

Air Emissions Accounts. Series 1990, 1995-2010.

The fight against **climate change** constitutes one of the most significant challenges facing humankind, in order to reach a level of concentration in the atmosphere of greenhouse gases (GEG) that does not cause unnatural changes in the earth's climate.

In order to adopt measures that reduce this type of emissions, it has been necessary to have access to reliable statistical information regarding polluting substances generated by the different economic sectors. In this sense, the “European Environmental Account Strategy” identifies the Air Emissions Accounts as a core module that should be produced on a regular basis to serve as a support for adopting policies in this scope.

Atmospheric Emissions Accounts form part of the Environmental Accounts developed by the INE using available international methodologies. In this publication, the results are published for the new base change, with the series 1990, 1995-2010.

The new Regulation (UE) No 691/2011 on European environmental economic accounts set up in 2011 contains a section about this account.

The Air Emissions Accounts present data on atmosphere emissions, with the National Accounts System, broken down by branches of economic activity and household sector. The methodology used in estimates is to be found in the “Manual for Air Emissions Accounts. 2009 edition” published by EUROSTAT.

The information on air emissions presents polluting agents with a direct effect on warming of the atmosphere (greenhouse effect), acid rain, the forerunners of the ozone layer, and on photochemical contamination.

The estimates of the Emissions Accounts are made from Atmospheric Emission National Inventories, which the Ministry of Agriculture, Food and Environment is responsible for compiling (<http://www.magrama.gob.es/en/calidad-y-evaluacion-ambiental/temas/sistema-espanol-de-inventario-sei-/volumen2.aspx>). In the inventories, the EMEP/CORINAIR methodology carried out by the European Environment Agency is used, with SNAP nomenclature (Selected Nomenclature for Air Pollution) which groups emissions functionally by process. The Emission Accounts are compiled by adapting data to the classification based on the NACE (plus the household sector). The majority of categories in the inventories correspond to one economic activity registered in a NACE branch, but in certain cases, emissions should be divided into several branches (combustion plants, transport and others).

Since atmospheric emissions are distributed by branch of economic activity in accordance with the rules of the National Accounts system, those resulting from secondary and auxiliary activities are grouped with those of the main activity of economic units. In the household sector, direct emissions corresponding to private transport, heating and others of a secondary nature are considered.

Overall coverage of the Emission Accounts and the Inventories differs due to the framework used in the former, the National Accounts system, which only considers national economic activities (principle of residence), whereas the inventories present emissions from all sources within Spain. In addition, in the Emission Accounts, emissions from non-economic agents (nature) are not shown, nor is absorption of gases by nature (absorption of CO₂). Thus, in the Air Emissions Accounts, emissions covered are those generated by national economic activities (resident units), and emissions from these units abroad, tourists and international transport companies, which must be included in the corresponding branch of activity or in households, whereas emissions from non-resident units are excluded within national borders.

Results of the base change, (series 1990, 1995-2010). Analysis of the GHG evolution.

In the new publication, the results are published for the base change, with the series 1990, 1995-2010. The detail in the tables may be found in INEBase, with the distribution of emissions from each of the gases and pollutants (greenhouse effect, acid rain, forerunners of the ozone layer, and photochemical contamination) by branch of activity and household sector.

The evolution of emissions of greenhouse gases (CO₂: carbon dioxide, CH₄: methane, N₂O: nitrous oxide, HFC: hydrogenfluorocarbon composites, PFC: polyfluorocarbon composites, SF₆: sulphur hexafluoride), is shown below. In order to be able to compare the amounts emitted into the atmosphere of the different agents, greenhouse effect gases other than carbon dioxide are converted into their equivalent carbon dioxide value (CO₂eq) by multiplying the mass of gas in question by their global warming potential. In this way it is possible to compare emissions of all GHGs.

The results obtained for the total emissions of GHGs measured in thousands of equivalent tonnes of CO₂ are presented in the following table¹:

TOTAL GHG emission (Equivalent kilotonnes (Gg) of CO₂)

	1990	1995	2000	2005	2006	2007	2008	2009	2010
ECONOMIC ACTIVITY									
Agriculture, livestock, hunting, forestry and fishing	41,537	41,135	47,181	45,375	46,031	47,001	44,577	44,356	45,077
Extractive industries	3,012	2,882	3,073	2,810	2,581	2,501	2,318	2,635	1,809
Manufacturing industry	83,332	92,213	102,141	116,892	115,039	114,880	107,538	92,246	97,662
Production and distribution of electrical energy, gas and water supply	64,829	72,252	90,294	110,631	102,006	108,056	91,144	75,507	59,149
Construction	4,254	3,401	4,179	5,359	5,568	5,798	5,443	4,764	4,292
Transport, storage and communications	20,419	22,730	28,739	36,146	36,799	38,984	37,177	30,965	29,577
Other Service activities	13,538	17,455	21,824	25,267	26,096	26,293	26,675	27,204	27,676
Household Sector	44,340	52,142	68,126	78,788	79,172	80,201	77,037	75,121	75,989
Unclassified*	3,965	4,092	6,590	10,227	11,499	11,119	11,164	12,598	13,019
TOTAL	279,226	308,302	372,147	432,309	424,980	435,562	403,579	365,396	354,251

In the results obtained, we can see that if a percentage distribution is made for emissions of GHGs by branches of activity and household sector highlight, as the main polluting branches, manufacturing industry and production of electricity, gas and water, as well as the household sector:

PERCENTAGE STRUCTURE GHG

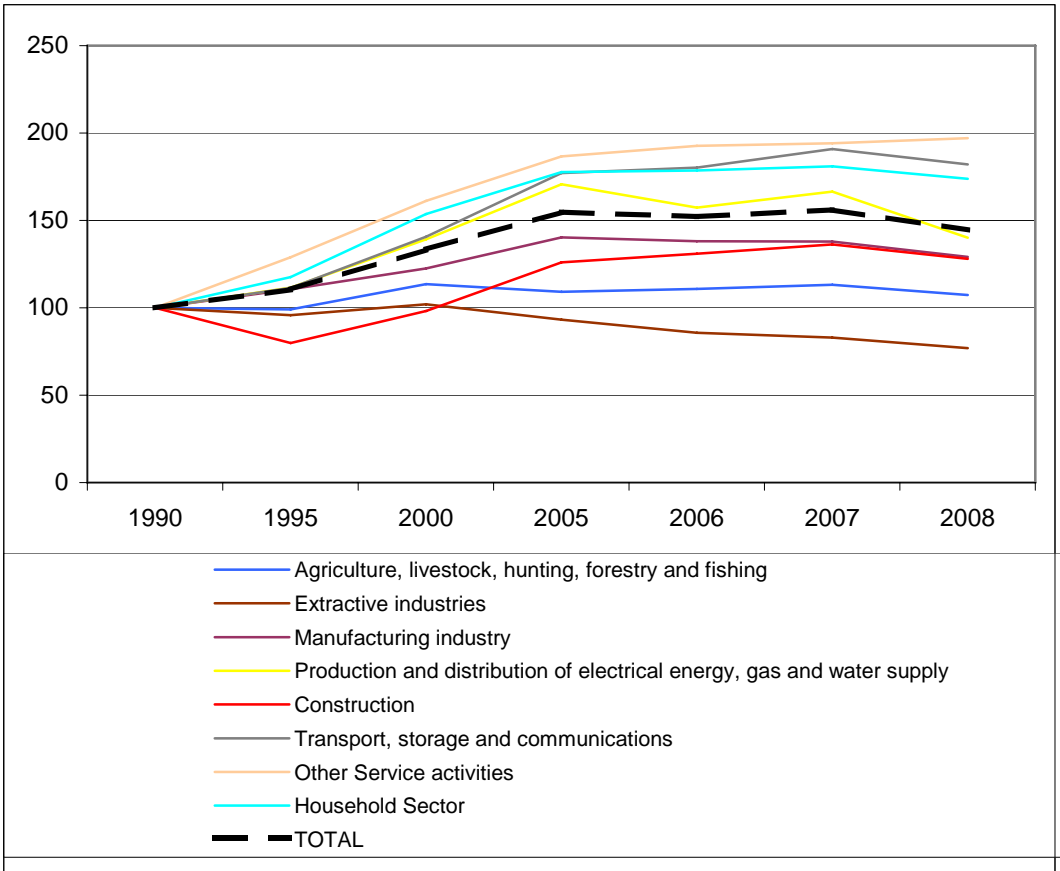
	1990	1995	2000	2005	2006	2007	2008
ECONOMIC ACTIVITY							
Agriculture, livestock, hunting, forestry and fishing	14.9	13.3	12.7	10.5	10.8	10.8	11.0
Extractive industries	1.1	0.9	0.8	0.6	0.6	0.6	0.6
Manufacturing industry	29.8	29.9	27.4	27.0	27.1	26.4	26.6
Production and distribution of electrical energy, gas and water supply	23.2	23.4	24.3	25.6	24.0	24.8	22.5
Construction	1.5	1.1	1.1	1.2	1.3	1.3	1.3
Transport, storage and communications	7.3	7.4	7.7	8.4	8.7	9.0	9.2
Other Service activities	4.8	5.7	5.9	5.8	6.1	6.0	6.6
Household Sector	15.9	16.9	18.3	18.2	18.6	18.4	19.1
Unclassified*	1.4	1.3	1.8	2.4	2.7	2.6	2.8
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

On the other hand, we can see how, of the total emissions of GHGs, the emissions from the household sector have increased its percentage-wage systematically year after year. This result in 2010 is higher than those generated from the production of electrical energy, water and gas.

Regarding the increase or reduction of the total emissions of GHGs, in the following table and graph, the variation indices are presented, with base 1990:

VARIATION INDEX (1990=100)

ECONOMIC ACTIVITY	1990	1995	2000	2005	2006	2007	2008
Agriculture, livestock, hunting, forestry and fishing	100	99	114	109	111	113	107
Extractive industries	100	96	102	93	86	83	77
Manufacturing industry	100	111	123	140	138	138	129
Production and distribution of electrical energy, gas and water supply	100	111	139	171	157	166	140
Construction	100	80	98	126	131	136	128
Transport, storage and communications	100	111	141	177	180	191	182
Other Service activities	100	129	161	187	193	194	197
Household Sector	100	118	154	178	179	181	174
Unclassified*	100	103	166	258	290	280	282
TOTAL	100	110	133	155	152	156	145



Lastly we analyse for the year 2010 the percentage represented by each gas over the total GHG emissions in equivalent carbon dioxide mass. Emissions of carbon dioxide represent, in 2010, approximately 81% of the total, although over the years analysed in the Air Emissions Accounts this percentage has varied between 82 and 85%. Regarding CH₄ (methane) and N₂O (nitrous oxide), these represent approximately 10% and 6% of the total, respectively

PERCENTAGE STRUCTURE GHG YEAR 2008

ECONOMIC ACTIVITY	CO2	SF6	N2O	CH4	PFC	HFC	TOTAL
Agriculture, livestock, hunting, forestry and fishing	24.55	0.00	33.05	42.40	0.00	0.00	100.00
Extractive industries	67.68	0.00	0.51	31.81	0.00	0.00	100.00
Manufacturing industry	96.63	0.33	1.54	1.20	0.12	0.19	100.00
Production and distribution of electrical energy, gas and water supply	98.78	0.00	0.61	0.60	0.00	0.00	100.00
Construction	99.16	0.00	0.74	0.10	0.00	0.00	100.00
Transport, storage and communications	98.93	0.00	0.74	0.33	0.00	0.00	100.00
Other Service activities	46.05	0.00	6.63	47.31	0.00	0.00	100.00
Household Sector	96.78	0.00	1.10	0.92	0.01	1.20	100.00
Unclassified*	46.60	0.00	0.64	0.92	1.19	50.65	100.00
TOTAL	84.27	0.09	4.94	8.95	0.07	1.68	100.00

Analysed separately below are the emissions of CO₂, CH₄, and N₂O, the gases that contribute the most to the so-called greenhouse effect.

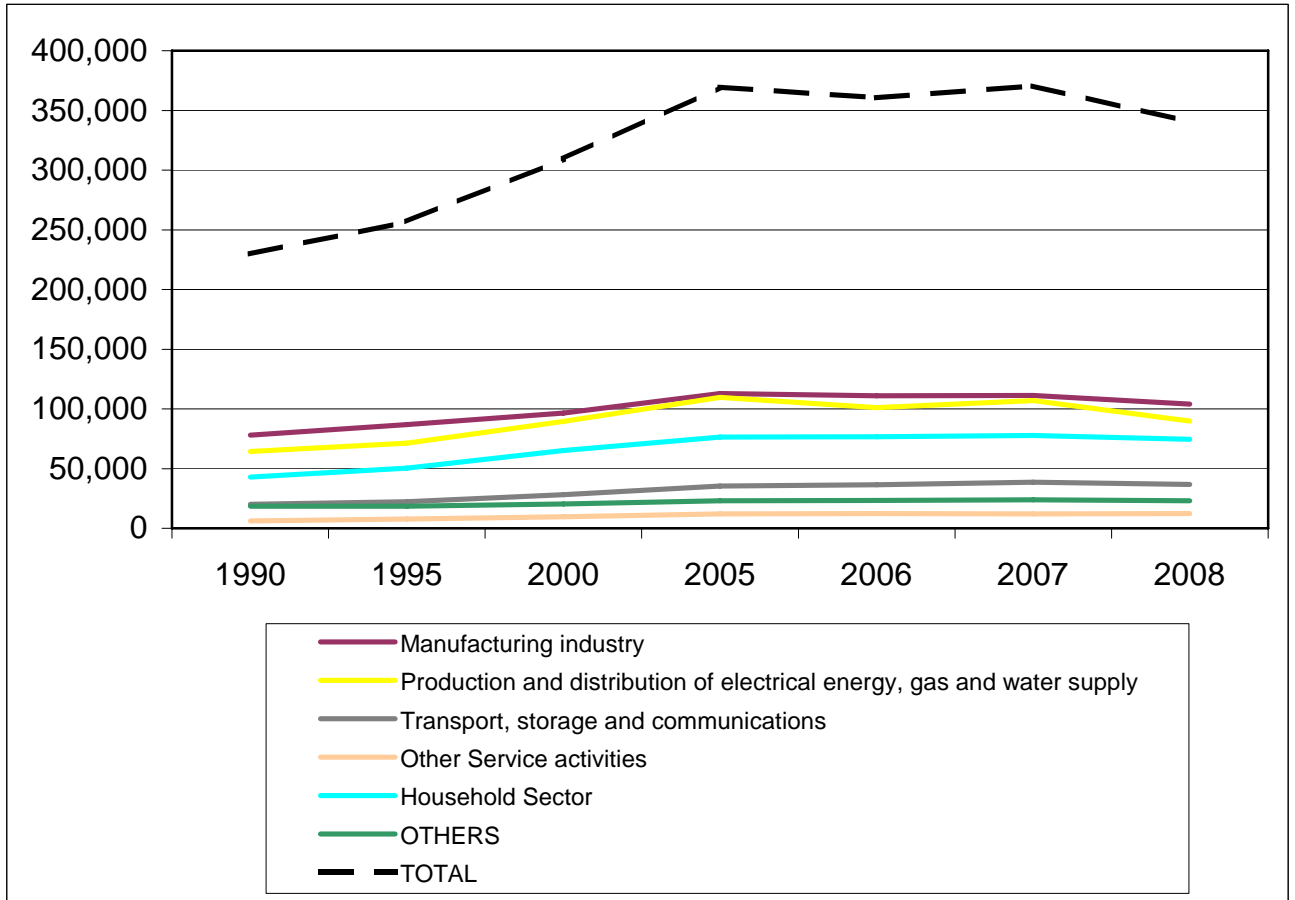
RESULTS FOR EMISSIONS OF CO₂ (series 1990, 1995-2010)

DISTRIBUTION BY BRANCH OF ECONOMIC ACTIVITY AND HOUSEHOLD SECTOR OF EMISSIONS OF CO₂

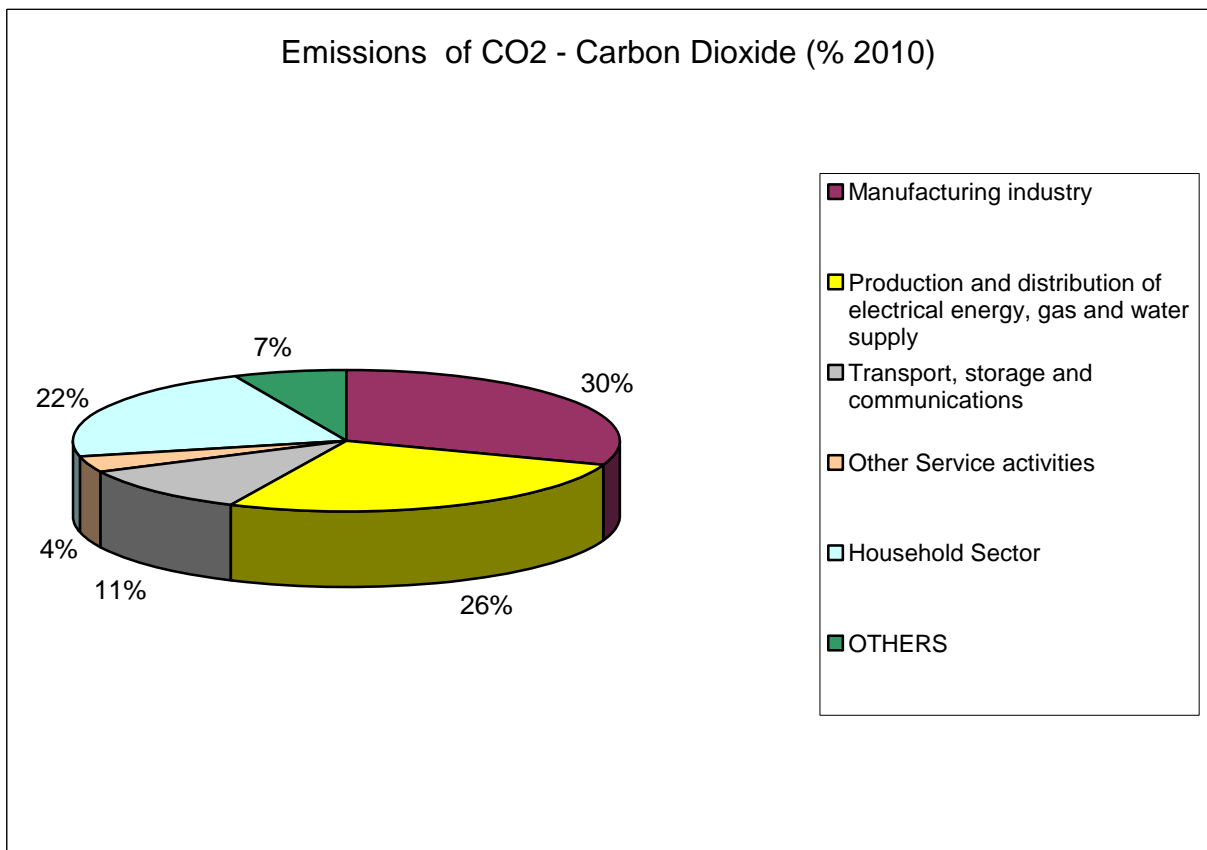
CO₂-Carbon Dioxide Emissions (Equivalent kilotonnes (Gg) of CO₂)

ECONOMIC ACTIVITY	1990	1995	2000	2005	2006	2007	2008
Agriculture, livestock, hunting, forestry and fishing	9,913	10,123	10,384	10,725	10,821	10,866	10,943
Extractive industries	1,074	1,339	1,760	1,804	1,592	1,561	1,569
Manufacturing industry	77,888	86,764	96,397	112,756	111,102	111,169	103,913
Production and distribution of electrical energy, gas and water supply	64,293	71,354	89,446	109,570	100,939	106,837	89,778
Construction	4,213	3,367	4,141	5,316	5,523	5,751	5,398
Transport, storage and communications	20,026	22,204	28,086	35,402	36,351	38,585	36,777
Other Service activities	6,226	7,735	9,612	11,956	12,353	11,949	12,284
Household Sector	42,810	50,431	65,247	76,357	76,784	77,767	74,558
Unclassified*	3,420	3,537	4,183	5,191	5,416	5,600	5,203
TOTAL	229,862	256,854	309,255	369,475	360,478	370,419	340,090

EVOLUTION OF EMISSIONS OF CO₂ (year 2010)



PERCENTAGE STRUCTURE OF EMISSIONS OF CO₂ (year 2010)



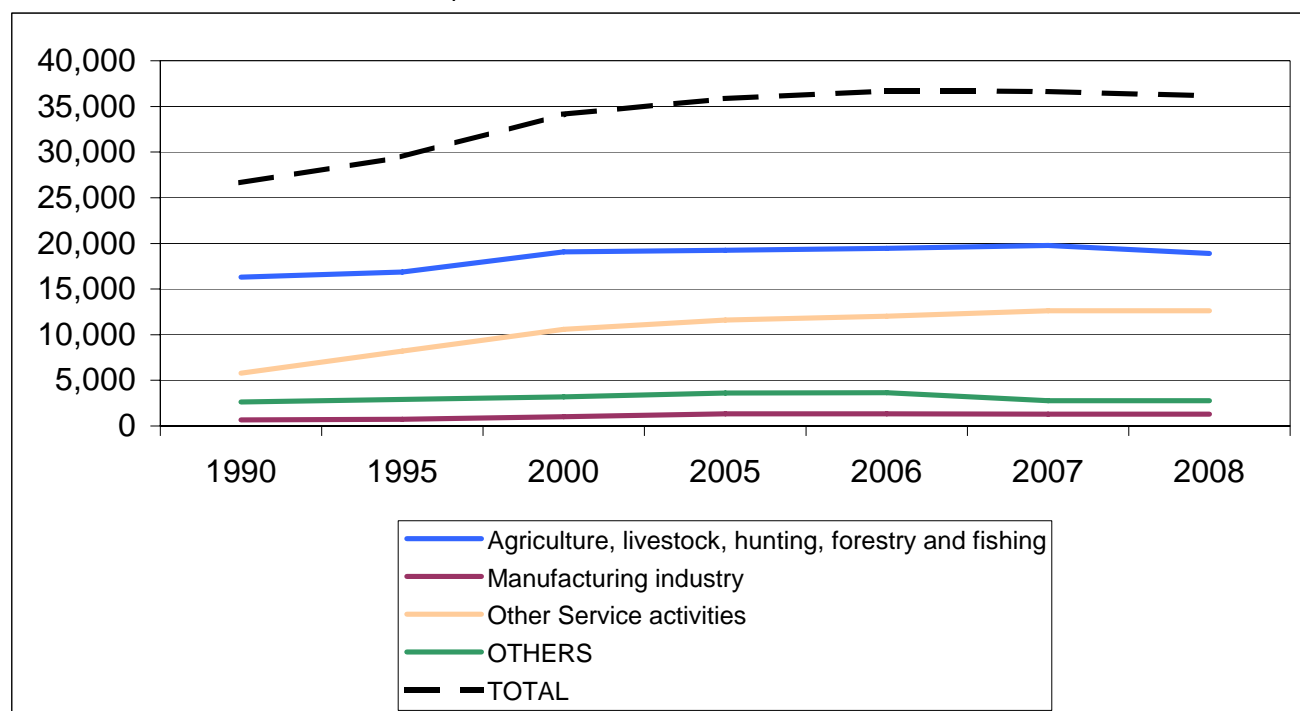
RESULTS FOR EMISSIONS OF CH₄ (series 1990, 1995-2010)

DISTRIBUTION BY BRANCH OF ECONOMIC ACTIVITY AND HOUSEHOLD SECTOR OF EMISSIONS OF CH₄

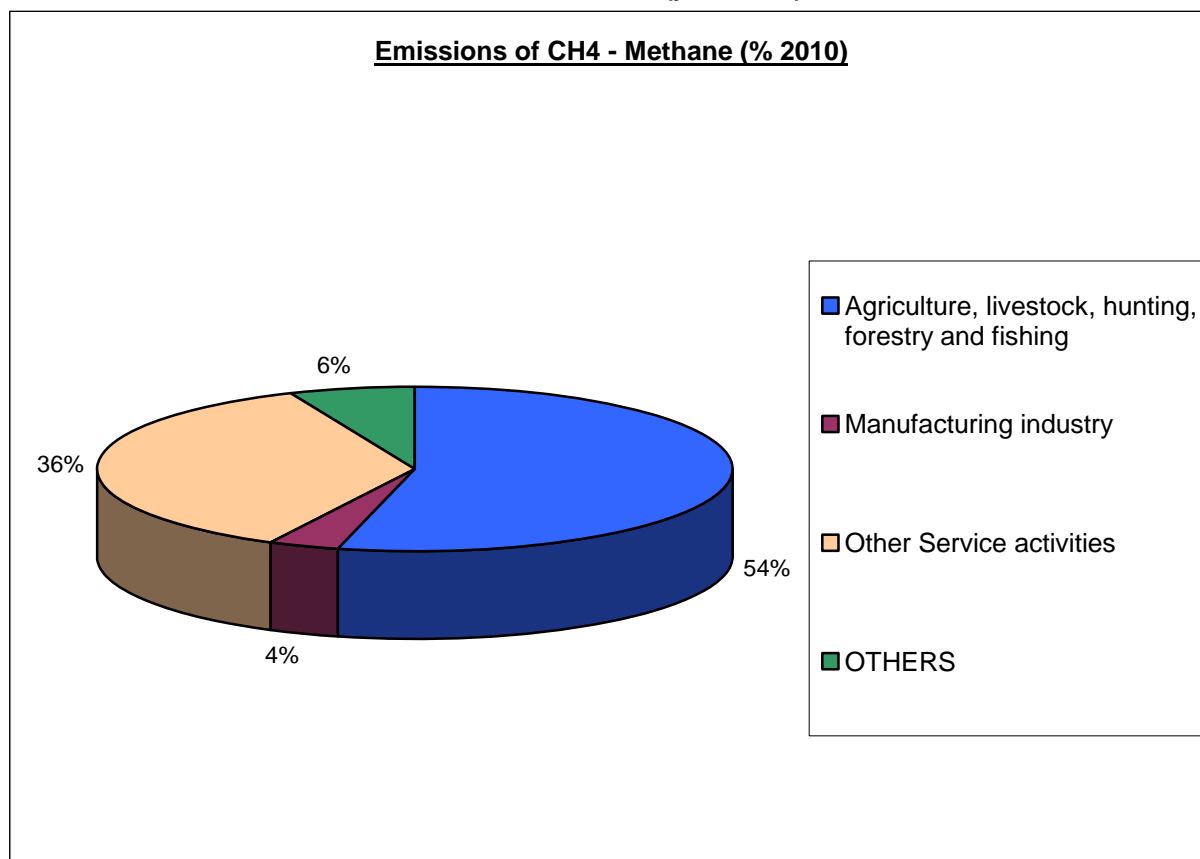
CH₄-Methane Emissions (Equivalent kilotonnes (Gg) of CO₂)

ECONOMIC ACTIVITY	1990	1995	2000	2005	2006	2007	2008
Agriculture, livestock, hunting, forestry and fishing	16,317	16,856	19,076	19,257	19,449	19,786	18,903
Extractive industries	1,931	1,534	1,301	992	977	929	737
Manufacturing industry	651	743	1,000	1,333	1,335	1,307	1,286
Production and distribution of electrical energy, gas and water supply	350	471	376	479	516	535	549
Construction	5	4	5	6	6	6	6
Transport, storage and communications	198	314	408	508	198	127	123
Other Service activities	5,790	8,186	10,581	11,612	12,029	12,621	12,621
Household Sector	1,045	1,013	902	775	749	730	709
Unclassified*	372	376	505	495	856	83	103
TOTAL	26,658	29,497	34,153	35,874	36,706	36,637	36,133

EVOLUTION OF EMISSIONS OF CH₄



PERCENTAGE STRUCTURE OF EMISSIONS OF CH₄ (year 2010)



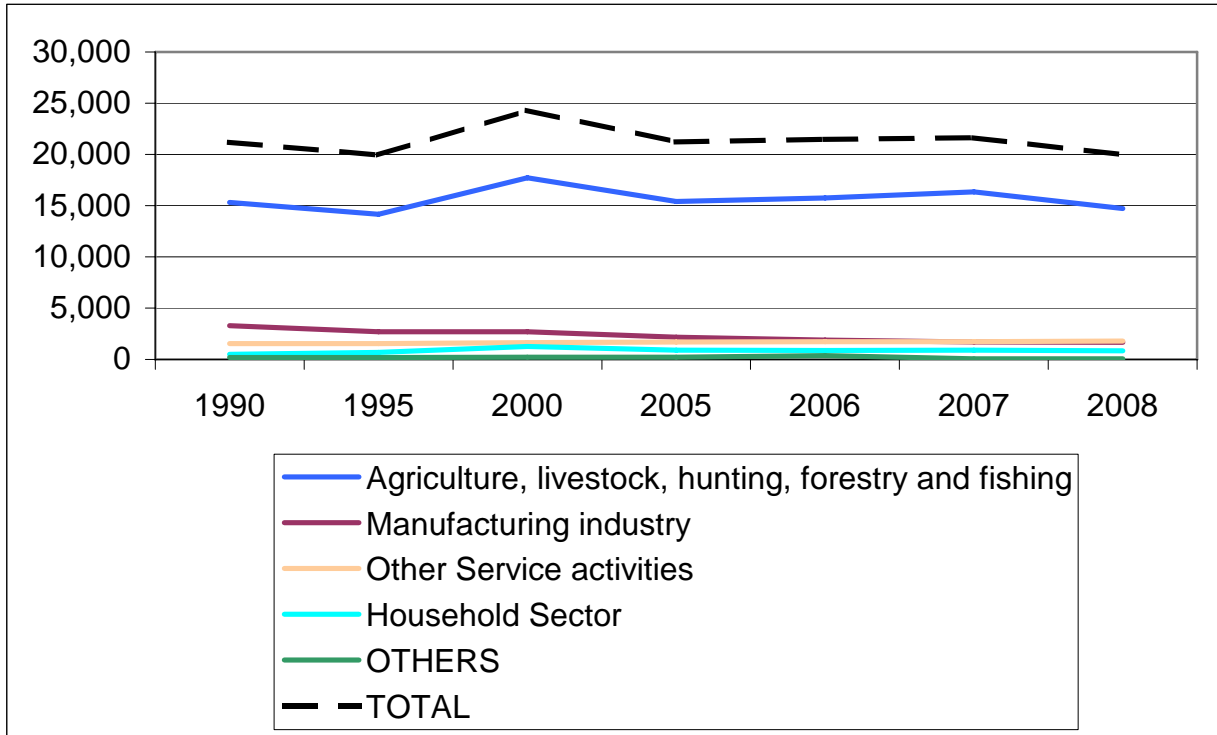
RESULTS FOR EMISSIONS OF N₂O (series 1990, 1995-2010)

DISTRIBUTION BY BRANCH OF ECONOMIC ACTIVITY AND HOUSEHOLD SECTOR OF EMISSIONS OF N₂O

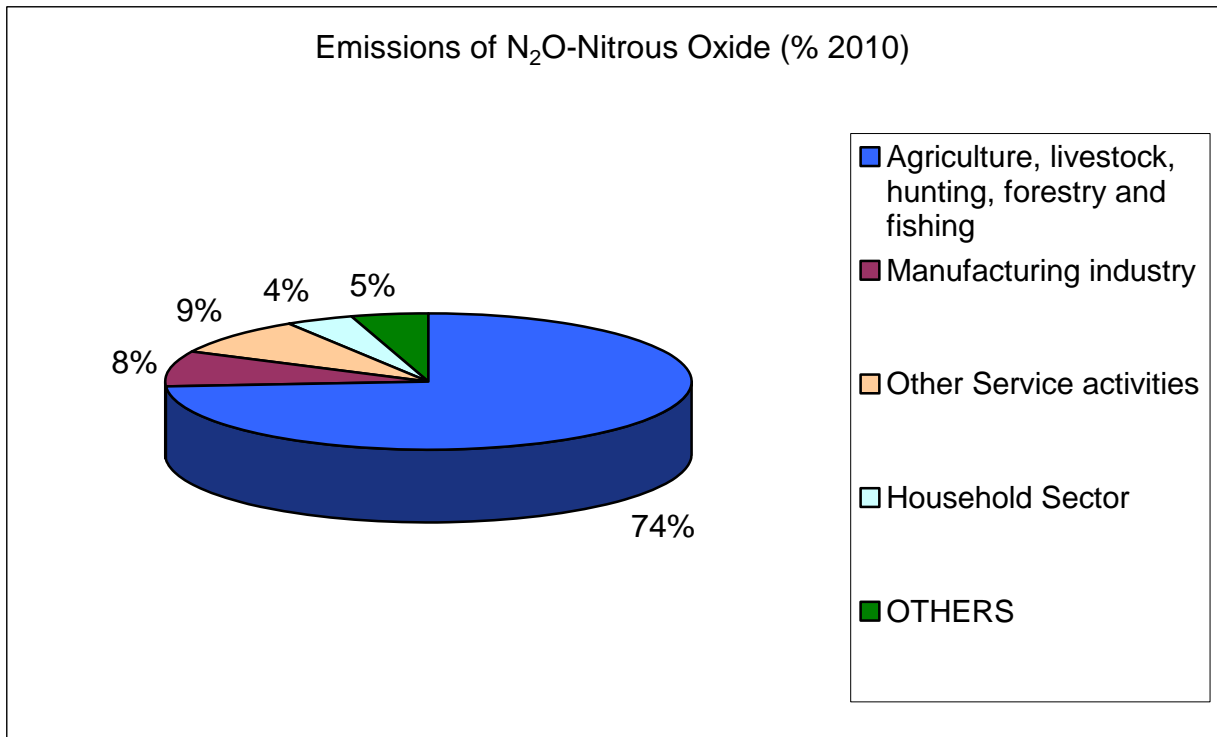
N₂O-Nitrous Oxide Emissions (Equivalent kilotonnes (Gg) of CO₂)

	1990	1995	2000	2005	2006	2007	2008
ECONOMIC ACTIVITY							
Agriculture, livestock, hunting, forestry and fishing	15,308	14,156	17,721	15,393	15,761	16,350	14,731
Extractive industries	7	9	12	14	12	12	12
Manufacturing industry	3,270	2,700	2,695	2,160	1,875	1,702	1,655
Production and distribution of electrical energy, gas and water supply	187	427	472	582	551	564	557
Construction	36	29	33	37	39	41	40
Transport, storage and communications	194	212	246	236	250	272	276
Other Service activities	1,522	1,534	1,631	1,699	1,714	1,722	1,770
Household Sector	486	691	1,257	891	891	897	844
Unclassified*	174	179	231	219	363	62	71
TOTAL	21,182	19,937	24,298	21,230	21,456	21,622	19,956

EVOLUTION OF EMISSIONS OF N₂O



PERCENTAGE STRUCTURE OF EMISSIONS OF N₂O (year 2010)



* Unclassified* - amount not distributed by branches of economic activity and household sector.