

ANALYSIS OF THE SHARE OF ENERGY OBTAINED FROM RENEWABLE ENERGY SOURCES IN THE EUROPEAN UNION COUNTRIES

Dorota GAWROŃSKA

Politechnika Śląska, Wydział Organizacji i Zarządzania, dorota.gawronska@polsl.pl,
ORCID: 0000-0001-8192-0789

Purpose: The article aims to present the use of energy from sources by European Union countries in 2004-2021. The article contains statistical data on the share of energy from common sources and three sources of consumption (electricity, heating and cooling, and transport) in the European Union¹.

Design/methodology/approach: The data was analyzed regarding changes in the energy share in subsequent years of the European Union members, the smallest and largest claims concerning other countries, and the differences between the minimum and maximum percentages for individual countries.

Findings: Based on the data analysis, it is possible to determine the countries that use energy from renewable sources to the highest extent (for example Sweden, Finland) and those that use them to a minimum size to other European Union countries.

Research limitations/implications: The analysis covers data until 2021 due to the lack of data from all European Union countries for 2022.

Practical implications: The results of the data analysis can be used to assess the implementation of the assumptions of European Union directives regarding the use of energy from renewable sources, as well as the capabilities of individual countries, indicating the countries that have the most significant problems with the implementation of energy plans.

Social implications: Awareness of the entire European Union society about the need to take action to protect the environment, climate, and the use of natural energy sources.

Originality/value: Due to climate change, it seems necessary to monitor and analyze the implementation of the energy plans of European Union countries on an ongoing basis and to identify, in particular, those members of the European Union that should pay specific attention to their country's energy policy.

Keywords: renewable electricity in road transport, heating and cooling, final energy consumption, gross final consumption of energy from renewable.

¹ https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

1. Introduction

The European Union, striving to achieve ambitious sustainable development goals and reduce the impact of human activity on the natural environment, is consistently developing its approach to energy production and consumption². One of the critical elements of this energy transformation is increasing the share of energy from renewable sources, which brings many potential benefits. Using power from renewable sources reduces greenhouse gas emissions, increases energy security, and creates conditions for innovation and sustainable economic growth. Energy from renewable sources is more environmentally friendly than traditional energy sources. Its acquisition and use generate significantly fewer CO₂ emissions and other pollutants, which contributes to reducing climate change and improving air quality. In addition to environmental factors, using renewable sources reduces dependence on external energy sources and uncertain energy markets.

Gross final consumption of energy is defined in the Renewable Energy Directive 2009/28/EC (RED I) as energy goods supplied for energy purposes to industry, transport, households, services (including the public), agriculture, forestry, and fisheries, including the consumption of electricity and heat by the energy industry for the production of electricity and heat and taking into account losses of electricity and heat in distribution and transmission. The article presents the share of energy from renewable sources calculated for four indicators: transport, heating and cooling, electricity, and the total percentage of renewable energy sources based on data collected under Regulation (EC) No. 1099/2008 on energy statistics, which are transmitted Eurostat by national administrations. This dataset includes an indicator for monitoring progress towards the Europe 2020 renewable energy targets implemented under Directive 2009/28/EC on the promotion of the use of energy from renewable sources (RED I) and the Fit for 55 strategies under the Green Governance implemented by Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (RED II). The data analysis covers the years 2004-2021, divided into the four indicators mentioned above in terms of changes in the share of energy from renewable sources in individual EU countries in subsequent years, indicating the smallest and largest shares, specifying the period in which they occurred and due to differences in percentages in over the years 2004-2021. Countries with the most significant shares in energy from renewable sources and those with the most minor shares compared to other countries were indicated. Based on the analysis, it is possible to determine which countries can best implement European Union plans and directives.

² <https://www.europarl.europa.eu/news/pl/headlines/society/20180208STO97442/ograniczenie-emisji-gazow-cieplarnianych-w-ue-krajowe-cele-na-2030-r>

2. Share of energy from renewable sources

The table below presents the percentage gross final energy consumption data regarding the share of energy from renewable sources in European Union countries in 2004-2021.

Table 1.

Share of energy from renewable sources over the years 2004-2021

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Austria	22,55	24,35	26,28	28,14	28,79	31,04	31,21	31,55	32,73	32,67	33,55	33,50	33,37	33,14	33,78	33,76	36,55	36,45
Belgium	1,92	2,33	2,66	3,14	3,61	4,75	6,00	6,30	7,09	7,67	8,04	8,06	8,74	9,14	9,47	9,93	13,00	13,01
Bulgaria	9,23	9,17	9,42	9,10	10,35	12,01	13,93	14,15	15,84	18,90	18,05	18,26	18,76	18,70	20,58	21,55	23,32	17,02
Croatia	23,40	23,69	22,67	22,16	21,99	23,60	25,10	25,39	26,76	28,04	27,82	28,97	28,27	27,28	28,05	28,47	31,02	31,33
Cyprus	3,07	3,13	3,26	4,00	5,13	5,92	6,16	6,25	7,11	8,43	9,14	9,90	9,83	10,48	13,87	13,78	16,88	18,42
Czechia	6,77	7,11	7,36	7,90	8,67	9,98	10,51	10,95	12,81	13,93	15,07	15,07	14,93	14,80	15,14	16,24	17,30	17,67
Denmark	14,84	15,96	16,33	17,75	18,54	19,95	21,89	23,39	25,47	27,17	29,31	30,47	31,72	34,39	35,16	37,02	31,68	34,72
Estonia	18,42	17,48	16,01	17,14	18,81	23,01	24,58	25,52	25,59	25,36	26,13	28,99	29,23	29,54	29,97	31,73	30,07	38,01
Finland	29,23	28,81	30,04	29,56	31,07	31,05	32,17	32,53	34,22	36,63	38,63	39,23	38,94	40,86	41,19	42,81	43,94	43,10
France	9,32	9,27	8,94	9,43	11,19	12,22	12,67	10,81	13,24	13,88	14,36	14,80	15,45	15,85	16,38	17,17	19,11	19,34
Germany	6,21	7,17	8,47	10,04	10,07	10,85	11,67	12,47	13,55	13,76	14,38	14,90	14,89	15,47	16,66	17,27	19,09	19,17
Greece	7,16	7,28	7,46	8,25	8,18	8,73	10,08	11,15	13,74	15,33	15,68	15,69	15,39	17,30	18,00	19,63	21,75	21,93
Hungary	4,36	6,93	7,43	8,58	8,56	11,67	12,74	13,97	15,53	16,21	14,62	14,50	14,38	13,56	12,55	12,63	13,85	14,12
Ireland	2,38	2,82	3,07	3,50	3,98	5,24	5,76	6,61	7,03	7,52	8,52	9,08	9,19	10,52	10,94	11,98	16,16	12,55
Italy	6,32	7,55	8,33	9,81	11,49	12,78	13,02	12,88	15,44	16,74	17,08	17,53	17,42	18,27	17,80	18,18	20,36	19,03
Latvia	32,79	32,26	31,14	29,62	29,81	34,32	30,38	33,48	35,71	37,04	38,63	37,54	37,14	39,01	40,02	40,93	42,13	42,11
Lithuania	17,22	16,77	16,89	16,48	17,82	19,80	19,64	19,94	21,44	22,69	23,59	25,75	25,61	26,04	24,70	25,47	26,77	28,23
Luxembourg	0,90	1,40	1,47	2,73	2,81	2,93	2,85	2,86	3,11	3,49	4,47	4,99	5,36	6,19	8,94	7,05	11,70	11,74
Malta	0,10	0,12	0,15	0,18	0,20	0,22	0,98	1,85	2,86	3,76	4,74	5,12	6,21	7,22	7,91	8,23	10,71	12,15
Netherlands	2,03	2,48	2,78	3,30	3,60	4,27	3,92	4,52	4,66	4,69	5,42	5,71	5,85	6,51	7,39	8,89	14,00	13,00
Poland	6,88	6,87	6,86	6,90	7,69	8,68	9,28	10,34	10,96	11,45	11,61	11,88	11,40	11,06	14,94	15,38	16,10	15,62
Portugal	19,21	19,52	20,79	21,91	22,93	24,41	24,15	24,60	24,57	25,70	29,51	30,51	30,86	30,61	30,20	30,62	33,98	33,98
Romania	16,81	17,57	17,10	18,20	20,20	22,16	22,83	21,74	22,83	23,89	24,85	24,79	25,03	24,45	23,88	24,29	24,48	23,60
Slovakia	6,39	6,36	6,58	7,77	7,72	9,37	9,10	10,35	10,45	10,13	11,71	12,88	12,03	11,47	11,90	16,89	17,35	17,41
Slovenia	18,40	19,81	18,42	19,68	18,65	20,77	21,08	20,94	21,55	23,16	22,46	22,88	21,98	21,66	21,38	21,97	25,00	25,00
Spain	8,35	8,44	9,16	9,67	10,74	12,96	13,78	13,18	14,24	15,08	15,88	16,22	17,02	17,12	17,02	17,85	21,22	20,73
Sweden	38,43	39,98	41,73	43,22	43,92	47,02	46,10	47,63	49,40	50,15	51,15	52,22	52,60	53,39	53,92	55,79	60,12	62,57

Source: https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

Based on the data presented, the lowest and highest values of energy shares were determined, as shown in Table 2.

Table 2.

Individual countries will give the highest and lowest value of shares of energy from renewable sources over the years 2004-2021

	The smallest value	Year of lowest value	The greatest value	Year of greatest value	Difference
Austria	22,55	2004	36,55	2020	13,99
Belgium	1,92	2004	13,01	2021	11,10
Bulgaria	9,10	2007	23,32	2020	14,22
Croatia	21,99	2008	31,33	2021	9,34
Cyprus	3,07	2004	18,42	2021	15,35
Czechia	6,77	2004	17,67	2021	10,89
Denmark	14,84	2004	37,02	2019	22,18
Estonia	16,01	2006	38,01	2021	22,00
Finland	28,81	2005	43,94	2020	15,13
France	8,94	2006	19,34	2021	10,41
Germany	6,21	2004	19,17	2021	12,96
Greece	7,16	2004	21,93	2021	14,77
Hungary	4,36	2004	16,21	2013	11,84
Ireland	2,38	2004	16,16	2020	13,78
Italy	6,32	2004	20,36	2020	14,04
Latvia	29,62	2007	42,13	2020	12,52
Lithuania	16,48	2007	28,23	2021	11,75
Luxembourg	0,90	2004	11,74	2021	10,84

Cont. table 2.

Malta	0,10	2004	12,15	2021	12,05
Netherlands	2,03	2004	14,00	2020	11,97
Poland	6,86	2006	16,10	2020	9,24
Portugal	19,21	2004	33,98	2021	14,78
Romania	16,81	2004	25,03	2016	8,22
Slovakia	6,36	2005	17,41	2021	11,05
Slovenia	18,40	2004	25,00	2021	6,60
Spain	8,35	2004	21,22	2020	12,88
Sweden	38,43	2004	62,57	2021	24,15

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

Among the European Union member states, Malta had the smallest share of renewable energy from renewable sources – 0,10% in 2004, while Sweden had the largest – 62,57% in 2021. In terms of the minor difference between the maximum and minimum share of energy over the years 2004 -2021 was obtained by Slovenia – 6,60% (difference between 2004 and 2021), while Sweden received the highest value of the difference – 24,15% (difference between 2004 and 2021). Below, in Table 3, each country's energy share is presented in 2019, 2020 and 2021 in descending order.

Table 3.

Presentation of the share of energy from renewable sources in 2019, 2020 and 2021 in descending order

2019		2020		2021	
Sweden	55,785	Sweden	60,124	Sweden	62,573
Finland	42,807	Finland	43,939	Finland	43,096
Latvia	40,929	Latvia	42,132	Latvia	42,107
Denmark	37,02	Austria	36,545	Estonia	38,01
Austria	33,755	Portugal	33,982	Austria	36,445
Estonia	31,73	Denmark	31,681	Denmark	34,718
Portugal	30,623	Croatia	31,023	Portugal	33,982
Croatia	28,466	Estonia	30,069	Croatia	31,329
Lithuania	25,474	Lithuania	26,773	Lithuania	28,23
Romania	24,29	Slovenia	25	Slovenia	25
Slovenia	21,968	Romania	24,478	Romania	23,596
Bulgaria	21,545	Bulgaria	23,319	Greece	21,928
Greece	19,633	Greece	21,749	Spain	20,729
Italy	18,181	Spain	21,22	France	19,342
Spain	17,852	Italy	20,359	Germany	19,168
Germany	17,266	France	19,109	Italy	19,034
France	17,174	Germany	19,09	Cyprus	18,419
Slovakia	16,894	Slovakia	17,345	Czechia	17,667
Czechia	16,239	Czechia	17,303	Slovakia	17,412
Poland	15,377	Cyprus	16,879	Bulgaria	17,015
Cyprus	13,777	Ireland	16,16	Poland	15,624
Hungary	12,634	Poland	16,102	Hungary	14,115
Ireland	11,979	Netherlands	13,999	Belgium	13,014
Belgium	9,929	Hungary	13,85	Netherlands	13,003
Netherlands	8,886	Belgium	13	Ireland	12,546
Malta	8,23	Luxembourg	11,699	Malta	12,154
Luxembourg	7,046	Malta	10,714	Luxembourg	11,735

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

In the last three years of the analyzed period, Sweden was in first place in share of energy from renewable sources (55,785% - 2019, 60,12% - 2020, 62,57% - 2021), followed by Finland (42,81% - 2019, 43,94 - 2020, 43,096% - 2021) and Latvia (40,93% - 2019, 42,13 - 2020, 42,11 - 2021). The following countries changed in the following places: Austria, Estonia, Lithuania, Portugal, Croatia and Denmark. The countries with the lowest share in the last three years of the analyzed period are Malta (8,23% - 2019, 107,71% - 2020, 12,15% - 2021) and Luxembourg (7,05% - 2019, 11,699% - 2020, 11,735% - 2021). Analyzing the last year of reported data, Sweden had the largest share in energy from renewable sources (62,57%), ahead of Finland (43,10%) and Latvia (42,11%) by 19,48%. In comparison, the smallest share was achieved by Luxembourg (11,735%), Malta (12,154%), and Ireland (12,546%). The average share of European Union countries in energy from renewable sources in 2021 was 24,52%. Only ten countries had an above-average share of energy from renewable sources, with Slovenia having the most minor difference from the average - 25%. Below, Figure 1 presents the results of the share of energy from renewable sources in EU countries last three years from the period 2004-2021.

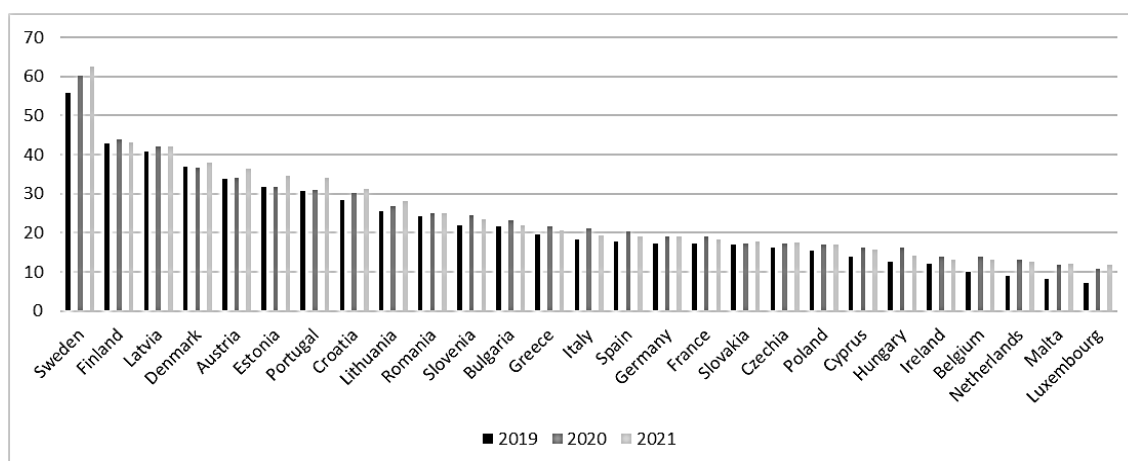


Figure 1. Presentation of the share of energy from renewable sources in EU countries in 2019, 2020 and 2021.

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

Table 4 below shows the percentage change in the energy share in subsequent years compared to the year immediately preceding. Data analysis shows that Belgium is the only country that did not record any declines over 2004-2021 - the smallest increase was achieved in 2021 (0,11%) compared to 2020. Bulgaria showed The most significant share decrease - a decrease of 27,03% in 2021 compared to 2020. The most significant increase in the energy share can be observed in the case of Malta in 2010 compared to 2009 - a rise of 342,99%, while the smallest growth in the percentage change in the energy share was recorded by Finland in 2013 - an increase of 7,04%.

Table 4.

Percentage change from year to year in the share of energy from renewable sources in EU countries over the years 2004-2021

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	min	Max
Austria	8,0	7,9	7,1	2,3	7,8	0,5	1,1	3,7	-0,2	2,7	-0,2	-0,4	-0,7	2,0	-0,1	8,3	-0,3	-0,7	8,3
Belgium	21,3	14,3	18,1	15,0	31,4	26,5	5,0	12,4	8,3	4,8	0,3	8,5	4,5	3,7	4,8	30,9	0,1	0,1	31,4
Bulgaria	-0,6	2,6	-3,4	13,7	16,0	16,0	1,6	11,9	19,3	-4,5	1,2	2,7	-0,3	10,1	4,7	8,2	-27,0	-27,0	19,3
Croatia	1,2	-4,3	-2,2	-0,8	7,3	6,4	1,1	5,4	4,8	-0,8	4,1	-2,4	-3,5	2,8	1,5	9,0	1,0	-4,3	9,0
Cyprus	2,0	4,2	22,6	28,2	15,4	4,1	1,4	13,9	18,5	8,5	8,3	-0,7	6,6	32,4	-0,7	22,5	9,1	-0,7	32,4
Czechia	5,0	3,5	7,2	9,9	15,0	5,4	4,1	17,1	8,7	8,2	0,0	-1,0	-0,9	2,3	7,3	6,6	2,1	-1,0	17,1
Denmark	7,5	2,4	8,7	4,5	7,6	9,7	6,9	8,9	6,7	7,9	4,0	4,1	8,4	2,2	5,3	-14,4	9,6	-14,4	9,7
Estonia	-5,1	-8,4	7,0	9,8	22,3	6,8	3,8	0,3	-0,9	3,1	10,9	0,8	1,0	1,5	5,9	-5,2	26,4	-8,4	26,4
Finland	-1,4	4,3	-1,6	5,1	-0,1	3,6	1,1	5,2	7,0	5,5	1,5	-0,7	4,9	0,8	3,9	2,6	-1,9	-1,9	7,0
France	-0,5	-3,6	5,5	18,7	9,2	3,7	-14,7	22,4	4,8	3,5	3,1	4,4	2,6	3,4	4,8	11,3	1,2	-14,7	22,4
Germany	15,5	18,1	18,6	0,3	7,7	7,5	6,9	8,7	1,5	4,5	3,6	-0,1	3,9	7,7	3,6	10,6	0,4	-0,1	18,6
Greece	1,6	2,5	10,6	-0,8	6,7	15,4	10,7	23,2	11,5	2,3	0,0	-1,9	12,4	4,1	9,1	10,8	0,8	-1,9	23,2
Hungary	58,8	7,2	15,4	-0,1	36,3	9,2	9,7	11,2	4,3	-9,8	-0,8	-0,8	-5,7	-7,4	0,7	9,6	1,9	-9,8	58,8
Ireland	18,7	8,9	13,8	13,8	31,8	9,8	14,8	6,4	7,0	13,2	6,7	1,2	14,5	4,0	9,5	34,9	-22,4	-22,4	34,9
Italy	19,5	10,3	17,8	17,2	11,2	1,9	-1,1	19,9	8,4	2,0	2,6	-0,6	4,9	-2,6	2,2	12,0	-6,5	-6,5	19,9
Latvia	-1,6	-3,5	-4,9	0,7	15,1	-11,5	10,2	6,7	3,7	4,3	-2,8	-1,1	5,0	2,6	2,3	2,9	-0,1	-11,5	15,1
Lithuania	-2,6	0,7	-2,4	8,1	11,1	-0,8	1,5	7,5	5,8	4,0	9,1	-0,5	1,7	-5,2	3,2	5,1	5,4	-5,2	11,1
Luxembourg	56,0	4,8	85,5	3,1	4,3	-2,7	0,1	9,0	12,3	28,0	11,5	7,6	15,5	44,4	-21,2	66,0	0,3	-21,2	85,5
Malta	20,6	21,1	18,8	10,2	13,3	343,0	89,0	54,7	31,4	26,2	7,9	21,3	16,3	9,6	4,0	30,2	13,4	4,0	343,0
Netherlands	22,1	12,1	18,7	9,0	18,6	-8,2	15,5	3,0	0,7	15,4	5,5	2,3	11,3	13,6	20,2	57,5	-7,1	-8,2	57,5
Poland	-0,2	-0,1	0,6	11,3	12,9	7,0	11,4	6,0	4,5	1,3	2,4	-4,1	-3,0	35,1	3,0	4,7	-3,0	-4,1	35,1
Portugal	1,7	6,5	5,4	4,7	6,4	-1,0	1,9	-0,1	4,6	14,8	3,4	1,1	-0,8	-1,3	1,4	11,0	0,0	-1,3	14,8
Romania	4,5	-2,7	6,4	11,0	9,7	3,1	-4,8	5,0	4,6	4,0	-0,2	1,0	-2,3	-2,4	1,7	0,8	-3,6	-4,8	11,0
Slovakia	-0,5	3,5	18,0	-0,6	21,3	-2,9	13,7	1,0	-3,1	15,6	10,0	-6,6	-4,7	3,8	42,0	2,7	0,4	-6,6	42,0
Slovenia	7,7	-7,0	6,8	-5,2	11,4	1,5	-0,7	2,9	7,5	-3,0	1,9	-4,0	-1,4	-1,3	2,8	13,8	0,0	-7,0	13,8
Spain	1,2	8,4	5,6	11,1	20,6	6,4	-4,4	8,1	5,9	5,3	2,2	4,9	0,6	-0,6	4,9	18,9	-2,3	-4,4	20,6
Sweden	4,0	4,4	3,6	1,6	7,1	-2,0	3,3	3,7	1,5	2,0	2,1	0,7	1,5	1,0	3,5	7,8	4,1	-2,0	7,8

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

3. Share of energy from renewable sources in transport

The table below presents the percentage gross final energy consumption data regarding the allocation of energy from renewable sources in transport in European Union countries in 2004-2021.

Table 5.

Share of energy from renewable sources in transport over the years 2004-2021

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Austria	4,53	5,07	7,53	8,24	9,56	11,18	10,71	10,08	10,03	9,70	10,98	11,41	10,58	9,70	9,93	10,05	10,28	9,36
Belgium	0,64	0,66	0,68	0,67	0,71	2,19	4,80	4,80	4,91	5,09	5,85	3,92	6,03	6,64	6,71	6,82	11,04	10,26
Bulgaria	0,97	0,88	1,05	0,96	0,94	1,09	1,50	0,90	0,65	5,89	5,74	6,49	7,20	7,27	8,08	7,89	9,10	7,61
Croatia	1,00	1,03	1,01	1,12	1,07	1,29	1,12	1,03	1,05	2,72	2,65	2,36	1,22	1,17	2,58	5,86	6,59	6,98
Cyprus	0,00	0,00	0,00	0,00	1,92	2,04	1,99	0,00	0,00	1,13	2,68	2,52	2,67	2,56	2,66	3,32	7,40	7,19
Czechia	1,20	1,10	1,07	1,05	2,84	4,31	5,22	1,29	6,25	6,45	7,00	6,54	6,50	6,62	6,56	7,84	9,38	7,49
Denmark	0,45	0,44	0,52	0,54	0,54	0,69	1,15	3,61	6,28	6,46	6,56	6,43	6,73	6,94	6,92	7,11	9,70	10,55
Estonia	0,20	0,24	0,18	0,17	0,19	0,44	0,43	0,45	0,45	0,45	0,42	0,41	0,43	0,42	3,32	6,24	12,17	11,24
Finland	1,01	0,91	0,96	1,03	2,91	4,56	4,39	1,00	1,05	10,67	24,12	24,57	8,82	18,68	14,77	14,85	14,31	20,51
France	0,78	0,78	0,79	0,83	6,25	6,65	6,58	0,99	7,41	7,60	8,25	8,37	8,41	8,77	8,96	9,25	9,21	8,21
Germany	2,14	3,95	6,70	7,53	6,32	5,88	6,41	6,46	7,32	7,30	6,90	6,57	7,01	7,03	7,94	7,63	10,01	7,97
Greece	0,09	0,06	0,74	1,27	1,06	1,10	1,92	0,60	0,90	0,98	1,33	1,10	1,62	4,00	4,11	4,05	5,34	4,31
Hungary	1,02	1,01	1,22	1,63	5,18	5,89	6,16	6,17	6,00	6,34	7,00	7,17	7,77	7,73	7,75	8,06	11,57	6,16
Ireland	0,04	0,08	0,10	0,50	1,31	1,96	2,49	3,84	4,04	4,90	5,20	5,94	5,16	7,44	7,19	8,92	10,19	4,30
Italy	1,21	1,05	1,00	0,96	2,62	4,00	4,92	5,06	6,16	5,41	5,02	6,51	7,41	6,48	7,66	9,05	10,74	10,00
Latvia	2,14	2,39	2,17	1,67	1,69	1,89	3,98	4,09	4,00	4,03	4,08	3,64	2,45	2,27	4,73	4,55	6,73	6,44
Lithuania	0,45	0,66	1,91	3,82	4,32	4,48	3,79	3,83	4,97	4,84	4,36	4,58	3,65	4,30	4,33	4,05	5,51	6,46
Luxembourg	0,14	0,16	0,19	2,20	2,17	2,23	2,09	2,36	2,83	4,07	5,55	6,70	5,97	6,48	6,60	7,71	12,58	7,96
Malta	0,00	0,00	0,00	0,00	0,00	0,00	0,00	2,02	3,22	3,48	4,67	4,68	5,27	6,83	8,02	8,90	10,59	10,58
Netherlands	0,52	0,50	0,85	3,18	2,98	4,57	3,40	5,07	5,22	5,34	6,56	5,60	4,76	5,84	9,48	12,33	12,63	8,99
Poland	1,58	1,75	1,82	1,75	4,14	5,41	6,64	6,92	6,53	6,67	6,32	5,69	3,97	4,23	5,72	6,20	6,58	5,67
Portugal	0,42	0,45	1,63	2,43	2,52	3,89	5,55	0,70	0,81	0,93	3,67	7,43	7,65	7,91	9,04	9,09	9,70	8,61

Cont. table 5.

Romania	1,82	1,87	1,54	1,64	1,35	1,30	1,37	5,54	4,96	5,45	4,68	5,49	6,17	6,56	6,34	7,85	8,54	7,67
Slovakia	1,50	1,66	3,30	3,99	4,28	5,36	5,29	5,73	5,60	6,21	7,95	8,63	7,77	6,95	6,99	8,31	9,26	8,75
Slovenia	0,85	0,83	1,06	1,47	1,77	2,25	3,12	2,48	3,25	3,77	2,88	2,24	1,60	2,57	5,48	7,98	10,91	10,64
Spain	1,04	1,27	0,84	1,38	2,17	3,71	5,02	0,77	0,87	0,95	1,02	1,09	5,17	5,80	6,94	7,61	9,53	9,19
Sweden	6,29	6,60	7,51	8,42	8,69	9,36	9,63	11,94	13,78	15,32	18,83	21,49	26,56	26,84	29,70	30,31	31,85	30,43

Source: https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

Table 6.

The largest and smallest share of energy from renewable sources in transport over the years 2004-2021

	The smallest value	Year of lowest value	The greatest value	Year of greatest value	Difference
Austria	4,53	2004	11,41	2015	6,88
Belgium	0,64	2004	11,04	2020	10,39
Bulgaria	0,65	2004	9,10	2020	8,45
Croatia	1,00	2004	6,98	2021	5,99
Cyprus	0,00	2004	7,40	2020	7,40
Czechia	1,05	2007	9,38	2020	8,34
Denmark	0,44	2005	10,55	2021	10,10
Estonia	0,17	2007	12,17	2020	12,00
Finland	0,91	2005	24,57	2021	23,66
France	0,78	2004	9,25	2019	8,47
Germany	2,14	2004	10,01	2020	7,87
Greece	0,06	2005	5,34	2020	5,28
Hungary	1,01	2005	11,57	2020	10,57
Ireland	0,04	2004	10,19	2020	10,14
Italy	0,96	2007	10,74	2020	9,77
Latvia	1,67	2007	6,73	2020	5,07
Lithuania	0,45	2004	6,46	2021	6,02
Luxembourg	0,14	2004	12,58	2020	12,44
Malta	0,00	2004-2010	10,59	2020	10,59
Netherlands	0,50	2005	12,63	2020	12,13
Poland	1,58	2004	6,92	2011	5,34
Portugal	0,42	2004	9,70	2020	9,28
Romania	1,30	2009	8,54	2020	7,24
Slovakia	1,50	2004	9,26	2020	7,76
Slovenia	0,83	2005	10,91	2020	10,08
Spain	0,77	2011	9,53	2020	8,76
Sweden	6,29	2004	31,85	2020	25,57

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

Among the European Union member states, Malta had the smallest share of energy from renewable sources in transport - until 2010, the value shown was 0.00, while Sweden had the most significant – 31,85% in 2020. In terms of the minor difference obtained between the maximum and minimum energy share over the years 2004-2021 was achieved by Latvia – 5,07% (difference between 2007 and 2020), while Sweden achieved the highest value of the energy share difference – 25,57% (difference between 2004 and 2020). Below, in Table 7, each country's share of energy in transport is presented in 2019, 2020 and 2021 in descending order.

Table 7.

Presentation of the share of energy from renewable sources in transport in 2019, 2020 and 2021 in descending order

2019		2020		2021	
Sweden	30,309	Sweden	31,854	Sweden	30,426
Finland	14,845	Finland	14,31	Finland	20,512
Netherlands	12,326	Netherlands	12,631	Estonia	11,236
Austria	10,051	Luxembourg	12,581	Slovenia	10,641
France	9,248	Estonia	12,165	Malta	10,58
Portugal	9,089	Hungary	11,571	Denmark	10,546
Italy	9,047	Belgium	11,035	Belgium	10,262
Ireland	8,917	Slovenia	10,911	Italy	10,001
Malta	8,902	Italy	10,736	Austria	9,355
Slovakia	8,308	Malta	10,586	Spain	9,194
Hungary	8,057	Austria	10,283	Netherlands	8,991
Slovenia	7,983	Ireland	10,187	Slovakia	8,753
Bulgaria	7,893	Germany	10,008	Portugal	8,609
Romania	7,846	Denmark	9,701	France	8,209
Czechia	7,841	Portugal	9,701	Germany	7,972
Luxembourg	7,707	Spain	9,528	Luxembourg	7,962
Germany	7,63	Czechia	9,383	Romania	7,669
Spain	7,61	Slovakia	9,259	Bulgaria	7,613
Denmark	7,11	France	9,207	Czechia	7,492
Belgium	6,817	Bulgaria	9,101	Cyprus	7,188
Estonia	6,243	Romania	8,54	Croatia	6,983
Poland	6,2	Cyprus	7,401	Lithuania	6,462
Croatia	5,855	Latvia	6,733	Latvia	6,436
Latvia	4,554	Croatia	6,593	Hungary	6,159
Lithuania	4,049	Poland	6,575	Poland	5,665
Greece	4,049	Lithuania	5,511	Greece	4,31
Cyprus	3,316	Greece	5,341	Ireland	4,296

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

In the last three years of the analyzed period, Sweden was in first place (30,31% – 2019, 31,85% – 2020, 30,43% – 2021), followed by Finland (14,85% – 2019, 14,31% – 2020, 20,51% – 2021). The Netherlands was third in terms of energy from renewable sources in transport in 2019 (12,326%) and 2020 (12,631%). In 2021 on the third places was Estonia – 11,236%. Particular attention should be paid to the fact that Luxembourg was fourth in 2020 (12,58%), and Malta was fifth in 2021 (10,58%), i.e. countries that were last in the overall share of energy in those years. The countries with the lowest share in the last three years of the analyzed period are: Lithuania (4,05%), Greece (4,05%) and Cyprus (3,32%) in 2019, Poland (6,58%), Lithuania (5,51%) and Greece (5,34%) in 2020, Poland (5,67%), Greece (4,31%) and Ireland (4,23%) in 2021. Focusing on the last year reported data (2021), Sweden had the largest share in energy from renewable sources (30,43%), ahead of Finland (20,51%) by 9,91 % and Estonia by 19,19% (share 11,24%), while the smallest share was obtained by Ireland (4,30%), Greece (4,31%) and Poland (5,67%). The average percentage of European Union countries in energy from renewable sources in 2021 was 9,39%. Only ten countries have an above-average share of energy from renewable sources, with Italy having the most minor difference from the

average – 10%. Below, Figure 2 presents the results of the share of energy from renewable sources in transport of EU countries last three years from the period 2004-2021.

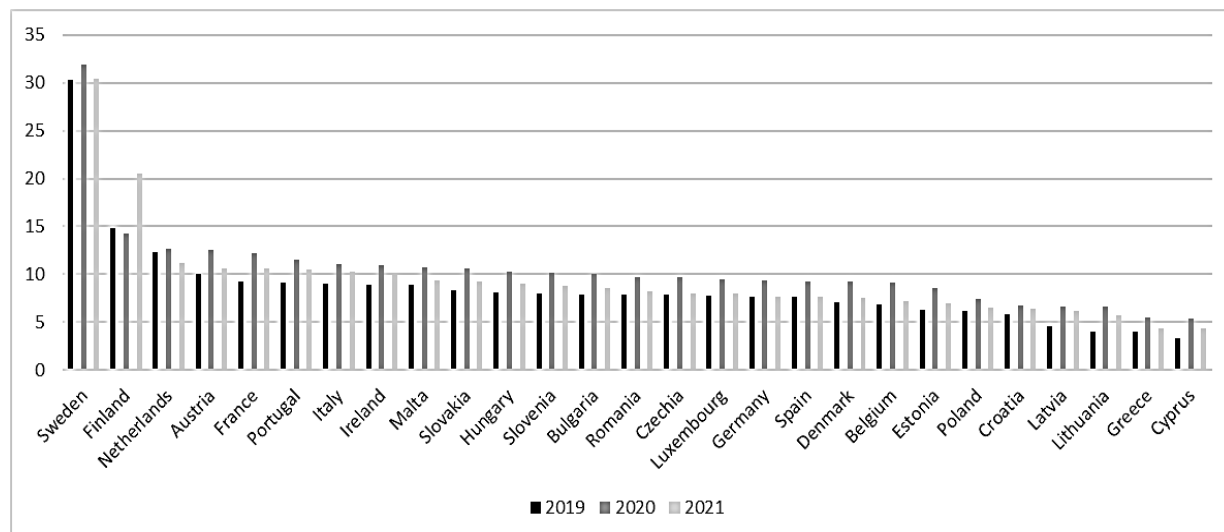


Figure 2. Presentation of the percentage share of energy from renewable sources in transport of EU countries last three years from the period 2004-2021.

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

Table 8 below shows the percentage change in the share of energy from renewable sources in transport in subsequent years compared to the year immediately preceding. Malta and Cyprus are the critical points of concern. In the years 2004-2010, Malta's share of energy from renewable sources in transport was 0.00 in statistical reports, but in the following years, there were increases in the percentage of energy from year to year until 2020 - in 2021, there was a decrease of 0,06% compared to 2020. In turn, Malta has a 0,00 share of energy in the tables in the years 2004-2007 and 2011-2012, which, when determining percentage changes, resulted in a 100,00% decrease in the percentage change in 2011, defined to the immediately preceding year. Data analysis on the maximum percentage change shows that Greece achieved an increase of 1145,76% in 2006 compared to 2005, while Sweden achieved the most minor growth – 24,01% in 2011 compared to 2010.

Table 8.

Percentage change from year to year in the share of energy from renewable sources in the transport of EU countries over the years 2004-2021

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Min	Max
Austria	11,9	48,6	9,4	16,0	16,9	-4,2	-5,9	-0,5	-3,3	13,3	3,9	-7,2	-8,3	2,3	1,2	2,3	-9,0	-9,0	48,6
Belgium	3,3	2,0	-0,7	6,1	207,6	119,2	0,0	2,3	3,5	14,9	-32,9	53,8	10,1	1,1	1,6	61,9	-7,0	-32,9	207,6
Bulgaria	-9,0	18,7	-8,9	-1,9	16,4	37,2	-40,1	-27,6	805,5	-2,4	13,1	11,0	1,0	-2,3	15,3	-16,3	-40,1	805,5	
Croatia	3,0	-2,0	11,5	-4,4	20,4	-13,0	-8,4	1,9	158,8	-2,3	-11,0	-48,4	-3,6	119,9	126,8	12,6	5,9	-48,4	158,8
Cyprus	-	-	-	-	6,0	-2,1	-100	-	-	137,8	-5,9	6,0	-4,1	3,9	24,6	123,2	-2,9	-100,0	137,8
Czechia	-8,6	-2,4	-2,3	171,3	51,7	21,1	-75,4	386,3	3,1	8,6	-6,6	-0,6	1,8	-0,9	19,6	19,7	-20,2	-75,4	386,3
Denmark	-0,4	17,6	2,7	0,9	28,3	65,9	213,8	74,0	2,8	1,5	-1,9	4,7	3,0	-0,2	2,7	36,4	8,7	-1,9	213,8
Estonia	17,5	-21,7	-8,7	10,1	136,8	-1,1	2,8	1,3	-0,7	-6,7	-1,2	4,4	-3,2	695,0	88,3	94,9	-7,6	-21,7	695,0
Finland	-9,9	5,1	7,2	183,8	56,6	-3,7	-77,1	4,5	916,7	126,2	1,8	-64,1	111,9	-20,9	0,5	-3,6	43,3	-77,1	916,7
France	0,1	1,0	4,5	654,2	6,5	-1,1	-85,0	651,2	2,5	8,5	1,4	0,5	4,3	2,3	3,2	-0,4	-10,8	-85,0	654,2
Germany	85,1	69,5	12,4	-16,1	-7,0	9,1	0,7	13,3	-0,3	-5,5	-4,8	6,8	0,2	13,0	-3,9	31,2	-20,3	-20,3	85,1
Greece	-32,2	1145,8	72,7	-16,3	3,8	73,8	-68,7	50,5	8,5	35,3	-17,0	47,6	146,4	2,7	-1,4	31,9	-19,3	-68,7	1145,8
Hungary	-1,0	21,0	34,2	217,4	13,6	4,7	0,2	-2,9	5,7	10,4	2,4	8,4	-0,5	0,2	4,0	43,6	-46,8	-46,8	217,4
Ireland	70,5	36,0	393,1	159,4	50,3	27,0	54,3	5,2	21,1	6,2	14,2	-13,2	44,3	-3,4	24,1	14,2	-57,8	-57,8	393,1
Italy	-13,6	-5,1	-3,1	171,4	52,9	22,9	2,9	21,6	-12,1	-7,2	29,6	14,0	-12,5	18,1	18,1	18,7	-6,8	-13,6	171,4
Latvia	11,7	-9,4	-23,0	1,3	11,8	110,7	2,8	-2,3	0,9	1,1	-10,7	-32,7	-7,3	108,3	-3,7	47,8	-4,4	-32,7	110,7
Lithuania	47,3	190,0	100,6	13,0	3,8	-15,3	0,9	29,9	-2,8	-9,9	5,2	-20,4	17,8	0,8	-6,6	36,1	17,3	-20,4	190,0

Cont, table 8.

Luxembourg	15,2	18,9	1065,6	-1,4	2,8	-6,3	12,8	19,8	44,1	36,2	20,7	-11,0	8,6	1,8	16,8	63,2	-36,7	-36,7	1065,6
Malta	-	-	-	-	-	-	-	59,5	8,3	34,0	0,3	12,6	29,6	17,5	11,0	18,9	-0,1	-0,1	59,5
Netherlands	-3,1	70,3	274,4	-6,3	53,3	-25,7	49,2	2,9	2,4	22,8	-14,7	-14,9	22,7	62,3	30,0	2,5	-28,8	-28,8	274,4
Poland	10,4	4,1	-3,9	137,3	30,5	22,8	4,2	-5,6	2,0	-5,2	-10,0	-30,1	6,5	35,2	8,4	6,0	-13,8	-30,1	137,3
Portugal	6,1	262,4	49,2	3,4	54,5	42,8	-87,5	16,1	14,6	296,4	102,6	2,9	3,5	14,2	0,6	6,7	-11,3	-87,5	296,4
Romania	2,9	-17,8	6,7	-18,0	-3,6	5,3	305,2	-10,4	9,7	-14,1	17,4	12,4	6,3	-3,3	23,7	8,8	-10,2	-18,0	305,2
Slovakia	10,7	98,5	21,2	7,1	25,4	-1,3	8,2	-2,3	11,0	28,0	8,6	-10,0	-10,5	0,5	18,9	11,4	-5,5	-10,5	98,5
Slovenia	-2,2	27,1	39,5	20,4	27,0	38,5	-20,6	31,3	15,9	-23,7	-22,0	-28,6	60,6	113,1	45,7	36,7	-2,5	-28,6	113,1
Spain	22,4	-33,9	64,3	57,5	71,4	35,3	-84,7	13,3	9,3	7,8	6,3	374,9	12,2	19,7	9,7	25,2	-3,5	-84,7	374,9
Sweden	4,9	13,8	12,1	3,2	7,6	2,9	24,0	15,4	11,2	23,0	14,1	23,6	1,1	10,6	2,1	5,1	-4,5	-4,5	24,0

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

4. Share of energy from renewable sources in electricity

The table below presents the percentage gross final energy consumption data regarding the allocation of power from renewable sources in electricity in European Union countries from 2004-2021.

Table 9.

Share of energy from renewable sources in electricity over the years 2004-2021

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Austria	61,63	62,90	63,53	65,67	65,88	68,63	66,36	66,78	67,44	68,91	71,06	71,49	72,52	71,63	74,19	75,07	78,20	76,19
Belgium	1,71	2,39	3,13	3,66	4,63	6,18	7,33	8,99	11,34	12,55	13,41	15,57	15,83	17,21	18,89	20,82	25,12	26,01
Bulgaria	8,36	8,67	8,73	8,90	9,54	10,91	12,36	12,62	15,82	18,68	18,69	18,98	19,15	19,02	22,36	23,51	23,59	18,79
Croatia	35,03	35,18	34,82	33,98	33,87	35,88	37,52	37,59	38,76	42,08	45,24	45,41	46,67	46,44	48,14	49,78	53,82	53,47
Cyprus	0,02	0,02	0,03	0,07	0,29	0,59	1,39	3,45	4,93	6,65	7,40	8,45	8,59	8,91	9,36	9,76	12,04	14,84
Czechia	3,69	3,78	4,10	4,62	5,18	6,38	7,52	10,61	11,67	12,78	13,89	14,07	13,62	13,65	13,71	14,05	14,81	14,54
Denmark	23,75	24,65	23,97	25,00	25,94	28,26	32,74	35,87	38,72	43,08	48,49	51,29	53,72	59,94	62,39	65,35	65,32	62,65
Estonia	0,55	1,13	1,43	1,43	1,97	5,97	10,29	12,20	15,67	12,95	14,02	16,15	16,19	17,58	19,68	22,00	28,29	29,34
Finland	26,71	26,92	26,42	25,47	26,75	26,82	27,22	28,96	29,11	30,54	31,11	32,21	32,72	35,04	36,54	37,97	39,56	39,53
France	13,78	13,74	14,06	14,29	14,36	15,09	14,82	16,18	16,55	16,98	18,47	18,82	19,21	19,93	21,13	22,39	24,82	25,02
Germany	9,44	10,58	11,94	13,73	15,14	17,52	18,24	20,93	23,61	25,28	28,17	30,88	32,27	34,61	37,59	40,60	44,22	43,68
Greece	7,84	8,21	8,92	9,33	9,65	11,02	12,31	13,81	16,36	21,24	21,92	22,09	22,66	24,46	26,00	31,30	35,86	35,93
Hungary	2,22	4,42	3,45	4,19	5,32	6,96	7,10	6,38	6,06	6,60	7,31	7,34	7,29	7,51	8,31	9,97	11,90	13,66
Ireland	6,03	7,20	8,51	9,53	10,82	14,06	15,64	18,25	19,84	20,96	23,32	25,73	27,07	30,32	33,32	36,46	39,06	36,40
Italy	16,09	16,29	15,93	15,95	16,65	18,81	20,09	23,55	27,42	31,30	33,42	33,46	34,01	34,10	33,93	34,97	38,08	36,00
Latvia	45,96	43,02	40,41	38,62	38,73	41,94	42,05	44,69	44,88	48,69	51,04	52,21	51,25	54,35	53,50	53,42	53,36	51,40
Lithuania	3,59	3,83	4,02	4,65	4,91	5,87	7,40	9,02	10,88	13,15	13,71	15,54	16,87	18,26	18,41	18,79	20,17	21,28
Luxembourg	2,77	3,18	3,17	3,31	3,58	4,11	3,79	4,08	4,66	5,33	5,96	6,20	6,67	8,06	9,12	10,86	13,89	14,22
Malta	0,00	0,00	0,00	0,00	0,00	0,00	0,03	0,45	1,12	1,57	3,33	4,31	5,71	6,85	7,70	7,49	9,49	9,66
Netherlands	4,45	6,30	6,54	5,96	7,46	9,07	9,60	9,74	10,35	9,91	9,92	11,04	12,55	13,81	15,17	18,23	26,41	30,39
Poland	2,05	2,51	2,86	3,32	4,25	5,71	6,55	8,08	10,61	10,68	12,36	13,40	13,34	13,08	13,03	14,36	16,24	17,17
Portugal	27,39	27,70	29,31	32,29	34,06	37,56	40,61	45,78	47,51	49,10	52,05	52,62	53,99	54,17	52,19	53,77	58,03	58,43
Romania	28,43	28,78	28,05	28,11	28,08	30,89	30,38	31,13	33,57	37,52	41,68	43,16	42,71	41,97	41,79	42,62	43,37	42,49
Slovakia	15,40	15,74	16,57	16,47	17,01	17,77	17,77	19,31	20,05	20,80	22,87	22,66	22,51	21,34	21,50	22,10	23,07	22,37
Slovenia	29,27	28,65	28,23	27,70	29,96	33,76	32,20	31,05	31,64	33,08	33,94	32,72	32,06	32,43	32,31	32,63	35,10	34,98
Spain	19,02	19,17	20,03	21,72	23,78	27,88	29,75	31,53	33,44	36,03	37,13	36,97	36,68	36,47	35,24	37,13	42,94	45,96
Sweden	51,20	50,90	51,78	53,21	53,69	58,25	55,77	59,62	59,78	61,74	63,21	65,73	64,87	65,91	66,23	71,23	74,50	75,70

Source: https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

The smallest and largest values were determined based on the data presented in Table 10.

Table 10.

The largest and smallest share of energy from renewable sources in electricity over the years 2004-2021

	The smallest value	Year of lowest value	The greatest value	Year of greatest value	Difference
Austria	61,63	2004	78,20	2020	16,58
Belgium	1,71	2004	26,01	2021	24,30
Bulgaria	8,36	2004	23,59	2020	15,23
Croatia	33,87	2008	53,82	2020	19,95
Cyprus	0,02	2004	14,84	2021	14,82
Czechia	3,69	2004	14,81	2020	11,12
Denmark	23,75	2004	65,35	2019	41,59
Estonia	0,55	2004	29,34	2021	28,79
Finland	25,47	2007	39,56	2021	14,10
France	13,74	2004	25,02	2021	11,28
Germany	9,44	2004	44,22	2020	34,78
Greece	7,84	2004	35,93	2021	28,09
Hungary	2,22	2004	13,66	2021	11,44
Ireland	6,03	2004	39,06	2020	33,02
Italy	15,93	2006	38,08	2020	22,16
Latvia	38,62	2007	54,35	2017	15,73
Lithuania	3,59	2004	21,28	2021	17,69
Luxembourg	2,77	2004	14,22	2021	11,45
Malta	0,00	2004-2009	9,66	2021	9,66
Netherlands	4,45	2004	30,39	2021	25,95
Poland	2,05	2004	17,17	2021	15,12
Portugal	27,39	2004	58,43	2021	31,04
Romania	28,05	2006	43,37	2020	15,32
Slovakia	15,40	2004	23,07	2020	7,66
Slovenia	27,70	2007	35,10	2020	7,40
Spain	19,02	2004	45,96	2021	26,94
Sweden	50,90	2004	75,70	2021	24,81

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

Among the European Union Member States, Malta had the smallest share of energy from renewable sources in electricity – 0,00 in 2004-2009, while Austria had the largest – 78,20% in 2020. In terms of the minor difference obtained between the maximum and minimum share of energy over the years 2004-2021, Slovenia achieved – 7,40% (difference between 2007 and 2020), while Denmark achieved the highest difference value – 41,59% (difference between 2004 and 2019). Below, in Table 11, each country's share of energy in electricity is presented in 2019, 2020 and 2021 in descending order.

Table 11.

Presentation of the share of energy from renewable sources in electricity in 2019, 2020 and 2021 in descending order

2019		2020		2021	
Austria	75,067	Austria	78,204	Austria	76,185
Sweden	71,234	Sweden	74,495	Sweden	75,704
Denmark	65,347	Denmark	65,323	Denmark	62,647
Portugal	53,774	Portugal	58,032	Portugal	58,433
Latvia	53,423	Croatia	53,816	Croatia	53,471
Croatia	49,783	Latvia	53,357	Latvia	51,397
Romania	42,616	Germany	44,215	Spain	45,962
Germany	40,604	Romania	43,374	Germany	43,681
Finland	37,969	Spain	42,944	Romania	42,489

Cont. table 11.

Spain	37,131	Finland	39,564	Finland	39,531
Ireland	36,46	Ireland	39,055	Ireland	36,403
Italy	34,969	Italy	38,081	Italy	35,996
Slovenia	32,632	Greece	35,856	Greece	35,934
Greece	31,295	Slovenia	35,095	Slovenia	34,976
Bulgaria	23,509	Estonia	28,293	Netherlands	30,394
France	22,389	Netherlands	26,407	Estonia	29,34
Slovakia	22,103	Belgium	25,122	Belgium	26,013
Estonia	21,998	France	24,819	France	25,016
Belgium	20,817	Bulgaria	23,586	Slovakia	22,369
Lithuania	18,79	Slovakia	23,066	Lithuania	21,278
Netherlands	18,23	Lithuania	20,166	Bulgaria	18,79
Poland	14,356	Poland	16,237	Poland	17,166
Czechia	14,046	Czechia	14,81	Cyprus	14,84
Luxembourg	10,863	Luxembourg	13,887	Czechia	14,544
Hungary	9,969	Cyprus	12,041	Luxembourg	14,217
Cyprus	9,756	Hungary	11,904	Hungary	13,66
Malta	7,485	Malta	9,489	Malta	9,655

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

In the last three years of the analyzed period, Austria was in first place in share of energy from renewable sources in electricity (75,07% – 2019, 78,2% – 2020, 76,185% – 2021), followed by Sweden (71,23% – 2019, 74,495% – 2020, 75,704% – 2021) and Denmark (65,35%-2019, 65,32-2020, 62,65-2021). The countries with the lowest share in the last three years of the analyzed period are: Hungary (9,969%), Cyprus (9,756%) and Malta (7,485%) in 2019, Cyprus (12,04%), Hungary (11,9%) and Malta (9,49%) in 2020, Luxembourg (14,217%), Hungary (13,66%) and Malta (9,655%) in 2021. Analysis of the last year of reported data, the largest share in energy from renewable sources was recorded by Austria (76,19%), followed by Sweden (75,70%) and Denmark (62,65%). In comparison, Malta obtained the smallest share (9,655%), then Hungary (13,66%) and Luxembourg (14,217%). The average percentage of European Union countries in energy from renewable sources in 2021 was 35,19%. The share of energy from renewable sources was above average in 13 countries, with the most minor difference from the average being Greece – 35,93%. Below, Figure 3 presents the results of the share of energy from renewable sources in electricity of EU countries last three years from the period 2004-2021.

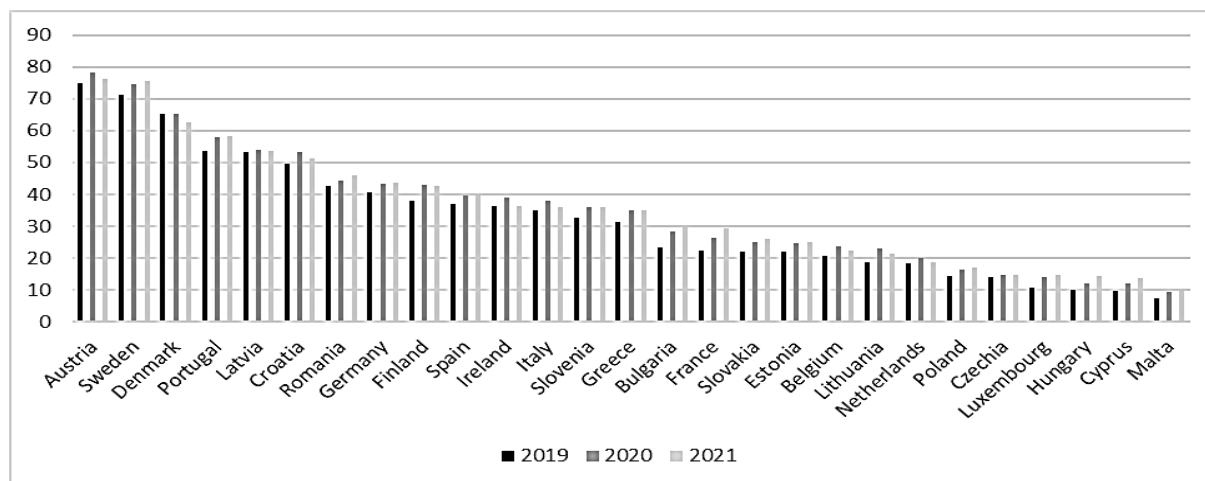


Figure 3. Presentation of the percentage share of energy from renewable sources in electricity of EU countries in 2021.

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

The table below shows the percentage change in the share of energy from renewable sources in electricity in subsequent years compared to the immediately preceding year. In the years 2004-2009, Malta in the statistical reports of the share of energy from renewable sources in electricity has 0.00, taking into account the percentage of 0,03% in 2010 and 0,45% in 2011, which indicates an increase in 2011 by 1318,75% compared to 2010. Over 2004-2021, only four countries did not record a decrease in the percentage change compared to the preceding year: Greece 0,22%, Lithuania 0.84%, Belgium 1,676% and Cyprus 1,681%. Of the remaining countries, Hungary experienced the most significant decline in 2006 (21,96%), and Germany had the smallest drop – 1,21% in 2021. In an analysis of the data on the maximum percentage change, it can be visible that Malta achieved an increase of 1318,75% in 2011 compared to 2010, while the smallest increase was achieved by Austria by 4,18% in 2020 compared to 2019.

Table 12.

Percentage change from year to year in the share of energy from renewable sources in electricity in EU countries over the years 2004-2021

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Min	Max
Austria	2,1	1,0	3,4	0,3	4,2	-3,3	0,6	1,0	2,2	3,1	0,6	1,4	-1,2	3,6	1,2	4,2	-2,6	-3,3	4,2
Belgium	39,2	31,2	17,0	26,3	33,5	18,7	22,6	26,1	10,7	6,9	16,1	1,7	8,7	9,7	10,2	20,7	3,5	1,7	39,2
Bulgaria	3,7	0,7	1,9	7,2	14,3	13,3	2,1	25,3	18,1	0,0	1,5	0,9	-0,7	17,5	5,2	0,3	-20,3	-20,3	25,3
Croatia	0,4	-1,0	-2,4	-0,3	5,9	4,6	0,2	3,1	8,5	7,5	0,4	2,8	-0,5	3,7	3,4	8,1	-0,6	-2,4	8,5
Cyprus	26,3	41,7	117,6	285,1	106,7	136,0	147,8	43,0	35,1	11,2	14,1	1,7	3,8	5,0	4,3	23,4	23,2	1,7	285,1
Czechia	2,4	8,3	12,8	12,1	23,1	17,8	41,2	10,0	9,5	8,7	1,3	-3,2	0,3	0,4	2,4	5,4	-1,8	-3,2	41,2
Denmark	3,8	-2,8	4,3	3,7	8,9	15,8	9,6	7,9	11,3	12,6	5,8	4,7	11,6	4,1	4,7	0,0	-4,1	-4,1	15,8
Estonia	106,4	26,7	0,3	37,7	202,5	72,5	18,5	28,5	-17,4	8,3	15,2	0,3	8,6	11,9	11,8	28,6	3,7	-17,4	202,5
Finland	0,8	-1,9	-3,6	5,0	0,3	1,5	6,4	0,5	4,9	1,9	3,5	1,6	7,1	4,3	3,9	4,2	-0,1	-3,6	7,1
France	-0,3	2,3	1,6	0,5	5,1	-1,8	9,2	2,3	2,6	8,8	1,9	2,1	3,8	6,0	6,0	10,9	0,8	-1,8	10,9
Germany	12,1	12,9	14,9	10,3	15,7	4,1	14,7	12,8	7,1	11,4	9,6	4,5	7,2	8,6	8,0	8,9	-1,2	-1,2	15,7
Greece	4,7	8,7	4,5	3,4	14,2	11,7	12,2	18,5	29,8	3,2	0,8	2,6	8,0	6,3	20,4	14,6	0,2	0,2	29,8
Hungary	99,1	-21,9	21,4	26,8	30,9	2,1	-10,2	-5,0	9,0	10,7	0,5	-0,7	3,0	10,6	20,0	19,4	14,8	-21,9	99,1
Ireland	19,3	18,2	12,1	13,5	29,9	11,2	16,7	8,7	5,7	11,3	10,3	5,2	12,0	9,9	9,4	7,1	-6,8	-6,8	29,9
Italy	1,3	-2,3	0,2	4,3	13,0	6,8	17,2	16,5	14,2	6,8	0,1	1,7	0,3	-0,5	3,1	8,9	-5,5	-5,5	17,2
Latvia	-6,4	-6,1	-4,4	0,3	8,3	0,3	6,3	0,4	8,5	4,8	2,3	-1,8	6,1	-1,6	-0,1	-0,1	-3,7	-6,4	8,5
Lithuania	6,8	4,8	15,8	5,6	19,4	26,1	21,9	20,6	20,9	4,2	13,4	8,6	8,2	0,8	2,1	7,3	5,5	0,8	26,1
Luxembourg	15,0	-0,2	4,2	8,4	14,6	-7,8	7,6	14,4	14,4	11,8	4,0	7,7	20,7	13,2	19,2	27,8	2,4	-7,8	27,8
Malta	-	-	-	-	-	-	1318,8	145,6	40,9	112,2	29,4	32,5	19,8	12,5	-2,8	26,8	1,7	-2,8	1318,8
Netherlands	41,6	3,9	-8,8	25,2	21,5	5,9	1,4	6,3	-4,2	0,1	11,2	13,7	10,1	9,8	20,2	44,9	15,1	-8,8	44,9
Poland	22,6	13,9	15,9	28,1	34,5	14,6	23,3	31,3	0,6	15,8	8,4	-0,4	-1,9	-0,4	10,2	13,1	5,7	-1,9	34,5
Portugal	1,1	5,8	10,2	5,5	10,3	8,1	12,7	3,8	3,4	6,0	1,1	2,6	0,3	-3,7	3,0	7,9	0,7	-3,7	12,7
Romania	1,2	-2,5	0,2	-0,1	10,0	-1,7	2,5	7,8	11,8	11,1	3,6	-1,0	-1,7	-0,4	2,0	1,8	-2,0	-2,5	11,8

Cont. table 12.

Slovakia	2,2	5,3	-0,6	3,3	4,4	0,1	8,6	3,9	3,7	10,0	-0,9	-0,6	-5,2	0,7	2,8	4,4	-3,0	-5,2	10,0
Slovenia	-2,1	-1,5	-1,9	8,2	12,7	-4,6	-3,6	1,9	4,6	2,6	-3,6	-2,0	1,2	-0,4	1,0	7,5	-0,3	-4,6	12,7
Spain	0,8	4,5	8,4	9,5	17,3	6,7	6,0	6,1	7,7	3,1	-0,4	-0,8	-0,6	-3,4	5,4	15,7	7,0	-3,4	17,3
Sweden	-0,6	1,7	2,8	0,9	8,5	-4,3	6,9	0,3	3,3	2,4	4,0	-1,3	1,6	0,5	7,6	4,6	1,6	-4,3	8,5

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

5. Share of energy from renewable sources in heating and cooling

The table below presents the percentage gross final energy consumption data regarding energy allocation from renewable sources in heating and cooling in European Union countries in 2004-2021.

Table 13.*Share of energy from renewable sources in heating and cooling over the years 2004-2021*

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Austria	20,17	22,82	24,49	27,14	27,20	29,63	30,96	31,52	33,08	33,22	33,38	33,23	33,48	33,67	34,18	33,93	35,00	35,48
Belgium	2,93	3,42	3,81	4,71	5,12	6,09	6,71	6,72	7,11	7,64	7,75	7,94	8,25	8,20	8,29	8,32	8,45	9,24
Bulgaria	14,06	14,26	14,79	13,86	17,26	21,64	24,33	24,77	27,24	29,23	28,52	28,90	29,99	29,85	33,25	35,42	37,18	25,63
Croatia	29,41	30,00	29,07	29,30	28,82	31,30	32,88	33,82	36,55	37,31	36,22	38,62	37,64	36,63	36,65	36,79	36,93	38,03
Cyprus	9,26	9,97	10,43	13,06	14,47	17,31	18,81	19,98	21,76	22,54	22,19	24,07	24,69	26,42	37,16	35,05	37,12	41,34
Czechia	9,92	10,84	11,23	12,37	12,92	14,26	14,10	15,39	16,25	17,71	19,53	19,79	19,88	19,73	20,64	22,63	23,54	24,18
Denmark	20,50	22,61	23,66	26,71	27,96	29,40	30,37	31,89	33,20	34,68	38,01	39,54	41,08	44,06	44,97	47,30	51,07	41,53
Estonia	33,36	32,37	30,84	33,04	36,00	42,03	43,16	44,55	43,22	43,11	44,93	50,03	51,77	52,22	53,67	52,19	58,83	61,32
Finland	39,50	39,12	41,41	41,43	43,08	42,89	43,97	45,73	48,23	50,77	51,96	52,62	53,70	54,59	54,91	56,88	57,62	52,59
France	12,53	12,36	11,70	12,79	13,28	15,04	16,16	15,26	16,59	17,61	18,05	18,88	20,12	20,60	21,22	22,36	23,37	24,21
Germany	7,20	7,71	8,41	10,25	10,33	11,16	12,06	12,61	13,42	13,41	13,41	13,43	13,03	13,37	14,22	14,50	14,48	15,44
Greece	13,47	13,38	13,10	14,68	14,72	17,25	18,66	20,11	24,12	27,42	27,87	26,56	25,42	28,25	30,12	30,05	31,94	31,15
Hungary	6,45	9,94	11,38	13,54	11,97	17,02	18,08	20,04	23,31	23,70	21,28	21,34	21,03	19,90	18,20	18,16	17,72	17,93
Ireland	2,87	3,44	3,59	3,79	3,51	4,18	4,28	4,66	4,85	5,19	6,26	6,18	6,24	6,62	6,38	6,34	6,26	5,17
Italy	5,71	8,22	10,09	13,33	15,31	16,43	15,64	13,82	16,98	18,09	18,91	19,26	18,89	20,08	19,28	19,70	19,95	19,71
Latvia	42,49	42,68	42,59	42,36	42,94	47,89	40,75	44,71	47,27	49,65	52,15	51,74	51,81	54,58	55,41	57,75	57,09	57,38
Lithuania	30,44	29,32	29,23	29,09	31,99	33,72	32,53	32,79	34,54	36,87	40,63	46,08	46,56	46,50	46,02	47,37	50,35	48,63
Luxembourg	1,82	3,61	3,63	4,35	4,57	4,63	4,70	4,74	4,93	5,33	7,07	6,86	7,06	7,45	8,36	8,69	12,61	12,92
Malta	1,04	1,03	1,36	1,51	1,70	2,01	7,28	12,03	13,40	15,40	15,03	14,64	16,85	19,31	22,83	23,60	23,03	31,36
Netherlands	2,18	2,38	2,70	2,91	3,02	3,37	3,10	3,69	3,77	4,00	4,93	5,28	5,19	5,75	6,16	7,22	8,05	7,72
Poland	10,21	10,16	10,17	10,46	10,85	11,61	11,81	13,24	13,50	14,27	14,24	14,80	14,92	14,78	21,47	22,01	22,14	21,03
Portugal	32,49	32,08	34,23	34,95	37,45	37,93	33,81	35,18	33,15	34,63	40,45	40,10	41,61	41,02	40,92	41,66	41,55	42,68
Romania	17,34	17,93	17,58	19,47	23,17	26,43	27,23	24,31	25,75	26,20	26,74	25,89	26,87	26,58	25,43	25,74	25,33	24,48
Slovakia	5,06	5,03	4,45	6,23	6,10	8,18	7,90	9,26	8,80	7,88	8,87	10,79	9,88	9,84	10,60	19,70	19,43	19,52
Slovenia	22,82	26,40	24,35	29,31	27,53	28,87	29,54	31,79	33,15	35,12	34,64	36,15	35,56	34,64	32,34	32,13	32,14	35,22
Spain	9,55	9,41	11,38	11,25	11,62	13,22	12,50	13,47	13,97	13,97	15,56	16,85	15,90	16,21	16,14	17,20	17,97	17,40
Sweden	45,93	49,02	52,50	54,47	55,78	59,20	57,07	58,52	60,64	61,71	62,57	63,24	63,41	63,62	63,30	64,39	66,38	68,64

Source: https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

The smallest and largest values were determined based on the presented data, as shown in Table 14.

Table 14.*The largest and smallest share of energy from renewable energy sources in heating and cooling over the years 2004-2021*

	The smallest value	Year of lowest value	The greatest value	Year of greatest value	Difference
Austria	20,17	2004	35,48	2021	15,32
Belgium	2,93	2004	9,24	2021	6,31
Bulgaria	13,86	2007	37,18	2020	23,32
Croatia	28,82	2008	38,62	2015	9,80
Cyprus	9,26	2004	41,34	2021	32,08
Czechia	9,92	2004	24,18	2021	14,27
Denmark	20,50	2004	51,07	2020	30,57

Cont. table 14.

Estonia	30,84	2006	61,32	2021	30,49
Finland	39,12	2005	57,62	2021	18,51
France	11,70	2006	24,21	2021	12,52
Germany	7,20	2004	15,44	2021	8,24
Greece	13,10	2006	31,94	2021	18,85
Hungary	6,45	2004	23,70	2013	17,25
Ireland	2,87	2004	6,62	2020	3,75
Italy	5,71	2004	20,08	2021	14,37
Latvia	40,75	2010	57,75	2021	17,00
Lithuania	29,09	2007	50,35	2020	21,26
Luxembourg	1,82	2004	12,92	2021	11,10
Malta	1,03	2005	31,36	2021	30,33
Netherlands	2,18	2004	8,05	2020	5,88
Poland	10,16	2005	22,14	2020	11,98
Portugal	32,08	2005	42,68	2021	10,61
Romania	17,34	2004	27,23	2021	9,89
Slovakia	4,45	2006	19,70	2019	15,25
Slovenia	22,82	2004	36,15	2015	13,33
Spain	9,41	2005	17,97	2020	8,56
Sweden	45,93	2004	68,64	2021	22,71

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

Among the European Union member states, Malta had the smallest share of energy from renewable sources in heating and cooling – 1,03% in 2005, while Sweden had the largest – 68,64% in 2021. In terms of the minor difference obtained between the maximum and minimum share of energy over the years 2004-2021, Ireland achieved – 3,75% (difference between 2004 and 2020), while Cyprus achieved the highest value of the difference – 32,08% (difference between 2004 and 2021).

Table 15.

Presentation of the share of energy from renewable sources in heating and cooling in 2019, 2020 and 2021 in descending order

2019		2020		2021	
Sweden	64,394	Sweden	66,381	Sweden	68,642
Latvia	57,749	Estonia	58,834	Estonia	61,323
Finland	56,884	Finland	57,622	Latvia	57,378
Estonia	52,193	Latvia	57,094	Finland	52,589
Lithuania	47,372	Denmark	51,073	Lithuania	48,627
Denmark	47,302	Lithuania	50,35	Portugal	42,681
Portugal	41,657	Portugal	41,546	Denmark	41,53
Croatia	36,791	Bulgaria	37,178	Cyprus	41,343
Bulgaria	35,423	Cyprus	37,117	Croatia	38,028
Cyprus	35,051	Croatia	36,928	Austria	35,481
Austria	33,929	Austria	34,995	Slovenia	35,215
Slovenia	32,132	Slovenia	32,141	Malta	31,356
Greece	30,048	Greece	31,941	Greece	31,146
Romania	25,739	Romania	25,327	Bulgaria	25,625
Malta	23,602	Czechia	23,535	Romania	24,483
Czechia	22,632	France	23,368	France	24,212
France	22,36	Malta	23,027	Czechia	24,183
Poland	22,005	Poland	22,143	Poland	21,031
Italy	19,699	Italy	19,949	Italy	19,713
Slovakia	19,696	Slovakia	19,427	Slovakia	19,521
Hungary	18,16	Spain	17,966	Hungary	17,929

Cont. table 15.

Spain	17,203	Hungary	17,72	Spain	17,398
Germany	14,504	Germany	14,481	Germany	15,438
Luxembourg	8,687	Luxembourg	12,614	Luxembourg	12,918
Belgium	8,319	Belgium	8,447	Belgium	9,241
Netherlands	7,217	Netherlands	8,053	Netherlands	7,72
Ireland	6,344	Ireland	6,264	Ireland	5,174

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

In the last three years of the analyzed period, Sweden was in first place in share of energy from renewable sources in heating and cooling (64,394% - 2019, 66,381% - 2020, 68,642% - 2021), followed by Latvia (57,749% in 2019 and 57,378% in 2021) and Finlandia (56,884% in 2019 and 57,622% in 2020). Estonia was in second place wn 2020 (58,834%) and in 2021 (61,323%). The countries with the lowest share in the last three years of the analyzed period are Belgium, Netherlands and Ireland. In these countries share of energy from renewable sources in heating and cooling was as follows: in 2019 – Belgium 8,319%, Netherlands 7,217%, Ireland 6,344%, in 2020 – Belgium 8,447%, Netherlands 8,053, Ireland 6,264%, in 2021 – Belgium 9,241%, Netherlands 7,72%, Ireland 5,174%. Analysis of the last year of reported data, the largest share in energy from renewable sources was recorded by Sweden (68,642%), followed by Estonia (61,32%) and Latvia (57,38). In contrast, the smallest share was recorded by Ireland (5,174%), then the Netherlands (7,72%) and Belgium (9,241%). The average percentage of European Union countries in energy from renewable sources in 2021 was 30.74%. The share of energy from renewable sources was above average in 13 countries, with the most minor difference from the average being Greece – 31,15%. Below, Figure 4 presents the results of the share of energy from renewable sources in heating and cooling of EU countries last three years from the period 2004-2021.

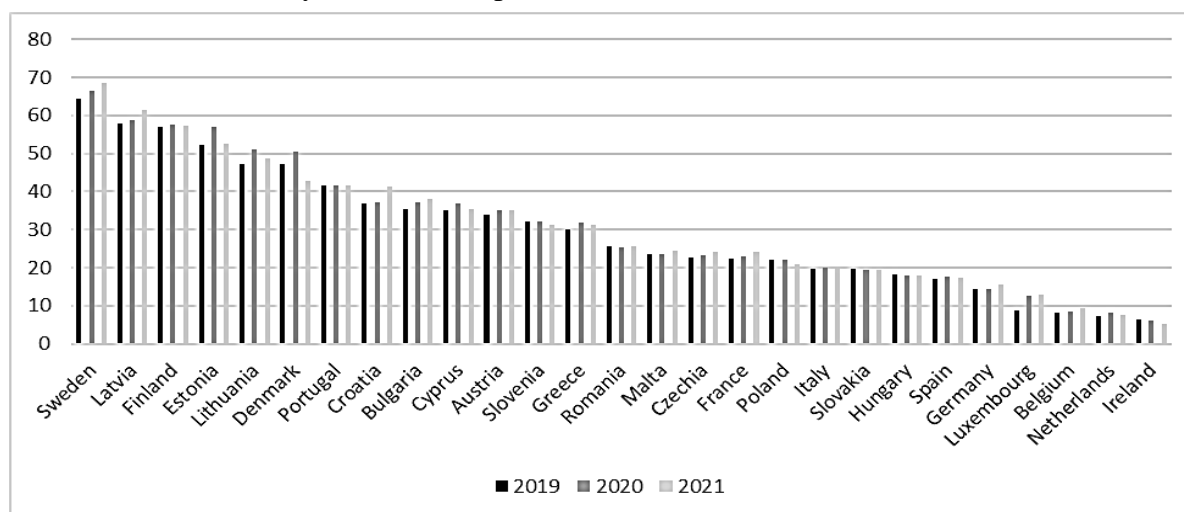


Figure 4. Presentation of the percentage share of energy from renewable sources in heating and cooling of EU countries in 2019, 2020 and 2021.

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

The table below shows the percentage change in the share of energy from renewable sources in heating and cooling in subsequent years compared to the year immediately preceding. Over the years 2004-2021, all countries recorded a decline. The most significant decrease was achieved by Bulgaria in 2021 (31,07%), and the most minor drop by Belgium was 0,57% in 2017. Analysis of the data on the maximum increase in percentage change, Malta achieved a rise of 262,11% in 2010 compared to 2009, while the smallest increase was achieved by Finland by 5,86% in 2006 compared to 2005.

Table 16.

Percentage change from year to year in the share of energy from renewable sources in heating and cooling in EU countries over the years 2004-2021

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	MIN	MAX
Austria	13,2	7,3	10,8	0,2	8,9	4,5	1,8	4,9	0,4	0,5	-0,4	0,7	0,6	1,5	-0,7	3,1	1,4	-0,7	13,2
Belgium	16,8	11,5	23,6	8,7	18,9	10,2	0,1	5,8	7,5	1,5	2,5	3,8	-0,6	1,1	0,3	1,5	9,4	-0,6	23,6
Bulgaria	1,4	3,7	-6,3	24,5	25,4	12,5	1,8	10,0	7,3	-2,4	1,4	3,8	-0,5	11,4	6,5	5,0	-31,1	-31,1	25,4
Croatia	2,0	-3,1	0,8	-1,6	8,6	5,1	2,9	8,1	2,1	-2,9	6,6	-2,5	-2,7	0,1	0,4	0,4	3,0	-3,1	8,6
Cyprus	7,6	4,7	25,2	10,8	19,7	8,7	6,2	8,9	3,6	-1,6	8,5	2,6	7,0	40,7	-5,7	5,9	11,4	-5,7	40,7
Czechia	9,2	3,7	10,1	4,4	10,4	-1,2	9,2	5,6	9,0	10,3	1,3	0,5	-0,8	4,6	9,6	4,0	2,8	-1,2	10,4
Denmark	10,3	4,6	12,9	4,7	5,1	3,3	5,0	4,1	4,5	9,6	4,0	3,9	7,3	2,1	5,2	8,0	-18,7	-18,7	12,9
Estonia	-3,0	-4,7	7,1	9,0	16,8	2,7	3,2	-3,0	-0,2	4,2	11,3	3,5	0,9	2,8	-2,8	12,7	4,2	-4,7	16,8
Finland	-1,0	5,9	0,1	4,0	-0,4	2,5	4,0	5,5	5,3	2,3	1,3	2,1	1,7	0,6	3,6	1,3	-8,7	-8,7	5,9
France	-1,3	-5,4	9,3	3,9	13,2	7,5	-5,6	8,7	6,1	2,5	4,6	6,6	2,4	3,0	5,4	4,5	3,6	-5,6	13,2
Germany	7,1	9,1	21,9	0,8	8,0	8,1	4,6	6,5	-0,1	0,0	0,2	-3,0	2,6	6,4	2,0	-0,2	6,6	-3,0	21,9
Greece	-0,6	-2,2	12,1	0,3	17,2	8,2	7,8	19,9	13,7	1,6	-4,7	-4,3	11,1	6,6	-0,2	6,3	-2,5	-4,7	19,9
Hungary	54,0	14,5	19,0	-11,6	42,2	6,2	10,9	16,3	1,7	-10,2	0,2	-1,4	-5,4	-8,5	-0,2	-2,4	1,2	-11,6	54,0
Ireland	19,8	4,4	5,4	-7,2	19,0	2,4	8,8	4,1	6,9	20,8	-1,2	1,0	6,1	-3,7	-0,6	-1,3	-17,4	-17,4	20,8
Italy	43,9	22,8	32,1	14,8	7,3	-4,8	-11,7	22,9	6,5	4,5	1,8	-1,9	6,3	-4,0	2,2	1,3	-1,2	-11,7	43,9
Latvia	0,4	-0,2	-0,5	1,4	11,5	-14,9	9,7	5,7	5,0	5,0	-0,8	0,1	5,3	1,5	4,2	-1,1	0,5	-14,9	11,5
Lithuania	-3,7	-0,3	-0,5	10,0	5,4	-3,5	0,8	5,3	6,8	10,2	13,4	1,0	-0,1	-1,0	2,9	6,3	-3,4	-3,7	13,4
Luxembourg	98,2	0,5	19,9	5,0	1,3	1,6	0,7	4,1	8,1	32,6	-3,0	2,9	5,6	12,2	3,9	45,2	2,4	-3,0	98,2
Malta	-0,7	32,6	10,6	12,5	18,6	262,1	65,1	11,4	14,9	-2,4	-2,6	15,1	14,6	18,2	3,4	-2,4	36,2	-2,6	262,1
Netherlands	9,2	13,5	7,9	3,8	11,4	-8,0	19,0	2,2	6,2	23,1	7,2	-1,6	10,7	7,1	17,2	11,6	-4,1	-8,0	23,1
Poland	-0,5	0,1	2,9	3,7	7,0	1,8	12,1	1,9	5,7	-0,2	3,9	0,8	-0,9	45,3	2,5	0,6	-5,0	-5,0	45,3
Portugal	-1,3	6,7	2,1	7,2	1,3	-10,9	4,1	-5,8	4,4	16,8	-0,9	3,8	-1,4	-0,2	1,8	-0,3	2,7	-10,9	16,8
Romania	3,4	-1,9	10,7	19,0	14,1	3,0	-10,7	5,9	1,7	2,1	-3,2	3,8	-1,1	-4,3	1,2	-1,6	-3,3	-10,7	19,0
Slovakia	-0,6	-11,5	40,0	-2,2	34,1	-3,4	17,2	-4,9	-10,5	12,6	21,7	-8,5	-0,4	7,7	85,8	-1,4	0,5	-11,5	85,8
Slovenia	15,7	-7,8	20,4	-6,1	4,9	2,3	7,6	4,3	5,9	-1,4	4,4	-1,6	-2,6	-6,6	-0,6	0,0	9,6	-7,8	20,4
Spain	-1,5	20,9	-1,1	3,3	13,8	-5,4	7,8	3,7	0,0	11,4	8,3	-5,6	1,9	-0,4	6,6	4,4	-3,2	-5,6	20,9
Sweden	6,7	7,1	3,8	2,4	6,1	-3,6	2,5	3,6	1,8	1,4	1,1	0,3	0,3	-0,5	1,7	3,1	3,4	-3,6	7,1

Source: own study based on

https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en

6. Summary

The EU share in the gross final energy consumption from renewable sources in 2021 amounted to 21,775%, compared to 2020, and the energy share of 22,038%, gives a decrease of 0,263%. This change may have been influenced by the lifting of restrictions related to the Covid-19 pandemic, as well as a difference in the legal basis and accounting methodology: data for 2020 were calculated based on the RED I directive, while data for 2021 were based on the RED II directive. This article focuses on analyzing available energy share data from 2004-2021. Still, it seems reasonable to explore in more detail the data from these two periods (2020 and 2021) and the impact of the differences between the RED I and RED II directives.

References

1. Baehr, J., Frąckowiak, A., Hajdrowski, K., Lisoń, P., Pokrzywniak, J., Szambelańczyk, M., Stawicki, A., Urban, S. (2016). *Ustawa o odnawialnych źródłach energii*. Wolters Kluwer.
2. Chmielnik, T. (2018). *Technologie energetyczne*. Warszawa: PWN.
3. Chwiediuk, D. (2018). *Energetyka odnawialna w budownictwie. Magazynowanie energii*. Warszawa: PWN.
4. European Commission (2021). *Shares tool manual*. Retrieved from: <https://ec.europa.eu/eurostat/documents/38154/4956088/SHARES+tool+manual-2021.pdf/11701ebe-1dae-3b00-4da4-229d86d68744?t=1664793455773>
5. European Parliament (2017). *Renewable energy: setting ambitious targets for Europe*. Retrieved from: <https://www.europarl.europa.eu/news/pl/headlines/economy/20171124STO88813/energia-odnawialna-wyznaczanie-ambitnych-celow-dla-europy>
6. European Parliament (2018). *Ograniczanie emisji gazów cieplarnianych w UE: krajowe cele na 2030 r.* Retrieved from: <https://www.europarl.europa.eu/news/pl/headlines/society/20180208STO97442/ograniczanie-emisji-gazow-cieplarnianych-w-ue-krajowe-cele-na-2030-r>
7. https://ec.europa.eu/eurostat/cache/metadata/en/nrg_ind_share_esmsip2.htm
8. https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren/default/table?lang=en
9. Jastrzębska, G. (2017). *Energia ze źródeł odnawialnych i jej wykorzystanie*. Sulejówek: Wydawnictwa Komunikacji i Łączności WKŁ.
10. Klugmann-Radziemska, E., Lewandowski, W. (2017). *Proekologiczne odnawialne źródła energii. Kompendium*. Warszawa: PWN.
11. Ligus, M. (2009). *Efektywność inwestycji w odnawialne źródła energii*. Warszawa: CeDeWu.
12. Niedziółka, D. (2018). *Funkcjonowanie polskiego rynku energii*. Warszawa: Difin.
13. Parlament europejski i Rada Unii europejskiej (2009). *Dyrektywa Parlamentu Europejskiego i Rady 2009/28/WE*. Retrieved from: <https://eur-lex.europa.eu/legal-content/PL/TXT/PDF/?uri=CELEX:32009L0028&from=EN>
14. Szyrski, M. (2017). *Rola samorządu terytorialnego w rozwoju odnawialnych źródeł energii (OZE) analiza administracyjnoprawna*. Wolters Kluwer.