

## **Documentation of statistics for Environmental Goods and Services 2023**

## **1 Introduction**

The statistics on environmental goods and services shows economy and employment related to market-based business activities within environmental protection and resource saving areas. The statistics contribute to the overall picture of what happens in the environmental field and is a part of the environmental accounts. First results covers 2012.

## **2 Statistical presentation**

Environmental goods and services (EGSS) is products with specific environmental or resource saving purposes (e.g. waste water management or production of windmills) as general products cleaner and/or more resource efficient than similar types. Freezers with low energy consumption and construction of low energy houses are examples. The statistics is part of the the Environmental-Economic Accounts for Denmark.

The statistics are designed to show results by 16 environmental and resource saving purposes and by type of industry. The activities are categorized in: Environmental specific services, connected goods and services and cleaner and resource efficient products.

### **2.1 Data description**

Environmental goods and services are products with specific environmental or resource saving purposes (e.g. waste water management or production of windmills) as general products cleaner and/or more resource efficient than similar types. Freezers with low energy consumption and construction of house with very low use of energy are examples.

The statistics is designed to show results broken down by 8 environmental protection areas and 8 resource saving areas. The kind of activities can be categorized in 3 sub-types: Environmental specific services, connected goods and services and cleaner and resource efficient products.

Non-market based environmental goods and services also exists, mainly as public services and as internal environmental costs in the enterprises. These elements are not in this statistic.

The products and services are as far as possible only counted in first stage of production cycle. Activities within transport and trade sector is not included.

Main indicators are turnover, export, value added and employment. However, other variables can be compiled as well.

Data for the statistics is collected for 2013, 2015, 2017, 2019 and 2021 by a survey targeting types of industry expected to partly produce environmental goods and services. For 9 types of industry (2-digit level) the needed data are (from 2017) derived or estimated from existing statistics. For 2021 the construction sector is again part of the survey, so the model based approach can be consolidated.

## 2.2 Classification system

The environmental goods and services are shown broken down on protective and resource saving activities.

For environmental protection the CEPA classification (Classification of Environmental Protection Activities) is used:

- Cepa 1: Protection of ambient air and climate.
- Cepa 2: Wastewater management.
- Cepa 3: Waste management.
- Cepa 4: Protection of soil, groundwater and surface water.
- Cepa 5: Noise and vibration abatement.
- Cepa 6: Protection of biodiversity and landscape.
- Cepa 7: Protection against radiation.
- Cepa 8: Environmental research and development.
- Cepa 9: Other Environmental protection activities.

In the data collection and dissemination CEPA 7 is reported under CEPA 9.

For resource saving / optimizing is used the CreMa classification (Classification of resource Management activities):

- CreMa 10: Management of water.
- CreMa 11: Management of forest areas (11a og 11b).
- CreMa 12: Management of wild flora and fauna.
- CreMa 13: Management of energy resources. **13A**: Production of energy from renewable resources. **13B**: Heat/energy saving and management. **13C**: Minimisation of use of fossile materials.
- CreMa 14: Management of minerals.
- CreMa 15: Research and development for ressource management.
- CreMa 16: Other ressource management activities.

CreMa 12 are not directly included in the statistics, as the market based activities in these fields are seen as insignificant. Activities may be recorded under CreMa 16.

In the future a recently new classification, Classification of Environmental Purposes, CEP, has to be used. It covers substantially the same activities, but they are reordered and the distinction between environmental protection and resource management is cancelled.

The main change is that more efficient use of materials now are merged under the group CEP 042: Materials recovery and savings, where previously reported under CreMa 11B, 13C and 14, respectively

## **2.3 Sector coverage**

The EGSS statistics covers the following NACE-groups:

- A Agriculture, forestry and fishing
- C Manufacturing (excluded specific types not expected to produce EGSS-products)
- D Electricity, gas, steam and air conditioning supply
- E Water supply, sewerage, waste management and remediation activities
- F Construction
- M Professional, scientific and technical activities - selected types of industry

## **2.4 Statistical concepts and definitions**

Annual Work Units as Employment Related to Environmental Goods and Services: Employment related to environmental goods and services in AWU.

Monetary Value of Export of Environmental Goods and Services: Export of environmental goods and services in mio. DKK.

Monetary Value of Turnover from Environmental Goods and Services: Turnover from environmental goods and services in mio. DKK.

Monetary Value for Value Added from Environmental Goods and Services: Value added from environmental goods and services.

## **2.5 Statistical unit**

The core units in the data collection and dissemination is the legal business units, grouped by type of industry. In few cases the economic unit is used. All units are in principle covered, independent of economic size.

## **2.6 Statistical population**

Includes business units in agriculture, manufacturing, energy supply, sewage and waste, construction and professional/scientific .

## **2.7 Reference area**

Denmark.

## **2.8 Time coverage**

2012 and forward

## **2.9 Base period**

Not relevant for these statistics.

## **2.10 Unit of measure**

Turnover, export and gross value added is shown in million DKK, current prices. Employment is shown in annual work units, AWU.

## **2.11 Reference period**

Calendar year.

## **2.12 Frequency of dissemination**

Annually.

## **2.13 Legal acts and other agreements**

Data used in the statistics is partly existing data, partly data collected specifically for this statistics. These data are collected according to the Law on Statistics Denmark, paragraph 8.

The EGSS-statistic and five other statistics (modules) are framed by regulation 691/2011. Further, implementing regulation 2015/2174 and 2022/125 are in force.

The regulation decides that first data on EGSS had to be submitted to Eurostat by the end of 2017 with 2015 as the first reference year, but 2014-results are obligatory as well. The early compilation in Denmark (from 2012) was partly due to a wish from governmental agencies to get information earlier than stipulated by the regulation.

## **2.14 Cost and burden**

DKK 100.000 for 2021.

## **2.15 Comment**

Please contact Statistics Denmark in case of further questions.

## **3 Statistical processing**

The data collection 2023 is based on a stratified sample of 1.700 business units out of in total 3,600 units with 10 employees or more in the relevant types of industries

In the complete statistics also estimates for smaller business units and compiled results from existing sources are included.

### 3.1 Source data

There are overall two sources for the statistics:

- A. A survey by questionnaire, where enterprises are asked about turnover in 2013, 2015, 2017, 2019, 2021 and 2023 from EGSS broken down by environmental purposes. About 1.700 units were selected in 2023 as a sample covering a population of about 6.100 business units in the respective types of industry. The selection is by stratified methods.

The stratification is by type of industry and by number of employees (10-19, 20-49 and 50+). In the last group the selection is 100 per cent of population. Within manufacturing a pre-selection is carried out according to a list of environmental goods type of goods (CN8). Within advisory service engineer firms are prioritized. In 2013 Enterprises in Nace\_rev2 38 and 39 was selected 100 per cent. from 2015 results for this sector is estimated from other statistics

- B. Existing data from Statistics Denmark or other agencies, which could be used, either directly or as source for estimation.

Both sources are linked to statistical data on employment, value added and export.

The *survey* covers the following types of industry: 13, 14, 16, 17, 18 (from 2015), 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 (from 2021), 33, 41+42+43 (only 2013, 2015 and 2021) , 71, 74

Results covering the units with less than 10 employees has been estimated by industry, using data from units with 10-19 employees.

*Existing data* is used for the following industries: 01, 02, 35, 37, 38+39 (from 2015), 41+42+43 (2017-2020, 2023), and 72

**Other statistical sources:** - Account statistics for agriculture - Forestry statistics - Account statistics, non-agricultural industries - Enterprise statistics - Employment statistics - External trade statistics - National account statistics - Sale and purchase, enterprises - Business register - Construction statistics

### 3.2 Frequency of data collection

Every second year. Latest regarding 2023.

For other years results for environmental goods and services is compiled by combining newest data collected and other statistics.

For the types of industry, where existing data is used, the data collection is annual or more frequent.

### 3.3 Data collection

The survey for EGGS is web-based, meaning that a web questionnaire has been developed. See the Danish version of the questionnaire:

[Spørgeskema 2023](#)

[Vejledning til indberetning 2023](#)

[Hjælpeliste til placering af grønne varer og tjenester](#)

The questionnaire has from 2015-collection been into three sections, addressing manufacturing, construction and knowledge based services, respectively. However, the construction sector was not included in the data collection for 2017, 2019 and 2023, but covered by model-based estimates.

### 3.4 Data validation

The validation of collected data are given high priority. This because the not very precise definition on environmental goods and services makes it difficult to formulate very clear questions in the survey. Further, with a bi-annual frequency, the understanding by the data providers may be weak.

Overall, 70-80 per cent of the received answers has been subject to validation. Main checks was:

- if the answers match information from web site and other sources about the production of the firm in relation to possible EGSS products.
- if the answers about activity match with the PRODCOM statistics information.
- if the distinction between specific and cleaner and resource efficient EGSS products has been fully understood.
- if the data about turnover match in size with statistics from last years (to check the measurement unit).
- if the answers are consistent with previous answers

About 2-300 enterprises has been contacted for clarification of data. In many cases the communication has led to an increase in figures related to EGSS, as the definition has not been fully understood in first stage.

The reported data from consulting engineers units has been compared to data collected for the specific statistics on services for this type of industry.

The non-reporting units have been checked for their importance. In few cases imputation based on available information has been the practical solution.

### 3.5 Data compilation

The consistency of the specific collected data is to the possible extend ensured through the validation.

In general, there has been no imputation needed. The final weighting is expected to adjust for non-response.

Totals are estimated by using the stratification and related weights for the sample.

**2023-compilation:** The collected data for 2023 are adjusted by turnover from the provisional

enterprise statistics 2023. Grossing has been done by using the provisional statistics on enterprises as the frame, meaning that original weights has been adjusted. Estimation for small units (below 10 employed) is based on 2023-results adjusted to provisional 2023-results for this strata.

**2022-compilation:** The collected data for 2021 are adjusted by turnover from the final enterprise statistics 2022. Grossing has been done by using the provisional statistics on enterprises as the frame, meaning that original weights has been adjusted. Estimation for small units (below 10 employed) is based on 2021-results adjusted to final 2022-results for this strata.

**2021-compilation:** The collected data for 2021 are adjusted by turnover from the final enterprise statistics 2021. Grossing has been done by using the provisional statistics on enterprises as frame, meaning that original weights has been adjusted. Estimation for small units (below 10 employed) is based on 2021-results adjusted to provisional 2021-results for the strata.

**2020-compilation:** The collected data for 2019 are adjusted by turnover from the provisional enterprise statistics 2020. Grossing has been done by using the provisional statistics on enterprises as frame, meaning that original weights has been adjusted. Estimation for small units (below 10 employed) is based on 2019-results adjusted to final 2020-results for the strata.

Compiling for previous years has followed similar procedures resulting in provisional and final results.

**Linking survey data to other statistics:** The survey data are merged to data on employment and GVA for the individual firm by using the unique business ID. Data for small units has been merged at strata-level.

**Value added:** Value added 2012-2022 is based on Account statistics, by using the green share of turnover as proxy for share of value added. Value added 2023 is preliminary based on provisional enterprise statistic.

**Employment:** Employment 2012-2022 is based on Account statistics by using the green share of turnover as proxy for share of employment. Employment 2023 is preliminary based on provisional enterprise statistic. For small units the employment 2021 has been adjusted to try to include the owner under employment.

**Export:** Export values of *goods* is for 2012-2021 is based on registers, where production data and export data is merged at enterprise level. However, the merging cannot be perfect as exporting unit are sometimes different from the producing unit, which may induce some noise in the overall picture. The Export is calculated by using the green share of turnover as proxy for EGSS-share of export. For 2022 and 2023 the export are provisional and based on "raw" export results. Export values for *\*services* is compiled using the same model as for goods.

Existing statistics used for for EGSS in certain types of industry are listed below. Results are in most cases provisional for latest year in question.

**Agriculture:** The results from Farm account statistics on organic holdings has been used for compiling turnover,, value added and employment. Export value is a sub-selection from Statistic results on trade with organic product as only primary goods are selected. The activity under agriculture is allocated to the environmental purpose: *Protection of soil and water*.

**Forestry:** The results from gross output calculation on primary wood production are used together with National Account statistics to compile turnover, employment and value added from wood production in certified forest. Export value are not compiled as expected to be insignificant .The activity under forestry is allocated to the environmental purpose: *Management of forest resources*.

**Fishery and aquaculture** Turnover, value added and employment is based on data from account



statistics on fisheries and Aquaculture for organic producers. Export is estimated to 40 per cent of the turnover. As regards the environmental purposes, the results are equally distributed to *Protection of soil and water*.

**Energy Supply:** The activities in NACE 35.10.00, 35.21.00 and 35.30.00 includes energy products from renewables. Statistics Denmark compile economic data for the types of activity. From the statistics on energy production (From Danish Energy Agency) the share of renewables can be compiled and used to estimate of share of turnover, value added etc. A share of export of electricity is compiled using the share of renewables in electricity production. The activity relates to environmental purpose *Production of energy from renewable sources*.

**Collection and treatment of waste water:** Data for this type of industry is already compiled by Statistics Denmark and can directly be used for EGSS compilation. The activities relates to the purpose *Wastewater management*.

**Collection and treatment of waste** Data for this type of industry is already compiled by Statistics Denmark and are, using results for 2013-collection, distributed to environmental purposes, mainly "Treatment of waste". The break-down keys has been adjusted more times, in the light of increased reuse.

**Construction.** Using statistics covering the construction sector and information on environmental and resource saving activities in construction, the turnover 2017 - 2020 of EGSS in construction has been estimated, partly based on 2016-results. Further information on the sources and the compilation can be provided by the contact person. Employment and value added is compiled by combining the EGSS-turnover and the Account statistics. Previously, and again in 2021, the construction sector was part of direct data collection for EGSS. For 2023 the figures are based on estimations using 2022-results as baseline.

**Research and development:** By use of the R&D register and the variables *research in energy* and *environmental research* turnover and employment can be estimated for the EGSS. The value added is estimated based on Account statistics. Export is based on value of export and is the EGSS-share of exports from units in type of industry NACE 72. The estimates build upon several assumptions, which have to be noted when using of data.

**Other technical business service:** The results 2019-2020 are figures from 2018 adjusted by use of statistics for organic production and Account statistics. The main business type is agricultural advisory service. In 2021 the type of industry is again included in the survey

### 3.6 Adjustment

No further adjustment than mentioned under Data compilation has been made.

## 4 Relevance

The data users are mainly public authorities working with environment, resources and business activities and international goals in these areas, including the SDG's from 2015. Associations in the same fields are interested as well. The level of satisfaction has not yet been measured.

#### **4.1 User Needs**

Information about business activities related to environmental and resource purposes is highly requested, in order to show the importance for the business sector in this field. Statistics on environmental goods and services (EGSS) has the aim to provide such information and was established in cooperation with governmental agencies in these fields. The development in the green activities is followed by governmental agencies.

#### **4.2 User Satisfaction**

Not yet measured.

The members of relevant fora for dialogue about the statistics has been informed and involved.

#### **4.3 Data completeness rate**

The dissemination for 2012 to 2014 got further than requested in the EU-regulation. This was due to domestic interests. Since only requirements in the regulation has been met.

Only results for market-based activities is included in the results are published in DK. EGSS in the public sector can indirectly be found in the statistics on the public sectors spending on environmental sector.

In the deliveries to Eurostat a total including non-market activities by industry is submitted next to the market-based values

### **5 Accuracy and reliability**

There are several sources of errors, which are considered to induce uncertainty to the results for environmental goods and service. In particular, this is due to the level of clarity of definitions on EGSS. This size of this problem has been reduced by very intensive validation of data.

Errors exist mainly in the special surveyed data. In particular the result regarding firms with less than 10 employees have significant errors due to estimation methods.

#### **5.1 Overall accuracy**

Compiled on total turnover for EGSS, the error is expected to be plus/minus 10-15 billion DKK (related to a level for output at 250 billion DKK). The main part of the total error are considered to be due to measurement errors.

For value added, employment and export, the errors are of at least same size, relatively, as data are linked.

There is no knowledge if the results are over- or underestimating the "true" value.

## **5.2 Sampling error**

The variance (CV) on the total estimate for turnover of EGSS in the surveyed types of industries is calculated to about 1,5 per cent. Its correspond to an error on 3 billion DKK, as the turnover in the subpopulation is 200 billion DKK.

For the single types of industries the error is higher, relatively. The typical variation is about 10 per cent.

On smaller units (less than 50 employees) the error is about 10 per cent. For larger holdings about 1,5 per cent.

## **5.3 Non-sampling error**

The errors from other reasons than sample survey is measurement errors. It is difficult exactly to assess if a good or service is part of EGSS or not.

What matters other variables than turnover, the assumption is, that an EGSS share of turnover also reflects the EGSS share of export, value added and employment. Furthermore, it is assumed that 2013-data also could be used for 2012 and 2014 compilation - 2015 data for 2016 compilation, 2017-data for 2018-compilation, 2019-data for 2020-compilation and 2021 data for 2022 compilation.

The results for export is underestimating the real level, due to problems to connect data on production and export. It is assessed, that the und

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n 10 per cent.

## **5.4 Quality management**

Statistics Denmark follows the recommendations on organisation and management of quality given in the Code of Practice for European Statistics (CoP) and the implementation guidelines given in the Quality Assurance Framework of the European Statistical System (QAF). A Working Group on Quality and a central quality assurance function have been established to continuously carry through control of products and processes.

## **5.5 Quality assurance**

Statistics Denmark follows the principles in the Code of Practice for European Statistics (CoP) and uses the Quality Assurance Framework of the European Statistical System (QAF) for the implementation of the principles. This involves continuous decentralized and central control of products and processes based on documentation following international standards. The central quality assurance function reports to the Working Group on Quality. Reports include suggestions for improvement that are assessed, decided and subsequently implemented.

## **5.6 Quality assessment**

There are several sources of errors, which are considered to induce uncertainty to the results for environmental goods and service. In particular, this is due to the level of clarity of definitions on EGSS. This size of this problem has been reduced by very intensive validation of data.

In particular service in EGSS can be difficult to estimate, as EGSS services often is a part of a comprehensive process. Isolation of buildings is most often part of repair or construction and the time spend on the EGS is not easy to estimate. Further, advisory service also contains elements of EGSS, but difficult to distinguish between EGSS and non-EGSS.

EGSS-data from existing statistical sources is considered to be of good quality. Is is difficult to access the quality of the estimated figures (since 2017) for the construction sector.

## **5.7 Data revision - policy**

Statistics Denmark revises published figures in accordance with the [Revision Policy for Statistics Denmark](#). The common procedures and principles of the Revision Policy are for some statistics supplemented by a specific revision practice.

## **5.8 Data revision practice**

There have no been recent revision as regards turnover, employment and value added. Provisional results are updated to final figures in the consecutive year.

The export results for 2012-2014 has been revised, due to revisions in the original results.

## **6 Timeliness and punctuality**

First data release about 11 month after end of reference year.

### **6.1 Timeliness and time lag - final results**

Results are published October or November after end of reference year. Results for 2022 were published November 27, 2023, together with consolidated data on 2021. Results for 2023 were published November 22, 2024, together with consolidated data on 2022.

Final/consolidated figures 2023 will be published in November 2025 - together with provisional data for 2024

### **6.2 Punctuality**

The first six releases (2013 until 2018)- kept the deadlines.

In later years some delays caused by later results for the provisional account statistics.

## **7 Comparability**

The statistics exist for 2012 to 2023. Results for these years can be compared, taken in consideration that results 2012-2014 on construction and knowledge service most probably were underestimated.

In principle the results for Denmark can be compared with results from other EU-countries, but different compiling methods may affect the conclusions.

### **7.1 Comparability - geographical**

The statistics are in line with the Eurostat guidelines. Different methods by country may have impact on the comparability.

[Manual environmental goods and services.](#)

Results for more countries are available in Eurostat database (<https://ec.europa.eu/eurostat/>)

In November 2015 a News release with international comparisons were produced.

[Danmark i top-3 med grønne varer og tjenester](#)

In the publication Green National Accounts 2015-16, comparisons also can be found.

### **7.2 Comparability over time**

The statistics for 2012, 2013, 2014 is comparable at output level. Regarding 2015 -2023 , the higher values (compared to 2012-14) for construction and knowledge based service is partly due to improved questionnaire. Regarding the purposes, the improved questionnaire meant in particular higher values for waste water management.

Enterprises in type of industry NACE 18xxxx was not surveyed until 2015. Data for previous years has not been estimated. Enterprises in type of industry NACE 31xxxx was not surveyed until 2020. Data for previous years has not been estimated.

Regarding the environmental purposes, in particular "Management of waste water" has been affected by the differentiated questionnaire used from 2015.

### **7.3 Coherence - cross domain**

The EGSS statistics is using similar grouping and classifications as other business statistics. Final results will be consistent with The Accounts Statistics.

The classifications used for environmental protection is also these used in (other) environmental statistics, in example Environmental Protection Expenditure Accounts (EPEA)

### **7.4 Coherence - internal**

Data are consistent. However, there are changes on which types of industry is surveyed.

## **8 Accessibility and clarity**

The main variables are published in Statistical News and in the <http://www.statbank.dk>.

For a broader description, publications was produced in 2015.

It is possible to link data on EGSS with data on in example research, education and salaries.

More information can be found under the subject: [Environmental-economic accounts](#).

### **8.1 Release calendar**

The publication date appears in the release calendar. The date is confirmed in the weeks before.

### **8.3 User access**

Statistics are always published at 8:00 a.m. at the day announced in the release calendar. No one outside of Statistics Denmark can access the statistics before they are published.

### **8.2 Release calendar access**

The Release Calendar can be accessed on our English website: [Release Calendar](#).

### **8.4 News release**

See Statistical NEWS on EGSS: [Grønne varer og tjenester for 165 milliarder](#) and

Statistical NEWS on EGSS: [59.000 grønne arbejdspladser](#)

Statistical NEWS on EGSS: [Danmark i top-3 med grønne varer og tjenester](#)

Statistical NEWS on EGSS: [Mange erhverv bidrager til grøn omstilling](#)

Statistical NEWS on EGSS: [Produktion inden for grøn energi stiger](#)

Statistical NEWS on EGSS: [Stigende eksport af grønne varer og tjenester](#)

Statistical NEWS on EGSS 2018: [Flere grønne varer og tjenester, men ikke i 2018](#)

Statistical NEWS on EGSS 2019: [Vækst i ressourcebesparende aktiviteter](#)

Statistical NEWS on EGSS 2020: [COVID-19 gav lille knæk i grøn industriproduktion](#)

Statistical NEWS on EGSS 2021: [Stigning i genanvendelse og materialebesparelser](#)

Statistical NEWS on EGSS 2022: [Øget grøn omsætning - dog ikke i vindindustrien](#)

### **8.5 Publications**

Publications has been produced in 2015 (in Danish): [Grønne varer og tjenester 2013](#), and [Grønne varer og tjenester 2014](#).

## 8.6 On-line database

- Environmental Goods and Services by environmental purpose: [GRON1](#)
- Environmental Goods and Services by environmental purpose: [GRON1A](#) (new classification)
- Environmental Goods and Services by type of industry: [GRON2](#)

## 8.7 Micro-data access

Access to Micro-data 2013, 2015, 2017, 2019 and 2021 is possible via the Research service unit. Please be aware of the high level of insecurity in the collected data when used.

## 8.8 Other

Access to data is provided in line with Statistic Denmark's policies.

## 8.9 Confidentiality - policy

The general policy in Statistics Denmark on data confidentiality applies: [Data Confidentiality Policy at Statistics Denmark](#).

## 8.10 Confidentiality - data treatment

In the compiling of results, groups are merged to ensure that the confidentiality rules are followed.

## 8.11 Documentation on methodology

Eurostats manual on environmental goods and services: [Manual](#)

## 8.12 Quality documentation

Results from the quality evaluation of products and selected processes are available in detail for each statistics and in summary reports for the Working Group on Quality.

## 9 Contact

The administrative placement of these statistics is in the division of Science, Technology and Culture, Business Statistics. The contact person is Ole Olsen, tel.: + 45 2977 1498, and e-mail: [OLO@dst.dk](mailto:OLO@dst.dk).