

# European Residual Mixes

## Results of the calculation of Residual Mixes for the calendar year 2024

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### 1 Introduction

The purpose of a Guarantee of Origin (GO) system is to enable consumers to decide how the electricity they purchase is generated by selecting a supplier and a power product. GOs (RED II, Directive 2018/2001, Art. 19) provide a way to reliably track the origin of energy from production to consumption within the context of the international and complex power markets.

GOs are used (cancelled) by electricity suppliers<sup>1</sup>, who must disclose the origin and environmental attributes of sold electricity (IEM Directive (EU) 2019/944, Annex 1 (5)). This process is called electricity disclosure.

A country's residual mix represents the shares of electricity generation attributes available for disclosure, after the use of explicit tracking systems, such as GO, have been accounted for.

#### Residual mix is a pre-requisite for reliable GOs

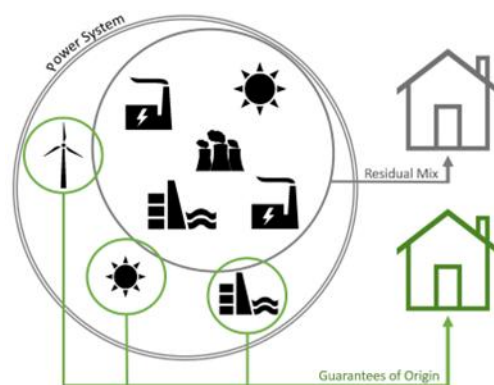
As long as not all consumption is tracked using GOs, a *residual mix* is needed to make the GO a reliable tracking instrument. The Residual Mix is the energy source mix excluding tracked energy generation attributes from the generation mix. A residual mix is a logical consequence of implementing energy attribute tracking as it ensures that the attributes represented by GOs are not double disclosed to other consumers through an implicit mix. In other words, without a residual mix, renewable electricity sold with GOs would be double counted because the same electricity would be disclosed to consumers buying "regular" electricity. The use of uncorrected generation statistics for purposes of disclosure should thus be avoided.

#### International harmonization of the residual mix calculation is needed

Due to the international nature of both the electricity markets and tracking systems, the volume of available generation attributes in the domestic residual mix differs from the volume of untracked consumption<sup>2</sup>. Thus, the calculation of residual mixes needs to be centrally coordinated and a common pool for balancing generation attributes must be used. This is achieved via the European Attribute Mix (EAM), which replaces the deficit of energy origin caused by exported GOs (and/or imported electricity). EAM acts as an "equalising reservoir" for generation attributes for national residual mixes. After the attribute balancing via the EAM the volume of available generation attributes in the residual mix is equal to the untracked consumption in every country. This is a precondition for the GO to be a credible tracking instrument in the context of international trading.

#### Residual mix is not needed in countries with "full consumption disclosure"

Residual mix is needed when consumption is only partially explicitly tracked. In so-called "full consumption disclosure domains" residual mix is not needed because all consumption is covered by cancelled GOs. Austria and Switzerland have a full disclosure system in place and hence the residual mix is zero. Also the Netherlands have full disclosure



<sup>1</sup> In some cases and countries it might be done also directly by end-consumers (or service providers on their behalf) for own electricity use.

<sup>2</sup> Untracked consumption = Electricity consumption for which the energy source is not explicitly disclosed through tracking instruments such as Guarantees of Origin.

regulation but, due to implementation details and calculation rules, residual mixes can still be calculated and are included in the results.

**AIB residual mixes are calculated with the issuance-based method**

The AIB European Residual mixes are calculated using the so-called issuance-based method. For more information refer to methodology material on: <https://www.aib-net.org/facts/european-residual-mix>. AIB calculated national residual mixes are official when adopted by national disclosure authorities. A number of disclosure authorities calculate national residual mixes themselves. Most of those are calculated with the same issuing-based method utilizing EAM from this report, but some countries use different methodologies.

## 2 Description of the Document

The main results of this document are the **European Attribute Mix (EAM)** and the **residual mixes for all 34 countries** included in the calculation<sup>3</sup>. A wide variety of additional information and graphs is presented as supporting material. The EAM (Table 1) is the mix of energy sources and the corresponding CO<sub>2</sub> and radioactive waste that is collected from countries which have surpluses of energy attributes. The EAM is then used to fill up the national residual mixes in case of a deficit of disclosure attributes. The national surpluses and deficits to/from EAM are shown in Table 3 and Figure 3 and 4.

The **national residual mixes** for 34 European countries are shown in Figure 1 and 2 as well as Table 2. Note that the official residual mixes for each country are published by the respective national authorities. Also note that for countries without recorded explicit tracking, untracked consumption equals the total electricity consumption, and thus the residual mix is applicable for the disclosure of the entire electricity consumption.<sup>4</sup>

Energy sources in the residual mixes are divided in three main categories: renewable, nuclear and fossil, of which renewable and fossil are further divided into subcategories (Table 8). Selected subcategories are based on relevance in terms of volume and perceived consumer importance. The used categorization is also identical to all residual mix calculations since the 2013.

Figure 5 shows the direct greenhouse gas emissions as **direct CO<sub>2</sub> emissions per kWh** of produced electricity. Figure 6 shows the content of **highly active radioactive waste as mgRW/kWh**. Both environmental indicators are calculated for the European Attribute Mix (EAM), the production mix (PM), the residual mix (RM) and the total supplier mix (TSM) of European countries.

The **total supplier mixes (TSMs)** are presented in Table 4, Figure 7 and 8. The total supplier mix represents the total consumption mix of a country, i.e. it is the sum of attributes of 1) cancelled GOs as well as 2) the final residual mix. Thus, both explicitly tracked and available remaining electricity attributes are included in the TSM, which equals in physical volume with the country's total electricity consumption. For understanding, it might help to consider that without the international transferability of GOs and electricity, the TSM would equal the production mix of the country.

The production mixes of the countries are shown in Table 5. The evolution of attributes, on the European scale: how much renewables are in the Production mix, how much of those are left in the residual mix and lastly how much renewables are carried on to EAM is shown in the Figure 11 and Table 6.

The rest of the results are different kinds of comparisons between different mixes and different years, between the production and residual mixes as well as production and total supplier mixes of different countries. Finally Table 7 and Figure 16 show the difference between final residual mixes of 2022, 2023 and 2024.

**Note:** Any use of the data presented in this document should include a reference to AIB.

**Note:** The calculated country and energy source/technology emission factors forming the base for the National Residual Mix calculations may not be sold, distributed or processed as part of a derivative tool.

### Partners



<sup>3</sup> Austria, Bosnia & Herzegovina, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Iceland, Ireland (All-Island), Italy, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland

<sup>4</sup> Calculation of the Residual Mix obviously can only take the volumes of explicit tracking systems into account if the respective data is public or known by the authority and respectively being made available to the one who conducts the calculation. This means that explicit tracking systems, for which no statistical data is available to the competent authority and/or AIB, cannot be reflected in the residual mix and are therefore likely to lead to double counting.

**Disclaimer on data quality:**

- Because of the 12 months lifetime of GOs, the residual mixes were calculated based on all recorded GO transactions during the assumed time period (1.4.2024 – 31.3.2025) for disclosure of 2024 consumption, irrespective of the underlying production year of these GOs. This ensures that over the years all GO transactions are considered in the calculation.
- Volumes which have been explicitly tracked without the use of transparent tracking instruments, e.g. by so-called contract based tracking, self-declarations etc., cannot be taken into account at all, if they are not reported by the competent authority.
- Due to the absence of reliable EECS GO statistics for Netherlands for the time period 11/2024-03/2025 the issuance and cancellation volumes were extrapolated based on the time period 04/2024-10/2024. The total issuance and cancellation data for 04/2024-10/2024 per energy source was divided with equivalent data for 04/2023-10/2023. This factor (by energy source) was used to multiply volumes of 11/2023-03/2024 (by energy source) to derive the volumes for 11/2024-03/2025. The additional volumes were added to national GO statistics to distinguish them more easily (other GO data is under EECS).
- Like last years, for Germany, it is assumed that RES production for which a GO is not issued falls under EEG and is deducted from the residual mix. This is considered as tracked consumption with energy source "renewable unspecified" (as no energy source specific info was provided for EEG) and adds to the Total Supplier Mix.

### 3 Data sources and references

The main data source for the calculation is information collected from the national competent authorities through an information request specifically for the purpose of residual mix calculation. Most notably this includes information on any possible national tracking systems (certificate or non-certificate based) and electricity generation.

Where not reported by the competent authority, the generation data is based on Eurostat (electricity generation by fuel as well as supply, transformation and consumption of electricity). Power import/export data from/to countries outside of the calculation area are collected from ENTSO-E Transparency platform.

EECS GO statistics are collected centrally from the AIB statistics. The volume of ex-domain cancellations<sup>5</sup> (including the target domains of these cancellations) is collected as part of data collection from competent authorities.

The base data for the direct CO<sub>2</sub>-emissions is based on nationally reported information (where available) or the Ecoinvent database. The data for the radioactive waste has been compiled based on BDEW (2014), DECC (2014), the Platts World Database and IAEA PRIS. These indicators reflect the differences in waste rates produced by the types of nuclear power reactors used in the respective countries per kWh of electricity. Due to a lack of detailed data per reactor, the waste rates have been based on estimates of typical data for five major types of reactors used in Europe. However, where available, factors as reported by national authorities are used instead.

#### References

National Issuing Bodies and Disclosure Competent Bodies: Updates through the annual data collection

Generation data: Eurostat: [Product - Products Datasets - Eurostat \(europa.eu\)](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&code=sdg-7-2-1) and

[Product - Products Datasets - Eurostat \(europa.eu\)](https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&code=sdg-7-2-1)

EECS Guarantee of Origin Statistics: Association of Issuing Bodies, [Statistics | AIB \(aib-net.org\)](https://aib-net.org/statistics)

Sources for emission factors and radioactive waste:

Ecoinvent (2024): Ecoinvent database and bilaterally provided data.

BDEW (2014). Leitfaden "Stromkennzeichnung", Berlin, Oktober 2014

DECC (2014), Fuel Mix Disclosure Data Table, 2014

IAEA PRIS. The IAEA Power Reactor Information System (PRIS), 2015, <https://www.iaea.org/pris/>

Platts: The Platts World Database, 2014

<sup>5</sup> A cancellation of a certificate for disclosure of electricity consumption in another country. Under AIB rules, ex-domain cancellations are not allowed between two countries connected to the AIB Hub.

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#### 4 Main result tables

The need for a methodology to determine a cross-border central residual mix emerges when a country exports more GOs than physical energy, thus creating a deficit of generation attributes. In principle the deficit/surplus of attributes is always the net effect of import/export of electricity and export/import of GOs respectively (for details, please refer to the residual mix [methodology document](#)). Such a deficit of attributes in the disclosure of energy supplied without being backed by GO cancellation needs to be complemented with an excess of attributes from countries that are net importers of GOs.

The European Attribute Mix (Table 1) contains all surplus generation attributes from countries with an excess of attributes. It is used to fill the gap in the residual mix in countries with a deficit of attributes in their residual mix. The exchange with the European Attribute Mix is graphically presented in Figure 3

Table 1: European Attribute Mix (EAM) 2024: Energy source distribution and environmental indicators

|            | RE total | RE unspecified | RE biomass | RE solar | RE geothermal | RE wind | RE hydro | Nuclear | FO total | FO unspecified | FO hard coal | FO lignite | FO oil | FO gas  | CO2 (gCO2/kWh) | Rad waste (mg/kWh) |
|------------|----------|----------------|------------|----------|---------------|---------|----------|---------|----------|----------------|--------------|------------|--------|---------|----------------|--------------------|
| <b>EAM</b> | 4,94 %   | 0,02 %         | 0,67 %     | 1,33 %   | 0,00 %        | 1,61 %  | 1,31 %   | 19,40 % | 75,66 %  | 5,80 %         | 37,62 %      | 0,36 %     | 1,79 % | 30,08 % | 536,94         | 0,58               |

**EAM** = European Attribute Mix is used for balancing surpluses and deficits in national residual mixes caused by international trading of electricity and guarantees of origin.

The introduction of a GO system provides a way to supply energy with specified attributes, but also impacts the remaining attributes of energy supplied without a GO. According to preamble 13 of 2018/2001/EC: 'residual energy mix' means the total annual energy mix for a Member State, excluding the share covered by cancelled guarantees of origin. If uncorrected generation statistics were used for the purpose of disclosure of untracked electricity consumption, then the renewable energy origin represented by GOs would be double counted. Table 2 and Figure 2 and 3 present the residual mixes of 2024 for 34 European countries as calculated by AIB. Note that the official residual mixes for each country are in principle published by the respective national authorities. The residual mix is not applicable for Austria, the Netherlands and Switzerland in which all power consumption is tracked with GOs.

Table 2: Residual Mixes 2024

|           | RE total | RE un-specified | RE bio-mass | RE solar | RE geo-thermal | RE wind | RE hydro | Nuclear | FO total | FO un-specified | FO hard coal | FO lignite | FO oil  | FO gas  | Untracked % | CO2 (gCO2/kWh) | Rad waste (mg/kWh) |
|-----------|----------|-----------------|-------------|----------|----------------|---------|----------|---------|----------|-----------------|--------------|------------|---------|---------|-------------|----------------|--------------------|
| <b>AT</b> | NA       | NA              | NA          | NA       | NA             | NA      | NA       | NA      | NA       | NA              | NA           | NA         | NA      | NA      | NA          | NA             | NA                 |
| <b>BA</b> | 39,27 %  | 0,00 %          | 0,00 %      | 2,04 %   | 0,00 %         | 2,80 %  | 34,43 %  | 0,00 %  | 60,73 %  | 0,00 %          | 60,73 %      | 0,00 %     | 0,00 %  | 0,00 %  | 100,00 %    | 777,02         | 0,00               |
| <b>BE</b> | 18,07 %  | 0,00 %          | 1,16 %      | 13,71 %  | 0,00 %         | 2,61 %  | 0,59 %   | 54,08 % | 27,85 %  | 1,48 %          | 3,71 %       | 0,00 %     | 0,01 %  | 22,65 % | 68,35 %     | 131,73         | 1,46               |
| <b>BG</b> | 13,97 %  | 0,00 %          | 0,45 %      | 7,48 %   | 0,00 %         | 1,99 %  | 4,04 %   | 47,88 % | 38,16 %  | 0,51 %          | 4,07 %       | 25,89 %    | 0,16 %  | 7,53 %  | 96,44 %     | 379,53         | 1,67               |
| <b>CH</b> | NA       | NA              | NA          | NA       | NA             | NA      | NA       | NA      | NA       | NA              | NA           | NA         | NA      | NA      | NA          | NA             | NA                 |
| <b>CY</b> | 16,90 %  | 0,00 %          | 0,61 %      | 11,54 %  | 0,00 %         | 4,76 %  | 0,00 %   | 0,00 %  | 83,10 %  | 0,00 %          | 0,00 %       | 0,00 %     | 83,10 % | 0,00 %  | 95,65 %     | 613,08         | 0,00               |
| <b>CZ</b> | 16,87 %  | 0,00 %          | 8,14 %      | 5,56 %   | 0,00 %         | 1,11 %  | 2,05 %   | 38,09 % | 45,04 %  | 0,16 %          | 39,62 %      | 0,00 %     | 0,11 %  | 5,15 %  | 88,11 %     | 584,07         | 0,50               |
| <b>DE</b> | 0,00 %   | 0,00 %          | 0,00 %      | 0,00 %   | 0,00 %         | 0,00 %  | 0,00 %   | 0,00 %  | 100,00 % | 8,03 %          | 52,48 %      | 0,00 %     | 2,20 %  | 37,29 % | 5,87 %      | 724,56         | 0,00               |
| <b>DK</b> | 24,45 %  | 4,12 %          | 4,52 %      | 6,71 %   | 0,00 %         | 7,85 %  | 1,24 %   | 12,23 % | 63,33 %  | 7,08 %          | 30,91 %      | 0,23 %     | 1,55 %  | 23,55 % | 57,71 %     | 421,89         | 0,37               |
| <b>EE</b> | 11,55 %  | 0,01 %          | 1,69 %      | 6,13 %   | 0,00 %         | 2,82 %  | 0,91 %   | 12,76 % | 75,69 %  | 29,31 %         | 24,75 %      | 0,24 %     | 1,18 %  | 20,21 % | 80,21 %     | 611,96         | 0,38               |
| <b>ES</b> | 4,45 %   | 0,00 %          | 0,15 %      | 2,28 %   | 0,00 %         | 1,72 %  | 0,29 %   | 38,81 % | 56,75 %  | 1,30 %          | 10,38 %      | 0,08 %     | 2,32 %  | 42,67 % | 59,47 %     | 292,20         | 1,11               |
| <b>FI</b> | 11,25 %  | 0,01 %          | 4,77 %      | 4,19 %   | 0,00 %         | 0,90 %  | 1,38 %   | 30,94 % | 57,81 %  | 6,61 %          | 29,66 %      | 0,20 %     | 1,95 %  | 19,40 % | 30,07 %     | 405,59         | 0,93               |
| <b>FR</b> | 7,25 %   | 0,00 %          | 1,11 %      | 3,13 %   | 0,00 %         | 1,99 %  | 1,01 %   | 87,87 % | 4,88 %   | 0,01 %          | 0,18 %       | 0,00 %     | 0,45 %  | 4,25 %  | 82,76 %     | 23,52          | 2,37               |
| <b>GB</b> | 3,29 %   | 0,01 %          | 0,34 %      | 1,49 %   | 0,00 %         | 0,80 %  | 0,65 %   | 23,86 % | 72,85 %  | 5,01 %          | 19,40 %      | 0,18 %     | 1,42 %  | 46,84 % | 86,35 %     | 420,76         | 1,42               |
| <b>GR</b> | 24,82 %  | 1,88 %          | 0,63 %      | 14,53 %  | 0,04 %         | 6,45 %  | 1,28 %   | 0,00 %  | 75,18 %  | 0,04 %          | 1,28 %       | 8,72 %     | 10,40 % | 54,75 % | 61,21 %     | 367,07         | 0,00               |

|    | RE total | RE un-specified | RE bio-mass | RE solar | RE geo-thermal | RE wind | RE hydro | Nuclear | FO total | FO un-specified | FO hard coal | FO lignite | FO oil  | FO gas  | Untracked % | CO2 (gCO2/kWh) | Rad waste (mg/kWh) |
|----|----------|-----------------|-------------|----------|----------------|---------|----------|---------|----------|-----------------|--------------|------------|---------|---------|-------------|----------------|--------------------|
| HR | 12,40 %  | 0,01 %          | 0,54 %      | 3,04 %   | 0,00 %         | 4,72 %  | 4,09 %   | 12,16 % | 75,44 %  | 3,64 %          | 29,25 %      | 0,23 %     | 23,46 % | 18,86 % | 76,84 %     | 573,17         | 0,36               |
| HU | 11,92 %  | 0,00 %          | 0,65 %      | 9,91 %   | 0,00 %         | 0,72 %  | 0,63 %   | 42,23 % | 45,85 %  | 2,55 %          | 16,77 %      | 0,11 %     | 0,68 %  | 25,73 % | 90,28 %     | 318,64         | 1,45               |
| IE | 22,65 %  | 0,00 %          | 2,04 %      | 0,25 %   | 0,00 %         | 18,14 % | 2,22 %   | 0,00 %  | 77,35 %  | 0,00 %          | 7,45 %       | 0,00 %     | 0,31 %  | 69,60 % | 5,45 %      | 365,61         | 0,00               |
| IS | 10,52 %  | 0,01 %          | 0,63 %      | 1,26 %   | 5,76 %         | 1,52 %  | 1,35 %   | 18,26 % | 71,22 %  | 5,46 %          | 35,40 %      | 0,34 %     | 1,71 %  | 28,31 % | 77,80 %     | 505,51         | 0,55               |
| IT | 9,49 %   | 0,00 %          | 0,75 %      | 7,14 %   | 0,00 %         | 0,39 %  | 1,21 %   | 4,73 %  | 85,78 %  | 68,77 %         | 9,16 %       | 0,09 %     | 0,44 %  | 7,33 %  | 63,35 %     | 441,20         | 0,14               |
| LT | 3,13 %   | 0,01 %          | 0,43 %      | 0,84 %   | 0,00 %         | 1,02 %  | 0,83 %   | 12,29 % | 84,58 %  | 11,30 %         | 23,82 %      | 0,23 %     | 4,56 %  | 44,68 % | 28,77 %     | 567,91         | 0,37               |
| LU | 63,20 %  | 0,00 %          | 3,24 %      | 50,48 %  | 0,00 %         | 2,59 %  | 6,88 %   | 5,13 %  | 31,67 %  | 6,95 %          | 9,96 %       | 0,10 %     | 0,47 %  | 14,19 % | 19,25 %     | 213,07         | 0,15               |
| LV | 8,70 %   | 0,01 %          | 1,47 %      | 5,15 %   | 0,00 %         | 1,13 %  | 0,92 %   | 15,52 % | 75,78 %  | 4,20 %          | 28,27 %      | 0,26 %     | 1,26 %  | 41,80 % | 85,67 %     | 504,22         | 0,48               |
| ME | 34,98 %  | 0,00 %          | 0,00 %      | 0,57 %   | 0,00 %         | 3,42 %  | 30,99 %  | 0,00 %  | 65,02 %  | 51,75 %         | 0,00 %       | 13,27 %    | 0,00 %  | 0,00 %  | 99,50 %     | 622,51         | 0,00               |
| MT | 12,54 %  | 0,00 %          | 0,50 %      | 11,22 %  | 0,00 %         | 0,45 %  | 0,36 %   | 5,38 %  | 82,08 %  | 1,61 %          | 10,43 %      | 0,10 %     | 0,75 %  | 69,19 % | 95,16 %     | 398,45         | 0,16               |
| NL | NA       | NA              | NA          | NA       | NA             | NA      | NA       | NA      | NA       | NA              | NA           | NA         | NA      | NA      | NA          | NA             | NA                 |
| NO | 4,82 %   | 0,01 %          | 0,66 %      | 1,30 %   | 0,00 %         | 1,57 %  | 1,28 %   | 19,05 % | 76,14 %  | 7,91 %          | 36,67 %      | 0,35 %     | 1,74 %  | 29,46 % | 70,52 %     | 534,84         | 0,57               |
| PL | 9,29 %   | 0,00 %          | 0,77 %      | 8,04 %   | 0,00 %         | 0,13 %  | 0,35 %   | 1,63 %  | 89,08 %  | 1,44 %          | 70,07 %      | 0,03 %     | 0,15 %  | 17,39 % | 83,06 %     | 808,30         | 0,05               |
| PT | 4,13 %   | 0,01 %          | 0,56 %      | 1,12 %   | 0,00 %         | 1,35 %  | 1,10 %   | 21,14 % | 74,73 %  | 5,76 %          | 31,73 %      | 0,30 %     | 1,50 %  | 35,45 % | 85,21 %     | 501,76         | 0,66               |
| RO | 47,65 %  | 0,00 %          | 0,41 %      | 6,79 %   | 0,00 %         | 12,59 % | 27,87 %  | 20,88 % | 31,47 %  | 0,30 %          | 12,96 %      | 0,02 %     | 0,17 %  | 18,02 % | 99,34 %     | 233,02         | 3,61               |
| RS | 25,74 %  | 0,00 %          | 0,01 %      | 0,35 %   | 0,00 %         | 0,99 %  | 24,38 %  | 0,00 %  | 74,26 %  | 1,72 %          | 0,00 %       | 67,43 %    | 0,00 %  | 5,11 %  | 87,56 %     | 895,96         | 0,00               |
| SE | 50,70 %  | 0,00 %          | 7,47 %      | 28,20 %  | 0,00 %         | 7,75 %  | 7,28 %   | 32,54 % | 16,76 %  | 13,78 %         | 0,08 %       | 0,00 %     | 1,22 %  | 1,69 %  | 8,42 %      | 85,52          | 0,88               |
| SI | 18,97 %  | 0,00 %          | 1,04 %      | 13,23 %  | 0,00 %         | 0,13 %  | 4,56 %   | 33,41 % | 47,62 %  | 0,19 %          | 41,58 %      | 0,01 %     | 0,14 %  | 5,70 %  | 52,42 %     | 429,45         | 1,00               |
| SK | 10,67 %  | 0,30 %          | 4,41 %      | 0,98 %   | 0,00 %         | 0,69 %  | 4,28 %   | 41,39 % | 47,94 %  | 3,84 %          | 17,33 %      | 0,42 %     | 2,55 %  | 23,80 % | 81,95 %     | 334,33         | 2,00               |

**Untracked Consumption** = Electricity consumption not explicitly disclosed through tracking instruments such as Guarantees of Origin.

**Note:** CO<sub>2</sub> and radioactive waste figures reported are destined for purposes of electricity disclosure only (rf. page 2).

**Data Sources:** Information reported by national Competent Bodies; Association of Issuing Bodies (AIB); Eurostat

Residual mix of Germany assumes all renewable energy production for which a GO is not issued is tracked under EEG

5    Graphs with detailed calculations results

5.1    Residual mixes 2024

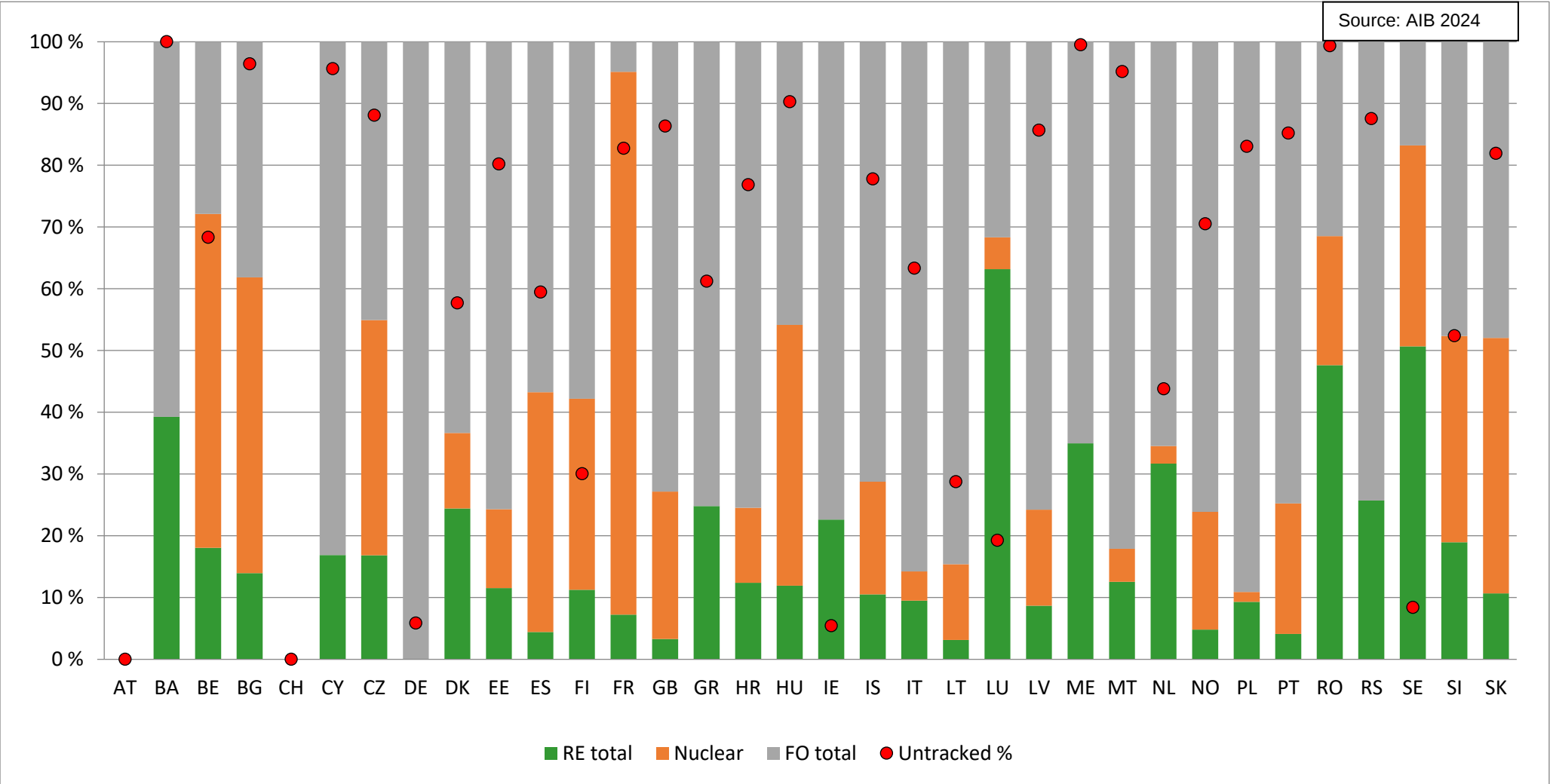


Figure 1 Residual Mixes 2024

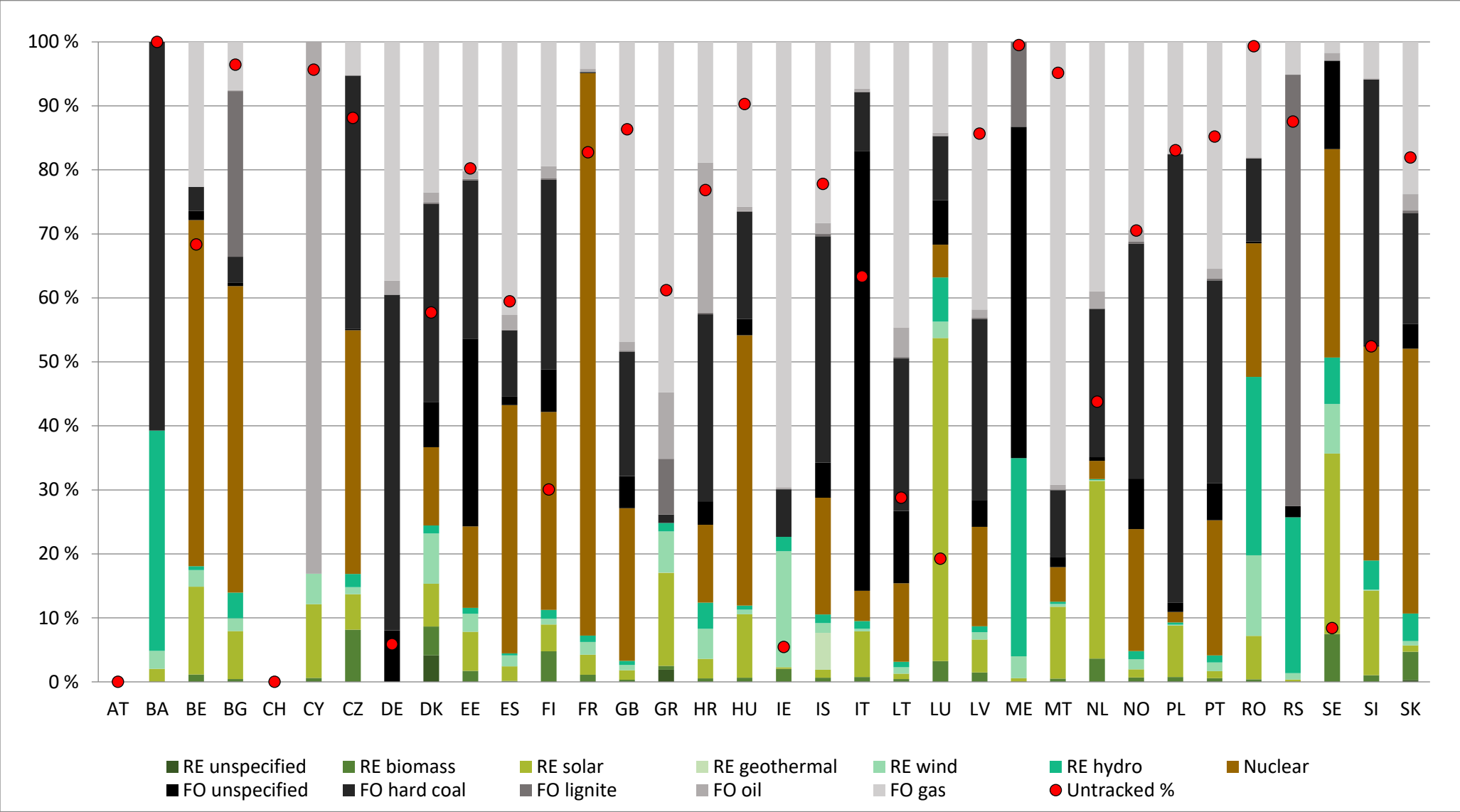


Figure 2 Residual Mixes 2024 (detailed fuel categories)

## 5.2 Attributes to/from the European Attribute Mix 2024

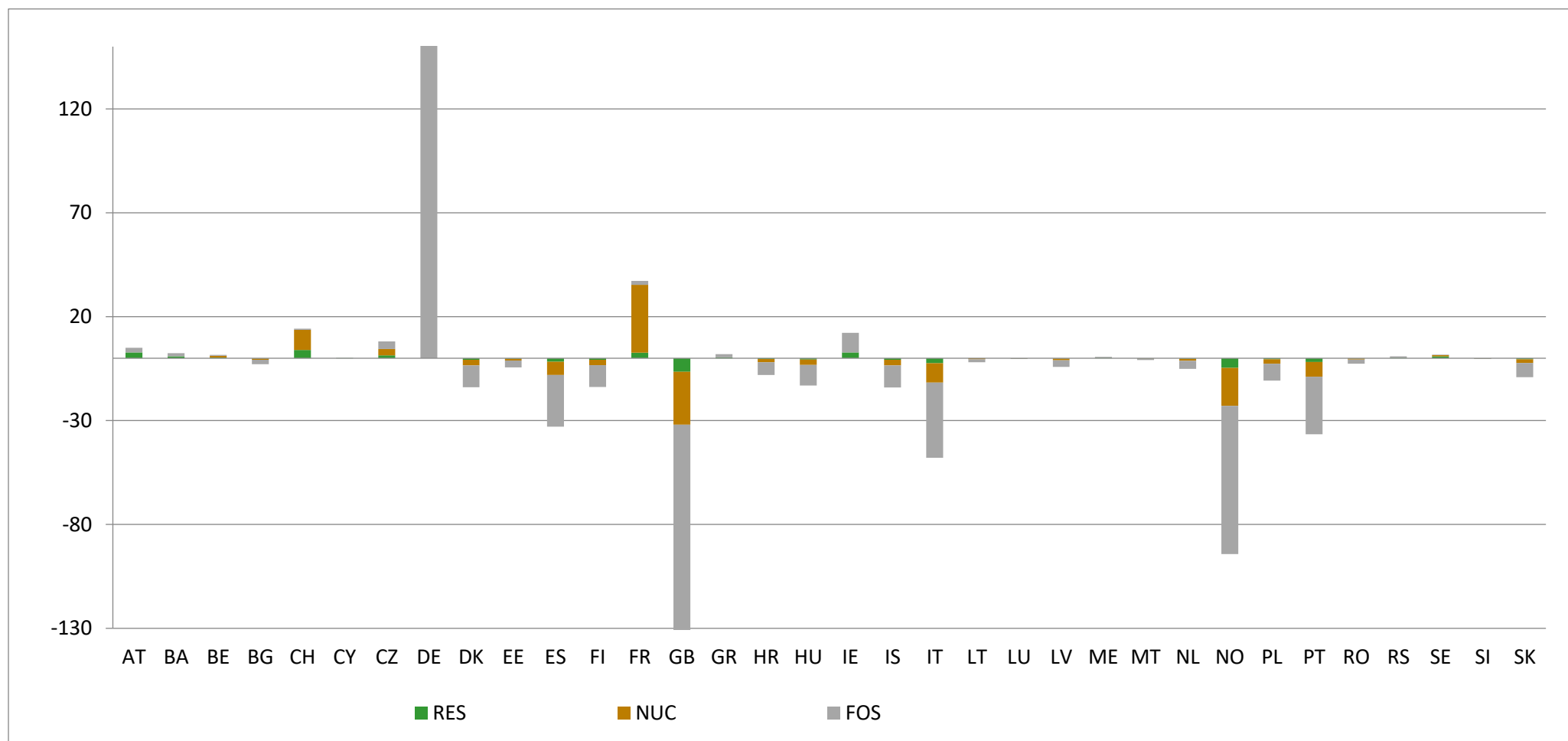


Figure 3: Attributes [TWh] to(positive)/from(negative) the European Attribute Mix 2024<sup>6</sup>

<sup>6</sup> In this figure, the renewable energy added to the EAM does not equal the renewable energy taken out of it, which may seem peculiar. There are two reasons for it: 1) temporal attribute deficit caused by issuing volumes being higher than expiry and cancellation volumes, and 2) some countries have negative renewable energy balance in domestic residual mixes (caused by variation in disclosure periods and GO lifetimes overlapping two disclosure periods). This negativity is transferred into the EAM before considering the domestic residual mix attribute surpluses and deficits.

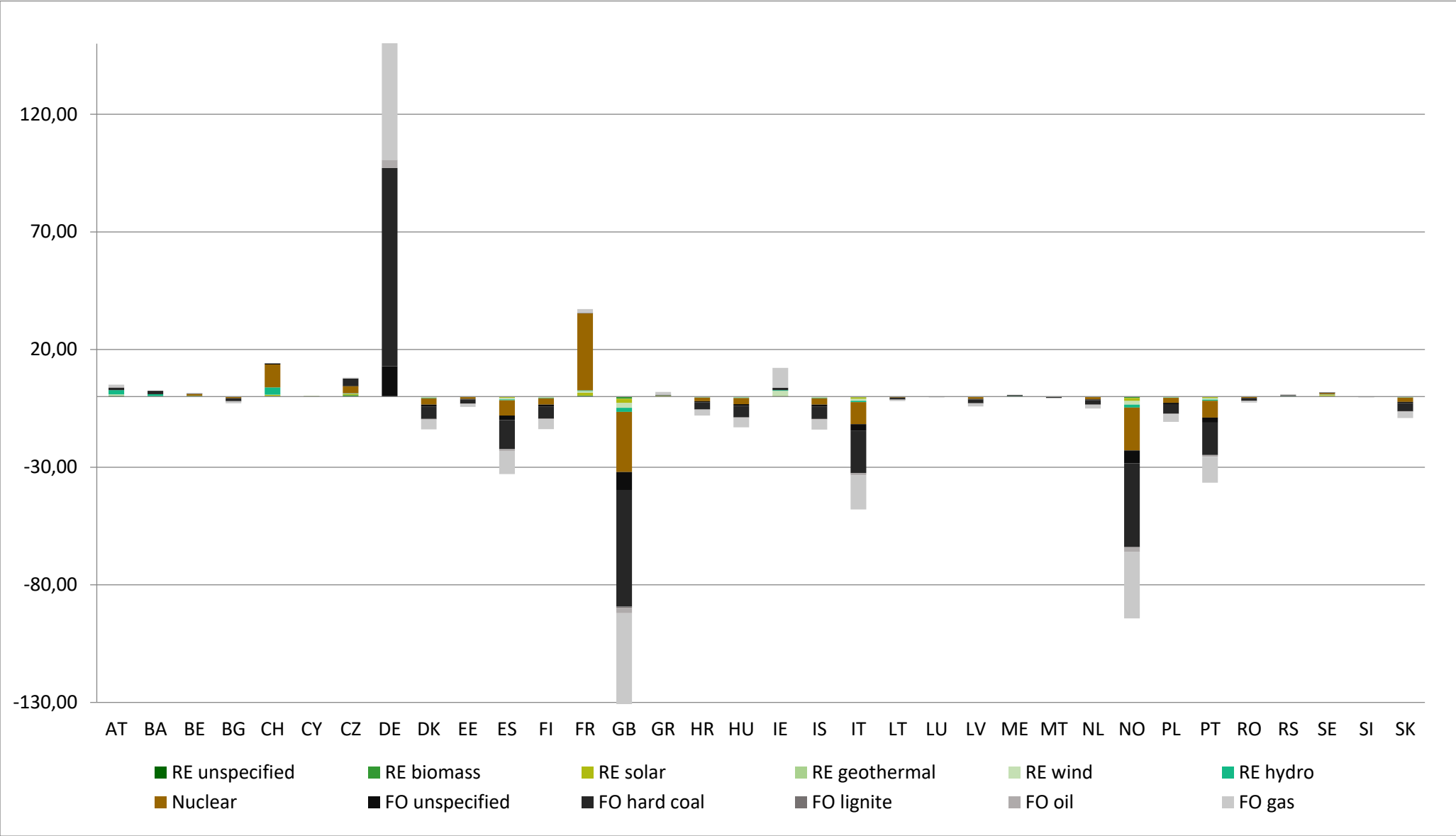


Figure 4 Attributes [TWh] to(positive)/from(negative) the European Attribute Mix 2024 (detailed fuel categories)

Table 3 Attributes [TWh] to/from the European Attribute Mix 2024<sup>7</sup>

| Country code | Volume (TWh) | RE unspecified | RE biomass | RE solar | RE geothermal | RE wind | RE hydro | Nuclear | FO unspecified | FO hard coal | FO lignite | FO oil | FO gas |
|--------------|--------------|----------------|------------|----------|---------------|---------|----------|---------|----------------|--------------|------------|--------|--------|
| AT           | 5,05         | 0,00           | 0,33       | 0,00     | 0,00          | 0,63    | 1,80     | 0,00    | 0,00           | 1,07         | 0,00       | 0,33   | 0,90   |
| BA           | 2,46         | 0,00           | 0,00       | 0,05     | 0,00          | 0,07    | 0,85     | 0,00    | 0,00           | 1,49         | 0,00       | 0,00   | 0,00   |
| BE           | 1,61         | 0,00           | 0,02       | 0,22     | 0,00          | 0,04    | 0,01     | 0,87    | 0,02           | 0,06         | 0,00       | 0,00   | 0,36   |
| BG           | -2,85        | 0,00           | -0,02      | -0,04    | 0,00          | -0,05   | -0,04    | -0,55   | -0,17          | -1,07        | -0,01      | -0,05  | -0,86  |
| CH           | 14,21        | 0,00           | 0,25       | 0,52     | 0,00          | 0,03    | 3,14     | 9,74    | 0,48           | 0,00         | 0,00       | 0,00   | 0,06   |
| CY           | 0,03         | 0,00           | 0,00       | 0,00     | 0,00          | 0,00    | 0,00     | 0,00    | 0,00           | 0,00         | 0,00       | 0,03   | 0,00   |
| CZ           | 8,09         | 0,00           | 0,66       | 0,45     | 0,00          | 0,09    | 0,17     | 3,08    | 0,01           | 3,21         | 0,00       | 0,01   | 0,42   |
| DE           | 160,52       | 0,00           | 0,00       | 0,00     | 0,00          | 0,00    | 0,00     | 0,00    | 12,89          | 84,24        | 0,00       | 3,54   | 59,85  |
| DK           | -13,98       | 0,00           | -0,09      | -0,19    | 0,00          | -0,22   | -0,18    | -2,71   | -0,81          | -5,26        | -0,05      | -0,25  | -4,21  |
| EE           | -4,36        | 0,00           | -0,03      | -0,06    | 0,00          | -0,07   | -0,06    | -0,85   | -0,25          | -1,64        | -0,02      | -0,08  | -1,31  |
| ES           | -32,98       | -0,01          | -0,22      | -0,44    | 0,00          | -0,53   | -0,43    | -6,40   | -1,91          | -12,41       | -0,12      | -0,59  | -9,92  |
| FI           | -13,87       | 0,00           | -0,09      | -0,19    | 0,00          | -0,22   | -0,18    | -2,69   | -0,81          | -5,22        | -0,05      | -0,25  | -4,17  |
| FR           | 37,20        | 0,00           | 0,41       | 1,16     | 0,00          | 0,74    | 0,37     | 32,69   | 0,00           | 0,07         | 0,00       | 0,17   | 1,58   |
| GB           | -131,67      | -0,02          | -0,89      | -1,76    | 0,00          | -2,12   | -1,72    | -25,54  | -7,64          | -49,54       | -0,48      | -2,36  | -39,61 |
| GR           | 1,95         | 0,04           | 0,01       | 0,28     | 0,00          | 0,13    | 0,03     | 0,00    | 0,00           | 0,02         | 0,17       | 0,20   | 1,07   |
| HR           | -8,08        | 0,00           | -0,05      | -0,11    | 0,00          | -0,13   | -0,11    | -1,57   | -0,47          | -3,04        | -0,03      | -0,14  | -2,43  |

<sup>7</sup> Same as in previous figure 3, the renewable energy added to the EAM does not equal the renewable energy taken out of it. For more information refer to footnote 4.

| Country code | Volume (TWh) | RE unspecified | RE biomass | RE solar | RE geothermal | RE wind | RE hydro | Nuclear | FO unspecified | FO hard coal | FO lignite | FO oil | FO gas |
|--------------|--------------|----------------|------------|----------|---------------|---------|----------|---------|----------------|--------------|------------|--------|--------|
| HU           | -13,09       | 0,00           | -0,09      | -0,17    | 0,00          | -0,21   | -0,17    | -2,54   | -0,76          | -4,93        | -0,05      | -0,23  | -3,94  |
| IE           | 12,21        | 0,00           | 0,25       | 0,03     | 0,00          | 2,21    | 0,27     | 0,00    | 0,00           | 0,91         | 0,00       | 0,04   | 8,49   |
| IS           | -14,05       | 0,00           | -0,09      | -0,19    | 0,00          | -0,23   | -0,18    | -2,73   | -0,82          | -5,29        | -0,05      | -0,25  | -4,23  |
| IT           | -47,96       | -0,01          | -0,32      | -0,64    | 0,00          | -0,77   | -0,63    | -9,30   | -2,78          | -18,04       | -0,17      | -0,86  | -14,43 |
| LT           | -1,89        | 0,00           | -0,01      | -0,03    | 0,00          | -0,03   | -0,02    | -0,37   | -0,11          | -0,71        | -0,01      | -0,03  | -0,57  |
| LU           | -0,26        | 0,00           | 0,00       | 0,00     | 0,00          | 0,00    | 0,00     | -0,05   | -0,02          | -0,10        | 0,00       | 0,00   | -0,08  |
| LV           | -4,21        | 0,00           | -0,03      | -0,06    | 0,00          | -0,07   | -0,06    | -0,82   | -0,24          | -1,59        | -0,02      | -0,08  | -1,27  |
| ME           | 0,72         | 0,00           | 0,00       | 0,00     | 0,00          | 0,02    | 0,22     | 0,00    | 0,37           | 0,00         | 0,10       | 0,00   | 0,00   |
| MT           | -0,82        | 0,00           | -0,01      | -0,01    | 0,00          | -0,01   | -0,01    | -0,16   | -0,05          | -0,31        | 0,00       | -0,01  | -0,25  |
| NL           | -5,05        | 0,00           | -0,03      | -0,07    | 0,00          | -0,08   | -0,07    | -0,98   | -0,29          | -1,90        | -0,02      | -0,09  | -1,52  |
| NO           | -94,29       | -0,01          | -0,63      | -1,26    | 0,00          | -1,52   | -1,24    | -18,29  | -5,47          | -35,47       | -0,34      | -1,69  | -28,36 |
| PL           | -10,74       | 0,00           | -0,07      | -0,14    | 0,00          | -0,17   | -0,14    | -2,08   | -0,62          | -4,04        | -0,04      | -0,19  | -3,23  |
| PT           | -36,61       | -0,01          | -0,25      | -0,49    | 0,00          | -0,59   | -0,48    | -7,10   | -2,12          | -13,77       | -0,13      | -0,66  | -11,01 |
| RO           | -2,60        | 0,00           | -0,02      | -0,03    | 0,00          | -0,04   | -0,03    | -0,50   | -0,15          | -0,98        | -0,01      | -0,05  | -0,78  |
| RS           | 0,91         | 0,00           | 0,00       | 0,00     | 0,00          | 0,01    | 0,22     | 0,00    | 0,02           | 0,00         | 0,61       | 0,00   | 0,05   |
| SE           | 1,79         | 0,00           | 0,13       | 0,51     | 0,00          | 0,14    | 0,13     | 0,58    | 0,25           | 0,00         | 0,00       | 0,02   | 0,03   |
| SI           | -0,22        | 0,00           | 0,00       | 0,00     | 0,00          | 0,00    | 0,00     | -0,04   | -0,01          | -0,08        | 0,00       | 0,00   | -0,07  |
| SK           | -9,13        | 0,00           | -0,06      | -0,12    | 0,00          | -0,15   | -0,12    | -1,77   | -0,53          | -3,43        | -0,03      | -0,16  | -2,75  |

### **5.3 Environmental indicators 2024**

According to directive 2019/944/EC, Annex 1(5), electricity suppliers shall (together with energy origin disclosure) disclose “information on the environmental impact, in at least terms of CO2 emissions and the radioactive waste resulting from the electricity produced by the overall energy mix of the supplier over the preceding year”. The calculation of the environmental indicators goes hand in hand with the calculation of energy source shares in the residual mix:

- The CO2 factor of the production mix is obtained by multiplying each energy in the production mix with the CO2 factor of that energy source for that country (nationally reported data or Ecoinvent database).
- The emissions of the Domestic Residual Mix are the emissions of the Production Mix adjusted with the Issued and Expired Attributes for each energy source respectfully,
- For surplus countries, CO2 factor in Final RM is equal to the CO2 factor in Domestic RM. For deficit countries, CO2 is added to the Domestic RM by multiplying the volume of deficit with the CO2 factor of the EAM.

The process is identical for radioactive waste, but the source data is as described in the introduction.

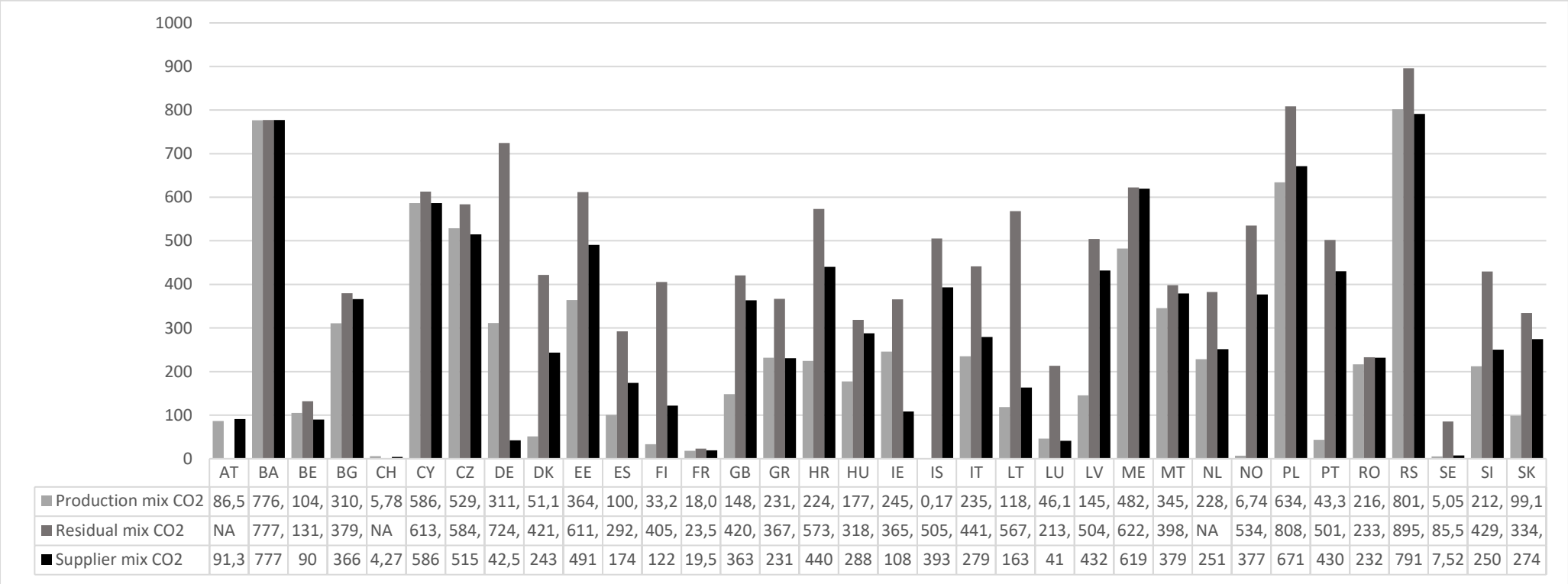


Figure 5 Direct CO2 content in Production, Residual and Total Supplier mix 2024 [gCO2/kWh]

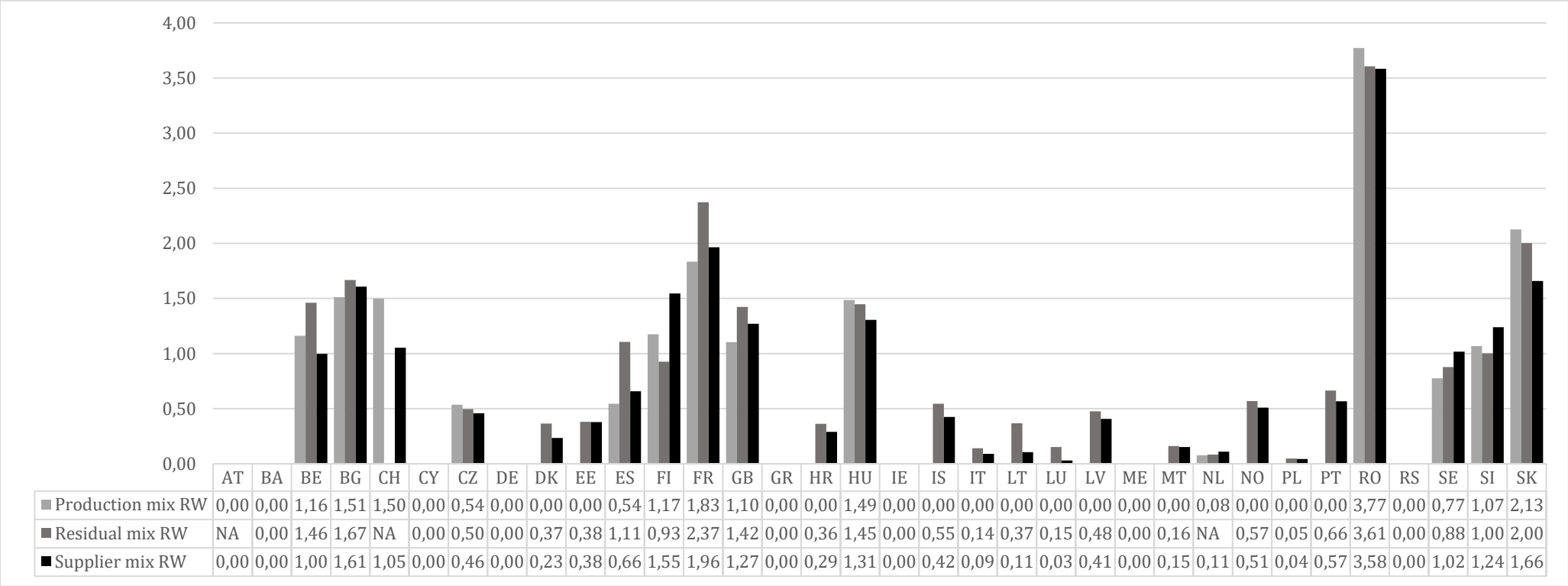


Figure 6 Highly active radioactive waste content in Production, Residual and Total Supplier Mix 2024 [mgRW/kWh]

## 5.4 Total supplier mixes 2024

The total supplier mix (Table 4, Figures 7 and 8) represents the total consumption mix of a country, i.e. it is the sum of attributes of 1) cancelled GOs as well as 2) the final residual mix. Thus, both explicitly tracked and available remaining electricity attributes are included in the TSM, which equals in physical volume with the country's total electricity consumption. For understanding, it might help to consider that without the international transferability of GOs and electricity, the TSM would equal the production mix of the country.

*Note: The supplier mix from Germany assumes all RES production for which a GO is not issued is tracked under the EEG and marked as renewable unspecified in the total supplier mix due to unavailability of energy source specific data for the EEG.*

Table 4: Total Supplier Mix 2024

|    | Volume (TWh) | RE unspecified | RE biomass | RE solar | RE geothermal | RE wind | RE hydro | Nuclear | FO unspecified | FO hard coal | FO lignite | FO oil  | FO gas  | CO <sub>2</sub> (gCO <sub>2</sub> /kWh) | Rad waste (mg/kWh) |
|----|--------------|----------------|------------|----------|---------------|---------|----------|---------|----------------|--------------|------------|---------|---------|-----------------------------------------|--------------------|
| AT | 60,72        | 0,03 %         | 4,07 %     | 6,02 %   | 0,18 %        | 12,94 % | 58,37 %  | 0,00 %  | 0,07 %         | 1,91 %       | 0,00 %     | 0,58 %  | 15,82 % | 91,33                                   | 0,00               |
| BA | 11,56        | 0,00 %         | 0,00 %     | 2,04 %   | 0,00 %        | 2,80 %  | 34,43 %  | 0,00 %  | 0,00 %         | 60,73 %      | 0,00 %     | 0,00 %  | 0,00 %  | 777,02                                  | 0,00               |
| BE | 77,76        | 0,02 %         | 5,55 %     | 10,43 %  | 0,18 %        | 17,78 % | 10,03 %  | 36,96 % | 1,01 %         | 2,54 %       | 0,00 %     | 0,01 %  | 15,48 % | 90,04                                   | 1,00               |
| BG | 33,59        | 0,00 %         | 0,46 %     | 9,36 %   | 0,00 %        | 2,70 %  | 4,50 %   | 46,18 % | 0,49 %         | 3,93 %       | 24,97 %    | 0,15 %  | 7,26 %  | 366,03                                  | 1,61               |
| CH | 61,63        | 0,00 %         | 1,53 %     | 4,18 %   | 0,00 %        | 3,53 %  | 67,80 %  | 21,93 % | 0,80 %         | 0,00 %       | 0,00 %     | 0,00 %  | 0,24 %  | 4,27                                    | 1,05               |
| CY | 5,24         | 0,00 %         | 0,73 %     | 15,23 %  | 0,00 %        | 4,56 %  | 0,00 %   | 0,00 %  | 0,00 %         | 0,00 %       | 0,00 %     | 79,48 % | 0,00 %  | 586,43                                  | 0,00               |
| CZ | 60,21        | 0,02 %         | 8,95 %     | 6,04 %   | 0,11 %        | 3,30 %  | 6,67 %   | 35,22 % | 0,14 %         | 34,91 %      | 0,00 %     | 0,10 %  | 4,54 %  | 514,64                                  | 0,46               |
| DE | 453,02       | 45,41 %        | 1,92 %     | 3,31 %   | 0,49 %        | 8,61 %  | 34,39 %  | 0,00 %  | 0,47 %         | 3,08 %       | 0,00 %     | 0,13 %  | 2,19 %  | 42,50                                   | 0,00               |
| DK | 38,44        | 2,42 %         | 4,47 %     | 11,41 %  | 0,00 %        | 32,46 % | 4,87 %   | 7,82 %  | 4,09 %         | 17,84 %      | 0,13 %     | 0,89 %  | 13,59 % | 243,46                                  | 0,23               |
| EE | 8,26         | 0,01 %         | 4,16 %     | 9,76 %   | 0,05 %        | 9,27 %  | 3,37 %   | 12,66 % | 23,51 %        | 19,85 %      | 0,19 %     | 0,94 %  | 16,21 % | 490,89                                  | 0,38               |
| ES | 247,84       | 0,00 %         | 1,83 %     | 10,70 %  | 0,00 %        | 19,00 % | 11,64 %  | 23,08 % | 0,77 %         | 6,17 %       | 0,05 %     | 1,38 %  | 25,38 % | 173,77                                  | 0,66               |
| FI | 82,74        | 0,01 %         | 6,03 %     | 3,07 %   | 0,01 %        | 11,97 % | 9,97 %   | 51,56 % | 1,99 %         | 8,92 %       | 0,06 %     | 0,59 %  | 5,83 %  | 121,97                                  | 1,55               |
| FR | 449,20       | 0,01 %         | 1,45 %     | 4,33 %   | 0,01 %        | 7,26 %  | 10,17 %  | 72,73 % | 0,01 %         | 0,15 %       | 0,00 %     | 0,37 %  | 3,52 %  | 19,47                                   | 1,96               |
| GB | 305,20       | 0,01 %         | 3,13 %     | 1,80 %   | 0,00 %        | 9,64 %  | 1,38 %   | 21,13 % | 4,32 %         | 16,75 %      | 0,16 %     | 1,23 %  | 40,45 % | 363,34                                  | 1,27               |
| GR | 56,56        | 1,15 %         | 1,62 %     | 18,18 %  | 0,05 %        | 22,48 % | 8,42 %   | 0,00 %  | 0,03 %         | 0,78 %       | 5,34 %     | 6,36 %  | 35,58 % | 230,64                                  | 0,00               |

|    | Volume (TWh) | RE unspecified | RE biomass | RE solar | RE geothermal | RE wind | RE hydro | Nuclear | FO unspecified | FO hard coal | FO lignite | FO oil  | FO gas  | CO2 (gCO2/kWh) | Rad waste (mg/kWh) |
|----|--------------|----------------|------------|----------|---------------|---------|----------|---------|----------------|--------------|------------|---------|---------|----------------|--------------------|
| HR | 16,78        | 0,01 %         | 4,11 %     | 2,98 %   | 0,00 %        | 6,82 %  | 18,39 %  | 9,72 %  | 2,80 %         | 22,48 %      | 0,17 %     | 18,03 % | 14,49 % | 440,41         | 0,29               |
| HU | 46,43        | 0,02 %         | 1,73 %     | 11,20 %  | 0,04 %        | 3,89 %  | 3,60 %   | 38,13 % | 2,30 %         | 15,14 %      | 0,10 %     | 0,62 %  | 23,23 % | 287,66         | 1,31               |
| IE | 42,53        | 1,29 %         | 5,59 %     | 10,90 %  | 0,00 %        | 40,97 % | 16,47 %  | 0,00 %  | 0,00 %         | 0,41 %       | 0,00 %     | 0,02 %  | 24,37 % | 108,23         | 0,00               |
| IS | 19,19        | 0,01 %         | 0,76 %     | 3,91 %   | 5,46 %        | 13,41 % | 6,84 %   | 14,20 % | 4,25 %         | 27,54 %      | 0,27 %     | 1,33 %  | 22,02 % | 393,29         | 0,42               |
| IT | 310,83       | 0,07 %         | 5,89 %     | 9,94 %   | 2,00 %        | 8,10 %  | 16,66 %  | 2,99 %  | 43,56 %        | 5,81 %       | 0,06 %     | 0,28 %  | 4,64 %  | 279,50         | 0,09               |
| LT | 10,37        | 0,00 %         | 14,37 %    | 13,63 %  | 0,00 %        | 29,99 % | 14,13 %  | 3,54 %  | 3,25 %         | 6,85 %       | 0,07 %     | 1,31 %  | 12,86 % | 163,42         | 0,11               |
| LU | 5,13         | 0,09 %         | 1,98 %     | 10,80 %  | 1,66 %        | 14,26 % | 64,12 %  | 0,99 %  | 1,34 %         | 1,92 %       | 0,02 %     | 0,09 %  | 2,73 %  | 41,03          | 0,03               |
| LV | 6,98         | 0,01 %         | 3,76 %     | 5,37 %   | 0,00 %        | 3,49 %  | 9,16 %   | 13,30 % | 3,59 %         | 24,21 %      | 0,22 %     | 1,08 %  | 35,81 % | 431,94         | 0,41               |
| ME | 3,26         | 0,00 %         | 0,00 %     | 0,57 %   | 0,00 %        | 3,90 %  | 30,83 %  | 0,00 %  | 51,49 %        | 0,00 %       | 13,21 %    | 0,00 %  | 0,00 %  | 619,41         | 0,00               |
| MT | 3,10         | 0,00 %         | 1,01 %     | 11,90 %  | 0,00 %        | 1,42 %  | 2,44 %   | 5,12 %  | 1,53 %         | 9,92 %       | 0,10 %     | 0,72 %  | 65,85 % | 379,17         | 0,15               |
| NL | 115,92       | 0,00 %         | 3,00 %     | 16,97 %  | 0,00 %        | 26,88 % | 0,72 %   | 3,99 %  | 2,16 %         | 10,40 %      | 0,02 %     | 1,19 %  | 34,66 % | 251,44         | 0,11               |
| NO | 137,16       | 0,02 %         | 0,78 %     | 2,85 %   | 0,02 %        | 6,50 %  | 19,10 %  | 17,06 % | 5,56 %         | 25,86 %      | 0,25 %     | 1,23 %  | 20,77 % | 377,10         | 0,51               |
| PL | 154,20       | 0,00 %         | 3,23 %     | 8,53 %   | 0,00 %        | 11,29 % | 1,47 %   | 1,49 %  | 1,20 %         | 58,20 %      | 0,03 %     | 0,12 %  | 14,44 % | 671,39         | 0,04               |
| PT | 51,40        | 0,23 %         | 1,67 %     | 0,98 %   | 0,00 %        | 8,90 %  | 6,00 %   | 18,01 % | 5,44 %         | 27,04 %      | 0,26 %     | 1,27 %  | 30,21 % | 430,01         | 0,57               |
| RO | 50,74        | 0,00 %         | 0,41 %     | 6,88 %   | 0,00 %        | 12,92 % | 27,76 %  | 20,74 % | 0,33 %         | 12,87 %      | 0,02 %     | 0,17 %  | 17,90 % | 232,04         | 3,58               |
| RS | 34,80        | 0,00 %         | 0,84 %     | 0,34 %   | 0,00 %        | 3,84 %  | 29,03 %  | 0,00 %  | 1,86 %         | 0,00 %       | 59,05 %    | 0,00 %  | 5,05 %  | 790,95         | 0,00               |
| SE | 136,29       | 0,06 %         | 7,09 %     | 3,64 %   | 0,01 %        | 15,63 % | 34,41 %  | 37,68 % | 1,23 %         | 0,01 %       | 0,00 %     | 0,10 %  | 0,14 %  | 7,52           | 1,02               |
| SI | 12,80        | 0,00 %         | 3,16 %     | 15,19 %  | 0,06 %        | 0,62 %  | 11,23 %  | 41,31 % | 0,10 %         | 21,80 %      | 1,22 %     | 0,08 %  | 5,23 %  | 250,20         | 1,24               |
| SK | 26,33        | 0,25 %         | 4,76 %     | 2,61 %   | 0,00 %        | 2,83 %  | 15,83 %  | 34,42 % | 3,15 %         | 14,20 %      | 0,34 %     | 2,09 %  | 19,53 % | 274,11         | 1,66               |

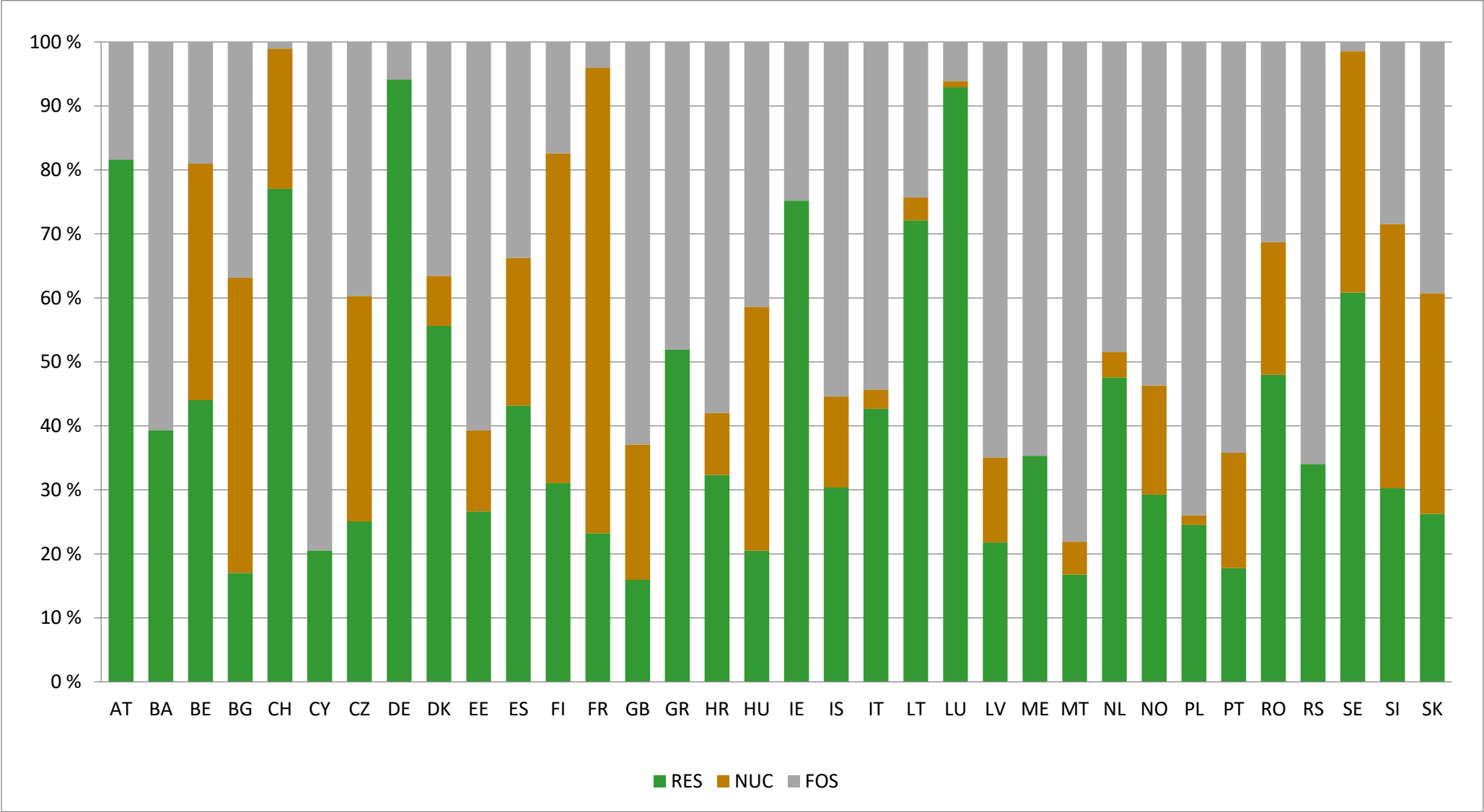


Figure 7 Total Supplier Mix 2024 (simple fuel categories)

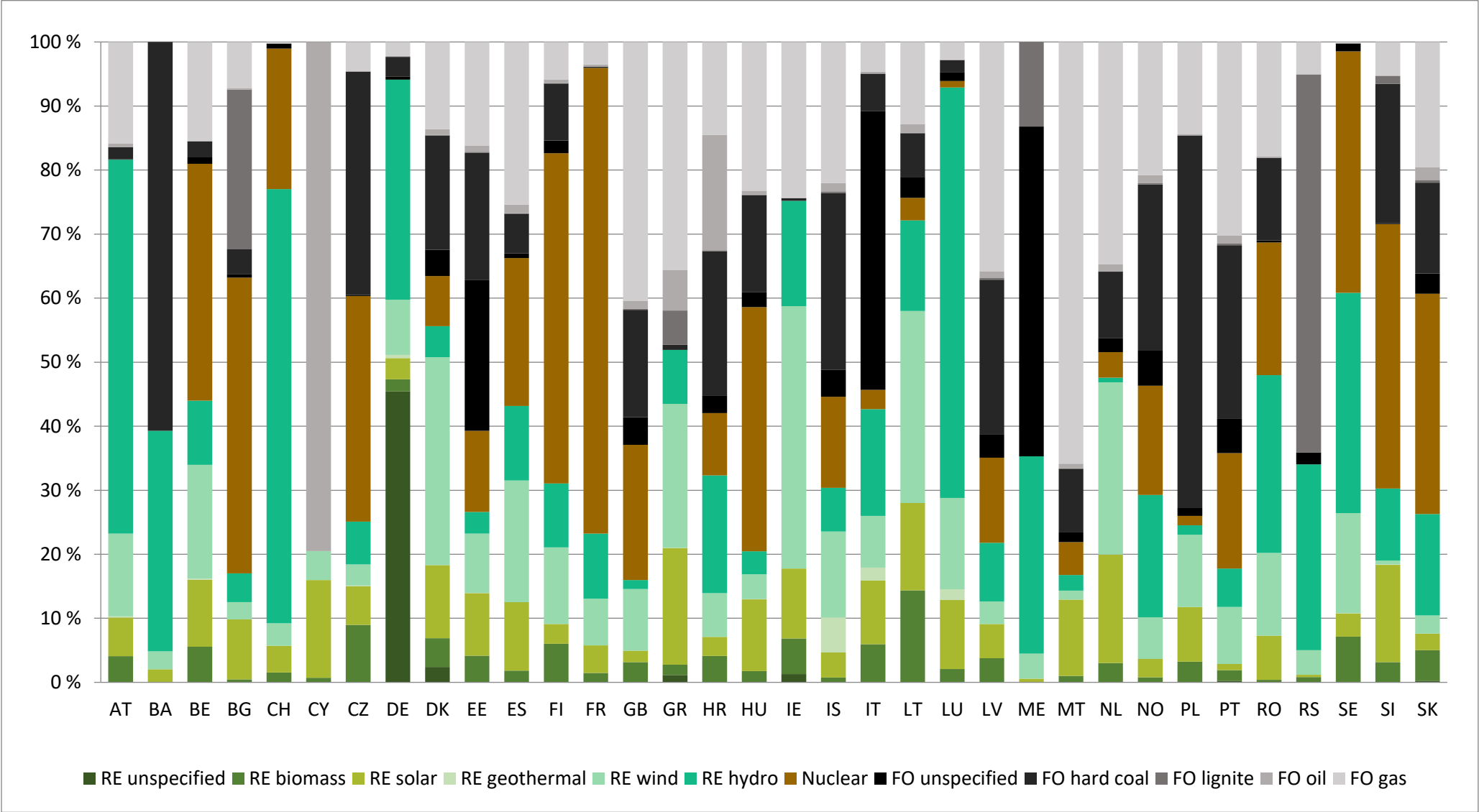


Figure 8 Total Supplier Mix 2024 (detailed fuel categories)

## 5.5 Production mixes 2024

Table 5: Production Mix 2024<sup>8</sup>

|    | Volume [TWh] | RE unspecified | RE biomass | RE solar | RE geothermal | RE wind | RE hydro | Nuclear | FO unspecified | FO hard coal | FO lignite | FO oil  | FO gas  | CO2 (gCO2/kWh) | Rad waste (mg/kWh) |
|----|--------------|----------------|------------|----------|---------------|---------|----------|---------|----------------|--------------|------------|---------|---------|----------------|--------------------|
| AT | 72,72        | 0,00 %         | 4,29 %     | 0,00 %   | 0,00 %        | 14,67 % | 65,20 %  | 0,00 %  | 0,93 %         | 2,89 %       | 0,00 %     | 0,95 %  | 11,07 % | 86,53          | 0,00               |
| BA | 14,03        | 0,00 %         | 0,00 %     | 2,04 %   | 0,00 %        | 2,80 %  | 34,47 %  | 0,00 %  | 0,00 %         | 60,69 %      | 0,00 %     | 0,00 %  | 0,00 %  | 776,55         | 0,00               |
| BE | 68,86        | 0,00 %         | 3,59 %     | 11,57 %  | 0,00 %        | 19,07 % | 0,61 %   | 43,00 % | 1,18 %         | 2,95 %       | 0,00 %     | 0,01 %  | 18,03 % | 104,82         | 1,16               |
| BG | 34,64        | 0,00 %         | 0,47 %     | 14,90 %  | 0,00 %        | 3,97 %  | 8,02 %   | 43,18 % | 0,00 %         | 0,71 %       | 24,18 %    | 0,00 %  | 4,56 %  | 310,74         | 1,51               |
| CH | 73,57        | 0,00 %         | 2,43 %     | 5,41 %   | 0,00 %        | 0,23 %  | 59,28 %  | 31,24 % | 1,17 %         | 0,00 %       | 0,00 %     | 0,00 %  | 0,24 %  | 5,78           | 1,50               |
| CY | 5,27         | 0,00 %         | 0,76 %     | 15,87 %  | 0,00 %        | 3,87 %  | 0,00 %   | 0,00 %  | 0,00 %         | 0,00 %       | 0,00 %     | 79,50 % | 0,00 %  | 586,55         | 0,00               |
| CZ | 68,07        | 0,00 %         | 7,32 %     | 5,25 %   | 0,00 %        | 1,02 %  | 3,93 %   | 41,27 % | 0,15 %         | 35,59 %      | 0,00 %     | 0,10 %  | 5,37 %  | 529,13         | 0,54               |
| DE | 435,06       | 0,00 %         | 3,89 %     | 16,55 %  | 0,05 %        | 32,13 % | 4,38 %   | 0,00 %  | 3,45 %         | 22,57 %      | 0,00 %     | 0,95 %  | 16,03 % | 311,58         | 0,00               |
| DK | 36,17        | 2,57 %         | 20,48 %    | 10,44 %  | 0,00 %        | 56,85 % | 0,06 %   | 0,00 %  | 2,10 %         | 4,41 %       | 0,00 %     | 0,26 %  | 2,82 %  | 51,18          | 0,00               |
| EE | 5,36         | 0,00 %         | 22,37 %    | 18,75 %  | 0,00 %        | 21,71 % | 0,56 %   | 0,00 %  | 35,78 %        | 0,00 %       | 0,00 %     | 0,00 %  | 0,83 %  | 364,28         | 0,00               |
| ES | 258,07       | 0,27 %         | 1,49 %     | 18,87 %  | 0,00 %        | 23,64 % | 12,28 %  | 20,16 % | 0,00 %         | 1,15 %       | 0,00 %     | 1,12 %  | 21,02 % | 100,66         | 0,54               |
| FI | 79,56        | 0,00 %         | 11,79 %    | 1,45 %   | 0,00 %        | 24,96 % | 17,78 %  | 39,13 % | 1,05 %         | 2,71 %       | 0,00 %     | 0,30 %  | 0,82 %  | 33,20          | 1,17               |
| FR | 532,34       | 0,00 %         | 1,98 %     | 4,66 %   | 0,00 %        | 8,80 %  | 12,87 %  | 67,95 % | 0,01 %         | 0,14 %       | 0,00 %     | 0,34 %  | 3,26 %  | 18,07          | 1,83               |
| GB | 270,65       | 0,00 %         | 13,64 %    | 5,42 %   | 0,00 %        | 30,92 % | 2,09 %   | 13,80 % | 2,05 %         | 0,59 %       | 0,00 %     | 0,51 %  | 30,98 % | 148,50         | 1,10               |
| GR | 57,59        | 1,21 %         | 1,25 %     | 20,15 %  | 0,00 %        | 22,32 % | 5,87 %   | 0,00 %  | 0,03 %         | 0,00 %       | 5,62 %     | 6,70 %  | 36,85 % | 231,97         | 0,00               |
| HR | 13,60        | 0,00 %         | 6,51 %     | 2,73 %   | 0,00 %        | 19,28 % | 44,92 %  | 0,00 %  | 0,00 %         | 5,38 %       | 0,00 %     | 21,19 % | 0,00 %  | 224,38         | 0,00               |

<sup>8</sup> The physical electricity imports and exports outside of the Residual mix calculation area are not included in these figures.

|    | Volume [TWh] | RE unspecified | RE biomass | RE solar | RE geothermal | RE wind | RE hydro | Nuclear | FO unspecified | FO hard coal | FO lignite | FO oil | FO gas  | CO2 (gCO2/kWh) | Rad waste (mg/kWh) |
|----|--------------|----------------|------------|----------|---------------|---------|----------|---------|----------------|--------------|------------|--------|---------|----------------|--------------------|
| HU | 35,70        | 0,00 %         | 4,15 %     | 24,87 %  | 0,02 %        | 1,78 %  | 0,63 %   | 42,47 % | 0,87 %         | 5,89 %       | 0,00 %     | 0,14 % | 19,18 % | 177,20         | 1,49               |
| IE | 36,99        | 0,60 %         | 2,59 %     | 2,37 %   | 0,00 %        | 38,18 % | 2,11 %   | 0,00 %  | 0,00 %         | 2,92 %       | 0,00 %     | 0,12 % | 51,09 % | 245,57         | 0,00               |
| IS | 19,57        | 0,00 %         | 0,00 %     | 0,00 %   | 30,40 %       | 0,06 %  | 69,51 %  | 0,00 %  | 0,00 %         | 0,00 %       | 0,00 %     | 0,02 % | 0,00 %  | 0,17           | 0,00               |
| IT | 259,84       | 0,00 %         | 5,07 %     | 13,88 %  | 2,03 %        | 8,49 %  | 19,48 %  | 0,00 %  | 51,04 %        | 0,00 %       | 0,00 %     | 0,00 % | 0,00 %  | 235,24         | 0,00               |
| LT | 5,73         | 0,00 %         | 12,60 %    | 1,66 %   | 0,00 %        | 59,04 % | 7,59 %   | 0,00 %  | 3,97 %         | 0,00 %       | 0,00 %     | 1,79 % | 13,35 % | 118,76         | 0,00               |
| LU | 1,52         | 0,00 %         | 18,00 %    | 34,24 %  | 0,00 %        | 31,34 % | 8,84 %   | 0,00 %  | 3,53 %         | 0,00 %       | 0,00 %     | 0,00 % | 4,05 %  | 46,18          | 0,00               |
| LV | 5,91         | 0,00 %         | 7,44 %     | 6,74 %   | 0,00 %        | 4,63 %  | 54,06 %  | 0,00 %  | 0,00 %         | 0,00 %       | 0,00 %     | 0,00 % | 27,14 % | 145,65         | 0,00               |
| ME | 3,45         | 0,00 %         | 0,00 %     | 1,80 %   | 0,00 %        | 8,45 %  | 50,94 %  | 0,00 %  | 0,00 %         | 0,00 %       | 38,81 %    | 0,00 % | 0,00 %  | 482,21         | 0,00               |
| MT | 2,13         | 0,00 %         | 0,43 %     | 15,02 %  | 0,00 %        | 0,00 %  | 0,00 %   | 0,00 %  | 0,00 %         | 0,00 %       | 0,00 %     | 0,36 % | 84,19 % | 345,33         | 0,00               |
| NL | 120,14       | 0,00 %         | 5,32 %     | 18,10 %  | 0,00 %        | 27,35 % | 0,07 %   | 2,83 %  | 1,28 %         | 8,03 %       | 0,00 %     | 1,11 % | 35,91 % | 228,58         | 0,08               |
| NO | 155,60       | 0,12 %         | 0,00 %     | 0,16 %   | 0,00 %        | 9,35 %  | 88,98 %  | 0,00 %  | 1,39 %         | 0,00 %       | 0,00 %     | 0,00 % | 0,00 %  | 6,74           | 0,00               |
| PL | 154,20       | 0,00 %         | 4,46 %     | 9,79 %   | 0,00 %        | 15,68 % | 1,34 %   | 0,00 %  | 0,79 %         | 55,58 %      | 0,00 %     | 0,00 % | 12,35 % | 634,03         | 0,00               |
| PT | 46,62        | 6,34 %         | 2,89 %     | 10,48 %  | 0,00 %        | 30,23 % | 39,25 %  | 0,00 %  | 3,69 %         | 0,00 %       | 0,00 %     | 0,00 % | 7,11 %  | 43,30          | 0,00               |
| RO | 47,80        | 0,00 %         | 0,39 %     | 7,08 %   | 0,00 %        | 13,18 % | 29,32 %  | 20,96 % | 0,00 %         | 11,62 %      | 0,00 %     | 0,08 % | 17,37 % | 216,47         | 3,77               |
| RS | 34,29        | 0,00 %         | 0,85 %     | 0,35 %   | 0,00 %        | 3,89 %  | 28,97 %  | 0,00 %  | 0,01 %         | 0,00 %       | 61,03 %    | 0,00 % | 4,91 %  | 801,71         | 0,00               |
| SE | 169,79       | 0,00 %         | 5,95 %     | 2,44 %   | 0,00 %        | 24,04 % | 37,89 %  | 28,70 % | 0,74 %         | 0,01 %       | 0,00 %     | 0,10 % | 0,13 %  | 5,05           | 0,77               |
| SI | 15,59        | 0,00 %         | 1,27 %     | 7,15 %   | 0,00 %        | 0,04 %  | 33,37 %  | 35,61 % | 0,05 %         | 19,90 %      | 0,00 %     | 0,04 % | 2,55 %  | 212,22         | 1,07               |
| SK | 27,97        | 0,29 %         | 4,92 %     | 2,40 %   | 0,00 %        | 0,02 %  | 17,23 %  | 60,75 % | 1,35 %         | 1,37 %       | 0,26 %     | 1,74 % | 9,69 %  | 99,13          | 2,13               |

## 5.6 Various total mixes 2024

Table 6 European Total Production Mix, Total Attributes in Final Residual Mixes and European Attribute Mix 2024<sup>9</sup>

|                         | Production mixes | Residual mixes | European attribute mix |
|-------------------------|------------------|----------------|------------------------|
| <b>Volume [TWh]</b>     | 3168,37          | 1784,53        | 242,06                 |
| <b>RE unspecified %</b> | 0,18 %           | 0,10 %         | 0,02 %                 |
| <b>RE solar %</b>       | 9,42 %           | 5,29 %         | 1,33 %                 |
| <b>RE biomass %</b>     | 4,55 %           | 1,19 %         | 0,67 %                 |
| <b>RE wind %</b>        | 18,63 %          | 1,85 %         | 1,61 %                 |
| <b>RE geothermal %</b>  | 0,36 %           | 0,05 %         | 0,00 %                 |
| <b>RE hydro %</b>       | 18,25 %          | 2,59 %         | 1,31 %                 |
| <b>Nuclear %</b>        | 21,39 %          | 34,34 %        | 19,40 %                |
| <b>FO unspecified %</b> | 5,31 %           | 10,04 %        | 5,80 %                 |
| <b>FO lignite %</b>     | 1,07 %           | 1,91 %         | 0,36 %                 |
| <b>FO hard coal %</b>   | 7,97 %           | 18,54 %        | 37,62 %                |
| <b>FO gas %</b>         | 12,08 %          | 22,55 %        | 30,08 %                |
| <b>FO oil %</b>         | 0,77 %           | 1,56 %         | 1,79 %                 |

<sup>9</sup> The EAM volume and percentages presented here do not exactly match numbers provided in Table 1. This is due to some countries having negative renewable energy balance in domestic residual mixes (caused by variation in disclosure periods and GO lifetimes overlapping two disclosure periods). This negativity is transferred into the EAM before considering the domestic residual mix attribute surpluses and deficits. This negativity correction is included in this Table 6 for statistics purposes. For any member state residual mix calculation the values from the Table 1 should be used.

6 Comparisons

The following graphs and tables are not really results of the calculation, but meant for background information. They compare different mixes of the same year or the evolution of mixes on an annual level.

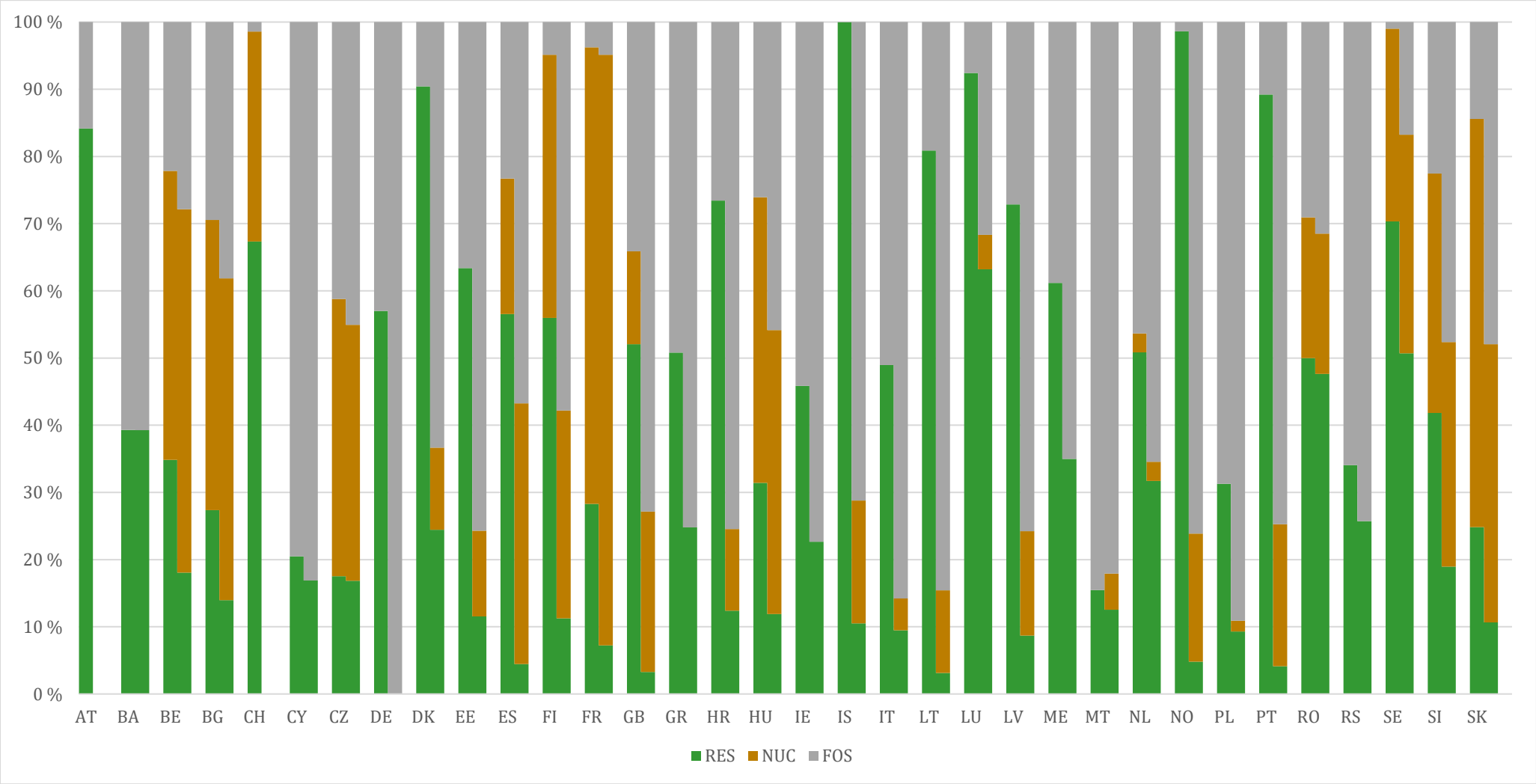


Figure 9 Production Mix (left) and Final Residual Mix (right) 2024 (simple fuel categories)

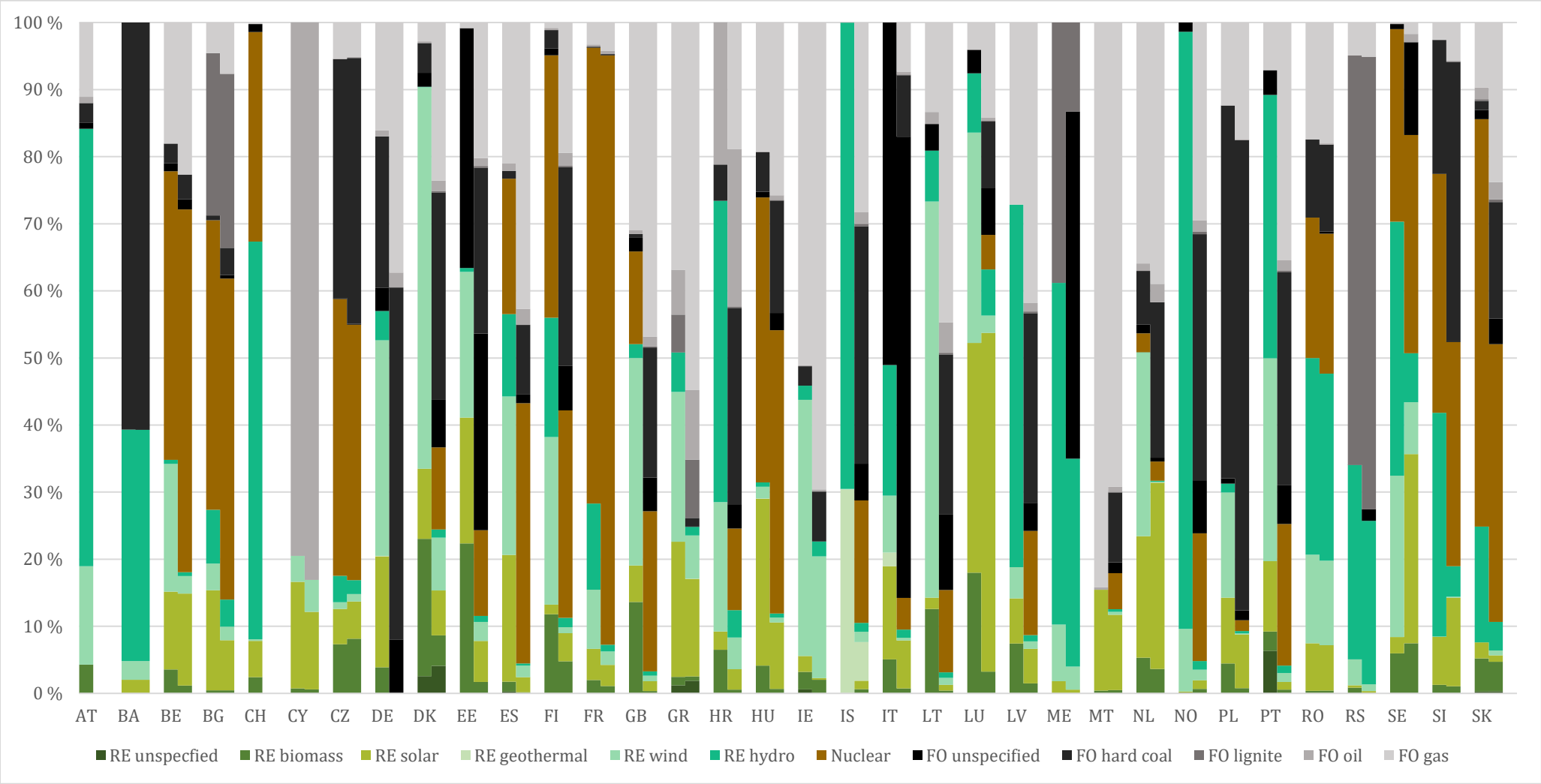


Figure 10 Production Mix (left) and Final Residual Mix (right) 2024 (detailed fuel categories)

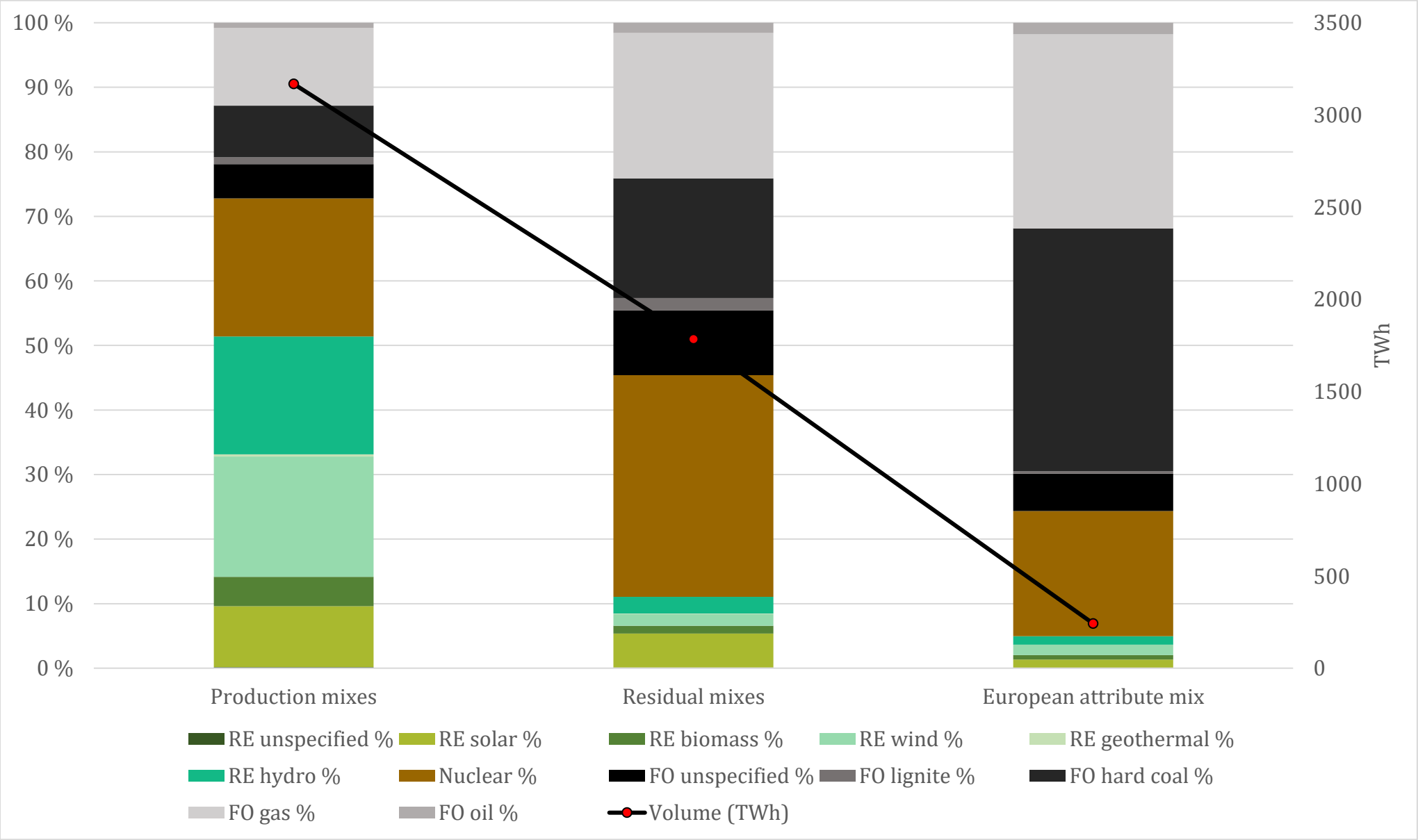


Figure 11 European Total Production Mix (left), Attributes in Final Residual Mixes (middle) and EAM (right) 2024

The following figures compare the production and total supplier mixes both in % and TWh. This provides an interesting viewpoint showing the difference of the production and consumption mix of countries. Countries with a “greener” consumption mix than their respective production mix are typically GO net importers and vice-versa.

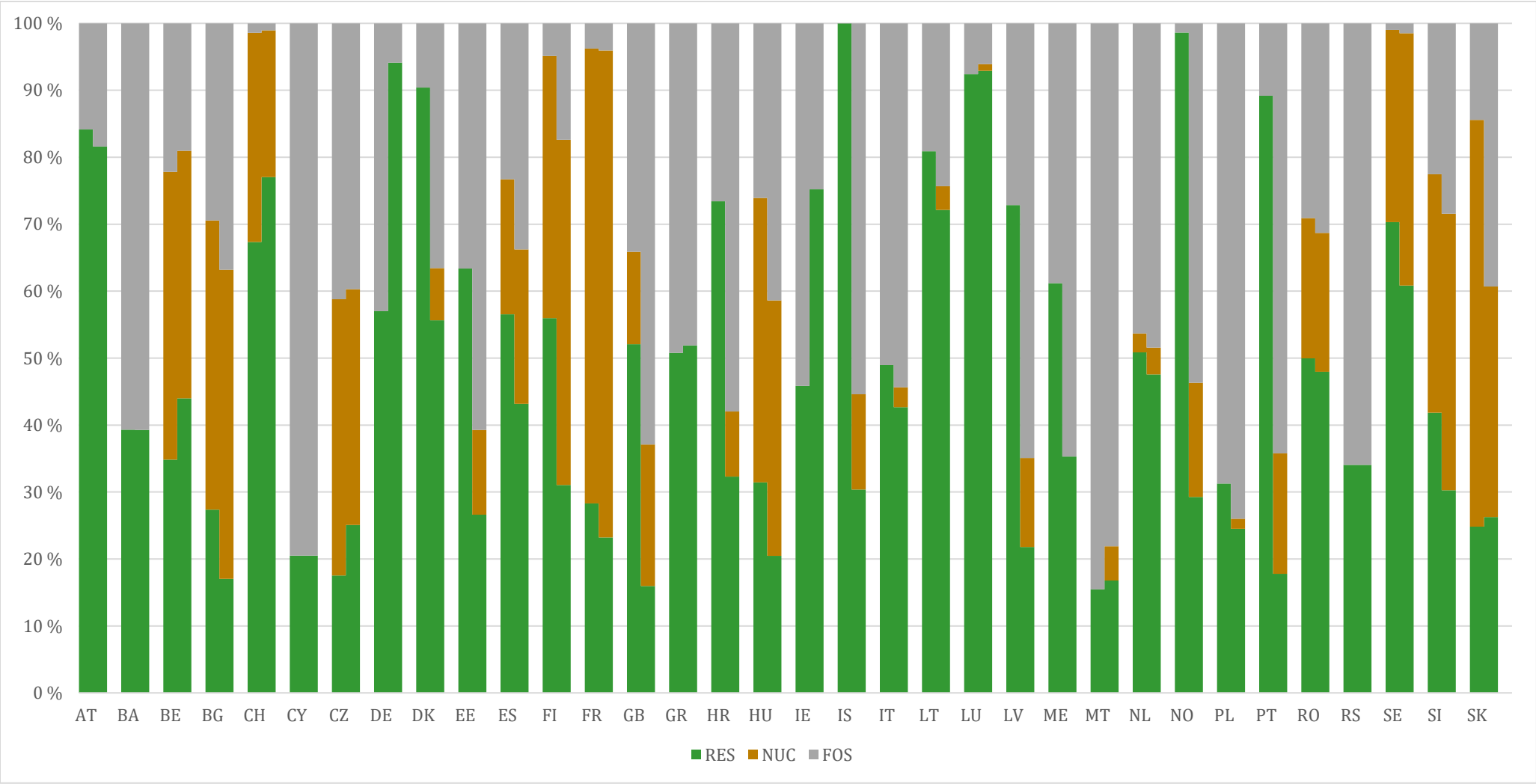


Figure 12 Production Mix (left) and Total Supplier Mix (right) 2024 % (simple fuel categories)

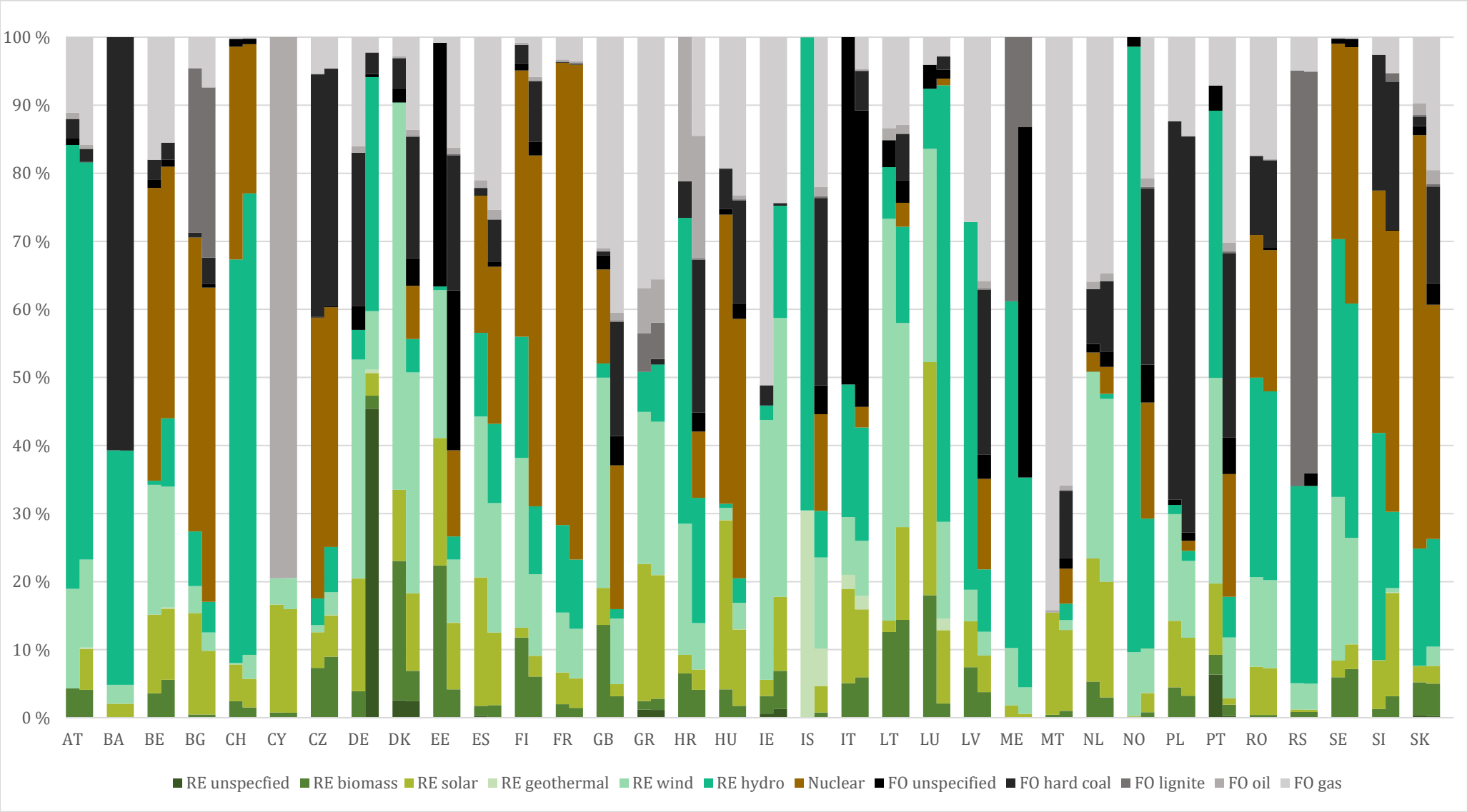


Figure 13 Production Mix (left) and Total Supplier Mix (right) 2024 % (detailed fuel categories)

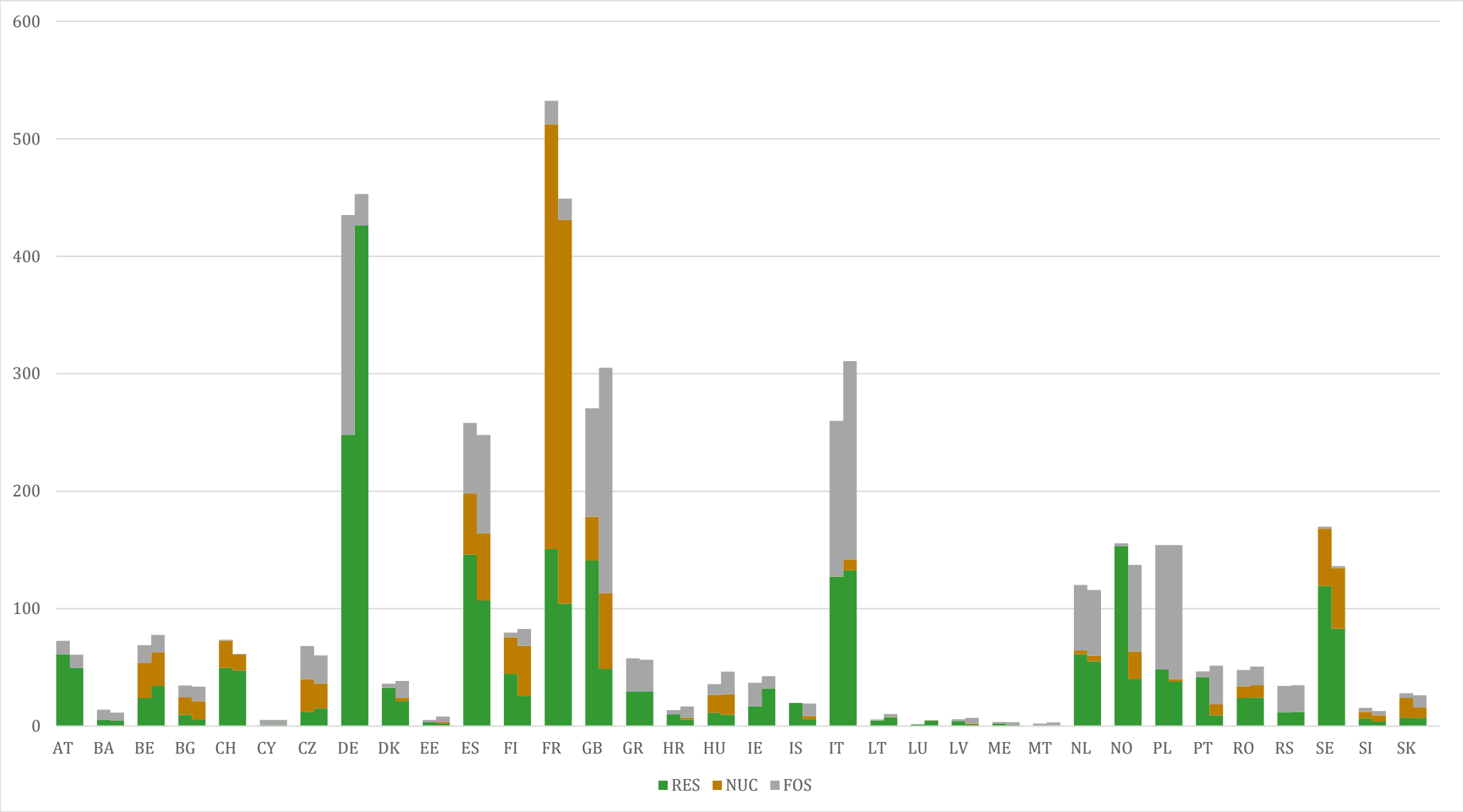


Figure 14 Production Mix (left) and Total Supplier Mix (right) TWh 2024 (simple fuel categories)

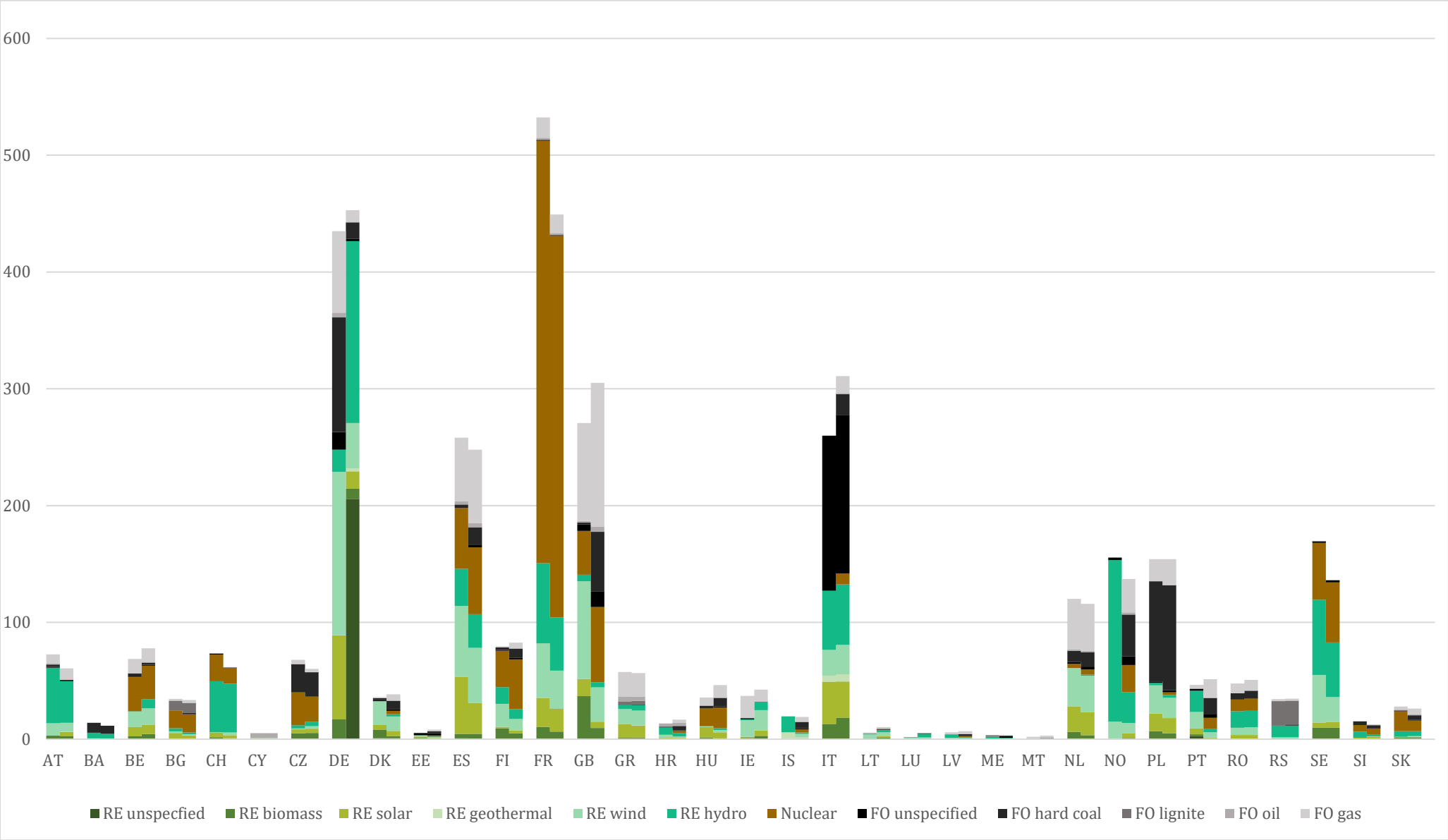


Figure 15 Production Mix (left) and Total Supplier Mix (right) TWh 2024 (detailed fuel categories)

Figure 16 and Table 7 compare the residual mixes of 2022, 2023 and 2024.

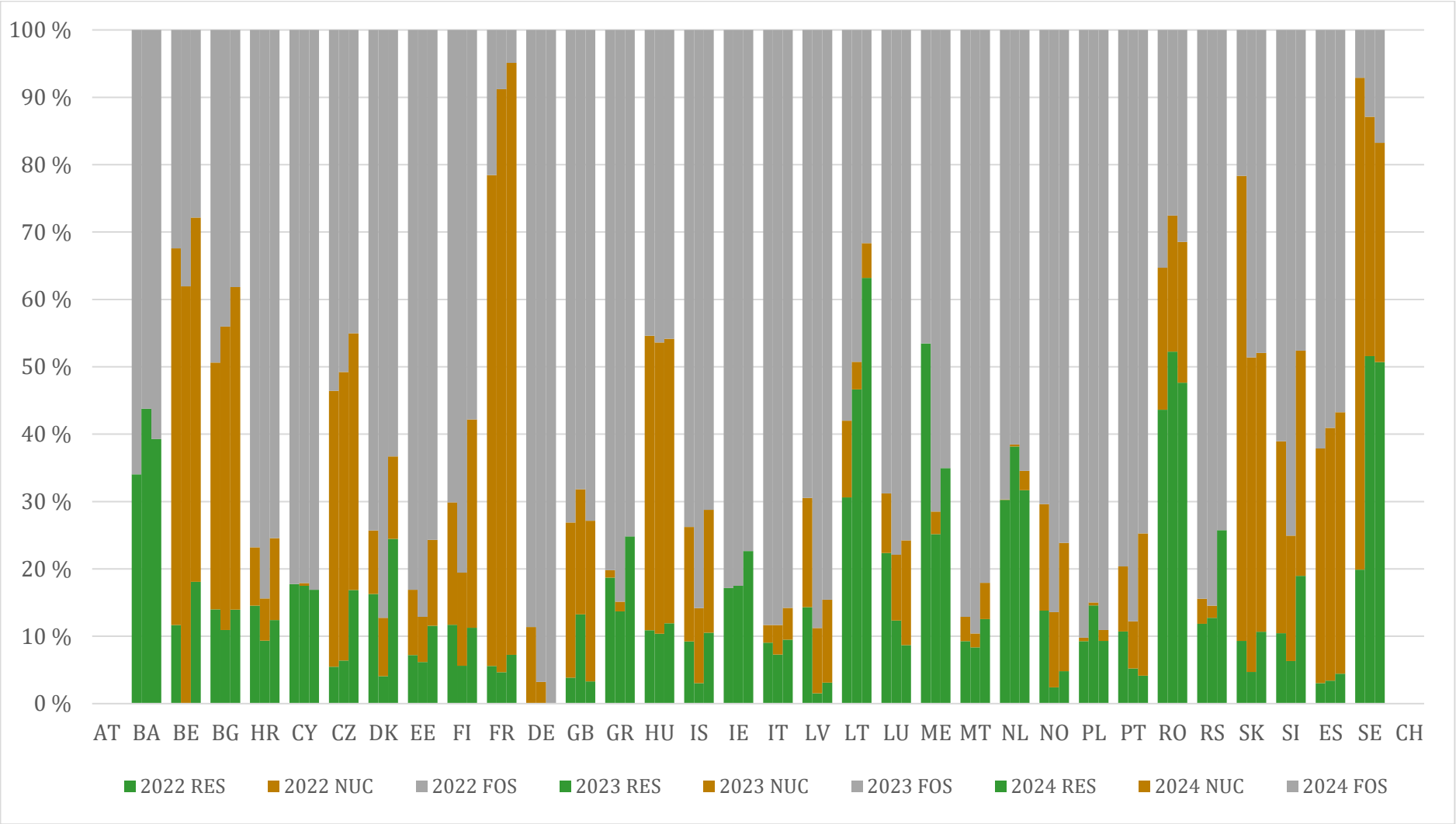


Figure 16 Residual Mixes 2022, 2023 and 2024

Table 7 Residual Mixes 2022, 2023 and 2024

|    |     | 2022   | 2023   | 2024   |
|----|-----|--------|--------|--------|
| AT | RES | 0,0 %  | 0,0 %  | 0,0 %  |
|    | NUC | 0,0 %  | 0,0 %  | 0,0 %  |
|    | FOS | 0,0 %  | 0,0 %  | 0,0 %  |
| BA | RES | 34,0 % | 43,8 % | 39,3 % |
|    | NUC | 0,0 %  | 0,0 %  | 0,0 %  |
|    | FOS | 66,0 % | 56,2 % | 60,7 % |
| BE | RES | 11,7 % | 0,0 %  | 18,1 % |
|    | NUC | 55,9 % | 61,9 % | 54,1 % |
|    | FOS | 32,4 % | 38,1 % | 27,9 % |
| BG | RES | 14,0 % | 10,9 % | 14,0 % |
|    | NUC | 36,7 % | 45,0 % | 47,9 % |
|    | FOS | 49,4 % | 44,0 % | 38,2 % |
| HR | RES | 14,6 % | 9,3 %  | 12,4 % |
|    | NUC | 8,6 %  | 6,3 %  | 12,2 % |
|    | FOS | 76,8 % | 84,4 % | 75,4 % |
| CY | RES | 17,7 % | 17,5 % | 16,9 % |
|    | NUC | 0,0 %  | 0,4 %  | 0,0 %  |
|    | FOS | 82,3 % | 82,1 % | 83,1 % |
| CZ | RES | 5,5 %  | 6,4 %  | 16,9 % |
|    | NUC | 40,9 % | 42,8 % | 38,1 % |
|    | FOS | 53,6 % | 50,8 % | 45,0 % |
| DK | RES | 16,3 % | 4,1 %  | 24,4 % |
|    | NUC | 9,4 %  | 8,7 %  | 12,2 % |
|    | FOS | 74,3 % | 87,3 % | 63,3 % |
| EE | RES | 7,2 %  | 6,2 %  | 11,6 % |
|    | NUC | 9,7 %  | 6,7 %  | 12,8 % |
|    | FOS | 83,1 % | 87,1 % | 75,7 % |
| FI | RES | 11,7 % | 5,6 %  | 11,3 % |
|    | NUC | 18,2 % | 13,8 % | 30,9 % |
|    | FOS | 70,1 % | 80,5 % | 57,8 % |
| FR | RES | 5,6 %  | 4,7 %  | 7,2 %  |
|    | NUC | 72,9 % | 86,5 % | 87,9 % |
|    | FOS | 21,6 % | 8,8 %  | 4,9 %  |

|    |     | 2022   | 2023   | 2024    |
|----|-----|--------|--------|---------|
| DE | RES | 0,0 %  | 0,0 %  | 0,0 %   |
|    | NUC | 11,4 % | 3,2 %  | 0,0 %   |
|    | FOS | 88,6 % | 96,8 % | 100,0 % |
| GB | RES | 3,9 %  | 13,2 % | 3,3 %   |
|    | NUC | 23,0 % | 18,6 % | 23,9 %  |
|    | FOS | 73,1 % | 68,2 % | 72,9 %  |
| GR | RES | 18,7 % | 13,7 % | 24,8 %  |
|    | NUC | 1,1 %  | 1,4 %  | 0,0 %   |
|    | FOS | 80,2 % | 84,9 % | 75,2 %  |
| HU | RES | 10,9 % | 10,4 % | 11,9 %  |
|    | NUC | 43,7 % | 43,2 % | 42,2 %  |
|    | FOS | 45,4 % | 46,4 % | 45,9 %  |
| IS | RES | 9,2 %  | 3,0 %  | 10,5 %  |
|    | NUC | 17,0 % | 11,1 % | 18,3 %  |
|    | FOS | 73,8 % | 85,8 % | 71,2 %  |
| IE | RES | 17,2 % | 17,5 % | 22,6 %  |
|    | NUC | 0,0 %  | 0,0 %  | 0,0 %   |
|    | FOS | 82,8 % | 82,5 % | 77,4 %  |
| IT | RES | 9,0 %  | 7,3 %  | 9,5 %   |
|    | NUC | 2,6 %  | 4,4 %  | 4,7 %   |
|    | FOS | 88,3 % | 88,3 % | 85,8 %  |
| LU | RES | 14,3 % | 1,5 %  | 3,1 %   |
|    | NUC | 16,2 % | 9,7 %  | 12,3 %  |
|    | FOS | 69,4 % | 88,8 % | 84,6 %  |
| LV | RES | 30,6 % | 46,6 % | 63,2 %  |
|    | NUC | 11,4 % | 4,1 %  | 5,1 %   |
|    | FOS | 58,0 % | 49,3 % | 31,7 %  |
| LT | RES | 22,3 % | 12,3 % | 8,7 %   |
|    | NUC | 8,9 %  | 9,8 %  | 15,5 %  |
|    | FOS | 68,8 % | 77,9 % | 75,8 %  |
| ME | RES | 53,5 % | 25,2 % | 35,0 %  |
|    | NUC | 0,0 %  | 3,3 %  | 0,0 %   |
|    | FOS | 46,5 % | 71,5 % | 65,0 %  |

|    |     | 2022   | 2023   | 2024   |
|----|-----|--------|--------|--------|
| NL | RES | 30,2 % | 38,2 % | 31,7 % |
|    | NUC | 0,1 %  | 0,3 %  | 2,8 %  |
|    | FOS | 69,7 % | 61,5 % | 65,5 % |
| NO | RES | 13,8 % | 2,4 %  | 4,8 %  |
|    | NUC | 15,8 % | 11,2 % | 19,0 % |
|    | FOS | 70,4 % | 86,4 % | 76,1 % |
| PL | RES | 9,3 %  | 14,6 % | 9,3 %  |
|    | NUC | 0,5 %  | 0,4 %  | 1,6 %  |
|    | FOS | 90,2 % | 85,0 % | 89,1 % |
| PT | RES | 10,7 % | 5,2 %  | 4,1 %  |
|    | NUC | 9,7 %  | 7,0 %  | 21,1 % |
|    | FOS | 79,6 % | 87,8 % | 74,7 % |
| RO | RES | 43,6 % | 52,2 % | 47,7 % |
|    | NUC | 21,1 % | 20,2 % | 20,9 % |
|    | FOS | 35,3 % | 27,5 % | 31,5 % |
| RS | RES | 11,9 % | 12,7 % | 25,7 % |
|    | NUC | 3,7 %  | 1,8 %  | 0,0 %  |
|    | FOS | 84,4 % | 85,4 % | 74,3 % |
| SK | RES | 9,3 %  | 4,7 %  | 10,7 % |
|    | NUC | 69,1 % | 46,7 % | 41,4 % |
|    | FOS | 21,6 % | 48,6 % | 47,9 % |
| SI | RES | 10,4 % | 6,3 %  | 19,0 % |
|    | NUC | 28,5 % | 18,6 % | 33,4 % |
|    | FOS | 61,1 % | 75,1 % | 47,6 % |
| ES | RES | 3,1 %  | 3,4 %  | 4,4 %  |
|    | NUC | 34,8 % | 37,5 % | 38,8 % |
|    | FOS | 62,1 % | 59,1 % | 56,7 % |
| SE | RES | 19,9 % | 51,6 % | 50,7 % |
|    | NUC | 73,0 % | 35,5 % | 32,5 % |
|    | FOS | 7,1 %  | 12,9 % | 16,8 % |
| CH | RES | 0,0 %  | 0,0 %  | 0,0 %  |
|    | NUC | 0,0 %  | 0,0 %  | 0,0 %  |
|    | FOS | 0,0 %  | 0,0 %  | 0,0 %  |

|    |     |        |        |        |
|----|-----|--------|--------|--------|
| MT | RES | 9,3 %  | 8,3 %  | 12,5 % |
|    | NUC | 3,6 %  | 2,1 %  | 5,4 %  |
|    | FOS | 87,1 % | 89,6 % | 82,1 % |

## Annex 1: Fuel Categories

Table 8 Fuel category breakdown

| Fact Sheet 5 compliance |                      | Fuel code           | Fuel description (including all subcategories)          | Sub-table reference | T1 Hard coal sub-categories          |                                |
|-------------------------|----------------------|---------------------|---------------------------------------------------------|---------------------|--------------------------------------|--------------------------------|
| Renewable               | Unspecified & Other  | F01000000           | Renewable - Unspecified                                 |                     | 0                                    | F0201010 Unspecified           |
|                         |                      | F01040300           | Renewable - Heat - Aerothermal                          |                     | 1                                    | F0201010 Anthracite            |
|                         |                      | F01040400           | Renewable - Heat - Hydrothermal                         |                     | 2                                    | F0201010 Bituminous coal       |
|                         |                      | F01040501           | Renewable - Heat - Process heat - Biogenic              |                     | 3                                    | F0201010 Coking coal           |
|                         |                      | F01050000           | Renewable - Mechanical source or other - Unspecified    |                     | 4                                    | F0201010 Coke-oven coke        |
|                         | Solar                | F01040100           | Renewable - Heat - Solar                                |                     | 5                                    | F0201010 Lignite coke          |
|                         | Wind                 | F01050100           | Renewable - Mechanical source or other - Wind           |                     |                                      |                                |
|                         | Hydro & Marine       | F01050200           | Renewable - Mechanical source or other - Hydro & Marine |                     | T2 Brown coal sub-categories         |                                |
|                         | Geothermal           | F01040200           | Renewable - Heat - Geothermal                           |                     | 0                                    | F0201020 Unspecified           |
|                         | Biomass              | F01010000           | Renewable - Solid                                       |                     | 1                                    | F0201020 Sub-bituminous coal   |
| F01020000               |                      | Renewable - Liquid  |                                                         | 2                   | F0201020 Lignite                     |                                |
| F01030000               |                      | Renewable - Gaseous |                                                         | 3                   | F0201020 Brown coal briquette        |                                |
| Nuclear                 |                      | F03010100           | Nuclear - Solid - Radioactive fuel                      |                     | 4                                    | F0201020 Peat briquette        |
| Fossil                  | Unspecified & Other  | F020000000          | Fossil - Unspecified                                    |                     | T3 Petroleum products sub-categories |                                |
|                         |                      | F02010000           | Fossil - Solid - Unspecified                            |                     | 0                                    | F0202030 Unspecified           |
|                         |                      | F02010400           | Fossil - Solid - Municipal waste                        |                     | 1                                    | F0202030 Ethane                |
|                         |                      | F02010500           | Fossil - Solid - Industrial and commercial waste        |                     | 2                                    | F0202030 Naphtha               |
|                         |                      | F02020000           | Fossil - Liquid - Unspecified                           |                     | 3                                    | F0202030 Aviation gasoline     |
|                         |                      | F02030000           | Fossil - Gaseous                                        | T4                  | 4                                    | F0202030 Motor gasoline        |
|                         | Hard Coal            | F02040000           | Fossil - Heat                                           |                     | 5                                    | F0202030 Aviation turbine fuel |
|                         |                      | F02010100           | Fossil - Solid - Hard coal                              | T1                  | 6                                    | F0202030 Other kerosene        |
|                         | Brown Coal / Lignite | F02010300           | Fossil - Solid - Peat                                   |                     | 7                                    | F0202030 Gas and diesel oil    |
|                         |                      | F02010200           | Fossil - Solid - Brown coal                             | T2                  | 8                                    | F0202030 Fuel oil low-sulphur  |
|                         | Natural Gas          | F02030100           | Fossil - Gaseous - Natural Gas                          |                     | 9                                    | F0202030 Fuel oil high-sulphur |
|                         |                      | F02020200           | Fossil - Liquid - Natural gas liquids                   |                     | 10                                   | F0202030 Liquid petroleum gas  |
|                         | Oil                  | F02020100           | Fossil - Liquid - Crude oil                             |                     | 11                                   | F0202030 Orimulsion            |
|                         |                      | F02020300           | Fossil - Liquid - Petroleum products                    | T3                  | 12                                   | F0202030 Bitumen               |
|                         |                      |                     |                                                         |                     | 13                                   | F0202030 Lubricants            |
|                         |                      |                     |                                                         | 14                  | F0202030 Petroleum coke              |                                |
|                         |                      |                     |                                                         | 15                  | F0202030 Refinery feedstock          |                                |
|                         |                      |                     |                                                         |                     | T4 Gaseous sub-categories            |                                |
|                         |                      |                     |                                                         | 0                   | F0203000 Unspecified                 | Unspecified                    |
|                         |                      |                     |                                                         | 20                  | F0203020 Coal-derived gas            | Unspecified                    |
|                         |                      |                     |                                                         | 21                  | F0203020 Coal-derived gas            | Blast furnace gas              |
|                         |                      |                     |                                                         | 22                  | F0203020 Coal-derived gas            | Coke-oven gas                  |
|                         |                      |                     |                                                         | 30                  | F0203030 Petroleum products          | Unspecified                    |
|                         |                      |                     |                                                         | 31                  | F0203030 Petroleum products          | Propane                        |
|                         |                      |                     |                                                         | 32                  | F0203030 Petroleum products          | Butane                         |
|                         |                      |                     |                                                         | 33                  | F0203030 Petroleum products          | Refinery gas                   |
|                         |                      |                     |                                                         | 34                  | F0203030 Petroleum products          | Chemical waste gas             |
|                         |                      |                     |                                                         | 40                  | F0203040 Municipal gas plant         | Unspecified                    |
|                         |                      |                     |                                                         | 50                  | F0203050 Process gas                 | Unspecified                    |
|                         |                      |                     |                                                         | 51                  | F0203050 Process gas                 | Carbon monoxide                |
|                         |                      |                     |                                                         | 52                  | F0203050 Process gas                 | Methane                        |
|                         |                      |                     |                                                         | 53                  | F0203050 Process gas                 | Hydrogen (fossil sourced)      |
|                         |                      |                     |                                                         | 54                  | F0203050 Process gas                 | Phosphor gas                   |
|                         |                      |                     |                                                         | 55                  | F0203050 Process gas                 | Oxy gas                        |

**Annex 2: Data Source Matrix**

Table 9 Data Source Matrix

|    | Production data                 | Consumption data                | Exchange with third countries   | Tracking data Gos | CO2 emissions | Radioactive waste |
|----|---------------------------------|---------------------------------|---------------------------------|-------------------|---------------|-------------------|
| AT | a                               | b                               | -                               | d,h               | i             | k                 |
| BA | a                               | b                               | -                               | f                 | i             | k                 |
| BE | a                               | b                               | -                               | d,h               | i             | k                 |
| BG | Nationally provided information | Nationally provided information | c                               | e,f,h             | i             | k                 |
| CH | Nationally provided information | Nationally provided information | -                               | f                 | i             | k                 |
| CY | Nationally provided information | Nationally provided information | -                               | d,f               | i,j           | k                 |
| CZ | a                               | b                               | -                               | d,h               | i             | j                 |
| DE | a                               | b                               | -                               | d,f,h             | i             | k                 |
| DK | Nationally provided information | Nationally provided information | -                               | d,h               | i,j           | k                 |
| EE | Nationally provided information | Nationally provided information | -                               | d,h               | i             | k                 |
| ES | Nationally provided information | Nationally provided information | Nationally provided information | d,f,h             | i             | k                 |
| FI | a                               | b                               | -                               | d,e,h             | i             | k                 |
| FR | Nationally provided information | Nationally provided information | -                               | d,e,h             | i,j           | k                 |
| GB | Nationally provided information | Nationally provided information | -                               | f,h               | i,j           | k                 |
| GR | Nationally provided information | Nationally provided information | c                               | d,h               | i,j           | k                 |
| HR | Nationally provided information | Nationally provided information | -                               | d,f,h             | i             | k                 |

|           |                                 |                                 |                                    |       |     |   |
|-----------|---------------------------------|---------------------------------|------------------------------------|-------|-----|---|
| <b>HU</b> | a                               | b                               | c                                  | d,h   | i   | k |
| <b>IE</b> | Nationally provided information | Nationally provided information | -                                  | d,f,h | i   | k |
| <b>IS</b> | Nationally provided information | Nationally provided information | -                                  | d     | i   | k |
| <b>IT</b> | Nationally provided information | Nationally provided information | -                                  | d,h   | i   | k |
| <b>LT</b> | a                               | b                               | c                                  | d,f,h | i   | k |
| <b>LU</b> | a                               | b                               | -                                  | d,h   | i   | k |
| <b>LV</b> | Nationally provided information | Nationally provided information | Nationally provided information    | d,h   | i   | k |
| <b>ME</b> | Nationally provided information | Nationally provided information | c                                  | f     | i   | k |
| <b>MT</b> | Nationally provided information | Nationally provided information | -                                  | h     | i,j | k |
| <b>NL</b> | a                               | b                               | -                                  | d,h   | i   | k |
| <b>NO</b> | Nationally provided information | Nationally provided information | -                                  | d,e,h | i   | k |
| <b>PL</b> | a                               | b                               | c                                  | e,f,h | i   | k |
| <b>PT</b> | Nationally provided information | Nationally provided information | Nationally provided information    | e,f,h | i   | k |
| <b>RO</b> | a                               | b                               | c                                  | h     | i   | k |
| <b>RS</b> | Nationally provided information | Nationally provided information | Nationally provided information, c | d,f,h | i   | k |
| <b>SE</b> | a                               | b                               | -                                  | d,f,h | i   | k |
| <b>SI</b> | a                               | b                               | -                                  | d,f   | i   | j |
| <b>SK</b> | Nationally provided information | Nationally provided information | Nationally provided information, c | d,h   | i   | k |

a [https://ec.europa.eu/eurostat/web/products-datasets/-/nrg\\_cb\\_pem](https://ec.europa.eu/eurostat/web/products-datasets/-/nrg_cb_pem)

b [https://ec.europa.eu/eurostat/web/products-datasets/-/nrg\\_cb\\_em](https://ec.europa.eu/eurostat/web/products-datasets/-/nrg_cb_em)

- c Entso-e Transparency Platform Cross-Border Flows: <https://transparency.entsoe.eu/transmission-domain/physicalFlow/show>
- d EECS Activity statistics <https://www.aib-net.org/facts/market-information/statistics/activity-statistics-all-aib-members>
- e EECS Ex-domain cancellations by country, by energy source, collected from DCBs
- f DCB provided information on other reliable tracking means
- h Ex-domain cancellations from other countries
- i Ecoinvent
- j Nationally provided factors
- k [http://reliable-disclosure.org/upload/250-D5.3\\_Direct\\_and\\_weighted\\_emissions.pdf](http://reliable-disclosure.org/upload/250-D5.3_Direct_and_weighted_emissions.pdf)

\* <https://www.erneuerbare-energien.de/EE/Redaktion/DE/Downloads/eeg-in-zahlen-xls.html>