Climate Change Mitigation and Adaptation Expenditures: A Position Paper for the London Group on Environmental Accounting 30th Meeting

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Executive Summary

The purpose of this paper is to lay a foundation for the discussion of measuring climate change mitigation and adaptation expenditures at the 30th London Group Meeting. Measurement of these expenditures has previously been recognized as an important data gap by the G20 Data Gap Initiative (DGI) and will be considered in the upcoming System of Environmental-Economic Accounting (SEEA) Central Framework Update. To facilitate discussion on accounting and methodological issues for the London Group, this paper sets out to provide background on existing efforts, synthesize existing work on this topic, and supply recommendations for the SEEA-CF Update to contemplate. Ideally, our goal for this paper and the subsequent discussion at the London Group Meeting will be to formulate tangible positions to hand off to the SEEA-CF Update and to inform ongoing measurement efforts on this topic. The measurement and accounting issues are sufficiently complex that this group can confidently predict that all issues will not be settled in this paper or at the 30th Meeting; rather, this discussion can help narrow the scope on the most prominent issues to focus and offer some intermediate or tentative conclusions for moving forward.

After providing relevant background, the paper describes options examined by this group on critical issues, key differences in the literature on these issues, and ultimately what the SEEA-CF Update (and future research on this topic) should work to resolve. The paper makes four core recommendations for the London Group participants to discuss, refine, and potentially adopt as positions to pass to the SEEA-CF Update effort: 1) Carefully define purpose and prioritize specificity in definitions, 2) Carefully consider the term 'impact' (or remove reference to it), 3) Carefully consider recommended data sources and definitional compatibility, 4) Provide very clear guidance on major expenditures. The final section of the paper provides further context and details for each of these recommendations.

1. Introduction

1.A. What is a Position Paper?

Each year at its annual meeting, the London Group on Environmental Accounting assembles experts in economic measurement and national accounting to present on topics at the forefront of environmental-economic accounting to help resolve issues facing national statistical offices (NSOs) that develop and compile accounts. Historically, participants at the London Group have facilitated the advancement of methodologies for environmental-economic accounts and related statistics, which have played an important role in the development of international statistical standards like the System of Environmental-Economic Accounting (SEEA) manuals and corresponding guidance notes.

This year's meeting (the 30th Meeting in Washington DC) takes place at a critical juncture, near the beginning of a multi-year process of updating the 2012 SEEA Central Framework (SEEA-CF), a key statistical standard for environmental-economic accounts. Several position papers will be presented and discussed that will be directly relevant to this manual's update (including the following four topics - 1. Climate Change Mitigation and Adaptation, 2. Treatment of Emission Trading Systems, 3. Treatment of Water in the CF, and 4. Treatment of human-induced flows within the environment). Each position paper covers a key issue that will be considered during the SEEA-CF Update process, where the goal of the position paper is to both inform the meeting participants and, ideally, garner greater consensus on a position or set of positions. To be sure, the topics undertaken for position papers in this meeting are complex; so, it may not be realistic to definitively solve each of these issues once and for all in such a short period of time. Instead, the papers should be able to put forth tangible ideas that can be debated and potentially endorsed by the London Group participants as a way forward for the SEEA Update.

Toward this end, the purpose of this position paper is to provide the meeting participants necessary background on the topic of how to define and measure climate change mitigation and adaptation expenditures and articulate recommendations for the SEEA-CF Update. Taken together, this document and the takeaways from the London Group Meeting can effectively function as a baton to hand off to the expert group handling this topic for the SEEA-CF Update, identifying areas to prioritize and offering relevant conclusions. Importantly, the ideas in this paper are not meant to be interpreted as the final position of any single contributor and should not be quoted as such; instead, the position paper presents ideas and recommendations that we believe would motivate the most effective discussion for the London Group Meeting.

The contributors to this paper have all done substantial work on environmental-economic accounts and/or national accounts more generally, including significant work on climate change mitigation and adaptation expenditures (or closely related topics). This paper draws directly from their work (and the work of other experts internationally), in some cases paraphrasing or directly reproducing lengthy passages on this topic verbatim. Within Session 7 at the London Group Meeting, there will be two other papers presented. One paper by a team at the International Monetary Fund on their framework for measuring climate change mitigation and adaptation expenditures, which is derived from several rounds of consultation with G20 countries on these topics. The other paper covers a

related topic, accounting for hazards and natural disasters, by Ken Bagstad and others. To reduce redundancy, the position paper will cover these papers in less depth because participants at the meeting will have access to these papers separately and we refer readers to these papers for more details on their closely related work. Hence, due to space and time constraints, the focus of this paper draws disproportionately from work in Europe and United States, acknowledging from the outset that the SEEA-CF Update will likely incorporate a more geographically diverse set of views in its global consultations and expert group work on this topic and others.

1.B. Why Climate Change Mitigation and Adaptation Expenditures?

For decades, climate change has become an increasingly salient policy issue globally. Regardless of one's policy preferences or debates surrounding the extent of its underlying sources and causes, assessing the state of climate change and its impact still requires extensive data collection, measurement, and monitoring for decisionmakers in both public and private sectors to make informed decisions. This includes measuring relevant economic activity in the national economic accounts. Indeed, accurate data is essential for decisionmakers to track expenditures for mitigation purposes like reducing greenhouse gas emissions, and to better understand adaptation costs like enhancing resilience to climate change. The availability of standardized data and statistics helps to ensure transparency, consistency, and comparability in reporting climate-related expenditures and activities across different sectors.

Many countries already produce environmental activity accounts that track expenditures in the economy for environmental purposes (such as resource management and environmental protection), and guidance for compiling these accounts already exists in the 2012 SEEA-CF manual. There is not, however, currently an international statistical standard for defining and measuring expenditures for the purposes of climate change mitigation and adaptation. In fact, this was identified by the G20 Data Gaps Initiative-3 (DGI) in 2022 as a key data gap in national economic statistics (as well as climate impacting subsidies). More recently, in July of 2024, the United Nations Statistical Division and Committee of Experts on Environmental-Economic Accounting jointly launched a global consultation on the list of issues to be considered for the SEEA-CF Update. This initial list included "C6 - extending the scope of environmental activities" in order to "investigate if and how to extend the scope to include for example to also include climate change adaptation and mitigation as well as environmental disaster management activities."

Moreover, this topic is more than a theoretical interest of statisticians and national accountants. Related statistics have recently been demanded by policymakers in legislation. For instance, earlier in 2024, legislation in the European Union (EU) now requires member states to report on climate change mitigation investments, with initial statistics reported as early as December 2024. Thus, there is a real, practical urgency for countries to figure out how to develop robust standards for measuring climate change mitigation and adaptation expenditures with the same rigor as the suite of national economic accounts.

While this has been a topic of increasing interest in recent years, we should note that this measuring expenditures on climate change mitigation and adaptation is not exactly new to the environmental-economic accounting community and London Group participants. In fact, Data collections on environmental protection expenditure (which only partial cover climate change) by Eurostat and OECD go back to 1994. The research agenda of the 2012 SEEA-CF in Annex II, in fact, includes the following statement which points in the direction of examining environmental protection and resource management expenditures together with climate change mitigation and adaptation (together with disaster related expenditures – preventive/adaptive or recovery).

> *Accounts and statistics relating to the minimization of natural hazards and the effects of climate change*
>
> A2.19 The SEEA Central Framework limits the scope of economic activities considered to be environmental to environmental protection and resource management activity. However, it is recognized that there are a number of other economic activities that are related to the environment which may be of particular interest for policy and analytical purposes (see sect. 4.2). A specific set of activities encompasses efforts to minimize the impact of natural hazards (such as floods, cyclones and bush fires) and efforts to mitigate, or adapt to, the effects of climate change.
>
> (SEEA-CF, Annex II, pages 307-308)

Yet, more than a decade later there is still substantial work to be done on definitions and methodologies for measuring climate change adaptation and mitigation expenditures. This paper (along with an accompanying discussion at the London Group Meeting) intends to advance the accounting and methodological discussion so that a consensus may be reached for the SEEA-CF Update.

The paper is divided into four sections followed by a detailed appendix. Following this introduction, Section 2 will summarize existing definitions, relevant background, classification issues, and methodological and data issues. Section 3 will summarize how the contributors to this paper characterize several key issues that the SEEA-CF Update should consider, discussing options and important areas to prioritize. Section 4 concludes with recommendations for the London Group participants to discuss, debate, refine, and potentially adopt at the meeting. The paper includes an appendix or annex at the end, which includes further background, various proposals for classifications/categories and activities included, and other detailed information that may be useful to readers.

2. Background and Existing Efforts on Climate Change Mitigation and Adaptation Expenditures

2A. Are expenditures related to climate change within the current definition / understanding used in the SEEA-CF?

Before addressing definitions of climate change mitigation and adaptation expenditures, it is worth taking a step back and beginning with environmental activity accounts in the SEEA-CF more generally. Currently, there is an expansive description of the expenditures within the SEEA, but in specifying the different types of economic activity accounts, the focus of the definition in the SEEA-CF is then reduced and limited to include only expenditures for specific environmental purposes.

For example, in SEEA-CF §2.24, we find an expansive description – where the SEEA activity accounts include, "economic activities related to the environment":

> 2.24 In addition to measuring stocks of environmental assets and flows between the environment and the economy, the Central Framework records flows associated with economic activities related to the environment. Examples of economic activity related to the environment include expenditures on environmental protection and resource management, and the production of environmental goods and services…

But later in §2.24, we also find the more limited description including only "economic activity undertaken for environmental purposes":

> 2.24 [cont.] Using the measurement framework of the SNA, **economic activity undertaken for environmental purposes** can be separately identified and presented in what are known as functional accounts (such as environmental protection expenditure accounts). [Note: emphasis added]

The scope of environmental activities is described as follows:

> 4.11 The scope of environmental activities encompasses those economic activities whose primary purpose is to reduce or eliminate pressures on the environment or to make more efficient use of natural resources.

Thus, the 'primary purpose' or 'main purpose' criterion has become a key pillar of defining environmental goods, services, and expenditures. However, identifying what is the main purpose of an economic activity can be challenging for compilers of these accounts. In these cases, it is helpful to refer to the UNCEEA's Technical note for the Environmental Goods and Services Sector Account for further information, especially regarding exceptions to this rule of 'primary purpose' in order to clarify the concept of "secondary purpose." The following passage may be useful for identifying CC-relevant expenditures:

> 13. There can also be some environmental products for which the primary purpose is not environmental, but which may serve a secondary environmental purpose. *Cleaner products*

are those non-specific environmental products which serve a secondary environmental purpose because they prevent pollution or environmental degradation because they are less polluting at the time of their consumption and/or scrapping, compared with equivalent 'normal' [standard/baseline] products (otherwise said: their secondary purpose is environmental protection). Examples include mercury-free batteries and cars or buses with lower air emissions. *Resource-efficient products* are those non-specific environmental products which serve a secondary environmental purpose because they help to prevent natural resource depletion because they contain fewer natural resources in the production stage and/or require less [fewer] natural resources during the use stage, compared with equivalent 'normal' products (otherwise said: their secondary purpose is resource management).

As we will see later in this paper, the expenditures being included in a country's climate change expenditure accounts are nested within the definition of "economic activities related to the environment," but they could include expenditures that do not fit the narrower, "environmental purposes" category. However, given that the SEEA-CF also provides guidance for using a broader definition including technical aspects and secondary purpose, these concepts would encompass climate change expenditures and allow their inclusion an updated SEEA-CF. We return to this issue of 'primary' and 'secondary' purpose in Section 3.

2.B. Definitions of climate change adaptation and mitigation and of CC-expenditures

The IPCC definitions are the internationally accepted definitions of climate change mitigation and adaptation. These definitions, therefore, provide the starting point for the development of climate change expenditure definitions.

2.B.1. UNFCCC Definitions of Climate Change Mitigation and Adaptation

- **Mitigation**
  A human intervention to reduce emissions or enhance the sinks of greenhouse gases.

- **Adaptation**
  In *natural systems*, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.

  In *human systems*, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities.

(Source: https://apps.ipcc.ch/glossary)

There are a couple aspects of these definitions that are worth noting. Mitigation includes interventions by humans to reduce GHG emissions and enhance sinks. The sinks can be human created, such as carbon capture systems, or natural sinks, such as soils, vegetation and forests that humans have intervened in order to preserve or enhance their abilities to capture and store carbon. Adaptation also encompasses both natural systems and human systems. These points will be relevant as we consider how to develop classifications for these expenditures later in the paper.

2.B.2 Climate change (CC) mitigation and adaptation expenditure definitions

As mentioned in the introduction, there is no consensus on the definitions of CC-mitigation or CC-adaptation expenditures or on the activities which are included in CC-expenditures. There are a number of proposed definitions, but none has gained broad international acceptance. We review some of the most SEEA-relevant definitions below, acknowledging that this review is not exhaustive. For additional details, we refer readers to the IMF paper on this topic presented at the 30th London Group Meeting, which has additional coverage of prior work on climate change mitigation and adaptation expenditures. We reproduce Table 1 of their paper in Appendix A1, which summarizes many of these efforts and their definitions.

It should also be noted that from a national accounts perspective, the current consensus in the community of practitioners is to align to SNA definition of 'expenditure', which includes gross capital formation, final consumption and exports. Some international experts also include intermediate consumption for reasons of completeness, this is also the approach followed in Europe in the environmental protection expenditure account (EPEA). Furthermore, a separate issue is how to link categories of so-designed expenditure with (categories of) economic activities, given that the former belongs in the demand side of the economy and the latter in the supply side.

I. Classification of Environmental Purposes (CEP)

The newly approved, international Classification of Environmental Purposes (CEP) (https://unstats.un.org/UNSDWebsite/statcom/session_55/documents/BG-4e-CEP-E.pdf) has an Appendix where the relevant detailed levels of the CEP are mapped to CC-mitigation and CC-adaptation categories based on an implicit definition.[1] This mapping was made based on a project financed by Eurostat, but does not fully grapple with some of the key issues we discuss later in the paper (such as incremental adaptation expenditures or sources of electricity production as potentially relevant for mitigation products - see Section 3 below for further discussion of such issues). Although this provides a useful initial attempt, it is not clear that it is sufficiently complete to define CC-expenditures for a statistical standard such as the SEEA-CF. A more systematic approach looking at all economic activities and ensuring consistency with the established SEEA-CF activity accounts (EPE, RM, EGSS, Env taxes and subsidies) is needed.[2] However, before we tackle categorization and classification issues, it is worth considering specific definitions in greater detail.

[1] It should be noted that the conceptual foundation and importance of the CEP is that it allows for multi-purpose SEEA accounts, which can be produced once and serve to many different user needs, including data on climate change, biodiversity, circular economy, pollution & health, etc. Ideally, there would be one classification or set of classifications that allows disentangling the datasets for such thematic applications, which is an important goal the CEP seeks to deliver.

[2] For example, organic agriculture for crops is included in EGSS being relevant for CEPA 4 Soil but is excluded from CC-mitigation, even though organic agriculture (crops) has been shown to increase carbon contained in soils. The CEP Appendix also claims that there are CC-activities that are outside the boundary of the SEEA-CF, but this position paper argues in Section 2.C. that this does not necessarily need to be situated outside the boundary.

II. US Bureau of Economic Analysis working definitions for pilot project on CC-expenditures

- **Climate change mitigation expenditures** include economic activities whose primary purpose is to **reduce emissions or enhance the sinks of greenhouse gases**; or, they include products and services with specific secondary/technical purpose serving as the cleaner or resource-efficient alternative toward these ends.
- **Climate change adaptation expenditures** include economic activities whose primary purpose is **adapting and building resilience of human systems and natural systems** to changing climate conditions.

These definitions attempt to do accomplish a few goals. First, the underlying activities described are designed to be relatively close to the UNFCCC definitions, but also include the natural resource management aspects of these activities that would be relevant for classifications. Second, the definitions contemplate primary and secondary purpose in a way that closely aligns with the SEEA-CF definitions. Third, for adaptation expenditures, note the term 'changing climate conditions,' and not simply 'climate conditions' is used. Incremental expenditures imply some amount over a baseline that would occur if climate were static. We return to all of these points in our discussion in Section 3 regarding further issues to be addressed with these definitions.

III. Eurostat

Eurostat has been directed by the EU parliament to begin reporting data on climate change mitigation investments by end 2024.

Eurostat provides the following CC-mitigation expenditure definition:

> **Climate change mitigation:** To align with SEEA CF §§ 4.11 – 4.13, Eurostat defines characteristic activities for climate change mitigation those activities directly serving a climate change mitigation purpose and climate change mitigation related products those services and goods produced, designed and manufactured for purposes of climate change mitigation, and cleaner/resource efficient goods. The latter are goods whose primary use is not for climate change mitigation, but they are less polluting (and thus less harmful for the climate) than equivalent "normal" goods which have the same usage and provide an equivalent service.
>
> **Climate change adaptation:** The IPCC provides an internationally accepted definition of the concept of climate change adaptation: "The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects."
>
> The above definition sets out those climate change adaptation economic activities whose primary purpose is to substantially reduce, moderate or avoid harm in natural and human systems in response to actual or expected climate change and their effects. The climate change adaptation activities are categorized by their purpose: activities that directly serve a climate change adaptation purpose or produce specifically designed products whose use

serve a climate change adaptation purpose. The project retains the following 6 purpose categories of economic activities for climate change adaptation: hydrological events: inland water, costal water; climatological events: temperature and droughts; meteorological events: precipitation intensity; meteorological events: wind intensity, other events posing risks to health, ecosystem and soils.

In their definition of CC-mitigation expenditures, on difference between the U.S. and Eurostat definition is that the human interventions for enhancing natural sinks for GHGs appears to be excluded in the Eurostat definition.[3]

Eurostat is working to develop a list of characteristic activities for CC-mitigation using the CEP-Annex as a starting point. This Annex was originally developed based on a Eurostat-financed project on Climate Change Expenditures where the definitions used in this project have not been made explicit in the CEP documentation.

IV. Destatis – Germany

Destatis proposes the following definitions, which share many similarities with the ones proposed above:

> **Climate Change Mitigation** expenditures are expenditures aimed at reducing the emission of greenhouse gases into the atmosphere and enhancing sinks of greenhouse gases.
>
> **Climate Change Adaptation** expenditures are expenditures aimed at adapting and building resilience of human and ecological systems to changing climate conditions, reducing vulnerability, and minimizing negative climate change impacts.

In addition to these definitions, Destatis also states, "it is crucial that only expenditures with a clearly stated purpose of climate change mitigation or adaptation should be counted as a climate change mitigation or adaptation expenditure." Although 'purpose' is not used specifically in the definitions, this is a major aspect of the definitions. They also propose that, "only the additional spending directly related to mitigation or adaptation – such as costs driven by regulatory requirements – should be considered."

It is also important that there is no double counting, which Destatis had emphasized in their work. For example, if a company installs solar panels, this expense should be recorded as mitigation expenditure for that company, not for the company that produces the solar panels as an intermediate product. As with EGSS expenditures, climate change mitigation and adaptation expenditures need to grapple with gross output and value-added boundaries and be clear about what is being added in the accounts.

[3] Eurostat includes human management of sinks but not explicitly named in CEP 050301. Similarly voluntary data on 0501 and 0502 is foreseen for data collection, and could be an issue for reporting. Further, whereas the US BEA is based on an UNFCCC definition it should be noted that there may be some inconsistency in how UNFCCC uses its own definition when measuring carbon sequestration and sinks. This may be a topic to revisit for the SEEA-CF update.

Destatis also advocates that CC-expenditures not be presented as only aggregates but rather by separate categories to make cross-country comparisons more transparent. Where appropriate the CEP categories could be used, but additional categories will be needed. We return to discussion of classifications in Section 2.3 as well as issues of international comparability in Section 3.

V. IMF – in the context of G20 Data Gaps Initiative 3 – Recommendation 7

The IMF "Working" definitions, based on several rounds of consultation with G20 countries, for CC-mitigation and adaptation expenditures are:

> **Climate change mitigation expenditures** are expenditures for preventing, removing, or reducing the emission of greenhouse gases (GHG) into the atmosphere and enhancing sinks of greenhouse gases.
>
> **Climate change adaptation expenditures** are expenditures on adapting and building resilience of human and ecological systems to the changing climate conditions and minimizing the negative climate change impacts.

The working definitions proposed by the IMF focus on the technical nature of the expenditures, and as in the case of BEA above, intend to cover primary and secondary purpose. Views can diverge on what is included as 'secondary purpose' (an issue we return to in Section 3) depending on how the baseline or 'normal' expenditure is defined.

2.C. Other Relevant Background on the EU experience

2.C.i. Climate Change Mitigation Investment Expenditures in the European Union – Background

In the European Union, countries are requested for data on the following environmental monetary accounts: environmentally related taxes by economic activity, environmental protection expenditures accounts, environmental goods and services accounts, forest accounts, environmental subsidies and similar transfers accounts. In 2024, the legislator indicates that environmental account should be developed in a view to enhancing general awareness of the effects of socio-economic activities on the environment and the contribution of the environment to the economy and to well-being and that climate change mitigation, including related investments, is indispensable to achieve the objective of EU climate neutrality in the Union at the latest by 2050. In that respect, it is essential to gather relevant and detailed data from Member States about their environmental investments to make sure that the Union is on the right track to meet the objectives of the European Green Deal objectives.

Eurostat will implement that characteristic in the current environmental goods and services accounts (EGSS) including a data reporting by EU countries on climate change mitigation investments by October 2025. Therefore, Eurostat is working in parallel to the data requirements from EU countries on climate change mitigation investments on using the results of a project developed in 2021-2023 to provide some estimates of the climate change mitigation investments.

2.C.ii Eurostat's workplan on Climate Change Mitigation Investment Expenditures

The European Parliament required the European Commission (Eurostat) to start publishing climate change mitigation investments by end 2024 with available data and to put in place a proper measurement by end of 2026. Eurostat will publish data by end of 2024 based on structural business statistics and on an identification of climate change mitigation economic activities. For the dissemination of data in 2026, Eurostat plans to add legal requirements for countries to report investment using the environmental goods and services sector accounts. Eurostat will provide definitions and compilation guidance to the national statistical institutes, and a table summarizing the proposed timelines is shown in the Appendix (section A.2).

2.C.iii Amending EU regulation for climate change mitigation investments

The 2024 EU legal act amendment includes the data requirements to EU countries for climate change mitigation investments. This statistic will be introduced in the environmental goods and services accounts (EGSS), with the data collection starting in 2025. The country data will be available for dissemination in 2026. All EU countries may not be fully compliant with those new requirements and therefore, Eurostat may use the project's results that will be published in December 2024 as estimates for the missing information.

The EU legal act lists the additional characteristics required as follows:

- gross fixed capital formation for climate change mitigation activities, broken down by corporations, government and households,
- gross fixed capital formation in products mitigating climate change, not already included in GFCF for climate change mitigation activities broken down by corporations, government and households,
- final consumption in products mitigating climate change, broken down by government and households.

Those characteristics, likewise, the other characteristics of the EGSS accounts, are requested according to some economic activity groupings (NACE, European classification in line with ISIC) and to the classification of environmental purposes (CEP). The EU legislation allows Eurostat to disseminate within T + 27 months approximately data for reference year T. This means early 2026 Eurostat will disseminate data related to the reference years up to 2023 for EU and EU countries.

Note that the EU legislation covers country data requirements for climate change mitigation investments. Data on climate change adaptation investments will remain with the project results. However, for the common part between climate change mitigation and adaptation, one could use the EU country data.

2.C.iv Defining expenditures/investments

While the focus of much of this paper is on expenditures more broadly, the EU legislation focuses on investments, which is a subset total mitigation expenditures. Eurostat interprets the legislator's request for data on climate change mitigation investments as data on **capital expenditure** to reduce the emissions of greenhouse gases (GHG) by source or enhance their removal from the atmosphere by sinks.

Traditionally, in the national economic accounts, capital expenditure includes:

- Gross fixed capital formation (GFCF) by climate change mitigation characteristic activities (i.e. GFCF for the production of characteristics products for climate change mitigation).
- GFCF in cleaner/resource efficient goods related to climate change mitigation, unless they are already included in GFCF by CCM characteristic activities.
- and final consumption in cleaner/resource efficient durables goods related to climate change mitigation.[4]

The definition allows for covering both specific products and cleaner and resource efficient products, which in the case of climate change mitigation are very relevant. While the reference to GFCF is straightforward when focusing on CCM investments, the inclusion of final consumption in cleaner and resource efficient durable goods is dictated by the need of covering also the expenditure of households given that the green transition is not only about the transformation of corporations and government, but also the households.

The definition:

- relates to **gross** expenditures;
- is coherent with the expenditure frameworks already in place for monetary accounts;
- is close to what is currently reported under climate change related finance / investments data by international initiatives;
- it allows for the reporting of items which are not in the perimeter of CEP but are commonly acknowledged to be important for climate change mitigation.

2.D. Classifications related to CC-expenditures

Once definitions are resolved, classifying activities into relevant categories would be necessary for reporting. Due to the challenges of calculating precise climate-related expenditures as discussed above, one should emphasize the need for separating the data into clear categories rather than consolidating the expenditures into single figures for climate mitigation or adaptation. This ensures accurate reporting. Presenting the collected data separately as "investments in energy efficient buildings", "investments in the production of renewable energy", etc. would be more precise. In this section, while we acknowledge there is work yet to be done on definitions (which is discussed further in Section 3 below), it is still useful to discuss how categories would emerge from the definitions and how they would fit within the existing SEEA-CF environmental activities framework.

There are two major types of activities that are related to climate change, mitigation and adaptation. It appears to be implicit in the development of Climate Change Expenditure Accounts where there

[4] It should be noted that the EU environmental protection *expenditure* accounts also include intermediate consumption, which is not uncommon. The US BEA's pilot EGSS account also includes some intermediate expenditures, for example. Ideally, a more align thematic account would focus on valued-added to be better aligned with other SNA-based accounts; but, depending on the nature of the source data and what is being measured, a comprehensive measure of 'expenditure', in particular of non-capital expenditure by businesses, may pragmatically need to be in terms of gross expenditures.

are two types of expenditures, mitigation expenditures and adaptation expenditures that these two types of expenditures are additive, such that,

Climate Change Expenditures = CC-Mitigation Expenditures + CC-Adaptation Expenditures

But, a key question that would need to be resolved by the SEEA-CF Update is: are mitigation and adaptation expenditures separate from each other or do they overlap?

Figure 1. Climate Change Expenditures in relation to human and natural systems, the Classification of Environmental Purposes (CEP), and mitigation and adaptation concepts

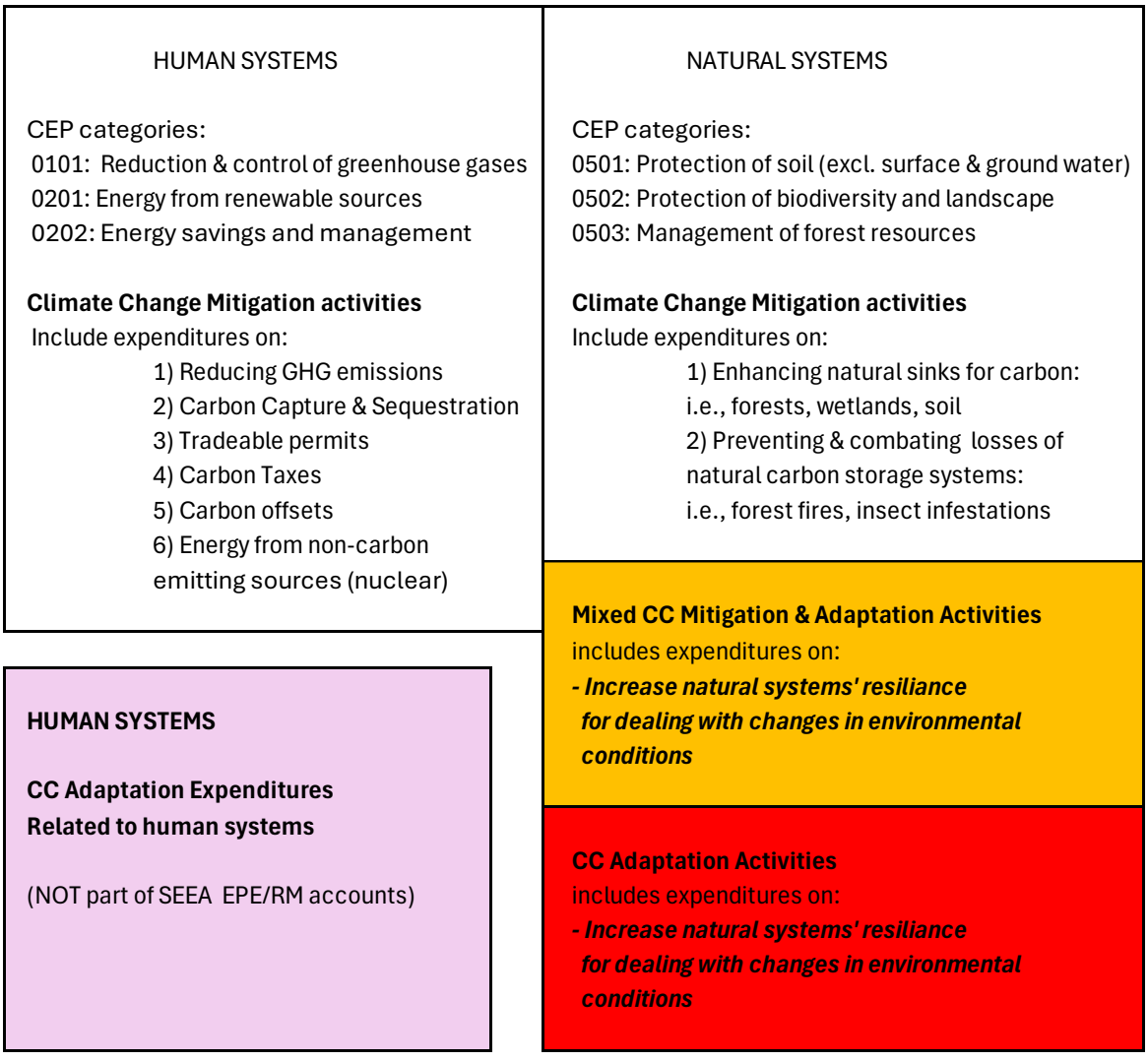

Figure 1 is derived from the U.S. pilot work on this topic and uses the CEP as a starting point to identify the climate change relevant portions of this classification system, but it also shows that it is not sufficient for covering all of the different activities that are considered within scope of climate change expenditures. In addition, the figure illustrates how activities that are considered both mitigation and adaptation might fit with a classification scheme. For example, the restoration

of mangroves in coastal areas serves as both a carbon sink, (i.e., mitigation), as well as increasing coastal resilience from erosion and flooding (i.e., adaptation). Alternatively, buildings refurbishment can serve as an example of making buildings both energy efficient and adaptive, as it both contributes to climate mitigation (because of lower needs for heating), and to climate adaptation, because of better insulation from heat outside. Because of this duality of purpose with regards to climate change mitigation and adaptation for these types of expenditures, it appears that mitigation and adaptation expenditures are not always additive but overlap in some cases. To avoid double-counting when aggregated, compilers could apportion some of these overlapping expenditures to mitigation and some to adaptation; or, "cross-cutting" categories could be developed for dual-purpose expenditures.

A number of the CEP categories already suggest some finer categorization beyond the two major categories of mitigation and adaptation. For example, the 4-digit categories, shown in Figure 1 could be one starting point but the CEP does not include many of the activities relevant to climate change, so some other classification needs to be considered.

As an illustrative example, other approaches might lead to alternative grouping, such as:

A. Mitigation Expenditures:

1. Activities that directly reduce GHG emissions (compared to fossil fuel only based systems) - human systems
    a. Carbon-free electricity and heat production
    b. Zero and low-carbon emission transport
    c. Infrastructure for charging electric vehicles
    d. Batteries for electricity storage for EVs and renewable energy sources
    e. Reduces methane (natural gas) emissions, due to leaks or biogas uses
2. Activities that indirectly reduce GHG through substitution, energy savings and energy efficiency – human systems
    a. Fuel Ethanol (biofuels)
    b. Energy efficient appliances, parts of buildings, machines
    c. Infrastructure for electricity distribution - improvements to reduce losses
    d. Infrastructure for electricity distribution - portion used for electricity from renewable sources
3. GHG Carbon capture, storage and destruction - by human systems
    a. Carbon capture systems
    b. Carbon storage systems
    c. Non-carbon dioxide GHGs reduction activities
4. Promotes carbon capture and storage - in biological systems (sinks)
    a. Promotes carbon storage - in soil
    b. Promotes carbon storage - in plants such as trees, shrubs, other vegetation
    c. Prevents/fights destruction of carbon storage in natural systems - such as forest fires, insect infestations

B. Combined Mitigation and Adaptation Expenditures

1. In biological systems - assumption that healthy ecosystems can adapt better than stressed ecosystems
    a. Resource management activities related to improving, restoring, protecting ecosystems
2. In combined biological and human systems = Nature-based mitigation and adaptation activities - combining human structures and nature-based aspects
    a. Resource management activities related to adapting human structures for better resource management
    b. Insulation, Refurbishment, and Energy efficient buildings

C. Adaptation Expenditures

1. In biological systems - assumption that healthy ecosystems can adapt better than stressed ecosystems
2. In combined nature based and human systems (where human systems assist/protect natural systems to adapt, and nature helps humans adapt)
3. In human built systems
    a. Heat reduction efforts – direct cooling systems (Air conditioning)
    b. Barriers to heat gains and losses – insulation
    c. Transportation infrastructure that is better suited to withstand damage from extreme weather events
    d. Water flow systems – dams, levies, channels, pipelines – to reduce damage from extreme water flow events
    e. Construction that withstands higher wind speeds

It should be emphasized that the above classification approach is **not a proposed classification for the London Group or SEEA-CF Update to consider** for adoption; rather, this is an example of climate change categories of expenditures that is meant to be illustrative (i.e., not meant to be fully developed or comprehensive). However, the example above provides another way of thinking about activities in the context of the IPCC definitions and ways of grouping them that could be useful when developing climate change expenditure information. This paper provides further illustrations for classifications and how CEP categories might align with CC expenditures from Eurostat in the Appendix. Some of the budget tagging methods have also developed some classification of climate change expenditures (see the IMF paper for additional references to such budget tagging efforts).

2.E. Methods and Data Considerations

Collecting data on climate change mitigation and adaptation expenditures across all sectors of society is a highly complex task. Disentangling climate-related spending from general expenditure data is challenging, as current classification systems lack the detailed categories needed to isolate climate-specific expenditure. For reasons discussed in more detail in Section 3, it is crucial that only expenditures with a clearly understood purpose of climate change mitigation or adaptation should be counted as a climate change mitigation or adaptation expenditures. While identifying such spending is relatively straightforward in government budgets, it becomes more complicated

in the private sector, where expenditures may be driven by profit motives and accounted for on balance sheets for income and asset considerations, with climate benefits as secondary outcomes. Nevertheless, the purpose of an expenditure should be the most important factor when defining what to include.

A SEEA-CF climate change expenditure account (CCEA) would ideally need to canvass the whole economy and all institutional sectors for relevant products and services. This means that methods that are relevant for only one institutional sector would not be adequate for the development of these accounts. Although different pieces of the CCEA could be developed separately and then sewn together but if this type of patchwork quilt approach is used, then all of the different pieces being combined would need to use the same definition principles or they could not be put together. However, it should be noted that one essential feature of CCEA for Eurostat is that it avoids duplications and double reporting with other SEEA accounts, in particular environmental protection expenditure, subsidies and environmental sector

Often the use of government finance statistics and government budgets provide easily available data sources for experimentation and pilot work. Unfortunately, the methods used in budget tagging exercises are seldom applicable to other accounts given the differences in what expenditures can be "tagged" versus "primary purpose". If the goal is to develop economy-wide estimates for climate change expenditures, then the more standard economic statistical data needs to be the starting point.

For government spending, Destatis, for example, uses budget data as for Environmental subsidies and similar transfers accounts (ESST). This involves analyzing the budgets of the federal government and the 16 states of Germany through a keyword search focused on terms related to climate change mitigation, adaptation, and biodiversity. The results from this keyword search are manually reviewed. This process includes a detailed examination of budget documents, which are categorized based on information from the documents themselves as well as legal directives for funding programs, evaluations, annual reports, framework plans, and financial statements. For the private sector, Destatis has analyzed a number of available data sources, which have shown to have a variety of issues. For NACE categories B, C, D and E, specific data for investments in environmental protection is available. The corresponding survey includes several categories of the climate change mitigation classification. Most data for renewable energy, electric vehicles, energy-efficient buildings, etc. is collected in a very general way. To present the data divided in NACE classes, more detailed data would be needed, which will likely be the case for many countries trying to implement this.

The SEEA-CF allows for two different ways to value expenditures. For environmental protection expenditures, it is the additional cost of the good or service above a baseline, often a more polluting version, that is included. Whereas, in the environmental goods and services sector, the full cost of the goods or services is included. Exactly which approach to take, full cost or additional cost, is a critical consideration when developing guidelines for CC-expenditures to ensure comparable statistics. Methodological consistence on this parameter is critical, also including the determination of the baseline if additional cost is the criterion.

The current International Recommendations for Energy Statistics (IRES) specifications for renewable energy sources (see p. 145) do not include all carbon-free emissions energy sources, specifically, electricity and thermal energy produced from nuclear fuels are not included. In the context of climate change mitigation, the SEEA-CF Update should consider whether all energy sources that do not result in carbon emissions should be included as mitigation relevant activities.

Once the major parameters of the boundaries for CC-expenditures are set, and the decision criteria for including/excluding specific expenditures have consensus, it can be helpful to develop lists of activities, goods and services that are considered CC-expenditures and map these to relevant classifications of industries (ISIC, NACE, NAICS), and goods and services (CPC, NAPCS). These types of lists can be an aid for countries to develop specific CC-expenditure accounts. The development of these types of lists needs to be done in a systematic manner with inputs from experts from economic statistics, environmental statistics, environmental-economic accounts, and climate change experts. It may be useful to have a core group of economic activities that all countries would produce which would allow valid international comparisons. This would also allow countries to develop their own country specific statistics tailored to national needs. The development of the lists of industries, goods and services, may be more relevant in compilation manuals than in the SEEA-CF but perhaps the core group of activities needs to be included as part of the revised SEEA-CF. We return to this point in Section 3.2.

3. Options considered, definitions, and key issues of determining "what's in and what's out"

3.1. Definitions, Options, and the Importance of Examining Purpose

At this stage, our first concern is deciding how to define terms and assess the implications for measuring these expenditures. It is clear from the background presented in Section 2 that this is not the first attempt to do so, as numerous efforts have already contemplated how to define climate change mitigation and adaptation expenditures. The options we focused on for the London Group Meeting were those that prioritized consistency with SEEA/SNA accounting principles. Namely, the position paper group spent the most time discussing the options put forth by the contributors from the European Commission (Eurostat), U.S., and IMF as summarized in Section 2, because these emphasized formulating purpose-based definitions and accounting principles consistent with the SEEA-CF.

One common thread that runs through these options is general agreement on the inclusion of expenditures where the primary purpose is for either climate change mitigation or adaptation. This primary purpose criterion forms the foundation of definitions of expenditures in the SEEA-CF environmental activity accounts. However, some viewpoints on this topic may diverge on how they define what other activities can be encompassed by the definition, particularly how to define expenditures related to climate change mitigation and adaptation by secondary purpose. We summarize some of the key issues below, all of which the SEEA-CF will have to confront and clarify if these expenditures would become part of the updated statistical standard.

The idea of products and services being included based on secondary purpose is not new. In fact, SEEA-CF environmental activity accounts also contemplated secondary purpose, albeit for

specific and technical reasons as summarized in Section 2 above. UNCEEA's technical note for the Environmental Goods and Services Sector Account describes secondary purpose for an EGSS account to include environmental products that are either: 1) cleaner products or 2) resource efficient products relative to 'normal' or standard products as a baseline. For example, while the primary purpose of an electric automobile is for transportation, it is included in the EGSS account because the default/normal product is one with a standard combustion engine running on gasoline or diesel (with some 'normal' level of greenhouse gas emissions). In other words, one of its defining features is that an electric vehicle serves as an emissions-mitigating alternative to the standard product. Thus, it would be consistent with the SEEA-CF for products and services to be included on a very similar secondary purpose basis; but, there are still significant caveats and specifics yet to be worked out.

One caveat for secondary purpose is whether the total expenditure on the product or service should be included or some 'partial' or increment of this expenditure is most relevant for the purposes of climate change mitigation or adaptation. For example, an electric vehicle that reduces greenhouse gas emissions (relative to the default vehicle) would be considered as part of climate change mitigation expenditures, as the nature of its secondary purpose seems to satisfy the criteria in much the same way as the EGSS account. Yet, one question might be: how *much* of the electric vehicle expenditure should be attributed to mitigation of greenhouse gas emissions? Should the full expenditure of each electric vehicle be "all in" even if the difference between one model and another model is amenities-based (e.g., quality of the interior, sound system, tech features)? Further complicating this issue, consider if one country's electric grid's power source is more fossil fuel-based while another country's is sourced by a much higher percentage of carbon-free emissions energy, should we count products like electric vehicles in these countries the same in our mitigation estimates? Or, should we discount expenditures on electrified products based on the emissions intensity of the electricity source as the U.S. proposes in the BEA's work on this topic? For EGSS products, many of these questions have been answered by prior guidance; however, the SEEA-CF Update may revisit some of these questions, and it remains an open question regarding the extent to which the scope of mitigation and adaptation expenditures should define these boundaries in more targeted manner in the new standard.

A second caveat to be considered is not necessarily a new idea, but one that was debated at the drafting of the 2012 SEEA-CF: what should be compared as the 'default' or 'normal' product when considering secondary purpose? This issue had come up in the 2012 SEEA-CF when contemplating whether public transportation, for example, should be included as the 'cleaner' or 'more resource-efficient' version of transport compared to autonomous vehicles. The decision was made to exclude public transportation from EGSS for various reasons. Its primary purpose is mass transportation and the comparison to individual, autonomous transportation is not an identical product. The key question in this circumstance (and potentially many other products compilers of these accounts consider) is how narrow or broad the scope of the comparison of products should be. That is, in the broad scope comparison, compilers of these accounts would be comparing transport to transport (e.g., public transport to non-electric autonomous transport); whereas, in the narrow scope the comparisons would be mass transit to mass transit (e.g., low/zero emissions busses to diesel busses) and autonomous transport to autonomous transport (e.g., low/zero

emissions cars to conventional gas/diesel cars). The scope of how exactly to define this baseline has not yet been settled for climate change mitigation and adaptation expenditures, which is an issue we return to in the next subsection.

It should be clear at this point that the position paper does not definitively answer all questions related to secondary purpose. These issues that will not only be considered in the SEEA-CF Update for climate change mitigation and adaptation expenditure, but some of these issues are potentially relevant for revisions to traditional EGSS accounts. Determining the scope of activities to be included that satisfy secondary purpose criteria is inherently more difficult to garner consensus in the short period of time that this group had convened. Indeed, it will be critical for the SEEA-CF Update to confront these issues and ensure there is consensus around the specifics. The success of countries compiling EGSS accounts required the statistical standard to take a stand on what is included and what is not, which facilitates consistency and international comparability. If climate change mitigation and adaptation expenditures are adopted as part of the updated SEEA-CF, then we would expect a similar rigor in defining terms and ultimately a high degree of clarity prescribing what is included in these accounts.

3.2 Major differences in application of purpose criteria: "what's in versus what's out"

As discussed in the prior subsection, the decision to define secondary purpose broadly or narrowly would have major implications for compilers of these accounts and ultimately the level of the expenditures included in the accounts. The example of how much public transport and rail expenditures to include was confronted by the guidance for EGSS; and, this issue will need to be nailed down for climate change mitigation expenditures as well. One reason for this, besides accountants' and statisticians' desires for completeness in accounting rules more generally, is the practical matter that a handful of rules related to the definitions could make large differences in the level of expenditure qualified for these accounts. Keeping with the same example, a broader definition that includes all light rail and public transportation would have a far larger expenditure than a narrower definition that includes only electrified (zero emissions) rail and (zero/low emissions) public transportation. Even further, a more tailored definition could include a subset of the latter, where electric transport is adjusted based on the percentage of zero/low emission energy supplying the country's electricity. If three countries have the same level of these products in aggregate, but their national statistical offices are following different rules such that their tally of climate change mitigation expenditures are widely different, then this could undermine the integrity of these figures and ultimately the international community's faith in the estimates. Moreover, a greater degree of discretion on these rules may run a greater risk of influencing the levels of these expenditures from regime to regime within a country, potentially distorting the values over time, which would further undermine the purpose of these statistics.

The SEEA-CF Update should prioritize specificity in the definitions of climate change mitigation and adaptation expenditures, but particularly for expenditures that would lead to major divergences as described in the example above. In other words, we acknowledge that all accounting standards will not be able to precisely specify all borderline or edge cases, but for major expenditures like public transportation and infrastructure, it is necessary for the SEEA-CF Update to articulate rules for what is in and what is out.

A second major issue to be considered by the SEEA-CF Update concerns the baseline for adaptation expenditures, which could dramatically alter the level of expenditures included in the adaptation expenditures account. When one considers how our buildings and infrastructure (e.g., bridges and roads) adapt to a warmer world with greater extreme weather events, how much of the expenditure is due to some baseline adaptation to some 'normal' level of climate versus the change in intensity? A bridge or building may be built to withstand a certain threshold of wind speeds and storm conditions, for example, which would be incurred independent of whether any climate change took place. But, how much *additional* spending was undertaken to adapt to *changing* climate conditions? In other words, are we trying to measure climate adaptation expenditures or climate *change* adaptation expenditures? The latter is more difficult to measure. For example, a national statistical office may need to first assess what the baseline expenditure would be (perhaps by picking a point in time where thresholds were considered more 'normal' or collect data directly on the marginal expenditures undertaken) in order to estimate the additional expenditure undertaken to adapt to changing conditions. But, if the guidance on this question is unclear, and national statical offices choose very different baselines (or choose no baseline at all and include all climate adaptation expenditures – e.g., the full expenditure on a "green building" rather than the marginal expenditure to achieve a "green" certification), then this runs another risk of having wildly different estimates across countries for assessing the same underlying expenditures. If climate change adaptation expenditures are proposed for adoption into the SEEA-CF, the statistical standard would need to resolve these issues with clear, definitive guidance on the major classes of expenditures and articulate the most relevant baseline (when applicable).

A similar issue would need to be confronted regarding climate-related hazards and natural disasters, where the SEEA-CF Update would need to define how mitigation and adaptation expenditures would incorporate and allocate hazard/disaster-related expenditures.[5] Similarly, when money is spent, for example, on flood protection, should the SEEA-CF Update only consider the additional expenditure above previously existing standards? If this rule follows, it would also apply to expenditure for construction on areas already at risk of flooding or for the reclamation of new land be considered there. With an accounting of some baseline cost, the cost of climate change mitigation and adaptation for hazards will be exaggerated. These nuances should also be carefully considered for public expenditures related to hazards/disaster relief and relevant CC-mitigation and CC-adaptation expenditures in government budgets.

3.3. Additional Discussion

It is worth noting that in the adaptation definitions summarized in Section 2, the criterion of minimizing negative climate change impacts is included and some definitions include the term 'impacts'. It is important to emphasize that using the term 'impact' would have a number of implications for compilers of these accounts. For example, it would have to be determined by the SEEA-CF Update whether evaluating the impacts of an expenditure is even possible for most NSOs, since accurately assessing the climate impact of a particular expenditure in the economy requires some time-lag and a quantitative analysis of causality. Quantifying impact is resource

[5] See Bagstad et al. (2024) for further exploration of how to account for hazards in the context of SEEA principles.

intensive, complex, and generally falls outside the scope/expertise of most national statistical offices. The inclusion of 'impacts' as part of climate change expenditure definitions needs to be carefully evaluated in terms of implementation practicalities.

4. Recommendations for the SEEA Central Framework Update

The previous section outlines the primary issues for further deliberation and for the SEEA-CF Update to prioritize with regard to defining and measuring climate change mitigation and adaptation expenditures, including many issues that lack a single consensus among our group of contributors on the solution. We do, however, agree on the following set of recommendations as a starting point for the London Group Meeting to discuss, refine, and potentially adopt as positions for the SEEA-CF Update:

1. **Carefully define purpose and prioritize specificity in definitions**: Given the SEEA-CF's use of the 'primary purpose' criterion in defining environmental protection and resource management expenditures, the definitions for climate change mitigation and adaptation expenditures should also, at a minimum, include activities that satisfy a 'primary purpose' criterion. To the extent 'secondary purpose' is also used in defining these expenditures, the criteria developed by SEEA-CF should be clear, specific, limited, and understandable for compilers of the accounts to maintain consistency across accounts and for international comparability.
2. **Carefully consider the term 'impact' (or remove reference of it)**: Accurately assessing the climate impact of a particular expenditure in the economy is resource-intensive, requires a time-lag, assumes causality, and is generally outside the scope/expertise of national statistical offices. Thus, assessing impact likely compromises the feasibility of producing consistent and comparable statistics. If terminology like 'impact' is used in the Update, it should be well-defined and clear in the guidance precisely how a national statistical office can measure it, ideally with worked examples from countries that have implemented it in order to demonstrate its feasibility and rigor that goes beyond limited government budget tagging exercises since the statistics are to include all institutional sectors of the economy.
3. **Carefully consider recommended data sources and definitional compatibility**: Definitions used in the SEEA-CF Update for climate change mitigation and adaptation expenditures should carefully consider the underlying data sources and the definitions used for generating those data and classifications, providing sufficient guidance and specificity for compilers.
    - For example, existing Supply-Use Table (SUT) data and classification schemes may have 'primary purpose' criteria that would need to be reconciled with any departures from 'primary purpose' in CCM and CCA definitions. Similarly, *ad hoc* budget tagging data for public sector expenditures may also use different criteria, which may be inconsistent with the proposed guidance.
4. **Provide very clear guidance on major expenditures**: To the extent that there is any ambiguity in the proposed definitions in the SEEA-CF Update for climate change and

adaptation expenditures, clear guidance on "what is in versus what is out" for major expenditures is essential for compilers to produce consistent and comparable estimates.

- The prior section describes several examples where reasonable compilers of these accounts may disagree on how to apply the primary purpose (or eligible secondary purpose) criteria if it is not sufficiently clear. The decision regarding how much of expenditures like rail and public transportation are included may affect a countries' aggregate estimates substantially. If countries apply the definitions differently due to lingering ambiguities in how to attribute purpose for major expenditures, it will likely lead to serious issues of international comparability, which can be avoided by both greater specificity in our definitions and clear guidance on major expenditures.

London Group Meeting papers often end with explicit questions for the participants to con template and discuss. Rather than specific questions, the more general question for this position paper is whether the above recommendations are reasonable and, if not, how can they be refined or edited to advance this topic more effectively in the years ahead?

Appendix

A.1. Additional Background on Prior Efforts

From the IMF's Concept Note for Recommendation 7, p. 9-11:

"An early initiative is the Climate Public Expenditure and Institutional Review (CPEIR)[6], which incorporated climate budget tagging initiatives undertaken with UNDP and World Bank support[7]. The CPEIRs, inter-alia, focus on the identification of climate change–relevant expenditures, drawing on elements of the OECD Rio markers' objective-based and/or MDBs' activity-based approaches. The definition of climate change related expenditures in the CPEIR[8] is, however, tailored for each country based on a consultative process that considers its national priorities.

The DGI REC 7 Task Team needs to build upon the initiatives to arrive at an internationally agreed statistical definition that can be used for defining the climate change mitigation and adaptation expenditures. Table 1 below gives a summary[9] of the definitions used for identifying climate change mitigation and adaptation activities, in some of the initiatives:"

Defining Climate Change Mitigation and Adaptation activities, selection of initiatives

Institution	Mitigation definition	Adaptation definition
OECD-Development Assistance Committee (DAC)[10]	An activity that contributes to the objective of stabilization of GHG concentrations in the atmosphere by promoting efforts to reduce or limit GHG emissions or to enhance GHG removal by sinks.	An activity that intends to reduce the vulnerability of human or natural systems to the current and expected impacts of climate change.
Multilateral Development Banks (MDBs)[11]	An activity, that by avoiding or reducing GHG emissions or increasing GHG sequestration, contributes substantially to the stabilization of GHG concentrations in the atmosphere.	An activity that aims to lower the current and expected risks or vulnerabilities posed by climate change.
International Development Finance Club (IDFC)[12]	An activity will be classified as related to climate change mitigation if it promotes "efforts to reduce or limit GHG emissions or enhance GHG sequestration"	An activity will be classified as related to climate change adaptation if it addresses current and expected effects of climate change, where such effects are material for the context of those activities

[6] UNDP 2015. A methodological guidebook - Climate Public Expenditure and Institutional Review (CPEIR)
[7] Budget Tagging World Bank Document
[8] Knowing What You Spend: A guidance note for governments to track climate change finance in their budgets | United Nations Development Programme (undp.org)
[9] The definitions presented here intend to capture the essence of the activity and may not match word-to-word with the definitions given in the respective reports. Users are advised to verify the text in the main report for citation/reference purposes.
[10] OECD DAC Rio Markers for Climate: Handbook
[11] MDB-IDFC 2021, Common principles for climate mitigation finance tracking, version 3; MDB-IDFC 2015, Common principles for climate change adaptation finance tracking
[12] IDFC. 2021. IDFC Green Finance Mapping Report 2021

Institution	Mitigation definition	Adaptation definition
Climate Policy Initiative (CPI)[13]	Activities aimed at Contributing to reducing or avoiding GHG emissions, including gases regulated by the Montreal Protocol; or Maintaining or enhancing GHG sinks and reservoirs.	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.
Intergovernmental Panel on Climate Change (IPCC)[14]	A human intervention to reduce emissions or enhance the sinks of greenhouse gases.	In human systems, the process of adjustment to actual or expected climate and its effects, to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.
Climate Bonds Initiative (CBI)[15]	Activities that can help deliver a low-carbon economy and adhere to GHG emissions screening criteria consistent with the 2-degree global warming target set by the COP21 Paris Agreement.	Activities that improve the ability of assets and systems to persist, adapt and/or transform in a timely, efficient, and fair manner that reduces risk, avoids maladaptation, unlocks development, and creates benefits, including for the public good, against the increasing prevalence and severity of climate-related stresses and shocks.
EU Sustainable finance taxonomy[16]	An economic activity that substantially contributes to the stabilization of greenhouse gas concentrations in the atmosphere by avoiding or reducing greenhouse gas emissions or enhancing greenhouse gas removals, consistent with the long-term temperature goal of the Paris Agreement.	An economic activity that either prevents or substantially reduces the risk of adverse impact or substantially reduces the adverse impact of the current and expected future climate on that economic activity itself without increasing the risk of an adverse impact on other people, nature, and assets.

[13] Buchner et al., 2021. Global Landscape of Climate Finance 2021.
[14] IPCC. 2022. Annex I: Glossary. In: P Shukla, J Skea, R Slade, et al. (eds.). Climate Change 2022: Mitigation of Climate Change.
[15] CBI 2019. Climate Resilience Principles: A framework for assessing climate resilience investments

[16] EU Commission. 2020. Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088

A.2. Eurostat Workplan and Timetable for Implementation

In the short-term (end of 2024) Eurostat will have two mainstream works: on one hand producing estimates of climate change using the project results and on another hand set up the methodology and data requirements for regular climate change mitigation investments data.

Here is Eurostat's current foreseen timetable:

Time	Project based	EU data requirements' implementation
2024-Q3		Consultation EU member states on legal data requirements
2024-Q4	Dissemination of CCM investments data Digital publication on climate change	Consultation EU Commission users
2025-Q1		Finalisation EU legal data requirements Questionnaire EGSS, incl. CCM Investments ready
2025-Q2		Launch CCM investments data collection (EGSS)
2026-Q1		CCM investment data dissemination (from EGSS questionnaire)
2026-Q4	Digital publication on climate change updated	

A.3. Eurostat's List of Climate Change Mitigation Activities, Goods, and Services

Renewable and low carbon energy	Energy from renewable sources incl.	CEP 0201
	Production of energy from renewable sources	CEP 020101
	Equipment and technologies for renewable energy	CEP 020102
	Supporting services for renewable energy	CEP 020103
	Others for energy from renewable sources n.e.c*	CEP 020199
	R&D for renewables	CEP 070201
	Production of nuclear energy	Out CEP
	R&D for nuclear energy	Out CEP
	Activities related to the transmission and distribution of energy, incl electricity grids	Out CEP
Energy efficiency	Energy saving and management includes	CEP 0202
	Energy savings through in process modifications	CEP 020201
	Energy efficient buildings; other efficient energy demand technologies	CEP 020202
	R&D for energy efficiency	CEP 070202
Low carbon transport activities and infrastructures	Prevention of greenhouse gases emissions incl Charging stations and other essential infrastructures for recharging electric road and vehicles	CEP 010101
	Low carbon transport activities	Out CEP
	Low emission transport infrastructure	Out CEP

Treatment, monitoring, measurement and other activities the reduction of GHGs	Reduction and control of greenhouse gases	CEP 0101
	Prevention of greenhouse gases emissions	CEP 010101
	Treatment of greenhouse gases	CEP 010102
	Protection of soil, surface and groundwater	CEP 0501
	Protection of biodiversity and landscape	CEP 0502
	Reforestation, afforestation and forest related land management	CEP 050301
	R&D for reduction and control of greenhouse gases	CEP 070101
	R&D for forest management	CEP 0708
Other CCM activities	Cross-cutting and other environmental purposes related to climate change mitigation	CEP 08

* As long as those activities are not already included in the renewable energy production , to avoid double counting.

Note: The international classification of environmental purposes CEP aims at classifying environmental activities, environmental products or environmental expenditures. The CEP is an UN classification. When being developed, a mapping was realised between the categories of CEP the climate change policy areas mitigation and adaptation. The mapping from CEP to climate change mitigation is the starting point for defining characteristic activities for climate change mitigation (as listed in the above table). However, CEP does not cover the whole scope of climate change mitigation. Indeed certain climate change mitigation activities are beyond the scope of SEEA, and thus they are not covered in the categories of CEP, in particular:

- activities related to the transmission and distribution of energy;
- activities related to the production of nuclear energy;
- low carbon public transport activities, i.e. subways, bike paths and lanes, railways and internal waterways transport and related infrastructure.

Whereas these activities are beyond the SEEA scope of environmental activities, because their primary purpose is not environmental, Eurostat considers that they should be taken into consideration and added to the CEP-based aggregate 'climate change mitigation', to have complete picture and measure of CCM investments. Distinguishing primary and secondary purpose is a valid open question whether to consider it explicitly or implicitly through the list of activities, goods and services.

A.4. Eurostat's data sources for climate change activities, goods and services

Practical implementation of the CCM activities, goods and services

Activity, goods and services	CEP	NACE/CPA
Reduction and control of greenhouse gases incl.:	0101	
Treatment of GHG (which includes carbon capture and storage - CCS- and carbon capture and use - CCU		NACE 39
Monitoring and measurement of GHG		NACE 71.12; 71.20
Other activities for reduction of GHG (ETIGA activities specific to CEP 0101)		NACE 84.1
Production of energy from renewable resources	020101	NACE 35.11; 35.21; 35.30; 39.21; 10.41; 20.14; 20.59; 02.20; 16.10
Reforestation, afforestation and forest related land management (GHG removal by sinks)	050301	NACE 02.10
R&D related to climate change mitigation	070101, 0702, 0708 (part of) and R&D for climate change activities not covered by CEP	NAE 71.1; 71.2
Production of nuclear energy	out	NACE 35.10
Electricity grids	out	NACE 3513
Low carbon transport activities		NACE 49.1; 49.2; 49.3; 50.3; 50.4
Low emission transport infrastructures		NACE 52.21

Energy savings through in-process modifications (e.g. recovery of heat through combined heat and power)	020201	CPA 25.30.2; 28.11.21; 28.11.31; 42.22.13
Electric and hybrid cars, buses and other cleaner and more efficient vehicles	010101	see transport equipment codes in the indicative compendium
Charging stations and other essential infrastructure for recharging electric road vehicles	010101	CPA 27.12.40; 27.90.44
Energy efficient buildings	020202	CPA 16.23.20; 41.00.10; 41.00.20; 43.99.7; 43.29.11
Other efficient energy-demand technologies (e.g. most efficient domestic appliances)	020202	CPA 26.11.22; 27.40.15; 27.51