



AIR EMISSION ACCOUNTS: year 2021

The Hellenic Statistical Authority (ELSTAT) announces data on Air Emissions Accounts, for the year 2021 and revised data for the period 2012-2020. Data are collected from administrative sources, are provisional and are revised on an annual basis for the whole period.

Through this announcement, ELSTAT presents data on national emissions of greenhouse gases and other air pollutants resulting from economic activities of resident units and households, both within and outside the national territory. The relevant data are presented by certain economic sections of the Statistical Classification of Economic Activities (NACE Rev.2) and households (Tables 1-8, Graphs 1-9).

The emissions and the respective percentage distribution by type of gas per main economic activity sectors of the Statistical Classification of Economic Activities (NACE Rev.2) and households, are analyzed as follows:

Carbon dioxide (CO₂)

Emissions of CO₂ in 2021 were 71,190.9 thousand tonnes showing an increase of 2.4% compared with 2020 (69,518.0 thousand tonnes) as shown in Table 1 and Graph 1. This was mainly caused by a notable increase in the emissions of the section of “Manufacturing” (Tables 2-3, Graph 2).

- ▶ The energy section of “Electricity, gas, steam and air conditioning supply” had the most important contribution to total CO₂ emissions, with a share of 28.8% in 2021. The corresponding share in 2020 was 29.0% (Table 3, Graph 2).
- ▶ The section of “Transportation and storage” accounted for 27.8% of total CO₂ emissions in 2021 and for 28.1% in 2020 (Table 3, Graph 2).
- ▶ “Manufacturing” contributed 22.5% into the total CO₂ emissions in 2021. In 2020, the corresponding share was 21.2% (Table 3, Graph 2).
- ▶ Households had also a significant share in CO₂ emissions, accounting for 17.3% of total CO₂ emissions in 2021. In 2020, the corresponding share was 17.5% (Table 3, Graph 2).

The total annual emissions of CO₂ and the year-on-year change (%) from 2012 to 2021 are shown in Table 1 and Graph 1.

Methane (CH₄)

In 2021, 92.8% of CH₄ emissions derived from two economic sections: “Water supply; sewerage, waste management and remediation” with share 49.1% and “Agriculture, forestry and fishing” with a share of 43.7%. In 2020, the respective contributions were 47.4% and 45.1% (Table 4, Graph 3).

Households did not contribute significantly in CH₄ emissions with a share of 2.4% in 2021 and 2.3% in 2020 (Table 4, Graph 3).

The total annual emissions of CH₄ from 2012 to 2021 are shown in Table 1 and Graph 6.

Information on methodological issues:

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Nitrous oxide (N₂O)

The section of “Agriculture, forestry and fishing” had the most significant contribution to N₂O emissions, with a share of 74.3% in 2021 and 75.2% in 2020 (Table 5, Graph 4).

Other economic sections that notably contributed to nitrous oxide’s emissions were:

- ▶ “Transportation and storage” with a share of 11.8% in 2021 and 11.0% in 2020 (Table 5, Graph 4).
- ▶ “Water supply; sewerage, waste management and remediation” with a share of 6.5% in 2021 and 6.3% in 2020. (Table 5, Graph 4).

The participation of Households in N₂O emissions accounted for 2.1% of total N₂O emissions in 2021 and for 1.9% in 2020. (Table 5, Graph 4).

The total annual emissions of N₂O from 2012 to 2021 are shown in Table 1 and Graph 6.

F-gases category (hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride)

Hydrofluorocarbons’ (HFCs) emissions came mostly from refrigeration and air conditioning operations through all economic activities and households. In 2021, the leading emitter of HFCs was the “Manufacturing” section followed by “Other services” with respective shares of 41.7% and 37.2% (Table 6, Graph 5). The participation of Households was also notable with 12.1% of total HFCs emissions in 2021 (Table 6, Graph 5).

The total annual emissions of HFCs from 2012 to 2021 are shown in Table 1 and Graph 6.

Perfluorocarbons’ (PFCs) emissions came exclusively from the “Manufacturing” section.

The total annual emissions of PFCs and the year-on-year change (%) from 2012 to 2021 are shown in Table 1 and Graph 7.

Emissions of **Sulphur hexafluoride (SF₆)** came exclusively from the section of “Electricity, gas, steam and air conditioning supply”.

The total annual emissions of SF₆ and the year-on-year change (%) from 2012 to 2021 are shown in Table 1 and Graph 8.

Air pollutants (NO_x, SO_x, NH₃, NMVOC, CO, PM₁₀)

In 2021, major emitters of air pollutants were the economic sections of “Transportation and storage” with a share of 40.4%, “Manufacturing” with 10.9% and “Agriculture, forestry and fishing” with 10.0% (Table 8, Graph 9). Households had also a significant contribution to air pollutants’ emissions with a share of 21.9% in 2021 (Table 8, Graph 9).

The total annual emissions of air pollutants from 2012 to 2021 are shown in Table 7.

Table 1. Emissions of greenhouse gases in 1,000 tonnes of CO₂ equivalent, 2012 – 2021*

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Carbon dioxide (CO ₂)	100,546.9	88,456.7	85,721.0	83,668.3	81,395.8	86,677.2	85,563.9	80,760.1	69,518.0	71,190.9
Methane (CH ₄)	12,106.5	11,826.7	11,612.3	11,396.6	11,009.5	11,349.4	11,493.1	11,243.2	10,989.9	11,352.9
Nitrous oxide (N ₂ O)	4,604.8	4,303.6	4,112.1	4,099.3	4,186.9	4,265.4	4,198.9	4,220.7	4,296.7	4,186.1
Hydrofluorocarbons (HFCs)	4,864.5	5,403.5	5,505.3	5,641.7	5,844.6	5,806.4	5,559.4	5,137.1	4,816.3	4,675.4
Perfluorocarbons (PFCs)	133.8	156.1	121.7	108.0	122.0	113.6	122.1	123.6	133.5	111.2
Sulphur hexafluoride (SF ₆)	5.2	5.3	5.1	5.2	5.4	5.2	5.1	5.1	5.1	5.0
TOTAL	122,261.8	110,151.9	107,077.5	104,919.2	102,564.1	108,217.1	106,942.5	101,489.8	89,759.5	91,521.5

*Provisional data

Table 2. Emissions of carbon dioxide (CO₂) in 1,000 tonnes by economic sector, 2012 – 2021*

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Agriculture, forestry and fishing	1,148.8	766.7	800.5	861.8	823.8	783.5	764.8	751.3	1,184.0	952.2
Mining and quarrying	72.0	79.1	55.2	81.6	86.2	95.9	94.6	67.4	60.0	63.4
Manufacturing	15,300.7	17,154.1	17,831.0	17,093.7	17,939.0	17,904.2	17,099.0	15,933.0	14,708.2	16,000.0
Electricity, gas, steam and air conditioning supply	51,217.6	44,475.0	40,742.8	35,851.4	31,697.0	35,265.3	33,615.9	27,723.6	20,172.7	20,479.6
Water supply; sewerage, waste management and remediation	43.0	104.3	100.4	56.6	81.5	100.6	60.1	67.0	50.9	86.6
Construction	179.9	241.5	254.0	224.5	246.9	168.9	208.1	139.0	165.3	199.6
Transportation and storage	14,880.9	12,161.3	12,768.2	14,528.2	15,991.9	17,961.0	20,196.1	21,910.3	19,560.4	19,776.3
Other services	2,065.8	1,843.2	1,540.4	1,745.8	1,675.8	1,536.4	1,452.9	1,461.3	1,428.6	1,303.1
Households	15,638.4	11,631.3	11,628.4	13,224.6	12,853.7	12,861.5	12,072.4	12,707.2	12,188.0	12,330.1
TOTAL	100,546.9	88,456.7	85,721.0	83,668.3	81,395.8	86,677.2	85,563.9	80,760.1	69,518.0	71,190.9

*Provisional data

Table 3. Percentage distribution of CO₂ emissions by economic sector, 2012 – 2021*

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Agriculture, forestry and fishing	1.1	0.9	0.9	1.0	1.0	0.9	0.9	0.9	1.7	1.3
Mining and quarrying	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Manufacturing	15.2	19.4	20.8	20.4	22.0	20.7	20.0	19.7	21.2	22.5
Electricity, gas, steam and air conditioning supply	50.9	50.3	47.5	42.8	38.9	40.7	39.3	34.3	29.0	28.8
Water supply; sewerage, waste management and remediation	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Construction	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3
Transportation and storage	14.8	13.7	14.9	17.4	19.6	20.7	23.6	27.1	28.1	27.8
Other services	2.1	2.1	1.8	2.1	2.1	1.8	1.7	1.8	2.1	1.8
Households	15.6	13.1	13.6	15.8	15.8	14.8	14.1	15.7	17.5	17.3
TOTAL	100									

*Provisional data

Table 4. Percentage distribution of CH₄ emissions by economic sector, 2012 – 2021*

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Agriculture, forestry and fishing	45.6	45.7	45.0	44.9	45.6	44.1	43.8	44.3	45.1	43.7
Mining and quarrying	12.7	11.2	10.7	9.9	7.3	8.1	7.8	6.0	3.2	2.7
Manufacturing	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6
Electricity, gas, steam and air conditioning supply	0.8	0.8	0.7	0.7	0.8	1.0	0.9	0.9	1.0	1.0
Water supply; sewerage, waste management and remediation	37.0	38.8	40.1	40.7	42.7	43.2	44.1	45.3	47.4	49.1
Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transportation and storage	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.4
Other services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Households	3.2	2.9	2.9	3.0	2.7	2.7	2.5	2.5	2.3	2.4
TOTAL	100									

*Provisional data

Table 5. Percentage distribution of N₂O emissions by economic sector, 2012 – 2021*

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Agriculture, forestry and fishing	72.7	78.3	76.6	75.2	75.4	75.0	73.9	74.3	75.2	74.3
Mining and quarrying	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manufacturing	8.5	3.3	3.9	3.9	3.4	3.5	3.7	3.1	2.9	2.7
Electricity, gas, steam and air conditioning supply	3.1	3.0	2.9	2.6	2.0	2.2	2.2	1.7	0.9	0.9
Water supply; sewerage, waste management and remediation	6.0	6.4	6.7	6.6	6.5	6.5	6.7	6.6	6.3	6.5
Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transportation and storage	5.8	5.3	6.0	7.6	8.7	9.0	9.8	10.5	11.0	11.8
Other services	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.6
Households	2.3	2.0	2.1	2.4	2.2	2.1	2.1	2.1	1.9	2.1
TOTAL	100									

*Provisional data

Table 6. Percentage distribution of HFCs emissions by economic sector, 2012 – 2021*

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Agriculture, forestry and fishing	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.6	0.6
Mining and quarrying	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Manufacturing	50.8	51.7	52.1	50.8	50.2	49.7	50.6	48.9	41.3	41.7
Electricity, gas, steam and air conditioning supply	0.8	0.8	0.9	0.8	0.9	0.7	0.6	0.7	0.8	0.8
Water supply; sewerage, waste management and remediation	0.8	1.0	1.0	1.0	1.2	1.1	1.2	1.3	1.4	1.4
Construction	4.1	4.1	4.0	3.9	3.8	3.7	3.9	4.2	4.0	4.1
Transportation and storage	2.6	2.3	2.3	2.1	1.9	1.9	1.8	1.7	1.8	2.1
Other services	28.7	29.0	28.3	29.3	29.2	31.4	30.6	30.9	36.7	37.2
Households	11.7	10.7	11.0	11.6	12.3	11.0	10.9	11.6	13.3	12.1
TOTAL	100									

*Provisional data

Table 7. Emissions of air pollutants in 1,000 tonnes, 2012 – 2021*

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Nitrogen Oxides (NO _x)	507.4	437.2	437.5	468.9	500.2	545.0	580.0	554.2	528.4	509.3
Sulphur Oxides (SO _x)	314.1	247.7	230.7	256.2	256.7	293.1	323.5	328.5	198.5	165.6
Ammonia (NH ₃)	68.1	68.0	65.3	64.0	63.9	63.5	63.2	63.1	63.7	62.8
Non-Methane Volatile Organic Compounds (NMVOC)	203.1	183.9	180.6	174.9	167.7	163.4	159.7	160.3	152.2	156.6
Carbon Monoxide (CO)	653.3	556.1	565.9	547.1	493.7	510.4	492.0	488.8	452.8	451.6
Particulate Matter (PM10)	90.3	81.9	86.0	81.8	83.4	83.8	80.8	78.7	80.8	78.3
TOTAL	1,836.4	1,574.8	1,566.0	1,593.0	1,565.6	1,659.2	1,699.2	1,673.6	1,476.5	1,424.2

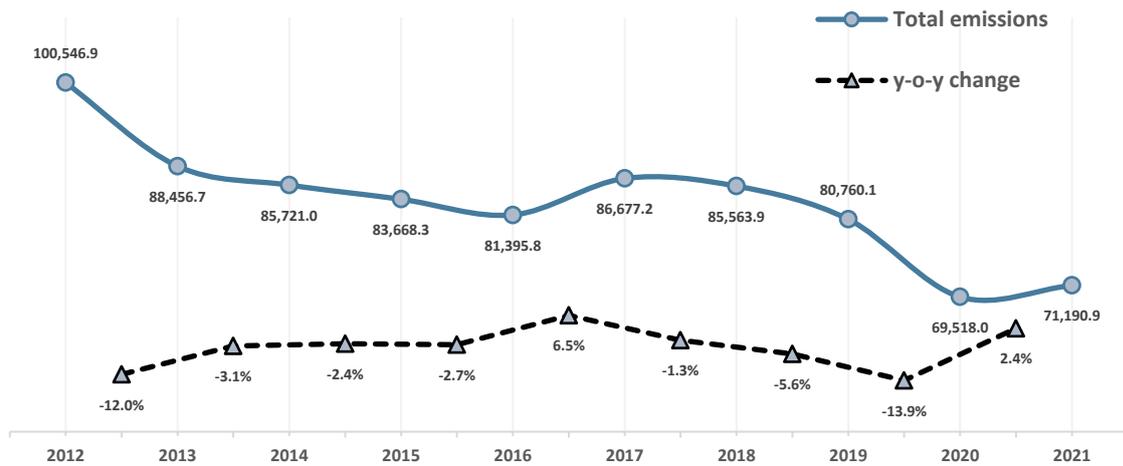
*Provisional data

Table 8. Percentage distribution of total air pollutants' emissions by economic sector, 2012 – 2021*

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Agriculture, forestry and fishing	12.8	10.8	9.6	9.1	9.2	9.0	8.2	8.5	10.4	10.0
Mining and quarrying	1.0	1.1	1.1	1.0	0.8	0.9	0.9	0.6	0.4	0.5
Manufacturing	9.0	10.1	10.8	9.9	10.3	9.3	9.5	9.4	10.2	10.9
Electricity, gas, steam and air conditioning supply	12.8	13.3	11.9	11.0	9.3	9.9	8.9	8.3	6.6	6.9
Water supply; sewerage, waste management and remediation	4.9	5.9	5.9	5.7	5.8	5.6	5.4	5.5	6.3	6.5
Construction	0.7	1.2	1.4	1.4	1.7	1.2	1.0	0.9	1.1	1.1
Transportation and storage	30.5	27.9	28.4	32.8	37.5	40.2	44.7	45.5	42.5	40.4
Other services	2.1	2.6	2.3	2.4	2.3	1.9	1.8	1.9	2.4	1.8
Households	26.1	27.2	28.6	26.7	23.1	22.1	19.7	19.4	20.0	21.9
TOTAL	100									

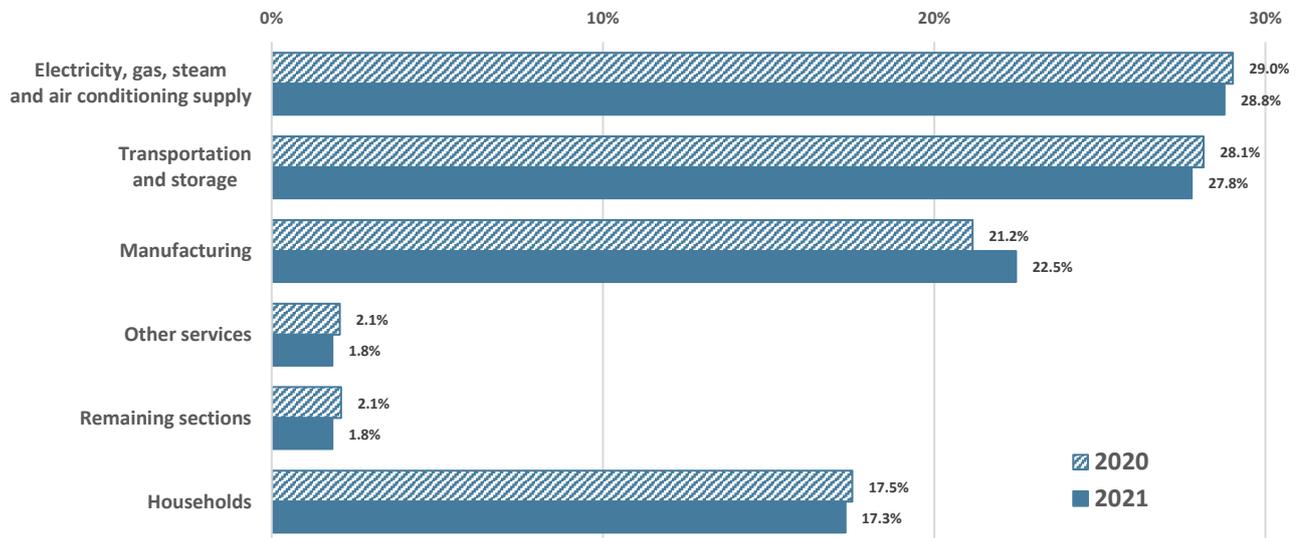
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Graph 1. Emissions of carbon dioxide (CO₂) in 1,000 tonnes and year-on-year change (%), 2012 – 2021*



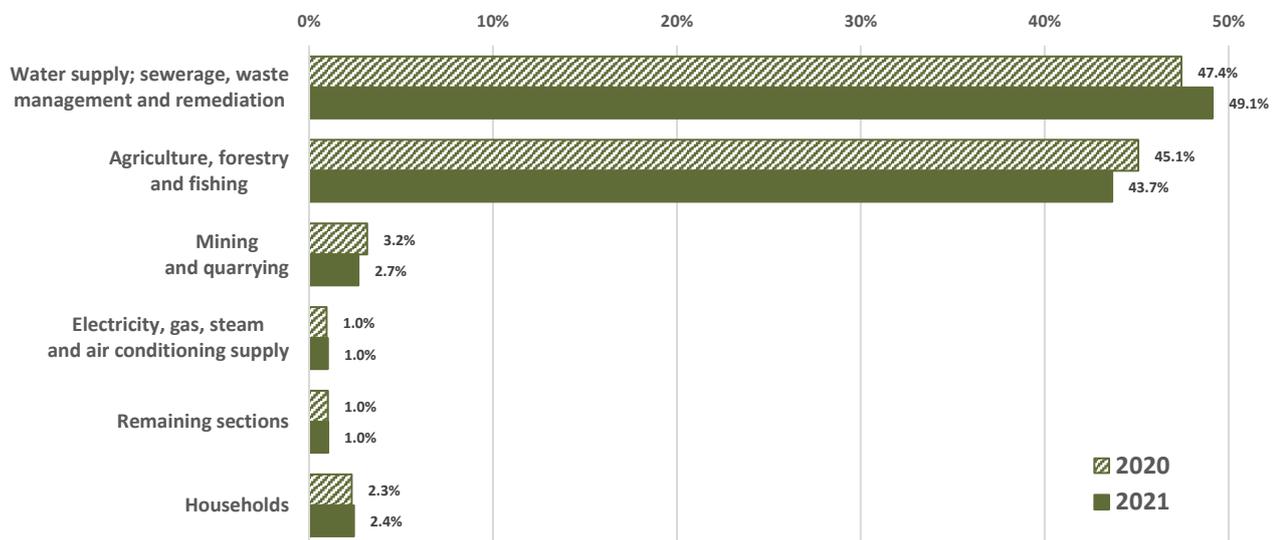
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Graph 2. Percentage distribution of carbon dioxide (CO₂) emissions to main sections of the statistical classification of economic activities (NACE Rev.2) and households, 2020* and 2021*



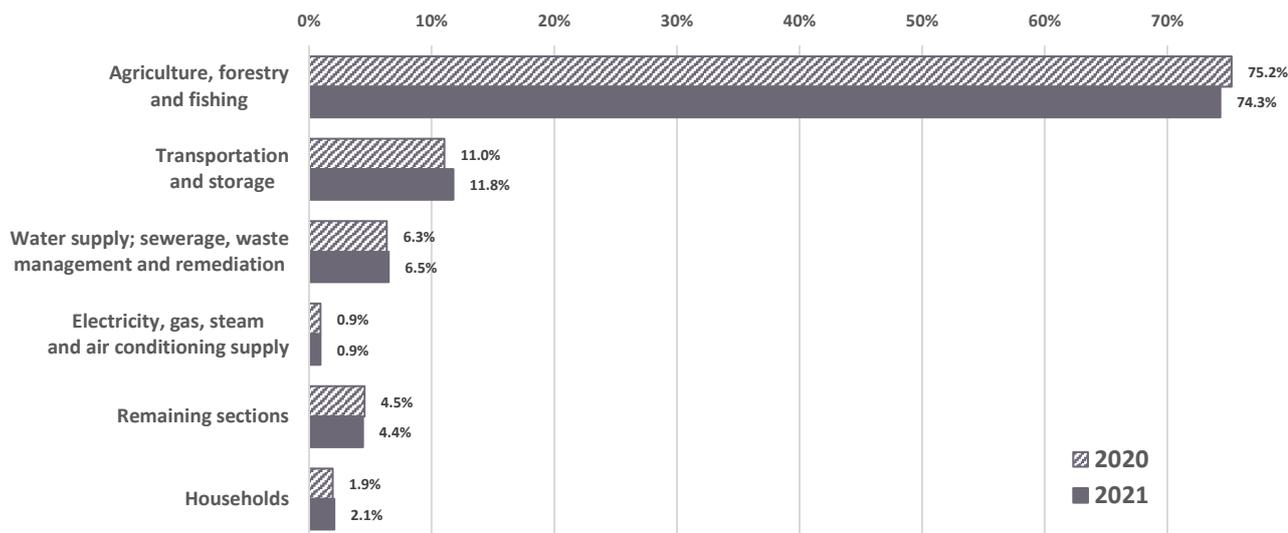
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Graph 3. Percentage distribution of methane (CH₄) emissions to main sections of the statistical classification of economic activities (NACE Rev.2) and households, 2020* and 2021*



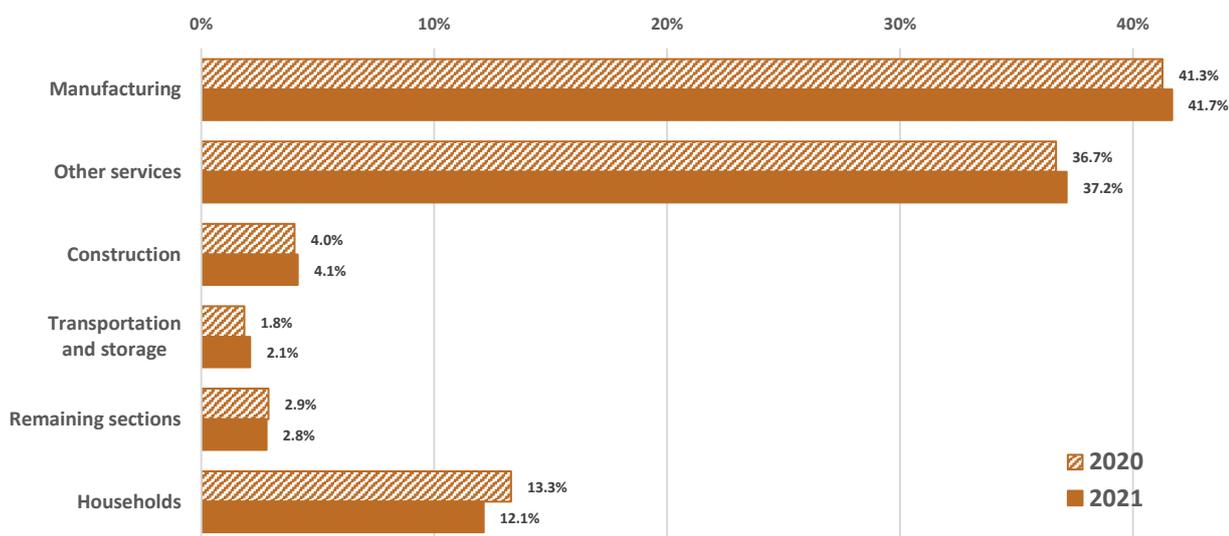
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Graph 4. Percentage distribution of nitrous oxide (N₂O) emissions to main sections of the statistical classification of economic activities (NACE Rev.2) and households, 2020* and 2021*



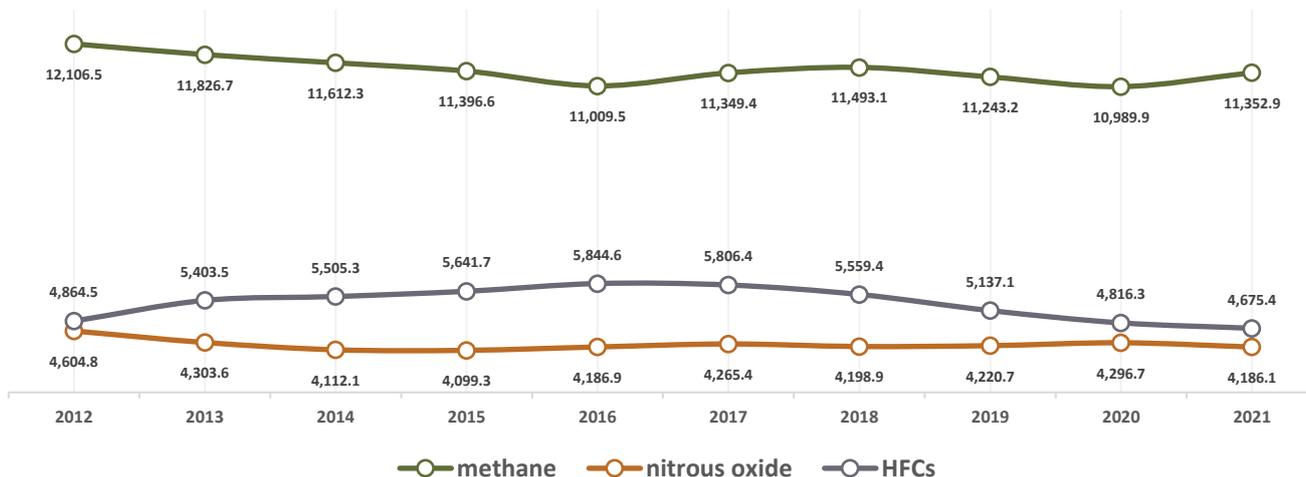
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Graph 5. Percentage distribution of hydrofluorocarbons (HFCs) emissions to main sections of the statistical classification of economic activities (NACE Rev.2) and households, 2020* and 2021*



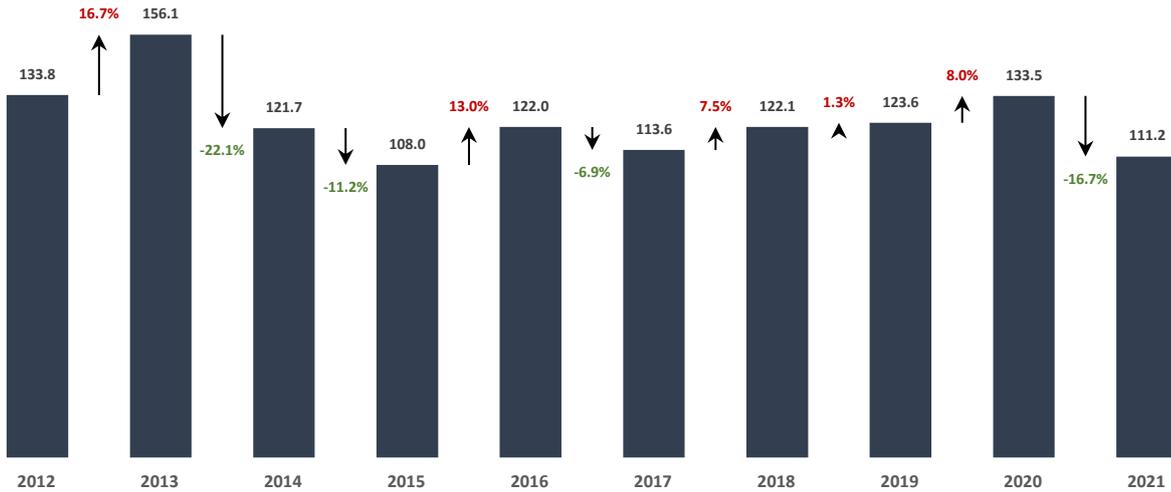
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Graph 6. Emissions of methane (CH₄), nitrous oxide (N₂O) and hydrofluorocarbons (HFCs) in 1,000 tonnes of CO₂ equivalent, 2012 – 2021*



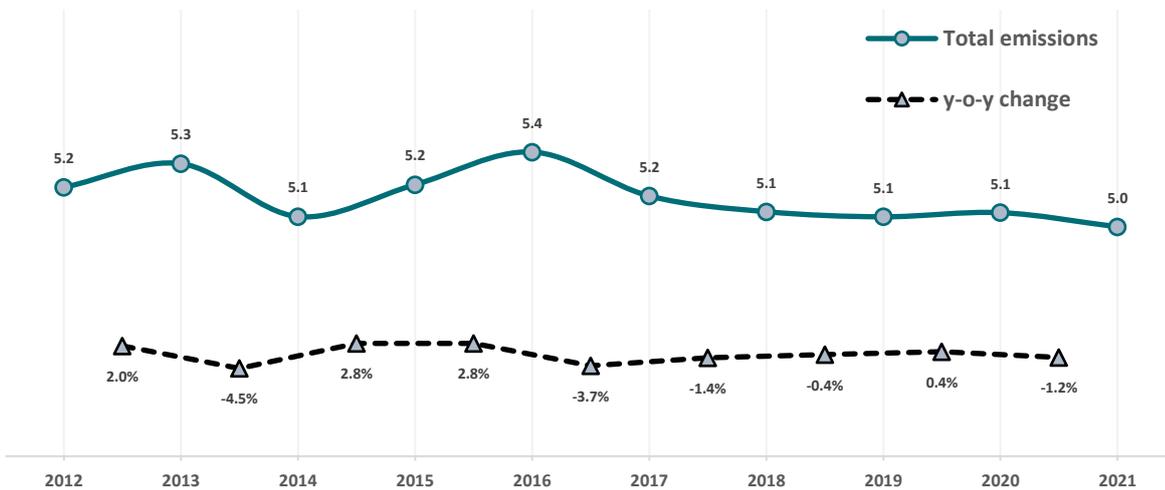
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Graph 7: Emissions of perfluorocarbons (PFCs) in 1,000 tonnes of CO₂ equivalent and year-on-year change (%), 2012 – 2021*



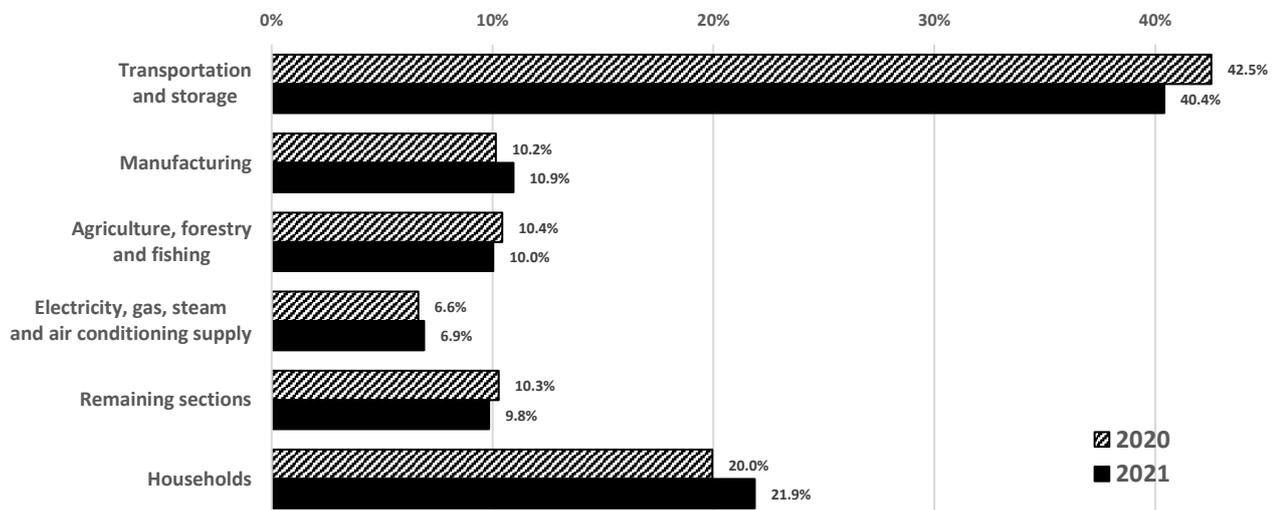
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Graph 8: Emissions of sulphur hexafluoride (SF₆) in 1,000 tonnes of CO₂ equivalent and year-on-year change (%), 2012 – 2021*



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Graph 9. Percentage distribution of air pollutants' emissions to main sections of the statistical classification of economic activities (NACE Rev.2) and households, 2020* and 2021*



*Provisional data

EXPLANATORY NOTES

Legal framework: The Air Emissions Accounts are compiled pursuant to Regulation 691/2011 of the European Parliament and of the Council (Section 1) which provides for and lays down the methodological frame for the compilation of Air Emissions Accounts.

Methodology: The main source of primary data on greenhouse gases and other air emissions is the annual inventory submission of Greece for GHG and air pollutants. The inventory is compiled and submitted by the Ministry of Environment and Energy, in the frame of the Kyoto protocol on greenhouse gases and other air pollutants to UNFCCC and CLRTAP respectively.
Data are presented by certain economic sections of the Statistical Classification of Economic Activities (NACE Rev.2) and households. "Other Services" sector corresponds to the NACE Rev.2 sections G, I-U.
Possible small deviations in sums are due to rounding.

**Concepts and
Definitions:**

Air Emissions Accounts include the following gases:

1. **Carbon dioxide (CO₂):** Carbon dioxide (CO₂) is the most important of the greenhouse gases because it is emitted in large quantities by several economic sectors. In Greece, the main source of carbon dioxide (CO₂) emissions is the use of solid fuels for electricity production.
2. **Methane (CH₄):** Methane (CH₄) holds the second place as regards air emissions that contribute to the increase of the world temperature. It is expressed in CO₂ equivalents. Methane (CH₄) is approximately 28 times more powerful than carbon dioxide (CO₂) in terms of warming the climate system. In Greece, the main sources of methane emissions are agriculture and waste management.
3. **Nitrous oxide (N₂O):** Nitrous oxide holds the third place as regards air emissions that contribute to the increase of the world temperature. It is expressed in CO₂ equivalents. Nitrous oxide (N₂O) is approximately 265 times more powerful than carbon dioxide (CO₂) in terms of warming the climate system. In Greece, the main sources of nitrous oxide emissions are agriculture and water transport.
4. **Hydrofluorocarbons (HFCs) and Perfluorocarbons (PFCs):** They are in the fourth place as regards air emissions that contribute to the increase of the world temperature. They are expressed in CO₂ equivalents. HFCs and PFCs are approximately 7,390 (CF₄) to 14,800 (HFC-23) times more powerful than carbon dioxide (CO₂) in terms of warming the climate system. In Greece, the main source of these gases is manufacturing.
5. **Sulphur hexafluoride (SF₆):** Sulphur hexafluoride (SF₆) holds the fifth place as regards air emissions that contribute to the increase of the world temperature. It is expressed in CO₂ equivalents. Sulphur hexafluoride is approximately 22,800 times more powerful than carbon dioxide (CO₂) in terms of warming the climate system. In Greece, the main source of sulphur hexafluoride emissions is the transfer and distribution of electricity.
6. **Air pollutants (NO_x, SO_x, NH₃, NMVOCs, CO, PM₁₀):** In Greece, the main source of air pollutants' emissions is the transport sector.

Resident Principle: Air Emissions Accounts follow the residence principle for land, water and air transport. In contrast with the territory principle, the residence adjustment is applied (a) to record the air emissions arising from activities of resident units, regardless of where these emissions actually occur, and (b) to exclude the emission relevant activities of non-residents on the national territory. This is the reason why the total emissions reported in Air Emissions Accounts following the residence principle deviate from those in the Annual Inventory Submission Report of Greece following the territory principle.

References: Complete datasets and metadata information are available in ELSTAT's portal (www.statistics.gr), at the following link:
<http://www.statistics.gr/en/statistics/-/publication/SOP08/>