

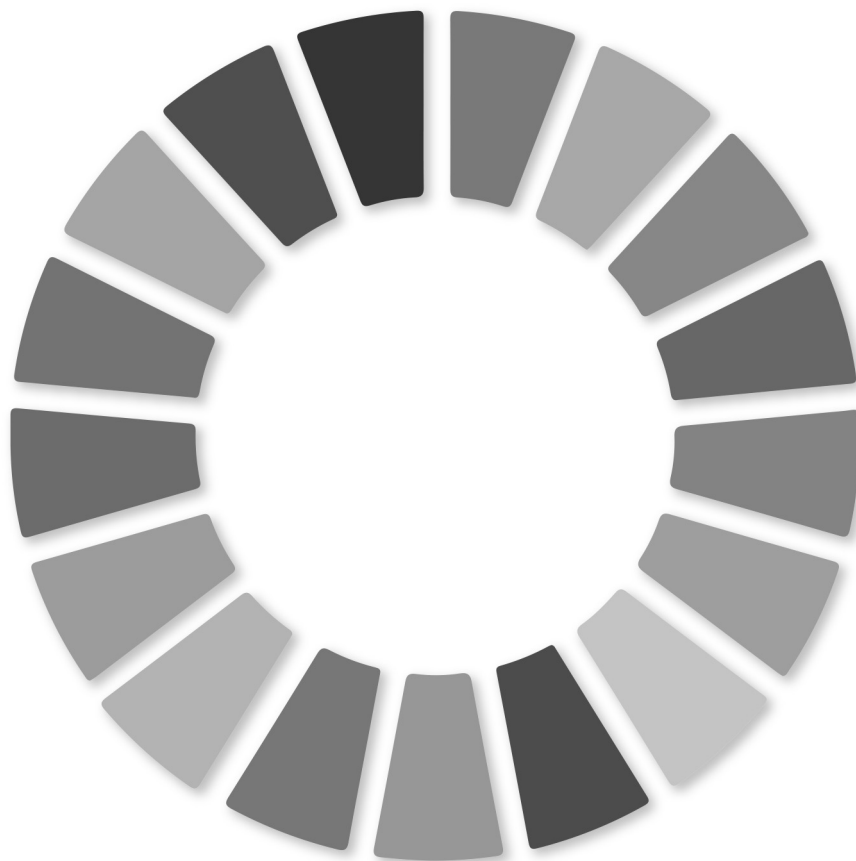


Report 2022

**Poland on the way to SDGs**

Environmentally sustainable development





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Environmentally sustainable development



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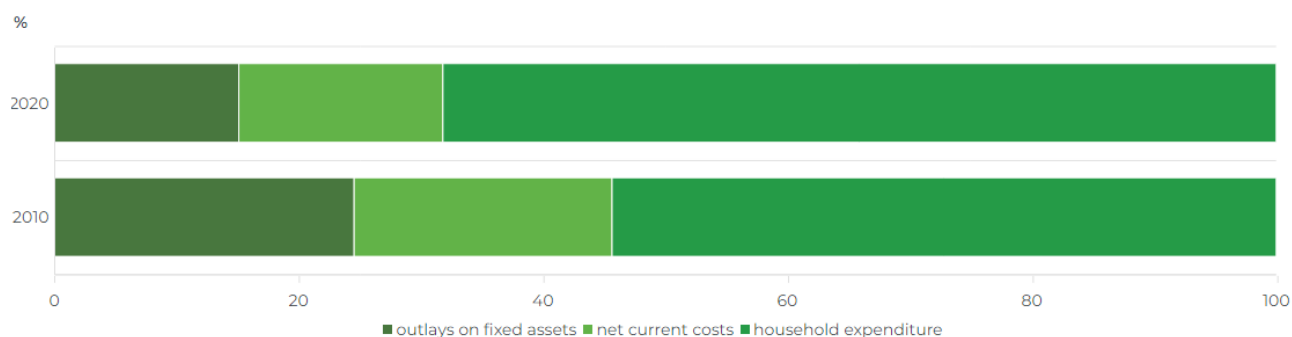
The last decade was the warmest in the history of meteorological measurements. The global mean temperature was higher by approximately 1°C compared to the pre-industrial era, and by about 2°C in Europe alone. At the same time, precipitation was irregularly distributed in space and time, and currently it is more intense than some years ago. We are increasingly exposed to weather and climate-related extreme events, as a result of which Poland, according to the European Environment Agency, faced financial loss of more than EUR 3 billion (EUR 88 per capita) in the years 2010-2020. The mitigation of climate change and the protection of natural environment for future generations have been the most urgent tasks outlined for us by the 2030 Agenda.

### Climate related financial losses

Years	in billion euros	euro per 1 inhabitant
2010-2020	3.4	88
2000-2009	2.0	53
1990-1999	5.6	145
1980-1989	5.1	139

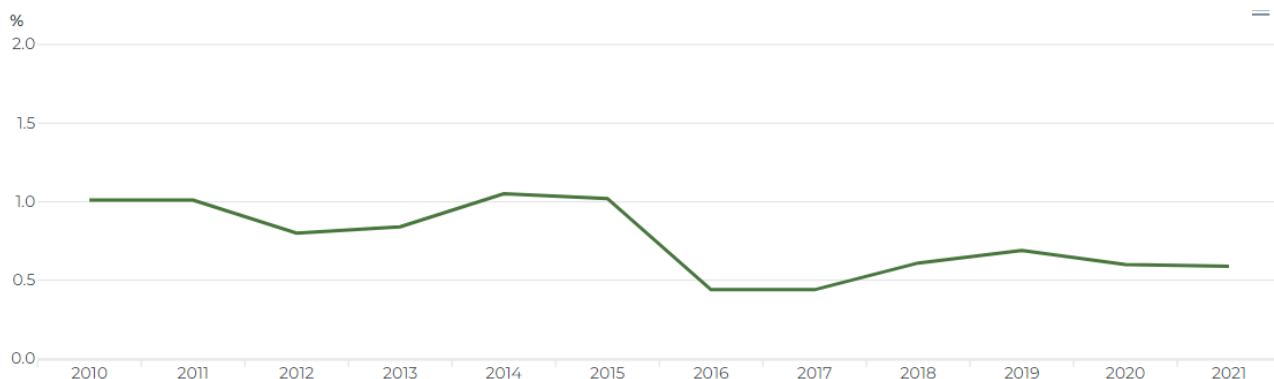
Eurostat/European Environment Agency

### Structure of expenditure on environmental protection



	2010	2020
outlays on fixed assets	24.5	15.1
net current costs	21.1	16.7
household expenditure	54.3	68.2

## Outlays on fixed assets for environmental protection and water management in relation to GDP



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
total	1.01	1.01	0.80	0.84	1.05	1.02	0.44	0.44	0.61	0.69	0.60	0.59

In Poland, an amount equivalent to about 3% of GDP (more than the EU average of approximately 2% of GDP) is spent each year on environment protection. Are financial outlays and undertakings aimed at limiting the negative influence of the economy on the environment effective? Is the Polish economy more environmentally sustainable now than a decade ago? This year's Report attempts to answer these questions. As in the previous editions, we present only selected phenomena and general trends. If you are interested in more detailed information, please refer to the following publications: Atlas of environment, Environment 2022 and Economic aspects of environmental protection, as well as to a Statistics Poland's Information Portal and the National Reporting Platform SDG.

We wish you pleasant reading!



## Environmental state

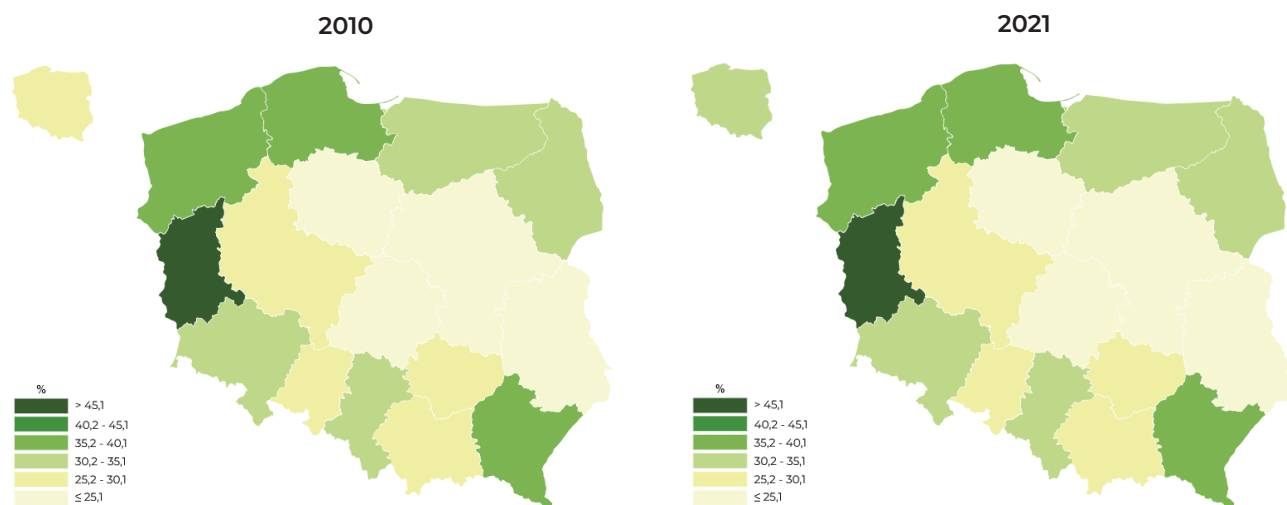
### Natural resources

Poland, having territorial rights to slightly over 2% of the Baltic Sea, belongs to the group of nine countries of the Baltic Sea region. Almost 90% of Poland's territory is situated in the basin of the country's two largest rivers: the Vistula and the Oder. Poland's landform consists mostly of lowlands: 91% of the country's territory is less than 300 metres above sea level, 6% is uplands (between 300 and 500 metres above sea level), and 3% is mountainous land (over 500 metres above sea level).

Medium-fertile brown earths and luvisols constitute over 50% of Poland's soil make-up, while acidic and infertile podzols and rusty soils account for 25%. The most fertile chernozems, black soils and fluvisols constitute 8% of Poland's soil make-up. Minerals are the natural riches of Poland's soil, which include fuels (mainly hard coal and lignite), chemical raw materials (e.g. rock salt), metallic raw materials (e.g. copper ores) and mineral resources (limestones and marls, crushed and broken stones, and also sands and gravels).

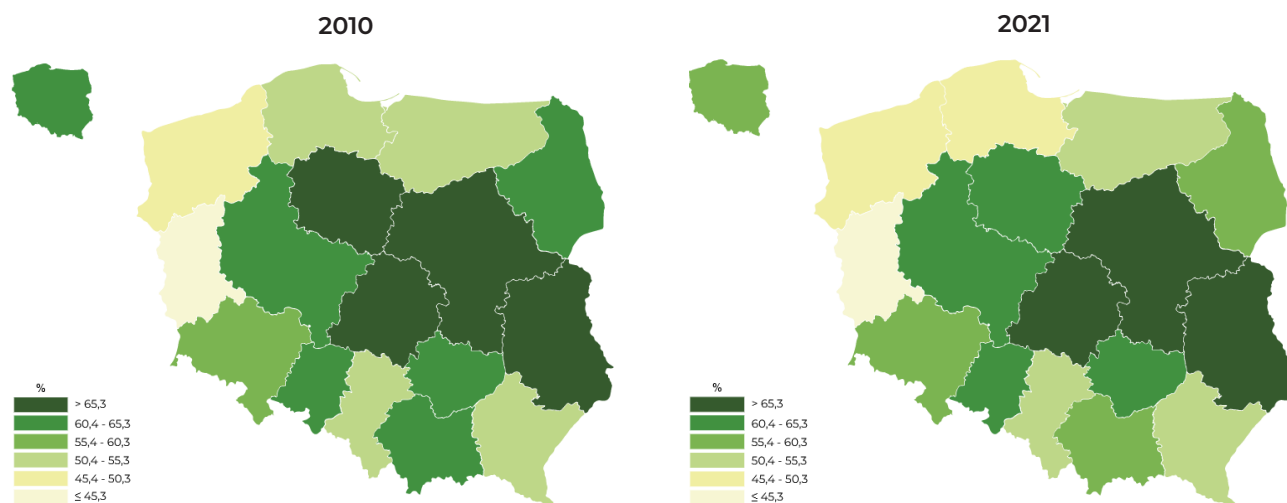
The largest part of Poland's area (60%) is composed of utilised agricultural area (mainly arable lands, meadows, pastures and orchards), and a significant part are forests (30% of the country's total area, which puts Poland below the EU average of 40%). Approximately 2% of Poland's area is covered by water; residential areas, as well as recreational and rest areas and industrial lands, likewise account for 2% of the country's land. Voivodships with the largest share of utilised agricultural area, accounting for about 70% of their total area, are Lubelskie and Łódzkie. Lubuskie Voivodship, on the other hand, has the least agricultural character, with just 40% of its area being agricultural land. At the same time, Lubuskie may boast the largest proportion of forests in Poland, which cover half of the total area of this voivodship. The least forested is Łódzkie Voivodship, where 22% of the land is woodland. Śląskie is Poland's most urbanised voivodship, where residential areas and industrial lands account for 6% of the total area, whereas the least urbanised voivodships are Podlaskie and Lubelskie (residential areas and industrial lands constitute less than 1% of each of their total areas).

## Share of forest area in total land area of voivodships



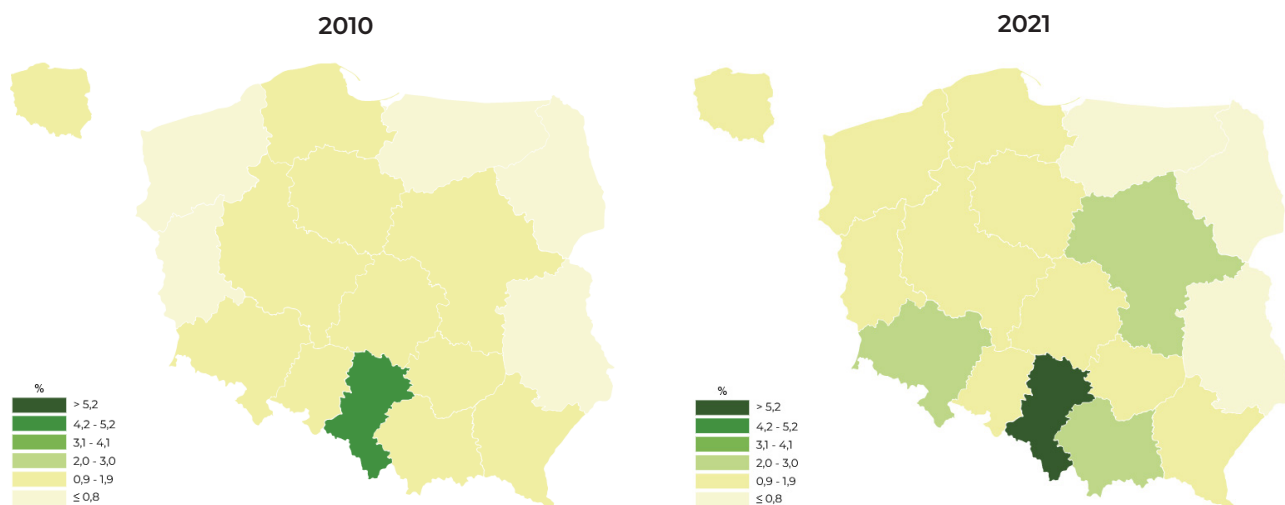
	2010	2021
Poland	29.7	30.2
Dolnośląskie	30.4	30.7
Kujawsko-pomorskie	23.7	23.9
Lubelskie	22.8	23.4
Lubuskie	50.6	50.9
Łódzkie	21.3	21.6
Małopolskie	28.9	29.1
Mazowieckie	22.6	23.6
Opolskie	27.4	27.6
Podkarpackie	37.8	38.7
Podlaskie	31.0	31.4
Pomorskie	37.0	37.3
Śląskie	32.4	32.8
Świętokrzyskie	28.4	28.8
Warmińsko-mazurskie	31.2	32.6
Wielkopolskie	26.2	26.4
Zachodniopomorskie	36.2	36.8

## Share of agricultural land in total land area of voivodships



	2010	2021
Poland	60.5	59.9
Dolnośląskie	60.0	59.4
Kujawsko-pomorskie	65.6	64.8
Lubelskie	70.8	70.2
Lubuskie	40.8	40.5
Łódzkie	71.3	70.3
Małopolskie	61.7	60.3
Mazowieckie	68.8	67.7
Opolskie	64.2	63.9
Podkarpackie	53.9	53.8
Podlaskie	60.4	60.2
Pomorskie	50.7	50.0
Śląskie	52.4	50.4
Świętokrzyskie	64.6	64.6
Warmińsko-mazurskie	54.9	54.3
Wielkopolskie	65.3	64.5
Zachodniopomorskie	49.3	49.2

## Share of residential and industrial land in total land area of voivodships



	2010	2021
Poland	1.3	1.6
Dolnośląskie	1.7	2.1
Kujawsko-pomorskie	1.2	1.6
Lubelskie	0.5	0.7
Lubuskie	0.8	1.1
Łódzkie	1.3	1.8
Małopolskie	1.6	2.5
Mazowieckie	1.5	2.0
Opolskie	1.5	1.7
Podkarpackie	0.9	1.3
Podlaskie	0.5	0.6
Pomorskie	1.3	1.6
Śląskie	5.2	6.3
Świętokrzyskie	0.9	1.2
Warmińsko-mazurskie	0.6	0.8
Wielkopolskie	1.2	1.7
Zachodniopomorskie	0.8	0.9

Poland's renewable fresh water resources are relatively small. They are estimated<sup>1</sup> at 61 bn m<sup>3</sup>. According to the UN, in order to guarantee water security, a country has to have at least 1,700 m<sup>3</sup> of renewable fresh water per person a year. The figure for Poland, however, is below this minimum, reaching 1,600 m<sup>3</sup>, which at the same time is one of the smallest amounts in the EU. Only the Czech Republic, Malta and Cyprus struggle with even smaller fresh water resources than Poland.

Poland is a country of high biodiversity, with a broad range of areas and items of special natural value under legal protection. There are 23 national parks, 1,506 nature reserves, 126 landscape parks, 389 protected landscape areas, over 8,000 ecological areas, and more than 35,000 monuments of nature in Poland. Over 10 mln ha of land is under legal protection in Poland. Its large share, including all the national parks, is a part of Natura 2000 sites, which cover 20% of Poland's total land area. There are estimated 33,000 different animal species in Poland, 61 of which are threatened with extinction<sup>2</sup>. Nearly 590 animal species are under strict protection. Most of them (72%) are birds, and the remaining include gray wolves, Eurasian lynxes, northern chamoises, brown bears and European bison (whose population in Poland is the largest in the world). Some plant species are also under protection. From over 3,000 species of land plants<sup>3</sup> growing in Poland, 480 are threatened with extinction, out of which 400 are under strict protection.

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<sup>1</sup> The average for the years 1999–2020.

<sup>2</sup> According to the Polish Red Data Book of Animals (<https://www.iop.krakow.pl/pckz/defaultadf8.html?nazwa=default&-je=en>).

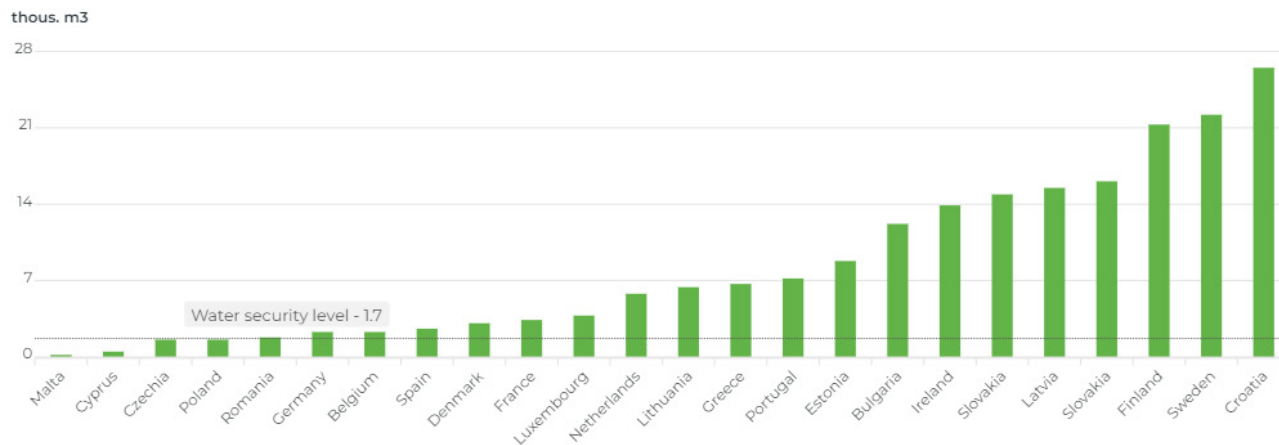
<sup>3</sup> Without mosses, liverworts and hornworts.

## Resources and the place of Poland in the world in extraction of selected minerals

Raw material	Mineral resources [mln tonnes]	Place in the world in extraction
Rock-salt	112.4	16 (2017)
Hard coal	64.7	10 (2018)
Lignite	23.1	4 (2018)
Sand and gravel	20.2	13 (2020)
Copper and silver ores	3.2	9*(2020)

\*Copper only.

## Renewable freshwater resources per capita in the EU (LTAA)



\*Average from 1999-2020

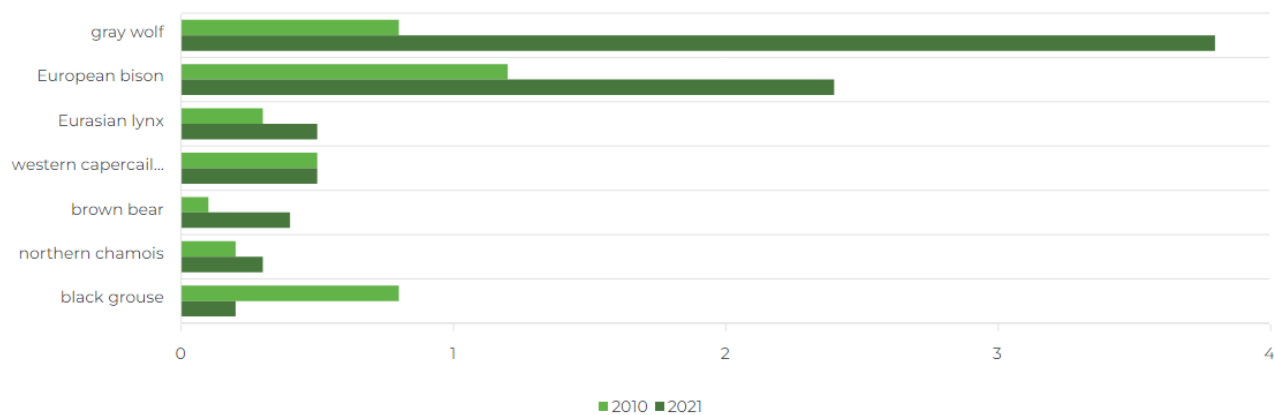
Long Term Annual Average

Malta	0.2
Cyprus	0.5
Czechia	1.6
Poland	1.6
Romania	1.8
Germany	2.3
Belgium	2.3
Spain	2.6
Denmark	3.1

France	3.4
Luxembourg	3.8
Netherlands	5.8
Lithuania	6.4
Greece	6.7
Portugal	7.2
Estonia	8.8

### Selected protected animals

thous.



Specification	2010	2021
gray wolf	0.8	3.8
European bison	1.2	2.4
Eurasian lynx	0.3	0.5
western capercaillie	0.5	0.5
brown bear	0.1	0.4
northern chamois	0.2	0.3
black grouse	0.8	0.2

## Environmental quality

Since 2010, the quality of Poland’s natural environment has improved in certain areas, although the country is still facing challenges related to counteracting its degradation. Over 62,000 ha of land (0.2% of Poland’s total area) remain devastated and degraded as a result of natural environmental processes and human activity, even though on average 2,000 ha of land have been reclaimed each year. The area covered by forests has slightly expanded since 2010 (30.2% compared to 29.7%) due to renewals and afforestation (which covered an area of 55,000-65,000 ha annually). Nevertheless, it is observed that over 20% of trees suffer from leaf and needle drop caused by leaf- and needle-feeding insects, and air or soil pollution (the process is called defoliation). The increase of the Forest Bird Index (FBI 34) suggests that the health condition of forest ecosystems has improved. The FBI 34 has risen by 31% since 2000, when the survey began (the trends in this respect remained positive also in the last decade). The last decade additionally saw an increase in the population of protected animal species considered as important in Poland. According to the estimates provided by the General Directorate for Environmental Protection, since 2010, the population of gray wolves has risen nearly fivefold and the number of brown bears more than doubled. The Eurasian lynx, northern chamois and European bison populations have also grown. However, in the same period, the Farmland Bird Index (FBI) decreased, in 2021 reaching its lowest point since the beginning of the research (i.e. 2000). This suggests a change in the condition of the Polish agricultural ecosystems.

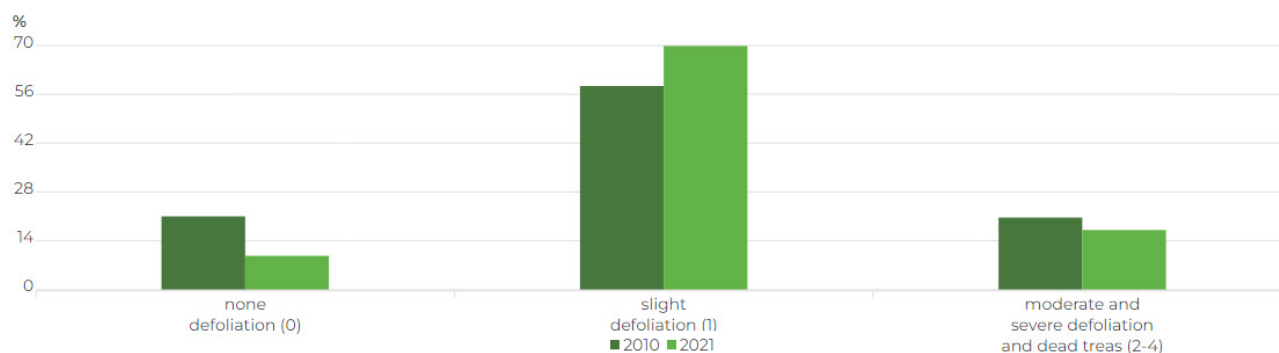
### Devastated and degraded land





Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
total	61.2	64.0	64.3	62.0	62.8	63.4	64.7	62.0	61.9	62.1	62.5	62.3
reclaimed and managed land	1.8	2.4	3.9	2.6	2.9	2.7	2.0	1.8	2.0	2.1	2.0	2.8

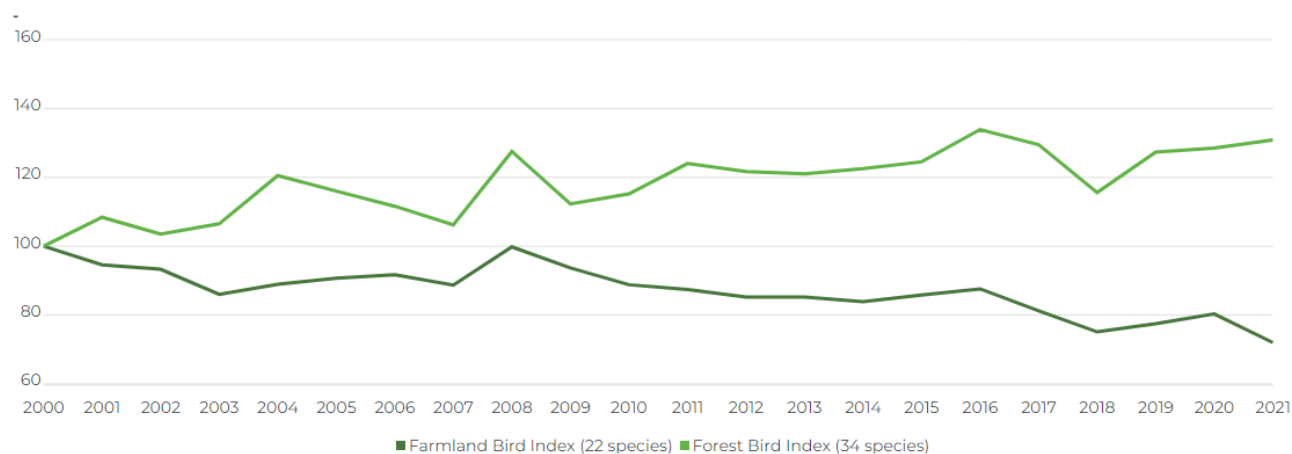
### Forest condition by defoliation classes



Defoliation - dropping of leaves or needles caused by feeding grounds of insects, air pollution or soil.

Specification	2010	2021
none defoliation (0)	21.0	9.7
slight defoliation (1)	58.4	73.2
moderate and severe defoliation and dead trees (2-4)	20.7	17.1

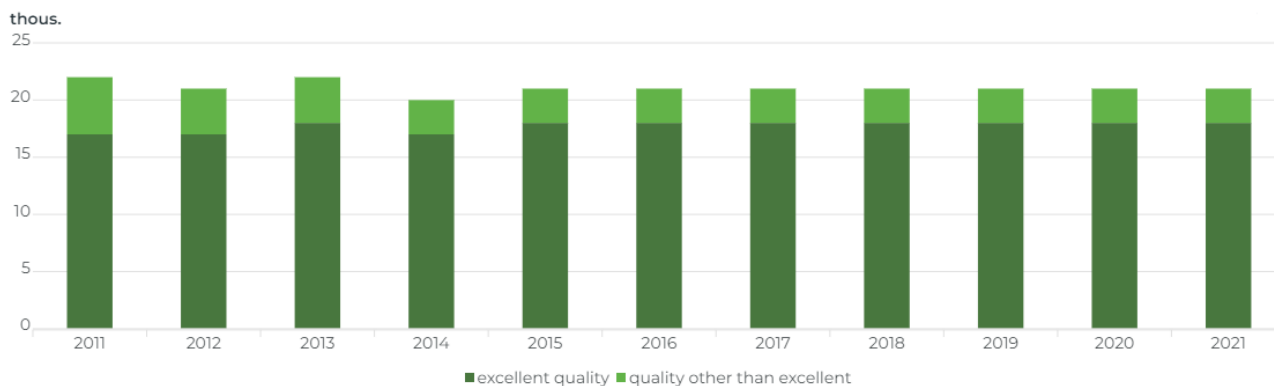
### Common Bird Index in Poland (2000=100)



Specification	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Farmland Bird Index (22 species)	100.0	94.6	93.3	86.0	88.9	90.7	91.7	88.7	99.8	93.7	88.8	87.4	85.2	85.2	83.9	85.8	87.6	81.2	75.1	77.5	80.3	72.0
Forest Bird Index (34 species)	100.0	108.4	103.5	106.5	120.5	116.0	111.6	106.2	127.5	112.3	115.2	124.0	121.7	121.0	122.5	124.5	133.9	129.5	115.6	127.3	128.5	130.9

The quality of surface waters is unsatisfactory. Among the factors which have a negative impact on water quality are substances (e.g. nitrogen and phosphorus) which enter the waters from e.g. utilised agricultural area, industry, through wastewater or precipitation. Out of 5,600 uniform surface water bodies (i.e. separate elements of surface waters, e.g. lakes, rivers, dam reservoirs or coastal waters) examined by the Chief Inspectorate of Environmental Protection in the years 2014–2019, merely 170 were of good quality, while the condition of the rest was assessed as poor. The increasingly common inspection of bathing sites in Poland also confirms the unsatisfactory quality of waters. Out of 670 inland and coastal bathing sites<sup>4</sup> examined in 2021, less than a half (nearly 300) could boast excellent quality (in 2011 it was 148 out of a total of 220 tested bathing sites). On the other hand, the quality of the water provided to residents has improved. For the past few years, less than 1% of people using water supply network received water which failed to meet the requirements imposed by the Minister of Health, while in 2010, 6% of recipients were supplied with water of an insufficient quality.

### Number of tested inland and coastal bathing sites in the EU



Specification	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
excellent quality	16.6	16.9	17.6	17.2	17.6	17.8	17.9	18.2	18.2	18.1	18.3
quality other than excellent	4.7	4.3	3.6	3.4	3.1	2.9	3.0	3.0	3.1	3.2	3.2

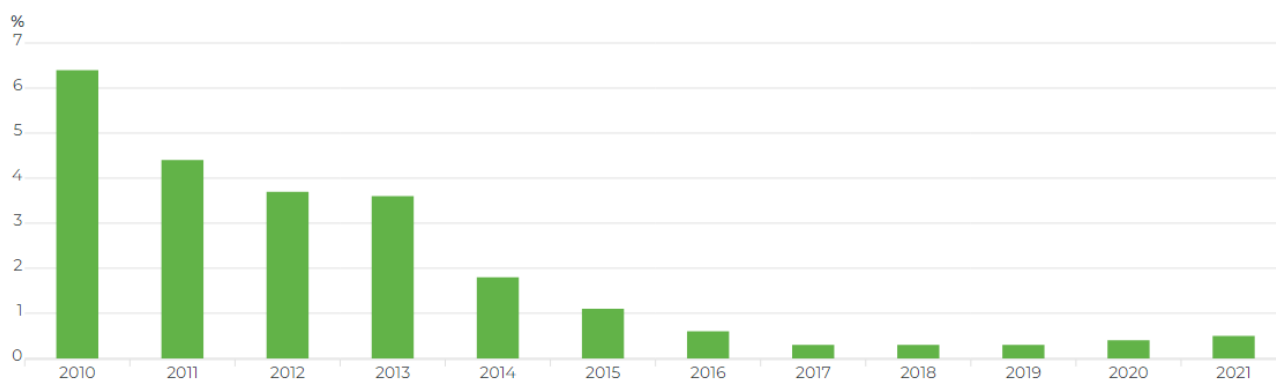
<sup>4</sup> Each year all bathing areas whose organisers apply for their examination to the gmina authorities are subject to this procedure. Thus, the number can be different each year and depends on how many organisers apply for such an inspection in a given year.

## Number of tested inland and coastal bathing sites in Poland



Specification	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
excellent quality	148	151	137	112	120	133	137	135	131	133	299
quality other than excellent	72	70	68	89	77	68	68	348	475	469	373

## Percentage of population supplied with water not meeting requirements



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
total	6.4	4.4	3.7	3.6	1.8	1.1	0.6	0.3	0.3	0.3	0.4	0.5

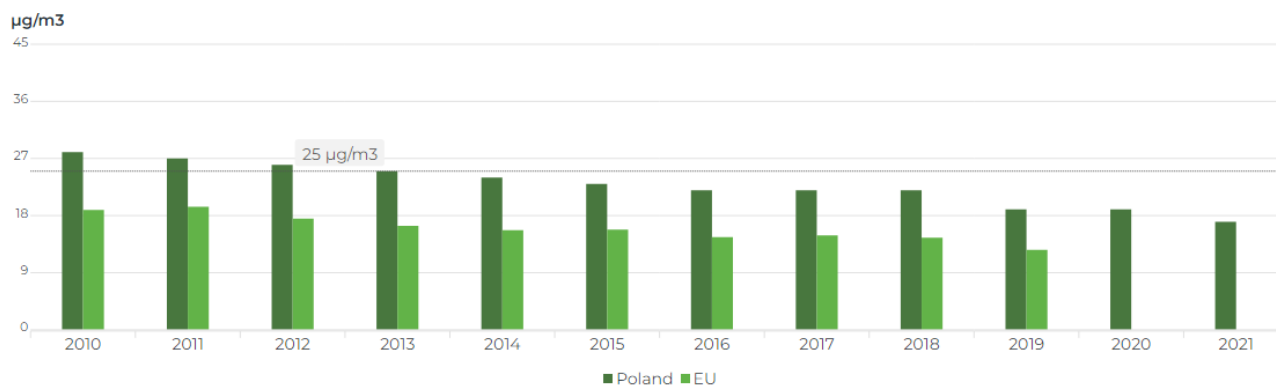
Despite the gradual improvement in the quality of Polish air, air pollution remains a serious problem, especially in terms of fine particulate matter (PM<sub>2.5</sub><sup>5</sup>). PM<sub>2.5</sub> is considered one of the most hazardous pollutants to human health due to its small size allowing it to reach the deepest parts of the human lungs. It is estimated<sup>6</sup> that in Poland in the years 2012-2018, PM<sub>2.5</sub> caused 43,000–48,000 premature deaths annually (2019 was the first year in the history of the survey when this number decreased to below 40,000). The exposure to PM<sub>2.5</sub> pollution in Poland has for years been at least twice as high as the norms indicated by the WHO. According to the organisation, until 2020, the concentration of PM<sub>2.5</sub> in the air hazardous to human health was at a level exceeding 10 µg/m<sup>3</sup>, while in 2021 the norm became stricter and was set at no more than 5 µg/m<sup>3</sup>. The average annual air pollution caused by PM<sub>2.5</sub> in Poland has been decreasing and reached 17 µg/m<sup>3</sup> in 2021 (in 2010 it was 28 µg/m<sup>3</sup>). Poland is in the group of EU countries with the highest exposure to PM<sub>2.5</sub> pollution; in the EU, the average concentration of these particles in the air decreased to 13 µg/m<sup>3</sup> in 2019. The indicator of the average PM<sub>2.5</sub> hazard in metropolitan areas reaches its highest levels in the southern parts of Poland, i.e. in Upper Silesian, Rybnicko-Jastrzębska and Cracow Agglomerations, where the average concentration of PM<sub>2.5</sub> in the air was at the level of 23-24 µg/m<sup>3</sup> in 2021. At the same time, it was significantly lower than 10 years before – in the first two of the above-mentioned agglomerations it decreased by 45%. The lowest average values of the PM<sub>2.5</sub> indicator were recorded in Tri-City Agglomeration (12 µg/m<sup>3</sup>).

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<sup>5</sup> PM<sub>2.5</sub> – atmospheric aerosols with a diameter below 2.5 micrometres.

<sup>6</sup> The estimates have been provided by the European Environment Agency since 2012.

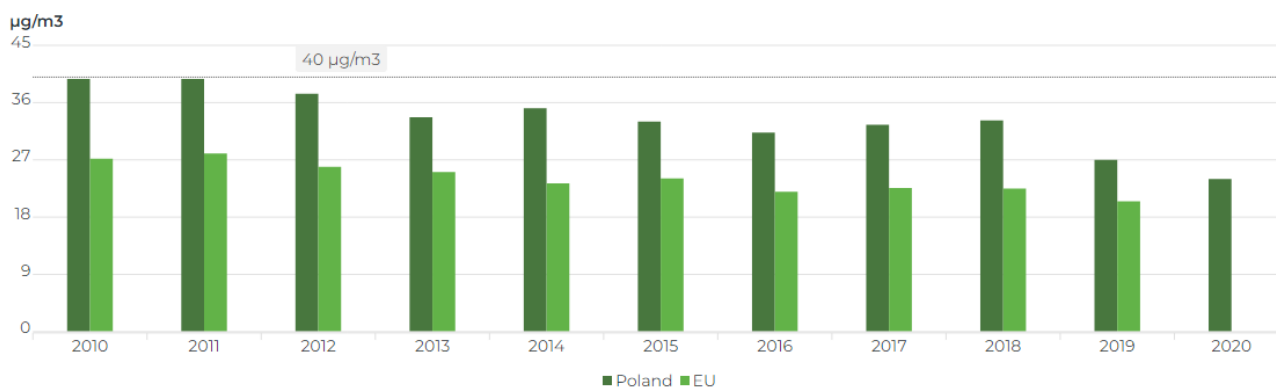
## Exposure of urban population to air pollution by particulate matter, PM2.5



The annual limit value for PM2.5 in the EU Directive on ambient air quality and cleaner air for Europe is 25 µg/m<sup>3</sup>

Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Poland	28.0	27.0	26.0	25.0	24.0	23.0	22.0	22.0	22.0	19.0	19.0	17.0
EU	18.9	19.4	17.5	16.4	15.7	15.8	14.6	14.9	14.5	12.6	n/a	n/a

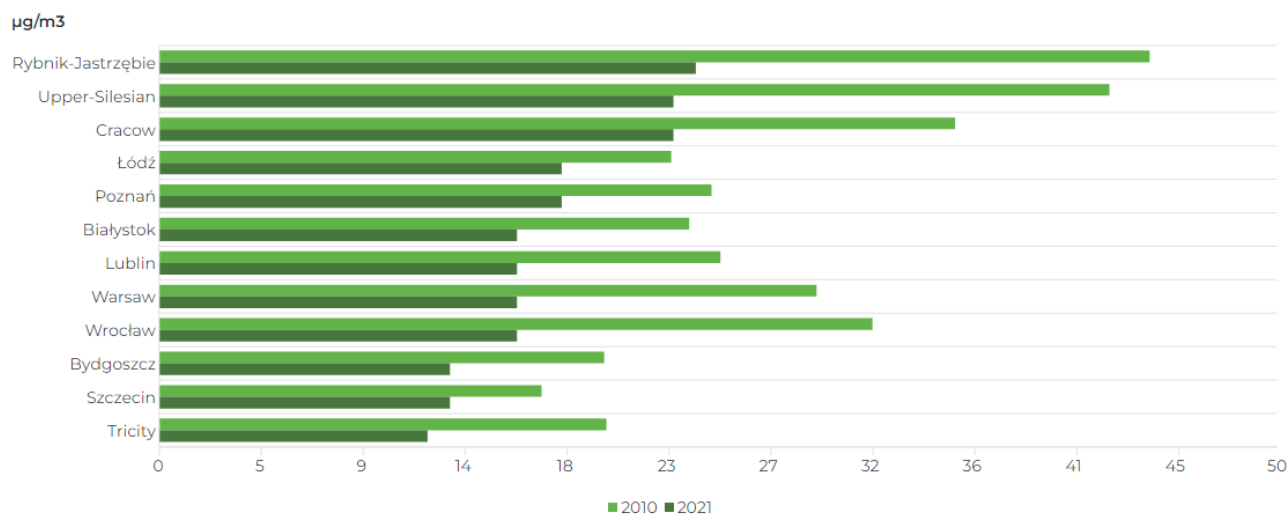
## Exposure of urban population to air pollution by particulate matter, PM10



The annual limit value for PM10 in the EU Directive on ambient air quality and cleaner air for Europe is 40 µg/m<sup>3</sup>.

Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Poland	39.7	39.7	37.4	33.7	35.1	33.0	31.3	32.5	33.2	27.0	24.0
EU	27.2	28.0	25.9	25.1	23.3	24.1	22.0	22.6	22.5	20.5	n/a

### Exposure of urban population to air pollution by PM2.5 particulate matter in agglomerations



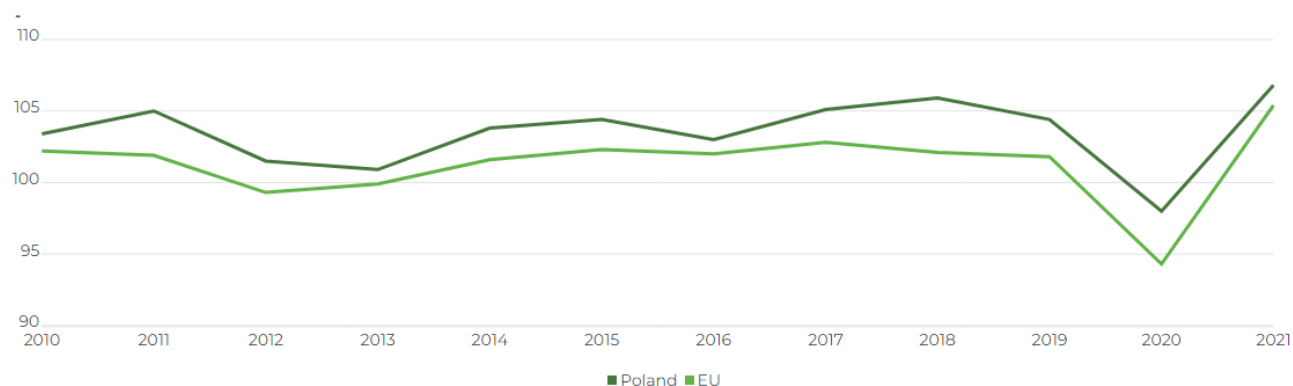
Specification	2010	2021
Białystok	23.7	16.0
Bydgoszcz	19.9	13.0
Upper-Silesian	42.5	23.0
Cracow	35.6	23.0
Lublin	25.1	16.0
Łódź	22.9	18.0
Poznań	24.7	18.0
Rybnik-Jastrzębie	44.3	24.0
Szczecin	17.1	13.0
Tricity	20.0	12.0
Warsaw	29.4	16.0
Wrocław	31.9	16.0

## Resource consumption

### Economic development

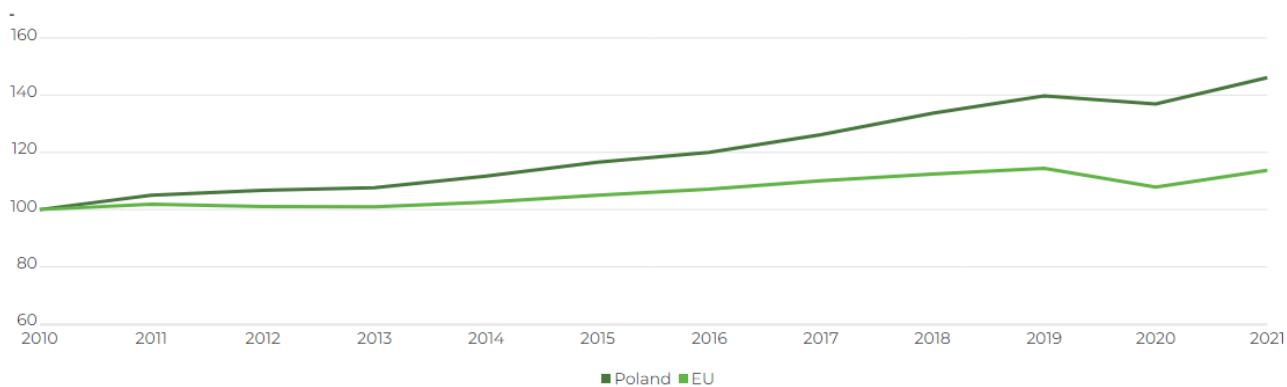
Sustainable economic development should be achieved without compromising the environment. It should therefore seek to make prudent use of natural resources and reduce both pollutant emissions and waste production. Poland has seen positive changes in this regard over the last decade, although to a lesser degree than the EU average. Poland's real gross domestic product increased by 46% in the years 2010-2021, and economic growth was accompanied by a more effective use of material resources and water and reduced emissions of greenhouse gases. The last decade, however, was exceptional. In the year 2020, the COVID-19 pandemic broke out, causing unprecedented limitations of social and economic activity in many countries. In Poland, this caused a short-lived, although serious, deterioration in the macroeconomic performance, and may have also affected the extent to which the economy influenced the environment.

#### GDP (constant prices) previous year=100



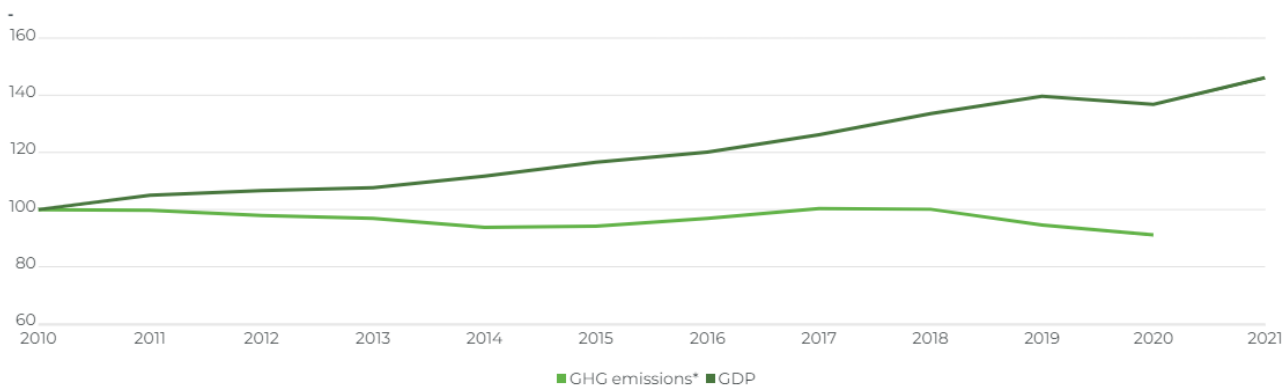
Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Poland	103.4	105.0	101.5	100.9	103.8	104.4	103.0	105.1	105.9	104.4	98.0	106.8
EU	102.2	101.9	99.3	99.9	101.6	102.3	102.0	102.8	102.1	101.8	94.3	105.4

### GDP (constant prices) 2010=100



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Poland	100.0	105.0	106.6	107.6	111.7	116.6	120.1	126.2	133.6	139.6	136.8	146.1
EU	100.0	101.9	101.1	101.0	102.6	105.0	107.1	110.1	112.4	114.4	107.9	113.7

### Greenhouse gas emissions and GDP (constant prices) 2010=100



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
GHG emissions*	100.0	99.7	97.9	96.9	93.8	94.2	96.9	100.4	100.1	94.6	91.1	n/a
GDP	100.0	105.0	106.6	107.6	111.7	116.6	120.1	126.2	133.6	139.6	136.8	146.1



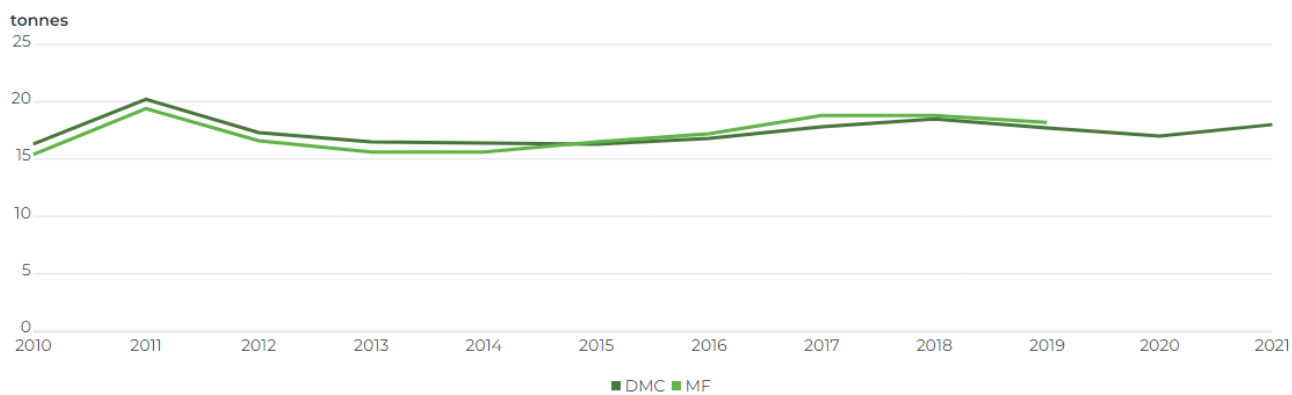
## Resource consumption and productivity

Economy's resources consumption is illustrated by two measures: the domestic material consumption (DMC) and the material footprint (MF). These metrics consider the use of the same types of resources (biomass, metals, minerals and fossil fuels), albeit from a different perspective. DMC measures the total amount of materials actually consumed by a given economy, while MF refers to the virtual amount of materials necessary for the ultimate satisfaction of that economy's needs. MF, therefore, covers the entire production and supply chain and takes into consideration those materials which were used to produce and transport imported goods. If DMC is higher than MF, it means that the materials sourced by an economy are also exported for consumption purposes to other countries. If the opposite is true, it indicates that materials are imported by an economy and consumption within that economy requires obtaining raw materials from other economies.

In Poland, DMC and MF are generally similar (in the last decade, the average annual DMC amounted to approximately 660 mln tonnes, and MF to about 655 mln tonnes). On a per capita basis, both figures are higher than the EU average; according to the latest available data, both the annual DMC and MF per capita in Poland were approximately 18 tonnes each, while in the EU they did not exceed 15 tonnes per capita. The Polish economy consumes raw materials with variable intensity, although mostly with an upward trend. Compared to 2010, DMC was 10% higher in 2021, while MF was 18% higher in 2019. What contributed to the growth in Poland's DMC was the increase in the use of metals and minerals (by 21%) and biomass (by 7%), with a simultaneous reduction in the use of high-emission fossil fuels (by 7%).

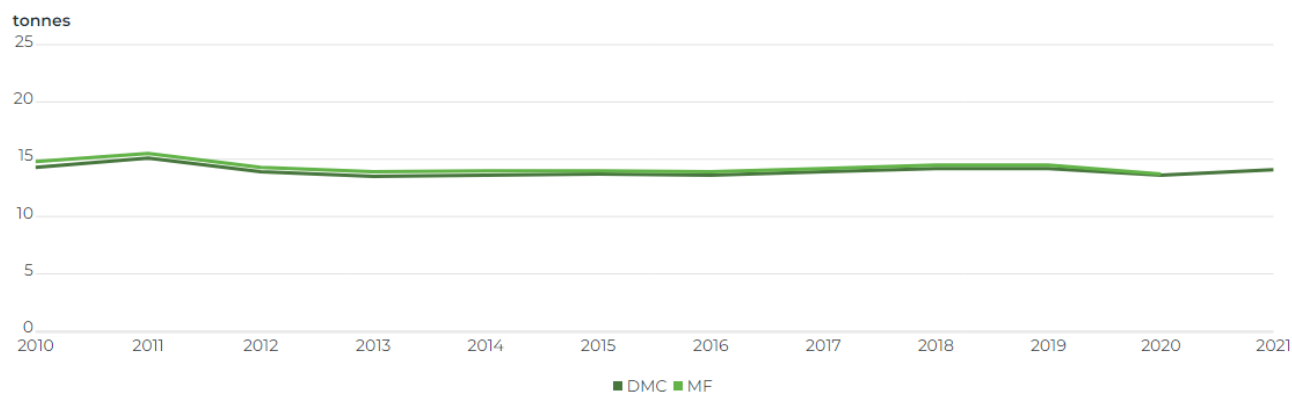
The GDP to DMC ratio indicates that materials are used less productively by the Polish economy than by most other EU economies. In 2021, 1 kg of raw materials produced a GDP value of 1.4 PPS (in the EU an average of 2.3 PPS), ranking Poland 22nd in the EU in terms of the efficiency of materials consumption. Among EU countries, the highest resources productivity was achieved by the Netherlands, where 1 kg of resources allowed the production of GDP worth 5.7 PPS, while the lowest was recorded in Bulgaria and Romania, in both of which it reached 0.8 PPS each.

## Domestic material consumption and material footprint per capita in Poland



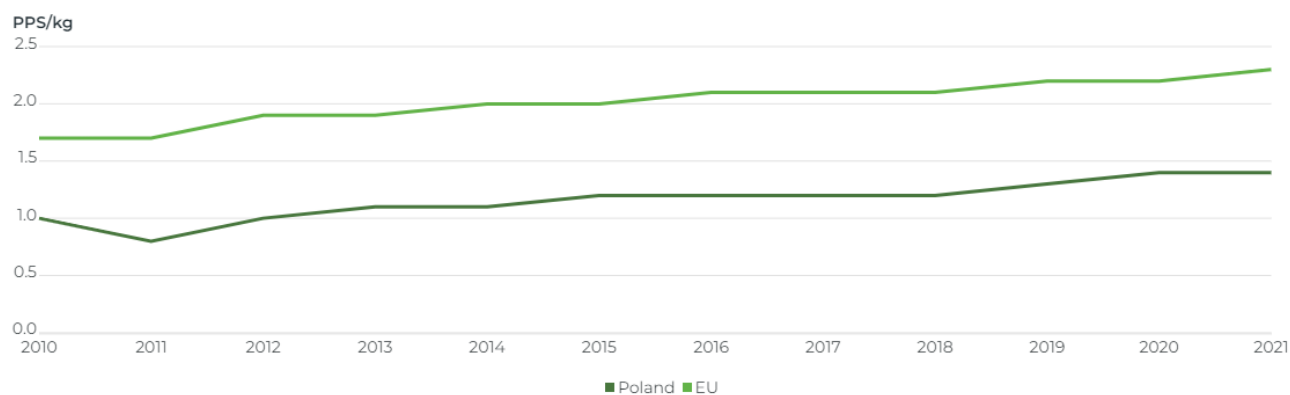
Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
DMC	16.3	20.2	17.3	16.5	16.4	16.3	16.8	17.8	18.5	17.7	17.0	18.0
MF	15.4	19.4	16.6	15.6	15.6	16.5	17.2	18.8	18.8	18.2	n/a	n/a

## Domestic material consumption (DMC) and material footprint (MF) per capita in the EU



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
DMC	14.3	15.1	13.9	13.5	13.6	13.7	13.6	13.9	14.2	14.2	13.6	14.1
MF	14.8	15.5	14.3	13.9	14.0	14.0	14.0	14.2	14.5	14.5	13.7	n/a

## Resource productivity



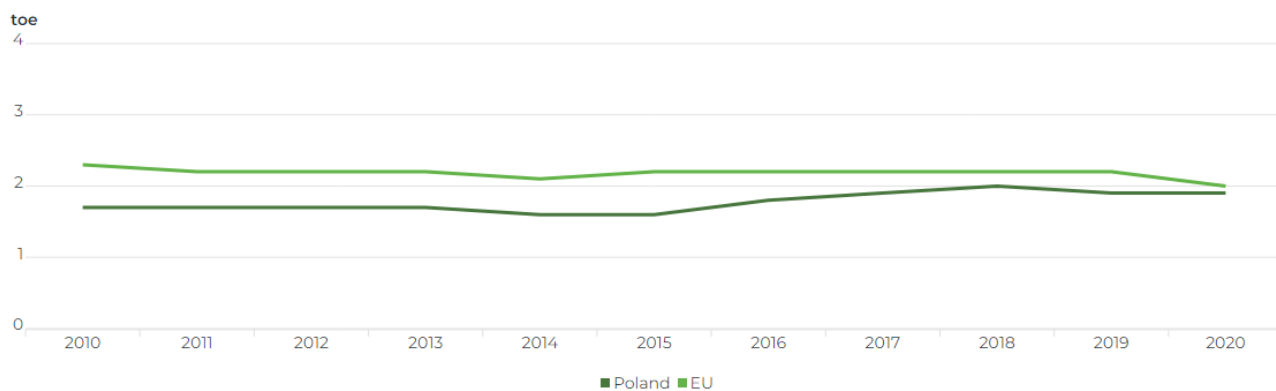
Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Poland	1.0	0.8	1.0	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.4	1.4
EU	1.7	1.7	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.3

## Energy efficiency

In 2010-2020, the Polish economy annually used between 60 mln and 73 mln tonnes of energy (expressed in units of equivalent oil). Poland's per capita use of energy was slightly lower than the EU average, e.g. in 2020 it was 1.9 toe compared to 2.0 toe in the EU (and in 2010, 1.7 toe compared to 2.3 toe, respectively). However, on average, energy was used slightly less effectively in Poland than in the EU. In 2020, 1 kg of equivalent oil allowed the production of GDP worth 8.6 PPS (6.0 PPS in 2010), whereas the average for the EU was GDP worth 9.7 PPS (and 6.8 PPS in 2010).

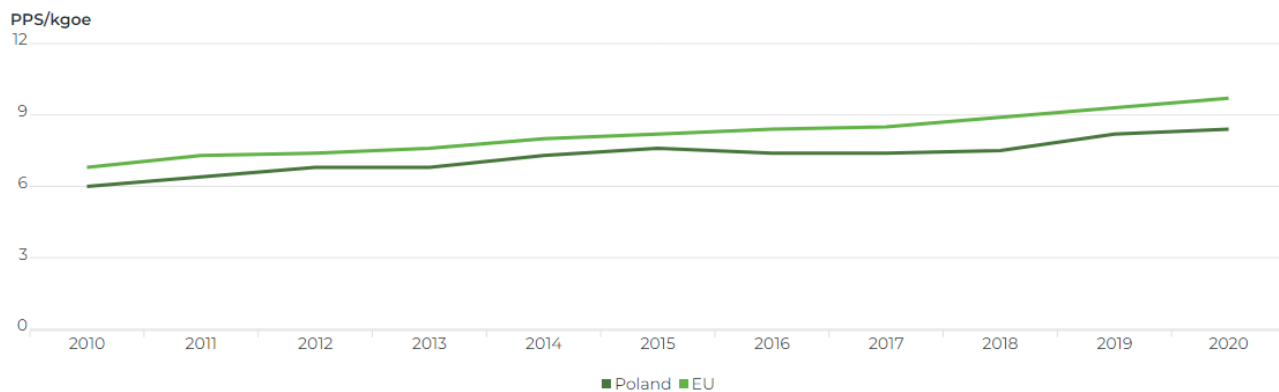
Energy in Poland is used to the largest extent by households and transport (in 2020, each of these sectors was responsible for almost 1/3 of the total energy consumed finally by the Polish economy). Industry (23%) and services (11%) are also relatively highly energy-intensive sectors. Compared to the beginning of the decade, Polish households slightly reduced the use of energy (in 2020 it was 4% lower than in 2010); its use by the services sector also decreased (by 14%). However, energy consumption in transport and industry increased significantly (by 27% and 18%, respectively).

## Final energy consumption per capita



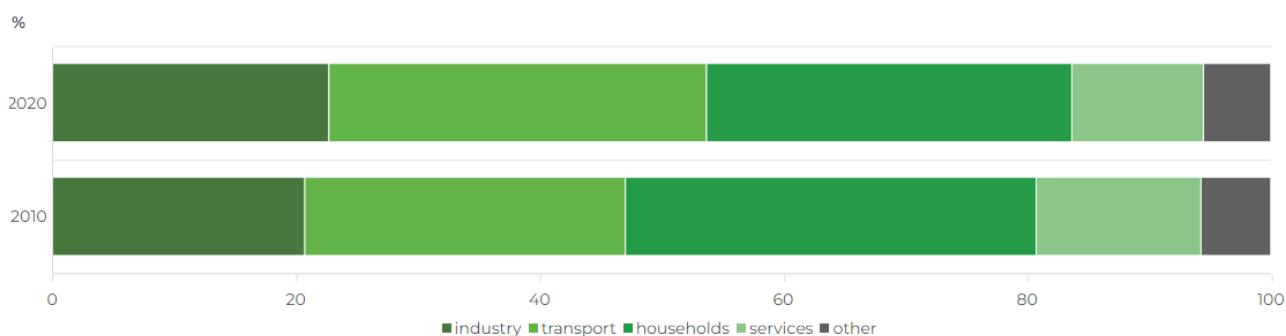
Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Poland	1.7	1.7	1.7	1.7	1.6	1.6	1.8	1.9	2.0	1.9	1.9
EU	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.0

## Energy productivity



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Poland	6.0	6.4	6.8	6.8	7.3	7.6	7.4	7.4	7.5	8.2	8.4
EU	6.8	7.3	7.4	7.6	8.0	8.2	8.4	8.5	8.9	9.3	9.7

## Structure of final energy consumption by sector



Specification	2010	2020
industry	20.7	22.7
transport	26.3	31.0
households	33.7	30.0

## Use of energy from renewable sources

Energy in Poland is produced mainly from fossil fuels. The use of renewable energy sources (RES) is steadily increasing, but still remains below the EU average. In 2020, RES were responsible for 16% of the total amount of energy consumed in Poland (compared to 9% in 2010), whereas in the EU it was 22% (and 12% in 2010). Heating and cooling is the sector which uses the largest amount of energy produced from renewable sources in Poland. In 2010-2020, the sector's share of energy from RES in its final gross energy consumption grew from 12% to 22%. In the electricity sector as well, the consumption of energy from renewable sources increased in this period – from 6% to 16%. Only the transport sector did not intensify its consumption of energy from renewable sources, which remained relatively low (7%).

As regards renewable energy sources, they were responsible for 18% of all the electricity produced in Poland in 2020 (compared to 7% in 2010), which was still over two-fold less than the EU average. The renewable energy source used most frequently in Poland is wind, which generated 10% of all the electricity produced in the country in 2020 (compared to 1% in 2010). Biomass and biogas are

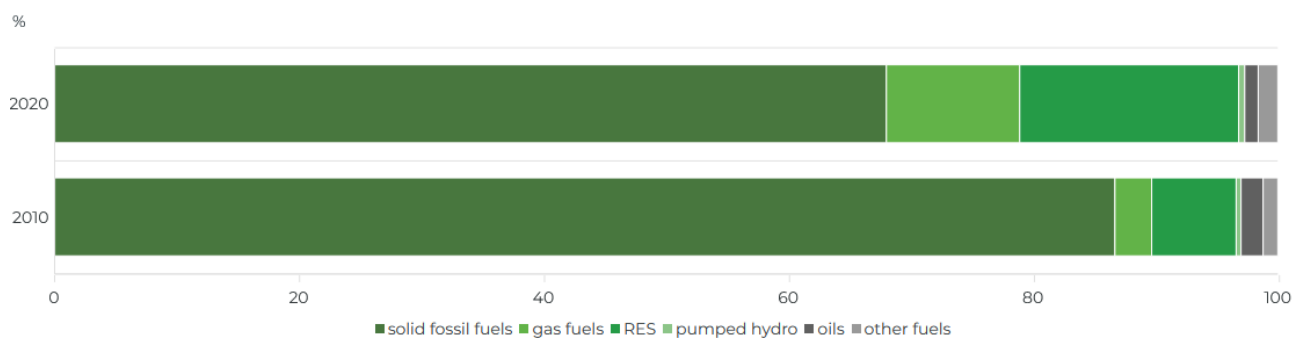
used in Poland on a much smaller scale (5% of all energy produced in 2020), and likewise water and photovoltaic cells (1% each). The level of production of electricity from renewable energy sources varies among EU countries. It is largest in Denmark and Austria (where in 2020 renewable energy sources generated 82% and 76% of electricity, respectively), and smallest in Malta (11%). EU countries also differ in their selection of the main renewable energy sources, e.g. in Denmark it is wind (in 2020, wind accounted for 57% of Denmark’s electricity), in Austria, Latvia, Sweden and Croatia water (58%-42%), and in Estonia biomass and biogas (31%).

### Share of renewable energy in gross final energy consumption by sector



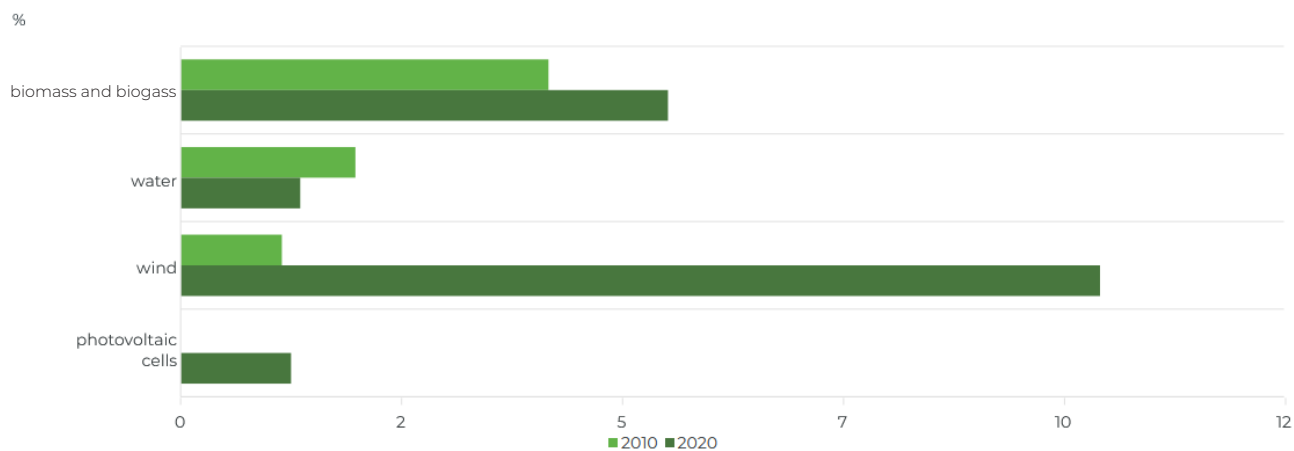
Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
total	9.3	10.3	11.0	11.5	11.6	11.9	11.4	11.1	14.9	15.4	16.1
transport	6.6	6.9	6.5	6.7	6.3	5.7	4.0	4.2	5.7	6.2	6.6
electricity	6.5	8.1	10.6	10.7	12.4	13.4	13.3	13.1	13.0	14.4	16.2
heating and cooling	11.8	13.2	13.5	14.3	14.2	14.8	14.9	14.8	21.5	22.0	22.1

### Structure of energy sources used for electricity production



Specification	2010	2020
solid fossil fuels	86.6	68.0
gas fuels	3.0	10.9
RES	6.9	17.9
pumped hydro	0.4	0.5
oils	1.8	1.1
other fuels	1.2	1.6

### Share of selected renewable energy sources in electricity production



Specification	2010	2020
biomass and biogas	4.0	5.3
water	1.9	1.3
wind	1.1	10.0
photovoltaic cells	0.0	1.2

## Water consumption and productivity

Poland is one of those EU economies where the demand for water is relatively high. In 2020, this country was able to generate GDP worth 95 PPS from 1 m<sup>3</sup> of water (and GDP worth 52 PPS in 2010). To compare, in the same period in Greece and Bulgaria (EU states with the lowest productivity of water), 1 m<sup>3</sup> of water generated GDP worth 20 PPS, and in Denmark, Latvia and the Czech Republic (where the productivity of water is the highest in the EU) GDP worth over 200 PPS.

The largest share of water used for the needs of the economy and population is consumed by industry (over 70% annually), and the remaining amount goes to the exploitation of the water supply network (below 20%), and serves filling and completing fishponds (approximately 10%). The overall yearly consumption of water decreased in Poland in over a decade: in 2021, it totalled 8.8 bn m<sup>3</sup>, whereas in 2010 it was 10.3 bn m<sup>3</sup>. More specifically, the amount of water used for industrial purposes decreased from 7.7 bn m<sup>3</sup> to 6.4 bn m<sup>3</sup>, and likewise did the volume of water necessary for filling and completing fishponds (from 1.1 bn m<sup>3</sup> to 0.8 bn m<sup>3</sup>). However, the amount of water consumed through the exploitation of the water supply network slightly increased (from 1.5 bn m<sup>3</sup> to 1.6 bn m<sup>3</sup>).

Water from the exploitation of the water supply network goes mainly to households (80%), and the rest of it is used for production and other purposes, e.g. related to services. The yearly consumption of water per household member totalled in Poland on average 34 m<sup>3</sup> in 2021, which marked an increase from 2010 (31 m<sup>3</sup>). However, inhabitants of Poland use relatively small amounts of water compared to residents of other EU countries. In 2020, a statistical inhabitant of Greece used the largest amount of water (107 m<sup>3</sup>), whereas their counterpart in Lithuania the smallest, i.e. 27 m<sup>3</sup>. In Poland, city residents use in general more water than inhabitants of rural areas. Still, while households in cities did not increase their water consumption from 2010 (35 m<sup>3</sup> per person annually), the use of water by residents of rural areas significantly grew in that period (from 25 m<sup>3</sup> per inhabitant in 2010 to 31 m<sup>3</sup> in 2021). One of the reasons behind this change was the expansion of water supply network in rural areas.



## Water productivity

PPS/m<sup>3</sup>

1200

900

600

300

0



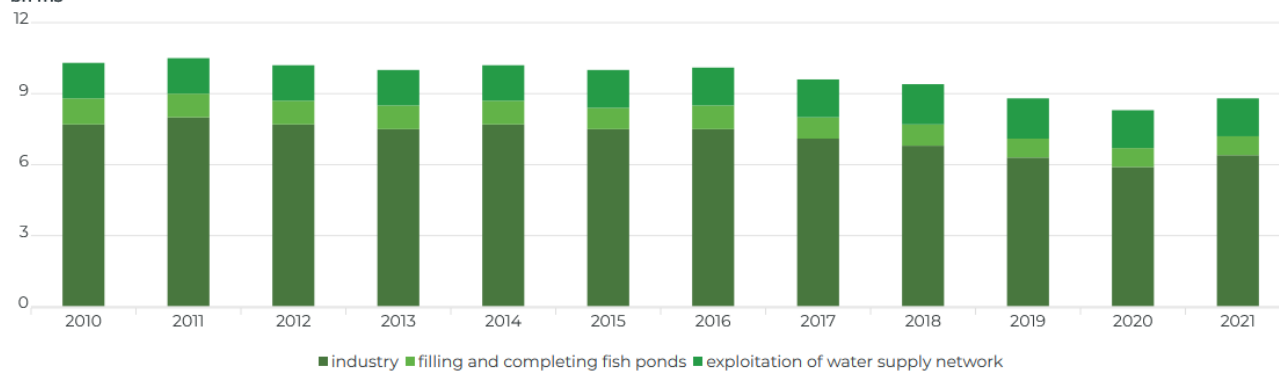
2020

Belgium	97.5
Bulgaria	22.5
Czechia	218.3
Denmark	239.8
Germany	118.3
Estonia	40.4
Greece	19.8
Spain	43.7
France	85.5
Croatia	117.0
Cyprus	103.3
Latvia	226.7
Latvia	182.2
Luxembourg	1048.9
Hungary	44.1
Malta	360.6
Netherlands	82.9
Poland	95.2
Romania	56.5
Slovenia	55.8
Slovakia	201.6
Sweden	145.6

Countries with last year available other than 2020: Sweden (2015), Germany (2016), Hungary (2017), Belgium and Spain (2018), France and the Netherlands (2019).

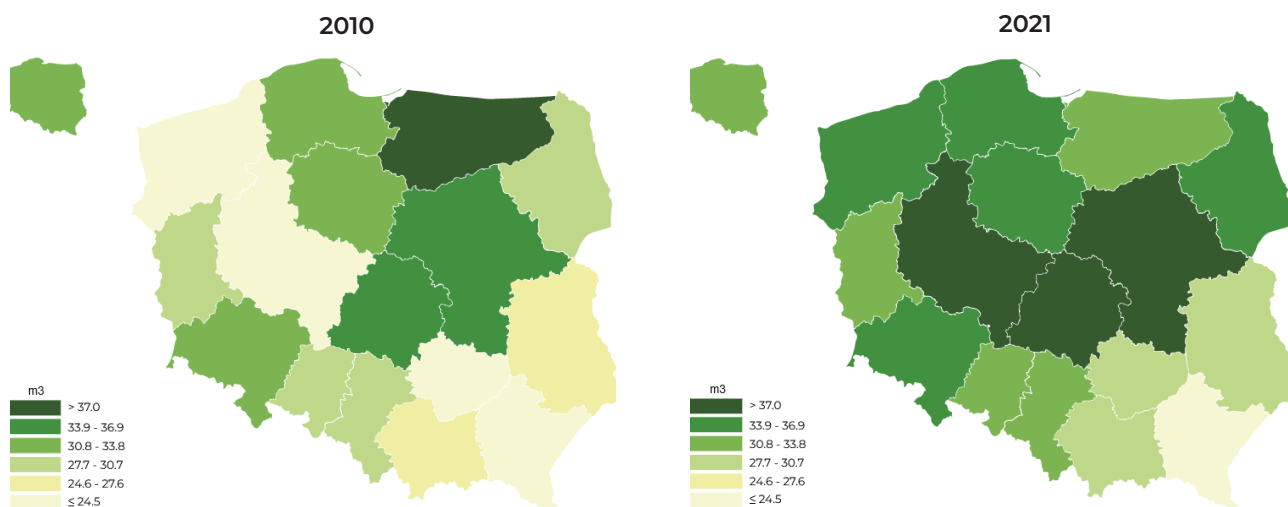
## Water consumption for the needs of the national economy and population

bn m<sup>3</sup>



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
total	10.3	10.6	10.3	10.0	10.2	10.0	10.1	9.6	9.4	8.8	8.4	8.8
industry	7.7	8.0	7.7	7.5	7.7	7.5	7.5	7.1	6.8	6.3	5.9	6.4
filling and completing fish ponds	1.1	1.0	1.0	1.0	1.0	0.9	1.0	0.9	0.9	0.8	0.8	0.8
exploitation of water supply network	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.7	1.7	1.6	1.6

## Water consumption per capita in households



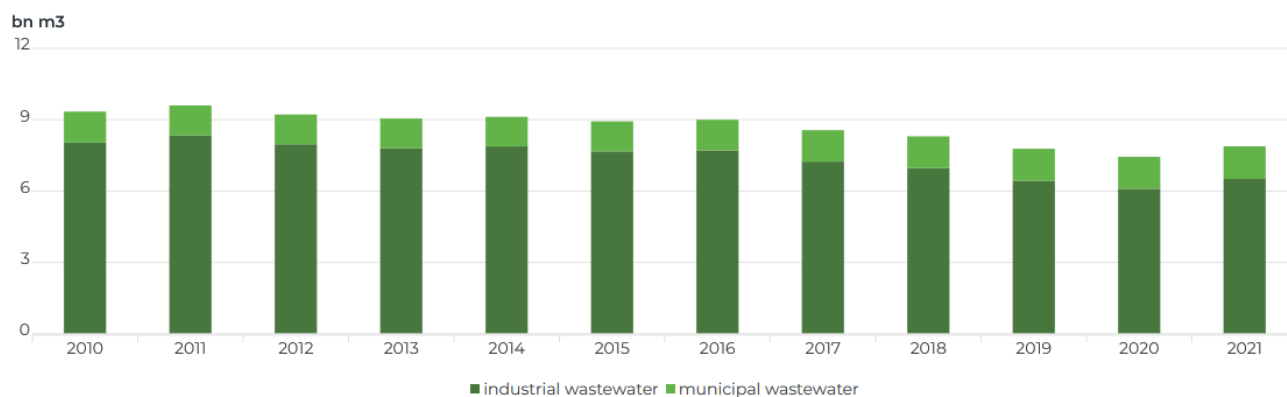
	2010	2021
Poland	31.1	33.5
Dolnośląskie	32.0	34.3
Kujawsko-pomorskie	32.6	35.2
Lubelskie	26.2	29.0
Lubuskie	30.0	31.4
Łódzkie	34.0	37.1
Małopolskie	26.8	28.4
Mazowieckie	35.9	38.7
Opolskie	29.2	31.2
Podkarpackie	22.0	24.4
Podlaskie	30.7	35.6
Pomorskie	32.9	35.6
Śląskie	30.3	30.9
Świętokrzyskie	24.4	28.2
Warmińsko-mazurskie	30.8	32.4
Wielkopolskie	35.0	39.3
Zachodniopomorskie	33.8	33.9

## Pollution

### Wastewater – generation and treatment

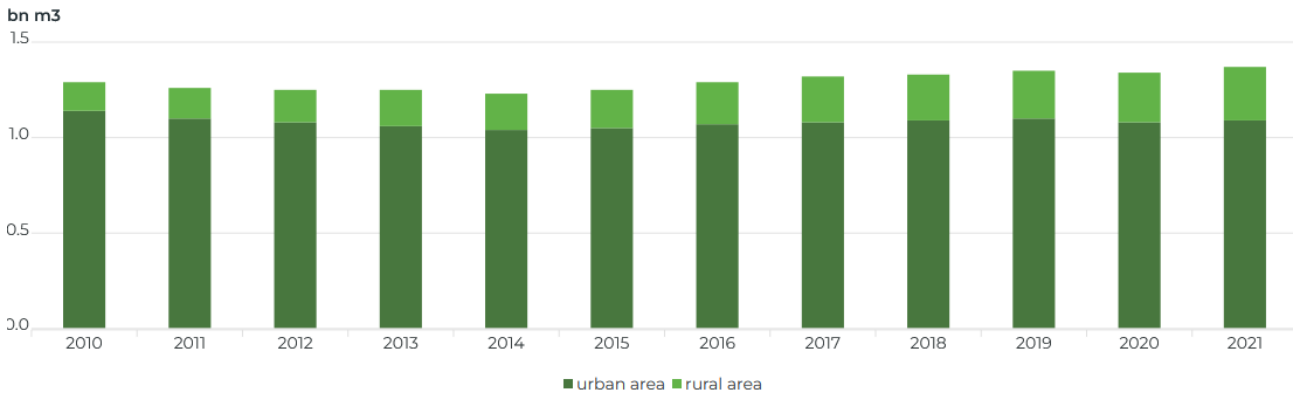
Along with the reduction of water consumption observed over the past decade, the volume of wastewater generated annually by the Polish economy also decreased – from 9.3 bn m<sup>3</sup> in 2010 to 7.9 bn m<sup>3</sup> in 2021. The majority of wastewater (over 80%) was industrial wastewater, generated by the trade, storage, transport and services activity. The remaining part was municipal wastewater, consisting mainly of wastewater produced by households. The yearly amount of industrial wastewater decreased in the past decade (from 8.0 bn m<sup>3</sup> in 2010 to 6.5 bn m<sup>3</sup> in 2021) in contrast to the volume of municipal wastewater, which slightly increased in the same period (from 1.3 bn m<sup>3</sup> to 1.4 bn m<sup>3</sup>). Municipal wastewater in Poland is mainly produced by cities and towns (approximately 80%). Over the past decade, the amount of this kind of wastewater generated in urban areas was relatively stable, but at the same time rural areas started to produce more wastewater than earlier due to the extension of the water and sewage network in rural areas.

#### Generation of wastewater



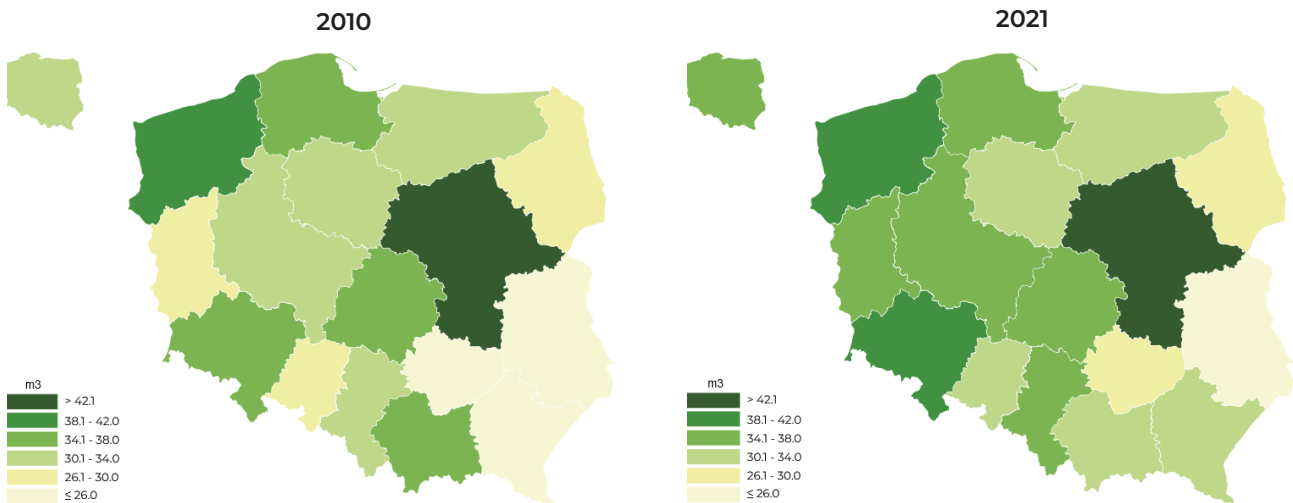
Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
industrial wastewater	8.04	8.34	7.97	7.80	7.88	7.67	7.71	7.24	6.97	6.44	6.10	6.51
municipal wastewater	1.30	1.26	1.25	1.25	1.24	1.26	1.29	1.32	1.33	1.34	1.34	1.37

### Municipal wastewater discharged by the area of generation



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
urban area	1.14	1.10	1.08	1.06	1.04	1.05	1.07	1.08	1.09	1.10	1.08	1.09
rural area	0.15	0.16	0.17	0.19	0.19	0.20	0.22	0.24	0.24	0.25	0.26	0.28

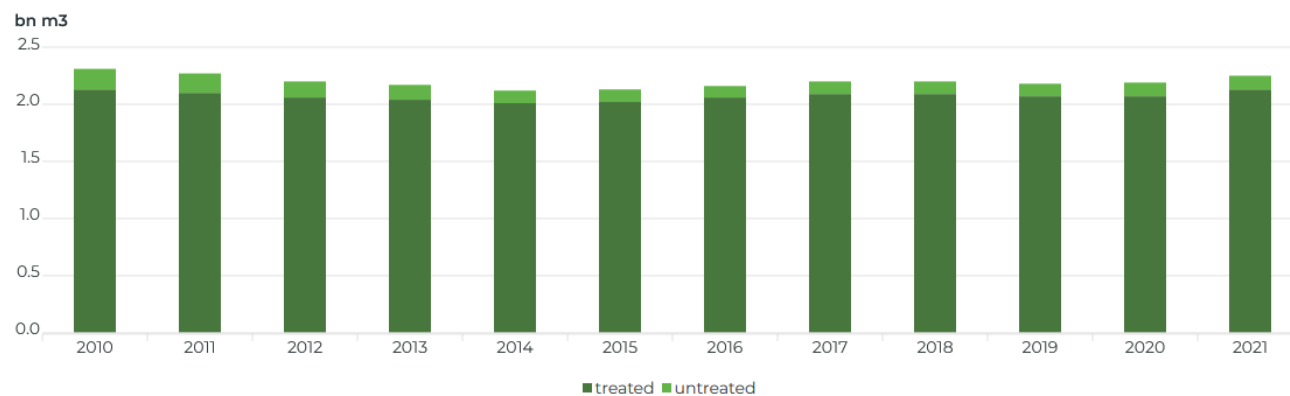
### Municipal wastewater discharged per capita



	2010	2021
Poland	34	36
Dolnośląskie	35	42
Kujawsko-pomorskie	34	33
Lubelskie	23	25
Lubuskie	29	36
Łódzkie	35	35
Małopolskie	35	34
Mazowieckie	45	43
Opolskie	29	33
Podkarpackie	25	31
Podlaskie	28	29
Pomorskie	35	38
Śląskie	32	35
Świętokrzyskie	26	29
Warmińsko-mazurskie	32	33
Wielkopolskie	31	35
Zachodniopomorskie	42	41

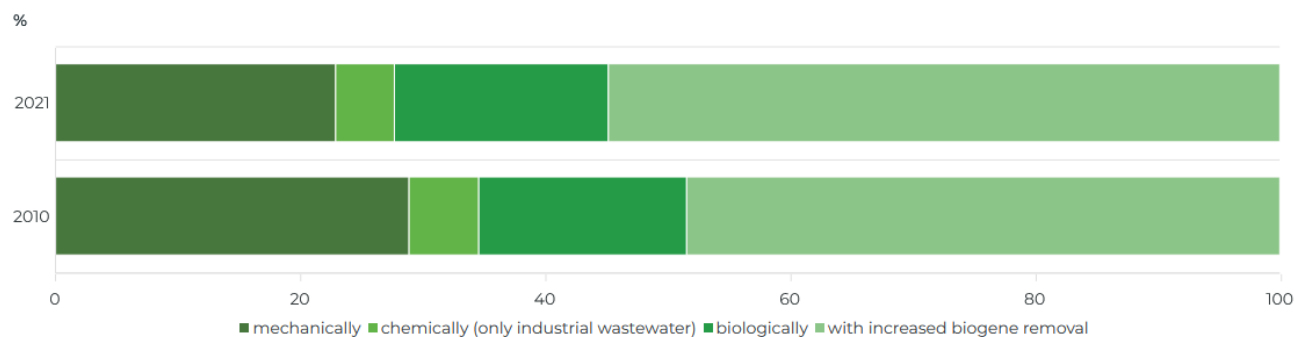
Out of all the wastewater generated annually by the Polish economy, approximately 2 bn m<sup>3</sup> (about 1/4) required treatment. The vast majority of the wastewater was subjected to such processes. Some of it, however (6% in the recent years, i.e. less than in 2010, when it was 8%), was released untreated into waters and land. Thanks to the modernisation of treatment plants in Poland, wastewater is increasingly often treated by means of advanced technologies, which allow a larger reduction in the amount of e.g. nitrogen and phosphorus. In 2021, this kind of processing was applied to 55% of wastewater requiring treatment (compared to 47% in 2010). Wastewater treatment based on advanced technologies is gradually replacing mechanical methods, which in 2021 accounted for 23% of all the treated wastewater (compared to 31% in 2010). The remaining wastewater is processed biologically (18%) and chemically (5%).

## Industrial and municipal wastewater requiring treatment discharged into waters or into the ground



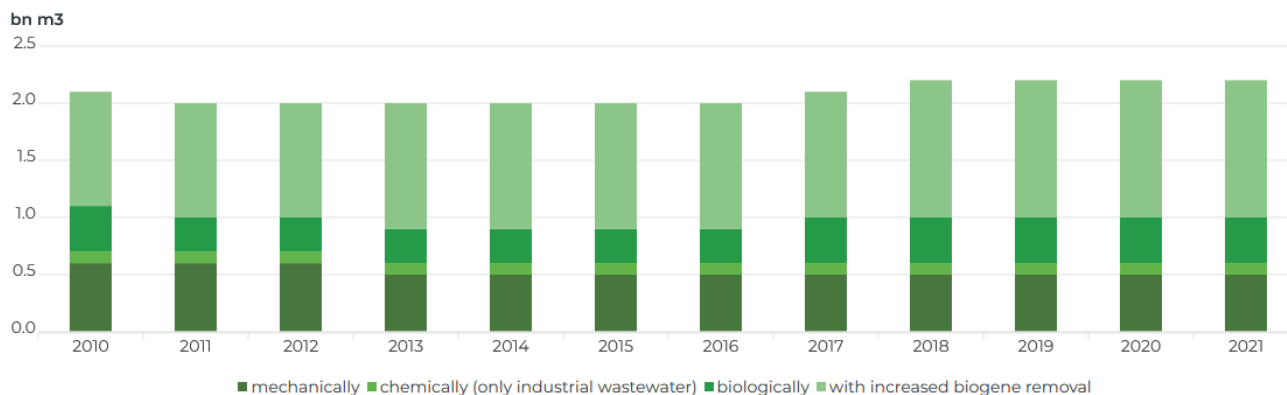
Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
treated	2.13	2.10	2.06	2.04	2.01	2.02	2.06	2.09	2.09	2.07	2.07	2.13
untreated	0.18	0.17	0.14	0.13	0.11	0.11	0.10	0.11	0.11	0.11	0.12	0.12

## Wastewater treated by treatment method



Specification	2010	2021
mechanically	28.9	22.9
chemically (only industrial wastewater)	5.7	4.8
biologically	17.0	17.5
with increased biogene removal	48.5	54.9

## Amount of wastewater treated by treatment method



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
mechanically	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
chemically (only industrial wastewater)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
biologically	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
with increased biogene removal	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2



## Waste – generation and management

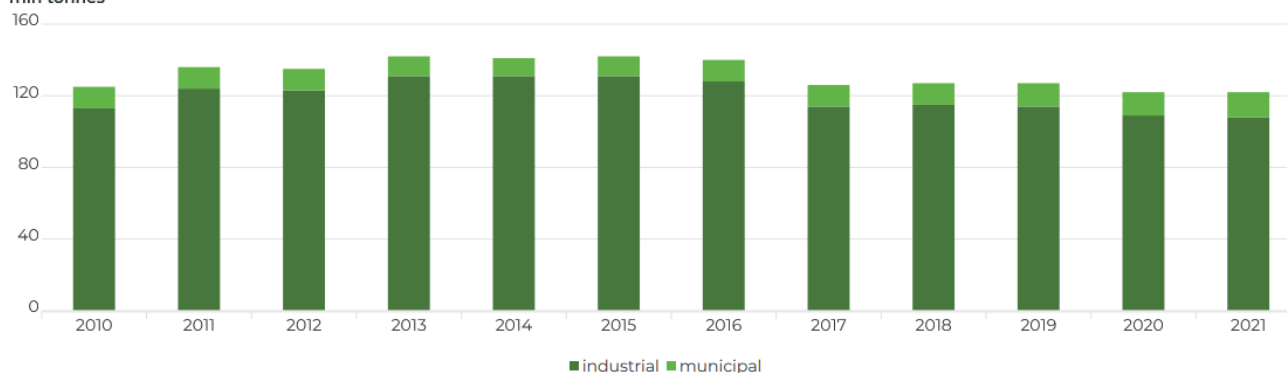
Until 2015, the Polish economy had been generating increasing amounts of waste each year, but after that date, its volume started gradually decreasing. Both in 2020 and in 2021, less waste was produced than in 2010. This positive change resulted from the reduction of industrial waste. However, an opposite trend was observed in the case of municipal waste (i.e. refuse from households, municipal services, commerce, small business, offices and institutions), the amount of which was on the rise.

The majority of waste produced by the economy is industrial waste (89% in 2021). Over half of it is generated by the mining and quarrying section, and is related to the search, extraction, and physical and chemical processing of ores and other minerals. Therefore, over 60% of all Polish industrial waste is generated in Śląskie and Dolnośląskie voivodships, where most of the extraction industry is located. The amount of waste produced in the mining and quarrying section increased compared to the beginning of the decade, but at the same time, the volume of other industrial waste shrank.

The share of municipal waste in the total waste generated by the Polish economy slightly increased between 2010 and 2021 (from 8% to 11%). Its amount produced yearly per capita was higher by 45 kg in 2021 than in 2010, and reached 360 kg. Still, a Polish resident generated far less municipal waste than an average EU dweller, who in 2020 produced 505 kg of refuse. Polish regions vary in terms of the volume of the generated municipal waste. Inhabitants of western Poland produce much more municipal waste than their eastern counterparts, which results from several factors, including different consumption patterns. Residents of Dolnośląskie Voivodship generate the largest amounts of municipal waste (438 kg per capita in 2021), and inhabitants of Podkarpackie Voivodship the smallest amounts (247 kg per capita). City dwellers produce more municipal waste than residents of rural areas (408 kg compared to 287 kg).

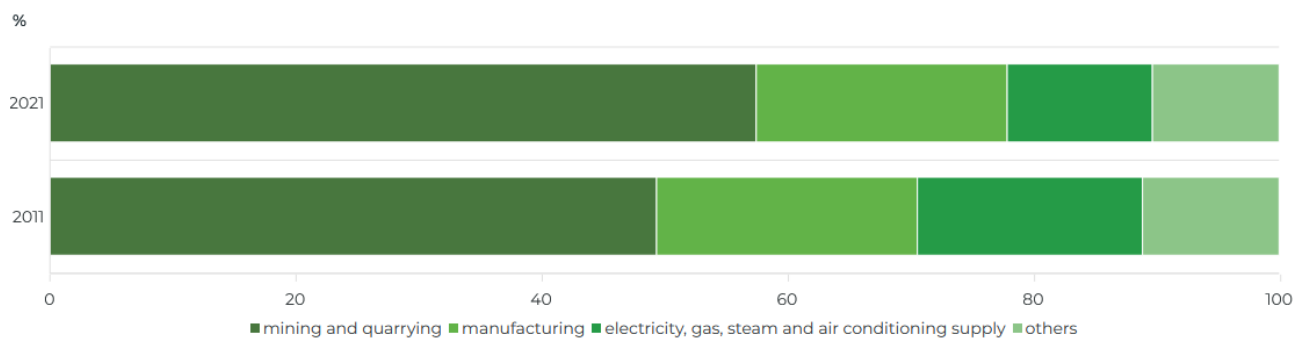
## Waste generated

mln tonnes



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
industrial	113	124	123	131	131	131	128	114	115	114	109	108
municipal	12	12	12	11	10	11	12	12	12	13	13	14

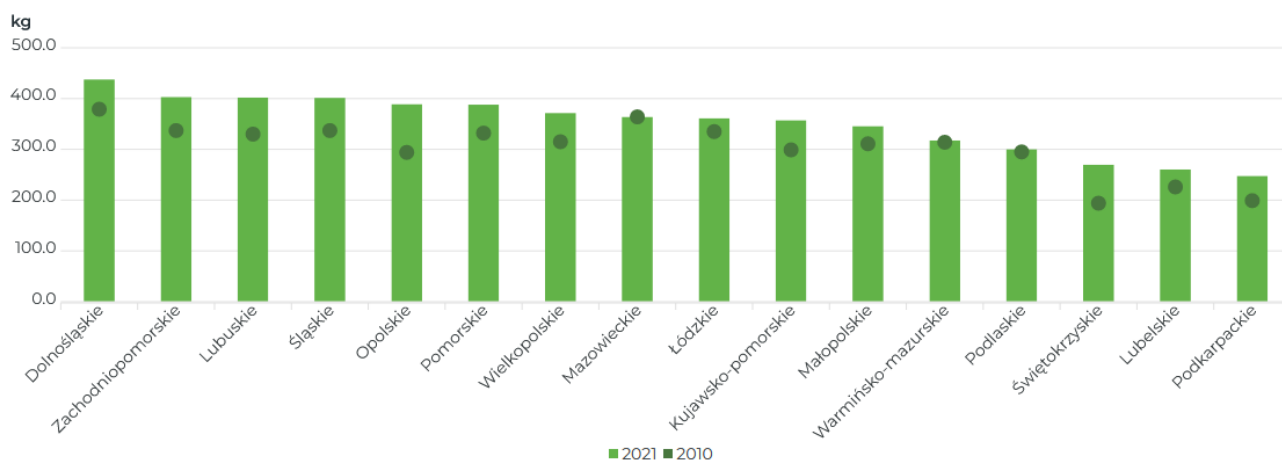
## Industrial waste by sections of Polish Classification of Activities



Comparison of data with 2010 impossible due to the changes in the Polish Classification of Activities (PKD2007), on which the data by section is based.

Specification	2011	2021
mining and quarrying	49.3	57.4
manufacturing	21.2	20.4
electricity, gas, steam and air conditioning supply	18.3	11.8
others	11.1	10.3

## Municipal waste generated per capita



Specification	2010	2021
Dolnośląskie	379	438
Zachodniopomorskie	337	403
Lubuskie	330	402
Śląskie	337	401
Opolskie	294	389
Pomorskie	332	388
Wielkopolskie	315	371
Mazowieckie	364	364
Łódzkie	335	361
Kujawsko-pomorskie	299	357
Małopolskie	311	345
Warmińsko-mazurskie	314	317
Podlaskie	295	300

Most industrial waste in Poland is subjected to processes aimed at neutralising its harmful influence to the extent where it is no longer a hazard to human life and health and is safe for the environment. In most cases the waste is either successfully disposed (51% in 2021 compared to 46% in 2016<sup>7</sup> or recovered (48% compared to 50%). The remaining waste is transferred to other recipients or stored.

Mixed waste is still dominating among all the municipal waste collected in Poland. However, thanks to legal regulations which started to be implemented in 2016<sup>8</sup>, the scale of waste collected separately has significantly increased. In 2021, 40% of all the municipal waste was collected separately, while in 2010 it was only 9%. Lubuskie Voivodship the largest amount of waste collected separately(50%), and Śląskie the smallest (32%).

Legal regulations on waste collected separately also influenced its structure. At the beginning of the decade, segregated waste included mostly paper and cardboard, as well as glass and plastic, jointly accounting for 60% of all the waste collected separately in 2010. However, in subsequent years, their share decreased (to 34% in 2021) as a result of the gradual introduction of other categories of waste, such as mixed package waste or batteries and storage batteries.

Thanks to the changes in the area of waste collected separately that took place over the last decade, increasing amounts of municipal waste have been recycled in Poland. The recycling indicator grew from 16% in 2010 to 39% in 2020. However, it is still lower in Poland than in the EU, where on average 48% of municipal waste is reused (in 2010 it was 38%).

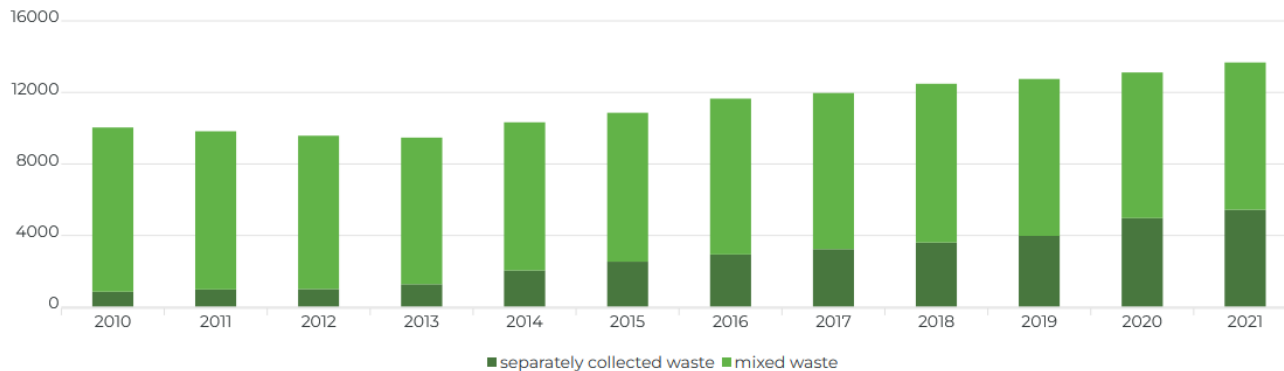
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<sup>7</sup> Comparison of data with 2010 impossible due to changes in the method of classifying waste into particular disposal categories.

<sup>8</sup> Minister of the Environment's Decree of 29th December 2016 on the detailed method of selective collection of the chosen waste categories (with further changes)

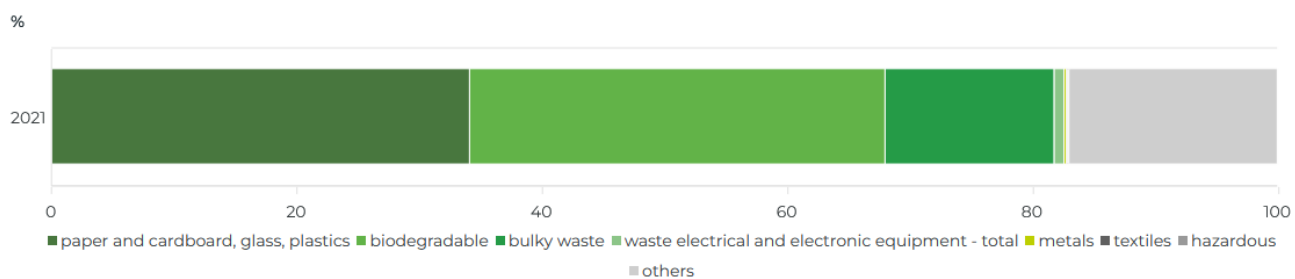
## Mixed and separately collected municipal waste

thous. tonnes



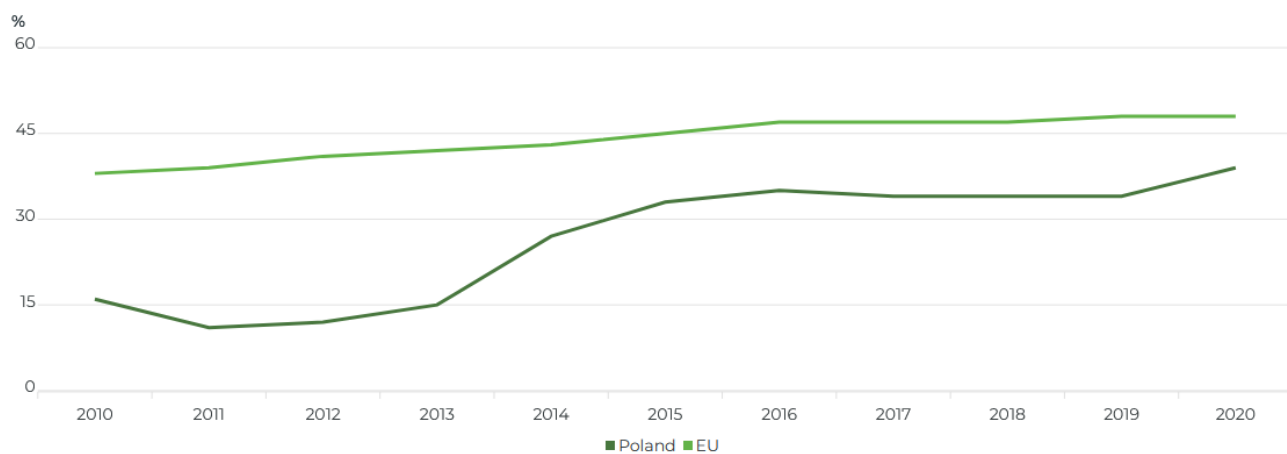
Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
separately collected waste	860	984	1005	1275	2049	2537	2942	3239	3608	3977	4975	5440
mixed waste	9180	8843	8575	8199	8281	8326	8712	8729	8877	8775	8142	8234

## Municipal waste collected separately in 2021



Specification	2021
paper and cardboard, glass, plastics	34.1
biodegradable	33.9
bulky waste	13.8
waste electrical and electronic equipment - total	0.8
metals	0.2
textiles	0.1
hazardous	0.1
others	17.0

### Recycling rate of municipal waste



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Poland	16	11	12	15	27	33	35	34	34	34	39
EU	38	39	41	42	43	45	47	47	47	48	48

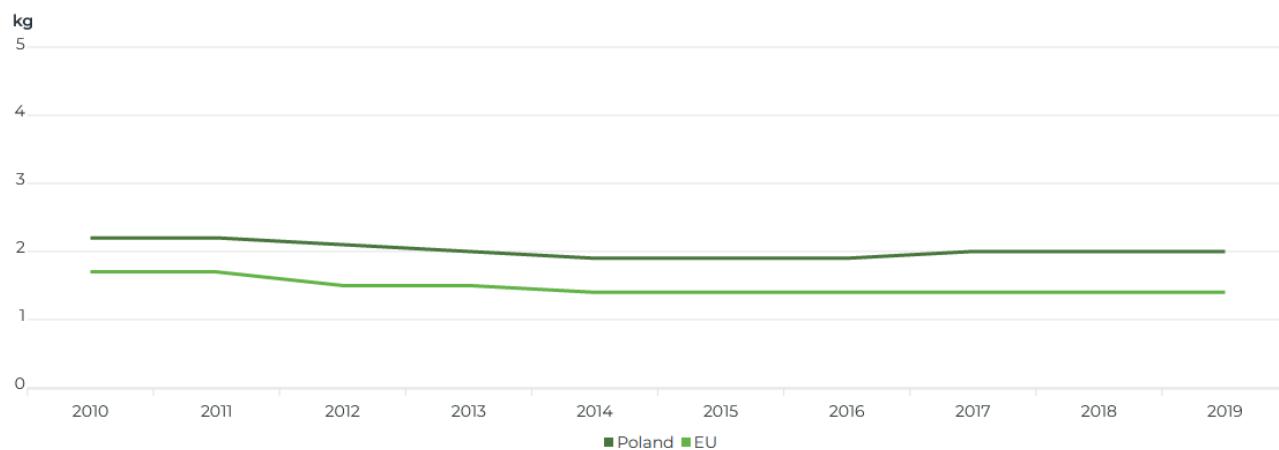
## Air pollution

Even though year by year Poland's emissions of pollutants into the atmosphere are decreasing, the country is still responsible for 1/5 of the particulate matter and 1/10 of the greenhouse gases released into the air from the territory of the EU. The volume of pollution emissions per capita is larger in Poland than in most other member countries. According to the European Environment Agency (EEA), in 2019 the annual amount of PM<sub>2.5</sub> released into the atmosphere in Poland was 2.0 kg per capita (compared to the average of 1.4 kg per capita in the EU), and the amount of PM<sub>10</sub> stood at 3.8 kg per capita (compared to 2.7 kg in the EU). The emission of greenhouse gases in 2020 reached 10 tonnes per capita in Poland, whereas in the EU it was 8 tonnes. Carbon dioxide emission is responsible for approximately 80% of the total greenhouse gas emissions, and is one of the reasons for global warming. The amount of this gas released into the atmosphere per capita is also larger in Poland than the EU average (in 2020, it was 7 tonnes in Poland compared to 5 tonnes in the EU).

It is the energy sector that is mostly responsible for the emission of air pollutants (the remaining emission is generated by the industry, agriculture and waste management sectors). In 2020, over 90% of PM<sub>2.5</sub>, 80% of PM<sub>10</sub> and over 80% of greenhouse gases were released into the air by this sector of the Polish economy. Fuel combustion in Poland had the largest share in the total emission of greenhouse gases within this sector (75%), this including fuel combustion in public electricity and heat production (35%) and transport – mainly on roads (12%).

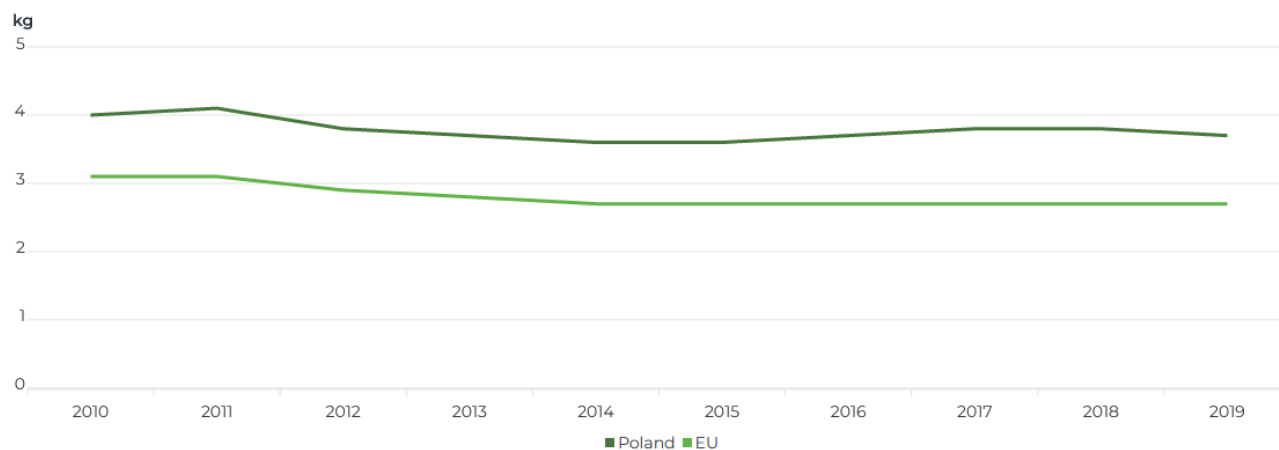
In the 2010-2020 period, the volume of air pollution produced by the energy sector was gradually decreasing in Poland, thanks to which in 2020, 30% less particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub> each) and 10% less greenhouse gases were released into the atmosphere than in 2010. Similar changes were observed in the whole EU; however, as regards the reduction in greenhouse gas emissions, EU member states made twice as much progress in this field as Poland. Both in Poland and in the EU, one of the contributors to limiting the volume of greenhouse gas emissions was its decrease in public electricity and heat production (20% less emission in Poland compared to 40% less in the EU). However, in contrast to the EU, Poland saw concerning upward trends in the emission of these gases from fuel combustion in transport. In 2020, greenhouse gas emission in Poland generated by transport was 28% larger than in 2010, while in the EU on average it decreased by 12% in the same period.

### PM2.5 emissions per capita



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Poland	2.2	2.2	2.1	2.0	1.9	1.9	1.9	2.0	2.0	2.0
EU	1.7	1.7	1.5	1.5	1.4	1.4	1.4	1.4	1.4	1.4

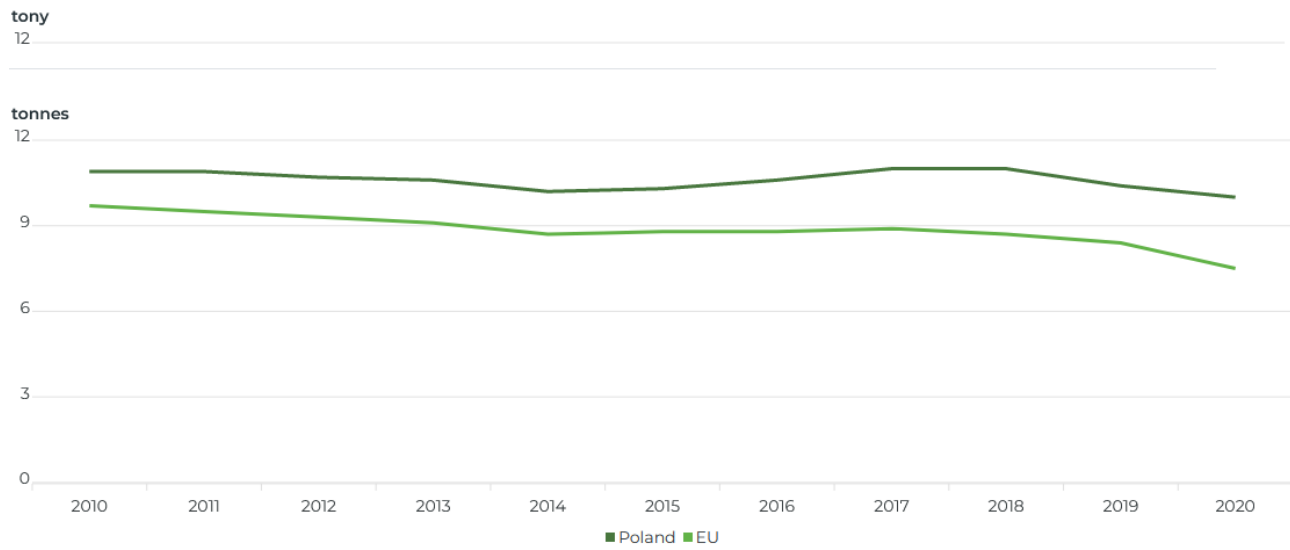
### PM10 emissions per capita



Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Poland	4.0	4.1	3.8	3.7	3.6	3.6	3.7	3.8	3.8	3.7
EU	3.1	3.1	2.9	2.8	2.7	2.7	2.7	2.7	2.7	2.7



## Greenhouse gas emissions per capita



\*In CO<sub>2</sub> equivalent excluding the balance of GHG emissions and removals from the LULUCF sector (land use, land use change and forestry) and including international aviation.

Specification	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Poland	10.8	10.8	10.7	10.6	10.5	10.7	10.6	11.0	11.0	10.6	10.0

## Cities and agriculture

### Urban areas

Approximately 60% of the Polish population resides in cities, whose area has been steadily increasing and currently constitutes more than 7% of Poland's territory. Urban areas have a major impact on the climate and the environment. The high density of urban building structure contributes to the formation of the urban heat island effect (places where the air temperature is higher compared to the surrounding areas). Urban traffic generates noise which, as indicated by the WHO, poses one of the most serious hazards to the environment (in Poland nearly 1/5 of city dwellers are exposed to excessive noise). Due to increased exhaust emissions from transport and industrial pollution, the quality of air is deteriorating, which is Poland's major problem – 39 of the country's cities are among the 100 EU cities which in 2021 the European Environment Agency ranked as the most polluted.

The key to ensuring the sustainability of urban areas is carefully considered development based on planning concepts. In Poland, the number of local land development plans is increasing each year. In 2021, such plans were devised for 55% of the Polish urban gminas<sup>9</sup>, while in 2010, it was 42%. What is important in planning urban development is to use green areas<sup>10</sup> as an element mitigating the effects of climate change and promoting the environment's successful adaptation to this change. Green spaces in cities absorb carbon dioxide from the atmosphere, retain water and, if skilfully distributed over a city, facilitate air temperature regulation and noise reduction. In the years 2010-2021, the amount of green areas in Polish cities increased by 10%, although their share in the total area of cities was maintained at the level of 2%. Polish cities offer an average of 23 sqm of green areas per inhabitant (by 2 sqm more than in 2010). City dwellers of Podkarpackie and Lubuskie voivodships may boast the largest share in green areas per person (over 30 sqm), while the residents of cities in Podlaskie Voivodship have the smallest green area at their disposal, i.e. 17 sqm per inhabitant. Reducing exhaust emissions from transport is a challenge for Polish cities. Poland is one of the most motorised countries in the EU (only Luxembourg and Italy are ahead in the ranking) with 664 passenger cars per 1,000 inhabitants in 2020 (560 was the EU average), which increased by 211 from 2010 (by 80 in the EU).

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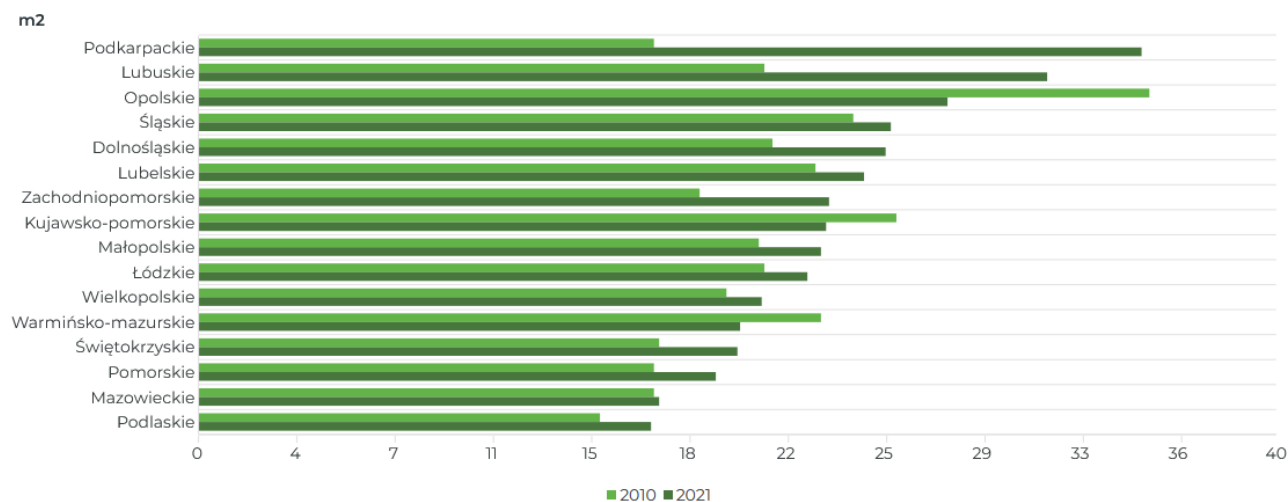
<sup>9</sup> Unit of the lowest basic level of fundamental three-tier territorial division of Poland.

<sup>10</sup> Strolling-recreational parks, lawns, green areas of the housing estate.

However, most of these vehicles were old:  $\frac{3}{4}$  of them were over 10 years old, while those aged under 2 constituted only 5% of the total. What is more, the fleet owned by Polish residents was dominated by high-emission vehicles and increasingly often powered by diesel engines: 52% of passenger cars registered in Poland in 2020 were petrol-fuelled cars (compared to 61% in 2010) and 32% were diesel cars (23% in 2010). The remaining 16% (similarly to a decade before) were cars powered by alternative fuels: electricity, hydrogen, biofuels and gas, but a majority of them (3 million out of 4 million in 2020) are LPG-powered cars.

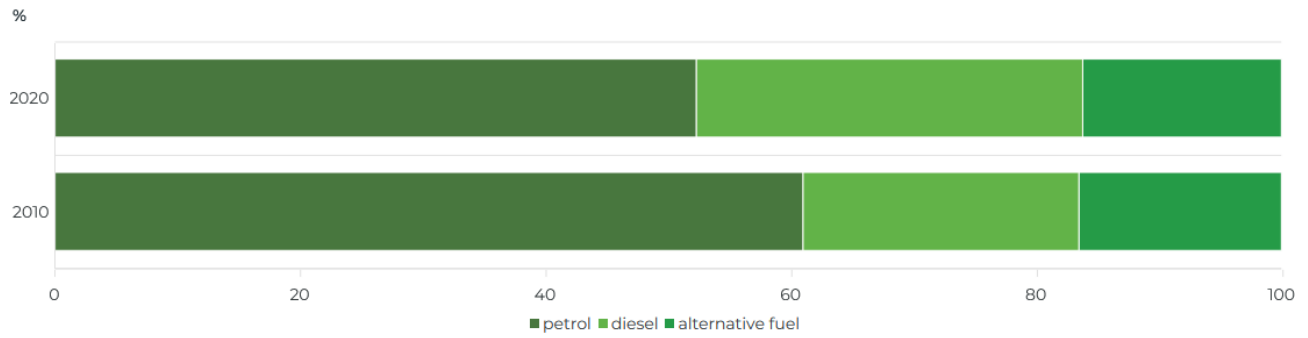
It is then the development of low-emission means of urban public transport and encouraging inhabitants to give up cars in favour of public transport that reduce the negative influence of cities on the natural environment. In the years before the COVID-19 pandemic (which severely limited the society's mobility), a statistical inhabitant of a Polish city or town used public transport (including the Underground) 161-175 times a year.

## Green areas in urban areas per 1 inhabitant



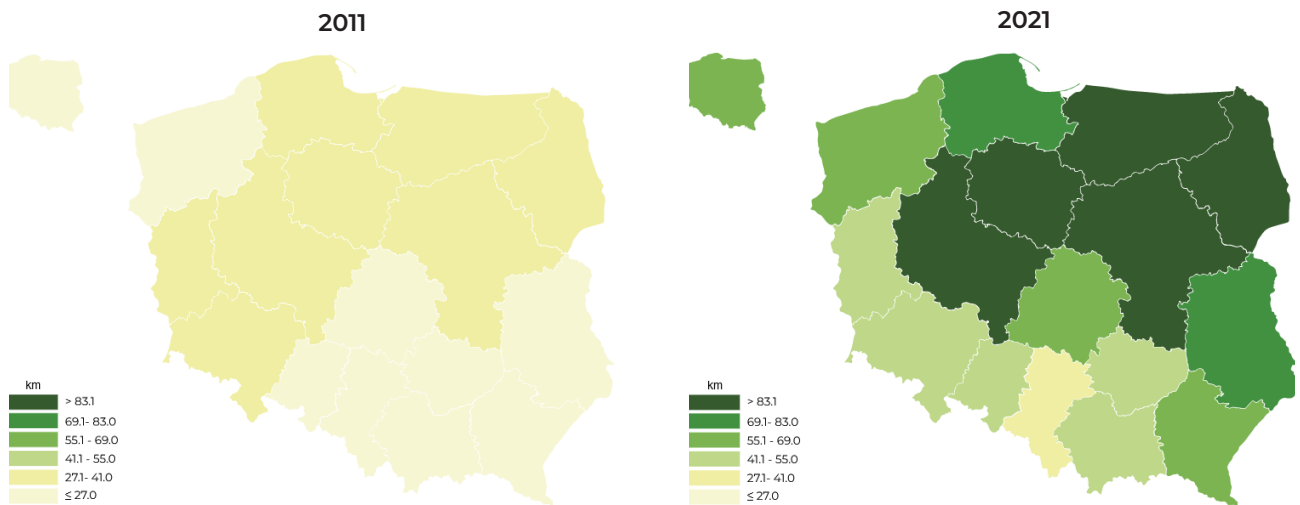
Specification	2010	2021
Podkarpackie	16.9	35.0
Lubuskie	21.0	31.5
Opolskie	35.3	27.8
Śląskie	24.3	25.7
Dolnośląskie	21.3	25.5
Lubelskie	22.9	24.7
Zachodniopomorskie	18.6	23.4
Kujawsko-pomorskie	25.9	23.3
Małopolskie	20.8	23.1
Łódzkie	21.0	22.6
Wielkopolskie	19.6	20.9
Warmińsko-mazurskie	23.1	20.1
Świętokrzyskie	17.1	20.0
Pomorskie	16.9	19.2
Mazowieckie	16.9	17.1
Podlaskie	14.9	16.8

### Structure of fuel consumption in motor transport



Specification	2010	2020
petrol	61.0	52.3
diesel	22.5	31.5
alternative fuel	16.5	16.2

### Bicycle tracks in urban gminas per 100 km2



	2011	2021
Poland	25.0	61.9
Dolnośląskie	31.7	53.7
Kujawsko-pomorskie	37.8	83.1
Lubelskie	26.9	79.0

Lubuskie	27.8	54.1
Łódzkie	19.0	59.0
Małopolskie	20.5	51.1
Mazowieckie	32.7	99.1
Opolskie	19.6	51.0
Podkarpackie	21.0	61.9
Podlaskie	31.2	93.2
Pomorskie	32.9	73.1
Śląskie	13.6	31.5
Świętokrzyskie	16.9	49.2
Warmińsko-mazurskie	36.2	88.8
Wielkopolskie	35.7	92.7
Zachodniopomorskie	23.4	57.2

The bus fleet in Polish cities is becoming more ecological. Even though its larger part still runs on diesel oil or uses hybrid fuelling (combining electricity and diesel), the number of buses using alternative fuels is steadily increasing. In the period of 2010-2021, their number grew from 280 to over 1890, and their share in the total urban bus fleet rose from 2% to 15%.

Among the incentives to use public transport in cities are the Park&Ride car parks, designed for drivers willing to change from their own car to a means of public transport. In 2021, 176 such parking sites operated in Polish urban gminas (3 times more than 5 years before<sup>11</sup>), including 44 in Mazowieckie Voivodship, 41 in Dolnośląskie Voivodship, 25 in Pomorskie Voivodship, and 20 in Śląskie Voivodship. Some urban-rural and rural gminas have also decided to implement this solution – in 2021, there were 109 Park&Ride parking sites in urban-rural gminas and 93 in rural gminas.

Those inhabitants of Poland who choose bicycles as their means of transport, have at their disposal an increasing amount of bicycle tracks. In the last 10 years, the total length of bicycle tracks in Poland grew threefold (from 6,000 km in 2011<sup>12</sup> to 19,000 km in 2021). Almost half of all those

<sup>11</sup> Data available from 2016.

<sup>12</sup> Data available from 2011.

tracks are situated in urban gminas, where on average, there are 62 km of bicycle tracks per each 100 km<sup>2</sup> (in 2011, it was 25 km per 100 km<sup>2</sup>). Urban gminas in Mazowieckie Voivodship can boast the most extensive networks of bicycle tracks (100 km of bicycle tracks per each 100 km<sup>2</sup>), followed by Podlaskie and Wielkopolskie voivodships (93 km). Śląskie Voivodship, on the other hand, has the lowest density of bicycle tracks in Poland (31 km per 100 km<sup>2</sup>).

## Agriculture

Poland is one of the main agricultural producers in the EU. The country belongs to the top three largest producers of basic cereals and root crops and is moreover the largest supplier of apples and poultry in the EU. Utilised agricultural area covers 60% of Poland's total area, and its cultivation is not without impact on the environment – more than half of the greenhouse gases emitted by the agricultural sector in Poland is the result of soil fertilisation. Nevertheless, fertilisers increase crops and some types are desirable, as they improve the soil's properties (which is the case of calcium fertilisers that normalise the soil's acidity level). On the other hand, excessive use of mineral fertilisers (which include nitrogen, phosphorus and potassium) causes e.g. water eutrophication. In Poland, fertilisers of this type are the most popular, and their total consumption increased from 120 kg per hectare of utilised agricultural area in 2010 to 131 kg in 2020. The use of calcium fertilisers, partly thanks to subsidies, also grew in the last decade (more than twofold, reaching 90 kg per hectare). This, however, proved insufficient to satisfy the demand<sup>13</sup> resulting from the high acidification of Polish soil. As regards mineral fertilisers, it is important to apply them in amounts beneficial to the crops and safe for the environment, ensuring an optimal balance of nutrients in the soil (i.e. a proper difference between their inflow and outflow). The concentration of nitrogen in Polish soils conformed to the norm (i.e. 30-70 kg per hectare of agricultural land) within the last decade. The concentration of phosphorus, however, reached 3 kg per hectare on average, exceeding the recommended amount close to 0 kg.

Farms affect the environment also through the use of plant protection products. In Poland, approximately 2 kg of pesticides per hectare of cropland are used each year, which is a rather low amount compared to the Netherlands, Cyprus and Ireland, which apply such products to the

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<sup>13</sup> According to the Institute of Soil Science and the Plant Cultivation – State Research Institute, on average it amounts to 2 tonnes per hectare of crops.

greatest extent. They use 7 kg to 11 kg of plant protection products per hectare, whereas countries at the other end of the scale, such as Romania and Sweden, use the lowest amount of plant protection products, i.e. below 1 kg per hectare.

Some farms are oriented towards production based on organic methods. The possibility of receiving EU subsidies contributed in the years 2004-2013 to the significant increase in the number of farms holding an organic farm certificate or being in the process of receiving one (to 27 thousand). As a consequence, the total area of organic farms also expanded, reaching 670 thousand hectares in the whole Poland. In the later years, however, these figures fell: in 2020, 19 thousand organic farms operated in Poland, which constituted 1.4% of all farms, and their total area also shrank.

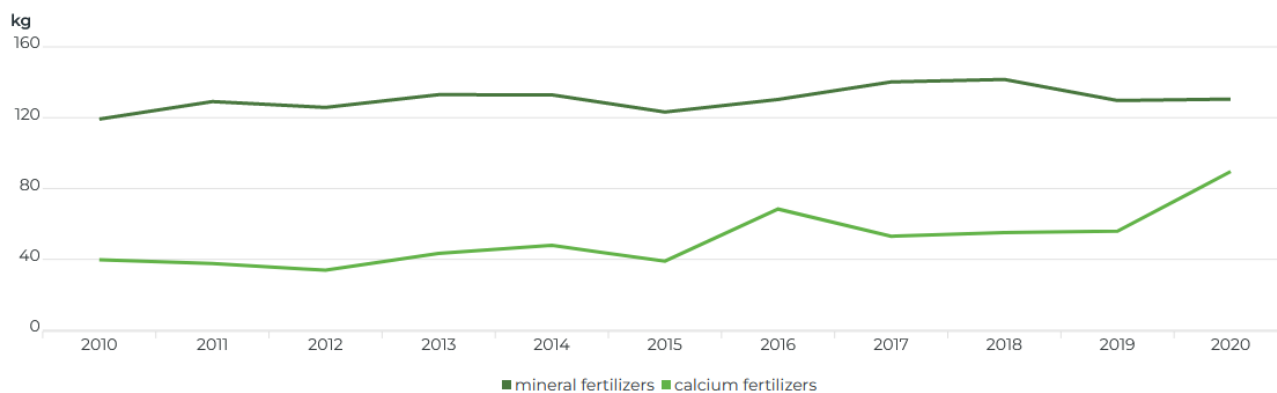
### Place of Poland in the production of selected agricultural products in the UE and in the world

Agricultural product	Place in the EU	Place in the world
wheat	3	16
rye	2	2
oats	1	3
potatoes	3	10
sugar beets	3	6
apples	1	4
poultry	1*	n/a

\*2021

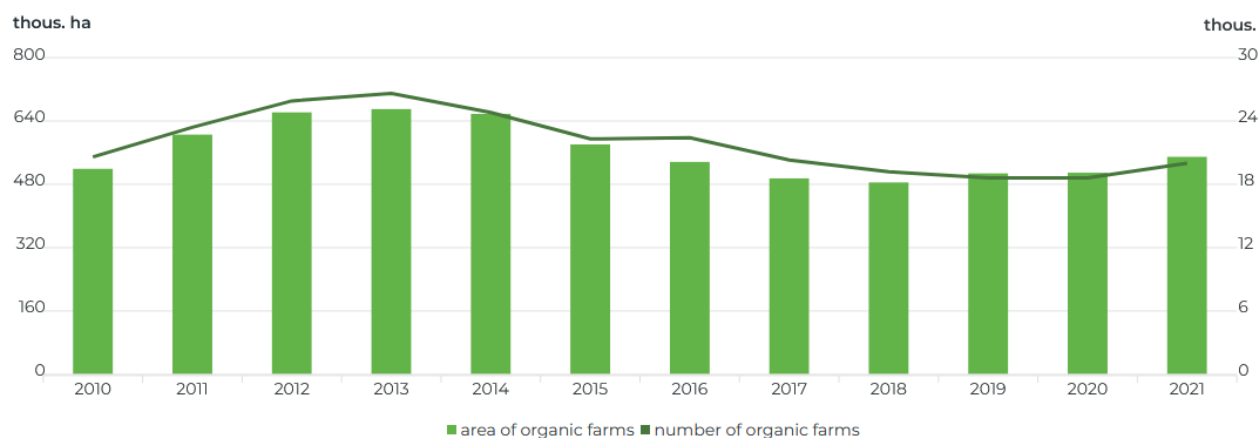


## Consumption of mineral and calcium fertilizers per 1 ha of agricultural land



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
mineral fertilizers	119.2	129.1	125.8	133.0	132.9	123.2	130.3	140.2	141.6	129.7	130.5
calcium fertilizers	39.8	37.6	33.9	43.4	47.9	39.0	68.4	53.0	55.1	55.9	89.6

## Organic farms



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
area of organic farms	519.1	605.5	661.7	670.0	657.9	580.7	536.6	495.0	484.7	507.6	509.3	549.4
number of organic farms	20.6	23.4	25.9	26.6	24.8	22.3	22.4	20.3	19.2	18.6	18.6	20.0

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20. The Institute of Soil Science and Plant Cultivation – State Research Institute (IUNG-PIB)
21. Polish Geological Institute - National Research Institute ([pgi.gov.pl/en](http://pgi.gov.pl/en))
22. Sustainable Agriculture ([rolnictwozrownowazone.pl](http://rolnictwozrownowazone.pl))

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33. FAOSTAT ([fao.org/faostat/en](http://fao.org/faostat/en))
34. SDG Indicators Database ([unstats.un.org/sdgs/dataportal/database](http://unstats.un.org/sdgs/dataportal/database))