INSTITUTO NACIONAL DE ESTADISTICA

Survey on Industry Expenditure on Environmental Protection.

Year 2017

Methodology

Madrid, July 2019

Index

1 Introduction

Human activities and mainly economic activities affect the environment, which provokes a degradation of its quality. As a result, the services provided by the environment are also diminished, especially for future generations. This can also have indirect effects on health.

Since the society is becoming increasingly aware of the effects that economic development has on the environment and natural resources, the establishment of environmental policies that ensure a high degree of protection is needed. The formulation of these policies, at both a national and an international level, leads to the problem of establishing systems for information, assessment and gross accounting of the economic aspects of the environment.

Within the whole of environmental statistics, the INE has conducted the **Survey on Industry Expenditure on Environmental Protection** for the purpose of measuring both the expenses made in order to avoid or reduce the pollution resulting from the development of its activity, and the waste generated by industrial establishments.

These statistics are included in the National Statistical Plan 2017-2020, with code 7097 Statistics on Activities for Environmental Protection[1].

2 Objectives

The main objective of the survey is to assess the expenditure on environmental protection made by establishments in the industrial sector, both current expenses and investments, to reduce or eliminate air pollution emissions, noise pollution, to improve wastewater treatment and the treatment of solid waste generated and to use less-contaminating raw materials or in less quantity.

The fundamental variable for the survey, **investment**, is broken down by environmental sphere for both types of existing equipment, "end-of-pipe" equipment and integrated equipment.

The survey allows for compliance with the terms envisaged in Regulation (EC) No 295/2008 of the European Parliament and of the Council, concerning structural business statistics, which also entails being able to establish international benchmarking.

The survey also provides basic information to compile the **Environmental Protection Expenditure Accounts (EPEA),** which are compiled according to the methodology of the Statistical Office of the European Communities (Eurostat), in the section related to producers of environmental protection ancillary services (for self-consumption).

The information supplied by this survey is used to compile representative synthesis indicators that facilitate the interpretation of the results.

[1] In the National Statistics Plan 2009-2012, the survey bore the statistical operation number 5720.

3 Survey units

The basic survey unit is the industrial establishment, understanding this to be "any productive unit located in a topographically delineated place (workshop, mine, factory, etc.), from which economic activities are carried out through the work of one or several persons from the same legal entity and whose main activity is included in sections B, C and D of the National Classification of Economic Activities (CNAE-2009)".

In the scheme of survey units, the company adopts the role of respondent unit, while the observation unit, that to which the data requested in the questionnaire refer, is always the industrial establishment. This facilitates the objective of offering data on a regional level.

4 Scope of the survey

4.1 POPULATION SCOPE

The target population is the group of industrial establishments, with more than 10 remunerated employees, whose main activity is included in sections B, C or D of the National Classification of Economic Activities (CNAE-2009). That is to say, the survey researches all establishments in the industrial sector, excluding the activities from section E, given that these are researched comprehensively in the Survey on the Supply and Treatment of Water, and in the Survey on Waste Collection and Treatment.

The main activity is the activity that generates the greatest added value. If this information is not available, the survey will use the activity that generates the greatest production value, or, in its absence, that which requires the greatest number of employees.

4.2 TERRITORIAL OR GEOGRAPHICAL SCOPE

From a geographical point of view, the survey covers the whole of the national territory.

For statistical use, and by means of regionalisation techniques, the survey allows for the limited presentation of some results aggregated by Autonomous Community. This aspect is of great importance for regional study and economic analysis.

4.3 TIME SCOPE

This survey is continuous and annual. Regarding the information reference period, the requested data refer to the calendar year when the survey is carried out.

5 Sample design

5.1 TYPE OF SAMPLING

As a reference framework, the survey uses:

-The INE Central Companies Directory (CCD) for divisions 05 to 09 of the National Classification of Economic Activities (CNAE-2009)

-The Annual Industrial Products Survey (AIPS-08) for activities 10 to 35 of the CNAE-2009.

The CCD is a register that assigns and classifies statistical units by main economic activity, according to the National Classification of Economic Activities (CNAE-2009) and by size as defined by the number of employees.

In order to select the sample of establishments to be surveyed, a stratified sampling has been used, in which each stratum is defined according to the following 3 variables:

- **Economic activity**: economic activity at the 2-digit level of the CNAE 2009 (except in special cases) for sections B, C and D (divisions 05-35).

- **Number of employed persons**: this variable is the grouping of certain sizes of establishments according to the number of employed persons. The sizes are as follows:

Size	Employed persons
1	10-19
2	20-49
3	50-99
4	100-199
5	200 and over

- **Region**: the Autonomous Communities are grouped in two regions in the following manner:

Region 1: Andalucía, Castilla y León, Cataluña, Comunitat Valenciana, Galicia, Comunidad de Madrid and País Vasco.

Region 2: the remaining Autonomous Communities.

Note: It has been necessary to design independent samples for the different divisions and groupings of Autonomous Communities (Regions 1 and 2).

5.2 SIZE OF THE SAMPLE

In terms of the divisions in which a stratified sampling has been performed, the sample units have been selected in each of the strata via a systematic random start sampling so that the units obtained are representative, by economic activity and size, with an allocation that is approximately proportional by Autonomous

Community, for the purpose of enabling, in as far as possible, the application of model-assisted estimations in order to regionalise a limited number of aggregates, given the scarce sample size at this geographical level.

The chart below relates the number of units selected in reference year, within each stratum, for the sections considered:

DISTRIBUTION OF THE SAMPLE. UNITS

Activity	Size	Region 1	Region 2	Type of selection	Total
SECTION B		98	48	Exhaustive*	146
SECTION C	14	1118	638	Sample	1756
	15	1396	731	Sample	2127
	16	875	438	Sample	1313
	17	772	315	Sample	1087
	18+	776	268	Exhaustive	1044
SECTION D		78	46	Exhaustive	124
Total		**5113**	**2484**		**7597**

5.3 ESTIMATORS

Unbiased expansion estimators have been used in the stratified sampling.

"Y" estimators are as follows

$$\hat{Y} = \sum_{h} \hat{y}_h = \sum_{h} (\sum_{i,}^{n_h^*} y_{ih} w_h + \sum_{k \neq h} \sum_{j}^{n_k^h} y_{jk} w_k^{'}); \text{ with } w_h = \frac{\hat{N}_h^*}{n_h^*}; w_k^{'} = \frac{N_k}{n_k}; \text{ (1)}$$

where the first sum includes the i units (establishment, operation, etc.) of the effective sample n_h^* in stratum h, which has not changed stratum, and the second sum is extended to all of the units n_k^h that have changed from stratum k to stratum h.

$\hat{N}_h^*$ refers to the total estimator of the stratum provided by the design, corrected for the proportion of units of the theoretical sample of stratum h, which changes to another stratum, and of inactive time units (in) and duplicates (d) estimated, by the proportion of the theoretical sample in the stratum that presents each incidence. In other words,

$$\hat{N}_h^* = N_h (1 - \frac{d + in}{n_h} - \sum_{k \neq h} \frac{n_h^k}{n_h}) \text{ (2)}$$

n_h^* represents the effective sample in stratum h.

Note: These values without * refer to the theoretical design factors.

6 Variables and definitions

For a better understanding and interpretation of the tables of results presented on the website, the main variables and concepts included in the survey are defined hereunder.

Specific definitions on environmental protection have been taken from the **SERIEE manual (European System for the Collection of Economic Information on the Environment),** developed by Eurostat.

ENVIRONMENTAL PROTECTION

Environmental protection mainly aims to prevent, reduce or eliminate pollutants and pollution or any other degradation of the environment. This excludes all activities that, having a beneficial effect on the environment, respond mainly to the technical, hygienic or safety needs of the company.

Some of the activities that environmental protection envisages are services that measure and control pollution, the collection and elimination of waste, wastewater management, the protection and decontamination of land, ground and surface waters, noise and vibration abatement, research and development activities related with the environment, as well as other types of activities: training, educational, administrative, etc.

A classification of environmental protection activities (**CEPA**) is available for the different environmental areas, which is jointly compiled by Eurostat and the United Nationals Economic Commission for Europe (EEC).

This classification can be found on the INE website along with this methodology.

CURRENT EXPENDITURE

Current expenditure on environmental protection includes those operating expenses charged to the profit and loss account of the General Accounting Plan, whose main objective is the prevention, reduction, treatment or elimination of the pollution or any other degrading of the environment arising as a result of the activity of the establishment.

It fundamentally comprises the following expenses:

- Payments to other companies for purchases of environmental protection services.
- Payments to the Public Administrations as fees (not including taxes or unrequited payments).
- Expenses associated with the equipment used (repairs, energy consumption and consumption of raw materials).

- Other expenses related to environmental protection, such as personnel employed in environmental protection activities, expenses on R&D activities related to the environment, expenses on personnel training, etc.

INVESTMENT

Investment is defined as the capital resources acquired to be used in the productive process for more than one year, purchases of capital goods or intangible assets carried out by the company during the reference year.

Investment goods are valued at acquisition prices, including transportation and installation charges and non-deductible taxes, and excluding deductible VAT. The tasks performed by the company using their own resources considered to be for investment, are valued at spot price, and leasing at the cash prices of the acquired goods.

INDEPENDENT EQUIPMENT OR FACILITIES

Also known as end-of-pipe or non-integrated technologies. This equipment works independently in the production process and its main purpose is to reduce the release of pollutants generated during said process (treatment of pollution). To evaluate the investment expenditure for this type of equipment, it is necessary to consider the purchase price of the equipment, major repairs on pre-existing equipment and/or the cost of the construction of the facility undertaken by the company itself, including - if applicable – those costs relating to the design, assembly of the equipment and purchase of the land for the location of the facility.

INTEGRATED EQUIPMENT AND FACILITIES

This equipment has a dual purpose, industrial and pollution control. The main goal is to reduce the release of pollutants generated during the production process (prevention of pollution). These may result from the modification of pre-existing equipment or facilities or from the acquisition of new equipment or facilities that perform said dual purpose. In the first case, the amount considered is the cost of the modification. As regards the purchase of new equipment or facilities, only the additional cost related to pollution control is considered.

7 Collection of the information

7.1 QUESTIONNAIRE

There is a single questionnaire. The respondent unit must fill in each section with the current and investment expenditure dedicated **exclusively** to performing environmental protection activities.

The different amounts may be entered into each of the environmental sections considered in the questionnaire.

7.2 ORGANISATION OF FIELD WORK

The information was collected via the postal questionnaire and telephone support procedure. Respondents were also informed of the possibility of completion via the Internet and fax.

The questionnaire was sent to all companies in the sample. In addition to the questionnaire, respondent units also received a list of possible end-of-pipe and integrated technologies for each of the environmental domains. This list has been included as an annex to this publication.

For a better collection of the data, companies that have not returned the questionnaire within the established deadline by post are telephoned in order to provide assistance if necessary, and request the pending information, in order to obtain the completed questionnaire. Measures such as the updating of the directory, and the control and revision of the questionnaires, are also carried out.

7.3 COMPUTERIZED TREATMENT OF THE SAMPLE FILE

A special computer program was used both for monitoring the collection and updating the data on the respondent companies. This guarantees the control and organisation of the whole process. This system permits the data to be examined and updated. The information is collected and filtered at the same time. This guarantees an efficient control over the process from the beginning of the survey, since systematic errors when completing the questionnaires can be detected rapidly in the initial stages, which facilitates their correction.

8 Processing the information

The initial stage of the survey information processing coincides with the fieldwork and is carried out in parallel to data collection, while this is taking place.

The main purpose is to establish appropriate quality levels that facilitate a correct and adequate recording of the questionnaires and significantly simplify the subsequent processing of information. The recording of questionnaires is carried out establishing the control measures required to guarantee an adequate quality level throughout the whole process. By doing so, the process attempts to limit errors that appear in this stage that could affect the quality of the information given by the respondent units.

Once questionnaires are recorded and the information is available on magnetic support, the information is analysed in order to detect possible duplicated data or coverage errors. A first assessment of the quality of variables obtained from the questionnaires is carried out at the same time. This stage is performed for each

economic sector and its implementation is previous to the creation of the survey file and thus, to the whole treatment of information.

Once the survey file is created, inconsistencies and errors are detected and corrected for every identification variable. Subsequently, several stages of filtering and imputation of content errors are carried out. When all filtering stages are finished, analysis tables are obtained in order to detect and eliminate errors or inconsistencies and to compare the results with those from other sources of information.

9 Dissemination of results

The data disseminated intends to offer basic and relevant information on the main results of the survey, which enables meeting the demand for information by its different users.

Data is provided on both a national level and broken down by Autonomous Community.[1]

It is important to point out, lastly, that the dissemination of the survey is not solely limited to the tables offered here or covered in the publication. Safeguarding the restrictions derived from statistical secrecy, or from the sample nature of the survey, the existing IT procedures enable dealing with personalised requests for aggregated data, which may be provided in the medium or format chosen by the ser.

[1] Results for the Autonomous Cities of Ceuta and Melilla are not published to maintain statistical secrecy.