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Directorate E: Sectoral and regional statistics
Unit E.5: Energy

SHARES Tool Manual

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1. INTRODUCTION

The SHARES tool focuses on the harmonised calculation of the share of energy from renewable sources among EU Member States. The legal basis for the implementation of all calculations and methodologies is based on Directive[1] 2009/28/EC (subsequently also referred to as the RES Directive) and also on Regulation[2] (EC) No 1099/2008, to which the Directive refers.

The acronym **SHARES** stands for **SH**ort **A**ssessment of **R**enewable **E**nergy **S**ources.

The SHARES tool is designed to collect and present the information — the energy data — that are needed for calculations as defined in Article 3 (transport target) and Article 5 (overall target) of the Directive. Consequently, additional calculations are needed for electricity in order to implement Article 3(4), as well as for heating and cooling as defined in the templates of the progress report on the website[3] of DG Energy.

Please note that the SHARES tool does not replace the legal obligations enacted by Article 22 and Article 23 of Directive 2009/28/EC — it only assists in reporting.

The main benefit derived from the SHARES tool is that Member States are engaged to go through the exact same method during the calculation of the desired values. Its application prevents any irregularities from varying parameters and rules used in different calculation methods and ensures harmonised and comparable results for all reporting countries. For this reason, the SHARES tool approach is deemed to be a more efficient approach than individual estimations/calculations performed by each EU Member State.

All calculations in the 2014 version of the SHARES tool reflect the version of Directive 2009/28/EC as in effect before 5 October 2015 (for ease of use, please see the consolidated version[4]). In other words, the amendment published in the Official Journal of the European Union on 15 September 2015 (*Directive (EU) 2015/1513 of the European Parliament and of the Council of 9 September 2015 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources*)[5] is not taken into account in the main calculation approach of the SHARES tool version 2014.

During year 2016 Eurostat will develop SHARES tool version 2015 that will take into account all specific calculation provision as in place in *Directive 2009/28/EC* following its amendment by *Directive (EU) 2015/1513*.

The SHARES tool is based on the methodological framework using the information gained through annual statistics on energy as covered under Regulation (EC) No 1099/2008. Five annual energy questionnaires are the necessary prerequisite for the use of the SHARES tool:

1. Coal (covers solid fossil fuels and manufactured gases)

2. Oil (covers crude oil and derived oil products)

3. Natural gas

4. Electricity & Heat

5. Renewables (also includes renewable and non-renewable wastes).

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[1] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0028
[2] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32008R1099
[3] http://ec.europa.eu/energy/en/topics/renewable-energy/progress-reports
[4] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02009L0028-20130701
[5] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32015L1513

Energy data from the above-mentioned questionnaires are linked with formulas to calculate the various shares. Countries have to provide some additional information that is not covered by Regulation (EC) No 1099/2008 (in other words: additional information that cannot be derived from the five annual energy questionnaires referred to above).

This manual is the second edition. The first version is available on the Eurostat website: http://ec.europa.eu/eurostat/documents/38154/41386/SHARES_2010.zip/f6bb560a-0b1d-4960-b8f0-bca469354448

1.1. Data publishing

In order to increase the transparency of the calculation process, results from the SHARES tool and the SHARES tool itself will be published on the Eurostat website. If any reporting country considers that their national data in this tool should be treated as confidential, Eurostat should be notified and the necessity for confidentiality should be explained in detail.

2. PREREQUISITES

2.1. Software Requirements

The annual energy questionnaires and the SHARES tool itself were developed in the Microsoft Excel file format. Both use built-in Visual Basic macros. Therefore, users have to enable the use of Visual Basic macros. Security confirmations (to enable macro execution) might vary, depending on the version of Microsoft Excel installed.

The SHARES tool was developed using MS Excel 2010 (32-bit version). While there has not been exhaustive testing in different environments, compatibility with MS Excel 2007 and MS Excel 2013 is expected. The SHARES tool will not work properly with MS Excel 2003 or earlier versions.

2.2. Annual Energy Questionnaires

Annual energy questionnaires are provided by countries to Eurostat in the MS Excel file format. These questionnaires are joint questionnaires of OECD/IEA, Eurostat and UNECE. The methodology for filling in the data is based on internationally agreed standards, methodologies[6] and conventions for energy statistics. From the legal perspective, these energy data are covered by Regulation (EC) No 1099/2008 on energy statistics.

The SHARES tool does not check the correctness of the annual energy questionnaires. It is assumed that all annual energy questionnaires are filled in completely with no mistakes and errors — the internal consistencies within each questionnaire as well as the cross questionnaire consistencies have to be respected.

This version of the SHARES tool will work only with the 'new' annual energy questionnaires (version to be used to submit data for 2012 and subsequent years). It is not possible to use the 'old' energy questionnaires. The previous version of the SHARES tool is compatible only with the 'old' annual energy questionnaires. Both versions of the questionnaires, as well as both versions of the SHARES tool, are available on Eurostat's website:

- http://ec.europa.eu/eurostat/web/energy/methodology/annual

- http://ec.europa.eu/eurostat/web/energy/data/shares

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[6] http://www.iea.org/publications/freepublications/publication/energy-statistics-manual.html

Energy data from the annual energy questionnaires must be exported to CSV format using the export function (built-in macro in the questionnaires). The data must be exported with IEA codes (option **No** has to be selected during exporting).

Subsequently, the data have to be imported into the SHARES tool using the inbuilt procedures (Visual Basic macros accessible from the sheet 'MAIN').

2.3. Additional data for calculations based on Directive 2009/28/EC

Additional data that are not covered by Regulation (EC) No 1099/2008 are needed for the calculations as defined in Directive 2009/28/EC. Detailed data from the following domains are needed:

- Compliant (sustainable) biofuels and bioliquids
- Heat pumps
- Mixed hydro plants
- Cooperation mechanisms (statistical transfers)

These additional data have to be entered into the SHARES tool. The details are described in the following chapters in this manual for the respective shares (RES-T, RES-E, RES-H&C).

Eurostat recommends that Member States ensure the availability of reliable data from these domains, and advises them to put in place (preferably in advance) provisions for these data to be available for reporting in the SHARES tool.

3. DEFINITIONS & METHODOLOGY

This chapter includes some general concepts of definitions and methodologies on various topics that are crosscutting across several domains.

3.1. Calorific values and conversions

Because of their diverse forms, the energy commodities included in the joint annual questionnaires are measured in a variety of units. For instance, heat is reported in TJ (terajoules), electricity in GWh (gigawatt-hours) and fossil fuels in 10^3 tonnes. In general, the SHARES tool converts the units of all products into ktoe in order for the energy products to be homogenous at every step of the target calculation procedure. The acronym 'ktoe' stands for 'one thousand tonnes of oil equivalent'. It is not a unit of mass but a unit of energy, as it expresses the amount of energy that would be released by burning one thousand tonnes of crude oil. For electricity, MW and GWh are used in some places, as those are deemed to be the most common units for expressing data for electricity.

The decision to use ktoe as the main calculation unit was made due to the choice of reporting units in the *Template for Member State progress reports under Directive 2009/28/EC*[7].

The conversion of a fuel quantity from its initial energy units into ktoe requires conversion factors. The conversion factors are:

$$1 \text{ ktoe} = 41.868 \text{ TJ} \qquad 1 \text{ GWh} = 3.6 \text{ TJ}$$

The formulas above are equivalent to the following equations:

$$1 \text{ ktoe} = 41.868 \text{ TJ} = 11.63 \text{ GWh}$$

$$1 \text{ GWh} = 3.6 \text{ TJ} = 0.086 \text{ ktoe}$$

$$1 \text{ TJ} = 0.02388 \text{ ktoe} = 0.2778 \text{ GWh}$$

For reasons of consistency and in order to respect the actual unit definitions, as well as to prevent any unnecessary rounding errors, in the SHARES tool, only the figures 41.868 and 3.6 are used for conversion as either multiplication or division (depending on the nature of the conversion).

The SHARES tools convert all values for all products to their **net** calorific value basis.

For 'natural gas', 'coke oven gas' and 'gas works gas' the implemented relationship between gross and net calorific value is: 1 NCV = 0.9 × GCV

For 'Blast furnace gas' and 'Other recovered gases' it is assumed that net and gross calorific values are the same.

In order to convert mass or volume units to ktoe, average calorific values must be applied so as to form the appropriate conversion factors.

When calculating the energy amounts of fuels used in the transport sector, Directive 2009/28/EC, Annex III defines which calorific values are to be used.

To calculate the amounts of energy in fuels in all other sectors, calorific values as reported in the annual energy questionnaires are used. In cases where those are missing, default values for each fuel are automatically used for the calculations. Countries are encouraged to report updated calorific values in all joint annual energy questionnaires that are transmitted to Eurostat in the framework of Regulation (EC) No 1099/2008 on energy statistics.

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[7] http://ec.europa.eu/energy/en/topics/renewable-energy/progress-reports

Table 1: Default net calorific values used by the SHARES tool for products reported in the renewables questionnaire

Product	Default Net Calorific Value [MJ/t]
Charcoal	30 000
Biogasoline (bio motor gasoline)	26 800
Bioethanol	27 000
Bio jet kerosene (bio kerosene-type jet fuel)	36 800
Biodiesels (bio road diesel)	36 800
Other liquid biofuels	30 000

Table 2: Default net calorific values used by the SHARES tool for products reported in the oil questionnaire

Product	Default Net Calorific Value [MJ/t]
Refinery gas, ethane	49 500
LPG	46 000
Crude oil	45 000
Natural gas liquids, naphtha, aviation gasoline, white spirit and SBP	44 000
Motor gasoline (non-bio), road diesel (non-bio), heating and other gas oil, gasoline-type jet fuel, kerosene-type jet fuel (non-bio), other kerosene	43 000
Lubricants	42 000
Fuel oil, paraffin waxes, other oil products	40 000
Bitumen	39 000
Biodiesels (bio road diesel)	36 800
Bio jet kerosene (bio kerosene-type jet fuel)	36 800
Petroleum coke	32 000
Biogasoline (bio motor gasoline)	26 800

Table 3: Default net calorific values used by the SHARES tool for products reported in the coal questionnaire

Product	Default Net Calorific Value [MJ/t]
Coal tar	38 000
Coking coal, patent fuel, coke oven coke	29 000
Anthracite	28 000
Other bituminous coal	27 000
Sub-bituminous coal	22 000
BKB	20 000
Lignite	15 000
Peat	10 000
Gas coke	28 500
Peat products	18 000
Oil shale and oil sands	12 000

These values are used only in the SHARES tool. While these values are consistent with the methodology for energy balances, some small discrepancies occur due to general approach of conservatism in order to avoid any overestimation for various shares of energy from renewable sources.

3.2. Criteria of compliance (aka sustainability criteria)

Some biofuels and bioliquids must comply with sustainability criteria defined in Directive 2009/28/EC in order to be counted towards a Member State's renewables share. This section describes how the compliance of biofuels and bioliquids with Articles 17 and 18 of Directive 2009/28/EC is applied in the calculations in the SHARES tool.

For data for the period 2004–2010: Directive 2009/28/EC did not then exist or had only very recently been adopted. In most European countries, it was not transposed into national legislation. Also, the values in these years are not used for any measurement of legislative compliance with indicative trajectory as defined in part B of Annex I of the Directive. It was decided that, for the years from 2004 to 2010, all biofuels and bioliquids would be counted towards the numerator of the share of energy from renewable sources.

For data for 2011 and onwards: Compliance with Article 17 ('Sustainability criteria for biofuels and bioliquids') has to be judged also with respect to Article 18 ('Verification of compliance with the sustainability criteria for biofuels and bioliquids'). As of data from 2011, countries should report as compliant only those biofuels and bioliquids for which compliance with Articles 17 and 18 can be fully demonstrated. If no additional country-specific information is entered or provided, no amounts of biofuels and bioliquids will be counted towards the numerator of the share of energy from renewable sources in the SHARES tool.

In detail, this approach in time series applies specifically to the following categories:

- biofuels in transport (liquid and gaseous)
- heat and electricity produced from bioliquids (liquid biofuels)
- final energy consumption of bioliquids (liquid biofuels used for energy purposes in industry, households, services, etc.).

The approach described above is implemented in the SHARES tool. The break in time series is marked with the symbol 'll' in between the years 2010 and 2011.

Picture: Example of visual notation of break in series

0.0	0.0	0.0	0.0
744.6	805.8ll	812.92	875.10
28 913.45	27 011.05	30 440.63	26 780.56
2.51%	**2.90%ll**	**2.60%**	**3.16%**

4. ELECTRICITY (RES-E)

4.1. Definition of RES-E share

The ratio determining a Member State's RES-E share is not defined directly in the Directive, as such. Article 5 defines only what one could consider as the numerator of such ratio. However, footnote 5 in the *Template for Member State progress reports under Directive 2009/28/EC* provides additional information about how this ratio should be considered in Table 1: gross final consumption of electricity from renewable sources divided by gross final consumption of electricity.

The numerator 'gross final consumption of electricity from renewable sources' is, for the purpose of the calculations in the SHARES tool, defined as the sum of the following elements:

- Gross electricity production by hydropower in accordance with the normalisation rules set out in Annex II, excluding the production of electricity in pumped storage units from water that has previously been pumped uphill. Gross electricity production in mixed hydro plants[8] is included without its electricity production due to pumped storage.

- Gross electricity production by wind power, in accordance with the normalisation rules set out in Annex II.

- Gross electricity production from pure bioliquids — as of 2011 only the production from compliant (sustainable) bioliquids is counted.

- Gross electricity production from blended bioliquids, to be reported as of 2011 — only production from the compliant (sustainable) blended bioliquids is to be reported, and only the electricity generated corresponding to the blended part should be reported.

- Gross electricity production from biogases.

- Gross electricity production from biogases blended in the natural gas grid — only the proportion corresponding to the ratio of blended biogases into natural gas

- Gross electricity production of other renewable sources reported in the annual questionnaires: geothermal; solar (photovoltaic and thermal); tide, wave and ocean; renewable municipal waste; solid biofuels (solid biomass).

In multi-fuel plants using renewable and conventional sources, only the part of electricity produced from renewable energy sources is taken into account — this principle is respected by default due to the reporting methodology in the annual energy questionnaires.

The denominator 'gross final consumption of electricity' is, for the purpose of the calculations in the SHARES tool, defined as:

- Gross electricity production from all energy sources (actual production, no normalisation for hydro and wind), excluding the production of electricity in pumped storage units from water that has previously been pumped uphill

- plus total imports of electricity

- minus total exports of electricity.

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[8] Mixed hydro plants are those plants which can be used for two purposes: for pumped storage as well as to generate genuine additional electricity from hydro power.

If any statistical transfers, joint projects or joint support schemes for renewable electricity are put in place and reported (as defined in Articles 7–11 of Directive 2009/28/EC), only the overall RES share numerator is correspondingly adjusted; RES-E is not influenced.

4.2. Reporting instructions

- **Normalisation rule: hydro & mixed plants**

Mixed plants have been added to the annual energy questionnaires for reference year 2012. The renewables questionnaire now collects data on the capacities of mixed plants and pure pumped storage plants. The reporting instructions for the electricity questionnaire also indicate how hydro production should be reported.

Definitions related to hydro power for annual energy questionnaires

ELECTRICITY questionnaire - Table 1 and Table 2:

"Hydro" report here all electricity generation in hydro stations including all electricity generation from pumped storage in all types of hydro plants.

"Pumped hydro" report here all electricity generated due to pumping in all types of pumped storage plants (pure + mixed); pure electricity generation in mixed plants should not be included here.

ELECTRICITY questionnaire - Table 3:

"Used for pumped storage" report here electricity consumed for pumping water in pumped storage plants (pure + mixed).

ELECTRICITY questionnaire - Table 7a:

"3 - Hydro" report here total capacity for electricity generation in hydro stations including all capacity for electricity generation of pure + mixed pumped storage plants

"4a – Mixed plants" report here the capacity for electricity generation in mixed pumped storage hydro plants.

"4b – Pure pumped storage" report here the capacity for electricity generation in pure pumped storage plants.

RENEWABLES questionnaire – Table 1:

"Hydro" report here a sum of "Hydro -1 MW" + "Hydro 1-10 MW" + "Hydro 10+ MW" + "Pumped hydro". The reported value has to be exactly the same as in the electricity questionnaire Table 1.

"Hydro -1 MW", "Hydro 1-10 MW", "Hydro 10+ MW" report here electricity generation in hydro stations including pure electricity generation from mixed pumped storage hydro plants. Electricity generation due to pumping should not be reported here.

"Pumped hydro" report here all electricity generated from pumped storage in all types of pumped storage plants (pure + mixed). Pure electricity generation in mixed plants should not be included here. The reported value has to be exactly the same as in the electricity questionnaire Table 1.

RENEWABLES questionnaire – Table 3:

Please report capacities for each plant category. The total for "Hydro" has to be the same in the renewable and electricity questionnaire, as well as the elements for "Mixed plants" and "Pure pumped storage".

Countries that do not operate mixed plants have to do nothing. Hydro normalisation is now automatically calculated on the sheet 'REN' in rows 184–188.

Countries that operate mixed plants have to report the actual electricity generation, without pumping, of these mixed plants on row 191 on the sheet 'REN' for all time periods (starting in 1990). Data for capacities of mixed plants are automatically taken from questionnaires.

The reported data should be consistent with other data in the annual energy questionnaires and a simple check is shown on row 198 on the sheet 'REN' to provide help.

Row 198: The reported total electricity generation without pumping in the electricity questionnaire is compared with electricity generated based on the data from the renewable questionnaire and the data for mixed plants. If the value is zero or very close to zero, there is a perfect match or small rounding error. If value is high, it indicates discrepancy between electricity and renewable questionnaire.

- **Gross electricity production from compliant (sustainable) bioliquids**

Countries should report the gross electricity generation from compliant bioliquids on the sheet 'OVERALL TARGET' in rows 6 and 7 for years from 2011 onwards. The reported figures in row 6 should be lower or equal to gross electricity generation reported in row 5.

Prior to 2011, all electricity generation from pure bioliquids is counted towards the numerator. While there is a break in series in methodology between 2010 and 2011, the electricity generation from bioliquids is, in general, very small when compared to all other types of electricity generation, so in practice no significant and visible break in series is expected.

Electricity from blended biofuels is to be reported only as of 2011. The actual reported values were zero for periods up to 2011. In practice, this use of blended bioliquids is expected to be negligible.

- **Normalisation rule: wind**

The use of n in the formula for wind normalisation is, from a mathematical perspective, inadequate and actually a value of 4 can be used without any effect on the actual result.

$$Q_N = \frac{C_N + C_{N-1}}{2} \times \frac{\sum_{i=N-n}^{N} Q_i}{\sum_{j=N-n}^{N} \left(\frac{C_j + C_{j-1}}{2} \right)} = \frac{C_N + C_{N-1}}{2} \times \frac{\sum_{i=N-4}^{N} Q_i}{\frac{C_{N-5}}{2} + C_{N-4} + C_{N-3} + C_{N-2} + C_{N-1} + \frac{C_N}{2}}$$

While the form on the left side is exactly as in the Annex II of the RES Directive, the form on the right side of the equation is implemented in the SHARES tool (as they are equivalent).

4.3. Maximum rule for RES-E

If calculation results lead to figures above 100 %, for any subsequent calculation using RES-E share as input (for example for RES-T), 100 % is used instead of the real calculated value.
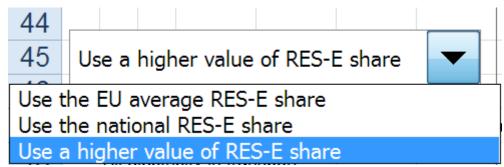
5. TRANSPORT (RES-T)

5.1. The choice of the appropriate RES-E share for electricity in transport

To calculate the amount of renewable electricity used in transport, the amount of electricity used in transport is multiplied with the RES-E share of year n-2. Regarding the used RES-E share, all countries have to make their own choice based on Article 3(4)(c) of Directive 2009/28/EC: '*Member States may choose to use either the average share of electricity from renewable energy sources in the Community or the share of electricity from renewable energy sources in their own country'*. This choice affects the calculation of the transport target and is the essential input parameter.

In the SHARES tool, the available options are:

- Use the EU average RES-E share

- Use the national RES-E share

- Use a higher value of RES-E (whichever of the above is higher)

The last option is selected as default value and can be changed on the sheet 'TRANSPORT' in row 45, in the combo box.

Reporting countries are requested to verify that the correct choice has been made for their country before sending the final version of the SHARES tool to Eurostat.

As mentioned in the chapter for RES-E, if the RES-E value is above 100 %, the SHARES tool will use 100 % instead of the real value for RES-T calculation.

5.2. Definition of RES-T share

Biofuels are defined in Article 2 of the RES Directive: '*"biofuels" means liquid or gaseous fuel for transport produced from biomass'*. Biomass is defined in this article as well: '*"biomass" means the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste'*.

The ratio determining a Member State's RES-T share is defined in the Article 3(4) of the RES Directive, as this Article defines both the numerator and the denominator.

Further clarifications are given in the FAQ document[9] on the website[10] of DG Energy:

> Article 3(4)(a) reads: 'for the calculation of the denominator … petrol, diesel, biofuels consumed in road and rail transport, and electricity shall be taken into account. In other words, the following four items must be included:

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[9] https://ec.europa.eu/energy/sites/ener/files/documents/nreap_z_faq_040110.pdf

[10] http://ec.europa.eu/energy/en/topics/renewable-energy/progress-reports

1) Consumption of petrol for transport (all modes of transport, e.g. also aviation gasoline)

2) Consumption of diesel for transport (all modes of transport, e.g. also rail or inland waterways consumption of diesel)

3) Biofuels used in road and rail transport

4) Electricity used in any mode of transport (e.g. including for pipeline transport).

LPG is not included in the denominator for the transport target, nor is aviation kerosene or any type of fuel used for international shipping.'

Transport modes, as defined in Regulation (EC) No 1099/2008, include: international aviation, domestic aviation, road, rail, domestic navigation, pipeline transport, and a category for transport not specified elsewhere. International marine bunkers (international shipping) are excluded and not considered in the transport sector.

The numerator 'energy from renewable sources consumed in transport' is, for the purpose of the calculations in the SHARES tool, defined as the sum of the following elements:

- Compliant biofuels (liquid and gaseous) in all modes of transport and, where applicable, the respective multiplier (2×) as defined in Article 21(2), is used.

- Renewable electricity, by applying the national or community RES-E share to the total electricity consumption in transport (proportionality of renewable electricity in the grid principle) with the respective multiplier (2.5×) for road transport, as defined in Article 3(4)(c). The RES-E share of year n-2 is applied ('… as measured two years before …'), with the exception of the years 2004 and 2005, which use the ratio of the year 2004, as it is not possible to calculate ratios for years prior to 2004. For the purpose of the RES-T calculation, the value of RES-E will be capped at a maximum of 100 % (in which case it means that all electricity is renewable).

- Hydrogen of renewable origin in all modes of transport.

- Synthetic fuels of renewable origin in all modes of transport.

- Other forms of renewable energy with reported consumption in the transport sectors in the annual renewable questionnaire (geothermal, solar thermal, renewable municipal waste, solid biofuels).[11]

With respect to the denominator, the FAQ document also provides additional calculation clarifications:

For the calculation of the transport target in chapter 3.2, is the 2,5 factor for electricity from renewable energy sources applied both in the numerator and the denominator?

Yes, the factor 2,5 should - as stated in the template – be applied for both the denominator and the numerator. Contrary to Article 3(4)(a) and 3(4)(b), Article 3(4)(c) applies to both the calculation of the numerator and the denominator (had the factor only applied to the numerator it would have appeared in point b).

Similar argument as presented above can be made for the application of the factor 2 of Article 21(2) - had the factor only applied to the numerator specific reference would have been made in Article 21(2) to Article 3(4)a.

The denominator 'energy consumed in transport' is, for the purpose of the calculations in the SHARES tool, defined as the sum of the following elements:

- Petrol in all modes of transport (motor gasoline plus aviation gasoline[12]).

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[11] This category is included only for the sake of full coverage of possible reporting in the annual renewable questionnaire. The actual contribution is expected to be zero or, in very exceptional circumstances, negligible.

- Diesel in all modes of transport (non-bio gas/diesel oil).

- All biofuels (compliant and non-compliant) in road and rail transport (including respective quantities with multiplier as defined in Article 21(2)).

- Electricity in all modes of transport (including respective quantities with multiplier as defined in Article 3(4)(c)).

5.3. Reporting instructions

- **Calorific values**

When calculating the amount of transport fuels to be reported in the SHARES tool, Directive 2009/28/EC defines which calorific values are to be used for transport fuels in Annex III.' Therefore the Annex III values (43 MJ/kg) are used for petrol and diesel consumption in the transport sector when calculating the RES-T numerator and denominator. When reporting quantities of biofuels used in transport, the calorific values in Annex III of Directive 2009/28/EC shall be used for reporting in rows 28–30, 32–34, and 42–43 (on the sheet 'TRANSPORT').

- **Reporting of all biofuels in transport**

All biofuels (compliant and non-compliant) should be reported on the sheet 'TRANSPORT' in rows 28–30 (liquid biofuels) and 32–34 (gaseous biofuels).

- **Reporting of hydrogen in transport**

Hydrogen of renewable origin used in transport shall be reported on the sheet 'TRANSPORT' in row 37.

If hydrogen is produced from electricity from renewable sources (via a direct physical connection or via the grid and using the RES-E share), then this hydrogen should be considered renewable only when corresponding electricity production is deducted from total electricity production — otherwise the renewable energies are counted twice.

Please note that in Regulation (EC) No 1099/2008 on energy statistics hydrogen is not accounted for and monitored for its use due to its current statistical insignificance, and thus it does not need to be reported. This approach might change in the future if hydrogen is used to a significant scale as transport fuel or energy carrier. In any case, as hydrogen is not included in the denominator for the RES-T calculation, RES-T is not influenced at all by this approach. For the overall RES share the impact is negligible as the overall use of hydrogen in European energy economy is currently insignificant when compared to fossil fuels.

- **Reporting of synthetic fuels of renewable origin in transport**

Synthetic fuels of renewable origin used in transport shall be reported on the sheet 'TRANSPORT' in row 38. Synthetic fuels of renewable origin in transport are those renewable liquid and gaseous transport fuels of non-biological origin, other than biofuels as defined in Article 2(i) of Directive 2009/28/EC, whose energy content comes from renewable energy sources other than biomass and which are used in transport.

If synthetic fuels of renewable origin are produced from electricity from renewable sources (via a direct physical connection or via the grid and using the RES-E share), then this synthetic fuels of renewable origin should be considered renewable only when

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[12] Note: aviation gasoline is not to be confused with jet fuels (gasoline/kerosene-type jet fuels).

corresponding electricity production is deducted from total electricity production — otherwise the renewable energies are counted twice.

Please note that in Regulation (EC) No 1099/2008 on energy statistics synthetic fuels of renewable origin are not accounted for and monitored for their use due to its current statistical insignificance. This approach might change in the future if synthetic fuels of renewable origin are used to a significant scale as transport fuel. In any case, as synthetic fuels of renewable origin are not included in the denominator for the RES-T calculation, RES-T is not influenced at all by this approach. For the overall RES share the impact is negligible as the overall use of synthetic fuels of renewable origin in European energy economy is currently insignificant when compared to fossil fuels.

- **Reporting of compliant (sustainable) biofuels in transport**

Compliance with Article 17 (Sustainability criteria for biofuels and bioliquids) has to be judged also with respect to Article 18 (Verification of compliance with the sustainability criteria for biofuels and bioliquids). As of 2011, countries shall report as compliant only those biofuels and bioliquids for which compliance with Articles 17 and 18 can be demonstrated.

Regardless of the circumstances, if compliance with the requirements of both Articles cannot be demonstrated, the quantities of such biofuels shall **not** be reported as compliant. Please note that demonstrating this compliance is not part of the SHARES tool.

Compliant biofuels should be reported in rows 42–43 on the sheet TRANSPORT. In case quantities are known, biofuels with respect to Article 21(2) can be reported also for periods before 2011 (row 43).

Calorific values as in Annex III of Directive 2009/28/EC should be used for all calculations for transport fuels, including for all types of biofuels. In case the biofuels used are not listed in Annex III of Directive 2009/28/EC, real world calorific values should be used for all calculations for biofuels and synthetic fuels of renewable origin.

**Definitions related to transport for annual energy questionnaires
(DRAFT version – provisional)**

Transport sector exclusion rules for specific elements:
- All transport in the energy sector (for example: surface and underground mines) for the carrying and transporting material within the energy production sites and/or energy transformation sites (aka not on the publically accessible transport network) is to be reported in the respective categories of the energy sector (coal mines, oil and gas extraction, oil refinery).
- All transport on publically <u>not</u> accessible transport network areas (in general off-road areas, regardless if paved or unpaved roads) in the following sectors is to be reported in the respective end-use sectors of final consumption and not in the transport sector: agriculture, forestry, fishing, construction.
- Military vehicles (wheeled or crawler/tracked type vehicles) are to be reported in the "other sectors — not elsewhere specified".
- International Marine Bunkers are not considered as a part of the final consumption (transport sector) in the joint annual energy questionnaires.
- Energy consumption of elevators, lifts and moving stairs are to be reported in the residential, commercial/public services and/or industrial sectors.
- Stationary engines are excluded from reporting in the transport sector (including mobile generators).
- Energy used in buildings supporting activity of the transport sector (NACE 49-53) should be reported in the category commercial/public services.

Transport Sector – Rail includes all transport on the rail tracks. This includes all form of trains: high speed trains, maglev, express trains, inter-city trains, local trains, suburban trains, monorail, metro, trams, cable cars (funiculars) on rail tracks (aka cable railway) and industrial railways. This includes all passenger transport and freight transport as well as all surface transport and underground transport on rail tracks. All transport on rail tracks is included, regardless if in urban areas or not.

Transport Sector – Road includes all transport on publically accessible roads, highways, motorways and unpaved roads, regardless if infrastructure is privately or publically owned. This includes all forms of road vehicles: powered bicycles and tricycles (e.g. electric bicycles), scooters, mopeds, motorcycles, three-wheelers, quads, cars, vans, SUVs, mini-buses, buses (including trolley buses), coaches, trucks, road tractors and all types of mobile utility vehicles (for example: fire trucks, snow plows, garbage truck). Use of fuel of utility vehicles (industrial, agricultural, forestry and construction sector vehicles) on publically accessible roads, highways and motorways should be also reported here. However, the "off-road" consumption of energy of utility vehicles (industrial, agricultural, forestry and construction sector vehicles) is not to be reported here. Energy consumption in the non-wheeled vehicles (crawlers/tracked vehicles) is not to be reported in the road transport but in the respective sectors of energy sector or final energy consumption sectors - industry. All transport is included, regardless if in urban areas or not.

Transport sector — International aviation includes quantities of aviation fuels delivered to aircrafts (planes, helicopters and drones) for international aviation. The domestic/international split should be determined on the basis of departure and landing locations and not by the nationality of the airline. Excludes fuels used by airlines for their road vehicles (to be reported in the transport sector — not elsewhere specified) and military use of aviation fuels (to be reported in the other sectors — not elsewhere specified).

Transport sector — Domestic aviation includes quantities of aviation fuels delivered to aircraft (planes, helicopters and drones) for domestic aviation — commercial, private, agricultural, etc. Note that this may include journeys of considerable length between two airports in a country (see geographical definitions of countries). Includes fuel used for purposes other than flying, e.g. bench testing of engines. The domestic/international split should be determined on the basis of departure and landing locations and not by the nationality of the airline. Excludes fuels used by airlines for their road vehicles (to be reported in the transport sector — not elsewhere specified) and military use of aviation fuels (to be reported in the other sector — not elsewhere specified).

Transport sector — Domestic navigation includes quantities delivered to vessels of all flags <u>not</u> engaged in international. The domestic/international split should be determined on the basis of port of departure and port of arrival and not by the flag or nationality of the ship. Note that this may include journeys of considerable length between two ports in a country (see geographical definitions of countries). Fuel used by fishing boats should <u>not</u> be reported in transport sector, but in the final energy consumption category fishing (in other sectors).

Transport sector — Pipeline transport includes quantities used as energy in the support and operation of pipelines transporting gases, liquids, slurries and other commodities. Includes energy used for pump stations and maintenance of the pipeline. Excludes energy used for the pipeline distribution of natural or manufactured gas, hot water or steam from the distributor to final users (to be reported in the energy sector), energy used for the final distribution of water to household, industrial, commercial and other users (to be included in commercial and public services) and losses occurring during this transport between distributor and final users (to be reported as distribution losses).

Transport sector — not elsewhere specified includes quantities used for transport activities not included elsewhere. By the way of example:

- fuels used in the airports for the surface transport;
- fuels used in ports for ships' unloaders;
- various types of cranes;
- consumption in cable cars not on rail tracks (hanging cable cars, aerial lifts, gondolas, ski lifts)
- recreational use of powered vehicles (ski-jets, snowmobiles, golf carts), use in racing vehicles, fuel used during competitions and shows (including recreational use of ex-military vehicles and ex-industrial vehicles);
- fuel used in space shuttles and spacecrafts.

6. HEATING & COOLING (RES-H&C)

6.1. Definition of RES-H&C share

This ratio determining a Member State's RES-H&C share is not directly defined in the Directive, as such. Article 5 defines only what one could consider as the numerator of such ratio. However, footnote 4 in the *Template for Member State progress reports under Directive 2009/28/EC* provides additional information about how this ratio should be considered in Table 1: 'gross final consumption of energy from renewable sources for heating and cooling divided by gross final consumption of energy for heating and cooling'.

The numerator 'gross final consumption of energy from renewable sources for heating and cooling' is, for the purpose of the calculations in the SHARES tool, defined as the sum of the following elements:

- Final energy consumption of renewable energies other than electricity, heat and bioliquids in sectors other than transport. Using the terminology and definitions of joint annual energy questionnaires, this covers:
  - o all consumption reported under 'Industry sector' and 'Other sectors' on the renewables questionnaire;
  - o all consumption reported under 'Transformation sector — Blast furnaces' on the renewables questionnaire.

- Compliant bioliquids consumed in the 'Transformation sector — Blast furnaces', 'Industry sector' and 'Other sectors':
  - o pure bioliquids reported in the renewables questionnaire
  - o the corresponding part of blended bioliquids (biogasoline, bio jet kerosenes, biodiesels) reported in the oil questionnaire.

- Derived heat produced from geothermal, solar thermal, renewable municipal waste, solid biofuels and biogas as reported in the renewables questionnaire.

- Derived heat produced from compliant bioliquids:
  - o heat produced form compliant pure bioliquids reported in the renewables questionnaire
  - o the corresponding part of heat produced from compliant blended bioliquids (biogasoline, bio jet kerosenes, biodiesels) reported in the oil questionnaire.

- The share of biogas blended in the natural gas network applied to natural gas consumption in the 'Transformation sector — Blast furnaces', 'Industry sector' and 'Other sectors'.

- The share of biogas blended in the natural gas network applied to derived heat produced from natural gas.

- The contribution of renewable energy from heat pumps calculated based on Commission Decision 2013/114/EU[13] (notified under document C(2013) 1082).

The denominator 'gross final consumption of energy for heating and cooling' is, for the purpose of the calculations in the SHARES tool, defined as the sum of the following elements:

- Final energy consumption of all energies other than electricity in sectors other than transport. Using the terminology and definitions of joint annual energy questionnaires, this covers:

  - o all consumption reported under 'Industry sector' and 'Other sectors' on the renewables, coal, oil and natural gas questionnaires;

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[13] http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32013D0114

- all consumption reported under 'Transformation sector — Blast furnaces' on the renewables, coal, oil and natural questionnaires minus the production of 'Blast furnace gas' reported on the coal questionnaire.

- All derived heat consumed in the 'Transformation sector — Blast furnaces', 'Industry sector' and 'Other sectors'.

- The contribution of renewable energy from heat pumps calculated based on Commission Decision 2013/114/EU (notified under document C(2013) 1082).

6.2. Reporting instructions

- **Reporting of final consumption of compliant biofuels**

  Final energy consumption of compliant biofuels should be reported in row 18 on the sheet 'OVERALL TARGET'. Report here only consumption in 'Industry sector', 'Other sectors' and 'Transformation sector — Blast furnaces'. Consumption in transport is **not** to be reported here.

- **Reporting of heat from compliant biofuels**

  Derived heat (heat sold[14]) produced from compliant biofuels should be reported in rows 23 and 24 on the sheet 'OVERALL TARGET'. The reported values in row 23 should be lower than the values shown in row 22.

6.3. Reporting instructions for heat pumps

All reporting of renewable energy captured by heat pumps should be based on Commission Decision 2013/114/EU (notified under document C(2013) 1082). Please note that there were some typographical errors in the first version of this Decision and therefore the corrected version should be used.

All information about heat pumps is to be reported on the sheet 'HEAT PUMPS'.

Countries can report in row 8 on the sheet 'HEAT PUMPS' renewable energy captured by heat pumps in the following cases:

- For historic time periods where a lack of data does not allow to use the approach established in Commission Decision 2013/114/EU.

- If national methodology with improved accuracy is used and the conditions described in 2013/114/EU — Annex — section 3.12 are fulfilled.

- On a temporary basis, if only partial coverage of all heat pumps is reported according to Commission Decision 2013/114/EU in other rows on the sheet 'HEAT PUMPS'.

Countries have to ensure that there is no double counting of renewable energy reported in row 8 on sheet 'HEAT PUMPS' with other renewable energy data reported elsewhere. Also, countries are asked to provide a written explanation of what exactly is reported in this row, in case they decide to use it (please use sheet REMARKS)

Please report **Capacity of heat pump installed** in the respective rows for your country's climate condition areas (cold, average, warm) — reporting units are gigawatts (GW) and all heat pumps should be included. If this information is not available, please provide an estimate. This element complements the elements needed for calculation and is not actually entered into any calculations; it serves only for checking purposes.

As only renewable energy from heat pumps with an SPF greater than 2.5 should be considered towards the target, it is necessary to also report capacities in GW '**of which SPF**

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[14] Please see harmonised IEA-Eurostat methodology for reporting in annual energy questionnaires.

is above the minimum threshold' in the respective rows for your country's climate zone (cold, average, warm).[15]

Clarification note for the minimum SPF threshold: Electrically driven heat pumps with an SPF of 2.5 and above, as well as thermally driven heat pumps with an SPF of 1.15 and above, should be included. Electrically driven heat pumps with an SPF below 2.5, as well as thermally driven heat pumps with an SPF below 1.15, must be excluded. It is not sufficient to judge if the national average is above this threshold — even if the national average is above this threshold the total capacity should be estimated based on the assessment of this threshold on the level of individual heat pump units.

Default values for 'Equivalent full load hours of operation' as well as 'Estimated average SPF' have been pre-entered. If based on scientific evidence and/or statistical data collections and more precise national values are available, such figures can be entered instead of the default values (please see Commission Decision 2013/114/EU — Annex — section 3.12).

The level of detail is significant (in total nearly 400 rows long). However, many Member States have only one climate condition area, several Member States have two areas, and only very few Member States might have all three climate condition areas to report.

Note: in the SHARES tool (MS Excel file) click on the '+' sign on the left side to expand the section you wish to see.

Until the map defined in Figure 2 of Commission Decision 2013/114/EU is defined in a more precise way in the legally binding documents referred to in this Decision or elsewhere, Eurostat defines on a **provisional basis** the climate condition areas based on the Heating Degree Days (HDD) dataset. This **provisional** definition is necessary to make reporting in the SHARES tool practical and operational. By no means is this provisional definition to prejudge any subsequent decision of the Commission on this matter.

Basic HDD data are available from Eurostat database[16] for the period 1980–2009, which allows the creation of long-term averages for nearly all NUTS 2 regions in the EU (and also country-level attribution, in case regional data are not available).

One of the main principles used when preparing heat pump guidelines was **conservatism** regarding heat pump performance. In line with this principle of conservatism, cold, average and warm climate areas were defined. This approach also has one additional advantage: countries are further encouraged to do some research in order to have better estimates for the default values in their territory.

A detailed table with attribution of available NUTS regions as in the Eurostat's database is provided in Annex I at the end of this document. On the next page, there is a provisional European map showing climate condition areas. Thresholds for defining cold/average/warm climates were set up as 2 000 and 3 000 annual heating degree days.

Please note the following aspects of this provisional definition of climate condition areas:

- This definition only defines how cold it is in winter for heating purposes and does not reflect how hot it is in summer.

- It is used only to apply default values when specific national values are not available.

For information: please also see other scientific work on climate classification.[17]
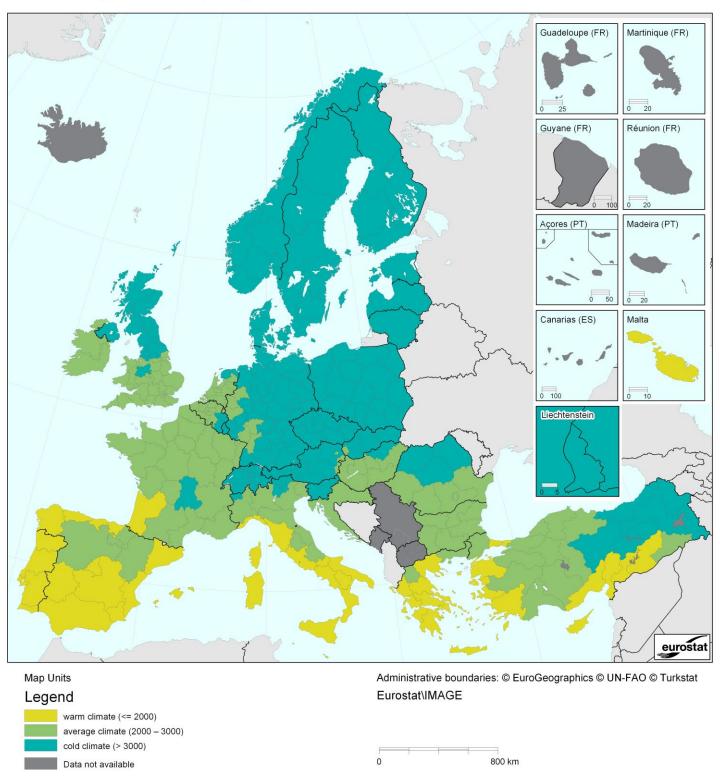
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[15] SPF stands for 'Seasonal Performance Factor'.
[16] dataset: Heating degree days by NUTS 2 regions — annual data (nrg_esdgr_a)
[17] http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf

Climate Condition Areas
Provisional approach for reporting in the SHARES tool

Guadeloupe (FR)
0   25

Martinique (FR)
0   20

Guyane (FR)
0   100

Réunion (FR)
0   20

Açores (PT)
0   50

Madeira (PT)
0   20

Canarias (ES)
0   100

Malta
0   10

Liechtenstein
0   5

eurostat

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat
Eurostat\IMAGE

Map Units

Legend

▨	warm climate (<= 2000)
▨	average climate (2000 – 3000)
▨	cold climate (> 3000)
▨	Data not available

0   800 km

7.   OVERALL RES SHARE

The RES ratio is defined in Article 5 of the Directive as this Article defines many details about the calculation of the share of energy from renewable sources. The following specificities and similarities with RES-E, RES-T and RES-H&C for overall RES share calculation are worth highlighting:

- While RES-T is calculated with a denominator as defined in Article 3, the overall RES share denominator is calculated with all fuels used in all transport modes (for example LPG and CNG consumption, as well as aviation consumption).

- While the RES-T numerator and denominator have a multiplier for renewable electricity in road transport and certain compliant (sustainable) biofuels, in the overall RES share numerator and denominator these multipliers are not applied.

- Additional renewable energy captured by heat pumps is included in the numerator and the denominator of RES-H&C as well as in the numerator and the denominator of the overall RES share.

- The calorific values for transport in Annex III are used in the numerator and the denominator of RES-T as well as the overall RES share; however, for the use of fuels outside the transport sector and fuels not defined in Annex III, calorific values as reported in the annual energy questionnaires are used.

Three elements of Article 5(1) are presented in the SHARES tool on the sheet 'OVERALL TARGET' in rows 42–44. These are automatically calculated based on input already provided and described in previous chapters.

'Gross final consumption of energy' (GFCoE) is calculated for each fuel on respective fuel sheets and is presented on the sheet 'OVERALL TARGET' in rows 32–36. Please note that the calculation of GFCoE has several particularities due to the linking of certain elements to RES-E and RES-T and in order to facilitate calculation in the SHARES tool:

- All transport fuels from the renewables questionnaire are included together with the 'OIL questionnaire' and values with the calorific values of Annex III are taken into account.

- The final energy consumption of renewable electricity and renewable derived heat is included together with other consumption of electricity and derived heat, and consumption quantities for GFCoE calculation are attributed to the "ELECTRICITY" questionnaire.

As a consequence, values under the heading 'RENEWABLE questionnaire' are much lower; however, as all values are summed together, this does not affect the total calculation. For individual calculations of RES-E, RES-T and RES-H&C, the correct amount of renewables in full are taken into account.

Overall RES share is presented in row 58 on the sheet 'OVERALL TARGET'. Data in this row are adjusted as described in sections 7.1 (Cooperation Mechanisms — Statistical Transfers) and 7.2 (Aviation adjustment).

7.1.   Cooperation Mechanisms — Statistical Transfers

If any statistical transfers joint projects or joint supports schemes for renewables are put in place and reported (as defined in Articles 6–11 of the Directive), both the numerator and the denominator are correspondingly adjusted. The information in Table 1a of the *Template for*

Member State progress reports under Directive 2009/28/EC provides a calculation formula[18] that indicates that only the total RES share should be adjusted for any 'Cooperation Mechanisms — Statistical Transfers'. Consequently, RES-T, RES-H&C and RES-E are not adjusted for any statistical transfers occurring.

All values are to be reported in ktoe in the cells highlighted in yellow on the sheet 'STAT. TRANSFERS' (rows 7–8, 13–14, 16–17, 22–23, 28–29, and 31–32). Only positive values should be entered here (<u>no negative values</u> for amounts of energy to be deducted).

The first notification was sent to the Commission for the year 2012 and therefore reporting for previous years is not possible.

Reporting countries are strongly encouraged to double check with their counterparts in other countries and report exactly the same values in order to avoid any possible discrepancies from unit conversions and rounding to certain number of decimal places.

Reporting units are ktoe.

7.2. Aviation adjustment

If bioliquids are used in aviation, the calorific values in Annex III should be used for conversion. As these are not reported in annual energy questionnaires, countries can provide adjusted values for aviation fuel consumption. If no fuels of renewable origin are used, no intervention by reporting countries is needed — there is a predefined formula with this respect included in the relevant cells.

Aviation consumption values are to be reported in ktoe in the cells highlighted in yellow on the sheet 'OVERALL TARGET' in row 54. Actual consumption without aviation cap adjustments should be reported there. The aviation cap adjustment with respect to Article 5(6) is performed subsequently.

8. REMARKS SHEET

The sheet 'REMARKS' should include all important notes related to the elements in the SHARES tool. Such notes might include explanations for breaks in series and outliers.

9. TEMPLATE TABLES SHEET

The sheet 'TEMPLATE TABLES' in the SHARES tool presents information that can be directly used for the preparation of certain tables in the progress report under Directive 2009/28/EC. It is not possible to provide information for all tables, only some information for tables 1, 1a, 1b and 1c is provided.

10. OVERALL SUMMARY SHEET

The sheet 'OVERALL SUMMARY' in the SHARES tool presents key information that can be easily printed in landscape format. The sole purpose of this sheet is presentational. There is no new information calculated here, nor there are any additional data to be entered.

Several energy units can be chosen using the drop-down list.

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[18] $(G) = (D) - (E) + (F)$.

11. TECHNICAL NOTES

- Many elements of the SHARES tool are password protected in order to prevent any possible distortion in calculations. While the password will not be shared, an unprotected version will be provided upon request.

- Data are loaded from CSV files to the sheets 'COAL', 'OIL', 'GAS', 'ELE' and 'REN'. There is a one-to-one relationship between a data point in the CSV file and the loading place in the SHARES tool.

- Data loading is based on short name codes located in columns A–F on the sheets 'COAL', 'OIL', 'GAS', 'ELE' and 'REN'. These columns are hidden, as end-users of the SHARES tool do not need access to it.

- Loaded data are in areas with a table border, supporting calculations are in cells with no special formatting. Data are loaded for time periods starting in the year 1990. Due to normalisation for hydro, the first year that calculations are possible for is 2004 (1990 plus 15 years of data for normalisation).

- Data to be entered by reporting countries are in the cells highlighted in yellow.

- The structure of the sheets 'COAL', 'OIL', 'GAS', 'ELE' and 'REN' is the same:
    - The first part is the calculation of 'Gross Final Consumption of Energy' in ktoe.
    - The second part is the section on calorific values:
        - reported in the annual questionnaires
        - default values
        - conversion factors to GJ with no gaps for missing values.
    - The third part is data from annual energy questionnaires needed for the calculations; some other support calculations are included there as well.

- Completed SHARES tool shall be transmitted or uploaded by electronic means to the Single Entry Point for data at Eurostat. Therefore we kindly ask you to transmit your data to Eurostat following the **eDAMIS** implementing procedures (https://webgate.ec.europa.eu/edamis). Dataset name in eDAMIS for SHARES tool is **ENERGY_SHARES_A**. If SHARES tool contains confidential data, please mention it in the "Remarks" sheet as well as include a comment with your data transmission in eDAMIS.

- In case of any questions or comments, please contact Eurostat via email at: ESTAT-ENERGY@ec.europa.eu or Marek.Sturc@ec.europa.eu.

12. ANNEX I — PROVISIONAL ATTRIBUTION OF NUTS REGIONS TO CLIMATE CONDITION AREAS

NUTS region code — NUTS regions name — annual HDD average 1980–2009 — climate area

BE - Belgium - 2830 - average
BE10 - Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest - 2601 - average
BE21 - Prov. Antwerpen - 2693 - average
BE22 - Prov. Limburg (BE) - 2712 - average
BE23 - Prov. Oost-Vlaanderen - 2591 - average
BE24 - Prov. Vlaams-Brabant - 2619 - average
BE25 - Prov. West-Vlaanderen - 2650 - average
BE31 - Prov. Brabant Wallon - 2655 - average
BE32 - Prov. Hainaut - 2750 - average
BE33 - Prov. Liège - 3037 - cold
BE34 - Prov. Luxembourg (BE) - 3193 - cold
BE35 - Prov. Namur - 2977 - average

BG - Bulgaria - 2654 - average
BG31 - Severozapaden - 2668 - average
BG32 - Severen tsentralen - 2616 - average
BG33 - Severoiztochen - 2582 - average
BG34 - Yugoiztochen - 2382 - average
BG41 - Yugozapaden - 2958 - average
BG42 - Yuzhen tsentralen - 2681 - average

CZ - Czech Republic - 3533 - cold
CZ01 - Praha - 3441 - cold
CZ02 - Strední Cechy - 3414 - cold
CZ03 - Jihozápad - 3627 - cold
CZ04 - Severozápad - 3520 - cold
CZ05 - Severovýchod - 3584 - cold
CZ06 - Jihovýchod - 3466 - cold
CZ07 - Strední Morava - 3539 - cold
CZ08 - Moravskoslezsko - 3542 - cold

DK - Denmark - 3438 - cold
DK001 - København og Frederiksberg Kommuner (NUTS 1999) - 3492 - cold
DK002 - Københavns amt (NUTS 1999) - 3485 - cold
DK003 - Frederiksborg amt (NUTS 1999) - 3454 - cold
DK004 - Roskilde amt (NUTS 1999) - 3409 - cold
DK005 - Vestsjællands amt (NUTS 1999) - 3392 - cold
DK006 - Storstrøms amt (NUTS 1999) - 3311 - cold
DK007 - Bornholms amt (NUTS 1999) - 3503 - cold
DK008 - Fyns amt (NUTS 1999) - 3338 - cold
DK009 - Sønderjyllands amt (NUTS 1999) - 3381 - cold
DK00A - Ribe amt (NUTS 1999) - 3373 - cold
DK00B - Vejle amt (NUTS 1999) - 3539 - cold
DK00C - Ringkøbing amt (NUTS 1999) - 3379 - cold
DK00D - Århus amt (NUTS 1999) - 3580 - cold
DK00E - Viborg amt (NUTS 1999) - 3430 - cold
DK00F - Nordjyllands amt (NUTS 1999) - 3547 - cold

DE - Germany - 3199 - cold
DE11 - Stuttgart - 3185 - cold
DE12 - Karlsruhe - 2977 - average
DE13 - Freiburg - 3163 - cold
DE14 - Tübingen - 3427 - cold
DE21 - Oberbayern - 3389 - cold
DE22 - Niederbayern - 3393 - cold
DE23 - Oberpfalz - 3502 - cold
DE24 - Oberfranken - 3513 - cold
DE25 - Mittelfranken - 3356 - cold
DE26 - Unterfranken - 3178 - cold
DE27 - Schwaben - 3458 - cold
DE30 - Berlin - 3097 - cold
DE41 - Brandenburg - Nordost (NUTS 2006) - 3185 - cold
DE42 - Brandenburg - Südwest (NUTS 2006) - 3096 - cold
DE50 - Bremen - 3071 - cold
DE60 - Hamburg - 3188 - cold
DE71 - Darmstadt - 2964 - average
DE72 - Gießen - 3203 - cold
DE73 - Kassel - 3326 - cold
DE80 - Mecklenburg-Vorpommern - 3228 - cold
DE91 - Braunschweig - 3171 - cold
DE92 - Hannover - 3082 - cold
DE93 - Lüneburg - 3143 - cold
DE94 - Weser-Ems - 3002 - cold
DEA1 - Düsseldorf - 2771 - average
DEA2 - Köln - 2985 - average
DEA3 - Münster - 2905 - average
DEA4 - Detmold - 3069 - cold
DEA5 - Arnsberg - 3172 - cold
DEB1 - Koblenz - 3121 - cold
DEB2 - Trier - 3157 - cold
DEB3 - Rheinhessen-Pfalz - 2895 - average
DEC0 - Saarland - 3033 - cold
DED1 - Chemnitz (NUTS 2006) - 3499 - cold
DED2 - Dresden - 3272 - cold
DED3 - Leipzig (NUTS 2006) - 3098 - cold
DEE1 - Dessau (NUTS 1999) - 3073 - cold
DEE2 - Halle (NUTS 2003) - 3126 - cold
DEE3 - Magdeburg (NUTS 2003) - 3115 - cold
DEF0 - Schleswig-Holstein - 3214 - cold
DEG0 - Thüringen - 3366 - cold

EE - Estonia - 4393 - cold
EE00 - Eesti - 4393 - cold

IE - Ireland - 2871 - average
IE01 - Border, Midland and Western - 2964 - average
IE02 - Southern and Eastern - 2788 - average

EL - Greece - 1642 - warm
EL11 - Anatoliki Makedonia, Thraki - 2005 - average
EL12 - Kentriki Makedonia - 1939 - warm
EL13 - Dytiki Makedonia - 2519 - average
EL14 - Thessalia - 1742 - warm
EL21 - Ipeiros - 1887 - warm
EL22 - Ionia Nisia - 1298 - warm
EL23 - Dytiki Ellada - 1435 - warm
EL24 - Sterea Ellada - 1483 - warm
EL25 - Peloponnisos - 1413 - warm
EL30 - Attiki - 1166 - warm
EL41 - Voreio Aigaio - 1310 - warm
EL42 - Notio Aigaio - 763 - warm
EL43 - Kriti - 949 - warm

ES - Spain - 1831 - warm
ES11 - Galicia - 1897 - warm
ES12 - Principado de Asturias - 1875 - warm
ES13 - Cantabria - 1896 - warm
ES21 - País Vasco - 1928 - warm
ES22 - Comunidad Foral de Navarra - 2002 - average
ES23 - La Rioja - 2225 - average
ES24 - Aragón - 2132 - average
ES30 - Comunidad de Madrid - 1960 - warm
ES41 - Castilla y León - 2392 - average
ES42 - Castilla-la Mancha - 1981 - warm
ES43 - Extremadura - 1343 - warm
ES51 - Cataluña - 1893 - warm
ES52 - Comunidad Valenciana - 1396 - warm
ES53 - Illes Balears - 1062 - warm
ES61 - Andalucía - 1275 - warm
ES62 - Región de Murcia - 1285 - warm
ES63 - Ciudad Autónoma de Ceuta (ES) - 437 - warm
ES64 - Ciudad Autónoma de Melilla (ES) - 708 - warm

FR - France - 2459 - average
FR10 - Île de France - 2527 - average
FR21 - Champagne-Ardenne - 2763 - average
FR22 - Picardie - 2722 - average
FR23 - Haute-Normandie - 2664 - average
FR24 - Centre (FR) - 2457 - average
FR25 - Basse-Normandie - 2506 - average
FR26 - Bourgogne - 2662 - average
FR30 - Nord - Pas-de-Calais - 2658 - average
FR41 - Lorraine - 2923 - average
FR42 - Alsace - 2756 - average
FR43 - Franche-Comté - 2950 - average
FR51 - Pays de la Loire - 2242 - average
FR52 - Bretagne - 2252 - average
FR53 - Poitou-Charentes - 2156 - average
FR61 - Aquitaine - 1926 - warm
FR62 - Midi-Pyrénées - 2235 - average
FR63 - Limousin - 2579 - average
FR71 - Rhône-Alpes - 2771 - average
FR72 - Auvergne - 3006 - cold
FR81 - Languedoc-Roussillon - 2114 - average
FR82 - Provence-Alpes-Côte d'Azur - 2299 - average
FR83 - Corse - 1285 - warm

IT - Italy - 1949 - warm
ITC1 - Piemonte - 2314 - average
ITC2 - Valle d'Aosta/Vallée d'Aoste - 3109 - cold
ITC3 - Liguria - 1899 - warm
ITC4 - Lombardia - 2436 - average
ITD1 - Provincia Autonoma Bolzano/Bozen (NUTS 2006) - 4055 - cold
ITD2 - Provincia Autonoma Trento (NUTS 2006) - 3485 - cold
ITD3 - Veneto (NUTS 2006) - 2387 - average
ITD4 - Friuli-Venezia Giulia (NUTS 2006) - 2444 - average
ITD5 - Emilia-Romagna (NUTS 2006) - 2177 - average
ITE1 - Toscana (NUTS 2006) - 1913 - warm
ITE2 - Umbria (NUTS 2006) - 2220 - average
ITE3 - Marche (NUTS 2006) - 2104 - average
ITE4 - Lazio (NUTS 2006) - 1754 - warm
ITF1 - Abruzzo - 2104 - average
ITF2 - Molise - 1878 - warm
ITF3 - Campania - 1500 - warm
ITF4 - Puglia - 1448 - warm
ITF5 - Basilicata - 1659 - warm
ITF6 - Calabria - 1273 - warm
ITG1 - Sicilia - 1125 - warm
ITG2 - Sardegna - 1240 - warm

CY - Cyprus - 762 - warm
CY00 - Kypros - 762 - warm

LV - Latvia - 4220 - cold
LV00 - Latvija - 4220 - cold

LT - Lithuania - 4048 - cold
LT00 - Lietuva - 4048 - cold

LU - Luxembourg - 3164 - cold
LU00 - Luxembourg - 3164 - cold

HU - Hungary - 2886 - average
HU10 - Közép-Magyarország - 2868 - average
HU21 - Közép-Dunántúl - 2892 - average
HU22 - Nyugat-Dunántúl - 2902 - average
HU23 - Dél-Dunántúl - 2798 - average
HU31 - Észak-Magyarország - 3015 - cold
HU32 - Észak-Alföld - 2927 - average
HU33 - Dél-Alföld - 2811 - average

MT - Malta - 543 - warm
MT00 - Malta - 543 - warm

NL - Netherlands - 2854 - average
NL11 - Groningen - 3030 - cold
NL12 - Friesland (NL) - 3008 - cold
NL13 - Drenthe - 2976 - average
NL21 - Overijssel - 2930 - average
NL22 - Gelderland - 2845 - average
NL23 - Flevoland - 2894 - average
NL31 - Utrecht - 2819 - average
NL32 - Noord-Holland - 2837 - average
NL33 - Zuid-Holland - 2755 - average
NL34 - Zeeland - 2620 - average
NL41 - Noord-Brabant - 2759 - average
NL42 - Limburg (NL) - 2745 - average

AT - Austria - 3540 - cold
AT11 - Burgenland (AT) - 2957 - average
AT12 - Niederösterreich - 3263 - cold
AT13 - Wien - 2980 - average
AT21 - Kärnten - 3600 - cold
AT22 - Steiermark - 3636 - cold
AT31 - Oberösterreich - 3474 - cold
AT32 - Salzburg - 3882 - cold
AT33 - Tirol - 3858 - cold
AT34 - Vorarlberg - 3570 - cold

PL - Poland - 3574 - cold
PL11 - Lódzkie - 3504 - cold
PL12 - Mazowieckie - 3639 - cold
PL21 - Malopolskie - 3645 - cold
PL22 - Slaskie - 3539 - cold
PL31 - Lubelskie - 3672 - cold
PL32 - Podkarpackie - 3576 - cold
PL33 - Swietokrzyskie - 3597 - cold
PL34 - Podlaskie - 3908 - cold
PL41 - Wielkopolskie - 3394 - cold
PL42 - Zachodniopomorskie - 3429 - cold
PL43 - Lubuskie - 3239 - cold
PL51 - Dolnoslaskie - 3442 - cold
PL52 - Opolskie - 3394 - cold
PL61 - Kujawsko-Pomorskie - 3565 - cold
PL62 - Warminsko-Mazurskie - 3796 - cold
PL63 - Pomorskie - 3646 - cold

PT - Portugal - 1278 - warm
PT11 - Norte - 1805 - warm
PT15 - Algarve - 797 - warm
PT16 - Centro (PT) - 1343 - warm
PT17 - Lisboa - 837 - warm
PT18 - Alentejo - 977 - warm

RO - Romania - 3092 - cold
RO11 - Nord-Vest - 3289 - cold
RO12 - Centru - 3572 - cold
RO21 - Nord-Est - 3440 - cold
RO22 - Sud-Est - 2804 - average
RO31 - Sud - Muntenia - 2824 - average
RO32 - Bucuresti - Ilfov - 2723 - average
RO41 - Sud-Vest Oltenia - 2799 - average
RO42 - Vest - 2867 - average

SI - Slovenia - 3024 - cold
SI0 - Slovenija - 3024 - cold

SK - Slovakia - 3416 - cold
SK01 - Bratislavský kraj - 2930 - average
SK02 - Západné Slovensko - 3113 - cold
SK03 - Stredné Slovensko - 3639 - cold
SK04 - Východné Slovensko - 3536 - cold

FI - Finland - 5774 - cold
FI13 - Itä-Suomi (NUTS 2006) - 5639 - cold
FI18 - Etelä-Suomi (NUTS 2006) - 4730 - cold
FI19 - Länsi-Suomi - 5073 - cold
FI1A - Pohjois-Suomi (NUTS 2006) - 6515 - cold
FI20 - Åland - 4304 - cold

SE - Sweden - 5387 - cold
SE11 - Stockholm - 4134 - cold
SE12 - Östra Mellansverige - 4227 - cold
SE21 - Småland med öarna - 3990 - cold
SE22 - Sydsverige - 3597 - cold
SE23 - Västsverige - 3954 - cold
SE31 - Norra Mellansverige - 4998 - cold
SE32 - Mellersta Norrland - 5632 - cold
SE33 - Övre Norrland - 6508 - cold

UK - United Kingdom - 3081 - cold
UKC1 - Tees Valley and Durham - 3243 - cold
UKC2 - Northumberland and Tyne and Wear - 3309 - cold
UKD1 - Cumbria - 3246 - cold
UKD2 - Cheshire (NUTS 2006) - 2971 - average
UKD3 - Greater Manchester - 3083 - cold
UKD4 - Lancashire - 3024 - cold
UKD5 - Merseyside (NUTS 2006) - 2831 - average
UKE1 - East Yorkshire and Northern Lincolnshire - 2920 - average
UKE2 - North Yorkshire - 3139 - cold
UKE3 - South Yorkshire - 2935 - average
UKE4 - West Yorkshire - 3084 - cold
UKF1 - Derbyshire and Nottinghamshire - 2985 - average
UKF2 - Leicestershire, Rutland and Northamptonshire - 2857 - average
UKF3 - Lincolnshire - 2850 - average
UKG1 - Herefordshire, Worcestershire and Warwickshire - 2902 - average
UKG2 - Shropshire and Staffordshire - 3028 - cold
UKG3 - West Midlands - 2915 - average
UKH1 - East Anglia - 2776 - average
UKH2 - Bedfordshire and Hertfordshire - 2793 - average
UKH3 - Essex - 2729 - average
UKI1 - Inner London - 2710 - average
UKI2 - Outer London - 2708 - average
UKJ1 - Berkshire, Buckinghamshire and Oxfordshire - 2803 - average
UKJ2 - Surrey, East and West Sussex - 2711 - average
UKJ3 - Hampshire and Isle of Wight - 2734 - average
UKJ4 - Kent - 2640 - average

UKK1 - Gloucestershire, Wiltshire and Bristol/Bath area - 2781 - average
UKK2 - Dorset and Somerset - 2720 - average
UKK3 - Cornwall and Isles of Scilly - 2512 - average
UKK4 - Devon - 2691 - average
UKL11 - Isle of Anglesey - 2767 - average
UKL12 - Gwynedd - 2967 - average
UKL13 - Conwy and Denbighshire - 3122 - cold
UKL14 - South West Wales - 2896 - average
UKL15 - Central Valleys - 2724 - average
UKL16 - Gwent Valleys - 2736 - average
UKL17 - Bridgend and Neath Port Talbot - 2724 - average
UKL18 - Swansea - 2704 - average
UKL21 - Monmouthshire and Newport - 2747 - average
UKL22 - Cardiff and Vale of Glamorgan - 2731 - average
UKL23 - Flintshire and Wrexham - 3111 - cold
UKL24 - Powys - 3082 - cold
UKM10 - Aberdeen City, Aberdeenshire and North East Moray (NUTS 2003) - 3597 - cold
UKM21 - Angus and Dundee City - 3482 - cold
UKM22 - Clackmannanshire and Fife - 3375 - cold
UKM23 - East Lothian and Midlothian - 3456 - cold
UKM24 - Scottish Borders - 3435 - cold
UKM25 - Edinburgh, City of - 3557 - cold
UKM26 - Falkirk - 3365 - cold
UKM27 - Perth & Kinross and Stirling - 3478 - cold
UKM28 - West Lothian - 3548 - cold
UKM31 - East Dunbartonshire, West Dunbartonshire and Helensburgh & Lomond - 3317 - cold
UKM32 - Dumfries & Galloway - 3251 - cold
UKM33 - East Ayrshire and North Ayrshire mainland - 3345 - cold
UKM34 - Glasgow City - 3387 - cold
UKM35 - Inverclyde, East Renfrewshire and Renfrewshire - 3342 - cold
UKM36 - North Lanarkshire - 3412 - cold
UKM37 - South Ayrshire - 3234 - cold
UKM38 - South Lanarkshire - 3444 - cold
UKM61 - Caithness & Sutherland and Ross & Cromarty - 3512 - cold
UKM62 - Inverness & Nairn and Moray, Badenoch & Strathspey - 3602 - cold
UKM63 - Lochaber, Skye & Lochalsh, Arran & Cumbrae and Argyll & Bute - 3319 - cold
UKM64 - Eilean Siar (Western Isles) - 3307 - cold
UKM65 - Orkney Islands - 3454 - cold
UKN0 - Northern Ireland (UK) - 3075 - cold

LI - Liechtenstein - 3207 - cold

NO - Norway - 5590 - cold
NO01 - Oslo og Akershus - 4515 - cold
NO02 - Hedmark og Oppland - 5868 - cold
NO03 - Sør-Østlandet - 5080 - cold
NO04 - Agder og Rogaland - 4455 - cold
NO05 - Vestlandet - 4915 - cold
NO06 - Trøndelag - 5222 - cold
NO07 - Nord-Norge - 6357 - cold

CH - Switzerland - 3463 - cold
CH01 - Région lémanique - 3563 - cold
CH02 - Espace Mittelland - 3360 - cold
CH03 - Nordwestschweiz - 3146 - cold
CH04 - Zürich - 3139 - cold
CH05 - Ostschweiz - 3511 - cold
CH06 - Zentralschweiz - 3568 - cold
CH07 - Ticino - 3589 - cold

HR - Croatia - 2561 - average

TR - Turkey - 2673 - average
TR10 - Istanbul - 1842 - warm
TR21 - Tekirdag, Edirne, Kirklareli - 2064 - average
TR22 - Balikesir, Çanakkale - 1891 - warm
TR31 - Izmir - 1323 - warm
TR32 - Aydin, Denizli, Mugla - 1549 - warm
TR33 - Manisa, Afyonkarahisar, Kütahya, Usak - 2258 - average
TR41 - Bursa, Eskisehir, Bilecik - 2351 - average
TR42 - Kocaeli, Sakarya, Düzce, Bolu, Yalova - 2300 - average
TR51 - Ankara - 2871 - average
TR52 - Konya, Karaman - 2687 - average
TR61 - Antalya, Isparta, Burdur - 2041 - average
TR62 - Adana, Mersin - 1521 - warm
TR63 - Hatay, Kahramanmaras, Osmaniye - 1852 - warm
TR71 - Kirikkale, Aksaray, Nigde, Nevsehir, Kirsehir - 2882 - average
TR72 - Kayseri, Sivas, Yozgat - 3461 - cold
TR81 - Zonguldak, Karabük, Bartin - 2300 - average
TR82 - Kastamonu, Çankiri, Sinop - 2857 - average
TR83 - Samsun, Tokat, Çorum, Amasya - 2631 - average
TR90 - Trabzon, Ordu, Giresun, Rize, Artvin, Gümüshane - 3066 - cold
TRA1 - Erzurum, Erzincan, Bayburt - 4235 - cold
TRA2 - Agri, Kars, Igdir, Ardahan - 4344 - cold
TRB1 - Malatya, Elazig, Bingöl, Tunceli - 3140 - cold
TRB2 - Van, Mus, Bitlis, Hakkari - 3744 - cold
TRC1 - Gaziantep, Adiyaman, Kilis - 1823 - warm
TRC2 - Sanliurfa, Diyarbakir - 1977 - warm
TRC3 - Mardin, Batman, Sirnak, Siirt - 2144 - average