

European Residual Mixes

Results of the calculation of Residual Mixes for the calendar year 2017

Version 1.13, 2018-07-11

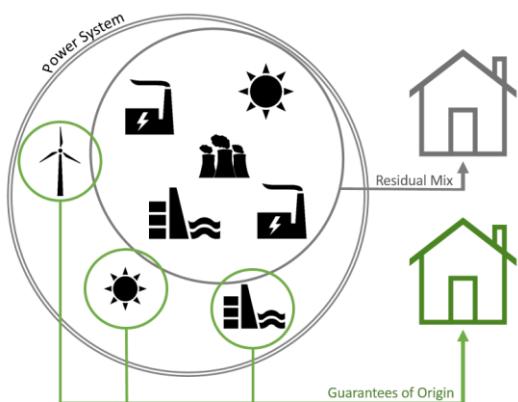
Introduction

Consumers have their say on how their electricity is generated via the freedom to select the supplier and sometimes power product. For consumers to be able to make informed choices, electricity suppliers must inform their customers of the origin and environmental attributes of sold electricity (IEM Directive 2009/72/EC, Art. 3(9)). This is called electricity disclosure.

For power companies to be able to tell their customers anything about the origin of the electricity in today's unbundled, international and complex power market, they need a way to track electricity from production to consumption. The main tracking tool for electricity is Guarantee of Origin (GO) (RES Directive 2009/28/EC, Art. 15). 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, has 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.

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 consumption¹. 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, by operating as an "equalising reservoir" for generation attributes in national residual mixes. After the attribute balancing via the EAM the volume of available generation attributes in each country's residual mix is equal to the untracked consumption in that country. This is a precondition for the GO to be a credible tracking instrument in the context of international trading.

The whole concept of a residual mix is needed only when consumption is only partly explicitly tracked. In so-called "full disclosure domains" residual mix is not needed. In calculations the volume of the residual mix would be zero and hence the energy source distribution and environmental indicators meaningless. In 2017, unlike previous years, the residual mix is not calculated for Austria as it has an operational full disclosure system. Also, Switzerland has full disclosure regulation but, due to detailed implementation and calculation rules, a residual mix can still be calculated and is included in the results.



Note: For 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. For the results of 2015 and 2016 please refer to the AIB-website.

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

Description of the Document

Table 1 presents the energy sources and environmental indicators of the European Attribute Mix to be used for filling in national residual mixes in case of a deficit of disclosure attributes. Table 2, Figure 1 and Figure 2 represent the national residual mixes for 30 European countries². In Figure 1 and Figure 2, colours indicate different energy sources as elaborated by the legend. The solid black line in Figure 1 shows the share of untracked consumption out of the total electricity consumption. 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

The results shown are based on the Shifted-Transaction Based Methodology. However, to acknowledge different perspectives to national calculations, Figure 9 and

Figure 21 provide national results following the Issuance-Based Methodology.⁴

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 10). 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.

Table 2 and

Figure 4 show the carbon emissions for the final residual mixes differentiated into:

- direct greenhouse gas emissions given as the single greenhouse gas CO₂ emissions,
- greenhouse gas emissions given as the single greenhouse gas CO₂ emissions based on a life-cycle analysis (LCA) and thus including up- and downstream impacts throughout the electricity generation value chain,
- direct greenhouse gas emissions, given as CO₂ equivalents (CO₂e), which includes the effects of other greenhouse gases than CO₂, and
- greenhouse gas emissions based on an LCA approach, given as CO₂ equivalents (CO₂e). This is the most comprehensive emission figure as it contains CO₂ and other greenhouse gases and the full electricity generation value chain.

The base data for the direct CO₂-emissions have been based on the following references: Treyer and Bauer (2013), Dong Energy A/S, Energi.dk, Vattenfall (2010), Fritzsche and Rausch (2009), Bauer (2008) and GEMIS database (GEMIS, 2015). The life-cycle-based CO₂-emissions, as well as the direct and life-cycle-based Global Warming Potential have been provided by the EcoInvent database (EcoInvent v3.1 Database). The data for the radioactive waste has been compiled based on BDEW (2014), DECC (2014), the Platts World Database and IAEA PRIS. However, where available, factors as reported by national competent authorities are used instead.

Note that these figures are destined for electricity disclosure purposes only. The RE-DIIS Disclosure Guidelines for Electricity Suppliers recommend that the direct CO₂ emissions (and the indicator on radioactive waste) are being used in disclosure statements directly on or with the bills. The other three indicators for carbon emissions are provided for information purpose and can be used for second-level information (e.g. on a related website) provided by suppliers and other bodies.

Table 1 and Figure 6 show the content of high-level radioactive waste in the European Attribute Mix (EAM), in the production mix (PM), in the residual mix (RM) and in the total supplier mix (TSM) of European countries. 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. Input factors are the same as used in 2015 and 2016 calculations.

The total supplier mixes (TSMs) are presented in Table 4, Figure 7 and Figure 8. The total supplier mix represents the total consumption mix of the country, i.e. shares of energy sources in the tracked and untracked part of consumption.

² Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Great Britain, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, 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.

⁴ For more information on the Shifted-Transaction Based Methodology (STBM) and the Issuance-Based Methodology, see the Residual Mix Methodology description in Deliverable 7.2 of the RE-DIIS II project (see http://www.reliable-disclosure.org/upload/234-D7.2_RMCcalculation.pdf).

Thus, both available and explicitly tracked attributes are included in the TSM, which equals in physical volume with the country's total electricity consumption.

Table 5, Figure 9 and Figure 10 present the comparison between the production and residual mix of different countries, and Figure 13 and Figure 14 that of production and total supplier mix (in TWh in Figure 15 and Figure 16). Figure 17, Figure 18, Table 7 and Table 8 show the difference between final residual mixes and production mixes of 2014, 2015 and 2016. Finally, Figure 19 and

Figure 20 disclose the volumes of EECS and National GO transactions which have been taken into account for the calculation (but not those of other Reliable Tracking Systems).

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.

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 (1.4.2017 – 31.3.2018) for disclosure of 2017 consumption, irrespective of the underlying production year of these GOs. This ensures that 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



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Table 1: European Attribute Mix (EAM) 2017: Energy source distribution and environmental indicators

	Renewables Total	Renewables Unspecified	Solar	Wind	Hydro & Marine	Geothermal	Biomass	Nuclear Total	Fossil Total	Fossil Unspecified	Lignite	Hard Coal	Gas	Oil	Direct CO2 (gCO2/kWh)	LCA CO2 (gCO2/kWh)	Direct GWP (gCO2/kWh)	LCA GWP (gCO2/kWh)	RW (mgRW/kWh)
EAM	7,87 %	0,18 %	0,66 %	2,38 %	3,00 %	0,05 %	1,59 %	30,56 %	61,57 %	2,61 %	19,17 %	14,59 %	24,50 %	0,70 %	503,92	539,67	507,28	580,97	0,92

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 2017

	Residual Mix																
	Renewables Total	Renewables Unspecified	Solar	Wind	Hydro & Marine	Geothermal	Biomass	Nuclear Total	Fossil Total	Fossil Unspecified	Lignite	Hard Coal	Gas	Oil	Untracked consumption	Direct CO ₂ (gCO ₂ /kWh)	RW (mgRW/kWh)
BE	26,95 %	2,94 %	6,23 %	8,39 %	3,85 %	0,21 %	5,33 %	44,38 %	28,67 %	0,00 %	0,00 %	0,00 %	28,59 %	0,08 %	41,61 %	122,76	1,20
BG	14,68 %	0,01 %	3,42 %	3,73 %	6,71 %	0,00 %	0,82 %	36,47 %	48,85 %	0,08 %	43,19 %	1,09 %	4,47 %	0,02 %	99,92 %	513,55	1,27
HR	34,31 %	0,17 %	0,54 %	8,17 %	23,11 %	0,02 %	2,31 %	12,65 %	53,04 %	1,08 %	11,20 %	13,54 %	26,92 %	0,29 %	92,92 %	413,25	0,38
CY	8.35%	0.00%	3.11%	4.46%	0.00%	0.00%	0.77%	0.00%	91.65%	0.00%	0.00%	0.00%	0.00%	91.65%	100.00%	637.45	0.00
CZ	7,60 %	0,00 %	2,14 %	0,45 %	1,43 %	0,00 %	3,58 %	35,01 %	57,40 %	2,73 %	43,77 %	5,38 %	5,45 %	0,06 %	98,01 %	614,38	1,23
DK	14,20 %	0,11 %	3,96 %	4,74 %	3,08 %	0,03 %	2,28 %	19,00 %	66,80 %	3,53 %	11,91 %	28,17 %	22,27 %	0,91 %	86,12 %	505,03	0,57
EE	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	100,00 %	99,36 %	0,00 %	0,00 %	0,51 %	0,12 %	74,52 %	1 042,25	0,00
FI	11,85 %	0,05 %	0,21 %	0,65 %	5,81 %	0,02 %	5,11 %	43,08 %	45,07 %	6,45 %	12,37 %	13,88 %	11,92 %	0,45 %	72,73 %	348,70	1,29
FR	10,78 %	0,00 %	1,89 %	4,93 %	2,55 %	0,00 %	1,40 %	78,03 %	11,20 %	0,00 %	0,00 %	2,00 %	8,42 %	0,78 %	94,14 %	57,34	2,11
DE	1,80 %	0,10 %	0,00 %	0,47 %	1,09 %	0,13 %	0,00 %	18,17 %	80,03 %	2,32 %	34,57 %	21,19 %	20,88 %	1,08 %	48,21 %	731,53	0,49
GB	4,54 %	0,00 %	1,38 %	1,71 %	1,46 %	0,00 %	0,00 %	27,34 %	68,12 %	0,99 %	0,00 %	9,33 %	57,78 %	0,01 %	71,87 %	366,52	2,19
GR	26,18 %	2,23 %	7,09 %	8,84 %	7,33 %	0,01 %	0,68 %	2,86 %	70,96 %	0,24 %	37,72 %	1,37 %	31,56 %	0,07 %	97,44 %	624,97	0,09
HU	9,40 %	1,28 %	0,91 %	2,07 %	1,97 %	0,01 %	3,16 %	46,27 %	44,33 %	1,43 %	12,94 %	6,81 %	22,77 %	0,37 %	98,42 %	341,40	1,59
IS	9,93 %	0,18 %	0,65 %	2,38 %	4,74 %	0,44 %	1,55 %	29,87 %	60,19 %	2,56 %	18,73 %	14,26 %	23,95 %	0,69 %	80,68 %	492,66	0,90
IE	23,88 %	0,55 %	0,08 %	22,03 %	0,00 %	0,00 %	1,22 %	0,00 %	76,12 %	0,44 %	15,56 %	32,22 %	27,80 %	0,11 %	14,46 %	640,57	0,00
IT	13,77 %	0,49 %	4,71 %	2,62 %	3,65 %	1,94 %	0,36 %	6,90 %	79,33 %	5,70 %	4,33 %	16,24 %	51,40 %	1,66 %	85,61 %	476,53	0,21
LV	67,58 %	0,00 %	0,00 %	1,79 %	55,27 %	0,00 %	10,52 %	0,00 %	32,42 %	6,73 %	8,49 %	0,00 %	17,21 %	0,00 %	99,69 %	243,85	0,00
LT	19,40 %	0,73 %	1,76 %	1,03 %	15,42 %	0,02 %	0,44 %	8,51 %	72,09 %	6,57 %	47,07 %	4,06 %	14,19 %	0,19 %	54,05 %	704,79	0,26
LU	17,76 %	0,16 %	0,57 %	2,04 %	13,59 %	0,05 %	1,36 %	26,13 %	56,11 %	5,45 %	16,39 %	12,48 %	21,20 %	0,60 %	46,55 %	456,54	0,78

	Residual Mix																
	Renewables Total	Renewables Unspecified	Solar	Wind	Hydro & Marine	Geothermal	Biomass	Nuclear Total	Fossil Total	Fossil Unspecified	Lignite	Hard Coal	Gas	Oil	Untracked consumption	Direct CO ₂ (gCO ₂ /kWh)	RW (mgRW/kWh)
MT	7,32 %	0,07 %	4,54 %	0,92 %	1,16 %	0,02 %	0,61 %	11,79 %	80,89 %	1,01 %	7,39 %	5,63 %	9,45 %	57,41 %	100,00 %	661,71	0,35
NL	1,08 %	0,00 %	0,66 %	0,42 %	0,00 %	0,00 %	0,00 %	4,39 %	94,53 %	0,00 %	0,00 %	17,96 %	76,57 %	0,00 %	55,45 %	530,69	0,12
NO	8,34 %	0,18 %	0,63 %	2,34 %	3,53 %	0,05 %	1,60 %	29,36 %	62,30 %	2,52 %	18,43 %	13,98 %	26,70 %	0,67 %	81,00 %	499,39	0,88
PL	15,55 %	0,01 %	0,11 %	9,10 %	1,65 %	0,00 %	4,69 %	0,45 %	84,00 %	1,83 %	29,27 %	46,60 %	4,89 %	1,41 %	99,59 %	834,55	0,01
PT	40,15 %	0,00 %	1,62 %	22,70 %	10,50 %	0,00 %	5,33 %	0,00 %	59,85 %	0,47 %	0,00 %	25,80 %	33,46 %	0,12 %	99,08 %	382,93	0,00
RO	39,37 %	0,03 %	3,01 %	11,92 %	23,76 %	0,00 %	0,64 %	18,63 %	42,00 %	8,76 %	22,77 %	2,72 %	7,73 %	0,02 %	100,00 %	424,74	3,35
SK	24,66 %	0,12 %	2,17 %	0,16 %	16,03 %	0,00 %	6,18 %	53,38 %	21,96 %	2,12 %	6,46 %	4,45 %	7,74 %	1,18 %	94,82 %	180,20	1,86
SI	9,73 %	0,87 %	1,19 %	3,35 %	2,20 %	1,44 %	0,68 %	50,30 %	39,97 %	1,62 %	35,69 %	0,95 %	1,67 %	0,05 %	86,42 %	447,33	1,36
ES	5,52 %	0,46 %	1,42 %	1,91 %	1,17 %	0,01 %	0,54 %	30,29 %	64,20 %	1,65 %	4,65 %	21,09 %	31,49 %	5,32 %	75,45 %	446,38	0,83
SE	32,55 %	0,54 %	1,27 %	5,00 %	15,73 %	0,00 %	10,01 %	62,64 %	4,81 %	3,72 %	0,00 %	0,78 %	0,00 %	0,30 %	13,80 %	26,04	1,69
CH	28,23 %	0,06 %	2,87 %	2,68 %	13,35 %	0,02 %	9,26 %	43,03 %	28,73 %	9,11 %	6,38 %	4,86 %	8,16 %	0,23 %	28,33 %	199,87	1,88

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

Note: CO₂ 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); ENTSO-E

Graphs with detailed calculations results

Figure 1: Residual Mixes 2017

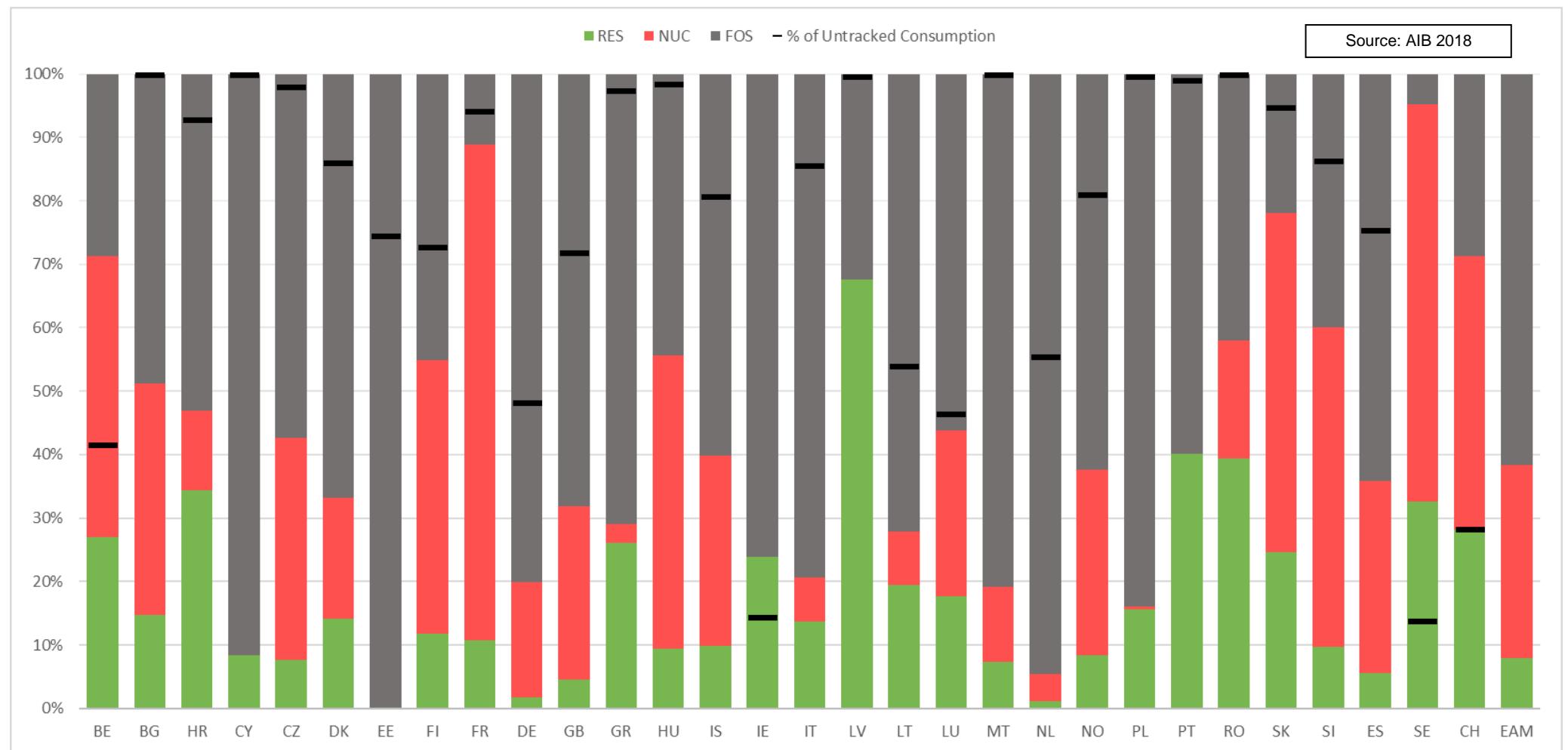


Figure 2: Residual Mixes 2017 (detailed fuel categories)

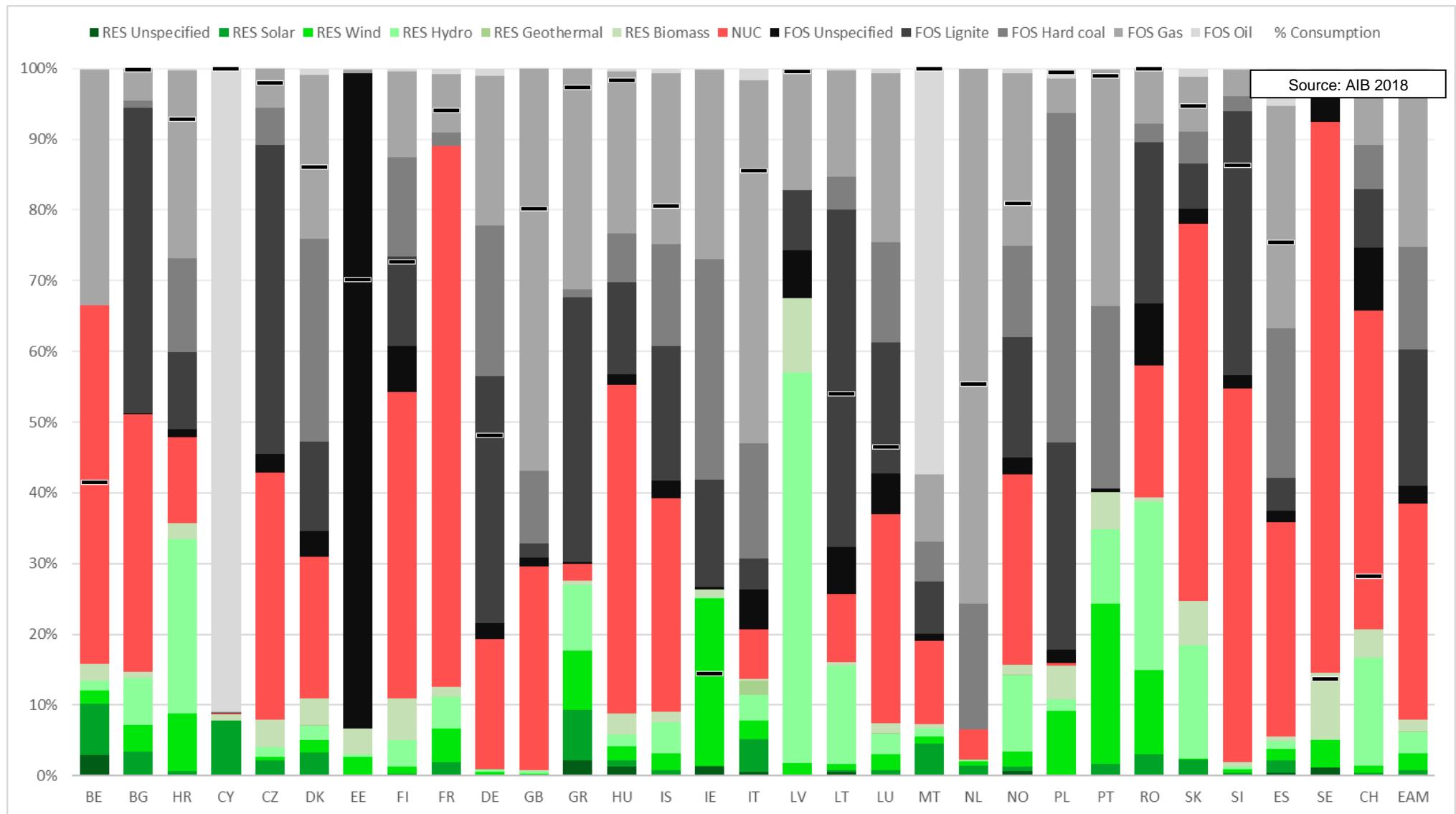
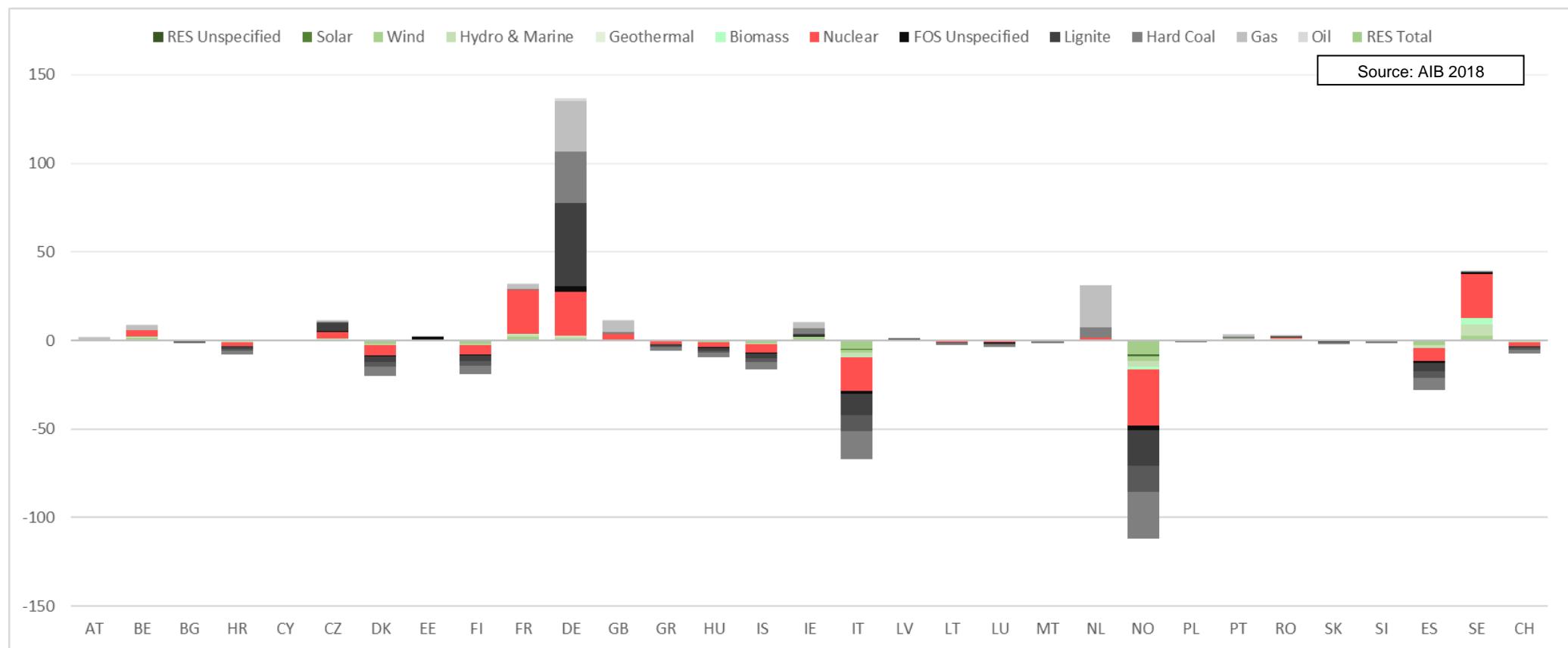


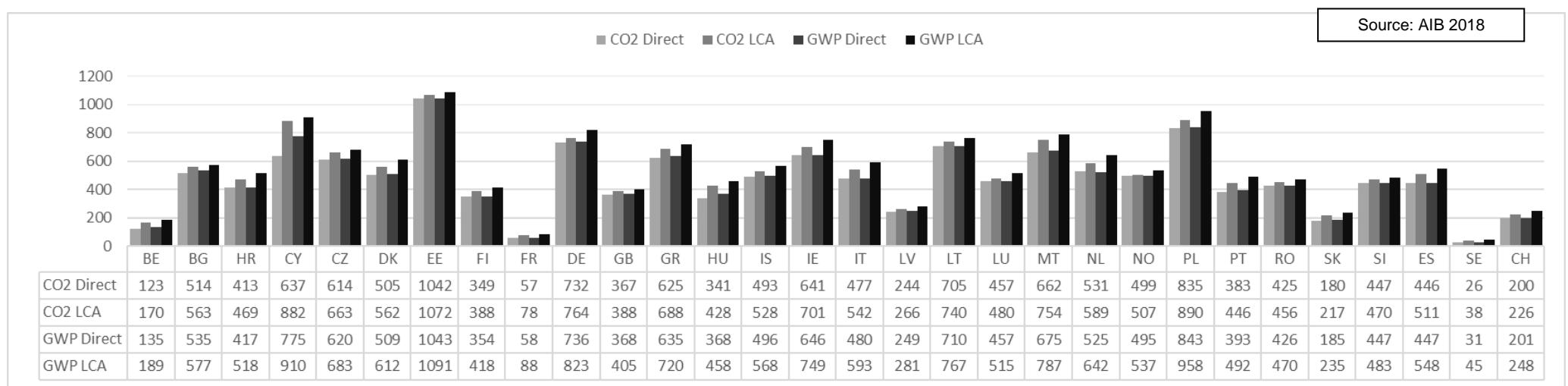
Figure 3: Attributes [TWh] to/from the European Attribute Mix 2017⁵

⁵ In this figure, the renewable energy added to the EAM does not equal the renewable energy taken out of it, which might seem peculiar. The reason for this is that some individual domains have negative renewable energy balance in domestic residual mixes (caused by previous production year GOs being used or exported). This negativity is transferred into the EAM

Table 3: Attributes [TWh] to/from the European Attribute Mix 2017⁶

	Renewables Total	Renewables Unspecified	Solar	Wind	Hydro & Marine	Geothermal	Biomass	Nuclear Total	Fossil Total	Fossil Unspecified	Lignite	Hard Coal	Gas	Oil
AT	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,52	0,12	0,00	0,23	1,07	0,10
BE	2,22	0,24	0,51	0,69	0,32	0,02	0,44	3,65	2,36	0,00	0,00	0,00	2,35	0,01
BG	-0,08	0,00	-0,01	-0,02	-0,03	0,00	-0,02	-0,31	-0,63	-0,03	-0,20	-0,15	-0,25	-0,01
HR	-0,54	-0,01	-0,05	-0,16	-0,21	0,00	-0,11	-2,11	-4,24	-0,18	-1,32	-1,01	-1,69	-0,05
CY	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
CZ	0,85	0,00	0,24	0,05	0,16	0,00	0,40	3,91	6,40	0,30	4,88	0,60	0,61	0,01
DK	-1,43	-0,03	-0,12	-0,43	-0,55	-0,01	-0,29	-5,57	-11,21	-0,48	-3,49	-2,66	-4,46	-0,13
EE	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,91	1,91	1,90	0,00	0,00	0,01	0,00
FI	-1,34	-0,03	-0,11	-0,41	-0,51	-0,01	-0,27	-5,21	-10,49	-0,45	-3,27	-2,49	-4,18	-0,12
FR	3,43	0,00	0,60	1,57	0,81	0,00	0,45	24,86	3,57	0,00	0,00	0,64	2,68	0,25
DE	2,46	0,14	0,00	0,64	1,50	0,18	0,00	24,81	109,32	3,17	47,22	28,94	28,52	1,47
GB	0,49	0,00	0,15	0,19	0,16	0,00	0,00	2,97	7,40	0,11	0,00	1,01	6,28	0,00
GR	-0,37	-0,01	-0,03	-0,11	-0,14	0,00	-0,08	-1,45	-2,92	-0,12	-0,91	-0,69	-1,16	-0,03
HU	-0,64	-0,02	-0,05	-0,20	-0,25	0,00	-0,13	-2,50	-5,04	-0,21	-1,57	-1,20	-2,01	-0,06
IS	-1,16	-0,03	-0,10	-0,35	-0,44	-0,01	-0,23	-4,49	-9,05	-0,38	-2,82	-2,15	-3,60	-0,10
IE	2,34	0,05	0,01	2,16	0,00	0,00	0,12	0,00	7,46	0,04	1,53	3,16	2,73	0,01
IT	-4,89	-0,11	-0,41	-1,48	-1,86	-0,03	-0,99	-18,98	-38,24	-1,62	-11,90	-9,06	-15,22	-0,43
LV	0,68	0,00	0,00	0,02	0,56	0,00	0,11	0,00	0,33	0,07	0,09	0,00	0,17	0,00
LT	-0,14	0,00	-0,01	-0,04	-0,05	0,00	-0,03	-0,55	-1,11	-0,05	-0,35	-0,26	-0,44	-0,01
LU	-0,22	-0,01	-0,02	-0,07	-0,08	0,00	-0,04	-0,85	-1,71	-0,07	-0,53	-0,41	-0,68	-0,02
MT	-0,06	0,00	-0,01	-0,02	-0,02	0,00	-0,01	-0,25	-0,50	-0,02	-0,16	-0,12	-0,20	-0,01
NL	0,33	0,00	0,20	0,13	0,00	0,00	0,00	1,36	29,32	0,00	0,00	5,57	23,75	0,00
NO	-8,15	-0,19	-0,69	-2,47	-3,11	-0,06	-1,65	-31,67	-63,79	-2,71	-19,86	-15,12	-25,39	-0,72
PL	-0,06	0,00	0,00	-0,02	-0,02	0,00	-0,01	-0,23	-0,46	-0,02	-0,14	-0,11	-0,18	-0,01
PT	1,26	0,00	0,05	0,71	0,33	0,00	0,17	0,00	1,88	0,01	0,00	0,81	1,05	0,00
RO	1,01	0,00	0,08	0,30	0,61	0,00	0,02	0,48	1,07	0,22	0,58	0,07	0,20	0,00
SK	-0,12	0,00	-0,01	-0,04	-0,05	0,00	-0,02	-0,47	-0,95	-0,04	-0,30	-0,23	-0,38	-0,01
SI	-0,06	0,00	-0,01	-0,02	-0,02	0,00	-0,01	-0,25	-0,49	-0,02	-0,15	-0,12	-0,20	-0,01
ES	-2,01	-0,05	-0,17	-0,61	-0,76	-0,01	-0,41	-7,80	-15,71	-0,67	-4,89	-3,72	-6,25	-0,18
SE	12,76	0,21	0,50	1,96	6,17	0,00	3,92	24,55	1,88	1,46	0,00	0,31	0,00	0,12
CH	-0,50	-0,01	-0,04	-0,15	-0,19	0,00	-0,10	-1,95	-3,92	-0,17	-1,22	-0,93	-1,56	-0,04

⁶ Same as in previous figure 5, the renewable energy added to the EAM does not equal the renewable energy taken out of it, which might seem peculiar. The reason for this is that some individual domains have negative renewable energy balance in domestic residual mixes (caused by previous production year GOs being used or exported). This negativity is transferred into the EAM

Figure 4: CO₂ content in Final Residual Mixes 2017 [gCO₂(e)/kWh]

CO₂ Direct = Direct onsite CO₂ emissions [gCO₂/kWh].

CO₂ LCA = Life Cycle Assessment CO₂ emissions gCO₂/kWh].

GWP Direct = Direct onsite Global Warming Potential emissions gCO₂e/kWh].

GWP LCA = Life Cycle Assessment Global Warming Potential emissions gCO₂e/kWh].

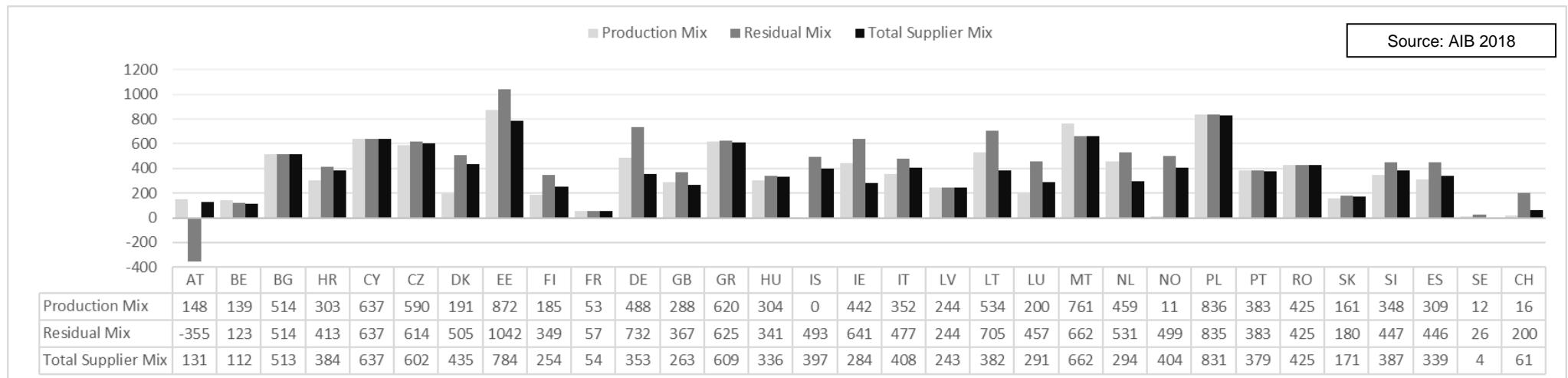
Figure 5: Direct CO₂ emissions for Production Mix, Residual Mix, and Total Supplier Mix 2017 [gCO₂/kWh]

Figure 6: High-level radioactive waste (RW) content in the Production Mix (PM), the Residual Mix (RM) and the Total Supplier Mix (TSM) 2017 [mgRW/kWh]

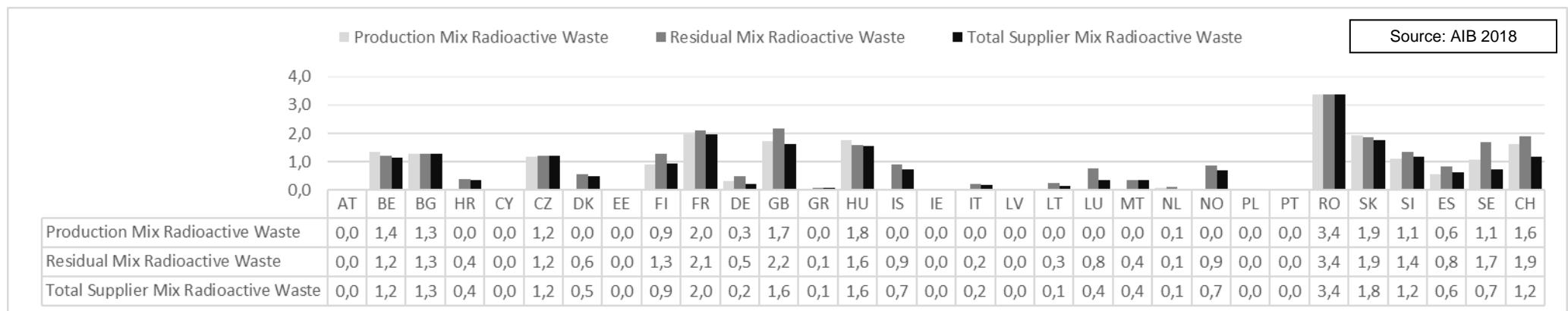


Table 4: Total Supplier Mix 2017

	Volume (TWh)	Renewables Total	Renewables Unspecified	Solar	Wind	Hydro & Marine	Geothermal	Biomass	Nuclear Total	Fossil Total	Fossil Unspecified	Lignite	Hard Coal	Gas	Oil	Direct CO2 (gCO2/kWh)	RW (mgRW/kWh)
AT	72,80	75,84 %	8,70 %	0,05 %	7,81 %	58,79 %	0,00 %	0,50 %	0,00 %	24,16 %	6,76 %	0,00 %	2,10 %	14,36 %	0,93 %	131	0,00
BE	85,22	32,02 %	1,39 %	2,97 %	7,08 %	13,35 %	0,35 %	6,89 %	42,69 %	25,29 %	12,45 %	0,00 %	0,00 %	12,80 %	0,03 %	112	1,15
BG	34,67	14,75 %	0,01 %	3,41 %	3,80 %	6,71 %	0,00 %	0,82 %	36,44 %	48,81 %	0,08 %	43,16 %	1,09 %	4,46 %	0,02 %	513	1,27
HR	17,92	38,96 %	0,16 %	0,50 %	7,59 %	28,48 %	0,02 %	2,21 %	11,76 %	49,28 %	1,01 %	10,41 %	12,59 %	25,01 %	0,27 %	384	0,35
CY	4,73	8,35%	0.00%	3.11%	4.46%	0.00%	0.00%	0.77%	0.00%	91.65%	0.00%	0.00%	0.00%	0.00%	91.65%	637	0.00
CZ	66,69	9,44 %	0,00 %	2,11 %	0,48 %	2,35 %	0,00 %	4,49 %	34,31 %	56,25 %	2,68 %	42,90 %	5,27 %	5,35 %	0,06 %	602	1,20
DK	34,02	26,11 %	0,10 %	3,41 %	15,87 %	4,51 %	0,03 %	2,20 %	16,36 %	57,52 %	3,04 %	10,26 %	24,26 %	19,18 %	0,78 %	435	0,49
EE	8,50	24,83 %	1,72 %	3,69 %	2,29 %	7,26 %	0,00 %	9,86 %	0,00 %	75,17 %	74,70 %	0,00 %	0,00 %	0,38 %	0,09 %	784	0,00
FI	85,48	35,89 %	0,04 %	0,26 %	3,55 %	21,51 %	0,01 %	10,52 %	31,33 %	32,78 %	4,69 %	8,99 %	10,09 %	8,67 %	0,33 %	254	0,94
FR	482,00	16,00 %	0,00 %	1,81 %	4,74 %	7,92 %	0,00 %	1,54 %	73,46 %	10,54 %	0,00 %	0,00 %	1,88 %	7,92 %	0,74 %	54	1,98
DE	540,56	52,66 %	0,31 %	6,82 %	19,53 %	17,28 %	0,50 %	8,22 %	8,76 %	38,59 %	1,12 %	16,67 %	10,21 %	10,07 %	0,52 %	353	0,24
GB	318,85	30,59 %	0,01 %	6,33 %	15,19 %	2,25 %	0,00 %	6,81 %	20,46 %	48,95 %	0,71 %	0,00 %	6,71 %	41,52 %	0,01 %	263	1,61
GR	51,93	28,06 %	2,17 %	6,94 %	9,12 %	9,16 %	0,01 %	0,66 %	2,79 %	69,15 %	0,24 %	36,76 %	1,33 %	30,75 %	0,06 %	609	0,08
HU	43,53	10,83 %	1,26 %	0,90 %	2,11 %	3,30 %	0,01 %	3,25 %	45,54 %	43,63 %	1,41 %	12,74 %	6,71 %	22,41 %	0,37 %	336	1,57
IS	18,65	27,33 %	0,15 %	0,52 %	1,92 %	14,97 %	8,52 %	1,25 %	24,10 %	48,57 %	2,06 %	15,12 %	11,51 %	19,32 %	0,56 %	397	0,72
IE	36,96	47,56 %	0,51 %	1,65 %	36,73 %	5,56 %	0,54 %	2,57 %	0,00 %	52,44 %	0,06 %	2,25 %	4,66 %	45,40 %	0,07 %	284	0,00
IT	321,35	26,18 %	0,47 %	4,28 %	2,87 %	12,95 %	2,02 %	3,58 %	5,91 %	67,91 %	4,88 %	3,70 %	13,90 %	44,01 %	1,42 %	408	0,18
LV	7,28	67,68 %	0,00 %	0,00 %	1,84 %	55,26 %	0,00 %	10,58 %	0,00 %	32,32 %	6,71 %	8,46 %	0,00 %	17,15 %	0,00 %	243	0,00
LT	11,97	56,27 %	0,50 %	3,18 %	16,42 %	22,23 %	0,01 %	13,92 %	4,60 %	39,13 %	3,72 %	25,44 %	2,19 %	7,67 %	0,10 %	382	0,14
LU	6,99	45,90 %	0,09 %	1,98 %	8,37 %	31,69 %	0,02 %	3,74 %	12,16 %	41,94 %	15,07 %	7,63 %	5,81 %	13,16 %	0,28 %	291	0,37
MT	2,10	7,32 %	0,07 %	4,54 %	0,92 %	1,16 %	0,02 %	0,61 %	11,79 %	80,89 %	1,01 %	7,39 %	5,63 %	9,45 %	57,41 %	662	0,35
NL	115,02	45,15 %	0,08 %	1,33 %	25,32 %	13,52 %	0,14 %	4,76 %	2,43 %	52,42 %	0,00 %	0,00 %	9,96 %	42,46 %	0,00 %	294	0,07
NO	133,46	25,76 %	0,14 %	0,69 %	2,13 %	21,15 %	0,19 %	1,45 %	23,78 %	50,46 %	2,04 %	14,93 %	11,33 %	21,63 %	0,54 %	404	0,71
PL	159,55	15,90 %	0,01 %	0,12 %	9,18 %	1,80 %	0,03 %	4,75 %	0,44 %	83,66 %	1,82 %	29,15 %	46,41 %	4,87 %	1,41 %	831	0,01
PT	50,06	40,70 %	0,00 %	1,60 %	22,70 %	11,11 %	0,00 %	5,28 %	0,00 %	59,30 %	0,47 %	0,00 %	25,56 %	33,15 %	0,12 %	379	0,00
RO	56,93	39,37 %	0,03 %	3,01 %	11,92 %	23,76 %	0,00 %	0,64 %	18,63 %	42,00 %	8,76 %	22,77 %	2,72 %	7,73 %	0,02 %	425	3,35
SK	28,67	28,57 %	0,11 %	2,06 %	0,20 %	20,34 %	0,00 %	5,86 %	50,61 %	20,82 %	2,01 %	6,12 %	4,22 %	7,34 %	1,12 %	171	1,76
SI	14,29	21,98 %	0,75 %	1,79 %	3,33 %	13,54 %	1,24 %	1,33 %	43,47 %	34,54 %	1,40 %	30,84 %	0,82 %	1,44 %	0,04 %	387	1,18
ES	269,57	28,13 %	0,35 %	5,12 %	15,74 %	5,44 %	0,01 %	1,47 %	22,85 %	49,01 %	1,27 %	3,50 %	15,91 %	24,32 %	4,01 %	339	0,63
SE	140,09	71,73 %	0,62 %	0,49 %	9,04 %	53,02 %	0,00 %	8,55 %	27,45 %	0,82 %	0,66 %	0,00 %	0,11 %	0,00 %	0,04 %	4	0,74
CH	67,52	65,25 %	0,04 %	1,69 %	1,10 %	59,13 %	0,01 %	3,28 %	25,61 %	9,14 %	3,16 %	1,81 %	1,38 %	2,73 %	0,07 %	61	1,18

Figure 7: Total Supplier Mix 2017

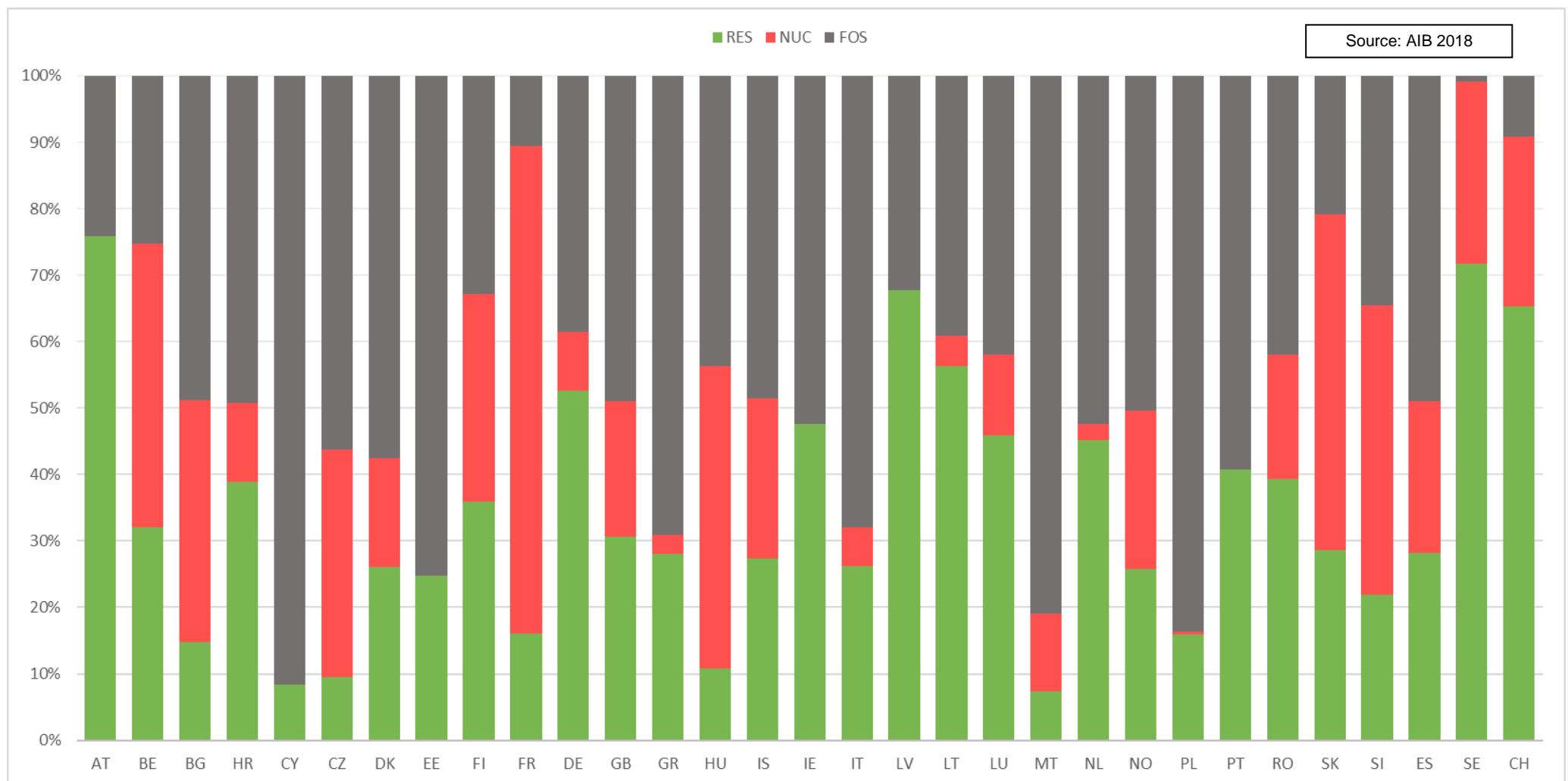


Figure 8: Total Supplier Mix 2017 (detailed fuel categories)

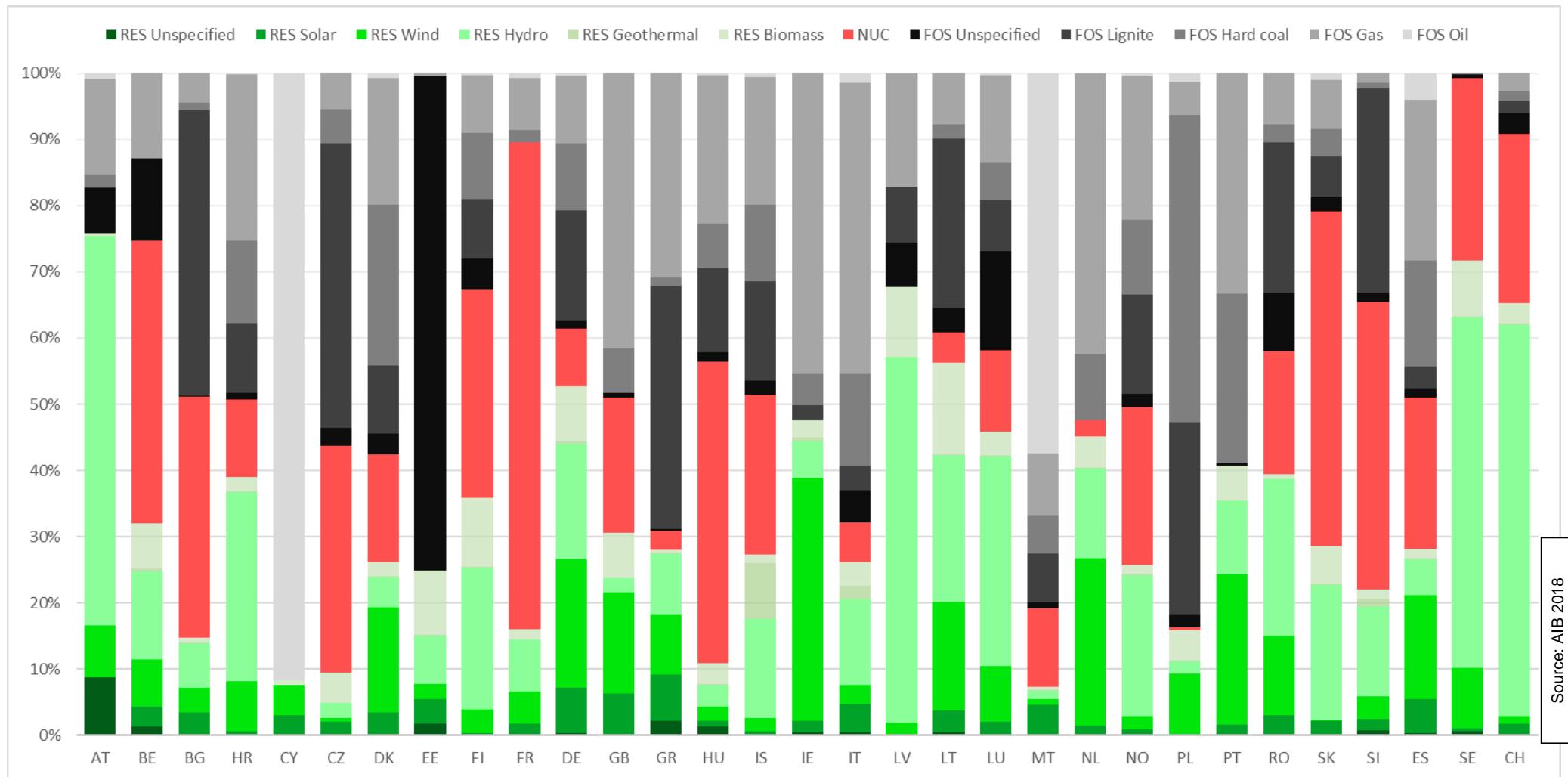


Table 5: Production Mix 2017

	Volume (TWh)	Renewables Total	Renewables Unspecified	Solar	Wind	Hydro & Marine	Geothermal	Biomass	Nuclear Total	Fossil Total	Fossil Unspecified	Lignite	Hard Coal	Gas	Oil	Direct CO ₂ (gCO ₂ /kWh)	RW (mgRW /kWh)
AT	66,28	72,87 %	10,92 %	0,00 %	9,84 %	52,11 %	0,00 %	0,00 %	0,00 %	27,13 %	7,01 %	0,00 %	2,65 %	16,30 %	1,18 %	148	0,00
BE	79,20	18,16 %	1,39 %	3,65 %	7,81 %	0,30 %	0,00 %	5,01 %	50,55 %	31,29 %	4,34 %	0,00 %	0,00 %	26,89 %	0,07 %	139	1,36
BG	40,16	14,89 %	0,00 %	3,50 %	3,77 %	6,82 %	0,00 %	0,79 %	36,65 %	48,46 %	0,00 %	43,93 %	0,68 %	3,85 %	0,00 %	514	1,28
HR	10,54	61,67 %	0,13 %	0,42 %	11,34 %	47,21 %	0,00 %	2,57 %	0,00 %	38,33 %	0,00 %	0,00 %	11,85 %	26,47 %	0,00 %	303	0,00
CY	4,73	8,35 %	0,00 %	3,11 %	4,46 %	0,00 %	0,00 %	0,77 %	0,00 %	91,65 %	0,00 %	0,00 %	0,00 %	0,00 %	91,65 %	637	0,00
CZ	79,73	11,31 %	0,00 %	2,65 %	0,73 %	2,31 %	0,00 %	5,62 %	33,60 %	55,09 %	2,62 %	42,01 %	5,16 %	5,23 %	0,06 %	590	1,18
DK	29,45	71,62 %	0,00 %	2,68 %	50,17 %	0,06 %	0,00 %	18,71 %	0,00 %	28,38 %	1,90 %	0,00 %	19,00 %	7,00 %	0,47 %	191	0,00
EE	11,23	14,43 %	0,00 %	0,04 %	5,96 %	0,26 %	0,00 %	8,16 %	0,00 %	85,57 %	85,04 %	0,00 %	0,00 %	0,44 %	0,10 %	872	0,00
FI	65,05	46,74 %	0,00 %	0,03 %	7,38 %	22,51 %	0,00 %	16,82 %	33,17 %	20,10 %	5,48 %	0,00 %	9,44 %	4,93 %	0,25 %	185	0,91
FR	522,30	17,00 %	0,00 %	1,76 %	4,60 %	9,30 %	0,00 %	1,34 %	72,58 %	10,42 %	0,00 %	0,00 %	1,86 %	7,83 %	0,73 %	53	1,96
DE	595,91	34,55 %	1,13 %	5,96 %	17,35 %	3,27 %	0,03 %	6,81 %	12,11 %	53,35 %	1,55 %	23,04 %	14,12 %	13,92 %	0,72 %	488	0,33
GB	305,46	24,99 %	0,00 %	3,42 %	13,49 %	2,45 %	0,00 %	5,63 %	21,48 %	53,52 %	0,78 %	0,00 %	7,33 %	45,40 %	0,01 %	288	1,72
GR	45,69	30,43 %	2,55 %	8,14 %	10,46 %	8,68 %	0,00 %	0,61 %	0,00 %	69,57 %	0,00 %	35,87 %	0,00 %	33,70 %	0,00 %	620	0,00
HU	30,66	10,04 %	1,60 %	1,12 %	2,40 %	0,70 %	0,00 %	4,22 %	49,62 %	40,33 %	1,33 %	13,26 %	0,58 %	24,92 %	0,25 %	304	1,76
IS	18,65	99,99 %	0,00 %	0,00 %	0,04 %	74,48 %	25,47 %	0,00 %	0,00 %	0,01 %	0,00 %	0,00 %	0,00 %	0,00 %	0,01 %	0	0,00
IE	37,95	29,27 %	0,87 %	0,03 %	25,98 %	1,85 %	0,00 %	0,55 %	0,00 %	70,73 %	0,18 %	6,21 %	12,86 %	51,39 %	0,09 %	442	0,00
IT	283,59	36,53 %	0,86 %	8,75 %	6,17 %	12,69 %	2,04 %	6,02 %	0,00 %	63,47 %	4,95 %	0,00 %	12,56 %	44,50 %	1,46 %	352	0,00
LV	7,34	73,13 %	0,00 %	0,00 %	2,01 %	59,28 %	0,00 %	11,84 %	0,00 %	26,87 %	7,57 %	0,00 %	0,00 %	19,30 %	0,00 %	244	0,00
LT	3,29	74,42 %	2,28 %	2,07 %	41,20 %	17,41 %	0,00 %	11,46 %	0,00 %	25,58 %	11,49 %	0,00 %	0,00 %	14,10 %	0,00 %	534	0,00
LU	0,81	57,75 %	0,00 %	12,89 %	28,95 %	9,14 %	0,00 %	6,77 %	0,00 %	42,25 %	12,89 %	0,00 %	0,00 %	29,36 %	0,00 %	200	0,00
MT	1,29	6,98 %	0,00 %	6,98 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	93,02 %	0,00 %	0,00 %	0,00 %	0,00 %	93,02 %	761	0,00
NL	111,51	14,73 %	0,00 %	1,67 %	9,82 %	0,06 %	0,00 %	3,19 %	3,73 %	81,53 %	0,00 %	0,00 %	15,49 %	66,04 %	0,00 %	459	0,10
NO	148,63	97,92 %	0,47 %	0,00 %	1,83 %	95,62 %	0,00 %	0,00 %	0,00 %	2,08 %	0,01 %	0,00 %	0,00 %	2,07 %	0,00 %	11	0,00
PL	157,26	15,65 %	0,00 %	0,10 %	9,19 %	1,62 %	0,00 %	4,73 %	0,00 %	84,35 %	1,84 %	29,48 %	46,82 %	4,79 %	1,42 %	836	0,01
PT	52,74	40,15 %	0,00 %	1,62 %	22,70 %	10,50 %	0,00 %	5,33 %	0,00 %	59,85 %	0,47 %	0,00 %	25,80 %	33,46 %	0,12 %	383	0,00
RO	59,82	40,32 %	0,00 %	3,09 %	12,26 %	24,31 %	0,00 %	0,66 %	17,65 %	42,03 %	9,01 %	23,41 %	1,84 %	7,78 %	0,00 %	425	3,35
SK	25,64	25,67 %	0,12 %	2,27 %	0,02 %	16,82 %	0,00 %	6,45 %	54,75 %	19,57 %	2,09 %	5,69 %	3,84 %	6,73 %	1,21 %	161	1,92
SI	14,71	29,26 %	0,72 %	1,70 %	0,04 %	25,67 %	0,00 %	1,14 %	40,55 %	30,19 %	1,22 %	28,91 %	0,00 %	0,06 %	0,00 %	348	1,09
ES	260,40	32,45 %	0,35 %	5,27 %	18,39 %	7,05 %	0,00 %	1,38 %	21,36 %	46,19 %	1,09 %	1,81 %	15,55 %	23,52 %	4,22 %	309	0,57
SE	159,08	58,18 %	0,81 %	0,00 %	10,86 %	40,17 %	0,00 %	6,34 %	39,61 %	2,21 %	1,56 %	0,00 %	0,29 %	0,25 %	0,11 %	12	1,07
CH	57,33	62,09 %	0,00 %	1,83 %	0,23 %	56,70 %	0,00 %	3,32 %	34,01 %	3,90 %	3,90 %	0,00 %	0,00 %	0,00 %	0,00 %	16	1,63

Figure 9: Production Mix (left) and Final Residual Mix (right) 2017

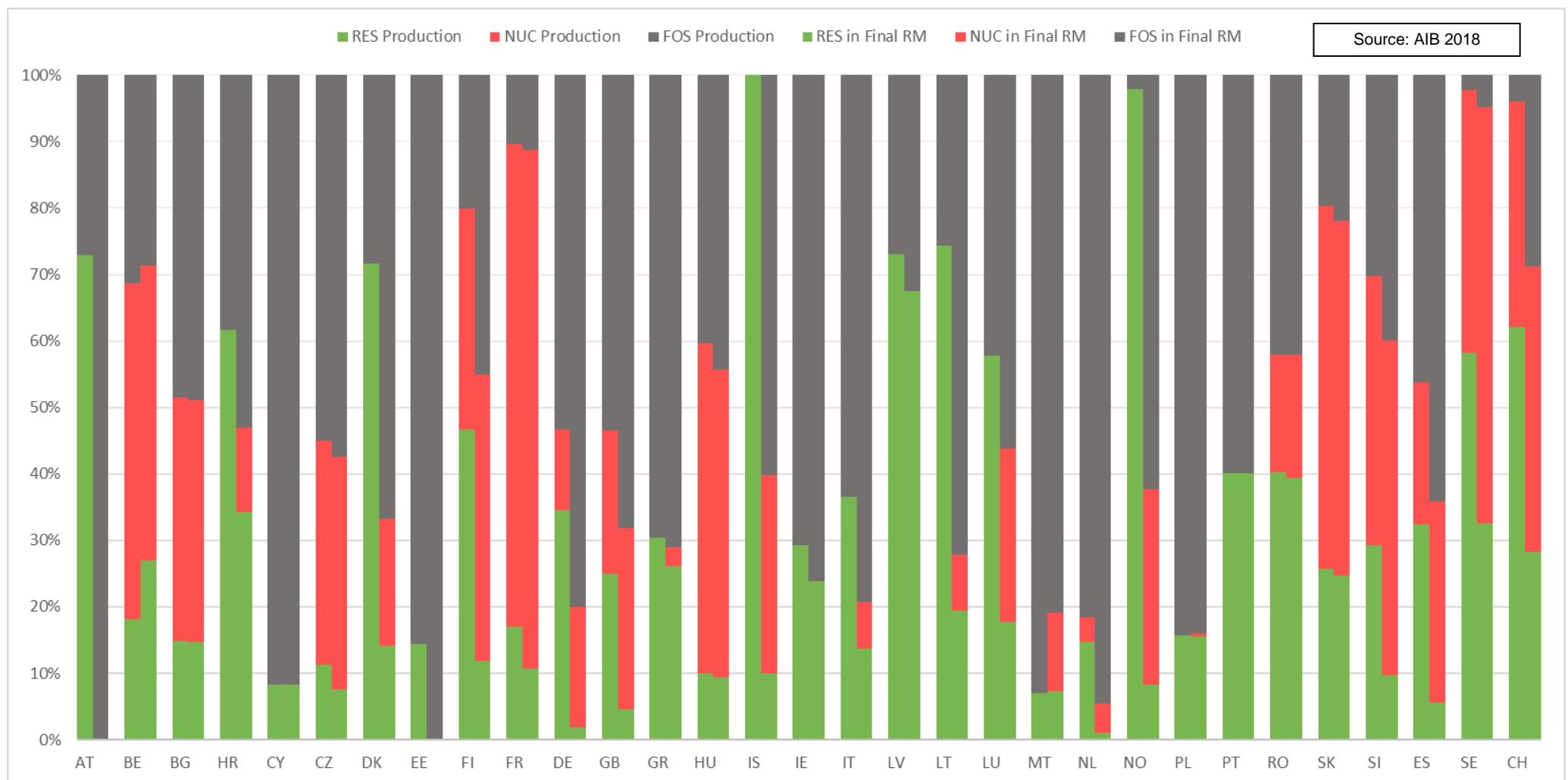


Figure 10: Production Mix (left) and Final Residual Mix (right) 2017 (detailed fuel categories)

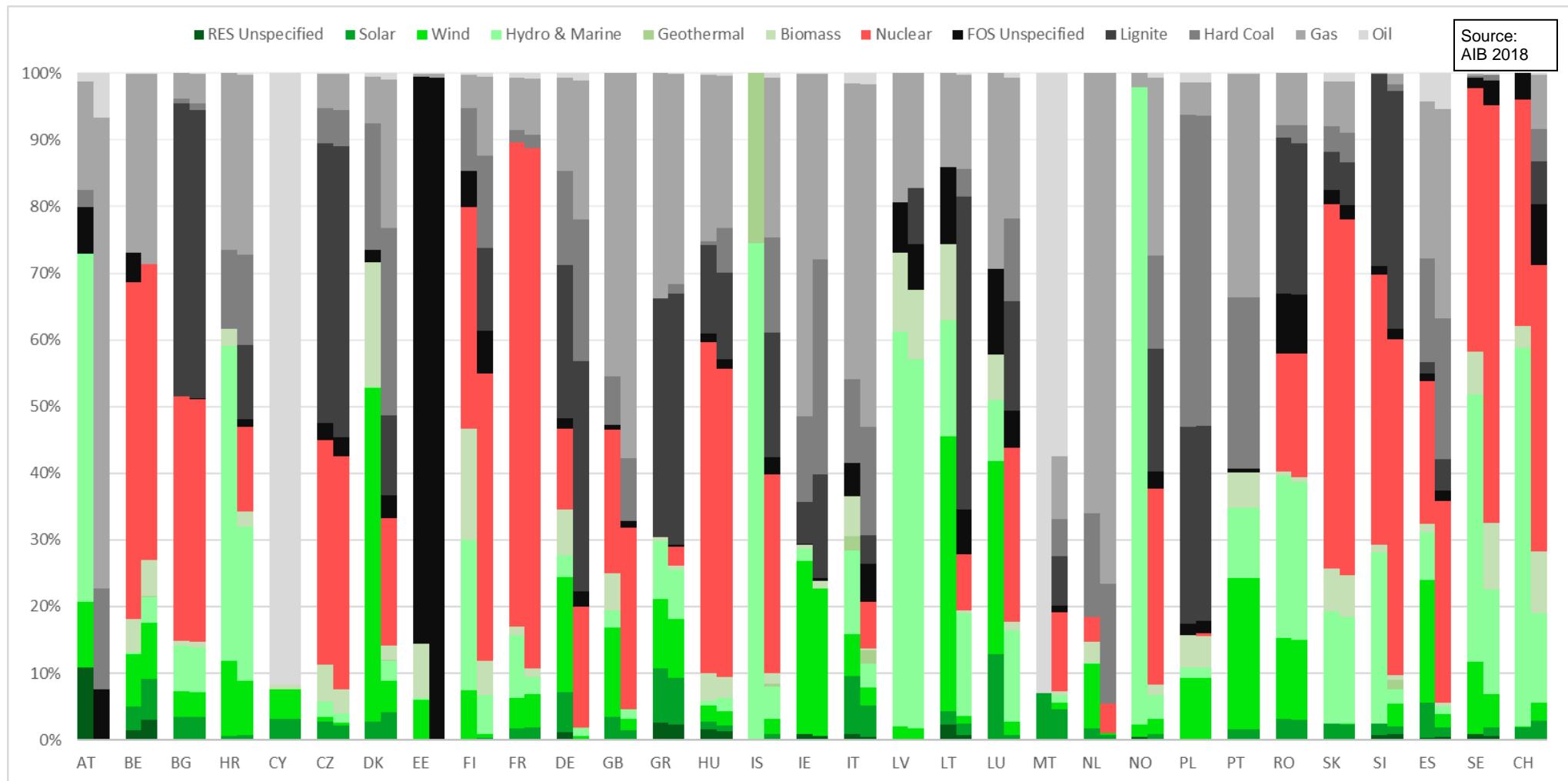


Figure 11: European Total Production Mix (left), Total of all available attributes in Final Residual Mixes (middle) and EAM (right) 2017

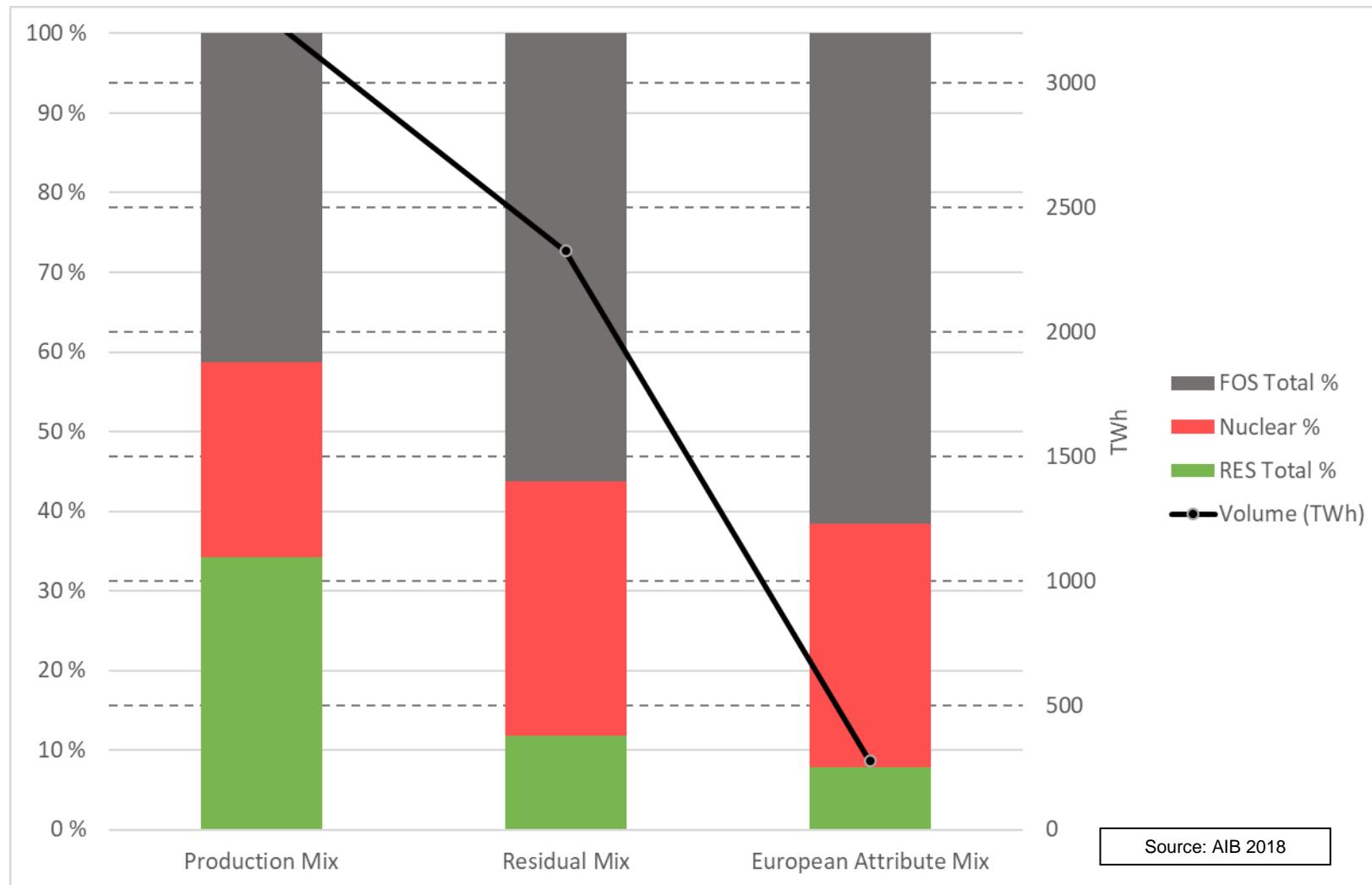


Figure 12: European Total Production Mix (left), Total of all available attributes in Final Residual Mixes (middle) and EAM (right) 2017 (detailed fuel categories)

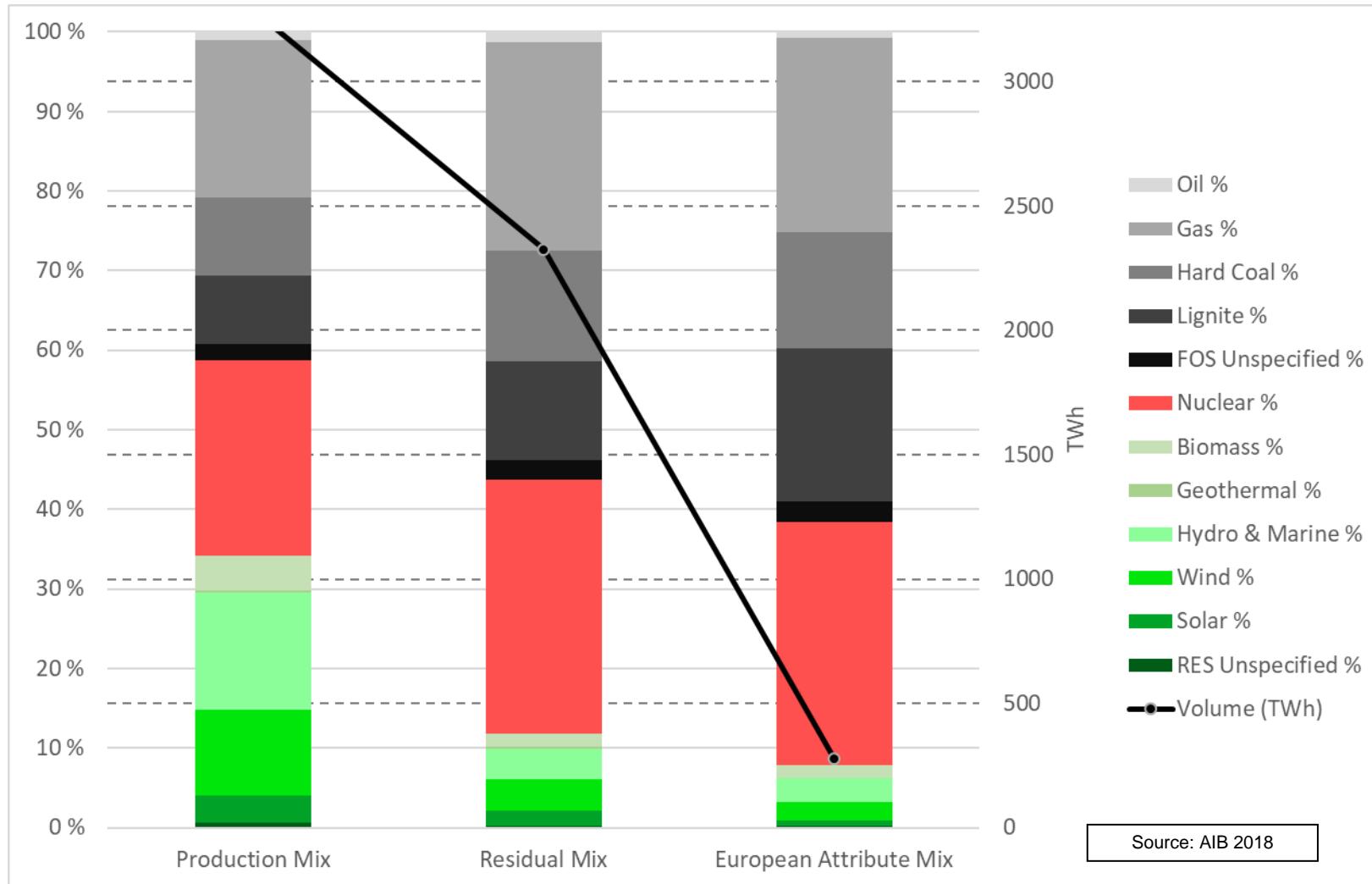


Table 6: European Total Production Mix, Total of all available attributes in Final Residual Mixes and EAM 2017 (detailed fuel categories)

	Production Mix	Residual Mix	European Attribute Mix
Volume (TWh)	3286.44	2324.82	276.90
RES Total %	34.17%	11.77%	7.87%
RES Unspecified %	0.69%	0.26%	0.18%
Solar %	3.41%	1.87%	0.66%
Wind %	10.72%	3.91%	2.38%
Hydro & Marine %	14.67%	3.84%	3.00%
Geothermal %	0.33%	0.26%	0.05%
Biomass %	4.35%	1.62%	1.59%
Nuclear %	24.59%	32.03%	30.56%
FOS Total %	41.25%	56.20%	61.57%
FOS Unspecified %	2.06%	2.45%	2.61%
Lignite %	8.58%	12.37%	19.17%
Hard Coal %	9.85%	13.85%	14.59%
Gas %	19.75%	26.17%	24.50%
Oil %	1.00%	1.37%	0.70%

Figure 13: Production Mix (left) and Total Supplier Mix (right) 2017



Source:
AIB 2018

Figure 14: Production Mix (left) and Total Supplier Mix (right) 2017 (detailed fuel categories)

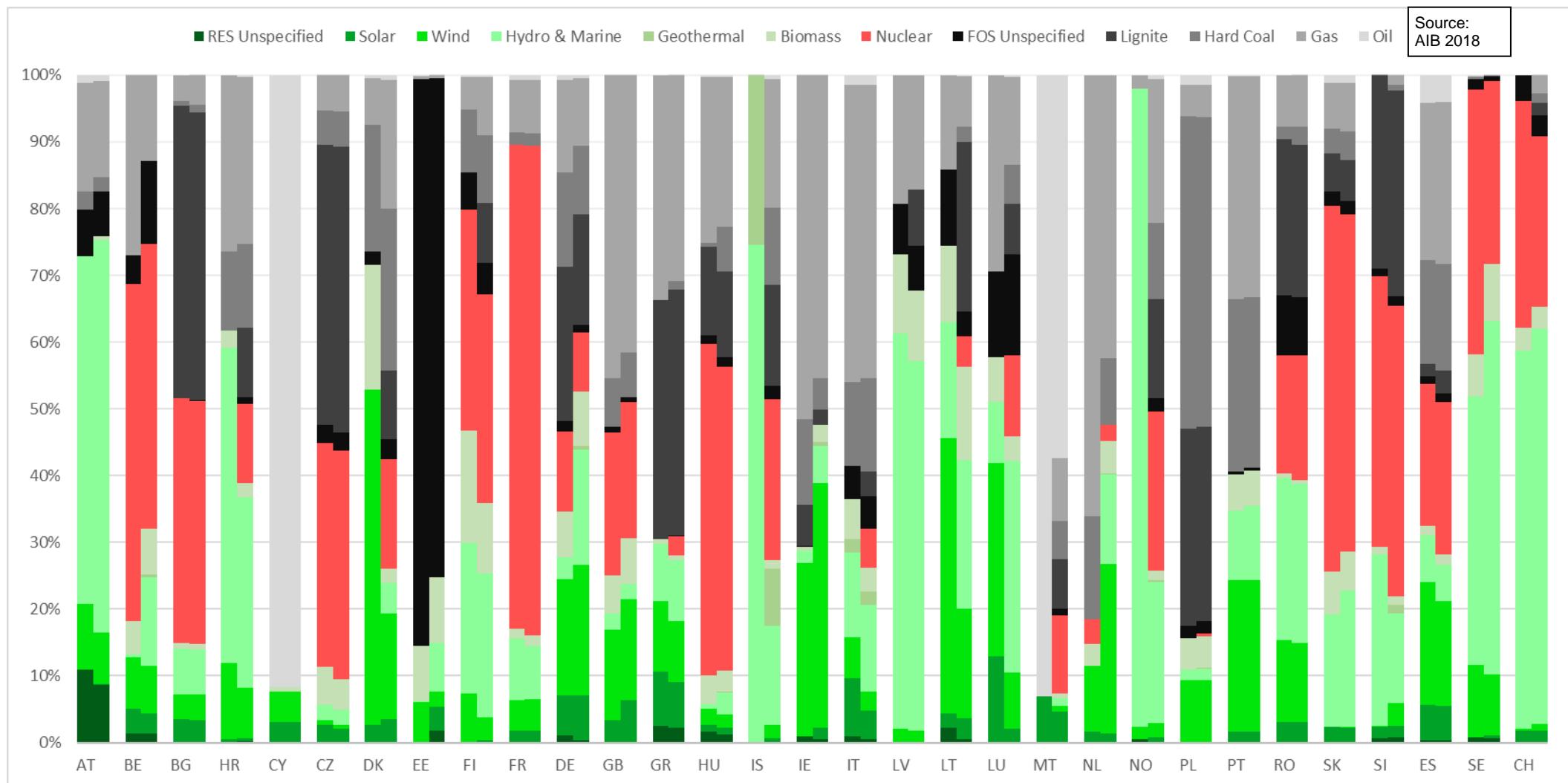


Figure 15: Production Mix (left) and Total Supplier Mix (right) [TWh] 2017

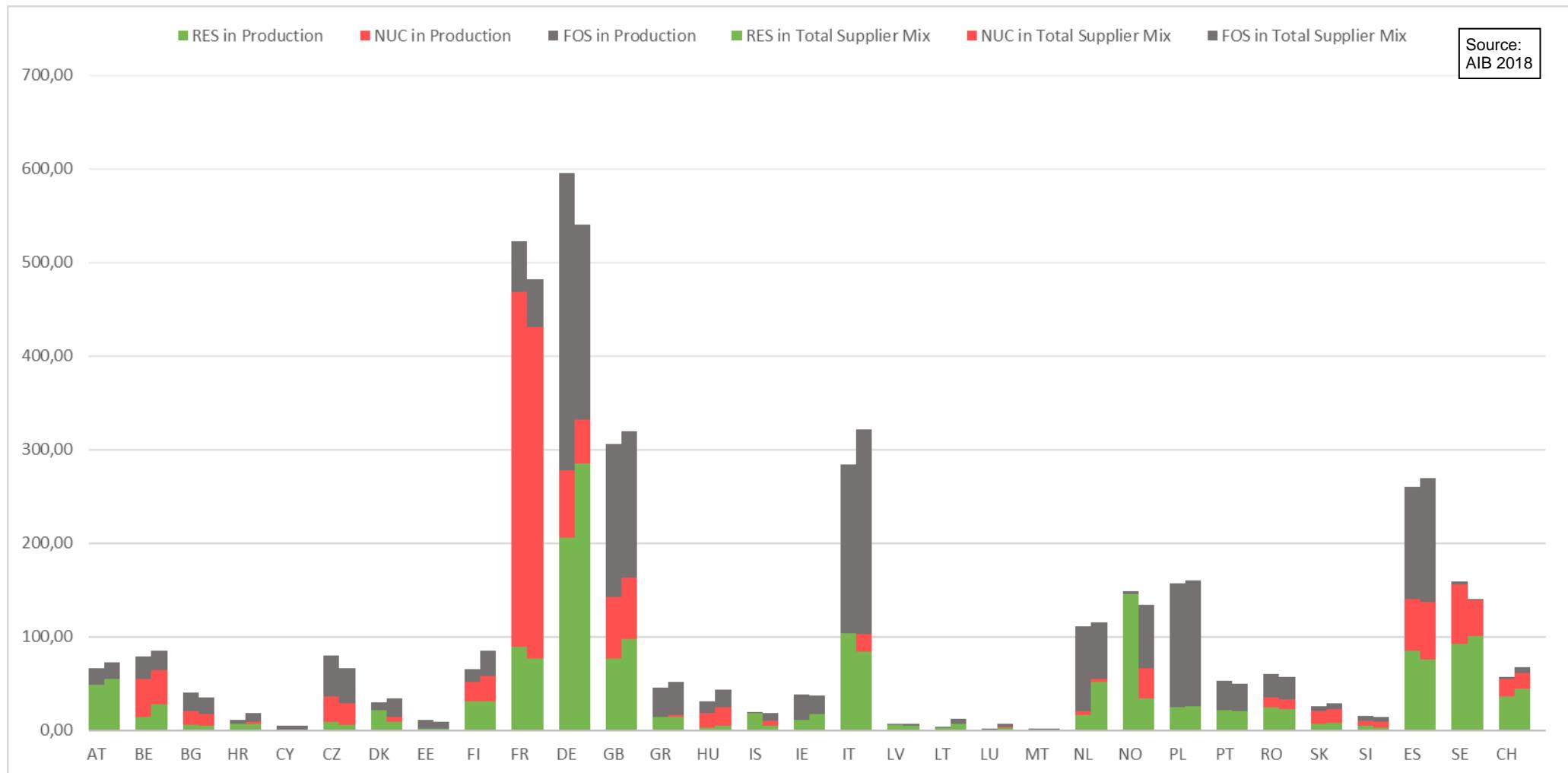


Figure 16: Production Mix (left) and Total Supplier Mix (right) [TWh] 2017 (detailed fuel categories)

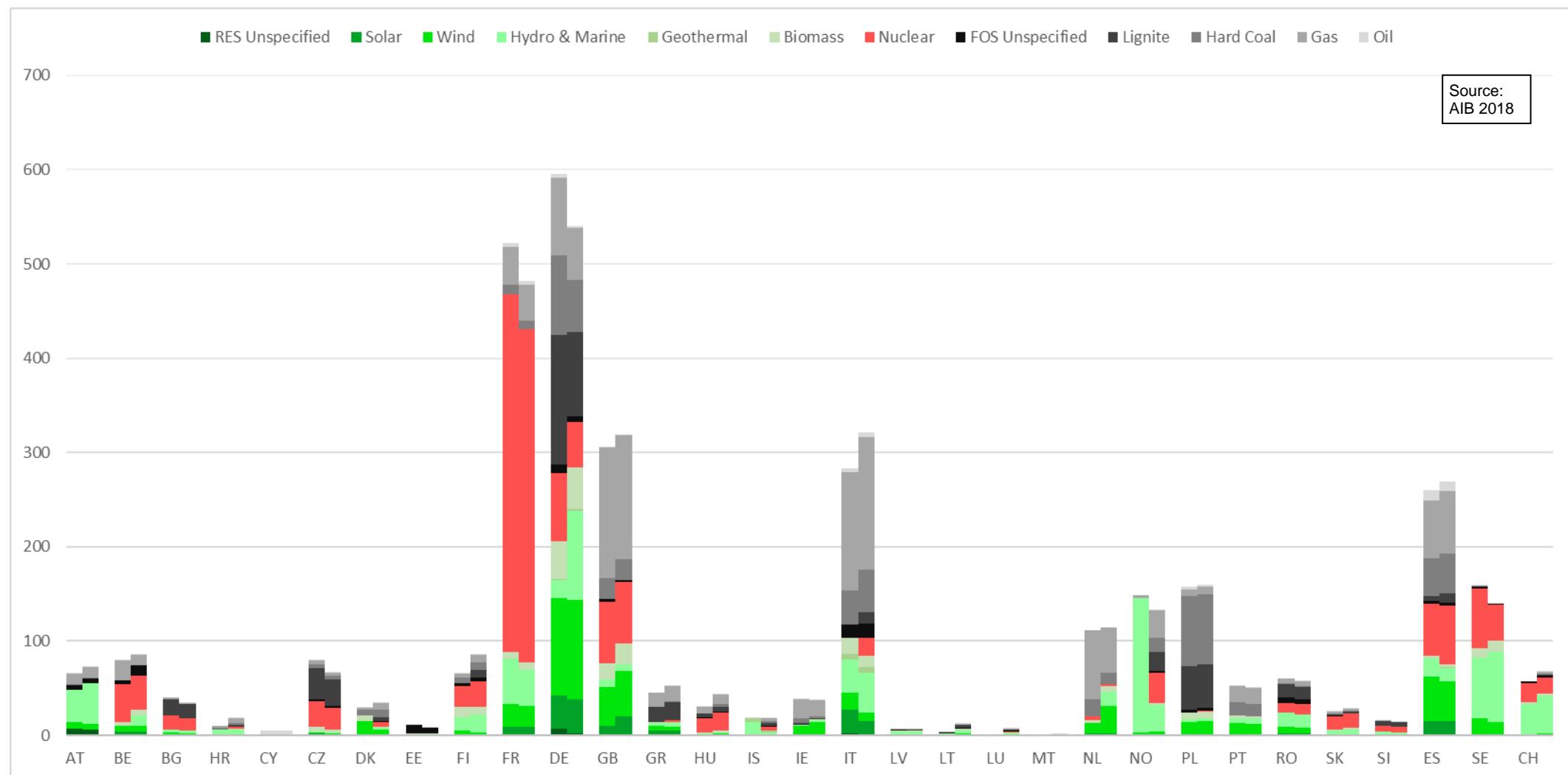


Figure 17: Residual Mixes 2015, 2016 and 2017

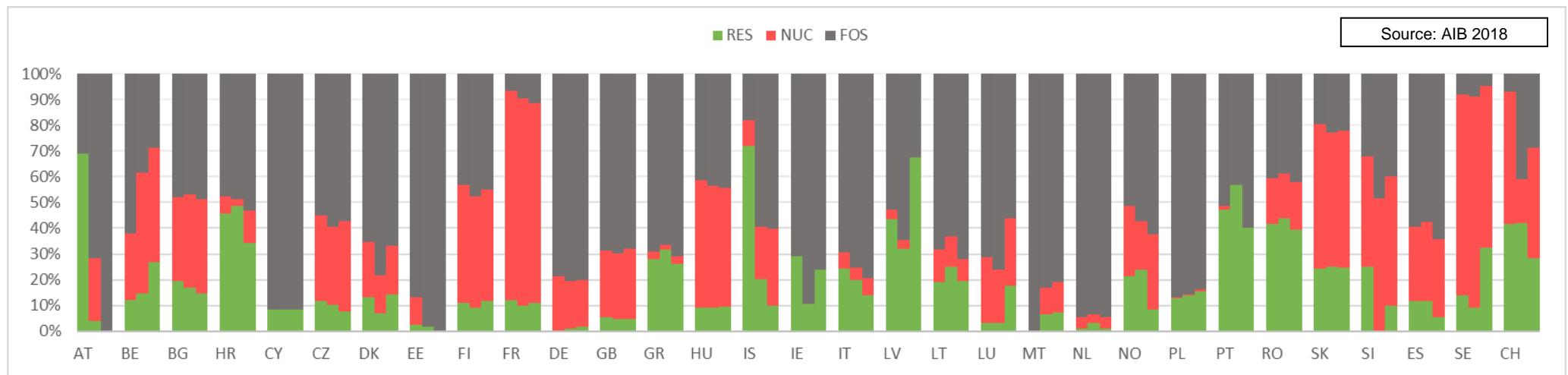


Table 7: Residual Mixes 2015, 2016 and 2017 (Percentages)

	AT	BE	BG	HR	CY	CZ	DK	EE	FI	FR	DE	GB	GR	HU	IS	IE	IT	LV	LT	LU	MT	NL	NO	PL	PT	RO	SK	SI	ES	SE	CH	
2015	RES	69,2	11,9	19,6	45,7	8,5	11,8	13,2	2,5	10,8	11,9	0,0	5,4	27,9	9,2	71,9	29,2	24,1	43,6	19,0	3,0	0,0	1,1	21,3	12,9	47,2	41,8	24,3	24,9	11,8	13,9	41,8
	NUC	0,0	26,0	32,5	6,7	0,0	33,1	21,3	10,8	46,2	81,4	21,4	26,0	3,1	49,4	10,3	0,0	6,3	3,7	12,5	25,8	0,0	4,4	27,6	0,1	1,6	17,6	56,1	42,9	28,8	78,1	51,3
	FOS	30,8	62,1	47,9	47,6	91,5	55,1	65,5	86,7	43,0	6,7	78,6	68,6	68,9	41,3	17,9	70,8	69,6	52,7	68,5	71,2	100,0	94,5	51,1	87,0	51,2	40,6	19,6	32,2	59,4	7,9	6,9
2016	RES	3,8	14,8	16,7	48,6	8,3	10,1	6,9	1,5	9,0	9,9	0,8	4,6	31,5	9,1	20,0	10,7	48,6	32,1	25,1	3,2	6,4	3,2	23,9	14,0	56,8	43,8	25,0	0,4	11,6	9,2	42,0
	NUC	24,7	46,8	36,5	2,6	0,1	30,4	14,9	0,1	43,6	80,5	18,8	25,7	2,2	47,2	20,5	0,0	2,6	3,2	11,7	20,7	10,6	3,1	18,9	0,4	0,0	17,5	52,3	51,1	30,7	81,9	17,0
	FOS	71,5	38,4	46,8	48,9	91,6	59,5	78,2	98,3	47,4	9,6	80,4	69,6	66,3	43,7	59,4	89,3	48,9	64,6	63,2	76,1	83,0	93,6	57,3	85,6	43,2	38,7	22,7	48,5	57,7	8,9	41,0
2017	RES	0,0	26,9	14,7	34,3	8,3	7,6	14,2	0,0	11,9	10,8	1,8	4,5	26,2	9,4	9,9	23,9	13,8	67,6	19,4	17,8	7,3	1,1	8,3	15,6	40,2	39,4	24,7	9,7	5,5	32,6	28,2
	NUC	0,0	44,4	36,5	12,7	0,0	35,0	19,0	0,0	43,1	78,0	18,2	27,3	2,9	46,3	29,9	0,0	6,9	0,0	8,5	26,1	11,8	4,4	29,4	0,4	0,0	18,6	53,4	50,3	30,3	62,6	43,0
	FOS	100,0	28,7	48,8	53,0	91,7	57,4	66,8	100,0	45,1	11,2	80,0	68,1	71,0	44,3	60,2	76,1	79,3	32,4	72,1	56,1	80,9	94,5	62,3	84,0	59,8	42,0	22,0	40,0	64,2	4,8	28,7

Figure 18: Production Mixes 2015, 2016 and 2017

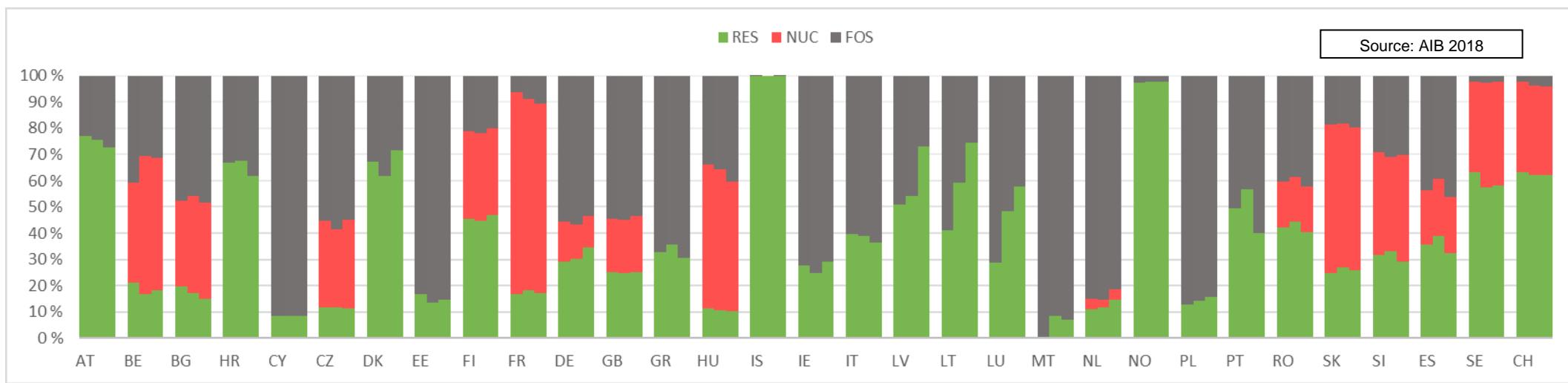


Table 8: Production Mixes 2015, 2016 and 2017 (Percentages)

		AT	BE	BG	HR	CY	DK	EE	FI	FR	DE	GB	GR	HU	IS	IE	IT	LV	LT	LU	MT	NL	NO	PL	PT	RO	SK	SI	ES	SE	CH	
2015	RES	76,9	21,1	19,7	67,1	8,5	11,6	67,1	16,6	45,3	16,7	29,1	32,9	32,9	11,1	100,0	27,8	39,7	50,9	40,9	28,6	0,0	10,9	97,6	12,9	49,3	42,2	24,9	31,6	35,6	63,3	63,4
	NUC	0,0	38,2	32,5	0,0	0,0	33,2	0,0	0,0	33,7	77,0	15,1	0,0	0,0	54,9	0,0	0,0	0,0	0,0	0,0	0,0	3,9	0,0	0,0	0,0	17,3	56,6	39,2	20,7	34,3	34,5	
	FOS	23,1	40,7	47,8	32,9	91,5	55,2	32,9	83,4	20,9	6,3	55,8	67,1	67,1	34,0	0,0	72,2	60,3	49,1	59,1	71,4	100,0	85,2	2,4	87,1	50,7	40,5	18,5	29,2	43,7	2,4	2,1
2016	RES	75,6	16,6	17,3	67,5	8,4	11,5	61,7	13,6	44,6	18,1	30,0	35,5	35,5	10,6	100,0	24,6	38,7	54,2	0,0	48,2	8,4	11,8	97,9	14,1	56,8	44,3	26,9	33,0	38,9	57,3	62,2
	NUC	0,0	52,8	36,9	0,0	0,0	29,9	0,0	0,0	33,7	73,2	13,3	0,0	0,0	53,7	0,0	0,0	0,0	0,0	0,0	0,0	2,8	0,0	0,0	0,0	17,1	54,8	36,3	21,7	40,0	34,2	
	FOS	24,4	30,6	45,8	32,5	91,6	58,6	38,3	86,4	21,7	8,7	56,7	64,5	64,5	35,7	0,0	75,4	61,3	45,8	0,0	51,8	91,6	85,4	2,1	85,9	43,2	38,6	18,4	30,8	39,4	2,7	3,6
2017	RES	72,9	18,2	14,9	61,7	8,3	11,3	71,6	14,4	46,7	17,0	34,5	25,0	30,4	10,0	100,0	29,3	36,5	73,1	74,4	57,7	7,0	14,7	97,9	15,6	40,2	40,3	25,7	29,3	32,5	58,2	62,1
	NUC	0,0	50,5	36,7	0,0	0,0	33,6	0,0	0,0	33,2	72,6	12,1	21,5	0,0	49,6	0,0	0,0	0,0	0,0	0,0	0,0	3,7	0,0	0,0	0,0	17,7	54,8	40,5	21,4	39,6	34,0	
	FOS	27,1	31,3	48,5	38,3	91,7	55,1	28,4	85,6	20,1	10,4	53,3	53,5	69,6	40,3	0,0	70,7	63,5	26,9	25,6	42,3	93,0	81,5	2,1	84,4	59,8	42,0	19,6	30,2	46,2	2,2	3,9

Figure 19: Recorded cancellations of EECS and National GOs in 2017 [TWh]



Figure 20: Recorded imports and exports of EECS and National GOs in 2017 [TWh] (Note that ex-domain cancellations are not included)

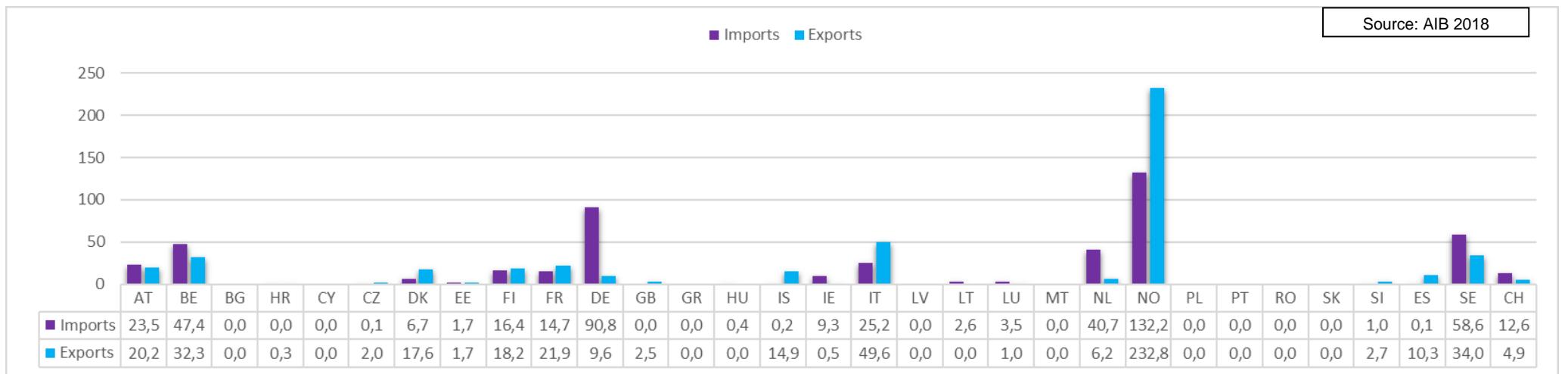
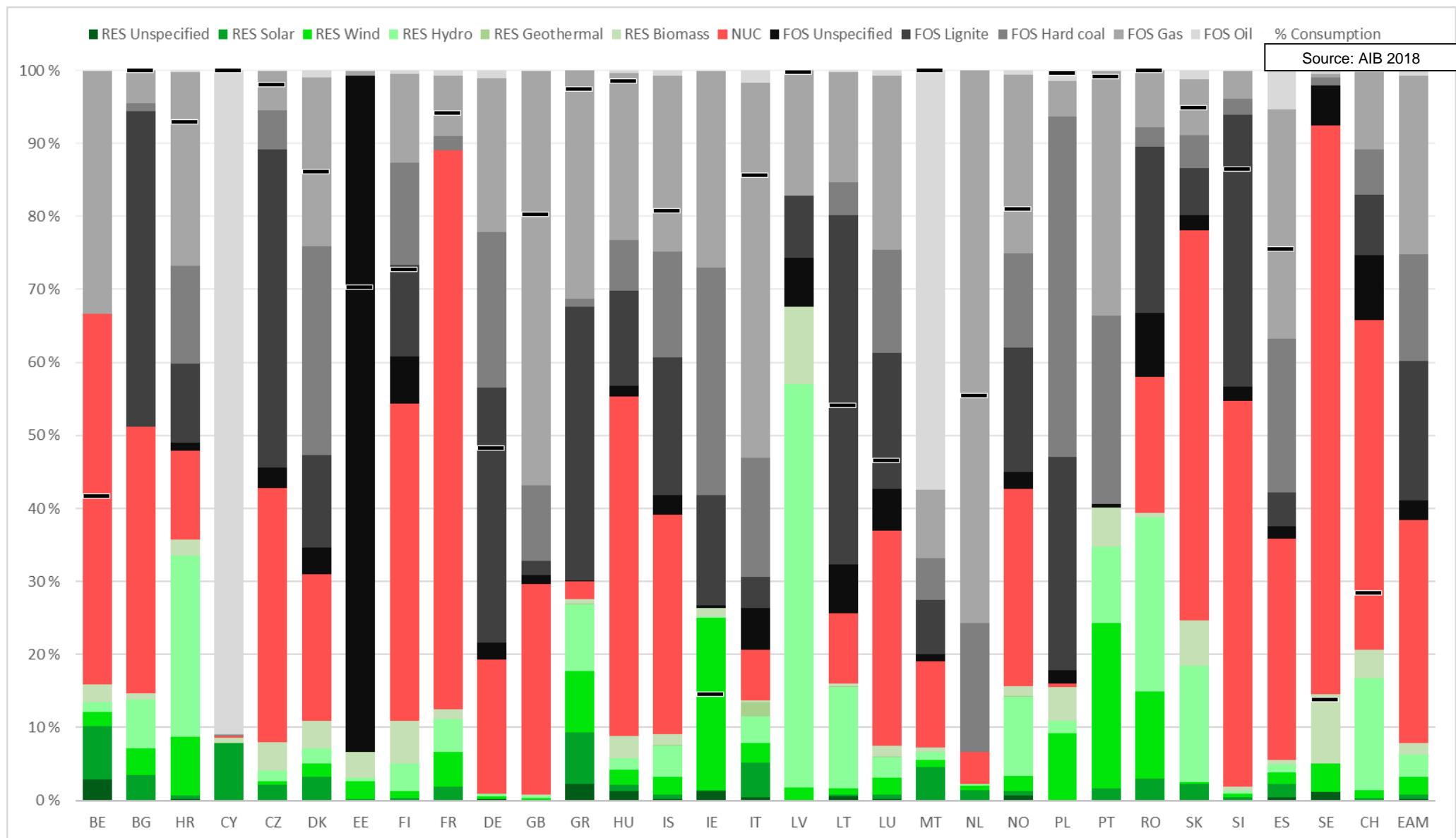


Table 9: Residual Mixes 2017 Issuance Based Methodology

	Renewables Total	Renewables Unspecified	Solar	Wind	Hydro & Marine	Geothermal	Biomass	Nuclear Total	Fossil Total	Fossil Unspecified	Lignite	Hard Coal	Gas	Oil	Untracked consumption	Direct CO2 (gCO2/kWh)	RW (mgRW/kWh)
BE	15.84%	2.89%	7.23%	1.97%	1.35%	0.00%	2.40%	50.76%	33.41%	0.00%	0.00%	0.00%	33.31%	0.09%	41.61%	147.87	1.37
BG	14.68%	0.01%	3.42%	3.73%	6.71%	0.00%	0.82%	36.47%	48.85%	0.08%	43.19%	1.09%	4.47%	0.02%	99.92%	513.60	1.27
HR	35.79%	0.15%	0.52%	8.09%	24.74%	0.02%	2.26%	12.14%	52.08%	1.04%	10.92%	13.32%	26.51%	0.28%	92.92%	405.66	0.37
CY	8.63%	0.00%	7.83%	0.01%	0.01%	0.00%	0.77%	0.15%	91.22%	0.01%	0.09%	0.07%	0.12%	90.92%	100.00%	634.80	0.00
CZ	7.96%	0.00%	2.15%	0.47%	1.43%	0.00%	3.92%	34.87%	57.17%	2.72%	43.60%	5.35%	5.43%	0.06%	98.01%	611.95	1.22
DK	10.96%	0.11%	3.14%	1.79%	2.05%	0.03%	3.84%	20.03%	69.01%	3.64%	12.62%	28.71%	23.11%	0.93%	86.12%	523.64	0.60
EE	6.66%	0.01%	0.21%	2.43%	0.44%	0.00%	3.57%	0.00%	93.34%	92.64%	0.00%	0.00%	0.59%	0.11%	70.25%	972.34	0.00
FI	10.95%	0.05%	0.21%	1.00%	3.74%	0.01%	5.93%	43.36%	45.69%	6.48%	12.57%	14.03%	12.15%	0.46%	72.73%	353.99	1.30
FR	12.51%	0.00%	1.86%	4.85%	4.42%	0.00%	1.39%	76.51%	10.98%	0.00%	0.00%	1.96%	8.25%	0.77%	94.14%	56.25	2.07
DE	0.96%	0.18%	0.00%	0.34%	0.45%	0.00%	0.00%	18.32%	80.72%	2.34%	34.87%	21.37%	21.06%	1.09%	48.21%	737.75	0.49
GB	0.81%	0.02%	0.07%	0.25%	0.31%	0.01%	0.16%	28.84%	70.35%	1.20%	2.01%	10.29%	56.76%	0.08%	80.26%	396.73	2.15
GR	27.56%	2.22%	7.08%	8.45%	9.15%	0.00%	0.65%	2.40%	70.04%	0.21%	37.44%	1.15%	31.19%	0.05%	97.44%	617.50	0.07
HU	8.86%	1.28%	0.91%	2.03%	1.53%	0.01%	3.10%	46.43%	44.70%	1.45%	13.06%	6.91%	22.91%	0.38%	98.42%	344.56	1.60
IS	9.10%	0.17%	0.64%	2.38%	4.34%	0.06%	1.52%	30.09%	60.82%	2.59%	18.95%	14.43%	24.14%	0.70%	80.68%	498.48	0.91
IE	26.34%	1.33%	0.07%	23.66%	0.10%	0.00%	1.19%	0.00%	73.66%	0.43%	15.05%	31.17%	26.90%	0.10%	14.46%	619.85	0.00
IT	13.75%	0.50%	4.70%	2.61%	3.65%	1.94%	0.35%	6.89%	79.36%	5.70%	4.34%	16.25%	51.41%	1.66%	85.61%	476.96	0.21
LV	67.58%	0.00%	0.00%	1.79%	55.27%	0.00%	10.52%	0.00%	32.42%	6.73%	8.49%	0.00%	17.21%	0.00%	99.69%	243.85	0.00
LT	16.08%	0.58%	0.23%	0.83%	13.93%	0.02%	0.48%	9.59%	74.33%	6.67%	47.78%	4.60%	15.07%	0.22%	54.05%	723.39	0.29
LU	7.48%	0.16%	0.63%	2.28%	2.89%	0.05%	1.48%	29.48%	63.04%	5.75%	18.57%	14.14%	23.91%	0.67%	46.55%	513.96	0.89
MT	7.28%	0.07%	4.54%	0.91%	1.15%	0.02%	0.59%	11.78%	80.95%	1.01%	7.42%	5.65%	9.45%	57.41%	100.00%	662.44	0.36
NL	2.24%	0.00%	1.45%	0.57%	0.19%	0.03%	0.00%	4.35%	93.41%	0.00%	0.00%	17.75%	75.66%	0.00%	55.45%	525.48	0.12
NO	15.63%	0.71%	0.60%	2.09%	10.83%	0.04%	1.36%	27.01%	57.36%	2.33%	17.03%	12.92%	24.47%	0.62%	81.00%	460.80	0.81
PL	15.55%	0.01%	0.11%	9.10%	1.65%	0.00%	4.69%	0.44%	84.00%	1.83%	29.27%	46.60%	4.89%	1.41%	99.59%	834.56	0.01
PT	40.15%	0.00%	1.62%	22.70%	10.50%	0.00%	5.33%	0.00%	59.85%	0.47%	0.00%	25.80%	33.46%	0.12%	99.08%	382.93	0.00
RO	39.37%	0.03%	3.01%	11.92%	23.76%	0.00%	0.64%	18.63%	42.00%	8.76%	22.77%	2.72%	7.73%	0.02%	100.00%	424.74	3.35
SK	24.66%	0.12%	2.17%	0.15%	16.03%	0.00%	6.17%	53.38%	21.97%	2.12%	6.46%	4.46%	7.74%	1.18%	94.82%	180.30	1.86
SI	1.86%	0.03%	0.45%	0.39%	0.45%	0.01%	0.54%	52.90%	45.23%	1.84%	37.33%	2.20%	3.75%	0.10%	86.42%	490.53	1.44
ES	5.56%	0.46%	1.75%	1.62%	1.10%	0.01%	0.63%	30.29%	64.14%	1.65%	4.66%	21.10%	31.41%	5.32%	75.45%	446.39	0.83
SE	14.54%	1.17%	0.00%	3.89%	0.06%	0.00%	9.42%	77.92%	7.54%	5.42%	0.00%	1.19%	0.47%	0.46%	13.80%	40.71	2.10
CH	20.66%	0.07%	0.28%	1.11%	15.27%	0.02%	3.91%	45.12%	34.22%	8.88%	8.25%	6.28%	10.51%	0.30%	28.33%	247.81	1.93

Figure 21: Residual Mixes 2017 Issuance Based Methodology



Annex 1: Fuel Categories

Table 10: 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		T1 Hard coal sub-categories
		F01050100 Renewable - Mechanical source or other - Wind		0 F0201010 Unspecified
	Wind	F01050200 Renewable - Mechanical source or other - Hydro & Marine		1 F0201010 Anthracite
	Hydro & Marine	F01040200 Renewable - Heat - Geothermal		2 F0201010 Bituminous coal
	Geothermal	F01010000 Renewable - Solid		3 F0201010 Coking coal
	Biomass	F01020000 Renewable - Liquid		4 F0201010 Coke-oven coke
		F01030000 Renewable - Gaseous		5 F0201010 Lignite coke
		F03010100 Nuclear - Solid - Radioactive fuel		
		F02000000 Fossil - Unspecified		
		F02010000 Fossil - Solid - Unspecified		T2 Brown coal sub-categories
	Fossil	F02010400 Fossil - Solid - Municipal waste		0 F0201020 Unspecified
		F02010500 Fossil - Solid - Industrial and commercial waste		1 F0201020 Sub-bituminous coal
		F02020000 Fossil - Liquid - Unspecified		2 F0201020 Lignite
		F02030000 Fossil - Gaseous	T4	3 F0201020 Brown coal briquette
		F02040000 Fossil - Heat		4 F0201020 Peat briquette
	Hard Coal	F02010100 Fossil - Solid - Hard coal	T1	
		F02010300 Fossil - Solid - Peat		
	Brown Coal / Lignite	F02010200 Fossil - Solid - Brown coal	T2	
		F02030100 Fossil - Gaseous - Natural Gas		
	Natural Gas	F02020200 Fossil - Liquid - Natural gas liquids		
		F02020100 Fossil - Liquid - Crude oil		
	Oil	F02020300 Fossil - Liquid - Petroleum products	T3	
				T3 Petroleum products sub-categories
				0 F0202031 Unspecified
				1 F0202031 Ethane
				2 F0202031 Naphtha
				3 F0202031 Aviation gasoline
				4 F0202031 Motor gasoline
				5 F0202031 Aviation turbine fuel
				6 F0202031 Other kerosene
				7 F0202031 Gas and diesel oil
				8 F0202031 Fuel oil low-sulphur
				9 F0202031 Fuel oil high-sulphur
				10 F0202031 Liquid petroleum gas
				11 F0202031 Emulsion
				12 F0202031 Bitumen
				13 F0202031 Lubricants
				14 F0202031 Petroleum coke
				15 F0202031 Refinery feedstock
				T4 Gaseous sub-categories
				0 F0203001 Unspecified
				20 F0203021 Coal-derived gas
				21 F0203021 Coal-derived gas
				22 F0203021 Coal-derived gas
				30 F0203031 Petroleum products
				31 F0203031 Petroleum products
				32 F0203031 Petroleum products
				33 F0203031 Petroleum products
				34 F0203031 Petroleum products
				40 F0203041 Municipal gas plant
				50 F0203051 Process gas
				51 F0203051 Process gas
				52 F0203051 Process gas
				53 F0203051 Process gas
				54 F0203051 Process gas
				55 F0203051 Process gas