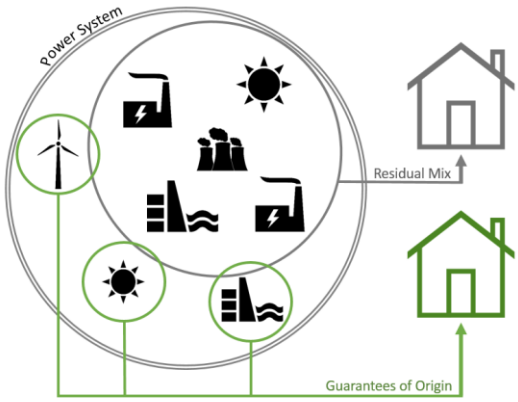
European Residual Mixes

Results of the calculation of Residual Mixes for the calendar year 2021

Version 1.0, 2022-05-31

Introduction

The purpose of a Guarantee of Origin (GO) system is to enable consumers to have their say on how electricity is generated by selecting a supplier and a power product. For consumers to be able to make informed choices, electricity suppliers must disclose the origin and environmental attributes of sold electricity (IEM Directive (EU) 2019/944, Annex 1 (5)). This is called electricity disclosure.



For power companies to be able to tell their customers anything about the origin of the electricity in todays unbundled, international and complex power market, they need a way to track electricity from production to consumption. The main tracking tool for electricity is the GO (REDII Directive 2018/2001, Art 19). As long as not all consumption is tracked using GOs, a *residual mix* is needed to make the GO a reliable tracking instrument. 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. 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.

***Note**: For the calculation methodology and results since 2015, please refer to the AIB-website. For additional background information regarding the concept of residual mix calculations and its application please refer to the website of the RE-DISS project http://www.reliable-disclosure.org, where you can find the final report of the project, residual mix calculation methodology, results of previous year calculations (up to year 2014) and the RE-DISS Best Practice Recommendations.*

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[1]. 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. 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 needed when consumption is only partially explicitly tracked. In so-called "full consumption disclosure domains" residual mix can be not needed because all consumption is covered by cancelled GOs. Austria has had a full disclosure system in place since 2017 and hence the residual mix is zero. Also, Switzerland and Netherlands have full disclosure regulation but, due to implementation details and calculation rules, residual mixes can still be calculated and are included in the results.

The AIB European Residual mixes are currently calculated using 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

[1] Untracked consumption = Electricity consumption for which the energy source is not explicitly disclosed through tracking instruments such as Guarantees of Origin.

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.

Regarding the data sources, as for previous year, the usual production and exchange data sources on ENTSO-E were not available. Instead, Eurostat were used as the main production data source and the exchange data were collected from ENTSO-E Transparency platform (instead of the Power Statistics used before).

Description of the Document

The main results of this document are the **European Attribute Mix** (EAM) and the residual mixes for all countries. A wide variety of additional information is also presented as supporting material. The **EAM (**Table 1**)** is the mix of energy sources and the corresponding environmental indicators 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.

The **national residual mixes** for 34 European countries[2] are shown in Table 2, Figure 1 and Figure 2. Note that the official residual mixes for each country are in principle 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.[3]

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 4 shows the **direct greenhouse gas emissions** as direct CO_2 emissions per kWh of produced electricity.

Figure 5 shows the content of **highly active radioactive waste** as mgRW/kWh. Both of these environmental indicators are shown for the European Attribute Mix (EAM), the production mix (PM), the residual mix (RM) and the total supplier mix (TSM) of European countries.

The base data for the direct CO_2-emissions is based on the following references: Treyer and Bauer (2013), Dong Energy A/S, Energi.dk, Vattenfall (2010), Fritsche and Rausch (2009), Bauer (2008) and GEMIS database (GEMIS, 2015). 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.

The total supplier mixes (TSMs) are presented in Table 4, and Figure 6. The total supplier mix represents the total consumption mix of a country, i.e. shares of energy sources in the tracked and untracked part of consumption. 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. The production mixes 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 finally how much renewables are carried on to EAM is shown in the Table 6 and Figure 8.

The rest of the results are different kinds of **comparisons** between different mixes and different years. Figure 7 present the comparison between the production and residual mix of different countries, and Figure 9 that of production and total supplier mix. Table 7 and Figure 10 show the difference between final residual mixes of 2019, 2020 and 2021.

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.*

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[2] 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

[3] 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 (1.4.2021 – 31.3.2022) for disclosure of 2021 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.

Partners

References

Generation data: Eurostat: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_cb_pem&lang=en and https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_cb_em&lang=en

EECS Guarantee of Origin Statistics: Association of Issuing Bodies

Sources for emission factors:

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RE-DISS II: http://reliable-disclosure.org/upload/250-D5.3_Direct_and_weighted_emissions.pdf

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

Table of Tables

Table 1: European Attribute Mix (EAM) 2021: Energy source distribution and environmental indicators 5
Table 2: Residual Mixes 2021 6
Table 3: Attributes [TWh] to/from the European Attribute Mix 2021 11
Table 4: Total Supplier Mix 2021 14
Table 5: Production Mix 2021 17
Table 6: European Total Production Mix, Total of all available attributes in Final Residual Mixes and European Attribute Mix 2021 21
Table 7: Residual Mixes 2019, 2020 and 2021 24
Table 8: Fuel category breakdown 25

Table of Figures

Figure 1: Residual Mixes 2021 8
Figure 2: Residual Mixes 2021 (detailed fuel categories) 9
Figure 3: Attributes [TWh] to(positive)/from(negative) the European Attribute Mix 2021 10
Figure 4: Direct CO_2 content in Production, Residual and Total Supplier mix 2021 [gCO_2/kWh] 13
Figure 5: Highly active radioactive waste content in the Production Mix, the Residual Mix and the Total Suppler Mix 2021 [mgRW/kWh] 13
Figure 6: Total Supplier Mix 2021 16
Figure 7: Production Mix (left) and Final Residual Mix (right) 2021 19
Figure 8: European Total Production Mix (left), Total of all available attributes in Final Residual Mixes (middle) and EAM (right) 2021 20
Figure 9: Production Mix (left) and Total Supplier Mix (right) 2021 22
Figure 10: Residual Mixes 2019, 2020 and 2021 23

Table 1: European Attribute Mix (EAM) 2021: 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)
EAM	9,91 %	0,00 %	3,02 %	3,70 %	0,00 %	0,71 %	2,48 %	24,37 %	65,71 %	3,12 %	25,21 %	0,72 %	1,33 %	35,33 %	442,66	0,99

***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.*

Table 2: Residual Mixes 2021

	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	Untracked %	CO2 (gCO2/kWh)	Rad waste ()mg/kWh
AT	**0,00 %**	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	**0,00 %**	**0,00 %**	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	**0,00 %**	0,00	0,00
BA	**40,44 %**	0,00 %	0,00 %	0,28 %	0,00 %	2,32 %	37,84 %	**0,00 %**	**59,56 %**	0,00 %	59,56 %	0,00 %	0,00 %	0,00 %	**100,00 %**	558,52	0,00
BE	**11,04 %**	0,00 %	3,63 %	7,13 %	0,00 %	0,00 %	0,29 %	**57,86 %**	**31,10 %**	0,20 %	2,32 %	0,00 %	0,02 %	28,56 %	**62,03 %**	149,19	1,56
BG	**22,79 %**	0,00 %	4,90 %	3,44 %	0,00 %	3,32 %	11,13 %	**36,19 %**	**41,03 %**	0,00 %	34,20 %	0,00 %	0,58 %	6,25 %	**100,00 %**	404,12	1,27
CH	**35,55 %**	2,17 %	0,00 %	6,85 %	0,00 %	0,10 %	26,42 %	**64,34 %**	**0,11 %**	0,00 %	0,00 %	0,00 %	0,01 %	0,10 %	**5,99 %**	19,15	3,09
CY	**15,19 %**	0,00 %	0,87 %	9,25 %	0,00 %	5,06 %	0,01 %	**0,12 %**	**84,69 %**	0,01 %	0,12 %	0,00 %	84,38 %	0,17 %	**100,00 %**	625,07	0,00
CZ	**5,56 %**	0,00 %	3,31 %	1,65 %	0,00 %	0,00 %	0,61 %	**40,41 %**	**54,03 %**	0,12 %	43,89 %	0,00 %	0,12 %	9,89 %	**94,15 %**	549,96	1,41
DE	**0,00 %**	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	**20,80 %**	**79,20 %**	5,11 %	48,24 %	0,00 %	1,30 %	24,56 %	**38,90 %**	617,84	0,56
DK	**6,63 %**	0,00 %	2,02 %	2,47 %	0,00 %	0,48 %	1,66 %	**16,34 %**	**77,03 %**	5,11 %	40,03 %	0,48 %	1,78 %	29,63 %	**67,54 %**	529,32	0,66
EE	**7,55 %**	0,00 %	2,00 %	3,40 %	0,00 %	0,47 %	1,68 %	**16,08 %**	**76,37 %**	34,99 %	16,63 %	0,48 %	0,88 %	23,39 %	**85,14 %**	636,58	0,65
ES	**6,37 %**	0,27 %	0,61 %	2,45 %	0,00 %	2,69 %	0,35 %	**35,60 %**	**58,02 %**	0,44 %	6,55 %	0,10 %	1,81 %	49,11 %	**65,70 %**	295,83	1,01
FI	**7,52 %**	0,00 %	2,78 %	1,31 %	0,00 %	0,16 %	3,27 %	**49,29 %**	**43,19 %**	2,32 %	18,12 %	0,16 %	0,76 %	21,83 %	**65,14 %**	285,32	1,56
FR	**8,03 %**	0,00 %	1,00 %	1,85 %	0,02 %	3,12 %	2,04 %	**82,70 %**	**9,27 %**	0,43 %	0,87 %	0,00 %	0,44 %	7,53 %	**87,42 %**	48,57	2,23
GB	**4,81 %**	0,00 %	2,73 %	2,08 %	0,00 %	0,00 %	0,00 %	**24,15 %**	**71,04 %**	4,61 %	0,00 %	2,46 %	0,80 %	63,18 %	**39,85 %**	351,17	1,93
GR	**23,70 %**	0,00 %	1,44 %	9,07 %	0,15 %	8,35 %	4,69 %	**3,45 %**	**72,86 %**	0,60 %	5,62 %	10,17 %	7,74 %	48,73 %	**91,85 %**	444,63	0,14
HR	**17,19 %**	0,00 %	2,17 %	2,16 %	0,02 %	1,83 %	11,01 %	**14,21 %**	**68,60 %**	1,82 %	25,16 %	0,42 %	0,84 %	40,36 %	**76,95 %**	466,50	0,58
HU	**16,14 %**	0,00 %	4,79 %	8,65 %	0,01 %	1,45 %	1,24 %	**41,23 %**	**42,62 %**	1,34 %	12,90 %	0,15 %	0,43 %	27,81 %	**98,21 %**	276,26	1,48
IE	**15,20 %**	0,00 %	1,56 %	0,00 %	0,00 %	12,46 %	1,19 %	**0,00 %**	**84,80 %**	1,56 %	24,53 %	3,75 %	3,66 %	51,29 %	**8,47 %**	570,09	0,00

	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	Untracked %	CO2 (gCO2/kWh)	Rad waste ()mg/kWh
IS	**13,83 %**	0,00 %	2,89 %	3,54 %	1,35 %	0,69 %	5,36 %	**23,31 %**	**62,86 %**	2,98 %	24,11 %	0,69 %	1,29 %	33,79 %	**83,34 %**	423,48	0,94
IT	**10,81 %**	0,00 %	2,33 %	5,24 %	0,00 %	0,76 %	2,48 %	**6,42 %**	**82,77 %**	1,80 %	12,75 %	0,19 %	4,43 %	63,61 %	**78,22 %**	456,57	0,26
LT	**26,27 %**	0,01 %	5,72 %	1,13 %	0,00 %	15,35 %	4,06 %	**4,67 %**	**69,06 %**	1,23 %	3,33 %	0,00 %	1,02 %	63,49 %	**6,71 %**	384,50	0,17
LU	**22,22 %**	0,00 %	2,34 %	12,87 %	0,00 %	5,09 %	1,92 %	**18,86 %**	**58,92 %**	9,20 %	19,51 %	0,56 %	1,03 %	28,62 %	**15,08 %**	403,06	0,76
LV	**45,63 %**	35,68 %	6,24 %	0,81 %	0,00 %	0,61 %	2,28 %	**6,63 %**	**47,75 %**	0,69 %	6,18 %	0,14 %	0,25 %	40,50 %	**88,97 %**	302,58	0,26
ME	**60,82 %**	0,03 %	1,16 %	0,09 %	0,00 %	9,73 %	49,81 %	**0,00 %**	**39,18 %**	0,00 %	4,64 %	32,20 %	2,34 %	0,00 %	**100,00 %**	439,03	0,00
MT	**11,79 %**	0,00 %	0,79 %	10,46 %	0,00 %	0,12 %	0,42 %	**4,14 %**	**84,07 %**	0,53 %	4,28 %	0,12 %	1,88 %	77,25 %	**97,32 %**	623,66	0,17
NL	**32,33 %**	0,00 %	14,04 %	17,69 %	0,00 %	0,00 %	0,60 %	**0,35 %**	**67,32 %**	0,00 %	24,76 %	0,00 %	2,14 %	40,42 %	**5,82 %**	450,74	0,01
NO	**17,58 %**	0,00 %	2,80 %	3,33 %	0,00 %	0,64 %	10,81 %	**21,91 %**	**60,51 %**	4,24 %	22,66 %	0,65 %	1,20 %	31,76 %	**76,38 %**	404,91	0,89
PL	**7,94 %**	0,00 %	2,44 %	2,29 %	0,00 %	2,66 %	0,56 %	**1,25 %**	**90,80 %**	0,86 %	78,44 %	0,03 %	0,06 %	11,42 %	**93,46 %**	850,21	0,05
PT	**43,51 %**	0,05 %	5,15 %	3,57 %	0,44 %	17,23 %	17,06 %	**7,24 %**	**49,25 %**	1,50 %	9,28 %	0,21 %	3,43 %	34,83 %	**80,31 %**	281,06	0,29
RO	**45,84 %**	0,00 %	0,76 %	3,10 %	0,00 %	11,70 %	30,28 %	**20,07 %**	**34,09 %**	0,06 %	17,49 %	0,01 %	0,11 %	16,42 %	**99,87 %**	281,65	3,40
RS	**27,72 %**	0,00 %	0,13 %	0,16 %	0,00 %	0,03 %	27,40 %	**1,04 %**	**71,24 %**	0,13 %	1,07 %	66,50 %	0,06 %	3,48 %	**88,44 %**	763,74	0,04
SE	**0,00 %**	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	**84,47 %**	**15,53 %**	10,87 %	0,10 %	0,00 %	2,48 %	2,09 %	**9,86 %**	76,63	2,28
SI	**12,34 %**	0,00 %	2,05 %	3,10 %	0,00 %	0,38 %	6,81 %	**13,10 %**	**74,56 %**	1,75 %	50,78 %	0,38 %	1,29 %	20,35 %	**66,26 %**	565,44	0,53
SK	**13,44 %**	0,38 %	3,81 %	2,61 %	0,00 %	0,04 %	6,60 %	**58,77 %**	**27,79 %**	4,88 %	1,26 %	3,10 %	1,29 %	17,26 %	**81,34 %**	184,62	2,06

Untracked Consumption *= Electricity consumption not explicitly disclosed through tracking instruments such as Guarantees of Origin.*
Note*: CO_2 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*

Graphs with detailed calculations results

Figure 1: Residual Mixes 2021

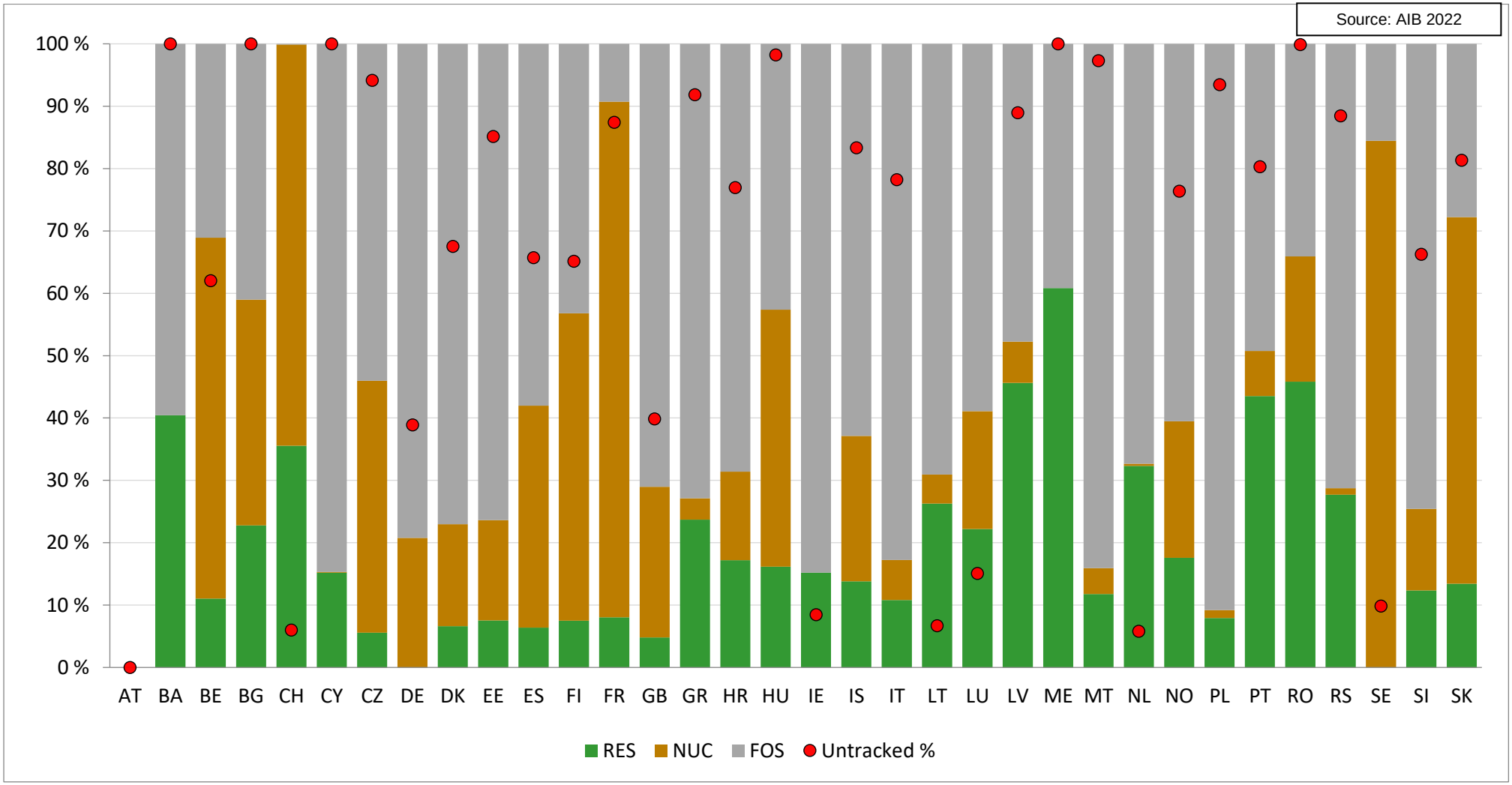


Figure 2: Residual Mixes 2021 (detailed fuel categories)

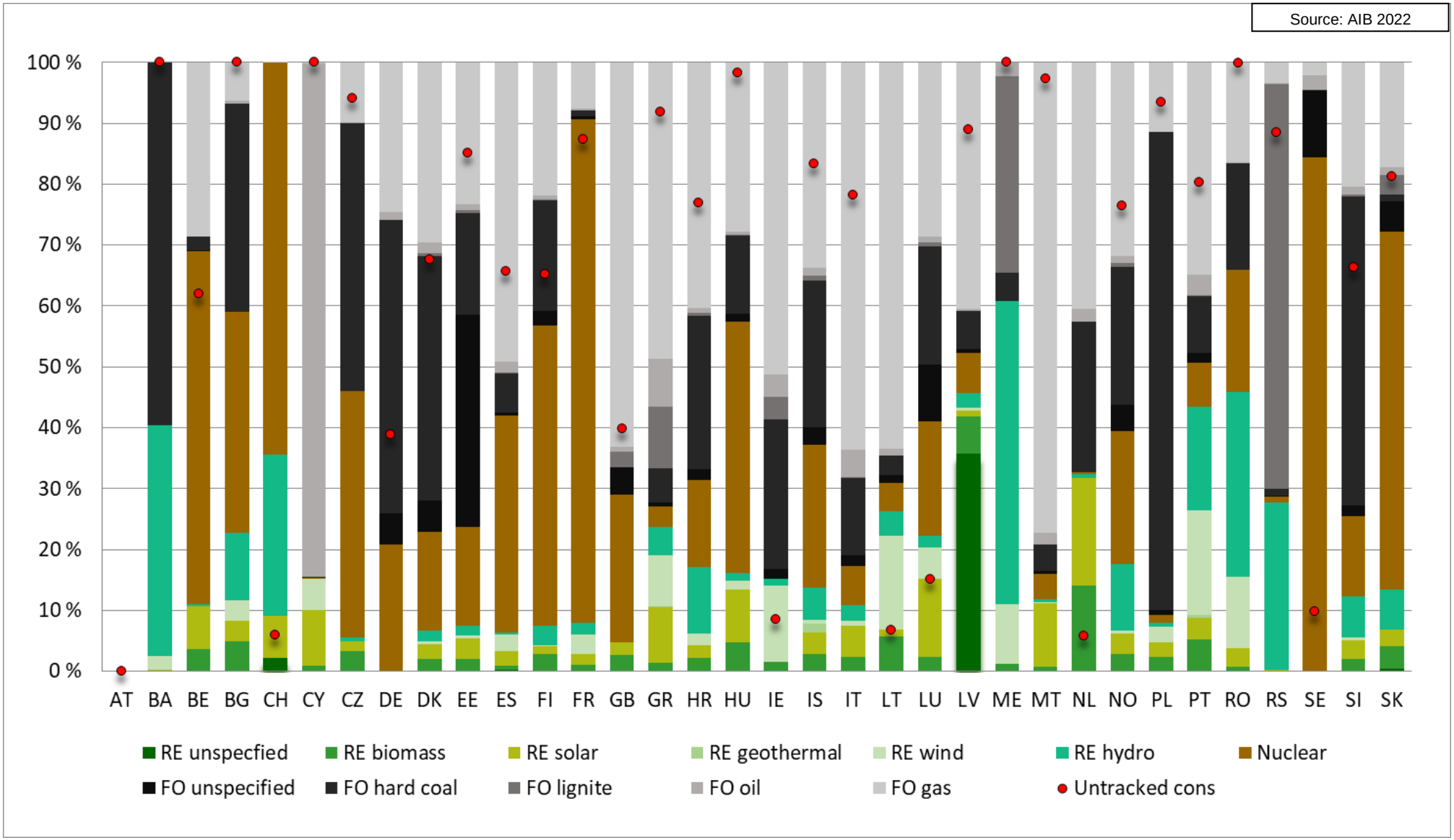
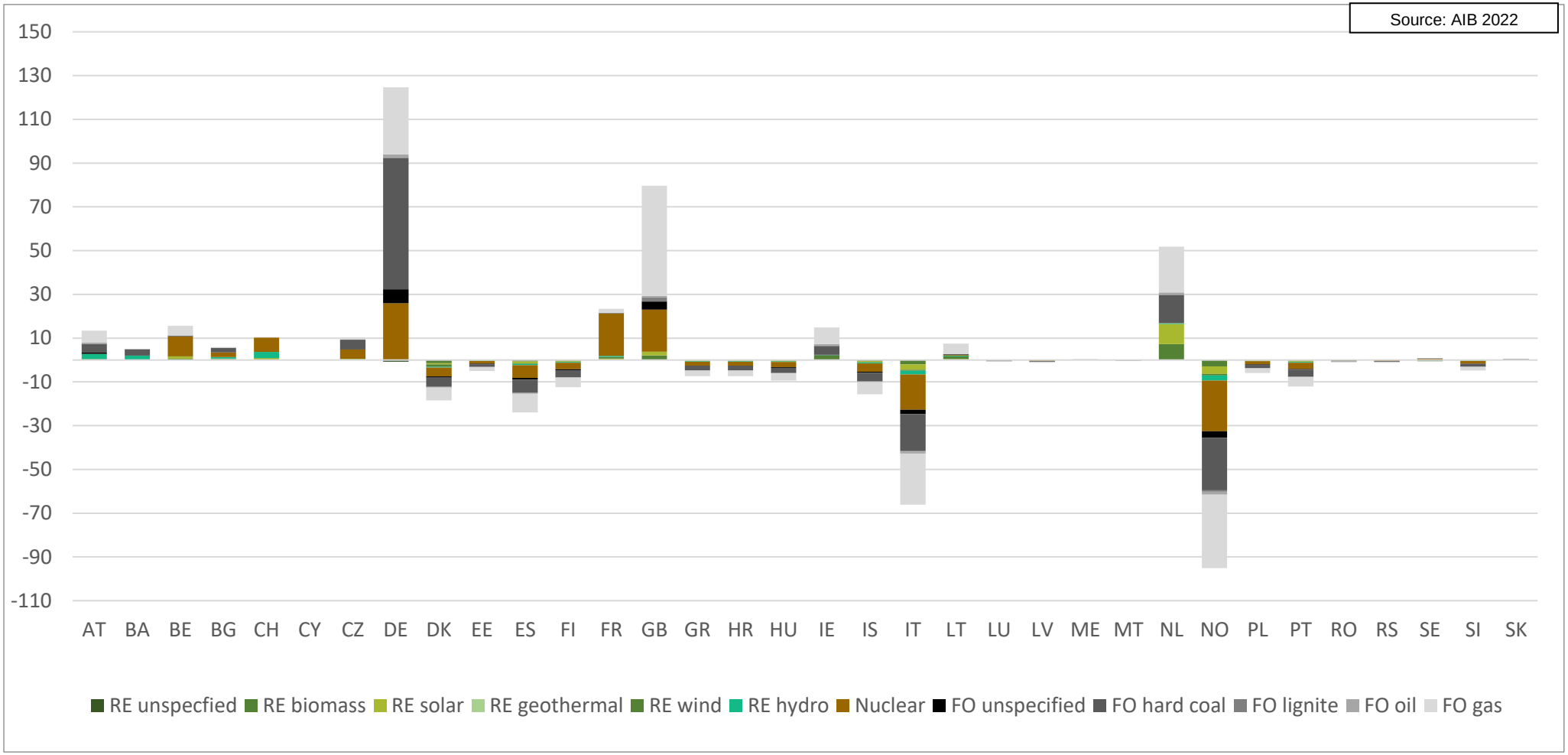


Figure 3: Attributes [TWh] to(positive)/from(negative) the European Attribute Mix 2021[4]



[4] 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 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.

Table 3: Attributes [TWh] to/from the European Attribute Mix 2021[5]

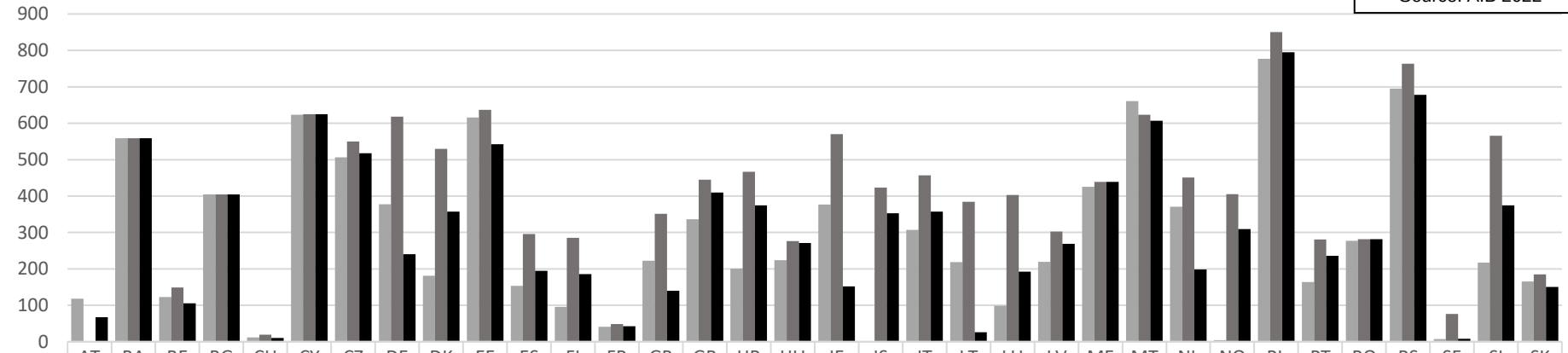
	RE unspeci-fied	RE biomass	RE solar	RE geother-mal	RE wind	RE hydro	Nuclear	FO unspeci-fied	FO hard coal	FO lignite	FO oil	FO gas
AT	0,00	0,45	0,00	0,00	0,00	2,32	0,00	0,63	3,97	0,00	0,64	5,43
BA	0,00	0,00	0,01	0,00	0,11	1,85	0,00	0,00	2,92	0,00	0,00	0,00
BE	0,00	0,57	1,12	0,00	0,00	0,05	9,06	0,03	0,36	0,00	0,00	4,47
BG	0,00	0,29	0,20	0,00	0,20	0,66	2,15	0,00	2,04	0,00	0,03	0,37
CH	0,22	0,00	0,71	0,00	0,01	2,72	6,63	0,00	0,00	0,00	0,00	0,01
CY	0,00	0,00	0,00	0,00	0,00	0,00	-0,01	0,00	-0,01	0,00	0,00	-0,01
CZ	0,00	0,34	0,17	0,00	0,00	0,06	4,19	0,01	4,55	0,00	0,01	1,03
DE	-0,76	0,00	0,00	0,00	0,00	0,00	25,91	6,37	60,10	0,00	1,62	30,59
DK	-0,01	-1,43	-0,61	0,00	-1,04	-0,41	-4,05	-0,52	-4,18	-0,12	-0,22	-5,86
EE	0,00	-0,15	-0,19	0,00	-0,04	-0,12	-1,23	-0,16	-1,27	-0,04	-0,07	-1,78
ES	0,00	-0,72	-0,89	0,00	-0,17	-0,59	-5,83	-0,75	-6,03	-0,17	-0,32	-8,46
FI	0,00	-0,38	-0,46	0,00	-0,09	-0,31	-3,04	-0,39	-3,14	-0,09	-0,17	-4,40
FR	0,00	0,23	0,43	0,00	0,73	0,48	19,34	0,10	0,20	0,00	0,10	1,76
GB	0,00	2,17	1,65	0,00	0,00	0,00	19,24	3,67	0,00	1,96	0,64	50,32
GR	0,00	-0,22	-0,28	0,00	-0,05	-0,18	-1,81	-0,23	-1,88	-0,05	-0,10	-2,63
HR	0,00	-0,22	-0,27	0,00	-0,05	-0,18	-1,81	-0,23	-1,87	-0,05	-0,10	-2,63
HU	0,00	-0,29	-0,35	0,00	-0,07	-0,23	-2,30	-0,29	-2,38	-0,07	-0,13	-3,33
IE	0,00	0,23	0,00	0,00	1,85	0,18	0,00	0,23	3,65	0,56	0,54	7,62
IS	0,00	-0,47	-0,58	0,00	-0,11	-0,39	-3,81	-0,49	-3,94	-0,11	-0,21	-5,52

[5] 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.

	RE unspeci-fied	RE biomass	RE solar	RE geother-mal	RE wind	RE hydro	Nuclear	FO unspeci-fied	FO hard coal	FO lignite	FO oil	FO gas
IT	0,00	-2,00	-2,45	0,00	-0,47	-1,64	-16,12	-2,06	-16,67	-0,48	-0,88	-23,37
LT	0,00	0,43	0,08	0,00	1,15	0,30	0,35	0,09	0,25	0,00	0,08	4,74
LU	0,00	-0,02	-0,02	0,00	0,00	-0,02	-0,16	-0,02	-0,17	0,00	-0,01	-0,23
LV	0,00	-0,04	-0,05	0,00	-0,01	-0,03	-0,30	-0,04	-0,31	-0,01	-0,02	-0,44
ME	0,00	0,00	0,00	0,00	0,02	0,11	0,00	0,00	0,01	0,07	0,01	0,00
MT	0,00	-0,01	-0,02	0,00	0,00	-0,01	-0,11	-0,01	-0,11	0,00	-0,01	-0,16
NL	0,00	7,27	9,16	0,00	0,00	0,31	0,18	0,00	12,82	0,00	1,11	20,92
NO	0,00	-2,88	-3,52	0,00	-0,68	-2,36	-23,18	-2,96	-23,97	-0,69	-1,27	-33,60
PL	0,00	-0,18	-0,22	0,00	-0,04	-0,15	-1,45	-0,18	-1,50	-0,04	-0,08	-2,10
PT	0,00	-0,37	-0,45	0,00	-0,09	-0,30	-2,95	-0,38	-3,05	-0,09	-0,16	-4,27
RO	0,00	-0,03	-0,04	0,00	-0,01	-0,03	-0,27	-0,03	-0,28	-0,01	-0,01	-0,39
RS	0,00	-0,04	-0,05	0,00	-0,01	-0,03	-0,31	-0,04	-0,32	-0,01	-0,02	-0,46
SE	-0,03	0,00	0,00	0,00	-0,55	0,00	0,55	0,07	0,00	0,00	0,02	0,01
SI	0,00	-0,15	-0,18	0,00	-0,03	-0,12	-1,18	-0,15	-1,22	-0,03	-0,06	-1,71
SK	0,00	0,02	0,01	0,00	0,00	0,03	0,26	0,02	0,01	0,01	0,01	0,08

Figure 4: Direct CO_2 content in Production, Residual and Total Supplier mix 2021 [gCO_2/kWh]

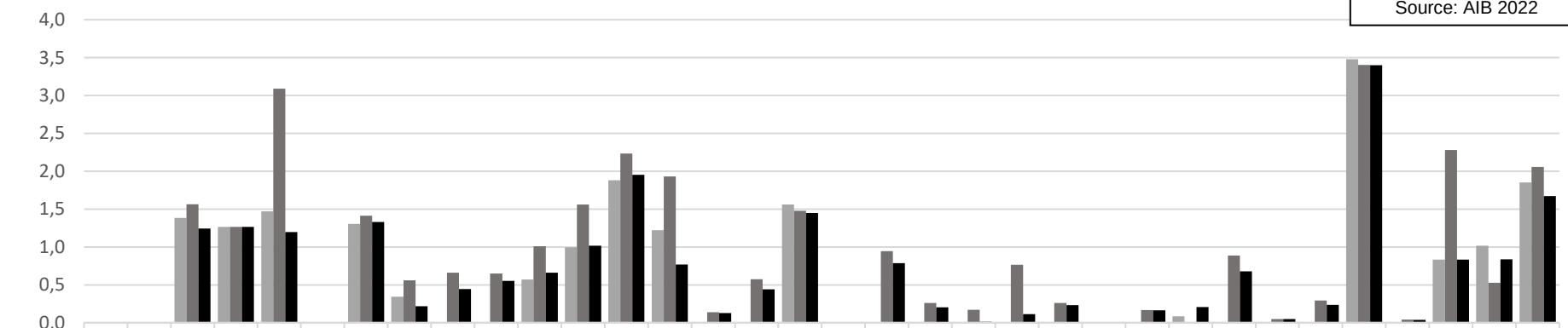
Source: AIB 2022



	AT	BA	BE	BG	CH	CY	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HR	HU	IE	IS	IT	LT	LU	LV	ME	MT	NL	NO	PL	PT	RO	RS	SE	SI	SK
Production mix CO2	118	559	123	404	12	623	507	378	181	616	153	96	41	222	337	201	224	377	0	307	219	99	220	425	661	370	4	777	164	277	695	8	217	165
Residual mix CO2	0	559	149	404	19	625	550	618	529	637	296	285	49	351	445	466	276	570	423	457	385	403	303	439	624	451	405	850	281	282	764	77	565	185
Supplier mix CO2	67	559	105	404	10	625	518	240	357	542	194	186	42	140	410	375	271	152	353	357	26	193	269	439	607	198	309	795	236	281	678	8	375	150

Figure 5: Highly active radioactive waste content in the Production Mix, the Residual Mix and the Total Suppler Mix 2021 [mgRW/kWh]

Source: AIB 2022



	AT	BA	BE	BG	CH	CY	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HR	HU	IE	IS	IT	LT	LU	LV	ME	MT	NL	NO	PL	PT	RO	RS	SE	SI	SK
Production mix RW	0,0	0,0	1,4	1,3	1,5	0,0	1,3	0,3	0,0	0,0	0,6	1,0	1,9	1,2	0,0	0,0	1,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	3,5	0,0	0,8	1,0	1,9
Residual mix RW	0,0	0,0	1,6	1,3	3,1	0,0	1,4	0,6	0,7	0,7	1,0	1,6	2,2	1,9	0,1	0,6	1,5	0,0	0,9	0,3	0,2	0,8	0,3	0,0	0,2	0,0	0,9	0,0	0,3	3,4	0,0	2,3	0,5	2,1
Total supplier mix RW	0,0	0,0	1,2	1,3	1,2	0,0	1,3	0,2	0,4	0,6	0,7	1,0	2,0	0,8	0,1	0,4	1,5	0,0	0,8	0,2	0,0	0,1	0,2	0,0	0,2	0,2	0,7	0,0	0,2	3,4	0,0	0,8	0,8	1,7

Table 4: Total Supplier Mix 2021

	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	65,99	0,12 %	5,70 %	1,85 %	0,00 %	10,23 %	66,96 %	0,00 %	0,27 %	0,13 %	0,00 %	0,00 %	14,73 %	67,29	0,00
BA	11,60	0,00 %	0,00 %	0,28 %	0,00 %	2,32 %	37,84 %	0,00 %	0,00 %	59,56 %	0,00 %	0,00 %	0,00 %	558,52	0,00
BE	84,39	0,27 %	5,89 %	4,84 %	0,04 %	9,64 %	11,03 %	46,08 %	0,12 %	1,44 %	0,00 %	0,01 %	20,63 %	105,42	1,24
BG	34,12	0,00 %	4,90 %	3,44 %	0,00 %	3,32 %	11,13 %	36,19 %	0,00 %	34,20 %	0,00 %	0,58 %	6,25 %	404,12	1,27
CH	62,52	0,15 %	0,40 %	2,54 %	0,00 %	1,72 %	68,08 %	24,91 %	1,65 %	0,04 %	0,00 %	0,00 %	0,51 %	10,47	1,20
CY	4,88	0,00 %	0,87 %	9,25 %	0,00 %	5,06 %	0,01 %	0,12 %	0,01 %	0,12 %	0,00 %	84,38 %	0,17 %	625,07	0,00
CZ	65,45	0,02 %	4,90 %	2,32 %	0,04 %	1,02 %	2,80 %	38,04 %	0,12 %	41,32 %	0,00 %	0,12 %	9,31 %	517,79	1,33
DE	489,56	0,17 %	3,79 %	10,55 %	0,28 %	24,92 %	21,39 %	8,09 %	1,99 %	18,76 %	0,00 %	0,51 %	9,55 %	240,32	0,22
DK	36,74	0,10 %	2,58 %	2,21 %	0,00 %	24,29 %	7,75 %	11,04 %	3,45 %	27,03 %	0,33 %	1,20 %	20,01 %	357,49	0,45
EE	8,97	0,06 %	7,54 %	3,69 %	0,51 %	4,88 %	4,61 %	13,69 %	29,79 %	14,16 %	0,41 %	0,75 %	19,92 %	542,03	0,55
ES	255,96	0,23 %	2,97 %	6,91 %	0,02 %	19,85 %	8,51 %	23,39 %	0,29 %	4,31 %	0,07 %	1,19 %	32,27 %	194,36	0,66
FI	85,59	0,27 %	10,80 %	2,09 %	0,02 %	7,17 %	19,41 %	32,11 %	1,51 %	11,80 %	0,10 %	0,50 %	14,22 %	185,85	1,02
FR	472,15	0,00 %	1,38 %	2,17 %	0,04 %	5,61 %	10,38 %	72,30 %	0,38 %	0,76 %	0,00 %	0,38 %	6,59 %	42,48	1,95
GB	276,65	0,03 %	16,33 %	8,29 %	0,00 %	32,90 %	4,52 %	9,63 %	1,84 %	0,00 %	0,98 %	0,32 %	25,18 %	139,95	0,77
GR	57,30	0,00 %	1,32 %	8,80 %	0,14 %	10,09 %	9,16 %	3,16 %	0,55 %	5,16 %	9,34 %	7,11 %	45,15 %	409,82	0,13
HR	16,57	0,00 %	4,30 %	2,13 %	0,45 %	4,28 %	22,22 %	10,94 %	1,40 %	19,36 %	0,32 %	0,65 %	33,95 %	374,87	0,44
HU	46,69	0,01 %	4,81 %	8,86 %	0,01 %	2,12 %	1,84 %	40,50 %	1,32 %	12,67 %	0,15 %	0,42 %	27,31 %	271,32	1,45
IE	39,46	0,86 %	5,22 %	3,14 %	0,29 %	33,20 %	27,70 %	0,00 %	0,14 %	2,08 %	0,32 %	0,31 %	26,74 %	151,73	0,00
IS	19,61	0,00 %	2,41 %	2,95 %	9,12 %	0,57 %	13,12 %	19,43 %	2,48 %	20,09 %	0,57 %	1,07 %	28,16 %	352,94	0,79
IT	320,90	0,05 %	5,84 %	5,50 %	2,09 %	3,75 %	12,99 %	5,02 %	1,41 %	9,97 %	0,15 %	3,47 %	49,75 %	357,15	0,20
LT	11,73	0,00 %	10,78 %	3,07 %	2,32 %	58,66 %	20,22 %	0,31 %	0,08 %	0,22 %	0,00 %	0,07 %	4,26 %	25,80	0,01
LU	5,67	0,23 %	3,98 %	4,81 %	0,22 %	6,00 %	55,36 %	2,84 %	16,07 %	2,94 %	0,08 %	0,16 %	7,31 %	192,66	0,12
LV	7,38	31,75 %	6,75 %	0,80 %	0,02 %	2,20 %	10,11 %	5,90 %	0,61 %	5,50 %	0,12 %	0,22 %	36,03 %	269,21	0,23

	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
ME	3,49	0,03 %	1,16 %	0,09 %	0,00 %	9,73 %	49,81 %	0,00 %	0,00 %	4,64 %	32,20 %	2,34 %	0,00 %	439,03	0,00
MT	2,67	0,00 %	0,77 %	10,18 %	0,00 %	1,34 %	1,87 %	4,03 %	0,52 %	4,17 %	0,12 %	1,83 %	75,18 %	606,93	0,16
NL	118,29	0,03 %	4,58 %	5,09 %	0,06 %	39,22 %	5,98 %	7,67 %	1,99 %	3,83 %	0,00 %	0,12 %	31,42 %	198,21	0,21
NO	138,50	0,00 %	3,01 %	2,95 %	0,07 %	2,32 %	28,70 %	16,73 %	3,24 %	17,31 %	0,50 %	0,91 %	24,26 %	309,26	0,68
PL	162,28	0,00 %	3,83 %	2,32 %	0,00 %	7,08 %	0,69 %	1,21 %	0,80 %	73,31 %	0,03 %	0,05 %	10,68 %	794,62	0,05
PT	50,69	0,23 %	5,52 %	3,94 %	0,37 %	19,00 %	23,18 %	5,81 %	1,27 %	7,46 %	0,17 %	2,76 %	30,28 %	236,24	0,24
RO	55,89	0,00 %	0,78 %	3,10 %	0,00 %	11,79 %	30,24 %	20,05 %	0,06 %	17,47 %	0,01 %	0,11 %	16,40 %	281,30	3,40
RS	34,24	0,00 %	0,91 %	0,20 %	0,00 %	3,18 %	31,20 %	0,92 %	0,12 %	0,95 %	58,81 %	0,05 %	3,66 %	678,24	0,04
SE	139,42	0,06 %	7,82 %	1,12 %	0,00 %	9,72 %	48,79 %	30,80 %	1,22 %	0,01 %	0,00 %	0,24 %	0,21 %	8,26	0,83
SI	13,75	0,00 %	2,63 %	9,76 %	0,00 %	0,33 %	10,29 %	26,67 %	1,16 %	33,65 %	0,25 %	0,85 %	14,40 %	374,68	0,84
SK	28,03	0,31 %	4,80 %	3,29 %	0,00 %	0,53 %	20,67 %	47,80 %	3,97 %	1,02 %	2,52 %	1,05 %	14,04 %	150,16	1,67

Figure 6: Total Supplier Mix 2021

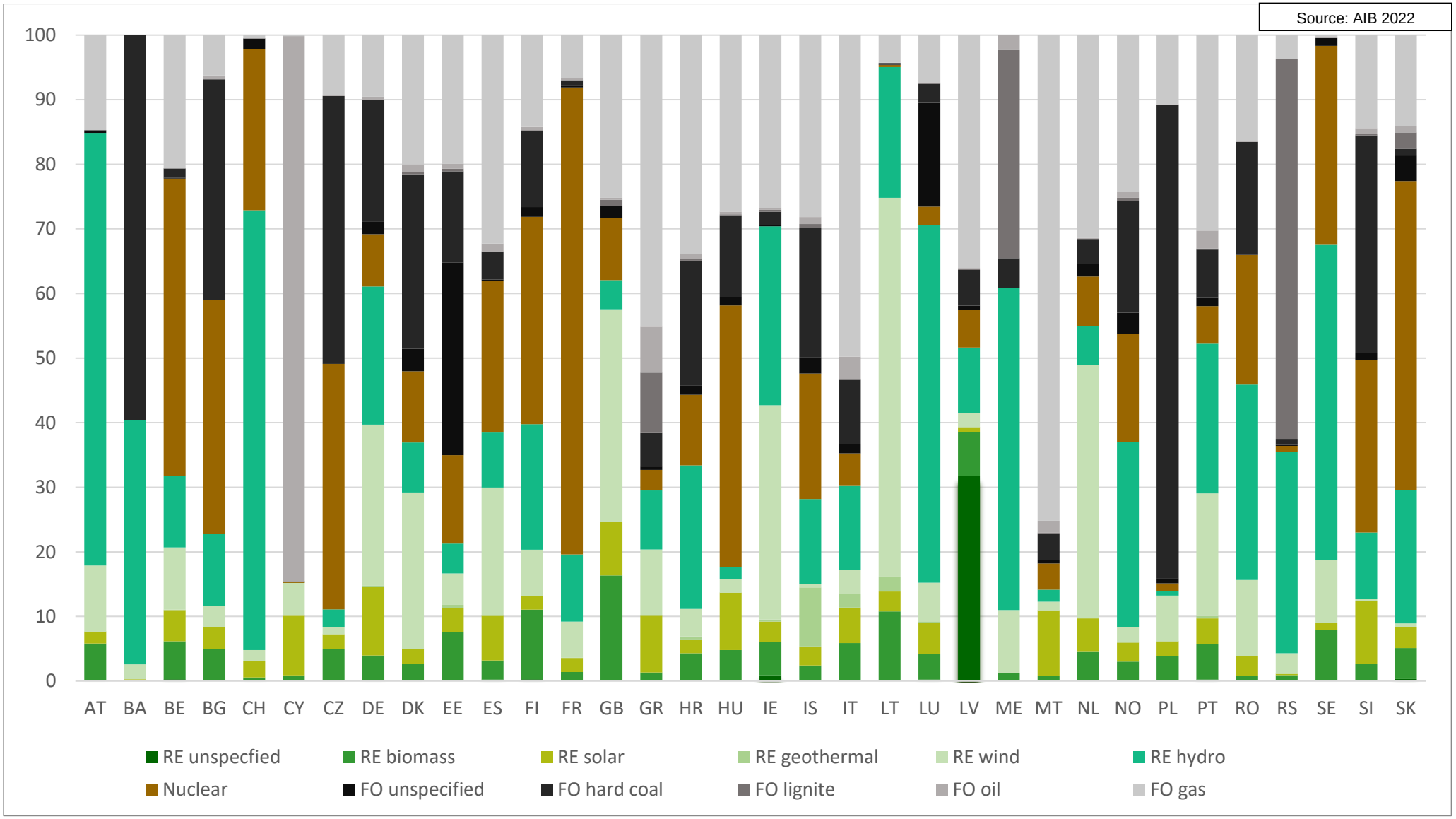


Table 5: Production Mix 2021[6]

	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	63,19	0,00 %	4,56 %	0,00 %	0,00 %	11,78 %	60,79 %	0,00 %	1,00 %	3,46 %	0,00 %	1,01 %	17,40 %	118,47	0,00
BA	16,50	0,00 %	0,00 %	0,28 %	0,00 %	2,32 %	37,84 %	0,00 %	0,00 %	59,56 %	0,00 %	0,00 %	0,00 %	558,52	0,00
BE	93,50	0,00 %	4,53 %	5,79 %	0,00 %	12,28 %	0,34 %	51,28 %	1,04 %	1,69 %	0,00 %	0,01 %	23,04 %	122,64	1,38
BG	43,28	0,00 %	4,90 %	3,44 %	0,00 %	3,32 %	11,13 %	36,19 %	0,00 %	34,20 %	0,00 %	0,58 %	6,25 %	404,12	1,27
CH	59,86	3,00 %	0,00 %	4,83 %	0,00 %	0,24 %	58,52 %	30,65 %	1,81 %	0,00 %	0,00 %	0,05 %	0,90 %	11,63	1,47
CY	4,88	0,00 %	0,86 %	9,71 %	0,00 %	5,05 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	84,38 %	0,00 %	622,96	0,00
CZ	78,14	0,00 %	6,39 %	2,73 %	0,00 %	0,76 %	3,11 %	37,23 %	0,11 %	40,44 %	0,00 %	0,11 %	9,11 %	506,71	1,30
DE	515,38	0,00 %	3,27 %	9,95 %	0,04 %	22,48 %	3,14 %	12,71 %	3,13 %	29,48 %	0,00 %	0,79 %	15,01 %	377,64	0,34
DK	31,92	0,00 %	19,93 %	4,01 %	0,00 %	50,30 %	0,05 %	0,00 %	2,36 %	18,01 %	0,00 %	0,69 %	4,66 %	181,34	0,00
EE	6,33	0,00 %	24,27 %	4,82 %	0,00 %	11,54 %	0,39 %	0,00 %	58,98 %	0,00 %	0,00 %	0,00 %	0,00 %	616,13	0,00
ES	255,39	0,34 %	1,87 %	10,06 %	0,00 %	23,69 %	10,84 %	21,16 %	0,00 %	1,95 %	0,00 %	1,07 %	29,03 %	153,30	0,57
FI	68,36	0,00 %	17,10 %	0,53 %	0,00 %	11,62 %	22,58 %	33,12 %	1,19 %	8,26 %	0,00 %	0,38 %	5,22 %	95,84	0,99
FR	517,70	0,00 %	1,56 %	2,76 %	0,00 %	7,11 %	11,07 %	69,67 %	0,37 %	0,73 %	0,00 %	0,37 %	6,36 %	40,98	1,88
GB	300,06	0,00 %	13,32 %	4,19 %	0,00 %	20,61 %	1,63 %	15,29 %	2,92 %	0,00 %	1,56 %	0,51 %	39,98 %	222,25	1,22
GR	53,78	0,00 %	0,91 %	9,63 %	0,00 %	19,93 %	11,02 %	0,00 %	0,15 %	0,00 %	9,93 %	7,42 %	41,01 %	336,64	0,00
HR	14,56	0,00 %	6,57 %	0,51 %	0,51 %	14,18 %	48,42 %	0,00 %	0,00 %	9,16 %	0,00 %	0,05 %	20,59 %	200,52	0,00
HU	33,93	0,00 %	5,61 %	11,08 %	0,02 %	1,87 %	0,60 %	44,56 %	0,94 %	7,96 %	0,00 %	0,14 %	27,23 %	223,97	1,56

[6] 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)
IE	38,34	0,90 %	1,34 %	0,38 %	0,00 %	32,07 %	2,00 %	0,00 %	0,74 %	11,65 %	1,78 %	1,74 %	47,40 %	377,10	0,00
IS	19,61	0,00 %	0,00 %	0,00 %	29,58 %	0,03 %	70,38 %	0,00 %	0,00 %	0,00 %	0,00 %	0,01 %	0,00 %	0,10	0,00
IT	278,11	0,00 %	6,56 %	9,01 %	1,99 %	7,41 %	15,94 %	0,00 %	0,88 %	5,51 %	0,00 %	3,68 %	49,01 %	306,85	0,00
LT	3,63	0,00 %	13,17 %	2,04 %	0,00 %	39,27 %	10,34 %	0,00 %	2,18 %	0,00 %	0,00 %	1,86 %	31,14 %	218,52	0,00
LU	1,27	0,00 %	30,08 %	19,19 %	0,00 %	26,00 %	5,97 %	0,00 %	4,56 %	0,00 %	0,00 %	0,00 %	14,21 %	98,83	0,00
LV	5,61	0,00 %	13,26 %	0,11 %	0,00 %	2,49 %	47,89 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	36,24 %	219,65	0,00
ME	3,66	0,00 %	0,00 %	0,07 %	0,00 %	8,74 %	54,83 %	0,00 %	0,00 %	0,00 %	36,36 %	0,00 %	0,00 %	425,28	0,00
MT	2,16	0,00 %	0,33 %	11,84 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	2,00 %	85,83 %	660,69	0,00
NL	118,04	0,00 %	8,25 %	9,78 %	0,00 %	15,26 %	0,07 %	3,08 %	1,34 %	14,07 %	0,00 %	1,09 %	47,06 %	370,40	0,08
NO	156,67	0,00 %	0,13 %	0,00 %	0,00 %	7,51 %	91,43 %	0,00 %	0,92 %	0,00 %	0,00 %	0,00 %	0,00 %	4,49	0,00
PL	162,42	0,00 %	4,14 %	2,37 %	0,00 %	9,85 %	1,38 %	0,00 %	0,76 %	72,17 %	0,00 %	0,00 %	9,34 %	776,59	0,00
PT	47,91	0,00 %	9,55 %	4,40 %	0,36 %	27,23 %	24,79 %	0,00 %	0,61 %	1,53 %	0,00 %	2,60 %	28,94 %	164,18	0,00
RO	53,70	0,00 %	0,72 %	3,14 %	0,00 %	12,13 %	31,32 %	19,32 %	0,00 %	17,08 %	0,00 %	0,07 %	16,22 %	277,46	3,48
RS	34,29	0,00 %	0,71 %	0,04 %	0,00 %	3,11 %	31,94 %	0,00 %	0,00 %	0,00 %	61,77 %	0,00 %	2,42 %	695,08	0,00
SE	165,04	0,00 %	7,81 %	0,68 %	0,00 %	16,58 %	42,47 %	30,90 %	1,11 %	0,01 %	0,00 %	0,22 %	0,22 %	7,67	0,83
SI	14,41	0,00 %	1,42 %	2,10 %	0,00 %	0,04 %	32,24 %	37,62 %	0,06 %	23,63 %	0,00 %	0,37 %	2,53 %	216,85	1,02
SK	27,73	0,34 %	4,27 %	2,21 %	0,00 %	0,02 %	15,40 %	52,88 %	4,40 %	1,13 %	2,79 %	1,16 %	15,40 %	165,49	1,85

Figure 7: Production Mix (left) and Final Residual Mix (right) 2021

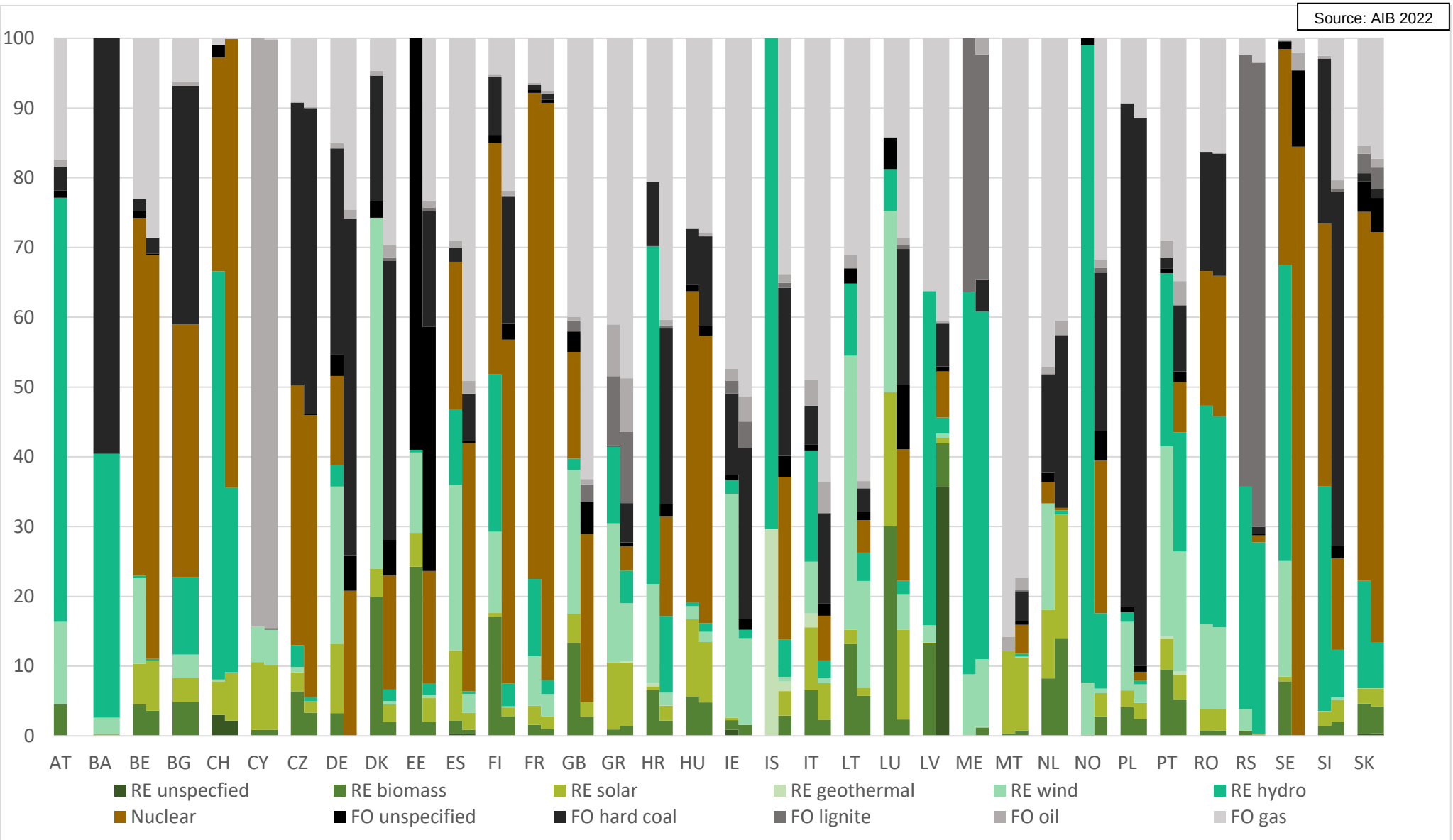


Figure 8: European Total Production Mix (left), Total of all available attributes in Final Residual Mixes (middle) and EAM (right) 2021

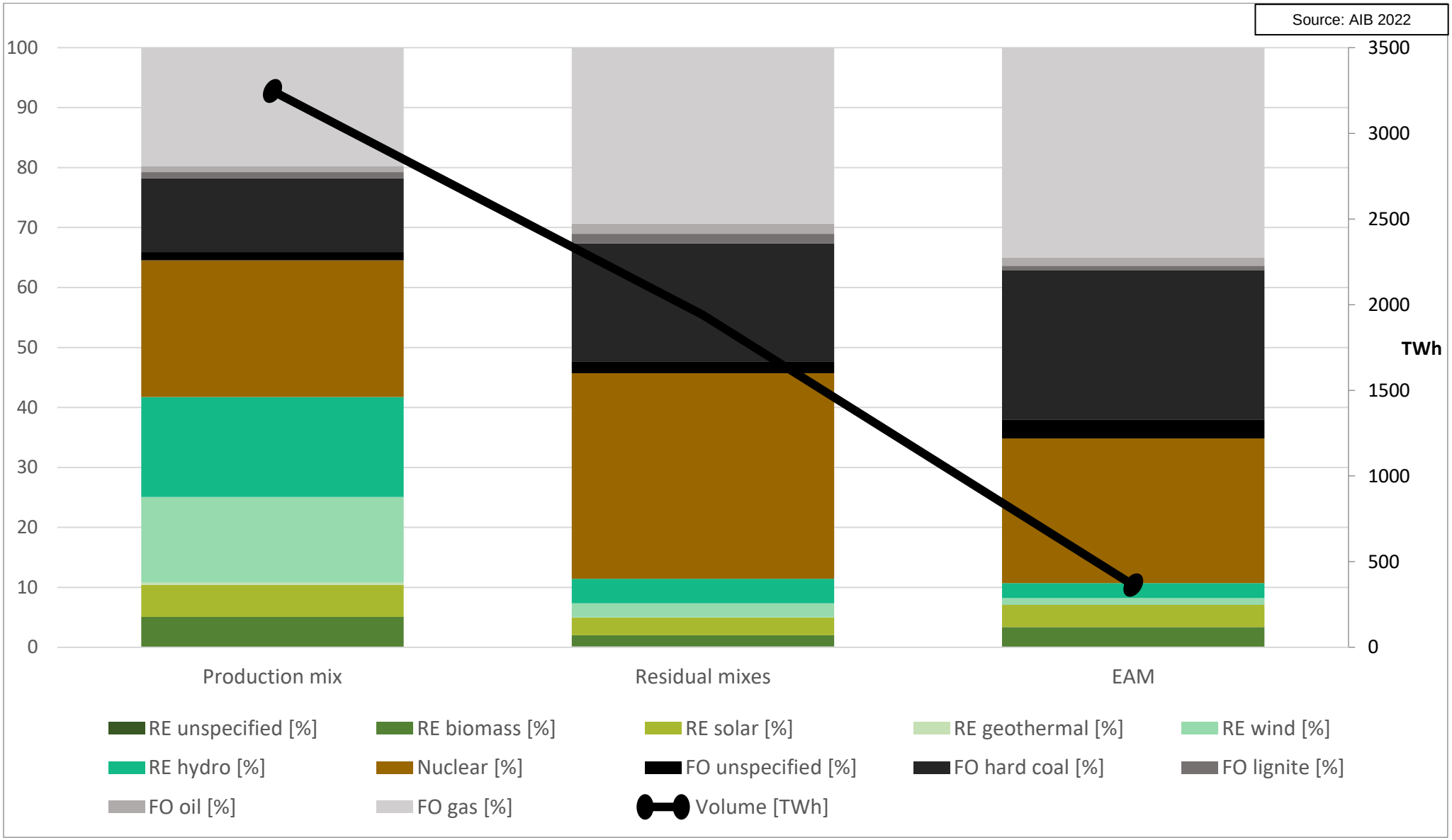


Table 6: European Total Production Mix, Total of all available attributes in Final Residual Mixes and European Attribute Mix 2021[7]

	Production mix	Residual mixes	European attribute mix
Volume [TWh]	**3247,26**	**1939,26**	**363,22**
RE unspecified %	0,09 %	0,15 %	0,06 %
RE biomass %	4,99 %	1,87 %	3,30 %
RE solar %	5,34 %	2,94 %	3,73 %
RE geothermal %	0,36 %	0,03 %	0,00 %
RE wind %	14,28 %	2,36 %	1,12 %
RE hydro %	16,67 %	4,08 %	2,49 %
Nuclear %	22,79 %	34,27 %	24,12 %
FO unspecified %	1,37 %	1,91 %	3,09 %
FO hard coal %	12,31 %	19,74 %	25,02 %
FO lignite %	1,02 %	1,62 %	0,71 %
FO oil %	1,04 %	1,69 %	1,32 %
FO gas %	19,73 %	29,33 %	35,04 %

[7] 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.

Figure 9: Production Mix (left) and Total Supplier Mix (right) 2021

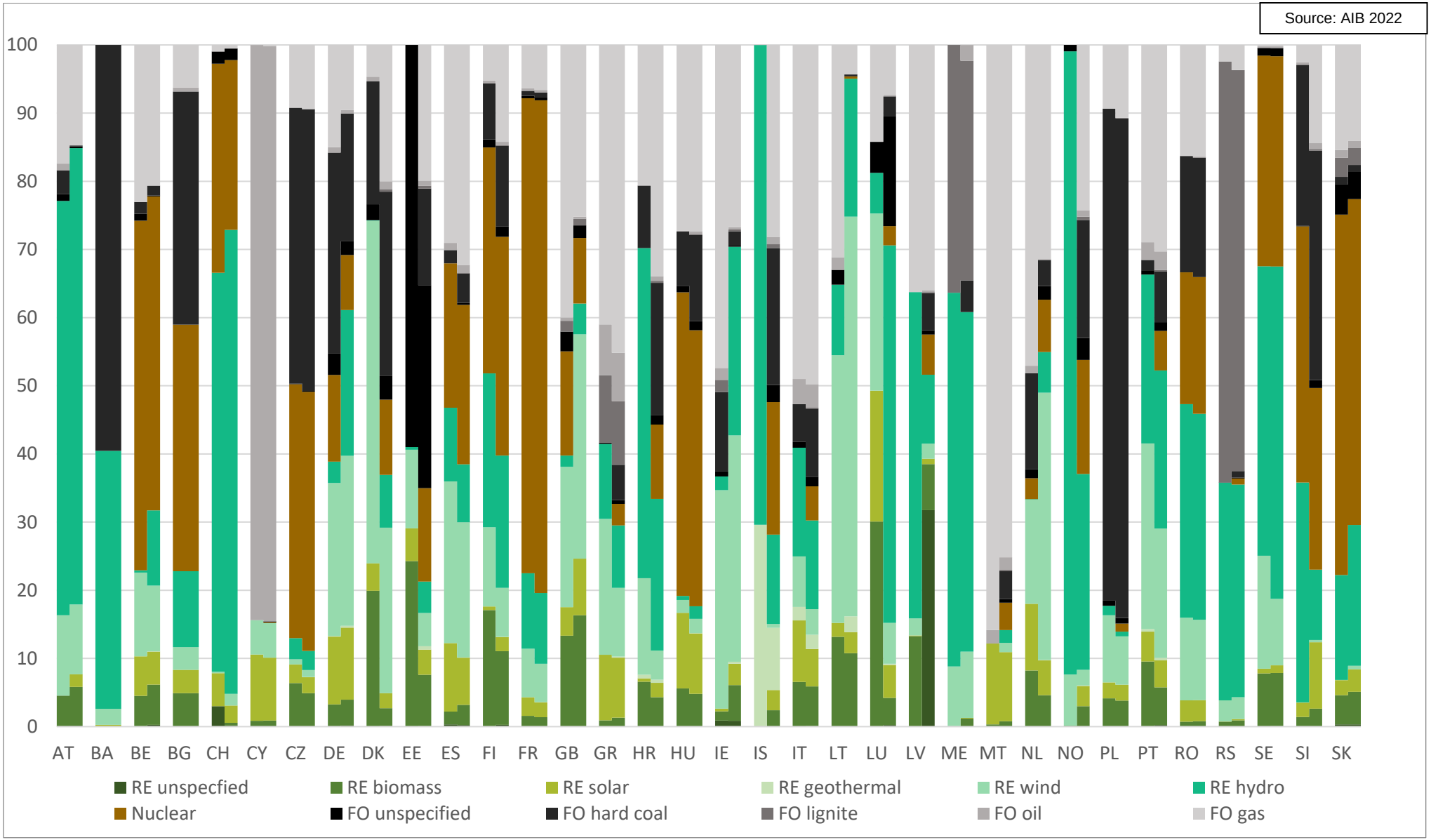
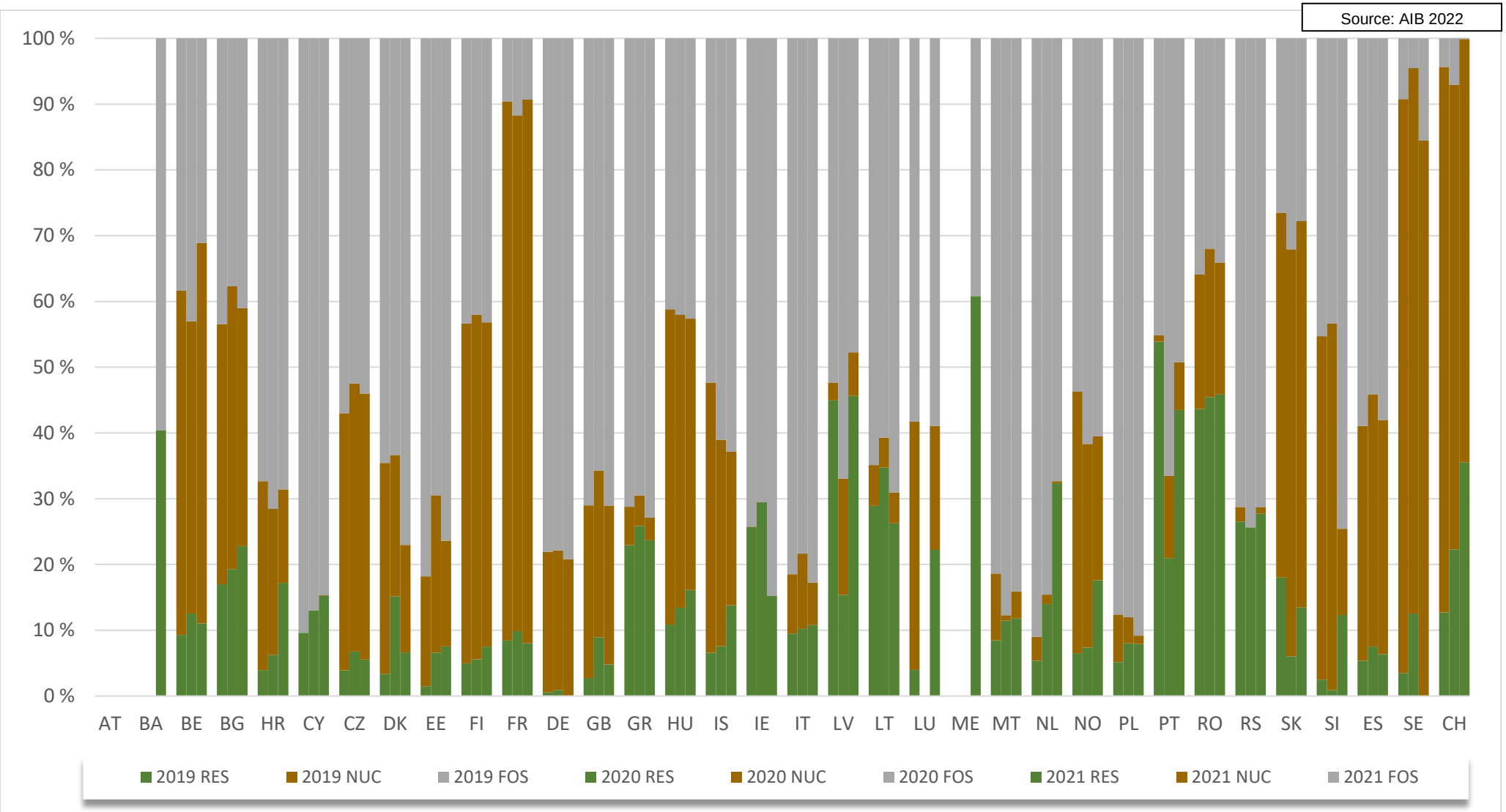


Figure 10: Residual Mixes 2019, 2020 and 2021[8]



[8] For the first time all three years are with Issuing Based methodology. Earlier years up to 2018 were calculated with the Shifted Transaction Based method.

Table 7: Residual Mixes 2019, 2020 and 2021

		2019	2020	2021
AT	RES	0,0 %	0,0 %	0,0 %
	NUC	0,0 %	0,0 %	0,0 %
	FOS	0,0 %	0,0 %	0,0 %
BA	RES	0,0 %	0,0 %	40,4 %
	NUC	0,0 %	0,0 %	0,0 %
	FOS	0,0 %	0,0 %	59,6 %
BE	RES	9,3 %	12,5 %	11,0 %
	NUC	52,4 %	44,5 %	57,9 %
	FOS	38,3 %	43,0 %	31,1 %
BG	RES	17,0 %	19,3 %	22,8 %
	NUC	39,5 %	43,0 %	36,2 %
	FOS	43,5 %	37,7 %	41,0 %
HR	RES	3,9 %	6,2 %	17,2 %
	NUC	28,7 %	22,2 %	14,2 %
	FOS	67,3 %	71,5 %	68,6 %
CY	RES	9,6 %	13,0 %	15,2 %
	NUC	0,0 %	0,0 %	0,1 %
	FOS	90,4 %	87,0 %	84,7 %
CZ	RES	3,9 %	6,8 %	5,6 %
	NUC	39,1 %	40,8 %	40,4 %
	FOS	57,0 %	52,5 %	54,0 %
DK	RES	3,4 %	15,2 %	6,6 %
	NUC	32,1 %	21,5 %	16,3 %
	FOS	64,5 %	63,4 %	77,0 %
EE	RES	1,5 %	6,6 %	7,5 %
	NUC	16,7 %	23,9 %	16,1 %
	FOS	81,8 %	69,5 %	76,4 %
FI	RES	5,0 %	5,6 %	7,5 %
	NUC	51,7 %	52,4 %	49,3 %
	FOS	43,3 %	42,0 %	43,2 %
FR	RES	8,4 %	9,9 %	8,0 %
	NUC	82,0 %	78,4 %	82,7 %
	FOS	9,6 %	11,8 %	9,3 %

		2019	2020	2021
DE	RES	0,6 %	0,9 %	0,0 %
	NUC	21,4 %	21,2 %	20,8 %
	FOS	78,0 %	77,8 %	79,2 %
GB	RES	2,7 %	8,9 %	4,8 %
	NUC	26,3 %	25,3 %	24,2 %
	FOS	71,0 %	65,7 %	71,0 %
GR	RES	22,9 %	25,9 %	23,7 %
	NUC	5,8 %	4,6 %	3,4 %
	FOS	71,2 %	69,5 %	72,9 %
HU	RES	10,9 %	13,4 %	16,1 %
	NUC	47,9 %	44,5 %	41,2 %
	FOS	41,2 %	42,0 %	42,6 %
IS	RES	6,6 %	7,6 %	13,8 %
	NUC	41,1 %	31,4 %	23,3 %
	FOS	52,3 %	61,0 %	62,9 %
IE	RES	25,7 %	29,5 %	15,2 %
	NUC	0,0 %	0,0 %	0,0 %
	FOS	74,3 %	70,5 %	84,8 %
IT	RES	9,5 %	10,2 %	10,8 %
	NUC	9,0 %	11,4 %	6,4 %
	FOS	81,5 %	78,3 %	82,8 %
LU	RES	4,0 %	0,0 %	22,2 %
	NUC	37,7 %	0,0 %	18,9 %
	FOS	58,3 %	0,0 %	58,9 %
LV	RES	45,0 %	15,4 %	45,6 %
	NUC	2,7 %	17,7 %	6,6 %
	FOS	52,3 %	66,9 %	47,7 %
LT	RES	28,9 %	34,8 %	26,3 %
	NUC	6,2 %	4,5 %	4,7 %
	FOS	64,9 %	60,7 %	69,1 %
ME	RES	0,0 %	0,0 %	60,8 %
	NUC	0,0 %	0,0 %	0,0 %
	FOS	0,0 %	0,0 %	39,2 %
MT	RES	8,5 %	11,4 %	11,8 %
	NUC	10,2 %	0,9 %	4,1 %
	FOS	81,4 %	87,7 %	84,1 %

		2019	2020	2021
NL	RES	5,4 %	14,0 %	32,3 %
	NUC	3,6 %	1,5 %	0,3 %
	FOS	91,0 %	84,6 %	67,3 %
NO	RES	6,5 %	7,4 %	17,6 %
	NUC	39,8 %	31,0 %	21,9 %
	FOS	53,7 %	61,7 %	60,5 %
PL	RES	5,2 %	8,0 %	7,9 %
	NUC	7,2 %	4,0 %	1,3 %
	FOS	87,6 %	88,0 %	90,8 %
PT	RES	53,9 %	21,0 %	43,5 %
	NUC	1,0 %	12,5 %	7,2 %
	FOS	45,1 %	66,5 %	49,3 %
RO	RES	43,6 %	45,5 %	45,8 %
	NUC	20,4 %	22,5 %	20,1 %
	FOS	35,9 %	32,0 %	34,1 %
RS	RES	26,5 %	25,6 %	27,7 %
	NUC	2,2 %	0,0 %	1,0 %
	FOS	71,3 %	74,4 %	71,2 %
SK	RES	18,0 %	6,0 %	13,4 %
	NUC	55,5 %	61,9 %	58,8 %
	FOS	26,5 %	32,1 %	27,8 %
SI	RES	2,5 %	0,9 %	12,3 %
	NUC	52,2 %	55,8 %	13,1 %
	FOS	45,3 %	43,4 %	74,6 %
ES	RES	5,4 %	7,5 %	6,4 %
	NUC	35,7 %	38,4 %	35,6 %
	FOS	58,9 %	54,1 %	58,0 %
SE	RES	3,5 %	12,5 %	0,0 %
	NUC	87,3 %	82,9 %	84,5 %
	FOS	9,2 %	4,5 %	15,5 %
CH	RES	12,7 %	22,3 %	35,6 %
	NUC	83,0 %	70,7 %	64,3 %
	FOS	4,3 %	7,1 %	0,1 %

Annex 1: Fuel Categories

Table 8: Fuel category breakdown

Fact Sheet 5 compliance		Fuel code	Fuel description (including all subcategories)	Sub-table reference
Renewable	Unspecified & Other	F01000000	Renewable - Unspecified	
		F01040300	Renewable - Heat - Aerothermal	
		F01040400	Renewable - Heat - Hydrothermal	
		F01040501	Renewable - Heat - Process heat - Biogenic	
		F01050000	Renewable - Mechanical source or other - Unspecified	
	Solar	F01040100	Renewable - Heat - Solar	
	Wind	F01050100	Renewable - Mechanical source or other - Wind	
	Hydro & Marine	F01050200	Renewable - Mechanical source or other - Hydro & Marine	
	Geothermal	F01040200	Renewable - Heat - Geothermal	
	Biomass	F01010000	Renewable - Solid	
		F01020000	Renewable - Liquid	
		F01030000	Renewable - Gaseous	
Nuclear		F03010100	Nuclear - Solid - Radioactive fuel	
Fossil	Unspecified & Other	F02000000	Fossil - Unspecified	
		F02010000	Fossil - Solid - Unspecified	
		F02010400	Fossil - Solid - Municipal waste	
		F02010500	Fossil - Solid - Industrial and commercial waste	
		F02020000	Fossil - Liquid - Unspecified	
		F02030000	Fossil - Gaseous	T4
		F02040000	Fossil - Heat	
	Hard Coal	F02010100	Fossil - Solid - Hard coal	T1
	Brown Coal / Lignite	F02010300	Fossil - Solid - Peat	
		F02010200	Fossil - Solid - Brown coal	T2
	Natural Gas	F02030100	Fossil - Gaseous - Natural Gas	
		F02020200	Fossil - Liquid - Natural gas liquids	
	Oil	F02020100	Fossil - Liquid - Crude oil	
		F02020300	Fossil - Liquid - Petroleum products	T3

T1 Hard coal sub-categories		
0	F0201010	Unspecified
1	F0201010	Anthracite
2	F0201010	Bituminous coal
3	F0201010	Coking coal
4	F0201010	Coke-oven coke
5	F0201010	Lignite coke

T2 Brown coal sub-categories		
0	F0201020	Unspecified
1	F0201020	Sub-bituminous coal
2	F0201020	Lignite
3	F0201020	Brown coal briquette
4	F0201020	Peat briquette

T3 Petroleum products sub-categories		
0	F0202030	Unspecified
1	F0202030	Ethane
2	F0202030	Naphtha
3	F0202030	Aviation gasoline
4	F0202030	Motor gasoline
5	F0202030	Aviation turbine fuel
6	F0202030	Other kerosene
7	F0202030	Gas and diesel oil
8	F0202030	Fuel oil low-sulphur
9	F0202030	Fuel oil high-sulphur
10	F0202030	Liquid petroleum gas
11	F0202030	Orimulsion
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