in pollution prevention to decrease pollution and rehabilitate sites; investments in biodiversity to improve the state of biodiversity; and, finally, investments in the green economy to promote resource efficiency and circularity (and, by extension, a reduction in GHG emissions).

Various preconditions, supporting factors and risks are often cited as supporting or hindering green investments. Literature covering previous programming periods identifies several preconditions for successful investments, including the presence of robust national frameworks and plans, robust implementation of ex-ante conditionalities, administrative capacity and skills and the quality of the projects prepared and selected. Furthermore, previous investments were supported by effective coordination between authorities and across sectors, along with increased use of financing instruments to support investments. The literature recognises national processes and procedures (such as EIA and permitting) and external factors impacting market conditions as key risks impacting the effectiveness and efficiency of investments. These preconditions, risks and hypotheses formed the starting point for formulating hypotheses to test the theory of change across the 12 policy instruments.

Mixed methods and triangulation of data sources were used to analyse the findings. The evaluation included: an extensive literature review; an analysis of ERDF/CF allocation and expenditure based on data from the Cohesion Open Data Platform and data on individual operations, beneficiaries and indicators available in the WP 2 Single Database; analysis of ERDF/CF achievements based on data from the Cohesion Open Data Platform; an analysis of 70 operational programmes based on a document review and 78 interviews with managing authorities and implementing bodies; 12 policy instrument case studies relying on triangulated data from field research in three selected countries per case study, including a literature review, statistics, analysis of expenditure and operations and interviews; 11 technical workshops conducted to discuss findings emerging for each policy instrument; and three horizontal case studies (climate tracking system, financial instruments and contribution to the EGD).

2.1. Theory-based impact evaluation

This evaluation analyses the contribution of ERDF/CF interventions and policy instruments to climate and environmental objectives during the 2014-2020 programming period. The evaluation covers all expenditure and measures classified under 34 intervention fields²⁰ (IFs) funded by the ERDF and CF. The list of intervention fields and policy instruments is presented in Figure 1. To structure the evaluation, the concept of ‘policy instrument’ was used as a key unit of analysis throughout the evaluation. A policy instrument (PI) is defined as a consistent set of activities aimed at achieving a policy goal, i.e. addressing the same market/systemic failures and challenges and having the same expected impact(s). The same policy instrument may cover one or multiple intervention fields and may be delivered in various ways (for instance, through direct support or through intermediary organisations) and via various forms of finance. The policy instruments were identified using a combination of top-down and bottom-up approaches. First, the analysis drew on in-depth scrutiny of expenditure data at the level of operations and beneficiaries during the 2014-2020 programming period, as available in the WP2 Single Database. Second, the exercise was guided by the findings of the literature review performed under Task 2 of this evaluation, which provided information about the rationale behind each policy instrument and the types of pathways that can be mobilised, the expected stakeholder types and influencing factors. Further details on the methodology used to develop the taxonomy of policy instruments are provided in Annex I.

Figure 1 – List of 34 intervention fields within the scope of the evaluation

003 - Productive invest. in large enterprises linked to LCE	009 - Renewable energy: wind 010 - Renewable energy: solar 011 - Renewable energy: biomass 012 - Other renewable energy (hydro, geo, etc) & RE integration	013 - Energy efficiency renovation of public infra. & demo. 014 - Energy efficiency renovation of housing stock & demo
015 - Intelligent Energy Distrib. Systems (incl. smart grids) 016 - High efficiency co-generation and district heating	017 - Household waste mgmt. (incl. minimise, sort, recycle) 018 - Household waste mgmt (incl. Mech, Bio, thermal & landfill) 019 - Commercial, industrial or hazardous waste management	020 - Water infrastructure for human consumption 021 - Water management & drinking water conservation 022 - Waste water treatment
023 - Env. measures aimed to reduce/avoid GHG emissions 083 - Air quality measures 084 - Integrated pollution prevention and control (IPPC) 089 - Rehabilitation of industrial sites and contaminated land	043 - Clean urban transport infrastructure & promotion 090 - Cycle tracks and footpaths	068 - Energy efficiency & demonst. projects in SMEs 069 - Support to enviro-friendly production processes in SMEs 070 - Promotion of energy efficiency in large enterprises 071 - Firms specialised in LCE & climate service
087 - Adapt to climate change & prevent & manage climate risks 088 - Prevent & manage non-climate related natural risks	085 - Biodiversity, nature protection & green infrastructure 086 - Protect, restore & sustainable use of Natura 2000 sites 091 - Develop & promote tourism potential of natural areas	092 - Protect, develop & promote public tourism assets 093 - Development and promotion of public tourism services 094 - Protect, develop & promote public cultural assets 095 - Develop & promote public cultural & heritage services

²⁰ The 34 intervention fields were defined by the Tender Specifications of the study.

Source: Authors

A theory-based impact evaluation approach was used to structure the evaluation. This approach was used to assess programme effectiveness by mapping and testing the underlying theories or mechanisms through which the programme is expected to achieve its desired outcomes. This approach was applied at two levels: 1) at the level of individual policy instruments; 2) at an overarching level, covering all cohesion policy instruments related to climate and environment. First, the evaluation team developed a ‘theory’ and assumptions on how specific types of policy instruments were expected to generate outputs, results and impacts on climate and environment, based on a literature review and secondary data (‘theory-building’). The theory and concrete assumptions about preconditions, risks and success factors were then tested using empirical data and primary data sources. This process was conducted through case studies for each of the policy instruments. Data were triangulated and analysed using findings from the literature review, statistical data sources (such as Eurostat, Cohesion Open Data Platform and the WP2 Single Database)²¹ and investigations of the specific cases (i.e. selected Member States, operational programmes and measures). An overview of the specific policy instrument cases is presented below. Second, an overall ‘theory’ of how all ERDF/CF interventions contributed to fulfilling the climate and environmental objectives (of the Europe 2020 strategy) was developed and used to consolidate the findings across the broad spectrum of policy instruments. The overarching theory of change and the specific theories of change for each policy instrument are interconnected to allow for consolidation of the findings at an overall level. The overarching theory of change is presented in the figure below. The evaluation was guided by evaluation questions set out in the Tender Specifications in accordance with the Better Regulation Guidelines criteria (relevance, effectiveness, efficiency, coherence and EU added value). An overview of the evaluation questions investigated is presented in Annex II. In addition, policy instrument case studies were undertaken investigating specific hypotheses/themes related to the implementation of each policy instrument. The themes investigated are presented in Annex III.

The 2020-2024 ERDF/CF programmes were expected to have positive impacts in the fields of decarbonisation, adaptation/ risk management and environment/resource efficiency. Given the diverse nature of the policy instruments covered by this evaluation, the climate and environmental results and impacts also vary. In general terms, investments funded by ERDF/CF programmes were expected to contribute primarily to three thematic objectives (TOs), namely TO4 (low-carbon economy), TO5 (adaptation and risk management), TO6 (environment and resource efficiency). Investments in sustainable energy production, energy efficiency and clean transport were designed to decarbonise the energy production, industry, heating and cooling and transport sectors. Investments in adaptation and risk management were aimed at improving the natural and built environment. Investments in nature and environment were intended to yield a wide range of outcomes, including water and wastewater investments to increase the

²¹ Cohesion Open Data Platform, [see link](#). The WP2 Single Database was established in preparation for the ex-post evaluations. The database provides inputs for the evaluations by a) creating a single database of the funded operations and classifying them according to their scope, form of finance and type of beneficiary; and 2) gathering, classifying and quality assessing the output indicator data collected by managing authorities, [see link](#).

number of people connected to water and wastewater treatment systems, investments in waste to improve prevention/recycling rates and raise awareness, investments in pollution prevention to decrease pollution and rehabilitate sites, investments in biodiversity to improve the state of biodiversity; and, finally, investments in the green economy to promote resource efficiency and circularity (and, by extension, a reduction in GHG emissions).

Various preconditions, supporting factors and risks are often cited as supporting or hindering green investments. Literature covering previous programming periods identifies several preconditions for successful investments, including the presence of robust national frameworks and plans, robust implementation of ex-ante conditionalities, administrative capacity and skills and the quality of the projects prepared and selected. Furthermore, previous investments were supported by effective coordination between authorities and across sectors, along with the increased use of financing instruments to support investments. The literature recognises national processes and procedures (such as EIA and permitting) and external factors impacting market conditions as key risks impacting the effectiveness and efficiency of green investments. These preconditions, risks and hypotheses formed the starting point for formulating hypotheses to test the theory of change across the 12 policy instruments.

The evaluation applies a theory-based impact evaluation approach to structure its analysis. As outlined above, cohesion policy investments were expected to contribute to a wide range of objectives and impacts and were reported (previously) to be frequently supported by or hindered by various preconditions, supporting factors and risks. This evaluation used a theory-based impact evaluation approach to understand and test the *what* (what achievements were generated by different types of policy instruments), the *how* (whether certain types of interventions were more relevant or successful in producing results) and the *why* (what preconditions, supporting factors and risks influenced the presence or lack of achievements for a given policy instrument and within a given policy context).

The theory-based impact evaluation method was applied systematically at two levels:

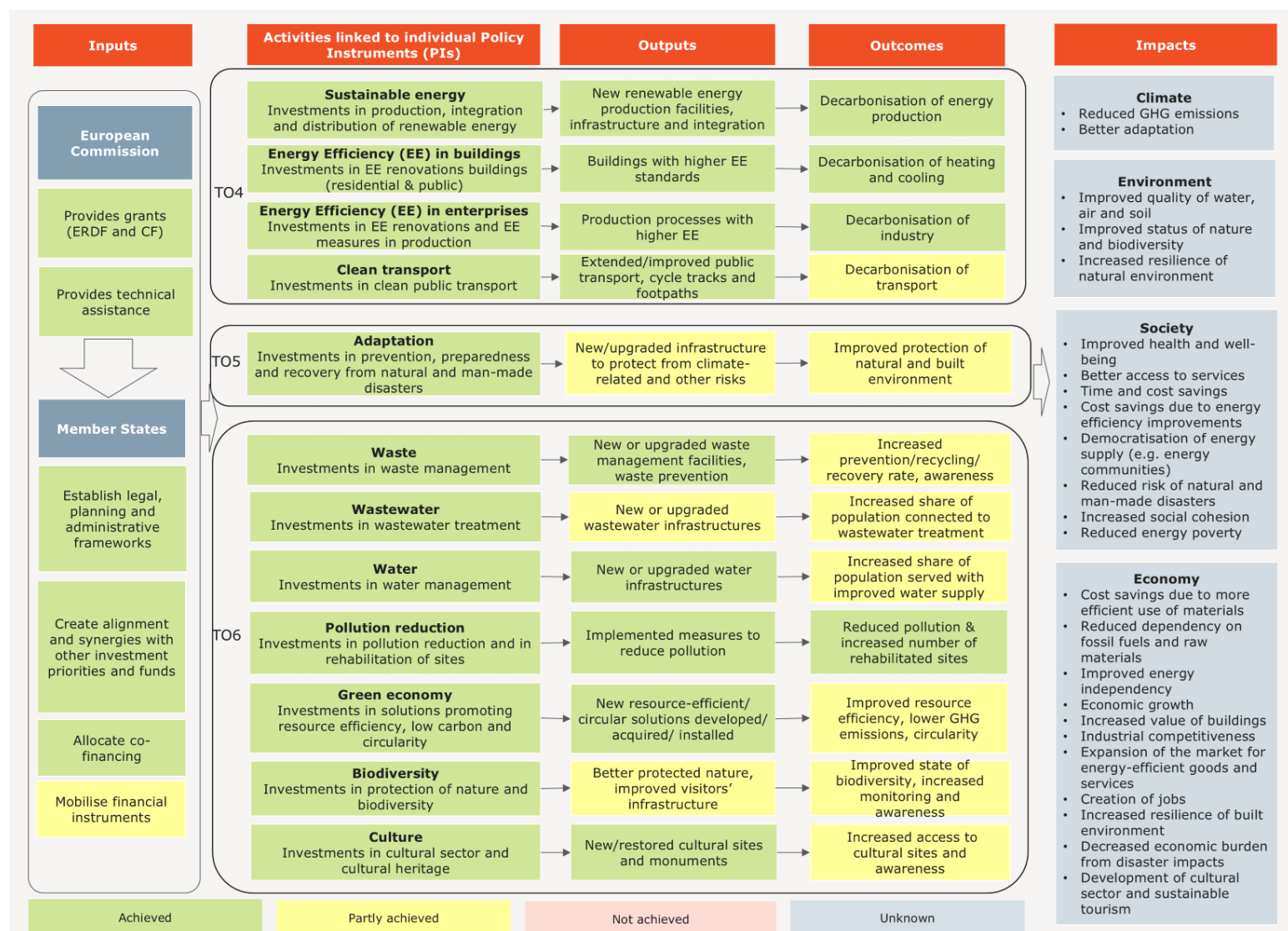
- First, *12 policy instrument-specific theories of change*, including specific expected outputs, outcomes and impacts, along with the particular preconditions, supporting factors and risks, were defined based on the literature review and initial interviews. For each policy instrument, the theory of change and underlying hypotheses (defined in the literature review) were then tested through 12 case studies, each covering three selected Member States per policy instrument. The investigation was based on the literature review (including statistical data) and field research. The field research involved +190 interviews with managing authorities, intermediate bodies, final beneficiaries, thematic experts and other stakeholders across the 12 policy instruments covering 24 Member States.²² Eleven technical expert workshops involving 123 participants were conducted to discuss and validate the emerging findings. A mix of methods

²² Member States covered in the case studies: Austria, Belgium, Bulgaria (x2), Czechia (x2), Croatia (x2), Estonia, France (x2), Finland, Greece (x3), Germany (x3), Hungary, Italy (x5), Ireland, Latvia (x2), Lithuania (x2), Malta, Poland, Portugal (x2), Poland (x2), Romania (x3), Slovenia, Spain, Sweden, Slovakia. Some countries were covered by several PI case studies, which are marked in brackets.

was used for each case study. Quantitative analysis, i.e. analysis of data on expenditures, beneficiaries and operations for each specific policy instrument, was combined with analysis of statistics on needs and macro-indicators. This was supplemented by qualitative analysis of literature data, as well as process tracing of the implementation of the policy instrument investments in the context of three selected Member States, to understand the factors and context impacting them.

- Second, an *overarching theory of change for ERDF/CF programmes in relation to climate and environment* was defined based on the literature review and linked to the individual policy instrument-specific theories of change. The analysis at this level was performed by triangulating, aggregating and comparing data at multiple levels. Quantitative analysis of the portfolio of investments and correlation analysis were performed to understand patterns and trends and to investigate specific elements of the theory of change. This analysis helped assess the '*what*' and achievements relative to needs. Qualitative data from the EU-level literature review and all national evaluation reports, in-depth analysis of 70 operational programmes and the 12 policy instrument-specific case studies were systematised and triangulated to identify trends and patterns regarding the '*how*' and the '*why*'. Investigation of the '*why*' was structurally linked to the preconditions, supporting factors and risks that emerged from the initial literature review. However, the detailed investigations also identified aspects that were not included in the initial theory of change (such as behavioural aspects, which were reported as a key risk affecting the success of investments).

Figure 2 – Tested theory of change of ERDF/CF programmes' contribution to climate and environmental objectives



The causal chains and the impact of specific proximate conditions on specific policy instruments were tested using mixed methods. The findings concerning the extent to which specific causal links between activities, outputs and outcomes were confirmed rely on the investigations performed in the policy instrument case studies, as well as a combination of desk research, quantitative analyses and stakeholder views. The findings are explained in sections 5.1, 5.2 and 6.2 of the report. The testing of the proximate conditions and their impact on policy instruments is detailed in sections 5.3 to 5.6 of the report based on a systematic analysis across policy instruments.

2.2. Mixed methods analytical approach

Mixed methods and triangulation of data sources were used to perform analysis of the findings. The evaluation was guided by a set of evaluation questions corresponding to the Better Regulation Guidelines evaluation criteria (relevance, effectiveness, efficiency, coherence and EU added value). The mixed methods and data sources comprise:

- **An extensive literature review** performed at EU level (such as reports and studies relevant to specific policy instruments) and at national level (such as operational programme documentation and national evaluations and studies, where available). A literature review was conducted throughout the study. It informed, for example, identification of the policy instruments, the development of theories of change, the case studies and analyses of the evaluation questions.
- **An analysis of ERDF and CF allocation and expenditure based on data from the Cohesion Open Data Platform.** This analysis shed light on the allocation and expenditure under ERDF/CF programmes over the years of the programming periods (until 2023), providing aggregate figures and breakdowns by multiple dimensions, including by territorial scope (regional vs. national operational programmes), by intervention field, by Member State and by development level (more developed, in transition, less developed).
- **An analysis of the data on individual operations, beneficiaries and indicators available in the WP2 Single Database.** This database offers significantly greater granularity and coverage than the public lists of operations, national open data platforms and programme-specific annual implementation reports, although it is limited by an earlier cut-off date (end of 2020 or early 2021). Despite providing an incomplete picture of what was funded, the WP2 Single Database allows for the identification of patterns. It was particularly useful for the identification and mapping of policy instruments.
- **Analysis of ERDF/CF achievements based on data from the Cohesion Open Data Platform.** This analysis shed light on target and implemented values of common indicators for ERDF/CF programmes over the years of the programming periods (until 2022; data for 2023 are not yet available), providing aggregate figures and breakdowns by multiple dimensions, including by territorial scope (regional vs. national operational programmes), by intervention field, by Member State and by development level (more developed, in transition, less developed).

- **An analysis of 70 operational programmes (OPs).** The analysed operational programmes were selected to cover at least 80% of the total ERDF/CF allocation for environment and climate. In addition, the selection ensured that all EU28 countries were represented in the sample. Two main data collection tools were employed: i) documentary review of OP programming and implementation documents, along with previous evaluation studies, where available; ii) semi-structured interviews with one to two informed representatives from the managing authorities or implementing bodies of each operational programme. A total of 78 interviews involving 132 different interviewees were carried out (excluding additional interviews carried out for the policy instrument-specific case studies). The analysis was expanded and refined throughout the evaluation, informing the analyses of the evaluation questions and supporting the scoping and implementation of the specific case studies.
- **Twelve case studies at the policy instrument level²³** test specific elements of the policy instrument-specific theory of change and selected assumptions underpinning it in detail. Specific research questions and hypotheses tailored to the policy instrument were developed. Furthermore, each case study included an analysis of the five evaluation criteria. Each case study examined three selected Member States in detail (focusing within each Member State on one specific operational programme and one specific investment supported under the programme). An overview of the case study coverage is presented in Annex III.

Each case study relies on a tailored methodology and scoping, followed by the triangulation of data collected from: 1) an in-depth analysis of literature at EU and national level about the specific policy instrument; 2) national or EU-level statistics (where available); 3) an analysis of the ERDF/CF expenditure based on the Cohesion Open Data Platform; 4) an analysis of data on individual operations, beneficiaries and indicators based on the WP2 Single Database; 5) an analysis of ERDF/CF achievements based on data from the Cohesion Open Data Platform; 6) an in-depth investigation of implementation of the policy instruments in three selected countries, including analysis of operational programmes, analysis of national evaluations (where available); interviews with relevant stakeholders; 7) a technical seminar per policy instrument case study.

Across all 12 case studies, evidence was collected by analysing extensive data: 1) literature and documentation, including evaluations at EU and national level, 2) analysis of 34 operational programmes, 3) analysis of selected projects – three projects per case study, 4) +190 interviews with managing authorities, intermediate bodies, final beneficiaries, thematic experts and other stakeholders; 5) 11 technical expert workshops involving 123 participants, conducted to discuss and validate the emerging findings.

A cross-analysis of the case studies at the level of clusters of intervention types was performed and the results were systematised to inform the analysis of what works/does not work, where and under which conditions.

- **Eleven technical workshops** dedicated to the different policy instruments (with two policy instruments combined into one workshop). The purpose of the

²³ Before commencing the work on each case study, a scoping note outlining the research questions and the specific assumptions and themes to be investigated in more detail was prepared. These notes formed the basis for the work.

workshops was to present, refine and discuss the (preliminary) findings from the case studies and collect further inputs from experts, Member States and European Commission officials. The cross-cutting feedback from these workshops was grouped into two main categories: technical feedback on the content of the findings and more general considerations aimed at strengthening the reliability and validity of the findings (such as nuancing the findings, adding contextual details to explain the findings and clarifying terminology and data). In addition, the workshops provided reflections on issues identified in the case studies, including whether such issues have been addressed in the 2021-2027 period and possible recommendations for the post-2027 period. All feedback was taken into account when revising the case studies and preparing this report.

- **A seminar** with the participation of 137 attendants, including representatives of the European Commission and other European institutions (such as the European Investment Bank), managing authorities, local and regional authorities, NGOs/CSOs, independent experts and academia. The seminar served to discuss the findings emerging from the evaluation.
- **28 country fiches.** For each country, these documents provide an overview of the national context through key climate and environmental indicators (including in comparison with the EU average) and map the ERDF/CF expenditure over the years and the main intervention fields activated, highlighting differences between operational programmes where applicable. For better contextualisation, the ERDF/CF climate and environmental expenditure is also compared with the total ERDF/CF resources in the country, the national government expenditure in selected environmental sectors and the national GDP. Furthermore, the fiches provide an overview of all policy instruments mobilised in the country and present key findings about the main policy instruments, focusing on those with the highest funding. Finally, the fiches draw conclusions on the key aspects that defined the implementation of the 2014-2020 ERDF/CF OPs in the climate and environmental domain, identifying the main country-specific challenges and lessons learned.

In addition to a vertical analysis by country, a horizontal analysis was performed, with cross-analysis of the fiches to identify common elements, patterns and key differences. The horizontal analysis involved the systematic mapping and re-elaboration of quantitative and qualitative points included in the fiches. This information was sorted by Member State, policy instrument, topic and evaluation criterion to facilitate the development of a solid and granular body of evidence. Moreover, each Member State was further categorised by its main characteristics, including the types of regions it comprises (more developed, in transition, less developed), its geography (by geographic macro-area) and the territorial scope of its ERDF/CF OPs (only national OPs vs. only regional OPs vs. mixed approach). The horizontal analysis contributed to the draft final report, enhancing assessment of the territorial dimension in climate and environmental actions.

- **Horizontal case studies.** Three horizontal case studies were prepared on: 1) the climate tracking system, 2) financial instruments, 3) contribution to the EGD. The horizontal case study findings fed into this final report.
 - **Case study on the climate tracking system:** Climate tracking refers to the practice of assigning a climate tag to public budgets and involves identifying and categorising expenditures aimed at addressing climate change and reducing greenhouse gas emissions. This case study focuses on analysis of

the methodology used for climate tracking in the ERDF and the CF programmes. It aims to identify the strengths and weaknesses of the mechanism and assess its ability to provide a reliable overview of the climate-related investments made. The case study also seeks to investigate how the mechanism has influenced programme development by steering expenditures towards climate priorities. Similar forms of tracking for biodiversity and clean air spending are now also in place.

- **Case study on financial instruments:** Financial instruments can be used to support cohesion policy projects that are expected to generate net revenues or savings. This requirement reflects the need for projects to generate sufficient financial resources to enable repayment of the initial funding. While most of the cohesion policy support for investments under TO4, TO5 and TO6 has been provided through grants, financial instruments play a role in delivering EU support in certain investment areas. For example, in the field of energy efficiency (e.g. energy efficiency renovation of private housing stock), financial instruments may account for a relatively high share of overall investments. However, the scale of financial instrument use varies widely, both in absolute and relative terms, across countries, OPs and within the OPs, depending on the policy area. This case study assesses the extent to which the financial instruments were suitable and effective in the context of climate and environmental investments, as well as the factors contributing to or limiting their successful performance and smooth implementation in given policy areas or countries.
- **Case study on contribution to the EGD:** Cohesion policy plays an important role in ensuring that the EU delivers on the Europe 2020 strategy and its targets, as well as in supporting the objectives of the EGD. This case study investigates the cross-cutting issue of how ERDF/CF investments in the period 2014-2020 contributed to the EGD objectives. The EGD was published (adopted) in December 2019, well into the 2014-2020 programming period. However, given the significance of cohesion funds (which constitute about one third of the EU budget) and the emphasis placed on climate and environmental objectives in the legislative framework governing the funds, it is pertinent to assess the extent to which ERDF/CF funding has contributed to the EGD objectives. The case study maps cohesion policy investments to the EGD objectives, providing an aggregated overview of how the ERDF/CF contributed to the EGD objectives (climate and environmental). It identifies areas of alignment and misalignment with Europe 2020 targets and the EGD objectives and highlights missed opportunities for improved alignment of the contribution with these goals.

2.3. Robustness, limitations and mitigation measures

The methodological design has several key strengths:

- **Robustness of the theory-based impact analysis.** The theory-based impact analysis was applied both at the level of overall evaluation and at the level of specific policy instruments. For each policy instrument, research questions and hypotheses were formulated, clarified, fine-tuned and challenged using literature and secondary data (as part of the theory-building process). Hypotheses were then tested empirically based on the triangulation of various sources of

information and by assessing the plausibility of each hypothesis. This rigorous approach ensured consistency across the theory-based evaluation approach between tasks, analytical components and data collection.

- **Comprehensive evidence base established through a systemic approach to data collection.** Data were collected and analysed throughout the evaluation through a mix of literature and desk review, statistics and stakeholder consultations. First, data were collected to inform the definition of policy instruments, the categorisation of intervention fields according to policy instruments and preparation of the draft theories of change, as well as the scoping of each policy instrument-specific case study. Second, data were gathered to inform development of the case studies. Case study findings were tested during technical and policy instrument-specific workshops and through a seminar. All of the above, together with further and targeted use of literature and statistics, fed into the preparation of country fiches and policy instrument fiches.

However, given the complexity of the evaluation (covering multiple sectors, a range of policy instrument types and a large geographical scope) and despite the large amount of data collected and evidence gathered, some limitations should be noted:

- **Analytical breadth versus depth.** A balance needed to be struck between the depth of analysis and the required comprehensiveness or breadth. Accordingly, in-depth specific findings are largely found in the policy instrument-specific case studies. However, this approach meant that the entire theory of change was not tested in each case study. Instead, each case study zoomed in on specific elements of the policy instrument, such as one or two specific pathways or proximate conditions. The robustness and wider applicability of the case-specific findings were also analysed through the technical workshop and the seminar. However, testing of the policy instrument's theory of change focused more on the wider geographical applicability than on applicability to the entire theory of change. While the case studies also assessed the generic evaluation criteria and the policy instrument fiches aimed to apply a more comprehensive policy instrument perspective, the specific observations analysed and tested in detail mainly relate to elements of each specific theory of change. This weakness primarily concerns the success factors and challenges referred to in this report, which relate mainly to proximate conditions. However, it should be noted here that while each case study only zooms in on specific elements, many observations derived from the exercise are common across several case studies. The case studies identified specific themes related to the preconditions, supporting factors and risks of the theory of change. These themes were tested in the context of the case studies through a literature review, statistical information and interviews with managing authorities and relevant project beneficiaries. The information was then organised by thematic area and comparisons were drawn across policy instrument case studies to ascertain the extent to which the reported preconditions, supporting factors, risks and other emerging findings were applicable across the portfolio of ERDF/CF green investments.
- **The analysis of impacts and outcomes is constrained by the effect lag.** Despite efforts to ensure that the statistics developed for the evaluation based on the Cohesion Open Data Platform were regularly updated, outcomes and impacts of the investments take time to materialise and may not be observed immediately. For example, the construction of new renewable energy capacity

will yield benefits in the medium to long term, such as reduction of costs and lower GHG emissions. While quantitative evidence on achievement rates provides an indication of the direction of performance of policy instruments, it is insufficient to rely solely on common indicators to analyse impacts and outcomes. Therefore, extensive evidence was collected through the literature review, analysis of datasets and the case studies to further assess the direction and magnitude of impacts and outcomes.

- **Evolving policy context during the programming period.** The EGD was launched at the end of 2019, with many of the related strategies and legislation following in subsequent years (including the updated EU Adaptation Strategy, Zero Pollution Action Plan, the second Circular Economy Action Plan and Biodiversity Strategy for 2030, European Climate Law, Renewable Energy Directive (RED II) and the Sustainable Finance Taxonomy). These new strategic and legislative documents provide crucial guidance on the needs shaping interventions co-funded from cohesion policy funds. However, since they only became available in the last years of the programming period, their recommendations could not be fully incorporated into the planning and implementation of programmes and projects. This limitation is overarching and of particular relevance to the policy instruments on climate adaptation, biodiversity, green economy and pollution reduction. Nevertheless, where applicable, these forward-looking aspirations have been addressed in the context of the 2014-2020 programming period. For example, they were explored in the technical workshops on the individual policy instruments, where today's policy context and future developments were discussed. The horizontal case study on the contribution to the EGD provides a specific discussion of the inherent methodological limitations of analysing the 2014-2020 achievements in light of the EGD.
- **Future evaluations will benefit from a narrower scope and more systematic data.** This evaluation was challenging due to the complexity and variety of policy instruments covered (12 policy instruments and 34 intervention fields). Future evaluations would benefit from a narrower, more focused thematic scope to ensure a deeper level of analysis. The availability of thematic evaluations conducted by the managing authorities is another critical aspect that posed challenges to this evaluation. In many cases, thematic national evaluations were lacking. Future overarching evaluations would benefit from access to national-level thematic evaluations presenting achievements in a national context in line with the intervention theory. The availability of systematic data measuring outcomes and impacts of specific intervention types could also be improved in the future. For example, the impact of adaptation is measured in terms of flood protection and forest fires, with a focus on the size of the population protected. However, the actual impact is much wider and could also encompass co-benefits, such as positive effects on biodiversity, air quality, water management and greenhouse gas emissions reduction. However, the administrative burden of such data collection should not be underestimated, especially given the challenges already faced by managing authorities in providing data on current indicators within the monitoring framework. The efforts and costs should be balanced carefully against the utility of these data.

3. Rationale and policy context

This chapter presents the overall rationale and policy context for ERDF/CF support for environment and climate. The main points presented in this chapter are summarised below.

ERDF/CF support for environment and climate is driven by their status as public goods, the occurrence of market failures and the need to meet EU strategic goals. The use of cohesion policy alongside other public funding sources is justified by several factors. It addresses significant investment gaps in many EU regions where environmental and climate policies are underfunded or deprioritised. Cohesion policy, particularly in the context of large multiannual investments, can help leverage other funding sources. Finally, the territorial focus of ERDF/CF programmes makes them effective in translating EU environmental and climate strategies into local action.

Improving the environmental and climate performance of Member States was a key goal for the 2014-2020 period. Thematic objectives 4 (low-carbon economy), 5 (promotion of climate change adaptation) and 6 (environment and resource efficiency) and more specifically the 34 intervention fields considered in this evaluation together accounted for the largest ERDF/CF allocation for the 2014-2020 programming period.

During the 2014-2020 programming period, the ERDF and CF intervention areas were closely aligned with the objectives under the Europe 2020 strategy's sustainable growth pillar, which aimed to promote a shift towards a low-carbon, resource-efficient and climate-resilient economy. This flagship EU policy, adopted in 2010, laid the groundwork for the EU's evolving focus on integrating sustainability at the core of its agenda. The EGD continues this trajectory by setting more ambitious goals through its many linked initiatives, introducing new aspirations. While the investment priorities of the ERDF and CF during this period were largely consistent with the EGD objectives, some areas, such as energy production (TO4), TEN-T infrastructure (TO7) and SME competitiveness (TO3), were found to be misaligned with the more ambitious sustainability targets under the EGD.

The ERDF and CF are well-suited to addressing both widespread and context-specific needs. The most pressing and widespread needs include lowering GHG emissions through energy efficiency in buildings, green production processes and greening urban public transport. The preservation of natural resources and biodiversity, along with the prevention and effective response to extreme events caused by climate change, are also frequent needs. However, investment needs related to nature protection, climate adaptation and risk prevention projects largely depend on regional geomorphology and human pressures, including uncontrolled urbanisation. The patterns of needs shaping the actions included in the various programmes are also influenced by the level of development of each region or country, with some regions and countries still facing challenges in complying with EU targets. For example, most of the less developed regions continue to require improved infrastructure for wastewater treatment and waste management.

3.1. Rationale for ERDF/CF support for environment and climate investments

The rationale for ERDF/CF support for environment and climate lies in the nature of the policy problems involved, the expected impacts of the supported investments and their territorial dimension:

- **The policy challenges require public intervention.** Public intervention is driven by the nature of environment and climate as public goods, by market failures to roll back negative externalities and prevent further ones and by the need to contribute to the achievement of EU strategic goals.
- **The supported investments are expected to generate impacts that tackle the policy problems.** The main rationale for public support for environment and climate investments lies in the potential for these investments to contribute to climate change mitigation and adaptation, sustainable economic development, conservation of the natural environment and improvements in the quality of life. The theory of change for the ERDF/CF contribution to climate and environment objectives in 2014-2020 illustrates how various investment areas are expected to help deliver these contributions (see Figure 5).²⁴ The use of cohesion policy alongside other (predominantly national) public funding sources is justified by several factors. First, it helps address the considerable investment gaps in environmental and climate policy areas that persist in many EU regions due to insufficient prioritisation or insufficient budget for these policy domains. Furthermore, cohesion policy funding, especially for large multiannual investments, generates effects of scale. ERDF/CF support also acts as a lever for other sources of funding, which, on their own, would be insufficient to meet environmental and climate policy objectives.
- **Due to their territorial dimension, ERDF/CF programmes are well-suited to translating EU strategies in environmental and climate fields into local action.** The strong territorial dimension of cohesion policy has various facets, many of which are key to the success of climate and environment investments, including proximity to local needs and adaptability to the specific context, stakeholder involvement in all stages of the policy cycle (particularly in planning and implementation), a focus on territories with greater investment gaps and an integrated multisectoral approach to investments.

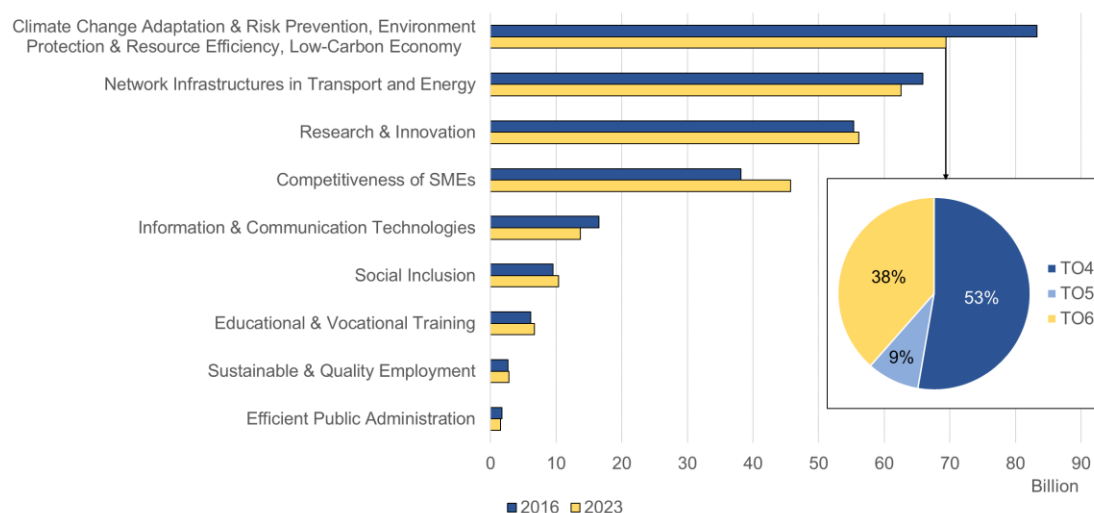
Improving the environmental and climate performance of EU Member States was a key goal for the 2014-2020 period. As the largest source of EU support during this period, the ERDF and CF played a crucial role in supporting the objectives and targets under the Europe 2020 strategy. Environmental and climate goals of Cohesion Policy are reflected especially in thematic objectives 4 (*Low-carbon economy*), 5 (*Promotion of climate change adaptation*) and 6 (*Environment and resource efficiency*)²⁵ and more specifically in 34 intervention fields (see Figure

²⁴ More specific theories of change illustrate the causal chains behind each policy instrument (as included in the Booklet).

²⁵ In principle, for the 2014-2020 programming period, all ERDF/CF thematic objectives may directly or indirectly contribute to climate, energy and environmental EU targets. See Article 9 of the Common Provision Regulation (CPR) on the ERDF and CF, Regulation (EU) No 1303/2013.

4). Collectively, these objectives accounted for the largest ERDF/CF allocation for the 2014-2020 programming period, with a total budget of around EUR 70 billion in 2023 (see Figure 6), of which ERDF/CF accounted for nearly EUR 53 billion.²⁶

Figure 3 – Total planned expenditure (ERDF/CF plus national cofinancing) for the 11 thematic objectives of cohesion policy for 2014-2020 (EUR billion)



Source: Authors

The ERDF/CF interventions for climate and environment represented just one component of a broader and more comprehensive set of instruments targeting these policy areas. During the same period, several other EU initiatives offered direct support for climate and environment investments, as well as more indirect support aimed at improving the framework conditions for environment and climate. Direct support was provided by other EU funds and programmes, such as the European Agricultural Fund for Rural Development (EAFRD) and the Programme for the Environment and Climate Action (LIFE), as well as by the European Investment Bank (EIB). In addition to its blending facilities developed with the EU, the EIB provides direct loans, loans via financial intermediaries, guarantees and equity investments in the field of climate action to enterprises and local and regional authorities in all EU Member States as part of its standard operations. Indirect support includes the EU Emissions Trading System, as well as a broad range of sectoral legislation, which has evolved over the years as described in Annex IV – Policy and legislative framework. In addition to EU-backed initiatives, national-level initiatives also play a role. While a review of financing options and support initiatives available in each Member State is beyond the scope of this evaluation, an effort to illustrate the role of ERDF and CF compared to national financing for climate and environment is presented in Annex VIII – The role of ERDF and CF compared to national financing for the environment.

The intervention areas of cohesion policy for the 2014-2020 period were closely aligned with the objectives of Europe 2020, the EU's flagship strategy,

²⁶ The figures provided in this paragraph are based on [ESIF 2014-2020 categorisation ERDF-ESF-CF planned vs implemented](#) as at the end of 2023, considering the variables 'Planned_Total_Amount_(Notional)' and 'EU_amount_planned'.

which was adopted in 2010, promoting ‘smart, sustainable and inclusive growth’. Under its sustainable growth pillar, the Europe 2020²⁷ strategy targeted a shift towards a low-carbon, resource-efficient and climate-resilient economy. Accordingly, it set three headline targets for climate and energy sustainability: a 20% reduction in greenhouse gas emissions compared to 1990 levels; 20% of energy demand met by energy generated from renewable sources; and a 20% increase in energy efficiency. The Europe 2020 strategy encouraged Member States to promote sustainable transport and recognised the importance of resource efficiency and the protection of biodiversity and natural capital in promoting sustainable growth, although it did not establish specific targets in these areas.

During the programming period in question, the EU’s growth strategy increasingly shifted towards one that places sustainability at its core. The years 2013-2014 were marked by recovery from the 2008-2009 financial crisis and the subsequent European debt crisis, which had a profound impact on the economies of the Member States. This period saw a strong emphasis on economic growth and on bolstering companies’ competitiveness and innovation.²⁸ In subsequent years, there was a renewed focus on sustainability, based on the recognition that social and economic objectives cannot be met without tackling climate change and environmental degradation. Following the Paris Agreement,²⁹ the EU launched revision of its energy policy framework to enable it to deliver on its commitment to reduce GHG emissions by at least 40% by 2030. By the end of 2018, negotiations were concluded on all aspects of the Clean Energy Package, which includes eight different legislative texts.³⁰ The Clean Energy Package introduced two new targets for the EU for 2030: a binding renewable energy target of at least 32% and an energy efficiency target (i.e. a reduction in final energy consumption) of at least 32.5%, with a possible upward revision in 2023. These actions collectively laid the foundation for the European Green Deal (EGD) initiative, which was launched in December 2019.

The EGD can be seen as a continuation of previous EU climate policy efforts. However, it sets more ambitious goals through its many linked initiatives, introducing new aspirations. By extending the policy focus to include all sectors and systems, the EGD adopts a far more comprehensive and integrated approach to climate governance than seen previously. Moreover, the EGD includes a proposal to raise the 2030 target for reducing GHG emissions to 55% and the targets for renewables and energy efficiency to 40% and 36%,³¹ respectively. The Climate Law was one of the first policy measures negotiated under the EGD. This law, which

²⁷ European Commission (2010) Communication – Europe 2020: A strategy for smart, sustainable and inclusive growth. COM (2010) 2020 final, [see link](#).

²⁸ See, for instance, Schmidt J. (2019). EU Cohesion Policy: A suitable tool to foster regional innovation? and Loewen, B., Schulz, S. (2019). Questioning the Convergence of Cohesion and Innovation Policies in Central and Eastern Europe. In: Lang, T., Görmär, F. (eds) Regional and Local Development in Times of Polarisation. New Geographies of Europe. Palgrave Macmillan.

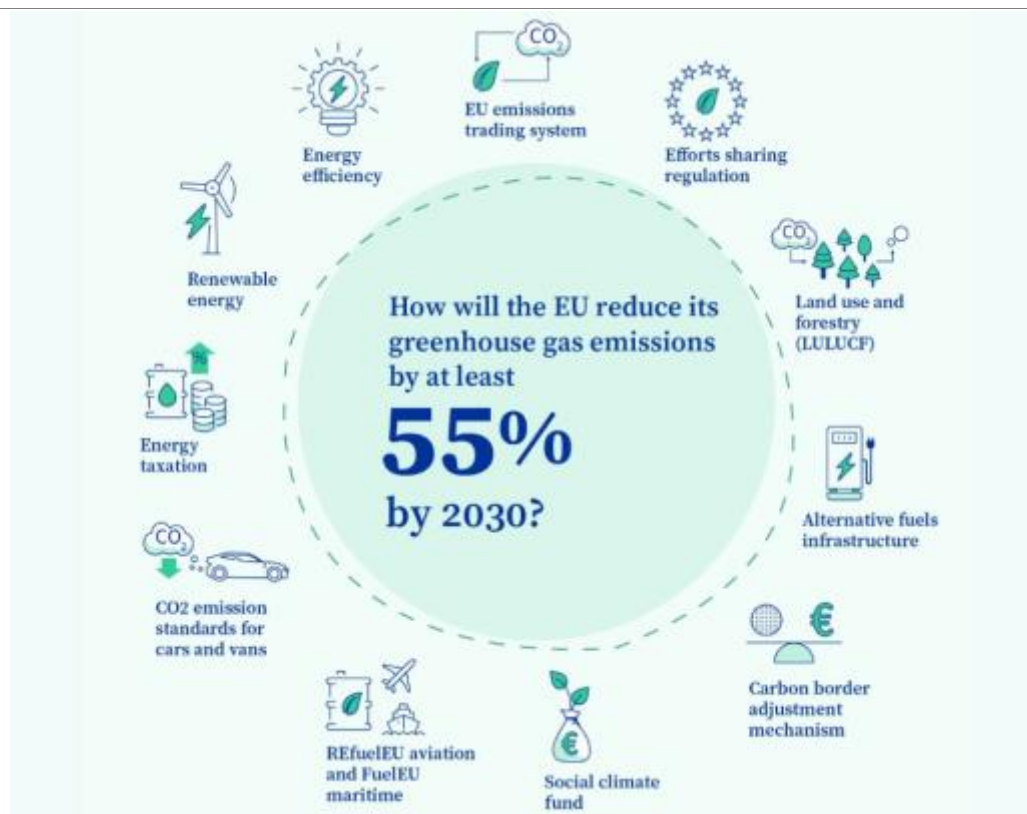
²⁹ On 12 December 2015, the Parties to the UNFCCC adopted the Paris Agreement at COP21, establishing a new legally-binding framework for an internationally coordinated effort to tackle climate change.

³⁰ Energy Performance in Buildings [Directive 2018/844/EU](#); Renewable Energy [Directive 2018/2001/EU](#); Energy Efficiency [Directive 2018/2002/EU](#); Governance of the Energy Union and Climate Action [Regulation 2018/1999](#); Electricity Market [Directive 2019/944](#); Electricity Market [Regulation 2019/943](#); Risk Preparedness [Regulation 2019/941](#); Rules for the Energy Regulator (Agency for the Cooperation of Energy Regulators ACER), [Regulation 2019/942](#).

³¹ In July 2021, as part of the [European Green Deal](#) package, the Commission introduced a proposal to overhaul the Energy Efficiency Directive to set a stronger and binding EU energy efficiency target of 9% for 2030, compared to the projections of the Reference Scenario 2020 (787 Mtoe in final and 1 023 Mtoe in primary energy consumption, respectively). This proposal corresponded to a reduction of 36% in final energy consumption.

enshrines the goal set out in the EGD for Europe's economy and society to become climate-neutral by 2050, entered into force in July 2021. In this context, the 'Fit for 55' package was designed to achieve the objectives of the European Climate Law: climate neutrality by 2050 and a 55% reduction in net GHG emissions by 2030, compared with 1990 levels. The package consists of a set of proposals to revise legislation related to climate, energy and transport, as well as new legislative initiatives aimed at aligning EU laws with the EU's climate goals (see the figure below). The revised Renewable Energy Directive (EU) 2023/2413 raises the EU's binding renewable target for 2030 to a minimum of 42.5%, up from the previous 32% target, with the aspiration to reach 45%. The revised Energy Efficiency Directive (EU) 2023/1791 sets the goal of reducing EU final energy consumption by 11.7% by 2030, compared to the projected energy use for 2030 (based on the Reference Scenario 2020). This new target reflects the EU's heightened ambition on energy efficiency, exceeding both the 9% target proposed by the European Commission in 2021 as part of the 'Fit for 55' package and the 2030 target set in 2018.

Figure 4 – Fit for 55 package



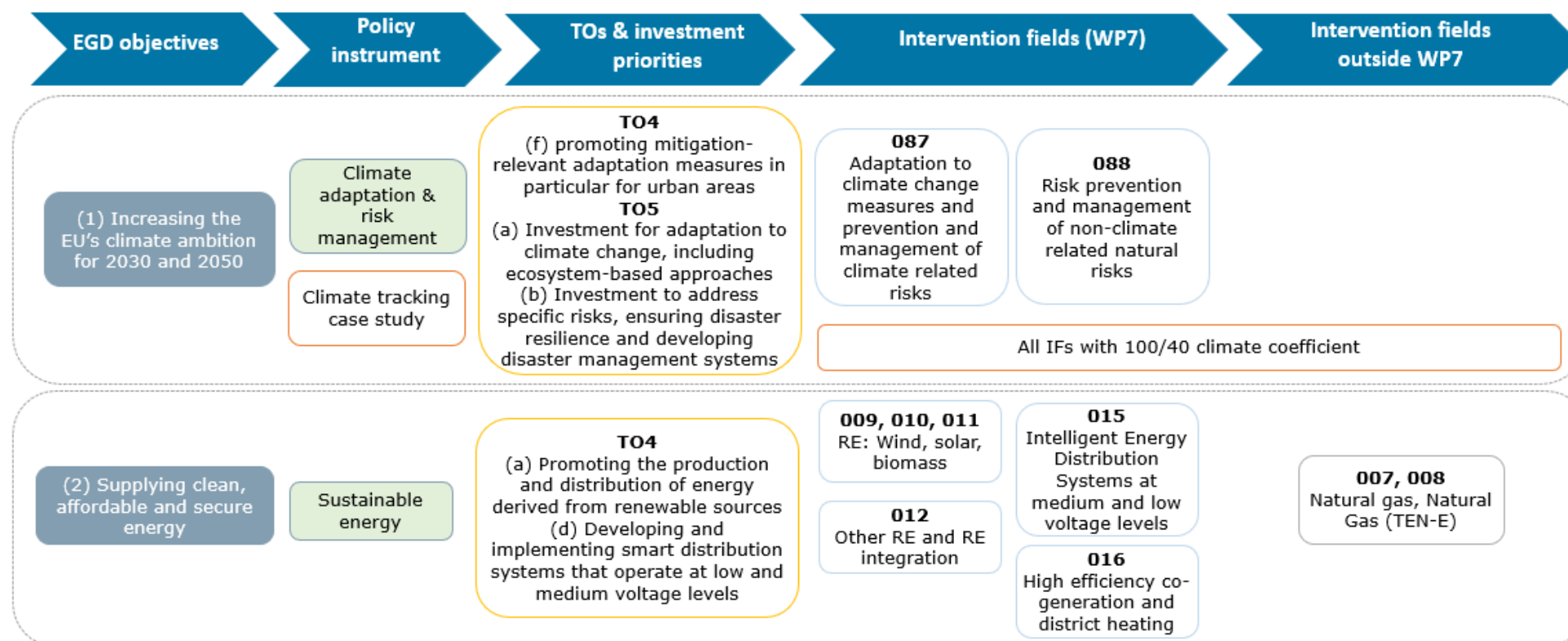
Source: [European Commission website](https://ec.europa.eu/clima/fit-for-55)

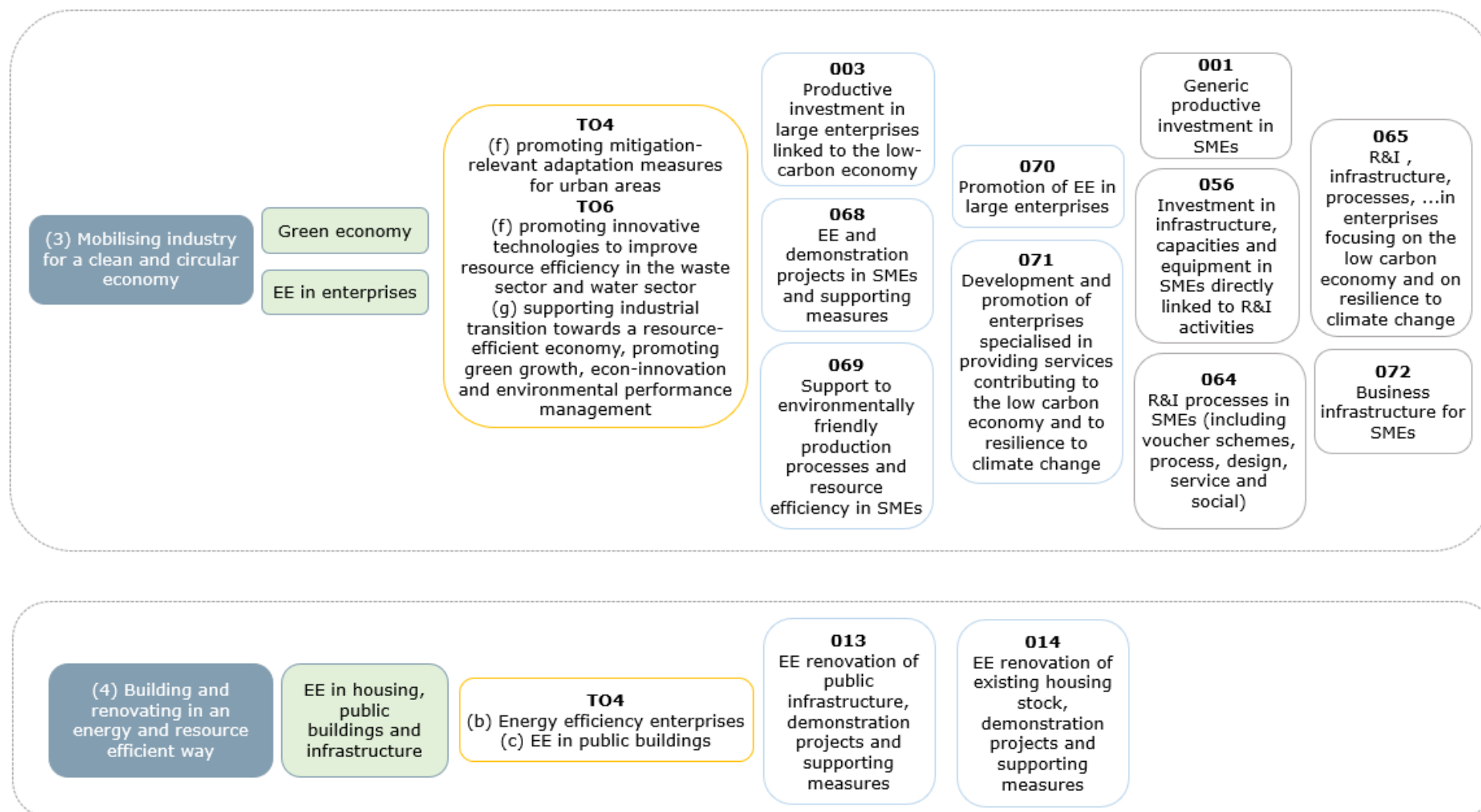
The ERDF and CF primarily pursued climate and environment investments under three of the 11 thematic objectives³² and their embedded investment priorities, which are closely aligned with the EGD objectives. In the context of one of the case studies conducted for this evaluation, a link was established, where possible, between the thematic objectives, investment priorities and intervention fields of ERDF/CF support in the 2014-2020 programming period and the EGD objectives (see the figure below). Based on this framework, it was possible to analyse the extent to which the interventions of 2014-20 programmes align with – and are therefore relevant to – the current EGD objectives. The analysis found an overall alignment, particularly within the three climate and environmental thematic objectives, i.e. TO4, TO5 and TO6.

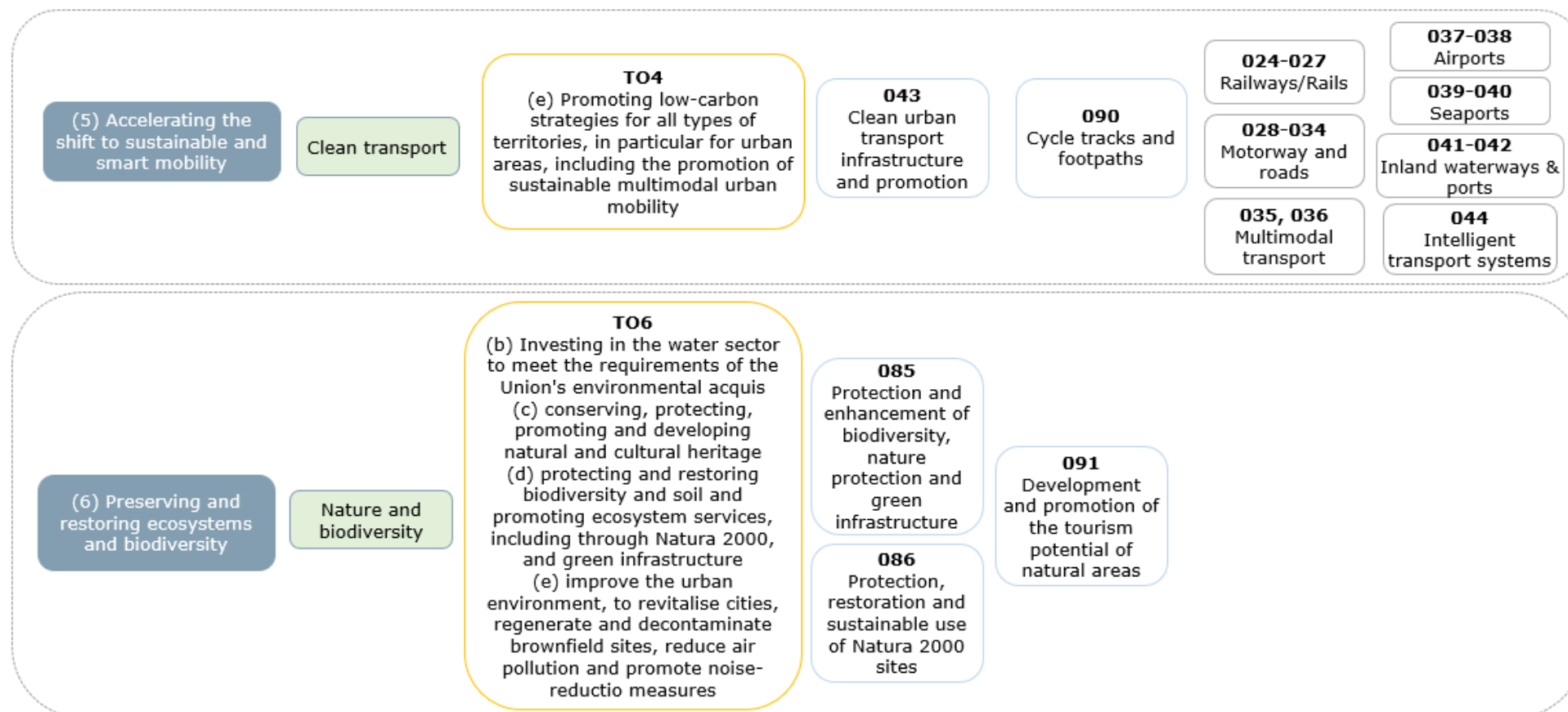
Some of the supported intervention fields related to energy production (TO4), TEN-T infrastructure (TO7) and SME competitiveness (TO3) may cover investments that can create technological lock-ins. For instance, intervention fields 007 and 008 support natural gas and its TEN-E infrastructure, which can lead to technological lock-in to fossil fuel-intensive technologies. Similarly, intervention fields 028-034 (motorways and roads) and intervention fields 037-038 (airports) support infrastructure that, while addressing regional disparities and promoting economic and social cohesion, can negatively affect the shift to sustainable and smart mobility. Also, intervention fields such as 001 (Generic productive investments in SMEs) and 072 (Business infrastructure for SMEs) support businesses without considering their environmental and climate impact. This can negatively impact the climate objectives of the EGD and can be seen as a missed opportunity to support and steer industry (particularly SMEs) towards a clean and circular economy.

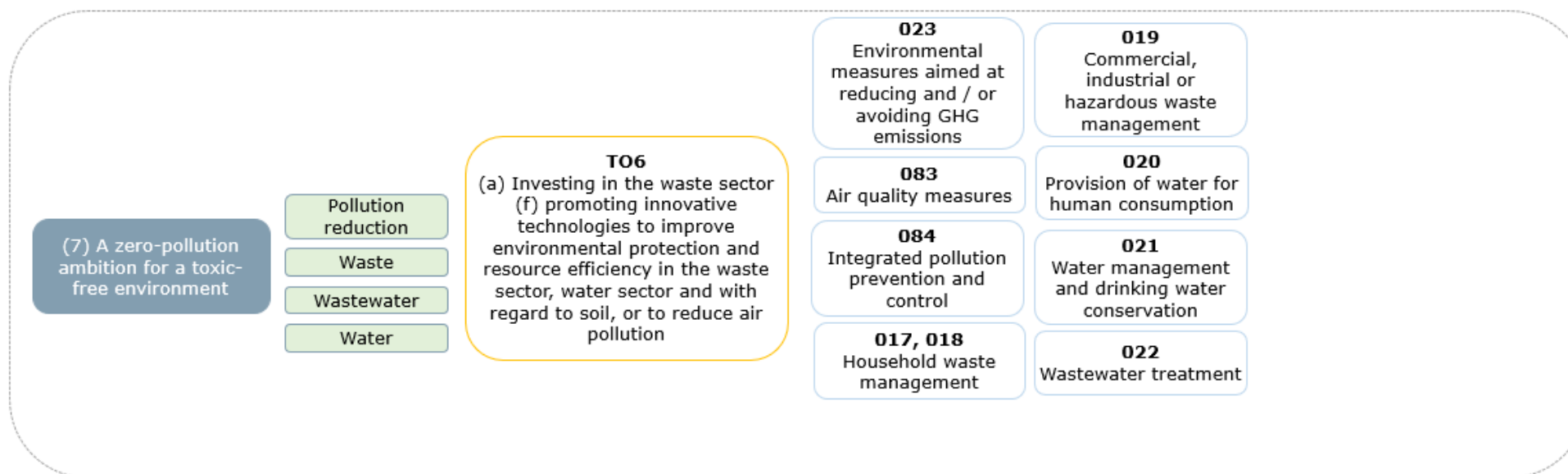
³² In principle, for the 2014-2020 programming period, all ERDF/CF thematic objectives may directly or indirectly contribute to climate, energy and environmental EU targets. See Article 9 of the Common Provision Regulation (CPR) on the ERDF and CF, Regulation (EU) No 1303/2013, [see link](#).

Figure 5 – Mapping of EGD objectives to ERDF/CF thematic objectives (TOs), investment priorities (IPs) and intervention fields (IFs) for the 2014-2020 programming period









Source: Prepared by the authors.

Note: The breadth and cross-cutting nature of the first EGD objective (i.e. increasing the EU's climate ambition for 2030 and 2050) makes it difficult to map out specific thematic objectives/investment priorities and intervention fields, as climate action is mainstreamed across different thematic objectives, investment priorities and intervention fields. Accordingly, for the purpose of this case study, the analysis of the first EGD objective will be twofold: 1) analysis of the intervention fields with 100/40 climate coefficient and 2) analysis of climate adaptation support (IF 087, IF 088).

3.2. Investment needs and country/regional differences

While investments in climate and environment funded by ERDF/CF targeted diverse needs, they shared some common features across target countries and regions. Urgent widespread needs are driven by the pressing requirement to lower GHG emissions, preserve natural resources and biodiversity and prevent and respond effectively to extreme events caused by climate change. It is also possible to identify some patterns in the needs that shaped the actions taken to implement the specific programmes, depending on the territory's characteristics and the level of development of the region or country. Some regions and countries still face challenges in complying with EU targets and requirements.

3.2.1. TO4 – Low-carbon economy

Member States and regions that have invested in renewable energy production faced the dual need to address growing electricity demand and reduce emissions, according to the analysis of 70 operational programmes. Some countries, such as Bulgaria, Croatia, Lithuania and Malta, also needed to reduce their dependence on foreign energy sources. The need for investments in sustainable energy was especially acute in Member States with high untapped potential for renewables. Such untapped potential, however, varies from country to country,³³ as the energy mixes and the share of renewable energy in total electricity and in total heating/cooling consumption³⁴ differed widely at the start of 2014-2020 programming period. According to Eurostat statistics, Central and Eastern European countries, in particular, exhibited lower levels of renewable energy in electricity. Moreover, most of Central Europe had a lower level of renewable energy in heating and cooling.

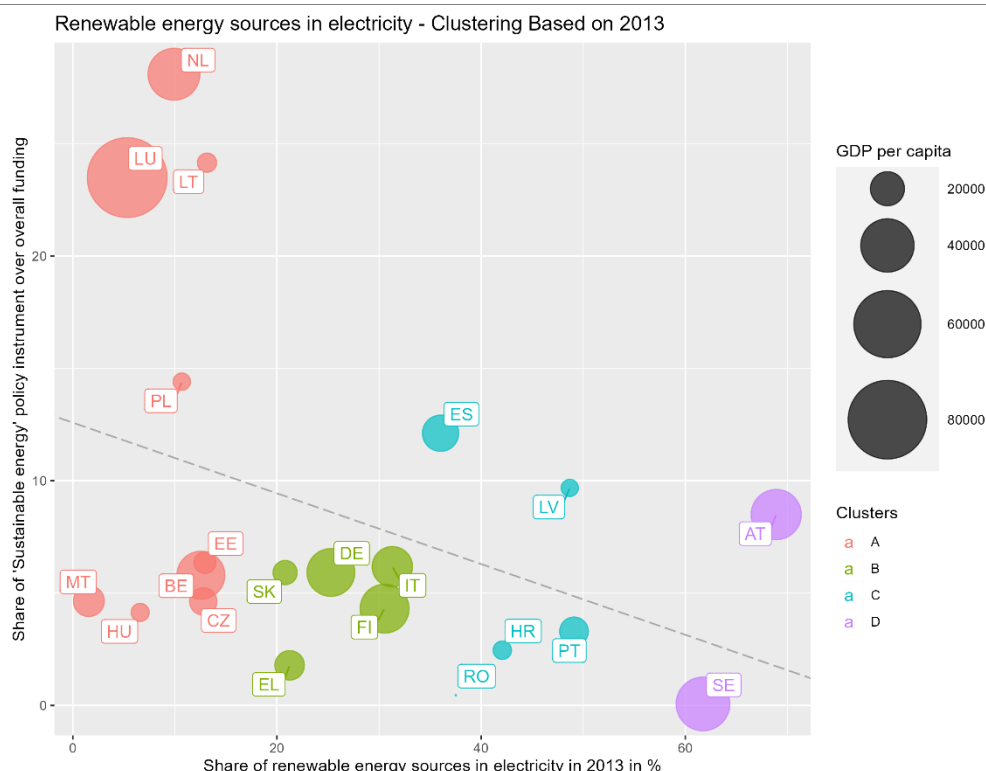
Member States placed higher priority on investments in sustainable energy when their share of renewable energy sources in electricity was lower. At the start of the 2014-2020 programming period, the production of renewable energy varied markedly from one country to another. In some countries, electricity generation was still largely dependent on coal and lignite, particularly in most regions of Poland and Czechia, as well as in the Netherlands. In contrast, electricity was principally produced from renewables in other countries, notably in Austria and Sweden. The following diagram shows the share of electricity from renewable sources in 2013 on the x-axis and the share of funds allocated to sustainable energy over the total allocated funding for climate and environment on the y-axis. The results of the correlation analysis between the 'share of renewable energy sources in electricity (%)' and the share of funds allocated to sustainable energy within the overall climate and environment budget are statistically significant. This suggests that countries with a lower share of renewable energy in their electricity mix tend to prioritise investments in sustainable energy more highly in their funding allocations. This finding is also confirmed by a regression analysis performed for the purpose of

³³ As can be seen in the country fiches.

³⁴ The indicator 'Share of energy from renewable sources' is used to monitor progress towards the renewable energy targets set by the Europe 2020 strategy, as implemented by Directive 2009/28/EC on the promotion of the use of energy from renewable sources.

the evaluation (see Annex V – Statistical Analysis – methodology and results). In addition, the types of renewable investments supported vary as the potential of countries or regions for producing renewable energy depends on their geo-physical characteristics. For instance, coastal regions generally have high potential for producing wind energy, especially those along the shores of the North and Baltic Seas and some Mediterranean islands. The potential for solar energy production is obviously higher in areas with greater amounts of sunshine. Likewise, the production of hydroelectricity requires suitable geo-physical features. Accordingly, the expenditure allocation data show that the highest shares of ERDF/CF funding allocated to solar energy are in Malta, Italy, Slovenia and Croatia. The highest share of the ERDF/CF allocated to wind energy is in Sweden. The highest shares of the ERDF/CF allocated to geothermal energy are in Belgium, Germany, Portugal and the Netherlands.

Figure 6 – Share of electricity from renewable sources in 2013 against the share of expenditure allocated to 'Sustainable energy' over the overall funding available



Source: Authors, based on Eurostat and WP2 Single Database Data.

Reducing the energy consumption of buildings through energy efficiency measures is a critical priority in all countries and regions. The buildings sector is one of the largest contributors to energy consumption, accounting for 40% of total energy consumption and generating 36% of GHG emissions.³⁵ It also contributes significantly to air pollution, especially in the Member States in Central and Eastern Europe. The energy savings potential, however, varies depending on the age and status of the building stock. The need to invest in energy efficiency measures is higher in regions and countries with old buildings constructed before thermal standards were introduced, at a time when awareness of climate impacts was more

³⁵ European Commission (2020), Energy efficiency in buildings, [see link](#).

limited than today. This is the case for regions like Sicily in Italy and Picardie in France, as well as in Central and Eastern European countries like Romania, where public buildings date back to the communist period. Given the widespread shortcomings in the energy performance of buildings and public infrastructure across different geographical areas, coupled with the significant potential for energy savings and emissions reduction through investments in energy efficiency in buildings and public infrastructure, these investments feature strongly in the policy mix of many countries. According to the expenditure data and the analysis of 70 operational programmes, energy efficiency investments in buildings and infrastructure were supported substantially in most Member States.³⁶ It is the climate and environmental investment area with the highest funding in 13 EU Member States. In 11 of these, energy efficiency investments in buildings and infrastructure account for 25% or more of the total ERDF/CF allocation related to environment and climate.

Climate, air pollution and social considerations all drive the need to invest in energy efficiency in buildings. Although the primary focus is on addressing the poor performance of building stock in terms of energy consumption and associated emissions of greenhouse gases and air pollutants, the inclusion of support for energy efficiency in buildings in the policy mix of many countries is also influenced by social factors, as exemplified by the French region of Picardie. According to the collected information, at the start of the 2014-2020 period, poor thermal quality of housing and rising energy costs drove 140 000 households in Picardie into energy poverty,³⁷ prompting the region to initiate support for investments in energy efficiency in buildings. Similarly, in Martinique, the goal of the support for energy efficiency in buildings was to reduce the energy poverty of households, particularly in the priority neighbourhoods identified by urban policies. Likewise in Czechia, the intention to enhance energy efficiency was driven not only by environmental considerations but also by a commitment to improving living standards, especially for lower-income families, which are primarily impacted by high energy consumption. Reducing this burden was therefore not only aimed at lowering the carbon footprint but also towards mitigating the risk of social exclusion for vulnerable households.

The potential for energy savings in enterprises varies depending on the industry structure and energy conditions of the country or region. The analysis of 70 operational programmes revealed that the perceived needs for energy efficiency investments depend on the size of enterprises and their energy intensity. In Southern Italy, for example, the prevalence of small and micro companies lacking the necessary resources to invest in energy efficiency results in a more pressing need for support in this area. The Nordrhein-Westfalen region of Germany has an economic structure dominated by energy-intensive companies, suggesting need to promote and support energy savings. Furthermore, the analysis of 70 operational programmes, along with the policy instrument case study on energy efficiency in enterprises, revealed that energy prices are an important driver for these investments. For example, in Sweden and Austria, the traditionally low cost of energy slowed enterprises' investments in energy efficiency measures. Accordingly,

³⁶ The sole exception is Austria, which does not allocate resources to this policy instrument.

³⁷ That is, spending more than 10% of income in heating.

the managing authorities allocated the ERDF funds to promote such investments. Both Austrian and Swedish operational programmes³⁸ include a measure specifically designed to advise small and medium-sized enterprises (SMEs) and to increase awareness of potential energy efficiency measures.

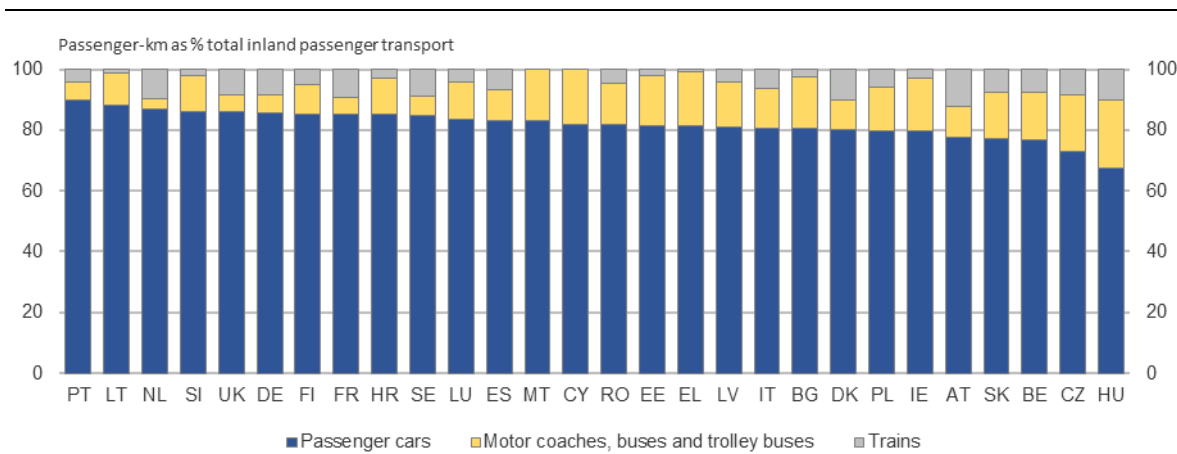
The need to reduce energy consumption and adopt green production processes is evident across all European countries and regions. This is driven not only by environmental reasons but also by competitiveness. Moving towards less energy-intensive machinery and replacing obsolete technology is seen as a competitive and innovative factor.

The need to support the greening of urban transport sector is widespread. Tackling the disproportionate reliance on private vehicles over public transport could significantly reduce emissions, especially in densely populated areas. At the start of the 2014-2020 programming period, cars accounted for over 83% of all inland passenger kilometres travelled in the EU,³⁹ ranging from 68% in Hungary to almost 90% in Portugal and Lithuania. Buses accounted for 9% of passenger kilometres travelled, with the share varying from 3% in the Netherlands to 23% in Hungary. Trains accounted for 8%, although this share varies depending on the size and state of the rail network. In the field of urban transport, access to high-frequency departures was (and remains) highest in cities with at least 1 million inhabitants and is considerably lower in cities with fewer than 250 000 inhabitants.⁴⁰ As evident from the analysis of expenditure allocation data, the analysis of 70 operational programmes and the policy instrument case study on clean urban transport, investments in clean urban transport are not limited to regions and countries with infrastructural gaps in urban public transport. Indeed, the prevalent use of private vehicles persists even in territories where local public transport has already achieved satisfactory levels of development, as seen, for example, in Luxembourg, Flanders and the French region of Lorraine. Nevertheless, in these contexts, it is necessary to encourage the modal shift through investments in multimodal solutions and improved accessibility of stations and fleets, as well as functionality and new approaches to mobility, such as car and bike sharing. Specifically, renewal of the urban public transport fleet is a need expressly reiterated in various programmes, including the national programmes of Slovakia and Lithuania, as well as in the Italian and Spanish multi-regional programmes.

³⁸ The Austrian operational programme is 'Investments in Growth and Employment' and the Swedish operational programme is 'National fund programme for investments in growth and jobs 2014-2020'.

³⁹ Passenger kilometre represents one passenger travelling a distance of one kilometre. The share is the percentage of transport by passenger cars in total inland passenger transport, measured in passenger kilometres.

⁴⁰ Dijkstra, L. and Poelman, H. (2015), Measuring access to public transport in European cities, Regional Working Papers No 01/2015.

Figure 7 – Passenger travel by transport mode (2014)

Source: Authors, based on Eurostat.

3.2.2. TO5 – Adaptation and risk management

The need to invest in climate adaptation and risk prevention projects primarily depends on the geomorphological features of each region and the pressures resulting from human activity and uncontrolled urbanisation.

The ArcGIS data⁴¹ show that most European regions are affected by climate change risks (such as droughts, sea level rises, flooding and forest fires), although certain patterns of exposure to risks can be identified. According to the European Environmental Agency (EEA), Mediterranean regions are likely to experience significant increases in days of extreme heat, a growing risk of droughts, declining crop yields and more frequent multiple climatic hazards.⁴² Coastal areas face the risk of rising sea levels, increasing sea temperatures and growing numbers of 'marine dead' zones.⁴³ The Atlantic region is experiencing increased instances of heavy rainfall and greater risk of river and coastal flooding and damage from winter storms. The EEA also notes that the economic impact of climate-related extremes varies considerably across countries.⁴⁴

The analysis of expenditure allocation data indicates that, during the 2014-2020 period, investments in adaptation generally targeted the European regions with the highest needs, i.e. those exposed to the highest climate change risks from climate-related extremes. The highest allocations for adaptation to climate change and prevention and management of risks were made in less developed regions and transition regions including in Italy, Germany, Slovakia, Poland, Croatia, France, Greece, Czechia and Spain. Moreover, evidence from the three case study examples (Hungary and the Italian regions of Sardinia and Slovenia) indicates that investments were targeted at a small number of localities with the highest adaptation needs, in particular in regions where previous cases of extreme flooding had

⁴¹ European Environment Agency, Climate change impacts in Europe, [see link](#).

⁴² European Environment Agency (2017).

⁴³ Dead zones are hypoxic (low-oxygen) areas caused by excessive nutrient pollution from human activity coupled with other factors that deplete the oxygen required to support most marine life in bottom and near-bottom waters.

⁴⁴ European Environment Agency, 8th Environment Action Programme – Economic losses from weather- and climate-related extremes in Europe, [see link](#).

occurred. However, in recent years, extreme events have become increasingly widespread across Europe, revealing similar needs for interventions in various areas of Europe. For instance, drought is no longer limited to the hottest regions of Southern Europe and the Mediterranean area, such as Andalusia, Calabria, Cyprus and Portugal, but also affect Polish regions such as Dolnośląskie, Lubelskie and Małopolskie and the Belgian region of Flanders. Similarly, flooding affects the entire European territory, from England through Bulgaria to the Spanish region of Galicia.

Beyond climate-related risks (such as extreme weather, flooding, forest fires and drought), geo-physical risks (earthquakes, landslides, volcanoes) also present significant challenges, with their impact affected by uncontrolled urbanisation and other man-made activities. As a result, other needs include protection from landslides and safeguarding areas at high seismic and volcanic risk. Reducing the risk of landslides requires improvements in land management practices, which is a highly localised activity. Moreover, many countries in Southeastern Europe are particularly vulnerable to earthquake hazards, since the main fault lines in Europe are located where the Eurasian plate meets the African plate and run through the Mediterranean Sea. In this context, effective preparedness, appropriate response capacities and adequate resilience building measures to reduce the severity of impacts of earthquakes are essential. Member States generally allocated more ERDF and CF resources to address climate-related risks (especially flooding) than non-climate-related ones. However, more developed regions in Italy are an exception: the regions of Lazio, Marche and Umbria, which are vulnerable to earthquakes, made significant investments in anti-seismic measures using ERDF funds.

3.2.3. TO6 – Environment and resource efficiency

The unprecedented trend of biodiversity loss is affecting many territories across Europe. Their natural legacy is under threat due to the impact of expanding human and activities, in particular industrialisation. The analysis of 70 operational programmes reveals that several programmes highlight the need to preserve unique geographic locations renowned for their exceptional biodiversity across Europe. This necessity is evident, for example, in Croatia, Czechia, France, Germany and Hungary. Historically, industrialised regions such as North Rhein-Westphalen in Germany have faced issues such as a shortage of green corridors, inadequate near-natural places of leisure and scarcity of intact ecosystems. To address these concerns, several programmes include actions to mitigate biodiversity loss by safeguarding specific areas together with the flora and fauna inhabiting them. At the same time, these programmes recognise that investments in the development of tourism in protected areas can yield returns, benefitting both local economies and nature protection.⁴⁵ Through an analysis of operations available in the WP2 Single Database, the policy instrument case study on nature and biodiversity confirmed that significant policy support in this field was directed towards maintenance of the Natura 2000 network⁴⁶ and promotion of eco-tourism.

⁴⁵ This argument is also supported by relevant literature, e.g. World Bank (2021). Banking on Protected Areas: Promoting Sustainable Protected Area Tourism to Benefit Local Economies. World Bank, Washington, DC, [see link](#).

⁴⁶ Especially terrestrial areas.

The need to support pollution reduction in soil is stronger in regions with vast industrial wasteland, large industrial companies and illegal landfills. The analysis of 70 operational programmes identifies two main needs underpinning the implementation of investments for pollution reduction. First, it is necessary to restore abandoned industrial zones and brownfields located in former heavily industrialised areas. This need is particularly urgent, for example, in the German regions of Mecklenburg-Vorpommern, Nordrhein-Westfalen, Sachsen-Anhalt and Thüringen. These regions saw the abandonment of productive areas and a transition of industries away from coal and iron extraction to less polluting sectors. Similar circumstances were reported in the French regions of Nord-Pas de Calais and Picardie and Croatia, where pollution issues are mainly related to poor air quality and inadequate remediation of former industrial sites. The second need concerns remediation of land due to landfill contamination. Campania in Italy is illustrative of a region grappling with significant and pervasive pollution due to a history of illegal landfills. This resulted in highly contaminated areas that require lengthy remediation processes. Aside from Italy, Romania, Bulgaria and Spain are further examples of countries taken to the Court of Justice of the EU by the European Commission for failure to close and rehabilitate illegal landfills.⁴⁷ According to the European Commission,⁴⁸ at the end of 2021, 1995 illegal or substandard landfills were still operating and had to be rehabilitated or adapted to EU standards.

Air quality improvements were a focal point for a number of primarily EU-13 Member States with high levels of air pollution, hindering their compliance with EU ambient air quality legislation. Member States including Bulgaria, Czechia, Poland, Romania and Slovakia had urban and industrial areas with a very high concentration of air pollutants such as PM_{2.5} and PM₁₀. The high levels of air pollution resulted in failure to comply with EU ambient air quality legislation, resulting in infringement cases against these Member States. For example, Bulgaria faced infringement cases due to exceeding air quality limit values in 28 municipalities. This acted as a driver for the programming of support for air quality measures in the Bulgarian 'Environment' programme. A similar situation prompted the inclusion of investments in air quality measures in the Czech 'Environmental' and the Slovakian 'Quality of Environment' programmes. The support for air quality measures included funding for monitoring networks and for pollution reduction measures. In Bulgaria and Czechia, for example, the support included measures targeted at residential and commercial heating, as inefficient and polluting heating boilers were one of the main sources of poor air quality in the affected cities.

In terms of water management and conservation, the primary focus for EU-13 countries is on bridging the infrastructure gap to guarantee adequate public services. In contrast, for EU-14+UK countries, the main requirement is the modernisation of existing infrastructure. Ensuring compliance with EU directives continues to pose a significant challenge in EU-13 countries. This is highlighted, for example, in the Hungarian 'Environmental and Energy Efficiency' programme and in the Latvian 'Growth and Employment' programme. The Slovenian 'Cohesion Policy' programme also places particular emphasis on the water sector, noting that, despite investments during the 2007-2013 period, there are still many areas in the

⁴⁷ [See link.](#)

⁴⁸ [See link.](#)

country without adequate public water supply systems. Infrastructure deficiencies, such as losses in water transmission and infrastructure obsolescence were reported in areas including Portugal and the French overseas region Réunion, as well as in the Southern Italian regions of Sicily, Sardinia, Campania and Calabria, where the local population frequently complains about irregularities in the water service. Water resource management is a persistent challenge in Malta. Due to its semi-arid climate, Malta faces severe water scarcity, which leads to the overexploitation of aquifers and to contamination with nitrates. The latter is mainly caused by excessive fertilisation in agricultural practices. At the start of the 2014-2020 programming period, the provision of water for human consumption was a less urgent issue in most Member States, as the share of the population connected to water supply in 2013 was high in all Member States with the exception of a few Eastern European countries.⁴⁹ Accordingly, the higher concentration of spending on water management and water conservation (compared to provision of drinking water) appears to be aligned with the identified needs.

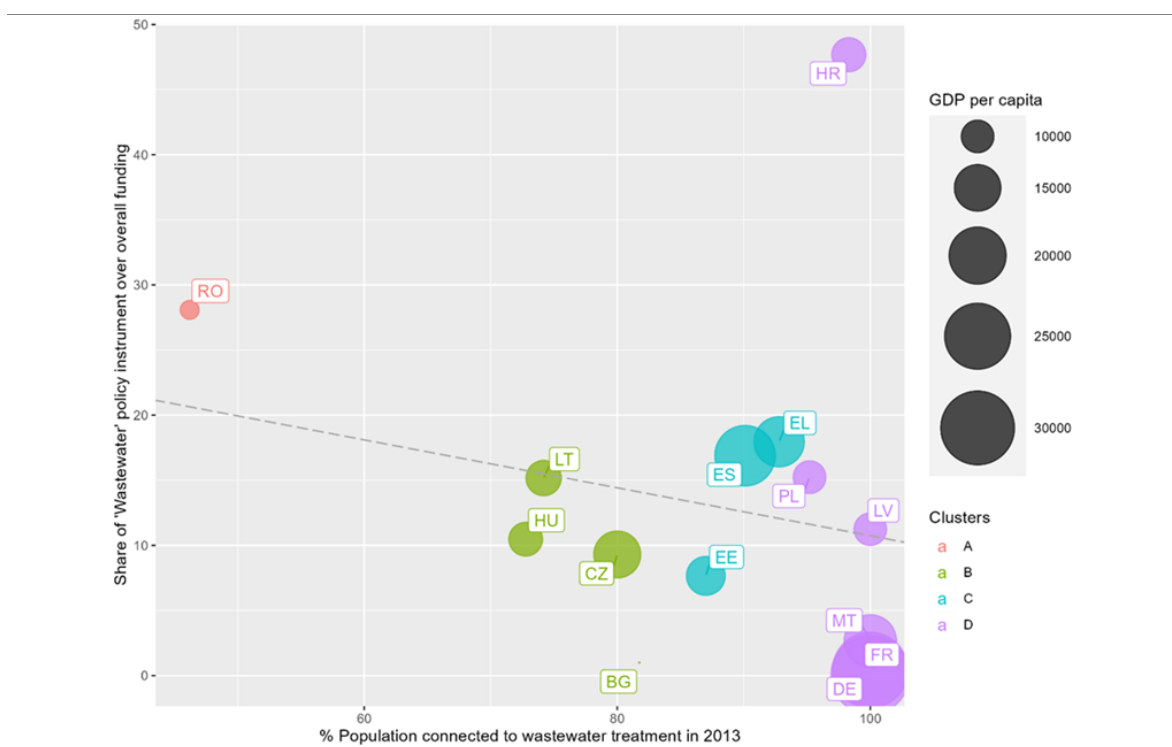
In the majority of less developed regions, it is still necessary to improve infrastructure for wastewater treatment, both in terms of population coverage and modernisation of existing facilities. Despite significant investments during the 2007-2013 programming period, many EU-13 countries and less developed regions in the EU-14 were still not in compliance with the Urban Wastewater Treatment Directive (UWWTD – 91/271/EEC) in 2014. At the start of the 2014-2020 programming period, different levels of connection to wastewater services were evident across the EU Member States. According to the 9th UWWTD reporting exercise,⁵⁰ high compliance rates were generally observed in most EU-14+UK countries, especially in Austria, Germany and the Netherlands, which have largely implemented the directive. However, some EU-14 countries still had compliance gaps in some of their regions. This is notably the case for Italy, Spain, Belgium, Luxembourg and Ireland. The situation is different for EU-13 Member States, partly due to their later accession and the transitional periods for compliance granted to them. At the start of the 2014-2020 programming period, compliance levels were especially low in Croatia, Slovenia, Bulgaria and Romania. The following diagram shows the share of the population connected to wastewater treatment plants in 2013 on the x-axis and the share of the funding allocated to investments in wastewater relative to the total funding for climate and environment investments on the y-axis. Countries with a higher level of connection to wastewater treatment facilities are shown on the right, while those with a lower level of connection are displayed on the left. Intuitively, the relationship between the 2013 performance and the share of funding should be negative. Countries with a lower level of connection would require higher investments and should, therefore, have a higher absolute allocation and higher relative share of the country's total allocation for climate and environment. This would reflect higher prioritisation by the country to this type of investment. The negative relationship depicted in the graph below is confirmed by a correlation analysis once the outlier Croatia is excluded. A negative relationship was also found between the share of the population connected to tertiary wastewater treatment plants in 2013 and the share of the funding allocated to wastewater investments relative to the total funding allocated for climate and environment investments (see

⁴⁹ EEA data based on the 2nd River Basin Management Plans.

⁵⁰ The UWWTD monitoring reports are available, [see link](#).

Annex V – Statistical Analysis – methodology and results. The analysis of 70 operational programmes highlighted the role of infringement procedures as a driver for prioritising investments in the wastewater field.

Figure 8 – Share of population connected to wastewater treatment plants in 2013 against the share of expenditure allocated to ‘wastewater’ relative to the overall funding available



Source: Authors, based on Eurostat and WP2 Single Database data.

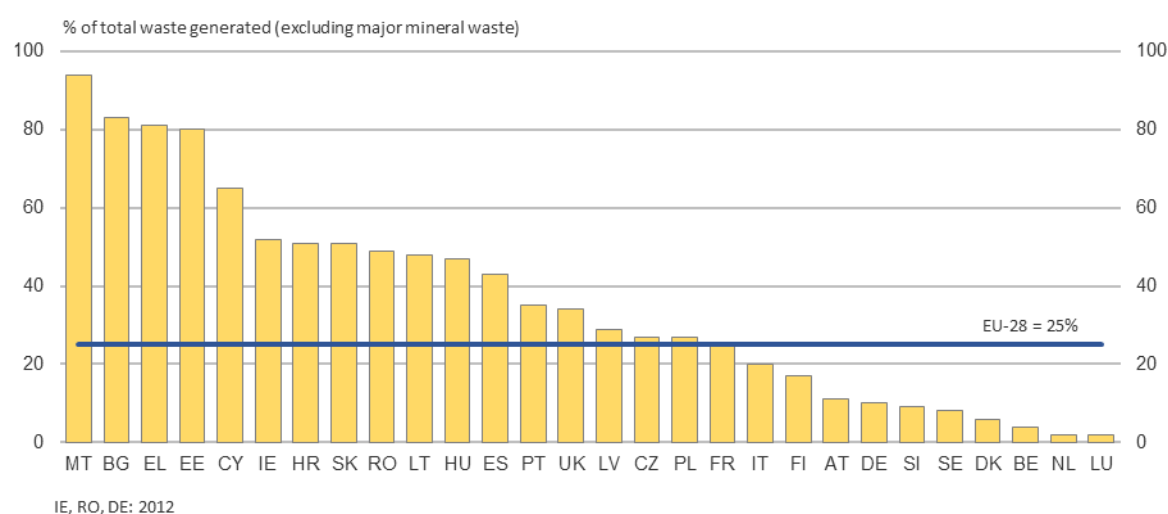
Another recurring theme in some programmes is the need to protect the marine environment from pollution discharges into watercourses. This is especially relevant for countries with extensive coastal regions, such as Greece, Portugal and Italy, and for territories of exceptional environmental significance. An example of this is highlighted in the Apulian programme, where the intervention strategy in the wastewater sector was shaped in accordance with the Natura 2000 guidelines.

The regions in the EU-13 countries and less developed regions within some of the EU-14+UK countries recognise the need to invest in improving waste collection capacity and enhancing recycling processes. In the middle of the 2014-2020 period, most Member States (Bulgaria, Cyprus, Croatia, Estonia, Finland, Greece, Hungary, Latvia, Malta, Poland, Portugal, Romania, Slovakia, Spain, Sweden, France, Italy and Czechia) were at risk of failing to meet the municipal waste targets on preparation for reuse and recycling by 2020.⁵¹ Moreover, more than half of the Member States were not fully compliant with obligations concerning the treatment of waste before landfilling and some landfills themselves were non-compliant. This suggests that there was significant need for investment in

⁵¹ European Commission (2018), Early warning report for Member States at risk of missing the 2020 preparation for re-use/recycling target on municipal waste, COM/2018/656 final.

reuse, preparation for re-use and recycling of waste, as well as measures and infrastructure to facilitate the transition away from landfills and incineration. Accordingly, the high allocation of many operational programmes in intervention field 017, which focuses on recycling, appears to be aligned with the identified needs. Deficiencies in waste management practices were reported in the operational programmes of several European regions and countries, including Croatia, Greece, Czechia, Malta, Poland, Romania and Slovakia. These countries still rely heavily on landfills for waste disposal (see the figure below), with Romania having a particularly low recycling rate of just 4.35%. At the same time, the most developed regions that made investments in waste management (the Danish and Finnish regions⁵²) focused on the need to promote actions to reduce waste generation.

Figure 9 – Share of waste landfilled in selected EU Member States (2014)



Source: Authors based on Eurostat data.

Overall, the operational programmes generally targeted relevant needs but some under-exploited opportunities to use ERDF/CF funding more intensively for some priorities were also identified.

- In the field of climate adaptation, **nature-based solutions were not sufficiently prioritised, and implementation progressed slowly.**⁵³ Preference was given to more 'conventional' grey solutions. This was largely due to a lack of knowledge within national and regional administrations on how to implement green infrastructure investments, as confirmed by interviews with stakeholders and participants of the seminar. According to research by the EEA,⁵⁴ the uptake of nature-based solutions is also hindered by limited knowledge and challenges in quantifying the effectiveness of such investments. Furthermore, the preference of the implementing bodies for conventional engineering ('grey')

⁵² In 2026, the recycling rates for municipal waste in Denmark and Finland were 48% and 42%, respectively.

⁵³ EIB (2023), Investing in nature-based solutions. State-of-play and way forward for public and private financial measures in Europe, [see link](#).

⁵⁴ European Environment Agency (2021), Nature-based solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction, available at: <https://www.eea.europa.eu/publications/nature-based-solutions-in-europe> [link](#).

approaches, which are perceived as 'easier' and may require lower investment costs to implement, is also a factor affecting the uptake of nature-based solutions. Interviews with stakeholders also suggest that effective implementation of nature-based solutions requires social acceptance amongst stakeholders, as well as cross-sectoral and cross-border cooperation to foster local innovations. In this respect, the recent Taxonomy Delegated Act provides technical criteria for nature-based solution measures and can provide guidance to Member States on the implementation of such investments.⁵⁵

- In the wastewater sector, **despite the high potential for water reuse and sewage sludge** to contribute to the Circular Economy Action Plan, **few investments were identified in this area**. According to the policy instrument case study, reasons for that include technical knowledge gaps, low profitability/high risk and reluctance of stakeholders to accept reused water and sewage sludge. These limiting factors should be accounted for at the design stage of projects.
- In the water sector, despite growing risks of water scarcity and droughts in Europe and the potential for cost savings, the policy instrument case study identifies **few investments explicitly targeted at reducing water use, improving water reuse or awareness of these topics**. While managing authorities and project promoters tend to use EU funding to support large investments that may otherwise lack financing, small projects to reduce water use, improve water reuse or raise awareness can have positive environmental impacts. Considering the growing need to manage droughts and water scarcity across Europe, as well as the significant opportunity for reducing infrastructure losses and costs, cohesion policy funding could make a greater contribution to such projects. To this end, an important precondition is raising awareness among stakeholders and providing clear EU guidelines in order to increase the acceptance of water reuse and integrated water resource management.

In the policy instrument on waste, **few investments in actions addressing waste prevention were identified, including re-use and preparation for reuse** (i.e. at the top of the waste hierarchy). While the policy instrument case study recognises, as stressed by experts attending the thematic workshop, that cohesion funds may not always be the optimal funding source for measures such as prevention and reuse,⁵⁶ it suggests that defining clear and ambitious targets for waste prevention and reuse could incentivise investments (or other non-infrastructure measures) at the upper levels of the waste hierarchy. Such targets could be incorporated into the conditionalities for cohesion policy support.

Under the policy instrument on the green economy, the analysed programmes revealed that **investments did not truly support a systemic shift towards a circular economy and were limited to supporting resource efficiency gains within a continued 'linear' model**.⁵⁷ In this regard, it is worth noting that while resource efficiency has formed part of the EU policy framework for some time, the

⁵⁵ [Taxonomy Environmental Delegated Act](#)

⁵⁶ Instead, it is a relevant financing source for the waste infrastructure required for sorting, separation and recycling.

⁵⁷ Under the linear model, the production of goods generates waste that is discarded without being reintegrated into the production cycle.

topic of circularity only gained importance during the 2014-2020 period with the Circular Economy Action Plans (CEAPs) adopted in 2015 and 2020.⁵⁸ The shift in the policy framework was not reflected in the analysed operational programmes. While experts at the thematic workshop held as part of this evaluation viewed the possibilities and scope of cohesion policy in this field as limited, efforts should be made to improve incentives for promoting circularity in cohesion policy to boost uptake of EU funding for such initiatives. Notably, operations connecting multiple actors along the value chain would be needed to fully realise the potential of the circular economy.

⁵⁸ European Court of Auditors (2023), Circular Economy. Slow transition by member states despite EU action. Special report 17/2023, p. 712.

4. The interventions supported

This chapter presents the key findings of the evaluation concerning the type of interventions supported by ERDF/CF in the field of climate and environment. Specifically, it provides an overview of the policy instruments used and their key characteristics, the support provided by the programmes and the main findings on policy mixes and the drivers influencing their selection. The box below summarises the high-level findings outlined in this chapter.

Twelve broad policy instruments were analysed in this evaluation. According to the WP2 Single Database, as at 2020, 98,639 operations were supported under these 12 policy instruments, mainly through non-repayable grants. These operations reached 73,021 beneficiaries, the majority of which are enterprises and public administrations at the local level. The average expenditure per operation varied significantly depending on the type of policy instrument and programme. This disparity can be attributed to the nature of the investments supported by the different policy instruments. Operations lasted an average of 2.4 years. The longest durations were typically observed in operations involving significant infrastructure components, such as wastewater and water projects.

The overall allocation for climate and environmental investments by the end of 2023 was lower than initially expected. This allocation remained stable until the end of 2019. The COVID-19 pandemic prompted a slight decrease, with some funds redirected towards business support and healthcare instruments. However, this reduction was largely offset by the injection of REACT-EU resources, which were mostly used to support mature investments in the pipeline or interventions with quick implementation. Following post-pandemic growth, the planned allocation decreased again in 2023, with funds generally redirected to intervention fields with higher absorption rates and with committed funds significantly exceeding planned ones in 2022. Programmes that reduced their budgets generally had above-average initial allocations for climate and environmental objectives. Despite the overall downward trend, allocations for investments in solar renewable energy, energy efficiency in public infrastructure, clean urban transport and cycling paths increased substantially over the 2014-2020 programming period.

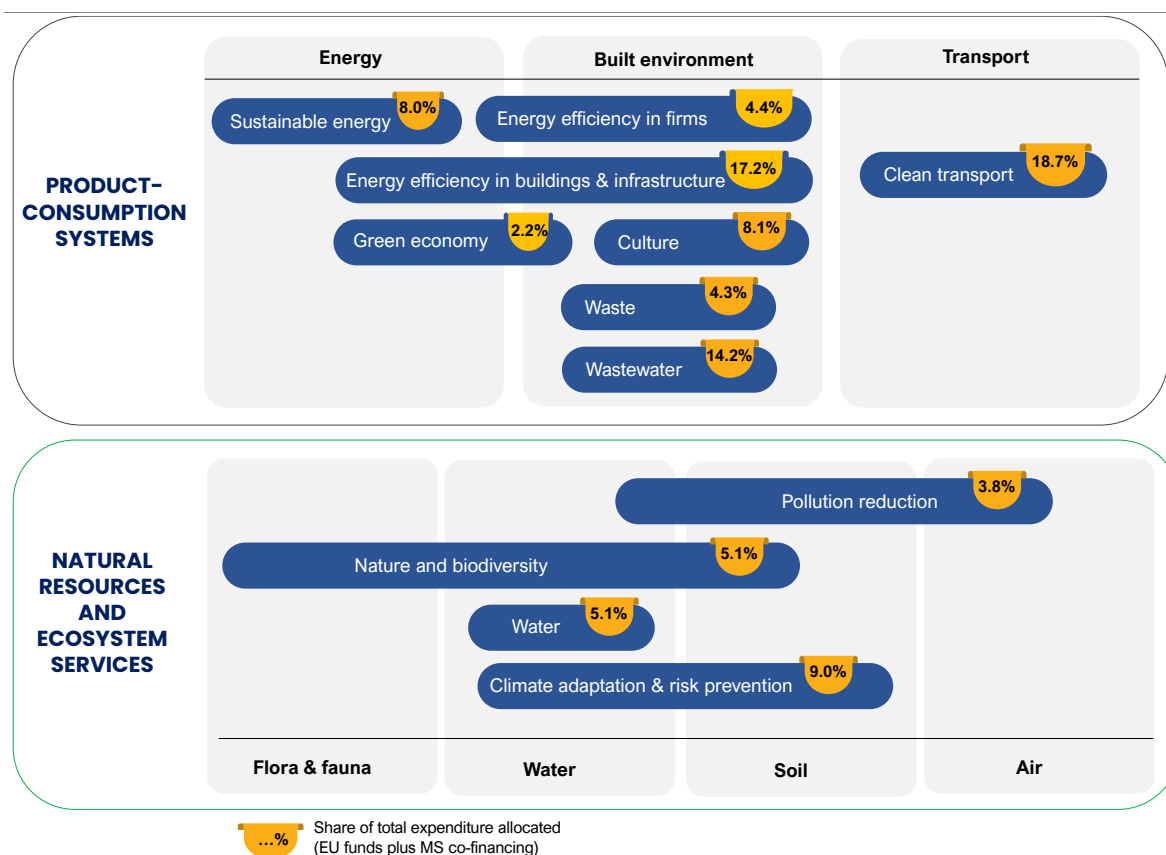
The use of different ERDF/CF policy mixes (i.e. combinations of policy instruments) varies according to national/regional contexts and policy choices. Investments in the policy instrument on energy efficiency of buildings and the policy instrument on clean urban transport feature strongly in the policy mixes of many countries. Investments in the policy instruments on water, wastewater and waste are represented in roughly half of the programmes but are consistently included in the operational programmes of EU-13 countries, with the exception of operational programmes with a thematic focus on competitiveness/growth/innovation. The policy instrument on energy efficiency in enterprises and the policy instrument on green economy accounted for only a small share of the total environment and climate expenditure. They are mainly implemented by EU-14+UK countries, especially in programmes where growth and enterprise competitiveness are central to the intervention approach.

Three main drivers behind the selection of investments have been identified: i) **compliance with European directives** is a key driver that determines the selection of policy instruments (especially in the areas of water, wastewater and waste); ii) **infringement procedures** act as a catalyst, speeding up certain investments; iii) the **focus on specific types of investments** also depends on the available ERDF/CF funding in alignment with national priorities and funding. The policy mix tends to be similar in regions and countries where the starting conditions – i.e. initial environmental performance and the role of the ERDF/CF relative to government expenditure – are similar.

4.1. Policy instruments

Twelve broad policy instruments were covered in this evaluation.⁵⁹ These are illustrated in Figure 10. The policy instruments provide support for preservation and effective management of natural resources, as well as for prevention and reduction of the negative impacts of production and consumption systems. Resources such as water, flora and fauna, soil and air underpin the functioning of the production and consumption systems that support our economies and overall well-being by providing natural resources and a range of ecosystem services. In turn, energy, construction and transport systems affect the very ecosystems that they rely on.

Figure 10 – Policy instruments



Source: Authors

⁵⁹ The methodology used to identify the taxonomy of policy instruments for environment and climate is described in Annex I.

Table 1 - Typology of policy instruments

Policy instrument	Policy goal	Main types of activities funded	Predominant IFs associated ⁶⁰
Nature and biodiversity	Restore and enhance biodiversity and natural heritage, including for touristic purposes.	Green urban areas. Investments to restore and develop green spaces in urban settings, including city parks, urban riverbanks and green infrastructure, such as green walls and roofs. Such interventions contribute to healthier living environments in cities and climate change adaptation. Biodiversity and ecosystems. Investments in the protection and restoration of biodiversity and ecosystems, as well as green infrastructure in non-urban settings. Examples include investments in protection and restoration of flora/fauna, including in Natura 2000 sites and natural parks. Eco-tourism. Investments to develop and promote the touristic and recreational potential of natural areas, including Natura 2000 sites and natural parks. Examples include walking/cycling paths in natural areas, information displays and visitor centres.	085 (Protection and enhancement of biodiversity, nature protection and green infrastructure) 086 (Promotion, restoration and sustainable use of Natura 2000 Sites) 091 (Development and promotion of the tourism potential of natural areas)
Clean transport	Decarbonise urban transport, promote urban public transport (UPT) and alternative modes of transport and ensure energy efficiency in the transport sector.	Extension of UPT infrastructure. This investment type includes bus, tram and metro lines. Sustainable, energy-efficient, universally accessible and affordable public transport systems/infrastructure. Provision of fleets and UPT infrastructure that are safe, secure and/or smart, as well as provision of fleets (clean rolling stock such as electric, gas, hydrogen) and UPT infrastructure that are energy-efficient and clean/green. Cycle tracks and footpaths. This includes provision or rehabilitation of safe cycle tracks and footpaths to promote alternative modes of transport and active mobility. Promotion of multimodality. This includes the construction of Bike & Ride and Park & Ride areas, with a focus on environment and climate and with an urban scope. Charging stations. Installation of public charging stations to promote clean electric mobility, contributing to emissions reduction.	043 (Cleaner urban transport infrastructure & promotion) 090 (Cycle tracks and footpaths)
Climate adaptation & risk management	Strengthen climate proofing, resilience building and prevention and preparedness against risks related to climate change (e.g. floods, forest fires) as well as non-climate-related disasters (e.g. earthquakes, technological accidents). It also covers measures aimed at improving the knowledge base, along with preparation and	Measures under this policy instrument are structured into risk prevention actions (including actions to improve the knowledge base for disaster risk management, such as flood plans, early warning systems, modelling, radars, video surveillance, awareness raising and flood prevention infrastructure), preparedness actions (infrastructure for civil protection units, such as integrated rescue stations; vehicles and equipment, such as rescue vehicles, fire engines, ice-breakers, helicopters, planes; and training); recovery actions (such as reforestation after fires, reconstruction of coastlines and ecosystems and development of post-flood zones). Prevention and management of risks related to storms and floods. This type of investment covers risk prevention and management of acute flash floods due to storms, as well as inland and river basin floods.	087 (Adaptation to climate change & prevention & management of climate risks) 088 (Risk prevention and management of non-climate-related natural risks and risks linked to human activities, including awareness raising, civil protection and disaster management systems and infra structures)

⁶⁰ For the full labels, please refer to Regulation (EU) No 215/2014-IA., Annex I.

Policy instrument	Policy goal	Main types of activities funded	Predominant IFs associated ⁶⁰
	implementation of disaster risk management strategies.	Prevention and management of risks related to forest fires. Prevention, preparedness and recovery actions related to forest fires (e.g. early warning systems, coordination centres, reforestation). Prevention and management of risks related to coastal erosion. This includes risk prevention and management of coastal erosion phenomena (e.g. monitoring systems, prevention infrastructure, coastal defences). Prevention and management of non-climate natural risks. This includes prevention, preparedness and recovery actions related to earthquakes (e.g. surveillance technology, awareness raising, civil protection equipment). Prevention and management of non-climate risks related to human activities. Prevention, preparedness and recovery actions related to technological accidents. Other generic civil protection measures. Umbrella measures related to civil protection.	
Energy efficiency in enterprises	Improve energy efficiency in large enterprises and SMEs, including within their productive processes.	Energy efficiency in production processes. This includes purchase of equipment and services aimed at improving energy efficiency in large enterprises and SMEs. Energy efficiency in company buildings. Investments in thermal renovation, heating and cooling optimisation, investments in lighting efficiency in enterprises. In some cases, photovoltaic installations may also be included in deep thermo-modernisation interventions. Note: hotels are considered company buildings.	003 (Productive investments in large enterprises linked to LCE) 023 (Environmental measures aimed at reducing and/or avoiding GHG emissions) 068 (EE & demonstration projects in SMEs) 069 (Support for environmentally friendly production processes in SMEs) 070 (Promotion of energy efficiency in large enterprises)
Energy efficiency in buildings and public infrastructure	Improve the energy efficiency performance of public and residential buildings (e.g. refurbishment of buildings, thermal insulation, space heating/cooling, hot water, smart meters), as well as public infrastructure.	Energy efficiency in housing. Energy efficiency renovation of existing housing stock, including demonstration projects and supporting measures. Examples of projects: energy efficiency and renewable heating and cooling in public buildings, investment in the wider use of Energy Performance Contracting in the public building and housing sectors. Energy efficiency in public buildings. Energy efficiency renovation of public buildings (e.g. schools, universities, hospitals). Energy efficiency in public lighting. This includes street lighting using renewable energy. Energy efficiency in other public infrastructure. This includes energy efficiency in wastewater treatment plants.	013 (Energy efficiency renovation of public infrastructure, demonstration projects and supporting measures) 014 (Energy efficiency renovation of existing housing stock, demonstration projects and supporting measures)
Green economy	Support SMEs and large enterprises in the green transition, with a focus on the	Circular economy in production processes. Investments promoting resource efficiency in production processes, including the prevention, recycling and reuse of waste.	003 (Productive investments in large enterprises linked to LCE)

Policy instrument	Policy goal	Main types of activities funded	Predominant IFs associated ⁶⁰
	circular economy in production processes, eco-innovation and demonstration projects for low-carbon technologies.	Low-carbon production processes/equipment. This type of investments includes support to enterprises purchasing electric vehicles and charging stations (as these are considered part of the companies' assets). Low-carbon goods and services. Investments/demonstration projects to develop low-carbon products and services, including research and innovation actions.	068 (EE & demonstration projects in SMEs) 069 (Support for environmentally friendly production processes in SMEs) 071 (Companies specialised in LCE and climate service)
Pollution reduction	Prevent, monitor and mitigate environmental pollution in water, soil and air (including GHG emissions) and rehabilitate polluted sites.	Air pollution. Investments in monitoring air quality and reducing air pollution (including GHG emissions). Water pollution. Rehabilitation of contaminated water bodies. Note: it does not include wastewater treatment interventions. Soil pollution. This investment type involves rehabilitation of contaminated land and re-cultivation of landfills. Rehabilitation of industrial sites. Investments in assessment of former industrial and contaminated sites, as well as planning and performance of rehabilitation and remediation measures.	023 (Environmental measures aimed at reducing and/or avoiding GHG emissions (including treatment and storage of methane gas and composting)) 083 (Air quality measures) 084 (Integrated pollution prevention and control) 089 (Rehabilitation of industrial sites and contaminated land)
Sustainable energy	Increase sustainability in the energy production and distribution sectors.	Renewable energy production and integration. Investments in renewable energy production (wind, solar, biomass, hydro, geothermal etc.); investments in renewable energy integration. Co-generation and district heating. Investments in high-efficiency co-generation and district heating. Intelligent energy distribution. Investments in intelligent energy distribution systems, including smart grids and ICT systems.	009 (Renewable energy: wind) 010 (Renewable energy: solar) 011 (Renewable energy: biomass) 012 (Other renewable energy (including hydroelectric, geothermal and marine) and renewable energy integration) 015 (Intelligent Energy Distribution Systems at medium/low voltage levels) 016 (High efficiency co-generation and district heating)
Waste	Enhance waste management in line with the EU waste management hierarchy (with a focus on increasing re-use and recycling and recovery of	Household waste: reuse and recycling. This investment type includes waste minimisation, sorting and recycling measures. Household waste: mechanical biological treatment, thermal treatment, incineration and landfill measures. It includes investments in waste treatment plants and waste management centres. Note: this does not include rehabilitation of former landfills.	017 (Household waste management (including minimising, sorting, recycling measures)) 018 (household waste management (including mechanical biological

Policy instrument	Policy goal	Main types of activities funded	Predominant IFs associated ⁶⁰
	waste for non-recyclable materials).	Commercial, industrial and hazardous waste management. This investment type includes specific waste treatment facilities for special waste (e.g. construction and demolition waste). Other waste management measures. Includes umbrella measures for waste prevention, management and treatment.	treatment, thermal treatment, incineration and landfill measures) 019 (Management of commercial, industrial or hazardous waste)
Wastewater	Improve wastewater collection and treatment to prevent poor freshwater and coastal water quality, human health risks and biodiversity loss.	Sewer and rain drainage systems. Investments in wastewater and rainwater collection, including both the rehabilitation of old infrastructure and the construction of new infrastructure. Wastewater treatment plants. Investments in wastewater treatment plants, including the rehabilitation of old infrastructure and the construction of new infrastructure. Water reuse systems. Investments in innovative facilities and technologies supporting water reuse objectives (especially for agricultural purposes). Sewage sludge treatment for recovery/reuse. Facilities for the treatment of sewage sludge for its subsequent recovery or reuse.	022 (Wastewater treatment)
Water	Improve the water supply system (catchment, treatment, transport, distribution) and the implementation of River Basin Management Plans.	Water distribution. Investments for extension and or rehabilitation of the water distribution network, including investments for leakage reduction in distribution networks and investments in efficient water supply. Water quality. Investments for water treatment. Note: this refers to water supply for civil purposes. Integrated water management. Integrated water management projects including components related to wastewater collection and/or treatment. The different sub-policy instruments also cover the implementation of River Basin Management Plans.	020 (Provision of water for human consumption (extraction, treatment, storage and distribution infrastructure) 021 (Water management and drinking water conservation)
Culture	Protect and enhance cultural heritage sites and cultural facilities, such as museums and theatres, including with a focus on tourism.	Cultural heritage. Investments in preservation, rehabilitation and valorisation of cultural sites and monuments (e.g. churches, historical and archaeological sites), including the improvement of accessibility and touristic services. Cultural paths. Investments in preservation, rehabilitation and valorisation of historic or cultural paths and trails (e.g. Camino de Santiago), including touristic services. Museums and other cultural facilities. Investments in renovation, modernisation and development of museums and investments enhancing culture and leisure facilities (e.g. art centres, historic cinemas, theatres, libraries). Urban renewal. Generic investments in sustainable urban development (i.e. not attributable to a specific sector such as energy efficiency or clean urban mobility), promoting quality of life for citizens and visitors. Visitor centres. Investments in tourist information offices and visitor centres.	092 (Protection, development and promotion of public tourism assets) 093 (Development and promotion of public tourism services) 094 (Protection, development and promotion of public cultural and heritage assets) 095 (Development and promotion of public cultural and heritage services)

4.2. Key characteristics of the policy instruments

Below the key characteristics of the policy instruments are presented, based primarily on the data from the WP2 Single Database,⁶¹ which includes all the operations selected for supporting environment and climate as of the end of 2020.

As of 2020, 98,639 operations were funded under the 12 policy instruments.⁶² In most cases, the operations represent individual projects. However, by definition, operations may also refer to groups of projects (including financial instruments). These operations reached 73,021 beneficiaries,⁶³ either directly or indirectly (i.e. as the ultimate beneficiaries of support services or financial support provided by an intermediary organisation). The following table summarises some of the key features of the policy instruments. In short, it can be observed that:

- **The average expenditure per operation varied significantly depending on the type of policy instrument and programme.** This disparity can be attributed to the nature of the investments supported by the different policy instruments. The policy instrument supporting energy efficiency in enterprises had the lowest average expenditure per operation (at around EUR 0.4 million), while infrastructural operations for the construction or upgrade of clean transport modes had the highest average expenditure, at around EUR 4 million. While the average operation cost stood at EUR 1.2 million, Major Projects⁶⁴ represent the most expensive operations. These were implemented in 13 Member States, with the majority located in Italy, Poland, Croatia, Greece, Portugal and Bulgaria.
- **Operations lasted an average of 2.4 years.** The longest durations were typically observed in operations involving significant infrastructure components, such as wastewater and water projects. Conversely, the shortest operations involved financing of waste management and green economy projects. This is due to the fact that many projects were mainly focused on demonstration and procurement or provision of goods. Analysis of project duration across different regions reveals distinct trends. Less developed regions typically have longer completion times, averaging 2.6 years, while transition regions and more developed regions have averages of around 2.2 years. This discrepancy could be attributed to the prevalence of infrastructure projects in less developed areas, extending the average duration.
- **Non-repayable grants were the most commonly used form of support across all policy instruments,** based on the database of operations funded as at the end of 2020. Fewer than 5% of operations were delivered in a form other than a non-repayable grant. The limited use of financial instruments is confirmed

⁶¹ Work Package 2 on monitoring data of ERDF and CF operations.

⁶² Through 250 programmes. Each operational programme funded an average of 395 projects under the 12 environmental policy instruments, ranging from just one project in the Finnish operational programme 'Entrepreneurship and skills Åland – ESF/ERDF' and the Swedish operational programme 'Stockholm – ERDF' to as many as 9,353 in the Czech operational programme 'Environment – ERDF/CF'.

⁶³ This figure represents the distinct beneficiary names rather than the total number of beneficiary entities, which number 177 435. This is due to some beneficiaries contributing to more than one operation. It also does not take into account over 18,000 anonymised beneficiaries, comprising 10% of all beneficiary entries.

⁶⁴ According to Article 100 of Regulation (EU) No 1303/2013.

by the latest expenditure data. As at the end of 2023, grants accounted for 95.6% of the total expenditure for TO 4, 5 and 6, while financial instruments and other repayable forms of support made up just 4.4%.⁶⁵

- **For most policy instruments, the main types of beneficiaries are enterprises and public administrations at the local level.** Enterprises represent the highest share of beneficiaries for policy instruments supporting energy efficiency in enterprises, green economy and sustainable energy. Local administrations constitute the largest share of beneficiaries for the policy instrument on clean transport. It is worth noting that 95% of enterprises (for which information on ownership is available) are categorised as publicly owned, including, for instance, local water companies and public transport companies.

⁶⁵ This figure was retrieved from the EC Categorisation Data and reflects the forms of finance used in operations classified under TO4, 5 and 6.

Table 2 - Key characteristics of the policy instruments

Policy instruments	Total expenditure allocation as at 2020 (MEUR)	Share of total expenditure allocation as at 2020 (% of total expenditure for environmental and climate objectives)	Number of operations	Share of operations (% of total)	Average duration of operations (years)	Most frequent types of direct beneficiaries (by share of expenditure)	Most commonly used form of finance (by share of expenditure, excluding missing data)
Clean transport	22,080	18.8%	5,569	5.6%	2.8	Public administration – Local level (46.3%)	Non-repayable grant (99%)
Climate adaptation & risk management	10,130	8.6%	5,637	5.7%	2.6	Other institution of public interest (30.4%)	Non-repayable grant (98.8%)
Culture	9,413	8.0%	7,040	7.1%	3.0	Public administration – Local level (47.4%)	Non-repayable grant (99.6%)
Energy efficiency in buildings and public infrastructure	20,135	17.1%	27,551	27.9%	2.5	Public administration – Local level (41.3%)	Non-repayable grant (90.1%)
Energy efficiency in enterprises	4,986	4.2%	12,506	12.7%	1.7	Enterprise (93.8%)	Non-repayable grant (90.7%)
Green economy	3,047	2.6%	4,093	4.1%	1.6	Enterprise (80.4%)	Non-repayable grant (75.3%)
Nature and biodiversity	6,120	5.2%	8,932	9.1%	2.8	Public administration – Local level (49.3%)	Non-repayable grant (99.8%)
Pollution reduction	4,209	3.6%	2,424	2.5%	2.8	Public administration – Local level (45.9%)	Non-repayable grant (99.8%)
Sustainable energy	9,602	8.2%	9,904	10.0%	1.9	Enterprise (54.8%)	Non-repayable grant (99%)
Waste	4,985	4.2%	5,343	5.4%	1.6	Public administration – Local level (37.2%)	Non-repayable grant (97.9%)
Wastewater	16,717	14.2%	4,639	4.7%	3.7	Other institution of public interest (35.8%)	Non-repayable grant (99.9%)
Water	5,994	5.1%	5,001	5.1%	3.2	Enterprise (57.9%)	Non-repayable grant (99.2%)
Total	117,419	100%	98,639	100%	2.4	Public administration – Local, regional, national level (40.5%) Enterprise (31.5%) Other institution of public interest (19.2%) Financial institution (2.5%) Other (6.5%)	Non-repayable grant (96.8%) Loans and guarantees or other forms of repayable aid (1.9%) Venture capital, equity, risk (0.3%) Mixed forms of grants (1%)

Note: The official definition of operations has been used, which may include individual projects, groups of projects or project components. Operations included both direct and indirect operations. The latter refers to operations managed by intermediary organisations, which are then responsible for distributing funding to final recipients.

Source: Authors based on WP2 expenditure data (last updated at the end of 2020).

4.3. ERDF/CF support for environment and climate: allocations over the programming period⁶⁶

4.3.1. Trends in overall support

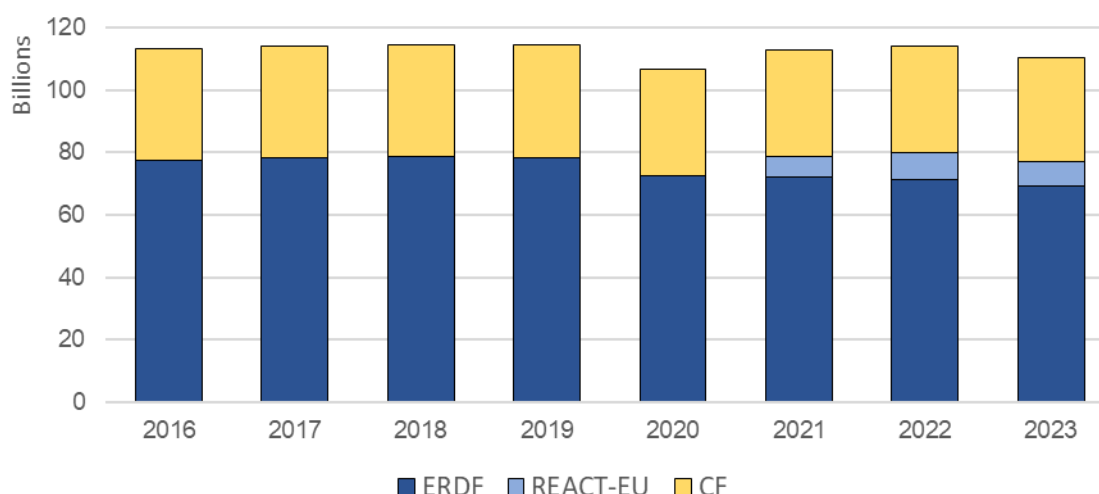
Until the end of 2019, the allocation for climate and environmental investments remained stable (see Figure 11 below). At the start of the 2014-2020 period, the national, regional and territorial cooperation (TC) programmes for environment and climate programmed an allocation of EUR 113.3 billion (of which the EU allocation was EUR 84.7 billion). Before 2020, changes to the initially envisaged policy instruments within the programmes were limited overall. However, revisions to policy instruments, their initial allocation or delivery mechanisms were introduced. These changes were typically made for the following reasons:

- **Ensure higher absorption of funds.** In many cases, funds were redirected to policy instruments with higher absorption rates and smoother and more timely implementation processes. For instance, in Czechia, some resources for energy efficiency were transferred from the 'Integrated Regional' operational programme to the 'Environment' operational programme. While the 'Environment' operational programme focused on public entities (regions, municipalities, universities), churches, foundations and state enterprises, the 'Integrated Regional' operational programme focused on owners of residential buildings and their associations. The initial allocation for energy efficiency projects aimed at households was reduced in the 'Integrated Regional' operational programme due to lower initial interest and strict funding criteria. Potential beneficiaries did not perceive energy as a scarce and expensive resource and the application process was demanding due to factors such as the infrequent use of energy certificates for buildings. As a result, some of the resources were redirected to the 'Environment' operational programme. Implementation challenges and delays associated with major projects can also lead to a significant reshuffling of funds across policy instruments. This was the case in the Réunion region, where the withdrawal of a major project on waste valorisation due to implementation problems led to a reduction in the ERDF allocation to the waste policy instrument in favour of policy instruments with higher absorption rates on adaptation and risk management, as well as clean transport.
- **Better respond to new emerging needs.** For instance, in Lithuania during the implementation phase, there was an increase in allocated funds for wastewater infrastructure interventions. Initially priority was given solely to agglomerations with fewer than 2,000 citizens. However, later, those above this threshold were also prioritised, primarily due to an infringement procedure (initiated by the Commission in February 2017) related to non-compliance with the Urban Wastewater Treatment Directive. The primary focus shifted towards

⁶⁶ This chapter first provides an overview of the ERDF/CF support for environment and climate. The analysis is based on financial data taken from the Open Cohesion Data Platform, specifically on 'planned' amounts from 2016 to 2023 across all programmes.

connecting separate systems in small towns or villages to a centralised wastewater collection system. As a further example, the managing authority of the national Bulgarian 'Environment' programme amended the programme to finance new measures in pollution prevention and mitigation in response to increasing deviations from air quality standards set in Directive 2008/50/EC. Similarly, the Finnish managing authority of the 'Sustainable Growth and Jobs' operational programme reported that the relative importance of funded topic areas changed during the course of the programming period due to an increase in the perceived importance of topics such as the circular economy since the start of the programme. In other cases, the operational programmes naturally evolved without the need for formal re-programming. This is, for instance, the case with the Bulgarian 'Regions in growth' operational programme, where a large share of urban development projects evolved to focus on energy efficiency measures, including, for example, lighting interventions.

Figure 11 – Total planned allocation of the CF and ERDF by year and by fund (billion EUR)



Source: Authors, based on REGIO financial data (as of the end of 2023).

In 2020, the COVID-19 pandemic⁶⁷ led to a redistribution of allocations, resulting in a slight decrease in funding available for environmental and climate measures, with some funds redirected towards business support and healthcare instruments.⁶⁸ As shown in Figure 2, the total funds allocated to the 34 intervention fields included in the evaluation amounted to EUR 106.6 billion in 2020 (of which the EU allocation was EUR 81.1 billion), i.e. 94% of the 2014 level. In 2021, the total allocation increased once again, returning by 2022 to its initial 2014

⁶⁷ The COVID-19 pandemic, which broke out in early 2020, was a major shock to all EU regions and Member States, with a profound and unprecedented impact on the entire society and economy. In response, the European Commission, followed by the managing authorities quickly acted to address the new needs arising from the pandemic. Through the Coronavirus Response Investment Initiative (CRII) and CRII+, the European Commission introduced exceptional measures (such as facilitating the use of unspent funds, quicker reprogramming procedures, extension of the eligibility period and increasing the cofinancing rate to 100%). These changes modified the implementation rules for cohesion policy funds, allowing for greater flexibility. Moreover, the European Commission injected additional resources through the Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU), enabling managing authorities to increase allocations to address the new needs arising during the pandemic.

⁶⁸ This was also acknowledged by the European Court of Auditors (2013), Special report 02/2013.

level. The 2020 reallocations in favour of instruments for business support and healthcare occurred in many operational programmes that have been reviewed in greater detail: Sardinia, Campania, the Bulgarian 'Innovations and Competitiveness', the Czech 'Enterprise and Innovation for Competitiveness', the Romanian 'Large Infrastructure Programme', Cataluña, Andalucía and the Swedish 'National fund for investments in growth and jobs'. For instance, to address the impact of the health emergency, the Italian region of Sardinia shifted resources from the environmental axis to instruments financing ICT solutions in healthcare, health equipment and providing support for enterprises. Consequently, some operations that had already been approved for financing under the operational programme were transferred to national programmes funded by national funds. As reported by the European Court of Auditors,⁶⁹ waiver of the thematic concentration requirement made it easier for Member States to move funding across programmes. Other managing authorities opted for an inter-programme reallocation of resources. For example, the Romanian managing authority shifted resources from the 'Large Infrastructure' operational programme to the 'Competitiveness' operational programme to support public health investments and promote economic recovery. Similarly, the Slovakian managing authority partially reallocated resources from priority axes 1, 2 and 4 of the 'Quality and environment' operational programme to the 'Human Resources' operational programme, which supported COVID-19 measures.

Beyond emergency areas, **in almost all Member States, the additional resources from the REACT-EU were used, to some extent, to support policy instruments aimed at environmental protection and climate change.** This was in line with the REACT-EU Regulation,⁷⁰ which included the expectation for 25% of the overall financial envelope of REACT-EU to contribute to climate objectives, although this was not set as a legal requirement. An example of how REACT-EU funding is being used to support green projects can be seen in the decision made by the Luxembourg managing authority, which allocated half of the additional resources from REACT-EU to finance a clean transport project involving the electrification of public road transport. Denmark also significantly raised its environmental budget thanks to the introduction of REACT-EU, marking a shift in strategy: while initially, support for green transition activities was given to SMEs only, REACT-EU, allowed such support to be extended to enterprises of all sizes.

The new resources contributed by REACT-EU were used to support mature investments in the pipeline or interventions with quick implementation. To ensure the efficient use of REACT-EU resources,⁷¹ the managing authorities extended operational programme support to projects already in the national or regional pipeline that, in the absence of REACT-EU funds, would have been financed exclusively by national/regional funds. For instance, in Luxembourg, all REACT-EU funds were directed towards urban mobility projects that were already at an advanced stage of design.⁷² In addition, the introduction of REACT-EU favoured projects that could ensure rapid absorption, such as investments in the

⁶⁹ European Court of Auditors (2023), Special report 02/2023: Adapting cohesion policy rules to respond to COVID-19, [see link](#).

⁷⁰ Regulation (EU) 2020/2221, recital 6.

⁷¹ The eligibility of REACT-EU ends on 31 December 2023, the same date as for regular 2014-2020 period funding.

⁷² This emerged from the interview with the managing authority and was also reported by the European Court of Auditors (2023), Special report 02/2023.

energy efficiency of buildings and renovation of public transport fleets. An example is provided by the Italian national operational programme 'Enterprises and competitiveness'. Originally focused on supporting businesses, the scope of the programme was expanded following the injection of REACT-EU funds to include energy efficiency measures in public administration buildings. Regional operational programmes, however, were already implementing projects in the same field, largely focusing on building enclosures, which typically require a long timeframe from design to completion. To ensure quick implementation, the national operational programme prioritised support for less demanding interventions, such as replacement of window fixtures and heat pumps. The focus on rapid implementation demonstrated the flexibility of cohesion policy in adapting to evolving challenges. However, it weakened the internal consistency of the programmes.

Following post-pandemic growth, in 2023, the planned allocation for environmental and climate intervention fields decreased again, totalling EUR 110 billion, with 7% sourced from REACT-EU. Conversely, the total planned allocation for ERDF and CF investments directed towards other, non-environmental intervention fields increased from EUR 266.5 billion to EUR 269.7 billion between 2022 and 2023. This shift indicates that funds originally allocated for environmental objectives were redirected to other purposes, with some previously programmed environmental interventions for the 2014-2020 programming period being withdrawn. Similar budgetary adjustments are evident when examining the planned resources, considering only EU contributions and excluding national co-financing. Based on the latest expenditure data, it is clear that, across all programmes, funds in 2023 were generally redirected to intervention fields with higher absorption rates and with committed funds significantly exceeding the planned ones in 2022.

4.3.2. Trends in support by programmes and fields

A total of 267 programmes, including 195 operational programmes and 71 TC programmes, allocated resources to support the environment and climate with varying degrees of intensity. As of 2023, 85% of the total eligible expenditure is concentrated in 77 programmes across 20 Member States, while 85% of the total EU contribution is concentrated in just 66 programmes. In terms of total eligible expenditure, the top five Member States are Poland, France, Czechia, Hungary and Italy. Regarding the total planned allocation for climate and environment as of 2023, the largest programmes in absolute terms are the Polish 'Infrastructure and Environment ERDF/CF' programme and the 'Multi-regional Spain – ERDF' programme. The 'Infrastructure and Environment ERDF/CF' operational programme in Poland has the highest relative allocation for climate and environmental investments, followed by the 'Large Infrastructure Programme – RO – ERDF/CF' implemented in Romania. On average, each programme allocated 30% of its total budget to climate and environment, but there are large variations in the sample (ranging from 3% to 100% of funds allocated to the 34 environmental intervention fields selected for this evaluation). EU-13⁷³ countries represent 54.0% of all CF and

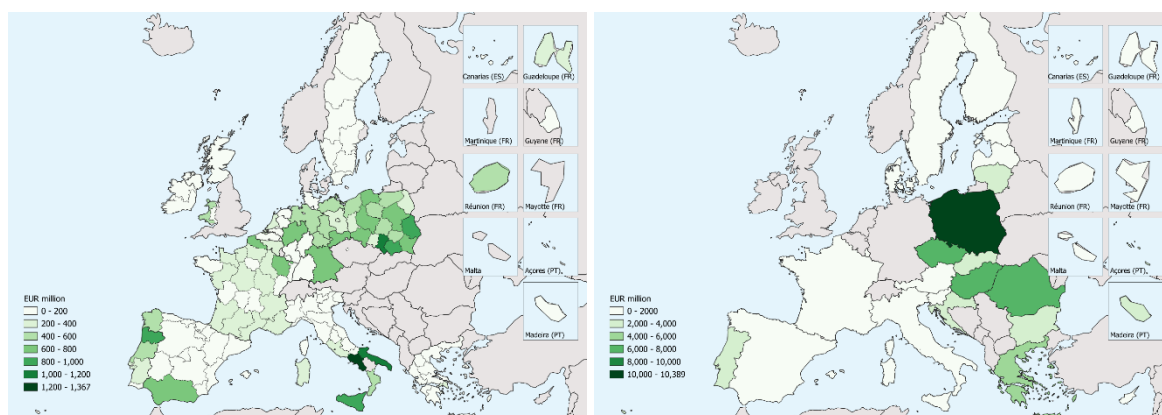
⁷³ The EU-13 group covers the following countries: BG – Bulgaria, CZ – Czechia, CY – Cyprus, EE – Estonia, HR – Croatia, HU – Hungary, LT – Lithuania, LV – Latvia, MT – Malta, PL – Poland, RO – Romania, SI – Slovenia and SK – Slovakia. The EU-14+UK group covers the remaining EU countries, along with the UK.

ERDF resources allocated to the 34 intervention fields, while EU-14+UK⁷⁴ countries allocated 41.7%. The remaining 4.3% of planned funding was allocated through territorial cooperation programmes.

Figure 12 – Distribution of total expenditure planned across EU regions and countries (2023)

Regional OPs

National and multi-regional OPs

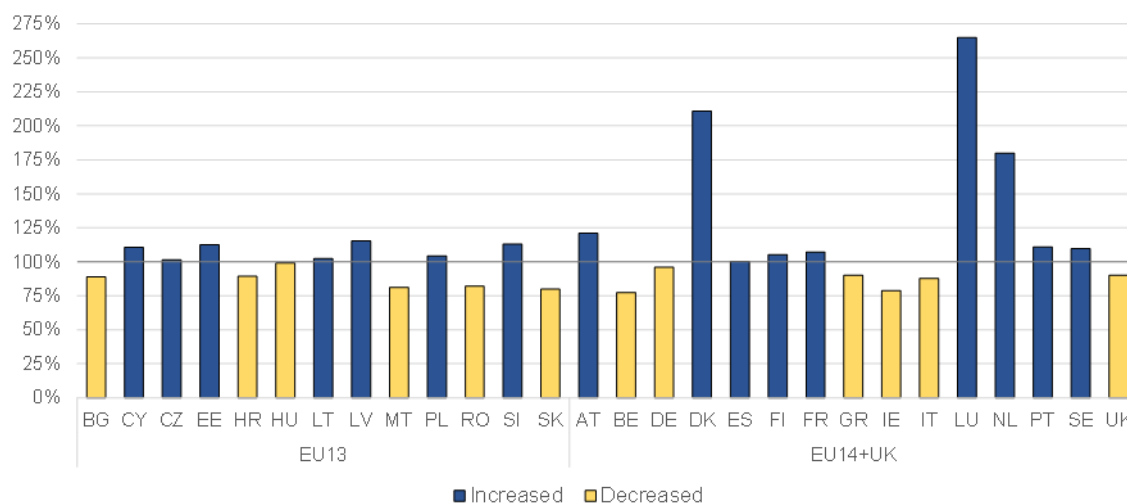


Note: The maps refer to the total expenditure classified under all of the selected 34 intervention fields.

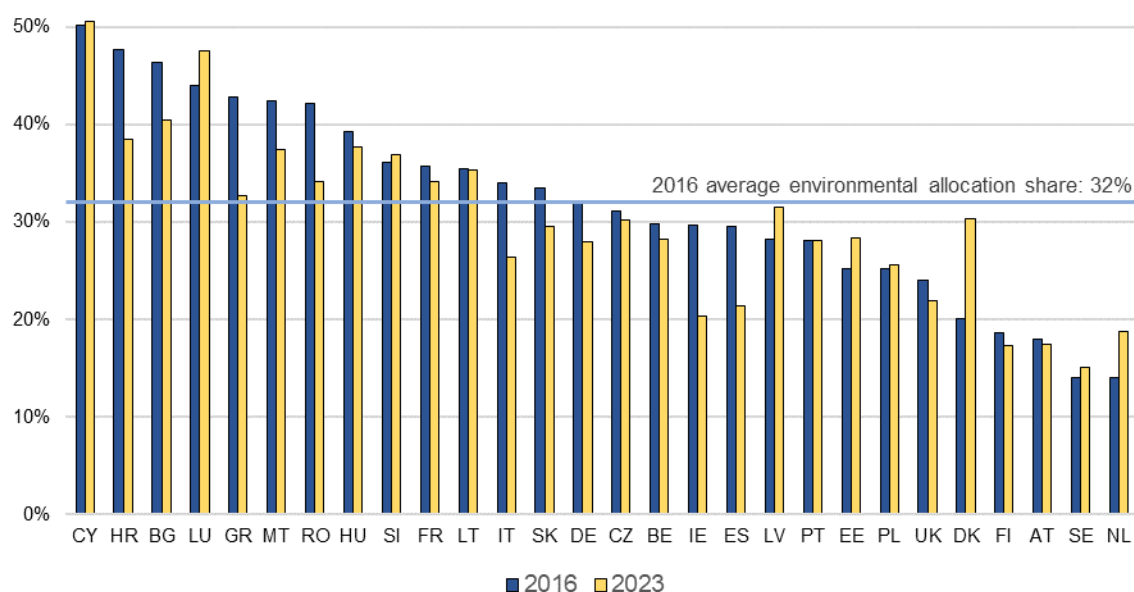
Source: Authors based on REGIO financial data (as of end 2023).

Variations in the allocation for climate and environmental investments between the start and the end of the programming period have followed diverse trajectories across the Member States. Figure 12 shows that, in 2023, 16 Member States (seven from the EU-13 group and nine from the EU-14+UK group) allocated more funds to green interventions than planned in 2016. Among the EU-13, the Baltic countries and smaller countries like Slovenia and Cyprus have significantly increased their resources allocated to climate and environment. Among the EU-14+UK, the Scandinavian countries and smaller developed countries in Central and Northern Europe, such as the Netherlands, Luxembourg and Austria, have boosted their resources for green projects. The common characteristic among the countries that decreased their budgets for environmental interventions is the substantial allocation of their ERDF/CF budget to climate and environmental objectives at the start of the programming period. Excluding Ireland, the United Kingdom and Belgium, the remaining nine Member States that decreased their resources between 2016 and 2023 had a higher-than-average share of ERDF/CF resources allocated to environmental objectives in 2016. The shifts can largely be attributed to the budgetary reprogramming that followed the post-pandemic crisis and the varying decisions made by Member States on the allocation of supplementary funds from the REACT-EU fund.

⁷⁴ Ibidem.

Figure 13 – Planned allocation for environmental intervention fields in 2023 as a percentage of the 2016 level (2016 = 100%)

Source: Authors based on REGIO financial data (as of the end of 2023).

Figure 14 – Share of planned environmental allocation over the total ERDF/CF budget by Member States in 2016 and 2023

Source: Authors based on REGIO financial data (as of the end of 2023).

An updated analysis of funding allocated at the policy instrument level is not feasible. This is because policy instruments were identified by analysing and clustering data on funded operations. As a result, only expenditure data included in the database of operations compiled in Work Package 2 – whose cut-off date is the end of 2020 – could be categorised by policy instruments. However, for each policy instrument it is possible to identify some of the most relevant intervention fields. Accordingly, an analysis of allocations using intervention fields is provided below.

Most allocations were channelled towards the policy instruments on urban transport, energy efficiency public infrastructure, wastewater and adaptation

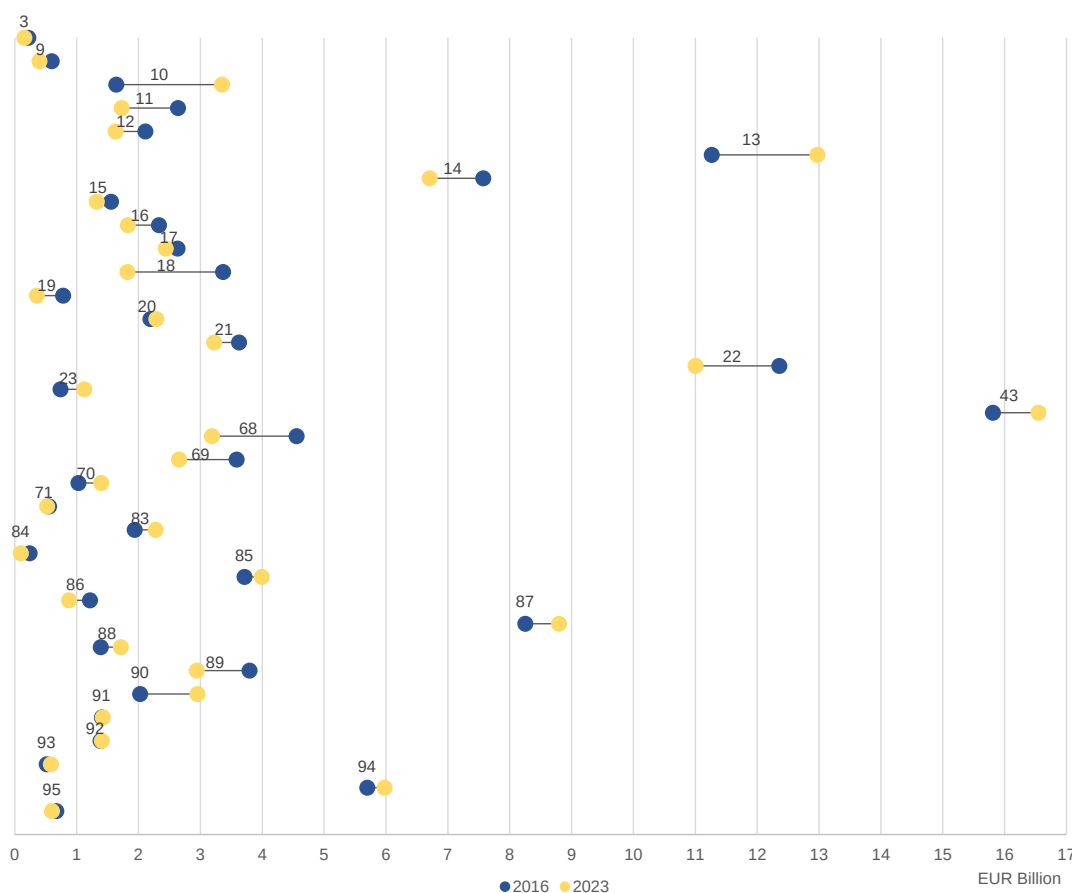
and risk management. More precisely, the intervention fields with the highest allocation (above EUR 10 billion) are clean urban transport infrastructure (043), energy efficiency of public infrastructure (013), wastewater treatment (022) and climate change adaptation (087). The intervention fields with the highest allocation are similar for EU-13 and EU-14-UK. In EU-13, the intervention fields with the highest allocation are clean urban transport infrastructure (043), wastewater treatment (022) and energy efficiency of public infrastructure (013). For the EU-14+UK countries, the intervention fields with the highest investments are energy efficiency of public infrastructure, clean urban transport infrastructure and measures for climate adaptation, prevention and risk management (087).

Allocation shares across the intervention fields vary across the different categories of regions. When considering only the less developed regions, the highest allocations are in intervention fields 043, 013 and 022 but, notably, investments in the protection, development and promotion of public cultural and heritage assets (094) rank fourth in terms of funding volume, with a total allocation close to that for wastewater treatment. In the more developed regions, the intervention field with the highest allocation share is 013, followed by the intervention field for energy efficiency renovation of existing housing stock (014), highlighting energy efficiency actions as a priority in these regions. Similarly, in the transition regions, the most heavily funded interventions are to improve the efficiency of public infrastructure (013), followed in terms of funding volume by measures for climate adaptation, prevention and risk management (087). Regarding the regions categorised as outermost or northern sparsely populated,⁷⁵ it is relevant to highlight that these regions allocate a large portion of their budget to actions related to environmental safeguarding. The most heavily funded intervention field is non-climate-related risk prevention, such as earthquakes and anthropogenic risks like technical accidents (088). The second is intervention field 087, while the third concerns the protection of biodiversity, nature and green infrastructure (085).

Allocations to investments in solar renewable energy, energy efficiency in public infrastructure, clean urban transport and cycling paths increased substantially over the 2014-2020 programming period. During the 2014-2020 programming period, some intervention fields exhibited an upward trend in allocations, while others showed a downward trend. The figure below illustrates the variation in the planned allocations for each of the intervention fields regarding environmental investments between 2016 and 2023. Of the 34 intervention fields, 15 experienced an increase from the start to the end of the programming period. Notable among these are substantial increases in investments in solar renewable energy (010), actions for efficiency improvement of public infrastructure (013), investments in clean urban transport (043) and cycling tracks and footpaths (090). Conversely, among the 19 intervention fields with reduced planned allocations, the most significant decreases occurred in investments including biomass renewable energy (011), efficiency renovation of existing housing stock (014), household waste management (018), wastewater treatment (022) and interventions for the rehabilitation of industrial sites and contaminated land (089).

⁷⁵ The programmes financed in the category of 'outermost or northern sparsely populated' include regions classified as less developed, in transition and more developed. The programmes referred to are as follows: Canarias – ERDF, Central Norrland – ERDF, Martinique – ERDF/ESF/YEI, Mayotte – ERDF/ESF, Réunion – ERDF, Sustainable growth and jobs – FI – ERDF/ESF, Upper Norrland – ERDF.

Figure 15 – Variation in planned allocation by intervention fields (ERDF/CF and matching funds (in billion EUR) between 2016 and 2023



Source: Authors based on REGIO financial data (as of the end of 2023).

4.4. Policy mixes and drivers for selection of policy instruments and investments

The use of different ERDF/CF policy mixes (i.e. combinations of policy instruments) **varies according to national/regional contexts and policy choices.** Although nearly all the programmes display a certain level of concentration of funds on key instruments, a broad mix of policy instruments was implemented by most operational programmes.⁷⁶ This reflects the aspiration to address a vast spectrum of different needs, all related to the environment and climate change. Investments in the policy instrument on energy efficiency of buildings feature strongly in the policy mixes of many countries. The policy instrument on clean urban transport is likewise common to most of the operational programmes. Conversely, investments in policy instruments on water, wastewater and waste are only included in about half of the programmes. However, they are consistently included in the operational programmes of the EU-13 countries, with the exception of operational programmes with a thematic focus on competitiveness/growth/innovation. Policy instruments regarding businesses, such as the policy instruments on energy efficiency in

⁷⁶ Specifically, regional operational programmes have supported an average of nine policy instruments.

enterprises and on the green economy, are allocated only a small share of the total environment and climate expenditure. They are implemented mainly by the EU-14+UK countries, especially in programmes where growth and competitiveness of enterprises are central to the intervention approach. It is noteworthy that the countries with a high proportion of resources allocated to the policy instrument on energy efficiency in enterprises are also among the countries investing most strongly in the policy instrument on the green economy, pointing to a strong interrelation between the two policy instruments.

Compliance with European directives and national/regional strategies or plans are key drivers for the selection of policy instruments. Both the in-depth analysis of 70 operational programmes and the case studies confirmed that compliance with EU directives is the primary factor influencing the selection of policy instruments relating to water, wastewater and waste. Regional and EU-14+UK operational programmes (for example, in Greece, Italy, Spain, the UK and France) tend to cite alignment with regional/national strategies or plans as the main driver for the implementation of policy instruments rather than compliance with EU directives. This can partially be explained by the prevalence of other types of policy instruments in these operational programmes, such as clean transport, pollution reduction, nature and biodiversity and adaptation and risk management. For these policy instruments, the existing national and regional sectoral strategies or plans are the most immediate strategic references.

Infringement procedures act as a catalyst, speeding up certain investments. For example, the infringement procedures on the grounds of non-compliance with the air quality limit values defined by the Ambient Air Quality Directives (AAQDs) were the main drivers for the investments in air quality improvements in the three Member States (Bulgaria Czechia and Slovakia) examined in the policy instrument case on pollution reduction. Interviews with the managing authorities confirmed that the infringement procedures formed the basis for programming significant investments in air quality improvements. Furthermore, the investments were focused on the municipalities with zones/agglomerations included in the infringement procedures on the grounds of non-compliance with the AAQDs. Infringement procedures were also critical factors in the selection of investments for the policy instrument on wastewater. For example, in Lithuania, during the implementation phase, the allocated funds for wastewater infrastructure interventions were increased in response to an infringement procedure related to non-compliance with the UWWTD. Initially, priority was given solely to agglomerations with fewer than 2,000 citizens. However, following initiation of the infringement procedure in 2017, larger municipalities were also prioritised. The primary focus shifted towards connecting separate systems in small towns or villages to a centralised wastewater collection system.

The focus on specific types of investments also depends on the available ERDF/CF funding in alignment with national priorities and funding. Programmes with limited financial resources had to opt for a selective policy mix with a marked thematic concentration. This is the case for Austria, Cyprus, Belgium, Denmark, Finland, Ireland, Luxembourg, the Netherlands and Sweden. Specifically, Belgium adopted a different policy mix for each of its three regional operational programmes, reflecting different needs and policy choices regarding use of the ERDF environmental funds. Under the Wallonia operational programme, most resources are allocated to the policy instrument on energy efficiency in buildings;

under the operational programme Brussels, to culture; and under the Flemish operational programme, to sustainable urban transport. Flanders chose to allocate its limited ERDF funds primarily to the development of bicycle highways – an investment type considered ambitious and challenging to finance using national resources. Some Member States with a relatively modest cohesion policy budget, including Austria, Denmark, Finland, Netherlands and Sweden, implemented a thematic resource concentration strategy, where the environmental policy instruments supported goals related to growth and competitiveness of enterprises, at the core of the overarching intervention logic for ERDF. Unlike these Member States, Ireland did not implement the policy instruments on green economy and energy efficiency in enterprises, opting instead to support these via national funds. Under its Southern and Eastern Regional operational programme, Ireland chose to allocate its limited ERDF funds to improving the stock of social housing and financing the Better Energy Warm Homes scheme.

Some Member States have very similar policy mix patterns. For instance, the UK's policy mix is fairly similar to the Dutch one in its fundamentals. In both cases, the three policy instruments with the highest allocation are sustainable energy, green economy and energy efficiency in buildings. Like the Netherlands, the UK also allocated nearly 10% of its ERDF climate and environment-related funds to support energy efficiency in enterprises. Neither country has allocations to traditional environmental sectors, such as the policy instruments on water, wastewater and waste. Bulgaria and Romania likewise have a very similar mix: their largest policy instruments are respectively water and wastewater, with clean transport as the second-largest policy instrument and energy efficiency in buildings as the third-largest in both Member States. Moreover, neither country allocates significant ERDF/CF resources to the policy instrument on sustainable energy. These similarities suggest that ERDF and CF can adapt to the context in which they are embedded: the policy mix tends to be similar in countries where the starting conditions – especially in terms of initial environmental performance and the role of the ERDF relative to government expenditure in the sector – are similar (see also: Annex VIII – The role of ERDF and CF compared to national financing for the environment).

Ex-ante conditionalities helped Member States to improve planning and cooperation, but had limited influence on the selection of investments in 2014-2020. Ex-ante conditionalities affect the relevance, effectiveness and efficiency of ERDF/CF investments.

- Concerning the policy instrument on adaptation and risk management, delays in fulfilling the ex-ante conditionality impacted the ability of some Member States to ensure that the operational programmes were guided by and aligned with the national risk assessments and adaptation strategies and plans. As of 2016, six Member States⁷⁷ had not adopted a National Adaptation Strategy and fifteen Member States⁷⁸ had not prepared a national adaptation plan.⁷⁹ This meant that a large proportion of operational programmes had been prepared without a

⁷⁷ Bulgaria, Croatia, Cyprus, Estonia, Latvia, Sweden.

⁷⁸ Belgium, Bulgaria, Croatia, Cyprus, Czechia, Estonia, Greece, Ireland, Italy, Latvia, Luxembourg, Netherlands, Portugal, Slovakia, Slovenia.

⁷⁹ European Commission, (2018), Evaluation of the EU Strategy on adaptation to climate change, [see link](#).

strategic framework in place to guide investments in adaptation and align them to needs and risks. This finding is further confirmed by a special report of the European Court of Auditors on the performance of the ex-ante conditionalities,⁸⁰ as well as by the three case study countries analysed in depth as part of the case study on policy instrument adaptation and risk management. The national adaptation strategies and plans had not in fact been adopted at the stage of preparing the operational programmes in Sardinia region (Italy), Hungary and Slovenia.⁸¹

- Regarding the policy instrument on water, Member States faced challenges in implementing the ex-ante conditionality at the time of preparing the operational programmes. While some of the criteria of the conditionality were eventually fulfilled (such as the adoption of River Basin Management Plans) and stakeholders⁸² generally recognised the ex-ante conditionality as useful for implementing reforms and improving governance processes and coordination, the conditionality had no or very limited influence on the selection of projects to be funded within the operational programmes.
- In the context of the policy instrument on waste, fulfilment of the ex-ante conditionality was delayed and its influence on the selection of waste investments was mixed. Thematic conditionality 6.2 – on the promotion of economically and environmentally sustainable investments in line with the requirements of the Waste Framework Directive⁸³ – had the lowest fulfilment rate of all thematic ex-ante conditionalities at the time of operational programme adoption. It had the second longest average fulfilment time and the second lowest rate of completed action plans by 2017.⁸⁴

High-quality supporting strategies and plans are essential for improved targeting of climate and environmental policy investments. Robust assessments and evidence-based national/regional/local strategies and plans play a pivotal role in the identification of key climate and environmental needs and ensuring that operational programmes and investments (such as those under the policy instruments for adaptation and risk management, waste and clean transport) are appropriately targeted.

The quality of strategies and plans varies across Member States, regions and even cities and is also influenced by differing traditions and experiences. This variation was particularly evident in the policy instruments on climate adaptation and risk management, waste and clean transport.

- For the policy instrument on adaptation, the EEA's evaluation of national adaptation policies (2020) indicated underdevelopment of the requirements for

⁸⁰ European Court of Auditors, (2017), Ex ante conditionalities and performance reserve in Cohesion: innovative but not yet effective instruments, [see link](#).

⁸¹ Accordingly, all three countries relied on other strategic documents, such as flood risk assessments. This enabled the countries to target the operational programmes towards some of the most pressing issues, but it also meant that wider climate change risks and adaptation needs were not addressed in a holistic manner.

⁸² According to the views expressed by stakeholders in the interviews and workshop held as part of this evaluation.

⁸³ The criteria for fulfilment of this conditionality included existence of the Waste Management Plan (WMP), the Waste Prevention Programme (WPP) and prioritisation according to the waste hierarchy.

⁸⁴ European Court of Auditors (2017), Ex ante conditionalities and performance reserve in Cohesion: innovative but not yet effective instruments, Special Report No 15/2017, [see link](#).

national adaptation strategies and national adaptation plans. This means that there was variation in their quality in terms of the strength of the assessments, identification of sectors, level of detail and articulation of implementation approaches. A similar criticism was made regarding national risk assessments, noting that there is variation in their quality and detail.^{85,86}

- For the policy instrument on waste, two studies prepared for the Commission – covering 72 Waste Management Plans (WMPs) – concluded that 31 of the WMPs failed to address mandatory elements for WMPs under the Waste Framework Directive properly.⁸⁷ Focusing on the three case countries (Greece, Croatia and Latvia) analysed in depth in the present evaluation, it also emerged that the quality of the adopted WMPs and Waste Prevention Programmes (WPPs) differed, with some persisting challenges in complying with the waste hierarchy and meeting the EU waste targets.
- Regarding the policy instrument on clean transport, the evaluation of the Urban Mobility Package 2013 and a report by the European Court of Auditors⁸⁸ underscore the varying uptake and quality of Sustainable Urban Mobility Plans (SUMP) across cities, as well as the risk that some SUMP have been developed and adopted merely as a formality for accessing funds, without decisive steps being taken towards the introduction of better conceived clean urban mobility investments and measures.⁸⁹ The Committee of the Regions (2022)⁹⁰ notes that the scope and level of ambition are unique for each SUMP. A key takeaway from the thematic expert workshop held as part of the present evaluation is that, beyond the requirement to have a SUMP in place to influence local political decisions, it is necessary to persuade transport planners, mobility experts and the public of the importance of sustainable mobility, coherent planning and the monitoring of investments to ensure their alignment with the plan.

4.5. Level of delivery

In climate and environmental actions, the territorial dimension plays a pivotal role: the green transition, in many respects, takes place on a local level. In this context, the OECD⁹¹ has recently analysed fiscal federalism in relation to the ecological transition by collecting data on public spending for environmental protection and climate action by governance level. According to its analysis, local

⁸⁵ European Environment Agency (2020), Monitoring and evaluation of national adaptation policies throughout the policy cycle, [see link](#).

⁸⁶ European Commission (2018), Evaluation of the EU Strategy on adaptation to climate change, [see link](#).

⁸⁷ Articles 28 (1) to (3) and (5) of Directive 2008/98/EC, concerning the requirement of existing WMP(s) to cover the entire territory of the Member State and to include, at minimum measures for re-use, recycling, recovery and disposal of waste, as well as general waste management policies and waste collection schemes, [see link](#).

⁸⁸ European Court of Auditors, (2020), Sustainable Urban Mobility in the EU: No substantial improvement is possible without Member States' commitment, Special report 06/2020, [see link](#).

⁸⁹ Several corrective measures were recently taken by the Commission to address these issues, including the Urban Mobility Framework Communication, the revised TEN-T Regulation, the revised EU Concept for SUMP and the Commission recommendation on national SUMP support programmes.

⁹⁰ European Committee of the Regions, (2022), The New Urban Mobility Initiative: Can it deliver inclusive local mobility needs and European decarbonisation goals at the same time?, [see link](#).

⁹¹ Dougherty, S. and A. Montes Nebreda (2023). 'The multi-level fiscal governance of ecological transition', OECD Working Papers on Fiscal Federalism, No. 44, OECD Publishing, Paris, [see link](#).

authorities bear primary responsibility for public spending on environmental protection, particularly on waste and wastewater management. They are also responsible for a large share of public climate expenditure, though to a lesser extent.⁹²

Focusing on the ERDF and CF, Member States supported climate and environment-related intervention fields through different combinations of national and regional operational programmes (see Figure 16). Six EU-14 Member States⁹³ and the United Kingdom made use of ERDF only through regional operational programmes in the 2014-2020 period. Conversely, five EU-13 Member States supported climate and environmental actions only through national thematic operational programmes focused on environment-related sectors.⁹⁴ A mixed approach, with both national thematic and regional operational programmes, was adopted in five other Member States.⁹⁵ The 11 remaining Member States had only one ERDF/CF operational programme during the 2014-2020 period.⁹⁶ As shown in the following graph, a positive relationship between the share of ERDF/CF support implemented through regional programmes and sub-national public expenditure as a share of total government spending can be observed only in EU14+UK countries (with the exception of Austria and Finland) and Poland. This implies that the degree of regionalisation of ERDF/CF funding for climate and environment areas is not always aligned with the national funding structure.

⁹² See Box 4.4 Decentralisation of public spending on the green transition in the 9th Cohesion Report, [see link](#).

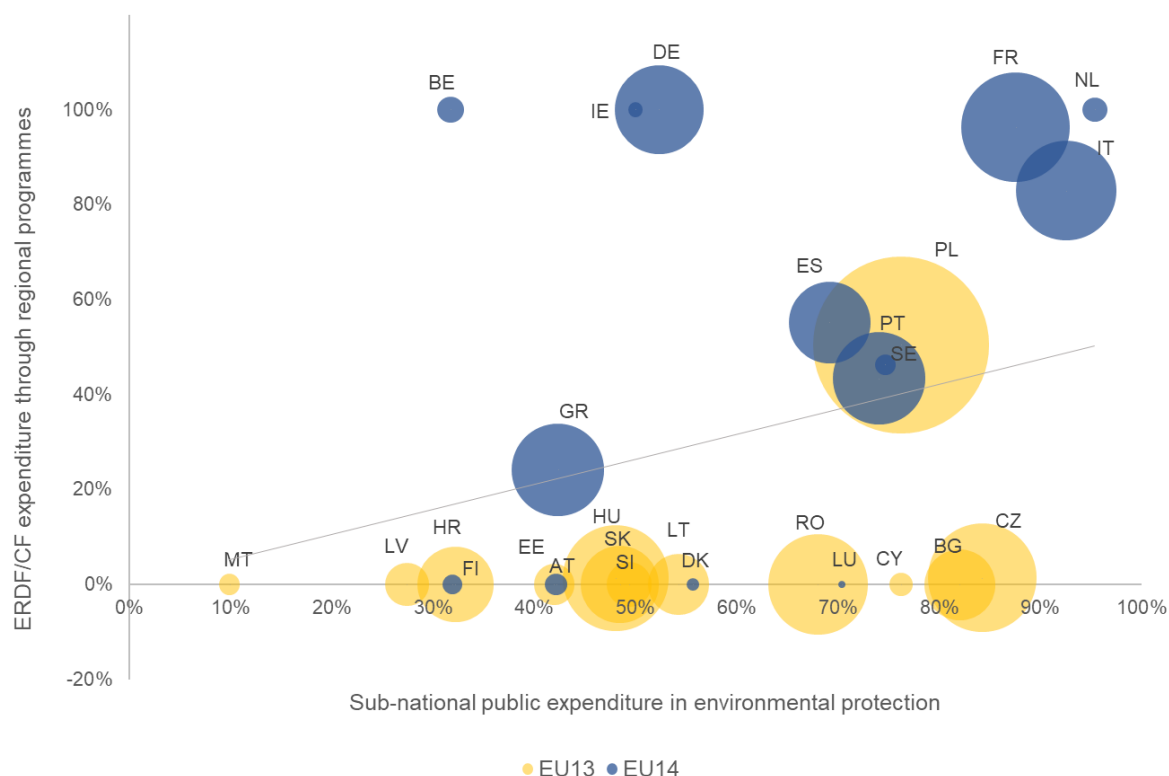
⁹³ Belgium, Germany, France, Ireland, Netherlands, Spain.

⁹⁴ Bulgaria, Czechia, Hungary, Romania and Slovakia.

⁹⁵ Greece, Italy, Poland, Portugal and Sweden.

⁹⁶ Austria, Croatia, Cyprus, Denmark, Estonia, Latvia, Lithuania, Luxembourg, Slovenia. Finland and Malta had two ERDF operational programmes, but one of the two programmes accounted for the overwhelming majority of funding.

Figure 16 – Share of ERDF and CF support implemented through regional programmes and share of sub-national public expenditure in environmental protection, 2014-2020



Source: Authors based on REGIO financial data (as of the end of 2023) and Eurostat data on sub-national government expenditure.

Each delivery approach (i.e. via regional operational programmes, national operational programmes or a mixed model) has its own merits. Implementation of support through national programmes does not preclude funds from reaching local levels:

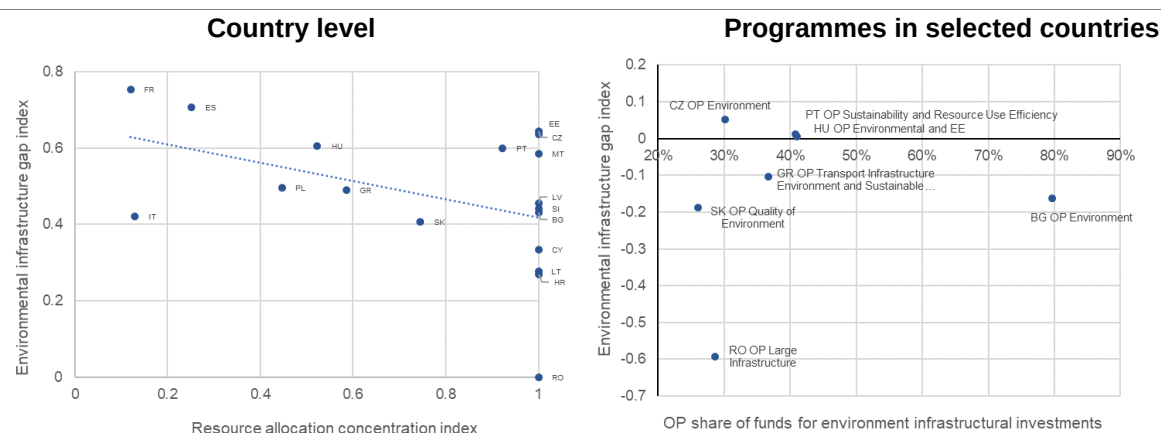
- The main rationale for an approach based only on regional operational programmes lies in the possibility to ensure strong alignment with local needs and specificities. Indeed, this alignment is reflected in the heterogeneous use of ERDF in regional operational programmes within the same country. In countries relying solely on regional operational programmes, few common patterns can be identified across the policy mixes of different operational programmes. Based on different contexts and prioritisation choices, each regional operational programme generated a different policy mix. This phenomenon can be observed in large countries (France, Germany, Spain, the United Kingdom), as well as in smaller countries with a lower number of regions (Belgium, Ireland).
- The approach based on national thematic operational programmes (each implementing a limited number of policy instruments) was chosen by Member States with severe infrastructure gaps⁹⁷ across almost all regions, such as

⁹⁷ Proxied by a synthetic index developed considering the deviation of each country from EU average in 2014 of three indicators related to infrastructural gaps: population connected to public water supply, population connected to wastewater treatment, municipal waste disposed in landfill.

Bulgaria, Czechia, Greece, Hungary, Portugal, Romania and Slovakia (see Figure 20). This approach, through the centralisation of competences, is well-suited to the need for extensive interventions in environmental sectors, especially those related to the pre-conditions for socio-economic development, such as policy instruments on water, wastewater and waste and, to a certain extent, the policy instrument on clean transport.

- In Member States with both national and regional operational programmes, the question of demarcation comes to the forefront. In Italy, for instance, strongly decentralised delivery through regional operational programmes (which account for 60% of ERDF climate and environmental resources and generally ensure strong alignment with local needs) is complemented by national operational programmes, which enable common integrated strategies for, among other priorities, the largest urban areas and SME competitiveness, with environmental aspects playing a crucial role in both cases. In the Swedish case, the national operational programme sought to address challenges that could not be solved at regional level, including with a focus on capacity building. During the seminar, it was noted that the national operational programme established knowledge platforms to support regions and project owners in their green transition, reinforcing the trend for expertise to be concentrated in national agencies and limited at local level.

Figure 17 – Environmental infrastructure gap and resource allocation in countries and selected programmes (2014)



Source: Authors based on REGIO financial data (as of the end of 2023).

5. The evaluation findings

This chapter presents the key emerging findings of the evaluation that arose from testing the policy instrument's specific theories of change and investigating specific causal chains, preconditions, supporting factors and risks. Based on the analysis performed, several key messages emerge that can provide lessons learnt for future programming of climate and environmental investments in ERDF/CF. The box below summarises the high-level findings that are outlined in this chapter.

ERDF / CF investments aimed at achieving the relevant objectives of the Europe 2020 strategy are overall below expectations (as expressed in common indicator target values); highest achievement rates are noted in the areas of renewables, energy efficiency, climate change adaptation and nature & biodiversity.

On *decarbonisation objectives*, investments generated an annual reduction of 9.6 million tonnes of CO₂ equivalent. Investments in renewable energy achieved 67% of the expected target on renewable energy production capacity. This needs to be put into the context of increased target values, increased financial allocations, as well as challenges related to the implementation of such investments, especially in relation to permitting. Investments in improved energy efficiency show varying trends with higher achievement rates for improved energy consumption in households (97%), and lower rates for public buildings (57%). Overall, less developed regions have the highest achievements. Next, clean transport measures led to the achievement of 51% of the target set for the improvement of trams and metro lines. The lowest achievement rate by far is seen in the developed regions. Such investments were predominantly found in Member States with transition and less developed regions. The relatively modest achievement rate can also be explained by the complexity of such projects, which require long implementation times, and which could therefore suggest that delays have occurred in implementation. Overall, despite the positive contributions of investments, more progress is needed - particularly in light of the progress report on climate, indicating that the EU is currently not on track to reach its 2030 objectives. In smart grid connections, the achievement rate lies at a modest 19%.

On *adaptation and risk management objectives*, investments helped to build resilience with approximately 29 million people protected against flood risks, and 24 million protected against fire risks. However, the achievement rates fall below expectations: Across all operational programmes, 81% of the target for flood protection has been achieved and 63% of the target for fire protection. The difference between the two is mainly because of a high achievement rate for flooding in territorial cooperation programmes. Disregarding territorial cooperation programmes, which nevertheless count for relatively high shares of the total targets, the highest achievement rates are seen in national programmes. The two output indicators (persons benefitting from flood protection and forest fire protection, respectively) are applied to a range of project types that differ widely. Projects thus cover prevention, preparedness and response measures. They are implemented in geographies with specific risk levels. Funded activities to protect against the impacts of disasters can include, for example, information campaigns, early warning systems, and preparation of strategies and plans. Due to these complexities, the simple adding up of persons benefitting from protection measures does not necessarily suggest a proportional development in the achieved 'protection level'.

On *environmental objectives*, investment results in environmental infrastructure implied that 8.3 million persons were served by improved water supply and 9.2 million persons were served by improved wastewater supply. However, in wastewater, this achievement implies that only 49% of the target has been reached. In water supply, the rate is 60%. Low achievement rates in a few countries are the main reason for the relatively low overall achievement rates. And these countries are predominantly found in Southern and South-Eastern Europe. The positive contribution from cohesion funds to improvements in water, wastewater and waste management can be statistically verified. In terms of waste, the common indicator is 'Additional waste recycling capacity', with an achievement rate of 69%.

On *nature and biodiversity objectives*, Output indicator data suggests that the target of supporting 11.3 million hectares of habitats - to attain better nature conservation - has almost been met (achievement of 99%). While achievements vary across Member States, the highest achievement rate is seen for the category 'developed regions', followed by 'transition regions'. 'Less developed' regions reflected the lowest achievement rate. Lack of co-funding can delay investments. However, a very high achievement rate in territorial cooperation programmes made a positive contribution towards the high overall achievement level. Nature & biodiversity is the single most important PI in these programmes in terms of allocations, and these programmes also count for more than half of the total target. The achievement rate in territorial programmes is 126.9%.

While several factors had both positive and negative impacts on the implementation of investments in climate and environment, a lack of administrative capacity and skills stand out as a key factor. Despite the limited administrative capacity negatively affecting all types of investments and regions, it is primarily a local-level issue. Capacity problems are especially present at the level of local administrations and impact small municipalities, regardless of whether they are located in less developed, transition or more developed regions. Bottlenecks exist when responsibilities are handed over to local administrations. These administrative bodies are responsible for a significant portion of the policy instruments' implementation - especially in relation to clean urban public transport, waste, water, and wastewater policy instruments. Low administrative capacity also impacted the ability of authorities to deal effectively with complex procedures such as permitting, procurement, EIAs, and state aid which further delayed investments. A shortage of skilled experts delayed investments, but this situation was specific to certain policy instruments and Member States. The availability of construction and engineering skills was reported to have impacted infrastructure-related investments, particularly in transition and less developed regions. External factors also impacted the implementation of the investments such as the COVID-19 pandemic, the Russian invasion of Ukraine and acceptance and uptake by citizens of investment solutions (e.g. public transport investments).

Financial instruments have been put into use in environment and climate categories, but their use remains limited and with likely unharvested potentials. However, financial instruments have been used less in climate and environment categories than what was aspired to at the beginning of the programming period. Financial instruments are only relevant and feasible under certain conditions. Yet when these are fulfilled, financial instruments have strong potentials. Financial instruments can leverage the impact from cohesion funding and provide for more investments with a higher impact, especially through combining grants with financial instruments. Continued incentivisation and support are required in order to fully benefit from financial instruments. While financial instruments demand certain conditions to be fulfilled, they must also be designed with a view not to be crowded out by competing grant schemes.⁹⁸ Their attractiveness may be challenged by a 'grant culture' where beneficiaries are accustomed to grant financing and reluctant to accept financial instruments. This, combined with uncertainties, capacity and skills challenges, indicates the unrealised potential of financial instruments.

The impact of ex-ante conditionalities on investment was affected by delays in fulfilling the conditionalities and the level of ambition. While some ex-ante conditionalities were reportedly 'easier' to fulfil (e.g. ex-ante conditionality on renewable energy), they were also reported not to have realised their full potential because they were perceived as a pure 'box-ticking' exercise. Meanwhile, the ex-ante conditionalities on water and wastewater were more challenging to fulfil yet they laid out important foundations for better investments. For instance, the ex-ante conditionality on water services (when adequately implemented) was reported to strengthen the framework for cost-recovery. However, water services are still below full-cost recovery in most Member States, principally due to methodological issues and concerns about affordability. Delays in fulfilling the ex-ante conditionality on adaptation and quality issues with the content of the adaptation plans meant that investments had been programmed without a strong overarching framework, thereby impacting their ultimate quality.

⁹⁸ As observed in FI compass publications and as also observed and pointed to by managing authorities interviewed as part of this evaluate.

Coordinated planning and governance enhanced investments. The use of horizontal principles and ex-ante conditionalities contributed to the coherence of investments at the programming stage. The horizontal principles (i.e. sustainable development, polluter-pays principle, the use of green public procurement (GPP) as a good practice, the application of the Strategic Environmental Assessment Directive and the Environmental Impact Assessment Directive) were instrumental in ensuring coherence between the cohesion policy investments and other EU policies and legislation. Furthermore, the integration of environmental criteria in the selection of projects contributed towards mainstreaming sustainability across cohesion policy measures but faced certain challenges.

5.1. Achievements are lower than targets, but positive contributions were made across all Green Deal-related areas

ERDF/CF investments contributed to meeting decarbonisation needs as set out in the Europe 2020 objectives, but a need for additional efforts remains. This is particularly in light of the overall EU ambition of climate-neutrality by 2050. Climate neutrality is at the heart of the European Green Deal, and recent progress reports indicate that the EU is not on track in reaching its 2030 objectives of removing 310 tonnes of CO₂ from the atmosphere per year.⁹⁹ Macro-level indicators (see Annex VII) confirm that progress was made in Europe in terms of decarbonisation. The share of renewable energy in electricity production increased from 26.8% to 41.2% during the period concerned, and CO₂ emissions from energy production decreased by more than 50%. Improvements are also clearly visible in final energy consumption in households, as well as in CO₂ emissions from heating/cooling in households. Furthermore, CO₂ emissions intensity has decreased by 37.7% due to the decarbonisation of industrial activities.¹⁰⁰ However, the level of contribution of ERDF/CF investments to these positive trends cannot be statistically established.¹⁰¹ By the end of 2022, decarbonisation investments delivered through the policy instruments covered by this evaluation led to an estimated annual decrease of 9.6 million t/CO₂ equivalents in greenhouse gas emissions.¹⁰² However, only 50% of the target for GHG emissions reduction was achieved, which is lower compared with indicators measuring progress on other policy instruments.

Table 3 - Achievement and absorption rates of investments related to creating a low-carbon economy

Common Output Indicator	Achievement (2022)	Achievement rate (2022) ¹⁰³	Δ Target value (2015-23)	Absorption rate (2023)	Δ Financial allocation (2016-2023)
Additional renewable energy production capacity (CO30)	6.012 MW	67%	+17%	93%	+2%
No. of households with improved energy consumption classification (CO31)	562.306	93%	-31%	106%	-11%
Decrease in annual primary energy consumption of public buildings (CO32)	3.6 bn kWh/year	57%	+17%	85%	+15%
No. of additional energy users connected to smart grids (CO33)	643,448	19%	+4%	45%	-15%

⁹⁹ European Commission (2023), Climate Action Progress Report.

¹⁰⁰ Based on Eurostat data.

¹⁰¹ The statistical analysis carried out as part of this evaluation (see Annex V) did not identify a statistically significant correlation. However, this absence of evidence should not be misinterpreted as evidence against the contribution of ERDF funding in that regard. Rather, it exemplifies very well that the ERDF/CF are only one out of a multitude of different factors that are needed to achieve desired outcomes.

¹⁰² Common output indicator: estimated annual decrease in GHG emissions (CO34).

¹⁰³ Measured against 2023 targets.

Common Output Indicator	Achievement (2022)	Achievement rate (2022) ¹⁰³	Δ Target value (2015-23)	Absorption rate (2023)	Δ Financial allocation (2016-2023)
New or improved tram or metro lines (CO15)	257 km	51%	-32%	93%	+5%
Estimated decrease in annual GHG emissions (CO34)	9.6 million t/CO ₂ eq.	50%	-56% ¹⁾	92%	+2%

¹⁾ The significant change of -56% is due to corrections in the initial set values in some of the programmes, applied later during the programming period.

Source: Authors, based on Cohesion Open Data Platform data relating to achievements and categorisation.

Although ERDF/CF investments contributed to increasing renewable energy capacity (especially solar capacity), achievement rates are below targets across all types of regions. Member States in which renewables account for a relatively small fraction of the electricity supply prioritised ERDF/CF spending for developing renewable energy capacity.¹⁰⁴ Furthermore, the highest share of allocations is programmed under national programmes (51%) and in less developed regions (54%) (see Annex VI). The ‘renewable energy: solar’ intervention field is the most significant, representing 23% of the total expenditure. By the end of 2022, renewable energy production capacity had reached 67% of its 2023 target. While this might suggest that effectiveness is lower than anticipated, two key factors should be taken into account. First, the higher absorption rate indicates that results may still be in progress; and second, permitting procedures often pose challenges for renewable energy projects, which can lead to delays.¹⁰⁵ Both factors suggest that the achievement rate may improve as delays in implementation are addressed and progress accelerates. Achievements are comparatively low in national programmes, while they are highest in less developed regions, primarily due to a strong achievement rate in Poland.¹⁰⁶

Contributions from clean transport to decarbonisation fall short of expectations. In clean urban transport, the overall achievement rate of the common indicator ‘new or improved tram or metro lines’ (CO15) lies at 51%. Whereas the achievement rate is highest for national/mixed programmes (almost 80%), it is only 5.5% for developed regions and 40.2% in less developed regions. Overall, Italy and Poland together count for almost half of the total target. Therefore, achievements in these two Member States have a large impact on the overall achievement rate. In Italy, the achievement rate is at only 11%, thus affecting the overall achievement rate negatively. In Poland, the achievement rate is 71.1%, contributing positively to the average achievement rate. Investments in clean transport are, on average, by far the largest (EUR 4 million on average per project)¹⁰⁷, which illustrates the complexity of such projects and the possible long-time span until a project is finished, which can imply that projects are still under implementation.

¹⁰⁴ At Member State level, needs expressed (based on the current share of electricity from non-renewable sources) are particularly pronounced in Netherlands, Luxembourg, Lithuania, Poland, Belgium, Estonia, Czech Republic, Hungary and Malta. The first four of those have also allocated a relatively high fraction of the ERDF funding towards renewables.

¹⁰⁵ The Policy Handbook developed as part of this evaluation and the case study on PI sustainable energy developed as part of this evaluation.

¹⁰⁶ The target is substantially higher for Poland than for any other country (see Annex VII) and thus Poland weighs heavily in the average achievement observed across all less developed regions.

¹⁰⁷ See Annex VI, table 37.

Investments in energy efficiency led to improved energy performance, particularly within households. Positive results have been noted across regions, particularly less developed ones. Investments in energy efficiency in households have nearly reached their target (93%), indicating effective implementation of measures to reduce energy consumption. In contrast, improvements in public buildings have progressed more slowly, with achievement rates falling short of expectations (57%). Less developed regions stand out in terms of their achievement rates, both in terms of households and public buildings. This is partly due to a shift in funding priorities after the COVID-19 pandemic, which saw increased financial allocations for public buildings later in the programming period, while funding for household energy efficiency was reduced. At a broader level, greenhouse gas emissions from energy use in buildings decreased by 22% between 2005 and 2021. This reduction reflects substantial improvements over a longer time period, though a direct statistical link between these outcomes and cohesion fund investments cannot be definitively established (see Annex V). Nevertheless, the overall trend suggests that cohesion funds have been effective in promoting energy efficiency, particularly in less developed regions, where both households and public buildings have benefitted from these investments.

ERDF/CF investments enhanced climate resilience, particularly through national programmes and in less developed and transition regions, with significant success in flood protection through territorial cooperation programmes. The need to strengthen resilience to climate change can be observed across Europe, with less developed and transition regions having provided significant financial allocations to this area. Investments in adaptation and risk management show achievement rates of 80.9% (people benefitting from flood protection); and 62.7% (people benefitting from fire protection), covering 53.1 million people.¹⁰⁸ Territorial cooperation programmes set higher targets for both indicators than any other programme type, and the variations in achievement rates for these programmes primarily explain the overall differences in achievement rates.¹⁰⁹ National programmes show the second largest total achievement rate. At the Member State level, Portugal performed well in forest fire protection at the level of ambition and achievement (110.8%), while Poland and Romania performed well in flood protection achievements (95.2%, 100.0%, respectively). Adaptation and risk management measures range from softer types of measures (e.g. including awareness initiatives, early warning systems, adaptation planning support, research) to complex infrastructure investments. The latter is more challenging to conceptualise, design and implement.¹¹⁰ Case studies revealed that flood protection investments, often costly, were derived from prior sector-based planning rather than comprehensive climate risk analyses.¹¹¹ Infrastructure investments stand out for

¹⁰⁸ Achievement rates and realised achievements must be interpreted with utmost care when assessing effectiveness. Investments in adaptation and risk management can assume many forms, ranging from hard, complex and expensive investments aimed at protecting an area against flooding, over development of early warning systems, and to awareness building campaigns and support to the development of adaptation strategies. All such investment types play an important and mutually supportive role in delivering improved protection. However, the invested value per person benefitting will vary significantly.

¹⁰⁹ In territorial cooperation, the achievement rate is 86.2% for flood protection and 43% in the case of forest fires (see Annex VII).

¹¹⁰ The average size of these investments ranks 3 among the 12 PIs; the PI has the highest allocation for an individual projects and exhibits a high level of variation in project size (ranking 4) (See Annex VII)

¹¹¹ Despite challenges encountered in the implementation of the measures funded (particularly administrative capacity and lack of skills, see section 5.4), progress towards adaptation and resilience has been made.

their scale, with average adaptation project sizes at EUR 1.8 million and the largest single project valued at EUR 708 million.

Table 4 - Achievements and absorption rates of investments related to climate adaptation and risk management

Indicator	Achievement (2022)	Achievement rate (2022) ¹¹²	Δ Target value (2015-23)	Absorption rate (2023)	Δ Financial allocation (2016-2023)
Persons benefitting from flood protection measures (CO20)	29.3 million	81%	+173%	89%	+9%
Persons benefitting from forest fire protection measures (CO21)	23.8 million	63%	+223%	89%	+9%

Source: Authors based on Cohesion Open Data Platform data on achievements and categorisation.

Achievement rates are below targets for water, waste and wastewater, despite high absorption of funds. The investments in all three policy instruments largely aim to meet compliance gaps and modernisation needs, especially in EU13 countries, which is also where the largest needs are identified.¹¹³ Case studies indicate that investments in circular solutions, which are at the “higher end” of the waste hierarchy, are limited. In wastewater, less developed regions account for the highest total target, followed by national programmes. The low overall achievement rate of 49% is due mainly to low achievement rates in five specific countries. In Slovenia, Hungary, Greece, and Spain¹¹⁴ achievement rates are between 30% and 40%, and in Croatia, it is only 9.7%. Allocations for wastewater in Croatia amounted to 40% of the total allocations (see Annex VI) and the low achievement rate thus raises concern whether the needs as prioritised in the national programme will eventually be met as anticipated. In water supply, the overall achievement rate is higher, at 60%. As for Croatia in wastewater, Bulgaria, Malta and Slovenia have allocated the single highest expenditure amount for PI water supply, and out of these three countries, only Slovenia is on track in meeting its targets. The achievement rate is 16.6% in Bulgaria and 0.0% in Malta.

The positive contribution of ERDF / CF investments to improvements in water supply wastewater treatment, waste recovery and resource efficiency can be statistically verified. Several macro-level indicators related to resource efficiency, circular material use and recovery of waste through recycling and energy recovery, show improvements during the period concerned.¹¹⁵ According to Eurostat data,

¹¹² Measured against 2023 targets.

¹¹³ Four Southern EU14 countries (Portugal, Spain, Italy, Greece) have allocated 20% or above of their expenditure for wastewater, water and waste, where the group of countries that have allocated 0% to one or more of the three PIs is dominated by Western (Northern and Central) European countries (see Annex VII).

¹¹⁴ These four Member States have relatively low achievement rates, and relatively high targets – the latter implies that they carry some weight in the calculation of the overall achievement rate.

¹¹⁵ See the Annex VII).

between 2013 and 2020, significant progress has thus been made across Europe in shifting municipal waste away from landfilling and incineration to recycling and energy recovery treatment plants. This is particularly pronounced in Eastern Europe (for example, Bulgaria, Czechia, Poland, Slovenia, Slovakia), but also in Belgium, Luxembourg, or Germany. A regression analysis carried out as part of this evaluation has confirmed a statistically significant correlation between the level of ERDF/CF funding allocated and the observed macro-level improvements.¹¹⁶ In concrete terms, this means that Member States¹¹⁷ which invested more have also achieved stronger improvements at the macro-level and vice versa.

Table 5 - Achievements and absorption rates of investments related to environment and resource efficiency

Indicator	Achievement (2022)	Achievement rate (2022) ¹¹⁸	Δ Target value (2015-23)	Absorption rate (2023)	Δ Financial allocation (2016-2023)
Additional waste recycling capacity (CO17)	3.4 million tonnes per year	69%	-16%	90%	-29%
Additional persons served by improved water supply (CO18)	8.3 million	60%	+12%	86%	-5%
Additional persons served by improved wastewater treatment (CO19)	9.2 million	49%	+12%	97%	-11%
Surface area of rehabilitated land (CO22)	3,376 hectares	51%	+32%	74%	-22%
Habitats supported to attain better nature conservation (CO23)	11.2 million hectares	99%	+77%	112%	-1%

Source: Authors, based on Cohesion Open Data Platform data relating to achievements and categorisation.

Achievement rates in nature and biodiversity are high, especially in territorial cooperation programmes and in developed regions. However, achievements in less developed regions are not so strong. Overall allocations towards this policy instrument lie at 5% out of total ERDF/CF funding while overall allocations in Member States lie in about the same range (see Annex VI). Five EU14 countries

¹¹⁶ For PI waste a regression analysis conducted thus confirmed such a positive contribution (see Annex V). It showed that there is a statistically significant relation between the change in the share of municipal waste recovered and the amount of relevant funding allocated. For both PI wastewater and PI water, the contribution of ERDF/CF investments to observed positive changes could also be validated by regression analyses and other sources. For wastewater, the statistical analysis carried out as part of this study also confirmed a statistically significant correlation between the percentage change in population connected to wastewater treatment and the amount of relevant funding allocated per capita. An evaluation of the UWWTD has shown that cohesion policy investments have contributed to achieving a high level of implementation of the Directive. For water, the statistical analysis carried out could also identify a positive result. When excluding the outliers Bulgaria and Malta, it confirmed a statistically significant correlation between the percentage change in population connected to water supply against the allocated funding per capita, adjusted by PPP in EUR.

¹¹⁷ Due to the absence of data at regional level, the regression analysis could only be carried out at Member State level.

¹¹⁸ Measured against 2023 targets.

have not allocated any funds (Austria, Denmark, Luxembourg, Netherlands and Sweden) for the policy instrument. However, this is not necessarily a reflection of the absence of a need, but rather of the fact that all these Member States, mainly comprised of “more developed” regions, receive relatively small allocations overall and focus their programmes strategically on a few specific themes. In territorial cooperation, ‘nature and biodiversity’ is the single most important PI in terms of the share of total expenditure. Looking at the common indicator CO23 (habitats supported to attain better nature conservation), the achievement rate is close to 100%. This positive trend is largely due to a very high achievement rate of 126.9% in territorial cooperation programmes (see Annex VII). At Member State level, there are substantial variations in achievement rates, yet in most Member States the achievement rate is at least 50%. Only Greece (42.0%), Poland (20.9%), Portugal (19.3%) and Romania (32.0%) are below. Achievement rates are highest in more developed regions (152.5%), followed by transition regions (76.8%) and by less developed regions (62.8%). The case study on nature and biodiversity conducted in the context of this evaluation suggests that a lack of co-financing could be a factor limiting the uptake of this policy instrument.¹¹⁹ It can also be noted (referring again to the case study) that a proportion of the funds was used to develop tourism potential and cultural assets. Even if these have created dual benefits to nature and people, the extent to which this type of investment is effective for nature conservation and protection is debatable and may vary from case to case.

5.2. More transformative and ambitious investments are needed to increase impact

Conventional investments continue to be the preferred type of investment across Member States. The majority of investments supported under ERDF/CF in 2014-2020 were conventional investments (see section 5.5). Conventional investments refer to typical infrastructure projects that address specific problems (rather than systemic problems). Such investments often focus on specific types of stakeholders as beneficiaries (e.g. municipalities, industry, farmers or citizens) rather than several stakeholder types. The portfolio analysis and stakeholders’ feedback point to several examples signalling a preference for conventional investments. For example, in the field of resource efficiency, proposed investments typically focussed on reducing the material being used but stayed within a linear logic (“produce, use, dispose”), rather than supporting the shift towards a circular logic. In the field of flood protection, solutions proposed typically consisted of grey infrastructure as opposed to nature-based solutions, which would also have benefits for nature, biodiversity and wellbeing.

While conventional investments remain essential (particularly in less developed and transition regions), more transformative investments are

¹¹⁹ See for example: Kettunen, M., et al. (2017) Integration approach to EU biodiversity financing: evaluation of results and analysis of options for the future. Final report for the European Commission (DG ENV) (Project ENV.B.3/ETU/2015/0014), Institute for European Policy (IEEP), Brussels/ London.

needed.¹²⁰ Conventional investments (e.g. water, wastewater, waste management) are needed in less developed and transition regions, in order to comply with EU environmental legislation (see section 4.4). Given regional disparities and based on feedback from authorities, the necessity to continue with such investments will remain, particularly in light of increasing ambitions embedded in the EU environmental acquis. The portfolio analysis and stakeholder feedback point to the fact that Member States continue to select investments based on rules that focus on system optimisation rather than system transformation. The latter would include nature-based solutions, circular economy initiatives, biodiversity initiatives. The European Green Deal outlines significant investment needs, estimated to total approximately EUR 520bn per year from 2021-2030¹²¹, to transition to a sustainable economy. Transformative investments are essential to meet these financial requirements and, ultimately, to work towards creating a more sustainable and resilient European economy and society.

Nature-based solutions and circularity investments were under prioritised in the 2014-2020 programming period. The analysis of the portfolio of investments indicates a prevalence of conventional engineering, i.e. “grey” solutions such as dam seawalls, pipes, to address climate adaptation. According to managing authorities, this prevalence can partly be explained by the absence of the skills required to develop solutions that move beyond the conventional technologies, among authorities and potential project promoters. In this respect, the implementation of nature-based solutions has been reported to have high potential in mitigating the risk of climate change while at the same time focussing on nature and ecosystem protection.¹²² Similarly, the analysis of the portfolio and the managing authorities’ interviews indicate that green economy, waste management and wastewater investments in the 2014-2020 programming period were primarily focussed on resource efficiency gains within the existing (linear) system. Circular initiatives were only supported to a limited extent. The case study on wastewater indicated that circular investments in wastewater treatment were not sufficiently used, i.e. sewage sludge and water reuse investments are lagging behind compared with wastewater treatment and sewerage projects. Such investments were reported by stakeholders as positively contributing to the Circular Economy Action Plan.

More ambitious investments were more challenging to implement yet had a greater impact. Irrespective of whether they are linked to transformative or conventional investments, there is also a general need for more ambitious investments. This is the case, for example, in the field of energy efficiency renovations in buildings, where there is a trade-off between different approaches to renovations. Often, the choice is to opt for gradual (light) renovation projects, which

¹²⁰ Defined as system-level change: investments that address root causes rather than symptoms, triggering fundamental shifts in environmental, social, and economic systems; innovation-focused approaches: funding novel technologies, processes, or governance models that break from traditional solutions and create step-change improvements; cross-sectoral integration: projects that bridge multiple sectors (energy, transport, industry, agriculture) to create synergistic climate and environmental benefits; scale and replicability: investments large enough to demonstrate viability at scale or designed to be widely replicated, multiplying impact beyond individual projects; long-term transformation: initiatives that catalyse lasting change in behaviours, markets, or infrastructure rather than temporary improvements; policy and regulatory alignment: projects that help reshape policy frameworks to sustain environmental improvements over time; Risk-taking approach: willingness to fund higher-risk projects with potentially greater returns rather than exclusively safe, established solutions; circular and regenerative models: investments promoting regenerative practices rather than merely reducing negative impacts of existing systems.

¹²¹ European Environmental Agency (2023), Investments in the sustainability transition: leveraging green industrial policy against emerging constraints. [See link.](#)

¹²² See Climate-ADAPT. [See link.](#)

are easier to implement and generate more or less immediate results. They demand lower financing, and investments can be spread over time. Furthermore, the investment decisions (for example, in case of multi-ownership structures) are easier to make. However, light renovations also bear the risk of leading to lock-ins. Namely, they deliver incremental improvements, but an accumulation of lighter renovations will generally not achieve the fundamental improvements brought about by deep renovations. In contrast, so-called deep renovations produce better results in the long run in terms of energy performance of buildings, yet they are also more complex and expensive in terms of project design and implementation. While both approaches have their pros and cons, and the appropriate choice depends on the specific situation, it is important to note that gradual or light renovation projects are often bankable and could potentially be supported through financial instruments. On the other hand, grants are often needed for deep renovations. Financial instruments can also be combined with grant schemes, for instance, to ensure that energy efficiency benefits are also available to low-income households. This was noted by several of the experts participating in the workshops linked to the case studies on sustainable energy and energy efficiency in buildings.

A second example of such a trade-off is investments in urban public transport fleet renovation, which deliver immediate results, yet infrastructure investments are needed to support a modal shift in the long term. The upgrading of existing public transport fleets leads to immediate results in terms of reduction of air pollution and GHG emissions as well as increased attractiveness of the public transport offer. While such investments are usually easier to implement and lead to immediate effects, they are more short-term oriented compared to infrastructural investments in new tram or metro lines and multi-modal solutions. The latter can be seen as more long-lasting investments that will serve several generations ahead and should drive a behavioural change in people.¹²³

Investments in more ambitious projects are often challenged by a limited administrative capacity and a shortage of skills. For example, in adaptation, nature-based solutions are challenged by a shortage of skilled experts to conceptualise, design and implement projects, and by stakeholder scepticism, which can either act as a barrier in the development of such projects or delay their implementation. A lack of skilled professionals in energy renovations leads to delays and reduces the ambition level of projects, and lack of capacity and skills in SMEs discourages them from seeking more advanced energy efficiency gains, e.g. in relation to production processes. Given the complexity of more integrated types of investments, the challenges related to the administrative capacity (also discussed separately in section 5.4) for handling public procurement, environmental impact assessments, permitting and state aid are intensified.

Some mechanisms help to incentivise investments in more ambitious projects. These include competitive procedures as well as awarding the combination of different objectives within the same investment. One mechanism that can help to increase the ambition level of investments is to avoid first-come, first-

¹²³ This is a finding from the case study on the support for clean transport conducted in the evaluation. For further literature see for example: European Court of Auditors (2020), Sustainable Urban Mobility in the EU: No substantial improvement is possible without Member States' commitment. [See link](#) and European Court of Auditors (2018), Towards a successful transport sector in the EU: Challenges to be addressed. [See link](#)

served selection procedures. While efficient, these can create unintended effects such as over-support to low-hanging fruits and to middle- and upper-class households. This issue has emerged specifically in the case of energy efficiency in buildings. Other types of selection procedures may be preferable, but this depends on the context. A second way of increasing the ambition level is to encourage the combination of different objectives within the same investments. For instance, there is a strong potential for synergies between energy efficiency and renewable energies investments. Both aspects contribute to decarbonisation and the reduction of costs for the energy system.¹²⁴ This integration of renewable energy investments could also be conceived for other sectors. For example, when building new tram or railway lines, solar panels could be installed right next to or even between the tracks.¹²⁵ Investments into wastewater management could be linked to investments in biogas production.¹²⁶ Flood protection measures could be conceived alongside investments in power generation from water flows.

5.3. Delayed fulfilment and low national ambition on thematic ex-ante conditionalities limited their impact on investments

Delayed fulfilment and low ambition levels of national targets prevented the ex-ante conditionalities from effectively supporting the implementation of the ERDF/CF interventions. The ex-ante conditionalities aim at supporting the strategic planning in the environmental sectors. Thereby, they should guide the programming by focussing the investments to effectively support the environmental objectives. Not all the ex-ante conditionalities were fulfilled at the time of adopting the OPs (see Table 6). For example, the ex-ante conditionalities on waste and water were only fulfilled by less than 5% of all OPs. In contrast, the ex-ante conditionalities on co-generation and renewable energy were fulfilled by almost 100% of OPs. The OPs not fulfilling the ex-ante conditionalities at the time of OP adoption needed to draft action plans on how to proceed to fulfilment. In general, most action plans were completed by 2017, except for some action plans relating to waste and water. This suggests that the ex-ante conditionalities on water and waste posed a challenge to Member States and regions. However, the non-fulfilment after 2017 did not lead to the withdrawal of funds. As further discussed regarding the thematic ex-ante conditionalities on energy, low ambition levels have also limited their impact. Evidence from the literature confirms that the ex-ante conditionalities have had limited impacts on the implementation of the cohesion funding.¹²⁷

¹²⁴ IRENA (2017), Synergies between renewable energy and energy efficiency, a working paper based on Remap. [See link.](#)

¹²⁵ An innovation not yet scaled up, however see for example: [Switzerland Is Putting Solar Panels on Railway Tracks | World Economic Forum \(weforum.org\)](#)

¹²⁶ Examples of such solutions exist, e.g. the Aarhus Water Treatment Plant in Denmark and the Newtown Creek Wastewater Treatment Plant in New York.

¹²⁷ The ECA report notes that Member States considered the conditionalities useful for self-assessment, and in some cases, as a driver for strategic planning. However, the report also notes that the expectations regarding the impact from the conditionalities varied, and most Member States did not consider that their fulfilment would automatically lead to a more effective implementation and better results.

Table 6 - Overview of examined ex-ante conditionalities

Ex-ante conditionality		Category	PI	Fulfilled at time of OP adoption	AP complete by Sept 2017	Share of OPs where applicable
04.1 Energy efficiency	Promotion of investments in energy efficiency when contracting or renovating buildings in relation to Directives 2006/32/EC, 2010/31/EU, 2012/27/EU	Regulatory	EE: buildings EE: enterprises	< 45%	14	70%
04.2 Co-generation	Promotion of efficient co-generation of heat and power in relation to Directive 2004/8/EC	Regulatory	EE: buildings EE: enterprises Sustainable energy	< 100%	1	19%
04.3 Renewable energy	Promotion of the production and distribution of renewable energy sources in relation to Directive 2009/28/EC	Regulatory/ Strategic	Sustainable energy	< 100%	20	41%
05.1 Risk assessment	Presence of national/regional risk assessment	Strategic	Adaptation and risk management	< 80%	13	32%
06.1 Water	Water sector: the existence of a water pricing policy in relation to Directive 2000/60/EC	Regulatory/ Strategic	Water Wastewater	< 5%	16 (19 not completed)	32%
06.2 Waste	Waste sector: Promoting economically and environmentally sustainable investments in the waste sector in relation to Directive 2008/98/EC	Regulatory/ Strategic	Waste	< 5%	49 (4 not completed)	28%

Source: constructed on the basis of: 'The value of ex-ante conditionalities in the European Structural and Investment Funds', SWD (2017) 127 final: 'Ex-ante conditionalities and performance reserve in Cohesion: innovative, but not yet effective instruments', ECA special report No 15, 2017, and 'The implementation of the provisions in relation to the ex-ante conditionalities during the programming phase of the European Structural and Investment (ESI) funds – final report', Report prepared by Metis et.al., EC, 2016.

The ex-ante conditionalities for energy have been less challenging to implement, but the ambition levels could have been set higher and thereby provided a stronger incentive for change. The three ex-ante conditionalities for energy (energy efficiency, co-generation and renewable energy) had very high fulfilment rates at the adoption of the OPs. However, evidence from case studies indicates that this did not translate into major impacts upon the realisation of results on the ground. For example, the ex-ante conditionality on renewable energy only needed action plans in 20 cases, and those were all completed by February 2017 or earlier. A screening of OPs and PAs in 2015-2016 showed that only very few Member States had problems in fulfilling the ex-ante conditionalities related to energy.¹²⁸ This suggests that fulfilment of the ex-ante conditionality on renewable energy was not a significant challenge in Member States. This is also confirmed by policy instrument case studies, which highlighted that ambitions in several regions exceeded the targets set by the fulfilment of the ex-ante conditionality at the national level.¹²⁹ For the ex-ante conditionality on renewable energy, the case studies also indicated that the fulfilment of the ex-ante conditionality was perceived as a “pure box-ticking” exercise without the potential to trigger real changes.

The ex-ante conditionalities on water and wastewater lead to some progress towards cost-recovery; however, the pricing of water services is still below full cost recovery in most Member States.¹³⁰ The ex-ante conditionality for water requires Member States to have user charges for water services (for example, water supply and wastewater treatment) that provide incentives to efficient water use and that recover the costs of providing the services^{131, 132}. Policy instruments case studies undertaken as part of this evaluation confirm methodological issues and concerns about affordability are the two key challenges to the fulfilment of this ex-ante conditionality¹³³. The PI case study on wastewater found progress in promoting cost recovery user charges in the three analysed Member States (Italy, Romania and Lithuania). While the ex-ante conditionality has not influenced investment choices, Member States, as exemplified by these three countries, have moved towards having more cost-recovery-based user charges in the water sector.

The ex-ante conditionality on waste was the least fulfilled among all thematic ex-ante conditionalities at the time of OP adoption; thus, the benefits have not been fully harvested. The conditionality for the waste sector requires Member States to have waste management plans in place. These plans should be consistent with the waste hierarchy, which has waste prevention and reuse as the top priority. This ex-ante conditionality had the second longest average time taken to be fulfilled

¹²⁸ The implementation of the provisions in relation to the ex-ante conditionalities during the programming phase of the European Structural and Investment (ESI) funds – final report, Report prepared by Metis et.al., EC, 2016.

¹²⁹ The ex-ante conditionality 4.3 required the existence of a National Renewable Energy Action Plan in which Member States outlined their targets for renewable energy sources. Those targets were set at the national level, and regions could have had lower or higher targets.

¹³⁰ European Commission, Service request supporting the Evaluation of Directive 91/271/EEC concerning urban wastewater treatment. Evaluative study (2019). [See link](#). This statement was confirmed by EurEau. According to the written feedback obtained from an EurEau representative, “Full cost recovery is only achieved in a minority of Member States. In some cases, tariffs do not even cover operational and maintenance costs”.

¹³¹ Relevant not only for the cohesion policy ex-ante conditionality, but also more broadly within the context of the WFD, which in its Article 9 requires an adequate contribution of the different water used to the recovery of the costs.

¹³² ECA Special Report No 23/2015, Water quality in the Danube River basin: progress in implementing the water framework directive but still some way to go. [See link](#).

¹³³ Possibly recognising this challenge, the 2021-2027 period has introduced an enabling condition stipulating that Member States must provide potential sources of public funding to complement user charges.

and had the second lowest completion rate of completed action plans by 2017¹³⁴. Reviews of 72 waste management plans in the period 2016-2018 concluded that 31 of these failed to properly address mandatory elements for such plans under the Directive¹³⁵. It means that the concrete implementation of the waste hierarchy remains a challenge.¹³⁶ The case study undertaken on waste looked specifically at Greece, Croatia and Latvia and confirms these overall observations: the waste hierarchy was to some extent observed in planning, but not fully in implementation/funding.¹³⁷ The responses to the survey conducted as part of this evaluation¹³⁸ suggest agreement that the ex-ante conditionality on waste helped to ensure compliance and coherence between national and EU levels and stimulated cooperation between different government levels, in addition to a more holistic planning approach. As a result, the ex-ante conditionality has stimulated a more holistic and coordinated approach to waste management, accelerated Member States efforts to deliver on mandatory requirements for Waste Management Plans and Waste Prevention Plans. However, it was noted that this process was, and is, highly challenging. Therefore, the benefits from the ex-ante conditionality were not fully harvested in 2014-2020 as many Member States still struggled to fulfil it well into the programming period. Furthermore, looking at the cohesion investment pattern, relatively little has been invested in projects promoting the top of the waste hierarchy.

The ex-ante conditionality on adaptation was largely fulfilled but delays, and in some cases, the low quality of adaptation strategies limited its impact.¹³⁹ As of 2016, 6 Member States had not adopted a National Adaptation Strategy, and 15 Member States had not prepared a national adaptation plan.¹⁴⁰ This included many of the Member States that allocated 10% or above of their cohesion expenditure towards adaptation (Ireland, Italy, Portugal, Slovenia and Slovakia). Thus, a large proportion of OPs had been prepared without a strategic and holistic framework in place to guide adaptation investments. This impacted the ability of some Member States to ensure that the OPs were guided and aligned with national risk assessments and with national adaptation strategies and plans. Delays and gaps in fulfilling the ex-ante conditionality have been noted in previous assessments as impacting the quality of investments supported by programmes financed by ERDF/CF.¹⁴¹ The data collected during the expert workshop and the case country research point to the same finding. In all three cases, countries analysed in-depth (Sardinia (Italy), Hungary, and Slovenia), the national adaptation strategies and plans were not adopted at the stage of preparing the OPs. Therefore, all three countries relied on other strategic documents, such as the flood risk assessments.

¹³⁴ European Court of Auditors (2017), Ex ante conditionalities and performance reserve in Cohesion: innovative but not yet effective instruments, Special Report No 15/2017. [See link.](#)

¹³⁵ Articles 28 (1) to (3) and (5) of Directive 2008/98/EC, concerning the requirement of existing WMP(s) to cover the whole territory of the Member State and at least to include measures for re-use, recycling, recovery, and disposal of waste as well as general waste management policies and waste collection schemes.

¹³⁶ See also the recent report: European Commission (2023), Waste Early Warning Report, 8 June 2023. [See link.](#)

¹³⁷ This choice may however be justified on the grounds that these countries have relatively high landfill rates, low recycling rates and a low waste generation per capita compared to the EU average.

¹³⁸ Covering 33 responding managing authorities.

¹³⁹ Before Operational Programmes could be adopted, Member States were required to report on the completion of these action plans in their Annual Implementation Reports, to be submitted by 30 June 2017, or in progress reports due in August 2017.

¹⁴⁰ European Commission (2018), Evaluation of the EU Strategy on adaptation to climate change. [See link.](#)

¹⁴¹ European Court of Auditors (2017), Landscape Review: EU action on energy and climate change: [see link](#); EUROSAl Working Group on Environmental Auditing (2012), Adaptation to climate change – are governments prepared? – a cooperative audit, [see link](#); COM (2013) 216 final, [see link](#).

This enabled the countries to target the OPs to some of the most pressing issues, but it also meant that wider climate change risks and adaptation needs were not captured in a holistic manner. This points to another main concern, namely the varying quality of key adaptation planning documents. EEA's evaluation of national adaptation policies (2020) indicated that the requirements for national adaptation strategies and national adaptation plans are underdeveloped. This means that their quality can vary in terms of the strength of the assessments, identification of sectors, level of detail, and articulation of implementation approaches. A similar criticism was extended to national risk assessments, indicating that there is variation in their quality and detail. Furthermore, most consider a 5-year time horizon while the impact of climate change requires a much longer time horizon to ensure that adaptation policies and investments can be properly aligned in order to address long-term risks.¹⁴² A European Commission assessment of national risk assessments also highlighted their different levels of detail and completeness.¹⁴³

5.4. Factors impacting investments vary across areas, with limited capacity and skills stands out as key factor

A wide array of factors impacted investments, which most often include administrative capacity, lack of skills and complex procedures. As outlined in the theory of change, the progress of cohesion policy actions in climate and environment is dependent on a set of key preconditions, supporting factors and risks. The prevalence of pre-conditions, supporting factors and risks was assessed in the case of investments implemented with ERDF/CF support for a selection of 70 OPs. When in place, binding national legal frameworks and a correct match between the needs and the actual investments are reported to have positive impacts. In contrast, widely reported problems that recur and impact the investments relate to administrative capacity and skills, as well as national processes and procedures. The factors influencing investments vary depending on the type of policy instrument, country and level of administration, as further explained in the following sections. The policy instruments case studies indicated that for most policy instruments, administrative capacity and skills posed difficulties in the implementation of investments (e.g. sustainable energy, energy efficiency in buildings, clean transport, adaptation, wastewater, water, pollution reduction, biodiversity and culture). Moreover, investments in decarbonisation (sustainable energy, energy efficiency in buildings, energy efficiency in enterprises, clean transport) as well as adaptation and environment (wastewater, water, biodiversity), were challenged when it comes to national processes and procedures related to EIA, permitting and public procurement, which delayed investments. While such issues are reported across Member States and regions, a higher reported prevalence of such issues can be observed in Eastern European Member States and in transition and less developed regions.

¹⁴² European Environment Agency (2020), Monitoring and evaluation of national adaptation policies. [See link.](#)

¹⁴³ European Commission (2018), Evaluation of the EU Strategy on adaptation to climate change. [See link.](#)

Table 7 - Factors perceived to influence the implementation (70 OPs)

Preconditions, supporting factors, risks	Factors	Negative influence	Neutral influence	Positive influence
National frameworks (e.g. legislation, plans)	Correspondence (or lack of) between the funded instruments and the needs related to climate and environment	3%	25%	72%
	Binding legislation (or lack of) at the EU or national level in the specific areas	13%	28%	56%
Administrative capacity, skills and knowledge	Administrative and technical capacity (or lack of) within the managing authority	22%	35%	40%
	Capacity/experience (or lack of) within local authorities and operators to design projects	40%	31%	25%
	Capacity/experience (or lack of) within local authorities and operators to implement projects	29%	32%	31%
	Familiarity of beneficiaries with ERDF/CF funds (or lack of experience)	15%	49%	35%
	Demand/interest (or lack of) of beneficiaries for measures supporting climate and environment	12%	29%	59%
	Procurement procedures (length, cost, expertise)	69%	28%	0%
National processes and procedures				
Quality of projects	Duration of implementation	40%	54%	3%
Other funding sources and support	Availability (or lack of) matching funds	21%	50%	25%
	Technical assistance and advisory services (e.g. JASPERS)	0%	37%	31%
External factors	General economic context	29%	53%	12%
	Change in the context conditions (not due to COVID)	28%	62%	7%
	Change in the context conditions (due to COVID)	53%	37%	9%

Source: Analysis of 70 OPs. Based on semi-structured interviews with 1-2 informed actors within the managing authorities or implementing bodies of each operational programme.

Despite the limited administrative capacity negatively affecting all types of investments and regions, it is primarily a local-level issue. Previous studies¹⁴⁴ widely acknowledged that the implementation of planned cohesion policy actions is often hindered by administrative capacity issues. The analysis of the 70 OPs, desk review and interviews performed in case studies on the specific policy instruments, technical workshops and seminars all confirm that the issue of administrative capacity persists. Capacity problems concentrate especially at the local administration level rather than at the regional or central level. Local administrations are responsible for a significant portion of the policy instruments' implementation, especially in relation to clean urban public transport, waste, water, and wastewater. The scarcity of staff and inadequate expertise continue to pose challenges, especially for small municipalities, regardless of whether they are located in less developed, transition or more developed regions. Limited capacity was reported to negatively affect the process of designing and executing investments (see further in the next paragraph), but also the development of plans underlying investment

¹⁴⁴ See [link](#).

decisions, consequently impacting actual investments. For example, a lack of capacity affected the quality of the plans (PI adaptation and risk management), waste management plans¹⁴⁵ also (PI waste) and SUMP (PI clean transport). To reduce the impact of capacity constraints, public authorities have taken several types of measures with positive effects. For example, the policy instruments case studies revealed that: in the region of Sardinia (Italy), the LIFE Master-ADAPT project contributed to mainstream adaptation in funded actions; in Hungary, assistance from JASPERS positively contributed to capacity at the local level and the introduction of innovative adaptation solutions; in Poland, JASPERS provided support in developing and implementing SUMP which ensured a more coordinated vision of urban transport.

A shortage of skilled experts impacted infrastructure investments, in particular. Skills issues vary across policy instruments, Member States and beneficiary types. Technical (e.g. engineering and construction) skills were reported as key challenges for projects across all policy instruments. For example, for energy efficiency investments in buildings, the availability of skilled contractors who could carry out energy efficiency measures was limited, leading to delays and increased costs. For energy efficiency investments in enterprises, SMEs were reported to lack the expertise and capacity to assess their potential for energy savings, as well as to carry out identified measures needed to ensure energy savings. This creates a barrier to applying for funding and carrying out projects. Examples from the case studies also indicate that SMEs that were successful in obtaining funding were the ones supported by advisers. For water investments, municipalities in the analysed Member States reported examples of difficulties in developing projects due to the lack of qualified experts. For adaptation investments, examples of cases where the number of bidders for construction activities was low indicated a shortage of relevant labour and limited supply at the local level. Interviews conducted as part of the case studies highlighted that the limited capacity for project design and implementation was a key delaying factor for investments. Again, examples from the case studies indicate that technical assistance provided, for example, by JASPERS can be a supporting factor in addressing local bottlenecks related to capacity in project development.

Complex procedures such as permitting, procurement and EIAs had an impact on the ability of authorities to effectively prepare investments and generated delays. Literature on the topic confirms that the complex procedures constitute an important barrier to projects. A recent EIB municipal survey indicates that authorities have challenges dealing with complex regulatory procedures due to regulatory uncertainty and the length of regulatory processes.¹⁴⁶ 70% of managing authorities interviewed in the context of this evaluation covering the 70 OPs signalled procurement and tendering processes as having a negative impact on projects. The issue was flagged by all types of regions. However, 80% of managing authorities from less developed regions reported this barrier. Examples from the in-depth analysis of the policy instruments in the case studies also substantiate these

¹⁴⁵ Bipro (2016, 2018), Detailed assessment of waste management plans, first and second batch, study prepared for DG ENV, see [link](#) for 2016 and [link](#) for 2018.

¹⁴⁶ EIB (2017), Municipal infrastructure: Investment survey, [see link](#). EIB (2020), The state of local infrastructure investment in Europe: EIB Municipalities Survey, [see link](#); and the latest one: EIB (2022), The state of local infrastructure investment in Europe: EIB Municipalities Survey 2022-2023, [see link](#).

challenges. For the PI water, permitting was reported as one of the key barriers to the wider uptake of water reuse activities and investments.^{147,148} For the PI adaptation, the limited capacity of authorities to deal with permitting and EIA procedures for large-scale adaptation investments (e.g. flooding) or more innovative types of investments (e.g. nature-based solutions) was reported to delay investments.^{149,150} For the PI sustainable energy, complex permitting procedures coupled with the capacity of authorities to deal effectively with them pose real challenges to the deployment of renewable energy projects.¹⁵¹ This is also illustrated by recent efforts initiated at the EU level to simplify permitting procedures¹⁵² and by concerns raised by multiple stakeholders.¹⁵³

Infrastructure-related investments were hit by the COVID-19 pandemic and the Russian invasion of Ukraine. Policy instruments linked to construction and infrastructure projects were more directly and heavily affected by both crises. The negative impact was particularly noticeable in projects on clean transport, energy efficiency in buildings, sustainable energy, wastewater, waste, and water. The consequent increase in labour costs and price increases in construction materials and energy costs, for example, led to significant delays in project implementation. This resulted in project suspensions and delays. The shift in funds to other priorities and the use of other funds for other projects also affected the implementation pace of investments (e.g. increased focus on renewable energy investment to mitigate the energy crisis).

The success of investments linked to several policy instruments depends on issues relating to awareness, acceptance, and behavioural change. As various case studies highlight, the success of policy interventions often depends not only on the investments per se, but also on aspects related to awareness, acceptance, and behavioural change. In the case of the PI on clean transport, this concerns the need for citizens to actually switch their transport modes and use new public transport offers, new bicycle lanes etc. Supporting behavioural changes is important also in the case of energy efficiency in buildings. Otherwise, rebound effects may significantly diminish the effectiveness of investments. The reluctance of potential users to apply reused water was identified as a barrier in the PI on wastewater, requiring more awareness on the safety and benefits to induce behavioural changes.

¹⁴⁷ However, an expert workshop on PI water also highlighted that the low uptake of investments for water reuse can also be attributed to the fact that some Member States are against the reuse of water.

¹⁴⁸ Fidelis, Teresa, et al. (2020), D3-2: Policy and planning settings for the transition to water circular economy – barriers and drivers in place. [See link.](#)

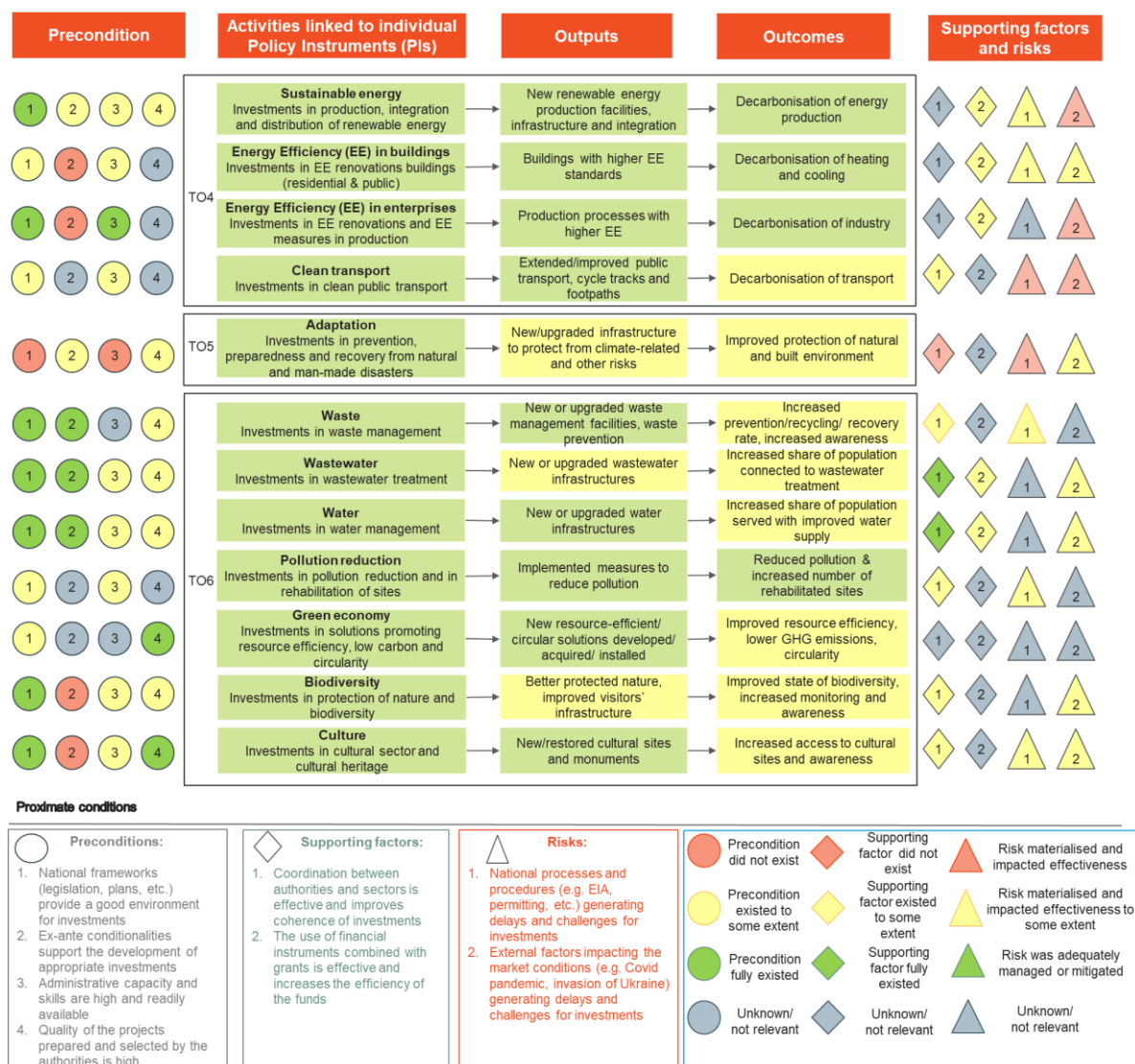
¹⁴⁹ OECD (2020), Nature-based solutions for adapting to water-related climate risks – policy papers, OECD Environment Policy Paper No. 21, [See link.](#)

¹⁵⁰ Committee of the Regions (2020), Adapting to climate change: challenges and opportunities for the EU local and regional authorities. [See link.](#)

¹⁵¹ European Commission (2022), Supporting document for the Commission Recommendation: on speeding up permitting procedures for renewable energy projects and facilitating power purchase agreements (SWD (2022) 151 final). [See link.](#)

¹⁵² European Commission, Enabling framework for renewables. [See link.](#)

¹⁵³ Consult for example Euractiv (2023), It takes longer to permit a wind farm than to build it, [see link](#), and CAN Europe (2023), Policy briefing: Guidelines to Faster and Fairer Permitting for Europe's Renewable Energy Transition, [see link](#). The latter source also points to the importance of being aware of possible impacts on biodiversity.

Figure 18 – Preconditions, supporting factors and risks that impacted the implementation of policy instruments

Source: Authors based on policy instruments evaluations. NB: the legend for the tested causal chains is presented in figure 3.

5.5. The use of financial instruments must be further incentivised for energy efficiency and a green economy¹⁵⁴

The use of financial instruments for climate and environmental investments remains limited and focussed under thematic objective 4. In 2014-20, the European Commission encouraged Member States to double the use of financial instruments in ESI Funds, in line with the objectives of the Investment Plan for Europe.¹⁵⁵ To achieve this, Member States were recommended to deliver, through FIs, a specific percentage of the allocations made in their Partnership Agreements to each of the 'key investment areas'. Allocations specifically included 5% in environment and nature, 20% in greenhouse gas emissions reduction. The use of financial instruments is predominant in TO4 (energy efficiency and green economy, in particular), and to a lesser extent under TO5 and 6 (water, waste, adaptation). By the end of 2022, 86.8% of planned climate and environment expenditure through FIs related to TO4. This substantial share largely reflects that investments in nature and environment and in 'adaptation' are predominantly of a public-good nature and, thus, do not generate monetised or market-priced outputs. For FIs to be relevant and attractive, they must deliver revenue or cost savings that can at least counterbalance the lending costs. This suggests that an effort to further promote financial instruments should focus on areas where there is, as a minimum, a revenue generating + cost-reducing impact. Such areas would include energy efficiency and renewables. However, this could also apply to different areas such as waste, water, wastewater investments.

Financial instruments enhanced the financial sustainability of cohesion funding when combined with grants. The overarching rationale for the use of FIs in the context of cohesion policy is to help trigger investments on the ground for revenue-generating and cost-saving activities. This is done while maximising private investment with minimum public support to deliver the cohesion policy objectives of economic, social and territorial cohesion.¹⁵⁶ In other words, the purpose of FIs is to enhance the financial sustainability of cohesion policy funds by increasing their remit from one-off grant payments to repayable forms of support such as loans, equity or guarantees, thus also creating reflows of finance.¹⁵⁷ For certain types of projects, grants are still considered necessary to complement FIs. The success of FIs in such cases can largely be attributed to the fact that they are implemented in combination with grants. For instance, this is the case of the residential energy efficiency financial instruments in Lithuania, where FIs are implemented in combination with grants, both in the form of technical assistance, interest rate subsidies and (mostly from non-ESIF resources) as capital rebates. In France (Nord-Pas de Calais), the CAP TRI instrument was complemented with a grant scheme (EUR 2.5 million ERDF resources) to provide technical advisory services for the preparation of the prospective investment by the final recipients. The funds devoted to investment and

¹⁵⁴ For further reference, more details and elaborations, see the horizontal case study on financial instruments prepared as part of this evaluation.

¹⁵⁵ European Commission (2014), Investment Plan for Europe, COM (2014) 903 final Brussels, 26 November.

¹⁵⁶ European Commission (2012), Financial Instruments in Cohesion Policy, Commission Staff Working Document, SWD (2012) 36 final.

¹⁵⁷ European Commission and EIB (2014), Ex-ante assessment methodology for financial instruments in the 2014-2020 programming period. Supporting the shift towards the low-carbon economy (thematic objective 4) Volume IV.

technical support were combined in one single operation.¹⁵⁸ However, such hybrid solutions can become complex for beneficiaries to handle¹⁵⁹, and if not fully combined from the onset and possibly with one entry-point for beneficiaries¹⁶⁰, the financing models may eventually run in parallel making the optimal use burdensome to administer and for beneficiaries to use.

Financial instruments are relevant if the projects concerned generate revenues + cost-savings, and if FIs close a market gap and are considered attractive by beneficiaries. First, credit conditions can impact the attractiveness of FIs. FIs are attractive only if the credit conditions are such that ERDF/CF-backed FIs are at least as attractive as other financing sources. In some countries, such as Czechia, the credit conditions offered to local public authorities were so favourable that ERDF/CF FIs have no added value. Second, in the case of the public sector, the beneficiaries must also be legally and financially able to undertake a loan. In some countries, such as Italy and Spain, the poor creditworthiness and credit limits imposed on local public authorities restrict how much they can borrow and, consequently, limit their ability to use debt instruments. Literature¹⁶¹ also suggests that municipal borrowing constraints, either due to credit limits restricting how much municipalities can borrow or insufficient creditworthiness, can dissuade some public authorities from developing solutions which would involve municipalities incurring debt.¹⁶² Third, the FIs must meet a market need, i.e. help to close a financial gap, and should not compete with other, possibly more favourable offerings that suffice to meet the demand. For example, the ex-ante assessment¹⁶³ did not recommend using ERDF FIs in Mecklenburg-Vorpommern and Brandenburg (Germany) because the existing offer of FIs from KfW Development Bank was considered sufficient to meet the demand. Third, there are also cases where FIs were initially planned but not implemented. Two reasons explain this. Firstly, the ex-ante evaluation, which was sometimes finalised after the approval of the first OP version¹⁶⁴, did not recommend the use of FIs, leading to the decision not to implement them. This situation occurred, for example, in the Czech Republic for the PI 'sustainable energy' under the OP Enterprise and Innovation for Competitiveness. Secondly, which is sometimes connected to the first one, there are cases where, although a financing gap exists, there is a lack of critical mass to justify the costs for the managing authority and/or make its implementation attractive for a financial intermediary. Several managing authorities (Cyprus, Catalunya, West Wales and the Valleys, Southern and Eastern Regional in Ireland, Luxembourg) pointed to this issue.

¹⁵⁸ European Commission and EIB (2016a), CAP Troisième Révolution Industrielle Nord-Pas de Calais, France. Case Study.

¹⁵⁹ For example, the Croatian managing authority of OP 'Competitiveness and Cohesion' noted that among the beneficiaries who received combined instruments (grant plus a financial instrument), many preferred single financial instruments. Also, the fund manager of the Hungarian combined energy loan programme for SMEs (a combination of a grant and a subsidised loan) noted that this scheme was not as straightforward as expected.

¹⁶⁰ In fact, in 2014-2020, it was not possible to combine financial instruments and grants at the level of the final beneficiary.

¹⁶¹ European Commission and EIB (2020c); Wishlade, Michie and Vernon (2017); Committee of the Regions (2015).

¹⁶² For example, credit limits were identified as a significant obstacle to the implementation of street lighting modernisation projects supported by the Energy Efficiency Fund 2014-20 in Lithuania. According to a recent EIB survey, municipalities in less developed regions more frequently reported not using external debt financing due to insufficient creditworthiness or cited reaching their debt limit than municipalities in more developed regions.

¹⁶³ An ex-ante assessment is a regulatory requirement for, and the first step in, the implementation of financial instruments.

¹⁶⁴ According to EC (2017), at the end of 2016, some member states had not yet completed ex-ante assessments, while some FIs were already operational, and some were already on a second round of investments.

The macro-economic environment had an impact on the uptake of financial instruments. The demand for a given FI is difficult to predict given that it depends also on macro-economic developments. This can lead to reluctance in applying them. German managing authorities, who were reluctant at the beginning of the programming period, pointed out that FIs would be attractive enough in a low-interest environment. The low-interest-rate environment that dominated the 2014-2020 period lowered the attractiveness of the financial instruments, compared with other financing options. Several managing authorities (e.g. in Bulgaria, Germany, Portugal, Slovenia) argued that the low-interest rates available in the 2014-2020 period made the attractiveness of EU-backed loans low compared to alternative financing options already available in the market. Therefore, in many cases, the initial allocation of funds to FIs was reduced over the course of the programming period. While such predictions are difficult, regularly updating the ex-ante assessment can be a useful tool to identify the need for revisions to the implementation of the financial instrument. This can ensure that the financial instruments remain relevant in a changing environment.

Limited experience, capacity and administrative costs affected the uptake of financial instruments. Some managing authorities perceive the complexity and administrative burden of FI implementation to be disproportionate compared to the role of ERDF/CF funding in their country/region. Consequently, the establishment of FIs is delegated to the central government. This reasoning was highlighted by Austria, Belgium (Flanders), and Greece (Central Macedonia). A decision to use financial instruments may also be influenced by the limited experience and capacity of the managing authorities. This was reported by managing authorities in both EU-13 (e.g. Poland (Zachodniomorskie Voivodeship) and Romania) and EU-14 (France (Haute-Normandie, Basse-Normandie, Lorraine et Vosges), Germany (Sachsen-Anhalt)). Managing authorities and financial intermediaries implementing ESIF FIs face a steep learning curve, especially if they are implementing FIs for the first time. As the regulatory framework changes between programming periods, authorities who have previously implemented FIs may need to refresh their knowledge. Building knowledge and providing support for the use of financial instruments can play a vital role. It was also argued that the requirement to use public procurement procedures for selecting financial intermediaries was a complicated and cost-imposing factor, that creates delays. In some countries, these procedures are highly inflexible, making any necessary amendments after the contract is signed challenging. Feedback on whether the 2014-2020 legislative framework for financial instruments facilitated their use was rather negative. However, the amendments to the Common Provision Regulation introduced by the Omnibus regulations in 2018 had a significant positive impact on the deployment of financial instruments.

Technical assistance, ex-ante assessments, and past experience supported the uptake of financial instruments. While there is little evidence available to assess the impacts and efficiency of the use of financial instruments, a range of examples illustrates that supporting measures are key to the development of relevant and feasible financial instruments. Thus, ex-ante assessments help to understand whether key conditions for the financial instrument under consideration are in place. Updating the ex-ante assessments can also help to identify needs for adjustments or revisions. Joint EU/EIB initiatives, such as JESSICA, ELENA and fi-compass have all contributed positively to enhancing the understanding and use of financial instruments. However, financial instruments remain a complex task. The

ability to build on previous experience is seen to play an important role, such as in Lithuania and Greece, for example.

5.6. Investments were negatively affected by insufficient cross-sector coordination and conflicting objectives at the local level

The incorporation of horizontal principles and sustainability requirements ensured that cohesion policy investments aligned with EU environmental objectives, although their integration varied in effectiveness across the 2014-2020 period. The horizontal principles, including sustainable development, the polluter-pays principle¹⁶⁵, green public procurement (GPP), and the application of the Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA) Directives¹⁶⁶, were crucial in aligning cohesion policy investments with other EU policies and legislation. These principles and general sustainability requirements ensured that, even if synergies were not achieved, cohesion policy investments would not undermine climate and environmental objectives. However, an assessment revealed that the integration of enhanced horizontal requirements varied during the 2014-2020 period.¹⁶⁷ Specifically, the effectiveness of SEA in integrating environmental concerns was limited by the general nature of cohesion policy programmes, tight time frames set by the European Commission, and ambiguous requirements for practitioners. Conversely, the principle of sustainable development positively influenced the programming of measures.

The integration of environmental objectives through the appraisal and selection of projects contributed to mainstreaming sustainability across all cohesion policy measures. A study on the integration of environmental considerations in projects supported by the European Structural and Investment Funds from 2014-2020 identified several key factors for successful sustainability integration.¹⁶⁸ Environmental standards or labels, particularly in the context of Green Public Procurement (GPP), can be used as part of the selection criteria. Specific and quantifiable selection criteria should provide clarity on the type of information necessary to demonstrate compliance. An appropriate scoring system that assigns sufficient weight to environmental criteria is also essential. The capacity and expertise of managing authorities are vital to ensure that environmental concerns are adequately considered throughout the project selection and implementation process. Involving a broad range of stakeholders, including specialist institutions, NGOs, and experts, throughout the programming and project cycle can enhance professionalism, collaboration, and transparency, thus making EU-funded operations more environmentally friendly. Additionally, a collaborative approach that

¹⁶⁵ Article 8 of the Common Provisions Regulation (Regulation (EU) No 1303/2013) required that objectives were 'pursued in line with the principle of sustainable development and with the Union's promotion of the aim of preserving, protecting and improving the quality of the environment [...] taking into account the polluter-pays principle'.

¹⁶⁶ Annex XI of the Common Provisions Regulation (Regulation (EU) No 1303/2013) included general ex-ante conditionalities. One of these conditions required the existence of arrangements for the effective application of Union environmental legislation related to EIA and SEA.

¹⁶⁷ COWI and Milieu (2019), Integration of environmental concerns in Cohesion Policy Funds (ERDF, ESF, CF) - Results, evolution and trends through three programming periods (2000-2006, 2007-2013, 2014-2020), Final report for Directorate-General for Environment of the European Commission. [See link.](#)

¹⁶⁸ COWI and Milieu (2020), Integration of environmental considerations in the selection of projects supported by the European Structural and Investment Funds, Final Report for European Commission Directorate-General for Environment. [See link.](#)

offers guidance and assistance to beneficiaries in preparing their applications enhances the success of environmental integration. By focussing on these areas, the study found that environmental sustainability could be successfully mainstreamed through the project appraisal and selection process.

Environmental sustainability was included in the selection criteria for investments in other policy areas, although occasionally it was challenging to prevent conflicting objectives. For example, OPs in Slovakia, Denmark, and Sweden often focussed on research, innovation, and competitiveness by supporting investments in green innovation and energy efficiency in businesses. The rationale was that more sustainable production processes drive growth and competitiveness. By embedding environmental sustainability criteria in broader calls to support enterprises' innovation and competitiveness, synergies between these objectives were generally ensured. However, demonstration projects related to the circular economy in businesses required particular attention during the design and selection phase to ensure they did not conflict with competitiveness or create tensions between separate policy goals.

A coherent approach across different operational programmes involves planning projects in phases, where initial investments set the stage for subsequent ones. This method requires managing authorities to establish clear eligibility and award criteria. For example, the regional OP Apulia in Italy supported clean transport and eco-tourism by financing a network of local cycle paths that connect various urban areas. These local paths were an extension of national cycleways. However, this phased approach has risks. While complementary investments are necessary to achieve the full benefits, issues in one project can affect other projects. Large infrastructure projects, typically funded by national programmes and essential for subsequent smaller investments, can face delays in procurement and implementation, potentially undermining overall effectiveness.

Managing authorities introduced coordination mechanisms to ensure the coherence of environment and climate investments with interventions in other supported sectors. In practice, these mechanisms frequently involved arrangements between managing authorities and relevant administrative bodies prior to the launch of project calls. These bodies could be in charge of managing specific priority axes or broader units overseeing overarching initiatives, like local strategies in innovation or energy implemented through ERDF/CF. The importance of these coordination mechanisms varied with the scope of the OPs: cross-sectoral OPs relied heavily on internal coordination, while OPs focussed on environment and climate depended more on ensuring external coherence. Often, OPs were part of broader policy coordination mechanisms, with forums established to boost institutional synergies. For example, in Portugal, the Inter-ministerial Commission oversees cohesion policy programmes, analysing and approving calls for both national and regional OPs to reduce overlaps and inconsistencies. Similarly, Spain's energy sector demonstrates effective coordination through various committees where representatives from central and local administrations collaborate. Examples of such committees are the Energy Sector Conference, the Energy Saving and Efficiency Advisory Commission, and the Climate Change Policies Coordination Commission.

The standardised structure of operational programmes, as provided by the Commission services, promoted coherent investment planning at the

programming stage. It minimised potential overlaps between policy instruments for environment and climate and other sectors supported by the same OPs. Concurrently, the Common Provision Regulation (CPR) granted managing authorities the flexibility to select the policy mix within each programme, thereby encouraging synergies and complementarities between different sectors. This aimed to trigger integrated development through a well-balanced investment portfolio. In their intervention logics for the environment and climate, the majority of the analysed 70 OPs explicitly linked environment and climate priorities to closely related areas such as energy, as well as measures supporting small and medium-sized enterprises (SMEs) and research and innovation. This pursuit of synergies, whether implicitly or explicitly set out at the programming stage, is an intrinsic characteristic of the ERDF/CF planning framework.

Some managing authorities developed guiding documents to promote coherence across programmes and investments. For instance, in Bulgaria, the Ministry of Environment used guidelines to encourage coordination and coherence across programmes. The "Guidelines on the Mainstreaming of Environmental and Climate Change Policy in 2014-2020 cohesion policy" served as a basis for coordinating with stakeholders of various Bulgarian programmes. These guidelines provided specific criteria to ensure that ERDF/CF funding and related funding by the Common Agricultural Policy and the Common Fisheries were allocated primarily to projects that significantly contributed to environmental and climate policy goals. By accurately determining demarcations and complementarities, the guiding document succeeded in achieving synergies and avoiding overlaps across OPs, according to managing authorities' perceptions.

6. Policy assessment

This chapter presents the main findings of the evaluation using the Better Regulation criteria and provides answers to the evaluation questions listed in Annex II. The text box below summarises the key responses to the evaluation questions by evaluation criterion.

Relevance

The objectives of climate and environmental investments made under the ERDF and CF addressed the diverse needs of the EU countries/regions, while also demonstrating some commonalities across the countries. The policy mix tended to be similar for countries/regions with relatively similar starting conditions, particularly concerning initial environmental performance and the volume of ERDF/CF support compared to government expenditure in the sector. The needs addressed by the ERDF/CF investments in 2014–2020 remain largely relevant. However, as countries/regions improve their climate and environmental performance, and with the rapidly evolving challenges of climate change, there is the need of raising the level of ambition in supported investments. This need is also justified in view of the increased ambitious goals set by the EGD. The latter was introduced only at the end of 2019, so its impact on the programming and implementation of ERDF/CF investments during the 2014–2020 programming period was limited. Nevertheless, the supported investments were found to be mostly aligned with EGD objectives. The 2014–2020 programming period also saw different international crises, prompting the managing authorities to make prompt adjustments to supported measures. In particular, the COVID-19 pandemic led to a redistribution of allocations, resulting in a decrease – partially offset by REACT-EU resources – in funding available for environment and climate measures, in favour of business support and healthcare. The recent multiple crises have brought the social challenges associated with the green transition to the forefront.

Effectiveness

Investments supported by ERDF/CF made important contributions to all policy objectives covered by this evaluation, including decarbonisation, increasing resource efficiency, preservation and restoration of natural resources, climate adaptation and cultural heritage. External factors, primarily the COVID-19 pandemic and the Russian invasion of Ukraine, impacted interventions across several policy instruments, particularly those linked to larger-scale construction and infrastructure projects. The resulting increase in labour costs and prices for construction materials and energy led to significant project delays and, in some cases, suspensions. Partially as a result of this, a mixed picture emerges in terms of achievement rates across the different relevant indicators. However, strong progress was made across all areas in 2022, signalling that the intervention fields lagging behind are now catching up. While no unintended effects were identified in any of the areas supported, there is some unexploited or underexploited potential for synergies and co-benefits between different policy instruments. Furthermore, there are a number of missed opportunities, i.e. types of investments that would have had high impact potential but were barely supported. This concerns notably investments to support circular solutions as well as to nature-based solutions.

Efficiency

The investments supported by ERDF/CF were negatively affected by limited administrative capacity at the local level and lack of workforce with the necessary skills causing delayed project implementation. The evaluation investigated a long list of factors and, in addition to administrative capacity and skill gaps, complex regulatory procedures come out as a key challenge affecting the efficient use of funds. Where the capacity for building or technical assistance projects or programmes was in place, they have successfully mitigated the constraints from lack of administrative capacity and lack of skilled experts.

Coherence

The ERDF/CF investments pursuing climate and environmental thematic objectives were coherent with relevant EU policies and international commitments that were in place at the time of programming (approximately 2014). This is both the case for investments for which thematic

ex-ante conditionalities existed and for those without. Most of the policies linked to the EGD were introduced or updated between 2014 and 2020, which can explain the limited coherence on issues, such as the circular economy. In terms of coherence with other funding instruments, the ERDF/CF investments in climate and environmental objectives were generally coherent with other EU funds pursuing similar objectives. Partnership Agreements defining the priorities for each of the five European Structural and Investment Funds in the period 2014–2020 as well as horizontal principles and some specific coordination mechanisms ensured coherence between the spending priorities of the different funds. Synergies with other EU funds, such as Horizon 2020 or LIFE, were realised to a small extent mainly due to lack of awareness about the complementarity between the funds.

EU added value

Cohesion policy funding triggered investments that would not have materialised with the same scope and speed if the funding had not been available. The added value was considerable in terms of effects of scale, allowing for more ambitious interventions. However, also certainty and continuity of funding compared to national and regional alternatives were highlighted as well as technical assistance to MAs having made important contributions. Another element highlighted was the approach towards partnership and cooperation with stakeholders and an integrated, cross-sectoral approach based on territorial strategies. While the primary goal of cohesion policy to reduce territorial disparities across the EU is reflected in the allocation of funds and achievements, interesting findings relate to intra-regional disparities, where some examples indicate that the application of cohesion policy funding led to an increase instead of a reduction of territorial disparities.

6.1. Relevance

The evaluation questions covered by the relevance criterion included:

- To what extent were the initial objectives and scope of climate and environment investments made under the ERDF and CF addressing the needs of the regions? Are they still relevant?
- Are there any new developments that would require changing the objectives and scope of these investments?
- How did the COVID crisis affect the relative relevance of the ERDF and CF support for climate and environment investment across the EU?
- To what extent are cohesion policy investments in the field of climate and environment relevant for the objectives of the European Green Deal?

The following sections summarise the answers to the questions.

The objectives of climate and environmental investments supported by the ERDF and CF addressed the highly diverse needs of the various regions, while also demonstrating some commonalities across the various target countries and regions. Pressing and widespread needs throughout the EU stem from the urgent requirement to reduce GHG emissions, conserve natural resources and biodiversity, and effectively address extreme events resulting from climate change. Additionally, some patterns emerge in the needs that shaped specific programmes, influenced by the characteristics of the territory and the region/country's level of development, with some regions/countries still grappling with compliance issues related to meeting EU targets and requirements. Beyond differences in compliance with EU directives, the natural, geographical and socio-economic characteristics of territories play an increasingly significant role in the convergence process. Indeed, the frequency and severity of weather-related disasters and their impact on people and the economy, as well as the capacity to cope with these events, varies widely

across the EU.¹⁶⁹ Moreover, while the advantages of decarbonisation are global, the associated costs are not. Regions dependent on mining and emission-intensive manufacturing are the hardest hit. The uneven capacity of regions to reap the benefits of the green transition may exacerbate territorial disparities. Therefore, the overarching objective of ERDF and CF to reduce disparities between regions and countries within the EU remains highly relevant, not only in terms of economic development but also in addressing disparities in climate action and environmental sustainability.

The policy mix tends to be similar in countries/regions with relatively similar starting conditions, particularly concerning initial environmental performance and the volume of ERDF/CF support compared to government expenditure in the sector. While most programmes exhibit a certain level of fund concentration on key instruments, they also deploy, especially regional OPs, a broad mix of policy instruments to address diverse environmental and climate needs. Investments in energy efficiency of buildings emerge predominantly across many countries/regions, alongside clean urban transport. Conversely, investments in water, wastewater, and waste are only included in about half of the programmes. They are always present in the OPs of EU-13, the exception being OPs with thematic focus on competitiveness/growth/innovation. Businesses-related instruments, such as energy efficiency in enterprises and green economy, received smaller allocations of the total environment and climate expenditure. They were primarily activated in EU-14+UK countries, especially under programmes that put growth and competitiveness of enterprises at the core of their intervention logic.

The needs addressed by the ERDF/CF investments in 2014–2020 remain largely relevant, but increasing ambition would be beneficial. The scope of interventions related to climate and environment investments made under the ERDF and CF in 2014–2020 programming period is still largely relevant to current and future territorial needs. However, as countries/regions improve their climate and environmental performance, and with the rapidly evolving challenges associated with climate change and the increasing ambition of policy targets, raising the level of ambition in supported investments would further enhance the policy's impact. Specifically, it entails gradually discontinuing support for technologies or energy sources (e.g. natural gas) that are not entirely clean or sustainable. On the one hand, this process will be driven by the higher targets embedded in renewed legislation. On the other hand, more stringent ERDF/CF intervention fields, as seen in the current 2021–2027 regulations, facilitate this enhancement. Finally, the evaluation found that public procurement and investments' selection procedures can also play a crucial role in guiding investments effectively. While first-come-first-served procedures may be efficient, they do not necessarily ensure high potential for better and more enduring outcomes. If not appropriately designed, these procedures risk favouring low-hanging fruit. This issue has specifically emerged in energy efficiency investments, where support for deep renovation is especially needed.

¹⁶⁹ European Commission (2024), Ninth report on economic, social and territorial cohesion. See [link](#). According to this report, the Coastal, Mediterranean and Eastern regions, which are already poorer than the EU average, are more vulnerable and disproportionately affected, and face estimated annual economic losses of at least 1% of GDP and greater human exposure to climate-related harms.

The 2014–2020 was marked by a quick evolution of the policy context, calling for reinforced support for climate and environment. The 2014–2020 cohesion policy was fundamentally designed to provide support for the Europe 2020 strategy, the flagship EU policy adopted in 2010 promoting ‘smart, sustainable and inclusive growth’. However, the start of the 2014–2020 period was marked by the recovery from the 2008–2009 financial and economic crisis, which had a profound impact on Member States’ economies. During the programming period, the EU’s growth strategy has shifted more towards one that integrates sustainability at its core, acknowledging that social and economic objectives cannot be met without tackling climate change and environmental degradation. The 2014–2020 programming period witnessed the introduction of new legislative packages, culminating with the launch of the EGD in December 2019. The EGD can be seen as a continuation of the Europe 2020 Strategy, but it sets more ambitious goals through its many linked initiatives which introduce new aspirations.

Due to the introduction of the EGD at the end of 2019, it had limited impact on the programming and implementation of ERDF and CF investments during the 2014–2020 programming period. Despite this, the EGD builds upon the environmental and climate strategy and targets that were already in place throughout the 2014–2020 programming period. While many of its components draw from existing EU policies and regulations, it represents the first comprehensive, long-term plan for transitioning to a climate-neutral Europe by 2050, encompassing all sectors of the economy. The EGD can be viewed as the culmination of a longer process of climate policy transformation in the EU, transitioning from narrow, separate climate and energy policy initiatives into broader coordinated packages aimed at achieving increasingly ambitious climate targets.

Overall, the cohesion policy investments in the field of climate and environment during the 2014–2020 programming period were relevant for the objectives of the EGD. This relevance is evident from the alignment observed when comparing the TOs and their respective investment priorities (IPs) with the objectives of EGD. However, despite this overall alignment, certain IPs, particularly some linked to competitiveness in SMEs (TO3), supporting TEN-T infrastructure (TO7), and promoting energy production from renewable sources (TO4) are assessed as misaligned with the EGD objectives. Further analysis of IFs revealed instances, such as supporting natural gas and its infrastructure, which could lead to technological lock-in in fossil fuel-intensive technologies. While IFs focused on promoting competitiveness and establishment of new SMEs are important for economic growth, without a clear environmental or sustainability focus, these investments could inadvertently contribute to the increase of GHG emissions, posing challenges to aligning with the climate objective of the EGD. Balancing economic development and environmental goals remains crucial, as also seen in investments in motorways, roads, and airports. While these investments may enhance regional cohesion, they also have the potential to slow the transition to sustainable and smart mobility. This underscores the importance of ensuring strategic alignment with EGD goals in future programming periods.

The 2014–2020 programming period also saw different international crises, prompting managing authorities to make prompt adjustments to supported measures. The COVID-19 pandemic, the Russian invasion of Ukraine, and consequent price increases have not only affected the implementation of investments but also influenced programming and priority setting for the OPs.

Indeed, cohesion policy was called to play an important role in response to the crises, starting from the COVID-19 pandemic. The latter broke out in early 2020 and represented a major shock to all EU regions and Member States, with a deep and unprecedented impact on the entire society and economy. The European Commission in the first instance, and managing authorities closely, thereafter, promptly reacted to the new emerging needs caused by the pandemic. Through the Coronavirus Response Investment Initiative (CRII) and CRII+, the European Commission introduced exceptional measures (e.g. facilitating the use of unspent funds, quicker reprogramming procedures, extension of the eligibility period, increasing co-financing rate to 100%¹⁷⁰) modifying the implementation rules of cohesion policy funds, thus allowing for higher flexibility. Moreover, the European Commission injected additional resources through the Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU), which allowed managing authorities to increase allocations, targeting the new needs that emerged during the pandemic.¹⁷¹

The COVID-19 pandemic led to a redistribution of allocations, resulting in a slight decrease in funding available for environment and climate measures, in favour of business support and healthcare instruments. However, such a decrease was largely offset by the injection of REACT-EU resources. In almost all Member States, the significant new resources brought in by REACT-EU were used to some extent to support policy instruments dedicated to environmental protection and climate change. In order not to lose REACT-EU resources, the managing authorities extended OP support to projects already in the national or regional pipelines that, in the absence of REACT-EU funds, would have been financed exclusively by national/regional funds. Also, the introduction of REACT-EU favoured projects that could ensure a rapid absorption, such as investments into the energy efficiency of buildings and renovation of public transport fleets. The focus on quick implementation demonstrated cohesion policy's flexibility in adapting to evolving challenges, but at the same time diluted the internal consistency of programmes.

The mobility disruptions caused by the pandemic, especially the increased interest in bicycle transportation, have further exacerbated the importance of investments in multimodality. The COVID-19 pandemic impacted the investments in clean urban transport in multiple ways. At the activity level, it led to delays in investment implementation due to a combination of factors, including restrictions, material shortages, and cost increases. At the outcomes level, it led to a significant decrease in public transport passengers due to the fear of using public transport and increased remote working. Simultaneously, it fostered an increased interest in cycling. Therefore, many cities viewed the COVID-19 pandemic as an opportunity to redefine their approaches and embrace more sustainable and active modes of transportation. In this regard, the case study on clean urban transport highlights that integration between public transport and active travel is key to delivering competitive levels of service that attract passengers away from private

¹⁷⁰ For expenditure declared in payment applications for the accounting year starting 1 July 2021 and ending 30 June 2022 for one or more priority axes in a programme supported by the ERDF, the ESF or the Cohesion Fund, Regulation 2022/562, see [link](#).

¹⁷¹ A new dedicated and cross-cutting Thematic Objective constituting a single Investment Priority was added for Cohesion Policy to facilitate the distinction of REACT-EU operations from others for monitoring and evaluation purposes, namely TO13 'Fostering crisis repair in the context of the COVID-19 pandemic and its social consequences and preparing a green, digital and resilient recovery of the economy'.

cars, rather than creating competition between urban transport and non-motorised modes. Beyond investments in physical integration (such as transport hubs and bike-and-ride facilities), other non-infrastructure actions are necessary. These include authorising the transportation of bicycles on trams, metro, and buses, coordinating timetables between different modes of transit, and integrating ticketing and service information across various modes, including bike-sharing schemes, even if operated by different entities.

In 2022–2023, the situation in some countries, especially Spain and Italy, was compounded by the need to plan rapidly and start implementing new investments under the Recovery and Resilience Facility (RRF). According to the mid-term evaluation of the RRF¹⁷², its launch generated no significant substitution effect regarding the 2014–2020 ERDF/CF operational programmes, as their implementation was already well advanced. However, the substantial influx of resources provided over a short term by the RRF put Member States' absorption capacity under pressure, especially in countries with traditional absorption problems such as Romania, and long-lasting capacity weakness, such as Italy, Greece, and Spain.

To conclude, it is worth noting that in recent times, tensions have appeared between the necessity of the green transition and the discontent of citizens. With the EGD, the EU has established ambitious climate goals in recent years, positioning itself as a global leader in the push for climate neutrality by 2050. However, since setting these goals, a range of global and economic challenges have happened, including the disruptions caused by the COVID-19 pandemic, conflicts such as Russia's war of aggression against Ukraine and the conflict in the Middle East, rising inflation, and financial constraints within the EU. This complex situation has brought the social challenges associated with the green transition to the forefront. While there appears to be general support among citizens for these initiatives, enthusiasm tends to wane when trade-offs become evident. Economic and financial concerns take priority, as reflected in a 2023 EIB survey,¹⁷³ which revealed a reluctance among respondents to accept the costs fully associated with the transition. The protests by farmers across Europe illustrate these tensions.¹⁷⁴ Therefore, as also emerged during the seminar organised in the context of this evaluation, it is increasingly crucial for both the EU and national governments to establish, alongside ERDF/CF support, protection measures tailored to the needs of individuals and the capacity for change within each region, in order to mitigate the negative social repercussions of the green transition. In this regard, measures such as the Social Climate Fund and the Just Transition Mechanism are essential but may not be sufficient.

¹⁷² European Commission (2024) Midterm evaluation of the Recovery and Resilience Facility, [see link](#). See specifically the case study on the functioning of the RRF and other EU funds.

¹⁷³ European Investment Bank (2023) Climate Survey Resources, Edition VI, [see link](#).

¹⁷⁴ See [link](#).

6.2. Effectiveness

The effectiveness criterion covered the following questions:

- What were the intended and potentially unintended effects of different policy interventions for climate and environmental objectives?
- How effective was the ERDF and CF support in contributing to the achievement of the relevant programme's objectives, as well as the relevant Europe 2020 objectives and targets? To what extent were these objectives and targets achieved?
- How were these effects influenced by external factors? What are the identified bottlenecks that may limit the impact of the ERDF and CF support to climate and environment investments?

The following sections summarise the answers to the questions.

Investments supported by ERDF/CF made important contributions to all policy objectives covered by this evaluation, that is, the transition towards a low-carbon economy, the improvement of resource efficiency, the preservation and restoration of natural resources, adaptation, and risk management as well as the protection and development of cultural heritage. In the field of decarbonisation, investments resulted in more than 6,000 MW additional renewable energy capacity, 590,000 households with improved energy consumption classification, a decrease of 3.6 billion kWh/year in primary energy consumption in public buildings as well as 257 km of new and/or improved tram and metro lines. Eurostat indicators confirm that good progress has been made at macro level in all these domains (see Figure 79, Figure 80, Figure 81,

Figure 82 in Annex VII). While it is difficult to determine the exact degree of contribution to objectives at macro level, there is sufficient evidence from case studies, regression analyses and academic as well as grey literature showing that the contribution is of significant scale. With respect to the objective of improving resource efficiency, an additional 3.4 million tonnes/year of additional waste recycling capacity was achieved. Several macro-level indicators related to resource efficiency, circular material use and recovery of waste through recycling and energy recovery, show progress during the period concerned (see Figure 83, Figure 84 in Annex VII). While the improvements are not due solely to the ERDF/CF investments, the case studies as well as a regression analysis confirm that the ERDF/CF investments contribute to these improvements (see Figure 85 in Annex VII). In relation to the preservation and restoration of natural resources, investments have contributed to more than 8 million people being served by improved water supply, more than 9 million people being served by improved wastewater treatment as well as 11 million hectares of land being turned into habitat protection. Again, the contribution of investments to positive change at the macro level could be validated by regression analyses and through other sources (see Figure 86 and Figure 87 in Annex VII). In the area of adaptation and risk management, investments have led to nearly 30 million people benefiting from new or improved flood protection measures as well as nearly 24 million people benefiting from new or improved forest fire protection measures. Investments in protecting and developing cultural heritage are estimated that they will lead to an additional 44 million visitors at supported sites per year. However, such estimates have to be taken with a high degree of caution,

because it is not clear how reliable these estimates are. On the basis of the evidence collected, no unintended effects were identified in any of the above fields.

On this basis, the contribution of ERDF/CF funding to the successful achievement of the Europe 2020 targets can be clearly confirmed.¹⁷⁵

External factors, primarily the COVID-19 pandemic and the Russian invasion of Ukraine, impacted interventions across several policy instruments, especially those linked to larger-scale construction and infrastructure projects. The resulting increase in labour costs and prices for construction materials and energy led to significant project delays and, in some cases, suspensions. Most heavily affected were the policy instruments on clean transport, energy efficiency in buildings, sustainable energy, wastewater, waste, and water. However, 2022 and 2023 numbers show strong progress in absorption and achievements, meaning that while investments were delayed, they are eventually being implemented and completed. Furthermore, the ultimate success of policy interventions (in terms of outcomes) was also tied to shifting public awareness, acceptance, and behavioural change. This was noted for example with respect to the policy instrument on clean transport, where the effectiveness of new infrastructure often depended on citizens opting to use these new services. Similarly, energy efficiency in buildings and wastewater reuse projects required shifts in public behaviour to avoid rebound effects and ensure the effectiveness of the projects.

A mixed picture emerges in terms of achievement rates of the different relevant indicators, but strong progress was made across all areas in 2022. The achievement rates vary strongly across the different relevant common indicators. Whereas 2022 achievement rates of CO19 (additional population served by improved wastewater treatment) and CO15 (total length of new and improved tram and metro lines) are only 44.8% and 53.7%, respectively, they reach 95.4% in the case of CO31 (number of households with improved energy consumption classification) and even 111.4% with respect to CO23 (surface area of habitats supported to attain a better conservation status).

The average achievement rate across all 11 selected indicators at the end of 2022 was 68.1%, the median 62.5%. While these numbers are significantly lower than the average achievement rate of 98% and the median of 78.5% across all common indicators used in the cohesion policy context, these latter numbers should not be used as benchmarks, for a variety of reasons. Most importantly, it must be considered that the nature of investments in other domains are of a very different kind and often much easier to implement than large construction and infrastructure projects which are subject to this evaluation. A second important aspect is the fact that common indicators used in other domains include activity-related indicators (as

¹⁷⁵ According to estimates of the EEA, all three targets were achieved: 20% reduction of greenhouse gas emissions compared to 1990 levels; increase in the share of renewable energy in the final energy consumption to 20% and an increase in energy efficiency by 20%. However, it needs to be noted that the 20% reduction in energy consumption was partially an effect of widespread lockdowns during the COVID-19 crisis: <https://www.eea.europa.eu/highlights/eu-achieves-20-20-20#:~:text=estimates%20that%20the%20EU%20achieved,improving%20energy%20efficiency%20by%2020%20%25>.

opposed to output- or outcome-related indicators) and it is especially those activity-related indicators where achievement rates are particularly high.¹⁷⁶

An additional point that should be highlighted is the fact that strong progress was made across all indicators between the end of 2021 and 2022. This implies that while many investments were delayed due to the complexity of investments as well as exogenous factors, there is a catch-up process in place.

When discussing achievement rates as a percentage of the set targets, one should also consider whether these targets have been changed during the course of the period in question. There were four indicators for which the targets have been significantly decreased between 2016 and 2022: CO15 (linked to clean transport), CO31 (linked to energy efficiency in buildings), CO34 (not linked to a specific intervention field) and CO17 (linked to waste management). In other words, the achievement rates of the mentioned fields would be significantly lower if measured against the initially set targets.

Both within but also across policy instruments, there is some unexploited or underexploited potential for synergies and co-benefits between different policy instruments. As the case studies have shown, this includes, for example, synergies between measures to support energy efficiency and investments in sustainable energy; co-benefits between pollution prevention and measures to support decarbonisation; synergies between investments in cultural heritage and various other policy instruments including energy efficiency, nature and biodiversity and transport.

Beyond these unexploited or underexploited synergies, there are a number of missed opportunities, i.e. types of investments that would have had high impact potential but were hardly supported. For example, supporting circular solutions, which would have been very relevant but mostly missing in the PIs green economy, waste and wastewater; supporting nature-based solutions, which would have been very relevant but mostly missing in the case of adaptation; supporting water efficiency (also independently of circular solutions) in the case of PI water.

6.3. Efficiency

The effectiveness criterion covered the following questions:

- What are the underlying factors and drivers which influence the implementation of ERDF and CF support for climate and environment investments?
- What inefficiencies and obstacles were identified, how were they addressed, and what could be done to (further) improve the efficiency of EU support to climate and environmental objectives?

The following sections summarise the answers to the questions.

¹⁷⁶ By way of example, this includes indicators such as 'number of enterprises participating in cross-border, transnational or interregional research projects' with an achievement rate of 403.0% or 'number of participants in joint education and training schemes' with an achievement rate of 316.8%.

A wide array of factors impacts investments, but the most often reported¹⁷⁷ negative impacts emerge from limited administrative capacity, lack of skills and complex processes and procedures. Out of a larger set of factors that were investigated, these three factors negatively affected efficiency by increasing the time and resources needed for implementation of the EFRD/CF support. They are closely linked. Lack of the necessary experts delays regulatory procedures such as procurement or permitting and when these procedures are complex, the effects are amplified.

The factors mentioned above, limited administrative capacity at local level and lack of workforce with the necessary skills have been found to cause delayed project implementation and potentially causing lower quality of implemented investments. Evidence from evaluation including the assessment of the 70 OPs (see Table 7) and the PI case studies points to workforce skills gaps as barriers to efficient project implementation. The sufficiency of human capital with appropriate skills is an issue that creates inefficiencies by delaying the implementation of the projects. This finding is supported by the literature.¹⁷⁸ The lack of a workforce with particular skills has also impacted on the quality of the projects.¹⁷⁹

Complex regulatory procedures also come out as a key challenge affecting the efficiency of funds implementation: in terms of time and resources, and in terms of resulting outputs. Evidence collected across PIs and OPs strongly suggest that regulatory procedures continue to be perceived as one of the biggest challenges within the implementation of ERDF/CF funds. Public procurement and permitting including the EIA procedure are the procedures most often identified.¹⁸⁰ The complex and length procedures affect the timeline for implementation of the investments. This finding is also supported by the literature.¹⁸¹ On the other hand, it is necessary to stress that procedures are not introduced by the cohesion policy but reflect important EU and national objectives. For example, the EIA procedure guarantees environmental protection and transparency with regard to the decision-making process for many larger public and private projects. The EIA ensures that environmental concerns are considered from the very beginning of new building or development projects, or their changes or extensions. The importance of the principle of environmental integration is a corner stone of the European Green Deal.

Weaknesses in the available sector plans and/or lack of coordination across national, regional, and local authorities have negatively affected the programming and implementation of cohesion support.¹⁸² The main impact of such deficiencies is the risk that supported operations are not the most cost-effective solutions. There is much literature with reviews of sector strategies and plans that have identified weaknesses. These weaknesses are often related to division of

¹⁷⁷ Based on the assessment of the 70 OPs (see section 5.4) and the policy instrument case studies.

¹⁷⁸ For example, the EIB municipal surveys that have repeatedly found the shortage of staff with the right skills constrain investments. EIB (2017), Municipal infrastructure: Investment survey, see [link](#). EIB (2020), The state of local infrastructure investment in Europe: EIB Municipalities Survey, see [link](#); and the latest one: EIB (2022), The state of local infrastructure investment in Europe: EIB Municipalities Survey 2022–2023, see [link](#).

¹⁷⁹ The PI cases study on wastewater includes such a finding.

¹⁸⁰ The assessment of the 70 OPs and literature such as the EIB municipal surveys.

¹⁸¹ EIB (2017), Municipal infrastructure: Investment survey, see [link](#). EIB (2020), The state of local infrastructure investment in Europe: EIB Municipalities Survey, see [link](#); and the latest one: EIB (2022), The state of local infrastructure investment in Europe: EIB Municipalities Survey 2022–2023, see [link](#).

¹⁸² Efficient planning is also related to coherence. This section assessed planning in relation to efficiency. The programming can be supported by existing plans that provide the basis for selection of cost-effective projects.

responsibilities across national, regional, and local authorities. Without coordination in preparing sector strategies and plans and coordination when the strategies and plans are to be used as the basis for the programming of ERDF/CF support, there is a risk of not identifying the most effective and efficient solutions.

The above factors have all delayed the implementation. Considering the absorption rates, there are some quantitative indications of the impacts. The lowest absorption rates are seen for IFs related to water and waste infrastructure. These are policy areas where the regulatory procedures in terms of permits and procurement are challenging. These are also areas with a deficiency of skilled experts. There is anecdotal evidence, for example from wastewater and energy efficiency, that lack of skilled experts has impacted the quality of supported projects. The data do not support a quantitative assessment of how long these factors have delayed the implementation.

The evaluation found that when technical assistance and capacity building were provided, the constraints from lack of administrative capacity and lack of skilled experts have been successfully addressed. The findings of this evaluation include ample examples of successful concrete initiatives or set-ups that have contributed to reducing the negative impacts from administrative capacity constraints. This includes technical assistance through for example LIFE, JASPERS and Climate-Adapt.

Factors, such as the beneficiaries' demand for and interest in funding and their familiarity with applying and receiving ERDF/CF funding, have had a positive impact on the implementation of the ERDF/CF support. The assessments of the 70 OPs and the PI case studies carried out as part of this evaluation have identified these factors as having positive impacts on the implementation. The interest in receiving ERDF/CF support is often closely linked to demands from EU environmental legislation where a region has implementation gaps.

6.4. Coherence

The coherence criterion covered the following questions:¹⁸³

- To what extent were the climate and environment investments from the ERDF and CF coherent with other EU interventions having similar objectives (overlaps, complementarities, synergies)?
- To what extent were the climate and environment investments from the ERDF and CF coherent with national climate and environment investments?
- To what extent were the climate and environment investments from the ERDF and CF coherent with the relevant international obligations taken by the EU?

The following sections summarise the answers to the questions.

Coherence with other EU interventions having similar objectives

¹⁸³ These are the questions included in the Tender Specifications of the study. They address the external coherence of the interventions. Another important aspect to address according to the Better Regulation Guidelines is also internal coherence – this aspect is discussed in Section 6.4.

The ERDF/CF investments in climate and environmental thematic objectives were coherent with relevant EU policies and international commitments, as compliance with EU requirements was a leading factor in the programming of operations in the 2014–2020 period, and thematic ex-ante conditionalities were in place for some policy instruments (i.e. the PIs on sustainable energy, energy efficiency, waste, water and wastewater, adaptation). The analysis of 70 OPs within this evaluation showed that the majority were coherent with the relevant EU legislation, such as the SEA, EIA and INSPIRE Directives, as well as with the thematic legislation and ex-ante conditionalities, country-specific recommendations and the Europe 2020 Strategy. Unsurprisingly, in the text of the OPs, alignment with Europe 2020 pillars and the EU legislation framework (both sector-specific and horizontal) was recalled systematically as a guiding reference. Europe 2020, in particular, was the overarching EU strategy at the time of the 2014–2020 programming phase.

Investments under the PIs for which thematic ex-ante conditionalities existed were, generally, aligned with the requirements of the relevant EU legislation and related national strategic documents. This includes energy-related investments under TO4, adaptation investments under TO5 and some of the environmental protection investments under TO6. The evidence collected during the preparation of the case studies (from literature and stakeholders) confirmed that: 1) investments under the PI on energy efficiency and the PI on sustainable energy were coherent with EU and national energy targets as they aligned with national energy strategies and action plans, including the National Energy and Climate Plans (NECPs); 2) operational programmes and investments under the PIs on adaptation, water, and wastewater were coherent with the requirements of the EU water acquis (as investments supported by operational programmes needed to be aligned with River Basin Management Plans and Flood Risk Management Plans); 3) investments under the PI on waste were generally aligned with national and local waste management plans.

This is a continuation of a trend from the previous 2007–2013 programming period (2007–2013), where cohesion policy funding was directed to investments (e.g. in wastewater treatment, waste and water management) that improve the compliance of Member States with the EU environmental acquis.¹⁸⁴ The need to comply with EU environmental legislation provided a legal framework and a basis for prioritisation of investments in environmental infrastructure (including major projects), particularly in the EU-13 countries.¹⁸⁵

As mentioned in section 5.6, compliance with the polluter-pays principle is one of the ways coherence of the ERDF/CF investments with environmental objectives is ensured. The principle is mentioned in the Water Framework Directive and the Waste Framework Directive. Its application in the 2014–2020 cohesion policy was reinforced by the ex-ante conditionalities, including the general conditionality for EIA and SEA application, which enables that preventive action or rectification for any

¹⁸⁴ COWI, Milieu and CSIL (2016) Environment Final Report Work Package 6 - Ex post evaluation of Cohesion Policy programmes 2007–2013, focusing on the European Regional Development Fund (ERDF) and the Cohesion Fund (CF), Report for the European Commission Directorate General for Regional and Urban Policy, see [link](#).

¹⁸⁵ CSIL (2019) Ex post evaluation of major projects supported by the European Regional Development Fund (ERDF) and Cohesion Fund between 2000 and 2013 - Lot Environment, Final Report for the European Commission Directorate General for Regional and Urban Policy, see [link](#).

environmental damage is made by the polluter; and the thematic ex-ante conditionality for water, which requires the application of the polluter-pays principle in water pricing policy. Despite the delays observed with the implementation of the conditionalities, they resulted in improved compliance with the relevant EU legislation.¹⁸⁶ For example, in the water sector, the conditionality triggered amendments of the water pricing policy for agriculture with the goal of incentivising a more efficient use of water resources in a number of countries (e.g. Bulgaria, Cyprus, Hungary, Italy, Malta and Slovakia). Nevertheless, an examination of 20 major projects in the water and waste management sectors from the 2007–2013 period concluded that despite the fact that all projects claimed to adhere to the principle, this was only partially achieved.

Investments that fell under the PIs and for which no ex-ante conditionalities were defined in the period 2014–2020, were nonetheless in compliance with the relevant requirements of the EU environmental acquis or the relevant national/regional strategies as recommended in the various Commission guidance fiches for desk officers.¹⁸⁷ This was confirmed by the evidence collected during the preparation of the case studies (from literature and stakeholders). For instance, operations in pollution reduction were coherent with air quality objectives defined in the EU Ambient Air Quality Directives.¹⁸⁸ In the area of the PI on nature and biodiversity, efforts were made to align investments with the priorities set out in the Priority Action Frameworks and/or Natura 2000 management plans required under the Nature Directives. The clean transport investments were designed and implemented coherently especially with measures related to supporting intelligent transport systems, multimodal transport, railways, and support to the tourism industry. Despite the varying uptake and differences in quality of the Sustainable Urban Mobility Plans (SUMP) across cities, their introduction had the added value of mainstreaming long-term strategic thinking about sustainable urban mobility, promoting public consultation and stakeholder involvement in policy making. Frequently, measures for clean transportation were not implemented within the framework of SUMP, but rather as part of air quality plans, with the aim of reducing air pollution caused by transport.

The alignment between cohesion policy investments and certain EU and national sustainability policies was inadequate due to missed opportunities identified under specific PIs. This includes insufficient focus of ERDF/CF investments on waste prevention and reuse (the PI on waste) and circular (i.e. non-linear supply and production) processes that go beyond mere resource efficiency gains (the PI on green economy), which is not completely aligned with the ambitious

¹⁸⁶ COWI and Milieu (2019) Integration of environmental concerns in Cohesion Policy Funds (ERDF, ESF, CF) - Results, evolution and trends through three programming periods (2000–2006, 2007–2013, 2014–2020), Final report for Directorate General for Environment of the European Commission, see [link](#).

European Commission (2017), The Value Added of Ex ante Conditionalities in the European Structural and Investment Funds, SWD(2017) 127 final.

Metis GmbH and ICF International (2016), The implementation of the provisions in relation to the ex-ante conditionalities during the programming phase of the European Structural and Investment (ESI) Funds, Final Report for the European Commission Directorate General for Regional and Urban Policy, see [link](#).

¹⁸⁷ 2014 thematic guidance fiches on TO4 (sustainable Multimodal Urban Mobility, Energy Efficiency Investments, Renewable Energy and Smart Grid Investments), TO5 (Climate Change Adaptation, Risk Prevention and Management) and TO6 (Biodiversity, Green Infrastructure, Ecosystem Services and Natura 2000, Water Management, Waste Management) retrieved from European Commission, Guidance on European Structural and Investment Funds 2014–2020: https://ec.europa.eu/regional_policy/information-sources/legislation-and-guidance/guidance_en.

¹⁸⁸ This refers to Directive 2008/50/EC on ambient air quality and cleaner air for Europe and Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.

objectives of the EU's 2020 Circular Economy Action Plan and the EGD. The limited number of investments in nature-based solutions (the PI on adaptation and risk management) indicates that there is no full alignment with the ambitious objectives of the EU Adaptation and Biodiversity Strategies or the 8th Environment Action Plan. The low uptake of measures in water reuse and use of sewage sludge in the PIs on water and on wastewater suggests lower coherence with EU objectives on water reuse and circularity.

Nevertheless, it should be kept in mind that most of the policies linked to the EGD were introduced or updated during the period 2014–2020, which can explain the limited coherence on issues such as circular economy. The evidence from the 70 OPs selected for in-depth analysis pointed to the lack of a significant impact of the EGD due to its introduction having taken place at the end of 2019, well into the implementation phase of the programming cycle. For the same reason, coherence with NECPs¹⁸⁹ is an aspect that is more relevant for the 2021–2027 period. Nevertheless, some of the interviewed managing authorities highlighted that the programmes benefiting from the availability of REACT-EU resources, which led to widespread post-COVID reprogramming, already used these additional resources in line with the EGD provisions, ensuring some external coherence of the programmes.

Coherence with other sources of financing

ERDF/CF funding for climate and environmental objectives was designed to be coherent with other EU funding programmes with similar objectives. The climate and environmental objectives covered in WP7 could be supported, including with interventions funded from other EU funding instruments in the 2014–2020 Multiannual Financial Framework (MFF), such as the European Agricultural Fund for Rural Development (EAFRD), European Maritime and Fisheries Fund (EMFF), LIFE and Horizon 2020. These different funds were designed to be complementary to cohesion policy by targeting different 'technological' or 'management' phases of similar investments or by targeting specific sectors. Namely, as the EU's research programme Horizon 2020 supported research and innovation activities, ERDF/CF investments focused on well-tested and tried infrastructure and technological investments. The LIFE programme focused on demonstration projects that could then be rolled out at a larger scale, including through support from cohesion policy. The EAFRD and EMFF targeted the needs of agricultural, rural and coastal areas.¹⁹⁰

The Commission guidance for the period¹⁹¹ highlighted the complementarity between ERDF/CF investments and EAFRD, EMFF and LIFE in the area of biodiversity or between ERDF/CF and EAFRD interventions in relation to climate change adaptation. Furthermore, the role of market-based instruments (e.g. loans,

¹⁸⁹ Introduced under the Regulation on the governance of the energy union and climate action (EU/2018/1999), the NECPs had to be submitted to the Commission by the end of 2019.

¹⁹⁰ Based on the legislation for each fund in the 2014–2020 period: Regulation (EU) No 1291/2013 (Horizon 2020), Regulation (EU) No 1293/2013 (LIFE), Regulation (EU) No 1300/2013 (Cohesion Fund), Regulation (EU) No 1301/2013 (ERDF), Regulation (EU) No 1305/2013 (EAFRD) and Regulation (EU) No 508/2014 (EMFF).

¹⁹¹ European Commission (2014) thematic guidance fiches on TO4 (sustainable Multimodal Urban Mobility, Energy Efficiency Investments, Renewable Energy and Smart Grid Investments), TO5 (Climate Change Adaptation, Risk Prevention and Management) and TO6 (Biodiversity, Green Infrastructure, Ecosystem Services and Natura 2000, Water Management, Waste Management) retrieved from European Commission, Guidance on European Structural and Investment Funds 2014–2020, see [link](#).

guarantees, Energy Performance Contracting schemes) in combination with ERDF/CF funding was highlighted as a financing source for investments in energy efficiency of buildings and deep renovation. The importance of building upon the results of research projects under FP7/Horizon 2020 was also stressed.

In addition, the 2013 CPR required Member States to develop Partnership Agreements (PAs) defining their priorities for each of the five European Structural and Investment Funds covered by the CPR (i.e. ERDF, CF, EAFRD, EMFF and the ESF) to ensure coherence between the different funds and spending priorities. In essence, the PAs are national investment plans that present the intervention logic employed to reach the Europe 2020 targets, relevant long-term reform needs defined in the Country Specific Recommendations and other relevant national priorities. They explain the logic behind the spending of the different funds in the 2014–2020 period, including allocations to different TOs, institutional arrangements for meeting the partnership principle, and measures for fulfilling the ex-ante conditionalities. An ECA report¹⁹² concluded that the PAs proved to be *‘an effective instrument for ring-fencing [...] funding for thematic objectives and investment priorities and supporting the focus on the objectives of the Europe 2020 strategy for growth and jobs’*. Despite the PAs being very long and sometimes not clear enough on areas, such as national co-financing, they were considered to be useful tools for ensuring support for strategic objectives with multiple EU funds was consistent.

The alignment between ERDF/CF and EAFRD-supported investments was stronger than the alignment with the EMFF, thanks to well-established coordination mechanisms, such as coordination or monitoring committees. Although coherence between ERDF/CF investments in climate and environmental investments and similar support from EAFRD and EMFF was not investigated in detail, findings from existing evaluations suggest that there was some degree of coherence. The ex-ante assessment of the rural development plans (RDPs) under the EAFRD in 2014–2020¹⁹³ found that in most cases (72%), RDPs were highly consistent with the cohesion policy funds. Examples of coherent measures were reported for the PIs on energy efficiency and adaptation and risk management. It was found that funding alignment was ensured through coordination committees, joint monitoring committees and thematic networks at national level and inter-fund coordination groups at regional level. The absence of formal coordination mechanisms for some RDPs was noted as an issue that could jeopardise the coherence between funds. A similar ex-ante assessment of the EMFF OPs in the 2014–2020 period¹⁹⁴ reported that in most cases there was no information about the interaction between the EMFF and other structural funds; wherever it was provided, it was superficial. The involvement of other stakeholders was achieved mainly through steering committee meetings.

¹⁹² European Court of Auditors (2017) The Commission’s negotiation of 2014–2020 Partnership Agreements and programmes in Cohesion: spending more targeted-on Europe 2020 priorities, but increasingly complex arrangements to measure performance, Special Report 2, see [link](#).

¹⁹³ European Commission, Directorate General for Agriculture and Rural Development (2015) Synthesis of Ex Ante Evaluations of Rural Development Programmes 2014–2020, Executive Summary, see [link](#). And Final Report, see [link](#).

¹⁹⁴ European Commission, Directorate General for Maritime Affairs and Fisheries (2016) Synthesis of the ex-ante evaluations attached to the EMFF operational programmes – Final report, see [link](#).

High complementarity was expected between the ERDF/CF investments under the climate and environmental thematic objectives and the Horizon 2020 and LIFE programmes, but synergies were not fully realised. The ex-post evaluation of the Horizon 2020 programme¹⁹⁵ concluded that synergies with the ERDF in specific thematic areas were limited. Complementarity was reported in relation to using the ERDF to enable the implementation of research activities (which is outside the scope of the WP7 investments), but the use of cohesion policy to invest in activities that exploit Horizon 2020 project results was limited and underused. The reasons for the 'rare and unsystematic' use of ERDF to support the use of research results were technically caused by administrative barriers, lack of sufficient information about Horizon 2020 projects, little and non-systematic cooperation between managing authorities and the national contact points for Horizon 2020, and the absence of a mapping of projects. Moreover, many of the consulted stakeholders were not sufficiently aware of the funds to be able to judge their synergies. An additional challenge rises from the excellence-based requirements of the Horizon 2020 programme, which means that significant capacity is required to obtain the funding. Regions that receive a lot of ERDF/CF funding are not necessarily those that are successful in receiving Horizon 2020 funds and in many cases are regions with some capacity gaps.

Similarly, the mid-term evaluation of the LIFE Programme for the 2014–2020 period¹⁹⁶ found that most of the fund's beneficiaries could not respond to the question whether LIFE and ERDF/CF funding was synergetic or overlapping (the lack of awareness was higher for the CF). While those who could answer responded that the cohesion policy funds and LIFE were synergetic, the high share of missing answers pointed to a general lack of awareness about the links between the two funding instruments. Awareness was higher among experts, who confirmed that cohesion policy and LIFE were highly complementary especially in the area of nature and the possibility to implement international projects across borders. However, the catalyst role of LIFE to support demonstration projects that could later be funded at a larger scale by other funds was not fully exploited.

The insufficient use of complementary funding from ERDF/CF and LIFE, and a need for stronger coherence between different funding instruments were identified in the case studies on adaptation and risk management and nature and biodiversity. In particular, further synergies of EU and national funding are needed in the PI on adaptation and risk management. While funding is available to support adaptation investments, the case countries¹⁹⁷ research indicated that further efforts in combining different sources of funding was needed to support adaptation measures. The nature and biodiversity case study confirmed coherence with other sources of funding, including in particular national funding, but cohesion policy was found not to play a recognisable role in nature protection as compared to other funding instruments (e.g. EAFRD or LIFE).

Overlaps with the Recovery and Resilience Facility (RRF) are not expected for the 2014–2020 cohesion policy. The RRF entered force in 2021 with the ambition

¹⁹⁵ European Commission (2024) Ex-post evaluation of Horizon 2020, the EU Framework Programme for Research and Innovation, SWD (2024) 29 final.

¹⁹⁶ European Commission, Directorate General for Environment (2017) Support for an external and independent LIFE midterm evaluation report – Final report, see [link](#).

¹⁹⁷ Italy, Hungary and Slovenia.

to support Member States in their digital and green transitions. The RRF's midterm evaluation¹⁹⁸ points out that 'no significant substitution effect' was observed for the 2014–2020 operational programmes, as their implementation was already well advanced when the RRF started. Potential risks of substitution or overlaps exist in relation to the 2021–2027 cohesion policy programmes,¹⁹⁹ but this is out of scope of the current evaluation.

Most 2014–2020 OPs contained explicit references to other EU funding programmes (EAFRD, EMFF, LIFE, Horizon 2020) but few specific mechanisms were put in place to ensure coherence according to the review of 70 OPs. As far as funding instruments, such as LIFE and Horizon 2020 were concerned, there was little evidence of mechanisms to ensure coherence. These were limited to the adoption, in the cohesion policy framework, of guidelines originally developed under EU-level programmes. No significant complementarity between projects was identified by the managing authorities. Similarly, no specific systematic mechanisms were indicated that would ensure coherence with the CAP or the CFP. Some exceptions in this regard were Bulgaria (where guidelines aimed at mainstreaming environmental and climate policies in all structural and investment funds in the 2014–2020 period were published in an attempt to ensure a uniform approach and larger policy impacts), Czechia (where a supra-ministerial advisory body coordinated investments by different structural and investment funds in 2014–2020) or France (where an integrated multi-fund strategy was prepared at regional level to ensure complementarity between the different structural and investments funds in the period).

General coherence between ERDF/CF support and other financing sources for similar climate and environmental investments can also be expected. While in-depth analysis of other funding sources was not carried out as part of the case studies, in most cases, general coherence was identified. This was to a large extent thanks to the coherence of OPs with relevant policies and national or local strategies, action plans and/or programmes aimed to promote the PIs. For example, in the water, wastewater or waste case studies²⁰⁰ relevant policy documents identified multiple financing sources, including relevant national funding programmes for environmental objectives, for their priorities. Annex VIII provides more information about the role of national financing for the environment compared to ERDF/CF funding.

A review of the executive summaries of the national evaluation reports of the 70 OPs analysed showed some mismatch between cohesion policy and other financial instruments concerning TO4, which affected both strategy development and programme design. In some cases, other funding opportunities were available that targeted energy efficiency and renewable energy investments, such as national alternative loan schemes and support packages in regional programmes and national banking activities. This meant that demand for financing was lower than

¹⁹⁸ European Commission (2024) Midterm evaluation of the Recovery and Resilience Facility, SWD(2024) 70 final.

¹⁹⁹ Ibid. and Corti, F., Nigohosyan, D., Pancotti, C. and Millard, S. (2023) Study supporting the midterm Evaluation of the Recovery and Resilience Facility, Final Report, see [link](#).

²⁰⁰ The water case study covered OP Central Macedonia from Greece, OP 'Fostering a competitive and sustainable economy' from Malta and OP 'Sustainability and Resource Use Efficiency' from Portugal. The wastewater case study covered OP Campania from Italy, OP 'EU Structural Funds Investments 2014–2020' from Lithuania and 'Large infrastructure OP' from Romania. The waste case study covered OP 'Transport Infrastructure Environment and Sustainable Development' from Greece, OP 'Competitiveness and Cohesion' from Croatia and OP 'Growth and Employment' from Latvia.

expected. Moreover, some measures for energy efficiency were not sufficiently adapted for some target groups, such as social housing or some public institutions such as universities. Similarly, more work was needed to establish the feasibility and economic viability of new transport routes at an earlier stage so that programme activities could be more efficient in targeting tangible investments. With regard to TO5, programme implementation was also hampered where national co-financing arrangements were lacking or unpredictable in offering the necessary financial support when needed. Implementation was further held back by insufficient availability of staff or skills/knowledge of staff.

6.5. EU added value

The EU added value criterion covered the following questions:

- To what extent would the objectives of the policy have been pursued in the absence of ERDF and CF support?
- Are there any investments that were triggered due to the EU support, and would not have materialised without it?
- To what extent did ERDF/CF support contribute to the reduction of territorial disparities between the various regions?

The following sections summarise the answers to the questions.

Evidence gathered throughout the evaluation points at three main aspects of the EU added value inherent in cohesion policy support during the evaluated financing period: 1) financial added value related to triggering the supported investments (this aspect encompasses the reliability of the funding, its leverage effects and long-term vision, as well as technical assistance funding); 2) non-financial elements accompanying the funding, such as ex-ante conditionalities and promotion of partnership principle; 3) contribution to the reduction of territorial disparities. It can be noted that the evaluation of EU added value relies extensively on feedback and opinions of stakeholders, with literature playing a minor role as a source of evidence.

Financial added value

Cohesion policy funding has triggered investments that would not have materialised with the same scope and speed if the ERDF/CF funding had not been available. While environment and climate would have been high on the policy agenda even without the strategic indications of ERDF/CF programmes, there was a shared consensus within the interviewed managing authorities that the latter had a significant added value in triggering the way in which investments in these fields have been realised. For about two thirds of the 70 programmes reviewed in the initial phase of the project, the ERDF/CF triggered investments within environmental and climate-related policy instruments that would not have materialised with the same scale, timeline, and design. According to the evidence collected from 78 interviews with the managing authorities of the selected programmes, this type of added value was assessed as high for 80% of the EU-13 OPs and for 50% of the OPs from the EU-14 and the UK.

This type of EU added value was confirmed in numerous case studies. For example, the case study on clean transport indicated that in some Member States, the ERDF/CF served either as the primary source of public support funding for clean

urban transport (Poland) or provided a very substantial support to this sector (Italy).²⁰¹ In the case study on culture, the contribution of cohesion policy funding to supporting investments in cultural infrastructure was found to be essential, especially considering the fact that changing national priorities and urgency (such as during the COVID-19 pandemic) bear the risk of redirecting funding away from the culture and creative sector. Regardless of the scale of EU funding, cohesion policy support has been instrumental in catalysing investments that would otherwise not have been implemented with the same scope.

The importance of cohesion policy funds in supporting environmental and climate policy-related projects which otherwise would have hardly been implemented can be illustrated through the example of Croatia. At the beginning of the 2014–2020 cycle, Croatia needed large capital investments in infrastructure in sectors such as wastewater treatment and waste management facilities. According to the consulted managing authorities, such investments would hardly have been implemented without the ERDF and CF, especially regarding infrastructure projects at the level of municipalities, which had no access to other funding of comparable volume. As such, the ERDF was the most significant enabler of infrastructure investments in the environment and climate domain.

Such effects are, however, not limited to Croatia's experience. For instance, in the French regions of Picardie and Nord-Pas-de-Calais (both regions in transition), according to the managing authorities' perception, environment and climate-related policy instruments were triggered due to EU support and would not have materialised without it, due to the absence of alternative sources of funding at the regional or national level. ERDF was thus crucial in these regions to implement policies in the field of environment and climate. The managing authority of another regional OP in France, Lorraine (also in transition), expressed a similar view, especially with regard to investments related to renewable energy, which would not have been implemented in the absence of ERDF support. In more developed regions in the EU-14 and the UK, however, this type of added value is less strong, as exemplified by the cases of Denmark, Finland, Ireland and Luxembourg.

Both case studies on energy efficiency (in buildings and in enterprises) highlighted that the investments supported from the ERDF/CF could not have been replaced by similar programmes on a regional or national level by Member States in all the assessed OPs and that they could not have been financed to a similar degree.²⁰² The main reasons for this are a lack of available funds, especially at the level of municipalities/counties. The case study on sustainable energy stressed the unique role of cohesion policy funding, which could not have been easily replaced by national funding. Without EU support, the investigated regions (Mecklenburg-Western Pomerania in Germany, Lubelskie region in Poland and La Réunion in France) would have struggled to implement similar measures. In these regions,

²⁰¹ The sustainable transport case study focused on OP Małopolskie Voivodeship from Poland, OP Metropolitan Cities from Italy and OP Flanders from Belgium.

²⁰² The case study on energy efficiency in buildings investigate the OP Lorraine et Vosges from France, OP Saxony from Germany, and Regional OP from Romania; the case study on energy efficiency in enterprises focused on the following OPs: Investments in Growth and Employment from Austria, Lubelskie Regional OP, and national funding programme for investments in growth and jobs 2014–2020 from Sweden.

there were no other regional or national funding schemes that could have substituted the ERDF/CF funding in sustainable energy initiatives.

Among the eight projects investigated in the case study on waste,²⁰³ most would not have been implemented without ERDF/CF funding, with the exception of one energy recovery project in Latvia. This project implemented provisions of the national waste management plan and would have been implemented even in the absence of cohesion policy funding but with a reduced scope. In the case study on water, the projects would have been either delayed or not implemented in the absence of the ERDF/CF funding. In the wastewater case study, the process of implementation of all the investigated interventions would have been much lengthier. This would result in delaying the final results and impacts, such as the improvement of the quality of water. Similarly, the case study on pollution reduction noted that the contribution of ERDF/CF funding helped to achieve higher air quality improvement than what would have been the case without the funding.

The ERDF/CF added value was considerable in terms of effects of scale, as a larger scale of funding allowed for more ambitious interventions. The interviewed managing authorities assessed this as high added value for more than half of the 70 programmes reviewed, including about two thirds of OPs from the EU-14 and the UK and about 40% of the EU-13 OPs. In Germany, ERDF support enabled a larger scale of investments and an earlier project implementation. In the five German OPs selected for in-depth analysis, this effect was not limited to transition regions (Mecklenburg-Western Pomerania, Saxony, Saxony-Anhalt, Thuringia) but also applied to a more developed one (North Rhine-Westphalia). In Latvia as well, scale effects enabling more ambitious projects were considerable. Large projects could not have been implemented within the state budget lines, especially with regard to the fields of environmental protection (habitat mapping, remediation of polluted sites, creation of anti-flood infrastructure): ERDF/CF funding was essential precisely because of the large volume, which allowed projects to be implemented in full, without being divided into phases or postponed.

Effects of scale were also observed in the wastewater case study, where ERDF/CF funding made it possible to work on vast territories and with coherent plans of regional scope that go beyond the logic of emergency interventions. According to the interviewed managing authorities, the possibility of having seven-year programming and further continuity through several programming periods makes it possible to plan ambitious long-term interventions.

These findings converge with the conclusions of the previous evaluation focusing on major projects supported by the ERDF/CF implemented in the period 2000–2013.²⁰⁴ In six out of ten cases of major projects investigated in that evaluation, the projects would not have been financed by Member States alone. Without EU support, the projects would have been postponed, not implemented, or implemented differently (e.g. without meeting certain EU standards).

²⁰³ The case study covered three projects from Croatia implemented under the OP Competitiveness and Cohesion, two projects from Latvia implemented under the OP Growth and Employment and three projects from Greece implemented under the OP Transport infrastructure, Environment and Sustainable Development.²⁰⁴ Ex post evaluation of major projects supported by the European Regional Development Fund (ERDF) and Cohesion Fund between 2000 and 2013, see [link](#).

²⁰⁴ Ex post evaluation of major projects supported by the European Regional Development Fund (ERDF) and Cohesion Fund between 2000 and 2013, see [link](#).

Cohesion policy funding is generally perceived as a funding source that is more reliable and less prone to political pressures compared to national and regional level funding. This message is based on the evidence gathered for all the case studies and applies to all policy instruments, but a specific reference can be made to the case studies on sustainable transport and on green economy. According to stakeholder interviews, there is a strong value added in the multi-annual programming approach of the cohesion policy funding. Multiple-year planning periods with a possibility of ensuring a follow-up of previously supported priorities in the subsequent programming rounds provide a long-term financing perspective for managing authorities. This also means that the managing authorities have a high level of confidence that the cohesion funding is and will continue to be available.

The continuity and certainty of funding in comparison to other national or regional funding lines were also highlighted by the managing authorities interviewed in the initial stage of the evaluation. Such aspects support long-term investment planning, continuous strategy development and implementation, and policy learning over time, with each programming cycle building on the previous one. This type of added value was assessed as high for more than half of the 70 programmes reviewed in the initial phase of the project. In Czechia, for instance, a managing authority representative indicated that the longer funding period compared to that of national financing schemes was an important advantage, as it provided room to implement projects which required a long timeframe. Moreover, a stable framework is conducive to positive capacity building effects over time, as highlighted especially by managing authorities in Germany and Portugal, within both public administration and beneficiaries. These aspects are seen as essential prerequisites for long-term investment planning, strategy development, implementation, and policy learning over time, with each programming cycle building on the previous one.

The continuity and reliability of cohesion policy funding can potentially lead to a downside: it may result in a risk that the ERDF/CF funding is allocated to the selected interventions because it is 'available by default' rather than following the principles of subsidiarity and proportionality which lie at the heart of the EU added value criterion.²⁰⁵ While such situations are theoretically possible, no evidence of such cases was found during the course of the evaluation. On the contrary, high reliability and sustainability of cohesion policy funding in supporting actions underpinning EU environmental goals for which other sources of funding would be challenging or impossible to acquire was highlighted by multiple stakeholders as one of the most appealing features of ERDF/CF. COFOG (Classification of the Function of Government) data supports these statements in particular with respect to less developed regions (mostly in the EU-13 countries), where cohesion policy funding emerges as a single major source of funding for multiple environmental protection areas including wastewater, water, biodiversity and pollution reduction. For example, in Bulgaria and Lithuania, ERDF/CF funding supported over 90% of wastewater infrastructure investments. In Hungary, Greece, Romania and Bulgaria, over 50% of investments related to biodiversity and landscape improvements were

²⁰⁵ The principle of subsidiarity aims to ensure that action at the EU level is necessary in the light of the limited possibilities available at national, regional or local level and that decisions are taken at the lowest possible level of governance. Proportionality means that actions taken at EU level do not go beyond what is necessary to achieve the aims of the EU treaties, see [link](#).

funded from cohesion policy sources. Cohesion policy support with high ratios proves both its relevance and high added value for the Member States and regions where national funding sources seem to be insufficient for addressing environmental and climate policy needs.

Funding from cohesion policy needs to be integrated with other sources of funding, resulting in amplification effects. These were observed in particular with respect to public financing, and to a lesser extent with respect to private financing sources. This was the case in the wastewater and water case studies, where numerous national funding programmes were combined with cohesion policy funding. Also, in all the countries being subject to the case study on waste, synergies between cohesion policy funding and other funding sources were found. Regional waste management plans identified OPs as funding sources along with other national and European funding sources as well as private financing. In Greece, EU funding served as a catalyst encouraging private actors to invest in waste management projects, including through the public-private-partnership model. The leverage effects could have been greater with a more widespread use of financing instruments, which would allow using cohesion funds more effectively and supporting a larger number of projects.

Technical assistance to Member States, which supports managing authorities in overcoming problems with administrative and technical capacity, is yet another element of cohesion policy contributing to its added value. Technical assistance funding dedicated to managing authorities accompanies cohesion policy funding devoted to the support for the selected interventions. Furthermore, technical assistance programmes such as JASPERS help managing authorities and beneficiaries to prepare the required analyses and documentation to ensure alignment with EU technical and economic criteria set out in the relevant legislation and guidance.

In the course of the work on the case study on waste, stakeholders consulted via interviews and the workshop highlighted the important role of cohesion policy funding in providing technical assistance and building administrative capacity in the waste sector. The case study on wastewater indicated that in Romania, technical assistance projects financed by the cohesion policy funding helped beneficiaries prepare project proposals and related documents, such as environmental impact reports and terms of reference for construction contracts.²⁰⁶ The need for further technical assistance for the water sector (e.g. through JASPERS) and support for Member States and beneficiaries to improve their administrative capacity was confirmed at the technical workshop devoted to the PI on water. Also, the adaptation and risk management case study highlighted an important role of the technical expert support from JASPERS.

Non-financial added value

Cohesion policy not only provides funding to support Member States in triggering sustainable investments, it also contributes to the strategic planning (in particular, through ex-ante conditionalities), providing incentives

²⁰⁶ This case study focused on the following OPs: Campania Regional OP from Italy, EU Structural Funds Investment 2014–2020 from Lithuania, and Large Infrastructure OP from Romania.

to strengthen alignment of national and regional priorities with EU legislation and policy. Ex-ante conditionalities adopted for the first time in the 2014–2020 planning of cohesion policy provided added value in supporting Member States to progress with the implementation of the EU climate and environmental acquis. Several relevant studies²⁰⁷ suggest that intangible benefits stemming from improvements to governance and strategic thinking in Member States can result from the reforms and efforts undertaken to fulfil the ex-ante conditionality criteria. This effect was observed in several case studies. In the PI on adaptation and risk management, establishing the ex-ante conditionality (existence of national or regional risk assessments considering climate change adaptation) helped to address climate change risks in a more holistic way through national and regional responses, strengthening alignment with the EU Adaptation Strategy and the relevant EU directives.²⁰⁸ The ex-ante conditionality for the PI on sustainable energy (adoption of national renewable energy action plans, NREAPs) provided an important framework for renewable energy promotion.

Furthermore, the ex-ante conditionality for the PI on waste (preparation of waste management plans and waste prevention programmes) led to improvements in governance and strategic thinking in the Member States through the reforms and efforts required for its fulfilment. In the water sector, the fulfilment of the ex-ante conditionality (setting out adequate water pricing mechanisms and alignment of the investments with river basin management plans, RBMPs) will potentially help bridge the investment gap and contribute to integrated water management. Ex-ante conditionalities, despite being established before the introduction of the EGD, contributed to the gradual process of alignment of cohesion policy investments with its goals. Similar role can be attributed to the enabling conditions enshrined in the 2021–2027 financing period.²⁰⁹

Ex-ante conditionalities are not the only non-financial aspects of cohesion policy in the area of environment and climate policy which contributes to the ‘greening’ of public investments. The programming process of cohesion policy encompasses so-called horizontal criteria which encourage implementation of sustainability rules, standards, and safeguards, such as the polluter-pays principle, EIA and SEA or green public procurement. While under the shared management of cohesion policy, managing authorities have flexibilities regarding selection of priority projects, European Commission supports formulation of selection criteria and other good practices, such as guidance and training, which further strengthen the mainstreaming of environmental considerations in the supported interventions.²¹⁰

Another element of EU added value as highlighted by stakeholders is that cohesion policy promotes partnership and cooperation with stakeholders.

²⁰⁷ European Court of Auditors (2017), Ex ante conditionalities and performance reserve in Cohesion: innovative but not yet effective instruments, Special Report No 15/2017, [see link](#); Nunez Ferrer, J., et al. (2018), Ex Ante Conditionality in ESI Funds: State of Play and their potential impact on the Financial Implementation of the Funds, Study for the European Parliament, [see link](#).

²⁰⁸ The case study on climate adaptation and risk management focused on the following OPs: Sardinia ERDF from Italy, Environmental and Energy Efficiency OP from Hungary, and EU Cohesion Policy from Slovenia.

²⁰⁹ European Commission, Enabling conditions, [see link](#).

²¹⁰ See for example COWI and Milieu (2020), Integration of environmental considerations in the selection of projects supported by the European Structural and Investment Funds, Final Report for European Commission Directorate General for Environment, [see link](#);

The partnership principle is a very important aspect of implementation of cohesion policy that is embedded in the Common Provisions Regulation. In this approach, managing authorities are obliged to involve a range of stakeholders, including cross-sectoral public authorities and civil society organisations, in programming, implementation and monitoring of cohesion policy.

The analysis of the case studies provides some examples of good practices regarding stakeholder consultations but also some challenges. Based on the findings from the case study on nature and biodiversity, the regulatory obligation to involve stakeholders in planning and implementation of EU-funded projects strengthens cooperation among public authorities and civil society, which may be in fact applied in a broader context than only within the framework of cohesion policy.²¹¹ The same case study pointed to the problem of a lack of a systematic approach to the involvement of third parties in projects concerning nature protection. One of the obstacles in cooperation with potentially interested/impacted stakeholders is data protection, which may hamper the process of identifying and informing local inhabitants and landowners.²¹² In the case study on adaptation and risk management, the OPs demonstrated coordination between authorities and stakeholders to ensure identification of sectoral issues. This benefited the management of risks. However, the response to addressing risks across a sufficient range of vulnerable sectors through investment activities was not fully developed.

ERDF/CF support also contributed to catalysing and targeting of investments, bringing about a new strategic focus on specific fields. For example, in Denmark, the ERDF framework was instrumental in generating a new policy focus on the topic of resource efficiency, low carbon and circular economy, and promoting innovative projects. A likely driver to this outcome was the requirement, introduced in 2014–2020 for the first time for Member States, to allocate a mandatory minimum share of the available funding to the goal of a low-carbon economy. For more developed regions such as Denmark, the foreseen threshold was 20% of national ERDF resources.²¹³

Qualitative feedback received from the managing authorities²¹⁴ also highlighted that **ERDF/CF promote an integrated, cross-sectoral approach with the use of territorial strategies**, which allows for some policy experimentation and innovation. In this sense, the place-based approach of ERDF/CF framework lends itself particularly well to multi-sectoral policies, such as integrated urban development. Furthermore, the well-structured regulatory and programming framework of cohesion policy helps ensure consistency across sectors and levels of governance, which may not be granted under alternative financing schemes. On a less positive note, one of the interviewed managing authorities pointed out that while a certain rigour and discipline in the planning, selection, and spending processes successfully ensures consistency and a certain level of quality in implementation, it also represents an obstacle for new or small beneficiaries. In turn, this entry barrier can have consequences in terms of funds flowing towards more experienced

²¹¹ The nature and biodiversity case study focused on the following OPs: Cohesion Policy Funding from Estonia, Southern and Eastern Regional Programme from Ireland, and Sustainability and Resource Use Efficiency from Portugal.

²¹² This finding was validated during the final project seminar (7 December 2023).

²¹³ ERDF Regulation, see [link](#).

²¹⁴ Semi-structured interviews conducted in the initial phase of the evaluation, focusing on 70 selected OPs covering 80% of the funding allocations covered by the study.

beneficiaries, not necessarily those having the most acute needs or investment gaps.

Contribution to the reduction of territorial disparities

The primary goal of cohesion policy remains to reduce territorial disparities across the EU. This is reflected in the general allocation methodology of cohesion policy, where less developed regions received proportionately more support than transition and developed regions. It can also be seen not only in the approach to the allocation of resources in numerous PIs but also in the achievements. In 2014, Member States and regions showed significant differences in terms of environmental performance indicators relating to the assessed PIs.²¹⁵ While these disparities have not disappeared by the end of the evaluated period (and while it is understandable that some variation will always be observed), evidence gathered in several case studies points to the important role of cohesion policy in reducing these disparities, namely:

- In the case study on wastewater, cohesion policy funding allocations were found to be correlated with the rate of connection to wastewater services. Countries with a lower level of connection had a higher absolute ERDF/CF allocation and higher relative share of allocation to this PI in the country's total allocation. This shows a deliberate trend to support wastewater treatment more intensively in areas which are lagging behind in terms of their level of provision of this essential service to the population and in terms of compliance with the Urban Wastewater Treatment Directive. Furthermore, during the evaluated period several countries, especially Romania, Hungary, and Bulgaria, showed remarkable progress in terms of population connection to wastewater treatment facilities. These countries have also progressed by advancing the connection to tertiary treatment plants.²¹⁶
- Participants to the technical workshop for the PI on water and wastewater pointed out that a potential decline in the availability of EU grants can result in a more systemic lack of investments in water management, deteriorating territorial disparities and environmental impacts.
- The case study on sustainable energy highlighted the role of cohesion policy funding for economically weaker regions. For the Lubelskie region in Poland, the cohesion policy support made it possible to compensate for the lagging behind of the region and to tap into its solar potential. Similar situations were observed in the German Mecklenburg-Vorpommern and the French Reunion. Thanks to cohesion policy funding, these regions were able to advance in their use of renewable resources to the level that would not have been possible without this support.
- The case study on energy efficiency in buildings provided some evidence of the contribution of this PI to fighting energy poverty. Energy poverty was one of the

²¹⁵ See a summary of the selected environmental performance indicators included in country fiches.

²¹⁶ For statistics, see Annex VII of the wastewater case study.

considerations which were taken into account during the allocation of cohesion policy funding for this PI in French Picardie, Martinique and Czechia.

- The case study on green economy provided evidence of a strategic approach of using cohesion policy funding to reduce economic disparities from two case study countries. In Finland, the ERDF OP is actively used to reduce regional disparities and is targeted at regions in northern and eastern Finland that are in a disadvantaged position with respect to the economic strength, demography, remoteness, and climatic conditions.

During the interviews with managing authorities conducted in the initial stage of the evaluation, the reduction of cross-regional territorial disparities between various regions was not highlighted as a significant component of EU added value of ERDF/CF programmes, despite being at the core of cohesion policy's original *raison d'être* (only about 10% of the managing authorities interviewed in the initial phase of the project found this aspect to be an important component of the EU added value). Indeed, it may be challenging for managing authorities, especially those in charge of regional OPs, to have specific insights or to claim having any influence on cross-regional territorial disparities.

Interesting findings relate to intra-regional disparities, where some examples indicate that the application of cohesion policy funding led to an increase instead of a reduction of territorial disparities. These are only single examples, and they cannot lead to any overarching conclusions. However, they show that this aspect should be treated with caution. For example, in Campania (Italy), the managing authority signalled that although indicators on environmental standards have improved for the whole region, interventions focused on more urbanised and populated areas along the coast, as they make the most difference in meeting targets for compliance. Yet, inner territories (typically mountainous areas with lower income) are left behind because they are less populated. A similar situation was observed in Romania. According to the evidence gathered in the case study on the PI wastewater, investments co-financed from the ERDF and CF in Romania were not (yet) successful in addressing regional disparities. According to statistical data, disparities among regions regarding connectivity rates to sewerage systems even increased over the 2014–2020 period, as more developed regions (Centre, West, South-East, North-West, and Bucharest-Ilfov) had better technical and financial capacity to absorb the funding than the Eastern and Southern regions.²¹⁷

Concluding, it becomes evident that despite an overall positive contribution of cohesion policy to the reduction of territorial disparities at an interregional level observed in various PIs, on intra-regional level, there are cases where this aspect either does not materialise or where adverse mechanisms are triggered (this can be seen in the Italian and Romanian examples highlighted above). There is a risk that the cohesion policy support in some regions concentrates in areas with better administrative capacity or higher chances of an effective contribution to the achievement of certain goals. Indeed, the effectiveness or efficiency of achieving certain objectives (such as alignment with the requirements of EU legislation) may not always go hand in hand with the objective of the reduction of territorial

²¹⁷ National Institute of Statistics (NIS) and National Administration of Water in Romania (annual reports).

disparities. Moreover, the role of cohesion policy in the reduction of territorial disparities hinges on local circumstances and the resulting approach of managing authorities to the selection of priority projects. This approach may be dictated by various considerations, including economic viability, or absorption capacity which may be higher in the specific groups of stakeholders or territories. Hence, the reduction of territorial disparities achieved with cohesion policy funding may not be equally successful in all EU regions. An increased consideration of territorial disparity aspects by managing authorities appears necessary to prevent cohesion policy from contributing, as an unintended side effect, to increasing intra-regional disparities, and especially urban-rural divides.

6.6. Policy implications and issues for further research

The evaluation findings and the technical workshops and seminars led to the identification of several key policy implications and issues for future research.

Cohesion policy needs to balance the needs of less developed and transition regions while at the same time evolving beyond ensuring compliance with EU legislation. Cohesion policy is one of the primary funding sources used by Member States to support green transition. In the future, the focus of cohesion policy should gradually shift from supporting compliance with EU legislation (which is currently often the case in developing regions) to providing a leverage for other sources of funding in supporting the most strategic interventions addressing more holistically numerous environmental and climate challenges. Maximising the leverage effect of cohesion policy can be achieved through a broader application of financial instruments, which would enable it to serve as a catalyst for additional investments in green initiatives. However, cohesion policy continues to be needed to support the implementation of EU policies and legislation which are constantly developing and more stringent and which would require new investments. Furthermore, future developments concerning cohesion policy need to balance the needs of regions that are still lacking basic environmental infrastructure and are using cohesion policy to catch up.

Non-infrastructure projects and behavioural aspects gain in importance and should be further supported. Cohesion policy primarily supports investments in infrastructure, e.g. waste, clean transport. However, in recent years, there has been a growing recognition that non-infrastructure elements and behavioural aspects are equally important in achieving green transition. This shift in focus comes from the understanding that transforming behaviours, attitudes, and societal norms alongside investments in physical infrastructure are necessary to achieve long-lasting and systemic change. Further research can explore how the non-infrastructure projects can be further supported by the cohesion policy, e.g. on waste prevention, circular approaches, sustainable mobility.

Selectivity in programming green transition investments can be effective in delivering more with less. By prioritising transformative investments, which have the potential to bring about significant positive changes and contribute to the green transition, the impact of cohesion policy can be optimised. In addition to the well-established principle of 'Do no significant harm', the introduction of a 'do significant benefit' principle could further enhance the prioritisation of investments in cohesion policy. This principle would emphasise the importance of not only avoiding negative

impacts but also actively seeking investments that generate substantial benefits for the environment and society. This approach should further be explored.

Increase the strategic use of public procurement to support the greening of investments and to prioritise investments with a larger impact, such as deep renovations. The CPR for 2014–2020 encourages the use of GPP in the selection of projects; however, its use by managing authorities is still limited.²¹⁸ The integration of GPP practices, together with socially responsible public procurement, in cohesion policy offers a range of significant benefits: it promotes environmental and social sustainability, drives innovation and market development, and can lead to cost savings.²¹⁹ The use of strategic procurement allows managing authorities to direct investments and prioritise environmental sustainability by incorporating technical requirements, such as energy efficiency, renewable materials and waste management. Additionally, it is worth noting that while a first-come-first-served approach might be efficient, it may not always ensure high-quality outcomes. This approach can potentially result in prioritising low-hanging fruits that do not adequately address deeper issues. For instance, in the context of energy efficiency, deep renovation measures are often necessary for significant and meaningful improvements.

Strengthen the alignment of cohesion policy with the EGD to ensure all investments reinforce its objectives. During the 2014–2020 programming period, numerous initiatives in the sectors of energy, transport and industry fell short of the EGD's goals. Although improvements in the 2021–2027 programming period have strengthened this alignment, it is crucial to ensure that future investments are fully consistent with EGD's ambitions. This could involve a heightened emphasis on integrating circular economy principles in business support and prioritising the investments targeting higher levels of the waste hierarchy.²²⁰

Increasing support for a policy instrument on energy efficiency in enterprises and the green economy is needed. The EGD envisions a shift in the economic structure and business models across all sectors. This includes a transition towards cleaner, more sustainable, and circular processes. In 2014–2020 programming period, investments primarily focused on improving the energy efficiency of processes and facilities as well as waste management. There is a need for a more ambitious approach that focuses on circular design and energy efficiency.²²¹ In addition, the context-specific nature of innovation in business processes and models highlights the need for tailored support. Every enterprise operates in a unique context with specific challenges and opportunities. Therefore, a one-size-fits-all approach may not be effective. By providing support under cohesion policy, which considers the specific needs and characteristics of each region, enterprises can receive targeted assistance to develop and implement circular economy practices that are most suitable for their respective contexts.

²¹⁸ Milieu, COWI (2020), Integration of environmental considerations in the selection of projects supported by the European Structural and Investment Funds, see [link](#).

²¹⁹ See also Green Public Procurement in the EU, see [link](#).

²²⁰ ECA (2023), Circular economy – Slow transition by member states despite EU action, [see link](#).

²²¹ Enterprises account for around 62% of economic energy saving potential by 2030, see European Commission (2021), Technical assistance services to assess the energy savings potentials at national and European level, [see link](#).

Ensure further support for climate adaptation, nature protection and biodiversity in line with the EGD. The intensifying investment needs for EU climate change adaptation demand additional support for innovative, climate-proofing efforts that are in harmony with the EGD's objectives, particularly those involving nature-based solutions. Such solutions are integral to preserving and restoring ecosystems and biodiversity. The ERDF/CF plays a critical role as a financing mechanism for these areas; however, the funding currently allocated is considered relatively low, given the magnitude of the required investments and the continuous, alarming decline in biodiversity across Europe.

More attention should be paid to maximise synergies and co-benefits, e.g. between climate mitigation and air pollution reduction, e.g. by including relevant result indicators. More attention should be paid in OPs to the needs expressed in Plans and Programmes that are mandatory under EU acquis (e.g. AQP, NAPCP, noise plans), especially as infringements, European Semester reports and/or Environmental Implementation Reports indicate such needs.

7. Lessons learnt and policy implications

This chapter presents the key lessons learnt from this evaluation in light of the European Green Deal and the contribution that cohesion policy can make to its objectives. Furthermore, the chapter summarises policy implications and issues for further research. The box below outlines the key ones.

Cohesion policy, through the European Regional Development Fund (ERDF) and the Cohesion Fund (CF), plays a crucial role in supporting the European Green Deal's (EGD) objectives across regions. Despite the EGD being introduced mid-way through the 2014-2020 programming period, the significant focus on climate and environmental objectives within ERDF and CF positions these funds as key drivers for achieving EGD goals.

A significant amount of the funds was allocated towards environmental and climate investments, with over EUR 68 billion dedicated to climate action. However, achieving the EGD's full ambitions requires much larger annual investments, estimated at EUR 520 billion from 2021-2030. The sectoral contributions of ERDF/CF investments showed varied significance, with notable positive contributions in climate action, sustainable transport and biodiversity. In contrast to this, investments in clean energy and circular economy lagged behind their intended EGD targets.

Certain ERDF/CF investments were found to be misaligned with EGD goals, potentially delaying their achievement. Investments in less sustainable transport modes and fossil-fuel infrastructure, such as natural gas, were highlighted as areas needing better alignment. Additionally, support provided to businesses without environmental considerations, as well as the lower uptake of innovative and context-specific investments, presented missed opportunities for advancing EGD objectives.

ERDF/CF investments contributed significantly to zero-pollution objectives and ecosystem protections. However, enhanced integrated approaches in water and waste management could further these contributions. Regions accumulated considerable expertise in designing and implementing climate and environmental projects, reflecting a strengthened capacity to tackle future challenges.

A crucial lesson involves the balance between replication and ambition. Investments in fields like energy efficiency in buildings demonstrated ease of replication and significant contributions to EGD objectives. However, more ambitious and context-specific investments, particularly in production processes and climate adaptation, are necessary to make a decisive impact.

A few strategic recommendations have emerged:

- **Shift focus beyond compliance:** evolve from merely ensuring compliance with EU legislation to leveraging cohesion policy for strategic, holistic environmental and climate initiatives, utilising broader financial instruments.
- **Support non-infrastructure projects:** recognise the importance of non-infrastructure and behavioural aspects, promoting societal shifts alongside physical investments.
- **Prioritise high-impact investments:** adopt a 'do significant benefit' principle to optimise the impact of investments, ensuring they generate substantial positive outcomes.
- **Enhance the use of strategic public procurement, through the Green Public Procurement:** enhance the use of GPP practices to support sustainable investments and prioritise projects with a high impact, like deep renovations.
- **Align with EGD objectives:** strengthen the alignment of all cohesion policy investments to reinforce EGD goals, particularly in energy efficiency, circular economy and climate adaptation.
- **Support business and innovation:** increase targeted support for energy efficiency in enterprises, circular economy practices and context-specific innovations.
- **Maximise synergies:** focus on co-benefits and synergies between climate mitigation and other objectives like air pollution reduction, including relevant indicators in operational programmes.

Cohesion policy holds significant potential to support the achievement of EGD's objectives in the regions. The EGD was adopted in 2019, well into the 2014-2020 programming period; as such, its influence on the programming of 2014-2020 investments was limited. Nevertheless, due to the magnitude of ERDF and CF support and the attention given to climate and environment objectives in the legislation governing the funds,²²² they are well-positioned to advance the EGD's objectives. Furthermore, through a place-based approach, ERDF and CF allow for the implementation of the EGD ambitions at the appropriate scale and adapted to the specific territories, while linking them to higher levels of governance (i.e., at the national or European level).

The ERDF and CF allocate a substantial share to environmental and climate investments, even though fulfilling the EGD's ambitions necessitates substantially larger investments. More than EUR 68 billion from the ERDF and CF were allocated for climate action, with three specific TOs (TO4, TO5, and TO6) being directly aligned with the key EGD objectives related to driving a low-carbon economy, climate change adaptation, and environmental preservation. Additionally, more than EUR 24 billion were allocated to investments supporting clean air and EUR 7 billion to biodiversity. Yet, it is estimated that the implementation of EGD will require around EUR 520 billion per year from 2021-2030, of which EUR 392 billion for energy and climate, and EUR 190 billion for other environmental objectives.²²³

The contribution of ERDF and CF environmental and climate investments to EGD objectives is overall positive, but its significance varies across the

²²² European Parliament Briefing – The European Green Deal and cohesion policy, see [link](#).

²²³ European Environment Agency (2023), Investments in the sustainability transition: leveraging green industrial policy against emerging constraints, see [link](#).

investments. The horizontal case study assessed the level of contribution based on the financial allocations and their absorption, achievement rates and needs analysis. It found that climate action, energy efficiency in buildings and renovations, sustainable transport and smart mobility, nature and biodiversity, and zero-pollution are the areas for which ERDF/CF support contributed more significantly to EGD objectives. On the other hand, ERDF/CF investments focussed on clean and secure energy, and on mobilising the industry for a clean and circular economy, contributed less significantly to their respective EGD objectives.

However, the misalignment of certain ERDF/CF investments with EGD objectives can negatively affect or delay the achievement of EGD objectives by making use of funds that could be allocated to better EGD-aligned purposes. While the ERDF and CF support investments in clean (urban) transport, less sustainable modes of transport are also supported. Enhancing regional mobility by connecting secondary and tertiary nodes to TEN-T infrastructure (TO7) can further increase the use of cars and aeroplanes, which is misaligned with the climate objectives of EGD. Investments in motorways and roads (IFs 028-034) as well as in airports (IFs 037-038) support infrastructure that, on one hand, helps to further address regional disparities and promote economic and social cohesion and, on the other hand, can negatively affect and delay the shift to sustainable and smart mobility.²²⁴

Despite overall alignment of ERDF/CF investments in promoting clean, affordable and secure energy production from renewable sources, fossil-fuel-based energy sources and their infrastructures were still supported during the 2014-2020 programming period. Significant funding was allocated to natural gas and its TEN-E infrastructure.²²⁵ Even if this source of energy can be considered a transitional fuel due to its lower carbon intensity compared to coal and oil, there is growing awareness of its environmental impact, and it can lead to technological lock-in fossil-fuel intensive technologies and block a development path towards climate neutrality.²²⁶ It is essential that the potential positive impacts of climate action are not neutralised by the investments in other policy areas that are eligible under the cohesion policy.²²⁷

Lastly, ERDF/CF support to businesses without environmental or climate considerations weakens the ERDF/CF alignment with the EGD's objective on mobilising industry for a clean and circular economy and is a missed opportunity to target and advance EGD objectives. ERDF/CF investments that promote competitiveness and the establishment of new SMEs (TO3) can lead to an increase in GHG emissions and are therefore misaligned with the climate objective of EGD. For instance, generic productive investments in SMEs, or investments in business infrastructure for SMEs (IFs 071-072), are ERDF/CF investments supporting businesses without considerations of their environmental and climate impact, which is a missed opportunity to support and mobilise industry (and

²²⁴ Around EUR 44.5 billion of the ERDF/CF has been earmarked for motorways, roads, airports and their infrastructure (IFs 028-034; 037-038).

²²⁵ Around EUR 2.4 billion of the ERDF/CF has been earmarked for natural gas and its infrastructure (IFs 008, 009).

²²⁶ In the 2021-2027 framework, the list of non-eligible activities under ERDF/CF has been revised and now allows exceptions for support for investments in gas-fired heating systems and gas networks.

²²⁷ European Parliament (2021), Cohesion Policy and Climate Change – Study Requested by the REGI committee, see [link](#).

specifically SMEs) for a clean and circular economy and to enhance contributions of ERDF/CF investments to EGD ambitions.

ERDF/CF investments in energy efficiency had a more significant contribution to the EGD objectives than those in renewable energy and faced fewer implementation challenges. ERDF/CF energy-related investments received large allocations and contributed positively to energy EGD objectives through increased capacity.²²⁸ However, renewable energy investments, namely in wind energy, faced important implementation bottlenecks. This led to absorption and performance challenges and increased the time frame of the investments in renewable energy needed to achieve EGD ambitions. On the other hand, energy efficiency investments in buildings and renovations achieved higher achievement rates, despite implementation challenges, and contributed more significantly to EGD objectives in this matter. Although both types of investments are well-suited for financial instruments, and these could increase the catalytic effect of the investments, their use in ERDF/CF is limited.

ERDF and CF investments have had varied contributions across sectors to the EGD's zero pollution objective, with room for enhancement using integrated approaches in water and waste management. Through investments in water, wastewater, waste as well as in pollution reduction, the ERDF and CF has positively contributed to EGD's objective of zero pollution. However, investments linked to infrastructure have faced low absorption rates, hindering the progress on the relevant EGD ambitions. ERDF/CF investment contributions towards EGD ambitions in water and waste could be enhanced by offering further support to integrated and circular approaches combining water reuse and water efficiency measures, and by targeting higher levels of the waste hierarchy (i.e., waste prevention).²²⁹

ERDF and CF support positively contributed to the EGD's objective of preserving and restoring ecosystems and biodiversity, with very high achievement rates, yet the composition of these investments is debatable. A significant portion of ERDF/CF investments earmarked for ecosystems and biodiversity is being used for the development of tourism potential in natural and cultural areas, which is less aligned with EGD biodiversity ambitions. Additionally, not enough importance is given to investments in Natura 2000 marine protected sites.

Through ERDF/CF funding, Member States and regions have accumulated significant know-how in the design and implementation of climate and environmental investments. Thanks to the increased emphasis on climate and environment in 2014-2020 compared to previous programming periods, managing authorities have gathered experience in this sector and learnt lessons that span across the whole project cycle. From the mainstreaming and prioritisation of climate aspects through to the design of calls, the use of financial instruments, stakeholder engagement, monitoring and evaluation, the 2014-2020 period represents a good basis for managing authorities to build upon. The interviews conducted under the

²²⁸ With the exception of investments in renewable energy infrastructure which remain modest.

²²⁹ Landfill and treatment of residual waste has been added to the list of non-eligible activities under ERDF/CF for the 2021-2027 programming period.

framework of this evaluation reflected an increased attention for climate and environment and frequently confirmed that managing authorities are able to mobilise thematic expertise. In this regard, the role of communities of practice is key to contributing towards the sharing of good practices and peer learning. Beneficiaries also engaged in learning. For instance, interviews pointed to the fact that enterprises that had familiarised themselves with the application process for ERDF/CF funding (under the business support and innovation measures) were prone to exploring opportunities for receiving support in navigating the green transition.

However, a trade-off emerges between replication and ambition. On the one hand, the period showed a good deployment of investments that are relatively easy to replicate, but on the other hand, more ambition is necessary to bring about a decisive contribution to the demanding goals of the EGD. Energy efficiency, in particular, is a case in point.

Investments targeting energy efficiency in buildings are relatively easy to replicate. The policy instrument aimed at improving energy efficiency in buildings was the one with the highest number of operations in 2014-2020, covering slightly less than one-third of the total (27%), corresponding to the second-highest allocation among PIs (17%).²³⁰ Its high level of replicability is proved not only by the PI's large role in 2014-2020 cohesion policy, but also by the fact that when REACT-EU was introduced, energy efficiency improvements in buildings were prioritised thanks to their ability to ensure a more rapid fund absorption and implementation compared to other types of investments. For example, the Italian NOP "Enterprises and competitiveness" devoted an important share of its REACT EU resources to energy efficiency in buildings. Moreover, the high degree of experience gathered in this area is proved also by the fact that the projects to improve energy efficiency in enterprises frequently resulted in simple (and replicable) renovations of company buildings, rather than in demanding and more uncertain revisions of production processes to make them more efficient, which would have a large untapped potential.

Investments in energy efficiency in buildings are not only easily replicable but will also maintain a high relevance in the future. Their future relevance is high due to different reasons. At the global level, the role of energy efficiency is increasingly recognised, as proven by the energy efficiency pledge resulting from the COP28. At the EU level, regulatory developments point to an increased determination to tackle energy efficiency in buildings,²³¹ which will require the mobilisation of considerable amounts of resources, not only from national budgets and private investors. Persisting insecurity in terms of energy supply amid a rising demand further bolsters the relevance of this PI. In addition, reducing heat demand and related emissions of air pollutants from domestic heating is key in many AQPs and NAPCPs. At the level of cohesion policy, the experience gathered in 2014-2020 indicates that this PI is among the types of investments that lend themselves well to the use of financial instruments, repeatedly suggested by the Commission. Moreover, it is a promising sector for the use of performance-based payment mechanisms such as financing not linked to costs, which is seeing increased attention from policymakers following the introduction of the RRF. The only example

²³⁰ See section 4.2.

²³¹ In March 2024, the European Parliament adopted plans, already agreed upon with the Council, to revise the Energy Performance of Buildings Directive.

of financing-not-linked-to-costs applied in the 2014-2020 period was precisely in the area of energy efficiency and renewable, in Austria. In short, against this background of high relevance, accumulated experience and replicability, this PI emerges as a field in which cohesion policy can continue to play a promising and significant role.

Climate adaptation investments are very context-specific, and therefore less easy to replicate, and extremely relevant to fostering the resilience of territories. Even within the same region, investments related to the same type of climate risk may require different competences and approaches depending on the local (project-specific) problem to tackle. For example, coastal erosion can take different forms. This depends on the strength of natural forces as well as the characteristics of the coast itself, which can show important differences even within short distances. For instance, within the same region a coastline can include sand beaches, high cliffs, built environment, ports. This diversity in turn requires specific technologies and knowledge to address erosion issues. A similar reasoning applies to a number of other climate risks, such as floods, heatwaves, droughts and all their ramifications. As such, while the support for climate adaptation is as necessary as ever, the replicability of its investments is not straightforward.

In more traditional investment types, such as those under the PIs on water, wastewater and waste, the large experience accumulated by cohesion policy can help achieve the EGD goals, but with some limitations. In the environmental sector, ERDF and CF have historically focussed on environmental infrastructure, such as aqueducts, wastewater treatment plants and waste sorting facilities. In more developed regions, this type of infrastructure is now generally in place, and thus no longer a priority. In the waste sector, for instance, attention should be increasingly paid to the highest levels of the waste hierarchy, through projects targeting, among other things, the prevention of waste or its reuse. In this regard, the future relevance of the experience gathered by cohesion policy is smaller than it was in the past in these countries. However, several Member States still show worrisome infrastructure gaps in these environmental sectors. This is in a context where the discussion on EU enlargement has regained momentum, with prospective Member States being underdeveloped in terms of environmental infrastructure. The know-how accumulated under the cohesion policy has the potential to be invaluable to achieving the EGD's 2050 goals.

Annex I – Methodology to develop the taxonomy of policy instruments

The categorisation of expenditure for environment and climate based on the IF, while practical, is not fully accurate. Although ERDF/CF funding for environment and climate is generally classified under the 34 IFs under scope in this study, interventions related to this policy area can also be found under other IFs. In addition, it can be expected that not all operations classified under the 34 IFs are relevant to environment and climate, as they can be geared towards other primary objectives. Indeed, the Preparatory study (WP2) found that the expenditure classification across IFs and TOs made by Managing Authorities is somehow discretionary and may be subject to different interpretations.²³²

The policy instruments supporting environment and climate environment in 2014-2020 were identified with the combination of a bottom-up and top-down approach. On the one hand, the identification builds on the in-depth scrutiny of the expenditure data at the level of operations and beneficiaries available in the WP2 Single Database. On the other hand, the identification has been guided by the findings of the literature review performed under Task 2, which informed on their rationale, the types of pathways that can be mobilised under each policy instrument, expected types of stakeholders involved, and influencing factors. The specific activities performed to identify the policy instruments are listed here.

Extraction of the full list of operations, related beneficiaries and monitoring indicators corresponding to at least one of the 34 IFs in the scope of this evaluation, from the Single Database developed by WP2. In line with the technical specifications, no other selection criteria have been set, e.g. in terms of thematic objective (TO). This extraction produced a database of 97,594 operations, 94% of which were classified under TO4, TO5 or TO6 (56%, 5% and 33%, respectively). The remainder was distributed mainly under TO3 and TO8 (2% each).²³³ It covered EU-27+UK, for a total of 250 programmes.²³⁴ Three additional OPs (West Wales and The Valleys OP, East Wales OP, and Sachsen OP) which were not included in the WP2 Single Database, were also considered for the mapping exercise using the data on the public list of operations made available on the Managing Authorities' website.²³⁵ As a result of these improvements, the number of operations increased to 99,017.

²³² See in particular Deliverable 5 of WP2, "Report on the clustering of operations and beneficiaries", see [link](#).

²³³ The remaining operations were classified as follows: TO1 (0.7%), TO2 (<0.1%), TO7 (0.4%), TO9 (0.7%), TO10 (<0.1%), TO11 (0.1%), TO12 (<0.1%), multiple TOs (<0.1%), no information (0.5%).

²³⁴ The categorisation data available on the Cohesion Data Platform shows that, as of the end of 2021, a total of 267 programmes (i.e., 196 OPs and 71 TCPs) have supported the 34 Fols under analysis.

²³⁵ In particular, operations from the British OPs "West Wales and The Valleys" and "East Wales" were collected by the study team through the publicly available lists of operations of the two programmes, with an extraction date of early 2021 to ensure consistency with the rest of the database. The German OP "Sachsen" was the only OP being entirely excluded from the extraction, because all of its operations included in the WP2 Single Database have no IF assigned. This would have however represented an important loss for the study especially because, according to SFC data, this is the OP with the largest allocation to the 34 IFs under scope among German programmes. To include operations from OP Sachsen nevertheless, the team has taken the WP2 list of operations from the OP, narrowed it down to the Priority Axes covering at least one of the 34 IFs under scope (based on publicly available information) and then manually excluded the operations that, based on project name and description, were out of scope for WP7.

First-level review of the extracted database of operations and attribution to a list of coherent policy instruments. This initial clustering exercise was carried out in a semi-automated way on the entire database based on the IF and searching for relevant keywords across various dimensions (depending on the availability of the information across programmes), such as the operation title, the description, OP measure/action, call for proposals, TO. As the operations data of more OPs and Member States were reviewed, the policy instrument taxonomy was refined through an iterative approach, ensuring consistency in how policy instruments were defined across different contexts. The iterative process allowed to verify whether the preliminarily identified policy instruments were self-contained or rather included diverging sub-sets of operations that justified the disaggregation of one instrument into two or more. Vice versa, it has allowed to verify whether it could be justified to merge more instruments into a single one. Checks have been performed also in terms of allocation of expenditure and geography (both in terms of Member States and type of regions covered), with the aim to contribute to a balanced identification of policy instruments.

Outcomes of the first and second-level review

The operations' categorisation into IF emerged as incorrect in some cases. Managing Authorities sometimes interpreted and applied different approaches for the attribution. As a result, while identifying the typology of policy instruments (and then classifying operations into the different instruments), the IF attribution was taken into account but could not be used as the only classification criterion.

Some operations had a hybrid nature, which made it difficult to attribute them to a specific policy instrument. For instance, there were operations supporting both water and wastewater services. In these cases, if the project name and project description made clear that one of the two elements of the project (either water or wastewater management) was dominant in the project, the study team attributed the operation to the dominant policy instrument. Moreover, if information was available about the ineligibility of some project components, only the eligible components were taken into consideration. During step 4, the country experts closely examined these operations and tried to disentangle their predominant objective. Similarly, projects carried out with a goal of sustainable urban development and having multiple elements (such as, for instance, the enhancement of natural areas, improvement of energy performance of public buildings, and measures aimed at promoting clean mobility) were attributed to a policy instrument based on which of their components appeared to be dominant based on the available description. Further examples of hybrid operations were projects aimed at preserving the natural environment and natural resources (or rehabilitating polluted sites), but at the same time promoting the sustainable use of these areas for touristic purposes.

On a different note, manual and automatic checks shed light on the inclusion into the database of operations that, despite generating some impacts in favour of climate or environment, did not have this goal as their primary rationale. The study team found potential overlaps with several other policy areas, among which transport and support to SMEs.

Second-level review, by conducting a more manual classification of operations. To fine-tune the attribution of operations into policy instruments, the preliminary clustering of the entire database of operations was enhanced through a more precise reading (beyond keywords) of the title and description of operations (when available), as well as the type of beneficiaries and the monitoring indicators attached to the operations.

Check and validation by the country experts of the clustering of operations into policy instruments, building on their direct knowledge of the OP and rationale of ERDF/CF support. This check was carried out while reviewing the programming documents for the purpose of the OP review.

Extensive literature review on policy instruments (Task 2) to better characterise each policy instrument in terms of their ToC. A review was conducted in parallel to the previous two steps and contributed to the fine-tuning of the taxonomy of policy instruments and their definition.

Coherence checks with the typologies of policy instruments identified under other Work Packages. This step aimed at identifying potential overlaps and defining clear boundaries between the policy instruments funded during the 2014-2020 programming period under different policy objectives (and therefore Work Packages of the ex-post evaluation). This check was conducted with the teams working on WP6 – SMEs and WP8 – Transport, considering the higher risk for overlaps. Minor additional checks were carried out with the team of WP4 – RTDI.

Regarding WP6 – SMEs, potential overlaps were identified between the instruments “Support to tourism and culture and creative industry (CCI)” and “Regional promotion for tourism attraction” under WP6 and the instruments “Energy efficiency in enterprises” and “Culture” under WP7. Support to SMEs in the tourism and CCI sector may involve renovation investments (including energy efficiency). Such operations were retained under WP6 if their primary aim was to support SMEs in the tourism sector and promote the improvement of the touristic offer to increase the tourists’ inflow, rather than energy efficiency investments to achieve specific environmental objectives. Instead, boundaries were established with regard to the “Culture” policy instrument. The broad distinction made in this field between the two WPs was the following: if the investment aimed to preserve and conserve cultural sites or institutions or had an urban renewal component aimed at promoting quality of life for citizens and visitors, it was classified under WP7. If the investment aimed to increase the inflow of tourists in a specific territory and ultimately have economic benefits for local SMEs, it was classified under WP6.

The table below summarises the number of projects by type of output that were moved from WP6 to WP7.

Table 8 - Overview of number of projects moved from WP6 to WP7

Output	Intervention Field	No. of projects
Urban renewal	66, 67, 72, 74, 75, Multi IF	260
Cultural heritage/ infrastructure	1, 66, 67, 72, 74, 75, 77	63
Parks	67, 74, 75, Multi IF	13
Paths/trails	1, 72, 74, 75, Multi IF	68
Energy efficiency	1, 66, 67, 74, 75, Multi IF	133
Other		6
TOTAL		543

The table below summarises the number of projects by type of output that were moved from WP7 to WP6.

Table 9 - Overview of number of projects moved from WP7 to WP6

Output	Intervention Field	No. of projects
Territorial marketing	92, 93, 94, 95, Multi IF	459
Accommodation facilities	90, 92, 93, 94, 95, Multi IF	73
Participation in Fair/Events/Festival	92, 93, 94, 95, Multi IF	334
Other	92, 93, 94	13
TOTAL		879

Regarding WP8 – Transport, potential overlaps were identified between the instruments “Multimodal transport” and “Intelligent transport systems” under WP8 and the policy instrument “Clean Transport” under WP7. Hence boundaries were established. The broad distinction made in this field between the two WPs was the following: if the investment aimed to promote energy efficiency and/or the use of public transportation in an urban context with the goal to decarbonise the transport sector, it was classified under WP7. If the investment aimed to promote multimodality without a predominant objective geared towards environment and climate and/or had an inter-urban or regional scope, it was classified under WP8.

The table below summarises the number of projects by type of output that were moved from WP8 to WP7.

Table 10 - Overview of number of projects moved from WP8 to WP7

Output	Intervention Field	No. of projects
Activities promoting public transport, smart mobility solutions, and improved passenger public transport information	44	117
Car or bike sharing or rental services	36, 44	8
Electric charging stations	44	7
Infrastructure facilitating the access of multimodal nodes	35, 36	35
New / restored / improved bike and / or pedestrian paths	35, 36, 44	157
New public transport route and metro lines	36, 44	5
New public transport vehicles (not including a change to electric operation)	35, 36	53
New ticketing scheme	36	3
New, clean public transport vehicles	36, 44	22
P+R and / or B+R parking centres / places	35, 36, 44	77
TOTAL		484

The table below summarises the number of projects by type of output that were moved from WP7 to WP8.

Table 11 - Overview of number of projects moved from WP7 to WP8

Output	Intervention Field	No. of projects
New / upgraded multimodal transport node (passenger transport)	23, 43, 83, 90	131
Interurban /regional connections/platforms	43, 93	17

Road/Railway/ferry infrastructures/services	43, Multi IF	32
TOTAL		180

To sum up, the expenditure considered to classify policy instruments does not solely pertain to the 34 IFs in scope under this WP. On the one hand, it considers some expenditure that, albeit not classified under any of the 34 IFs in scope, relates to environment and climate objectives. On the other hand, the considered expenditure excludes operations classified under the 34 IFs if they are primarily related to policy objectives other than environment and climate.

Table 12 - Identified expenditure and operations in scope and not in scope

	Total expenditure allocation (EUR)	Number of operations
● Initial extraction: list of operations under the 34 IFs under scope.	117,478,345,289	97,594
● Final extraction: list of operations under the 12 policy instruments related to environment and climate. (including operations: a) Classified under the 34 IFs under scope in the initial extraction and confirmed as related to environment and climate; b) Classified under IFs relevant for WP6 and WP8 but related in fact to environment and climate; c) Manually added ²³⁶)	117,418,707,025	98,639
● Operations included in initial extraction but excluded as part of data consolidation. (including operations: a) Excluded as related to WP6 and WP8; b) Excluded as out of scope (unrelated to environment and climate, or unclear contents))	4,755,479,013	1,706

Source: Authors based on WP2 expenditure data.

²³⁶ The study team enriched the dataset by adding to the initial extraction operations from three programmes. Operations from the British OPs “West Wales and The Valleys” and “East Wales” were not included in the WP2 Single Database, but the study team included publicly available lists of operations of the two programmes, considering only the 34 IFs under scope, with an extraction date of early 2021 to ensure consistency with the rest of the database. The German OP “Sachsen” was the only OP being entirely excluded from the initial extraction because all of its operations in the WP2 Single Database have no FOL assigned. This would have however represented an important loss for the study especially because, according to SFC data, this is the OP with the largest allocation to the 34 IFs under scope among German programmes. To include operations from OP Sachsen nevertheless, the team has taken the WP2 list of operations from the OP, narrowed it down to the Priority Axes covering at least one of the 34 IFs under scope (based on publicly available information) and then manually excluded the operations that, based on project name and description, were out of scope for WP7.

Annex II – Evaluation matrix

The evaluation matrix was developed at the early stages of the evaluation and guided the implementation.

Effectiveness

Evaluation Questions	Data sources
EQ1. What were the intended and potentially unintended effects of different policy interventions for climate and environment objectives?	
JC 1.1. Extent to which the funded operations led to the achievement of intended outputs in terms of climate and environment	- Existing literature, analyses, and evaluations of individual programmes and/or policy instruments, which will be identified through the literature and documentary review (Task 2) and case studies (Task 3) - Case study interviews (Task 3) - Other elements within case studies (Task 3)
JC 1.2. Extent to which the outcomes and impacts in terms of climate and environment were reached	- Existing literature, analyses, and evaluations of individual programmes and/or policy instruments, which will be identified through the literature and documentary review (Task 2) and case studies (Task 3) - Case study interviews (Task 3) - Other elements within case studies (Task 3)
JC 1.3. Potentially unintended effects of the investments	- Existing literature, analyses, and evaluations of individual programmes and/or policy instruments, which will be identified through the literature and documentary review (Task 2) and case studies (Task 3) - Case study interviews (Task 3) - Other elements within case studies (Task 3)
EQ 2. How effective was the ERDF and CF support in contributing to the achievement of the relevant programme's objectives, as well as the relevant Europe 2020 objectives and targets? To what extent were these objectives and targets achieved?	
JC 2.1. Contribution of ERDF/CF investments to the achievement of the programme's objectives	- Relevant programme monitoring reports, implementation reports, evaluation studies (Task 3) - Interviews with managing authorities, beneficiaries and other stakeholders (Task 3)
JC 2.2. Contribution of ERDF / CF support to the Europe 2020 objectives and targets	Eurostat, EEA, (Task 1) Workshops and seminar (Task 5) with Member States and external experts
JC 2.3. Degree of attributability: Degree to which the progress made can actually be attributed to the investments made	- Evidence collected for EQ1 - Funding data
EQ 3. How were these effects influenced by external factors? What are the identified bottlenecks that may limit the impact of the ERDF and CF support to climate and environment investments?	
JC 3.1. Economic context: Impact of economic and developmental factors in the respective country/ region on	- Eurostat, potentially other public databases (Task 1) - Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3)

Evaluation Questions	Data sources
the expected effects of the investments	
JC 3.2. Other policy instruments: Existence of other policy instruments with similar/ overlapping/ complementary objectives and their influence on expected effects	• Documentation identified by case studies (Task 3) • Case study interviews (Task 3)
JC 3.3 COVID-19 pandemic: COVID-19 pandemic impact on the expected effects	• Existing analyses on this topic (e.g. in individual evaluations of policy instruments) – identified through Tasks 2 and 3 • Case study interviews (Task 3) • Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 3) • Workshops and seminar (Task 5) with Member States and external experts
JC 3.4 Administrative bottlenecks: Types of administrative bottlenecks that impacted the expected effects	• Existing analyses on this topic (e.g. in individual evaluations of policy instruments) – identified through Tasks 2 and 3 • Case study interviews (Task 3) • Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 3) • Workshops and seminar (Task 5) with Member States and external experts
JC 3.5 Funding bottlenecks: Types of bottlenecks encountered in finding matching funding	• Existing analyses on this topic (e.g. in individual evaluations of policy instruments) – identified through Tasks 2 and 3 • Case study interviews (Task 3) • Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 3) • Workshops and seminar (Task 5) with Member States and external experts
JC 3.6 Other barriers: Did other hindering factors limit the effect	• Existing analyses on this topic (e.g. in individual evaluations of policy instruments) – identified through Tasks 2 and 3 • Case study interviews (Task 3) • Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 3) • Workshops and seminar (Task 5) with Member States and external experts

Efficiency

Evaluation Questions	Data sources
EQ 4: What are the underlying factors and drivers which influence the implementation of ERDF and CF support for climate and environment investments?	
JC 4.1. Types of factors and drivers impacting the design and allocation of resources on programme level for climate and environment	• Desk research: data on funding per investment priority area and intervention field, including output indicators (RCO) and result indicators (RCR) (Task 1). • Fieldwork observations and measurements of territorial needs and impacts of investments (Task 1). • Interviews with managing authorities, national and regional authorities, implementing bodies, beneficiaries (Task 1).

Evaluation Questions	Data sources
	• Literature review: implementation reports, project reports, evaluations from Commission and Member States (Task 2). • Analysis of case studies (Task 3) • Analysis of cross-cutting case studies (Task 3)
JC 4.2. Types of factors and drivers impacting the implementation of projects funded by ERDF/ CF on climate and environment	• Desk research: data on funding per investment priority area and intervention field, including output indicators (RCO) and result indicators (RCR) (Task 1). • Fieldwork observations and measurements of territorial needs and impacts of investments (Task 1). • Interviews with managing authorities, national and regional authorities, implementing bodies, beneficiaries (Task 1). • Literature review: implementation reports, project reports, evaluations from Commission and Member States (Task 2). • Analysis of case studies (Task 3) • Analysis of cross-cutting case studies (Task 3)
EQ 5. What inefficiencies and obstacles were identified, how were they addressed and what could be done to (further) improve the efficiency of EU support to climate and environment objectives?	
JC 5.1. Obstacles hindering the efficient programme design with regards to climate and environment objectives have been identified and addressed	• Desk research: data on funding per investment priority area and intervention field, including output indicators (RCO) and result indicators (RCR) (Task 1). • Interviews with managing authorities, national and regional authorities, implementing bodies, beneficiaries (Task 1). • Literature review: implementation reports, project reports, evaluations from Commission and Member States (Task 2). • Case studies (Task 3) • Cross-cutting case studies (Task 3) • Results defined and complemented during the workshop and seminars (Task 5) with Member States and external experts, where further information may also be collected.
JC 5.2. Obstacles to the efficient implementation of ERDF/CF projects with regards to climate and environment objectives have been identified and addressed (simplification/burden reduction) by the competent authorities/ implementing stakeholders.	• Desk research: implementation reports, project reports, evaluations • Interviews with managing authorities, national and regional authorities, implementing bodies, beneficiaries (Task 1). • Case studies (Task 3) • Cross-cutting case studies (Task 3)
JC 5.3. Not already addressed obstacles hindering the efficient programme design with regards to climate and environment objectives are identified for improvement.	• Desk research: implementation reports, project reports, evaluations. • Interviews with managing authorities, national and regional authorities, implementing bodies, beneficiaries (Task 1). • Case studies (Task 3) • Cross-cutting case studies (Task 3)
JC 5.4. Not already addressed obstacles hindering an efficient	• Desk research: implementation reports, project reports, evaluations.

Evaluation Questions	Data sources
implementation of ERDF/CF projects with regards to climate and environment objectives are identified for improvement.	• Interviews with managing authorities, national and regional authorities, implementing bodies, beneficiaries (Task 1). • Case studies (Task 3) • Cross-cutting case studies (Task 3)

Relevance

Evaluation Questions	Data sources
EQ 6. To what extent were the initial objectives and scope of climate and environment investments made under the ERDF and CF addressing the needs of the regions? Are they still relevant?	
JC 6.1. The objectives of - supporting the shift towards a low-carbon economy in all sectors (TO4), - promoting climate change adaptation, risk prevention and management (TO5), preserving and protecting the environment and promoting resource efficiency (TO6), under which ERDF/CF investments have been pursued, addressed actual needs of the regions.	• Cohesion Data Portal/WP2 data (Task 1) • Regional indicators situation on climate and environmental thematic areas (Task 1) • Review of e.g., monitoring reports, implementation reports, evaluation studies (Task 1, 2, 3) • Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) • Workshops and seminar (Task 5)
JC 6.2. The overarching objective of ERDF and CF climate and environment investments to reduce disparities between regions and countries in the EU is still relevant	• Regional indicators on climate and environmental thematic areas (Task 1) • Interviews with managing authorities, EC and other stakeholders (Task 3) • Workshops and seminar (Task 5)
JC 6.3. The scope of intervention (intervention fields) related to climate and environment investments made under the ERDF and CF is still relevant to current and future territorial needs.	• Regional indicators on climate and environmental thematic areas (Task 1) • Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) • Workshops and seminar (Task 5)
EQ 7. Are there any new developments that would require changing the objectives and scope of these investments?	
JC 7.1. New geopolitical developments would require changing the objectives and scope of ERDF and CF climate and environment investments	• Review of e.g., European Commission and Member States' studies, monitoring reports, implementation reports, evaluation studies (Task 1, 2, 3) • Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) • Workshops and seminar (Task 5)

Evaluation Questions	Data sources
JC 7.2. New EU policy developments would require changing the objectives and scope of ERDF and CF climate and environment investments	- Review of e.g., European Commission and Member States' studies, monitoring reports, implementation reports, evaluation studies (Task 1, 2, 3) - Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) - Workshops and seminar (Task 5)
JC 7.3. Emerging challenges at Member States' level would require changing the objectives and scope of ERDF and CF climate and environment investments	- Review of e.g., European Commission and Member States' studies, monitoring reports, implementation reports, evaluation studies (Task 1, 2, 3) - Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) - Workshops and seminar (Task 5)
JC 7.4. New technological developments would require changing the objectives and scope of ERDF and CF climate and environment investments	- Review of e.g., European Commission and Member States' studies, monitoring reports, implementation reports, evaluation studies (Task 1, 2, 3) - Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) - Workshops and seminar (Task 5) - EQ 8. How did the COVID crisis affect the relative relevance of the ERDF and CF support for climate and environment investment across the EU? - Cohesion Data Portal/WP2 data (Task 1) - Review of e.g., monitoring reports, implementation reports, evaluation studies (Task 1, 3) - Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) - Workshops and seminar (Task 5)
EQ 8. How did the COVID crisis affect the relative relevance of the ERDF and CF support for climate and environment investment across the EU?	
JC 8.1. The COVID crisis positively affected the relative relevance of the ERDF and CF support for climate and environment investments across the EU	- Cohesion Data Portal/WP2 data (Task 1) - Review of e.g., monitoring reports, implementation reports, evaluation studies (Task 1, 3) - Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) - Workshops and seminar (Task 5)
EQ 9. To what extent are cohesion policy investments in the field of climate and environment relevant for the objectives of the European Green Deal?	
JC 9.1. ERDF and CF investments in the field of climate and environment are relevant to the objective of the European Green Deal.	- Cohesion Data Portal/WP2 data (Task 1) - Statistical analysis of regional performance on climate and environmental thematic areas (Task 1) - Review of e.g., monitoring reports, implementation reports, evaluation studies (Task 1, 3) - Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) - Workshops and seminar (Task 5)

Coherence

Evaluation Questions	Data sources
EQ 10. To what extent were the climate and environment investments from the ERDF and CF coherent with other EU interventions having similar objectives (overlaps, complementarities, synergies)?	
JC 10.1. Coherence of climate and environment investments from the ERDF and CF with other EU interventions supporting TO4, TO5 and TO6.	• Data on budget allocated by theme, intervention field, country (Task 1). • Semi-structured interviews with representatives of EU institutions, managing authorities, national and regional authorities, implementing bodies, beneficiaries (Task 1, 3). • Regulations ERDF, CF, and other EU instruments with similar objectives, grey and academic literature (Task 2). • Implementation reports, operational programmes, evaluations from Commission and Member States, institutional and academic studies (Task 1, 2, 3). • Eurostat, EEA and other general sources' statistics (Task 1, 2).
JC 10.2. Overlaps between climate and environment investments under the ERDF and CF and other EU interventions having similar objectives.	
JC 10.3. Synergies between climate and environment investments under the ERDF and CF and other EU interventions having similar objectives.	
JC 10.4. Complementarities between climate and environment investments under the ERDF and CF and other EU interventions having similar objectives.	
EQ 11. To what extent were the climate and environment investments from the ERDF and CF coherent with national climate and environment investments?	
JC 11.1. Coherence of climate and environment investments from the ERDF and CF with national interventions supporting TO4, TO5 and TO6.	• Data on budget allocated by theme, intervention field, country (Task 1). • Semi-structured interviews with managing authorities, national and regional authorities, implementing bodies, beneficiaries (Task 1, 3). • Regulations ERDF, CF, and national climate and environment policies (e.g., National Energy Efficiency Action Plans and National Renewable Energy Action Plans, Prioritised Action Frameworks), grey and academic literature (Task 2, 3). • Implementation reports, national and regional operational programmes, evaluations from Commission and Member States, institutional and academic studies (Task 1, 2, 3). • Eurostat, National Statistics (Task 1, 3).
JC 11.2. Overlaps between climate and environment investments under the ERDF and CF and national climate and environment investments.	
JC 11.3. Synergies between climate and environment investments under the ERDF and CF and national climate and environment investments.	
JC 11.4. Complementarities between climate and	

Evaluation Questions	Data sources
environment investments under the ERDF and CF and national climate and environment investments.	
EQ 12. To what extent were the climate and environment investments from the ERDF and CF coherent with the relevant international obligations taken by the EU?	
JC 12.1. Overlaps between climate and environment investments under TO4, TO5 and TO6 supported by the ERDF and CF and relevant international obligations.	• Semi-structured interviews with managing authorities, national and regional authorities, implementing bodies, beneficiaries (data on e.g., programme and monitoring) (Task 1, 3). • Regulations ERDF, CF, and the main policy documents relevant for the selected international obligations (Task 2). • Implementation reports, operational programmes, evaluations from Commission and Member States, institutional and academic studies (Task 1, 2).
JC 12.2. Synergies between climate and environment investments under TO4, TO5 and TO6 supported by the ERDF and CF and relevant international obligations.	
JC 12.3. Complementarities between climate and environment investments under TO4, TO5 and TO6 supported by the ERDF and CF and relevant international obligations.	

EU Added Value

Evaluation Questions	Data sources
EQ 13. To what extent would the objectives of the policy have been pursued in the absence of ERDF and CF support?	
JC 13.1. ERDF and CF climate and environment investments have contributed to pursuing the objectives set in TO4, TO5 and TO6 beyond what MS alone could have been able to achieve.	• Cohesion Data Portal/WP2 data (Task 1) • In-depth analysis of 70 OPs (Task 1) • Data on national/regional level investments from sources other than ERDF and CF (Task 2, 3) • Review of e.g., monitoring reports, implementation reports, evaluation studies, grey and academic literature (Task 1, 2, 3) • Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) • Workshops and seminar (Task 5) with Member States and external experts
EQ 14. Are there any investments that were triggered due to the EU support, and would not have materialised without it?	
EQ 14.1. Public and private investments in climate and environment were triggered at the national and regional levels due to ERDF and CF support and would not have materialised without it.	• Cohesion Data Portal/WP2 data (Task 1) • Data on national/regional level investments from sources other than ERDF and CF (Task 2, 3) • Review of e.g., monitoring reports, implementation reports, evaluation studies, other studies on national cohesion policies, grey and academic literature (Task 1, 2, 3) • Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) • Workshops and seminar (Task 5) with Member States and external experts
EQ 15. To what extent did ERDF/CF support contribute to reduction of territorial disparities between the various regions?	
JC 15.1. ERDF and CF climate and environment investments have contributed to pursuing the overarching objective of cohesion policy (reducing territorial disparities between regions and countries in the EU) beyond what MSs alone could have been able to achieve.	• Cohesion Data Portal/WP2 data (Task 1) • Data on national/regional level investments other than ERDF and CF (Task 2, 3) • Review of e.g., monitoring reports, implementation reports, evaluation studies, other studies on national cohesion policies, grey and academic literature (Task 1, 2, 3) • Interviews with managing authorities, beneficiaries, EC and other stakeholders (Task 1, 3) • Workshops and seminar (Task 5) with Member States and external experts

Policy relevant questions

Evaluation Questions	Data sources
EQ 16. How did the climate and environment investments from the cohesion policy support contribute to achieving the EGD goals?	
JC 16.1. ERDF and CF climate and environment investments have contributed to EGD objectives	• Cohesion Data Portal/WP2 data (Task 1) • EGD statistics • Review of implementation reports, evaluations from Commission and Member States, studies on national policies and cohesion (Task 2) • Interviews with managing authorities and EC (Task 1, Task 3) • Workshops and seminars (Task 5)
EQ 17. Which of these investments are the most effective tools available to the EU and its Member States to help achieving the European Green Deal objectives?	
JC 17.1. The level of ERDF and CF climate and environment investments have contributed to EGD objectives vary from policy instrument to policy instrument	• Cohesion Data Portal/WP2 data (Task 1) • EGD statistics • Review of implementation reports, evaluations from Commission and Member States, studies on national policies and cohesion (Task 1,2, 3) • Interviews with managing authorities and EC (Task 1, Task 3) • Workshops and seminars (Task 5)
EQ 18. Are there any specific areas of intervention / policy instruments which have generated a high level of know-how that would make them easy to replicate and thus help achieving the European Green Deal objectives sooner?	
JC 18.1. ERDF and CF climate and environment investments in those policy instruments with a high level of planned EU funding have generated a high level of know-how that would make them easy to replicate to achieve the EGD objectives sooner	• Results of JC 19.1 • Review of implementation reports, evaluations from Commission and Member States, studies on national policies and cohesion (Task 1,2, 3) • Interviews with managing authorities and EC (Task 1, Task 3) • Workshops and seminars (Task 5)

Annex III – Themes for policy instruments cases

Overview of case studies coverage and themes investigated

Policy instrument case	Member States covered	Themes investigated in depth
Adaptation	Italy, Hungary, Slovenia	Ex-ante conditionality Cross-border and cross-sectoral coordination Skills, knowledge and capacity
Clean transport	Poland, Italy, Belgium	Absence of ex-ante conditionality Supporting policies and measures COVID19 Capacity
Biodiversity	Estonia, Ireland, Portugal	Natura 2000 management plans Species protection, including rules and systems Integration of visitor's infrastructure and culture assets in urban and rural projects Role of strategic environmental impact assessments
Culture	Czechia, Spain, Italy	Social versus economic dimension of interventions Culture versus sustainable development Alternative financing sources for culture investments
EE in buildings	France, Germany, Romania	Lack of skilled professionals Role of intermediaries Ownership structures in buildings
EE in enterprises	Austria, Poland, Sweden	Lack of awareness and capacity among SMEs Policy strictness and complexity of production Financial instruments
Green economy	Bulgaria, Finland, Germany	Risk of green washing Green awareness Spatial proximity of actors / agglomerations
Pollution prevention	Bulgaria, Czechia, Slovakia	Role of air quality plans Synergies with transport and energy policies Shortage of staff and lack of sufficient expertise
Sustainable energy	Poland, Germany, France	Ex-ante conditionality Link to energy efficiency considerations Regulatory procedures
Waste	Greece, Croatia, Latvia	Ex-ante conditionality and strategic planning Supporting economic instruments and awareness Territorial perspective of funding
Wastewater	Italy, Lithuania, Romania	Ex-ante conditionality Other sources of financing Water and sewage sludge reuse
Water	Greece, Malta, Portugal	Ex-ante conditionality, coordination and integrated water resources management Investments aimed at more sustainable use of water

Annex IV – Policy and legislative framework

TO4 - Low carbon economy

The EU energy policy, and specifically the Energy Union Strategy,²³⁷ put forward in 2015, served as a key guidance for ERDF and CF interventions in the field of TO4 - low carbon economy. EU energy policy aims to achieve an integrated energy market, a secure energy supply and a sustainable energy sector²³⁸, and is meant to address the challenges of climate change mitigation, import dependency and volatile prices. Two of the five dimensions of the Strategy, i.e. energy efficiency and decarbonising the economy, were particularly relevant from a cohesion policy perspective. Accordingly, in 2014-2020, ERDF and CF supported the following investment priorities: production and distribution of energy derived from renewable sources; energy efficiency in enterprises; energy efficiency and smart energy management in public infrastructure and buildings; smart distribution systems; low-carbon strategies, including the promotion of sustainable urban mobility; and co-generation of heat and power. ERDF also supported research and innovation in low-carbon technologies.²³⁹

National Renewable Energy Action Plans formed the main framework through which ERDF/CF was to support renewable energy during the 2014-2020 period. Currently, the production and use of energy accounts for 78% of Europe's GHG emissions,²⁴⁰ and achieving climate neutrality requires a 55% reduction in GHG emissions by 2030. This, in turn, translated into a need to increase the share of renewable energy production to 38-40% by 2030.²⁴¹ The Renewable Energy Directive (2018/2001) is the EU's main instrument for promoting energy from renewable sources. The original Directive, adopted in 2009, set a 20% renewable energy target for 2020 and required Member States to set out in their National Renewable Energy Action Plans (NREAPs) how they intended to contribute to this target.²⁴² The targets for the share of renewables differed widely between Member States. Some had targets set around 40% of renewable energy by 2020 (Latvia and Finland, Sweden even close to 50%). Others had lower targets of around 15% (e.g., Bulgaria, Czechia, the Netherlands).²⁴³ According to the European Commission's thematic guidance on renewable energy and smart grid investments in the 2014-2020 programming period,²⁴⁴ support in these domains should be based on targets set in the NREAPs.²⁴⁵ The focus should be on decentralised electricity production from renewable energy sources (RES) and RES use in heating and cooling, as well as on innovative RES

²³⁷ The strategy is structured into five different dimensions: energy security, solidarity, and trust; a fully integrated European energy market; energy efficiency contributing to demand moderation; decarbonisation of the economy; research, innovation, and competitiveness. Source: European Commission (2015), Energy Union Package. COM (2015) 80 final.

²³⁸ European Parliament (2022), Energy policy: general principles, [see link](#).

²³⁹ European Structural and Investment Funds 2014-2020: official texts and comments, [see link](#).

²⁴⁰ European Commission, Energy and the Green Deal, [see link](#).

²⁴¹ European Commission (2021), Amendment to the Renewable Energy Directive. COM/2021/557 final.

²⁴² The NREAPs have been followed by National Energy and Climate Plans (NECPs) in 2019, which outline the path to 2030 and contain measures in the areas of energy supply, transmission and distribution, covering both EU and national funds.

²⁴³ European Commission (2020), Technical assistance in realisation of the 5th report on progress of renewable energy in the EU. ENER/C1/2019-478.

²⁴⁴ European Commission (2014), Draft thematic guidance for desk officers. Renewable energy and smart grids investments, [see link](#).

²⁴⁵ To establish a conducive framework, the ex-ante conditionality 4.3 required Member States to set up a NREAP.

technologies, as recorded by the Strategic Energy Technology Plan (SET-Plan)²⁴⁶ and the Energy Roadmap 2050.²⁴⁷

National Energy Efficiency Action Plans formed the main framework through which ERDF/CF was to support energy efficiency during the 2014-2020 period. Energy consumption in public and private buildings accounts for around 40% of total energy consumption. Additionally, 36% of direct and indirect GHG emissions are due to energy consumption in buildings. In households, as much as 80% of energy consumption is due to heating, cooling and hot water.²⁴⁸ To support energy efficiency measures, the EU on the one hand provides a legal framework and on the other hand co-funds refurbishment and renovation measures. Concerning the legal framework, the Directive on Energy Performance of Buildings (EPBD) is the most important Directive for the planned implementation of retrofits in the building sector. The Directive, which was adopted in 2002, recast in 2010 and amended again in 2018 (2018/844/EU), defines clear targets in the domain. A more general but crucial piece of legislation is the Energy Efficiency Directive (EED, EU/2023/1791), adopted in 2012 and amended in 2018 and 2023, which requires Member States to put measures in place to achieve national energy efficiency targets, and more specifically to establish "a long-term strategy mobilising investment in the renovation of the national building stock, including policies and measures to stimulate cost-effective deep renovations". Concretely, this strategy is included the National Energy and Climate Plans,²⁴⁹ as further specified by the Regulation on the governance of the energy union and climate action (EU/2018/1999). According to the EED, Member States must also ensure that 3% of the total heated and/or cooled floor space of buildings owned and occupied by central government is renovated annually.

In addition to actions targeting buildings, increasing energy efficiency in enterprises is also instrumental for reducing overall energy consumption and simultaneously improving the competitiveness of these enterprises. In fact, enterprises account for around 62% of economic energy saving potential by 2030,²⁵⁰; potential for energy efficiency improvements exists in almost all economic sectors. More specifically, it means reducing the energy intensity of the economy, i.e., the ratio between gross domestic energy consumption and gross domestic product. The International Energy Agency estimated that energy intensity in Europe could be reduced by a minimum of 2.5% per year between 2017 and 2030.²⁵¹ According to the Commission's estimates, the commercial sector has a savings potential of 16% and the industrial sector of 23.5%. These account for around 15% and 47% respectively of the total economic energy savings potential by 2030.²⁵² Against this background,

²⁴⁶ The SET plan foresees increasing research to reduce costs and improve performance of existing technologies, and by encouraging the commercial implementation of these technologies. For RES, this especially means the integration of renewable energy sources into the electricity network. In the long-term, also the development of a new generation of low carbon technologies should be addressed (see European Commission (2015), A European strategic energy technology plan (SET Plan) - Towards a low carbon future. COM (2015) 6317 final).

²⁴⁷ See European Commission (2011), Energy Roadmap 2050. COM (2011) 885 final, [see link](#).

²⁴⁸ European Commission (2020), Energy efficiency in buildings, [see link](#).

²⁴⁹ NECPs, in force since 2019, replaced the National Energy Efficiency Action Plans (NEEAPs).

²⁵⁰ European Commission (2021), Technical assistance services to assess the energy savings potentials at national and European level, [see link](#).

²⁵¹ IEA, Annual average change in energy intensity by region and scenario, 1990-2030, [see link](#).

²⁵² European Commission (2021), Technical assistance services to assess the energy savings potentials at national and European level, [see link](#).

the EED foresees energy audits²⁵³ obligations for energy-intensive enterprises. Since the 2023 revision of the EED, signalling a growing attention to the untapped potential for efficiency gains in enterprises, the scope of these audits has expanded to include energy-intensive SMEs. Additionally, large industrial energy consumers are now obliged to implement energy management systems.²⁵⁴ More broadly, the strategic framework for supporting enterprises in navigating the transition towards a low-carbon economy has included a focus on technologic innovation as well, for instance already through the EU Eco-innovation Action Plan adopted in 2011, which focused on boosting innovation to reduce pressures on the environment.²⁵⁵ Moreover, regional innovation strategies developed for the 2014-2020 period under cohesion policy frequently included the topic of eco-innovation.

The promotion of sustainable urban mobility has a crucial role in the wide-ranging efforts to achieve a low-carbon economy. Ensuring the development of strategies that stimulate a shift towards cleaner and more sustainable modes of transport, such as public transport, cycling and walking, and shared mobility, is imperative to address the challenges related to the high levels of congestion, GHG emissions, noise, and air pollution. Urban mobility is in the competence remit of local authorities, and it is not regulated by EU regulations or directives. However, the European Commission issued several policy documents in this area, including the Urban Mobility Package adopted in 2013,²⁵⁶ whose central element was the concept of sustainable urban mobility planning (SUMP).²⁵⁷ SUMPs should be linked with AQPs, NAPCPs and noise plans as they have many synergies. Beyond the Urban Mobility Package, other pieces of legislation introduced in the period 2014-2020 have contributed to shape Member States' policies on sustainable urban transport. Since 2015, with the Declaration on Cycling as a climate friendly Transport Model,²⁵⁸ increasing attention has been paid to the importance of cycling in a sustainable urban mobility offer and to the specific infrastructure planning focusing on improvement of this way of moving, especially at urban level.²⁵⁹ In 2017, the European Commission issued the Communication "Europe on the move, an agenda for a socially fair transition towards clean, competitive and connected mobility for all",²⁶⁰ comprising a set of initiatives toward modernising European mobility and transport. In December 2020, the 'Sustainable and Smart Mobility Strategy' together with an Action Plan of 82 initiatives was published. This strategy lays the foundation for how the EU transport system can achieve the EGD's objectives. After 2020, a series of relevant publications were issued: 2021 Communication on New EU urban mobility framework, 2021 Proposal for a revised TEN-T Regulation, 2022 Reformed

²⁵³ An energy audit is a systematic procedure to obtain knowledge of the existing energy consumption profile and are mostly carried out by external service providers.

²⁵⁴ Energy Management Systems according to ISO 50001.

²⁵⁵ European Commission (2011), Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP), [see link](#).

²⁵⁶ The Urban Mobility Package consists of the Communication "Together towards competitive and resource-efficient urban mobility", the accompanying annex: "A Concept for Sustainable Urban Mobility Plans", and four Commission Staff Working Documents: "A call to action on urban logistics", "Targeted action on urban road safety", "A call for smarter action on urban access regulations", and "Mobilising Intelligent Transport Systems for EU cities". A new communication on the New EU Urban Mobility Framework was issued in 2021, [see link](#).

²⁵⁷ A SUMP is a strategic plan designed to satisfy the mobility needs of people and businesses in cities and their surroundings for a better quality of life. It builds on existing planning practices and takes consideration of integration, participation, and evaluation principles. SUMPs are meant to address, within a coherent policy framework, issues related to congestion, air and noise pollution, climate change, road accidents, on-street parking, and the integration of new mobility services.

²⁵⁸ Declaration on Cycling as a Climate Friendly Transport Model, [see link](#).

²⁵⁹ In October 2023, the Commission has adopted an Interinstitutional European Declaration on Cycling.

²⁶⁰ Communication from the Commission and the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Europe on the Move. An agenda for a socially fair transition towards clean competitive and connected mobility for all', COM/2017/028, 31.5.201, [see link](#).

Expert Group on Urban Mobility (EGUM), 2023 Commission recommendation to Member States on National SUMP support programmes, 2023 Revised SUMP Concept.

On a different note, through environmental legislation²⁶¹ the EU can exert direct influence on Member States in the transport field as well. This includes the adoption of more stringent emission standards for road transport vehicles and ambitious targets for the public procurement of clean vehicles. The EU Clean Vehicles Directives (2009 and 2019) set requirements on renewal of transport fleets, with explicit reference to the principles of circular economy and clean or zero-emission vehicles.

TO5 - Adaptation and risk management

The EU Strategy on Adaptation to Climate Change,²⁶² adopted in 2013 and revised in 2021, served as a key reference for the ERDF/CF interventions for TO5. The strategy demands swift and systemic action with a long-term perspective and calls upon cohesion policy and other financing schemes to focus on climate change adaptation investments and climate-proof financing. Under TO5, ERDF and CF supported two investment priorities: investment for adaptation to climate change, including ecosystem-based approaches; and investment to address specific risks, disaster resilience and disaster management systems.²⁶³

There is wide recognition that adaptation investment needs in Europe are high and highly diversified at the territorial level. Estimates vary but expert literature indicates that the investments that are necessary to ensure sufficient climate resilience could be between EUR 35 billion to more than EUR 500 billion annually.²⁶⁴ It is estimated that the annual welfare loss in the EU resulting from a 3°C global warming would amount to at least EUR 170 billion.²⁶⁵ Thus, at the overall level, the economic rationale for investing in climate change adaptation is clearly present. Climate adaptation also has a strong territorial dimension, which makes it a suitable area for cohesion policy intervention. Differences in the type of risks and in the levels of exposure to risks at the local level,²⁶⁶ as well as in the sectoral composition of local economies, call for a place-based approach that addresses specific local needs with the involvement of a broad set of stakeholders, including public administrations at different levels, researchers, vulnerable groups. Needs and solutions can vary

²⁶¹ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe; Directive (EU) 2019/1161 of The European Parliament and of the Council of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles.

²⁶² European Commission (2013), EU strategy on adaptation to climate change, [see Link](#); European Commission (2021), Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change, [see link](#).

²⁶³ European Commission (2014), Thematic guidance fiche for desk officers. Climate change adaptation, risk prevention and management version 2 - 20/02/2014.

²⁶⁴ European Commission (2017), Climate mainstreaming in the EU budget: preparing for the next MFF. The range is based on two studies: De Bruin et al. (2009), Economic aspects of adaptation to climate change; BASE (2016), EU-wide economic evaluation of adaptation to climate change.

²⁶⁵ Szewczyk et al. (2020), Economic analysis of selected climate impacts, JRC Peseta IV project – Task 14. This estimate is mentioned in the 2021 EU Adaptation Strategy as well as in the EIB Climate Adaptation Plan. See European Commission (2021), Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change; European Investment Bank (2021), EIB Climate Adaptation Plan: Supporting the EU Adaptation Strategy to Build Resilience to Climate Change'.

²⁶⁶ See for instance the European Commission's RiskData Hub, which integrates spatial data with statistical analysis to provide evidence on human losses and economic damages generated across Europe by hazardous events: <https://drmkc.jrc.ec.europa.eu/risk-data-hub/#/dashboardvulnerability>

between urban and rural areas, in coastal and inland areas, and in more developed and less developed ones. Outermost regions, mountainous areas and islands also have specific challenges. These territorial disparities can be addressed by cohesion policy, with proportionately more funding allocated to territories that are lagging and where national funding may not be sufficient to address climate adaptation needs.

Depending on the risk at hand, relevant EU policies and legislation apply. For instance, the 2015 Floods Directive on the assessment and management of flood risks and the 2000 Water Framework Directive are crucial instruments to coordinate flood risk management plans and river basin management plans, and more broadly represent cornerstones of the EU approach to climate adaptation.

The EU Adaptation Strategy urges Member States to establish adaptation strategies and plans for successful policy implementation. It emphasises comprehensive identification of climate change risks and adaptation measures. This requires coordination among relevant authorities to address cross-sectoral and cross-border risks in vulnerable sectors. To strengthen the formulation of operational programmes and guide investment selection, the 2014-2020 Common Provisions Regulation (CPR) introduced an ex-ante conditionality requiring Member States to adopt national risk assessments and strategies in line with the EU Adaptation Strategy.²⁶⁷

TO6 - Environment and resource efficiency

Under TO6, the EU policy framework consists mainly in sector-specific legislation that sets out the key principles and requirements for the management of natural resources and the protection of the environment. Under this TO, ERDF and CF supported investment priorities related to the waste sector, the water sector, biodiversity and soil and urban environment. The ERDF, in addition, supported natural and cultural heritage, innovative technologies to improve environmental protection and the industrial transition towards a resource efficient economy.

The Waste Framework Directive (2008/98/EC) is the main legislative pillar of EU waste policy. It sets out key concepts for waste management and outlines the five-steps of the 'waste hierarchy', which is the basis for waste management in the EU. The waste hierarchy sets out the priority order in waste prevention and management legislation and policy: (a) prevention; (b) preparing for re-use; (c) recycling; (d) other recovery, e.g., energy recovery; and (e) disposal, i.e. incineration without energy recovery and landfilling. The Directive, among its provisions, set targets to increase the share of household waste (at least paper, metal, plastic, and glass) being prepared for re-use and recycling to 50% by 2020 and the share of non-hazardous construction and demolition waste being prepared for re-use, recycling, and other material recovery to 70% by 2020. The amendment adopted in 2018 increased these targets to 55% by 2025, 60% by 2030, and 65% by 2035 for all municipal

²⁶⁷ EAC 5.1. Risk prevention and risk management: the existence of national or regional risk assessments for disaster management, taking into account climate change adaptation.

waste.²⁶⁸ The Directive also requires Member States to ensure that their competent authorities establish Waste Management Plans (WMPs) and Waste Prevention Programmes (WPPs), either as part of the plans or as stand-alone instruments. Beyond the Waste Framework Directive and many directives on specific waste streams,²⁶⁹ the Landfill Directive (1999/31/EC) is another key piece of EU waste legislation. It aims to prevent and reduce the negative effects of waste landfills on the environment, including their safe closure, by setting clear requirements for landfills (e.g. permitting, waste acceptance, technical requirements) to ensure that human health and the environment are protected. The European Commission's thematic guidance on waste management for the 2014-2020 programming period²⁷⁰ outlined that support from the ERDF and CF had to target investments in waste management aligned with the waste hierarchy. This means prioritising waste prevention, reuse, separate collection, and recycling.²⁷¹ In addition, investments had to comply with the WMPs. To ensure this compliance, the CPR 2014-2020 introduced an ex-ante conditionality.²⁷²

The EU's circular economy policy is also important for waste management due to its potential for resource efficiency. The EU policy framework on circularity and resource-efficiency started to evolve earlier and was also part of the Europe 2020 strategy. In 2011, the Commission put forward a Roadmap to a Resource Efficient Europe that called for a fundamental transformation of the economy and a reduction of the levels and impact of our resource use. The First Circular Economy Action Plan (CEAP 1)²⁷³ was published in 2015. It was the first EU plan to guide the transition to a circular economy, encompassing the entire life cycle of products, including waste management.

Water management in the EU is mainly driven by the Water Framework Directive (WFD, 2000/60/EC), whose objective is to achieve (or maintain) good status of water bodies and to prevent deterioration. Good status includes both chemical and ecological status of surface water and chemical and quantitative status of groundwaters.²⁷⁴ The main tools for implementing the WFD in Member States are the River Basin Management Plans (RBMPs) that outline how water bodies should be managed and identify gaps, measures, and targets for a given area (all regions in Europe are divided into hydrologically based river basins). The RBMPs are part of the water planning cycle, which lasts six years.²⁷⁵ The most relevant interval for the 2014-2020 programming period started in 2015 and ended in 2021. The European Commission's thematic guidance on water management for 2014-2020

²⁶⁸ European Commission, Waste Framework Directive, [see link](#).

²⁶⁹ E.g. the Directive 94/62/EC on Packaging and Packaging Waste (REFIT), see [Packaging waste \(europa.eu\)](#) and [Revision of Directive 94/62/EC on Packaging and Packaging Waste \(REFIT\)](#). The Single Use Plastics Directive (2019/904/EU). The Batteries Directive (2018/849/EU). The website "Municipal Waste Europe" summarizes the relevant waste legislation at EU level, [see link](#).

²⁷⁰ European Commission (2014), Draft Thematic Guidance Fiche for Desk Officers. Waste Management, Version 2 – 20/02/2014, [see link](#).

²⁷¹ It can be noted that certain funding opportunities that were eligible during the 2014-2020 financing period, such as incineration (subject to some exceptions), cannot be realised any more under the 2021-2027 period.

²⁷² EAC 6.2. Waste sector: Promoting economically and environmentally sustainable investments in the waste sector particularly through the development of waste management plans consistent with Directive 2008/98/EC, and with the waste hierarchy.

²⁷³ European Commission (2019), First circular economy action plan, [see link](#).

²⁷⁴ European Commission, Water Framework Directive, [see link](#).

²⁷⁵ European Environment Agency (2012), Territorial cohesion and water management in Europe: the spatial perspective, [see link](#).

underlined that the investments supported from the ERDF/CF should be based on the RBMPs.²⁷⁶ In addition to RBMPs, some EU countries have adopted Drought Management Plans for vulnerable river basins. While most of Europe is considered to have adequate water resources, water scarcity and droughts are increasingly frequent and widespread in the EU.²⁷⁷ To strengthen the links between cohesion policy investments and the implementation of the WFD, an ex-ante conditionality specifically aimed at ensuring that Member States are on track with the implementation of key WFD objectives was introduced in 2014-2020.²⁷⁸ In addition, more technical legislation ensures that the objectives of the WFD can be achieved. The Urban Wastewater Treatment Directive (UWWTD, 91/271/EEC), the Floods Directive (2007/60/EC), the Groundwater Directive (2006/118/EC), the Regulation on minimum requirements for water reuse (2020/741) and the Drinking Water Directive (DWD, Directive 98/83/EC, now repealed by Directive 2020/2184/EU) are particularly relevant for cohesion policy investments.²⁷⁹ In particular, the UWWTD sets standards and rules to collect and treat wastewater from urban agglomerations. While the EU as a whole has achieved a high level of compliance with this Directive, in 2018 about 45 million person-equivalents²⁸⁰ did not achieve the secondary treatment required.²⁸¹ The ongoing revision of the UWWTD will broaden its scope to cover all agglomerations with more than 1,000 inhabitants.²⁸² This change is expected to result in an increased relevance of cohesion policy funding to provide co-financing of wastewater investments.

The Birds Directive (2009/147/EC) and the Habitats Directive (92/43/EEC) are the main pieces of EU nature legislation, which provide a common framework setting the standards for nature protection across the Member States. They are collectively referred to as the 'Nature Directives'.²⁸³ The aim of the Nature Directives is to contribute to enhancing biodiversity through the conservation of natural habitats and wild fauna and flora in the EU. These directives are considered the backbone of the EU's biodiversity policy and the legal basis for the establishment of Natura 2000, the world's largest ecological network of conservation areas that are designated and properly managed. Moreover, as invasive alien species (IAS) are major threats to biodiversity and to economic activities such as agriculture, the EU complemented the legal framework with the adoption of the Invasive Alien Species Regulation (Regulation (EU) 1143/2014). The planning framework for nature and biodiversity investments under TO6 includes the Prioritised Action Framework and the Natura 2000 management plans which should ensure synergies with other investment priorities and funds (including TO5 of cohesion policy on climate change adaptation, EAFRD, LIFE, EMFF, and Horizon 2020). The implementation of cohesion policy

²⁷⁶ European Commission, Draft Thematic guidance fiche for desk officers: water management, Version 2, 20.02.2014, [see link](#).

²⁷⁷ European Commission, Water scarcity and droughts, [see link](#).

²⁷⁸ EAC 6.1. Water sector: The existence of (a) a water pricing policy which provides adequate incentives for users to use water resources efficiently and (b) an adequate contribution of the different water uses to the recovery of the costs of water services at a rate determined in the approved river basin management plan for investment supported by the programmes.

²⁷⁹ OECD (2020), Financing Water Supply, Sanitation and Flood Protection: Challenges in EU Member States and Policy Options, [see link](#).

²⁸⁰ The UWWTD establishes this common measure for urban wastewater, which can come from households as well as industrial and other activities.

²⁸¹ European Commission (2022), 11th Technical assessment on UWWTD implementation, [see link](#).

²⁸² European Parliament, Revision of the Urban Wastewater Treatment Directive (the current scope is for agglomerations above 2,000 inhabitants measured with population equivalent), [see link](#).

²⁸³ Milieu, IEEP and ICF (March 2016), Evaluation Study to support the Fitness Check of the Birds and Habitats Directives, [see link](#).

investment in biodiversity and nature protection intends to contribute to the EU Biodiversity Strategy,²⁸⁴ and to the EU Green Infrastructure Strategy (COM/2013/0249 final). Investing in green infrastructure was a new opportunity to steer the ERDF and CF investments in 2014-2020 programming period.

The Ambient Air Quality Directives are the main driver for investments in air quality improvements. The Ambient Air Quality Directives (AAQDs, 2008/50/EC and 2004/107/EC)²⁸⁵ set EU air quality standards for 12 air pollutants to avoid, prevent or reduce harmful effects on human health and the environment. Member States are required to prepare action plans for all zones or agglomerations where the EU air quality standards are not achieved. In the context of the zero-pollution ambition of the EGD, the AAQDs are currently under revision.²⁸⁶ The new directives include tightening of the air quality standards and strengthening of air quality monitoring, as well as modelling and preparation of air quality action plans as means to support local authorities in achieving the objectives. Beyond the AAQDs, the National Emissions Reduction Commitment Directive (NECD)²⁸⁷ (2016/2284/EU, established 2001, revised in 2016) further drives the efforts to reduce emissions and improve air quality. The NECD sets reduction commitments for the five main transboundary air pollutants for the years 2020-2029 and more stringent targets from 2030 onwards. The NECD also requires Member States to issue National Air Pollution Control Programmes (NAPCPs) by 2019 and to update them regularly every four years. Contrary to air quality plans, the NAPCPs have to be developed even if a Member State complies with standards. More recently, an integrated approach on pollution prevention is promoted through the Zero Pollution Action Plan (COM (2021) 400 final).

²⁸⁴ The EU Biodiversity Strategy sets the objective of unlocking at least EUR 20 billion a year of financing for nature. Until 2020, the key guiding strategy was the EU Biodiversity Strategy for 2020 (COM (2011) 244 final) followed by the Biodiversity Strategy for 2030 (COM/2020/380 final) adopted in 2020.

²⁸⁵ Directive 2008/50/EC on ambient air quality and cleaner air for Europe, 2008, see [link](#); and Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air, see [link](#).

²⁸⁶ European Commission (2022). Proposal for a revision of the Ambient Air Quality Directives, see [link](#).

²⁸⁷ European Parliament and Council of the EU (2016), Directive on the reduction of national emissions of certain atmospheric pollutants, 2016/2284/EU, see [link](#).

Annex V – Statistical Analysis – methodology and results

Methodology and limitations

This section describes the overarching approach and methodology, as well as limitations, of the performed statistical analysis. The objective of the statistical analysis was to characterise the development of the regions in terms of their progress towards climate- and environment-related objectives and provide a supportive basis to the evaluation by:

1. Matching the conditions, as captured by available indicators, to the policy instruments' funding and, thereby, contributing to the analysis of the relevance criterion.
2. Characterizing the evolution of regional performance of the environmental and climate indicators over time for contrasting against the policy instruments, contributing to the analysis of the effectiveness criterion.

Four principal steps were carried out:

Identification of indicators

The first principal step was to identify relevant indicators and corresponding datasets. The following data sources were screened:

1. European Environment Agency (EEA) database
2. Eurostat database
3. ESPON Database
4. JRC e.g. Energy and Industry Geography Lab (EIGL)
5. Additional data sources screened include the Global Biodiversity Information Facility, OECD environmental data, UNEP and IEA.

While the emphasis was on data at the regional level data, the first review of these data sources revealed that there are only very few climate- and environment-related indicators available at NUTS2 level matching the scope of the policy instruments. Limited regional data availability is also apparent in the annual Eurostat Regional Yearbook. Several indicators at NUTS2 level are available through the ESPON Database Portal. Many of these are the results of individual (applied research) projects. Available data years are limited to the scope of the respective research projects. Furthermore, many of the available indicators are not intuitive or are complex indices, which require additional qualification in terms of their definition and scope within the context of their projects and project reports. Methodological limitations of such data, which may be exploratory or experimental in nature as part of the respective project in which they were created, cannot be fully accounted for. On the other hand, the WP2 funding database, although providing information on the NUTS2 recipient regions, does not provide a breakdown to each NUTS2 region. Deriving such a breakdown would have necessitated strong assumptions.

In contrast, at NUTS0 level, the availability of indicators, especially from Eurostat, is greater and provided along easily accessible metadata. WP2 funding data provides the data at NUTS0 level (country level), with only relatively few cases of funding being allocated to more than one country. Consequently, the subsequent analysis is based on NUTS0 level data. Around 70 potentially relevant indicators of which most are at NUTS0 level were identified in this initial screening.

Database construction of relevant indicators

An initially identified selection of indicators and data sources were downloaded, screened for suitability, selected, collated, re-formatted and prepared for analysis. This data selection and data construction stage was prepared for a selection of relevant indicators. An initial selection of a few selected indicators was prepared in form of database to describe the context for Tasks 1 and 3 along with visualisations. This database and visualisation then complemented the online data tool 'Statistics for the European Green Deal' provided by Eurostat (<https://ec.europa.eu/eurostat/cache/egd-statistics/>) with a selection of additional indicators in Excel.

All identified indicators were subsequently reviewed for their suitability against the policy instrument's scope, geographic and time coverage, and ease to understand for the further use in the analysis of the relevance and effectiveness criteria. For this an additional database for statistical analysis was constructed. Given that the WP2 funding database provided information on the allocated funding but could not be reliably and easily broken down to the NUTS2 level, NUTS0 data indicators were selected, and preference given to clearly defined and comparable data sources, which are primarily provided by Eurostat. This resulted in 1-3 indicators being selected per policy instrument and listed in the following policy instrument chapter sections.

Analysis of indicators: characterisation and cluster analysis

The first analytical step was the characterisation of the countries to provide an overview of the relative status quo at the point of or close to the beginning of the programming period. This was done in map format. For each of the maps, the 2013 or 2014 indicator data was segmented by quintiles, quartiles or terciles to form the value ranges. The colour coding was chosen to be consistent for better comparison across the maps. A darker blue indicates better environmental performance.

The breadth and complexity of the environmental and climate themes covered by the policy instruments, thus, does not lend itself well to clustering analysis across several environmental indicators. Across the different indicators, a very mixed pattern emerged not conducive to interpretation. For example, a country may perform comparably well in one indicator but poorly in other. The clustering analysis for the characterisation of the countries, to identify similar types of territories according to different climate and environmental relevant dimensions, was, thus, limited to each individual environmental indicator for the year 2013/14 and integrated in the figures as part of the relevance and effectiveness analysis.

Status quo and development comparison with funding

The data for the indicators was downloaded in November 2022. The year 2013 was chosen as the year prior to the beginning of the funding period. For indicators where data was missing or insufficiently available, the year 2014 was selected. 2019 or

2020, depending upon data availability or likely effect of the COVID-19 pandemic on the indicator year 2020, was selected as the end period.

For the statistical analysis, the allocated funding data was used, given that this is the most reliable or most complete indicator available within the WP2 Single Database. Allocated funding for projects that are attributed in the database to more than one country were excluded from the policy instrument's country aggregate, as it could not be clearly attributed to one single country. Allocated funding per policy instrument per country was derived by summing up the country allocated funding by policy instrument for the full data period covered by the WP2 Single Database. The share of allocated funding by policy instrument in the overall sum of 12 policy instrument was derived per country per policy instrument in percent. This allocated funding policy instrument share formed the dependent variable for the statistical relevance analysis. The independent variable was provided by the respective selected suitable environmental indicator(s) for that policy instrument. For the effectiveness analysis, the allocated funding absolute value per country per policy instrument in EUR was taken but adjusted by per capita to account for the different sizes of the countries and adjusted by purchasing power parity to account for the different relative value a EUR has in each country. Allocated funding was converted to purchasing power parity by taking the ratio of gross domestic product (GDP) per capita to purchasing power parity (PPP) adjusted GDP per capita (Eurostat, [sdg_10_10]).

The following paragraphs detail the applied methodology for the statistical analysis. It needs to be stressed however that, due to the underlying complexity of trends of regions, any clear cause-effect relationships identifiable through statistical analysis of time series data is outside the viable scope of this analysis. For a substantiated statistical analysis, a comparison against a very similar, sufficiently large control group composed of regions without such a policy intervention would be required. An important assumption for difference-in-difference analysis is, for example, the parallel trends assumption i.e. treatment and control group have the same time trend, which are difficult to extract from small heterogeneous groups. Countries and regions are unique in their socio-economic-political and environmental composition and may respond and be affected by a range of other external factors in very different ways, which in turn affect a region's performance across any range of environmental indicators. Such factors can include an ongoing industrial structural transformation, national policy initiatives, regulation enactment and enforcement, economic turbulences (e.g. financial crisis, COVID19-Pandemic, energy crisis, trade sanctions or wars), unusual climatic variance (e.g. temperature, air pollution through Sub-Saharan-dust, precipitation levels), among many other. Observable and unobservable factors may cause the level of the outcome variable to differ. For these and other reasons, regional statistical analyses do not lend themselves well to robust causal inferences at this level of detail, particularly where consistent data is not rich and only small number of observations are available. Consequently, the statistical analysis is only exploratory highlighting large relationships.

For the relevance analysis, the correlation and regression analysis applied the following steps. First, a diagram was produced by placing, on the x-axis, the environmental performance and, on the y-axis, the share of the funds allocated to the respective policy instrument within the total funding allocated to the 12 policy instruments. This was done for all countries, within the same diagram. Second, the country's gross domestic product per capita was added as a third dimension in form

of the relative size of the bubble. A basic best-fit trend line was added based on the x- and y-axis values. Finally, the countries were colour-coded by allocating these to a cluster group based on the environmental indicator. This colour coding represents a grouping of the countries into clusters, which were identified using the k-means algorithm. Clustering analysis is an unsupervised learning technique that allows for a mathematically rigorous grouping of countries according to a common variable, in this case only the environmental indicator in question. In this relatively simple implementation, it allows to visually distinguish countries according to the status of this indicator. The number of clusters were set to k=4 but verified by the Elbow method to identify cases requiring a more suitable number of clusters to appropriate grouping. The resulting figure allowed for an initial visual interpretation and identification of potentially extreme values of individual countries that could be considered and excluded as outliers in the statistical analysis.

The visual analysis was complemented by conventional correlation analysis using the indicators from x- and y-axis of the diagram. The correlation analysis was conducted as a Pearson and Spearman correlation analysis to also consider non-linear relationships. In cases, where the figure suggested extreme values of individual countries, further correlation analysis was conducted excluding the outlier(s). In instances, where the correlation between the two variables was strong, i.e. statistically significant or nearly significant, the relationship was further analysed in a linear regression analysis to control for confounding other variables. As controlling variables, the gross domestic product per capita was used, as an important measure for the socio-economic status of the country. In individual instances, also population density and share of urban population were included as control variables (e.g. clean transport). In this manner the robustness of the initial correlation could be tested. Only meaningful regression results are presented in this report.

The effectiveness analysis followed the same procedure as the relevance analyse with the exception that the indicator 'allocated funds' is expressed as an absolute value adjusted by per capita and purchasing power parity by using the ratio between gross domestic product and gross domestic product in purchasing power parity. For the regression analysis, the allocated fund variable is selected as independent variable and the change variable, i.e. the percentage change in the environmental performance indicator between 2013/14 and 2019/20, as the dependent variable. This is based on the hypothesis that the allocated funds at least contributed to a change in the environmental indicator. In instances, where the correlation between the two variables was strong, i.e. statistically significant or nearly significant, the relationship was further analysed in a linear regression analysis to control for confounding other variables. In this manner the robustness of the initial correlation could be tested. As controlling variables, the growth of gross domestic product per capita was used, as an important measure for the socio-economic development of the country. Only meaningful results are presented in this report.

Limitations

The lack of suitable data at NUTS2 level required the analysis to be conducted with data at the higher NUTS0 aggregated level, implying that the analysis needed to be based on a small number of observations. While statistical analysis with a small number of observations is possible, they are generally aimed at uncovering large effects. The lack of many observations upon which the models can be fitted can

then lead to inflated standard errors. This in turn can lead to small effects in the estimated parameters of the independent variables being more often not significant. Given the focus of this study and the often-poor match between environmental indicator and scope of the policy instrument, such large effects may not be observed for clear statistical results, not least due to the specific contexts. The low number of observations also implies that the Gauss-Markov assumption for the Ordinary Least Squares (OLS) estimator to be unbiased and consistent is only poorly met. This is particularly concerning where heteroscedasticity of error terms and outliers and/or high-leverage points are present. The magnitude of the estimated parameters, therefore, need to be interpreted cautiously although the direction of the relationship is indicative. Only a few control variables were selected and accounted for in the OLS models, given that the exploratory character of this analysis and the limited data availability. Respectively, the inclusion of only few variables increases the possibility of omitted variable bias, which requires consideration when examining the results.

In addition to these statistical limitations, the analysis also must contend with the limits of the meaning of the indicators themselves. Firstly, allocated funding may not accurately reflect actual funding spent or invested within the programming period. Relatedly, the time horizon of allocated funding to materialisation of operational infrastructure of similar on the ground may exceed the observed time period of the selected environmental indicator. These present challenges to the effectiveness analysis. Furthermore, allocated funding may in themselves only be a small of private or non-EU-funded investments that happen to correlate with allocated funding. Allocated funding does not present a comprehensive picture of all the resources that are being directed to the areas of the policy instrument. Finally, the selected environmental indicator or set of indicators may not match well with the scope of the policy instrument, especially when the policy instrument is broad and covers several dimensions of an environmental issue. This challenge was compounded by the fact that it was not viable within the project to further differentiate the allocated funding or combine the environmental indicators in a way to better match the scope of the policy instrument's broad scope objective.

Results by policy instrument

Energy efficiency in enterprises

The following Eurostat indicator was used for the analysis:

- Manufacturing energy intensity in thousand tonnes of oil equivalent (KTOE) per million EUR gross value added (NUTS0, 2013 and 2019²⁸⁸).

The exploratory statistical analysis test, whether more resources were allocated to where they were needed, showed no statistically significant relationship between the manufacturing energy intensity in 2013 and the share of funds allocated to the 'energy efficiency in enterprises' policy instrument over the overall funding, i.e., as the share in the country's total allocated funding to the 12 instruments, and absolute allocated funding to this policy instrument. The results are, thus, not reported. It is worth noting, that the analysis is limited by the availability of indicator data with a precise fit for the policy instrument's scope and the complex contexts that may be driving change.

According to Eurostat data, between 2013 and 2019 significant improvements in manufacturing energy intensity were made across the European Union. Several eastern European countries show particularly remarkable improvement, notably Estonia, Bulgaria, Czech Republic, Slovakia, Poland, and Romania. Also, other countries show improvements, such as Ireland, Cyprus, Luxembourg and Portugal. Drivers for this change may be varied. They may include increases in productivity leading to higher gross value added with the same amount of energy use, decline of energy intensive industries, or/and reduced energy use at the same productivity levels i.e. energy efficiency. Correspondingly, the exploratory analysis to test whether the allocated funding has contributed to a change in the selected indicator to reflect the performance status of the policy instrument provided no clear relationship. The general decrease in manufacturing energy intensity that is observed across Member States could be due to other concurring factors that are not possible to capture solely with the allocated funding and available selected data.

Energy efficiency in buildings and public infrastructure

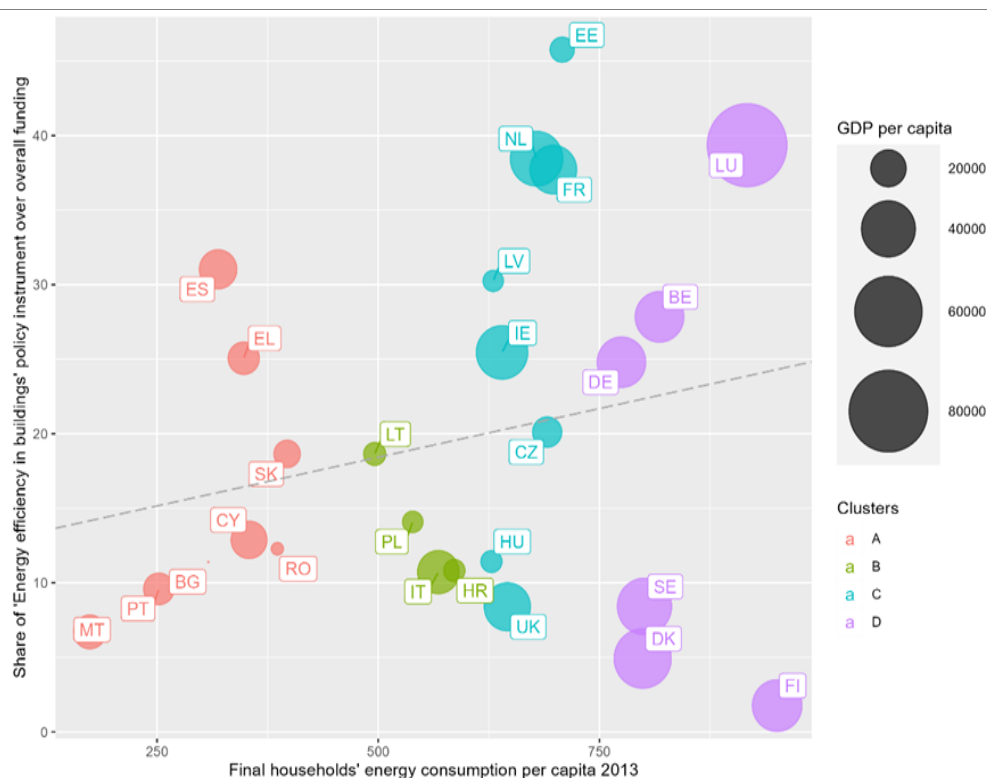
Amongst the identified indicators, the Eurostat indicator "Final energy consumption in households per capita" (NUTS0, 2013 and 2020) was considered the most suitable. This indicator is part of the EU Sustainable Development Goals indicator set and is embedded in the European Commission's Priorities under the 'European Green Deal'. Final energy consumption in households per capita measures how much electricity and heat every citizen consumes at home excluding energy used for transportation. Only energy used by end consumers is considered and excludes the consumption by the energy sector itself. However, the policy instrument buildings and public infrastructure has a broader scope, it covers energy: energy efficiency in housing, energy, energy efficiency in public buildings, energy efficiency

²⁸⁸ The year 2019 was selected over the year 2020 to disregard the COVID-19 pandemic disturbances in the manufacturing output.

in public lighting and energy efficiency in other public infrastructure. Therefore, the indicator only covers a narrow part of the wider scope of the policy instrument and is a poor fit.

The following diagram shows on the x-axis the final energy consumption per capita in households in 2013 and on the y-axis the share of funding allocated to the 'energy efficiency in public buildings' policy instrument out of total funding allocated to the 12 policy instruments. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters, which were identified using the k-means algorithm based on the final energy consumption per capita in households in 2013. Intuitively, the relationship between initial performance and the share of funding should be positive. A weak positive relationship emerges. However, the correlation analysis suggests no statistically significant relationship.

Figure 19 – Final energy consumption in households in KGOE per capita in 2013 and the share of 'Energy efficiency in buildings' policy instrument over the overall funding available



Source: Authors, based on Eurostat and WP2 Single Database Data.

According to Eurostat data, between 2013 and 2020 a mixed development across the European Union can be noticed. Countries with an initially high per capita consumption have achieved notable reductions (e.g., Belgium, Denmark, Germany, France, Luxemburg, Netherlands, Sweden), but also countries with a mid-level per capita consumption rate such as Czech Republic, Croatia or Slovenia, Latvia, while some have increased their per capita consumption while remaining below the average level (e.g., Bulgaria, Cyprus, Malta, Portugal). The correlation analysis did not identify any relationship between the relative change in final energy consumption per capita during the period 2013-2020 and allocated funding (per capita adjusted

by PPP)²⁸⁹ for the policy instrument ‘energy efficiency in buildings’. This could be due to several limitations concerning the data, especially with respect to the availability of indicators that could closely fit and represent the policy instrument’s objectives.

Green economy

It was difficult to find indicators at the European level for policy instrument “green economy”. Amongst the identified indicators, the Eurostat indicator “Employment in the environmental goods and services sector” (NUTS0, 2014 and 2019²⁹⁰) was considered the most suitable. The two other identified indicators (number of patents and Greentech clusters) provide a too broad focus for this policy instrument. Employment can be considered as a measure for market demand for low-carbon technologies and the size of the industry providing low-carbon technologies. More specifically, the indicator used is “Share of persons employed in CEPA1+CREMA13B (FTE) in total employment (persons) in %”. Where CEPA1 stands for “Protection of ambient air and climate” and CREMA13B stands for “Heat/energy saving and management”.

The exploratory statistical analysis test, whether more resources were allocated to where they were needed, showed no statistically significant relationship between the share of persons employed in CEPA1+CREMA13B in 2014 and the share of funding allocated to the policy instrument “green economy” over the overall funding, i.e., as the share in the country’s total allocated funding to the 12 instruments. The results are, thus, not reported. The analysis is, however, limited by the availability of indicator data with a precise fit for the policy instrument’s scope and the complex contexts that may be driving change.

According to Eurostat data, between 2014 and 2019 most countries showed a relative growth in the sub-sector of “protection of ambient air and climate and heat/energy saving and management” relative to the total employment. Some countries show rapid growth (for example, Bulgaria, Lithuania, Luxembourg). Only few countries show a relative decline compared to the employment development of the overall economy (Croatia, France, Romania). The exploratory analysis, to test whether the allocated funding to the policy instrument has contributed to a change in the selected indicator, provided no clear relationship. The analysis is significantly limited by the data availability for a suitable indicator with a precise fit for the policy instrument’s scope and the complex contexts that may be driving change.

Pollution reduction

The policy instrument pollution prevention is very broad covering several very different activities. No indicator was identified that covers the breadth of this policy instrument. Furthermore, environmental aspects of this policy instrument overlap

²⁸⁹ The absolute value of allocated funding per capita adjusted for PPP is used to better capture any potential absolute size-based investment effect on the indicator to best reflect the policy instrument. It is important to remind that the allocated funding does not reflect actual amount spent or overall investments conducted (e.g. private, other public sources).

²⁹⁰ The years 2014 was chosen due to limited data availability for the year 2013. 2019 was chosen to avoid the distortions caused in 2020 by the COVID-19 pandemic.

with other policy instruments, especially sustainable energy, green economy, clean transport. The actions within those policy instruments contribute to reducing emissions from combustion for energy production and mobility, or by energy use reductions. The selected indicator is the “Net greenhouse gas emission in tonnes per capita” (NUTS0, 2013 and 2019²⁹¹). It is used to monitor progress towards Goal 13 of the EU Sustainable Development Goals, which is embedded in the European Commission’s Priorities under the European Green Deal. However, this indicator provides a very poor fit for this policy instrument. The analysis is severely limited by the very poor fit with the policy instrument’s objectives.

Despite limitations due to the limited availability of indicator data with a precise fit for the policy instrument’s scope and the complex contexts that may be driving change (e.g. planning and construction periods, share and sources of investment funding from private and public sources), the question of relevance will be explored with statistical data by using a simple correlation analysis. The following diagram shows on the x-axis the net greenhouse gas emissions in tons per capita in 2013 and on the y-axis the share of funding allocated to the policy instrument’s out of the total funding allocated to the 12 PIs. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters, which were identified using the k-means algorithm based on the level of greenhouse gas emissions per capita in 2013. The pattern highlighted in the figure below suggests an overall positive relationship. This relationship indicates that countries with higher per capita emissions attributed to PI “pollution reduction” a higher relative priority. The pattern is confirmed with a correlation analysis. However, this relationship is not robust when excluding a group of countries (Estonia, Czech Republic, Germany and Belgium), and highlights the sensitivity of this analysis to individual or small groups of countries. To further test the hypothesis, an OLS regression analysis was conducted by including additional variables. The analysis confirmed a robust relationship between allocated funding priority and net greenhouse gas emissions in tons per capita in 2013.

²⁹¹ The year 2019 was chosen to avoid the distortions caused in 2020 by the Covid-pandemic.

Figure 20 – Net greenhouse gas emission in tons per capita in 2013 and the share of 'Pollution prevention' policy instrument over the overall funding available



Source: Authors, based on Eurostat and WP2 Single Database Data.

Table 13 - Correlation analysis between the “Net greenhouse gas emission in tonnes per capita in 2013” against the allocated funds expressed as a share of the overall funding allocated to the 12 policy instruments in %

Correlation test	Correlation coefficient		p-value
Pearson	0.46		0.05
Spearman	0.21		0.36

Source: Authors

The following OLS model fits were applied:

$$(1) \text{ Allocated Funding}_{PC} = \beta_0 + \beta_1 GHGpc_{2013} + \varepsilon$$

$$(2) \text{ Allocated Funding}_{PC} = \beta_0 + \beta_1 GHGpc_{2013} + \log GDPpc_{2013} + \varepsilon$$

The following table shows the results of the regression analysis. The coefficient for the level of greenhouse gas emissions at the beginning of the period ($GHGpc_{2013}$) is positive and significant in specification 2. It underscores the correlation analysis that countries attribute a higher priority to this policy instrument which have higher per capita GHG emissions.

Table 14 - Relevance analysis for Net greenhouse gas emission in tonnes per capita in 2013 considering the allocated funds expressed as a share of the overall funding allocated to the 12 policy instruments in %

	Model 1	Model 2
Intercept	-0.70	10.71
	(2.79)	(14.88)
GHGpc₂₀₁₃	0.63	0.69 *
	(0.31)	(0.32)
logGHGpc₂₀₁₃		-1.23
		(1.57)
R²	0.18	0.21

p < 0.001 ****; p < 0.01 ***; p < 0.05 **; p < 0.1 “.”

Then, the effectiveness question was explored, i.e. whether the allocated funding has contributed to a change in the selected indicator to reflect the performance status of the policy instrument. According to Eurostat data, across the European Union per capita net greenhouse gas emissions have declined between 2013 and 2019. In several eastern European countries per capita GHG emissions have, however, increased, notably in Bulgaria, Croatia, Latvia, Lithuania, Hungary, Romania, but also in Cyprus, Portugal. The conducted analysis is based on the change of the indicator of interest during the period 2013-2019 and related to total allocated funding amount. The absolute value of allocated funding per capita adjusted for PPP is used to better capture any potential absolute size-based investment effect on the indicator to best select reflect the policy instrument. The correlation analysis and more detailed regression analysis fail to establish a clear relationship between the change in the net greenhouse gas emissions in tonnes per capita between 2013 and 2019 and the allocated funding to the policy instrument ‘pollution prevention’.

Sustainable energy

The following Eurostat indicators were used for the analysis:

- Share of renewable energy sources in electricity in % (NUTS0, 2013 and 2020)
- Share of renewable energy sources in heating and cooling in % (NUTS0, 2013 and 2020)

Electricity from renewable sources

The following diagram shows on the x-axis the share of electricity from renewable sources in 2013 and on the y-axis the share of the policy instrument's allocated funding in total allocated funding is shown. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters, which were identified using the k-means algorithm based on the share of electricity from renewable sources in 2013. Countries with a higher level of renewable energy in their electricity are to the right.

Figure 21 – % of electricity from renewable sources in 2013 against the share of 'Sustainable energy' policy instrument over the overall funding available



Source: Authors, based on Eurostat and WP2 Single Database Data.

The following table shows the results of the correlation analysis between the “share of renewable energy sources in electricity (in %)” and the allocated funds expressed as a share of the overall funding allocated by the country to the 12 policy instruments. This correlation analysis is statistically significant suggesting a higher

allocated funding priority is attributed to the policy instrument sustainable energy in countries with a relatively lower share of renewable energy in electricity.

Table 15 - Correlation analysis between the “share of renewable energy sources in electricity in % in 2013 against the allocated funds expressed as a share of the overall funding allocated to the 12 policy instruments in %

Correlation test	Correlation coefficient	p-value
Pearson	-0.38	0.09
Spearman	-0.33	0.13

To further test the correlation and relevance hypothesis, that regions receive more funding which have a lower wastewater connection level, an OLS regression analysis was conducted by including additional variables. The following model fits were applied:

$$(1) \%Allocated\ Funding = \beta_0 + \beta_1 RenewableElectricity_{2013} + \varepsilon$$

$$(2) \%Allocated\ Funding = \beta_0 + \beta_1 RenewableElectricity_{2013} + \beta_2 \log GDPpc_{2013} + \varepsilon$$

The regression model confirms a robust relationship between allocated funding priority and low level of renewable energy in electricity.

Table 16 - Relevance analysis for share of renewable energy sources in electricity in % in 2013 and considering the allocated funds expressed as a share of the overall funding allocated to the 12 policy instruments

	Model 1	Model 2
Intercept	12.58 ***	-25.89
	(2.84)	(25.12)
RenewableElectricity₂₀₁₃	-0.16	-0.16
	(0.09)	(0.08)
log GDPpc₂₀₁₃		3.92
		(2.54)
R²	0.15	0.25
Adj. R²	0.10	0.16

p < 0.001 “***”, p < 0.01 “**”, p < 0.05 “*”, p < 0.1 “.”

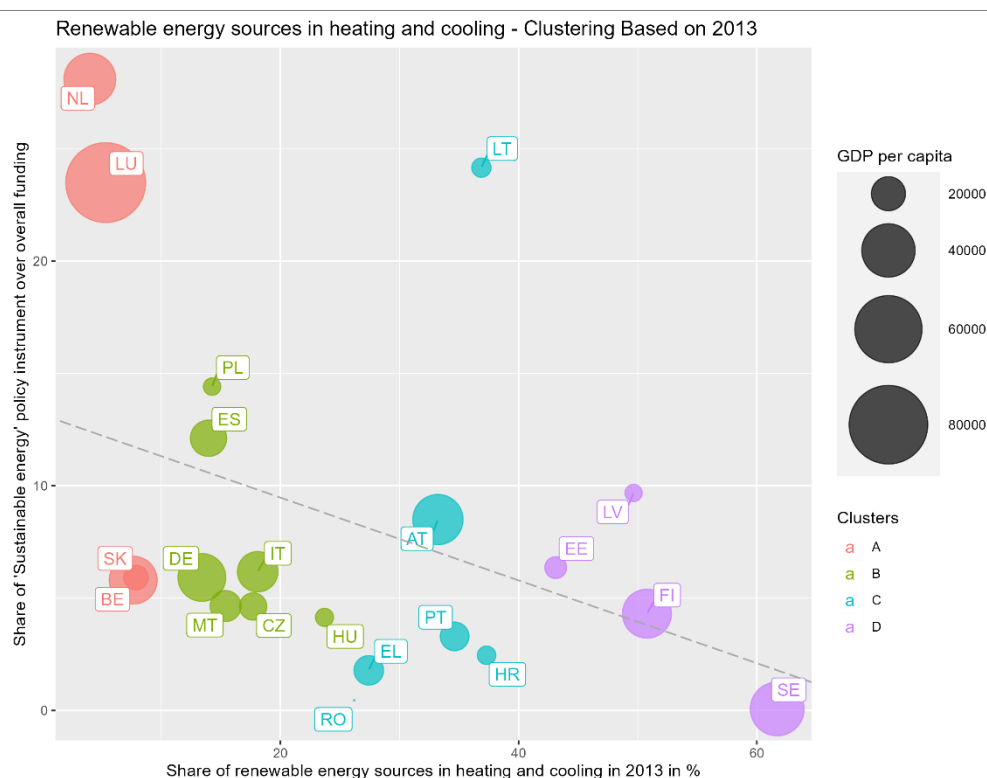
Heating and cooling from renewable sources

The following diagram shows on the x-axis the share of renewable energy in heating and cooling in 2013. On the y-axis the share of the policy instrument’s allocated funding in total allocated funding is shown for the data period. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters, which were identified using the k-means algorithm based on the share of renewable energy in heating and cooling in 2013. Countries with a higher level of renewable energy in heating and cooling are to the right. Intuitively, the relationship between initial

performance and the share of funding should be negative. Countries with a lower level of renewable energy require a higher investment and higher relative share in the country's total allocation, reflect a higher priority attributed by the country to this policy instrument. The figure below and the correlation analysis suggests such a negative relationship exists.

To further test the correlation and the hypothesis that countries that allocated a relatively higher share of their funding are those that have a lower share of renewable energy in their heating and cooling, an OLS regression analysis was conducted by including additional variables. A regression analysis allows to control for additional factors that may influence the response variable (Allocated Funding). One key variable is the socio-economic development status, which is most holistically represented by GDP per capita at the beginning of the period (2013).

Figure 22 – % of heating and cooling from renewable sources in 2013 and the share of 'Sustainable energy' policy instrument over the overall funding available



Source: Authors, based on Eurostat and WP2 Single Database Data.

Table 17 - Correlation analysis between the “share of renewable energy sources in heating and cooling in % in 2013” against the PI allocated funds (expressed as a share of the overall funding allocated to the 12 policy instruments)

Correlation test	Correlation coefficient	p-value
Pearson	-0.38	0.09
Spearman	-0.42	0.06

The following linear models were fitted:

$$(1) \%Allocated\ Funding = \beta_0 + \beta_1 RenewHeating\&\ Cooling_{2013} + \varepsilon$$

$$(2) \%Allocated\ Funding = \beta_0 + \beta_1 RenewHeating\&\ Cooling_{2013} + \beta_2 \log GDPpc_{2013} + \varepsilon$$

Table 18 - Regression analysis for share of renewable energy sources in heating and cooling in % in 2013 considering the allocated funds expressed as a share of the overall funding allocated to the 12 policy instruments

	Model 3	Model 4
Intercept	13.15 ***	-15.43
	(3.09)	(27.04)
RenewHeating&Cooling₂₀₁₃	-0.18	-0.16
	(0.10)	(0.10)
log GDPpc₂₀₁₃		2.84
		(2.67)
R²	0.15	0.20
Adj. R²	0.10	0.11
N	21	21

p < 0.001 ****; p < 0.01 ***; p < 0.05 **; p < 0.1 .

According to Eurostat data, between 2013 and 2020, a rapid advancement of the use of renewable energy in electricity and heating and cooling across Europe has taken place. However, no significant relationship was found between the change in the shares of renewable energy between 2013 and 2020 and the allocated funding to the policy instrument ‘sustainable energy’.

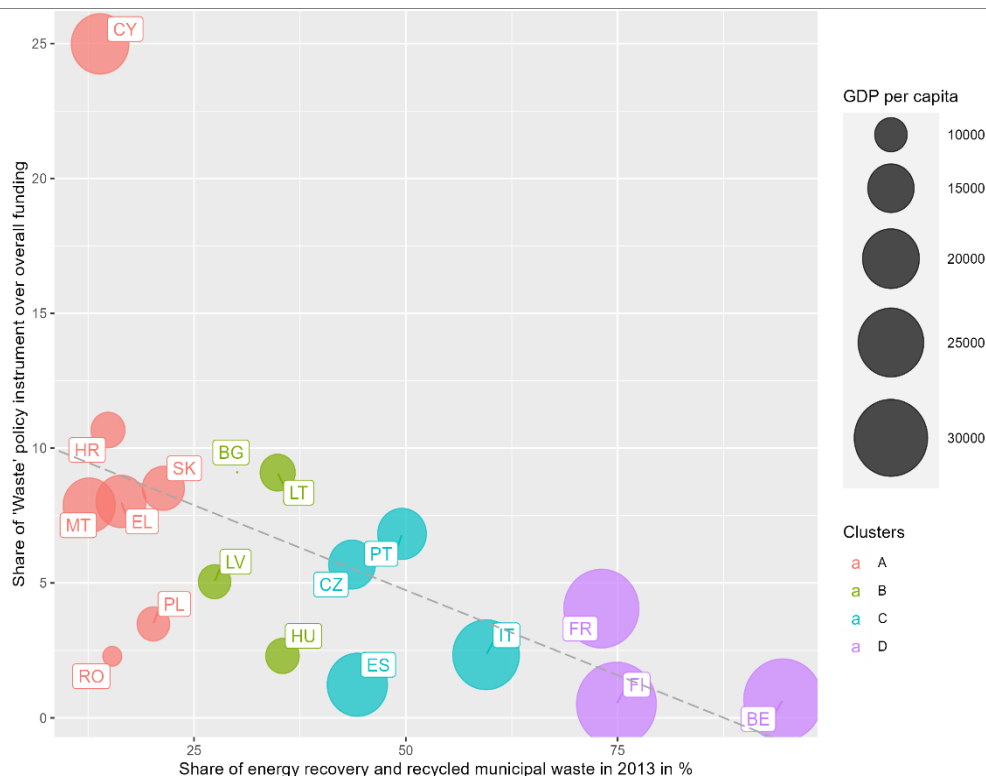
Waste

“Share of municipal waste energy recovered and recycled as % in municipal waste generated (per capita)” (NUTS0, 2014 and 2020) was selected as the most suitable indicator for the PI. Municipal waste is mainly produced by households, similar wastes from sources such as commerce, offices and public institutions are included. The share of municipal waste treated was derived by taking the ratio of waste treated by energy recovery and recycling to total municipal waste generated. It is important to note that this data does not discount sorting and recycling losses.

The following diagram shows on the x-axis the share of waste being energy recovered or recycled in 2013 and on the y-axis the share of funding allocated to the ‘waste’ policy instrument out of the total allocated funding to the 12 PIs. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters, which were identified using the k-means algorithm. Countries with a higher share of energy recovery or recycling of generated municipal waste are to the right. The distribution shown in the following graph reflects the expectation, that countries with a lower share of energy recovery or recycling of municipal waste attributed a higher relative priority to the ‘Waste’ policy instrument. The negative relationship shown in the figure below is confirmed with a correlation analysis once the outlier Cyprus is excluded. To further test the hypothesis, an OLS regression analysis was conducted by including additional control variables. The analysis suggests that GDP per capita

increases the importance of the level of connection but is significant only when excluding Bulgaria and Malta.

Figure 23 – % share of energy recovered and recycled municipal waste in 2013 against the share of ‘Waste’ policy instrument over the overall funding available



Source: Authors, based on Eurostat and WP2 Single Database Data.

Table 19 - Correlation analysis between the “share of energy recovery and recycling of municipal waste” in 2014 against the allocated funds expressed as a share of the overall funding allocated to the 12 policy instruments in %

Correlation test	Correlation coefficient	p-value
Pearson (all observations)	-0.54	0.02 *
Pearson (excluding Cyprus)	-0.61	0.01 **
Spearman (all observations)	-0.62	0.01 **

Source: Authors

The following linear models were fitted:

$$(1) \%Allocated\ Funding_{PC} = \beta_0 + \beta_1 ShareRecycling_{2013} + \varepsilon$$

$$(2) \%Allocated\ Funding_{PC} = \beta_0 + \beta_1 ShareRecycling_{2013} + \beta_3 \log GDPpc_{2013} + \beta_3 UrbanShare_{2013} + \beta_5 PopDensity_{2013} + \varepsilon$$

The regression model results are presented in the table below. The effect of the chosen indicator ($ShareRecycling_{2013}$) is negative and significant. Furthermore, its coefficient grows stronger once additional variables have been accounted for.

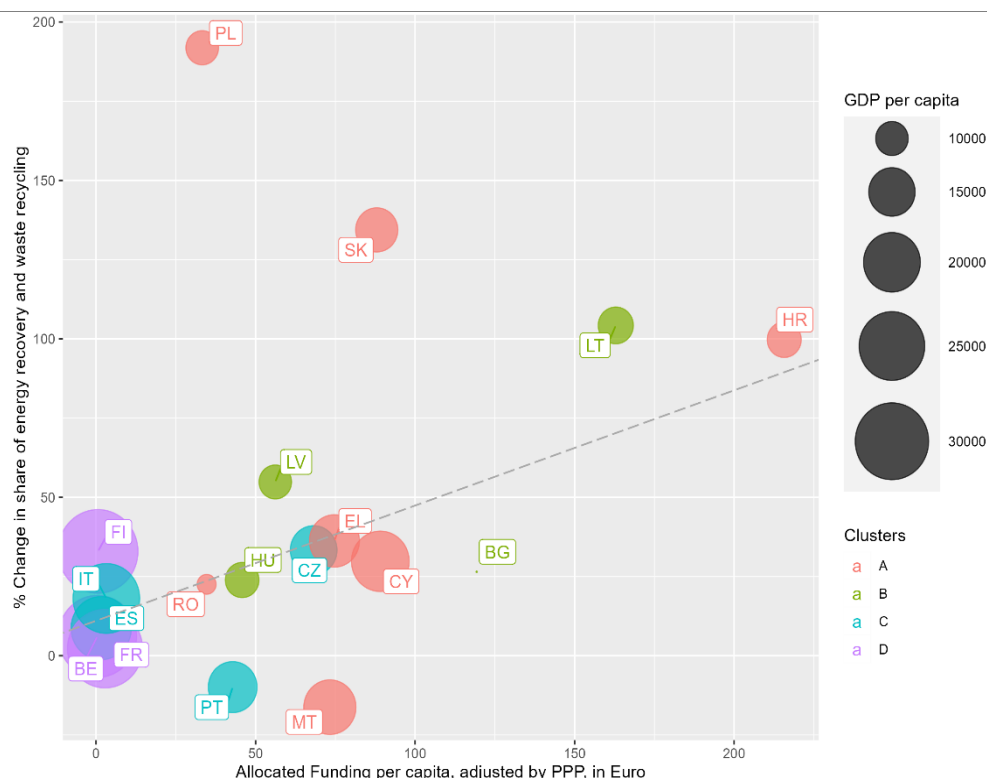
Table 20 - Regression analysis

	Model 1	Model 2
Intercept	11.04 ***	-15.88
	(2.21)	(30.91)
ShareRecycling₂₀₁₃	-0.13 *	-0.25 **
	(0.05)	(0.07)
log GDPpc₂₀₁₃		3.95
		(3.25)
UrbanShare₂₀₁₃		-0.18
		(0.11)
PopDensity₂₀₁₃		0.00
		(0.01)
R²	0.29	0.51
Adj. R²	0.24	0.35
N	18	18

p < 0.001 "****"; p < 0.01 "***"; p < 0.05 "**"; p < 0.1 "."

Then, the effectiveness question was explored, i.e. whether the allocated funding has contributed to a change in the selected indicator to reflect the performance status of the policy instrument. According to Eurostat data, between 2013 and 2020, significant progress has been made across Europe in shifting municipal waste away from landfilling and incineration to recycling and energy recovery treatment plants. This is particularly pronounced in eastern Europe (for example, Bulgaria, Czechia, Poland, Slovenia, Slovakia), but also in Belgium, Luxembourg, or Germany. The following diagram shows the allocated funding per capita (adjusted by PPP) on the x-axis and the change in the share of energy recovered or recycled municipal waste on the y-axis. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters. Confronting the growth in the share of municipal waste energy recovered or recycling against the allocated funding per capita adjusted suggests a positive relationship, which is confirmed by the correlation analysis with a weak level of significance. This weak level of significance ($p \approx 0.1$) remained in the regression analysis, which controlled for additional variables, such as GDP per capita.

Figure 24 – % change in share of municipal waste energy recovered and recycled between 2013 and 2020 against allocated funding per capita PPP in EUR for the policy instrument ‘waste’



Source: Authors, based on Eurostat and WP2 Single Database Data.

Table 21 - Correlation analysis between allocated funding per capita adjusted by PPP in EUR and % change of the share of energy recovery and recycling of municipal waste between 2014 and 2020

Correlation test	Correlation coefficient	p-value
Pearson	0.39	0.1
Spearman	0.47	0.05 *

Source: Authors

Exploring the relationship between the growth in the share of share of energy recovery and recycling of municipal waste including other control factors, the following model fits were applied:

$$(3) \Delta \text{ShareRecycling}_{2013-2020} = \beta_0 + \beta_1 PI + \varepsilon$$

$$(4) \Delta \text{ShareRecycling}_{2013-2020} = \beta_0 + \beta_1 PI + \beta_2 \log GDPpc_{2013} + \beta_3 \Delta GDPpc_{2013-2020} + \varepsilon$$

The results reported below barely fail to confirm the effectiveness hypothesis, although it must be noted that in Model 5 the coefficient for allocated funding is just short of the 10% significance level ($p\text{-value} = 0.105$).

Table 22 - Regression analysis

	Model 3	Model 4
Intercept	21.93	-126.14
	(17.82)	(410.52)
PI	0.36	0.26
	(0.21)	(0.25)
log GDPpc₂₀₁₃		13.06
		(41.05)
ΔGDPpc_{2013–2020}		2.17
		(1.70)
R²	0.16	0.40
Adj. R²	0.10	0.14
N	18	18

p < 0.001 “****”; p < 0.01 “***”; p < 0.05 “**”; p < 0.1 “.”

Wastewater

Amongst the indicators identified as potentially relevant for the PI, the “Population connected to wastewater treatment plants” was considered the most suitable. The two other identified indicators (generation of wastewater and employment in the sewage sector) provide no insight into the coverage of wastewater treatment or only provide a less accurate characterisation on the scale, extent and technological advancement of wastewater treatment. From the available indicators, thus, “Population connected to wastewater treatment plants” was selected as a measure for the level of advancement in the construction or upgrading of wastewater treatment plants and sewerage networks. Specifically, the following variables were used for the analysis:²⁹²

- Percentage of population connected to wastewater treatment (NUTS0, 2013 and 2020).
- Percentage of population connected to urban and other wastewater treatment plants - tertiary treatment (NUTS0, 2013 and 2019). The year 2019 was selected, as opposed to 2020, as more observations were available. Remaining data gaps were filled with data from adjacent years where available.

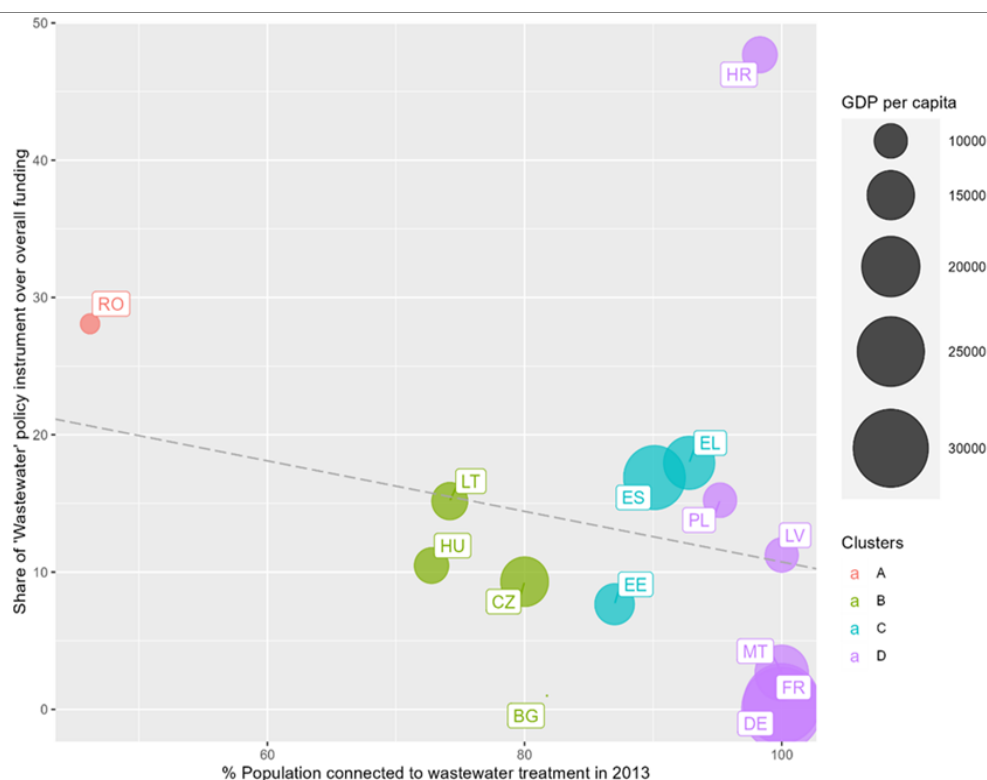
Population connected to wastewater treatment

The following diagram shows on the x-axis the share of the population that is connected to wastewater treatment plants in 2013 and on the y-axis the share of the funding allocated to policy instrument’s out of the total funding allocated to the 12

²⁹² The data was downloaded from Eurostat in November 2022.

PIs. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters, which were identified using the k-means algorithm based on the share of population connected to wastewater treatment in 2013. Countries with a higher level of connection to wastewater treatment facilities are to the right, i.e., those countries with the highest connection. Towards the left-hand side, the level of connection is lower. Intuitively, the relationship between initial performance and the share of funding should be negative. Countries with a lower level of connection require a higher investment, should, thus, have a higher absolute allocation and higher relative share in the country's total allocation. The latter would reflect a higher priority attributed by the country to this policy instrument. The figure below suggests such a relationship. Romania stands out with a low level of connection and high priority in the allocated funding to this policy instrument. In contrast, countries with a high level of connection have a lower share and priority attribution of allocated funding to this policy instrument. Croatia stands out as an outlier. A group of countries with a high to medium level of connection to wastewater treatment shows some variance with regards to the attributed allocated funding priority to this policy instrument. This may be a result of the limitations of the available data. The negative relationship shown in the figure below is confirmed with a correlation analysis once the outlier Croatia is excluded. To further test the hypothesis, an OLS regression analysis was conducted by including additional variables. The analysis suggests that the share of population connected to wastewater is likely dependent upon the socio-economic development status of the country, which in turn informs the priority of allocated funding the country attributed to this policy instrument.

Figure 25 – % of population connected to wastewater treatment plants in 2013 and the share of 'wastewater' policy instrument over the overall funding available



Source: Authors, based on Eurostat and WP2 Single Database Data.

Table 23 - Correlation analysis between the “connection of wastewater treatment in 2013” against the funds allocated to the PI (expressed as a share of the overall funding allocated to the 12 policy instruments)

Correlation test	Correlation coefficient	p-value
Pearson (all observations)	-0.22	0.44
Pearson (excluding Croatia)	-0.63	0.02

Source: Authors

The following OLS model fits were applied:

- (1) $\%Allocated\ Funding = \beta_0 + \beta_1 \%Connection_{2013} + \varepsilon$
- (2) $\%Allocated\ Funding = \beta_0 + \beta_1 \%Connection_{2013} + \beta_2 \log(GDPpc_{2013}) + \varepsilon$
- (3) $\%Allocated\ Funding = \beta_0 + \beta_1 \%Connection_{2013} + \varepsilon$ [Model excludes Croatia]
- (4) $\%Allocated\ Funding = \beta_0 + \beta_1 \%Connection_{2013} + \beta_2 \log(GDPpc_{2013}) + \varepsilon$ [Model excludes Croatia]

Table 24 - Relevance analysis for connection of wastewater treatment in 2013 considering the allocated funds expressed as a share of the overall funding

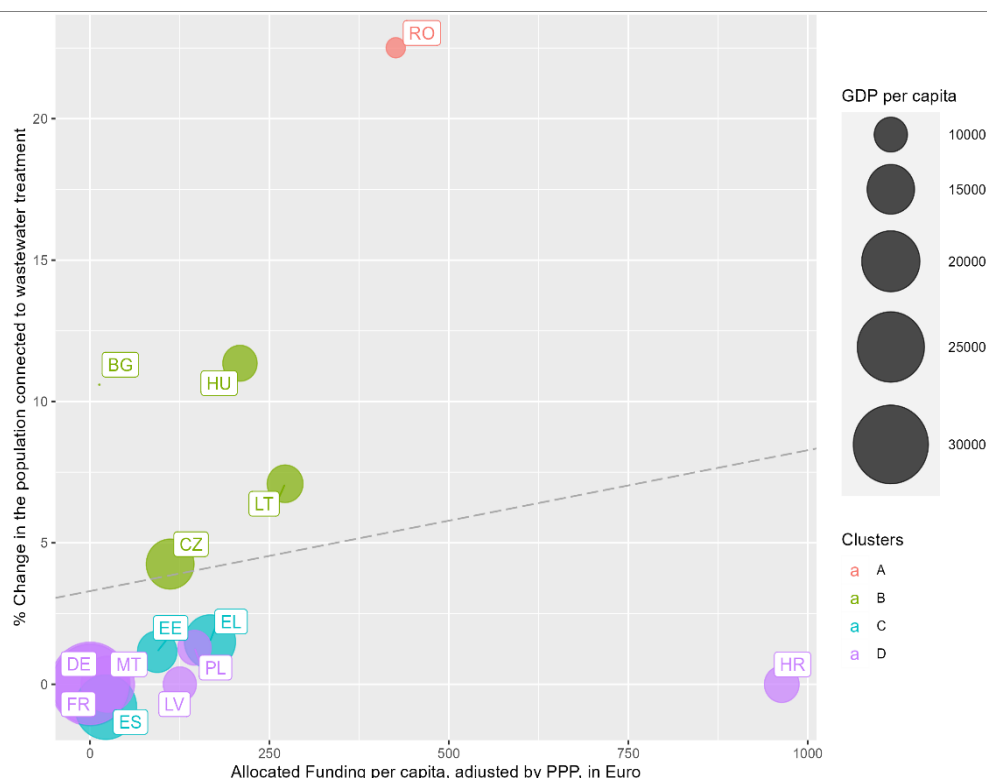
	Model 1	Model 2	Model 3	Model 4
Intercept	29.14	90.60	39.61 **	41.19
	(20.75)	(68.24)	(10.89)	(38.04)
%Connection₂₀₁₃	-0.18	-0.03	-0.34 *	-0.33
	(0.24)	(0.28)	(0.12)	(0.16)
log GDPpc₂₀₁₃		-7.85		-0.21
		(8.30)		(4.71)
R²	0.05	0.12	0.40	0.40
Adj. R²	-0.03	-0.04	0.35	0.28
N	14	14	13	13

p < 0.001 “****”; p < 0.01 “***”; p < 0.05 “**”; p < 0.1 “.”

Then, the effectiveness question is explored i.e. whether the allocated funding has contributed to a change in the selected indicator to reflect the performance status of the policy instrument. According to Eurostat data, between 2013 and 2020 several countries, especially Romania, Hungary, and Bulgaria, show remarkable progress in terms of population connection to wastewater treatment facilities. The following diagram shows the allocated funding per capita (adjusted by PPP) on the x-axis and the change in the level of connection to wastewater treatment infrastructure on the y-axis. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters. Romania stands out by the large increase in the share of the population connected to wastewater treatment between 2013 and 2020, while also having a high allocated funding per capita. Excluding Croatia, the following diagram suggests, that countries have increased the share of the population connected to wastewater treatment facilities especially there where the wastewater policy

instrument allocated funding is higher. This is especially the case for Romania, but also possibly in Bulgaria, Hungary, Czech Republic, and Lithuania. The correlation analysis reported suggests a statistically significant relationship between the percentage change in population connected to wastewater treatment between 2013 and 2020 and the allocated funding for the 'wastewater' policy instrument.

Figure 26 – % change in population connected to wastewater treatment between 2013 and 2020 against the allocated funding per capita adjusted by PPP in EUR for the 'wastewater' policy instrument.



Source: Authors, based on Eurostat and WP2 Single Database Data.

Table 25 - Correlation between allocated funding per capita adjusted by PPP in EUR and % change in share of population connected to wastewater treatment between 2013 and 2019

Correlation test	Correlation coefficient	p-value
Pearson (all observations)	0.14	0.66
Pearson (excluding Croatia)	0.72	0.01 **

Source: Authors

Exploring the relationship between the growth in the share of population connected to wastewater treatment including other control factors, the following model fits were applied:

$$(1) \Delta \text{Connection}_{2013-2020} = \beta_0 + \beta_1 PI + \varepsilon$$

$$(2) \Delta \text{Connection}_{2013-2020} = \beta_0 + \beta_1 PI + \beta_2 \log(GDPpc_{2013}) + \beta_3 \Delta GDPpc_{2013-2020} + \varepsilon$$

$$(3) \Delta \text{Connection}_{2013-2020} = \beta_0 + \beta_1 PI + \varepsilon \text{ (excluding HR)}$$

$$(4) \Delta \text{Connection}_{2013-2020} = \beta_0 + \beta_1 PI + \beta_2 \log(GDPpc_{2013}) + \beta_3 \Delta GDPpc_{2013-2020} + \varepsilon \text{ (excluding HR)}$$

Table 26 - Effectiveness regressions analysis considering the change in the share of the population connected to wastewater treatment plans between 2013 and 2020

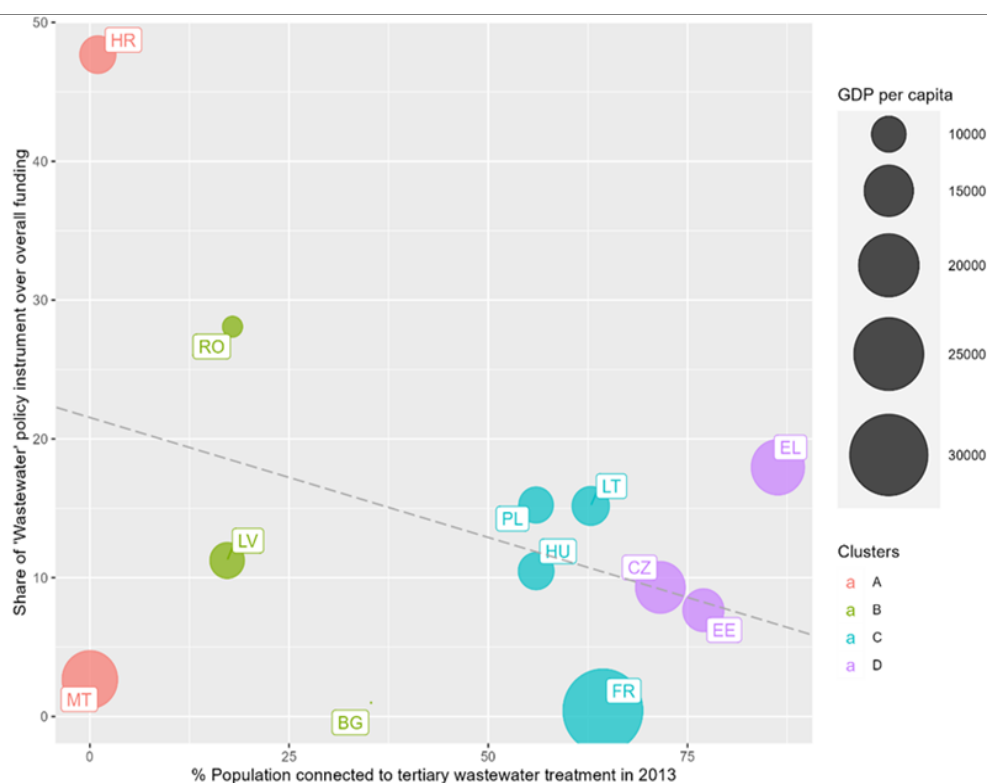
	Model 1	Model 2	Model 3	Model 4
Intercept	3.28	60.67	-0.60	65.72
	(2.26)	(57.58)	(1.84)	(38.74)
PI	-0.00	-0.00	0.04 **	0.03 *
	(0.01)	(0.01)	(0.01)	(0.01)
log GDPpc₂₀₁₃		-6.13		-6.64 *
		(5.05)		(3.83)
ΔGDPpc_{2013–2020}		0.12		-0.14
		(0.21)		(0.18)
R²	0.04	0.43	0.58	0.69
Adj. R²	-0.07	0.24	-0.07	0.63
N	13	13	12	12

p < 0.001 ****; p < 0.01 ***; p < 0.05 **; p < 0.1 *.

Population connected to tertiary wastewater treatment

The following diagram shows on the x-axis the share of the population connected to tertiary wastewater treatment plants in 2013 and on the y-axis the share of the policy instrument's allocated funding in total allocated funding. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters. Countries with a larger share of their population connected to tertiary wastewater treatment facilities are found on the right side of Figure. Available data suggest Malta has no tertiary wastewater treatment infrastructure and only a small share of their allocated funds devoted to this policy instrument. The position of Croatia also stands out as an outlier. Noteworthy is that both Croatia and Malta have a large share of their population connected to wastewater treatment, but different allocated funds devoted to this policy instrument. For this reason, Malta was excluded as an outlier from the analysis. The correlation test confirms a negative relationship. When Malta is excluded, the regression analysis suggests that the level of tertiary wastewater connection is a factor for the allocated funding priority given to this policy instrument for the country, not accounting for other possibly relevant factors.

Figure 27 – % of population connected to tertiary wastewater in 2013 and the share of 'wastewater' policy instrument over the overall funding available in %



Source: Authors, based on Eurostat and WP2 Single Database

Table 27 - Correlation analysis between the “connection of tertiary wastewater treatment in 2013” against the funding allocated to the PI (expressed as a share of the overall funding allocated to the 12 policy instruments)

Correlation test	Correlation coefficient	p-value
Pearson (all observations)	-0.41	0.12
Pearson (excluding Malta)	-0.61	0.02 *

Source: Authors

The following linear models were fitted:

- (1) $\%Allocated\ Funding = \beta_0 + \beta_1\%TertiaryConnection_{2013} + \varepsilon$
- (2) $\%Allocated\ Funding = \beta_0 + \beta_1\%TertiaryConnection_{2013} + \beta_2 \log(GDPpc_{2013}) + \varepsilon$
- (3) $\%Allocated\ Funding = \beta_0 + \beta_1\%TertiaryConnection_{2013} + \varepsilon$ [Model excludes Malta]
- (4) $\%Allocated\ Funding = \beta_0 + \beta_1\%TertiaryConnection_{2013} + \beta_2 \log(GDPpc_{2013}) + \varepsilon$ [Model excludes Malta]

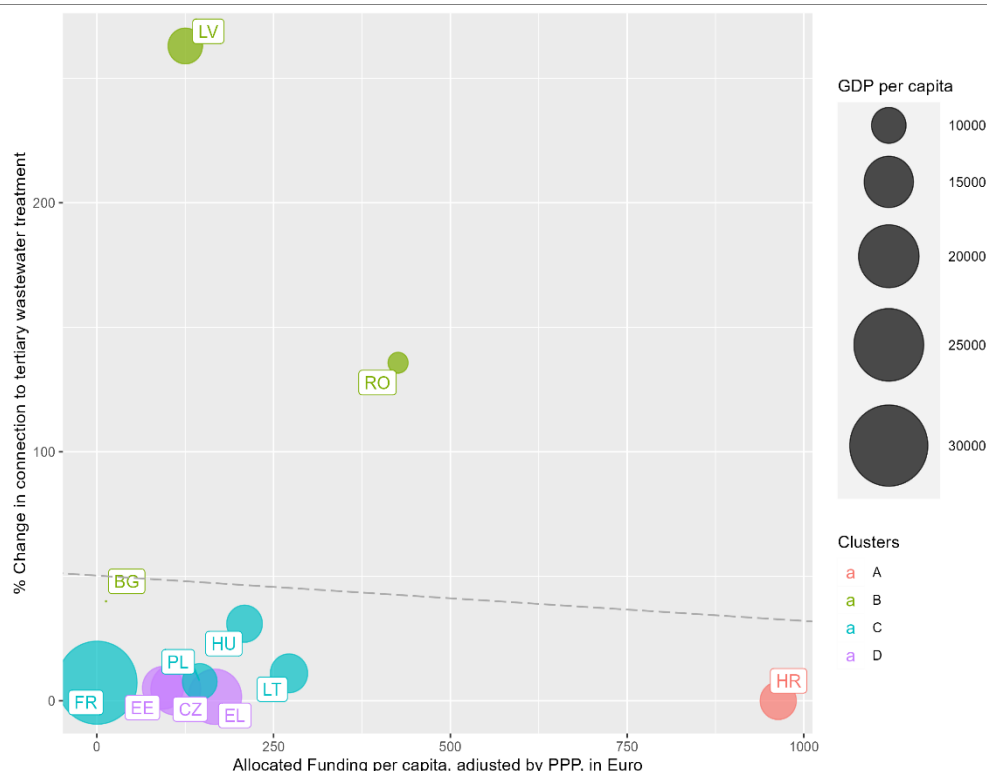
Table 28 - Regression analysis for connection of tertiary wastewater treatment in 2013 considering the funds allocated to the PI (expressed as a share of the overall funding allocated to the 12 policy instruments)

	Model 1	Model 2	Model 3	Model 4
Intercept	21.54 **	61.99	28.21 ***	24.82
	(5.91)	(60.22)	(6.08)	(57.83)
%TertiaryConnection ₂₀₁₃	-0.17	-0.14	-0.27 *	-0.28
	(0.10)	(0.12)	(0.10)	(0.13)
log GDPpc ₂₀₁₃		-4.41		0.38
		(6.53)		(6.42)
R ²	0.17	0.20	0.24	0.27
Adj. R ²	0.11	0.07	0.18	0.13
N	15	15	14	14

p < 0.001 "****"; p < 0.01 "***"; p < 0.05 "**"; p < 0.1 "."

Then, the effectiveness question is explored i.e. whether the allocated funding has contributed to a change in the selected indicator to reflect the performance status of the policy instrument. According to Eurostat data, between 2013 and 2020 several countries, especially Romania, Hungary, and Bulgaria, show remarkable progress in terms of population connection to wastewater treatment facilities. These countries have made also progress by advancing the connection to tertiary treatment plants. Latvia and Slovenia have also made progress in improving connection to technologically advanced tertiary treatment facilities. In the figure below the percentage change in the share of population connected to tertiary wastewater treatment plants (y-axis) is plotted against the allocated funding in per capita adjusted by PPP (x-axis). The size of the bubbles and the colour coding take on the same meaning as they had in the previous diagram. The diagram presents an unclear pattern, and no statistically significant correlation exists.

Figure 28 – % change in population connected to tertiary wastewater treatment between 2013 and 2020 against the allocated funding per capita adjusted by PPP in EUR for the 'wastewater' policy instrument in EUR



Source: Authors, based on Eurostat and WP2 Single.

Water

Available datasets were examined for their suitability to provide information on increased water resource efficiency and improved water quality. Only few indicators could be identified at the European level. Selected available indicators are thus:

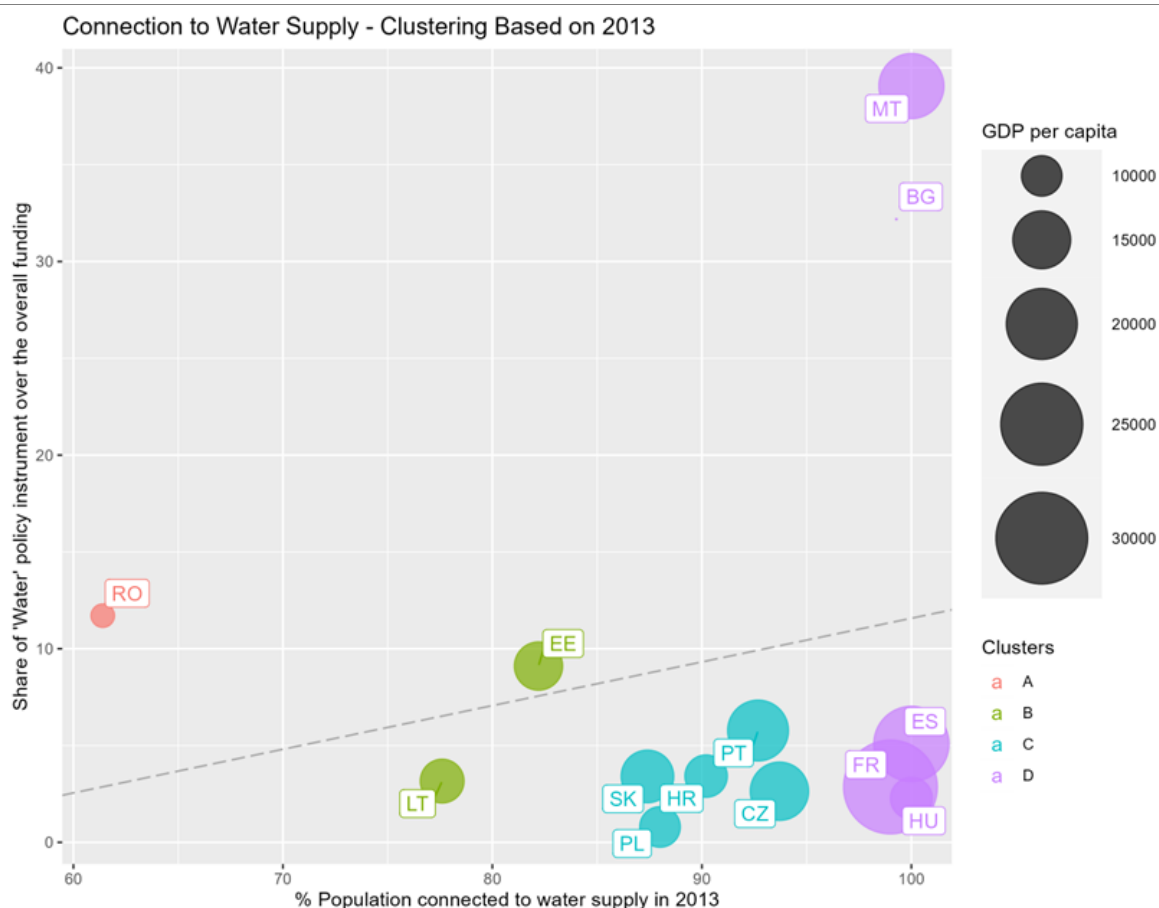
- Population connected to public water supply (NUTS0, 2014 and 2019)
- Water exploitation index, plus (WEI+)
- Surface water bodies: Ecological status or potential (NUTS0, RMBP1 and RMBP1)

Population connected to water supply

The figure below shows on the x-axis the share of population connected to water supply in 2013. On the y-axis the share of the policy instrument's allocated funding in total allocated funding is shown. The colour coding represents a grouping of the countries into clusters, which were identified using the k-means algorithm based on the share of population connected to water supply in 2013. Intuitively, the relationship between the share of connection to water supply and the share of funding should be negative. Instead, a weak positive relationship emerges in the figure below. The correlation analysis, on the other hand, suggests a negative relationship once the outliers Bulgaria and Malta are excluded from the analysis. To further test the hypothesis, an OLS regression analysis was conducted by including additional variables. The analysis suggests that GDP per capita increases the

importance of the level of connection, but the relationship is statistically significant only once Bulgaria and Malta are excluded from the analysis.

Figure 29 – % of population connected to water supply in 2013 and the share of ‘Water’ policy instrument over the overall funding available



Source: Authors, based on Eurostat and WP2 Single Database Data.

Table 29 - Correlation analysis between the “Population connection of water supply in 2014” against the funds allocated to the PI (expressed as a share of the overall funding allocated to the 12 policy instruments)

Correlation test	Correlation coefficient	p-value
Pearson (all observations)	0.21	0.49
Spearman (all observations)	0.02	0.94
Pearson (excluding Malta and Bulgaria)	-0.67	0.02 *

Source: Authors

The following linear models were fitted:

$$(1) \%Allocated\ Funding_{PC} = \beta_0 + \beta_1 WaterSupply_{2013} + \varepsilon$$

$$(2) \%Allocated\ Funding_{PC} = \beta_0 + \beta_1 \log(WaterSupply_{2013}) + \beta_2 \log(GDPpc_{2013}) + \varepsilon$$

$$(3) \%Allocated\ Funding_{PC} = \beta_0 + \beta_1 \log(WaterSupply_{2013}) + \varepsilon \text{ (Excluding Bulgaria and Malta)}$$

$$(4) \%Allocated\ Funding_{PC} = \beta_0 + \beta_1 \log(WaterSupply_{2013}) + \beta_2 \log(GDPpc_{2013}) + \varepsilon \text{ (Excluding Bulgaria and Malta)}$$

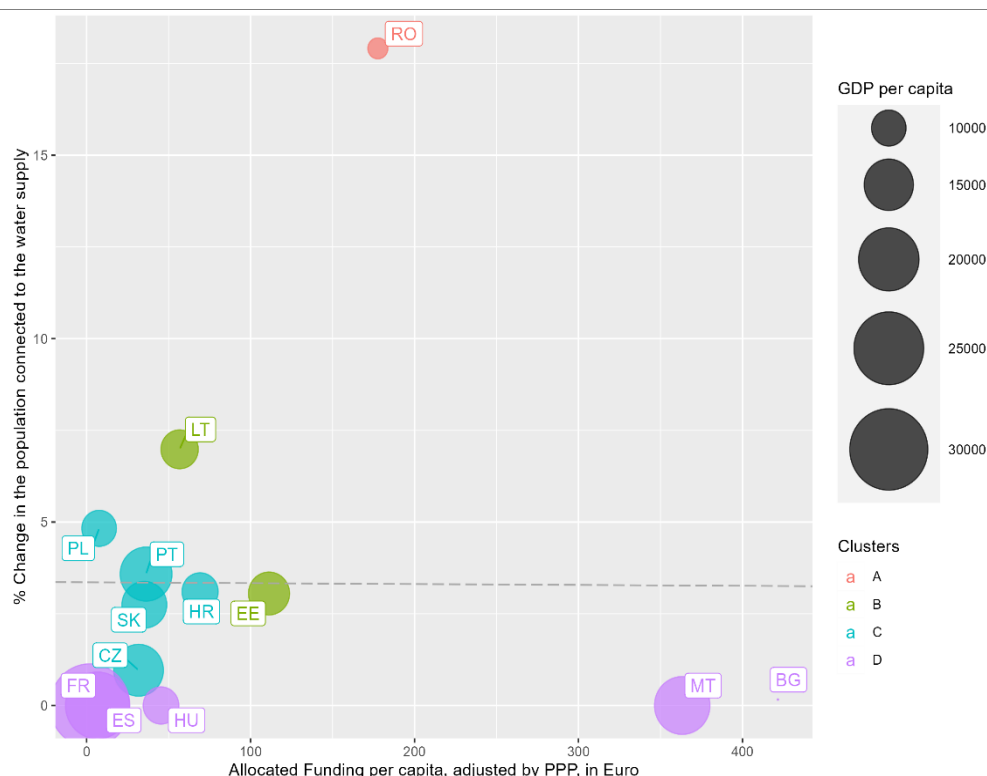
Table 30 - Relevance analysis for population connected to water supply in 2014 considering the allocated funds expressed as a share of the overall funding allocated to the 12 policy instruments (Model 4 and Model 5 exclude Bulgaria and Malta)

	Model 1	Model 2	Model 3	Model 4
Intercept	-59.95	-32.55	75.08 *	74.05 *
	(116.26)	(115.68)	(24.17)	(24.12)
WaterSupply₂₀₁₃	15.42	31.48	-15.76 *	-21.19 *
	(25.87)	(28.40)	(5.40)	(7.55)
log GDPpc₂₀₁₃		-10.54		2.67
		(8.52)		(2.60)
R²	0.03	0.16	0.49	0.55
Adj. R²	-0.06	-0.01	0.43	0.43
N	13	13	11	11

p < 0.001 "****"; p < 0.01 "***"; p < 0.05 "**"; p < 0.1 "."

Then, the effectiveness question is explored i.e. whether the allocated funding has contributed to a change in the selected indicator to reflect the performance status of the policy instrument. According to Eurostat data, the level of the population connected to water supply across the European Union has improved from 2013 to 2020, especially in Eastern Europe (Romania, Lithuania, Poland, Estonia, Croatia, Slovakia) but also in Portugal. The following diagram shows the allocated funding per capita (adjusted by PPP) on the x-axis and the change in the level of connection to water supply on the y-axis. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters. The diagram suggests a positive relationship. The largest growth in the connection of the population to water supply between 2013 and 2020 is observed in Romania and Lithuania. Bulgaria and Malta appear as outliers. Excluding the outliers, Bulgaria and Malta, the correlation analysis shows a statistically significant correlation. The higher the allocated funding the larger the change in the share of population connected to water supply. When excluding Bulgaria and Malta, allocated funding is significant even when controlling for GDP per capita and GDP growth.

Figure 30 –% change in population connected to water supply between 2013 and 2020 against the allocated funding per capita adjusted by PPP in EUR for the policy instrument ‘water’



Source: Authors, based on Eurostat and WP2 Single Database Data.

Table 31 - Correlation analysis between allocated funding per capita adjusted by PPP in EUR and % change in share of population connected to water treatment between 2014 and 2020

Correlation test	Correlation coefficient	p-value
Pearson (all observations)	-0.007	0.98
Pearson (excluding Bulgaria and Malta)	0.80	0.002 **

Source: Authors

The following OLS model fits were applied:

$$(1) \Delta\% \text{ Water Supply}_{2013-20} = \beta_o + \beta_1 PI + \varepsilon$$

$$(2) \Delta\% \text{ Water Supply}_{2013-20} = \beta_o + \beta_1 PI + \beta_2 \log(GDPpc_{2013}) + \beta_3 \Delta GDPpc_{2013-2020} + \varepsilon$$

$$(3) \Delta\% \text{ Water Supply}_{2013-20} = \beta_o + \beta_1 PI + \varepsilon \text{ (excluding Bulgaria and Malta)}$$

$$(4) \Delta\% \text{ Water Supply}_{2013-20} = \beta_o + \beta_1 PI + \beta_2 \log(GDPpc_{2013}) + \beta_3 \Delta GDPpc_{2013-2020} + \varepsilon \text{ (excluding Bulgaria and Malta)}$$

Table 32 - Effectiveness regressions analysis

	Model 1	Model 2	Model 3	Model 4
Intercept	3.28	60.67	-0.60	65.72
	(2.26)	(57.58)	(1.84)	(38.74)
PI	-0.00	-0.00	0.04 **	0.03 *
	(0.01)	(0.01)	(0.01)	(0.01)
log GDPpc ₂₀₁₃		-6.13		-6.64 *
		(5.05)		(3.83)
ΔGDPpc _{2013–2020}		0.12		-0.14
		(0.21)		(0.18)
R ²	0.04	0.43	0.58	0.69
Adj. R ²	-0.07	0.24	-0.07	0.63
N	13	13	12	12

p < 0.001 “***”; p < 0.01 “**”; p < 0.05 “*”; p < 0.1 “.”

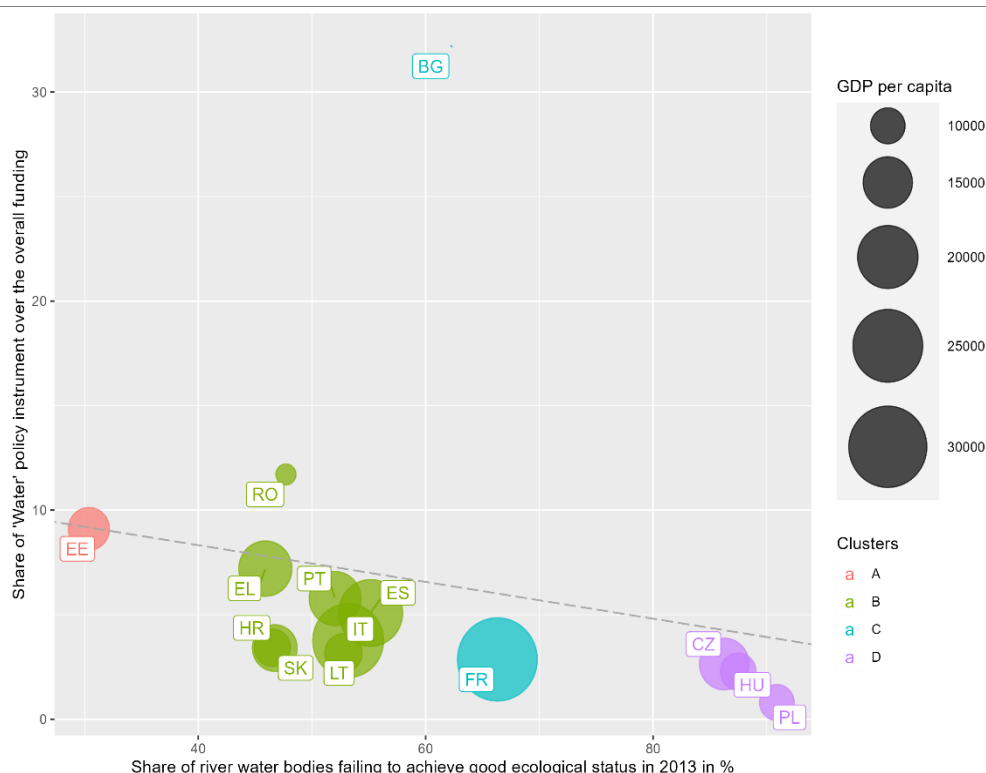
Water Exploitation Index

The correlation analysis shows no statistically significant relationship between the Water Exploitation Index in 2013 and the share of 'water' policy instrument over the overall funding and the absolute allocated funding to the water policy instrument. The results are thus not reported.

Ecological Status of Surface Water Bodies

The following figure shows the share of rivers by length failing to achieve good ecological status, as identified in the first River Basis Management Plans, on the x-axis. This is contrasted against the share of Allocated Funding for water in total allocated funding on the y-axis. The following figure and the correlation analysis suggest a statistically significant negative relation. Bulgaria is treated as an outlier. The higher the share of poorer ecological status of rivers, the lower the attributed priority of the allocated funding to water in 2013. In other words, the regression results are counterintuitive, and they are likely the expression of a poor variable choice given that the ecological status of water bodies is a holistic measure of the environmental condition of regions, which are particularly under pressure where urban-industrial centres are located. The results provide correspondingly little explanatory meaning for whether the funding of this policy FoI is directed to the relevant regions of Europe, or it may indicate that insufficient attention is attributed to this policy instrument vis-à-vis the state of Europe's rivers.

Figure 31 –Share of river water bodies failing to achieve good ecological status according to RBMP1 in % against the funding allocated to the ‘Water’ policy instrument (as a share over the overall funding to the 12 PIs)



Source: Authors, based on EEA, [RBMP1] and WP2 Single Database Data.

Table 33 - Correlation analysis between the “RBMP1 ecological status of water bodies” against the allocated funds expressed as a share of the overall funding allocated to the 12 policy instruments in %

Correlation test	Correlation coefficient	p-value
Pearson (all observations)	-0.19	0.49
Pearson (excluding Bulgaria)	-0.68	0.01 **

The following linear models were fitted:

$$(5) \text{ Allocated Funding}_{PC} = \beta_0 + \beta_1 \text{FailureRBMP}_{2013} + \varepsilon$$

$$(6) \text{ Allocated Funding}_{PC} = \beta_0 + \beta_1 \text{FailureRBMP}_{2013} + \beta_2 \log \text{GDPpc}_{2013} + \varepsilon$$

$$(7) \text{ Allocated Funding}_{PC} = \beta_0 + \beta_1 \text{FailureRBMP}_{2013} + \beta_2 \log \text{GDPpc}_{2013} + \varepsilon \text{ (excluding Bulgaria)}$$

Table 34 - Relevance analysis for RBMP1 ecological status of water bodies considering the allocated funds expressed as a share of the overall funding allocated to the 12 policy instruments (Model 7 excludes Bulgaria)

	Model 5	Model 6	Model 7
Intercept	11.84	104.87 *	30.83
	(7.63)	(37.50)	(14.92)
FailureRBMP ₂₀₁₃	-0.09	-0.10	-0.11 **
	(0.12)	(0.10)	(0.03)
log GDP ₂₀₁₃		-9.74 *	-2.05
		(3.87)	(1.54)
R ²	0.04	0.39	0.54
Adj. R ²	-0.04	0.28	0.45
N	14	14	13

Culture

According to the Europe 2020 strategy, the role of culture is crucial for achieving the goal of a "smart, sustainable and inclusive" growth. Culture is, however, a complex and multifaceted concept. Available data is limited and provides only a narrow individual view. The "number of world heritage sites" or the "number of museum visits" portray only a narrow perspective giving larger attention to established international cultural assets and heritage sites. For this reason, these were considered less suitable as a proxy for the PI. Rather, the "percentage of persons working as creative and performing artists, authors, journalists and linguists in the total economy" (NUTSO, 2013 and 2019) was selected as a proxy for the level of cultural activities within a country to reflect the policy instrument on protection, development and promotion of public cultural assets as well as public cultural and heritage services. For conciseness, this indicator is hereafter called "share of cultural occupation". It must be acknowledged that this is a poor fit for this policy instrument. The year 2019 was chosen to avoid the distortions caused in 2020 by the COVID-pandemic.

Despite limitations due to the availability of indicator data with a precise fit for the policy instrument's scope and the complex contexts that may be driving change, the question of relevance (i.e. i.e. whether more resources were allocated to where they were needed) was explored with a simple correlation analysis. The correlation analysis showed no statistically significant relationship between the share of cultural occupation in 2013, and the share of funding allocated to 'culture' policy instrument over the country's total allocated funding, i.e. as the share in the country's total allocated funding to the 12 instruments, and total allocated funding to culture. The results are, thus, not reported.

According to Eurostat data, between 2013 and 2019,²⁹³ a growth of cultural occupation can be observed across most countries, especially in eastern and southern European countries (e.g., Bulgaria, Czechia, Greece, Poland, Portugal, Romania, Slovakia, Spain). Only in few European countries a small relative decline in relation to the total population can be observed (Austria, Croatia, Denmark, and Sweden). The exploratory statistical analysis did not identify any relationship between the relative change in the share of cultural occupations in the total population between 2013 and 2019²⁹⁴ and allocated funding (per capita adjusted by PPP)²⁹⁵ for the policy instrument 'culture'. This could be due to several limitations concerning the data, especially with respect to the availability of indicators that could closely fit and represent the policy instrument's scope.

Nature and biodiversity

The following Eurostat indicators was used for the analysis:

- Protected marine area (km²) under Natura 2000, without area only protected under national legislation (NUTS0, 2013 and 2020). The following indicator is derived: Natura 2000 marine protected area in km² per km coastline.
- Protected terrestrial area (km²) under Natura 2000, without area only protected under national legislation (NUTS0, 2013 and 2020). The following indicator is derived: Natura 2000 territorial protected area in the country's land area

Despite limitations due to the availability of indicators with a precise fit for the policy instrument's scope and the complex contexts that may be driving change (for example, planning and construction periods, share and sources of investment funding from private and public sources), the question of relevance has been explored with statistical data by using a simple correlation analysis. Accordingly, relevance has been here understood to be high in those countries with a low-level of area under protection under Natura 2000 at the beginning of the programming period. Natura 2000 marine protected area is expressed as a ratio to the length of a given Member State's coastline. Natura 2000 terrestrial protected area is expressed as a share of national territory. It is important to recall that the allocated funds data is not further differentiated by areas of application, marine or terrestrial. The correlation analysis showed no statistically significant relationship between the Natura 2000 Marine and Terrestrial protected area in 2013 and the share of funds to 'nature and biodiversity' policy instrument over the overall funding to the 12 PIs. The results are, thus, not reported.

According to Eurostat data, between 2013 and 2020, progress was made in expanding the Natura 2000 Marine protected area network in Portugal, Spain, France, United Kingdom and Ireland. The correlation analysis could, however, not identify any relationship between the relative size and change in Natura 2000

²⁹³ The year 2019 was chosen to avoid the distortions caused by the COVID19-pandemic.

²⁹⁴ The year 2019 was chosen as the end year of the period of interest to avoid capturing the distorting effects of the COVID-19 pandemic, which are likely to be large given the issue at hand.

²⁹⁵ The absolute value of allocated funding per capita adjusted for PPP is used to better capture any potential absolute size-based investment effect on the indicator to best reflect the policy instrument. It is important to remind that the allocated funding does not reflect actual amount spent or overall investments conducted (e.g. private, other public sources).

protected area and allocated funding for the policy instrument nature and biodiversity. This could be due to several limitations concerning the data, especially with respect to the availability of indicators that could closely fit and represent the policy instrument's objectives.

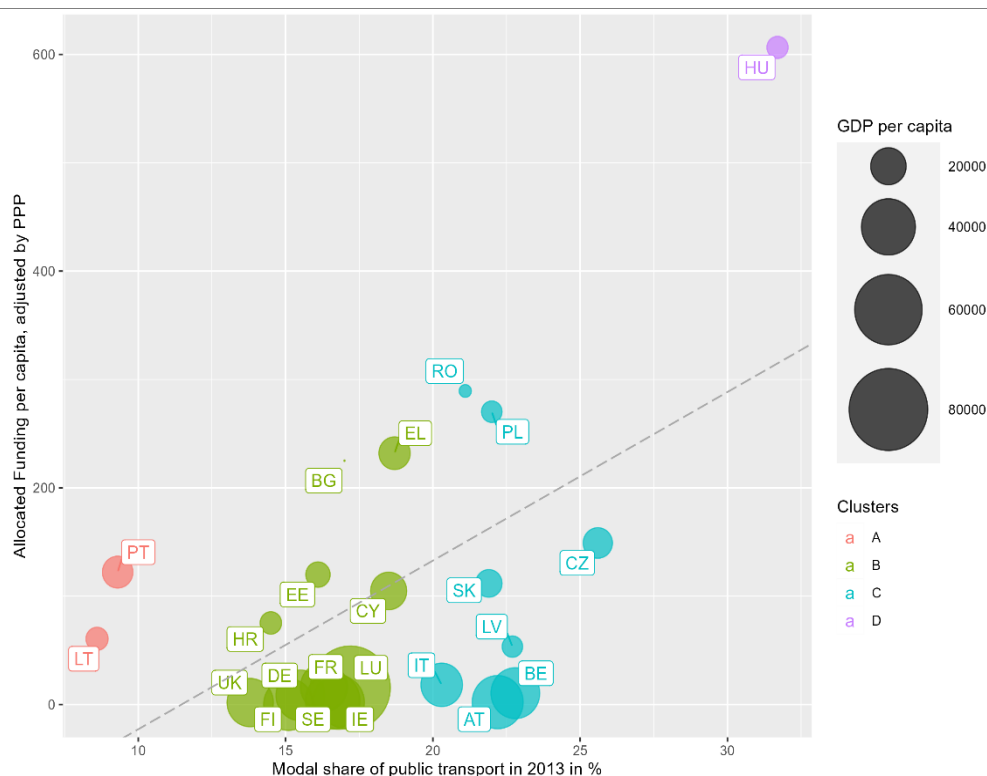
Clean transport

The selected Eurostat indicators is:

- Modal split of passenger transport (NUTS0, 2013 and 2019)

The figure below shows on the x-axis the modal share of public transport in 2013 and on the y-axis the share of funding allocated to the policy instrument out of the total funding allocated to the 12 PIs. The size of the bubbles represents the GDP per capita in 2013 for the respective country. The colour coding represents a grouping of the countries into clusters, which were identified using the k-means algorithm based on the modal share of public transport in 2013. Countries with populations relying more extensively on public transportation are positioned to the right. The correlation analysis indicates no statistically significant relationship between the two variables shown in the graph.

Figure 32 - % of modal share of public transport in passenger transportation in 2013 and the share of 'Clean transport' PI over the overall funding



Source: Authors, based on Eurostat and WP2 Single Database Data.

According to Eurostat data, between 2013 and 2019,²⁹⁶ progress towards the usage of public transportation vary from country to country. The correlation analysis could not identify any statistically significant relationship between the change in public transportation modal share and allocated funding for the policy instrument clean transport.

Climate adaptation & risk management

No indicators at the European level could be identified that measure the level of climate adaptation preparedness or resilience or similar. No suitable indicator measure for vulnerability at the European level could be identified. Only one indicator on the resulting economic losses in the event of a climate-related hazard event occurring could be identified “Climate related economic losses by type of event”. The indicator measures the economic losses from weather and climate-related events. Weather and climate-related events are defined as meteorological events (storms), hydrological events (floods, mass movements) and climatological events (heatwaves, cold waves, droughts, forest fires). The indicator is also included in Eurostat's Statistics for the European Green Deal visualisation tool. However, this indicator is highly reliant on available data provisions on the losses i.e. how what was measured as loss in the context of the database. Especially data on heat- and drought-related losses are sparse and often underrepresented in these databases (Trenczek et al. 2022). Thus, it may not well represent actual economic losses associated with climate-related events. The climate related losses were set into relation with the population to form the indicator “climate related losses per capita”. Given the significant variations of such losses a year-on-year aggregate for two time periods was derived (2010-2014 and 2016-2020). A comparison between the two time periods is not advisable.

No statistically significant relationship was identified between the aggregate climate related economic losses per capita between 2010 and 2014 and the share of funding allocated to the policy instrument “climate adaptation” over the overall funding, i.e., as the share in the country's total allocated funding to the 12 instruments. The results are, thus, not reported. The analysis is, however, limited by the availability of indicator data with a precise fit for the policy instrument's scope and the complex contexts. No effectiveness analysis was conducted, as the two derived data periods cannot be compared due to the irregularity of climate events and losses occurring.

²⁹⁶ The year 2019 was chosen as the end year of the period of interest to avoid possible effects from the COVID-19 pandemic.

Annex VI – Analysis of expenditure, beneficiaries, and form of finance across the policy instruments

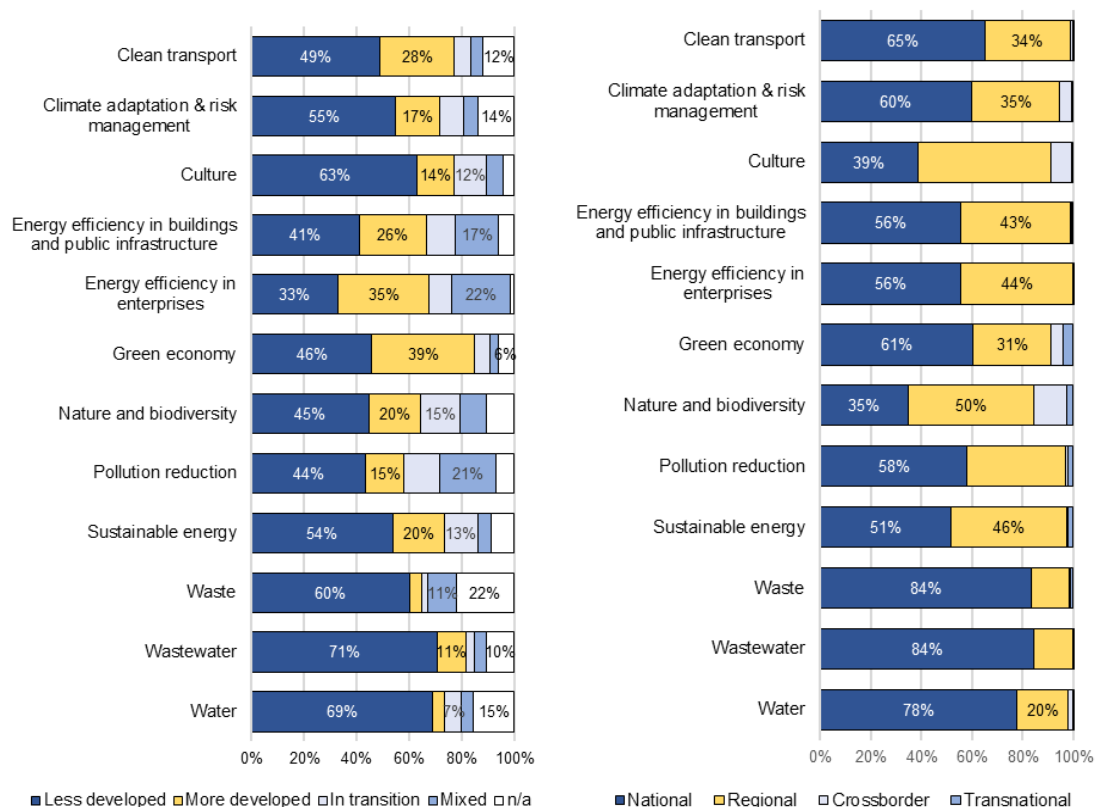
This Annex presents some additional key features of the policy instruments deployed to support climate and environment. It is mainly based on the analysis of the database of expenditure at operation and beneficiary level up to the end of 2020 assembled under Work Package 2 – Preparatory Study.

Table 35 - Distribution of expenditure and number of operations by policy instrument

Policy instrument	Total expenditure allocation (MEUR)	Number of operations	Share of total expenditure allocation (% over total)	Share of operations (% over total)
Clean transport	22,080	5,569	18.8%	5.6%
Climate adaptation & risk management	10,130	5,637	8.6%	5.7%
Culture	9,413	7,040	8.0%	7.1%
Energy efficiency in buildings and public infrastructure	20,135	27,551	17.1%	27.9%
Energy efficiency in enterprises	4,986	12,506	4.2%	12.7%
Green economy	3,047	4,093	2.6%	4.1%
Nature and biodiversity	6,120	8,932	5.2%	9.1%
Pollution reduction	4,209	2,424	3.6%	2.5%
Sustainable energy	9,602	9,904	8.2%	10.0%
Waste	4,985	5,343	4.2%	5.4%
Wastewater	16,717	4,639	14.2%	4.7%
Water	5,994	5,001	5.1%	5.1%
Total	117,419	98,639	100.0%	100.0%

Note: the table also covers TC programmes.

Source: Authors based on WP2 Single Database (last update: end of 2020)

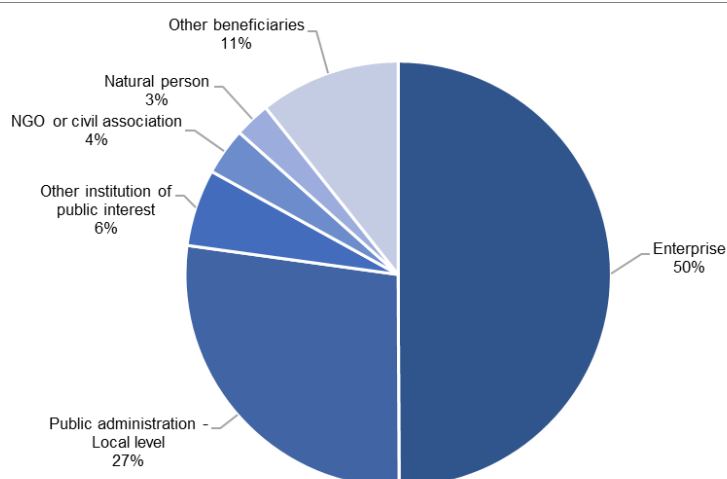
Figure 33 – Allocations to policy instruments by territorial scope of the OPs (right-hand side) and category of region (left-hand side)

Source: Authors based on WP2 Single Database (last update: end of 2020)

Table 36 - Average and maximum expenditure per project and variance

Policy instrument	Allocation per project		
	Average (EUR million)	Max (EUR million)	Coefficient of variation
Clean transport	4.0	687.5	6.5
Climate adaptation & risk management	1.8	708.0	8.2
Culture	1.3	129.1	2.0
Energy efficiency in buildings and public infrastructure	0.7	600.0	8.3
Energy efficiency in enterprises	0.4	144.8	5.0
Green economy	0.7	355.6	8.4
Nature and biodiversity	0.7	50.9	2.5
Pollution reduction	1.7	50.2	2.2
Sustainable energy	1.0	201.9	3.9
Waste	0.9	157.2	5.8
Wastewater	3.6	487.4	4.6
Water	1.2	393.1	8.9

Source: Authors based on WP2 Single Database (last update: end of 2020)

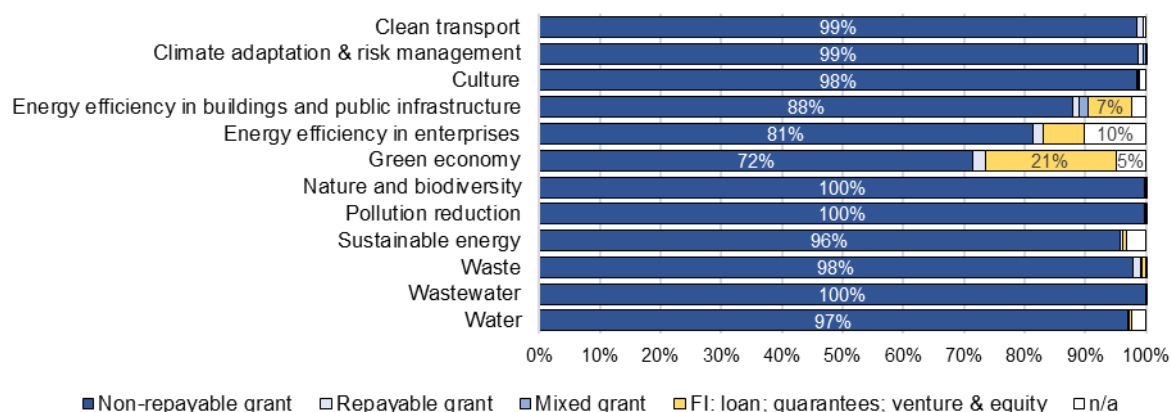
Figure 34 – Types of beneficiaries

Source: Authors based on WP2 Single Database. Note: The completeness of the categories of beneficiaries varies across OPs and Member States. The information on the types of beneficiaries was improved compared to the original version of the WP2 Single Database thanks to further checks performed by country experts during Task 1.

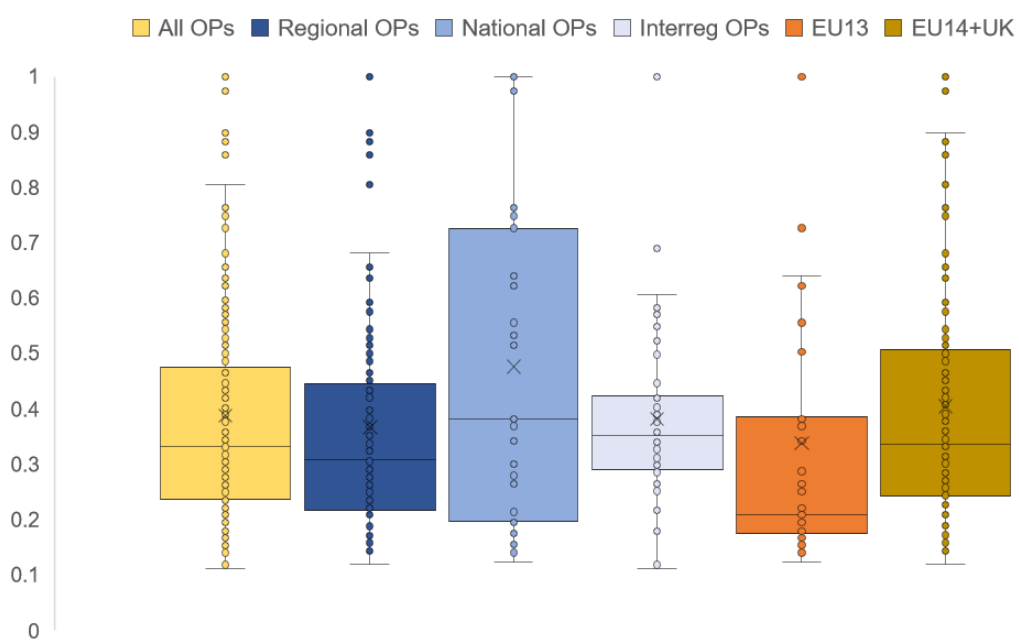
Table 37 - Total share of beneficiaries by beneficiary type and policy instrument
 (green = shares above 60%; yellow = shares between 30% and 59%; orange = shares between 10% and 30%)

Beneficiary type	Clean transport	Climate risk	Culture	EE in buildings	EE in enterprises	Green economy	Nature & biodiversity	Pollution reduction	Sustainable energy	Waste	Waste water	Water
Enterprise	24.2%	32.6%	15.2%	37.1%	96.2%	85.6%	40.3%	44.3%	59.5%	60.3%	41.5%	23.3%
Public administration - Local level	62.6%	39.4%	49.9%	33.2%	1.5%	3.5%	28.9%	31.0%	18.5%	32.5%	32.3%	16.3%
Other institution of public interest	2.6%	5.5%	9.0%	9.2%	0.4%	0.4%	10.7%	4.5%	5.8%	2.6%	5.9%	5.0%
NGO or civil association	0.3%	1.5%	6.7%	9.5%	0.2%	0.7%	3.2%	0.4%	1.3%	0.3%	0.0%	0.2%
Natural person	0.7%	0.5%	0.8%	1.0%	0.2%	0.3%	1.0%	0.1%	0.0%	0.2%	14.3%	46.9%
Chamber of commerce, business association/support, trade union	0.2%	0.6%	0.7%	0.2%	0.1%	0.7%	0.8%	1.0%	0.3%	0.1%	0.0%	0.0%
Education institution (incl. higher education and training)	1.1%	3.0%	2.4%	2.7%	0.3%	3.1%	2.7%	1.9%	2.8%	0.6%	0.1%	1.2%
Financial institution	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other public administration/agency	1.9%	3.7%	1.2%	1.6%	0.5%	1.2%	1.9%	2.4%	0.9%	1.5%	0.3%	0.9%
Public administration - National level	1.6%	2.4%	2.5%	1.2%	0.0%	0.1%	2.0%	4.0%	1.1%	0.5%	1.4%	1.8%
Public administration - Regional level	1.9%	5.7%	5.9%	1.6%	0.1%	0.4%	3.0%	2.8%	0.5%	0.4%	3.9%	2.5%
Research and technology transfer organisation	0.3%	1.3%	0.6%	0.3%	0.1%	0.7%	1.5%	0.9%	0.6%	0.1%	0.1%	0.7%
Unclassifiable	2.5%	3.8%	5.1%	2.4%	0.3%	3.4%	4.0%	6.7%	8.7%	1.0%	0.1%	1.2%

Source: Authors based on WP2 Single Database. Note: The completeness of the categories of beneficiaries varies across OPs and Member States. The information on the types of beneficiaries was improved compared to the original version of the WP2 Single Database thanks to further checks performed by country experts during Task 1.

Figure 35 – Distribution of total expenditure by form of finance and policy instrument

Source: Authors, based on WP2 expenditure data (last update: end of 2020)

Figure 36 – Evenness index (investments concentration across policy instruments, 0 = low concentration, 1 = high concentration)

Source: Authors based on WP2 expenditure data (last update: end of 2020). Note: Herfindahl-Hirschman Index

Table 38 - Share of total eligible expenditure by type of policy instruments across Member States

	Clean transport	Climate risk	Culture	EE in buildings	EE in enterprises	Green economy	Nature & biodiversity	Pollution reduction	Sustainable energy	Waste	Waste water	Water	Total
AT	7%	0%	0%	0%	71%	13%	0%	0%	9%	0%	0%	0%	100%
BE	20%	4%	14%	28%	8%	3%	2%	14%	6%	1%	0%	0%	100%
BG	19%	2%	4%	10%	10%	2%	2%	8%	0%	9%	1%	32%	100%
CY	23%	4%	18%	11%	7%	0%	1%	0%	0%	21%	12%	5%	100%
CZ	13%	5%	7%	21%	14%	1%	5%	11%	5%	6%	10%	3%	100%
DE	13%	12%	7%	25%	13%	4%	9%	12%	6%	0%	0%	0%	100%
DK	0%	2%	0%	3%	4%	87%	0%	0%	0%	4%	0%	0%	100%
EE	8%	3%	0%	38%	3%	15%	5%	8%	5%	1%	6%	8%	100%
ES	13%	3%	7%	27%	10%	0%	6%	2%	11%	1%	15%	4%	100%
FI	1%	2%	1%	3%	12%	71%	1%	0%	8%	1%	0%	0%	100%
FR	17%	6%	6%	27%	0%	2%	8%	4%	25%	3%	0%	2%	100%
GR	25%	5%	6%	25%	0%	0%	2%	1%	2%	8%	18%	7%	100%
HR	4%	5%	5%	11%	2%	0%	6%	3%	2%	11%	48%	3%	100%
HU	33%	12%	11%	12%	3%	0%	6%	2%	4%	2%	11%	2%	100%
IE	8%	33%	11%	42%	0%	0%	6%	0%	0%	0%	0%	0%	100%
IT	15%	18%	12%	12%	7%	1%	3%	3%	7%	3%	14%	4%	100%
LT	3%	3%	5%	19%	1%	9%	4%	2%	25%	9%	16%	3%	100%
LU	47%	0%	0%	30%	0%	2%	0%	0%	21%	0%	0%	0%	100%
LV	5%	6%	12%	34%	4%	0%	3%	6%	11%	6%	13%	0%	100%
MT	0%	0%	25%	8%	0%	0%	1%	1%	6%	9%	3%	47%	100%
NL	0%	0%	0%	38%	10%	16%	0%	0%	36%	0%	0%	0%	100%
PL	29%	7%	7%	14%	2%	0%	4%	1%	15%	4%	16%	1%	100%
PT	20%	12%	22%	10%	1%	1%	5%	2%	3%	7%	10%	6%	100%
RO	20%	13%	5%	13%	0%	0%	2%	2%	0%	2%	30%	12%	100%
SE	16%	0%	0%	8%	32%	40%	0%	3%	1%	0%	0%	0%	100%
SI	7%	13%	8%	17%	4%	4%	5%	2%	7%	0%	14%	19%	100%
SK	11%	9%	0%	18%	3%	18%	4%	7%	7%	9%	12%	3%	100%
TC	7%	15%	22%	7%	0%	7%	26%	3%	7%	2%	1%	3%	100%
UK	7%	9%	8%	16%	9%	17%	10%	0%	23%	0%	0%	0%	100%
Total	19%	9%	8%	17%	4%	3%	5%	4%	8%	4%	14%	5%	100%

Source: Authors based on WP2 Single Database

Annex VII – Additional statistics per intervention field

Please note: This annex is organised in three subsections:

- Subsection a: statistics on absorption rates,
- Subsection b: statistics on achievement rates,
- Subsection c: statistics on macro-level indicators.

Furthermore, each of the three subsections in this annex are organised by “clusters” of policy instruments:

Transition towards a low-carbon economy, including the following PIs:

- Sustainable energy,
- Energy efficiency in buildings,
- Energy efficiency in enterprises,
- Clean transport;

Increasing resource efficiency, including the following PIs:

- Green economy,
- Waste management;

Preservation and restoration of natural resources, including the following PIs:

- Wastewater,
- Water,
- Biodiversity and nature;

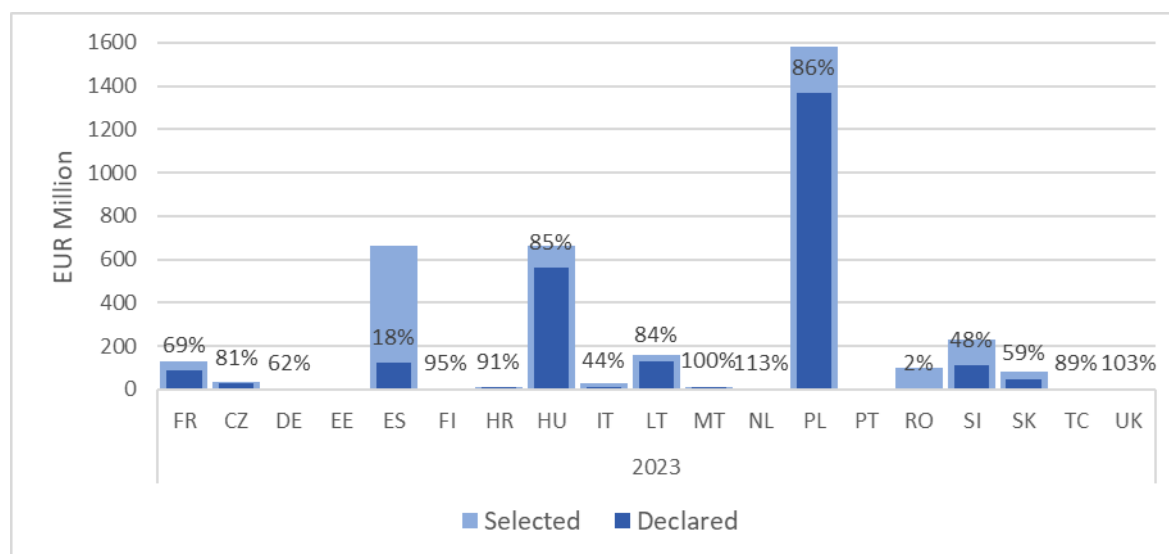
Adaptation and risk management (covering only the PI with the same name);

Protecting and developing cultural heritage (equally covering only the PI with the same name).

Absorption rates per intervention field, per country

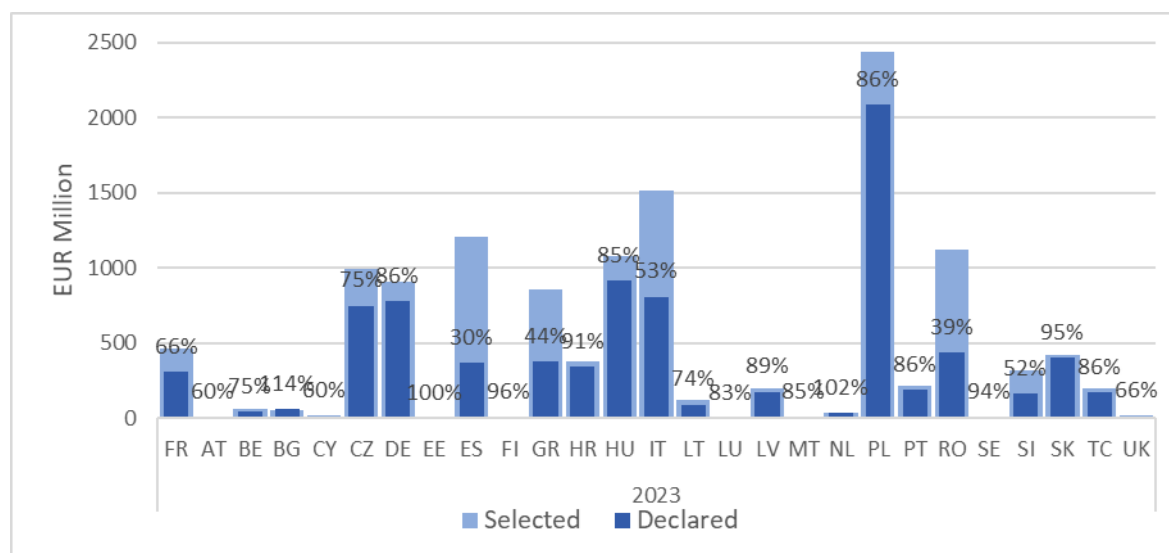
Transition towards a low-carbon economy

Figure 37 - Absorption rate 2023: Intervention Field 10 (Renewable energy: solar)



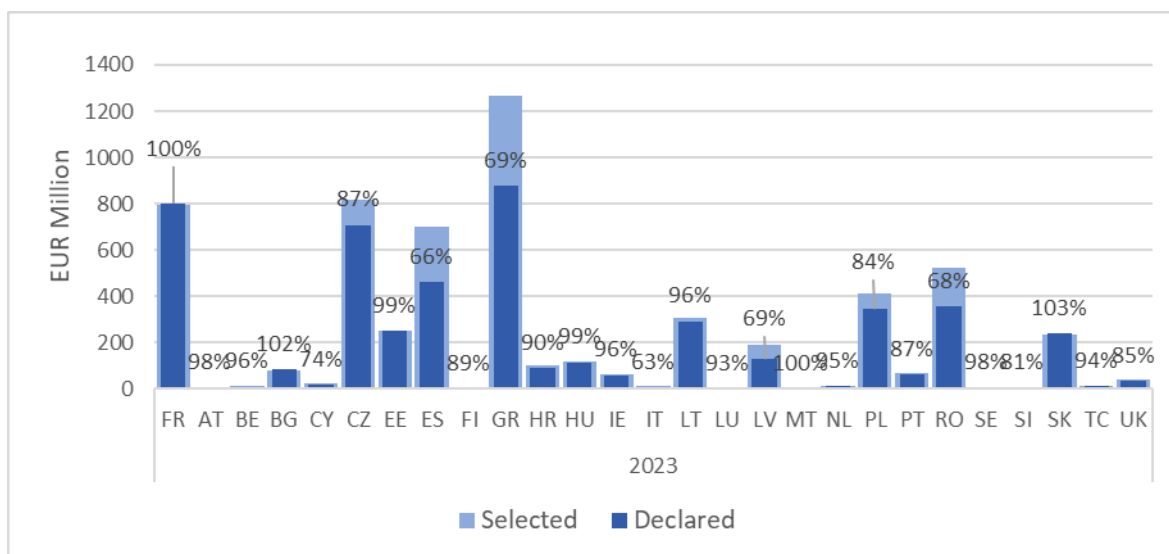
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 38 - Absorption rate 2023: Intervention Field 13 (Energy efficiency renovation of public infra. & demo.)



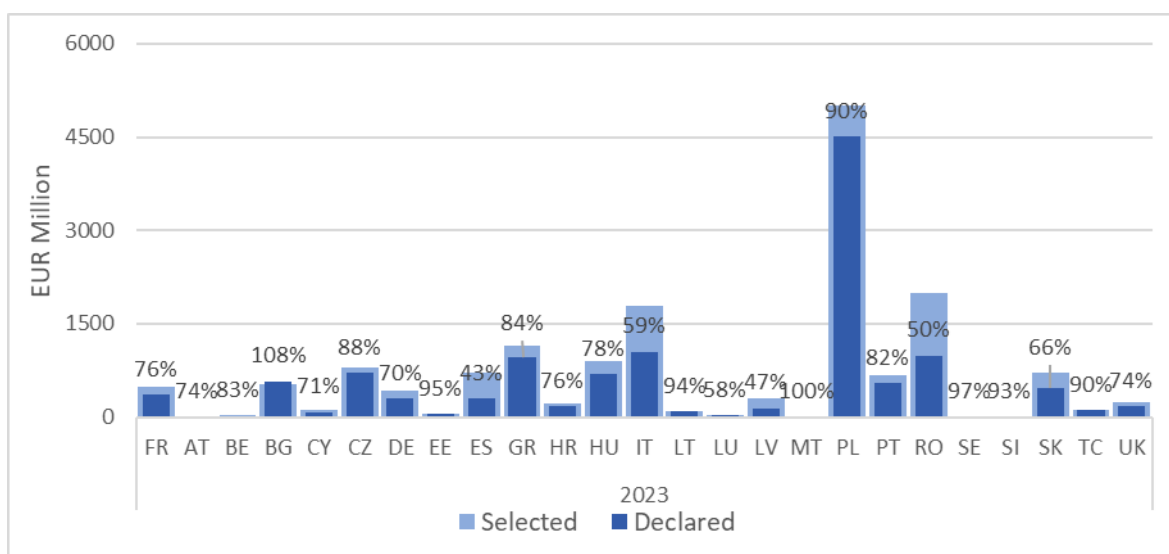
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 39 - Absorption rate 2023: Intervention Field 14 (Energy efficiency renovation of housing stock & demo)

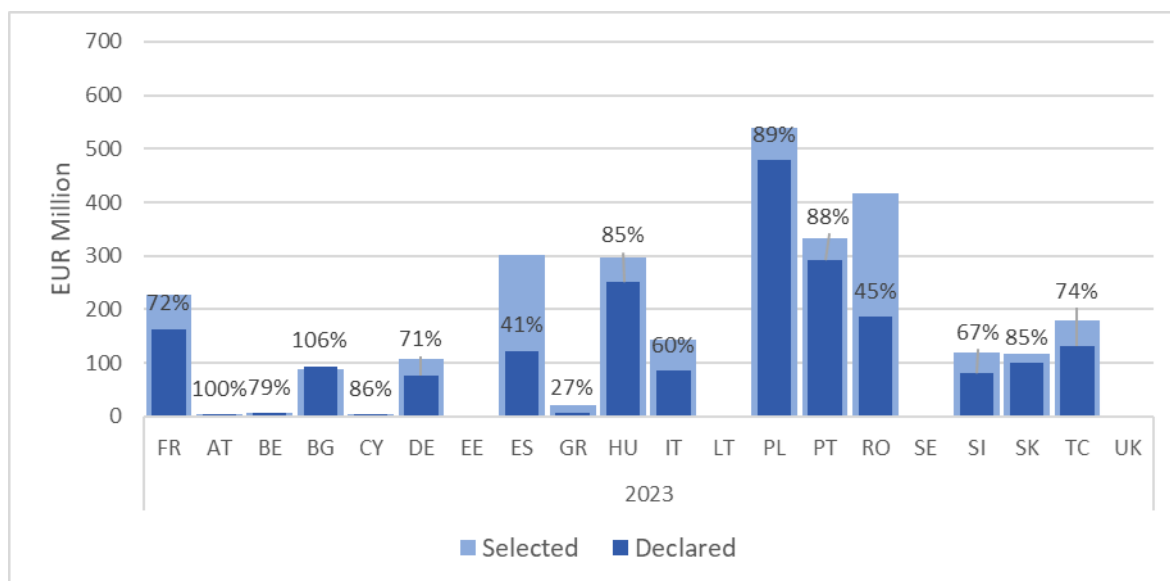


Source: Authors based on ESIF categorisation data 2014-2020.

Figure 40 - Absorption rate 2023: Intervention Field 43 (Clean urban transport infrastructure & promotion)

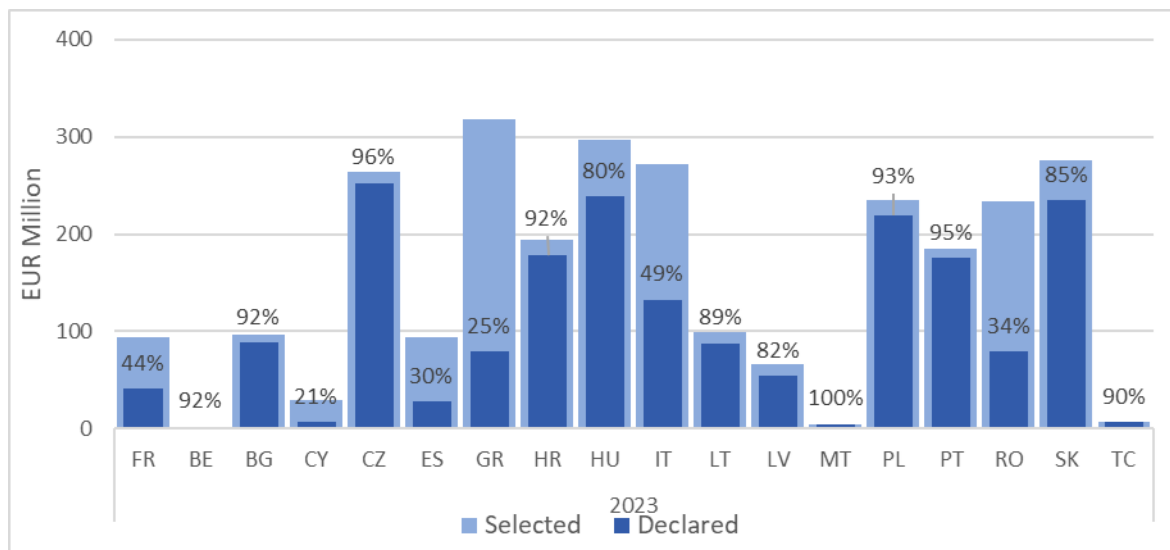


Source: Authors based on ESIF categorisation data 2014-2020.

Figure 41 – Absorption rate 2023: Intervention Field 90 (Cycle tracks and footpaths)


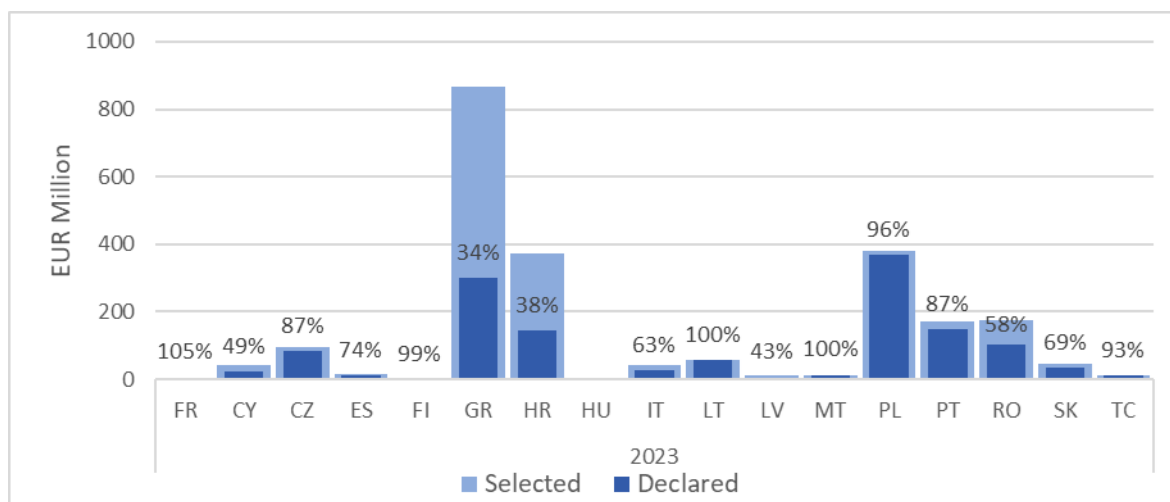
Source: Authors based on ESIF categorisation data 2014-2020.

Increasing resource efficiency

Figure 42 – Absorption rate 2023: Intervention Field 17 (Household waste mgmt. (incl. minimise, sort, recycle ...))


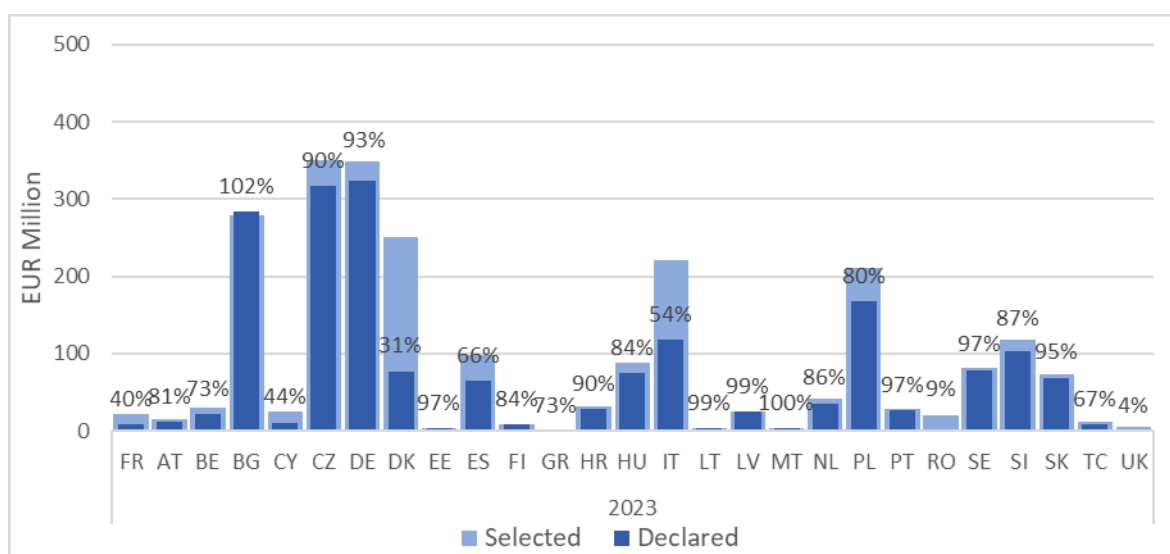
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 43 – Absorption rate 2023: Intervention Field 18 (Household waste management (incl. Mech, Bio, thermal & landfill))



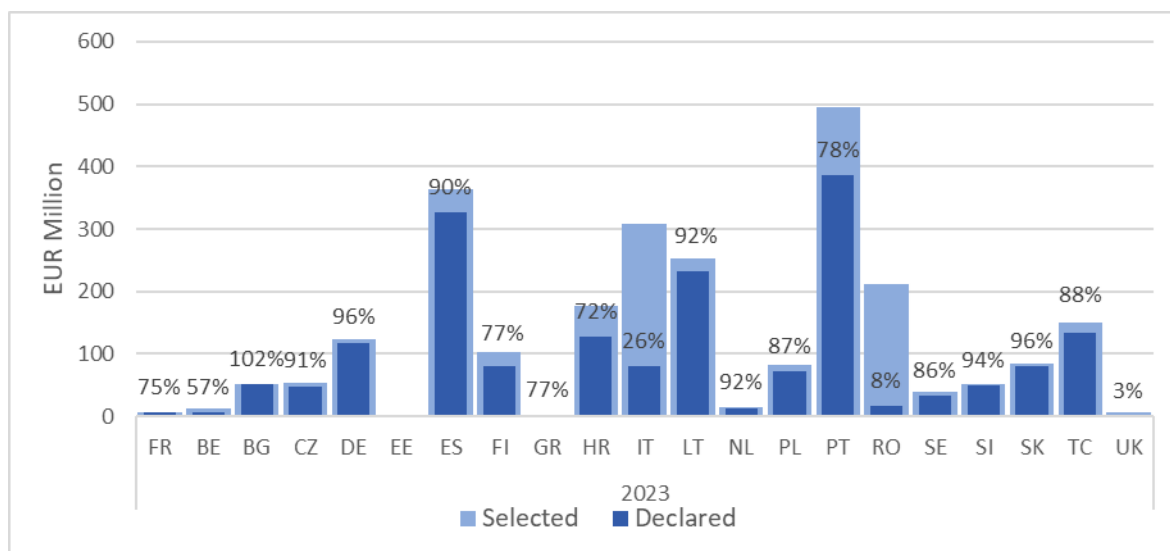
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 44 – Absorption rate 2023: Intervention Field 68 (Energy efficiency & demo. projects in SMEs)



Source: Authors based on ESIF categorisation data 2014-2020.

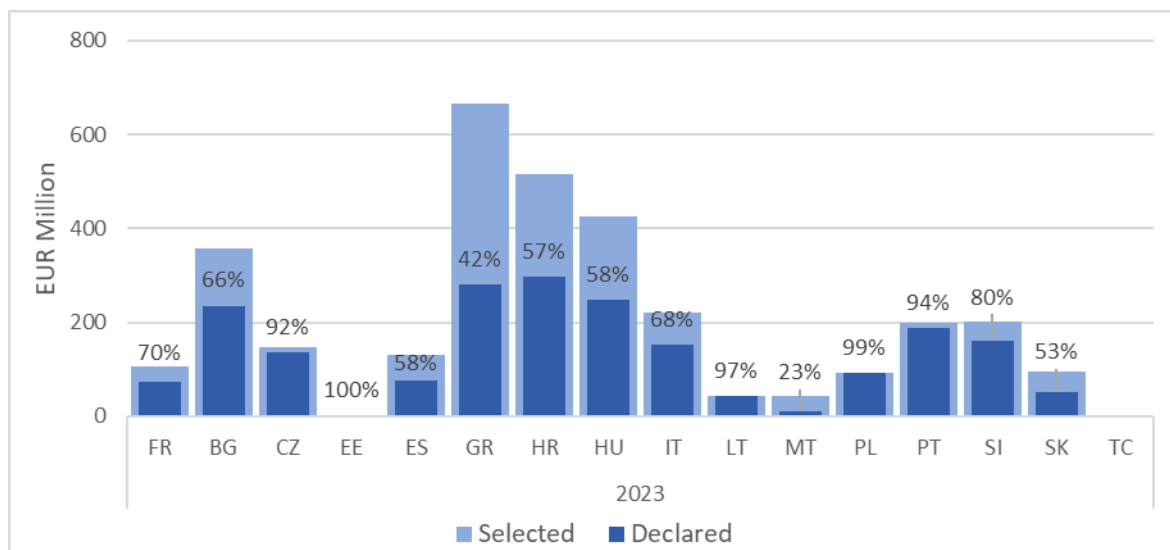
Figure 45 – Absorption rate 2023: Intervention Field 69 (Support to enviro-friendly production processes in SMEs)



Source: Authors based on ESIF categorisation data 2014-2020.

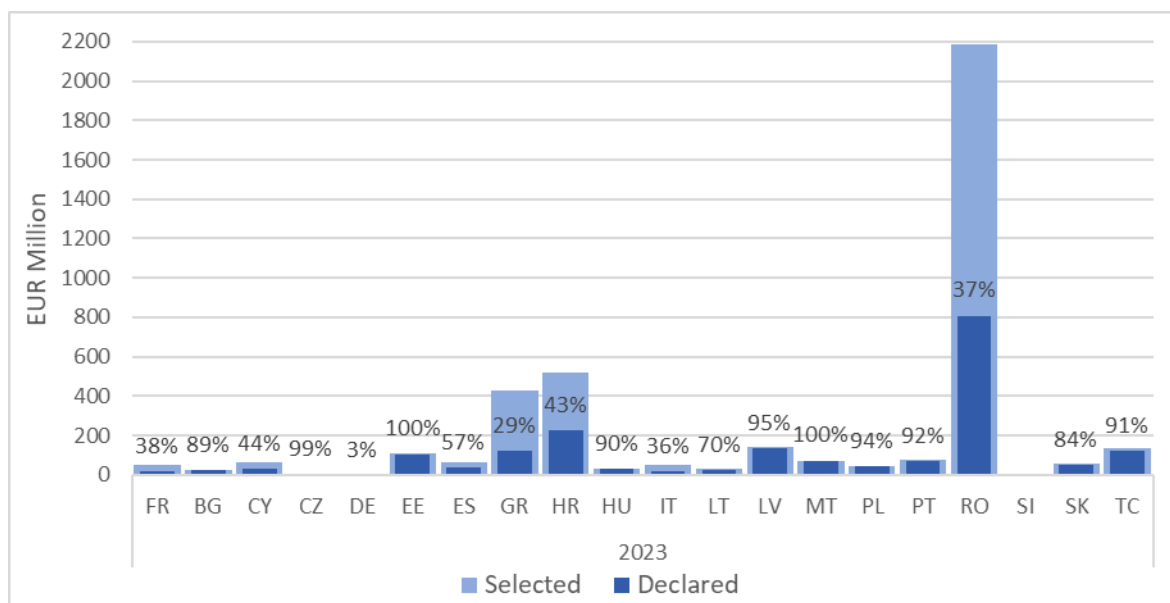
Preservation and restoration of natural resources

Figure 46 – Absorption rate 2023: Intervention Field 20 (Water infrastructure for human consumption)



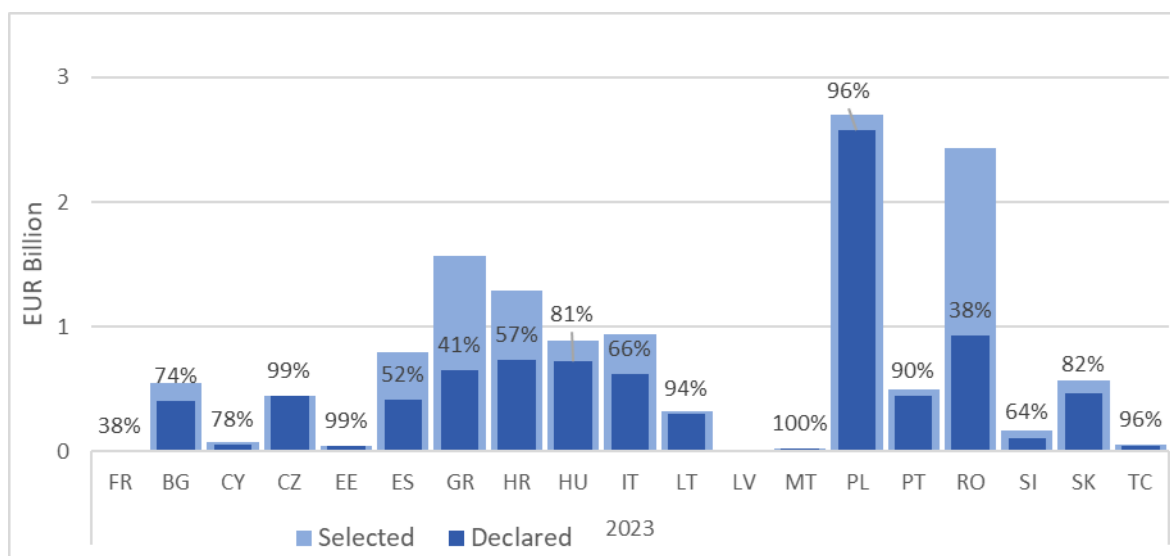
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 47 – Absorption rate 2023: Intervention Field 21 (Water management & drinking water conservation)



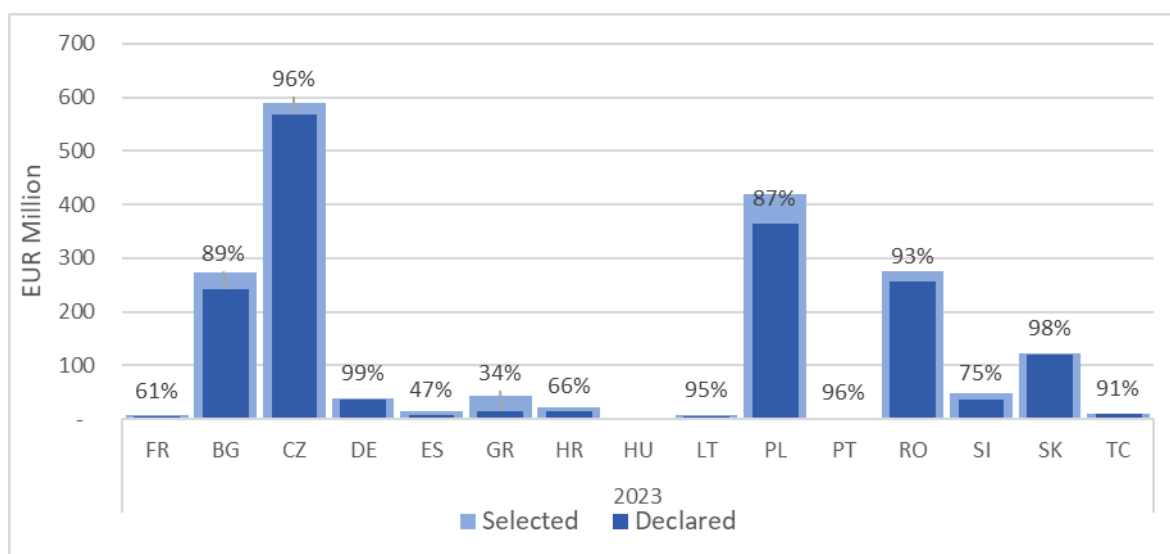
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 48 – Absorption rate 2023: Intervention Field 22 (Wastewater treatment)



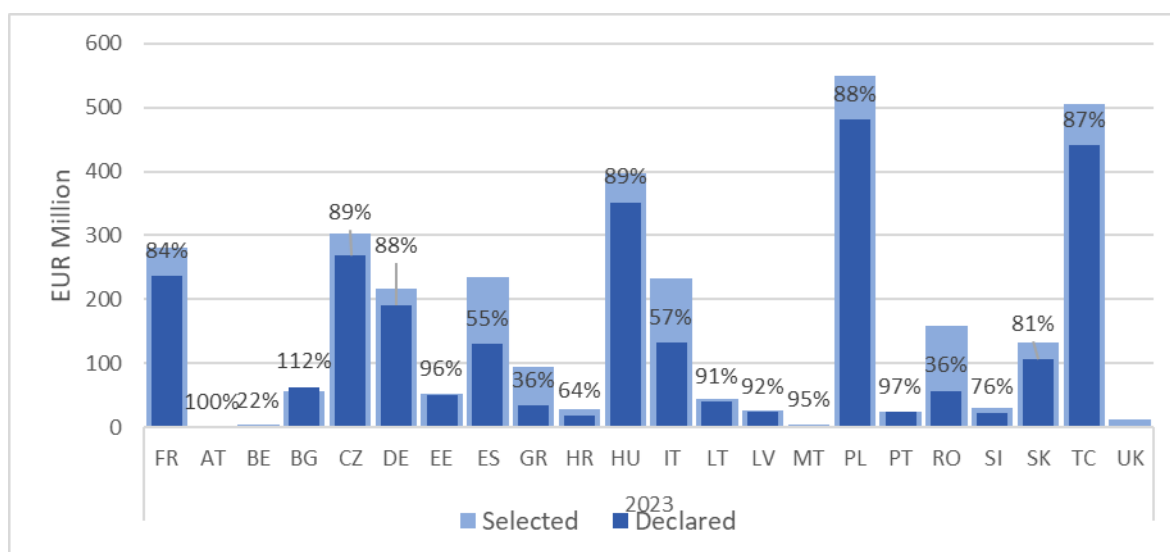
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 49 – Absorption rate 2023: Intervention Field 83 (Air quality measures)

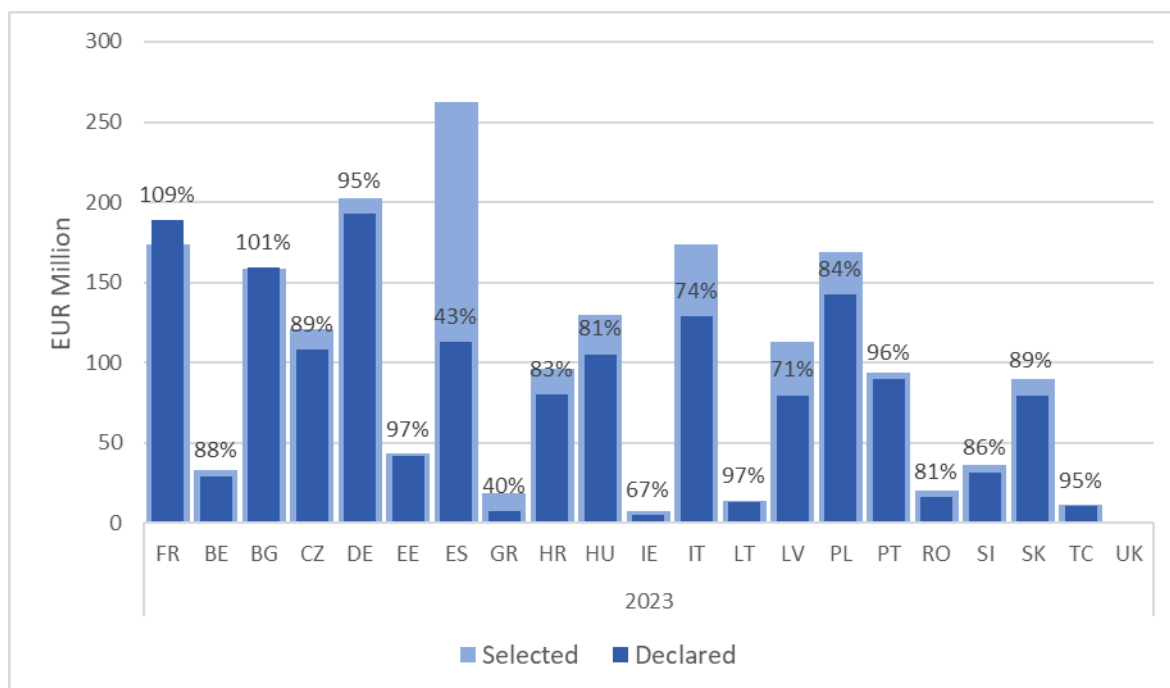


Source: Authors based on ESIF categorisation data 2014-2020.

Figure 50 – Absorption rate 2023: Intervention Field 85 (Biodiversity, nature protection & green infrastructure)

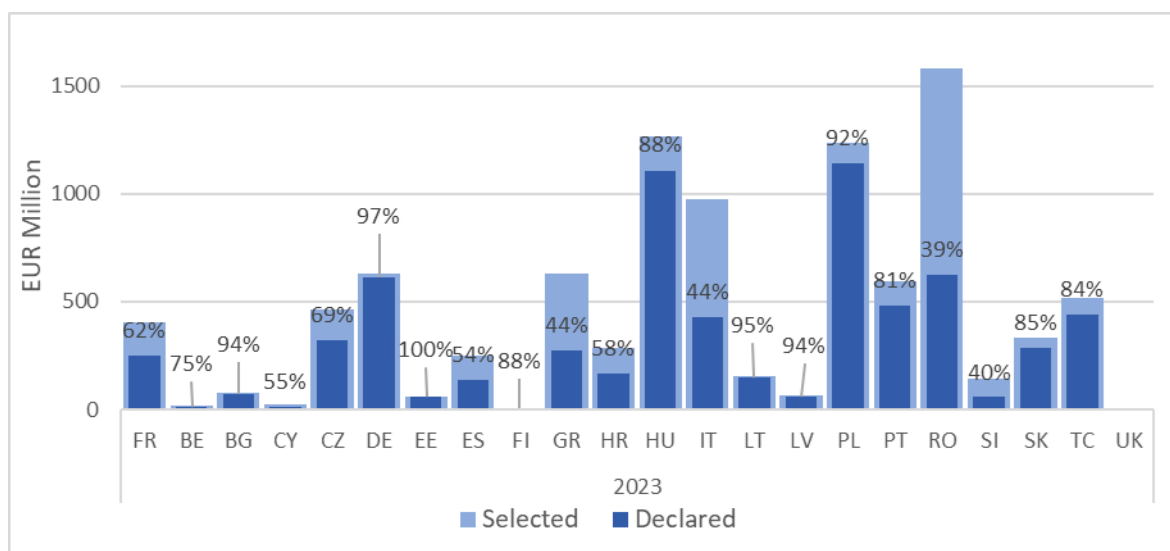


Source: Authors based on ESIF categorisation data 2014-2020.

Figure 51 – Absorption rate 2023: Intervention Field 89 (Rehabilitation of industrial sites and contaminated land)

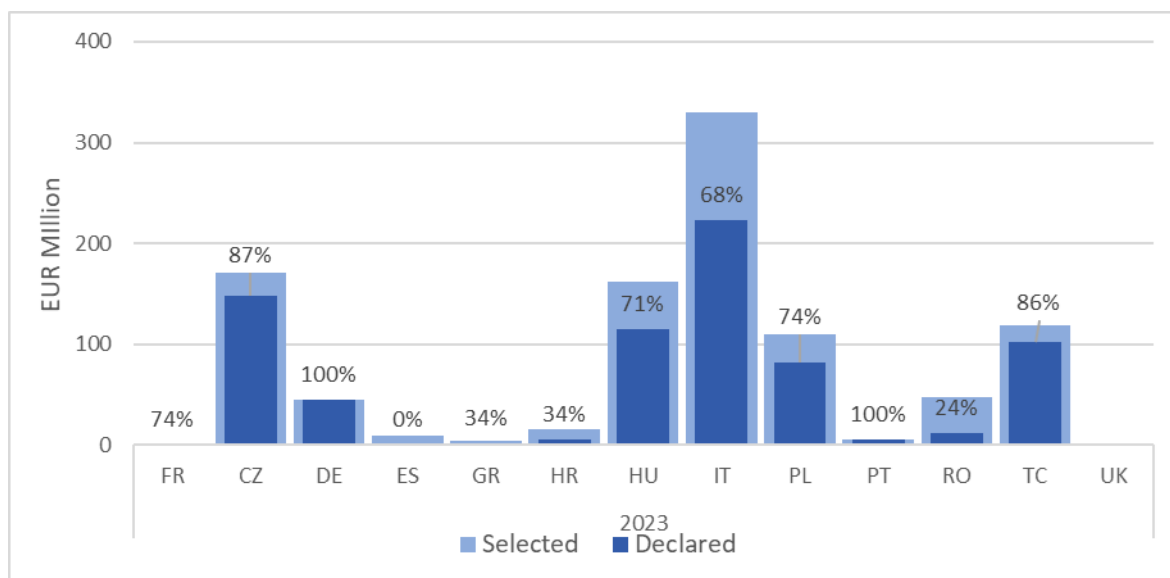
Source: Authors based on ESIF categorisation data 2014-2020.

Adaptation and risk management

Figure 52 – Absorption rate 2023: Intervention Field 87 (Adapt to climate change & prevent & manage climate risks)

Source: Authors based on ESIF categorisation data 2014-2020.

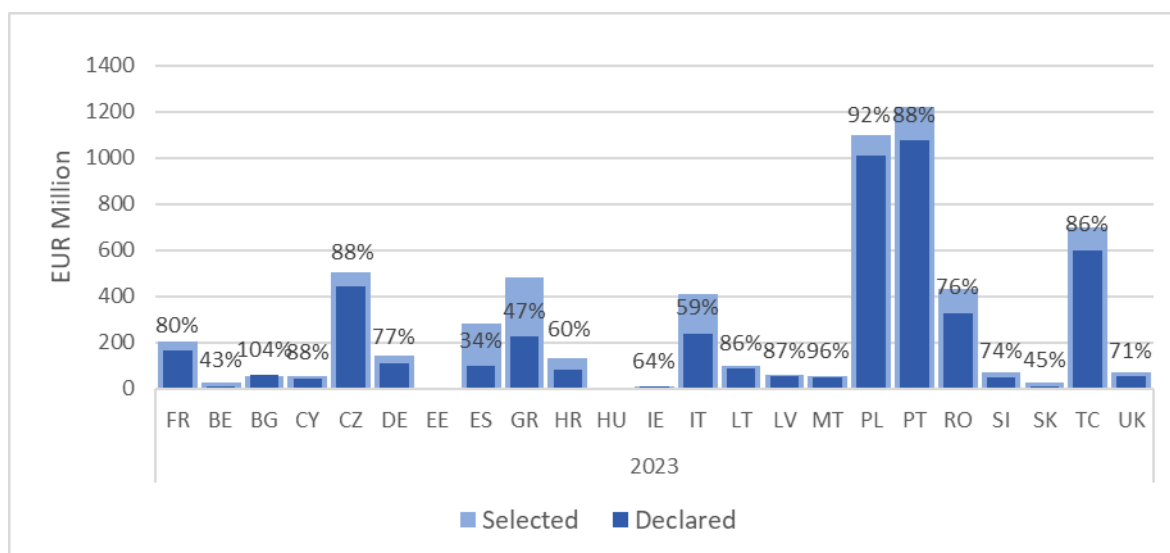
Figure 53 – Absorption rate 2023: Intervention Field 88 (Prevent & manage non-climate related natural risks)



Source: Authors based on ESIF categorisation data 2014-2020.

Protecting and developing cultural heritage

Figure 54 – Absorption rate 2023: Intervention Field 94 (Protect, develop & promote public cultural assets)

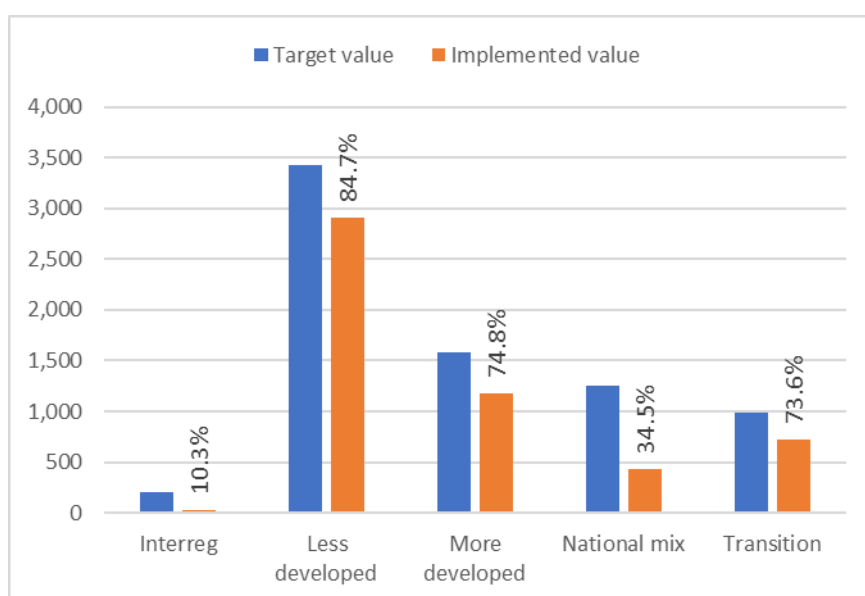


Source: Authors based on ESIF categorisation data 2014-2020.

Achievement rates per common indicator (overall, per type of region and per country)

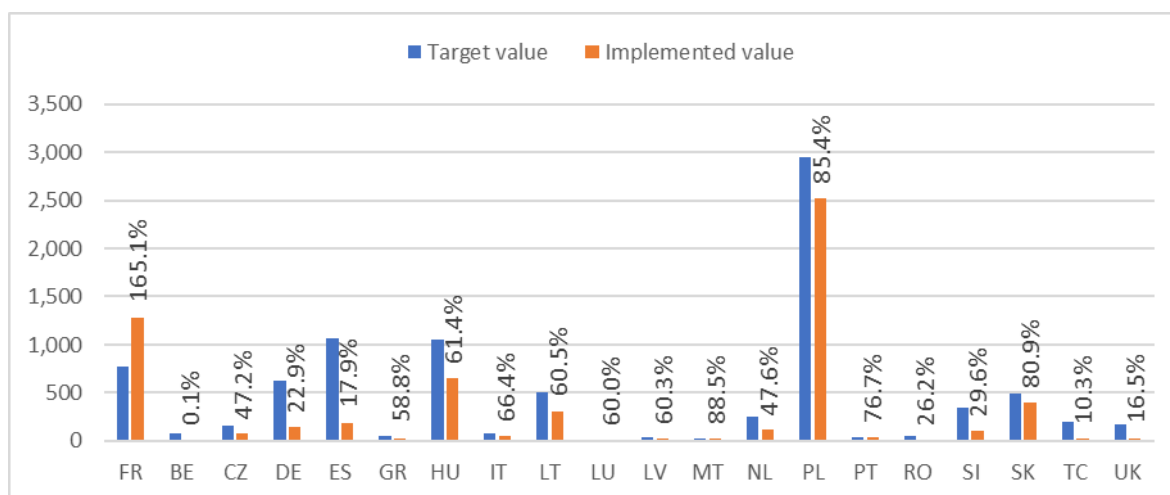
Transition towards a low-carbon economy

Figure 55 – Achievement rates CO30 (ENERGY: RE production), by category of region



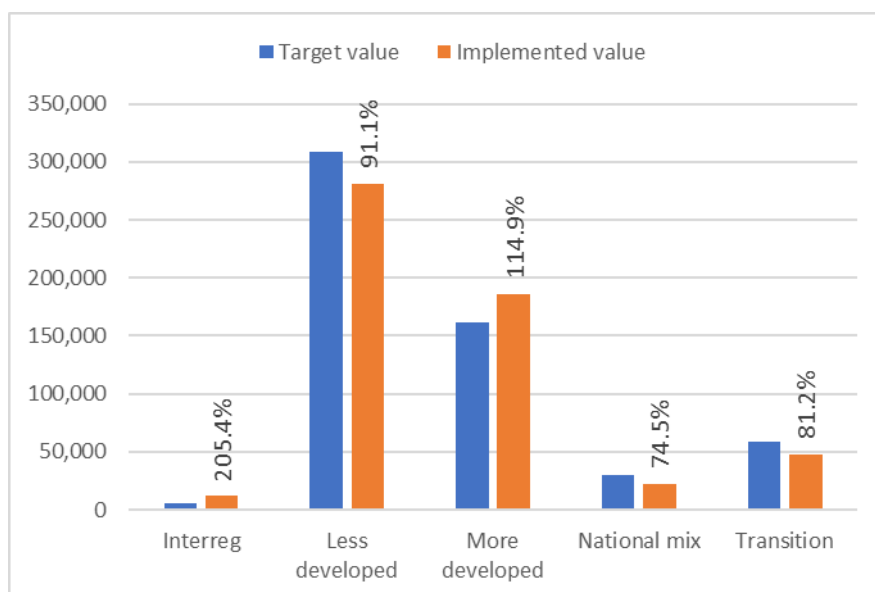
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 56 – Achievement rates CO30 (ENERGY: RE production), by country



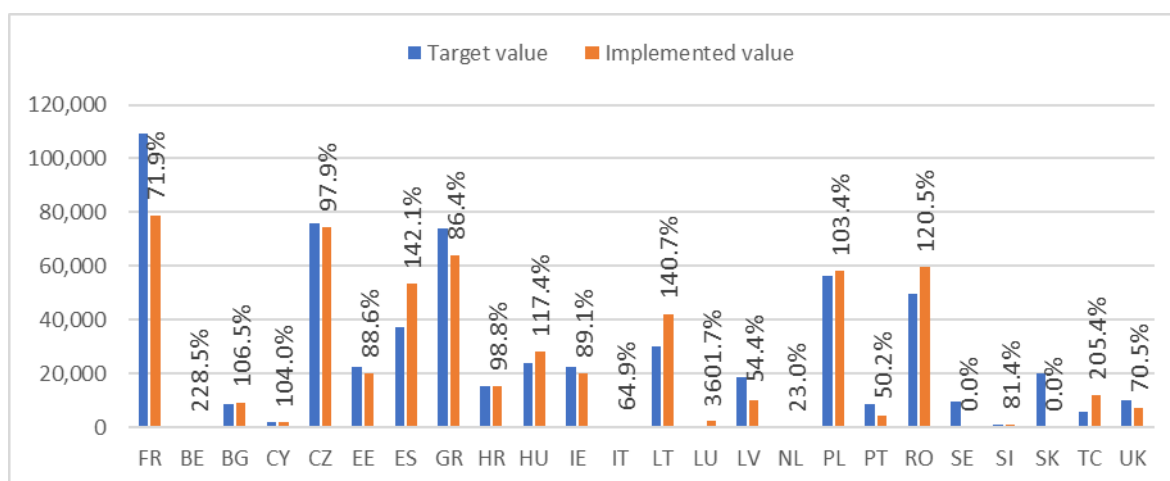
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 57 - Achievement rates CO31 (ENERGY: improved performance in houses), by category of region



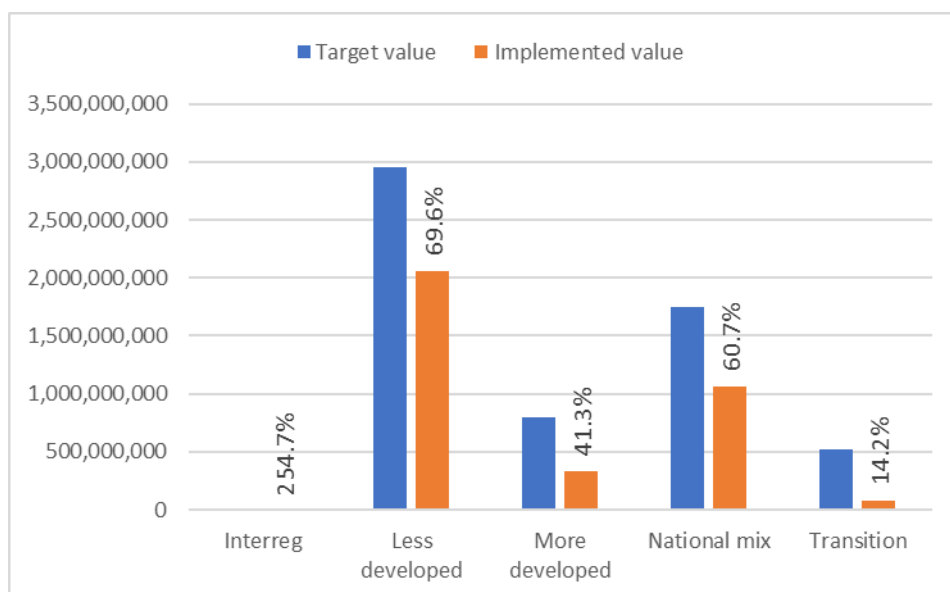
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 58 - Achievement rates CO31 (ENERGY: improved performance in houses), by country



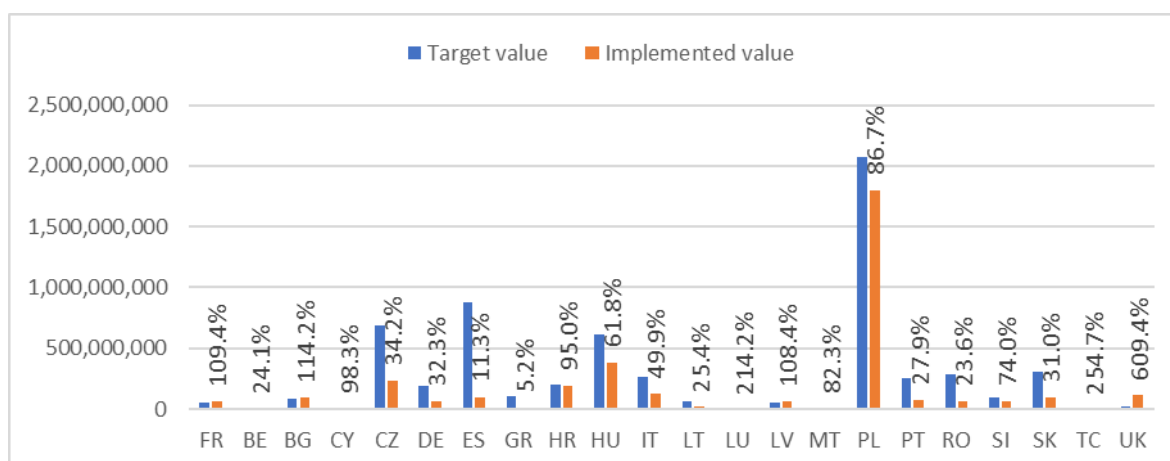
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 59 - Achievement rates CO2 (ENERGY: reduced consumption public buildings), by category of region



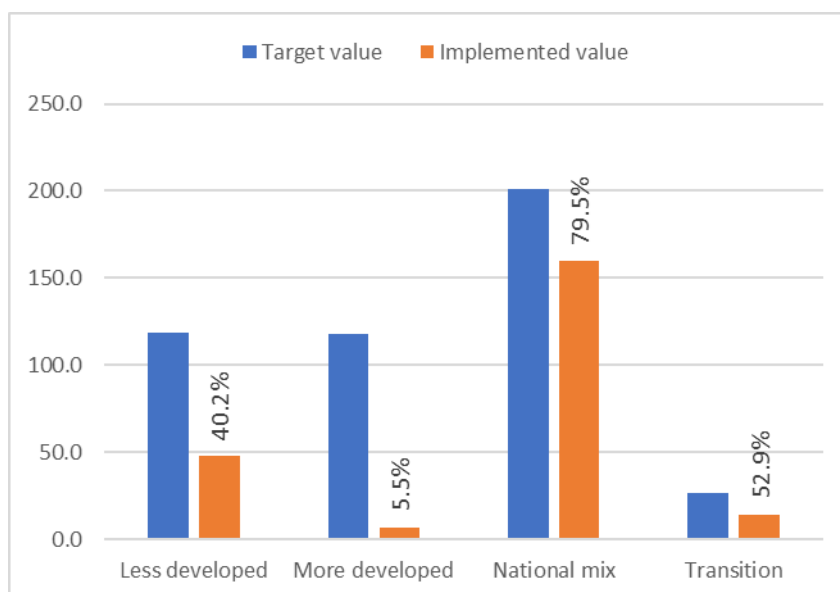
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 60 - Achievement rates CO2 (ENERGY: reduced consumption public buildings), by country



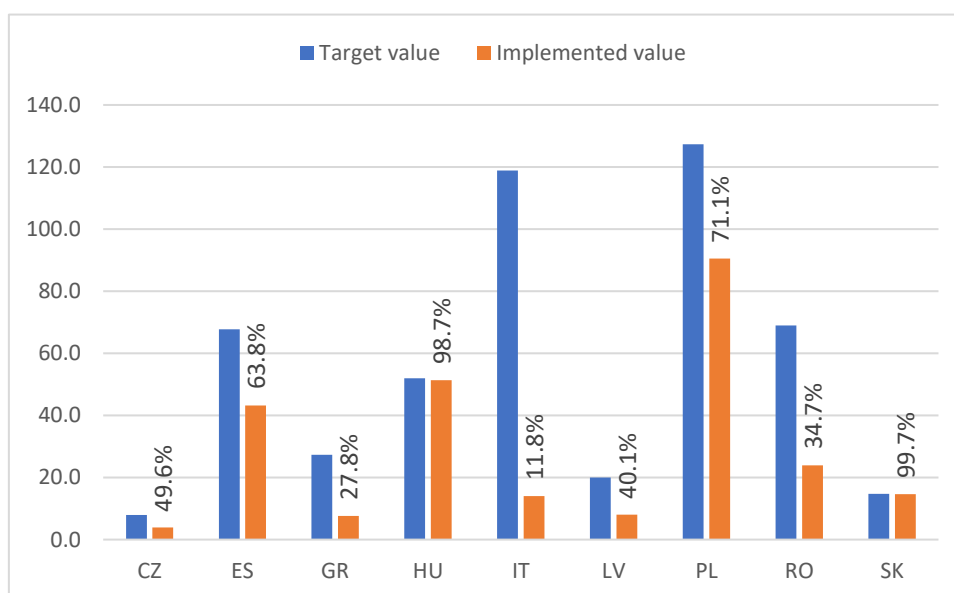
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 61 - Achievement rates CO15 (Tram or metro (new / improved)), by category of region



Source: Authors based on ESIF categorisation data 2014-2020.

Figure 62 - Achievement rates CO15 (Tram or metro (new / improved)), by country



Source: Authors based on ESIF categorisation data 2014-2020.

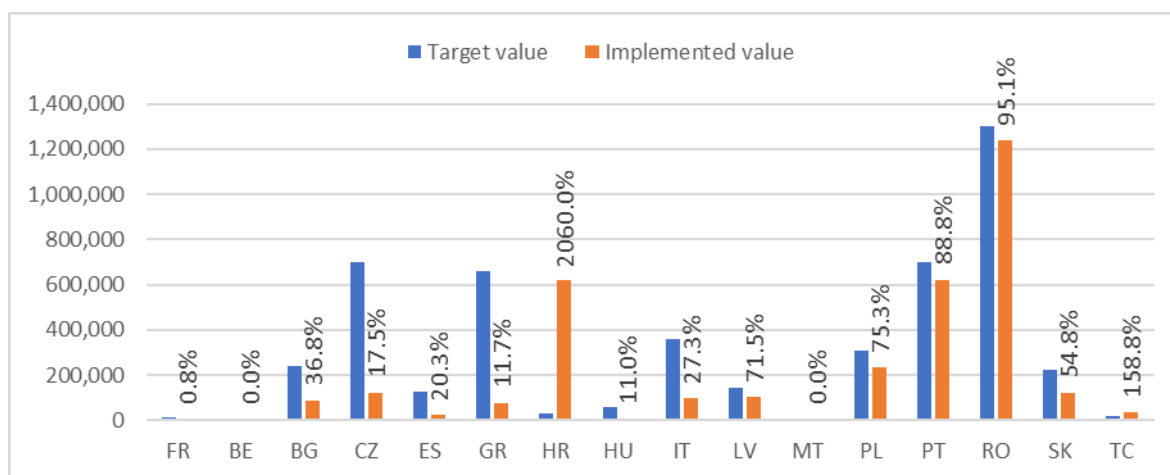
Increasing resource efficiency

Figure 63 - Achievement rates CO17 (ENV: Waste Recycling), by category of region



Source: Authors based on ESIF categorisation data 2014-2020.

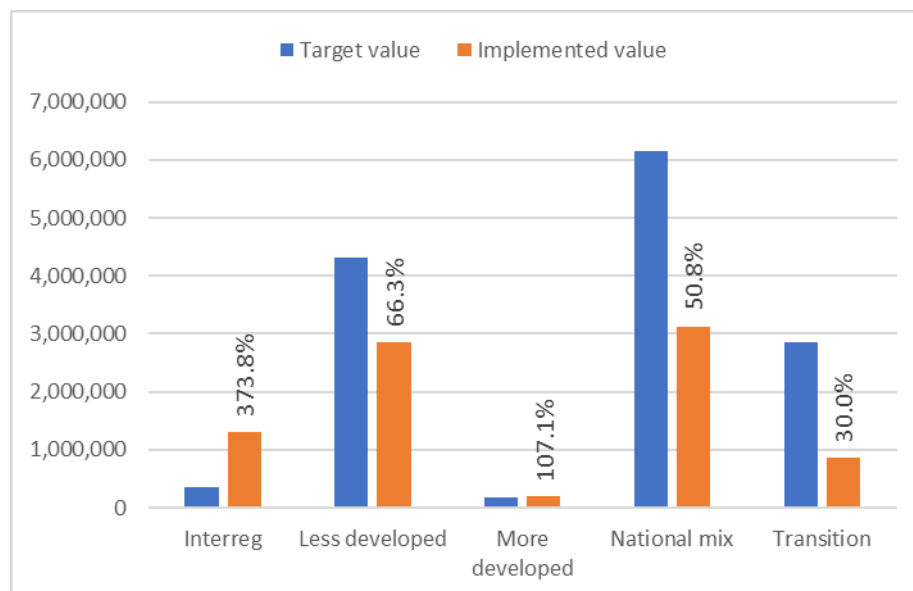
Figure 64 - Achievement rates CO17 (ENV: Waste Recycling), by country



Source: Authors based on ESIF categorisation data 2014-2020.

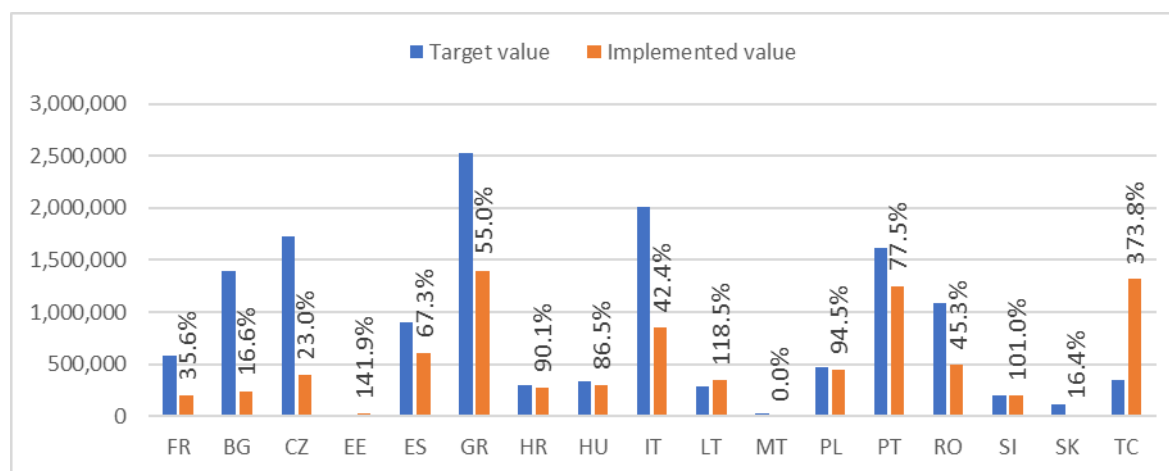
Preservation and restoration of natural resources

Figure 65 - Achievement rates CO18 (ENV: Improved water supply), by category of region



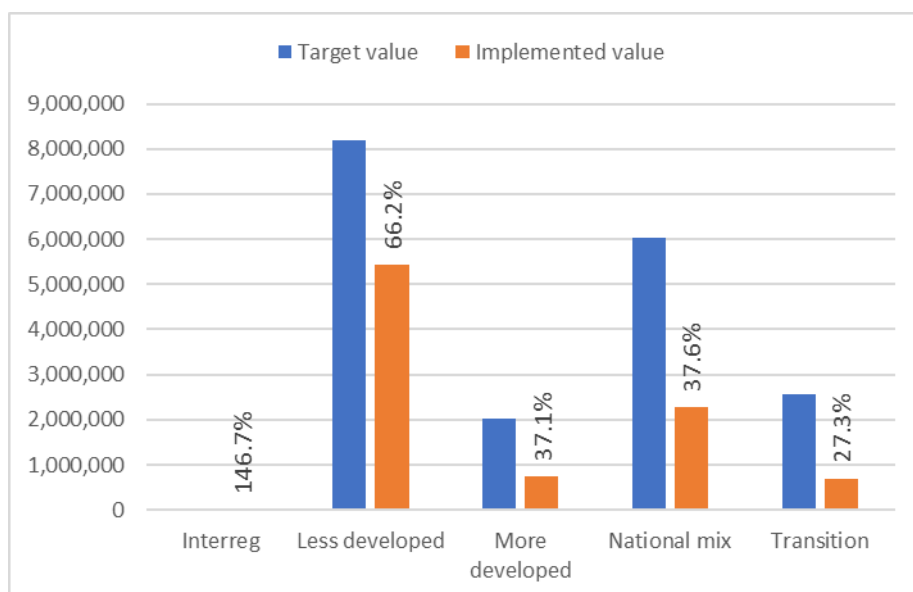
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 66 - Achievement rates CO18 (ENV: Improved water supply), by country



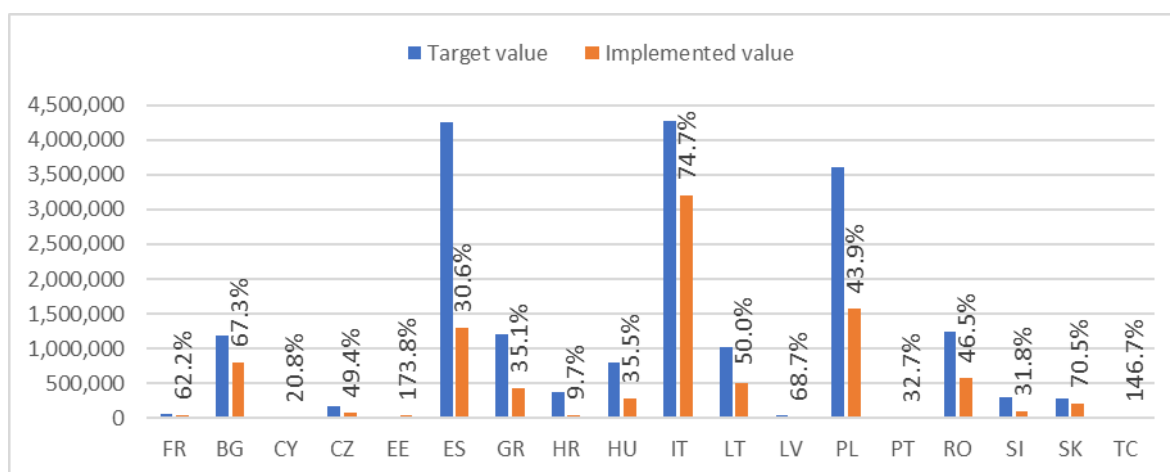
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 67 - Achievement rates CO19 (ENV: Wastewater treatment), by category of region

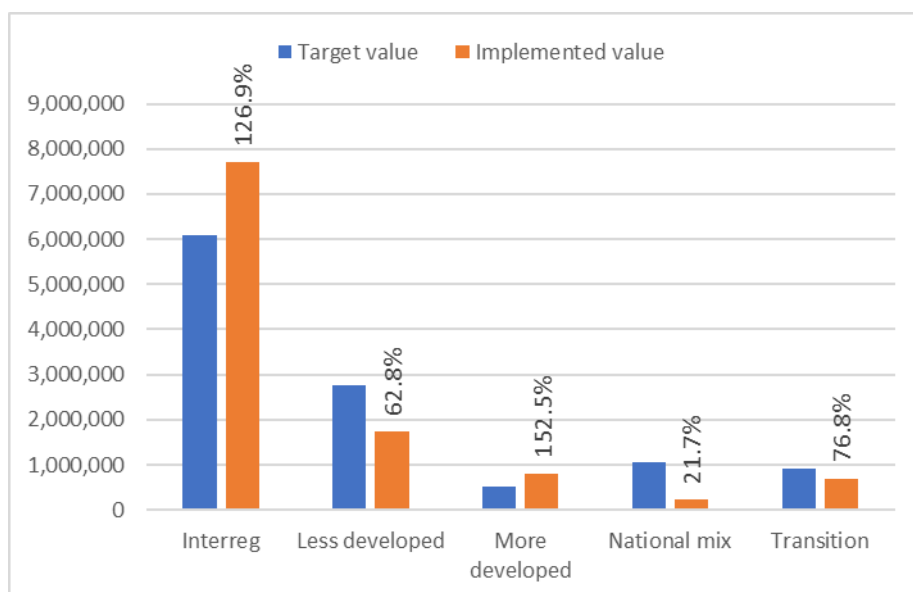


Source: Authors based on ESIF categorisation data 2014-2020.

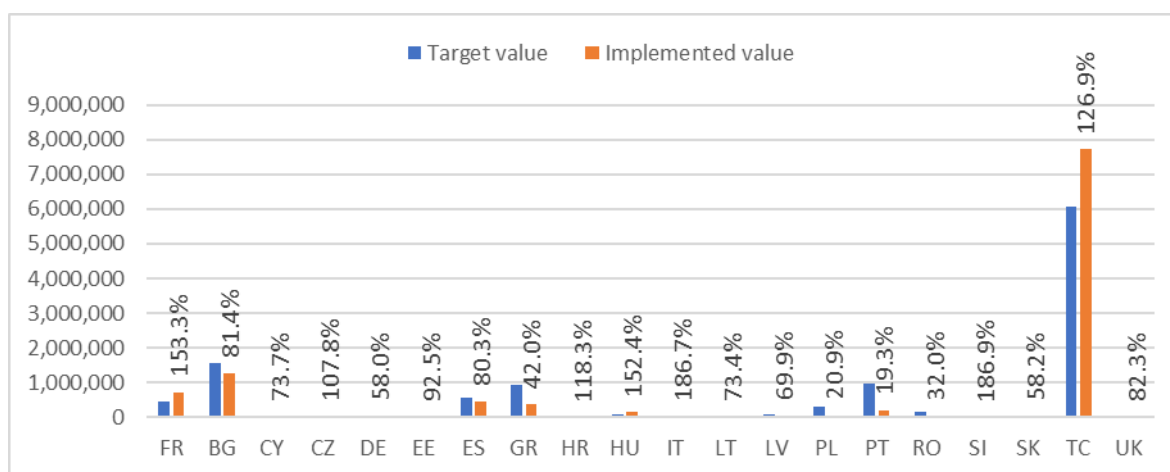
Figure 68 - Achievement rates CO19 (ENV: Wastewater treatment), by country



Source: Authors based on ESIF categorisation data 2014-2020.

Figure 69 - Achievement rates CO23 (ENV: Habitats conserved), by category of region

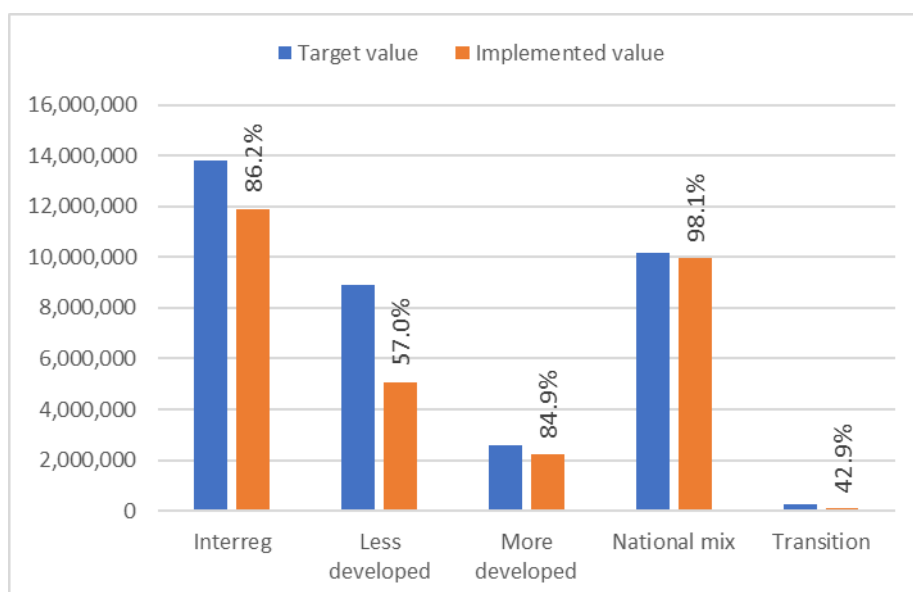
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 70 - Achievement rates CO23 (ENV: Habitats conserved), by country

Source: Authors based on ESIF categorisation data 2014-2020.

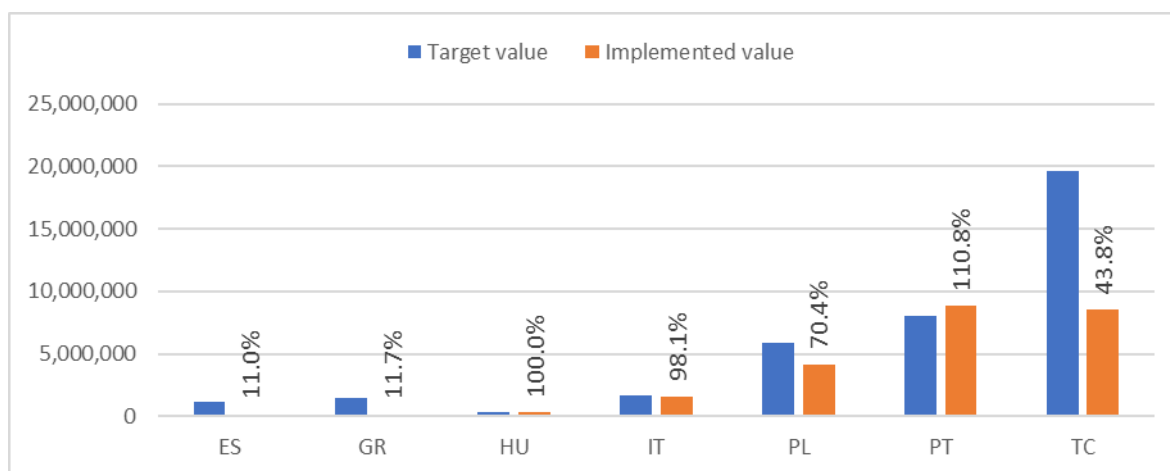
Adaptation and risk management

Figure 71 - Achievement rates CO20 (ENV: Flood protection), by category of region



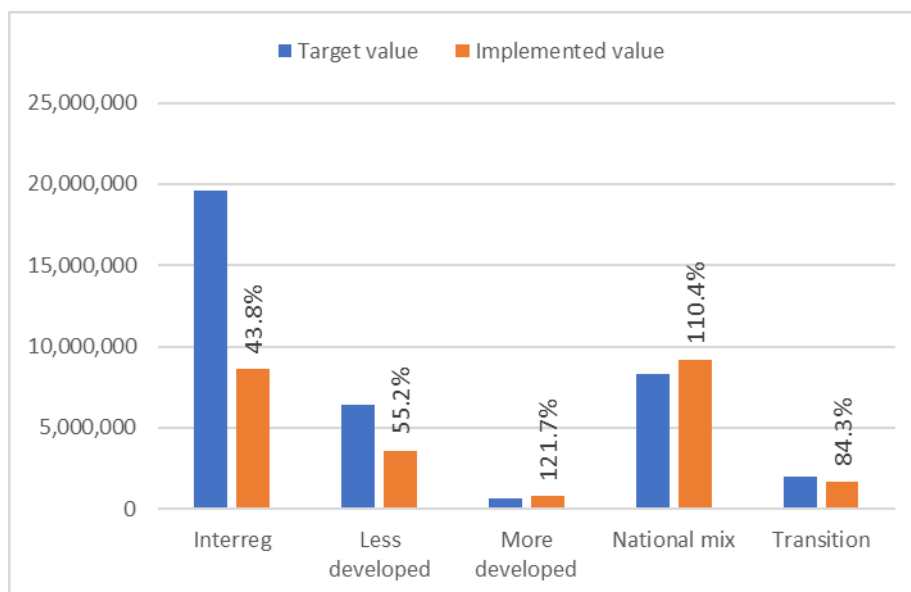
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 72 - Achievement rates CO20 (ENV: Flood protection), by country



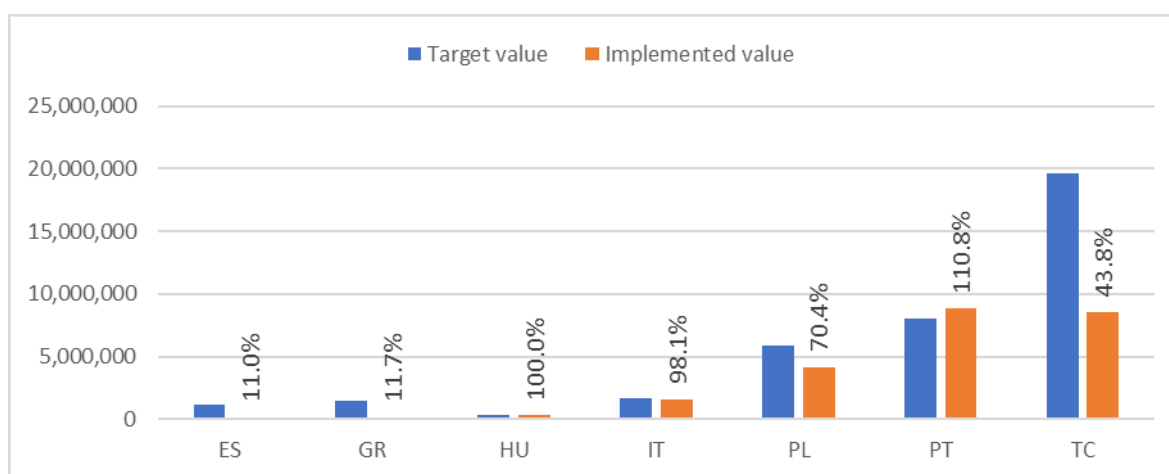
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 73 - Achievement rates CO21 (ENV: Forest fire protection), by category of region



Source: Authors based on ESIF categorisation data 2014-2020.

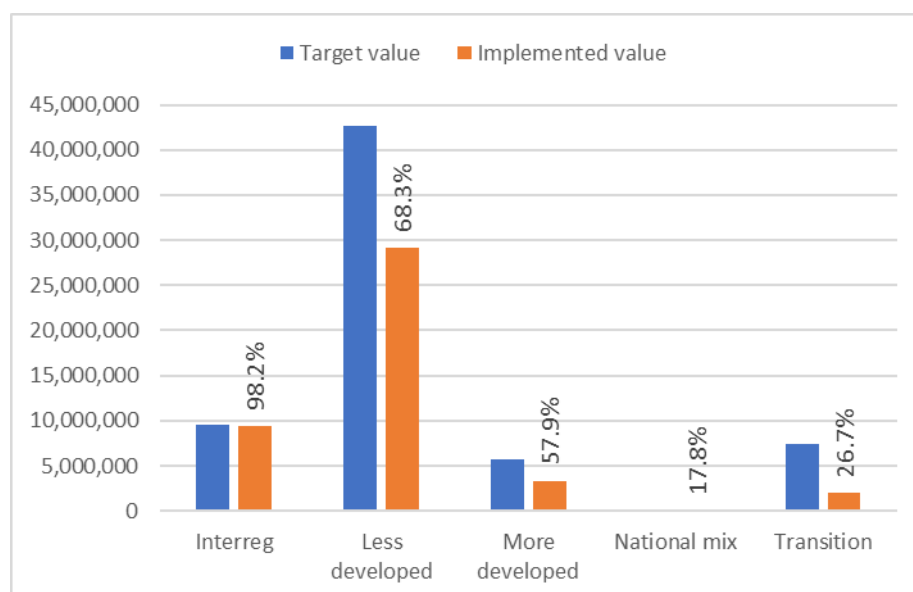
Figure 74 - Achievement rates CO21 (ENV: Forest fire protection), by country



Source: Authors based on ESIF categorisation data 2014-2020.

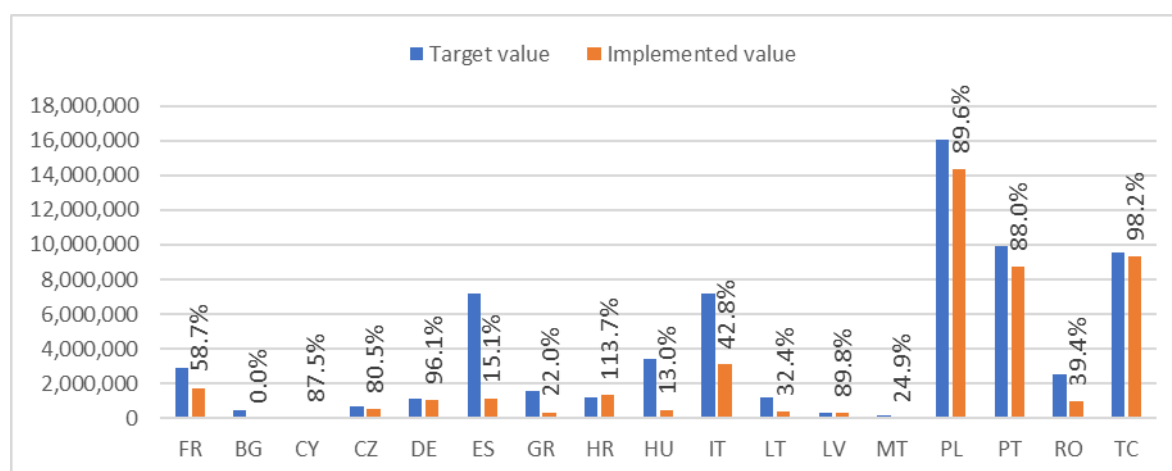
Protecting and developing cultural heritage

Figure 75 - Achievement rates CO9 (Tourism: New visitors), by category of region



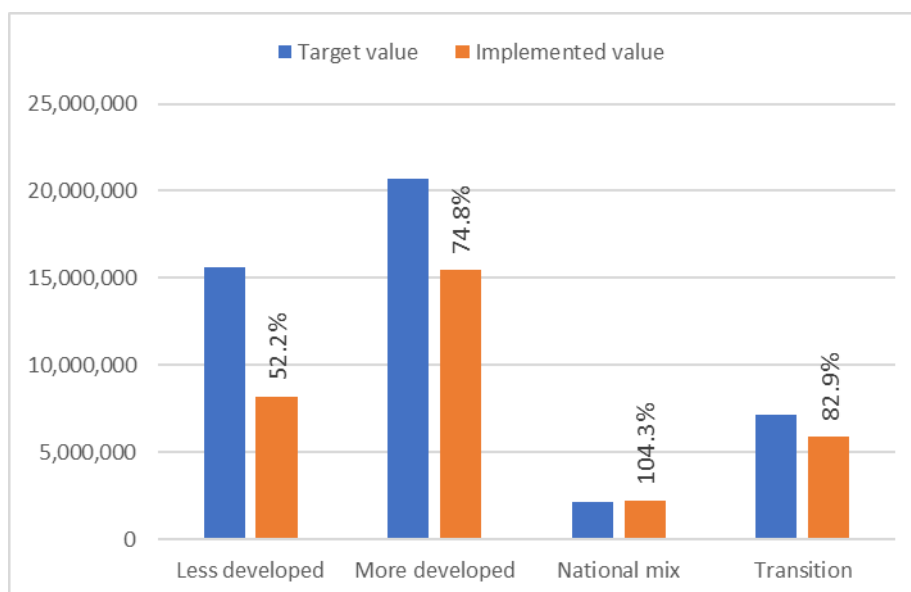
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 76 - Achievement rates CO9 (Tourism: New visitors), by country



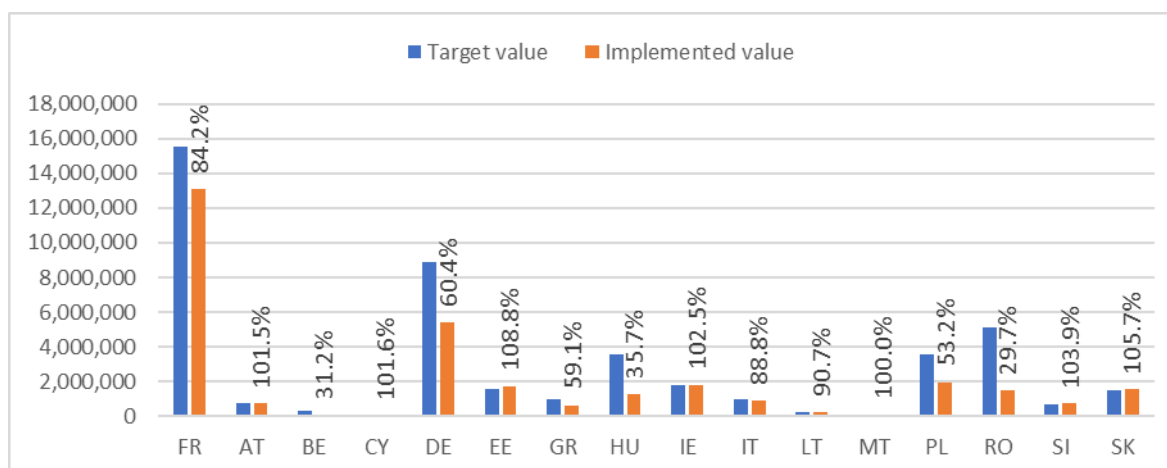
Source: Authors based on ESIF categorisation data 2014-2020.

Figure 77 - Achievement rates CO37 (Urban population with integrated strategy), by category of region



Source: Authors based on ESIF categorisation data 2014-2020.

Figure 78 - Achievement rates CO37 (Urban population with integrated strategy), by country

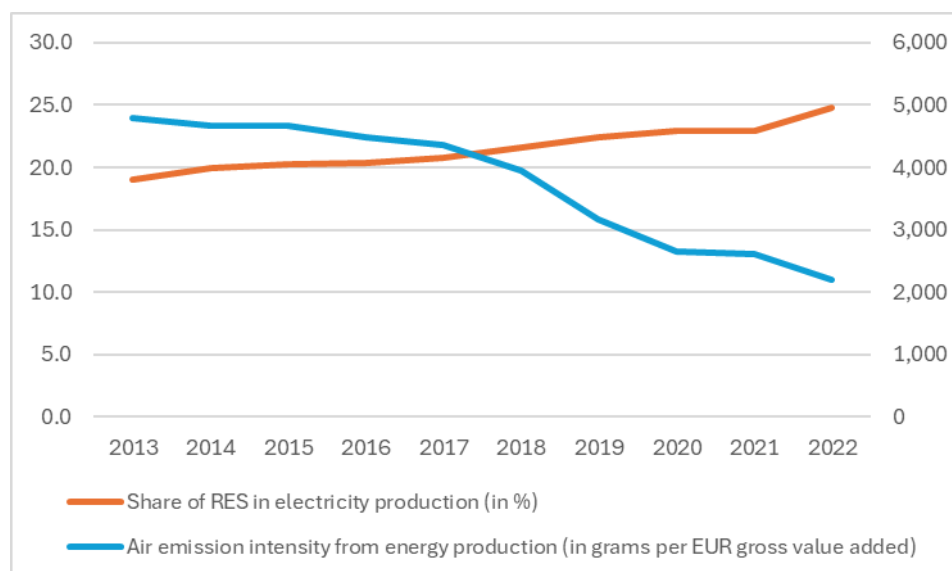


Source: Authors based on ESIF categorisation data 2014-2020.

Macro-level indicators

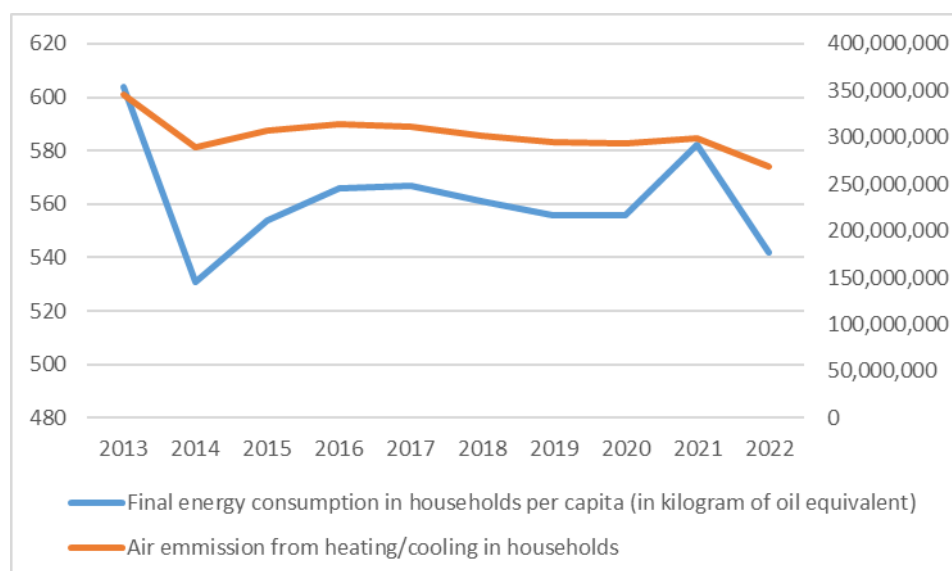
Transition towards a low-carbon economy

Figure 79 – Decarbonisation of energy production (EU27)



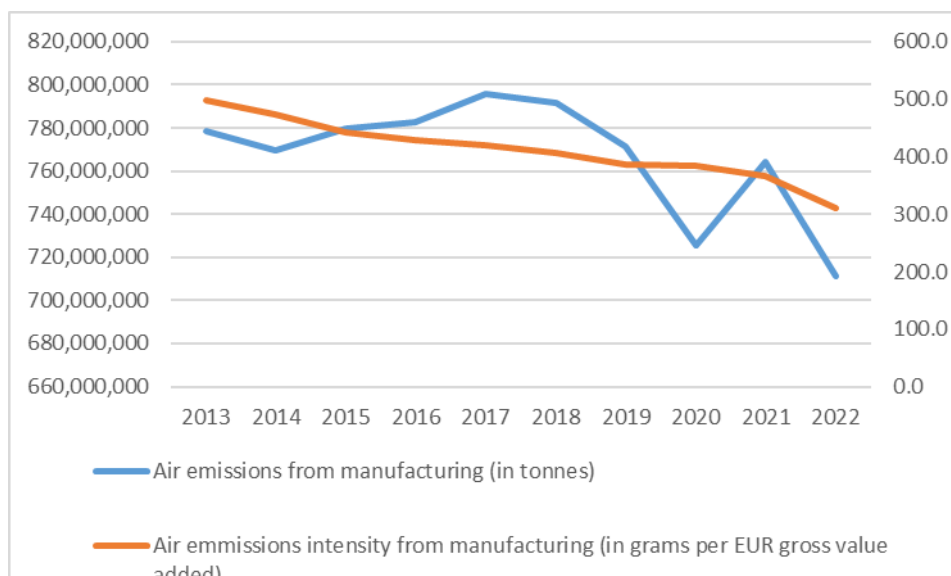
Source: Authors based on Eurostat data

Figure 80 – Decarbonisation of heating and cooling (EU27)



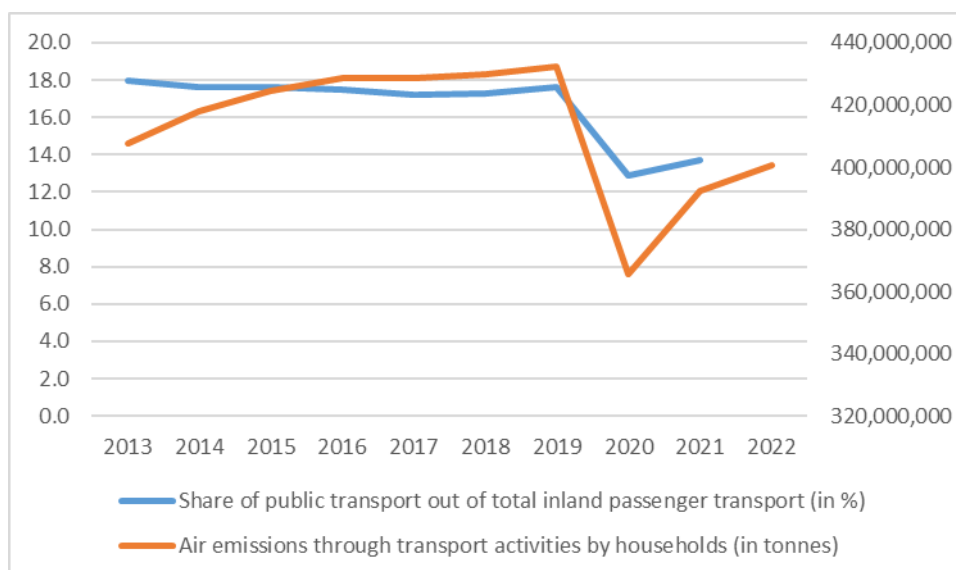
Source: Authors based on Eurostat data

Figure 81 – Decarbonisation of industrial activities (EU27)



Source: Authors based on Eurostat data

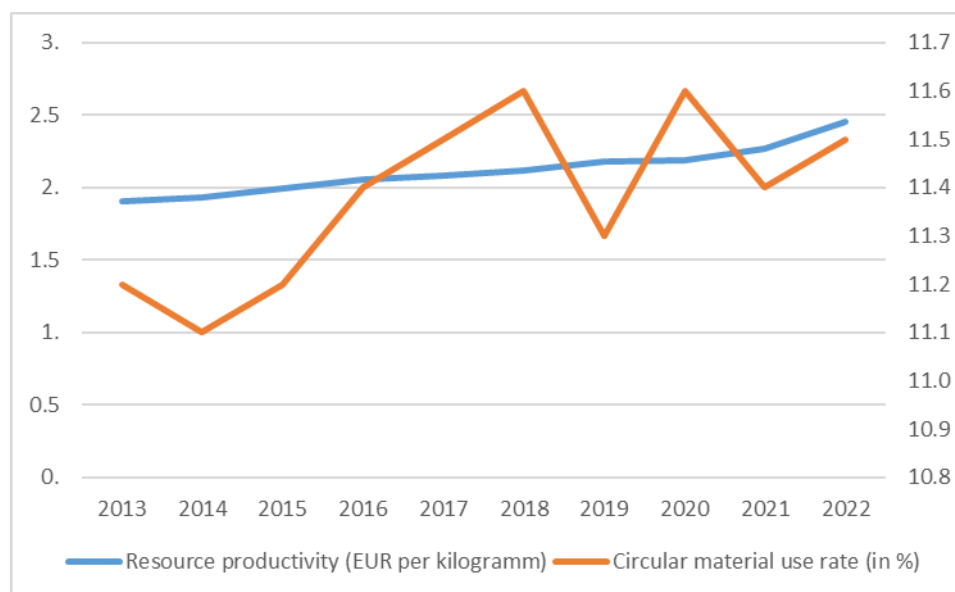
Figure 82 – Decarbonisation of transport (EU27)



Source: Authors based on Eurostat data

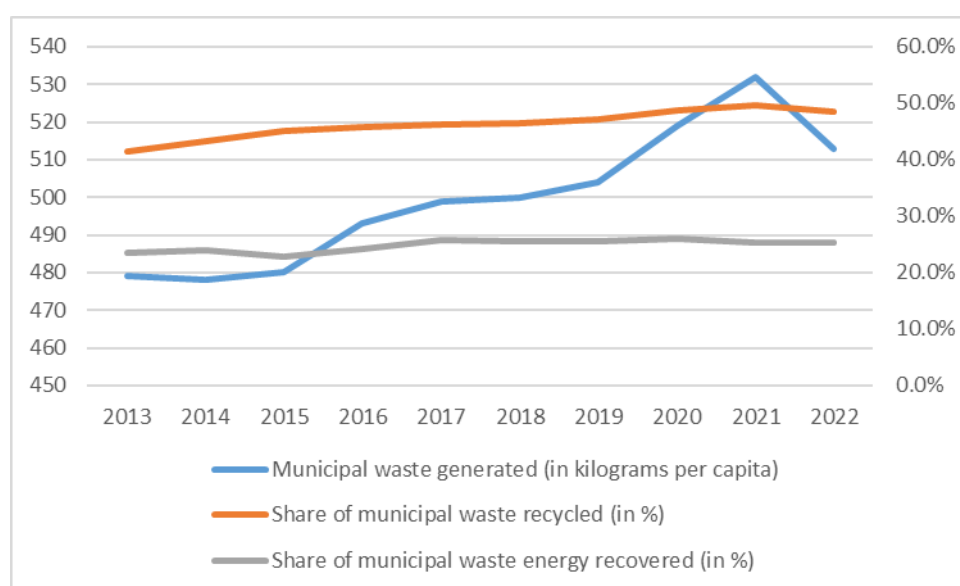
Increasing resource efficiency

Figure 83 – Resource efficiency (EU27)



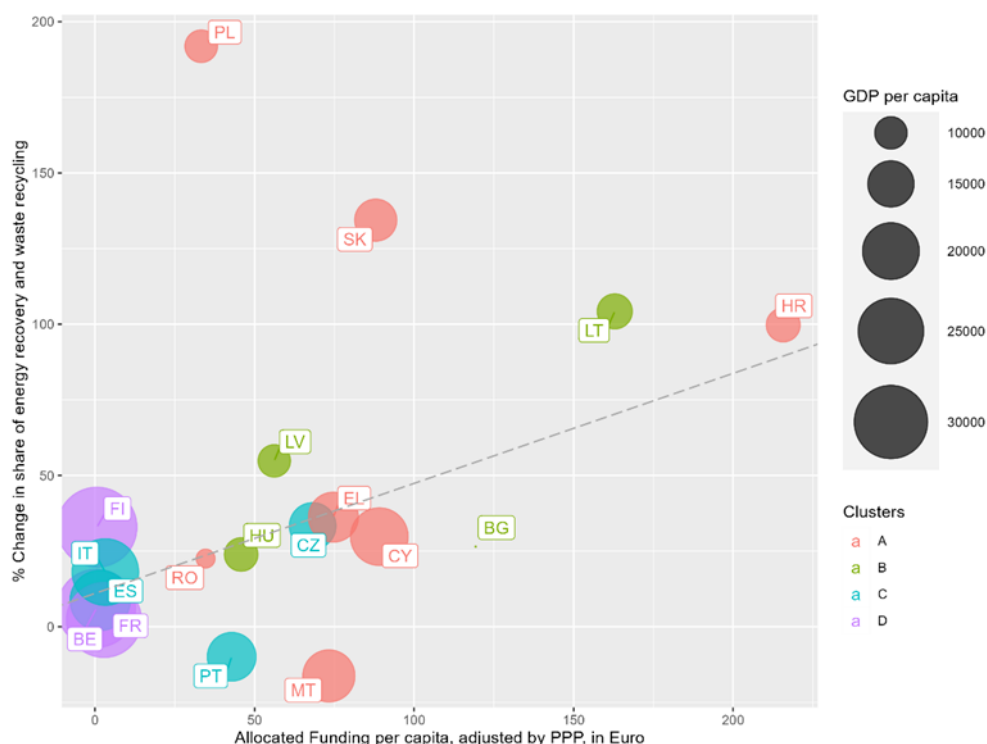
Source: Authors based on Eurostat data

Figure 84 – Waste generated and share of recycling and energy recovery (EU27)



Source: Authors based on Eurostat data

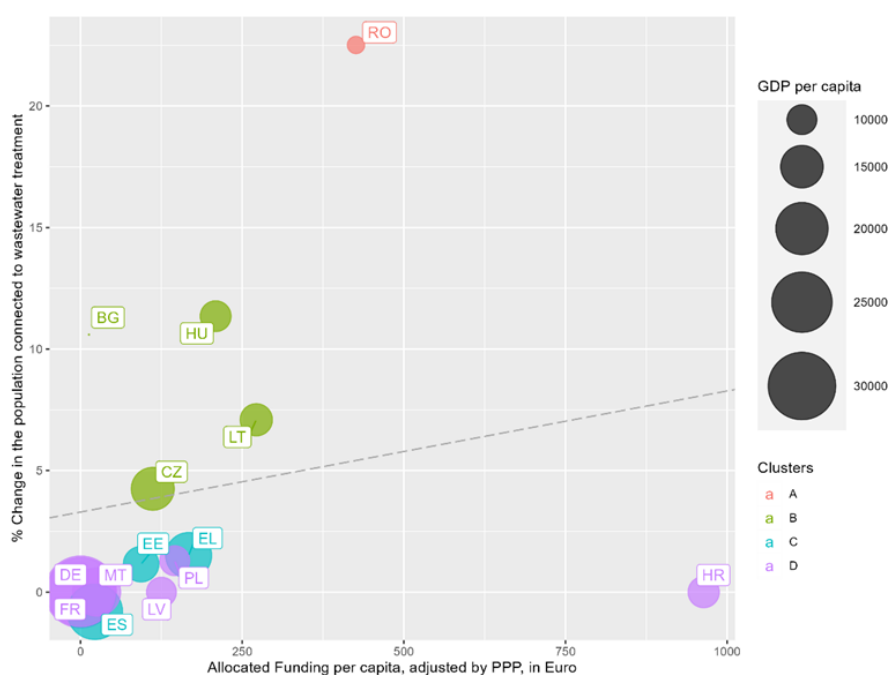
Figure 85 – Percentage change in share of municipal waste energy recovered and recycled between 2013 and 2020 against allocated funding per capita PPP in EUR for the policy instrument ‘waste’



Source: Authors, based on Eurostat and WP2 Funding Data.

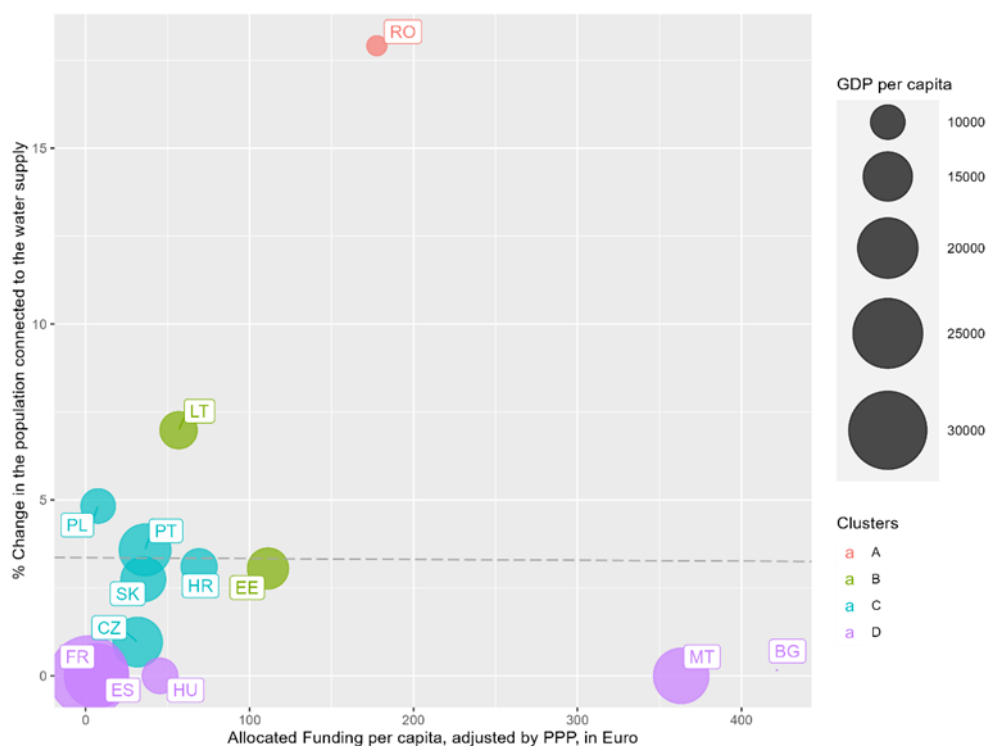
Preservation and restoration of natural resources

Figure 86 – Percentage change in population connected to wastewater treatment between 2013 and 2020 against the allocated funding per capita adjusted by PPP in EUR



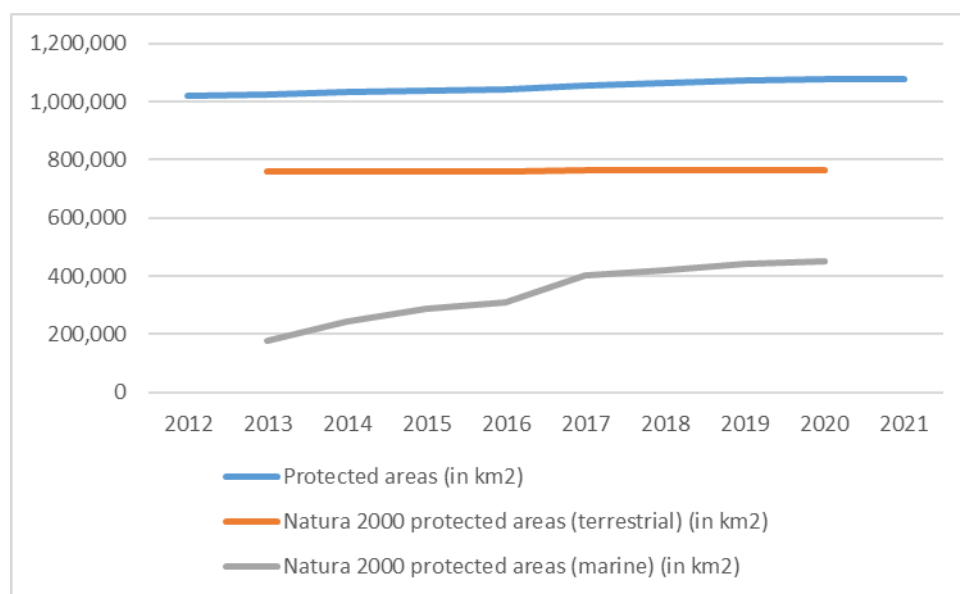
Source: Authors, based on Eurostat and WP2 Funding Data.

Figure 87 – Percentage change in population connected to water supply between 2013 and 2020 against the allocated funding per capita adjusted by PPP in EUR



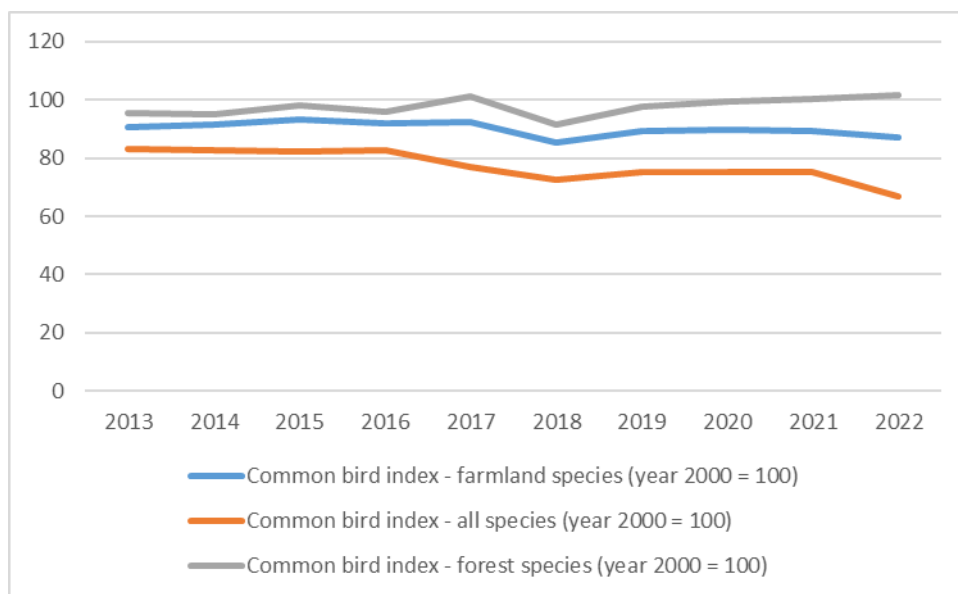
Source: Authors, based on Eurostat and WP2 Funding Data.

Figure 88 – Protected areas in the EU



Source: Authors based on Eurostat data

Figure 89 – Common bird indices



Source: Authors based on Eurostat data

Annex VIII – The role of ERDF and CF compared to national financing for environment

An assessment of the relevance and the value added of the ERDF and CF support for environment and climate would benefit from the ability to compare this support to national public spending. However, such data are not available, neither at PI nor at IF/TO level for all Member States. The COFOG (Classification of the Function of Government) database provides a breakdown of government spending across various sectors. Selecting from the database the government functions for which it is possible to find a reasonable (yet rough) counterpart in the cohesion policy breakdown - by thematic objectives and intervention fields²⁹⁷ - data can be identified that can inform considerations on the role of ERDF and CF in overall public spending for environment and climate. COFOG contains data that enables indicative comparison in the areas of water management, wastewater treatment, waste management, biodiversity protection, pollution reduction, investments in sustainable energy production sources and public building efficiency within the energy sector. However, meaningful comparisons cannot be made for sectors such as clean transportation, energy efficiency in businesses, soil protection, climate risk prevention and culture investments. As a result, the comparative analysis provided here covers about 55% of the cumulative planned European ERDF/CF support in environment and climate.

The comparison presented here relies on the latest updated planned EU contribution for the 2014-2020 programming period.²⁹⁸ However, since planned and actual expenditures might not always match at the end of the spending period, the cumulative portion of the EU contribution that had been certified as spent by 2022 is also reported in the graphs. In terms of government expenditure, the analysis is based on the total government spending for the same seven-year period. While the figures and graphs offer a good approximation of the relationship between EU and national government financing, they should be approached with caution as they utilise data sources that use different methods and expenditure categories.²⁹⁹

The figure below illustrates the indicative proportion the ERDF and CF provided compared to national government total expenditure considered. It is evident that the EU13 countries rely significantly more on the EU ERDF/CF funds than the EU14³⁰⁰ countries. In the latter group, most of the expenditure originates from national sources. However, Portugal and Greece stand out as exceptions in EU14. The proportion that the EU funding constitutes in these two countries is in line with the

²⁹⁷ The selected government functions for analysis include: 05.1 - Waste management, 05.2 - Waste water management, 05.3 - Pollution abatement, 05.4 - Protection of biodiversity and landscape, 05.6 - Environmental protection n.e.c, and 06.3 - Water supply. The Fields of Intervention (Fols) selected for comparison in the Cohesion Platform database are: 009, 010, 011, 012, 013, 014, 015, 016, 017, 018, 019, 020, 021, 022, 023, 083, 084, 085, 086, 091.

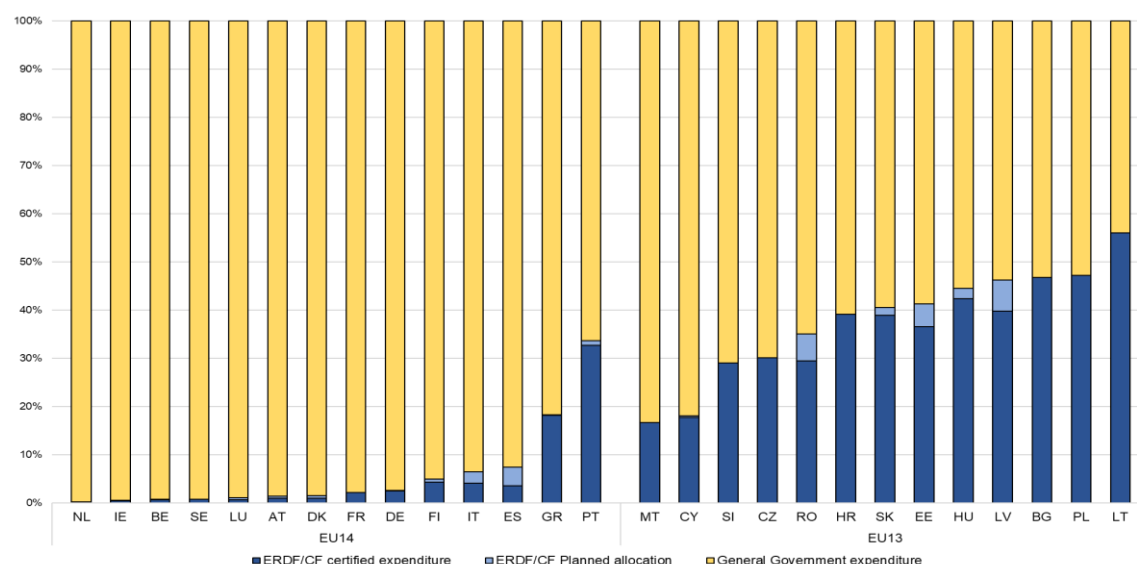
²⁹⁸ The analysis considers only the ERDF and CF funding, excluding the portion of national co-financing from the calculation.

²⁹⁹ In addition to the fact that in the early years of programming the certified expenditure is naturally zero or very low, given the normal implementation times of the program, the spending for the Cohesion policy continues under the n+3 rule for an additional three years beyond the programming period. Therefore, to obtain a comparable figure with government spending, we consider both the planned allocation that tracks the reprogramming and the cumulative expenditure for ERDF and CF funds until 2022. These are compared with the cumulative government spending over the seven-year period between 2014 and 2020.

³⁰⁰ The United Kingdom has been excluded from the analysis as there were no data available in the COFOG database.

level in some of the EU13 countries. This can be attributed to them being covered also by the CF. This ensures a substantial additional allocation of resources, with a significant proportion mandated by the fund's regulations³⁰¹ to be directed towards environmental initiatives.

Figure 90 – ERDF/CF and general government expenditure in environment

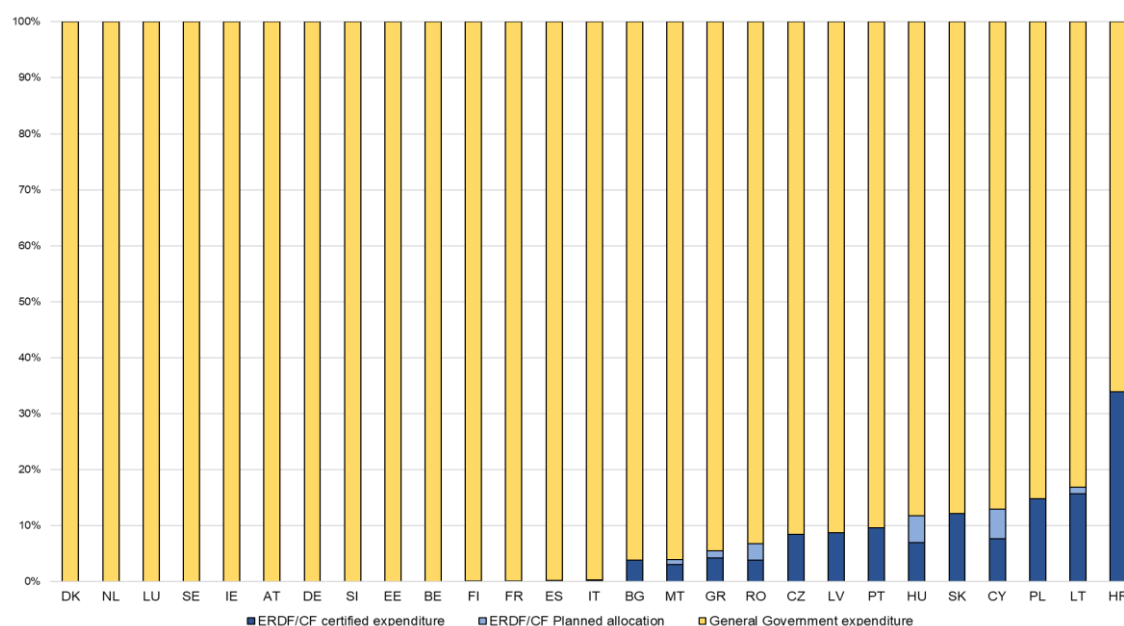


Source: Authors elaboration based on Cohesion Portal data and COFOG database

When considering the EU14 Member States that do not benefit from the CF, there are differences between small and larger countries that also include less developed regions. In smaller, economically developed Member States the ERDF contribution to environmental/climate investments is negligible compared to the level of national expenditure. Conversely, in the larger Member States with less developed regions included in their territory, the ERDF contribution represents a non-negligible share. In Sweden, the Netherlands, Belgium, Ireland and Austria, environmental spending from ERDF is below 1%. On the other hand, in Spain and Italy, the planned contribution of ERDF to climate/environment expenditure is 7.5% and 6.5% respectively.

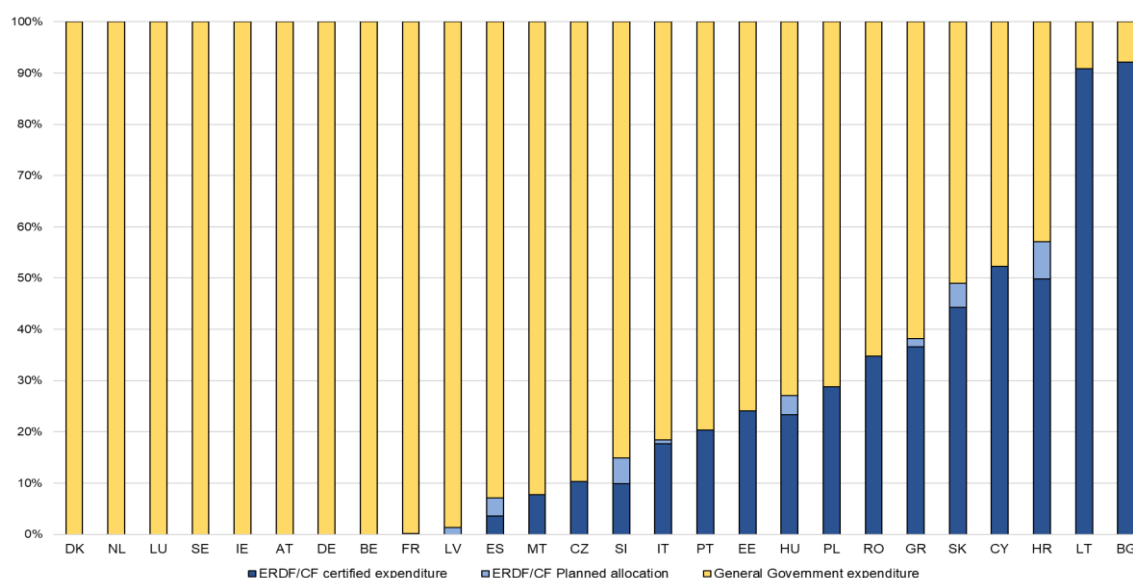
Looking at the waste sector alone, the weight of ERDF and CF funds compared to general government expenditure is generally the lowest among the sectors considered. As of 2022, 10 Member States did not have any certified ERDF/CF expenditure for investments in waste management, and in Spain, France, Italy and Finland ERDF/CF represented less than 1% of the total.

³⁰¹ Regulation (EU) 2021/1058 on the European Regional Development Fund and on the Cohesion Fund. Official Journal of the European Union, L, 261, 1-260, Article 2.

Figure 91 – ERDF/CF and general government expenditure in waste management

Source: Authors elaboration based on Cohesion Portal data and COFOG database

When it comes to wastewater infrastructure management, the ERDF/CF play a much more significant role in the financing of investments. The ERDF/CF share is over 90% of the total expenditure in Lithuania and Bulgaria. Even in some of the EU14 countries the role of ERDF and CF funding in wastewater investments is substantial. Greece thus stands out with about 38% of its wastewater expenditure coming from ERDF and CF funds, while in Portugal and Italy the corresponding share is 20%.

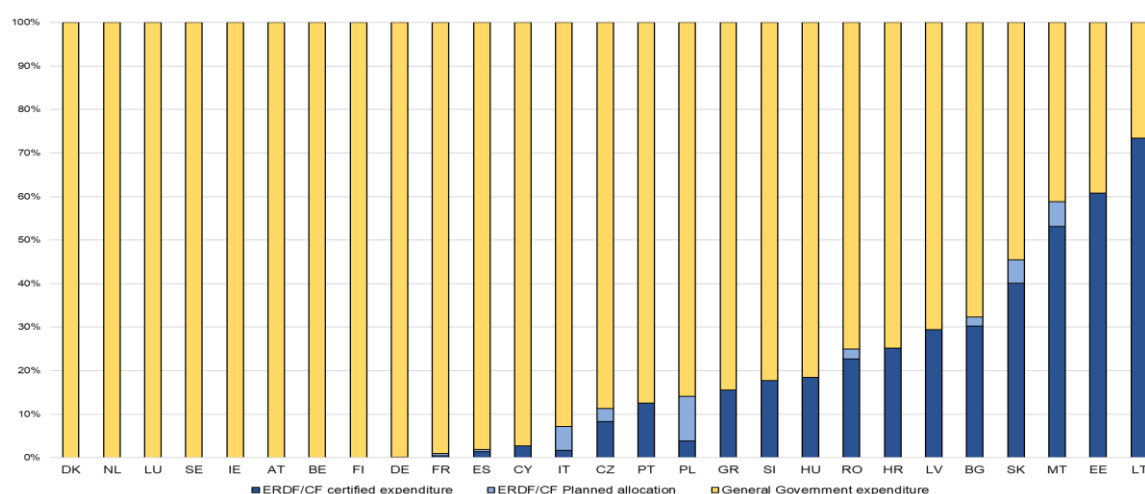
Figure 92 – ERDF/CF and general government expenditure in wastewater

Source: Authors elaboration based on Cohesion Portal data and COFOG database

Note: According to the available data, Finland does not appear to have invested in wastewater projects using either of the funding sources.

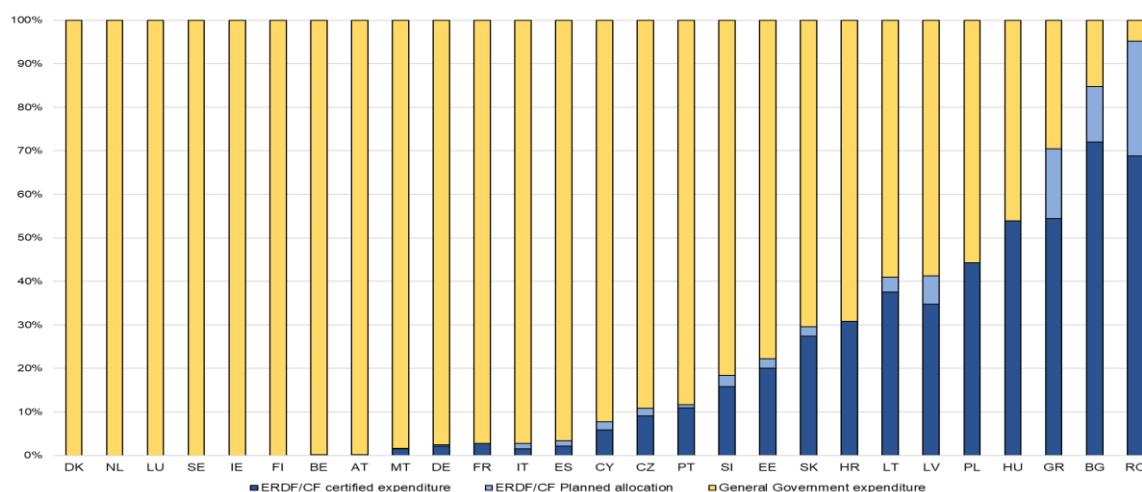
The COFOG database does not categorise **water**-related expenses under environmental spending but rather under housing and community amenities. However, it encompasses various aspects of water resource management, including the provision of clean drinking water, control of its quality, pricing, availability, and infrastructure investments for distribution, making it somewhat comparable to the water-related intervention fields from the Cohesion funds. Eight Member States do not have ERDF/CF funded water management investments, and in France it constitutes less than 1% of total expenditure. Among the Member States that allocate ERDF and CF resources for water management, there is a heterogeneous distribution of the significance of the funds. It is worth highlighting their significant role in Malta, Estonia and Lithuania where ERDF/CF represent 59%, 61% and 73% of total resources.

Figure 93 – ERDF/CF and general government expenditure in water



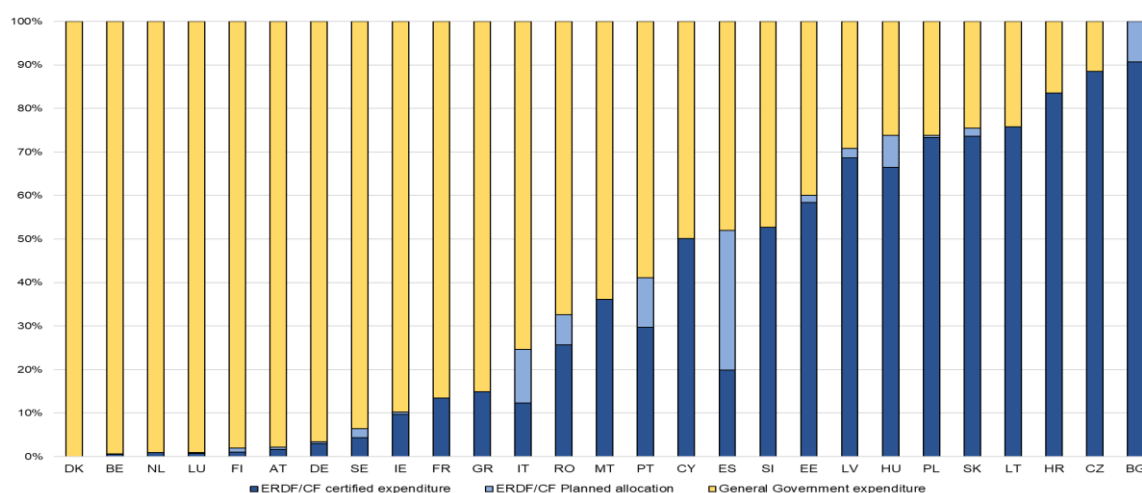
Source: Authors elaboration based on Cohesion Portal data and COFOG database. Note: According to the available data, Denmark does not appear to have invested in water projects using either of the funding sources.

Also, when it comes to expenditures for **biodiversity and landscape** protection, there is significant variation in the relative weight of Cohesion Policy funds on the overall expenditure in Member States. In eight Member States, this area is not supported through ERDF/CF resources. Notably, Romania stands out as almost completely relying on ERDF and CF funds for financing of initiatives in biodiversity and landscape protection.

Figure 94 – ERDF/CF and general government expenditure in biodiversity and landscape

Source: Authors elaboration based on Cohesion Portal data and COFOG database.

ERDF and CF expenditure for **pollution reduction** plays a significant role in many Member States. This also includes Member States that do not have any CF/ERDF spending in the other areas considered in this analysis. This applies in Ireland where ERDF/CF funding account for almost 10% of its spending in pollution reduction. This can be attributed to two main factors. Firstly, within the COFOG database, the pollution reduction sector encompasses traditional direct pollution reduction systems and investments to reduce pollution through renewable energy sources. This broadens the scope of the comparable ERDF and CF-funded operations under this category. Secondly, the significant share in this area can be attributed to the fact that almost all Member States, especially those with limited Cohesion Policy funding, have prioritised a concentration of resources towards the energy sector.

Figure 95 – ERDF/CF and general government expenditure in pollution reduction

Source: Authors elaboration based on Cohesion Portal data and COFOG database.

Figure 96 – Energy efficiency renovation of housing stock & demo

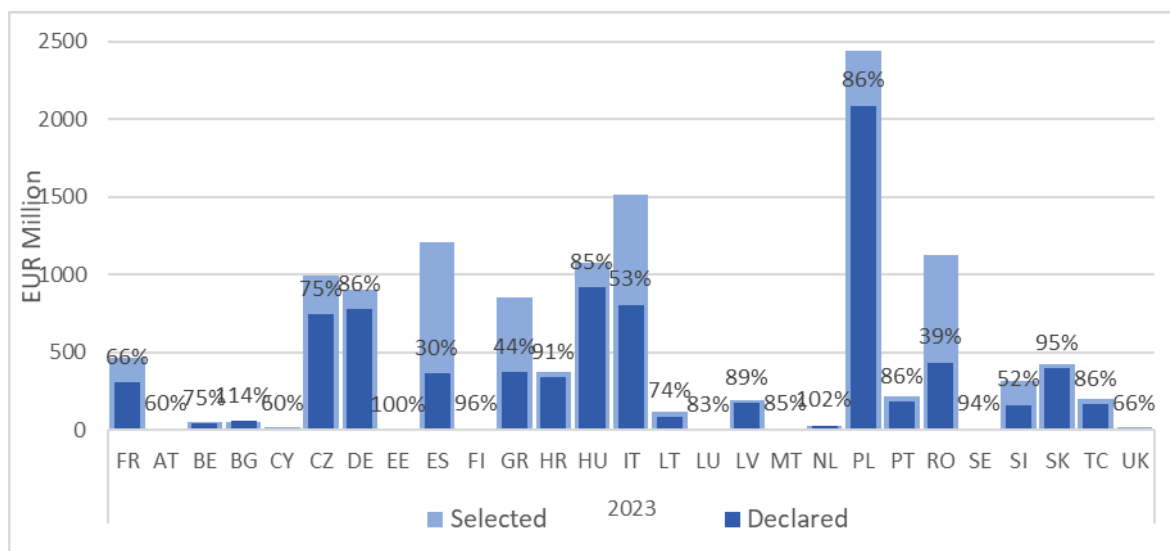


Figure 97 – Energy efficiency renovation of housing stock & demo

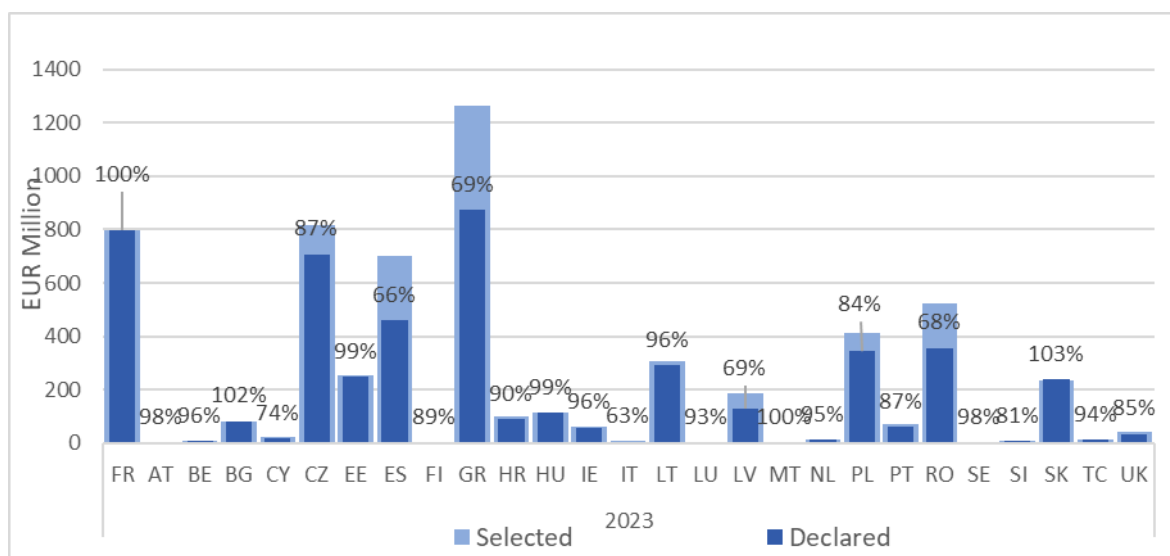


Figure 98 – Clean urban transport infrastructure & promotion

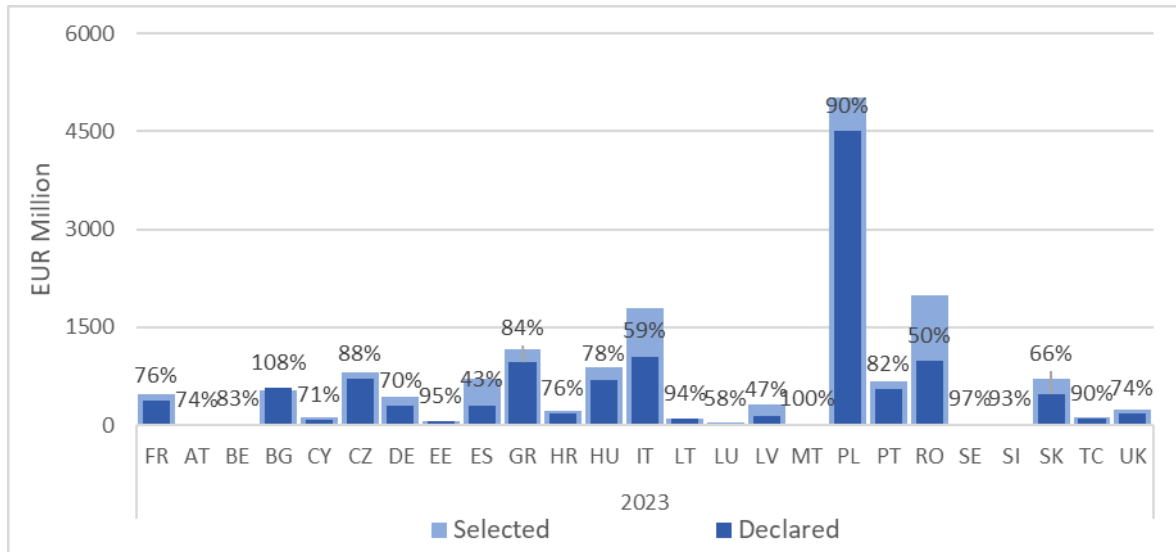
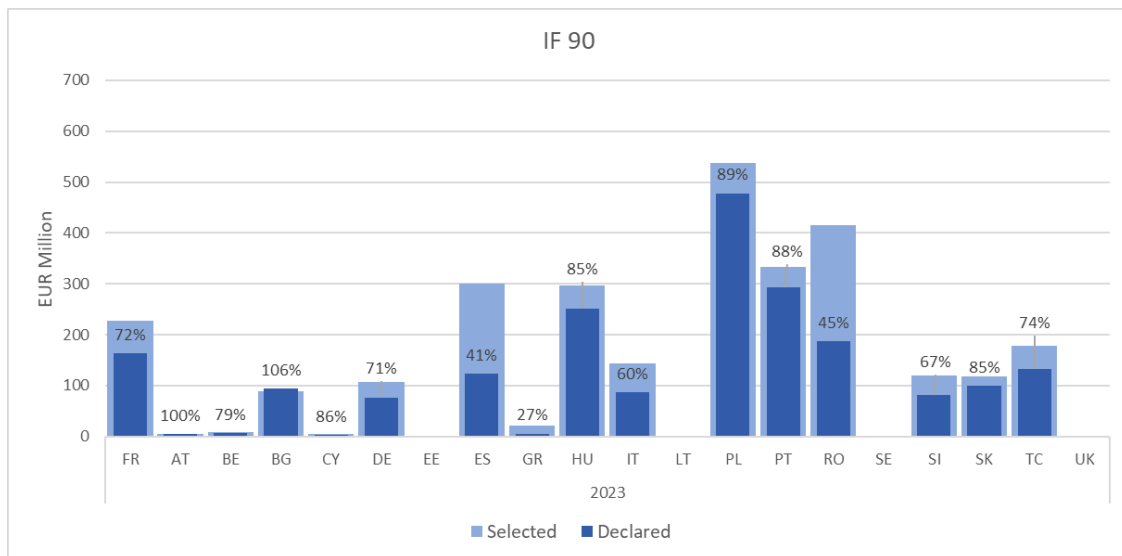


Figure 99 - Cycle tracks and footpaths



Annex IX – Country fiches

The country fiches are presented as self-standing document accompanying this report. These includes:

- (1) Austria
- (2) Belgium
- (3) Bulgaria
- (4) Croatia
- (5) Republic of Cyprus
- (6) Czechia
- (7) Denmark
- (8) Estonia
- (9) Finland
- (10) France
- (11) Germany
- (12) Greece
- (13) Hungary
- (14) Ireland
- (15) Italy
- (16) Latvia
- (17) Lithuania
- (18) Luxembourg
- (19) Malta
- (20) Netherlands
- (21) Poland
- (22) Portugal
- (23) Romania
- (24) Slovakia
- (25) Slovenia
- (26) Spain
- (27) Sweden
- (28) UK

Annex X – Policy instrument fiches

The policy instrument fiches are presented as a self-standing document accompanying this report. They include:

- (1) Adaptation and risk management
- (2) Clean transport
- (3) Culture
- (4) Energy efficiency in buildings
- (5) Energy efficiency in enterprises
- (6) Green economy
- (7) Nature and biodiversity
- (8) Pollution reduction
- (9) Sustainable energy
- (10) Waste
- (11) Wastewater
- (12) Water

Annex XI – Case studies

The policy instrument fiches studies are presented as self-standing document accompanying this report. These includes:

- (1) Adaptation and risk management
- (2) Clean transport
- (3) Culture
- (4) Energy efficiency in buildings
- (5) Energy efficiency in enterprises
- (6) Green economy
- (7) Nature and biodiversity
- (8) Pollution reduction
- (9) Sustainable energy
- (10) Waste
- (11) Wastewater
- (12) Water
- (13) Climate tracking (horizontal case study)
- (14) Financial instruments (horizontal case study)
- (15) Contribution to EGD (horizontal case study)

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