An Phríomh-Oifig Staidrimh
Central Statistics Office

Standard SIMS Report:

Environment Taxes

Single Integrated Metadata Structure (SIMS) Report

For

Environment Taxes

This documentation applies to the reporting period:
2021

Last edited: 08.07.2022

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1. Introduction

Environmental Accounts is a satellite account within the European System of Accounts (ESA), a satellite account provides additional information on selected areas of specific interest. Environment taxes are a subdivision within Environmental Accounts concerned with estimating the amount of environment taxes paid annually by households and industries in the state. Environment taxes are compiled under EU Regulation (EU) 691/2011 and its amendments EU Regulation (EU) 538/2014 and (EU)2022/125. The official estimates of environment taxes for Ireland covering the years 2012 to 2021 are published in 2022 in this release. The principal environment tax statistics made available in this release relate to annual total taxes paid when Energy, Transport, Pollution or (natural) Resources are used in the state.

For national economic purposes this shows where the tax burden falls and how that burden changes over time. It also ensures that Ireland's classification of environment taxes is comparable with those of other EU member states. Accordingly, this information is particularly useful for informing policy on sustainable development goals and the green economy both nationally and at the EU level and more generally for monitoring developments in the wider economy.

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3. Metadata Update

3.1. Metadata last certified

04/10/2021

3.2. Metadata last posted

08/10/2021

3.3. Metadata last update

04/10/2021

4. Statistical Presentation

4.1. Data Description

Data presents environmental tax revenue (by tax category - energy, transport, pollution and resource taxes) broken down by economic activity (taxpayer), using the NACE classification for production activities extended to cover taxes payable by households and non-residents.

An environment tax is defined by the regulation as: “A tax whose tax base is a physical unit (or a proxy of a physical unit) of something that has a proven, specific negative impact on the environment, and which is identified in the European System of Accounts as a tax.” In Ireland the source for environment tax data is the National Tax List (NTL) compiled for National Accounts. Using the definition certain taxes in the NTL are classified as environment taxes. Using a variety of data sources overall environment tax amounts are allocated to households and industries, with the industry amount further distributed across NACE Revision Rev. 2 sectors at 2-digit (division) level – NACE Rev. 2 is the Statistical Classification of Economic Activity in the European Communities.

All data sources are aggregate data.

4.2. Classification System

Environmental tax revenue is broken down by:
A. type of environmental tax,
B. sector/industry of taxpayer

A. Classification according to type of environmental tax

For analytical purposes, the environmental taxes are divided into four categories:
1. energy taxes (including CO2 taxes),
2. transport taxes,
3. pollution taxes,
4. resource taxes (excluding taxes on oil and gas extraction).

B. Environmental taxes by economic activity

Environmental tax revenues are allocated to the different taxpayers:
• by economic activity according to the statistical classification of economic activities in the European Community (NACE Rev.2)
• households as consumers
• non-residents
• not allocated (impossible to be allocated to one of the categories mentioned above)

4.3. Sector Coverage

Environmental taxes by economic activity data covers taxes payable by all sectors of the economy: producers (economic activities by NACE), households as consumers as well as non-residents.

All NACE Rev.2 sectors are covered grouped as follows:

Abbreviated Titles	Full Titles
Agriculture, forestry and fishing (01-03)	**Agriculture, forestry and fishing (01-03)**
Industry (05-43)	**Industry (05-43)**
Mining and quarrying (05-09)	Mining and quarrying (05-09)
Food, beverages and tobacco (10-12)	Food, beverages and tobacco products (10-12)
Textiles and pharmaceuticals (13-21)	Textiles, wood, leather, petroleum, chemical and pharmaceutical products (13-21)
Plastic and non-metallic minerals (22-23)	Rubber, plastic and non-metallic mineral products (22-23)
Metals, machinery and equipment (24-33)	Metals, computers, electronic, electrical, machinery and equipment, transport and other manufacturing, repair and installation (24-33)

Electricity and gas (35)	Electricity, gas, steam and air conditioning supply (35)
Water and Waste (36-39)	Water collection/treatment/supply, sewerage, waste collection, treatment, disposal, materials recovery, remediation and other waste management (36-39)
Construction (41-43)	Construction (41-43)
Services (45-96)	**Services (45-96)**
Wholesale and retail trade (45-47)	Wholesale and retail trade including motor vehicles and their repair (45-47)
Transport, postal and warehousing (49-53)	Transport, postal, courier activities including warehousing and support (49-53)
Accommodation and food (55-56)	Accommodation; food and beverage service activities (55-56)
Information and computing (62-63)	Computer programming, consultancy, information services activities (62-63)
Rental and leasing (77)	Rental and leasing (77)
Public administration (84)	Public administration and defence; compulsory social security (84)
Other Services (58-61, 64-66, 68-75, 78-82, 85-88, 90-96)	Other Services (58-61, 64-66, 68-75, 78-82, 85-88, 90-96)

4.4. Statistical Concepts and definitions

Environmental tax statistics are part of European environmental economic accounts, which constitute satellite accounts to national accounts. Thus, environmental tax statistics follows ESA2010 definition of 'taxes'. Consequently, only payments that are identified as taxes in the national accounts can be reported as environmental taxes whereas other types of payments to government are not excluded from the scope of the data collection. Compliance with the tax definition of the national accounts improves international comparability of the statistics, and is in line with the guidance, concepts and definitions of the System of environmental and economic accounting (SEEA).

An environment tax is defined by Regulation (EU) 691/2011 as: "A tax whose tax base is a physical unit (or a proxy of a physical unit) of something that has a proven, specific negative impact on the environment, and which is identified in ESA as a tax."

- **Energy taxes (including fuel for transport**): This category includes taxes on energy production and energy products, including taxes on fuels for transport and stationary purposes. By definition Carbon taxes are included as an Energy tax rather than a Pollution tax, largely to aid international comparability. In Ireland's case, taxes on transport fuels make up the bulk of energy taxes.

- **Transport taxes:** This category includes taxes related to the ownership and use of motor vehicles. In Ireland this mainly relates to Vehicle Registration Tax (VRT) and Motor tax.

- **Pollution taxes**: This category includes taxes levied on emissions to air and water, management of solid waste and noise. Carbon taxes are not included in this category.

- **Resource taxes: Included** are taxes linked to the extraction or use of natural resources. Taxes on land are generally not included, nor are taxes designed to capture the resource rent from the extraction of natural resources.

4.5. Statistical Unit

The statistical unit is the enterprise. Data refer to environmental taxes collected by the government and payable by the different economic agents.

4.6. Statistical Population

The target population are all production sectors by NACE (Rev 2), households as consumers and non-residents.

4.7. Reference Area

State.

4.8. Time Coverage

The data is available annually from 1995 to 2020 with provisional figures for 2021.

4.9. Base period

Not applicable.

5. Unit of Measure

Million National Currency (MNAC). Euro – millions for Ireland.

6. Reference Period

2021 Calendar year.

7. Institutional Mandate

7.1. Legal Acts and other agreements

Statistics on environmental taxes are based on Regulation (EU) No. 691/2011 (Annex II) on European environmental economic accounts as amended by Regulations 538/2014 and 2022/125 as well as legal acts in the area of national accounts. Data transmission became obligatory in September 2013. Before, Eurostat collected the data on a voluntary basis.

The basis for the national accounts tax aggregates is Table 9 "Detailed tax and social contribution receipts by type of tax or social contribution and receiving sub-sector including the list of taxes and social contributions according to national classification" of the ESA2010 transmission programme - Annex B of Regulation (EU) No. 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union.

Moreover, Commission Regulation (EC) N° 995/2001 of 22 May 2001 implementing Council and European Parliament Regulation (EC) N° 2516/2000 of 10 July 2000 on the recording of taxes and social contributions sets the rules for the data sources, time of recording and comparable treatment of taxes and social contributions assessed but unlikely to be collected.

7.2. Data Sharing

Data is not shared.

8. Confidentiality

8.1. Confidentiality – policy

All information supplied to the CSO is treated as strictly confidential. The Statistics Act, 1993 sets stringent confidentiality standards: Information collected may be used only for statistical purposes, and no details that might be related to an identifiable person or business undertaking may be divulged to any other government department or body. These national statistical confidentiality provisions are reinforced by the following EU legislation: Council Regulation (EC) No 223/2009 on European statistics for data collected for EU statistical purposes. Further details are outlined in the CSO's Code of Practice on Statistical Confidentiality.

For more information on the CSO confidentiality policy please visit:
https://www.cso.ie/en/aboutus/lgdp/csodatapolicies/statisticalconfidentiality/

8.2. Confidentiality – data treatment

Certain key data used to compile environment taxes, such as the Supply-Use table, are available on the CSO website. Other data are available internally in CSO, these are confidential and so in accordance with Statistics

Act, 1993 cannot be accessed under the terms of the Freedom of Information Act, 1997. Such data are not disclosed by the CSO to any other Government Department or outside body.

9. Release Policy

9.1. Release Calendar

The date of dissemination of all statistics released by CSO can be found in the Release Calendar published in CSO.ie. This calendar is regularly updated.

9.2. Release calendar access

The release calendar can be accessed via the CSO website, www.cso.ie, or directly from this link: https://www.cso.ie/en/csolatestnews/releasecalendar/

9.3. User access

In accordance with Principle 6 of the European Statistics Code of Practice all users of CSO statistics have equal access via the CSO website at the same time of 11 am. Any privileged pre-release access to any outside user is limited, controlled and publicised. In the event that leaks occur, pre-release arrangements are revised so as to ensure impartiality.

The CSO recognises that in very limited circumstances a business need for pre-release access may be substantiated. Any form of pre-release access is a privilege and a strict CSO pre-release access policy is adhered to for these special requests. The full pre-release access policy can be accessed at https://www.cso.ie/en/aboutus/lgdp/csodatapolicies/csopolicyonpre-releaseaccess/

The various results are published nationally in statistical release format as well as on the CSO website (www.cso.ie). Selected extracts from the results are posted on the CSO's data dissemination database, PxStat.

10. Frequency of Dissemination

Annual.

11. Accessibility and clarity

11.1. News release

Not applicable.

11.2. Publications

The Environment Taxes Release is available at:
https://www.cso.ie/en/statistics/environmentaccounts/environmenttaxes/

The release presents data across 5 Tables. Table 1 presents the total environment taxes from 2012, broken down by category of environment tax and individual tax type. Tables 2 to 5 present the environment tax categories broken down by the NACE Rev. 2 economic activity of the payee.

11.3. On-line database

The tables associated with the Environment Taxes release can be accessed from the CSO's dissemination database PxStat directly from this link: https://data.cso.ie/product/ETA

11.3.1. AC 1. Data tables -consultations

Not calculated.

11.4. Micro-data Access

Not applicable.

11.5. Other

The Eurostat publication, “Environmental taxes - a statistical Guide, 2013 edition” is available at http://ec.europa.eu/eurostat/documents/3859598/5936129/KS-GQ-13-005-EN.PDF

11.5.1. AC2. Metadata consultations

Not calculated.

11.6. Documentation on Methodology

The key characteristic of the estimation process is that it is primarily based on the methodology set out in the Eurostat publication, “Environmental taxes - a statistical guide, 2013 edition”. The guide emphasises an administrative data approach to estimate environment taxes based on applying the Use table; the Supply-Use tables are published annually by CSO (see https://www.cso.ie/en/statistics/nationalaccounts/supplyandusetablesforireland/).

Extra documentation on methodology can be found on the methods page of the latest environment tax release. https://www.cso.ie/en/methods/environment/environmenttaxes/

11.6.1. AC3 – Metadata completeness – rate

Not calculated.

11.7. Quality Documentation

Further information on quality for this output can be found on the methods page of the latest environment tax release. https://www.cso.ie/en/methods/environment/environmenttaxes/

12. Quality Management

12.1. Quality Assurance

The CSO avails of an office wide Quality Management Framework (QMF). This framework allows all CSO processes and outputs to meet the required standard as set out in the European Statistics Code of Practice (ESCOP). The QMF foundations are based on establishing the UNECE’s Generic Statistical Business Process Model (GSBPM) as the operating statistical production model to achieve a standardised approach to Quality Management. All and any changes implemented to CSO processes and outputs require adherence to the QMF.

A key aspect of the estimation is that the overall environment tax amounts are taken from the NTL, these control totals are maintained throughout the estimation procedure.

Year-on-year comparisons are made to the estimates produced to ascertain whether or not continuity of the estimate may raise concerns. When this occurs, intervention to adjust the weights in the process is considered. In 2016 an intervention of this form was deemed necessary for certain industries using products from the Renting & Leasing (NACE 77) division due to local year-on-year movement in certain Use table cell values. Prior to publication, some further manual checking is also carried out to ensure the robustness of the estimates.

12.2. Quality Assessment

An annual Quality Review questionnaire is completed and returned to Quality Management, Support and Assurance for analysis. This questionnaire is a self-assessment of quality of the process and output following the phases of the GSBPM.

13. Relevance

13.1. User Needs

The key driver for the compilation of environment tax estimates comes from the need of policy makers to assess the environmental impact of a certain tax, such as the reduction in pollution resulting from the introduction of a

new tax, and importantly assess the proportion of overall tax burden that is environmental. This release provides key data within the overall framework of environment statistics that contributes to addressing these needs for Ireland. In the international context these data are needed to fulfil Ireland's requirements under EU Regulations (EU) 691/2011, (EU) 538/2014 and (EU) 2022/125 specifically the 'module' on environment taxes. This contributes to the development of a satellite account for the environment sector. The principal environment tax statistics are annual total taxes paid for Energy, Transport or Pollution and Resources uses in the state.

13.1.1. Main National Users

National users: CSO, EPA, Department of the Environment, Climate and Communications and Department of Finance, economic commentators, the media, third level educational institutions, the public at large.

13.1.2. Principal External Users:

Eurostat, IEA and OECD.

13.2. User Satisfaction

Not measured.

13.3. Data Completeness

Statistics supplied are complete.

13.3.1. Data Completeness rate

100% - All required variables are supplied.

14. Accuracy and reliability

14.1. Overall accuracy

The estimation is based on maintaining overall environment tax amounts from the NTL as control totals throughout the estimation procedure. The procedure itself follows the guidelines set out in the Eurostat publication, "Environmental taxes - a statistical Guide, 2013 edition". The Irish specific estimation procedure has been coded in SAS, this approach ensures the data and programming are maintained separately (unlike an Excel based solution). Thus,, new data that might involve revisions can be readily incorporated without contaminating the procedural aspects of the estimation. Accordingly, the estimates are considered reliable.

14.2. Sampling Error

Not applicable.

14.2.1. A1.Sampling error indicator

Not applicable

14.3. Non-sampling Error

Not applicable.

14.3.1. Coverage error

Not applicable.

14.3.1.1. A2. Over coverage rate

Not applicable.

14.3.1.2. A3. Common units – proportion

Not applicable.

14.3.2. Measurement error

Not applicable.

14.3.3. Non-Response Error

Not applicable.

14.3.3.1. Unit non response rate

Not applicable.

14.3.3.2. Item non response rate

Not applicable.

14.3.4. Processing error

The main data sources are the NTL, the Use Table from Supply-Use Tables (SUT) compiled by National Accounts and Business Energy Use survey estimates available internally in Environment and Climate division. All these data sources are aggregate data. Environment Taxes are then estimated by a process that involves weighting NTL aggregates using weights derived from SUT and BEU aggregates for the relevant year. The weights applied depend on the particular type of tax, for example Energy taxes use both SUT and BEU weights with the latter applied to fuels. Significantly, only relevant products (rows) are selected from the UT to create weights for distributing NTL aggregate tax amounts. For example, for certain energy taxes Electricity and Gas (NACE 35) production is the row of the table chosen to compute weights to distribute the aggregate amount of tax across each industry using that product. This approach will be elaborated further below.

14.3.5. Model assumption error

Forecasts
Use tables are normally compiled 3 years after the period in question in accordance with Eurostat requirements. This means that it is necessary to forecast the most recent Use table for recent years.
Forecasts ahead for each cell in the Use table, that is for each product by industry cell combination (both at NACE Rev.2, 2-digit division level) are made; about 8,000 individual series are forecast. A simple univariate forecast procedure based on an Integrated Moving Average Model of Order 1 (IMA (1)) has been found most stable and reliable given the very short length of the series (17 annual data points from 2000 to 2016). We generate a sequence of IMA (1) values for each cell in each year and take the growth rate from the final two years(e.g. 2017 to 2018) to forecast future cell values (e.g. 2019 to 2021). Thus, if *T* denotes the last year the Use table has been compiled, we compute the forecast of the value in product by industry cell *(i,j)* of the UT at time *T+k* as

$$u_{ij,T+k} = u_{ij,T+k-1} * g_{ij,T} \quad (k = 1,2,3)$$

where the growth rate in the cell computed from the IMA (1) model. We further smooth the forecast cell values by applying a Quasi-Independence model to each forecast Use table to dampen noise associated with very small unstable forecast values in each annual forecasted Use table.

We note this procedure is an improvement on the simpler weighted growth rate procedure that has been used in previous years as it incorporates a smoothed growth rate estimation from the IMA (1) model followed by Quasi-Independence table fitting to reduce the influence of shocks arising from estimating small cell growth rates.

Back-casts of Use Table and environment tax estimates

Back-casts to years prior to 2009 are available in earlier releases. By way of background, the procedure to generate these back-casts is outlined in the following two paragraphs.

To comply with the spirit of EU Regulation (EU) 691/2011 and its amendments EU Regulation (EU) 538/2014 and (EU) 2022/125 we have endeavoured to make available a continuous series of environment tax estimates from 2000 onward. To facilitate this, it has been necessary to compile the Use tables for 2000 to 2007 under the NACE Rev. 2 classification as UTs for those years are currently only published in Ireland under the older NACE Rev. 1.1 classification of economic activity.

The methodology used to compile UTs under NACE Rev. 2 for 2000 to 2007 is not trivial. Firstly, and obviously values for activity codes headings with a one-to-one match are copied directly, about 2/3rd's of all matches were of this type. Where mismatches occur two methods are adopted. Specifically, many-to-one matches from NACE Rev. 1.1 to Rev 2. are simple aggregations. For one-to-many activity code headings matched from Rev. 1.1 to Rev 2 a split of the Rev. 1.1 amount was needed. The weights used to allocate the single NACE Rev. 1.1 amount in the UT to many NACE Rev 2 amounts was derived from the corresponding split of the United Kingdom's UT for relevant year. Because of the two-way structure of the UT the allocation was applied both row wise and column wise to arrive at a valid two-way allocation. This highly intricate procedure was programmed in SAS to ensure the structure of the two-way transformations applied were identical across all years 2000-2007, in other words only the within year weights changed from year to year. The resulting NACE Rev. 2 UT was then used as described earlier to compile the environment taxes estimates for the years 2000 to 2007.

15. Timeliness and punctuality

15.1. Timeliness

The results arising from this procedure are required to be sent to Eurostat within 15 months of the end of the year to which the figures relate. We endeavour to make available the release of the estimates nationally as soon as practicable before the 15 month deadline has elapsed. Indeed, estimates for 2021 have been released in under 5 months from the end of that year.

15.1.1. TP1. Time lag – First results

Not applicable.

15.1.2. TP2. Time lag – Final results

The last day of the reference period is 31/12/21 so when we submitted it on 27/04/22 it was 3 months and 27 days later.

15.2. Punctuality

The last Environment Taxes release was done on 12 July 2022, 11am on the CSO website.

15.2.1. TP3. Punctuality – Punctuality - delivery and publication

0 days, the release was published on time according to the date first published in the CSO Release Calendar.

16. Comparability

16.1. Comparability – Geographical

The statistics are compiled to meet, to the greatest extent possible, the recognised statistical standards recommended by Eurostat as set out in their publication, "Environmental taxes - a statistical Guide, 2013 edition". Accordingly, they are regarded as being methodologically sound and therefore comparable over time and between those countries subscribing to the methodology. However, Use Tables are country specific and so reflect specific shocks that occur in that economy, irrespective of whether those shocks are anticipated or not. Statistical comparisons over time and across countries should therefore be made with care.

16.1.1. CC1. Asymmetry for mirror flow statistics

Not applicable.

16.2. Comparability over time

A key aspect of the estimation is that the overall environment tax amounts are taken from the NTL, these control totals are maintained throughout the estimation procedure. Year-on-year comparisons made to the estimates to ensure reasonable continuity over time.

BEU statistics available from 2009 onward replace certain estimates previously compiled using CO2 Emissions data from that point forward. These survey estimates provide a more robust distribution of fuel use in the Irish economy. Nonetheless, this methodological improvement has introduced a significant discontinuity in the Environment Taxes estimates between 2008 and 2009.

16.2.1. Comparability over time - detailed

Tax type	Reference period	Reasons for breaks
Energy	1995-2021	No Breaks
Transport	1995-2021	No Breaks
Pollution and Resource	1995-2021	No Breaks

16.2.2. Length of Comparable Time series

Annually from 1995 to 2020 with provisional figures for 2021.

16.3. Coherence – cross domain

Not applicable.

16.3.1. Coherence – Sub annual and annual statistics

Not applicable.

16.3.2. Coherence with National Accounts

The main data sources are the NTL, the Use Table from Supply-Use tables compiled by National Accounts and the BEU survey results. National Accounts Division in the CSO compile the NTL and Use tables.

16.4. Coherence – internal

Not applicable.

17. Cost and Burden

No burden is placed on respondents since data is taken provisionally from National tax authority.

18. Data Revision

18.1. Data Revision Policy

Revisions refer to changes made to published statistical data when the information used in its production has been updated or corrected. This information includes all data used in compiling the statistic e.g. respondent data, administrative data, weights and factors, methodology, classifications, definitions, modifications to survey questionnaires, survey scope and data collection methods.

The data revision policy that CSO statistics adheres to can be found via the following link:
https://www.cso.ie/en/methods/quality/treatmentofrevisions/

18.2. Data Revision Practice

Revisions are made annually as more up to date Use tables become available. Indeed, the need for annual revisions based on more up to date Use tables is highlighted in the Eurostat publication, “Environmental taxes - a statistical Guide, 2013 edition”.

Environment taxes 2021 show revisions when compared with corresponding figures in the 2020 Environment taxes release. These revisions arise due to the incorporation of the 2018 Supply and Use Table, annual revisions to taxes in our National Accounts and revisions to the Business Energy Use statistics.

The National Car Test levy now includes the Commercial Vehicle levy from 2013 forward, while an updated method for calculating Carbon Credits within the National Accounts has led to a revision of the Carbon Credits figures from 2012 forward.

18.2.1. Data Revision – Average size

Minor level revision.

19. Statistical processing

19.1. Source Data

The data used by the procedure comes from administrative source within CSO.
National Accounts Source Data details:

Tax Name/ESA Code	Source data for compiling tax revenue by payer	
Energy taxes	D2122C Duty on imported hydrocarbon oil products	PCE data
	D214A Electricity Tax D214A Duty on domestic hydrocarbon oil products	SUT PCE data
	D29H Public Service Obligation Levy	SUT
	D214L National Oil Reserves Agency levy	SUT
	D214L Carbon Tax	SUT
Transport taxes	D214D Vehicle Registration Tax D214D National Car Test (NCT) levy	SUT PCE data
	D59F Vehicle & driving licence expenses	SUT
	D214H Air Travel Tax	SUT
	D29B Motor tax (business)	SUT
	D59D Motor tax (households)	SUT
Pollution taxes	D214L Plastic bag levy	SUT
	D29F Environment Fund levies	PCE data
	D29F Landfill Levy	SUT
Resource taxes	D51E Fisheries levy	SUT

19.1.1. Population and sampling frame

Not applicable.

19.1.2. Sampling design

Not applicable.

19.1.3. Survey size

Not applicable.

19.1.4. Survey technique

Not applicable.

19.2. Frequency of data collection

Annual.

19.3. Data Collection

The main data sources are the NTL, the Use Table from Supply-Use tables compiled by National Accounts and the BEU survey results. National Accounts Division in the CSO compile the NTL and Use tables while BEU statistics are available internally in Environment and Climate division.

19.3.1. Type of Survey/Process

Environment Taxes Estimates based on macro aggregates.

19.3.2. Questionnaire (including explanations)

Not applicable.

19.3.3. Survey Participation

Not applicable.

19.3.4. Data Capture

Not applicable.

19.4. Data Validation

Not applicable.

19.5. Data Compilation

Detailed annual estimates of environment taxes are compiled in two parts as follows:

- Non-Fuel taxes
- Fuel taxes

These are added together to arrive at annual estimates of environment taxes classified by environment tax type and NACE Rev.2 industry sector of the payee. All computations and analysis involved are undertaken using SAS software.

19.5.1. Data Compilation Method

19.5.1.1. Non-Fuel Taxes

Table 1 shows how individual NTL tax base headings within NTL environment tax types are associated with NACE Rev 2. product headings. The identification of individual tax bases by type of tax was accomplished jointly by National Accounts Division and Environment and Climate Division in CSO.

For each tax listed in the body of Table 1 the associated NACE Rev 2. product manufactured or service delivered that is primarily responsible for the tax burden is identified, specifically the column heading in Table 1. The corresponding row in the Use table (UT) is extracted and weights for each NACE Rev. 2 industry involved in making this product or delivering this service are computed. Specifically, the weights are the contribution in the relevant row of UT of each industry to the total for that row including the household amount. Denoting the (€'000) amount in cell (i,j) of the UT by $u_{i,j}$, the industry weight $w_{i,j}$ for industry j ($j = 1 \cdots J$) relating to the use of the product in row i is

$$w_{i,j} = \frac{u_{ij}}{\sum_{j=1}^{J} u_{ij} + h_i}$$

where h_i is the amount spent in household consumption (Personal Consumption Expenditure) of product in row i. Where tax exemptions exist, or the use is clearly not related to final consumption of the product the amount in cell (i,j) of the Use table ($u_{i,j}$) is set to zero, the use of motor vehicles within the motor trade being an example. The zeroing of Use table components in the computations is accomplished via multiplying the $u_{i,j}$ value by a corresponding binary indicator value (0 or 1) separately maintained in an 'inclusion table'. With the appropriate weight computed for a specific tax in each row k and product in column i in Table 1 (e.g. cell (2,1) is Carbon tax), the amount of this tax attributable to industry j, denoted by tax_{kij}, is

$$tax_{kij} = w_{ij} * tax_{ki}$$

This provides a breakdown of environment taxes by tax type, product and industry, aggregating over products i we obtain estimates of tax paid by industry sector of payee for non-fuel taxes. Note the use of the inclusion table permits this procedure to be applied *mutatis mutandis* to pure household taxes such as Motor Tax (households), here in the inclusion table we simply set all industry indicator values to zero and the household value to 1, this automatically assigns the full tax to households within the estimation procedure.

Table 1: NTL Tax headings classified by NTL Environment Tax Type and NACE Rev 2. Product							
		NACE Rev 2. Product					
		Coke and refined petroleum products (19)	**Motor vehicles, trailers and semi-trailers (29)**	**Electricity, gas, steam and air conditioning supply (35)**	**Waste collection, treatment and disposal activities; materials recovery (38)**	**Air transport (51)**	**Households**
NTL Environment Tax Type	**Energy**	National Oil Reserves Agency Levy		Electricity Tax			
		Carbon Tax		Public Service Obligation Levy			
	Transport		Vehicle Registration Tax			Air Travel Tax	Motor Tax (Households)
			Motor Tax (Business)				Vehicle Driving License Expenses
	Pollution				Land Fill Levy		Plastic Bag Levy
	Resource						Fishery Levy

19.5.1.2.Fuel Taxes

Fuel taxes are designated as a type of Energy tax. Estimates of fuel taxes follow along similar lines to non-fuel taxes outlined above subject to a few notable differences. Firstly, the business versus household distribution of a fuel tax is computed from Personal Consumption Expenditure data. For their own purposes Personal Consumption Expenditure within the National Accounts separately allocate fuel taxes to businesses or households. We take the relative proportions of these amounts and apply it to each tax, e.g. excise duty on petrol (light hydrocarbon oils) – Personal Consumption Expenditure data is not directly used in our computations as our tax amounts are compiled on an accrual's basis while taxes in Personal Consumption Expenditure are based on receipts, the differences are however small. The business portion of the tax is then estimated using the Use table procedure outlined above (with households excluded) for fuels for heating or powering stationary machinery. Motor vehicle fuel taxes are estimated using weights derived from the BEU survey results from 2009 forward – BEU results by fuel-type (petrol or auto-diesel) are available by NACE Rev. 2 (2-digit division level). Here the fuel weights, labelled f_w, are straightforwardly computed from the estimated value of BEU fuel-type, labelled e_j, in industry j ($j = 1 \cdots J$) as

$$fw_j = \frac{e_j}{\sum_{j=1}^{J} e_j}$$

The business amount of fuel tax of type m (m = 1: *Petrol*, 2:*Diesel*) attributable to industry j, denoted by tax_{mj}, is then computed as

$$tax_{mj} = fw_j * tax_m$$

19.5.1.3.Final environment tax estimates

Estimated non-fuel and fuel environment taxes are added to arrive at overall estimated environment taxes. Resulting estimates are held as Excel files and are available by environment tax type and NACE Rev.2 industry division of the payee. The outputs required for the release and for Eurostat are generated from these Excel files.

19.5.2. Imputation (for Non-Response or Incomplete Data Sets)

Not applicable.

19.5.2.1. A7. Imputation rate

Not applicable.

19.5.3. Grossing and Weighting

Year-on-year comparisons are made to the estimates produced to ascertain whether or not continuity of the estimate may raise concerns. When this occurs, intervention to adjust the weights in the process is considered. In 2016 an intervention of this form was deemed necessary for certain industries using products from the Renting & Leasing (NACE 77) division due to local year-on-year movement in certain Use table cell values.

19.6. Adjustment

Not applicable.

19.6.1. Seasonal Adjustment

Not applicable.

20. Comment

Not applicable.