

COUNTRY PRACTICE IN ENERGY STATISTICS

Topic/Statistics: Combined Heat & Power

Institution/Organization: Sustainable Energy Authority of Ireland (SEAI)

Country: Ireland

Date: October 2012

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Abstract

Write a short abstract of the statistics, and try to limit it to one page. The purpose of the abstract is to give the reader a general overview of the statistics/topic. It should therefore include a brief overview of the background and the purpose of the statistics, the population, the sample (if relevant), the main data sources, and the main users of the statistics. The abstract should also mention what is the most important contribution or issue addressed in the country practice (e.g. the practice deals with challenges of using administrative data, using of estimation, quality control, etc.). If there are other elements that are considered important, please feel free to include them in the abstract.

Keep in mind that all relevant aspects of the statistical production will be covered in more detail under the different chapters in the template. Therefore, the abstract should be short and focused on the key elements. What the most important elements are can vary from statistics to statistics, but as a help to write an abstract you can use the table below. The table can either replace a text or can be filled out in addition to writing a short text.

This data collection is a survey of all known Combined Heat and Power plants in Ireland on an annual basis. It collects information on plant capacities, fuel consumption and electricity and heat generated for the previous year by the CHP Plant. This data is combined with electricity and heat data from other non-CHP sources to give overall data that feeds into Ireland’s Energy Balance, and fulfil international reporting obligations.

SEAI took over this data collection in 2002 from the Department of Communication, Energy and Natural Resources.

Key elements	
Name of the statistics	Combined Heat & Power
Background and purpose of the statistics	<p>This data collection is a survey of all known Combined Heat and Power plants in Ireland on an annual basis</p> <p>SEAI took over this data collection in 2002 from the Department of Communication, Energy and Natural Resources.</p> <p>The data are used to populate Ireland Energy Balance and to fulfil international reporting obligations</p>
Population, sample and data sources	<p>Type of Data Collection: Business Survey Survey Format: Census Survey; we endeavour to collect data from all CHP sites.</p> <p>The list of companies used to define the population frame was handed over to SEAI from the Department of Communications, Energy and Natural Resources when we took over the collection of Energy Statistics in 2002. New entrants into the market have typically installed CHP using one of a number of large suppliers/operators that we survey. The suppliers fill in the annual survey form on behalf of their client companies. In some cases larger companies have installed and operate their own CHP units and these have been identified to us by other government departments, colleagues working in this area and also from some administrative data.</p> <p>Size of target population: 8 CHP Suppliers/Installers – provide annual data for approx 200 units. 20 individual companies using CHP.</p>
Main users	<p>Irish Government bodies including Department of Communications, Energy & Natural Resources, Department of the Environment & Local Government, Department of Transport and the Environmental Protection Agency</p> <p>EUROSTAT</p> <p>International Energy Agency</p> <p>Researchers</p>

	Media
Important contribution or issue addressed	
Other remarks	

1. General information

1.1. Name of the statistics/topic

The statistics/topic could either be a specific energy statistics (e.g. electricity production) or a topic within energy statistics (e.g. energy balances). For more information, please see Section III of the Instructions.

Combined Heat & Power

1.2. History and purpose

State when the statistics were first published.

Energy Balances are available at least as far back as 1972

Describe briefly the main purpose of producing the statistics and why it is relevant.

The data populate Ireland's Energy Balance and any international questionnaires. It is a vital input to meeting reporting obligations, for advising policy makers and informing investment decisions. The data are also used for the greenhouse gas emissions inventory calculation

1.3. Reference period

State the time period the data are collected for.

Reference period for the annual survey is annual and data are requested month +1 from reference period.

1.4. Frequency

Specify how often the statistics are disseminated (e.g. annually, monthly, quarterly, etc.). If the statistics are not produced at regular intervals, state at what times they have been produced in the past and the main reasons behind the irregularities.

The statistics are disseminated annually in Ireland's Energy Balance and international questionnaires. They are also available monthly and annually through EUROSTAT under the Energy Statistics Regulation of 2008, no.1099.

1.5. Dissemination

Describe how the statistics are published (e.g. printed publications, online publications, online databases, etc.). If applicable, include the web address to the main website of the statistics.

The Energy Balance is published online in PDF and Excel format and can also be downloaded via the Energy Statistics databank. It is also contained in a number of publications.
http://www.seai.ie/Publications/Statistics_Publications/

1.6. Regional level

State the lowest geographical level (e.g. administrative regions, municipalities, etc.) for which the statistics are made available to the public.

National level

1.7. Main users

Identify the key users of the data and the main applications. Include both internal and external users, and if possible try to distinguish between end users and others.

Irish Government bodies including Department of Communications, Energy & Natural Resources, Department of the Environment & Local Government, Department of Transport and the Environmental Protection Agency

EUROSTAT
International Energy Agency
Researchers
Media

1.8. Responsible authority

Write the name of the institution and department/office with the main responsibility for disseminating the statistics (e.g.: Statistics Norway, Department of Economics, Energy and the Environment).

Sustainable Energy Authority of Ireland

1.9. Legal basis and legally binding commitments

State the national legal basis for the data collection. Include a complete reference to the constitutional basis, and web address to an electronic version (e.g.: The Statistics Act of 16 June 1989 No. 54, §§2-2 and 2-3, http://www.ssb.no/english/about_ssb/statlaw/forskrift_en.html).

The data are provided are a voluntary basis

If the data collection is not based on a legal basis, give a short description of other agreements or volunteer arrangements.

The data are provided are a voluntary basis

If applicable, give reference to national and international commitments that are legally binding (e.g. EU statistical legal acts).

Regulation (EC) No 1099/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics

DIRECTIVE 2004/8/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC

1.10. Resource requirements

Specify how the production of the statistics is financed (e.g. over the ordinary budget, project based support, financial support from other institutions or organization). If applicable, state the contracting entity (e.g.: Ministry, EU Commission, OECD). A contracting entity is any entity which is ordering a survey or the compilation of a statistics, and paying for it

Ordinary budget, Department of Communications, Energy & Natural Resources

Specify the resource requirements for producing the statistics (e.g. man-labour days, number of workers involved in the statistical production process of the statistics/topic in question).

3 persons in the Energy Policy Statistical Support Unit

1.11. International reporting

List any international organizations and names of reporting schemes that the statistics are reported to. If available, also include the website where the reported data are published (e.g. International Energy Agency, Monthly Oil Statistics, UNSD, etc.).

EUROSTAT <http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/introduction>
International Energy Agency <http://www.iea.org/stats/index.asp>
UN Statistics Division <http://unstats.un.org/unsd/energy/default.htm>

2. Statistical concepts, methodology, variables and classifications

2.1. Scope

Describe the scope of the statistics (e.g. the statistics cover supply and use of all energy products in Norway, classified according to International Standard Industrial Classification of All Economic Activities – ISIC).

The statistics cover Combined Heat & Power plants in Ireland and use the following classifications:

European Energy Statistics Regulation of 2008, no.1099 classification

2.2. Definitions of main concepts and variables

Describe the main concepts (e.g.: territory principle, resident principle, net calorific value, gross calorific value).

National territory. Fuel inputs are collected in physical and energy units (Terajoules). Electricity and heat data are collected in energy units (MWh).

Describe the main variables (e.g. how are the different energy products defined in the statistics? How are production, intermediate consumption, final consumption, transformation, feed stock, the energy sector, etc. defined?).

Prime Mover
Fuel Type
Installed Electrical Capacity (kWe)
Installed Thermal Capacity (kWt)
Annual Operating Hours
Fuel Input e.g. Tonnes, Litres
Fuel Input (MWh)
Total Electricity Generated (MWh)
Total Heat Generated (MWh)
Heat Usefully Employed (MWh)
Electricity Exported to the Grid (MWh)

2.3. Measurement units

Describe in what unit the data is collected (e.g. physical unit (m³, metric tons), monetary unit (basic prices, market prices)). Describe in what unit the data is presented. Describe if the calorific values are collected (e.g. on a net vs. gross basis) and how they are used.

If applicable, describe the density of the energy product(s) and the estimated *thermal efficiency coefficients* of different energy products and consumer groups or by appliance. Thermal efficiency coefficient indicates the share of the energy products which is actually usable for end consumption. Descriptions of density and thermal efficiency coefficient could alternatively be put in an annex.

Fuel inputs are collected in physical and energy units (Terajoules). Electricity and heat data are collected in energy units MWh.

The data are presented in net energy units (kilo-tonne of Oil Equivalent) in the Energy Balance

2.4. Classification scheme

Include references to relevant international and national standard classifications. If national, give a brief description of the standards. If available, include web addresses to the electronic version of the standards).

European Energy Statistics Regulation of 2008, no.1099 classification for annual questionnaires <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008R1099:EN:HTML>

2.5. Data sources

Give an overview of the different data sources used in the collection and compilation of the statistics/topic (e.g. household survey, enterprise/establishment survey, administrative data/registers, foreign trade statistics, production statistics and other primary/secondary data sources).

Examples of administrative sources/registers are: business register for enterprises and establishments, population register, land register, housing and building registers, tax registers, international trade registers, etc.

Annual business and administrative surveys

2.6. Population

Describe the entire group of units which is the focus of the statistics (the population).

The survey is of all known Combined Heat and Power plants in Ireland. New entrants into the market have typically installed CHP using one of a number of large suppliers/operators that we survey. The suppliers fill in the annual survey form on behalf of their client companies. In some cases larger companies have installed and operate their own CHP units and these have been identified to us by other government departments, colleagues working in this area and also from some administrative data from grant applications.

Specify the following statistical units:

- Reporting unit
- Observational unit
- Analytical unit

Examples of different kind of statistical units include: enterprise, enterprise group, kind-of-activity unit (KAU), local unit, establishment, homogeneous unit of production.

In most cases the reporting unit, observational unit and analytical unit are identical, but there are examples where this is not the case. In electricity statistics, you may find that energy companies (the reporting unit) provide data about different consumers like the individual household or manufacturing company (the observational unit). The analytical unit may be a group of energy consumers, defined by the ISIC.

Reporting and observational units

2.7. Sampling frame and sample characteristics

Describe the type of *sampling frame* used in the collection and compilation of the statistics (e.g. list, area or multiple frames). A sampling frame is the source material or device from which a sample is drawn. Note that the sampling frame might differ from the population.

We survey all known CHP Supplier/Operators and other individual companies who have large CHP Units.

For each survey(s) used for the compilation of the statistics, specify the *sampling design* (e.g. random, stratified, etc.). Describe the routines employed for updating the sample. Include information about the sample size, and discuss to what extent the sample covers the population (e.g. energy consumption in the sample compared to total energy use by the population).

Note that chapter 2.7: *Sample frame and sample characteristics* may overlap with chapter 3.4: *Grossing up procedures*.

We rely on the CHP operators to identify any new smaller entrants in the annual survey. Larger CHP units are identified to us by other government departments, colleagues working in this area and also from some administrative data from grant applications.

2.8. Collection method

For each survey used for the compilation of the statistics/topic, describe how the data are collected (e.g. face-to-face, telephone, self-administered, paper and internet-based questionnaires, or administrative data and registers).

Data are collected by questionnaires which are sent annually via email.

2.9. Survey participation/response rate

For each survey used for the compilation of the statistics/topic, specify the average response rate, or refer to response rates for specific surveys conducted.

There usually is full response rate from the Supplier/Operators, though timeliness may be an issue. There is a non-response in some instances for the individual companies with approx 50% of surveys unanswered in some years. Data is estimated based on the previous year's values in these situations until there is a response.

3. The statistical production process

3.1. Data capture and storage

Describe how the data is captured and stored (e.g. if the respondent replies using Internet-based questionnaire, the received data are electronically transferred to the production database. Paper questionnaire responses are keyed manually to the production database).

Completed questionnaires are normally received via email and manually transferred to the production database which is in the form of an Excel spreadsheet

3.2. Data editing

Describe the regular routines employed for detecting and correcting errors. This may include:

- Manual routines for detecting and correcting errors
- Automatic error-detection (and correction)
- Micro- and macro editing procedures
- Data validation procedures
- Outlier identification
- Processes and sources used for quality controls

Any significant changes between years are noted and the respondent is asked to clarify why there is a difference and this would be investigated further. In most cases the fuel input and electricity and heat generation figures provided are broadly similar year on year unless the unit is out of operation for a time.

There is also a check on the efficiency reported. If the total efficiency is very high or very low, the survey is sent back to the respondent and they are asked to clarify.

In some instances data may be provided in incorrect units (i.e. GWh instead of MWh) but this is easily spotted when we add the data to our excel spreadsheet as the unit can be compared to other units of similar capacity and also the fuel input and associated outputs can be checked for reasonable accuracy.

The respondents provide us with a figure for electricity used on site and electricity exported to the Grid, we can compare this second figure with data provided by Ireland's electricity transmission system operator to make sure it is accurate.

3.3. Imputation

Describe the principles for imputation and the assumptions that these principles are based on. Note that this chapter may overlap with chapter 3.2: *Data editing* and chapter 5.2: *Accuracy*

Not relevant

3.4. Grossing up procedures

Describe how the population is divided into strata and what statistical models the estimations in the strata are based on. Describe how sub-indices are combined into aggregate indices and how uncertainty is estimated.

Not relevant

3.5. Analytical methods

Give a description of any analytical methods used to adjust the data (e.g.: seasonal adjustment and temperature adjustment). A more detailed description of the analytical method can also be included as an annex.

Not relevant

4. Dissemination

4.1. Publications and additional documentation

Describe the form of dissemination of the statistics/topics in question (e.g. printed publications, website, etc.). Please provide relevant website link(s) if available.

The Energy Balance is published online in PDF and Excel format and can also be downloaded via the Energy Statistics databank. It is also contained in a number of publications.
http://www.seai.ie/Publications/Statistics_Publications/

Give a complete reference to publicly available statistics databases where data from the statistics can be extracted. Include web addresses if available online.

Energy Statistics Databank <http://www.cso.ie/px/sei/database/sei/sei.asp>

Indicate whether you charge users for access to the statistics at any level of aggregation.

There is no charge

4.2. Revisions

Describe the current revision policies. E.g.: Is historical data revised when new methodology, new definitions, new classifications etc. are taken into use? Is the data continuously revised, or is the data revised at certain points in times (e.g. every third year, annually, etc.)?

No formal revision policy drafted. Typically a data revision will apply to all variables in the survey as it will be the result of a non-response or late response. Occasionally one data point will be revised if an error has been identified. This could occur with any data point.

Data revised due to late submissions; Accuracy improved due to estimations made for the late submissions

Data revised if an extra CHP Unit has been added and so must be revised historically

Data revised if a data supplier spots an error and resubmits the data

Data revised if SEAI spot an error and resubmits the data

If applicable, describe any major conceptual or methodological revisions that have been carried out for this statistic/topic in the past.

Not relevant.

4.3. Microdata

Describe how microdata are stored.

Microdata are stored in an Excel database

Specify if microdata are available for scientific and/or public use. If so, describe under what conditions these are made available.

These microdata are not currently available for scientific and/or public uses

4.4. Confidentiality

Describe the legal authority that regulates confidentiality, and what restrictions are applied to the publication of the statistics.

Confidentiality rules as provided by Ireland's national statistics body, the Central Statistics Office (CSO):

Describe the criteria used to suppress sensitive data in statistical tables (cell suppression).

Primary confidentiality

A category is confidential if any one of the following conditions applies:

- (i) there are less than three units
- (ii) one unit accounts for more than 80% of the total (dominance rule 1)
- (iii) two units account for more than 90% of the total (dominance rule 2)

Describe how confidential data are handled.

Confidential data are not published.

Describe any confidentiality standards that go beyond what is legally required.

Confidential data may be published if written approval is received from the affected unit/s.

Confidential data may be published if it is already in the public domain

5. Quality

5.1. Relevance

State to which degree the statistical information meet the real needs of clients/users.

Although no formal user surveys have been carried out, the statistical information mostly meets the real needs of clients/users

5.2. Accuracy

State the closeness of computations or estimates to the exact or true values that the statistics were intended to measure.

There is a possibility of missing some CHP units as we rely on others to inform us of new entrants.

There are problems with non-response with a number of the CHP units, which are estimated until there is a response. However, this has never been an issue with the single largest CHP installation. As this particular unit dominates the totals this helps to provide accurate values.

The survey responses for useful heat are not always reliable and overall useful heat values are likely to be overestimating the amount of useful heat

Measurement and processing errors

Discuss the measurement and processing errors that are relevant for the statistics. Try as far as possible to give an estimation of the size and scope of the errors.

Any significant changes between years are noted and the respondent is asked to clarify why there is a difference and this would be investigated further. In most cases the fuel input and electricity and heat generation figures provided are broadly similar year on year unless the unit is out of operation for a time.

There is also a check on the efficiency reported. If the total efficiency is very high or very low, the survey is sent back to the respondent and they are asked to clarify.

In some instances data may be provided in incorrect units (i.e. GWh instead of MWh) but this is easily spotted when we add the data to our excel spreadsheet as the unit can be compared to other units of similar capacity and also the fuel input and associated outputs can be checked for reasonable accuracy.

The respondents provide us with a figure for electricity used on site and electricity exported to the Grid, we can compare this second figure with data provided by Ireland's electricity transmission system operator to make sure it is accurate.

Non-response errors

State the size of the unit non-response and the item non-response, distributed by important variables in the population (e.g. region, industry). Consider if the non-response errors are systematic, and if so, describe the methods used to correct it. Indicate whether the effects of correcting non-response errors on the results have been analysed, and, if so, describe them.

As the CHP survey is voluntary it is up to the respondent as to whether they wish to reply or not.

The measures used to reduce the non-response rate are:

- Reminder emails sent and phone calls made to encourage completion of the survey.

If there is no response the data are estimated based on the previous year's data

Sampling errors

Discuss the size of the sampling errors. Compare the population and sample with regards to important properties (e.g. coefficient of variance).

Non-probability sampling due to difficulty of identifying all the units.

Other sources of error

Discuss other sources of errors that might be relevant for the statistics. E.g.: Model assumption errors, coverage errors

Undercoverage Errors are possible but we endeavour to cover all units.

Overcoverage Errors can occur in some instances if we get a response from a company and then also from an operator for that company. This is easily identified by the name and address of the site.

Overcoverage might also occur where a unit doesn't respond and we estimate it based on previous years and there is the possibility it was non-operational.

Data on useful heat, which is the total amount of CHP heat used during the year, as distinct from the total heat produced, is requested in the survey. The survey responses for useful heat are not always reliable and the overall useful heat values are likely to be overestimating the amount of useful heat. SEAI are striving to improve the data on useful heat. The overall heat to power ratio can be calculated from the data provided in the survey. Any significant annual variances in the ratio may be due to unreliable responses to the CHP survey for the useful heat values in those years.

5.3. Timeliness and punctuality

Specify the time between the end of the reference period and publication.

If the statistics are published both as preliminary and final figures, specify the time between publication of preliminary and final figures. You should also point out whether the publication date is set according to certain rules (e.g. advance release calendar, a specific day or prior to other publications).

The CHP surveys are not usually in time for the provisional Energy Balance, which is published in March. In this case estimates are used. It has occurred where CHP surveys have been completed after the final Energy Balance has been published. In this case the data is included in the next Energy Balance.

Point out if there have been any major discrepancies between the planned publication date and the actual publication date in recent years. If so, state the length of this discrepancy and its cause.

No major discrepancies between the planned publication date and the actual publication date in recent years

5.4. Accessibility

Describe how easily accessible the statistics are. In particular, is there an advance release calendar to inform the users about when and where the data will be available and how to access them?

Are metadata and other user support services easily available? Are there particular groups that don't have access to the published statistics (e.g.: visually disadvantaged)?

The FAQ which can be found on the SEAI website gives details on where the data can be found and when to expect the provisional and finalised Energy Balance to be published.

Metadata are not publicly available

The website has not yet been adjusted for visually disadvantaged users

5.5. Comparability

Discuss the comparability of the statistics over time, geographical areas and other domains.

Comparability over time

Discuss comparability over time and include information about whether there have been any breaks in the time series of the statistics and why. Also describe any major changes in the statistical methodology that may have had an impact on comparability over time.

Energy Balance data are available from 1972 for Ireland. However, data are only comparable from 1990.

Comparability over region

Discuss comparability over geographical areas, and include information about whether the statistics are comparable to relevant statistics published by other countries and/or international organisations.

Data submitted to international organisations is comparable to other countries

Comparability over other domains

Discuss comparability over domains, and include information about whether the statistics are comparable between different industries, different types of households etc.

Not relevant

5.6. Coherence and consistency

Discuss the coherence/consistency between preliminary and final figures.

There is usually a discrepancy between the provisional and final Energy Balance due to late survey returns.

Discuss the coherence/consistency between monthly, quarterly or yearly statistics within the same subject area. Can the results of different frequencies for the same reference period be combined in a reliable manner?

Not relevant as only annual figures are collected

Discuss the coherence/consistency with other related statistics (also those produced by other institutions/organisations on the same subject).

Not relevant

6. Future plans

Are there any current or emerging issues that will need to be addressed in the future? These could include gaps in collection, timeliness issues, data quality concerns, funding risks, confidentiality concerns, simplifications to reduce respondents' burden etc.?

As the surveys are currently voluntary, options are currently being explored for a legal obligation to be placed upon the suppliers to respond.

Annexes

Illustrations and flowcharts

Illustrations and flowcharts are useful to summarize information and to get a better overview of the statistical production process. Illustrations and flowcharts can either be placed in annexes or be included under relevant paragraphs in the template.

E.g.:

- A conceptual flowchart which illustrates the flow of data in the production of the statistics.
- A flowchart which illustrates the main tasks in the production process and the dependency between them.

Time schedule

Include a time schedule for the different phases of the statistical production process. The statistical production process *may* be divided into the following phases. Phase 1-3 may only be relevant for when a new statistics/survey is set up.

1. **Clarify needs** (e.g. map users needs, identify data sources)
2. **Plan and design** (e.g. plan and design population, sample size, how to analyze and edit data)
3. **Build** (e.g. build and maintain production system, test production system)
4. **Collect** (e.g. Establish a frame, draw the sample, collect data)
5. **Edit** (e.g. identify and code micro data, edit data, imputation)
6. **Analyse** (e.g. quality evaluation, interpret, analyse)
7. **Disseminate** (e.g. publish data, user contact)

Questionnaires

Include the complete questionnaire(s)/survey form(s) used

Example of publication tables

Include an example of a typical table published for the statistics. Include web addresses if available online.

Detailed description on analytical methods

If relevant, a detailed description of analytical methods used in the statistical production (like seasonal adjustment, temperature adjustment etc.) may be described in an annex. A short description can also be included in chapter 3.5: Analytical methods or under other suitable chapters.

**Sustainable Energy Authority of Ireland
Combined Heat and Power Survey**

CHP Details															
Installation Site	CHP Supplier ¹	Installation Date ²	Prime Mover ³	Fuel Type ⁴	Installed Electrical Capacity (kWe) ⁵	Installed Thermal Capacity (kWt) ⁶	Annual Operating Hours ⁷	Fuel Input e.g. Tonnes, Litres ⁸	Fuel Input MWh ⁹	Total Electricity Generated MWh ¹⁰	Total Heat Generated MWh ¹¹	Heat Usefully Employed MWh ¹²	Grid Connection to Export ¹³	Electricity Exported to the Grid MWh ¹⁴	Heat to Power Ratio Heat : Power ¹⁵
Totals					0	0	0	0	0	0	0	0		0	

Notes

1. The name of the company who supplied and installed your CHP unit is required here.
2. Provide the date when the CHP unit came online.
3. Choose one from the following: Combined cycle, Steam: backpressure turbine, Steam: condensing turbine, Gas turbine with heat recovery, Internal combustion engine or Other.
4. Choose one from the following: Coal, Peat, Residual Fuel oil, Gasoil, Natural gas, Refinery gas, Biogas, Biomass or other. Please specify when choosing other.
5. The rated electrical capacity of the CHP unit.
6. The rated thermal capacity of the CHP unit.
7. The total amount of hours the unit was in operation during the year.
8. This is the total amount of fuel used by the CHP unit in the year, excluding fuel used for supplementary firing (i.e. firing to meet heat demand not met by CHP output).
9. Same as number 8 but converted to MWh
10. Total amount of electricity generated by the CHP unit in the year.
11. Total amount of heat generated by the CHP unit in the year. Do not include heat generated from other sources.
12. Useful heat is the total amount of CHP heat that was used during the year as distinct from the total heat produced.
13. Is the unit connected to the national grid to export electricity (yes or no) ?
14. Total amount of electricity sold on to the national grid in the year.
15. Power to heat ratio is the ratio between electricity from CHP and useful heat when operating in full CHP mode.