

# **Integration of EGSS and EPEA in the form of a supply and use table**

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## **Introduction**

This paper presents the results of the exercise carried out between 2021 and 2023 in the project entitled “Framework for monetary environmental accounts and pilot accounts on environmental subsidies and transfers”, which was funded by Eurostat Grant. Our aim was to develop the monetary environmental accounts to be more connected to each other and improve coherence of the framework. One of the main tasks of the project was to investigate common features and differences on the environmental goods and services sector (EGSS) and the environmental protection expenditure accounts (EPEA). The accounts used follow Eurostat’s Environmental Accounts framework.

We decided to explore the integration between these accounts in the frame of a supply and use table. This supply and use table of environmental protection services and products (EP-SUT) gave us a tool to investigate data gaps and inconsistencies between these accounts. We also applied these results to a Sankey diagram which illustrates the flows of environmental protection activities in the whole economy.

## **The supply and use tables of environmental protection services and products**

Statistics Denmark introduced supply and use tables for environmental protection good and services in their grant project<sup>1</sup>. In our project similar table structure was used when compiling the EP-SUT. The figures are based on the EGSS, the EPEA and the national accounts supply and use tables. Year 2018 was selected as reference since it was the latest reported year at the beginning of the project. The EP-SUT did not hold information about resource management since the EPEA does not cover those which made it difficult to compile use of resource management activities.

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<sup>1</sup> Improve the quality and consistency of results in different modules in Environmental Accounts, in particular EPEA and EGSS. Technical report, February 2019. Statistics Denmark

The supply table for environmental protection goods and service was mainly produced with the EGSS figures. Output for public administration (NACE O) is complemented with the general government's output from the EPEA. Price components are estimated based on national accounts supply and use tables in industry (division) level. Total supply with the CEPA<sup>2</sup> breakdown is presented in Table 1.

Whereas the supply table was quite straight forward, the use table had more blank cells. In our example the official EPEA figures explained only 28% of the total use. We were able to add sewerage, waste management, and remediation activities for corporations outside of EPEA framework from the national accounts supply and use table. According to EGGS, about 9% of use was exports.

After inserting all information that was available about the use, the EGSS output was studied more detailed to find some supply that should have obvious use counterpart that was not included in the use table already. The most significant item identified was building sewerage systems which was included to gross fixed capital formation. Another big item was management of nuclear waste which was added to the consumption of energy industry. In addition, there were smaller miscellaneous construction items that were considered as intermediate consumption of construction industry, and small domestic output of electric busses was added to land transport industry. Lastly, changes in inventories were estimated from the national accounts supply and use tables but that had only minor effect on total use. Total supply with the CEPA breakdown is presented in Table 2.

Estimated total use was about 80% of the total supply which is significantly much more than the EPEA can explain by itself. It should be noted that the table is a mix of the Statistical Classification of Economic Activities (NACE) and Classification of Sectors. The tables were compiled so that transactions are recorded only once. For example, units in the public administration (NACE O) and the Government were recorded only once under either one.

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<sup>2</sup> Classification of environmental protection activities and expenditure (CEPA). More information: [https://ec.europa.eu/eurostat/web/metadata/classifications#Classification%20of%20environmental%20protection%20activities%20and%20expenditure%20\(CEPA\)](https://ec.europa.eu/eurostat/web/metadata/classifications#Classification%20of%20environmental%20protection%20activities%20and%20expenditure%20(CEPA))

Table 1. EP-SUT supply

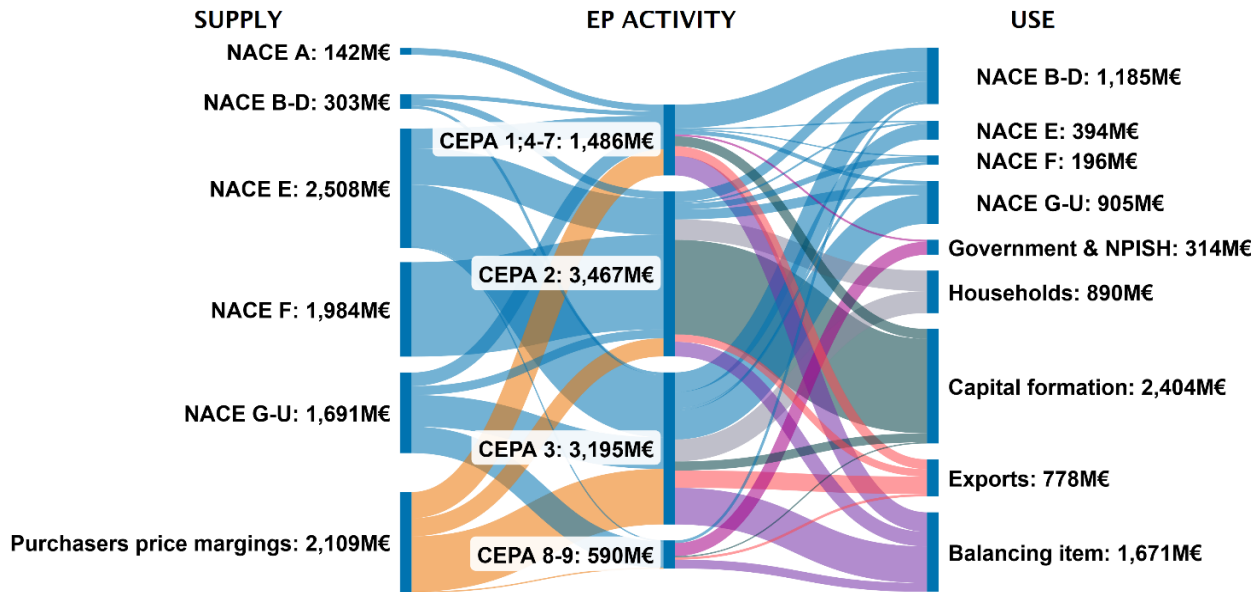
Supply table for EP goods and services 2018 (million €)															
million €	Output at basic (current) price														
	NACE A	NACE B	NACE C	NACE D	NACE E	NACE F	NACE G - I	NACE J - N	NACE O - Q	NACE R - U	Total output basic prices	Imports	Taxes less subsidies on environmental products	Trade and transport margins	Total supply purchasers' prices
CEPA 1			73		40			190	0		303	111	17	26	456
CEPA 2			153		763	1984		187			3087	110	226	44	3467
CEPA 3			60		1305			663			2028	699	91	376	3194
CEPA 4	142				60						202	38	3	34	276
CEPA 5			11						0		11	30	10	8	59
CEPA 6									2		2	0	0	0	2
CEPA 7			6		320				94		420	168	16	89	692
CEPA 8&9					20			243	299	13	575	12	3	0	590
<b>Total</b>	<b>142</b>	<b>0</b>	<b>303</b>	<b>0</b>	<b>2508</b>	<b>1984</b>	<b>0</b>	<b>1283</b>	<b>395</b>	<b>13</b>	<b>6628</b>	<b>1168</b>	<b>365</b>	<b>577</b>	<b>8737</b>
	based mostly on EGSS				based mostly on EPEA				based mostly on SUT						



## The Sankey diagram of environmental protection supply and use

To understand flows between supply and use tables better, the Sankey diagram was proceeded from the EP-SUT figures. See Graph 1.

Graph 1 The Sankey diagram of environmental protection supply and use 2018



In the Sankey diagram supply was linked to use via environmental protection activities. Graph 1 shows that a big share of wastewater activities (CEPA 2) accumulates capital formation. This is a consequence of building sewerage systems. The second largest environmental protection activity is waste management (CEPA 3) in which output is mainly used by NACE classified operators. In addition, waste management has the largest share of the balancing item. This means that there is a lot of supply for which the use could not be identified. Pollution abatement activities (CEPA 1; 4-7) are scattered widely between different operators in the economy. General government mainly uses other activities (CEPA 9) which are non-market output that is supplied by itself in NACE O. It should be noticed that the imports are included to purchaser price margins in the Graph 1.

## Data gaps and areas of development

All CEPA categories have unbalanced supply and use. The balancing items in Table 2 reveals that the biggest data gaps were in CEPA 2 (wastewater management) and CEPA 3 (waste management). In the project, the categories were analysed one by one to find out reasons for unbalanced supply and use.

In protection of ambient air and climate (CEPA 1) the conclusion was that missing use is mainly in industries outside the EPEA framework mandatory parts and, thus, outside our Finnish EPEA questionnaire. Potentially professional, scientific, and technical activities (NACE M) could be the industry that uses manufactured air protection appliances.

Although wastewater management (CEPA 2) had the second biggest imbalance between supply and use, EP-SUT gave lots of new information for the use. The gap to supply was relatively small in comparison with others when the size of the category was taken account. There are still some products that cannot be allocated to the use table because the limited coverage in the Finnish EPEA survey. The supply side should be fully covered.

Waste management (CEPA 3) had the largest imbalance in EP-SUT. Like with the CEPA 2 also here were some products and services that could not be allocated fully. Estimated exports and imports may contain waste or recycled materials that should not be included as these overestimates especially supply figures. Missing supply was not recognized.

Protection and remediation of soil, groundwater, and surface water (CEPA 4) has several areas of development. Most of the supply is coming from organic agricultural products which are totally missing on the use side. On the other hand, there were more used remediation services than supplied. At least some construction work is missing on the supply side.

Noise and vibration abatement (CEPA 5) is a small category. Scientific and technical activities, repair of motor vehicles and exports could have some unidentified transactions related to CEPA 5. It should be noted that multi-glazed windows were not included in noise abatement since those are mainly intended for heat savings in Finland.

Protection of biodiversity (CEPA 6) is the only category where we had more use than supply. All the supply was coming from the general government. There was some unrecognized use based on the Finnish EPEA survey. Nature parks and tourism which has been previously a part of resource management were not included in CEPA 6 figures.

Waste and monitoring of nuclear power plants were the main parts of protection against radiation (CEPA 7). Import figures are likely overestimated in the EP-SUT and reason for most of the imbalance between supply and use.

Environmental research and development (CEPA 8) and other environmental protection activities (CEPA 9) are bundled together. From the supply side, there is shortage in the scientific and technical activities. Use side is limited to the general government and industries that are included in the Finnish EPEA questionnaire.

Overall, same problems occurred in all the categories. On the use side, we did not have much knowledge about industries outside the EPEA questionnaire and all environmental protection products were not included in the EPEA. From the output perspective, it was difficult to recognize corporations working with these topics in scientific and technical activities since most of these corporations do other business as well. Import and export of the EP-SUT were estimated from the total figures of the certain industries, and we found that this might not match well with environmental protection products and services which leaves uncertainty to our figures. Similarly, purchaser's price margins were estimated from industry's totals which might have different portions than environmental protection products and services.

## **Conclusions**

Our exercise with the supply and use table of environmental protection services and products shows that the EGSS and the EPEA have a connection and those work well as counterparts. However, there

are some shortcomings, mainly caused by the narrower framework of the EPEA compared to the EGGS. Nevertheless, our conclusion is that the environmental accounts are suitable for supply and use table type of presentation. We believe that working with this type of table structure would ensure better integration between the accounts. One advantage, especially with the Sankey diagram, is that when all the information is in one picture, we avoid the illusion that environmental protection is taking place twice, which could happen with a separate account.

In order to account for all environmental protection expenditures, it should be objective for the EPEA to add the missing products. Extending the EPEA framework would make the whole environmental monetary accounts framework more coherent. It should also be examined how institutional sectors and the statistical classification of economic activities are combined in both accounts with a similar manner.

## References

Framework for monetary environmental accounts and pilot accounts on environmental subsidies and transfers, Final methodological report, February 2023, Statistics Finland

EGSS in Finland: <https://stat.fi/en/statistics/ylt>

EPEA in Finland: <https://stat.fi/en/statistics/ympsm>