



Subnational Government **Climate Expenditure and Revenue Tracking** in OECD and EU Countries

Subnational Government Climate Expenditure and Revenue Tracking in OECD and EU Countries

Monitoring progress towards meeting the Paris Agreement requires improving the tracking and measurement of public climate expenditure, investment, and revenues. This OECD working paper was prepared as part of the joint OECD-European Commission project on “Financing Climate Action in Regions and Cities”. It presents a pilot methodology for tracking, measuring, and comparing subnational government climate-significant expenditure and investment in OECD and EU countries based on National Accounts data. It also includes an analysis of the data collected, which is available in the new OECD Subnational Government Climate Finance database, and a stocktake of existing climate finance tracking initiatives. On the revenue side, the paper presents an analysis of climate-related public revenue sources available to subnational governments in OECD and EU countries, the results of which are available in the new online Compendium of Financial Instruments that Support Subnational Climate Action.

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Keywords: subnational government, climate finance, climate expenditure, environment, climate action, regional government, local government



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Foreword

Accounting for almost 60% of public investment and 40% of public expenditure in OECD countries, regional and local governments, who have jurisdiction over key policy areas relevant to the green transition such as land-use planning, housing development, waste, water, energy, and transport, play a key role in achieving climate and environmental objectives. However, only limited evidence exists to establish how much subnational governments spend and invest on climate change, and if their sources of revenue are able to fund the needs of the green transition.

To bridge this data gap, the Centre for Entrepreneurship, SMEs, Regions and Cities (CFE) and the European Commission (DG REGIO) have joined forces to measure climate expenditure and revenue tracking of subnational governments in OECD and EU countries, and, in turn, assess and monitor the fiscal capacity of subnational governments to develop and implement their climate action policies and provide evidence to support policy-makers in mobilising public and private funding and financing instruments to drive subnational climate action.

Building on a pilot methodology (OECD, 2019^[1]), this report presents the methodology and findings developed by the OECD to track subnational climate-significant expenditure and revenue flows. The first section takes stock of past or current subnational climate finance tracking initiatives in OECD and EU countries and internationally. The second presents key findings from the new online Subnational Government Climate Finance Database; populated using the updated subnational government climate expenditure and investment tracking methodology. It also introduces the Compendium of Financial Instruments that Support Subnational Climate Action; a repository of public climate-related sources of funding for subnational governments in OECD and EU countries. The third section details the methodology used to develop the Subnational Government Climate Finance Database.

This report is part of a broader joint OECD-European Commission project on “*Measuring and Enhancing Subnational Government Finance for Environment and Climate Action in OECD and EU Countries*” which started in October 2020. The project also focuses on subnational green budgeting, and provides a more granular analysis of subnational government green expenditure, investment, and revenues (OECD, 2022^[2]).

This report reflects discussions, deliberations and findings from two virtual workshops (October 13 and November 10 2021, the latter held during COP26) as well as bilateral meetings with key stakeholders. The report was submitted to Regional Development Policy Committee delegates for comments under written procedure in May 2022 [CFE/RDPC(2022)17]. It is published under the OECD Regional Development Papers series.

This work is part of OECD programme on *Financing Climate Action in Regions and Cities*. It was prepared under the leadership of the OECD Regional Development Policy Committee, with support from the RDPC Expert Group on Multi-Level Governance for Regional Development.

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The report was led and co-ordinated by Isabelle Chatry, Head of the Decentralisation, Subnational Finance and Infrastructure Unit under the supervision of Dorothée Allain-Dupré, Head of the Regional Development and Multi-Level Governance Division in CFE. The report was drafted by Isabelle Chatry, Kate Power, and Charlotte Lafitte from CFE and Alexis Robert, Principal at OnClimate - Urban Climate Policy and Funding Advisory, with inputs from Rose Camille Vincent, post-doctoral Researcher and Chair of Public Economics at ETH Zürich and Youssef Bouri (CFE). The report benefitted from inputs and comments from Nadim Ahmad, Deputy Director of CFE and Mauro Migotto in the OECD Environment Directorate.

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Executive summary

Accounting for almost 60% of public investment and 40% of public expenditure in OECD countries, regional and local governments, who have jurisdiction over key policy areas relevant to the green transition such as land-use planning, housing development, waste, water, energy, and transport, play a key role in achieving climate and environmental objectives. However, only limited evidence exists to establish how much subnational governments spend and invest on climate change, and if their sources of revenue are able to fund the needs of the green transition. The little that is known is just the tip of the iceberg.

Improving the measurement of subnational government climate-related expenditure and revenues flows can help bridge this data gap and improve the knowledge of the financial role of regional and local governments in the green transition. It can contribute to broader efforts to measure the progress that subnational government are making towards the Paris Agreement commitments and other environmental objectives. As stated in Article 2c of the Paris Agreement, meeting climate objectives requires “making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development” (UNFCCC, 2015^[3]).

Beyond this, tracking subnational government climate finance can help assess and monitor the fiscal capacity of subnational governments to develop and implement their climate action plans and policies as well as provide empirical evidence to guide policy-makers in mobilising public and private funding and financing instruments to further support subnational climate action.

This joint project developed by the OECD (CFE) and the European Commission (DG REGIO) seeks to enhance the tracking, measurement and mobilisation of subnational government climate finance in OECD and EU countries.

To situate the OECD subnational government climate finance tracking methodology within the broader climate finance tracking literature and to develop a common terminology and understanding of subnational government climate finance, the work starts by presenting a review of existing international, national, and subnational government climate finance tracking initiatives in OECD and EU countries. The review identified only one international exercise focused on the subnational level while four national-level initiatives have included a subnational component.

Methodologies to track, estimate and report climate finance exhibit considerable variation in terms of what is counted depending on the purpose and scope of the tracking exercise. This heterogeneity can be attributed to several key variables, including geographic scope, recipients, objectives, instruments, point of measurement and type of flows. Among the variety of climate finance tracking exercises that exist, very few include subnational government climate finance in their scope.

The review did not identify any national climate finance tracking initiatives with an exclusive subnational focus; however, four of the nine national-level initiatives have, or will have in the case of Mexico, a subnational component to them. These include the initiatives from Colombia, France, Mexico and the Netherlands.

The OECD subnational climate finance tracking methodology has two components: one component focusing on climate expenditure and investment, and another focusing on climate-related revenue sources. The methodology has been used to develop the *OECD Subnational Government Climate Finance Database* and the *Compendium of Financial Instruments that Support Subnational Climate Action in OECD and EU Countries*, hereafter referred to as the Compendium. These two outputs are complementary. The database includes data on subnational government climate-significant expenditure and investment in OECD and EU countries, while the compendium includes qualitative data on some climate-related revenue sources available to subnational governments in OECD and EU countries.

On the expenditure side, the database is the first of its kind to provide internationally comparable data on subnational government climate-significant expenditure and investment. The database is populated with data collected using the OECD's pioneering subnational government climate finance methodology, developed initially in 2018 (OECD, 2019^[1]) and refined for this project. It relies on Classification of the Functions of Government (COFOG) data from the OECD's National Accounts database, which is a unique repository of internationally comparable and harmonised government expenditure data. The methodology also uses the EU Taxonomy for Sustainable Activities to determine what constitutes climate-significant expenditure and investment, and applies it to 33 OECD and EU countries for which there is sufficient data.

An analysis of the database reveals that in 2019, subnational governments accounted for 63% of climate-significant public expenditure (1.1% of GDP) and 69% of climate-significant public investment (0.4% of GDP), on average, in 33 OECD and EU countries. Between 2009 and 2019, subnational climate-significant expenditure and investment increased annually (in real terms) in a majority of OECD and EU countries. However, the combined OECD and EU average annual increase was relatively low: 1.4% for investment and 2.5% for expenditure, ranging from a 10% annual average increase in investment in Denmark to a 15% annual average decrease in Ireland.

Climate expenditures, however, are only one half of the picture. Supporting subnational government climate action also requires having a better understanding of existing climate-related revenue sources available to them, so that relevant recommendations on how to enhance climate finance can be made. Due to the lack of financial data on climate-significant revenue, it was necessary to develop a qualitative methodology. The Compendium of Financial Instruments that Support Subnational Government Climate Action was thus created in order to provide concrete evidence of the diversity and accessibility of some revenue sources available to subnational governments in OECD and EU countries to fund and finance their climate action.

With over 300 instruments identified in almost all countries in the OECD and EU, the Compendium shows that earmarked grants and funds are by far the most common type of climate-related funding instruments available for subnational governments in the OECD and EU, but there is scope for increasing the use of other financing instruments such as loans, loan guarantees, and contracts. Municipalities are the most common beneficiary of climate-related funding instruments. The energy and buildings sectors are the two most common sectors receiving funding.

This joint OECD-European Commission project advances the measurement of subnational climate-related expenditure and revenue in OECD and EU countries as well as the understanding of the financial role of regions and cities in catalysing the green transition. However, more remains to be done in several areas including the need to adapt public financial accounting and statistical systems to include climate change considerations and to mainstream environmental and climate objectives into subnational funding and financing mechanisms.

Abbreviations and acronyms

CCFLA	Cities Climate Finance Leadership Alliance
CFL	Climate Finance Landscape
COFOG	Classification of the Functions of Government
COP	Conference of Parties
CPI	Climate Policy Initiative
DAC	Development Assistance Committee
EC	European Commission
EU	European Union
GFLAC	Climate Finance Group for Latin America and the Caribbean
GHG	Greenhouse gas
I4CE	Institute for Climate Economics
IDFC	International Development Finance Club
IMF	International Monetary Fund
MDB	Multi-lateral development bank
MRV	Monitoring, Reporting and Verification
NACE	<i>Nomenclature statistique des activités économiques dans la Communauté européenne</i> (Statistical Classification of Economic Activities in the European Community)
NDC	Nationally Determined Contribution
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
RRF	Recovery and Resilience Facility
SNGs	Subnational governments
TEG EU	Technical Expert Group on Sustainable Finance
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

Introduction

Regions and cities are important actors in the carbon-neutral transition; not least because they are simultaneously both highly vulnerable to the impacts of climate change and major green-house gas emitters. Moreover, subnational governments often have jurisdiction over key policy areas relevant to the transition such as housing development, land-use planning, transportation, wastewater treatment, and waste management. Their role is increasingly being acknowledged globally, with the 2015 Paris Agreement noting the need for cooperation amongst all levels of government in addressing climate change and the latest COP agreement, the Glasgow Pact, explicitly recognising the role of local and regional governments in advancing and implementing climate goals (UNFCCC, 2015^[3]; UNFCCC, 2021^[4]).

Subnational governments can act proactively to mitigate and adapt to the negative impacts of changing climate through their policies at regional and local levels. This includes, in particular in federal countries, developing environmental protection regulations and policies, and more generally, mainstreaming environmental and climate considerations throughout both fiscal and policy decision-making processes. In particular, subnational governments, through their financial flows, including spending, investment and revenue capabilities, have a powerful tool they can leverage to achieve a carbon-neutral, climate-resilient future.

As called for in Article 2.1c of the Paris Agreement, meeting climate objectives requires “making finance flows consistent with a pathway towards low greenhouse gas emissions (GHG) and climate-resilient development” (UNFCCC, 2015^[3]). Achieving a low-greenhouse gas development at the subnational level therefore involves making subnational government finance flows consistent with this objective.

Despite the growing recognition of regions and cities as key actors in decarbonising the global economy the true scale and nature of their financial role is poorly understood. There is a paucity of research and data on the amount subnational governments are spending and investing related to climate change, how this has changed over time, and where further action is needed. Information and data are also lacking concerning funding and financing resources they can mobilise. These knowledge gaps are problematic as they hinder efforts to track and measure the progress that subnational governments are making towards their climate objectives.

This knowledge gap on the state of subnational government climate finance is hindering in a time when considerable attention is being placed on tracking progress towards the Paris Agreement and other global commitments, and on coordinating efforts between all levels of government to enhance the mobilisation of financial resources to meet environmental and climate objectives.

At the same time, the pandemic and the recovery have also drawn increased attention to the ongoing fight against climate change and the urgent need to redirect considerable public and private funds towards tackling this challenge. As the green recovery gets underway, it is particularly crucial that financial and environmental aspects coalesce and that governments at all levels bolster their efforts to track climate finance flows.

Tracking subnational government climate finance can help to bridge these knowledge gaps and contribute to broader efforts to measure the progress that all levels of government are making towards the Paris Agreement commitments and other environmental objectives. It can also help regions and cities to better align their budgets with their green objectives, and estimate the expenditure and investment gaps they face in implementing their climate adaptation and mitigation objectives, and subsequently the amount of revenue they need to mobilise to bridge these gaps, from both traditional public budgetary sources (grants, taxes, user charges, etc.) and from complementary external financing (bonds, loans, private sector, etc.).

Ultimately, the empirical evidence provided by subnational government climate finance tracking can serve to guide policy-makers in adjusting international and national programmes and financial instruments that

support subnational climate action, in addition to enhancing the capacity of subnational governments to develop and implement their own climate action plans and policies.

Several international and national public climate finance tracking exercises currently exist, using a variety of methodologies and approaches. However, there is a notable lack of exercises and methodologies to track *subnational* public climate finance (Box 1). With this in mind, in 2018, the OECD developed a pilot methodology to track subnational government climate expenditure and investment (OECD, WorldBank and UN Environment, 2018^[5]; OECD, 2019^[11]). This pioneering methodology is based on National Accounts data, more precisely Classification of Functions of Government (COFOG) expenditure and investment data, and uses internationally comparable proxy coefficients to identify the share of expenditure and investment that has a significant impact on climate change adaptation and mitigation efforts. The 2018 study provided preliminary empirical evidence of the financial weight of subnational governments in public climate spending and investment in 30 OECD countries. The study also showed that these results were just the tip of the iceberg and that there is a need to substantially deepen research into subnational government climate finance in order to better support subnational governments in scaling up their climate action.

Box 1. Defining the topic: subnational government climate finance

The operational definition of subnational government climate finance used throughout this report refers to subnational government expenditure (both capital and current expenditure) and revenues directed to the funding and financing of climate change adaptation and mitigation initiatives.

The term “subnational government”, when used throughout this project, refers to all public entities that fall under the state government and local government sectors of the System of National Accounts. The state government sector is found in federal countries, and is defined differently depending on the country, and can refer to state, regional, and provincial governments, among others. The local government sector, in both federal and unitary countries, encompasses two categories of subnational government: general-purpose subnational governments (i.e., regional, intermediate and municipal governments) and special-purpose subnational governments (school boards, water boards, inter-municipal groupings, etc.).

Recognising this need, the OECD and the European Commission’s Directorate General of Regional and Urban Policy (DG REGIO) came together in 2020 to launch the joint project “*Measuring and Enhancing Subnational Government Finance for Environment and Climate Action in OECD and EU Countries*”. The project seeks to enhance the measurement, tracking, and mobilisation of subnational public climate finance by innovatively combining three interdependent pillars of work, two at a macro-level and one at a more micro-level:

- **Climate expenditure tracking** – this pillar consists of a high-level approach to tracking and measuring subnational public climate finance flows using aggregate, internationally comparable National Account data. To carry out this tracking, the OECD’s 2018 pilot subnational government climate finance methodology was updated and used to populate a new database on subnational government climate finance.
- **Climate revenue tracking** – this pillar complements the expenditure tracking by providing a compendium of climate-related public revenue sources (grants, loans, funds, contracts, etc.) available to subnational governments in OECD and EU countries. The results of this qualitative analysis shed light on the diversity of climate-related revenue sources available to subnational governments as well as the gaps that exist, providing evidence for recommendations on how, and at what level (state, regional, municipal, etc.), additional climate finance resources should be mobilised. The compendium is available online via an interactive dashboard.

- **Green budgeting** – this pillar zooms in from the macro-level to the micro-level to provide a more granular analysis of subnational government climate expenditure and revenue using individual budgets. The objective of a green budgeting approach is to use the tools of budgetary policymaking to align government budgets, both the revenue and expenditure sides, with national and local climate and environmental objectives. Through two case studies – one regional and one municipal – the OECD has developed a set of guidelines and a self-assessment tool for subnational governments to use in developing and implementing their own green budgeting exercise. The guidelines, the two case studies, and a stocktake of existing subnational green budgeting practices are available as part of the OECD publication “*Aligning Regional and Local Budgets with Green Objectives*”¹.

The outcomes of these three pillars are available on the OECD’s [Subnational Government Climate Finance Hub](#).

This report presents the qualitative and quantitative research carried out for the public climate expenditure and revenue tracking pillars of the project. The report is structured in three parts as follows:

- **Part I** presents a review of existing international, national, and subnational government climate finance tracking initiatives in OECD and EU countries. The objective of the review was twofold: first, to situate the OECD subnational government climate finance tracking methodology within the broader climate finance tracking literature and second, to develop a common terminology and understanding of subnational government climate finance.
- **Part II** presents the outcomes of the two macro-level pillars, related to expenditure on one hand, and revenues, on the other. It presents the main findings of the newly created [OECD Subnational Government Climate Finance Database](#) populated using the updated methodology for measuring subnational climate and environmental spending and investment. It also includes a description of the “*Compendium of Financial Instruments that Support Subnational Climate Action in OECD and EU Countries*”. The analysis seeks to answer some of the lingering questions outlined above regarding the scale and scope of the financial role of regions and cities in the carbon-neutral transition, including how much they are spending, how this has changed over time, and which kind of specific financial instruments are available to them.
- **Part III** outlines the tracking methodology used to create the OECD Subnational Government Climate Finance Database. It also highlights the key differences between the 2018 and 2022 methodologies, explains the data and methodological limitations that remain, and discusses future areas of work for refining the methodology and enlarging the database.

Annexes A and B at the end of the report present the methodology in more detail.

¹ OECD (2022), *Aligning Regional and Local Budgets with Green Objectives: Subnational Green Budgeting Practices and Guidelines*, OECD Multi-level Governance Studies, OECD Publishing, Paris, <https://doi.org/10.1787/93b4036f-en>.

Part I - To Each Their Own: A review of existing climate finance tracking initiatives

In order to inform the update of the OECD's subnational government climate finance tracking methodology, a review of existing climate finance tracking methodologies was carried out. The objective of the review was twofold: to situate the OECD methodology within the broader climate finance field by analysing its differences and similarities to other existing tracking initiatives, and to develop a common terminology and understanding of subnational public climate finance. The analysis of climate finance tracking initiatives was done at three levels: international, national, and subnational. The review identified only one international exercise focused on the subnational level while four national-level initiatives have included a subnational component.

Methodologies to track, estimate and report climate finance exhibit considerable variation in terms of what is counted depending on the purpose and scope of the tracking exercise. The heterogeneity can be attributed to several key variables, which should be considered when operationalizing a given definition of climate finance for reporting purposes (Bodnar, Brown and Nakhooda, 2015^[6]). Examples of these key variables include:

- Geographic scope: From where the finance has flowed to geographically, including international and/or domestic distinctions;
- Recipients: What actors receive the finance in the public and/or private sphere;
- Objectives: The motivation for the finance flow, whether it is primarily for climate mitigation or adaptation purposes, a co-benefit, or for no specific climate purpose but may contribute to a climate solution;
- Instruments: The range of instruments that should be included in the approach, whether a focus on concessionality is necessary and whether finance that is repaid (e.g. loans) should be counted;
- Point of measurement: Whether to account for financial commitments or disbursements in a given year;
- Type of flows: Whether it is incoming flow (revenues), outgoing flows (expenditures), or both.

Among the variety of climate finance tracking exercises that exist, very few include subnational finance in their scope. This is despite the fact that the most widely used definition of climate finance, proposed by the UNFCCC Standing Committee of Finance, explicitly mentions subnational actors as sources of climate finance (Box 2). The UNFCCC defines climate finance as “local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change” (UNFCCC, 2022^[7]).

Box 2. Some definitions of climate finance

- Climate finance: local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change”.
- Mitigation finance: resources directed to activities either reducing greenhouse gas (GHG) emissions, or aiming to remove GHGs already in the atmosphere or ocean, in order to slow warming and stabilise the climate in the long-term e.g. renewable energy generation, energy efficiency, low-carbon transport.
- Adaptation finance: resources directed to activities aimed at reducing the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by maintaining or increasing adaptive capacity and resilience e.g. water and wastewater management, disaster risk management, agriculture and land-use.
- Cross-cutting or dual finance: resources directed to activities with both adaptation and mitigation outcomes.

Source: (UNFCCC, 2022^[7]; Buchner et al., 2019^[8])

1 International-level Climate Finance Tracking Initiatives

Tracking climate finance flows: different international initiatives with diverse approaches

At the international-level, seven public climate finance tracking initiatives were identified. These include: the Cities Climate Finance Leadership Alliance’s State of Cities Climate Finance Report, the Climate Policy Initiative’s Global Landscape of Climate Finance, the International Development Finance Club’s Green Finance Mapping, the joint climate finance group of Multilateral Development Banks², the Overseas Development Institute’s Climate Funds Update, the OECD Development Assistance Committee (DAC)’s Creditor Reporting System (CRS), and the UNFCCC Standing Committee on Finance’s Biennial Assessments. Each initiative uses a different methodology that differs in terms of scope, frequency of publication, the type of data used, and more (Table 1.1). The State of Cities Climate Finance Report (CCFLA) was the only exercise found to exclusively focus on climate finance flows at subnational level.

² These include the African Development Bank (AfDB), Asian Development Bank (ADB), Asian Infrastructure Investment Bank (AIIB), European Bank for Reconstruction and Development, European Investment Bank (EIB), Inter-American Development Bank Group (IADB), Islamic Development Bank (IsDB), and the World Bank Group (WBG).

Table 1.1. Comparison of the scope of international-level public climate finance tracking initiatives

Name of Initiative (Author)	Frequency of publication (Annual, ad hoc, etc.)	Scope (Public sector, private sector, both)	Climate change scope (Adaptation, mitigation, or dual*)	Type of data used	Additional details
State of Cities Climate Finance Report (CCFLA)	Biennial	Both public and private sector.	Adaptation, mitigation.	Project-level investment data and capital expenditure data (for the transport and building sectors only).	Tracks commitments. Includes information on the financial provider, the financial instrument used, and the regions and sectors receiving the investment.
Global Landscape of Climate Finance (CPI)	Annual	Both public and private sector.	Adaptation, mitigation, and dual.	Primarily uses project-level data; uses aggregate data when project-level data is unavailable.	Tracks finance commitments. Tracks primary investment.
Green Finance Mapping (IDFC)	Annual	Both public and private sector.	Adaptation, mitigation and dual.	Project-level data.	Tracks finance commitments. Includes estimates of the volume of private finance mobilised by the member institutions as a result of their green finance. Activity-based tracking**. Individual development banks report data.
Joint Report on Multilateral Development Banks' Climate Finance (MDBs)	Annual	Both public and private sector.	Adaptation, mitigation, and dual.	Project-level data.	Tracks finance commitments. Includes estimates of the volume of private finance mobilised by the member institutions as a result of their green finance. Activity-based tracking**. Data collection and reporting is done by a central unit in each MDB.
Climate Funds Update (ODI)	Annual	Public sector only (multilateral climate funds).	Adaptation, mitigation, and dual. (Also focuses on finance flows for REDD+)	Project-level data.	Only tracks multilateral climate funds. Tracks financial commitments and disbursements.
Creditor Reporting System (OECD DAC)	Annual	Both public and private sector.	Adaptation, mitigation, and dual.	Project-level data.	Tracks financial commitments (disbursements also tracked; but data not comprehensive). Includes estimates of the volume of private finance mobilised by the member institutions as a result of their green finance. Activity-based tracking**. National governments, 7 MDBs, and 10 climate funds submit data.

Biennial Assessments (UNFCCC)	Biennial	Both public and private sector.	Adaptation, mitigation, and dual.	Both project-level and aggregate data used.	Summarises the reporting of Annex I countries who are party to the Paris Agreement. Tracks both financial commitments and disbursements.
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Note: *Dual refers to finance that has positive impacts on both climate change mitigation and adaptation efforts. **Activity-based means that a project is classified as climate finance if the activity of the project is related to climate change mitigation or adaptation, regardless of the purpose or the actual results of the project.

Source: Author's compilation based on: (OECD, 2018^[9]; UNFCCC, 2021^[10]; Buchner et al., 2019^[8]; ODI, 2013^[11]; IDFC, 2020^[12]; African Development Bank et al., 2020^[13]; Cities Climate Finance Leadership Alliance, 2021^[14])

Regarding the sectors analysed, there is some overlap between the initiatives with some having a broader scope than others. The OECD DAC initiative, for example, tracks all economic sectors and uses the DAC Rio markers³ to determine if an expenditure is “climate-related” or “climate-specific” (OECD, 2011^[15]). The IDFC initiative has the narrowest scope, only assessing investments in energy and energy efficiency; transport; agriculture, land use and forestry; water preservation; coastal protection; and disaster risk reduction (IDFC, 2020^[12]).

Climate finance definitions

In the absence of an internationally agreed upon definition of what constitutes climate finance, the seven tracking initiatives identified here have come up with their own (Table 1.2). Despite the heterogeneity, it is possible to distinguish between two broad groups of definitions:

- Those that classify public climate finance as all climate finance flows from national governments to any source (households, subnational governments, etc.), be it within its own country or in another country;
- And those that classify public finance as climate finance flows from national governments of developed countries to developing countries.

CCFLA's State of Cities Climate Finance Report, CPI's Global Landscape of Climate Finance, and the UNFCCC's Biennial Assessments are part of the former group, while the other four initiatives are part of the latter.

Table 1.2. Climate finance definitions: by international climate finance actors

Organisation	Definition
Cities Climate Finance Leadership Alliance (CCFLA)	“Urban climate finance refers to resources directed to activities limiting city-induced GHG emissions or aiming to address climate-related risks faced by cities, contributing to resilience and low carbon development.” (Cities Climate Finance Leadership Alliance, 2021 ^[14])
Climate Policy Initiative (CPI)	“[Public and private] primary capital flows directed towards low-carbon and climate-resilient development interventions with direct or indirect greenhouse gas mitigation or adaptation benefits.” (Buchner et al., 2019 ^[8])
International	“Climate finance consists of all activities related to mitigation of greenhouse gas emissions and adaptation to

³ Refers to a set of markers developed by the OECD's Development Assistance Committee (DAC) to identify development finance flows targeting the Rio Convention's objectives on biodiversity, climate change mitigation, climate change adaptation and desertification (OECD, 2011^[15]).

Development Finance Club (IDFC)	climate change.” (IDFC, 2020 ^[12])
Multilateral Development Banks (MDBs)	“... the financial resources (from own accounts and MDB-managed external resources) committed by MDBs to development operations and components thereof which enable activities that mitigate climate change and support adaptation to climate change.” (African Development Bank et al., 2020 ^[13])
Organisation for Economic Cooperation and Development (OECD)	<p>The OECD tracks climate finance provided and mobilised by developed countries to developing countries, based on an accounting framework developed in 2015, which defines climate finance as “all finance that specifically targets low-carbon or climate-resilient development.” (OECD, 2015^[16]). The methodology distinguishes four distinct components: bilateral public finance climate; multilateral public climate finance attributable to developed countries; officially supported climate-related export credits; and private climate finance mobilised attributable to developed countries.</p> <p>The OECD is also working on methodologies for tracking investment consistent with achieving a low greenhouse gas development. More precisely, the proposed scope for further tracking efforts focuses on gross primary investment in new infrastructure and equipment (tangible fixed assets in national accounts terms) and the refurbishment of such assets, as well the underlying sources of finance (Jachnik, Mirabile and Dobrinevski, 2019^[17]).</p>
Overseas Development Institute (ODI)	“Climate finance refers to the financial resources mobilised to help developing countries mitigate and adapt to the impacts of climate change” (ODI, 2013 ^[11])
UNFCCC Standing Committee on Finance	“Climate finance refers to local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change.” (UNFCCC, 2022 ^[7])
World Bank Group	“While there is no precise internationally agreed definition of climate finance at present, the term broadly refers to resources that catalyse low-carbon and climate resilient development.” (World Bank Group, 2011 ^[18])

Source: Author’s own elaboration.

With the exception of the OECD, ODI, and UNFCCC initiatives, which track both commitments and disbursements in a given year, the other four exercises only assess climate finance commitments.

Similarly, there are differences between the frequencies of reporting for each initiative. CPI, the IDFC, the joint MDB group, ODI, and the OECD DAC all report annually, while CCFLA and the UNFCCC release their analyses on a biennial basis.

All seven initiatives track, and distinguish between, climate adaptation and climate mitigation finance. Additionally, five of the initiatives also track dual (or crosscutting) finance, meaning they account for investments that have a positive impact on both adaptation and mitigation efforts. The IDFC tracks climate mitigation, adaptation, and dual finance as a subset of its broader tracking of green finance (IDFC, 2020^[12]).

In terms of the data used, all of the initiatives, except the UNFCCC’s Biennial Assessment, track project-level data wherever possible and use aggregate data as a last resort, if at all. The data used in the UNFCCC Biennial Assessments is both project-level and aggregate, and comes from a wide variety of sources, including from several of the five other international climate finance tracking initiatives mentioned here. Data on public climate finance comes from National Communications and Biennial Reports (UNFCCC Standing Committee on Finance, 2018^[19]). It is important to note that none of the seven initiatives uses National Accounts data.

Finally, regarding the sectors analysed, there is some overlap between the initiatives with some having a broader scope than others have. The OECD DAC initiative, for example, tracks all economic sectors and

uses the DAC Rio markers⁴ to determine if an expenditure is “climate-related” or “climate-specific” (OECD, 2011_[15]). The IDFC initiative has the narrowest scope, only assessing investments in energy and energy efficiency; transport; agriculture, land use and forestry; water preservation; coastal protection; and disaster risk reduction (IDFC, 2020_[12]).

2 National-level climate finance tracking initiatives

At the national-level, nine climate finance tracking initiatives were identified among OECD and EU countries. These countries include Belgium, Chile, Colombia, Czech Republic, France, Germany, Latvia, Mexico, and the Netherlands. Several of these national-level methodologies track both public and private climate finance, however, this review only focuses on the public climate finance element of these methodologies as that is the aspect most relevant to the OECD subnational government climate finance methodology.

Several other national-level climate finance tracking initiatives, funded by international organisations, were identified in developing nations (examples include Kenya, Peru and the Philippines). They are not included in the analysis as they are beyond the scope of the study which focuses on OECD and EU countries only.

Of the nine initiatives identified above, Colombia and France’s are conducted annually, Chile and Mexico’s are in the late stages of development but once implemented will be updated annually, and all of the others were one-time exercises.

A comparative analysis of these nine initiatives revealed two major methodologies in use:

- the Climate Finance Landscape (CFL) methodology developed by CPI;
- and (ii) the Monitoring, Reporting and Verification (MRV) methodology initially developed by the Climate Finance Group for Latin America and the Caribbean (GFLAC) (Table 2.1).

The methodology used in the Netherlands does not adhere to either of the two aforementioned methodologies.

Table 2.1. A comparison of national-level public climate finance tracking initiatives

	Climate Finance Landscape (CFL) Methodology	Monitoring, Reporting, and Verification (MRV) Methodology	The Dutch Methodology
Countries using this methodology	Belgium, Czech Republic, France, Germany, and Latvia.	Chile, Colombia, and Mexico.	The Netherlands.
Scope	Domestic; public and private sectors.	International and domestic; public and private sectors.	Domestic; public sector only.

⁴ Refers to a set of markers developed by the OECD’s Development Assistance Committee (DAC) to identify development finance flows targeting the Rio Convention’s objectives on biodiversity, climate change mitigation, climate change adaptation and desertification (OECD, 2011_[15]).

Level of government assessed	National-level only.	Includes the national and subnational levels.	Includes national and subnational levels.
Type of economic transactions assessed	Capital expenditure only, specifically gross fixed capital formation.	Current and capital expenditures.	Current and capital* expenditures.
Type of financial instruments assessed	Grants, subsidies and transfers, public investments, private investments, concessional loans, and balance sheet financing.	Loans, concessions, foreign aid, bonds.	Not tracked.
Geographical distribution of finance	Not tracked.	Tracked.	Not tracked.
Climate change scope (adaptation, mitigation, and dual)	The methodology can track adaptation, mitigation, and dual finance, however, all countries using it have just tracked mitigation finance.	The methodology can track adaptation, mitigation, and dual finance, but it depends on the country what is actually tracked.	Mitigation and adaptation.
Climate-related and/or climate-specific expenditures**	Both are tracked depending on available data.	Both are tracked depending on available data.	Climate-specific expenditures only.
End-use sectors covered	Varies between countries but at a minimum includes transportation, energy, buildings, industry and agriculture.	Varies between countries but includes all sectors covered by CFL methodology plus additional country-specific ones.	Flood protection, R&D, horticulture, mobility, alternative energy sources, subsidies, and climate policy.
Data granularity	Project-level data; data for public finance comes from budgets and National Accounts for some sectors (France).	Project-level data; data for public finance comes from budgets or government databases on expenditure and investment (Chile).	Primarily uses National Accounts data. Departmental financial reports and budget data also used depending on the level of government. COFOG data used for the central government level.
Additional information	Tracks financial intermediaries.	Does not track financial intermediaries.	Does not track financial intermediaries.

Note: * The Dutch methodology was designed to track both current and capital expenditures but due to a lack of data on investment at all levels of government results are only given for current expenditure. **Climate-specific refers to activities with an explicit climate adaptation or mitigation focus (e.g., carbon sequestration), whereas climate-related refers to activities with an indirect climate adaptation or mitigation focus (e.g., retrofits to transmission lines).

Source: Author's own elaboration based on information from (Trinomics, 2016^[20]; Gibbs, 2020^[21]; Comité de Gestión Financiera - Departamento Nacional de Planeación, 2016^[22]; Valentová, Knápek and Novikova, 2019^[23]; Hainaut, Ledez and Cochran, 2019^[24]; Novikova et al., 2019^[25]; Kamenders, Rochas and Novikova, 2019^[26]; INECC, 2019^[27]; van Geloof and de Kruik, 2012^[28]).

The Climate Finance Landscape Methodology

The Climate Finance Landscape (CFL) methodology was first developed by CPI in 2011 to track global climate finance flows (Buchner et al., 2011^[29]). The methodology has since been adapted to track domestic climate finance flows in several countries, namely Belgium, the Czech Republic, France, Germany and Latvia. Despite using the same methodology, cross-country comparisons are not possible as some of the data used in the analysis is gathered using country-specific accounting methods.

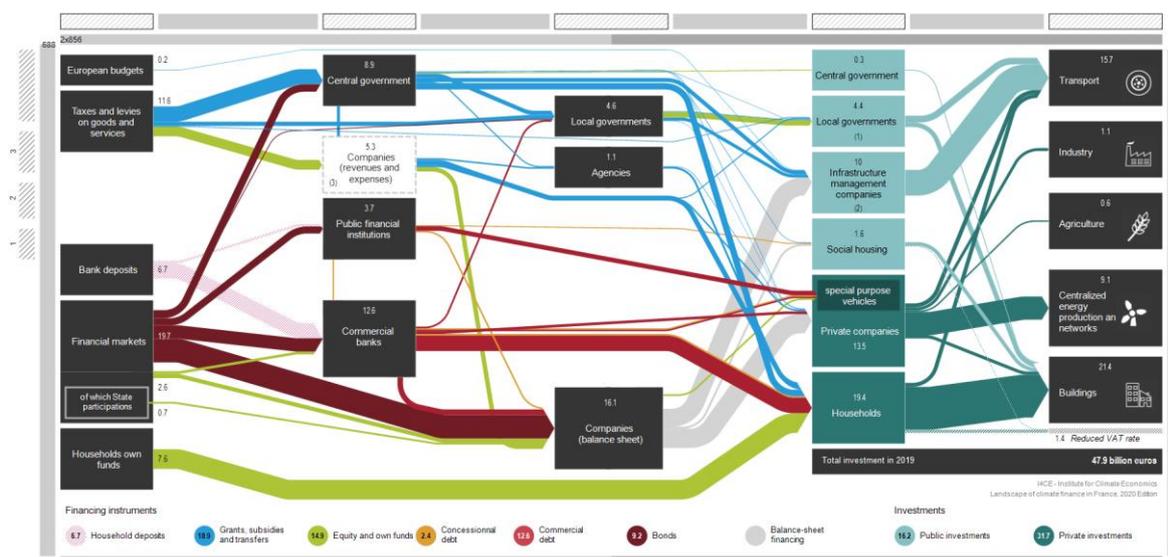
The governments of Belgium, France, and Germany funded independent consultants to carry out their respective tracking initiatives, while the European Climate Initiative (EUKI) funded the Czech Republic's

and Latvia's tracking initiatives. The French tracking initiative occurs on an annual basis and the other four happened only once.

A key feature of the CFL methodology is the Sankey flow diagram that is produced at the end of the analysis (Figure 2.1). The diagram includes information on climate finance sources, intermediaries, and financial instruments to provide a finely detailed and holistic view of domestic climate finance flows.

The CFL methodology uses either a bottom-up (compiling data from the project-level) or top-down (using aggregate statistics and reports from multilateral development banks) approach, depending on the sector, to calculate domestic public and private primary investment flows from the source through intermediaries and instruments to the end-use sector. Data is collected from national and subnational budgets, government agency annual financial reports, EU funds reports, expert interviews, and government statistics. It is important to note that the analysis only looks at gross fixed capital formation and does not look at current expenditure or indirect investment.

Figure 2.1. Landscape of Climate Finance in France Sankey Diagram: 2020 edition



Source: (I4CE, 2021^[30])

Public sources of investment include EU funds, and national, regional and local budgets. Intermediaries include government actors, public finance institutions, and commercial finance institutions. Each initiative tracks a slightly different combination of financial instruments but a general list includes grants, subsidies and transfers; public investments; private investments; concessional loans; and balance sheet financing to name a few. Similarly, the end-use sectors included also vary slightly between initiatives but at a minimum include transportation, energy, industry, agriculture, and buildings.

The methodology can differentiate between climate mitigation, adaptation and dual-purpose investment; however, this varies from country to country depending on the data available. Currently, only the Belgian exercise included adaptation. The crosscutting nature of climate adaptation investment, along with country-specific typologies of adaptation activities, make it more difficult to track compared to climate mitigation investment. The CFL methodology further distinguishes between climate-related and climate-specific investments and allows the option to track one or both depending on the available data. Additionally, all of the initiatives noted above distinguish between tangible and intangible investments, however, only the Belgian initiative tracks both kinds of investments.

The Monitoring, Reporting, and Verification Methodology

The term “monitoring, reporting, and verification”, or MRV, originally emerged from UNFCCC climate negotiations in the early 2000s and was used in the context of tracking the progress of impact of climate change mitigation projects in developing countries. Following the signing of the Paris Agreement in 2015, the term has gained widespread use as a framework for tracking the progress and measuring the impact of all Parties’ Nationally Determined Contributions (NDCs) through measurement, reporting, and verification of greenhouse gas emissions reductions. The use of an MRV framework for measuring and tracking climate finance is a relatively new development, which follows the same trend as prior uses of the framework by looking almost exclusively at climate change mitigation (INECC, 2019^[27]).

The MRV of climate finance methodology, initially developed by GFLAC, has been widely applied in Latin America and more generally speaking in developing countries receiving international climate finance. Much like the CFL methodology, the MRV method also provides a granular and holistic view of domestic climate finance flows. Part of this enhanced granularity comes from its coverage of a broad set of end-use sectors, as detailed below. An additional similarity to the CFL methodology is that the results of the MRV method are not comparable between countries, again due to the inclusion of data collected using country-specific standards.

Colombia is the only OECD country to have already implemented the MRV methodology for public climate finance. Chile and Mexico are in the late stages of developing and implementing their initiatives. All three of these climate finance tracking initiatives are funded by their respective governments.

As implied in its title, this methodology consists of a monitoring component, a reporting component, and a verification component. The monitoring component is the most developed aspect of the methodology in all three countries and the aspect most relevant to this study.

This monitoring component tracks both public and private sector climate finance flows coming from international and national (domestic) sources. In Chile and Colombia, for tracking domestic public climate finance, this includes both capital and current expenditure, whereas the Mexican MRV currently only covers capital expenditure. Similar to the CFL methodology, the MRV system tracks climate finance sources, instruments, and end-use sectors. However, unlike the CFL methodology, the MRV methodology includes the territorial scope of the investment and/or expenditure allowing for a breakdown of climate finance by national, regional/state, and municipal-levels. This territorial information can be combined with geospatial software to produce an interactive map showing the exact geographical location of an investment, although this only applies to project investments and does not account for current expenditures. Identifying the geographic scope of public expenditure and investment can facilitate improved tracking of subnational public climate finance flows.

In Chile and Colombia, the required data is collected from public databases on national and subnational procurement, expenditure, and investment. Mexico is proposing to collect the climate finance data using a digital form made available to “key actors” such as government departments and ministries, academia, and international development finance institutions (INECC, 2020^[31]).

The Colombian and Chilean tracking initiatives assess climate mitigation, adaptation, and crosscutting (dual) finance, while the Mexican initiative stands out among MRV practices by only covering climate adaptation finance. The MRV methodology allows for distinguishing between climate-related and climate-specific expenditure and investment and can track both depending on the data available.

In comparison to the CFL methodology, the MRV system covers a much broader array of end-use sectors and there are larger differences between countries in terms of which sectors are included in the analysis. For example, the proposed MRV for Mexico includes research and technology, food system resilience, and investment in agreements and institutional mechanisms as “end-use sectors”, while Colombia has

none of these but does include education, health and tourism. None of the examples of end-use sectors described above are included in an initiative using the CFL methodology.

In all three countries, the final output of the MRV methodology is an online dashboard and database that is easily accessible to the public and updated on an annual basis. This aligns with one of the main objectives of the MRV system, which is to enhance the transparency and accountability of climate finance.

Domestic public climate finance tracking in the Netherlands

In 2012, the Netherlands' National Accounts Department carried out a one-of-a-kind domestic climate finance tracking initiative (van Geloof and de Kruik, 2012^[28]). The purpose of the study was as much about quantitatively calculating climate finance flows as it was about probing the feasibility of the exercise and the quality and quantity of data available.

The study's uniqueness stems from its extensive use of National Accounts data for multiple levels of government, which lies in contrast to the CFL and MRV methodologies that rely primarily on financial and budgetary reports and internal financial management systems. This reliance on National Accounts data makes the Dutch study more of a top-down approach, using aggregate data, than the other two methodologies, which rely on both aggregate data and project-level data (bottom-up approach). All three of these methodologies can distinguish between climate mitigation and climate adaptation finance depending on the quality of the data available. In addition, the CFL and MRV methodologies are able to identify additional types of climate finance including crosscutting finance and climate services finance. The Dutch methodology only tracks public climate finance and has a narrower focus compared to the other two methodologies, as it does not track financial instruments or intermediaries. Like the MRV methodology, the Dutch method can assess both capital and current expenditure, however, due to data quality and quantity restraints the study was limited to current expenditure only.

Three key aspects of the Netherlands' methodology make it relevant to the methodology proposed as part of this project. First, the Dutch study includes subnational governments in its analysis and collects data on subnational government climate expenditures from National Accounts data. It also uses COFOG data to measure central government mitigation and adaptation expenditure. The second is its high-level approach that primarily focuses on using aggregate data over multiple years to discern trends in public climate finance rather than a more granular project-level approach. The third key aspect is its ability to track both current and capital expenditure. These three aspects directly align with the preliminary methodology developed by the OECD in 2018 and therefore make the Dutch methodology an important resource to draw on in developing an updated version of the preliminary OECD methodology as part of this project. A more detailed analysis of the subnational aspect of the methodology can be found in the following section.

3 Subnational-level public climate finance tracking initiatives

This review did not identify any national climate finance tracking initiatives with an exclusive subnational focus; however, four of the nine national-level initiatives explored in the previous section have, or will have in the case of Mexico, a subnational component to them. These include the initiatives from Colombia, France, Mexico and the Netherlands.

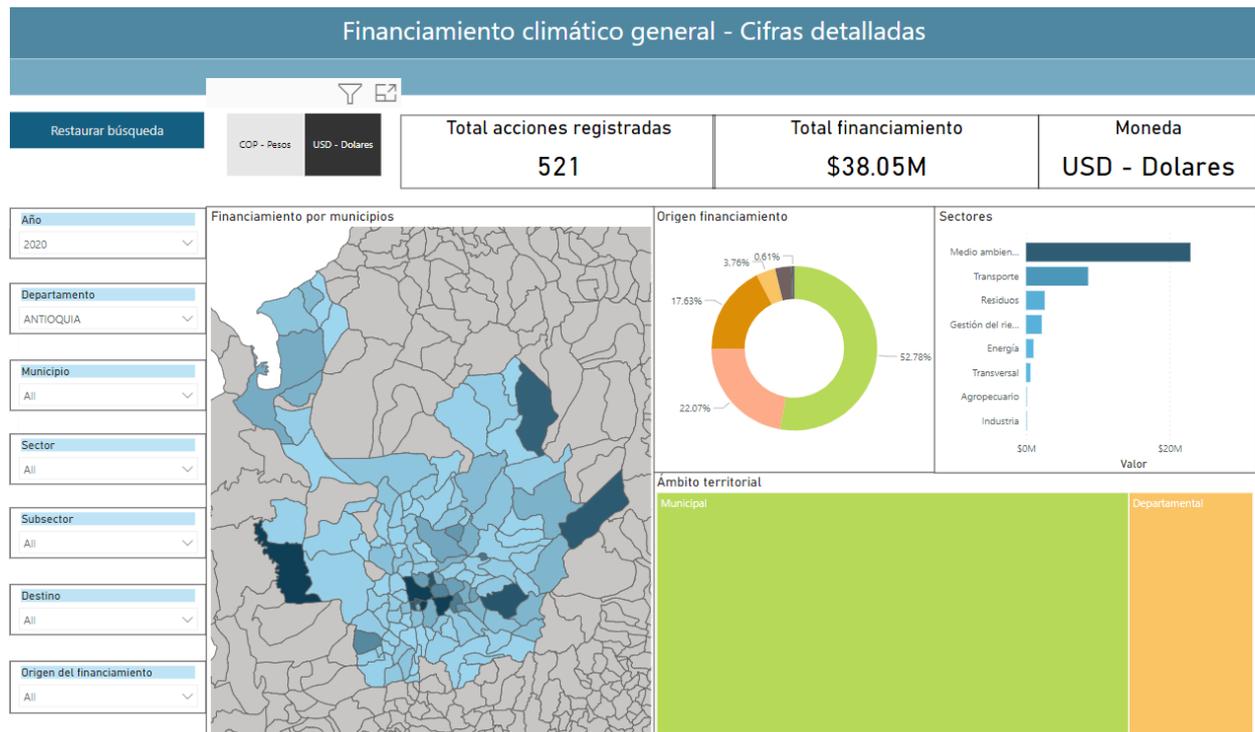
For each of the three existing cases, public expenditure and investment was collected at the subnational level and then aggregated at the national level. The Netherlands developed their own methodology based on a mixture of National Accounts data (COFOG data) and financial account reports.

Colombia

The subnational aspect of Colombia’s public climate finance tracking initiative is the most established of the four initiatives analysed in this section. The National Ministry of Planning collects project-level data on subnational government climate-related current and capital expenditure from several government databases containing information on departmental and municipal expenditure and finance. Once collected, the data is classified using a country-specific typology of climate mitigation, adaptation, and crosscutting activities. This typology was developed by GFLAC in consultation with local stakeholders and experts (Comité de Gestión Financiera - Departamento Nacional de Planeación, 2016^[22]).

The MRV dashboard or portal⁵, specifically designed as part of the development of Colombia’s MRV system, breaks down subnational climate-related public expenditure and investment in several different ways, including by territorial scope (departmental, municipal, etc.), by destination (mitigation, adaptation or dual), by sector, and by individual project. This analysis can be visualised by a map function providing a geospatial visualisation of individual projects for the entire country (Figure 3.1).

Figure 3.1. A close-up of Colombia’s MRV portal



Source: http://mrv.dnp.gov.co/Financiamiento_en_cifras/Paginas/general_cifras.aspx

⁵ See <https://mrvapp.dnp.gov.co/InfografiaPublico/>.

France

In the annual Landscape of Climate Finance in France, produced by the Institute for Climate Economics (I4CE), the subnational aspect is harder to discern in comparison to Colombia or Mexico's methodology, but is present nonetheless.

The annual I4CE publication refers to subnational governments as “local governments” but does not define it further except for clarifying that it includes public transport authorities (Hainaut, Ledez and Cochran, 2019^[24]). I4CE gathers data on local government gross fixed capital formation on a sector-by-sector basis using satellite accounts prepared by the French Ministry of the Environment for the building and transport sectors, and public budgets and cross-budget documents for other sectors. Unlike other initiatives using the CFL methodology, the French initiative does not collect project-level data.

According to the I4CE methodology, local governments act both as intermediaries and as project developers. Intermediaries are the entities that channel finance from sources to project developers. The category of project developer refers to “the household, the public institution or the private entity that makes the investment and which is usually the owner of the capital generated in this manner” (Hainaut and Cochran, 2018^[32]). This category is unique to the I4CE tracking exercise and is not used by other initiatives that follow the CFL methodology. Local governments are intermediaries and project developers because they undertake both investment in their own capital stock (project developer) as well as extend grants and subsidies to other project developers (intermediary).

From the Sankey diagram generated by the CFL methodology (Figure 2.1 above), it is possible to see all the sources of investment for local governments (intermediaries) and the type of instrument used to provide these funds. Subsequently, the source of financial resources for local governments (project developers) can be seen, followed by the end-use sectors in which they invest those resources (i.e., transport, industry, etc.). The width of the arrows indicates the relative size of the financial flow, while the colour of the arrow indicates the type of financial instrument used.

Figure 2.1 shows the aggregate sums of local government climate-related investment in a given year. It is not possible with this method to disaggregate the local government data, such as is done in Colombia, to spatially map subnational climate investment or to distinguish between municipal, departmental, or regional investment.

Mexico

Mexico's MRV system is still being developed and implemented and therefore the subnational component discussed here is preliminary and subject to change.

The subnational component of Mexico's proposed MRV is very similar to the system Colombia currently has in place, although with a narrower focus on climate adaptation finance only. The proposed methodology has three steps. First, project-level investment and expenditure data are collected from a range of stakeholders using a digital form and a centralised portal system. Next, each project is analysed individually to determine if it meets 12 pre-determined climate adaptation criteria. Finally, the project would be classified based on the source of funding (national, international, private, public), the type of financial instrument (grant, loan, etc.), the type of activity, and the geographical location (national, regional, state, or municipal-level) (INECC, 2020^[31]).

Once analysed, the data would be uploaded to an online public portal where it could be easily accessed and downloaded as infographics, reports, pdfs or csv files, much like Colombia's MRV portal.

The Netherlands

As mentioned above, the Netherlands tracked subnational government climate finance from 2007-2010 as part of a one-time study conducted in 2012 by the Dutch National Accounts Department (van Geloof and

de Kruik, 2012^[28]). Tracking subnational government climate finance was part of the broader purpose of the exercise to track all domestic government climate finance in the Netherlands, but it was not the main focus. The methodology used does not correspond to either the MRV or the CFL methodologies detailed in Section 2.2. Instead, the authors developed their own methodology based on a mixture of National Accounts data (COFOG data) and financial account reports.

To account for subnational climate-related expenditure the authors collected central, provincial, and municipal government and water board data on operational expenditures and environmental transfers. In the Netherlands, water boards are a form of special-purpose subnational government. The necessary data was collected from a mix of financial account reports, departmental budget reports, and the National Accounts database. The authors intended to also include investment in fixed tangible assets data in their study, however, they were unable to find sufficient investment data for each level of government and as such the study only assesses operating expenditures, which wherever possible are separated into operating costs and personnel salaries.

For the water boards, only dike and dam maintenance expenditure data was collected from Board financial reports. All of this expenditure was classified as flood protection costs, meaning that no mitigation expenditure was reported for the water boards.

At the provincial-level, flood protection expenditure data came from both the National Accounts database and annual provincial financial reports. Mitigation expenditure data was exclusively collected from annual financial reports, as the National Accounts data was too aggregated. The authors noted that the quality and quantity of provincial data varied greatly between provinces and that no personnel salary data was available at the provincial level and therefore only operating costs were tracked. For the municipalities, flood protection data was taken from the National Accounts, while mitigation expenditure data was collected from the financial reports of municipal funds that were part of a Dutch programme entitled Stimulating Local Climate Initiatives. All expenditures using resources from these funds were labelled as climate mitigation.

To present the results of the analysis, the authors used a series of tables and charts. For each level of government, they provided a table detailing the breakdown of expenditure by climate mitigation and flood control (adaptation) measure. They also included a table showing the breakdown of central government mitigation and flood protection expenditure by COFOG classification. Nine second and third level COFOG categories were included in the table for the years 2007 to 2010. The authors noted that there was insufficient COFOG data available at the provincial and municipal level and that their mitigation and adaptation expenditure responsibilities are less diverse compared to the central government (Table 3.1).

Table 3.1. Dutch central government mitigation and flood control expenditure using COFOG data: 2007 – 2010

COFOG Expenditure by Category

COFOG code	2007	2008	2009	2010
Million euro				
052	7.8	3.4	1.5	1.4
053	235.5	173.9	170.4	147.0
061	16.5	16.2	20.3	63.4
0411	11.4	11.9	12.6	12.6
0421	9.6	20.1	24.1	19.1
0430	3.5	11.8	682.9	720.1
0435	537.3	408.9	43.8	28.3
0474	435.8	576.5	806.2	715.2
0481	76.8	98.4	112.0	135.1

Note: See Annex A of this report for more detail on each COFOG category.

Source: (van Geloof and de Kruik, 2012^[28])

Part II - Punching Above Their Weight: An analysis of the financial role of subnational governments in the low-carbon transition

This chapter presents the outputs of Pillars 1 and 2 of the joint OECD-European Commission project “*Measuring and Enhancing Subnational Government Finance for Environment and Climate Action in OECD and EU Countries*”: the OECD [Subnational Government Climate Finance Database](#) and the Compendium of Financial Instruments that Support Subnational Climate Action in OECD and EU Countries, hereafter referred to as the Compendium. These two outputs are complementary. The database includes data on subnational government climate-significant expenditure in OECD and EU countries, while the compendium includes qualitative data on some climate-related revenue sources available to subnational governments in OECD and EU countries.

Tracking subnational government climate finance is key for assessing the true scale of the financial role of subnational governments in the carbon-neutral transition. Tracking climate expenditure can help regions and cities to better estimate the expenditure and investment gaps they face in implementing their climate adaptation and mitigation objectives, and subsequently the amount of revenue they need to mobilise to bridge these gaps, both from traditional budgetary sources (grants, taxes, user charges, etc.) and from complementary external financing (bonds, loans, private sector, etc.).

The results of the 2018 OECD study “*Financing Climate Objectives in Regions and Cities to Deliver Sustainable and Inclusive Growth*” showed that climate-related public spending did not substantially increase between 2000 and 2016, both as a share of GDP and in real terms. This is worrisome considering the scale of the climate challenge and the urgency with which it needs to be addressed, and points to a need to rapidly scale-up subnational public climate spending, which includes mobilising additional sources of subnational government climate finance. Tracking and measuring revenue sources available to regions and cities to finance and fund their climate actions can provide important evidence for identifying levers of action for mobilising additional public and private climate finance at the subnational level.

Ultimately, the empirical evidence provided by subnational government climate finance tracking, both expenditure and revenues, can serve to guide policy-makers in adjusting international and national frameworks, programmes, and fiscal instruments that support subnational climate action, in addition to enhancing the capacity of subnational governments to develop and implement their own climate action plans and policies.

The remainder of this chapter is divided into two sections. Section 1 presents the Subnational Government Climate Finance Database and the results of an analysis of the data included in it. The analysis was divided into three parts: climate-significant expenditure, climate-significant investment, and trends in climate-significant expenditure and investment between 2009 and 2019. Section 2 presents the Compendium, its structure and the analytical framework used to develop it. It also includes a short analysis of the qualitative data included in the Compendium.

1 OECD Subnational Government Climate Finance Database

The OECD [Subnational Government Climate Finance Database](#) (Figure 1.1) is the first of its kind to provide internationally comparable data on subnational public climate-significant expenditure and investment. The definition of climate-significant expenditure and investment is outlined in Box 3. The database is populated with data collected using the OECD's pioneering subnational government climate finance methodology. It relies on COFOG data from the National Accounts database, a unique repository of internationally comparable and harmonised government expenditure data. The methodology also used the EU Taxonomy for Sustainable Activities to determine what constitutes climate-significant expenditure and investment, and applies it to all OECD and EU countries within the database (European Commission, 2021^[33]). This methodology is outlined in greater detail in Part III and Annex B of this report.

Figure 1.1. OECD Subnational Government Climate Finance Database

Country	Form of the State	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Australia	Federal country	5 364 958	6 755 701	6 905 4	8 015 006	8 566 554	9 166 64	11 250 006	11 592 337	14 827 359	16 279 213	20 432 75	21 126 797	22 887 611	20 945 529	18 050 232	18 912 154	22 413 408	25 460 125	26 385 176
Austria		5 472 739	5 748 633	5 684 929	11 523 292	8 441 852	8 935 259	8 571 354	9 974 527	11 145 399	12 182 313	12 340 113	12 109 649	12 495 554	12 037 932	11 985 05	12 573 855	12 601 439	13 811 356	13 593 05
Belgium		7 103 986	7 628 598	8 845 915	8 893 77	16 148 205	10 711 885	10 779 448	12 436 947	14 047 416	14 663 701	17 302 631	16 838 449	16 558 672	18 088 352	14 422 126	14 190 666	15 459 783	17 126 5	17 614 189
Czech Republic	Unitary country	5 465 45	4 717 834	7 554 609	4 843 407	4 680 859	4 862 25	5 567 52	7 576 471	6 617 099	6 250 586	7 090 045	7 519 208	7 360 778	9 136 579	12 580 792	9 633 525	8 995 036	10 931 867	10 542 314
Denmark		2 458 887	2 882 278	2 338 417	2 238 03	2 005 599	1 815 056	1 962 117	2 334 042	2 686 964	2 738 729	3 617 397	3 746 24	4 436 354	4 945 091	5 367 894	5 049 322	5 555 537	5 801 632	5 706 96
Estonia		255 165	226 728	237 522	242 271	270 617	283 057	388 158	458 988	407 049	375 103	588 222	534 635	408 046	426 137	402 923	387 887	445 202	524 431	559 361
Finland		1 172 199	1 342 171	1 484 403	1 653 952	1 582 878	1 452 069	1 428 328	1 763 916	1 982 185	2 041 889	1 933 212	2 157 249	2 587 693	2 698 096	2 611 933	2 632 484	2 645 459	2 336 941	2 335 119
France		18 360 773	21 130 434	22 471 131	23 893 857	26 949 818	28 856 699	30 822 014	32 694 821	36 005 777	36 572 82	42 880 992	44 304 832	52 933 783	52 881 559	53 761 891	57 321 793	61 404 164	65 950 359	74 361 375
Germany	Federal country	31 766 391	34 662 328	36 990 027	34 264 297	29 673 398	32 660 725	31 795 037	32 282 168	32 344 844	33 413 787	36 695 523	36 425 73	40 166 73	42 849 906	43 764 945	45 227 371	48 404 043	52 188 09	55 824 652
Greece	Unitary country	1 192 538	2 455 24	3 279 303	4 158 725	2 287 752	1 948 773	2 822 78	2 829 428	3 309 055	3 343 218	1 817 422	2 840 597	4 084 983	3 135 368	4 694 371	4 684 885	3 337 671	3 325 913	3 800 742
Hungary		2 270 24	2 902 544	2 291 033	1 121 802	1 112 208	1 765 643	4 029 985	2 733 195	2 342 871	2 780 482	6 145 396	7 579 983	7 494 174	6 569 695	8 085 051	4 359 638	5 395 302	6 398 556	6 597 616
Iceland		49 998	51 167	54 989	53 768	50 853	54 639	56 305	71 343	74 569	65 341	66 458	68 103	76 868	77 814	95 375	110 868	111 392	125 952	126 433
Ireland		2 011 686	2 396 982	2 372 972	2 442 271	2 586 472	2 965 318	3 746 061	3 979 463	3 484 823	3 828 339	3 025 169	2 749 153	2 279 139	2 382 013	2 589 532	2 731 724	2 821 854	3 331 295	3 545 222
Israel														6 561 129	5 901 243	5 925 979	6 662 891	7 803 58	8 731 583	9 162 692
Italy		27 883 518	28 748 451	28 477 178	30 197 307	30 767 734	34 908 402	30 434 943	30 866 621	40 285 457	42 870 801	41 557 59	45 546 182	51 861 182	49 243 324	39 324 355	50 048 172	51 275 5	43 489 996	45 961 023
Japan					64 029 016	63 993 371	65 453 117	70 729 086	79 316 789	73 684 641	76 400 766	74 176 656	80 549 609	83 757 508	83 950 516	84 675 328	84 919 031	85 462 695	85 948 586	
Latvia		479 534	595 325	514 631	580 488	676 447	716 562	789 458	1 006 829	1 080 216	1 168 075	919 494	1 334 152	1 265 254	1 673 607	1 707 748	935 024	1 310 019	1 186 159	889 668
Lithuania		248 504	343 55	408 289	469 571	474 933	487 618	588 298	631 086	686 246	842 551	875 666	928 333	877 626	1 019 886	986 852	780 436	712 907	815 271	995 44

Source: The draft database is temporarily accessible at this address: <https://stats.oecd.org/Index.aspx?datasetcode=SGCFD>.

An analysis of the data included in the database makes it possible to provide preliminary answers to several key questions about the financial role of subnational governments in the carbon-neutral transition including:

- What share of public climate-significant expenditure and investment occurs at the subnational-level?
- In which sectors does climate-significant expenditure and investment occur in greater amounts at the subnational level, and in which sectors do national governments spend more?
- How has the share of climate-significant expenditure and investment by subnational governments changed over time, and how does this compare to national level spending and investment?

Scope of the Database

The fiscal database on subnational government climate finance provides comparative data on subnational climate-related expenditure and investment collected for a total of 33 countries for climate expenditure and 32 countries for climate investment, of which 30 are OECD member countries and 25 are EU member states (Table 4.1). Among the sample, six countries are federal countries. Ten countries are not included in the database for several reasons explained in Table 1.1 of the methodological section.⁶

Table 1.1. Sample of countries included in the database

	Expenditure	Investment
OECD – EU countries	22	22
OECD non EU countries	8	7
EU non OECD countries	3	3
TOTAL	33	32

The database includes both current and capital expenditure (in particular direct investment). It is important to conduct a comprehensive tracking that covers both expenditure categories, as they have both substantial carbon emissions impacts (Box 3). Data cover the period 2001 to 2019. The scope and time coverage of data differs across countries based on data availability⁷.

⁶ Canada, Chile, Colombia, Costa Rica, Cyprus, Korea, Malta, Mexico, New Zealand, United States.

⁷ Given that the IMF Government Finance Statistics database does not provide data on COFOG investment, Turkey, whose data is extracted from the IMF GFS, is excluded from the climate investment estimates. COFOG second-level data for Turkey are available from 2008 only, and for Japan from 2005. It is also noted that no COFOG second-level data are reported for Slovak Republic between 2003 and 2006.

Box 3. Defining subnational government climate expenditure and investment

In developing this subnational government climate finance tracking methodology, it was necessary to agree upon a definition of what constitutes subnational government climate spending and investment. It was decided to align this definition with the EU Taxonomy's principle of "significantly contributing to climate change mitigation and climate change adaptation".

Thus, the terms "climate-significant expenditure" and "climate-significant investment", when used throughout this report, refer to expenditure and investment directed towards the economic activities the EU Technical Expert Group on Sustainable Finance (TEG) identified as significantly contributing to climate change adaptation and mitigation in their March 2020 report "Taxonomy: Final report of the Technical Expert Group on Sustainable Finance".

These economic activities were matched with COFOG categories from the National Accounts in order to identify expenditure and investment that could be considered as contributing to climate adaptation or mitigation objectives. Although a complete mapping of the Taxonomy to the COFOG system was carried out, not all COFOG categories are included in this study due to a lack of proxy coefficients to determine the share of investment or expenditure in these categories that is related to climate change. As such, only thirteen second-level COFOG functions, in sectors such as transport and energy, environmental protection, waste, water management or housing development, are covered in the database (Table 4.2). Borrowing the terminology used by the EU Taxonomy, investment and expenditure in these categories is referred to as climate-significant once it has been identified using a proxy coefficient.

In addition, by including both capital and current expenditure in the analysis, this study has a wider scope than most tracking efforts undertaken by other international organisations, which tend to focus exclusively on investment, with some studies further limiting their scope to just GFCF.

- **Climate-significant expenditure** covers both current and capital expenditure. Current expenditure consists of staff expenditures, intermediate consumption, non-capital subsidies, and tax expenditure. Interest expenditures are not included. Capital expenditure refers to indirect investment (capital transfers and capital subsidies) and direct investment (gross fixed capital formation (GFCF) minus disposals of non-financial, non-produced assets)
- **Climate-significant investment** refers to a subset of capital expenditure, specifically direct investment (GFCF minus disposals of non-financial, non-produced assets). Measuring investment provided a way to focus on the amounts invested in climate-related infrastructure specifically. Using this subset also provided a more accurate estimate of climate-related infrastructure investment spending than the overall spending category could provide.

A focus on capital expenditure only may lead to an under-estimation of total climate finance flows. It is important to recall that on average in the OECD, investment expenditure represents around 14% of subnational expenditure while current expenditure represents the remaining part (OECD, 2021^[34]). Therefore, a comprehensive tracking should be conducted for both current and capital expenditure. Indeed, government current expenditure is climate relevant and can have substantial carbon emissions impacts. For example, regular maintenance for government buildings, classified as intermediate consumption, can greatly reduce a building's carbon footprint and as such should be included in an analysis of public climate finance. Subnational government public procurement, which accounted for 21% of subnational expenditure on average in the OECD in 2021, can also have a large climate impact, be it positive or negative. By prioritising green procurement subnational governments can both green their own consumption and influence a shift towards green products in the broader market. The same applies to current subsidies and grants allocated by subnational governments to households,

businesses or local associations, which can also have a carbon emissions impacts (10% of subnational expenditure, on average, in the OECD in 2021).

Source: (Technical Expert Group on Sustainable Finance, 2020^[35]; Jachnik, Mirabile and Dobrinevski, 2019^[17]; OECD, 2018^[36]; OECD, 2021^[37])

Non-consolidated climate-significant expenditure and investment data are provided for the General Government sector (S.13) as well as for two sub-sectors of the National Accounts⁸: state government (S.1312), and local government (S.1313). Subnational government refers to the sum of two sub-sectors: state governments (S.1312) and local governments (S.1313) in federal countries, and only local governments (S.1313) in unitary countries where the subnational government sub-sector is equivalent to the local government sub-sector.

The underlying expenditure and investment data came from the National Accounts database, more specifically from the “*Government expenditure by function*” dataset (COFOG data). Within this dataset, expenditure and investment data are classified into 10 main functions (called first-level functions) and in around 60 sub-functions (called second-level functions), for the national and subnational levels.

Using the EU Taxonomy for Sustainability Activities, three first-level COFOG functions (Economic Affairs, Environmental Protection, and Housing and Community Amenities) and 13 second-level COFOG functions, in sectors such as transport and energy, environmental protection, waste, water management or housing development, were identified as being “climate-significant”, meaning that expenditure in these areas contributes, to some extent, to climate adaptation or mitigation objectives (Table 1.2). This broad definition inherently captures spending that is not climate specific but that indirectly contributes to climate mitigation or adaptation objectives. This is the case for pollution abatement, where expenditure directed as reducing air pollution from vehicles, for example, might be targeted as a public health measure while also having an impact on climate change mitigation.

In order to identify the share of expenditure in each second-level COFOG function that could be considered climate-significant, proxy coefficients, derived from internationally comparable datasets, were then applied to each function (see Part III for more detail).

Table 1.2. Second-level COFOG categories included in the study

COFOG 04.2: Agriculture, forestry, fishing and hunting	COFOG 05.1: Waste management
COFOG 04.3: Fuel and energy	COFOG 05.2: Wastewater management
COFOG 04.5: Transport	COFOG 05.3: Pollution abatement
COFOG 06.1: Housing development	COFOG 05.4: Protection of biodiversity and landscape
COFOG 06.2: Community development	COFOG 05.5: R&D Environmental protection
COFOG 06.3: Water supply	COFOG 05.6: Environmental protection n.e.c.
COFOG 06.4: Street lighting	

The estimates for climate-significant expenditure and investment included in the database are expressed through different measures: in US dollars PPPs, per inhabitant and as ratios – primarily of general government climate expenditure and investment, and GDP. PPPs conversion rates equalise the purchasing power of different countries and thus allow for comparison among OECD and EU countries.

⁸ The National Accounts dataset has four subsectors that make up the General Government Sector. The fourth sub-sector is Social Security Funds and Other Entities and was not considered relevant for this study.

Converting the data in USD PPP also facilitates the computation of weighted averages for groups of countries – such as OECD, EU or OECD federal countries.

Subnational Government Climate-significant Expenditure

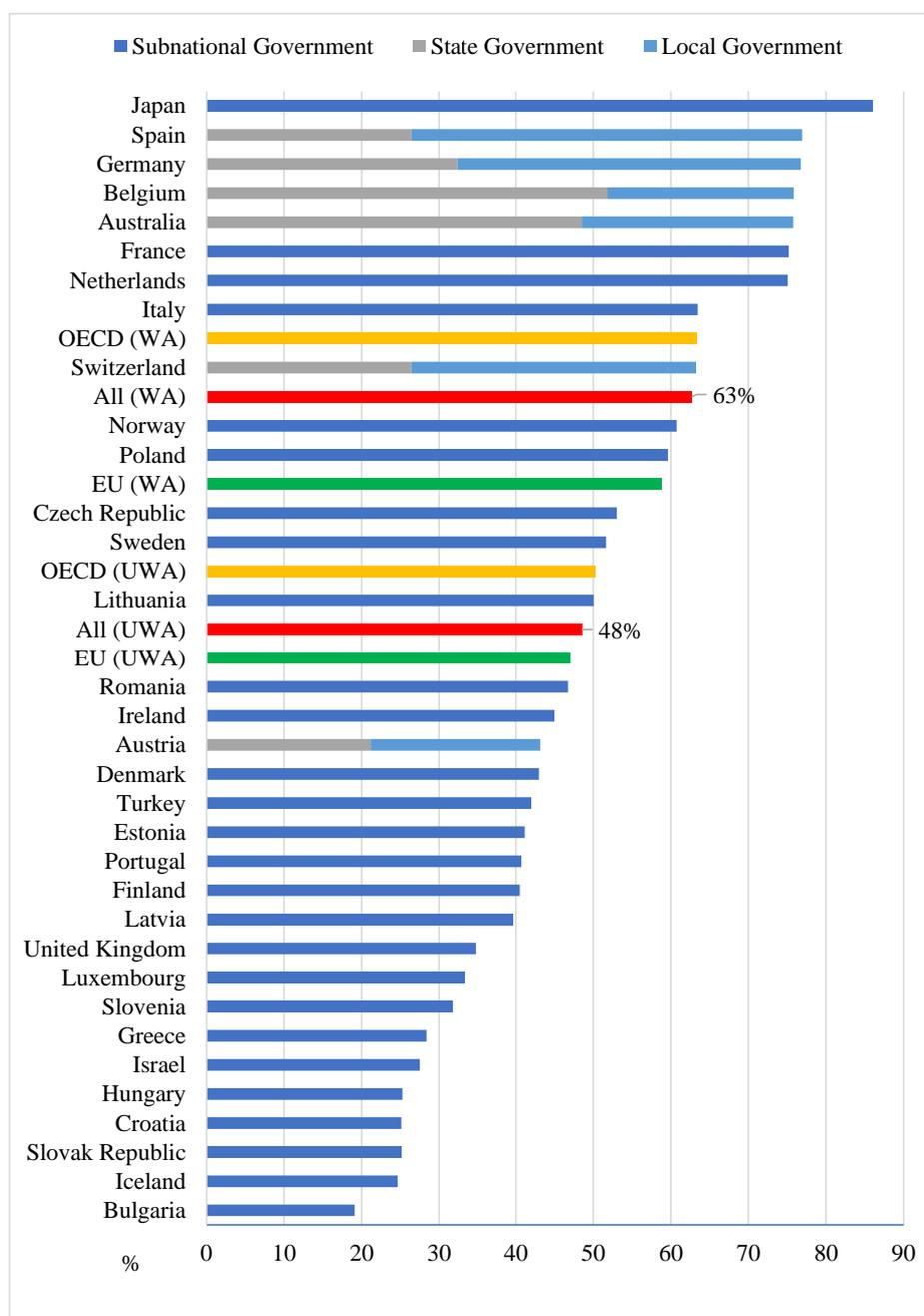
The results show that subnational governments are key financial actors in the carbon-neutral transition and that on average, across the OECD and EU, subnational governments account for the majority of public climate-significant expenditure⁹. In 2019, among the 33 OECD and EU countries sampled, subnational governments accounted for 63% of total climate-significant public expenditure, on average (weighted¹⁰) (Figure 1.2). In seven countries, 70% or more of climate-significant expenditure occurred at the subnational level, and in Japan the ratio exceeded 80%. Comparably, the central government was responsible for 70% or more of climate-significant expenditure in seven other countries, and in Bulgaria the central government accounted for 81% of all climate-significant public expenditure in 2019.

Among the ten countries with the highest ratios of subnational government climate-significant expenditure, half are federal – or quasi-federal - countries. By contrast, all 10 countries with the lowest ratios of subnational government climate-significant expenditure are unitary countries. Japan, a unitary country, had the highest ratio, with 86% of climate-significant public expenditure taking place at the subnational level in 2019. This reflects Japan's high-level of spending decentralisation, compared to other OECD unitary countries, as well as the fact that the prefectures and municipalities have jurisdiction over many of the key policy areas relevant to the carbon-neutral transition, such as waste management, water supply, housing development, and environmental protection (OECD-UCLG, 2019_[38]).

⁹ Based on the definition of climate-signification as encompassing the various COFOG categories listed previously.

¹⁰ OECD and EU averages that are mentioned in the text are weighted, unless otherwise specified. Unweighted averages (arithmetic means) are shown on the different graphs and included in the database. The averages provided in the previous 2018 study were unweighted.

Figure 1.2. Subnational government climate-significant expenditure as a share of general government climate-significant expenditure, OECD-EU countries, 2019

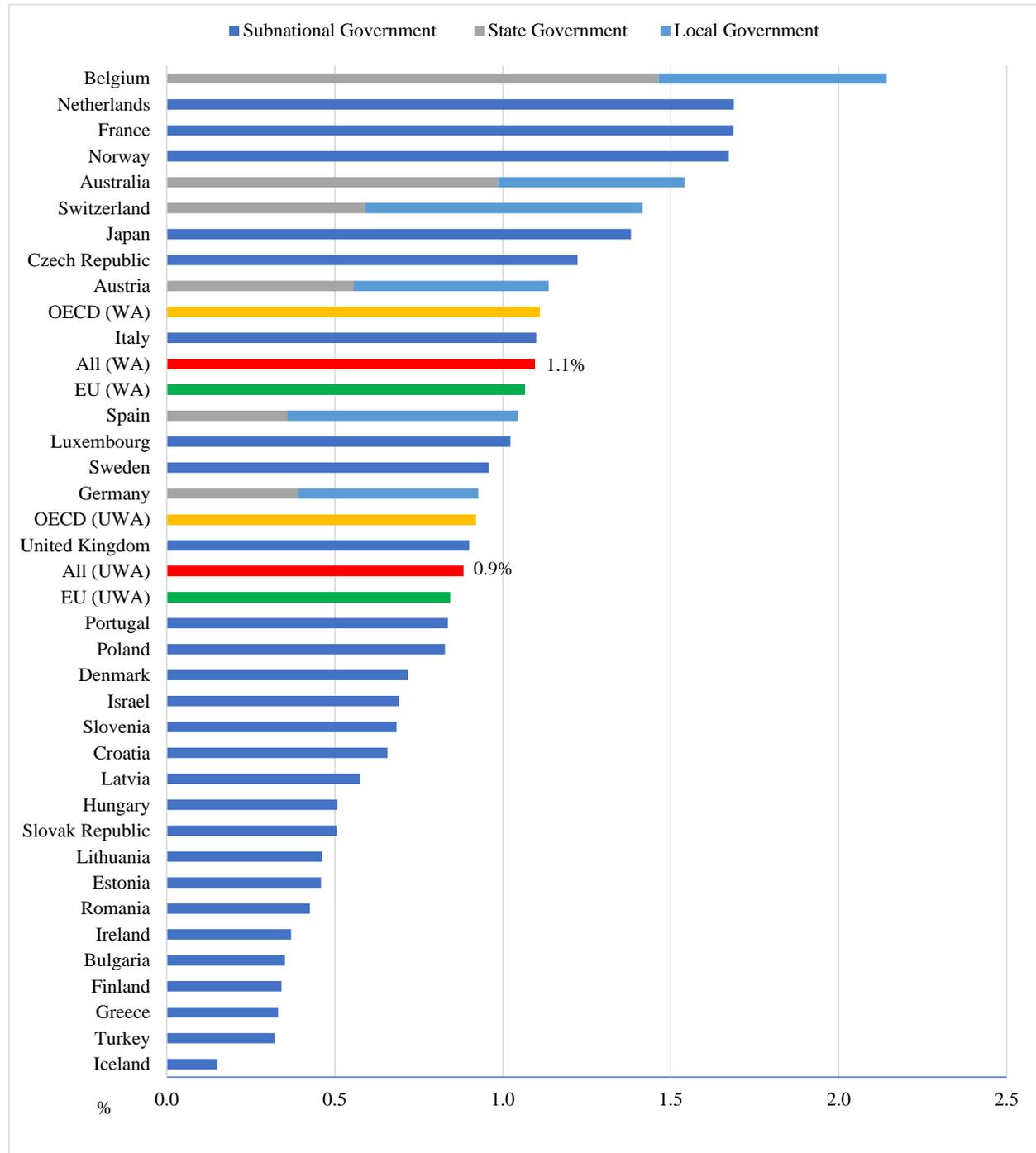


Note: The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law. WA=weighted average. UWA= Unweighted Average i.e. arithmetic means. All = all 33 OECD and EU countries sampled. For Austria, Germany, and Japan the methodology was adapted as these countries do not provide second-level COFOG data. More details on this adaptation are available in Part III on the methodology.

Source: OECD Subnational Government Climate Finance Database

In 2019, for the same sample of 33 countries, subnational government climate-significant expenditure amounted to 1.1% of GDP, on average (Figure 1.3). Subnational climate-significant expenditure as a share of GDP was highest in Belgium (2.2%) and lowest in Iceland (0.1%).

Figure 1.3. Subnational government climate-significant expenditure as a share of GDP, OECD-EU countries 2019



Note: The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law. WA=weighted average. UWA= Unweighted Average i.e. arithmetic means. All = all 33 OECD and EU countries sampled. For Austria, Germany, and Japan the methodology was adapted as these countries do not provide second-level COFOG data. More details on this adaptation are available in Part III on the methodology.

Source: OECD Subnational Government Climate Finance Database

Subnational Government Climate-significant Investment

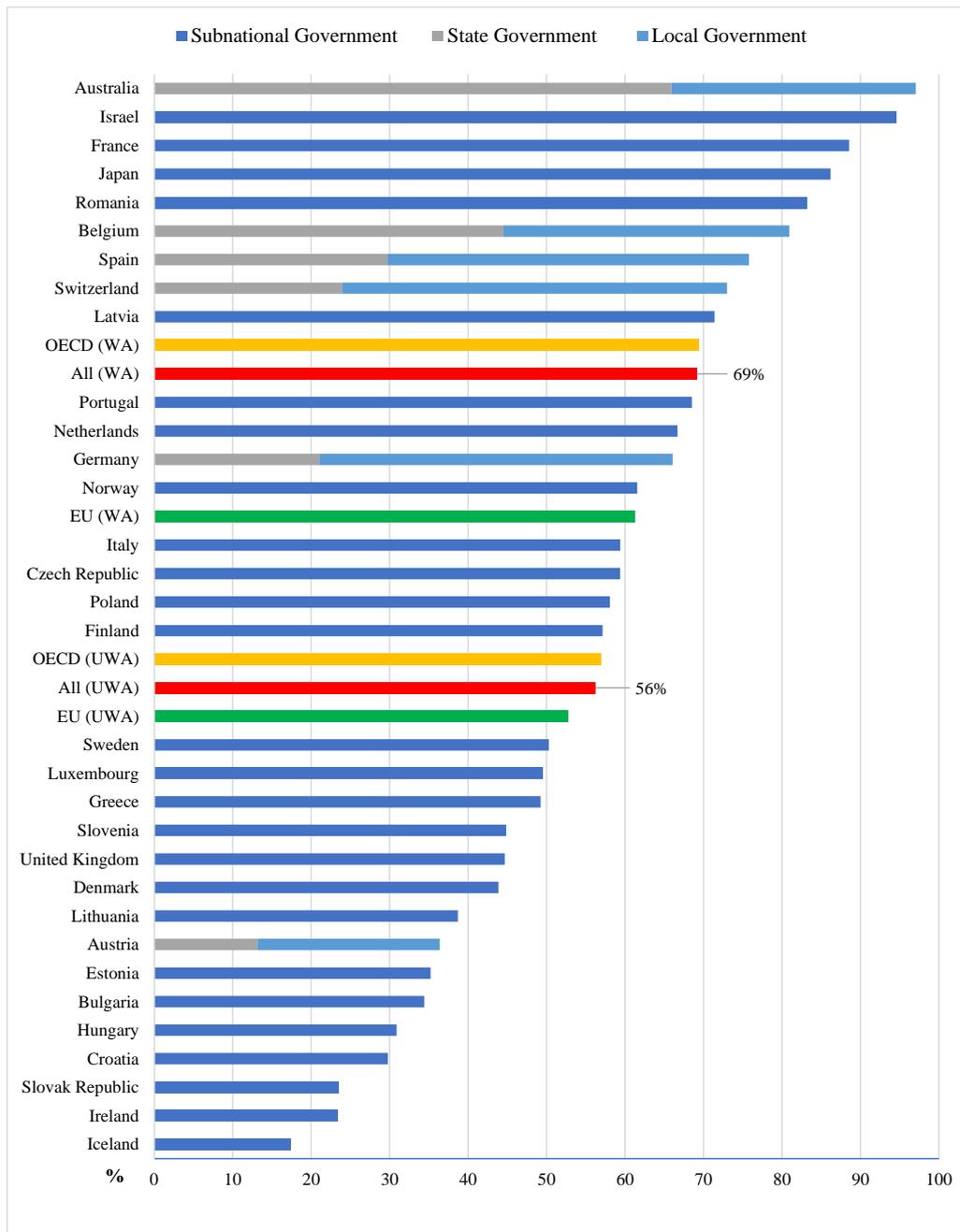
Subnational governments in OECD and EU countries are key investors in climate-related sectors and infrastructure, accounting for the majority of climate-significant investment. In 2019, among the 32 OECD and EU countries sampled, subnational governments accounted for 69% of total climate-significant public expenditure, on average (weighted)¹¹, representing 0,4% of GDP on average (weighted) (Figure 1.4 and Figure 1.5).

The contribution of subnational governments to climate-significant investment varies strongly across countries and within groups of countries (e.g. federal or unitary). The contribution of subnational governments to climate-significant investments is the highest in federal and most decentralised countries. In nine countries of the sample, more than 70% of climate-significant expenditure occurred at the subnational level. In Australia, subnational governments - and primarily the states and territories at federal level - are responsible for up to 97% of climate-significant investment at the country level. In some unitary countries as well, subnational governments play a very important role as climate investors. In France and in Japan, subnational governments accounted for 89% and 86% of total public climate-significant investment, respectively, in 2019. This can be explained by the high degree of administrative and spending decentralisation in those countries, where both regional and municipal governments have jurisdiction over many of the key policy areas relevant to the carbon-neutral transition (e.g. waste management, water supply, housing development, and environmental protection).

Comparably, subnational governments were responsible for less than 30% of climate-significant investment in four countries of the sample, mostly smaller and Eastern European countries, the lowest share being in Iceland, Ireland and Slovak Republic. Austria also stands out from other federal countries, with a relatively low share of subnational investment in total public climate-significant investments.

¹¹ OECD and EU averages that are mentioned in the text are weighted, unless otherwise specified. Unweighted averages (arithmetic means) are shown on the graphs and included in the database. All averages provided in the previous 2018 study were unweighted.

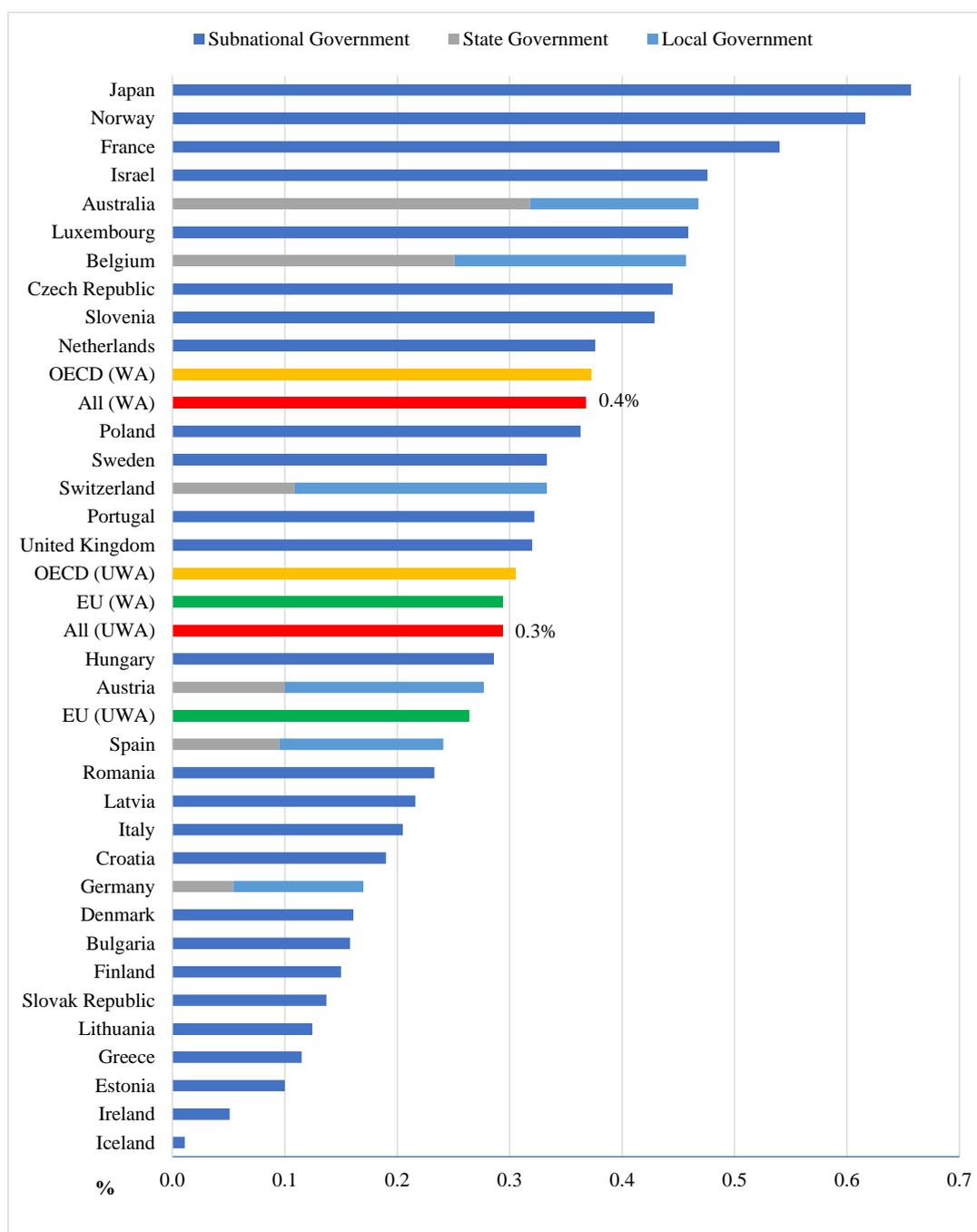
Figure 1.4. Subnational government climate-significant investment as a share of total public climate-significant investment, OECD-EU countries, 2019



Note: The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law. Turkey is not included in the sample. WA = Weighted Average. UWA= Unweighted Average i.e. arithmetic means. All = all 32 OECD and EU countries sampled. For Austria, Germany, and Japan the methodology was adapted as these countries do not provide second-level COFOG data. More details on this adaptation are available in Part III on the methodology.

Source: OECD Subnational Government Climate Finance Database

Figure 1.5. Subnational government climate-significant investment as a share of GDP, OECD-EU countries, 2019



Note: The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law. Turkey is not included in the sample. WA = Weighted Average. UWA=Unweighted i.e. arithmetic means All = all 32 OECD and EU countries sampled. For Austria, Germany, and Japan the methodology was adapted as these countries do not provide second-level COFOG data. More details on this adaptation are available in Part III on the methodology.

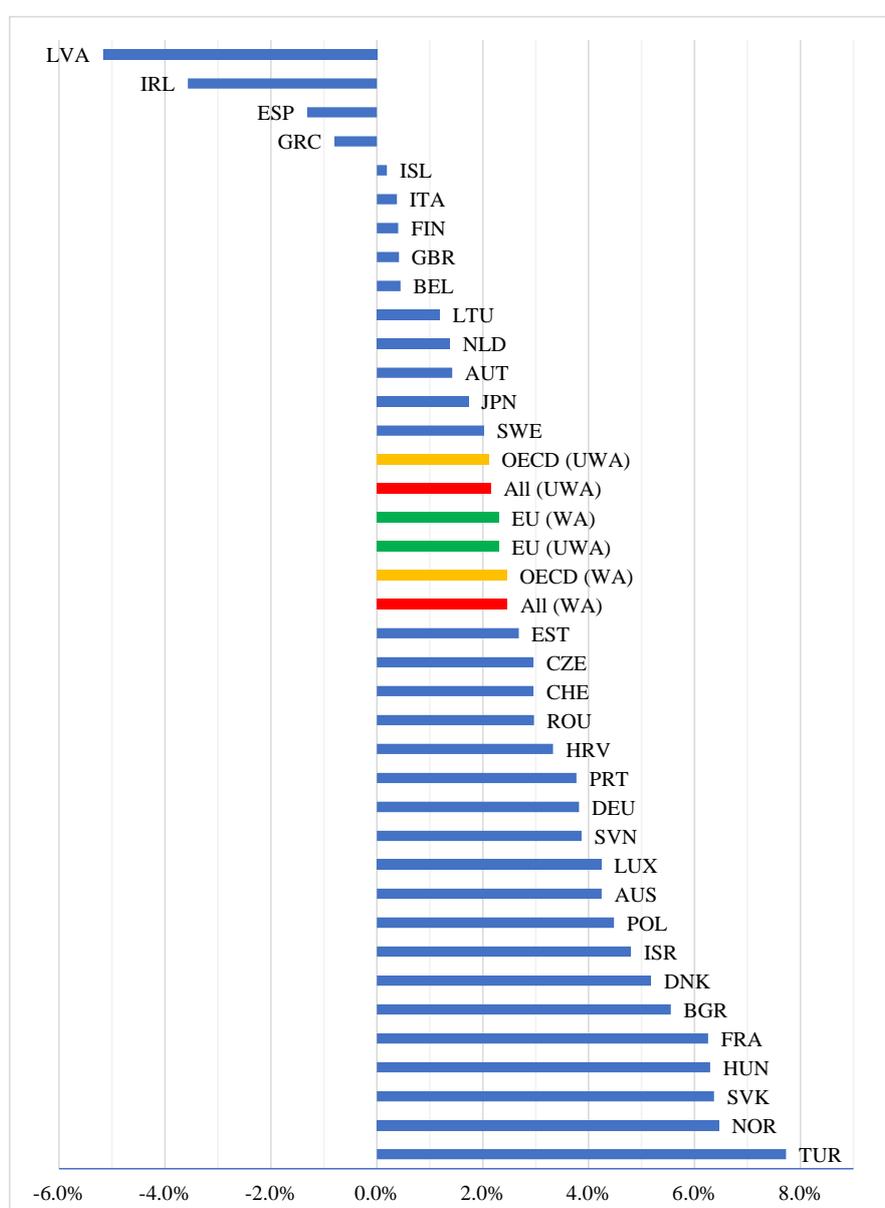
Source: OECD Subnational Government Climate Finance Database

Trends in subnational government climate-significant expenditure and investment between over the last decade

The overall trend in subnational government climate-significant expenditure and investment is increasing, with a great majority of the countries sampled having a positive annual average rate of change between 2009 and 2019 (in real terms).

Looking at subnational government climate-significant expenditure between 2009 and 2019, it is possible to see considerable variation between countries with some countries having an annual average increase of over 6% while in four countries, there was a decline, including two countries, Ireland and Latvia, where subnational government climate-significant expenditure declined annually by 4% and 6% respectively (Figure 1.6). The annual average rate of change was the same for the OECD and the sample of all 33 OECD and EU countries, at 2.5% respectively. The annual average rate of change for all of the EU countries in the sample was 2.3%. Overall, there was a positive rate of change in 88% of the countries sampled, with only five countries – Belgium, Finland, Iceland, Italy, and the United Kingdom – where there was little change in their level of subnational government climate-significant expenditure between 2009 and 2019.

Figure 1.6. Annual average rate of change of subnational government climate-significant expenditure, OECD-EU countries, 2009-2019 (real terms)



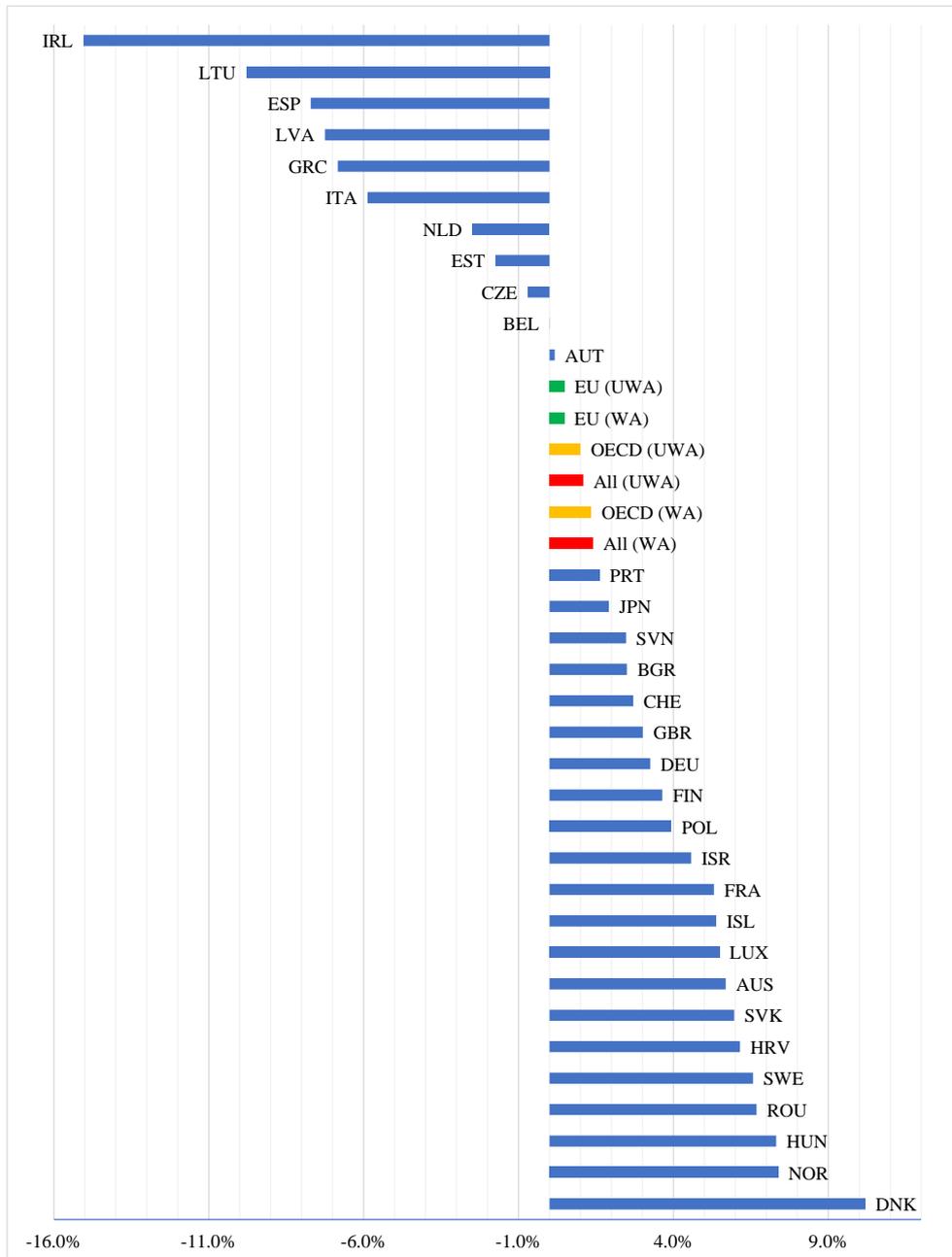
Note: The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law. Data for Israel is from 2013-2019. UWA= Unweighted Average i.e. arithmetic means. WA= Weighted Average. All = all 33 OECD and EU countries sampled.

Source: OECD Subnational Government Climate Finance Database

Regarding the annual average rate of change of subnational government climate-significant investment between 2009 and 2019, overall, there was a positive rate of change for 22 countries of the sample out of 32 in real terms (Figure 1.7). The annual average rate of change of all 32 countries in the sample for climate-significant investment was 1.4%. However, it is possible to see considerable variation between countries, with some countries having an annual average increase between 7% and 10% (Denmark, Hungary, and Norway). On the other hand, in some countries, subnational government climate-significant investment declined significantly annually, by -15% in Ireland, -10% in Lithuania and -8% in Spain, between

2009 and 2019. Further analysis is needed to precisely explain the extreme trends seen in climate-significant expenditure and investment in some countries, however, it is possible to offer a preliminary explanation based on qualitative research for certain countries.

Figure 1.7. Annual average rate of change of subnational government climate-significant investment, 2009-2019 (in real terms)



Note: The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law. Turkey is not included in the sample. Data for Israel is from 2013-2019. WA = Weighted Average. UWA= Unweighted Average i.e. arithmetic means. All = all 32 OECD and EU countries sampled.

Source: OECD Subnational Government Climate Finance Database

In **Ireland**, subnational government climate-significant expenditure declined on average 4% annually in the decade between 2009 and 2019. Over the same period, climate-significant investment declined on average 18% annually, with a particularly precipitous drop of 64% between 2010 and 2011. This decline in subnational government climate-significant investment can in part be explained by austerity measures put in place in response to the 2008 financial crisis, leading to a progressive decrease of subnational expenditure and investment in the context of cost-cutting policies (Dellepiane and Hardiman, 2012^[39]). Concomitant local government reforms in 2013 and 2014 that recentralised some responsibilities might have accentuated this decline. As part of the reforms, functions related to water services were transferred from local authorities to the State company “Irish Water”, while waste management was outsourced to private enterprises (Council of Europe, 2013^[40]). Considering that water supply and waste management were amongst the core climate-significant expenditure and investment areas of local authorities are, the recentralisation and privatisation of these functions likely explains some of the declines seen in the data.

In contrast to Ireland, subnational government climate-significant investment in **Denmark** increased steadily by an average of 10% per year between 2009 and 2019. This consistent positive trend could be attributed to two successive territorial reforms. In 2007, five new regions were created and gained responsibilities regarding environmental matters. This trend was accentuated in 2013, when an additional reform granted regions additional environmental responsibilities related to soil pollution and the mapping and planning of raw materials extraction. The same reform granted municipalities new responsibilities related to the environment and planning, notably preparation of local plan regarding wastewater, waste management, and water supply (Ministry of Economic Affairs and the Interior, 2013^[41]). Additionally, subnational governments in Denmark have access to diversified sources of financing for their environmental actions, including for example green financing instruments provided by KommuneKredit, a subnational financing company owned by the municipal and regional governments, to provide loans and low-cost financing to local governments. KommuneKredit is particularly active in issuing green loans and green bonds to help regions and municipalities to fund projects related to clean transportation green buildings, sustainable water and wastewater management, pollution prevention and control, renewable energy and energy efficiency, and climate change adaptation (Kommunekredit, n.d.^[42]).

2 Climate-revenue tracking: a compendium of financial instruments that support subnational government climate action

Supporting subnational government climate action requires having a better understanding of existing financial programmes and instruments available to them, so that relevant recommendations on how to enhance climate finance can be made. The Compendium of Financial Instruments that Support Subnational Government Climate Action (herewith the Compendium) was created in order to provide concrete evidence of the diversity and accessibility of some revenue sources available to subnational governments in OECD and EU countries to fund and finance their climate action.

There is a need for this kind of research and data to complement the growing body of research on public climate finance. The OECD subnational government climate finance tracking methodology, outlined in Part III of this report, only tracks and measures subnational public expenditure due to the nature of National Accounts COFOG data, which does not include revenue. The Compendium was developed as a complementary, yet independent, pillar of work centred on revenue sources. Due to the lack of data on

climate-significant revenue sources for subnational governments, this stream of work relies on a qualitative methodology, to provide a more complete picture of the financial role of subnational governments in combatting climate change and to identify where levers of action exist to scale up subnational public climate finance.

There are different sources of subnational government revenue that could be designed to foster and help finance the carbon-neutral transition. These include grants and subsidies; own-source revenues such as subnational taxes, user charges and fees, and income from assets; and external sources of financing such as bonds, loans, and loan guarantees, among others (OECD, 2019^[1]; OECD, 2021^[37]; OECD, 2020^[43]). External sources of finance can be “green”, “climate”, or “sustainable” focused or have no explicit focus but still be used for climate adaptation or mitigation projects.

The Compendium is designed to be a tool for policy-makers, academics, and the general public to use to identify and compare climate change targeted financial instruments available to subnational governments in all OECD and EU countries. The data contained within the Compendium can also be used to support and develop dialogue between levels of government on the quantity, quality, and diversity of resources available to subnational governments to support their climate action.

Structure of the Compendium

Those who use the Compendium will be able to find information on:

- The level of government providing the instrument: European Union level (for European countries), national government, state/regional government, or intermediate government.
- The entity managing the instrument: government department, government agency, or delegated organisation/agency.
- The type of instruments available: earmarked or non-earmarked grants, loans, loan guarantees, contractual agreements, funds, and more.
- The subnational beneficiary of the instrument: state or regional governments, municipalities, Indigenous communities, inter-municipal cooperation bodies, and other subnational governments specific to each country.
- The sectors targeted, based on the Climate Bonds Initiative Taxonomy: water, energy, transport, buildings, land use and marine resources, industry, waste, ICT and air quality¹² (Climate Bonds Initiative, 2020^[44]).
- Whether the instrument supports climate change adaptation, mitigation, or both.
- Under which conditions the funding be accessed: guidelines for applying and eligibility conditions.

The instruments included in the Compendium can be either funding instruments or financing instruments. In the context of this study, “funding” refers to the mobilisation of budgetary resources to capitalise a climate-related investment or expenditure. Budgetary resources include grants and subsidies as well as own-source revenues such as taxes, user charges and fees, and property income. The term “financing” when used throughout this report refers to capitalising a climate-related investment using external resources, for example public borrowing or private resources (green loans, loan guarantees, green bonds, etc.).

In order to make this tool easily accessible to subnational governments and other stakeholders, the OECD had developed an online platform using PowerBI, which showcases the results and findings of the compendium in an interactive way (Figure 2.1). Users are thus able to access the Compendium through

¹² Air quality is not included in CBI’s taxonomy but was added to the Compendium as it was noted that many instruments targeted air quality as part of their climate change focus.

this interactive dashboard which will be found on the Climate Revenue Tracking page of the OECD's [Subnational Government Climate Finance Hub](#). They are able to search the database by country, instrument, subnational beneficiary, and more to find comparable information on instruments available in all OECD and EU countries. The dashboard also included a country summary section providing an overview of the climate-targeted financial instruments available to subnational governments in a given country. The list of instruments included in the Compendium is not exhaustive.

Figure 2.1. Screenshots of the online Compendium tool



Analysis of the Compendium

This compendium lists 311 public sources of funding, herewith referred to as instruments that subnational governments (SNGs) can mobilise to fund climate-related activities. Only instruments provided by central governments (unitary countries), federal and state governments (federal countries), or government owned banks are included in the compendium. Instruments were found for 41 OECD and EU countries (8 federal and 33 unitary), plus the European Union. Research did not identify any currently available climate-related funding instruments provided by central governments for subnational governments in Cyprus and the Netherlands. A full list of the instruments can be found in Annex C.

Based on an analysis of the compendium, federal countries tend to have more climate-related instruments available for subnational governments (13,5 per country on average) than unitary countries (5,5 per country on average). The degree of decentralisation, in particular the degree of devolution of environment and climate competences to subnational governments also appear to be key factors contributing to the number and diversity of funding instruments available to subnational governments. This can be exemplified by comparing Italy and Turkey, two unitary countries with two tiers of subnational governments, but with a large difference in the number of climate-related instruments provided to subnational governments (11 in Italy, and one in Turkey). In Italy, there is a relatively high level of decentralisation, and Italy's subnational governments have important spending responsibilities in climate-related policy domains, such as transportation, energy, waste management, and agriculture. In comparison, Turkey is more fiscally centralised and within the environmental governance system, the national government exercises most of the powers. As a result, Turkish subnational governments have few climate-related spending responsibilities and therefore there is less scope for instruments to fund subnational climate action in Turkey. Regarding the diversity funding instruments available to subnational governments, a general trend of more decentralised and more populous countries providing greater diversity in instruments was noted.

Earmarked grants and funds are by far the most common type of climate-related funding instruments available for subnational governments in the OECD and EU that was identified for the Compendium. In many cases, earmarked grants are used to provide funding to sub-programmes of climate funds that manage a pool of financial resources. However, it is also possible that grants are a stand-alone funding instrument that are not part of a larger fund. The grants identified in the compendium vary considerably in how constrained the use of the funds is. It is important to keep a certain degree of flexibility in how grant funds can be used to allow for subnational governments to implement projects relevant to their local climate adaptation and mitigation needs. Overly restricting the use of grant funding can lead to an inefficient use of funds and hinder the low-carbon investments needed to ensure a carbon-neutral transition.

Loans and contracts are two less common climate-related instruments available to subnational governments from higher levels of government. The compendium includes 34 loan instruments, all of which are available to municipalities, and eight contract instruments, three of which are in Canada and the rest are in European countries (Belgium, France, Denmark, Sweden and Switzerland). Intergovernmental contracts can help foster place-based, long-term action for reaching climate objectives and have been used in France, Italy or the Netherlands for decades. All the contracts included in the Compendium include a funding element. France in particular has a long-standing practice of contractual arrangements, which in recent years have incorporated environmental and climate priorities (Box 2.1).

Box 2.1. The use of intergovernmental contracts in France

State-Region Planning Contracts

In France, the State-Region Planning Contracts (Contrat de Plan Etat-Region - CPER) launched in 1984 have played a critical role in supporting the convergence of financing in favour of structuring projects for the development of the territory, as well as the coherence of public policies based on a shared strategic vision for each region. The new generation of CPER that covers 2021-2027 supports the ecological transition, among other objectives, in close coordination with the 2021-2027 EU funds and the 2021-2022 French Recovery Plan.

Recovery and Ecological Transition Contracts

In 2020, France introduced Recovery and Ecological Transition Contracts for inter-municipal cooperation bodies (*Contrat de relance et de transition écologique* - CRTE). These contracts last from 2020 to 2026 and provide a framework for the territorialisation and coordination of a range of public policies that as a whole contribute to the challenges of territorial cohesion and the ecological transition. The priorities of the contract are defined locally and agreed upon with the State. IMCs can access funding for the projects in the contracts from a variety of sources including the Local Investment Support Grant (DSIL), EU funds, State government ministries implicated in the contract, and the private sector

Source: (Agence nationale de la cohésion des territoires, 2020^[45]; Ministère de la cohésion des territoires et des relations avec les collectivités territoriales, 2021^[46])

Several European countries rely heavily on European Union funds to encourage climate action at the subnational level (Box 2.2). The EU Cohesion Fund and the Modernisation Fund in particular are highly relied upon by some Member States (e.g. Czech Republic, Latvia, and Lithuania) to fund subnational climate action. The Modernisation Fund, in particular, is a dedicated funding programme to support 10 lower-income EU Member States in their transition to climate neutrality by helping to modernise their energy systems and improve energy efficiency. Post-COVID recovery and stimulus plans also constitute a significant source of funding for subnational governments in EU and most OECD countries. The majority of stimulus packages that have been introduced since 2020 include climate change as a key investment priority. In the EU, 37% of the EUR 672.5 billion Recovery and Resilience Facility (RRF) is to be allocated to climate-related actions. Subnational governments' access to the RRF is based on national Recovery and Resiliency Plans and whether funding for subnational governments is included in these plans. National governments submit plans to the European Commission for approval and RRF funding is then distributed within a country in accordance with these plans. In Italy, for example, the National Recovery and Resiliency Plan (*Piano Nazionale di Ripresa e Resilienza*) received RRF funding and included six instruments targeted to subnational governments. In France, the “*France Relance*” plan, endowed with a budget of EUR 100 billion over two years, allocates 30% of its resources to the ecological transition and funds seven climate-related instruments benefitting subnational governments. In the United States, both the American Rescue Plan and the Bipartisan Infrastructure Investment and Jobs Act allocated funds to climate-related expenditure and investments at the subnational level.

Box 2.2. The EU system of fiscal instruments available for subnational governments to implement climate-related actions

The European Union currently has at least 22 instruments in place that subnational governments can take advantage of to fund climate mitigation and adaptation actions. They can be divided into two main categories: instruments that subnational governments access indirectly depending on the national use of European funds and instruments that subnational governments can access directly without intermediary.

Examples of the first type of instruments, indirectly accessed by subnational governments, include the Recovery and Resilience Facility, the Common Agricultural Policy Funds, the Modernization Fund and the Cohesion Fund. These funds generally benefit subnational governments but their distribution at the national level depend on national plans proposed by EU countries to the European Commission before approval. Hence, national governments can submit projects that will allow subnational governments to act at their level.

The second type of instrument is the most common and groups funds to which different subnational entities can apply. Examples of these type of instruments include the Environment and Climate Policy Program (LIFE), the Connecting Europe Facility (CEF), the Invest EU Programme, Horizon Europe, or the Just Transition Mechanism.

The EU also provides climate-related funding through its Pre-Accession Assistance Environment Operational Programme to countries undergoing accession to the EU. This instrument is available to subnational governments in Turkey.

Source: Author's compilation based on the data in the Compendium.

An analysis of the compendium based on the sectors that instruments are targeted to, shows that the energy and buildings sectors are the two most common sectors receiving funding in OECD and EU countries. Out of 311 instruments, 40% list energy projects as eligible for funding (renewable energy development, energy efficiency upgrades, etc.). Similarly, more than one-third of the instruments target the buildings sector. Conversely, less than a tenth of the instruments in the compendium address information and communications technology (ICT) infrastructure or air quality. Canada for example, has three instruments funding ICT (among other sectors), one of which is the Rural and Northern Communities Infrastructure Stream of the federal government's Investing in Canada Infrastructure Programme. Countries in Eastern Europe with a historical reliance on fossil fuel energy sources, including Bulgaria, Czech Republic, and Estonia, have a higher share of instruments targeted at air quality compared to other OECD and EU countries.

In both federal and unitary countries, municipalities are the most common beneficiary of climate-related funding instruments. Unique national demographic, geographic, and historical contexts also influence which kinds of subnational governments are targeted. For example, in Canada, Mexico and the United States, there are climate-related instruments specifically targeted to Indigenous communities. Interestingly, this is not the case in Australia and New Zealand, two other OECD countries where Indigenous communities are a prominent form of subnational government. Among EU Member States, particularly unitary ones, it was noted that a large number of climate-related instruments were targeted to inter-municipal cooperation bodies (IMCs). For example, in France 46% of instruments available to subnational governments specifically targeted IMCs, while in Portugal this number rises to 83%. This could reflect the importance of IMCs in delivering climate-related services in those countries, such as water distribution, wastewater treatment, and waste management.

The diversity of public actors providing funding instruments to subnational governments within a country varies considerably between countries, but a general trend noted was that countries with larger populations and a higher level of spending decentralisation tend to have greater variety in terms of public entities providing support to subnational governments for climate action. In France, eight different organisations, such as government ministries, government agencies and specialised public financial institutions provide climate-related funding for subnational governments, from various levels of government, including the central government but also regional and departmental governments. Similarly, in the United Kingdom where 10 instruments were identified, five different public entities are providing and managing these instruments.

Part III - Following the Funds: the OECD subnational government climate expenditure tracking methodology

There is a need for a methodology to track subnational governments' progress towards the Paris Agreement commitments. This section presents a methodology for measuring and comparing subnational climate-related public expenditure among European Union and OECD member countries, which has been used to populate the OECD [Subnational Government Climate Finance Database](#) outlined in Part II of this report.

The methodology is based on National Accounts data, in particular the “Government expenditure by function” dataset. It is designed to provide internationally comparable data to i) track subnational governments' progress towards the Paris Agreement commitments; and ii) provide evidence to support subnational governments in acting on climate change. The empirical evidence provided by subnational government climate finance tracking can serve to guide policy-makers in adjusting international and national programmes, and mobilising fiscal instruments that support subnational climate action, in addition to enhancing the capacity of subnational governments to develop and implement their own climate action plans and policies.

The methodology is based on a pilot tracking methodology developed in 2018. This work featured several key characteristics that enhanced its value-added within the broader climate finance tracking space. However, it also revealed several limitations that the 2022 methodology has sought to address.

Part III is divided into two sections. The first section walks the reader through the four steps of the 2022 methodology and how it was applied to generate the data available in the OECD Subnational Government Climate Finance Database. The second section discusses some of the limitations of the methodology and outlines future areas of work for the methodology and more generally for the topic of subnational government climate finance tracking.

Further methodological considerations are available in Annexes A and B, including how the share of climate-significant spending was estimated for each COFOG function.

1 The 2022 tracking methodology

The 2022 tracking methodology builds on a pilot methodology, developed in 2018 as part of the Financing Climate Futures: Rethinking Infrastructure series (OECD, 2019^[1]; OECD, WorldBank and UN Environment, 2018^[5]). It marked a first attempt to identify climate-related spending within the OECD General Government dataset, which categorises national and subnational spending by first-level and second-level Classification of the Functions of Government (COFOG) functions.

The 2018 methodology took a purposefully broad approach to the definition of “climate-related”, due to data limitations that remain as of today, which necessarily implied some bias in the data (Box 1.1).

Box 1.1. Lessons learnt from the 2018 pilot methodology

The 2018 methodology took a purposefully broad approach to the definition of “climate-related”, due to data limitations that remain as of today, which necessarily implied some bias in the data. The pilot methodology considered trends in expenditure and investment, from 2006 to 2016, for a set of 30 OECD countries. The analysis of data collected through the 2018 methodology highlighted several challenges and limitations, which fall into two main categories: the scope of definitions and data availability.

First, this methodology relied on a very broad definition of “climate-related” expenditure and investment. It included all expenditure in the categories of agriculture, environment, and water supply. It also created proxy coefficients to measure expenditure on energy, transport, housing development and street lighting based on one national indicator for each second-level COFOG function. These proxies, by design, cast a wide net and inevitably included expenditure that was not climate-related.

Second, COFOG data are not reported in the same way for all countries, which meant certain countries were not included in the 2018 study. The United States was not included because its environmental expenditures are reported as a part of housing and community amenities spending, rather than part of environmental spending, making comparisons difficult. Canada was not included as the available COFOG data only includes expenses and does not include total expenditures, i.e., capital expenditure, which contrasts with the COFOG accounting method used by the rest of the OECD and therefore prevents comparability. Mexico and Chile were not included as they do not publish COFOG data.

The OECD General Government dataset, which serves as the base dataset for the methodology, presents its own limitations. It relies on reporting from member countries on their national and subnational expenditures. Some countries do not report every year; others report subnational spending only for first-level COFOG function categories. Some countries do not report on all categories; for example, the United States does not report environment expenditures rather, these are reported under relevant COFOG 04 Economic Affairs and COFOG 06 Housing and Community Development categories.

Some countries were included despite incomplete COFOG data. These included Iceland, where no data was available before the year 2013, and Japan, where no data was available before the year 2005. Australia did not provide data for the year 2016. Korea did not provide any data for gross fixed capital formation, which is the indicator used to measure investment.

In addition, analysing certain countries was made more difficult because of a lack of second-level COFOG data at the subnational level. Austria, Germany, and Japan only provided second-level data for the general government sector. Australia did not provide second-level COFOG data for any government sector.

Despite these limitations, this methodology features several key characteristics that enhance its value-added within the broader climate finance tracking space brings, in particular:

- **International comparability:** as was the case with the 2018 pilot methodology, this refined version uses the Classification of the Functions of Government (COFOG) of the National Accounts system (General Government dataset) to categorise expenditure and investment by function for all sectors of government (Box 1.2). Despite its limitations, this dataset is the only internationally comparable dataset on subnational spending.
- **Scope of government:** The methodology measures both national and subnational climate-related expenditure, which enables comparisons of levels of climate-related spending between the two

levels of government (Box 1.2). It also makes it possible to identify the second-level COFOG functions in which subnational governments or national governments spent more on climate. Comparisons between three levels of government are possible for federal countries that report both state and local government spending.

- **Scope of indicators:** The methodology measures overall spending and the subset of gross-fixed capital formation, which the study refers to as investment. Given the necessarily broad nature of the study’s definition of “climate-related”, the benefit of including the subset on gross fixed capital formation was that it provided a more narrow definition of climate-related spending by limiting it to infrastructure expenditures.

Box 1.2. Government sectors included in the methodology

In the National Accounts, the General Government sector is made up of four sub-sectors: central government, state government, local government, and social security funds and related entities.

Only three of these sub-sectors are included in the methodology used in this study:

- Central government (S.1311): all administrative departments of the central government and other central agencies whose competence extends typically over the whole economic territory.
- State government (S.1312): federated regions in federal and quasi-federal countries (Spain and South Africa) and related public entities (e.g. special-purpose state bodies, state public institutions and various satellite institutions attached to state governments).
- Local government (S.1313): municipalities, provinces/counties, regions (in unitary countries) and all related local public entities (e.g., special-purpose local bodies, inter-municipal co-operation structures, local public institutions and various satellite institutions attached to local governments).

Subnational government refers to the sum of two sub-sectors: state governments (S.1312) and local governments (S.1313) in federal countries, and only local governments (S.1313) in unitary countries where the subnational government sub-sector is equivalent to the local government sub-sector.

General Government (unconsolidated) refers to the sum of the above sectors (central, state, and local government). This measure is used to compute the ratios such as the share of subnational in general government climate spending and investment.

Source: (OECD, 2018^[36])

The 2022 version of the OECD’s subnational government climate expenditure tracking methodology features several key updates:

- **A link to the EU Taxonomy on sustainable activities:** COFOG functions (also referred to as categories) can be converted into classifications of economic activity, including the UN ISIC classification and the Eurostat NACE classification. The 2022 version of the methodology uses a definition of subnational government climate expenditure and investment that is linked to the EU Taxonomy. The COFOG expenditure and investment categories considered to be related to climate change were chosen by converting NACE codes used in the EU Taxonomy to COFOG codes. Because NACE activities included in the EU Taxonomy are considered to make a *significant* contribution to climate adaptation or mitigation objectives this tracking methodology uses the term

“climate-significant” to refer to the COFOG categories that were included in the study after being linked to NACE activities.

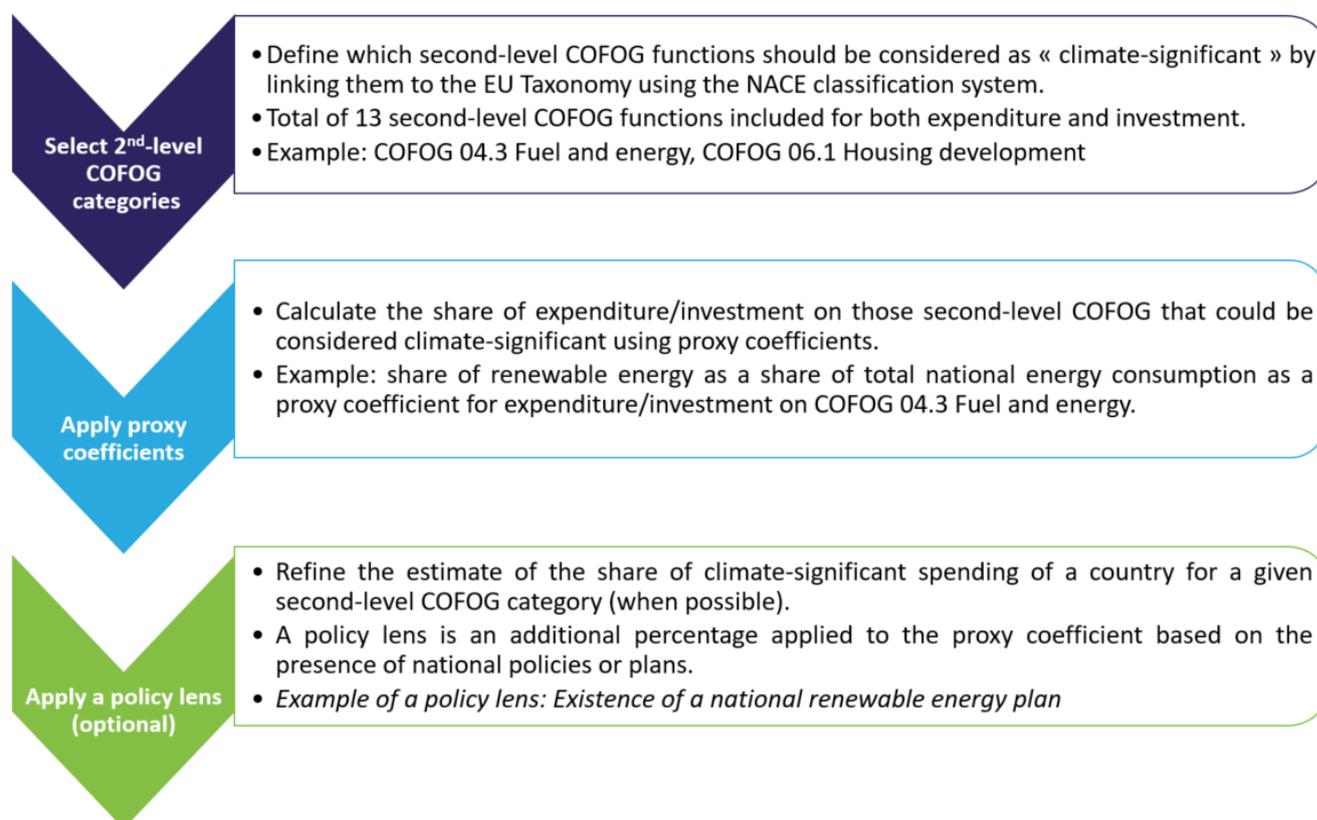
- **New proxy coefficients:** four new proxy coefficients were included.
- **A “policy lens”:** This is applied in addition to the proxy coefficient in order to further refine the share of spending or investment in a given COFOG category considered to be climate-significant.

The methodology can be broken down into three major steps:

1. The first step consists of identifying the second-level COFOG functions that are climate-related – for both expenditure and investment – by linking COFOG functions to NACE activities set out in the EU Taxonomy for Sustainable Activities classification system.
2. The second step consists in applying internationally comparable proxy coefficients to determine what share of spending in each second-level COFOG category is considered climate-significant.
3. The third step is optional and consists of applying a policy lens (an additional percentage on top of the proxy coefficient) to specific COFOG functions, in order to further refine the estimate of the climate-significant spending of a country for a given COFOG function.

The last step consisted of aggregating the estimates, calculating various ratios and the averages for groups of countries, and exporting the data in a digestible format for further analysis. Each of the key steps is outlined in greater detail below and in Figure 1.1.

Figure 1.1. Step-by-step representation of the methodology



Note: These two (sometimes three) steps are applied to each of the 13 second-level COFOG categories for each country included in the study and for each year between 2001 and 2019.

Step 1: Linking COFOG categories to the EU Taxonomy for Sustainable Activities classification system

The 2022 version of the methodology was intentionally designed to align with the EU Taxonomy for Sustainable Activities' technical screening criteria, developed in the framework of the European Commission commitment that aims at integrating, or mainstreaming, climate action into its whole budget (Box 1.3). This methodology uses the taxonomy created by the EU Technical Expert Group (TEG) on Sustainable Finance as the basis for determining which second-level COFOG categories contribute significantly to climate change mitigation or climate change adaptation. Spending in these COFOG categories is referred to as “climate-significant” throughout this report.

Box 1.3. EU Taxonomy for Sustainable Activities

The EU Taxonomy for Sustainable Activities is a classification system that establishes a list of environmentally sustainable economic activities using consistent and objective technical screening criteria. The Taxonomy is just one element of a broader EU sustainable finance framework designed to direct investment towards sustainable projects and activities, which is a key component of the Paris Agreement. The Taxonomy's legal basis is grounded in the Taxonomy Regulation, which entered into force on 12 July 2020, and tasks the European Commission with establishing the technical screening criteria. The Taxonomy Regulation set out the EU's six environmental objectives as well as four overarching conditions that an economic activity has to meet in order to qualify as environmentally sustainable. The six environmental objectives are:

- Climate change mitigation;
- Climate change adaptation;
- Sustainable use and protection of water and marine resources;
- Transition to a circular economy;
- Pollution prevention and control;
- Protection and restoration of biodiversity and ecosystems.

The four conditions an economic activity must meet to be considered sustainable are:

- Make a substantial contribution to a least one environmental objective;
- Do no significant harm to any other environmental objective;
- Comply with minimum social safeguards;
- Comply with the technical screening criteria.

The technical screening criteria are developed in delegated acts. The first delegated act on sustainable economic activities for climate change adaptation and mitigation objectives was formally adopted on 4 June 2021. Another delegated act for the remaining environmental objectives will be published in 2022. The European Commission established the Technical Expert Group (TEG) on Sustainable Finance in 2018 to develop recommendations for technical screening criteria for the climate change adaptation and mitigation objectives. The TEG published its final report on 9 March 2020, including two technical annexes containing technical screening criteria for 70 climate change mitigation and 68 climate change adaptation activities that do no significant harm to the other four environmental objectives. Economic activities are derived from the NACE classification system. NACE is the “statistical classification of economic activities in the European Community” and stands for “Nomenclature statistique des activités économiques dans la Communauté européenne”.

This methodology links the EU Taxonomy for Sustainable Activities to COFOG categories based on the first delegated act of environmentally sustainable economic activities for climate change adaptation and mitigation objectives and the NACE codes provided in that delegated act.

Source: (Technical Expert Group on Sustainable Finance, 2020^[35]; European Commission, 2021^[47]; OECD, 2020^[48])

This section explains how COFOG functions, which measure expenditure and investment¹³, were converted to the NACE activities the TEG taxonomy report identifies as making a substantial contribution to climate change adaptation or mitigation. NACE is the statistical classification of economic activities in the European Community and stands for “*Nomenclature statistique des activités économiques dans la Communauté européenne*”¹⁴.

No tables exist to directly convert COFOG functions into to NACE activities. Linking the two classification systems required converting COFOG functions to ISIC 3.1¹⁵ categories, then converting ISIC 3.1 categories to ISIC 4.0 categories, and then finally converting ISIC 4.0 categories to NACE 2 activities. The UN Statistics Division provides correspondence tables for each of these conversions¹⁶.

Once all second-level COFOG functions were converted to NACE activities, the TEG taxonomy report was used to identify NACE activities considered as substantially contributing to climate change adaptation or mitigation. Multiple NACE activities and TEG classifications were associated with the same second-level COFOG function to create a fuller picture of the activities associated with each COFOG function and to better identify activities that were climate-significant. This conversion provided the starting point for qualitatively understanding the share of a COFOG function that the TEG would consider as contributing substantially to climate change mitigation or adaptation.

No other conversion between COFOG functions and NACE activities for the purpose of determining climate change spending has been identified in existing literature on the topic of climate finance tracking. The conversion carried out as part of this study can serve a range of statistical purposes beyond the scope of the present methodology for tracking climate-significant spending.

Following the conversion process, total expenditure and investment data were extracted for 13 second-level COFOG categories for three government sub-sectors (Table 1.1) in each country from the OECD.Stat National Accounts database and the IMF’s Government Finance Statistics (GFS) dataset.

Table 1.1. Second-level COFOG categories included in the study

COFOG 04.2: Agriculture, forestry, fishing and hunting	COFOG 05.1: Waste management
COFOG 04.3: Fuel and energy	COFOG 05.2: Wastewater management
COFOG 04.5: Transport	COFOG 05.3: Pollution abatement
COFOG 06.1: Housing development	COFOG 05.4: Protection of biodiversity and landscape
COFOG 06.2: Community development	COFOG 05.5: R&D Environmental protection
COFOG 06.3: Water supply	COFOG 05.6: Environmental protection n.e.c.
COFOG 06.4: Street lighting	

¹³ P5_K2CG or OP5ANP: Gross capital formation and acquisition less disposals of non-financial non-productive assets.

¹⁴ Eurostat (2008), NACE Rev. 2 : Statistical classification of economic activities in the European Community

¹⁵ ISIC refers to International Standard Industrial Classification of All Economic Activities and was developed by the UN Statistics Commission.

¹⁶ Correspondence tables can be found here: <https://unstats.un.org/unsd/classifications/Econ/ISIC.cshtml>

Step 2: Selecting, extracting and applying internationally comparable proxy coefficients

Once climate-significant second-level COFOG functions were identified, the next step involved finding internationally comparable datasets that would allow for the calculation of the share of expenditure on those second-level functions that could be considered climate-significant. These datasets are referred to as proxy coefficients.

The COFOG expenditure and investment data are weighed by the proxy coefficients and then summed up to derive the estimated 'climate-significant expenditure' and 'climate-significant investment' for subnational government and other sub-sectors (e.g. unconsolidated general government) in each country.

While this approach allows for the calculation of national percentage estimates of climate-significant activities, it is important to note that these estimates remain partial and are subject to country-bias, due to the lack of a unified global methodology.

Table 1.2 lists the proxy coefficients used for each of the 13 second-level COFOG functions included in the methodology. An example of a proxy coefficient is the share of renewable energy as a share of total national energy consumption.

These proxy coefficients were restricted to the national-level, despite the purpose of this methodology being to characterise subnational spending, as no internationally comparable subnational data for the indicators could be found. Even if it could be, it would be impossible to know which subnational spending share aligns with which subnational government. Annex B provides more detail on the choice of proxy coefficients and the data used to calculate them.

Table 1.2. Comparison of proxy coefficients included in 2018 and 2022 studies, by COFOG function

First-level COFOG code and function	Second-level COFOG code and function	2022 Proxy Coefficient	2018 Proxy Coefficient	Data Source for 2022 Proxy Coefficient
04 - Economic affairs	04.2 - Agriculture, forestry, fishing and hunting	% of organic farm land for agriculture spending and 100% of forestry spending (using land cover data to identify share of agriculture spending and forestry spending under 04.2 spending, calculated).	100% of expenditure in this category was considered climate-significant.	OECD 2021, Dataset: Land Use, under Land Use, Land Resources, Environment; OECD 2021, Dataset: Agricultural land area, under Agri-Environmental other indicators, Environmental Indicators for Agriculture, Agriculture and Fisheries.
04 - Economic affairs	04.3 - Fuel and energy	% of modern renewables in each country's final energy consumption.	% of renewable energy in each country's energy consumption.	IEA 2021, Dataset: Indicator Renewable share (modern renewables) in final energy consumption (SDG 7.2), under Renewables.
04 - Economic affairs	04.5 - Transport	% rail transport investment within each country's inland transport investment.	% of each country's transportation investment in rail transport.	OECD 2021, Dataset: Municipal Waste, Generation and Treatment" under Waste, Environment.
05 – Environmental protection	05.1 - Waste management	% of municipal waste recovered rather than disposed nationally (includes through recycling, composting and incineration with energy recovery).	100% of expenditure in this category was considered climate-significant.	IEA 2021, Dataset: Indicator Share of renewables, low-carbon sources and fossil fuels in power generation under Electricity.
05 – Environmental protection	05.2 - Waste water management	% of population connected to urban wastewater collection system.	100% of expenditure in this category was considered climate-significant.	OECD 2021, Dataset: "Wastewater treatment" under Water, Environment.

05 – Environmental protection	05.3 – Pollution abatement	No internationally comparable proxy coefficient found; 100% of expenditure in this category is considered climate-significant.	100% of expenditure in this category was considered climate-significant.	N/A
05 – Environmental protection	05.4 - Protection of biodiversity and landscape	No internationally comparable proxy coefficient found; 100% of expenditure in this category is considered climate-significant.	100% of expenditure in this category was considered climate-significant.	N/A
05 – Environmental protection	05.5 - R&D Environmental protection	No internationally comparable proxy coefficient found; 100% of expenditure in this category is considered climate-significant.	100% of expenditure in this category was considered climate-significant.	N/A
05 – Environmental protection	05.6 - Environmental protection n.e.c.	No internationally comparable proxy coefficient found; 100% of expenditure in this category is considered climate-significant.	100% of expenditure in this category was considered climate-significant.	N/A
06 – Housing and community amenities	06.1 - Housing development	% of each country's population living in a TL3 region with more than 1000 people/km2.	% of each country's population living in a TL3 with more than 1000 people/km2.	OECD 2021, Dataset: Demographic indicators by Typology (rural / urban)" under Regional Demography, Regional Statistics, Regions and Cities.
06 – Housing and community amenities	06.2 - Community development	% of each country's population living in a TL3 region with more than 1000 people/km2.	0% of expenditure in this category was considered climate-significant.	OECD 2021, Dataset: Demographic indicators by Typology (rural / urban)" under Regional Demography, Regional Statistics, Regions and Cities.
06 – Housing and community amenities	06.3 - Water supply	% of renewable sources in each country's power generation (this indicator recognizes the close connection between the water supply and electricity use).	100% of expenditure in this category was considered climate-significant.	IEA 2021, Dataset: Indicator Share of renewables, low-carbon sources and fossil fuels in power generation under Electricity.
06 – Housing and community amenities	06.4 - Street lighting	% of renewable sources in each country's power generation.	% of each country's electricity from non-hydroelectric renewables.	IEA 2021, Dataset: Indicator Share of renewables, low-carbon sources and fossil fuels in power generation under Electricity.

Note: This table only lists the second level COFOG categories that are taken into account in the study. The following first level COFOG functions are not included in the study due to a lack of internationally comparable proxy indicator: General public services; Defence; Public order and safety; Health; Recreation, culture and religion; Education; and Social protection.

Step 3: Applying a policy lens

To further refine the internationally comparable coefficients identified in Step 2, a policy lens was added. A “policy lens” is defined as a policy document (e.g. a national renewable energy plan) that could improve the estimate of the share of climate-significant spending under each second-level COFOG function. The policy lens is an additional percentage applied to the proxy coefficient based on the presence of national policies or plans that indicate a commitment to activities that substantially contribute to climate change mitigation or adaptation.

Applying a policy lens to the coefficients can improve the accuracy of the coefficients, which depend on the availability of internationally comparable data to estimate the share of spending on a COFOG category

that substantially contributes to climate change mitigation or adaptation. For example, for COFOG 04.3 Fuel and energy, the proxy coefficient used to represent the share of climate-significant energy spending is equal to national renewable energy consumption. This coefficient does not capture government investment in future renewable energy generation. To account for this, it is possible to apply a policy lens to the coefficient and take a percentage of 150% rather than 100% of its value. For example, if a country's renewable energy consumption is currently 10% of all renewable energy consumption, but it has a renewable energy plan, 15% of the country's energy spending is considered to be climate-significant instead of the 10% normally considered by the proxy coefficient if a policy lens was not applied. This additional percentage, derived from the policy lens, is applied only to the years for which the renewable energy plan is in place.

In the OECD Subnational Government Climate Finance database, a policy lens was applied to only COFOG 04.3 Fuel and energy, using national renewable energy plans. For EU Member Countries this refers to their National Energy and Climate Plans. For non-EU countries, national-level renewable energy plans are considered.

Policy lenses were not applied to other proxy coefficients because as it was not possible to identify any relevant internationally comparable national policies or plans for those proxy coefficients, such as sustainable forestry, circular economy, green procurement and energy efficiency. If these types of plans become more standardised, a future version of this methodology could apply them as a policy lens.

Final step: Aggregating the estimates

The estimates for climate-related expenditure and investment are expressed through different measures: in US dollars PPPs, per inhabitant and as ratios – primarily of general government climate expenditure and investment, and GDP. PPPs conversion rates equalise the purchasing power of different countries and thus allow for comparison among OECD and EU countries. Converting the data in USD PPP also facilitates the computation of weighted averages for groups of countries – such as OECD, EU or OECD federal countries.

An automated process was adopted to extract and process the data from various sources and to calculate the proxy coefficients included in the database. The automated extraction and processing were carried out using the statistical software Stata. There are many advantages to an automated process.

- First, it is time-efficient. It streamlines the work instead of downloading and compiling various files for each COFOG category and proxy coefficient.
- Second, it allows for the fast identification of outliers. While it requires both coding skills and knowledge of national accounts to extract and process the data in a proper manner, the automated process facilitates the correction of errors at any point in time. It also ensures that the same coding standards apply to every data point.
- Third, it facilitates replicability. Anyone with access to the raw files can consistently replicate the work that has been done. The same approach can also be applied to other countries should the data become available in the future.

2 Challenges and limitations

Limitation of COFOG data

As underlined above, using data from the National Accounts has both advantages and disadvantages. The advantage of using the National Accounts data is that it provides the only internationally comparable dataset on national and subnational spending. The disadvantage is that the COFOG system does not include a climate change category but instead includes very broad categories that encompass both climate-significant and non-climate significant expenditure. The categories are organised in three levels (divisions, groups, and classes), with increasingly precise levels of granularity (Annex A provides a full list of first-level, second-level and third-level COFOG functions). Given the cross-cutting nature of climate change it would not be possible to include a climate category under the COFOG system; however, COFOG could be adapted to capture more climate-related expenditure by being sub-divided based on the Classification of Environmental Activities¹⁷ (CEA) (Pizarro et al., 2021^[49]).

Another disadvantage is that of data availability, because while third-level COFOG functions exist, countries either do not have them or do not report them in the OECD National Accounts Database. Therefore, it was necessary to collect data for second-level COFOG. Third-level COFOG functions were used for reference in aligning the COFOG system with the NACE activities set out in the EU Taxonomy as third-level COFOG functions provide the highest amount of detail.

COFOG categories not captured by the methodology

Seven of the ten COFOG functions do not relate directly to climate or other environmental spending: COFOG 01 General public services; COFOG 02 Defence; COFOG 03 Public order and safety; COFOG 07 Health; COFOG 08 Recreation, culture and religion; COFOG 09 Education; and COFOG 10 Social protection.

Two options were explored, outlined below, for including these COFOG functions in the study, in order to capture climate-significant spending in these categories, such as: energy-efficient lighting and building technologies, low-carbon vehicle fleets, and renewable energy consumption. However, in the end, these functions were not included in order to have results that were more credible and statistically sound.

The first option considered was to apply a standard percentage to the seven COFOG categories not previously included that was equal to the share of spending on “COFOG 05 Environmental protection” out of total spending for all ten COFOG categories. For example, if a country’s COFOG 05 Environmental protection expenditure equalled 4% of total spending in all ten COFOG functions, then 4% of spending in COFOG 01 General public services would have been considered climate-significant spending, and 4% of spending in COFOG 02 Defence would have been considered climate-significant, etc. There are several drawbacks to using this method. First, it would penalise countries who had mainstreamed climate spending across COFOG categories and thus had a smaller percentage of spending on COFOG 05 Environmental protection. Second, it would reward countries who did not have climate-significant spending in other

¹⁷ The CEA is a functional classification system that regroups government and private producer activities related to environmental goods and services that are intended to protect the environment.

COFOG categories but who spent a lot on COFOG 05 Environmental protection categories. Overall, it was concluded that the negative impacts to the credibility of the results from using this method would outweigh the positive benefit of having a more comprehensive analysis that included all ten COFOG categories.

The second option considered was to apply green procurement and energy efficiency policy-lenses. The idea was that if a country had implemented a green procurement strategy that included subnational governments, then a certain percentage of the spending in each of the seven COFOG categories not previously included would have been considered to be climate-significant. The same approach would have applied for an energy efficiency strategy that included subnational governments. In the event that countries had both a green procurement and an energy efficiency strategy in place, a larger percentage of spending in each of the seven COFOG categories would have been considered to be climate-significant. This method was not used due to concerns about how to ensure objectivity in the selection of percentages to apply and a lack of standardisation amongst the green procurement and energy efficiency strategies. This same conclusion was reached for this method as for the first method mentioned above, namely that the negative impact to the credibility of the results from using the policy lenses would outweigh the positive benefits of having a more comprehensive analysis that included all ten COFOG categories.

Proxy-coefficients and policy lens

As indicated above, the methodology is constrained by the availability of proxy coefficients, including overtime and by country. While applying policy lens could help refine these proxy coefficients, their use was difficult given the lack of information and risk of arbitrary application (this step was finally only applied to COFOG 04.3).

Data accessibility

Several of the data limitations noted in the 2018 study remain present in this refined version. Canada, Chile, Colombia, Costa Rica, Korea, Mexico, and the United States still cannot be included in the study due to either missing COFOG data or differences in accounting methodologies preventing international comparison. Cyprus, Malta, and New Zealand are not included due to missing coefficient data. Table 2.1 provides more details on why each country was not included.

For Austria, Germany, and Japan second-level COFOG data is only available for the general government sector. In order to include these countries, the methodology was adapted and the ratio of climate-significant subnational expenditure as a share of climate-significant general government expenditure was calculated using first-level COFOG data. These ratios were then applied to the second-level COFOG categories using general government data. These were the same 13 second-level categories used for the other countries included in the study that had second-level COFOG data for the subnational government sector available.

The data used to calculate the proxy indicators contains some gaps. In the case of a gap, the value from the year preceding the gap was carried forward. If the gap was at the beginning of the time series of study (2001-2019), then the value from the year directly succeeding the gap was carried backwards.

Despite the remaining data limitations, there have been some improvements to the availability of data since the 2018 study. For example, Iceland now has COFOG data available for 2013 and Australia now has first and second-level COFOG data available for all years included in the scope of the study.

Table 2.1. Countries not included in the study

Country not included in the study	Reasoning
Canada	COFOG accounting methodology differs from other countries.
Chile	No COFOG data is available.
Colombia	Missing COFOG data.
Costa Rica	Missing COFOG data.
Cyprus	Missing coefficient data.
Korea	Second-level COFOG data for state, local, and central government sectors not available.
Malta	Missing coefficient data.
Mexico	No COFOG data is available.
New Zealand	Missing coefficient data.
United States	Second-level COFOG data for central, state, and local government sectors not available and COFOG accounting methodology differs from other countries.

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Annex A.

Table A A.1. COFOG Functions

Code	Description
01	General public services
01.1	Executive and legislative organs, financial and fiscal affairs, external affairs
01.1.1	Executive and legislative organs (CS)
01.1.2	Financial and fiscal affairs (CS)
01.1.3	External affairs (CS)
01.2	Foreign economic aid
01.2.1	Economic aid to developing countries and countries in transition (CS)
01.2.2	Economic aid routed through international organizations (CS)
01.3	General services
01.3.1	General personnel services (CS)
01.3.2	Overall planning and statistical services (CS)
01.3.3	Other general services (CS)
01.4	Basic research
01.4.0	Basic research (CS)
01.5	R&D General public services
01.5.0	R&D General public services (CS)
01.6	General public services n.e.c.
01.6.0	General public services n.e.c. (CS)
01.7	Public debt transactions
01.7.0	Public debt transactions (CS)
01.8	Transfers of a general character between different levels of government
01.8.0	Transfers of a general character between different levels of government (CS)
02	Defence
02.1	Military defence
02.1.0	Military defence (CS)
02.2	Civil defence
02.2.0	Civil defence (CS)
02.3	Foreign military aid
02.3.0	Foreign military aid (CS)
02.4	R&D Defence
02.4.0	R&D Defence (CS)
02.5	Defence n.e.c.
02.5.0	Defence n.e.c. (CS)
03	Public order and safety
03.1	Police services
03.1.0	Police services (CS)
03.2	Fire-protection services
03.2.0	Fire-protection services (CS)
03.3	Law courts
03.3.0	Law courts (CS)
03.4	Prisons
03.4.0	Prisons (CS)
03.5	R&D Public order and safety
03.5.0	R&D Public order and safety (CS)

03.6	Public order and safety n.e.c.
03.6.0	Public order and safety n.e.c. (CS)
04	Economic affairs
04.1	General economic, commercial and labour affairs
04.1.1	General economic and commercial affairs (CS)
04.1.2	General labour affairs (CS)
04.2	Agriculture, forestry, fishing and hunting
04.2.1	Agriculture (CS)
04.2.2	Forestry (CS)
04.2.3	Fishing and hunting (CS)
04.3	Fuel and energy
04.3.1	Coal and other solid mineral fuels (CS)
04.3.2	Petroleum and natural gas (CS)
04.3.3	Nuclear fuel (CS)
04.3.4	Other fuels (CS)
04.3.5	Electricity (CS)
04.3.6	Non-electric energy (CS)
04.4	Mining, manufacturing and construction
04.4.1	Mining of mineral resources other than mineral fuels (CS)
04.4.2	Manufacturing (CS)
04.4.3	Construction (CS)
04.5	Transport
04.5.1	Road transport (CS)
04.5.2	Water transport (CS)
04.5.3	Railway transport (CS)
04.5.4	Air transport (CS)
04.5.5	Pipeline and other transport (CS)
04.6	Communication
04.6.0	Communication (CS)
04.7	Other industries
04.7.1	Distributive trades, storage and warehousing (CS)
04.7.2	Hotels and restaurants (CS)
04.7.3	Tourism (CS)
04.7.4	Multi-purpose development projects (CS)
04.8	R&D Economic affairs
04.8.1	R&D General economic, commercial and labour affairs (CS)
04.8.2	R&D Agriculture, forestry, fishing and hunting (CS)
04.8.3	R&D Fuel and energy (CS)
04.8.4	R&D Mining, manufacturing and construction (CS)
04.8.5	R&D Transport (CS)
04.8.6	R&D Communication (CS)
04.8.7	R&D Other industries (CS)
04.9	Economic affairs n.e.c.
04.9.0	Economic affairs n.e.c. (CS)
05	Environmental protection
05.1	Waste management
05.1.0	Waste management (CS)
05.2	Waste water management
05.2.0	Waste water management (CS)
05.3	Pollution abatement
05.3.0	Pollution abatement (CS)
05.4	Protection of biodiversity and landscape
05.4.0	Protection of biodiversity and landscape (CS)

05.5	R&D Environmental protection
05.5.0	R&D Environmental protection (CS)
05.6	Environmental protection n.e.c.
05.6.0	Environmental protection n.e.c. (CS)
06	Housing and community amenities
06.1	Housing development
06.1.0	Housing development (CS)
06.2	Community development
06.2.0	Community development (CS)
06.3	Water supply
06.3.0	Water supply (CS)
06.4	Street lighting
06.4.0	Street lighting (CS)
06.5	R&D Housing and community amenities
06.5.0	R&D Housing and community amenities (CS)
06.6	Housing and community amenities n.e.c.
06.6.0	Housing and community amenities n.e.c. (CS)
07	Health
07.1	Medical products, appliances and equipment
07.1.1	Pharmaceutical products (IS)
07.1.2	Other medical products (IS)
07.1.3	Therapeutic appliances and equipment (IS)
07.2	Outpatient services
07.2.1	General medical services (IS)
07.2.2	Specialized medical services (IS)
07.2.3	Dental services (IS)
07.2.4	Paramedical services (IS)
07.3	Hospital services
07.3.1	General hospital services (IS)
07.3.2	Specialized hospital services (IS)
07.3.3	Medical and maternity centre services (IS)
07.3.4	Nursing and convalescent home services (IS)
07.4	Public health services
07.4.0	Public health services (IS)
07.5	R&D Health
07.5.0	R&D Health (CS)
07.6	Health n.e.c.
07.6.0	Health n.e.c. (CS)
08	Recreation, culture and religion
08.1	Recreational and sporting services
08.1.0	Recreational and sporting services (IS)
08.2	Cultural services
08.2.0	Cultural services (IS)
08.3	Broadcasting and publishing services
08.3.0	Broadcasting and publishing services (CS)
08.4	Religious and other community services
08.4.0	Religious and other community services (CS)
08.5	R&D Recreation, culture and religion
08.5.0	R&D Recreation, culture and religion (CS)
08.6	Recreation, culture and religion n.e.c.
08.6.0	Recreation, culture and religion n.e.c. (CS)
09	Education
09.1	Pre-primary and primary education

09.1.1	Pre-primary education (IS)
09.1.2	Primary education (IS)
09.2	Secondary education
09.2.1	Lower-secondary education (IS)
09.2.2	Upper-secondary education (IS)
09.3	Post-secondary non-tertiary education
09.3.0	Post-secondary non-tertiary education (IS)
09.4	Tertiary education
09.4.1	First stage of tertiary education (IS)
09.4.2	Second stage of tertiary education (IS)
09.5	Education not definable by level
09.5.0	Education not definable by level (IS)
09.6	Subsidiary services to education
09.6.0	Subsidiary services to education (IS)
09.7	R&D Education
09.7.0	R&D Education (CS)
09.8	Education n.e.c.
09.8.0	Education n.e.c. (CS)
10	Social protection
10.1	Sickness and disability
10.1.1	Sickness (IS)
10.1.2	Disability (IS)
10.2	Old age
10.2.0	Old age (IS)
10.3	Survivors
10.3.0	Survivors (IS)
10.4	Family and children
10.4.0	Family and children (IS)
10.5	Unemployment
10.5.0	Unemployment (IS)
10.6	Housing
10.6.0	Housing (IS)
10.7	Social exclusion n.e.c.
10.7.0	Social exclusion n.e.c. (IS)
10.8	R&D Social protection
10.8.0	R&D Social protection (CS)
10.9	Social protection n.e.c.
10.9.0	Social protection n.e.c. (CS)

Source: (IMF, 2014_[50])

Annex B.

This Annex explains in more detail how the share of climate-significant spending or investment was calculated for each COFOG function.

COFOG 01 General public services

The 2018 study did not include any estimates for climate-related general public services spending.

In the refined methodology, no suitable proxy to determine the share of climate-significant general public services spending was developed due to a lack of internationally comparable data.

COFOG 02 Defence

The 2018 study did not include any estimates for climate-related defence spending.

In the refined methodology, no suitable proxy to determine the share of climate-significant general public services spending was developed due to a lack of internationally comparable data.

COFOG 03 Public order and safety

The 2018 study did not include any estimates for climate-related public order and safety spending.

In the refined methodology, no suitable proxy to determine the share of climate-significant general public services spending was developed due to a lack of internationally comparable data.

COFOG 04 Economic affairs

Economic affairs has several second-level categories that each have several corresponding activities that contribute substantially to climate change mitigation or adaptation (Table 2.2).

Table 2.2. Climate-significant COFOG 04 Economic Affairs categories

Second-level COFOG code	Second-level COFOG function	Regulatory Activity	Operational Activity	Corresponding TEG code	Corresponding TEG Activity	Mitigation	Adaptation	Included
04.1	General economic, commercial and labour affairs	●	●	None				No
04.2	Agriculture, forestry, fishing and hunting	●	●	Several	See table below.	●	●	Yes
04.3	Fuel and energy	●	●	Several	See table below.	●	●	Yes
04.4	Mining, manufacturing and construction	●		Several	See table below.	●	●	Yes
04.5	Transport	●	●	Several	See table below.	●	●	Yes
04.6	Communication	●	●	Several	See table below.	●		Yes
04.7	Other industries	●		None	See table below.			No
04.8	R&D Economic affairs		●	Several	See table below.	●	●	No

04.9	Economic affairs n.e.c.	●	●	None					No
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Source: Author's elaboration.

Three economic affairs second-level categories are included in the methodology: 04.2 Agriculture, forestry, fishing and hunting, 04.3 Fuel and energy, and 04.5 Transport.

04.2 Agriculture, forestry, fishing and hunting

The 2018 study designated as climate-related all agriculture, forestry, fishing and hunting spending at both the national and subnational level. The macro methodology seeks to improve on this approach.

The TEG report identifies eight technical criteria that apply to two of the three third-level COFOG functions: to agriculture and forestry. National and subnational governments mainly regulate activities within this function, with the exception of forest management (Table 2.3).

Based on the TEG technical criteria, the share of climate-significant public spending related to agriculture (04.2.1) and forestry (04.2.2) was calculated. Climate-significant fishing and hunting spending (04.2.3) was not calculated, based on the assumption that any activities related to improving habitats in a way that contributes to climate change mitigation or adaptation would fall under COFOG 05.4 Protection of biodiversity.

Table 2.3. Climate-significant COFOG 04.2 Agriculture, forestry, fishing and hunting categories

Third-level COFOG code	Third-level COFOG function	Corresponding NACE 2 code	Corresponding NACE 2 activity	Regulatory Activity	Operational Activity	Corresponding TEG code	Corresponding TEG Activity	Mitigation	Adaptation	Included
04.2.1	Agriculture	1.2	Growing of perennial crops	●		2.1	Growing of perennial crops	●	●	Yes
		1.1	Growing of non-perennial crops	●		2.2	Growing of non-perennial crops	●	●	Yes
		1.4	Livestock production	●		2.3	Livestock production	●	●	Yes
04.2.2	Forestry	2	Forestry and logging	●	●	1.1	Afforestation	●	●	Yes
				●	●	1.2	Rehabilitation, Restoration	●	●	Yes
				●	●	1.3	Reforestation	●	●	Yes
				●	●	1.4	Existing forest management	●	●	Yes
				●	●	1.5	Conservation forest	●	●	Yes
04.2.3	Fishing and hunting	3.2	Aquaculture	●		None				No
		84.13	Regulation of and contribution to more efficient operation of businesses	●		None				No

Source: Author's elaboration.

Base data set: Land use

This indicator requires first calculating the share of agricultural and forestry spending as a share of all agriculture, forestry and fishing and hunting spending. This was done by calculating the share of “arable and permanent crops and pastures” and the share of “forest” in total arable, pasture and forest land.

Data source: OECD 2021, Dataset: “Land Use”, under Land Use, Land Resources, Environment. Last accessed 11 March 2021.

Calculating climate-significant agricultural spending

The share of climate-significant agricultural spending was estimated as equivalent to the national share of organic farming land area in total agricultural land area. The share of organic farming land serves as a proxy for the agricultural TEG technical criteria, which include avoiding or reducing greenhouse gas emissions and doing no significant harm to other green objectives identified by the TEG.

Data source: OECD 2021, Dataset: “Agricultural land area”, under Agri-Environmental other indicators, Environmental Indicators for Agriculture, Agriculture and Fisheries. Last accessed 11 March 2021.

Calculating climate-significant forestry spending

The methodology takes 100% of the spending related to forestry into account. This indicator assumes that all forestry spending is climate-significant, based on the fact that the TEG technical criteria list a wide range of forestry activities as substantially contributing to climate change mitigation or adaptation are all within the forestry sector, including: afforestation; rehabilitation, restoration; reforestation; existing forest management; and conservation forest.

Applying a policy lens related to sustainable forestry plans was considered, but it was not possible to find internationally comparable plans in enough countries to create a reliable policy lens, that would not penalize countries with a low share of forest cover.

04.3 Fuel and energy

The 2018 study estimated the share of climate-significant energy spending at both the national and subnational level as equal to the percentage of each country's energy consumption from renewable sources. The data source was the World Bank World Development Indicators.

The TEG report identifies 25 technical criteria that apply to the production, transmission and distribution of energy. Most of these fit under two third-level COFOG functions (Table 2.4):

- 4.35 Electricity, which the UNSD COFOG-ISIC 3.1 correspondence table separates into:
 - Operation of non-enterprise-type electricity supply systems
 - Electricity (except operation of non-enterprise-type electricity supply systems)
- 4.36 Non-electric energy, which the UNSD COFOG-ISIC 3.1 correspondence table separates into:
 - Operation of non-enterprise-type non-electricity supply systems
 - Non-electric energy (except operation of non-enterprise-type non-electricity supply systems)

The share of climate-significant public spending related to electricity (04.3.5) and non-electric energy (04.3.6 non-electric energy) was calculated, as these COFOG categories covered all 25 of the energy-related activities identified in the TEG technical criteria. Spending related to the other third-level COFOG categories, which related to fossil fuels, nuclear energy and other fuels, was not calculated as it is currently not feasible to use internationally comparable data to estimate the share of spending under those functions that contribute substantially to climate change mitigation or adaptation.

Table 2.4. Climate-significant COFOG 04.3 Fuel and energy categories

Third-level COFOG code	Third-level COFOG function	Corresponding NACE 2 code	Corresponding NACE 2 activity	Regulatory Activity	Operational Activity	Corresponding TEG code	Corresponding TEG Activity	Mitigation	Adaptation	Included
04.3.1	Coal and other solid mineral fuels			●		None				No
04.3.2	Petroleum and natural gas			●		None				No
04.3.3	Nuclear fuel			●		None				No
04.3.4	Other fuels			●		None				No
04.3.5	Electricity	35.1	Electric power generation, transmission and distribution	●	●	4.1	Production of Electricity from Solar PV	●	●	Yes
				●	●	4.2	Production of Electricity from Concentrated Solar Power	●	●	Yes
				●	●	4.3	Production of Electricity from Wind Power	●	●	Yes
				●	●	4.4	Production of Electricity from Ocean Energy	●	●	Yes
				●	●	4.5	Production of Electricity from Hydropower	●	●	Yes
				●	●	4.6	Production of Electricity from Geothermal	●	●	Yes
				●	●	4.7	Production of Electricity from Gas (not exclusive to natural gas)	●	●	Yes
				●	●	4.8	Production of Electricity from Bioenergy (Biomass, Biogas and Biofuels)	●	●	Yes
				●	●	4.9	Transmission and Distribution of Electricity	●	●	Yes
				●	●	4.10	Storage of Electricity	●	●	Yes
04.3.6	Non-electric energy	35.3 and 84.13	Steam and air conditioning supply and Regulation of and contribution to more efficient operation of businesses	●	●	4.11	Storage of Thermal Energy	●	●	Yes
				●	●	4.12	Storage of Hydrogen	●	●	Yes
				●	●	4.13	Manufacture of Biomass, Biogas or Biofuels	●	●	Yes
				●	●	4.14	Retrofit of Gas Transmission and Distribution Networks	●	●	Yes

				●	●	4.15	District Heating/Cooling Distribution	●	●	Yes
				●	●	4.16	Installation and operation of Electric Heat Pumps	●	●	Yes
				●	●	4.17	Cogeneration of Heat/Cool and Power from Concentrated Solar Power	●	●	Yes
				●	●	4.18	Cogeneration of Heat/Cool and Power from Geothermal Energy	●	●	Yes
				●	●	4.19	Cogeneration of Heat/Cool and Power from Gas (not exclusive to natural gas)	●	●	Yes
				●	●	4.20	Cogeneration of Heat/Cool and Power from Bioenergy (Biomass, Biogas, Biofuels)	●	●	Yes
				●	●	4.21	Production of Heat/Cool from Concentrated Solar Power	●	●	Yes
				●	●	4.22	Production of Heat/Cool from Geothermal	●	●	Yes
				●	●	4.23	Production of Heat/Cool from Gas Combustion	●	●	Yes
				●	●	4.24	Production of Heat/Cool from Bioenergy (Biomass, Biogas and Biofuels)	●	●	Yes
				●	●	4.25	Production of Heat/Cool using Waste Heat	●	●	Yes

Source: Author's own elaboration.

The share of climate-significant spending for the COFOG category “Fuel and energy” was calculated as the equivalent to each country's share of modern renewables in final energy consumption. This indicator is similar to the one used in the 2018 study. While it is also possible to construct this indicator by separately calculating the share of renewables within electricity and within non-electricity energy by using data on electricity and heat generation sources, this single indicator has the advantage of not requiring a calculation of the share of consumption represented by electricity and heat.

Data source: IEA 2021, Dataset: Indicator “Renewable share (modern renewables) in final energy consumption (SDG 7.2)”, under Renewables.

Policy lens

This indicator can be further refined through applying the presence of national renewable energy plans as a policy lens. The EU 2020 national renewable energy action plans are proposed as a model, but alternatives could be used for non-EU countries.

In countries where a national renewable energy plan exists, the methodology calculates the share of climate-significant spending as equal to 150% of current renewable energy consumption. If a national renewable energy plan does not exist, then the methodology applies 100% of current renewable energy consumption to calculate the share of climate-significant energy spending.

Applying this policy lens acknowledges that using the proxy of renewable energy consumption may underestimate public spending on renewable energy to meet future demand. This potential undercalculation is corrected for by applying a percentage of 150% to the renewable energy consumption share in cases where a renewable energy action plan exists. In an attempt to choose an average percentage to apply, 150% was used as it acknowledges that spending on renewable energy may be as much as 50% more than current energy consumption.

04.5 Transport

The 2018 study estimated the share of climate-related transport spending at both the national and subnational level as equal to the share of rail transport investment within each country's overall transport investment. The data source was the OECD "Transport infrastructure investment and maintenance spending" dataset.

The TEG report identifies 10 technical criteria that apply to transportation, and apply to three of the five third-level COFOG functions: road transport systems, water transport, and railway transport. National and subnational governments both regulate and operate transport systems (Table 2.5). The TEG criteria apply to both types of functions.

The share of climate-significant transportation spending was calculated related to railway transport (04.5.3). The TEG technical criteria apply to railway transport as well as road transport (04.5.1) and water transport (04.5.2), and also include a category for public transport that cuts across transport types. However, internationally comparable data is available only for railway-related spending. No internationally comparable datasets exist to calculate share of public transport spending at the national level.

Table 2.5. Climate-significant COFOG 04.5 Transport categories

Third-level COFOG code	Third-level COFOG function	Corresponding NACE 2 code	Corresponding NACE 2 activity	Regulatory Activity	Operational Activity	Corresponding TEG code	Corresponding TEG Activity	Mitigation	Adaptation	Included
04.5.1	Road transport systems	49.3	Other passenger land transport	●	●	6.3	Public transport	●	●	No
						6.4	Infrastructure for low carbon transport (land transport)	●	●	No
						6.5	Passenger cars and commercial vehicles	●	●	No
						6.7	Interurban scheduled road transport services of passengers	●	●	No
		49.4	Freight transport	●	●	6.6	Freight transport	●	●	No

			by road and removal services				services by road			
		33.17	Repair and maintenance of other transport equipment	●		None				No
		52.21	Service activities incidental to land transportation	●		None				No
04.5.2	Water transport	50	Water transport	●	●	6.8	Inland passenger water transport	●	●	No
				●	●	6.9	Inland freight water transport	●	●	No
				●	●	6.10	Infrastructure for low carbon transport (water transport)	●	●	No
		33.15	Repair and maintenance of ships and boats	●		None				No
		52.22	Service activities incidental to water transportation	●		None				No
04.5.3	Railway transport	49.1 and 49.2	Passenger rail transport, interurban and Freight rail transport	●	●	6.1	Passenger rail transport (interurban)	●	●	Yes
				●	●	6.2	Freight rail transport	●	●	Yes
				●	●	6.4	Infrastructure for low carbon transport (land transport)	●	●	Yes
		33.17	Repair and maintenance of other transport equipment			None				Yes
		52.21	Service activities incidental to land transportation			None				Yes
04.5.4	Air transport	51	Air transport	●	●	None				No
		33.16	Repair and maintenance of aircraft and spacecraft	●		None				No
		52.23	Service activities incidental to air transportation	●		None				No
04.5.5	Pipeline and other transport	49.5	Transport via pipeline	●		None				No
		84.13	Regulation of and contribution to more efficient operation of businesses	●		None				No

Source: Author's elaboration.

The share of climate-significant transport spending at both the national and subnational level was estimated as equal to the share of rail transport investment within each country's inland transport

investment. The selection of the railway indicator is based on the finding that the share of CO₂ emissions from rail transport in total inland transport (rail, road, inland water, air travel and pipeline) is very small compared to road travel in all OECD and EU countries and smaller than air travel related emissions in most countries outside of Eastern Europe. Furthermore, rail is also most closely associated with public transport.

Data source: OECD 2021, Dataset: "Indicators, Transport infrastructure" under Performance Indicators, Transport. Last accessed 12 March 2021.

An alternative approach would estimate the share of public transport in each type of spending (road, rail, and water) but internationally comparable data to measure this do not exist. Another indicator could relate to spending on electric vehicle infrastructure and be further refined by the share of renewable energy in electricity sources. However, internationally comparable data on electric vehicle infrastructure are also lacking.

COFOG 05 Environmental protection

The 2018 study designated all environmental protection spending, at both the national and subnational level, as climate-related. This updated version of the methodology seeks to improve on this approach.

The TEG report identifies 11 technical criteria that apply to environmental protection, specifically to the two second-level COFOG functions: waste management and wastewater management. National and subnational governments both regulate and operate these three functions. Interestingly, the TEG technical criteria do not directly apply to the pollution abatement function. This may be due to how that function was converted from COFOG functions to ISIC and then NACE activities. However, Eurostat guidance recommends that tax subsidies aiming to increase the use of renewable energy be classified as pollution abatement (Eurostat, 2019^[51]). For this reason, the methodology includes pollution abatement because governments will likely classify spending related to greenhouse gas emissions reduction across a range of functions such as pollution abatement (Table 2.6).

All of the environmental protection second-level categories are included in the methodology. In the 2018 study, 100% of this category of spending was considered climate-significant. This methodology identified indicators to calculate shares of two categories: waste management (05.1) and wastewater management (05.2). For the other two-digit environment COFOGs, 100% of spending was considered as contributing significantly to climate change mitigation or adaptation.

Table 2.6. Climate-significant COFOG 05 Environment categories

Second-level COFOG code	Second-level COFOG function	Corresponding NACE 2 code	Corresponding NACE 2 activity	Regulatory Activity	Operational Activity	Corresponding TEG code	Corresponding TEG Activity	Mitigation	Adaptation	Included
05.1	Waste management	38	Waste collection, treatment and disposal activities; materials recovery	●	●	5.4	Separate collection and transport of non-hazardous waste in source segregated fractions	●	●	Yes
				●	●	5.5	Anaerobic digestion of bio-waste	●	●	Yes
				●	●	5.6	Composting of bio-waste	●	●	Yes
				●	●	5.7	Material recovery from	●	●	Yes

							non-hazardous waste			
		39	Remediation activities and other waste management services	●	●	5.8	Landfill gas capture and utilization	●	●	Yes
				●	●	5.9	Direct Air Capture of CO2	●	●	Yes
				●	●	5.10	Capture of Anthropogenic Emissions	●	●	Yes
				●	●	5.11	Transport of CO2	●	●	Yes
				●	●	5.12	Permanent Sequestration of Captured CO2	●	●	Yes
05.2	Waste water management	37	Sewerage	●	●	5.2	Centralized wastewater treatment	●	●	Yes
				●	●	5.3	Anaerobic digestion of sewage sludge	●	●	Yes
05.3	Pollution abatement			●						Yes
05.4	Protection of biodiversity and landscape	91.04	Botanical and zoological gardens and nature reserves activities							Yes
05.5	R&D Environmental protection	72	Scientific research and development							Yes

Source: Author's elaboration.

05.1 Waste management

This methodology calculates share of climate-significant public spending related to waste management in terms of waste recovery. The TEG technical criteria identify nine activities that could contribute substantially to climate change adaptation or mitigation, including material recovery, composting, and CO2 capture and sequestration. This indicator focuses on waste recovery method as internationally comparable data on CO2 capture and sequestration is not currently available, but could be considered in the future if a policy lens becomes available.

The share of climate-significant waste spending is estimated as equivalent to the national share of municipal waste recovered rather than disposed, including through recycling, composting and incineration with energy recovery.

Data source: OECD 2021, Dataset: "Municipal Waste, Generation and Treatment" under Waste, Environment. Last accessed 12 March 2021.

05.2 Wastewater management

This methodology calculates share of climate-significant public spending related to wastewater management in terms of waste-treatment. The TEG technical criteria identify two activities that could contribute substantially to climate change adaptation or mitigation, including centralized wastewater treatment and anaerobic digestion of sewage sludge.

The share of climate-significant wastewater spending is estimated as equivalent to the national share of the resident population connected to urban wastewater collecting system. This excludes individual (septic) treatment systems, which could in theory meet low-carbon standards.

Data source: OECD 2021, Dataset: "Wastewater treatment" under Water, Environment. Last accessed 12 March 2021.

05.3 Pollution abatement

For pollution abatement, given that it is partially connected with spending for greenhouse gas emissions reduction, the methodology takes 100% of the spending into account. Alternatively, if internationally comparable metrics become available to identify the share of pollution related spending related specifically to greenhouse gas emissions, then this more accurate metric could be used.

05.4 Protection of biodiversity and landscape

The methodology takes 100% of the spending related to the protection of biodiversity and the landscape into account, given the interlinkages between biodiversity protection and activities that significantly contribute to climate change mitigation and adaptation. Wetlands preservation, for example, contributes both to adaptation (flood prevention) and mitigation (CO₂ capture) but also to biodiversity.

COFOG 06 Housing and community amenities

The 2018 study estimated the share of climate-related spending at both the national and subnational level in these three categories as:

- 06.1 Housing Development: the share of each country's population living in a department/county (TL3) with more than 1000 people/km². The source was OECD Demographic indicators by Typology (rural/urban) dataset
- 06.3 Water supply: all spending was considered climate related
- 06.4 Street lighting: the share of each country's electricity produced from non-hydroelectric renewables. The source was the U.S. Energy Information Administration Total Non-Hydro Renewable Electricity Net Generation dataset.

The TEG report identifies four technical criteria that apply to housing and community amenities, specifically, and apply to three of the six second-level COFOG functions: housing development, water supply, and street lighting. National and subnational governments both regulate and operate these three functions (Table 2.7).

Four housing and community amenities affairs second-level categories are included in the methodology: housing development (06.1), community development (06.2), water supply (06.3), and street lighting (06.4).

Table 2.7. Climate-significant COFOG 06 Housing and community amenities categories

Second-level COFOG code	Second-level COFOG function	Corresponding NACE 2 code	Corresponding NACE 2 activity	Regulatory Activity	Operational Activity	Corresponding TEG code	Corresponding TEG Activity	Mitigation	Adaptation	Included
06.1	Housing development	41	Construction of buildings	●	●	8.1 (M); 7.1 (A)	Construction of new buildings	●	●	Yes, only in terms of location of buildings

				●	●	8.2 (M); 7.2 (A)	Building renovation	●	●	(compact development) Yes
				●		8.3	Individual measures and professional services	●		
06.2	Community development			●						Yes, only in terms of location of buildings (compact development)
06.3	Water supply	36	Water collection, treatment and supply	●	●	5.1	Water collection, treatment and supply	●	●	Yes
		42.2	Construction of utility projects	●	●			●	●	Yes
06.4	Street lighting	43.21	Electrical installation	●	●			●	●	Yes
06.5	R&D Housing and community amenities	72	Scientific research and development							
06.6	Housing and community amenities n.e.c.									

Source: Author's elaboration.

06.1 Housing development

Several methods for calculating the share of climate-significant public spending related to housing development were considered. This includes basing the calculation on the three TEG criteria linked with housing development through the COFOG to NACE conversion: construction of new buildings, building renovation and related professional services. However, internationally comparable data on greenhouse gas emissions associated with building construction is not currently available.

The application of a policy lens was also considered. National targets for energy efficiency in new buildings or building retrofits could provide a policy lens applicable to both climate change mitigation and adaptation. Similarly, national policies to limit construction in climate hazard zones (flood, wildfire, heat) could also be applied as a policy lens, though they may be rarer. However, building standards are often set at the subnational level, and internationally comparable plans are lacking.

Given the absence of internationally comparable data for a buildings-related metric, it was decided to base this methodology on the 2018 study's use of urban form as a proxy. Based on this methodology, government spending on housing development is considered climate-significant when it occurs in dense urban areas. To measure this, the methodology uses the share of the national population living in a small region (TL3) with a population density of least 1000 people/km².

Using OECD Demographic indicators by Typology (rural / urban), the share of the population living in TL3 areas with a population density of at least 1000 people/km² was divided by the total national population

per year. A population density of 1000 people per km² was used based on research that points to areas of this density level being most likely to widely adopt transit use¹⁸.

Data source: OECD 2021, Dataset: “Demographic indicators by Typology (rural / urban)” under Regional Demography, Regional Statistics, Regions and Cities.

06.2 Community development

Similar to housing development (06.1), the methodology calculates the share of climate-significant community development spending based on urban form. The indicator used is the share of the national population living in dense urban areas defined as TL3-level region with more than 1000 people/km².

Data source: OECD 2021, Dataset: “Demographic indicators by Typology (rural / urban)” under Regional Demography, Regional Statistics, Regions and Cities.

06.3 Water supply

The TEG technical criteria emphasize the energy-efficiency of water collection, treatment and supply systems. The methodology estimates the share of climate-significant public spending related to water supply in terms of the climate impact of the electricity supply. This focuses on the impact of the energy associated with delivering water on greenhouse gas emissions. This methodology provides a more-refined measure than the 2018 study, which considered 100% of all water spending as climate-related.

The share of climate-significant water supply spending is estimated as equivalent to the national share of renewable sources in power generation. This indicator recognizes the close connection between the water supply and electricity use. If internationally comparable indicators for water supply efficiency were available, that could be an alternate proxy coefficient.

Data source: IEA 2021, Dataset: Indicator “Share of renewables, low-carbon sources and fossil fuels in power generation” under Electricity.

06.4 Street lighting

The share of climate-significant public spending related to street lighting is estimated in terms of the climate impact of the electricity supply. The TEG technical criteria did not include reference to street lighting. This version of the methodology uses same indicator as was used for the 2018 study.

The share of climate-significant street lighting spending is estimated as equivalent to the national share of renewable sources in power generation. This proxy coefficient recognizes the close connection between street lighting and electricity use. If internationally comparable indicators for street lighting efficiency were available, that could be an alternate proxy coefficient.

Data source: IEA 2021, Dataset: Indicator “Share of renewables, low-carbon sources and fossil fuels in power generation” under Electricity.

¹⁸ Bertaud, A. and H.W. Richardson (2004) “Chapter 17: Transit and Density: Atlanta, the United States and Western Europe” in *Urban Sprawl in Western Europe and the United States*, C.C. Bae and H. W. Richardson, eds., Routledge, doi.org/10.4324/9781315235226, chapter available at www.semanticscholar.org/paper/Chapter-17-Transit-and-Density-%3A-Atlanta-%2C-the-and-Bertaud-Richardson/1f71a32d7713a0219038d642a41417031bded1e6

COFOG 07 Health

The 2018 study did not include any estimates for climate-related health spending.

In the refined methodology, it was not possible to develop a suitable proxy to determine the share of climate-significant health spending due to a lack of internationally comparable data.

COFOG 08 Recreation, culture and religion

The 2018 study did not include any estimates for climate-related recreation, culture and religion spending.

In the refined methodology, it was not possible to develop a suitable proxy to determine the share of climate-significant recreation, culture, and religion spending due to a lack of internationally comparable data.

COFOG 09 Education

The 2018 study did not include any estimates for climate-related education spending.

In the refined methodology it was not possible to develop a suitable proxy to determine the share of climate-significant education spending due to a lack of internationally comparable data.

COFOG 10 Social protection

The 2018 study did not include any estimates for climate-related social protection spending.

In the refined methodology, it was not possible to develop a suitable proxy to determine the share of climate-significant social protection spending due to a lack of internationally comparable data.

Annex C.

Table A C.1. List of financial instruments included in the compendium, by country (or EU)

Country	Name of support	Sub-initiatives
Australia	NSW Environmental Trust Strategic Plan 2020–24	Environmental education
	Emergency pollution clean-up program	Emergency pollution clean-up program
	Waste Less, Recycle More initiative	Landfill Consolidation and Environmental Improvements
	Waste Less, Recycle More initiative	Major Resource Recovery Infrastructure (MRRRI) Grants
	Environmental Restoration and Rehabilitation Program	Stream 1 – New Entrants
	Environmental Restoration and Rehabilitation Program	Stream 2 – Experienced
	State Government’s Western Australian Climate Policy 2020	Regional Climate Alliance Program
	National Partnership on Recycling Infrastructure	Recycling Modernisation Fund (RMF)
	National Water Infrastructure Development Fund	National Water Grid Fund
Austria	Disaster Recovery Funding Arrangements	Emergency Response Fund
	Climate and Energy Model Regions	
	CLEAR! Climate Change Adaptation Model Regions	
	Energy-efficient Construction of New Buildings	
	Klimaaktiv	Cycling and Mobility Management Grant
Belgium	Heat Recovery and Efficient Use of Energy	
	Climate Protection in Municipalities	
	Smart Belgium	Smart Cities, Climate Action & Circular Economy II
	POLLEC 2021	POLLEC 2021
	Walloon Recovery Plan	UREBA Programme
	Energy Performance Contract (CPE)	
	Energy Performance Contract (CPE)	RenoWatt
	Waterways and holding basins	Subsidy for work on watercourses and holding basins
	Flemish subsidises for erosion control	Small-scale erosion control measure
	Flemish subsidises for erosion control	Subsidy for drawing up a municipal erosion control plan
	Subsidy for sustainable biodiversity projects.	Subsidy for sustainable biodiversity projects.
	Flemish Blue Deal	Nature Project Grants 2021 (Natuur en Bos)
	Flemish Blue Deal	Green-blue veining
	Bicycle Fund subsidy	Bicycle Fund subsidy
	Provincial policy 2020-2025	Subsidy for small sustainable projects
	2nd and 3rd category watercourses	
	Flemish Climate Fund (VKF)	Calls for projects for local authorities
	Climate Fund (COBRACE)	NRClick
	Climate Fund (COBRACE)	SolarClick
	Action Climat	Action Climat 2021
International Solidarity Fund	Water and Sanitation Component	
Bulgaria	Biodivercités	
	Renewable Energy, Energy Efficiency, Energy Security Programme	
	Fund for Local Authorities and Governments	Bulgarian Urban Investment and Advisory Platform
	Waste Management Projects	
	Air Purity Protection Projects	
Water Management Projects		
Climate Microprograms Program		

	Climate Investment Program	Climate Investment Program - Electric Vehicles
	Climate Investment Program	Climate Investment Program - Energy Efficiency
Canada	Green Municipal Fund	Community Efficiency Financing
	Green Municipal Fund	Community Buildings Retrofit Initiative
	Green Municipal Fund	Sustainable Affordable Housing
	Low Carbon Economy Fund	Low Carbon Economy Leadership Fund
	Low Carbon Economy Fund	Low Carbon Economy Challenge
	Investing in Canada Infrastructure Program	Green Infrastructure Stream
	Investing in Canada Infrastructure Program	Rural and Northern Communities Infrastructure Stream
	Investing in Canada Infrastructure Program	Public Transit Stream
	Green and Inclusive Community Buildings	
	Smart Renewables and Electrification Pathways Program	
	Climate Change Preparedness in the North Program	
	First Nation Adapt Program	
	Community Resiliency Investment Program	FireSmart Community Funding & Supports program
	Community Resiliency Investment Program	Crown Land Wildfire Risk Reduction
	Community Resiliency Investment Program	FireSmart Economic Recovery Fund
	Infrastructure Planning Grant Program	
	Active Transportation Infrastructure Grants Program	Active Transportation Network Planning Grant
	Active Transportation Infrastructure Grants Program	Active Transportation Infrastructure Grant
	Federal Gas Tax Fund	Strategic Priorities Fund
	Federal Gas Tax Fund	Greater Vancouver Regional Fund
Federal Gas Tax Fund	Community Works Fund	
Sustainable Communities Program	Community energy managers, internships, and co-op student funding	
Sustainable Communities Program	Community Energy Projects Funding	
Chile	Neighborhood Improvement Program	
	Environmental Protection Fund	
	Fund for Recycling 2022 Exequiel Estay - Fund for Recycling 2022 Exequiel Estay Base Recyclers	
Colombia	Programa Nacional de Pagos Por Servicios Ambientales	
Costa Rica	IFAM Verde	IFAM Verde - Solid Waste
	IFAM Verde	IFAM Verde - HIDRIC RESOURCE
	Emissions Reduction Program	
	IFAM Verde	
Croatia	Environmental Protection and Energy Efficiency Fund	Energy Efficiency Projects for the Public Lighting Systems
	Environmental Protection and Energy Efficiency Fund	Public Call for Fund renewable energy systems
	ESIF	Grants for enhancing public lighting
Czech Republic	New Green Savings Programme	
	National Programme Environment	
	Modernisation Fund	HEAT – Modernisation of heating systems
	Modernisation Fund	RES+ New Renewable Energy Sources
	Modernisation Fund	ENERG ETS – Improving energy efficiency and reducing greenhouse gas emissions in industry in EU ETS
	Modernisation Fund	TRANSGov – The modernisation of public transport
	Modernisation Fund	ENERGov – Energy efficiency in public buildings and infrastructure
Modernisation Fund	LIGHTPUB – Modernisation of public lighting systems	
Denmark	Green Loans	
	Coastal Protection Pool	
	Joint Agreements on Coastal Protection	

	Subsidies to save energy municipal and regional buildings	
Estonia	Environmental Program	Fund Program
	Environmental Program	Water Management Program
	Environmental Program	The Atmosphere Air Protection Programme
	Environmental Program	Circular Economy Program
European Union	Modernisation Fund	
	Cohesion Fund	
	NextGenerationEU	Recovery and Resilience Facility
	Environment and Climate Policy Program (LIFE)	Clean Energy Transition
	Just Transition Mechanism	ReactEU
	Just Transition Mechanism	Public Sector Loan Facility
	Just Transition Mechanism	InvestEU Just Transition Scheme
	Just Transition Mechanism	Just Transition Fund
	Interreg Europe	
	Horizon Europe	Climate-Neutral and Smart Cities
	Horizon Europe	Adaptation to Climate Change
	Horizon Europe	European Local Energy Assistance (ELENA)
	Horizon Europe	European City Facility (EUCF)
	Horizon Europe	EU Innovation Fund
	Environment and Climate Policy Program (LIFE)	Nature and biodiversity
	Environment and Climate Policy Program (LIFE)	Circular economy and quality of life
	Environment and Climate Policy Program (LIFE)	Climate change mitigation and adaptation
	European Regional Development Fund	
	Invest EU Programme	InvestEU Fund
	Connecting Europe Facility (CEF)	Connecting Europe Facility (CEF) Transports
Connecting Europe Facility (CEF)	Connecting Europe Facility (CEF) Energy	
Common Agricultural Policy Funds	European Agricultural Fund for Rural Development (EAFRD)	
Finland	Municipal climate change solutions programme	Municipal climate projects grant application
	Municipal Climate Solutions Program	
	Municipal Climate Solutions Program	Support for the provincial climate work
	Municipal Climate Solutions Program	Subsidies for municipal climate and circular economy projects
	Municipal Climate Solutions Program	Grants for the recycling and recovery of nutrients in municipal waste water
	Finland Sustainable Growth Programme	Grants for investment projects promoting the green transition
	Grants for wind power construction	
	Low Carbon Built Environment Program	Climate work in the built environment
	Sustainable City program	Grants for participatory and interactive sustainability work for municipalities
	Grant to municipalities to give up oil heating	
France	Recovery Plan	New credit-line in partnership between EIB and Caisse des Dépôts
	Long-Term Loans to Subnational Governments	Green Recovery Loan
	Long-Term Loans to Subnational Governments	GPI-AmbRE Loan, 2018
	Long-Term Loans to Subnational Governments	Aqua Loan
	Energy saving certificates (CEE)	Certificats d'Economie d'Énergie (CEE), Energy saving certificates (CEE)
	AACT-AIR	AACT-AIR - Support for local government action on air quality
	France Relance	Local Investment Support Grant (DSIL - Dotation de soutien à l'investissement local)
	France Relance	Brownfield recycling fund
	France Relance	Assistance for the energy renovation of community

		buildings
	France Relance	Improving the resilience of electricity networks and energy transition in rural areas
	France Relance	Coastal protection
	France Relance	Ecological restoration for the preservation and enhancement of territories, MobBiodiv/Restauration
	France Relance	Sustainable city demonstrators: Living in the France of tomorrow
	Regional Environmental Health Plan 2016-2021	2021 Calls for projects
	Finance Law	Solidarity grant for the equipment of local governments and their groupings affected by climatic or geological events
	Climaxion	
	Climaxion	Mobility
	Climaxion	Support for consultation and support for renewable energy projects
	Climaxion	Requalification of brownfields
	Climaxion	Building energy efficiency
	Climaxion	Renewable energies
	Climaxion	Waste management
	Climaxion	Prime Oktave Collectivites
	Regional Climate Plan (Gardons une COP d'avance)	Dispositif Isolation Collectivités
	Regional Strategy for Biodiversity	A birth, a tree
	Regional Strategy for Biodiversity	Energy rehabilitation projects of communal and/or intermunicipal rental housing
	Regional Recovery Plan	Call for innovative solutions for for air quality
	Innovation Fund for the Energy-Climate Transition	Innovation Fund for the Energy-Climate Transition
	State-Region Plan Contracts 7th Generation	
	Recovery and Ecological Transition Contract (CRTE)	
Germany	German Adaptation Strategy to Climate Change (DAS)	Measures for Adaptation to Climate Change
	German Sustainability Strategy (DNS)	Municipal model projects for the implementation of ecological sustainability goals in structural change regions (KoMoNa)
	National Climate Protection Initiative	INNOVATIVE CLIMATE PROTECTION PROJECTS
	National Climate Protection Initiative	Climate Protection through Cycling
	National Climate Protection Initiative	E-cargo bike Directlyive
	National Climate Protection Initiative	PIONEERING MODEL PROJECTS IN MUNICIPAL CLIMATE PROTECTION
	National Climate Protection Initiative	BIKE + RIDE OFFENSIVE 2022
	Bavarian Climate Protection Program 2050	Climate protection in municipalities (KommKlimaFör)
	Promotion of communal climate protection and adaptation projects as well as communal information initiatives	Promotion of communal climate protection and adaptation projects
	Funding program for voluntary municipal heating planning	Funding program for voluntary municipal heating planning
	NRW Economic Stimulus Program	Climate Resilience in Municipalities
Greece	Antonis Tristis Programme	
	Building Sector ELECTRA: Subsidies for Energy Efficiency of Public Buildings	
	Green Fund	
Hungary	Renewable Energy Support Scheme (METAR)	
	Green Bus Program	
	Green Investment Scheme	Climate Friendly Home Panel sub-program
Iceland	Icelandic Climate Fund	
Ireland	Climate Action Fund	Creative Climate Action
	Community Energy Grants	Better Energy Communities

	Electric Vehicle Public Charge Point Grant	
	Urban Regeneration and Development Fund (URDF)	
	Rural Regeneration and Development Fund (RRDF)	
	Community Environment Action Fund	
	Environment Fund	
Israel	Electric Car Ride-Share Program	
	Financing energy efficient projects	
	Acceleration of infrastructure projects in the energy and water economies to encourage economic growth	
Italy	Call for green infrastructures with ecological relevance and increase in naturalness for plains and hills	
	Italia Domani - Piano Nazionale di Ripresa e Resilienza	Improvement and mechanization of the separate collection network for urban waste
	Italia Domani - Piano Nazionale di Ripresa e Resilienza	Modernization (also with expansion of existing plants) and construction of new treatment / recycling plants for urban waste from separate collection
	Italia Domani - Piano Nazionale di Ripresa e Resilienza	Modernization (also with expansion of existing plants) and construction of new innovative treatment / recycling plants for the disposal of absorbent materials for personal use (PAD), waste water sludge, leather goods and textile waste
	Italia Domani - Piano Nazionale di Ripresa e Resilienza	Promotion of eco-efficiency and reduction of energy consumption in theaters and cinemas, public and private
	Italia Domani - Piano Nazionale di Ripresa e Resilienza	Green Islands Program
	Italia Domani - Piano Nazionale di Ripresa e Resilienza	PNRR for Metropolitan Cities
	Contribution for investments in urban regeneration (Contributo per investimenti di rigenerazione urbana)	Contribution for investments in urban regeneration (Contributo per investimenti di rigenerazione urbana)
	Contribution for hydrogeological risks	Contribution for hydrogeological risks
	Grants for the construction of plants and interventions for waste management	Grants for the construction of plants and interventions for waste management
	Grants for environmental improvements	Grants for environmental improvements
Japan	Low Interest Loans for Energy Efficient Retrofit/Construction for Buildings	
Korea	Green New Deal	Environmental Infrastructure Carbon Neutral Programme
	Climate change subsidies	Subsidy for the establishment of eco-friendly consumption and low-carbon production
	Climate change subsidies	Climate change and public practice
	Climate change subsidies	Support for the establishment of greenhouse gas management infrastructure
	Air pollution subsidies	Distribution of electric and hydrogen vehicles and construction of charging infrastructure
Latvia	Environmental Protection Projects	
Lithuania	Climate Change Program	
	Waste Prevention And Management Program	
	Lithuanian Environmental Investment Fund Program	
Luxembourg	Climate Energy Fund / Environment Protection Fund	Climate Pact 2.0 (Klimapakt)
	Climate Energy Fund	Nature Pact (Naturpakt)
	Water Management Fund	Water Management Fund
Malta	The Environment fund	
	Scheme for more sustainable transports	
Mexico	Fund for Energy Transition and Sustainable Use of Energy (FOTEASE)	Proyecto Nacional de eficiencia energética en el alumbrado público municipal
	Fund for Energy Transition and Sustainable Use of Energy (FOTEASE)	Atlas Eólico Mexicano
	Fund for Energy Transition and Sustainable Use of Energy	Proyecto de Eficiencia y Sustentabilidad Energética

	(FOTEASE)	en Municipios, Escuela y Hospitales (PRESEMH)
	Fund for Energy Transition and Sustainable Use of Energy (FOTEASE)	Programa de eficiencia energetica en edificios de oficinas de la administracion publica federal
	Fund for Energy Transition and Sustainable Use of Energy (FOTEASE)	Implementacion de un sistema electrico renovable y sustentable en Punta Allen, Reserva de la Biosfera de Sian Ka'an. Quintana Roo
	Climate Change Fund	
	National Infrastructure Fund Trust (FONADIN)	Solid Waste Program (PRORESOL)
	National Infrastructure Fund Trust (FONADIN)	The Federal Support Program for Mass Transportation (PROTRAM)
New Zealand	Waste Minimisation Fund	
	Community Environment Fund	
	Plastics Innovation Fund	
	Freshwater Improvement Fund	
	Crown Loans	
Norway	Energy Transition Accelerator	
	Green Loans	Green lending programme
	Grants for climate adaptation	Grants for climate adaptation
	Klimasats	Climate Rate scheme
	Klimasats	Emission-free speedboats
	Grants to safeguard biodiversity in municipal planning	
Poland	Subsidies for municipal climate measures	
	Rational waste management and protection of the earth's surface	Rational waste management
	Adaptation to climate change and protection of waters against pollution	Water and sewage management in agglomerations
	Rational waste management and protection of the earth's surface	Removal of abandoned waste
	Biodiversity, environmental education and monitoring	Protection and restoration of biological and landscape diversity
	Polish Climate Support	Polish Climate Support
Portugal	Environmental Fund	Programa de Apoio à Redução do Tarifário dos Transportes Públicos (PART)
	Environmental Fund	Programa de Apoio à Densificação e Reforço da Oferta de Transporte Público (PROTransP)
	Environmental Fund	Programa de Apoio à Mobilidade Elétrica na Administração Pública
	Environmental Fund	Programa Portugal Ciclavel 2030
	Environmental Fund	Descarbonização dos Transportes Públicos
	Environmental Fund	Hidrogénio e Gases Renováveis
Romania	EEA (European Fund)	Developing Climate Change Mitigation and Adaptation Plans in Municipalities
	National Investment Program "Anghel Saligny"	
Slovakia	Environmental Fund	Improving the energy efficiency of existing public buildings
	Environmental Fund	Village Renewal Programme
	Environmental Fund	Development of waste and circular economy
	Environmental Fund	air protection program
Slovenia	EKP Operational Program 2014-2020	Public tender for Fund the energy renovation of buildings owned and used by municipalities
	EKP Operational Program 2014-2020	Fishing ports, landing sites, sales halls and shelters
	National Recovery and Resilience Plan	Investments in waste water collection and treatment systems
	National Recovery and Resilience Plan	Investments in water supply systems serving less than 10 000 inhabitants
	Eco Fund, Slovenian Environmental Public Fund	Vehicles And Sustainable Mobility
	Eco Fund, Slovenian Environmental Public Fund	Construction Or Complete Renovation Of Buildings
	Eco Fund, Slovenian Environmental Public Fund	Insulation And Windows

	Eco Fund, Slovenian Environmental Public Fund	Energy Efficiency
	Eco Fund, Slovenian Environmental Public Fund	Heating And Ventilation
	Eco Fund, Slovenian Environmental Public Fund	Electrical Self-Sufficiency
	Eco Fund, Slovenian Environmental Public Fund	Lighting
	Eco Fund, Slovenian Environmental Public Fund	Water Protection And Water Supply
	Eco Fund, Slovenian Environmental Public Fund	Waste
Spain	Environmental Push Plans	Planes de Impulso al Medio Ambiente - Cambio Climatico
	Environmental Push Plans	Planes de Impulso al Medio Ambiente - Residuos
	Recovery, Transformation and Resilience Plan	Fundacion Biodiversidad
	Recovery, Transformation and Resilience Plan	DUS 5000
	Recovery, Transformation and Resilience Plan	PREE 5000
	Recovery, Transformation and Resilience Plan	Programas de incentivos para la ejecución de instalaciones ligadas al autoconsumo y al almacenamiento, con fuentes de energías renovables
Sweden	Urban Environment Agreements	
	Charge the Car	
	Electric Bus Premium	
	Climate Leap (Klimatklivet)	
	Green Bonds	
Switzerland	SuissEnergie for Municipalities	Process Promotion
	SuissEnergie for Municipalities	Smart City Innovation Challenge
	SuissEnergie for Municipalities	Temporary projects
	SuissEnergie for Municipalities	Energy regions
	SuissEnergie for Municipalities	Progressive cities and towns
	SuissEnergie for Municipalities	Front runner municipalities
	Sustainable Development Strategy	Incentive program for sustainable development
	Program agreements in the environment sector	Program agreements in the environment sector 2020-24
	Vaudois Climate Plan	Municipal Energy and Climate Plan (PECC)
Turkey	IPA Environment Operational Programme in Turkey	
United Kingdom	Levelling Up Fund	
	Air Quality Grant Programme	
	Nature for Climate Fund	Nature for Climate Peatland Grant Scheme
	Nature for Climate Fund	Local Authorities Treescape Fund
	Social Housing Decarbonisation Fund	
	Scotland Recycling Fund	
	Local Authority Lending	
	On-street Residential Chargepoint Scheme	
	The Wales Funding Programme	
	Scottish Green Public Sector Estate Decarbonisation Scheme	Scottish Public Sector Energy Efficiency Loan Scheme
United States of America	Clean Water State Revolving Fund	
	Environmental Justice Small Grants Program	
	Brownfield Revolving Loan Fund and Cleanup Alternatives	
	Great Lakes Restoration Initiative (GLRI)	
	Tribal General Assistance Program	
	Coastal Program	
	Competitive Funding Opportunity; Low or No Emission Grant Program	
	Partnerships for Climate-Smart Commodities – Building Markets and Investing in America’s Climate-Smart Farmers, Ranchers & Forest Owners to Strengthen U.S. Rural and Agricultural Communities	
	Denali Commission Program Grants	Village Infrastructure Protection

	State and National Tribal Grants	
	Clean School Bus Program Funding	
	National Electric Vehicle Infrastructure Formula Program	
	Congestion Mitigation and Air Quality Improvement Program (FHWA)	
	Grants for Buses and Bus Facilities Formula Program	
	RAISE Grants	
	State Grants: Diesel Emissions Reduction Act (DERA)	
	Energy Efficiency and Conservation Block Grant Program	
	Energy Improvement in Rural or Remote Areas	
	Regional Clean Hydrogen Hubs	
	Rural Energy Savings Program	
	Rural Energy Pilot Program	

Note: This list includes all the instruments listed in the Compendium. However, the Compendium itself is not exhaustive and there are potentially other instruments available that are not included here.