Cover Note

Project Summary

Analysing the circular economy, climate change mitigation, climate change adaptation and bioeconomy as economic sectors

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Background

There is limited data available on economic activities related to circular economy, climate change mitigation, and climate change adaptation (i.e. green transition sectors) as well as to bioeconomy and other economic sectors relevant for environmental policy making. In the context of the data needs for EU policies in these areas, particularly the circular economy, it is necessary to improve information available on economic aspects, such as output, jobs created, investments, and gross value added of businesses operating in these sectors. Currently, national statistics agencies do not or only in relatively limited extend collect economic data on several sectors relevant for environmental policies.

Against this background, Eurostat initiated a project implemented by Prognos and DevStat (ESTAT/E/2019/009, lot 6) to develop a methodological approach that allows deriving key economic variables on the economic activities related to circular economy, climate change mitigation, and climate change adaptation, and bioeconomy, which can be used as a framework also for other green transition sectors.

Overall approach

The methodology developed for the three considered sectors can serve as a generic framework for compiling data on environment relevant economic sectors.

In essence, the approach can be summarised as follows:

1. Building a conceptual framework

■ Overall definition: A suitable and widely accepted overall definition of the environmental policy subject based on an international body serves as a starting point. The definition needs to be further specified to refer to related economic activities.
■ Defining the boundaries of the scope: A broader scope is recommended to include not only core activities, but also their enabling technologies and other related activities aligned with the definition of the respective environmental sector and its scope.
■ Sector classification by purpose: Criteria for the delineation of related economic activities can be established by means of a sector classification by purposes (e.g., the 10R framework for

Circular Economy). A focus should be placed on economic activities *providing* goods and services along with additional supporting criteria for the statistical delineation.

2. Mapping relevant activities and matching the against the integrated system of economic classification

- Drawing upon existing lists of goods and services, if available at the appropriate level, is recommended. In many cases such a list does not exist and needs to be transparently constructed (i.e., mapping of relevant activities).
- The developed longlist of sector activities needs to be matched against the integrated system of economic classification. This prevents double counting, enables clear transparent allocations and reproducibility. Complementary, a micro-data approach may be used to assist in this process.
- The matching should be conducted in the most detailed classification available. For NACE, this is the 4-digit (nationally often 5-digit) level. In addition, products can be matched against the Prodcom classification at 8-digit level (nationally often 9-digit).
- In only few cases even the most detailed codes will fully reflect the specific activity or product that is intended to be measured. Subsequently a share of the identified statistical entries has to be derived. The compilation of economic data, thus, needs to build on additional information that is used to estimate the shares of the relevant activities within the considered NACE divisions. Considering the heterogeneity of relations between the identified activities and corresponding NACE divisions, the estimation builds on various approaches, that can be considered in a hierarchy from more robust to more uncertain approaches:
  - Fully considered NACE codes
  - Fully considered Prodcom codes
  - Based on secondary statistics from Eurostat, allowing for dynamic adjustments by year and Member State (e.g., waste statistics or energy statistics)
  - Based on Use Tables, building on the supply relations to estimate the share of intermediate goods and services supplying core sector functions
  - Based on other secondary data sources, including other secondary statistics available for a few countries or few years only, findings in literature, proportionality assumptions, expert interviews, among other. In practice, this approach usually leads to a fixed share that is applied to all years and Member States.
- Following this procedure, the long list is narrowed down to a shortlist of activities that can be identified and delimited within the economic classification systems. The matching against the integrated system of economic classification should be clearly and transparently documented to allow for comparisons between studies of the same sector and with other sectors.

3. Data compilation

- The identified economic activities delineated by classification codes are used to compile the following data:
  - Output data can be derived from Eurostat's' Structural Business Statistics (SBS), Prodcom, as well as from National Accounts (NA) and may serve as a primary variable, from which other values can be calculated.
  - Exports and imports can be derived from Prodcom (Europroms) based on Comext.

- GVA is estimated by using the same shares as derived from output. GVA at factor costs can be derived from SBS.
- Employment should be measured in full-time equivalents (FTE). As respective data is not available from SBS and are often missing or are at a too highly aggregate level in NA, the figures on the number of persons employed must be converted into FTE based on coefficients derived from the Labour Force Survey (LFS).
- With regards to investments, the approach uses SBS data on "investment in tangible goods". Although more comprehensive concepts such as Gross fixed capital formation exist, the more detailed data availability on investment in tangible goods provides a more accurate reflection of the sector's investment activities.

Specific frameworks

Following this approach, three specific frameworks have been developed for Circular Economy, Climate Change Mitigation, and Climate Change Adaptation.

The sectors have been operationalised by the following definitions:

Sector	Definition applied for the delineation of economic activities	Identified economic activities
Circular Economy	The circular economy goods and services sector is a sub-set of the whole economy. Economic goods and services of the circular economy sector are those that maintain the value of products and materials as long as possible and minimise waste and resource use, thereby, closing or narrowing the [raw] material cycle.	Final list: 128 Longlist: 357
Climate Change Mitigation	The climate change mitigation sector is a sub-sector of the whole economy. Economic goods and services of the climate change mitigation sector are those that substantially reduce greenhouse gas emissions by source or from the atmosphere.	Final list: 137 Longlist: 334
Climate Change Adaptation	The climate change adaptation sector is a sub-sector of the whole economy. Economic goods and services of the climate change adaptation sector are those that moderate harm in natural or human systems in response to actual or expected climatic stimuli or their effects.	Final list: 112 Longlist: 184
Bioeconomy	The Bioeconomy Sector is a sub-set of the whole economy. Economic goods and services of the bioeconomy sector are those that produce, use, process, distribute or consume biological resources and those required for the production of biomass and bio-based goods. Examples include agriculture, forestry, fisheries and aquaculture; and all economic and industrial sectors that use biological resources to produce food, feed, biobased products, energy and services, and technologies for their production or generation.	Final list: 223 Longlist: 223

For the shortlist of activities (i.e. final lists) relevant shares have been estimated and variables calculated. Furthermore, the specific frameworks comprise a classification of the activities and an exploration of overlaps with the other two sectors considered as well as with EGSS and the EU taxonomy on Sustainable Finance. Further activities contained in the longlist of activities will be checked for operationalisation in the second project phase.

Data compilation and results

The above-described process for data compilation has been implemented in an automated data tool (see next section). The following tables present the results for the four sectors for selected years and the EU27_2020 aggregate level. The full dataset provided by the tool covers all EU Member States, EU aggregates and the years 2005-2021.

Results for EU27_2020:

Output in million EUR	2005	2010	2015	2021
Circular Economy (CE)	414.829	518.336	575.784	686.852
Climate Change Mitigation (CCM)	577.406	675.917	810.030	1.000.710
Climate Change Adaptation (CCA)	271.408	290.431	321.830	379.103
Bioeconomy (BE)	2.717.350	3.058.759	3.549.007	4.132.350

Persons Employed in FTE	2005	2010	2015	2021
Circular Economy (CE)	3.570.198	3.613.841	3.782.971	3.991.164
Climate Change Mitigation (CCM)	3.358.331	3.401.249	3.381.461	3.818.548
Climate Change Adaptation (CCA)	2.706.860	2.652.904	2.614.891	2.884.367
Bioeconomy (BE)	33.709.599	33.385.188	32.457.937	34.155.216

GVA in million EUR	2005	2010	2015	2021
Circular Economy (CE)	153.201	201.830	232.077	290.691
Climate Change Mitigation (CCM)	168.858	201.553	229.209	296.947
Climate Change Adaptation (CCA)	96.270	112.162	128.654	155.403
Bioeconomy (BE)	879.012	1.080.010	1.191.584	1.451.307

Exports in million EUR	2005	2010	2015	2021

Circular Economy (CE)	15.328	19.084	24.483	29.307
Climate Change Mitigation (CCM)	37.770	53.908	64.766	152.580
Climate Change Adaptation (CCA)	12.611	14.158	16.856	21.881
Bioeconomy (BE)	187.611	220.665	281.158	383.555

Imports in million EUR	2005	2010	2015	2021
Circular Economy (CE)	11.127	14.226	17.615	21.933
Climate Change Mitigation (CCM)	33.760	59.944	55.019	149.027
Climate Change Adaptation (CCA)	9.784	11.010	12.354	20.785
Bioeconomy (BE)	172.081	206.257	251.912	340.705

Investment in million EUR	2005	2010	2015	2021
Circular Economy (CE)	97.095	100.882	84.730	123.652
Climate Change Mitigation (CCM)	47.648	56.667	66.550	84.641
Climate Change Adaptation (CCA)	20.753	28.850	25.896	29.428
Bioeconomy (BE)	110.946	135.610	135.251	167.464

R tool for a fully automated compilation of the data

As part of the project, a tool for a fully automated compilation of the data has been developed using R-language. The tool allows regular updates of the dataset and provides the basis for a potential upload to Eurostat's database. It calculates the economic variables by EU Member States (MS) and economic activity. To this end, the tool automatically compiles all the information required from Eurostat sources.