

TURKEY Greenhouse Gas Inventory, 1990 to 2004

**Annual Report for submission under the Framework
Convention on Climate Change**

National Inventory Report

TURKISH STATISTICAL INSTITUTE

Ankara, 2006

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Data sheet

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Note: The sections pertaining to the related sectors in this report and the CRF tables are prepared by the related organizations.

Executive Summary

The United Nations Framework Convention on Climate Change (UNFCCC) was ratified by TURKEY in 2004. As a Party to the Convention, TURKEY has prepared its first national inventory report and CRF tables for the period 1990 - 2004.

TURKEY is committed to develop, periodically update and make available national inventories of anthropogenic GHG emissions by sources and removals by sinks of greenhouse gases not controlled by the *Montreal Protocol* using the comparable methodologies.

This report presents the national inventory of greenhouse gas (GHG) emissions and removals from 1990 to 2004. Emissions of the five direct greenhouse gases are covered in the report. These are:

- Carbon dioxide
- Methane
- Nitrous oxide
- Hydrofluorocarbons
- Sulphur hexafluoride.

These gases contribute directly to climate change owing to their positive radiative forcing effect. Also the following four indirect greenhouse gases are reported:

- Nitrogen oxides (reported as NO₂)
- Carbon monoxide
- Non-methane volatile organic compounds (NMVOC)
- Sulphur dioxide.

The Turkish Greenhouse Gas Inventory is submitted to the UNFCCC in the form of the Common Reporting Format which is attached to this report in the form of EXCEL sheets. It should be noted that in this report, carbon dioxide emissions and removals are reported separately and removals are reported with a negative sign.

In this National Inventory Report, the source categories according to the IPCC methodology, i.e. energy, industrial processes, agriculture, land-use, land use change and forestry (LULUCF), and wastes were considered. Solvent and other product use were not considered due to the lack of activity data.

The Turkish Statistical Institute is designated to be responsible for the national inventory of greenhouse gases in Turkey. The inventory was prepared as a joint work by Turkish Statistical Institute, Ministry of Agriculture and Rural Affairs, Ministry of Environment and Forestry, Ministry of Transportation, Ministry of Energy and Natural Resources, Turkish Technology Development Foundation and universities. The CRF tables for each source categories were prepared by related organizations and combined by TURKSTAT.

The CRF data sets also contain key source, trend and uncertainty analysis. The key source category is one that is prioritised within the national inventory system because its estimate has a significant influence on a country's total inventory of direct greenhouse gases in terms of the absolute level of emissions. In addition to key source analysis, the emission estimates have been prepared through the investigation of emissions trends. This trend assessment identifies source categories for which significant uncertainty in the estimate would have considerably affected overall emission trends, and therefore identifies source categories that diverge from the overall trend in national emissions. Quantitative estimates of the uncertainties in the emissions were calculated using direct expert judgement. However, it has only been done for 2004 due to the lack of data. The total uncertainty is 2.5%, because of the high certain data of energy production.

NATIONAL EMISSION INVENTORY SYSTEM

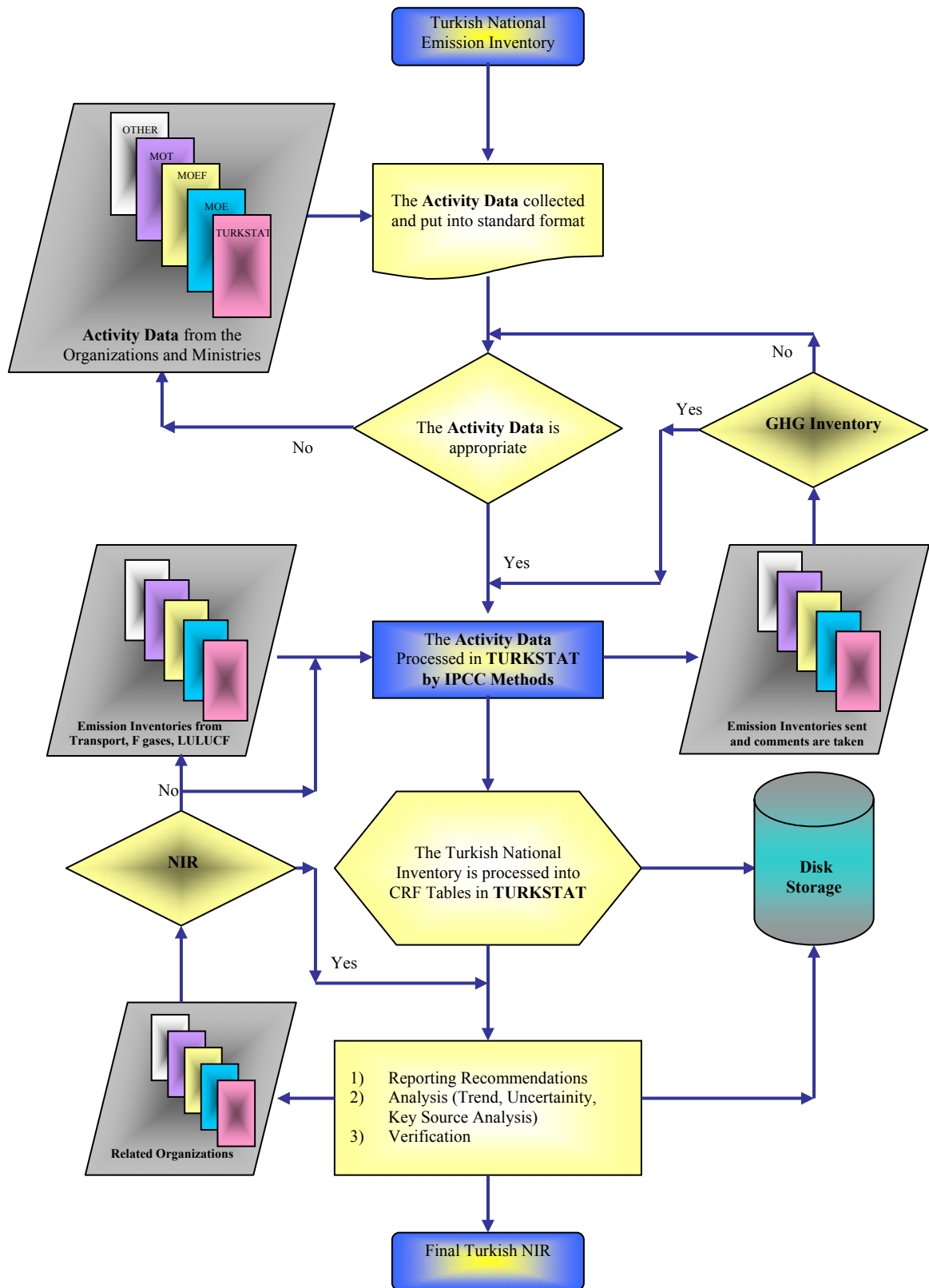


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List of Abbreviations

COP	Conference of the Parties
CRF	Common Reporting Format
EEA	European Environmental Agency
GHG	Greenhouse Gas
GPG	Good Practice Guidance
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
LULUCF	Land Use and Land Use Change and Forestry
MARA	Ministry of Agriculture and Rural Affairs
MENR	Ministry of Energy and Natural Resources
MOEF	Ministry of Environment and Forestry
OSD	Turkish Automotive Manufacturers Association
PETDER	Petroleum Manufacturers Association of Turkey
SHW	State Hydraulic Works
TTGV	Turkish Technology Development Foundations
TURKSTAT	Turkish Statistical Institute
UNFCCC	United Nations Framework Convention on Climate Change

Chapter 1

1. Introduction

The United Nations Framework Convention on Climate Change (UNFCCC) was ratified by Turkey in 2004. As a Party to the Convention, Turkey has prepared its first national inventory report and CRF tables for the period 1990 – 2004. As an Annex I party to Convention, Turkey is required to develop annual inventories on greenhouse gas (GHG) emissions by sources and removals by sinks of greenhouse gases not controlled by the *Montreal Protocol* using the methodology approved by the UNFCCC.

In Turkey, the major actor of the GHG inventory is the Turkish Statistical Institute (TURKSTAT). National emission inventory and Common Reporting Format (CRF) tables have been prepared in accordance with the UNFCCC Reporting Guidelines on Annual Inventories as adopted by the Conference of the Parties to the Convention (COP). The methodologies used in the calculation of emissions are based on the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC Guidelines) and the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (Good Practice Guidance) prepared by the Intergovernmental Panel on Climate Change (IPCC). As recommended by the IPCC Guidelines country specific methods have been used in electricity production.

The inventory does not cover all the sources required by the IPCC guidelines.

Emissions and removals from land use change and forestry are provided by the Ministry of Agriculture and Rural Affairs (MARA), and Ministry of Environment and Forestry (MOEF).

This National GHG Inventory Report presents on the basic GHGs – carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), GHG precursors (NO_x, CO, NMVOCs), sulphur dioxide (SO₂), and the emissions of Hydrofluorocarbons (HFCs) and Sulphur hexafluoride (SF₆).

This report presents greenhouse gas emissions for the years 1990-2004, and discusses the trends, fluctuations and changes in the estimates. The Appendices containing source categories, fuel types, emission factors and references, describe in detail the methodology of the estimates and how the Greenhouse Gas Inventory relates to the IPCC Guidelines. The Appendices also include sections on the estimation of uncertainties, key source and trend analysis.

It should be noted that in this report, carbon dioxide emissions and removals are reported separately and that carbon dioxide removals are reported with a negative sign.

According to the IPCC Good Practice Guidance, a key source category is one that is prioritised within the national inventory system because its estimate has a significant

influence on a country's total inventory of direct greenhouse gases in terms of the absolute level of emissions. The results of this study has shown that petroleum fuel combustion (CO₂), lignite fuel combustion (CO₂), solid waste disposal (CH₄), enteric fermentation (CH₄), cement production (CO₂), hard coal fuel combustion (CO₂), secondary coal combustion (CO₂) and natural gas fuel combustion (CO₂) were determined as key sources throughout the years.

In addition to key source analysis, the emission estimates have been prepared through the investigation of emissions trends. This trend assessment identifies source categories for which significant uncertainty in the estimate would have considerably affected overall emission trends, and therefore identifies source categories that diverge from the overall trend in national emissions. According to the base year considerations, the highest trends were seen in fuel combustion and industrial sectors. The percentage change of emissions according to the fuel combustion and industrial activities were seen to have increased throughout the years.

Quantitative estimates of the uncertainties in the emissions were calculated using direct expert judgement. However, this study has only been carried out for 2004 due to the lack of data. It can be concluded that the total uncertainty is 2.5% because of the high certain data of energy production.

The general procedure for uncertainty analysis was:

- Uncertainties of each activity were allocated by using emission factor and activity rate uncertainties.
- A calculation was set up to estimate the emission of each CO₂, CH₄, N₂O, HFCs and SF₆ gases.
- The uncertainties used for the industrial processes data were estimated from the statistical difference between entire supply and institutional inventory demand.
- The uncertainties for sectoral energy usage were taken from MENR.
- The uncertainties of agricultural activities were estimated by TURKSTAT experts.
- The uncertainties of transport sectors were taken from ITU.

Chapter 2

2. Greenhouse Gas Emissions

The national GHG inventory preparation was divided into the following basic activities:

- Collecting the data,
- Processing the activity data,
- Choosing the emission factors for estimating,
- Determination of the key GHG emission sources,
- Evaluation of the result (uncertainty and trend analysis).

The inventory can be modified in regard to the country specific circumstances. Every year, some changes occur that affect directly the activities above listed.

As the input data collection is considered, the inventory reflects the changes in the organization and management of data sources. These sources are as follows:

- Energy balance tables from the Ministry of Energy and Natural Resources,
- Industrial Production from Industry and Business Statistics Department in TURKSTAT,
- Agricultural Production from the Agriculture and Environment Statistics Department in TURKSTAT and land use and land use change data from Ministry of Agriculture and Rural Affairs,
- Data on the forest from the Ministry of Environment and Forestry
- Data on solid waste from the Environmental Statistics Group in TURKSTAT,
- Transport data from General Directorate of Railways, Harbors and Airports,
- Data on HFCs and SF₆ from Ministry of Environment and Forestry

Some organizations and universities should also be added to the above institutions. Because, the emission estimations, CRF table preparation and reports submission are done in cooperation with related Ministries. These are Turkish Technology Development Foundation for HFCs and SF₆, Harran University (Assoc.Prof.Dr.Halil Kirnak) for land use and land use change, Istanbul University (Prof.Dr.Ünal Asan) for forestry and Istanbul Technical University (Prof.Dr. Cem Sorusbay and Prof.Dr.Metin Ergeneman) for transportation.

The basic source for emission factors for these inventories was the IPCC Revised Guidelines.

The data confidentiality is one of the important problems. This problem was solved by aggregated reporting, without mentioning the quantities or production. This approach is quite uncertain.

Table 2.1 gives summary data for greenhouse gas emissions for the years 1990-2004. The inventory for the year 1990 and 2004 revealed that the overall GHG emissions expressed in CO₂ equivalent are correspondingly 170.06 and 296.60 million tonnes not taking into account the sector Land use Change and Forestry (LUCF).

Table 2.1 represents the emission trends of the basic GHGs, the overall emissions (not taking into account the LUCF) and the relative share of the overall emissions to the emissions from the year 1990 (referred to as 100 %).

Table 2.1. Aggregated GHG emissions by sectors (CO₂ eq.)

Total (million tonnes)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Energy	132.13	137.96	144.27	150.78	148.62	160.79	178.96	191.39	190.62	190.61	212.55	196.02	204.02	218.00	227.43
Industrial Processes	13.07	15.22	17.23	18.59	16.93	21.64	22.45	22.17	22.62	21.45	22.23	21.20	23.42	24.12	26.45
Solvent and Other Product Use	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Agriculture	18.47	19.04	18.84	18.62	18.32	17.97	17.98	16.84	16.70	16.74	16.13	15.77	14.77	14.80	15.18
Waste	6.39	9.74	13.29	15.99	16.59	20.31	22.69	25.12	26.69	27.97	29.04	29.11	28.41	29.36	27.55
Total (w/o land use)	170.06	181.96	193.64	203.98	200.46	220.72	242.09	255.51	256.63	256.78	279.96	262.10	270.62	286.28	296.60
Change Comp.to 1990 % (w/o land use)	100.0	107.0	113.9	119.9	117.9	129.8	142.4	150.3	150.9	151.0	164.6	154.1	159.1	168.3	174.4
Land use and land use change	-43.53	-55.23	-59.21	-58.48	-59.52	-60.09	-60.13	-62.59	-63.81	-64.54	-64.52	-70.18	-66.08	-64.82	-74.07

Unit: Million tonnes

The analysis of Table 2.1 shows that in 2004, the emissions from the energy sector is the largest portion with 76.7%, the emissions from the waste disposal is the second largest one with a value of 9.3%, and the emissions from manufacturing industries with an 8.9% shares the third place.

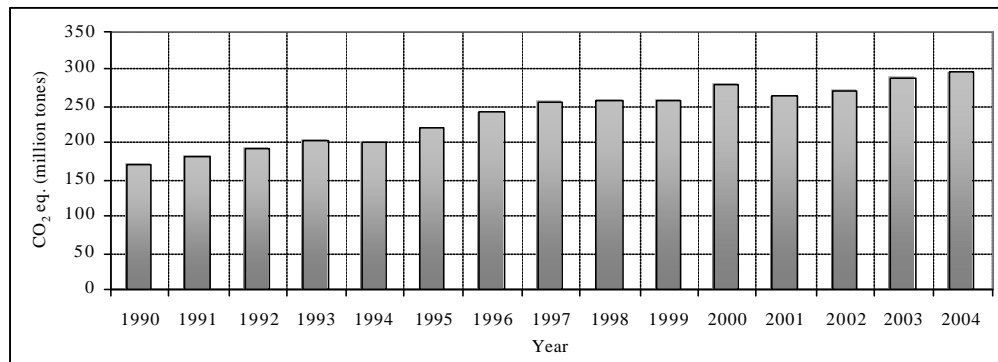


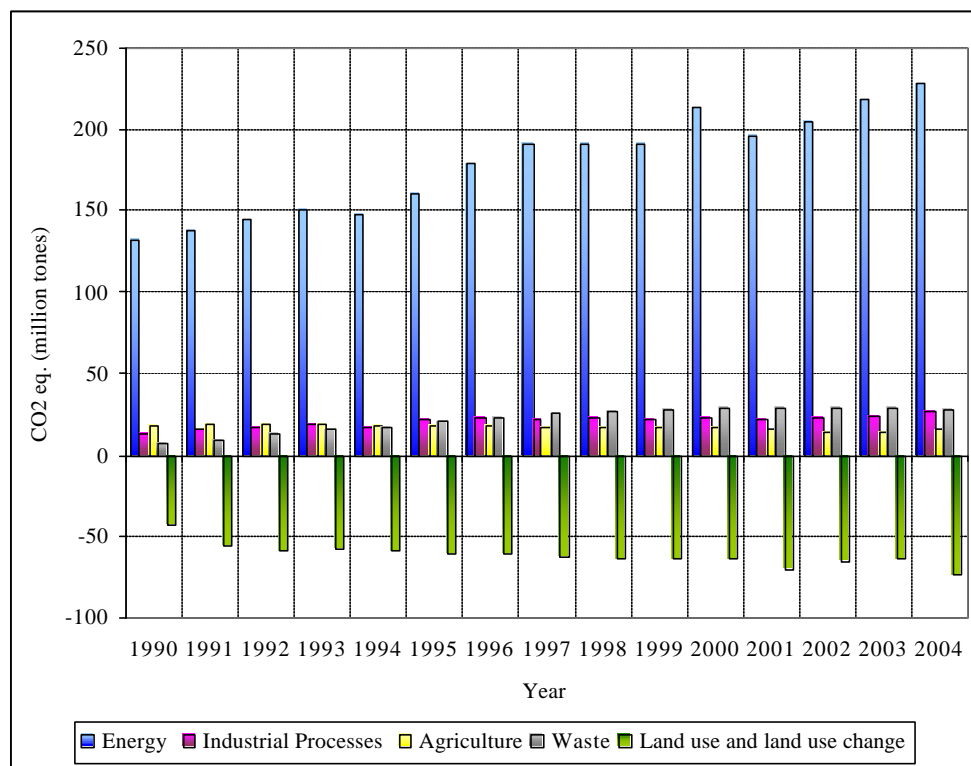
Figure 2.1. Overall greenhouse gases emission trend (without LUCF)

Figure 2.1 presents the trend of the overall emissions during the period 1990-2004. It can be seen that the emissions for the year 2004 are 74.4 % more than the emission of year 1990.

Table 2.2. Aggregated GHG emissions without LUCF (CO₂ eq.)

Total	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
CO ₂	139.59	146.55	152.93	160.91	159.10	171.85	190.67	203.72	202.71	201.71	223.81	207.38	216.43	230.99	241.88
CH ₄	29.21	33.17	36.66	38.98	39.19	42.54	44.99	46.45	47.71	48.83	49.27	48.70	46.87	47.76	46.29
N ₂ O	1.26	2.25	4.04	4.09	2.17	6.33	6.07	4.73	5.56	5.72	5.74	4.84	5.41	5.25	5.49
HFCs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.87	1.42	1.81	2.23
SF ₆	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.61	0.66	0.52	0.32	0.31	0.48	0.48	0.70
Total (without LUCF)	170.06	181.96	193.64	203.98	200.46	220.72	242.09	255.51	256.63	256.78	279.96	262.10	270.62	286.28	296.60

Unit: Million tones



Unit: Million tones

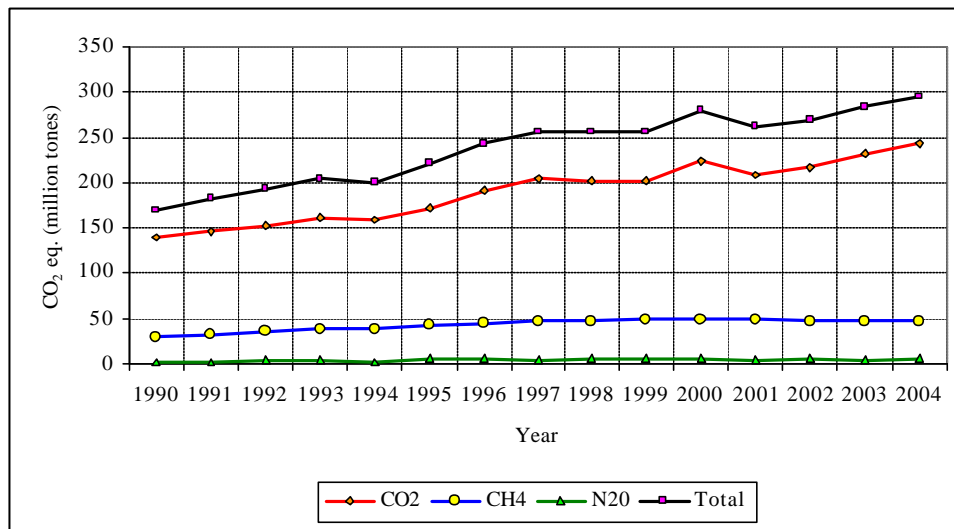
Figure 2.2 Greenhouse gases emission trend by sectors

Figure 2.2 presents the energy sector that forms the largest share of the overall emissions between the year 1990 and 2004.

Table 2.3. Contribution of sectors to the total emission (CO₂ eq.)

%	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Energy	104.4	108.9	107.3	103.6	105.5	100.1	98.4	99.2	98.9	99.2	98.7	102.1	99.7	98.4	102.2
Industrial Processes	10.3	12.0	12.8	12.8	12.0	13.5	12.3	11.5	11.7	11.2	10.3	11.0	11.4	10.9	11.9
Agriculture	14.6	15.0	14.0	12.8	13.0	11.2	9.9	8.7	8.7	8.7	7.5	8.2	7.2	6.7	6.8
Waste	5.0	7.7	9.9	11.0	11.8	12.6	12.5	13.0	13.8	14.6	13.5	15.2	13.9	13.3	12.4
LUCF	-34.4	-43.6	-44.0	-40.2	-42.2	-37.4	-33.0	-32.4	-33.1	-33.6	-29.9	-36.6	-32.3	-29.3	-33.3

Unit: (%)

Figure 2.3. Emission trend of main GHGs (CO₂ eq.)

It can be seen from Figure 2.3 that the trend of the basis GHGs show an increase up to the year 2004. This change is mainly the result of the changes accruing in energy sector and industrial processes. The emission from the waste is constant compared to other sector. However, the agricultural emission is reversely decreasing throughout the years. The result may be inferred in Table 2.3 and Figure 2.2.

There are some points in the methodology and the input data, which are;

- The emission from the combustion of biomass is considered as aggregated and taken as a solid fuel in calculations,
- Certain parts are presented as aggregated quantities due to data confidentiality of the processes and activities in the industrial processes sector,
- When assessing the emissions of F-gases only the actual emissions of the HFCs and SF₆ were taken into account. Because the usage of PFCs is not present in Turkey,
- The solid waste data were gathered from all municipalities. However, the annual survey has been done discontinuously. Only the data for years 1994, 1995, 1996, 1997, 1998, 2001, 2002, 2003 and 2004 are available. Others are estimated by regression analysis.

- The inventory data is linked the CRF tables for one year and the remaining years are updated for obtaining 15 years CRF tables.
- The local energy conversion factors are applied for the reference approach on calculations of domestic lignite, hardcoal and petroleum products. Average conversion factors for lignite and hardcoal are changing for each year owing to the quality and quantity of these fuels and quantity for petroleum products.
- Emissions from *International Bunkers* are not included in the emissions owing to the lack of data.
- The transport of fuels is not a part of the energy balance of Turkey and emissions are not estimated.
- The emission from the combustion of fuels in iron and steel industry is only the result of burning of fuels in large scale iron and steel production industries. The emission from the small and medium scale enterprises are included in other industries since their fuel combustion can not be obtain separately.

Chapter 3

3. Energy

3.1. Fuel Combustion

The major source of GHGs in Turkey is the fossil fuel combustion. For this reason, this sector was evaluated carefully. The uncertainties and the possible errors in collecting activity data, in selecting emission factors and in estimating emissions were decreased with expert groups. The emission factors (given in Appendix E) for energy consumption are consistent with the IPCC methodology, some uncertainty is introduced in emission factors and in activity data owing to the variations of the content, process and consumption of fuels. Fuel consumption data are taken from the Ministry of Energy and Natural Resources (MENR; 2006) which is compatible with the IEA system of international energy statistics though there are some small differences in reporting conventions.

According to the IPCC, the emission from the energy sector mainly comprises the fuel combustion. As can almost be seen in all countries, the energy sector in Turkey has also the key position for the emission of GHGs. Approximately 90% of the total CO₂ emission is emitted from the energy consumptions. During the calculation of GHGs emissions in energy sector, the sub-sectors are categorized owing to the energy balances tables. These sectors are energy industries, manufacturing industries and constructions, transport and other sectors (including residential, agriculture). The emission from the energy sector except for transport sectors are estimated by IPCC Tier 1 approach. However, for the transport sector, the tier 2/3 methodology for computations on a fuel consumption basis in different activities of this sector has been compiled according to the estimates with IPCC Tier 1 approach.

The results are indicating effects of certain improvements in near and long term transportation technologies and strategies for future reductions in transport based GHG emissions. Transportation sector consists of road transportation, domestic civil aviation, railways and national navigation. Emissions from international aviation that cannot be allocated to the national inventory are usually reported separately as unallocated emissions. The fuel consumption data related to aviation is provided only for the domestic consumption. Therefore no results are provided in this work for unallocated emissions resulting from international aviation. The limitation of the available data does not allow any estimation for navigation sector using methodology other than Tier 1. Methods of calculation are based on the IPCC recommendations. Some modifications are made for road transportation according to country specific conditions. The received data is verified and examined for consistencies. Fuel consumption data is obtained from the Ministry of Energy and Natural Resources which is considered as the most accurate data and used for the computations to estimate GHG emissions. Other information is received from Turkish Automotive Manufacturers Association (OSD), Petroleum Manufacturers Association of

Turkey (PETDER) and Turkish State Railways Research Planning and Coordination Department (Sorusbay and Ergeneman, 2006).

CO₂ is the most important GHG owing to the overall responsibilities of 60% Earth's Greenhouse effect. As can be seen from Figure 3.1, the distribution of CO₂ emission from the combustion of fuels by sectors is not changing considerably until the year 1994. There is a slow increase. However, between the year 1995 and 1997, the increase is sharp. While, the trend involves a position steady for the years 1997, 1998 and 1999 and it reaches its highest value in 2000 with a 207 million tones value. After this year, the CO₂ emission decreases then it shows a steady increase until 2004.

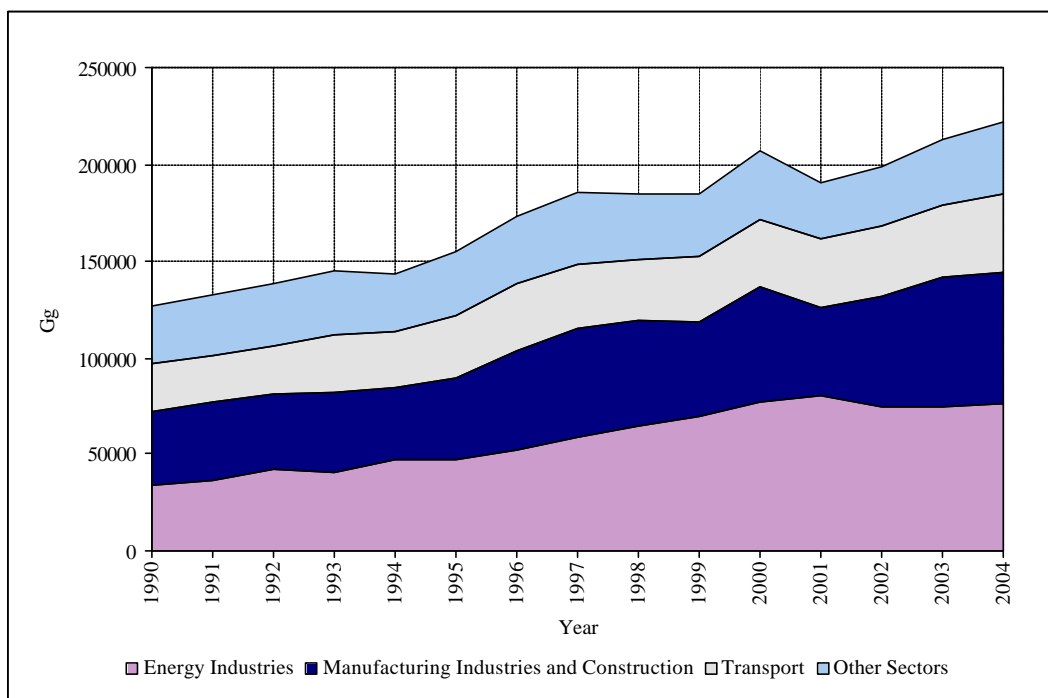


Figure 3.1. CO₂ emission from the combustion of fuels by sectors

In Turkey, the highest emission increase was observed in Electricity production with 124.0%. Then it is followed by manufacturing industries with 82.0%, transport with 55.9% and others with 27.9%. The total CO₂ increase in 2004 compared to year 1990 is 75.4%. The CO₂ emission distribution was given in Figure 3.2.

It can be seen from Figure 3.3 that the CO emission trend involves a peak in 1998 and then it shows a decline until the year of 2004. The main reason is the shifting the fuel coal to natural gas in residential consumption. In the transport sector, the CO emission also shows a decline trend due to increasing usage of LPG. Moreover, the consumption of diesel was decreasing after the year 1998.

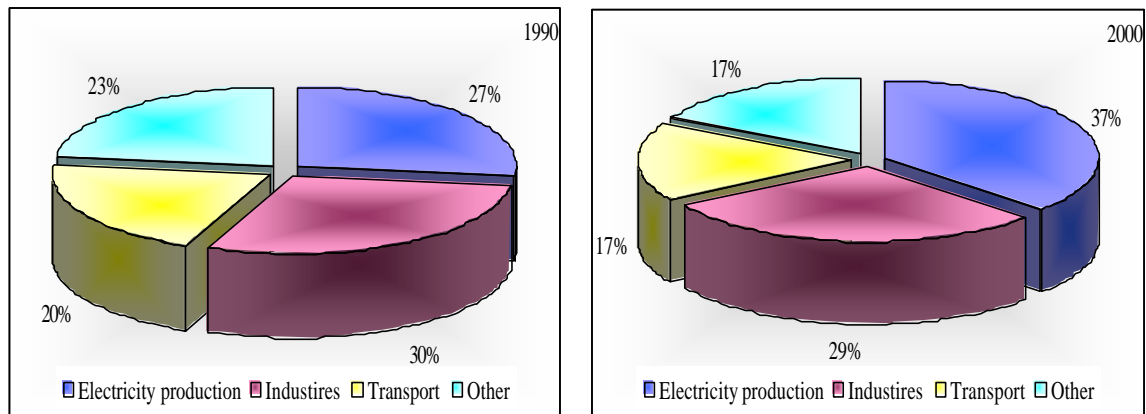


Figure 3.2. CO₂ emission distribution by sectors

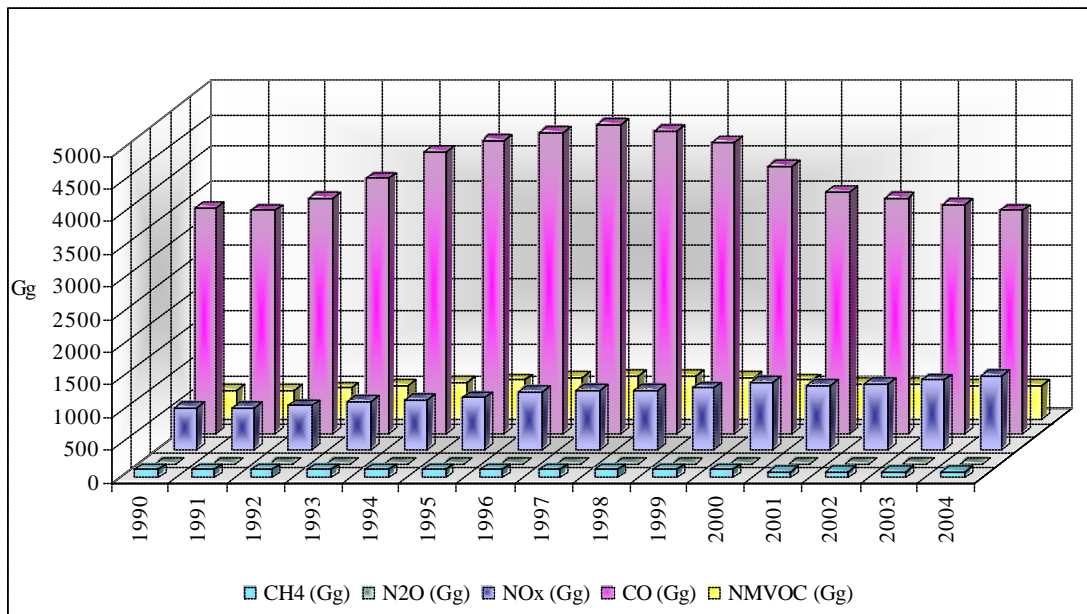


Figure 3.3. CH₄, N₂O, NO_x, CO, NMVOC emissions from fuel combustion

3.1.1. Reference Approach

The *Reference Approach* is the method for determining the CO₂ emissions from combustion of total domestic fuels. Therefore, first step in this approach is to calculate the apparent fuel consumption. This is done using the following formula:

$$\text{extraction} + \text{imports} - \text{exports} - \text{change (increase/decrease) in stocks} \quad (3.1)$$

The emission factors are related to all type of fuel that enter domestic consumption at the level of sources without regard to specific kinds of fuel burned in the consumer part of the energy balance.

In the equation (3.1), each fuel emission is presented in units of Gg. The conversion to energy units - TJ is done using conversion factors provided in the IPCC Guidelines. A domestic conversion factor is applied only for lignite, hardcoal and petroleum products. For each year average conversion factor are changing according to the quality and/or quantity of these fuels as seen in Table 3.1.

Table 3.1. Conversion Factors for Turkey - (Reference Approach)

(TJ/Gg)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Hardcoal	31.43	30.85	29.56	28.58	28.17	28.92	28.45	28.23	28.41	28.40	26.79	26.26	26.75	26.75	27.30
Lignite	8.91	9.06	8.88	9.01	8.45	8.47	8.52	8.67	8.20	8.05	8.14	7.84	8.40	8.61	8.83
Petroleum	44.08	44.14	44.00	43.94	43.95	43.98	43.76	43.79	43.78	43.72	43.52	43.67	43.49	43.42	43.44

Country specific emission factors were used for comparative estimation of CO₂ emissions. The differences tend to vary within 5% except for 1990, which is around 10%. The main reason is the reference approach uses data on crude oil, lignite and hardcoal as the average "calorific values" and "carbon content". However sectoral approach uses the individual "calorific values" and "carbon content" in each sector. The annual differences can be seen from Table 3.2.

Table 3.2. Comparison of CO₂ from Fuel combustion
(Sectoral and Reference Approach difference)

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
10.54	-4.37	0.18	3.71	4.83	4.70	3.11	1.66	5.08	3.30	2.58	1.35	3.25	4.42	1.97

The above differences could also be owing to the differences in the methodological approach and activity data.

3.1.2. Sectoral Approach

The *Sectoral Approach* is considerably demanding input data and requires information on fuel consumption according to type of sectors. The biggest advantage of this method is the possibility of analyzing the structure of emissions. The calculations by using sectorial approach should be more exact, because the emission factors employed are specific for each type of consumed fuel.

The GHG emissions from fuel combustion derive from two types of sources: stationary and mobile. The stationary sources include the industrial processes, energy production, services, agriculture and residential sector. The mobile sources include transport and other motor vehicles. All these sources grouped according to the IPCC requirements which are reflected in CRF tables. The GHG emissions are estimated by grouping the fuel types into 3 categories - liquid, solid and gaseous. The biomass which the quantity is considerably smaller than the other type of fuel is taken as solid fuels. Moreover, the CO₂ emission from biomass is considered in LULUCF.

The GHGs emissions in the energy sector are the main key sources in the inventory.

In relation to energy balances tables of Turkey, the corresponding fuel consumption processes can be divided into the following basic categories:

- (1A1) - Energy Industries
 - Public electricity and heat production
 - Petroleum refining
- (1A2) - Manufacturing industries and construction (including Manufacture of solid fuels and other energy industries)
 - Iron and Steel
 - Non-Ferrous Metals
 - Chemicals
 - Other (including “Pulp, Paper and Print” and “Food Processing, Beverages and Tobacco”)
- (1A3) - Transport
 - Civil aviation
 - Road transportation
 - Railway
 - Navigation
- (1A4) - Others
 - Residential (including Commercial / Institutional)
 - Agriculture / Forestry

Emissions from *International Bunkers* are not included in the emissions owing to the lack of data. Moreover, the transport of fuels is not a part of the energy balance of the country and emissions are not estimated.

3.2. Fugitive Emissions from Fuels

In Turkey, the main fugitive emissions are the CH₄ from the coal mining, especially the lignite and hardcoal mining from underground and surface mines. The percent of extracted coal from underground mines is approximately 5%.

The emission factors of underground and surface mines differ considerably. IPCC Tier 1 approach is used for the emission. The emission from the coal mining is seen in Table 3.3 and Figure 3.4. Moreover, the total amount of extracted coal is also given in Figure 3.5.

As shown in Figure 3.4 and Table 3.3, the CH₄ emission from coal mining is changing between 58.54 Gg and 77.72 Gg. The highest CH₄ emission is observed in 1998 and the lowest emission is observed in 2004.

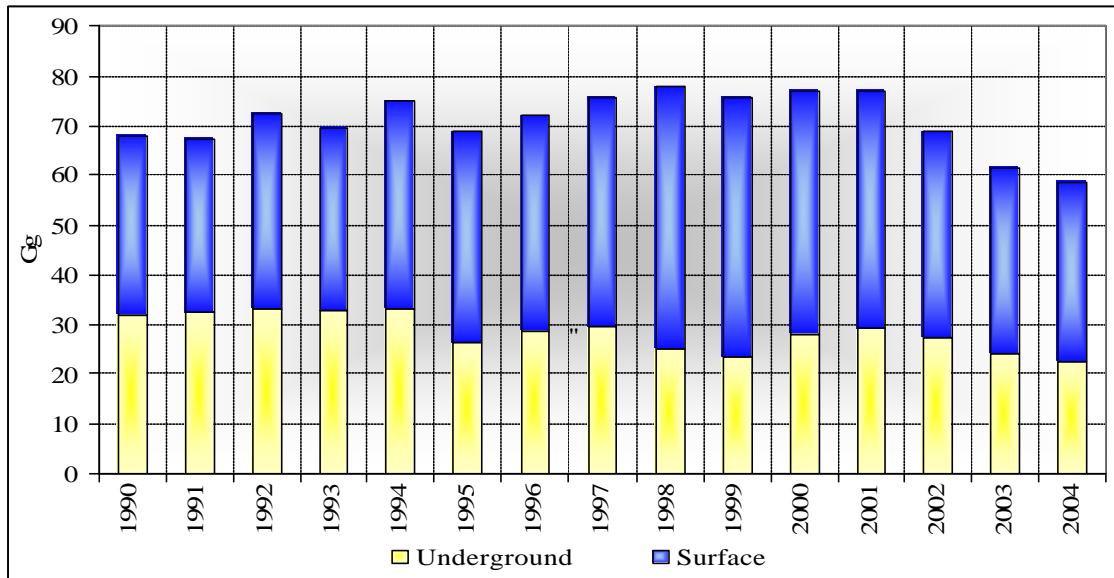


Figure 3.4. CH₄ emissions from coal mining

Table 3.3. CH₄ emissions from coal mining

Unit: Gg	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Underground	32.19	32.38	33.18	32.70	33.29	26.36	28.62	29.46	25.28	23.33	28.05	29.24	27.19	24.14	22.82
Surface	35.93	34.85	39.08	36.80	41.43	42.47	43.35	46.16	52.44	52.30	48.94	47.92	41.54	37.39	35.72

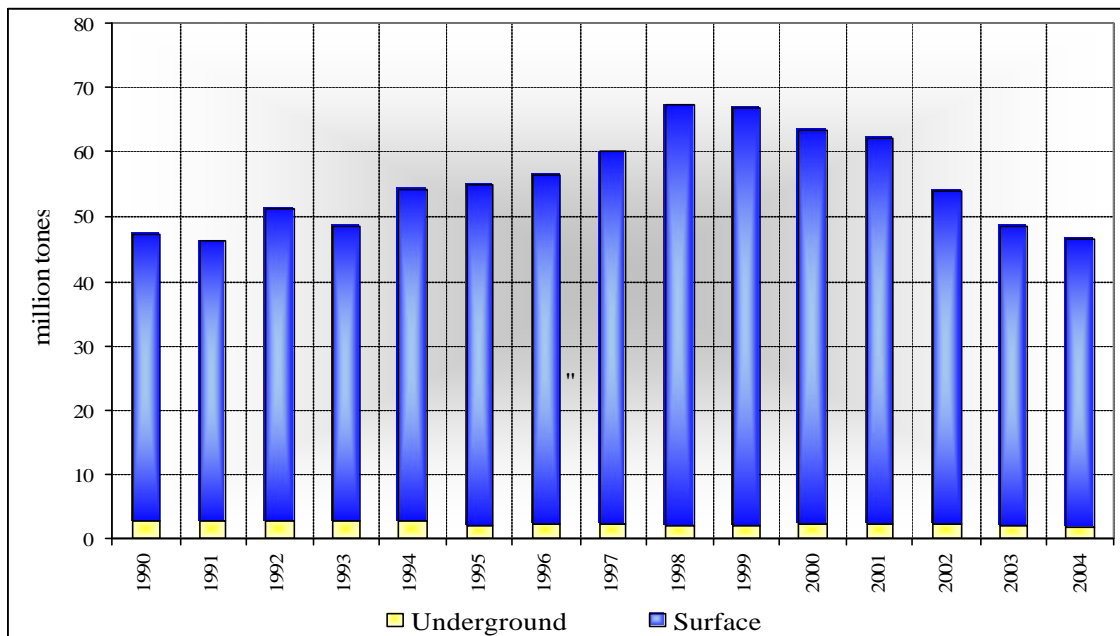


Figure 3.5. Coal mining

The coal mining in underground is decreasing throughout the years. In 1990, approximately 6% of the total extracted coal is obtained from underground mining. However, this ratio in 2004 is only 4.2%. The coal mining has decreased since 1990. The main reason is the shifting of fuel coal to natural gas in residential areas.

During surface and underground mining, methane escaping is not related to any specific conditions. Therefore, default IPCC emission factors are used to calculate methane emissions.

Activity data of the coal extraction is taken from the Ministry of Energy and Natural Resources.

Chapter 4

4. Industrial Processes

The GHG emissions from Industrial Processes are released as a result of manufacturing processes. It means this category includes only emissions from processes and not from fuel combustion used to supply energy for carrying out the processes. For that reason, emission from industrial processes are referred to as “non - combustion”.

The GHG emissions from Industrial processes are grouped in the following sub - sectors (categories):

- (2A) - Mineral Products
 - Cement Production
 - Lime Production
 - Limestone and Dolomite Use
 - Soda Ash Production and Use
 - Asphalt Roofing
 - Road Paving with Asphalt
 - Glass Production
- (2B) - Chemical Industry
 - Ammonia Production
 - Nitric Acid Production
 - Adipic Acid Production
 - Carbide Production
 - Other Chemical Production
- (2C) - Metal Production
 - Iron and Steel Production
 - Ferroalloys Production
 - Aluminium Production
- (2D) - Others
 - Pulp and Paper
 - Food and Drink
- Production of halocarbons and SF₆
- Consumption of halocarbons and SF₆

During the preparation of the inventories, because of the data confidentiality, some emissions are given as aggregated. The TURKSTAT is the basic data source for the quantities of materials and goods produced.

The emissions are calculated after the default method according to the following equation 4.1:

$$\text{Emissions} = \text{Production} * \text{Emission factor} \quad (4.1)$$

The emission factors for the current inventories are the default from the IPCC Guidelines emission factors are given in Appendix E).

According to the IPCC categorization of this source, it also includes emissions from production and use of HFCs and SF₆. In Turkey, there is no use of PFCs.

In industrial processes, 85% of the CO₂ emission is coming from the cement production (See Table 4.1), which is also one of the key sources. The main emission source is the clinker production. From the table, it may be concluded that the trend shows decrease after the year 2001.

Table 4.1. CO₂ emission contribution of cement production (%)

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
80.15	82.31	82.65	81.25	83.07	83.75	82.15	80.81	83.99	86.44	88.18	88.89	86.10	86.12	85.33

The total CO₂ emission from the Industrial Processes is given in Figure 4.1. According to this figure, the trend involves a steady increase.

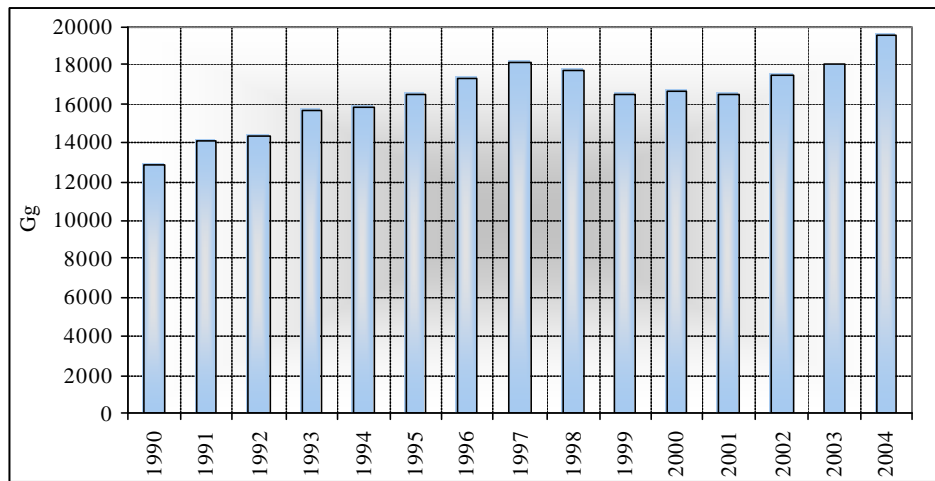


Figure 4.1. CO₂ emissions from industrial processes

In Turkey, the main source of the CH₄ emission is the Chemical Industry. The annual base emission from the industries is range between 2.0 and 2.5 Gg. As can be seen in Figure 4.2, there isn't steep change between 1990 and 2004.

The other GHGs emissions for this sector are also given in the following Figure 4.2.

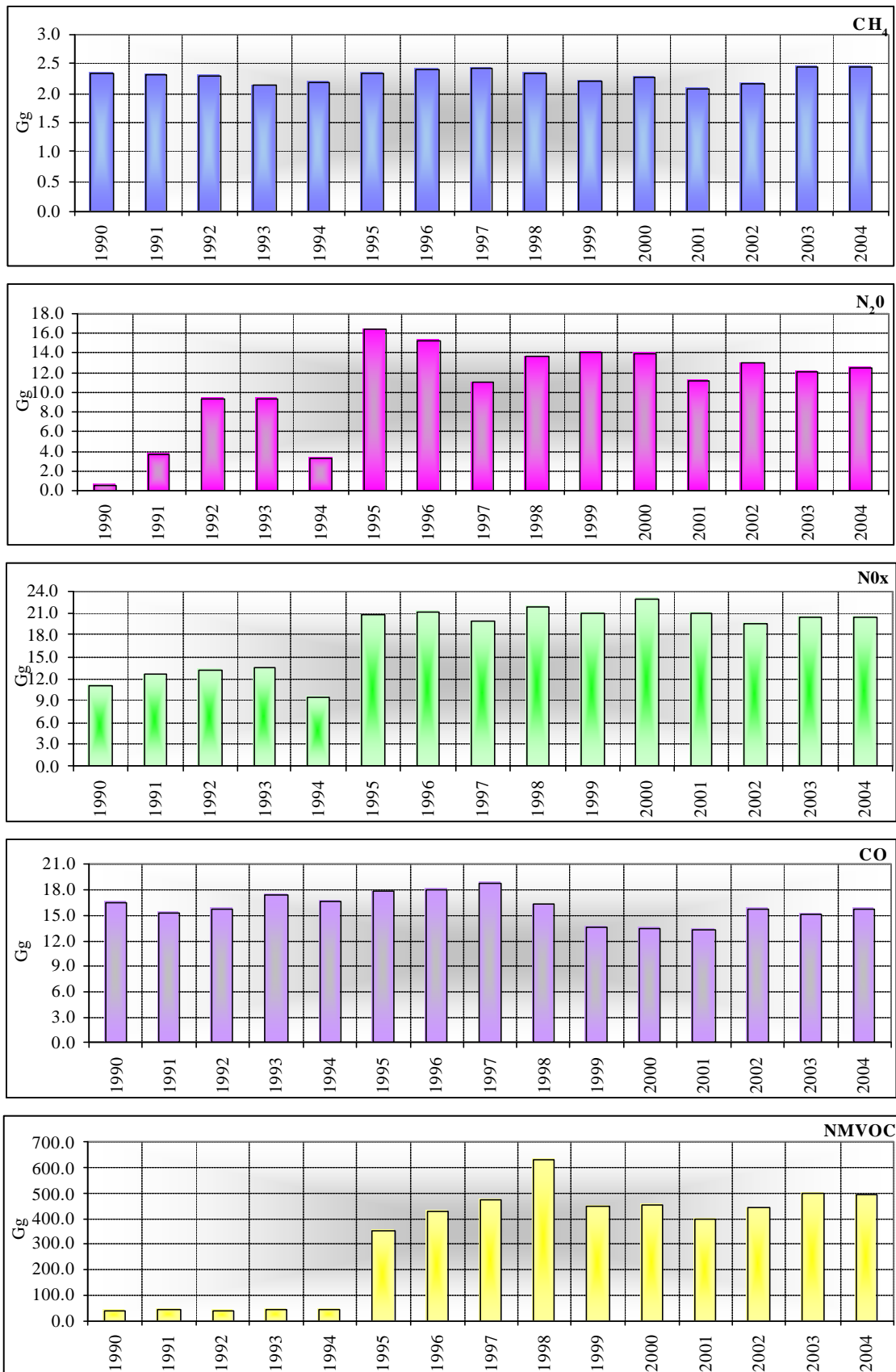


Figure 4.2. CH₄, N₂O, NO_x, CO, NMVOC emissions from industrial processes

The source of N_2O emission is the chemical industry, especially the nitric acid production. Between the years 1990 and 2004, the N_2O emission trend shows a great variety and fluctuations. The main reason is the nitric acid needed changes in domestic markets. This is also affecting the NO_x emissions. The main emission sources for NO_x can be categorized as follows: Glass production, road paving with asphalt, nitric acid production, other chemical productions, iron and steel production, aluminium industry, pulp and paper, petroleum industry. The NO_x emission from glass production and petroleum industry is estimated by the CORINAIR methodology. The IPCC Guidelines don't provide methodology for estimating the emissions for these processes. For the other industrial processes, the emission factors are the default from the IPCC Guidelines.

Until the year 1993, the NO_x emission trend shows an increase; afterwards it involves great variations. In Turkey, the highest NO_x emission sources are the pulp and paper and nitric acid production.

The main sources of CO emissions are road paving with asphalt, asphalt roofing, ammonia production, other chemical productions, aluminium industry, iron and steel production, petroleum industry, pulp and paper. The CORINAIR methodology is used for estimating the CO emission from petroleum industry. The IPCC Guidelines don't provide methodology for estimating the emission for this process. For the other industrial processes, the emission factors are the default from the IPCC. The highest CO emission source is the aluminium industry. CO emission range is changing between 13.26 Gg (in 2001) to 18.64 Gg (in 1997).

Finally, the main sources of NMVOC emissions are road paving with asphalt, asphalt roofing, ammonia production, other chemical productions, iron and steel production, petroleum industry, pulp and paper, food and drink. The highest NMVOC emission is coming from the food and drink industries. The emission trend involves fluctuations throughout the years. The CORINAIR methodology is used for estimating the NMVOC emission from petroleum industry. The IPCC Guidelines don't provide methodology for estimating the emission for this process.

The CORINAIR emission factors for NO_x , CO and NMVOC are given in the following Table 4.2.

Table 4.2. CORINAIR emission factor

Glass production type	Emission factor (kg NO_x /tones production)
Plain glass	10
Bottle	5
others	6
Gases	Emission factor from petroleum industry
NO_x	0.05 kg/m ³ *
CO	0.08 kg/m ³ *
NMVOC	0.25 g/kg

4.1. F Gases

This section is prepared by the Turkish Technology Development Foundation (TTGV). The methodology has been based on the IPCC Guidelines and the IPCC Good Practice Guidance. Inventory calculations have been based on the raw import data provided by Customs Department. Since there is no HFC and SF₆ production facility in Turkey all SF₆ used in industry is imported. A major portion of SF₆ is used in electrical instruments and for HFCs, it is used for refrigeration sector.

HFC data obtained from Customs. SF₆ data with company's name and amount are also provided by Customs. These data has been classified according to the company's name and the activity. When necessary, companies have been asked (i.e. leather industry) to clarify the emission rates. Based on the classification of MOEF and Customs data, following tables have been obtained.

Table 4.3. Amount of HFCs used in industry

Sector		2000	2001	2002	2003	2004
134 a	Refrigerator (home)	133.60	211.60	327.97	247.48	256.26
	Air conditioner and commercial refrigerator	93.69	96.03	165.05	240.26	305.11
	Vehicle	217.06	195.40	307.73	491.11	768.16
	service	157.95	158.92	258.41	341.47	276.69
Other	Refrigerator (home)	0.00	0.00	0.02	0.40	0.32
	Air conditioner + commercial refrigerator	2.03	0.46	2.08	5.32	7.73
	Vehicle	0.09	0.01	0.10	0.04	0.15
	service	4.23	0.41	2.15	1.65	3.49

Unit: tones

Table 4.4. Amount of SF₆ used in industry

Sector	1996	1997	1998	1999	2000	2001	2002	2003	2004
Electrical Equip.	15452	25202	27323	21450	12613	11896	18089	16448	24803
Tires	104	530	0	1197	1399	0	0	0	0
Medical	360	200	0	0	214	0	0	0	0
Laboratory	22	50	67	64	295	59	176	39	128
Not identified	0	0	0	-	0	0	120	0	0
Fire Ext.	-	-	-	-	-	1090	1090		2090
Leather	0	0	0	0	0	125	0	2040	2640
Metal	0	49	120	0	80	120	11	0	1000
Total	15938	26031	27510	22711	14601	13290	19486	18527	30661

IPCC emission factors have been used for estimating the emissions. HFCs are mostly consumed in the production processes. For that reason its emission is considered as fugitive emission and replaced in the production of HFCs. The accepted factors are 0.5% for usage and 100% for service operations. HFC-134a consumption is still low with its contribution to F gases since HFC-22 is largely in use by air conditioner and commercial refrigerator sectors in the industry. HFC-22 does not have GHG effect.

The only available data for electrical equipments is the imported SF₆ data. There is no information about the number and the capacity of the used, imported or exported equipments and the number of destroyed equipments. The imported amount has been assumed as completely emitted. Since, electrical equipment production is the main consumer of SF₆, this assumption has led to high emission rates which thought to be less in practice.

For car tires, calculation has been based on the import amount by tire manufacturers. Emission factor has been taken as 100% but with three years delay according to the IPCC guidelines.

SF₆ imported by laboratories, universities, medical industries have also been calculated in the same way and it has been assumed that all SF₆ is emitted in two years in equal amounts as suggested in guidelines. Amounts imported by unidentified users have also been calculated in the same way.

SF₆ used in “fire extinguishers” has been calculated by contacting the importing company. Emission factor of fire extinguishers depends on whether they are used in fixed systems or portable systems. Since there is no data about the place, according to the interview with the importer, it has been assumed that 2/3 of the imported amount is used in fixed systems and 1/3 is used in portable systems. Emission factors have been taken as %60 and %35 for portable and fixed systems respectively.

Metal Industry also uses SF₆ in their processes. There is only one aluminium production plant in Turkey however they haven't imported any SF₆. Most of the importers in metal industry are smaller foundries. Amount of emission by metal industry is equal to amount used as stated in guidelines.

Leather industry is a new sector which uses SF₆ and not listed in guidelines. It has been determined that SF₆ is used to prevent wrinkling during processing of leathers. In the same way as metal, all SF₆ used in leather industry has been taken as equal to amount emitted.

As seen from Table 4.3 and 4.4, main users of HFC and SF₆ in Turkey are refrigeration sector and electrical equipment manufacturers. For SF₆, most of the equipment suppliers are foreign companies and do not have production facilities in Turkey, so equipments are imported. It has been determined that some companies import equipments with SF₆ inside, whereas others import equipments empty and fill in Turkey. Also, these things are valid for manufactured equipments in Turkey especially exported to other countries and re-exported to third countries by companies located in Turkey. Since, electrical equipments production is the major consumer, the biggest error source could originate from this sector.

Also, use of SF₆ in fire extinguisher is a source of error due to lack of information whether it is used in fixed or portable systems.

Chapter 5

5. Solvent and Other Product Use

This category includes particularly emissions of CO₂, N₂O and NMVOC (IPCC Guidelines don't provide methodology for estimating the emissions of NMVOCs) from the use of solvents. It is very difficult to gather the information from the individual sources. The lack of data for solvent use hinder to estimate the CO₂, N₂O and NMVOC emissions. Therefore, this section, which contains the following activities

- Paint applications
- Degreasing and dry cleaning
- Chemical products, manufacture and processing
- Other
 - Use of N₂O for anaesthesia
 - N₂O from fire extinguishers
 - N₂O from aerosol cans
 - Other use of N₂O

are skipped by TURKSTAT.

Chapter 6

6. Agriculture

In Turkey, the GHG emissions from agriculture activities are released as a result of the production and processing of agricultural crop, animal population (enteric fermentation, manure management) and field burning of agricultural residue.

The processes and activities of the agricultural activities are mainly sources of CH₄. However, the field burning of agricultural residues are emitted N₂O, CO and NO_x.

The activity data is collected and provided by the TURKSTAT. The parameters and emission factors for estimating the GHG emissions from this sector are from the IPCC guidelines. Expert judgments for some parameters (such as; allocation of animals by climate region and typical animal mass) on enteric fermentation and manure management were used.

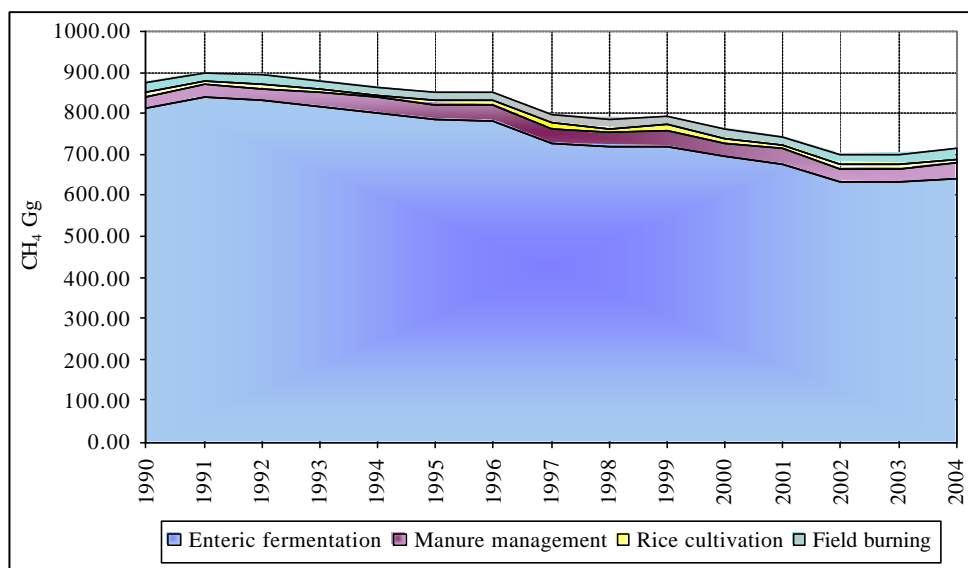


Figure 6.1. CH₄ emission trend from agricultural activities

In this sector, the highest methane emission is the results of the enteric fermentation. It can be seen from Figure 6.1 that, the CH₄ emission is decreasing after the year 1990. The main reason is the decreasing number of livestock as given in Table 6.1.

The emission from the field burning of agricultural residue is also one of the important emission sources. The result is seen in Figure 6.2. However, the emission trend shows fluctuations between 1990 and 2004. The highest CO emission from field burning is seen

in 2004 with a value of 501.85 Gg. For N₂O and NO_x, the highest emissions are determined as 0.48 Gg in 1998, 2004 and 11.42 Gg in 2004, respectively.

The Ministry of Environment and Forestry forbid farmer to burn the agricultural residue. Most of the farmers adapt the regulations, but the total quantity is not known. Therefore, the residue of the agricultural crops is still estimated as burned.

Table 6.1. The number of animals

Unit: (*1000)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Dairy Cattle	1013	1254	1337	1442	1512	1702	1795	1715	1733	1782	1806	1854	1860	1941	2109
Other Cattle	10364	10719	10613	10468	10389	10087	10091	9470	9298	9272	8955	8694	7944	7848	7960
Buffalo	371	366	352	316	305	255	235	194	176	165	146	138	121	113	104
Sheep	40553	40432	39416	37541	35646	33791	33072	30238	29435	30256	28492	26972	25174	25432	25201
Goats	10926	10764	10454	10133	9564	9111	8951	8376	8057	7774	7201	7022	6780	6772	6610
Camels	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1
Horse	513	496	483	450	437	415	391	345	330	309	271	271	249	227	212
Mules&Dankeys	1187	1136	1075	1013	978	900	843	782	736	680	588	559	512	490	452
Swine	12	10	12	9	8	5	5	5	5	3	3	3	4	7	4
Poultry	98848	141918	155437	181120	186591	131960	155693	169896	240108	242714	260769	219887	248009	279680	298897

Table 6.2. The percent of animal according to the climate region and manure management and enteric fermentation emission factors, 2004

Unit of EF (kg CH ₄ /head/y)	cool (%)	Tempe. (%)	Manure		Enteric EF
			Cool EF	Tempe. EF	
Dairy Cattle	77.6	22.4	7	16	56
Other Cattle	74.8	25.2	1	1	44
Buffalo	78.3	21.7	1	2	55
Sheep	93.0	7.0	0.1	0.16	5
Goats	74.3	25.7	0.11	0.17	5
Camels	48.0	52.0	1.3	1.9	46
Horse	11.7	88.3	1.1	1.6	18
Mules&Dankeys	62.8	37.2	0.6	0.9	10
Swine	66.1	33.9	1	4	1
Poultry	71.4	28.6	0.012	0.018	-

Turkey's climate is considerable changing from region to region. As the annual average air temperature is considered, Turkey's provinces are in cool (0 and 14 degrees centigrade) and temperate (15 and 25 degrees centigrade) climatic region. The used emission factor for manure management and enteric fermentation are according to the IPCC guidelines and the percent of the animal distribution are given in Table 6.2.

Direct emissions of nitrous oxide from agricultural soils (including the application of fertilizers and manure, the fixation by crops), are not estimated due to lack of data.

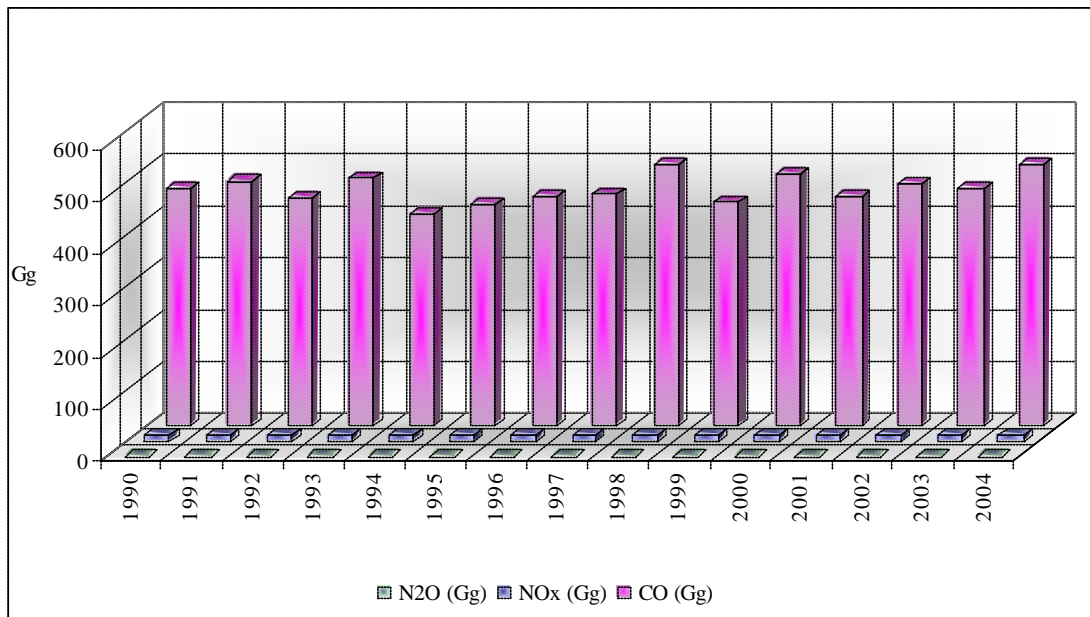


Figure 6.2. N₂O, NO_x and CO emissions from field burning of agricultural residues

Chapter 7

7. LULUCF

7.1. Forestry

This section is prepared by the Ministry of Environment and Forestry - Department of Research and Development and Istanbul University (Prof.Dr.Ünal ASAN). The data is reported under IPCC categories 5A-Changes in Forests and Other Woody Biomass.

Net annual amount of carbon and the other GHG uptake or release in the forests of Turkey between the years of 1990-2004 were estimated with the Preparation of Turkey's National Communication to the UNFCCC. Tier 2 methods given in the GPG – LULUCF manual were applied mainly during the preparation of initial national communication. It has to be noted that removals are reported with a negative sign in the CRF tables.

With regard to the document given by the General Directorate of Forestry, Turkey has 21,2 millions hectare forest area having approximately 1,288 billions m³ growing stock and 36,282 millions m³ current annual increment. All the woody areas having more than 3 ha magnitudes are accepted in forest regime disregarding their crown closure with respect to the forestry legislative in Turkey. 99% of the forests in the country belong to state.

The figures concerning forest resources in Turkey are given in Table 7.1.

Table 7.1. Forest inventory results of Turkey at the end of 2004 (x1000000)

Areas	Tree	High Forests (Ha)			Coppices (Ha)			TOTAL (Ha)		
	Species	Normal ¹	Degraded ²	Total	Normal	Degraded	Total	Normal	Degraded	Total
	Coniferous	7.083	5.689	12.772				7.083	5.689	12.772
	Deciduous	1.857	0.810	2.667	1.681	4.068	5.749	3.538	4.878	8.416
	Total	8.940	6.499	15.439	1.681	4.068	5.749	10.621	10.567	21.188

Growing Stock	Tree	High Forests (m ³)			Coppices (m ³) ³			TOTAL (m ³)		
	Species	Normal	Degraded	Total	Normal	Degraded	Total	Normal	Degraded	Total
	Coniferous	818.556	51.070	869.626				818.556	51.070	869.626
	Deciduous	310.014	14.367	324.381	70.464	23.654	94.118	380.478	38.021	418.499
	Total	1.128.570	65.437	1.194.007	70.464	23.654	94.118	1.199.034	89.091	1.288.125

Annual Volume Increment	Tree	High Forests (m ³)			Coppices (m ³) ³			TOTAL (m ³)		
	Species	Normal	Degraded	Total	Normal	Degraded	Total	Normal	Degraded	Total
	Coniferous	22.235	1.165	23.400				22.235	1.165	23.400
	Deciduous	7.674	0.353	8.027	3.926	0.929	4.855	11.600	1.282	12.882
	Total	29.909	1.518	31.427	3.926	0.929	4.855	33.835	2.447	36.282

¹ Crown closure between 0.11-1.00

² Crown closure between 0.01-0.10

³ 0.75 coefficient was used in order to convert the ster volume into M3 volume

2/3 of the forest existence is coniferous consisting of *Pinus brutia*, *P. nigra* and *P. silvestris*, *Abies* spp., *Juniperus* spp., *Picea orientalis*, *Cedrus libani* etc. *Fagus orientalis* and 22 *Quercus* spp are the main deciduous trees together with the others such as *Tilia*, *Ulmus*, *Alnus*, *Castanea* species. In portion of deciduous is 1/3 in total existence approximately either as in area or as in growing stock and increment.

4.100 Mill. ha of the total forests (19 %) consisting of national parks. protected areas. and other kinds of abandonment areas which were separated as unmanaged (out of felling) forests due to some conservative considerations. Rest of the areas occupying 17.089 Mill. ha (81%) are commercial forests.

Default method basing on the changes in aboveground and belowground biomass was used in determining of carbon sinks and GHG inventory. A series of equations foreseen in manual were used during calculations. Required data for the equations were collected from the forest statistics supported by Forestry Service and from the forestry expertise reports of the 7th, 8th and 9th Five Years Development Plans for the last 3 periods. The other necessary coefficients such as biomass expansion factors, average oven-dry matters, and so on were calculated by Prof. Dr. Ünal ASAN (Istanbul University) who is the forestry expert. Root to shot ratio combustion factors and some other necessary coefficients were extracted from the LULUCF's annex tables.

As is shown in Table 7.2A and 7.2B, annual sinks of carbon stocks in the forest areas for reporting year (2004) were estimated as 13594.639 Gg in living biomass; 888.387 Gg in dead organic matters and 14483.026 Gg totally. Dead organic matter covers the dead trees only for the forests older then 20 years old. Litter amounts were not included into calculations because of the absence of specific researches in this scope. Carbon contents in the forest soils were not considered too due to the same reason. Thus, both of these carbon pools did not taken into account because of the lack of document suitable for these purposes. Due to the extraordinary peculiarities among the geographical regions in Turkey, (southern and western parts of the country have Mediterranean forest conditions while the northern part looks like typical west European forests) default values given in LULUCF annexes tables could not be used.

GHG emissions from the forests due to forest fires were estimated as 0.0013 Gg for CH₄; 0.00076 Gg for CO; 0.01308 Gg for N₂O; and 0.00649 Gg for NO_x.

With respect to calculations for the last 15 years period between 1990 and 2004, CO₂ removals accrue increasingly depending on the net carbon sequestration in the forests of Turkey. Other GHG amounts change depending on the burned forest areas year by year in the past. There is no definite and significant trend for the other gasses.

Half of the forest areas (10.567 Mil. of 21.188 Mil.) are consisting of non-productive degraded (8.43 m³/ha growing stock and 0.23 m³/ha volume increment average) forests in Turkey. On the other hand, 1/3 of the productive forests have low density (0.11-0.40 crown closure) and very old.

Table 7.2A. Annual change of net carbon stocks in the forest areas of Turkey with regard to sub-categories, 2004

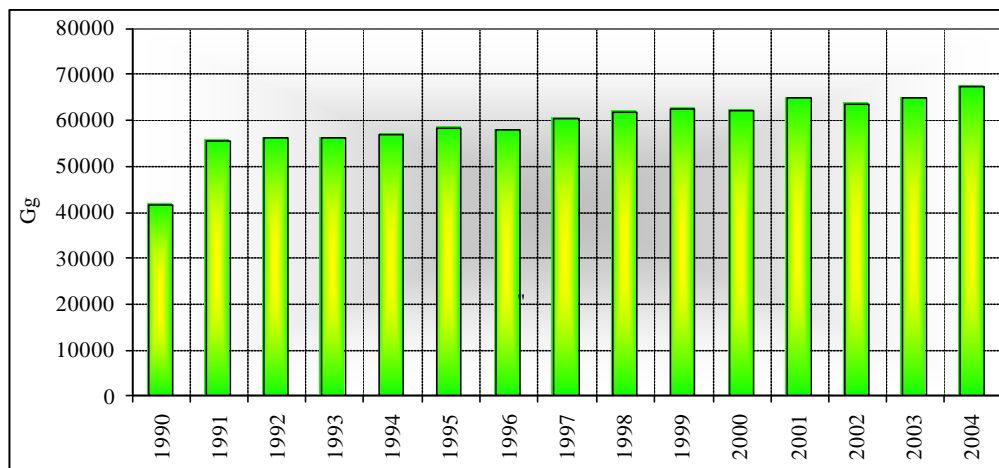
Tree Species	Change of Carbon Stocks in the Pools of Forest Lands Remaining Forest Lands				Change of Carbon Stocks in the Pools of Forest Lands Converted to Forest Lands			
	Areas	In Living Biomass	In Dead Organic Matter	In Forest Soil	Areas	In Living Biomass	In Dead Organic Matter	In Forest Soil
	Ha *(1000000)	Tones *(1000)	Tones *(1000)	Tones *(1000)	Ha *(1000000)	Tones *(1000)	Tones *(1000)	Tones *(1000)
Managed Coniferous	10.718	6185.5	551.659	0	0.507	411.0	0	0
Managed Deciduous	5.821	3911.6	245.283	0	0.043	29.5	0	0
Managed Total	16.539	10097.1	796.942	0	0.550	440.5	0	0
Unmanaged Coniferous	3.158	1568.0	58.082	0	0.062	65.9	0	0
Unmanaged Deciduous	0.873	1417.6	33.361	0	0.006	5.5	0	0
Unmanaged Total	4.031	2985.6	91.443	0	0.068	71.4	0	0
TOTAL	20.570	13082.7	888.385	0	0.618	511.9	0	0

Table 7.2B. Annual change of net carbon stocks and CO₂ equivalents in the whole forests of Turkey, 2004

Tree Species	Areas	In Living Biomass	In Dead Organic Matter	In Forest Soil	TOTAL
	Ha *(1000000)	Tones *(1000)	Tones *(1000)	Tones *(1000)	Tones *(1000)
Managed Coniferous	11.225	6596.5	551.659	0	7148.159
Managed Deciduous	5.864	3941.2	245.283	0	4186.483
Managed Total	17.089	10537.7	796.942	0	11334.642
Unmanaged Coniferous	3.220	1633.8	58.082	0	1691.882
Unmanaged Deciduous	0.879	1423.1	33.361	0	1456.461
Unmanaged Total	4.100	3056.9	91.443	0	3148.343
TOTAL	21.189	13594.6	888.385	0	14482.985

Turkey has a great opportunity on the promotion of affirmative effect on climate change by accruing of carbon stocks in the forests. 10.567 Mill. ha degraded forests. and the forestry policies for fulfilling the requirements of sustainable forest management concept create a huge potential for the carbon sequestration the future.

Net carbon removals between the years 1990-2004 in the forests of Turkey are outlined in Figure 7.1.

Figure 7.1. CO₂ removal in forest and other woody biomass stocks

The considerable reasons of the increase on the CO₂ removals throughout the years could be ordered as follows: moving to province centres from the rural areas; giving up old fashion goat breeding and cattle grazing in the forests and the meadows adjacent to forests, abandonment of some forest lands occupying on steep slopes and having non-economic management conditions, changing considerations on forestry applications towards multi functional use of forest resources in the framework of sustainable forest management concept, converting of coppices into high forests, and afforestation activities on the bare lands and degraded forests accomplished by the Forestry Service.

7.2. Land Use Change

This section is prepared by the Ministry of Agriculture and Rural Affairs Strategy Development Section and Harran University (Assoc.Prof.Dr.Halil Kirnak). The data is reported under IPCC categories 5 - Land Use Change.

In this part, estimation of CO₂ originated from land use and land use changes were prepared using LULUCF guidance. In order to make a reliable estimation, five main data types are required in regional scale. Those are: 1- main land use types 2- meteorological zones, 3- soil properties 4- crops grown 5- management practices. Either Tier 1 or Tier 2 approaches mentioned on the LULUCF guidance was used in the estimation procedures according to the availability of the country statistical data.

The available land use data in Turkey are examined in detail by considering three different approaches given in IPCC guidelines. According to the top level and categories for GHG inventory reports, lands are classified as cropland, grassland, wetlands, settlements and other lands. In Turkey, CORINE Land Cover 2000 studies are still continued by national knowledge centre under the supervision of MARA. The digital land use maps will be completed in June of 2007.

TURKSTAT and MARA have collaborated on collection of annual farmer records for each

cultivated crops. These records were collected by town branches of MARA and were sent to TURKSTAT yearly. The records are gathered in the scale of town and consist of whole crops grown in the town. Since all these records are kept in a suitable database format, any queries could be made. In this study, the data related to land use, crop type and cultivated area and yearly were obtained from TURKSTAT. Soil data are gathered from MARA.

In order to select default parameters mentioned in LULUCF guidance, top soil texture and Climate Zones are required. To do so, for climate zones in Turkey, point based meteorological data converted to regional data using local statistical methods by help of GIS (ArcGIS). Later overlap analysis in GIS was done to form climatic zones. For soil texture information, a query was made on soil database based on sub-province boundaries using GIS techniques.

Cropland: Tier 1 approach is used for estimating CO₂ emissions and uptake from cropland. While calculating C changes in soils, mineral soils are considered since area of the organic soils in Turkey is insignificant compared to the area of the mineral soils. The area of the organic soils is only about 0.3% of all soils in Turkey. Besides, there is no lime application in Turkey based on TURKSTAT and MARA records. Therefore, C_{soil} is equal to C_{CCmineral}. There is no country specific data for stock change factors. The relative stock change factors such as F_{LU}, F_{MG}, and F_I are selected based on climate regime from Table 3.3.4 of LULUCF guidance.

Grassland: Tier 2 approaches are used. It is also assumed that 75% of annual biomass growth of perennial woody biomass is lost. It means that $L_{\text{perennial}} = G_{\text{perennial}} * 0.75$ based on expert knowledge in Turkey. In the calculations of C stocks originated from soils, only mineral soils are considered due to reasons mentioned before. Default stock change factors are selected from LULUCF guidance. Concerning managed grassland area however the Range Land Regulations were approved and activated by government in 1998 and range land management program was initiated. Based on these regulations, following area of range lands are developed according to records of MARA.

Wetlands: CO₂ emissions associated with peat extractions is assumed to be zero since there is no peat production from wetlands in Turkey. The C stock change is originated only from land converted to flooded land (reservoirs) in wetlands under the conditions of Turkey. In order to determine area of flooded land (Reservoirs), list of the dams constructed between 1990 and 2004 was taken from State Hydraulic Works (SHW) and MARA. The water surface area of dams constructed both agricultural and hydro-powers are measured on the digital hydraulic map of Turkey by using GIS techniques.

Settlements: Tier “1a” approach is used. This approach uses changes in C stocks per tree crown cover area as a removal factor. CORINE 2000 database is used to determine the crown areas of trees located on settlements areas. CORINE 2000 database considers only lands bigger than 25 ha. Based on this limitation tree planted area in Cities in the year of 2000 are tabulated below. Total planted area is 16173 ha. It is assumed that %50 percentage of this plantation cover is before 1990. And then an equal increments rate is accepted and distributed to the years.

Other land: In Turkey, there is no land area converted to other land based on TURKSTAT database. Besides it is obvious that since there was no income incensement in agricultural sector. After 1990 marginal land were not opened to cultivated land so that no calculation was done.

A correct estimation process of CO₂ from land use and land use changes totally depend on input data used. Since there is no country-specific data, default coefficients given in LULUCF are used in the methodology. However, use of default coefficients can not reflect the real situations of a specific region due to spatial and temporal variability of the parameters. So, properties of soils, crops and also climatical parameters in site level should be measured and analyzed. To do so, researches related to variability and effects of climatically changes on agriculture should be initiated and accelerated. Systematic research on crops, crop systems and also farming systems to provide options for alternative land uses should be encouraged. Adaptation of new crops to new environmental conditions should be tested. Conservation of water resources, increases in irrigation efficiency, and control of erosion are the main topics to minimize the effects of the climatical changes on agriculture and social-cultural situations of the people.

As a result, the removals and emission of other Land use change activities are given in the following Figure 7.2. Throughout the years The net emission or removals by soils shows a great variations and fluctuations. For example, there is a high CO₂ emission in year 1991.

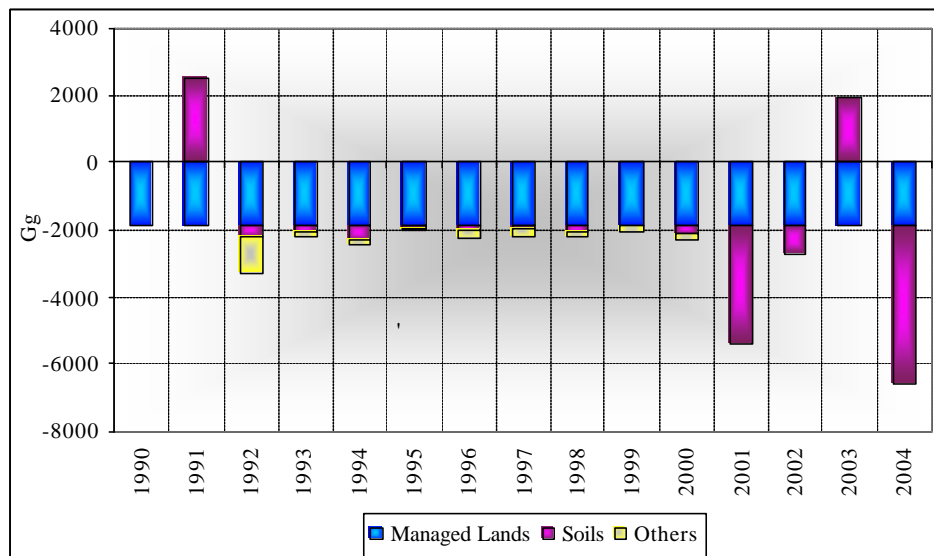


Figure 7.2. The net CO₂ removal and emissions in Land use change activities

Chapter 8

8. Waste

This sector includes emissions from landfills. The category evaluated is CH₄ emissions from municipal solid waste disposal on land.

Although there is one hazardous waste incineration plant and 2 hospital waste incineration plants in Turkey, emissions from waste incineration was not included in this report since the methodology for waste incineration has not been completed yet. Wastewater is also not handled within the inventory due to lack of data.

The disposed of solid waste emits C H₄ as a result of the processes of anaerobic and aerobic decomposition of organic mater contained in the waste. The default methodology recommended in the IPCC Guidelines is used for estimating the volumes of methane emitted in Turkey.

Both controlled and uncontrolled landfills are considered in the estimations. The annual data on municipal solid waste disposal on landfills were produced by TURKSTAT via survey. The data were gathered from all municipalities. However, the annual survey has been done discontinuously. Only the data for years 1994, 1995, 1996, 1997, 1998, 2001, 2002, 2003 and 2004 are available. Others are estimated by regression analysis. The used regression models are linear, logarithmic, quadratic, cubic, power and exponential. The best fit model is determined as quadratic and cubic models. The R² value for each model are given in Table 8.1. As shown in this table, the standard errors for power and exponential regression model are very small. R² values are also small. It means, the estimation do not fit for some years. The results could be seen from Figure 8.2. The missing data are estimated by using the cubic model. In Turkey, there was only one control landfill site for year 1992 and 1993 but data on waste disposal amount for those years were not available, 1994 waste disposal amount was used for emission estimations for 1992 and 1993. In 1999 and 2000, only one new controlled landfill site started to be operate. Therefore, the quantity of waste disposal on controlled landfill sites was assumed as same as waste disposed on controlled landfill sites in 2001. However, the regression model is preffered to estimate the waste disposed in uncontrolled landfilled in 1999 and 2000.

Table 8.1 Regression model results

	Linear	Logarithmic	Quadratic	Cubic	Power	Exponential
R square	0.64	0.76	0.95	0.97	0.74	0.61
Standard Err.	1722.44	1411.12	673.29	575.07	0.07	0.08

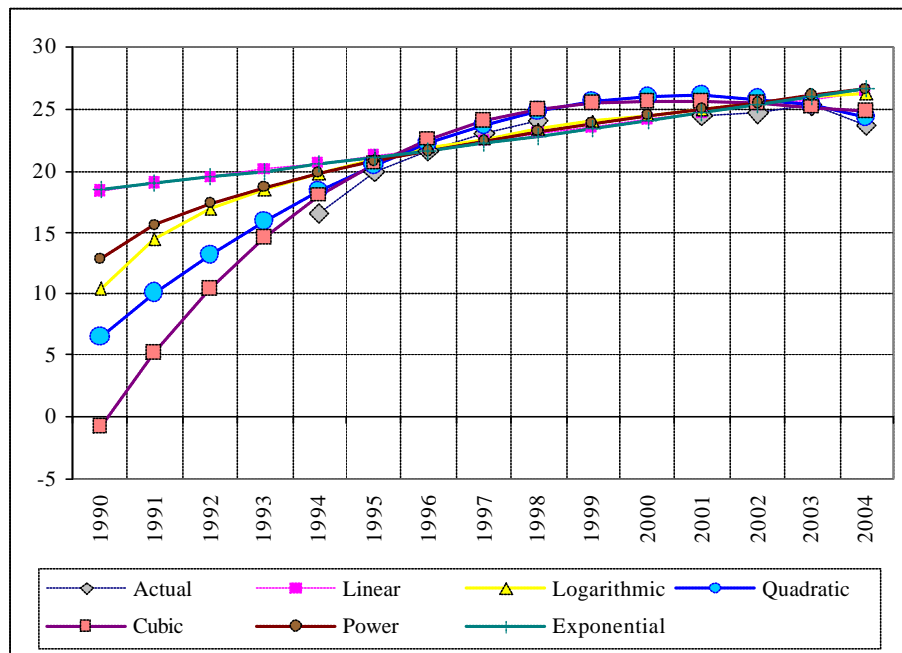


Figure 8.1 Best Fit Regression Model

The recovery of methane and its subsequent utilization is not considered in this calculations due to the lack of data.

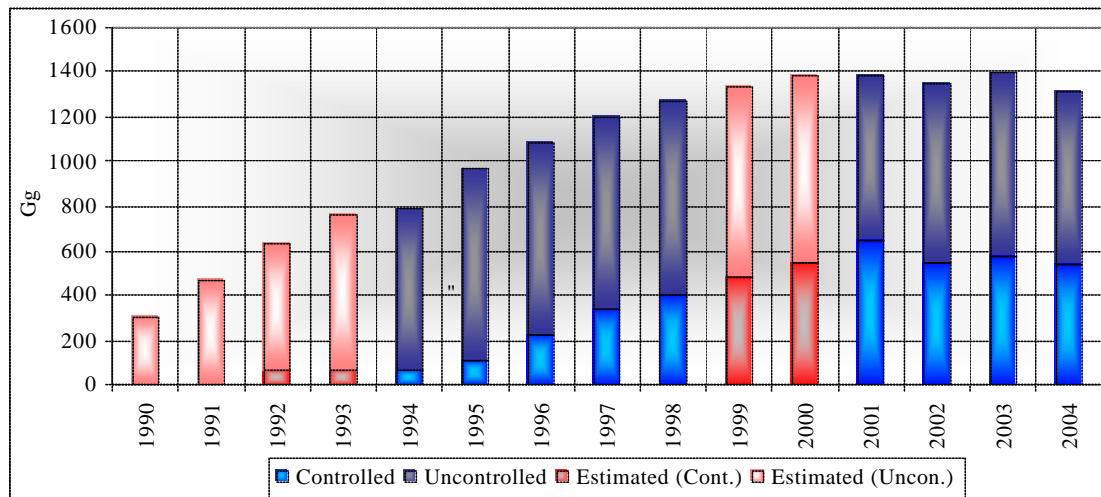


Figure 8.2 CH₄ emission trends from waste disposal

As seen in Figure 8.2, CH₄ emissions from solid waste disposal increases from 304 Gg to 1312 Gg during the period 1990 and 2004. Since 2000, the emission is relatively stable.

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Appendix A

A. Uncertainties

Quantitative estimates of the uncertainties in the emissions were calculated using direct expert judgement. However, this study has only been carried for the years of 2004 according to the lack of data. It can be concluded that the total uncertainty is 2.5% according to the high certain data of energy production.

The general procedure for uncertainty analysis was:

- Uncertainties of each activity were allocated by using emission factor and activity rate uncertainties.
- A calculation was set up to estimate the emission of each CO₂, CH₄, N₂O, HFCs and SF₆ gases.
- The uncertainties used for the industrial processes data were estimated from the statistical difference between entire supply and institutional inventory demand.
- The uncertainties for sectorial energy usage were taken from MOE.
- The uncertainties of agricultural activities were estimated by TURKSTAT experts.
- The uncertainties of transport sectors were taken from ITU.

The highest combined uncertainties are seen in the industrial processes (especially chemical productions), burning of agricultural residue, solid waste, coal mining and fuel combustion (basically the usage of hard coal in electricity production and residential areas).

The results are given in Table A1.

Table A1. Uncertainties, 2004

CATEGORY	FUEL	GAS	1990 EMIS.	2004 EMIS.	Activity data Unc. (%)	Emis fact. Unc. (%)	Combined Unc. (%)	Combined uncertainty as % of total national emissions in year 2004
Solid Waste		CH ₄	6386.46	27546.11	15.00	19.0	24.2	2.2
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	4168.15	23009.62	7.00	3.0	7.6	0.6
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	20662.22	25479.44	5.30	3.0	6.1	0.5
Road Transportation (Transport)	Petroleum	CO ₂	24035.93	34068.85	2.50	3.0	3.9	0.4
Emission of HFCs		HFC-134a	0.00	2228.73	40.00	20.0	44.7	0.3
Enteric Fermentation		CH ₄	17046.76	13471.87	6.30	1.0	6.4	0.3
PublicElectricityandHeatProduction(ElectricityProduction)	Natural Gas	CO ₂	5435.89	27451.00	0.00	3.0	3.0	0.3
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	851.45	9738.70	7.00	3.0	7.6	0.3
Iron and Steel (Industry)	Secondary Coal	CO ₂	7681.10	8463.61	5.30	3.0	6.1	0.2
Lime Production (Mineral Products)		CO ₂	645.09	1411.24	34.00	1.0	34.0	0.2
Other (Residential)	Lignite	CO ₂	9276.74	6845.35	5.30	3.0	6.1	0.1
Other (Industry)	Lignite	CO ₂	9948.37	6623.87	5.30	3.0	6.1	0.1
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	5795.38	9053.60	2.50	3.0	3.9	0.1
Nitric Acid Production (Chemical Industry)		N ₂ O	128.08	3862.41	8.91	1.0	9.0	0.1
Other (Residential)	Petroleum	CO ₂	9153.31	8733.71	2.50	3.0	3.9	0.1
Emission of SF ₆		SF ₆	0.00	704.57	40.00	20.0	44.7	0.1
Other (Industry)	Petroleum	CO ₂	7050.12	8048.33	2.50	3.0	3.9	0.1
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	3375.90	7830.33	2.50	3.0	3.9	0.1
Other (Residential)	Natural Gas	CO ₂	104.21	9765.28	0.00	3.0	3.0	0.1
Other (Industry)	Natural Gas	CO ₂	1729.02	8558.59	0.00	3.0	3.0	0.1
Fugitive (Coal Mining)		CH ₄	1430.32	1229.33	5.00	20.0	20.6	0.1
Other (Residential)	Biomass	CH ₄	1901.22	1459.12	0.00	16.0	16.0	0.1
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	3689.24	5685.38	2.50	3.0	3.9	0.1
Other (Residential)	Hard Coal	CO ₂	3845.79	2427.93	7.00	3.0	7.6	0.1
Other (Industry)	Petroleum Coke	CO ₂	941.03	5577.26	0.00	3.0	3.0	0.1
Cement Production (Mineral Products)		CO ₂	10333.37	16725.48	0.00	1.0	1.0	0.1
Ammonia Production (Chemical Industry)		CO ₂	713.47	641.25	24.00	1.0	24.0	0.1
Civil Aviation (Transport)	Jet Kerosene	CO ₂	904.59	4798.68	0.00	3.0	3.0	0.0
Field Burning of Agricultural Residues		CH ₄	454.59	501.31	25.00	14.0	28.7	0.0
Other (Residential)	Biomass	N ₂ O	374.21	287.19	0.00	45.0	45.0	0.0
Soda Ash Production and Use (Mineral Products)		CO ₂	106.30	255.57	45.00	1.0	45.0	0.0
Chemicals (Industry)	Petroleum	CO ₂	1984.26	2305.25	2.50	3.0	3.9	0.0
Other (Residential)	Lignite	CH ₄	589.29	434.84	5.30	16.0	16.9	0.0
Rice Cultivation		CH ₄	222.60	294.00	10.00	20.0	22.4	0.0
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	246.86	590.56	0.00	10.0	10.0	0.0
Manure Management		CH ₄	613.63	760.60	6.30	1.0	6.4	0.0
Field Burning of Agricultural Residues		N ₂ O	135.78	150.04	25.00	20.0	32.0	0.0

Table A1. Uncertainties, 2004

CATEGORY	FUEL	GAS	1990 EMIS.	2004 EMIS.	Activity data Unc. (%)	Emis fact. Unc. (%)	Combined Unc. (%)	Combined uncertainty as % of total national emissions in year 2004
Navigation (Transport)	Petroleum	CO ₂	494.28	1207.01	2.50	3.0	3.9	0.0
Iron and Steel (Industry)	Petroleum	CO ₂	1720.93	1045.18	2.50	3.0	3.9	0.0
Other (Industry)	Asphalt	CO ₂	88.46	1203.26	0.00	3.0	3.0	0.0
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.00	1128.16	0.00	3.0	3.0	0.0
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	774.22	806.84	2.50	3.0	3.9	0.0
Other (Residential)	Secondary Coal	CO ₂	635.01	512.64	5.30	3.0	6.1	0.0
Other Chemicals Production (Chemical Industry)		CH ₄	49.39	51.71	60.00	1.0	60.0	0.0
Other (Residential)	Hard Coal	CH ₄	261.34	164.99	7.00	16.0	17.5	0.0
Carbide Production (Chemical Industry)		CO ₂	112.25	61.38	45.00	1.0	45.0	0.0
Chemicals (Industry)	Natural Gas	CO ₂	0.00	795.04	0.00	3.0	3.0	0.0
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	90.42	111.50	5.30	20.0	20.7	0.0
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	19.51	107.72	7.00	20.0	21.2	0.0
Other (Industry)	Secondary Coal	CO ₂	679.26	345.90	5.30	3.0	6.1	0.0
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	0.00	224.07	7.00	3.0	7.6	0.0
Railways (Transport)	Petroleum	CO ₂	465.05	374.27	2.50	3.0	3.9	0.0
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	67.91	121.35	0.00	10.0	10.0	0.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	3.99	45.59	7.00	20.0	21.2	0.0
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	9.44	52.12	7.00	16.0	17.5	0.0
Iron and Steel (Industry)	Secondary Coal	N ₂ O	35.96	39.62	7.00	16.0	17.5	0.0
Other (Residential)	Lignite	N ₂ O	40.60	29.96	5.30	20.0	20.7	0.0
Other (Residential)	Secondary Coal	CH ₄	43.15	34.84	7.00	16.0	17.5	0.0
Other (Industry)	Lignite	N ₂ O	43.53	28.99	5.30	20.0	20.7	0.0
Other (Industry)	Petroleum Coke	N ₂ O	4.41	26.11	0.00	20.0	20.0	0.0
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	9.08	48.10	0.00	10.0	10.0	0.0
Non-Ferrous Metals (Industry)	Lignite	CO ₂	59.79	74.74	5.30	3.0	6.1	0.0
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	14.85	23.20	2.50	16.0	16.2	0.0
Other (Residential)	Petroleum	N ₂ O	23.45	22.38	2.50	16.0	16.2	0.0
Iron and Steel Production (Metal Production)		CO ₂	770.23	346.98	0.00	1.0	1.0	0.0
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.40	19.17	7.00	16.0	17.5	0.0
Other (Industry)	Petroleum	N ₂ O	18.06	20.62	2.50	16.0	16.2	0.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	8.65	20.06	2.50	16.0	16.2	0.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	3.02	15.25	0.00	20.0	20.0	0.0
Other (Residential)	Natural Gas	CH ₄	0.20	18.40	0.00	16.0	16.0	0.0
Other (Residential)	Petroleum	CH ₄	26.48	25.26	2.50	10.0	10.3	0.0
Other (Industry)	Natural Gas	CH ₄	3.25	16.10	0.00	16.0	16.0	0.0
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	73.36	40.76	5.30	3.0	6.1	0.0
Chemicals (Industry)	Lignite	CO ₂	529.42	39.82	5.30	3.0	6.1	0.0

Table A1. Uncertainties, 2004

CATEGORY	FUEL	GAS	1990 EMIS.	2004 EMIS.	Activity data Unc. (%)	Emis fact. Unc. (%)	Combined Unc. (%)	Combined uncertainty as % of total national emissions in year 2004
Other (Residential)	Hard Coal	N ₂ O	18.00	11.37	7.00	20.0	21.2	0.0
Other (Industry)	Lignite	CH ₄	21.07	14.03	5.30	16.0	16.9	0.0
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	9.45	14.57	2.50	16.0	16.2	0.0
Limestone and Dolomite Use (Mineral Products)		CO ₂	21.52	6.41	35.00	1.0	35.0	0.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.05	10.33	0.00	16.0	16.0	0.0
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	8.38	13.09	2.50	10.0	10.3	0.0
Aluminium Production (Metal Production)		CO ₂	109.62	115.20	0.00	1.0	1.0	0.0
Other (Industry)	Asphalt	N ₂ O	0.41	5.63	0.00	20.0	20.0	0.0
Other (Residential)	Natural Gas	N ₂ O	0.06	5.43	0.00	20.0	20.0	0.0
Chemicals (Industry)	Petroleum	N ₂ O	5.08	5.91	2.50	16.0	16.2	0.0
Other (Industry)	Natural Gas	N ₂ O	0.96	4.75	0.00	20.0	20.0	0.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	4.38	5.40	5.30	16.0	16.9	0.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	2.93	6.79	2.50	10.0	10.3	0.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	3.20	4.93	2.50	10.0	10.3	0.0
Other (Industry)	Petroleum	CH ₄	4.08	4.66	2.50	10.0	10.3	0.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	6.20	3.10	10.00	10.0	14.1	0.0
Other (Industry)	Asphalt	CH ₄	0.20	2.73	0.00	16.0	16.0	0.0
Iron and Steel (Industry)	Petroleum	N ₂ O	4.41	2.68	2.50	16.0	16.2	0.0
Other (Residential)	Secondary Coal	N ₂ O	2.97	2.40	7.00	16.0	17.5	0.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.19	2.21	7.00	16.0	17.5	0.0
Other (Industry)	Petroleum Coke	CH ₄	2.13	12.63	0.00	3.0	3.0	0.0
Ferroalloys Production (Metal Production)		CO ₂	81.17	37.31	0.00	1.0	1.0	0.0
Iron and Steel (Industry)	Natural Gas	CO ₂	0.00	12.14	0.00	3.0	3.0	0.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.00	2.12	0.00	16.0	16.0	0.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	1.98	2.07	2.50	16.0	16.2	0.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.22	3.03	0.00	10.0	10.0	0.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.36	2.91	0.00	10.0	10.0	0.0
Other (Industry)	Secondary Coal	N ₂ O	3.18	1.62	7.00	16.0	17.5	0.0
Road Transportation (Transport)	Natural Gas	CO ₂	0.00	9.01	0.00	3.0	3.0	0.0
Chemicals (Industry)	Natural Gas	CH ₄	0.00	1.50	0.00	16.0	16.0	0.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.00	1.05	7.00	20.0	21.2	0.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.69	1.71	0.00	10.0	10.0	0.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.31	1.54	0.00	10.0	10.0	0.0
Chemicals (Industry)	Petroleum	CH ₄	1.15	1.33	2.50	10.0	10.3	0.0
Other (Industry)	Secondary Coal	CH ₄	1.54	0.78	7.00	16.0	17.5	0.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.00	0.63	0.00	20.0	20.0	0.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.00	0.51	7.00	16.0	17.5	0.0

Table A1. Uncertainties, 2004

CATEGORY	FUEL	GAS	1990 EMIS.	2004 EMIS.	Activity data Unc. (%)	Emis fact. Unc. (%)	Combined Unc. (%)	Combined uncertainty as % of total national emissions in year 2004
Chemicals (Industry)	Natural Gas	N ₂ O	0.00	0.44	0.00	20.0	20.0	0.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.26	0.33	5.30	20.0	20.7	0.0
Iron and Steel (Industry)	Petroleum	CH ₄	1.00	0.60	2.50	10.0	10.3	0.0
Railways (Transport)	Diesel+FuelOil	CH ₄	0.73	0.62	0.00	10.0	10.0	0.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.45	0.47	2.50	10.0	10.3	0.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.00	0.25	0.00	16.0	16.0	0.0
Chemicals (Industry)	Lignite	N ₂ O	2.32	0.17	5.30	20.0	20.7	0.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.34	0.19	7.00	16.0	17.5	0.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.13	0.16	5.30	16.0	16.9	0.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.17	0.09	7.00	16.0	17.5	0.0
Chemicals (Industry)	Lignite	CH ₄	1.12	0.08	5.30	16.0	16.9	0.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.00	0.04	0.00	20.0	20.0	0.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.00	0.02	0.00	16.0	16.0	0.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.00	0.01	0.00	20.0	20.0	0.0
Chemicals (Industry)	Hard Coal	CO ₂	0.00	0.00	7.00	3.0	7.6	0.0
Railways (Transport)	Hard Coal	CO ₂	29.73	0.00	7.00	3.0	7.6	0.0
Navigation (Transport)	Hard Coal	CO ₂	3.19	0.00	7.00	3.0	7.6	0.0
Railways (Transport)	Lignite	CO ₂	21.87	0.00	5.30	3.0	6.1	0.0
Other (Residential)	Asphalt	CO ₂	390.56	0.00	0.00	3.0	3.0	0.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.00	5.30	3.0	6.1	0.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	103.25	0.00	0.00	3.0	3.0	0.0
Chemicals (Industry)	Hard Coal	CH ₄	0.00	0.00	7.00	16.0	17.5	0.0
Railways (Transport)	Hard Coal	CH ₄	0.07	0.00	7.00	16.0	17.5	0.0
Navigation (Transport)	Hard Coal	CH ₄	0.01	0.00	7.00	16.0	17.5	0.0
Railways (Transport)	Lignite	CH ₄	0.05	0.00	5.30	16.0	16.9	0.0
Other (Residential)	Asphalt	CH ₄	26.54	0.00	0.00	16.0	16.0	0.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.00	7.00	16.0	17.5	0.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.23	0.00	0.00	3.0	3.0	0.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.00	0.00	7.00	20.0	21.2	0.0
Railways (Transport)	Hard Coal	N ₂ O	0.39	0.00	7.00	20.0	21.2	0.0
Navigation (Transport)	Hard Coal	N ₂ O	0.01	0.00	7.00	20.0	21.2	0.0
Railways (Transport)	Lignite	N ₂ O	0.27	0.00	5.30	20.0	20.7	0.0
Other (Residential)	Asphalt	N ₂ O	1.83	0.00	0.00	20.0	20.0	0.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.00	7.00	16.0	17.5	0.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.48	0.00	0.00	20.0	20.0	0.0
Total			170065	296605				2.5

Appendix B

B. Key Source Analysis

According to the IPCC Good Practice Guidance, a key source category is one that is prioritised within the national inventory system because its estimate has a significant influence on a country's total inventory of direct greenhouse gases in terms of the absolute level of emissions. The results of this study has shown that Road Transportation (CO₂), Public Electricity and Heat Production (Electricity Production) (CO₂), Enteric Fermentation (CH₄), Cement Production (CO₂), Residential usage of lignite and petroleum (CO₂), Iron and Steel Industry (CO₂), Other industries (Cement Production, sugar, Fertilizer etc.), Petroleum refining (CO₂), Civil Aviation (Transport) (CO₂), Non-Ferrous Metals (Industrial Process) (CO₂), Manure Management (CH₄) and Solid Waste Disposal (CH₄) were determined as key sources.

Solid Waste Disposal (CH₄): Only the data for years 1994, 1995, 1996, 1997, 1998, 2001, 2002, 2003 and 2004 are present. Others are estimated by regression model. CH₄ emissions from solid waste disposal increases from 304 Gg to 1312 Gg during the period 1990 and 2004. For the last years, the emission is relatively stable. By the way, the controlled landfill sites are increasing within the time. The IPCC methodology is used for estimating the emission.

Road Transportation (CO₂): The CO₂ emissions from road transport constitute approximately 19% per year to the overall CO₂ emission. Moreover, 85% of CO₂ emission in transportation is coming from the consumption of fuels in road vehicles. However, it is interesting that compared to 1990 emission; the emission in 2004 is decreasing 2.28%. The main reason is the technological development in the motor system of the vehicles. Although the number of vehicle is increasing, the emission is decreasing due to the less amount consumption of the fuels. The CO₂ emissions were calculated according to the reported fuel consumption in the Energy balances tables. The fuels are consumed by different type of vehicles. The records related to the vehicle capacity, vehicle number and vehicle properties are obtained from TURKSTAT. The basic source for emission factors for these calculations is the IPCC Guidelines. Tier 2 methodology is used for the estimation.

Public Electricity and Heat Production (Electricity Production) (CO₂): The CO₂ emission from the combustion of hard coal, lignite and natural gas is considerably high throughout the years. In Turkiye, the quality of domestic lignite and hard coal are not good. However, the fuels lignite and coal are shifted to natural gas. As a result of, the emission trend involves a decrease after the year 1998. The emission from the lignite production in 2004 is 25429 Gg, which is 11.41% of total CO₂ emission. The ratio for hard coal is only 4.36%. The IPCC methodology (Tier 1) is applied for the emission estimations.

Enteric Fermentation and Manure Management (CH₄): The methane emissions from this source are released as a result of fermentation in the digestive systems of the ruminant animals. This process depends on the kind of animals and the feed intake. The highest methane emission in Agricultural sector is the results of the enteric fermentation. It can be

seen from the Figure 6.1 that, the CH₄ emission has been decreasing since 1990. The main reason is the decreasing number of livestock. The used emission factor for manure management and enteric fermentation are according to the IPCC guidelines. Moreover, the necessary data is gathered from TURKSTAT.

Cement Production (CO₂): The CO₂ emission from the cement production is 16725 Gg in 2004. The emission trend from this sector has involved an increasing trend since 1990. The emissions are estimated by using Tier 1 method. The only emission is coming from the clinker production.

Residential usage of lignite and petroleum (CO₂): The methodology for the estimation of CO₂ emission is the IPCC – Tier 1. The residential contribution to total CO₂ emission from the lignite and petroleum consumption is almost the same with a value of 7.3% in 1990. However, these ratios for lignite and petroleum in 2004 are only 3.1% and 3.9%, respectively. The main reason is the shifting from lignite to natural gas.

Iron and Steel Industry (CO₂): The emission from the Iron and steel industry is also very high compared to other sectors. The main reason is the burning of coal during the processing. The contributions to total CO₂ emission are only 6% in 1990 and 3.7% in 2004. However, the emission from the combustion of fuels in iron and steel industry is only the result of burning of fuels in large scale iron and steel production industries. The emission from the small and medium scale enterprises are included in other industries since their fuel combustion can not be obtained separately.

Other industries (Cement Production, sugar, Fertilizer etc.) (CO₂): The fuel consumption of the cement production, sugar, fertilizer and other industries are very high. All these sectors are collected in other groups of industrial sector. The main reason is that there is no such classification in CRF tables. For that reason the CO₂ emission seems very high. Except for cement production, the CO₂ emissions of sugar and fertilizer industries, are also very high. The methodology is the IPCC-Tier 1.

Petroleum refining (CO₂): The contribution to total CO₂ emission from petroleum refining is ranging between 2.3% and 3.3% throughout the years. The highest contribution is seen in 1994, and the lowest one is seen in 2000. IPCC - Tier 1 is used for the emission estimations.

Civil Aviation (Transport) (CO₂): The fuel consumption data related to aviation was provided only for the domestic consumption. Therefore no results were provided in this work for unallocated emissions resulting from international aviation.

Non-Ferrous Metals (Industrial Process) (CO₂): The CO₂ emission compared to total CO₂ emission from the combustion of petroleum is ranging between 0.4% and 0.6%. The methodology is IPCC-Tier 1.

Table B1. The Key Source Analysis

1990 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Road Transportation (Transport)	Petroleum	CO ₂	24035.9	14.1	14.1
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	20662.2	12.1	26.3
Enteric Fermentation		CH ₄	17046.8	10.0	36.3
Cement Production (Mineral Products)		CO ₂	10333.4	6.1	42.4
Other (Industry)	Lignite	CO ₂	9948.4	5.8	48.2
Other (Residential)	Lignite	CO ₂	9276.7	5.5	53.7
Other (Residential)	Petroleum	CO ₂	9153.3	5.4	59.1
Iron and Steel (Industry)	Secondary Coal	CO ₂	7681.1	4.5	63.6
Other (Industry)	Petroleum	CO ₂	7050.1	4.1	67.7
Solid Waste		CH ₄	6386.5	3.8	71.5
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	5795.4	3.4	74.9
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	5435.9	3.2	78.1
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	4168.1	2.5	80.5
Other (Residential)	Hard Coal	CO ₂	3845.8	2.3	82.8
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	3689.2	2.2	85.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	3375.9	2.0	87.0
Chemicals (Industry)	Petroleum	CO ₂	1984.3	1.2	88.1
Other (Residential)	Biomass	CH ₄	1901.2	1.1	89.2
Other (Industry)	Natural Gas	CO ₂	1729.0	1.0	90.3
Iron and Steel (Industry)	Petroleum	CO ₂	1720.9	1.0	91.3
Fugitive (Coal Mining)		CH ₄	1430.3	0.8	92.1
Other (Industry)	Petroleum Coke	CO ₂	941.0	0.6	92.7
Civil Aviation (Transport)	Jet Kerosene	CO ₂	904.6	0.5	93.2
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	851.4	0.5	93.7
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	774.2	0.5	94.2
Iron and Steel Production (Metal Production)		CO ₂	770.2	0.5	94.6
Ammonia Production (Chemical Industry)		CO ₂	713.5	0.4	95.0
Other (Industry)	Secondary Coal	CO ₂	679.3	0.4	95.4
Lime Production (Mineral Products)		CO ₂	645.1	0.4	95.8
Other (Residential)	Secondary Coal	CO ₂	635.0	0.4	96.2
Manure Management		CH ₄	613.6	0.4	96.5
Other (Residential)	Lignite	CH ₄	589.3	0.3	96.9
Chemicals (Industry)	Lignite	CO ₂	529.4	0.3	97.2
Navigation (Transport)	Petroleum	CO ₂	494.3	0.3	97.5
Railways (Transport)	Petroleum	CO ₂	465.1	0.3	97.8
Field Burning of Agricultural Residues		CH ₄	454.6	0.3	98.0
Other (Residential)	Asphalt	CO ₂	390.6	0.2	98.3
Other (Residential)	Biomass	N ₂ O	374.2	0.2	98.5

Table B1. The Key Source Analysis

1990 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Other (Residential)	Hard Coal	CH ₄	261.3	0.2	98.6
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	246.9	0.1	98.8
Rice Cultivation		CH ₄	222.6	0.1	98.9
Field Burning of Agricultural Residues		N ₂ O	135.8	0.1	99.0
Nitric Acid Production (Chemical Industry)		N ₂ O	128.1	0.1	99.1
Carbide Production (Chemical Industry)		CO ₂	112.2	0.1	99.1
Aluminium Production (Metal Production)		CO ₂	109.6	0.1	99.2
Soda Ash Production and Use (Mineral Products)		CO ₂	106.3	0.1	99.3
Other (Residential)	Natural Gas	CO ₂	104.2	0.1	99.3
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	103.2	0.1	99.4
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	90.4	0.1	99.4
Other (Industry)	Asphalt	CO ₂	88.5	0.1	99.5
Ferroalloys Production (Metal Production)		CO ₂	81.2	0.0	99.5
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	73.4	0.0	99.6
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	67.9	0.0	99.6
Non-Ferrous Metals (Industry)	Lignite	CO ₂	59.8	0.0	99.6
Other Chemicals Production (Chemical Industry)		CH ₄	49.4	0.0	99.7
Other (Industry)	Lignite	N ₂ O	43.5	0.0	99.7
Other (Residential)	Secondary Coal	CH ₄	43.2	0.0	99.7
Other (Residential)	Lignite	N ₂ O	40.6	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	36.0	0.0	99.8
Railways (Transport)	Hard Coal	CO ₂	29.7	0.0	99.8
Other (Residential)	Asphalt	CH ₄	26.5	0.0	99.8
Other (Residential)	Petroleum	CH ₄	26.5	0.0	99.8
Other (Residential)	Petroleum	N ₂ O	23.5	0.0	99.8
Railways (Transport)	Lignite	CO ₂	21.9	0.0	99.8
Limestone and Dolomite Use (Mineral Products)		CO ₂	21.5	0.0	99.9
Other (Industry)	Lignite	CH ₄	21.1	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	19.5	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	18.1	0.0	99.9
Other (Residential)	Hard Coal	N ₂ O	18.0	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.4	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	14.8	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	9.5	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	9.4	0.0	99.9
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	9.1	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	8.6	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	8.4	0.0	100.0

Table B1. The Key Source Analysis

1990 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	6.2	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.1	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	4.4	0.0	100.0
Other (Industry)	Petroleum Coke	N ₂ O	4.4	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	4.4	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.1	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	4.0	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.4	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	3.3	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	3.2	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	3.2	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	3.2	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	3.0	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	3.0	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	2.9	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	2.3	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	2.1	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.0	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	1.8	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	1.5	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.3	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.2	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	1.1	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	1.0	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	1.0	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	0.7	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.7	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.4	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.4	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.4	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.3	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.3	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.2	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.2	0.0	100.0

Table B1. The Key Source Analysis

1990 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Other (Residential)	Natural Gas	CH ₄	0.2	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.1	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	0.1	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.1	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Natural Gas	CO ₂	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Emission of HFCs		HFC-1	0.0	0.0	100.0
Emission of SF ₆		SF ₆	0.0	0.0	100.0
TOTAL			170065		

Table B1. The Key Source Analysis

1991 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	23336.8	12.8	12.8
Road Transportation (Transport)	Petroleum	CO ₂	22582.8	12.4	25.2
Enteric Fermentation		CH ₄	17605.4	9.7	34.9
Cement Production (Mineral Products)		CO ₂	11584.8	6.4	41.3
Other (Industry)	Lignite	CO ₂	10800.2	5.9	47.2
Solid Waste		CH ₄	9741.7	5.4	52.6
Other (Residential)	Lignite	CO ₂	9576.5	5.3	57.8
Other (Residential)	Petroleum	CO ₂	9457.3	5.2	63.0
Iron and Steel (Industry)	Secondary Coal	CO ₂	7705.6	4.2	67.3
Other (Industry)	Petroleum	CO ₂	7526.9	4.1	71.4
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	6099.4	3.4	74.7
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	5820.1	3.2	77.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	5005.3	2.8	80.7
Other (Residential)	Hard Coal	CO ₂	4741.1	2.6	83.3
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	3595.8	2.0	85.3
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	2225.2	1.2	86.5
Chemicals (Industry)	Petroleum	CO ₂	1938.7	1.1	87.6
Other (Industry)	Natural Gas	CO ₂	1914.0	1.1	88.6
Other (Residential)	Biomass	CH ₄	1902.3	1.0	89.7
Iron and Steel (Industry)	Petroleum	CO ₂	1778.0	1.0	90.6
Fugitive (Coal Mining)		CH ₄	1411.9	0.8	91.4
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	1374.9	0.8	92.2
Other (Industry)	Secondary Coal	CO ₂	1220.0	0.7	92.8
Nitric Acid Production (Chemical Industry)		N ₂ O	1099.9	0.6	93.4
Civil Aviation (Transport)	Jet Kerosene	CO ₂	1034.9	0.6	94.0
Other (Industry)	Petroleum Coke	CO ₂	1005.9	0.6	94.6
Lime Production (Mineral Products)		CO ₂	796.5	0.4	95.0
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	781.2	0.4	95.4
Ammonia Production (Chemical Industry)		CO ₂	678.1	0.4	95.8
Manure Management		CH ₄	661.0	0.4	96.2
Iron and Steel Production (Metal Production)		CO ₂	637.8	0.4	96.5
Other (Residential)	Lignite	CH ₄	608.3	0.3	96.9
Navigation (Transport)	Petroleum	CO ₂	530.7	0.3	97.1
Other (Residential)	Secondary Coal	CO ₂	527.9	0.3	97.4
Railways (Transport)	Petroleum	CO ₂	485.0	0.3	97.7
Field Burning of Agricultural Residues		CH ₄	468.8	0.3	98.0
Chemicals (Industry)	Natural Gas	CO ₂	401.9	0.2	98.2
Other (Residential)	Natural Gas	CO ₂	397.7	0.2	98.4

Table B1. The Key Source Analysis

1991 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Other (Residential)	Biomass	N ₂ O	374.4	0.2	98.6
Other (Residential)	Hard Coal	CH ₄	322.2	0.2	98.8
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	231.9	0.1	98.9
Other (Residential)	Asphalt	CO ₂	173.6	0.1	99.0
Rice Cultivation		CH ₄	168.0	0.1	99.1
Field Burning of Agricultural Residues		N ₂ O	139.8	0.1	99.2
Iron and Steel (Industry)	Natural Gas	CO ₂	129.7	0.1	99.2
Ferroalloys Production (Metal Production)		CO ₂	111.4	0.1	99.3
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	102.1	0.1	99.4
Soda Ash Production and Use (Mineral Products)		CO ₂	100.6	0.1	99.4
Aluminium Production (Metal Production)		CO ₂	100.5	0.1	99.5
Non-Ferrous Metals (Industry)	Lignite	CO ₂	82.2	0.0	99.5
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	73.4	0.0	99.6
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	65.8	0.0	99.6
Other (Industry)	Asphalt	CO ₂	58.4	0.0	99.6
Carbide Production (Chemical Industry)		CO ₂	57.5	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	48.9	0.0	99.7
Other (Industry)	Lignite	N ₂ O	47.3	0.0	99.7
Chemicals (Industry)	Lignite	CO ₂	43.6	0.0	99.7
Other (Residential)	Lignite	N ₂ O	41.9	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	36.1	0.0	99.8
Other (Residential)	Secondary Coal	CH ₄	35.9	0.0	99.8
Other (Residential)	Petroleum	CH ₄	27.4	0.0	99.8
Other (Residential)	Petroleum	N ₂ O	24.2	0.0	99.8
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	23.4	0.0	99.8
Other (Industry)	Lignite	CH ₄	22.9	0.0	99.9
Other (Residential)	Hard Coal	N ₂ O	22.2	0.0	99.9
Railways (Transport)	Hard Coal	CO ₂	21.1	0.0	99.9
Railways (Transport)	Lignite	CO ₂	19.9	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	19.3	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.5	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	14.9	0.0	99.9
Other (Residential)	Asphalt	CH ₄	11.8	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	11.3	0.0	99.9
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	10.4	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	9.2	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	8.4	0.0	99.9
Limestone and Dolomite Use (Mineral Products)		CO ₂	7.3	0.0	100.0

Table B1. The Key Source Analysis

1991 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	6.4	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	5.7	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	5.7	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	5.3	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.0	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	4.9	0.0	100.0
Other (Industry)	Petroleum Coke	N ₂ O	4.7	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	4.6	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.4	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	3.6	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.6	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	3.4	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	3.1	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.1	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	2.8	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	2.5	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.3	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	2.3	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.0	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	1.9	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.3	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.1	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	1.1	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	1.0	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	0.9	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.8	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	0.8	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	0.8	0.0	100.0
Other (Residential)	Natural Gas	CH ₄	0.7	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.7	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.4	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.3	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.3	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.3	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.3	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.2	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.2	0.0	100.0

Table B1. The Key Source Analysis

1991 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Chemicals (Industry)	Natural Gas	N ₂ O	0.2	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	0.2	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.2	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.1	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.1	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Emission of HFCs		HFC-1	0.0	0.0	100.0
Emission of SF ₆		SF ₆	0.0	0.0	100.0
TOTAL			181967		

Table B1. The Key Source Analysis

1992 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	25565.6	13.2	13.2
Road Transportation (Transport)	Petroleum	CO ₂	23119.8	11.9	25.1
Enteric Fermentation		CH ₄	17433.6	9.0	34.1
Solid Waste		CH ₄	13293.3	6.9	41.0
Cement Production (Mineral Products)		CO ₂	11814.1	6.1	47.1
Other (Residential)	Petroleum	CO ₂	10189.8	5.3	52.4
Other (Residential)	Lignite	CO ₂	9807.5	5.1	57.4
Other (Industry)	Lignite	CO ₂	9069.9	4.7	62.1
Other (Industry)	Petroleum	CO ₂	7469.5	3.9	66.0
Iron and Steel (Industry)	Secondary Coal	CO ₂	7439.3	3.8	69.8
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	5835.8	3.0	72.8
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	5535.8	2.9	75.7
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	4493.0	2.3	78.0
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	4339.5	2.2	80.3
Other (Residential)	Hard Coal	CO ₂	4230.8	2.2	82.4
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	3836.5	2.0	84.4
Other (Industry)	Natural Gas	CO ₂	2917.9	1.5	85.9
Nitric Acid Production (Chemical Industry)		N ₂ O	2889.0	1.5	87.4
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	2363.8	1.2	88.6
Chemicals (Industry)	Petroleum	CO ₂	2033.2	1.0	89.7
Iron and Steel (Industry)	Petroleum	CO ₂	1989.7	1.0	90.7
Other (Residential)	Biomass	CH ₄	1901.4	1.0	91.7
Other (Industry)	Petroleum Coke	CO ₂	1790.6	0.9	92.6
Fugitive (Coal Mining)		CH ₄	1517.4	0.8	93.4
Civil Aviation (Transport)	Jet Kerosene	CO ₂	1071.1	0.6	94.0
Other (Residential)	Secondary Coal	CO ₂	954.1	0.5	94.5
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	796.4	0.4	94.9
Other (Residential)	Natural Gas	CO ₂	791.1	0.4	95.3
Other (Industry)	Secondary Coal	CO ₂	749.9	0.4	95.7
Lime Production (Mineral Products)		CO ₂	738.7	0.4	96.0
Iron and Steel Production (Metal Production)		CO ₂	685.0	0.4	96.4
Manure Management		CH ₄	660.8	0.3	96.7
Ammonia Production (Chemical Industry)		CO ₂	647.4	0.3	97.1
Navigation (Transport)	Petroleum	CO ₂	623.6	0.3	97.4
Other (Residential)	Lignite	CH ₄	623.0	0.3	97.7
Railways (Transport)	Petroleum	CO ₂	461.3	0.2	98.0
Field Burning of Agricultural Residues		CH ₄	437.4	0.2	98.2
Chemicals (Industry)	Natural Gas	CO ₂	425.3	0.2	98.4

Table B1. The Key Source Analysis

1992 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Other (Residential)	Biomass	N ₂ O	374.2	0.2	98.6
Other (Residential)	Asphalt	CO ₂	290.4	0.1	98.7
Other (Residential)	Hard Coal	CH ₄	287.5	0.1	98.9
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	230.1	0.1	99.0
Rice Cultivation		CH ₄	180.6	0.1	99.1
Iron and Steel (Industry)	Natural Gas	CO ₂	138.2	0.1	99.2
Field Burning of Agricultural Residues		N ₂ O	130.8	0.1	99.2
Ferroalloys Production (Metal Production)		CO ₂	113.9	0.1	99.3
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	111.9	0.1	99.4
Soda Ash Production and Use (Mineral Products)		CO ₂	106.0	0.1	99.4
Aluminium Production (Metal Production)		CO ₂	105.4	0.1	99.5
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	100.5	0.1	99.5
Non-Ferrous Metals (Industry)	Lignite	CO ₂	82.2	0.0	99.6
Carbide Production (Chemical Industry)		CO ₂	73.3	0.0	99.6
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	72.0	0.0	99.6
Other (Residential)	Secondary Coal	CH ₄	64.8	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	47.9	0.0	99.7
Chemicals (Industry)	Lignite	CO ₂	43.6	0.0	99.7
Other (Residential)	Lignite	N ₂ O	42.9	0.0	99.7
Other (Industry)	Lignite	N ₂ O	39.7	0.0	99.8
Other (Industry)	Asphalt	CO ₂	38.4	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	34.8	0.0	99.8
Railways (Transport)	Hard Coal	CO ₂	34.1	0.0	99.8
Other (Residential)	Petroleum	CH ₄	29.5	0.0	99.8
Other (Residential)	Petroleum	N ₂ O	26.1	0.0	99.8
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	20.3	0.0	99.9
Other (Residential)	Hard Coal	N ₂ O	19.8	0.0	99.9
Other (Residential)	Asphalt	CH ₄	19.7	0.0	99.9
Other (Industry)	Lignite	CH ₄	19.2	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	19.1	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	16.9	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	15.0	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	11.5	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	11.1	0.0	99.9
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	10.9	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	9.8	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	9.8	0.0	99.9
Limestone and Dolomite Use (Mineral Products)		CO ₂	9.7	0.0	99.9

Table B1. The Key Source Analysis

1992 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	8.4	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	8.4	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	7.8	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	6.2	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	5.5	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	5.4	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.2	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	5.1	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	4.5	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.3	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	4.1	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	3.9	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	3.5	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.4	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	3.3	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	3.1	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	2.6	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.1	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	2.0	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	1.7	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	1.6	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.5	0.0	100.0
Other (Residential)	Natural Gas	CH ₄	1.5	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	1.4	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.2	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	1.2	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.9	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	0.8	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	0.7	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.5	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	0.4	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.4	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.3	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.2	0.0	100.0

Table B1. The Key Source Analysis

1992 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.2	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.2	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.1	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.1	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Emission of HFCs		HFC-1	0.0	0.0	100.0
Emission of SF ₆		SF ₆	0.0	0.0	100.0
TOTAL			193642		

Table B1. The Key Source Analysis

1993 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Road Transportation (Transport)	Petroleum	CO ₂	28267.6	13.9	13.9
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	23604.4	11.6	25.4
Enteric Fermentation		CH ₄	17123.9	8.4	33.8
Solid Waste		CH ₄	15994.6	7.8	41.7
Cement Production (Mineral Products)		CO ₂	12725.6	6.2	47.9
Other (Residential)	Petroleum	CO ₂	10691.3	5.2	53.1
Other (Residential)	Lignite	CO ₂	9074.9	4.4	57.6
Other (Industry)	Lignite	CO ₂	8374.0	4.1	61.7
Other (Industry)	Petroleum	CO ₂	8057.4	3.9	65.6
Iron and Steel (Industry)	Secondary Coal	CO ₂	7327.9	3.6	69.2
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	7188.1	3.5	72.8
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	5380.6	2.6	75.4
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	4838.9	2.4	77.8
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4447.4	2.2	80.0
Other (Residential)	Hard Coal	CO ₂	4091.1	2.0	82.0
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	4001.8	2.0	83.9
Other (Industry)	Natural Gas	CO ₂	3713.2	1.8	85.7
Other (Industry)	Petroleum Coke	CO ₂	2893.9	1.4	87.2
Nitric Acid Production (Chemical Industry)		N ₂ O	2885.2	1.4	88.6
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	2294.0	1.1	89.7
Iron and Steel (Industry)	Petroleum	CO ₂	2096.6	1.0	90.7
Chemicals (Industry)	Petroleum	CO ₂	2032.3	1.0	91.7
Other (Residential)	Biomass	CH ₄	1885.4	0.9	92.6
Fugitive (Coal Mining)		CH ₄	1459.5	0.7	93.4
Civil Aviation (Transport)	Jet Kerosene	CO ₂	1441.8	0.7	94.1
Other (Residential)	Natural Gas	CO ₂	1176.1	0.6	94.6
Ammonia Production (Chemical Industry)		CO ₂	1023.1	0.5	95.1
Lime Production (Mineral Products)		CO ₂	897.6	0.4	95.6
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	715.5	0.4	95.9
Manure Management		CH ₄	687.8	0.3	96.3
Navigation (Transport)	Petroleum	CO ₂	648.8	0.3	96.6
Iron and Steel Production (Metal Production)		CO ₂	628.6	0.3	96.9
Other (Residential)	Lignite	CH ₄	576.5	0.3	97.2
Other (Residential)	Secondary Coal	CO ₂	557.4	0.3	97.5
Other (Industry)	Secondary Coal	CO ₂	557.0	0.3	97.7
Railways (Transport)	Petroleum	CO ₂	547.0	0.3	98.0
Chemicals (Industry)	Natural Gas	CO ₂	542.3	0.3	98.3
Field Burning of Agricultural Residues		CH ₄	475.8	0.2	98.5

Table B1. The Key Source Analysis

1993 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Other (Residential)	Biomass	N ₂ O	371.1	0.2	98.7
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	280.5	0.1	98.8
Other (Residential)	Hard Coal	CH ₄	278.0	0.1	99.0
Chemicals (Industry)	Secondary Coal	CO ₂	244.5	0.1	99.1
Rice Cultivation		CH ₄	188.4	0.1	99.2
Other (Residential)	Asphalt	CO ₂	148.5	0.1	99.2
Field Burning of Agricultural Residues		N ₂ O	142.0	0.1	99.3
Ferroalloys Production (Metal Production)		CO ₂	117.0	0.1	99.4
Soda Ash Production and Use (Mineral Products)		CO ₂	113.2	0.1	99.4
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	106.0	0.1	99.5
Aluminium Production (Metal Production)		CO ₂	105.3	0.1	99.5
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	103.3	0.1	99.6
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	85.9	0.0	99.6
Non-Ferrous Metals (Industry)	Lignite	CO ₂	74.7	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	44.8	0.0	99.7
Carbide Production (Chemical Industry)		CO ₂	42.1	0.0	99.7
Other (Residential)	Lignite	N ₂ O	39.7	0.0	99.7
Other (Residential)	Secondary Coal	CH ₄	37.9	0.0	99.7
Chemicals (Industry)	Lignite	CO ₂	37.4	0.0	99.8
Other (Industry)	Lignite	N ₂ O	36.6	0.0	99.8
Railways (Transport)	Hard Coal	CO ₂	36.4	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	34.3	0.0	99.8
Other (Residential)	Petroleum	CH ₄	30.9	0.0	99.8
Other (Residential)	Petroleum	N ₂ O	27.4	0.0	99.8
Other (Industry)	Asphalt	CO ₂	21.7	0.0	99.8
Other (Industry)	Petroleum	N ₂ O	20.6	0.0	99.9
Other (Residential)	Hard Coal	N ₂ O	19.2	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	18.7	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	18.4	0.0	99.9
Other (Industry)	Lignite	CH ₄	17.7	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	16.6	0.0	99.9
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	14.6	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	13.5	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	12.4	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	11.4	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	10.7	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	10.4	0.0	99.9
Other (Residential)	Asphalt	CH ₄	10.1	0.0	99.9

Table B1. The Key Source Analysis

1993 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	9.1	0.0	99.9
Limestone and Dolomite Use (Mineral Products)		CO ₂	8.8	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CO ₂	8.5	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	7.8	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	7.0	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	6.6	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	6.2	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	5.4	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.2	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	5.0	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.7	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	4.2	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.0	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	3.9	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	3.0	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	2.6	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	2.6	0.0	100.0
Other (Residential)	Natural Gas	CH ₄	2.2	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	2.1	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	1.8	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.6	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.3	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	1.3	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	1.2	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.2	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	1.1	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	1.0	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.9	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	0.9	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.7	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	0.7	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.6	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.5	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.4	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0

Table B1. The Key Source Analysis

1993 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Chemicals (Industry)	Natural Gas	N ₂ O	0.3	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.2	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.2	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.1	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Emission of HFCs		HFC-1	0.0	0.0	100.0
Emission of SF ₆		SF ₆	0.0	0.0	100.0
TOTAL			203986		

Table B1. The Key Source Analysis

1994 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	28638.5	14.3	14.3
Road Transportation (Transport)	Petroleum	CO ₂	26527.5	13.2	27.5
Enteric Fermentation		CH ₄	16849.5	8.4	35.9
Solid Waste		CH ₄	16594.5	8.3	44.2
Cement Production (Mineral Products)		CO ₂	13205.1	6.6	50.8
Other (Residential)	Petroleum	CO ₂	10119.7	5.0	55.8
Other (Residential)	Lignite	CO ₂	8011.0	4.0	59.8
Iron and Steel (Industry)	Secondary Coal	CO ₂	7344.2	3.7	63.5
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	7224.8	3.6	67.1
Other (Industry)	Petroleum	CO ₂	6977.4	3.5	70.6
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	6224.9	3.1	73.7
Other (Industry)	Lignite	CO ₂	6162.4	3.1	76.8
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	5048.6	2.5	79.3
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4717.1	2.4	81.6
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	4199.8	2.1	83.7
Other (Industry)	Petroleum Coke	CO ₂	3150.4	1.6	85.3
Other (Industry)	Natural Gas	CO ₂	3149.7	1.6	86.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	2546.3	1.3	88.1
Other (Residential)	Hard Coal	CO ₂	2243.5	1.1	89.3
Chemicals (Industry)	Petroleum	CO ₂	1946.5	1.0	90.2
Iron and Steel (Industry)	Petroleum	CO ₂	1902.8	0.9	91.2
Other (Residential)	Biomass	CH ₄	1875.0	0.9	92.1
Other (Residential)	Natural Gas	CO ₂	1718.4	0.9	93.0
Civil Aviation (Transport)	Jet Kerosene	CO ₂	1618.5	0.8	93.8
Fugitive (Coal Mining)		CH ₄	1569.1	0.8	94.6
Nitric Acid Production (Chemical Industry)		N ₂ O	989.3	0.5	95.0
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	902.6	0.5	95.5
Lime Production (Mineral Products)		CO ₂	847.1	0.4	95.9
Ammonia Production (Chemical Industry)		CO ₂	805.2	0.4	96.3
Manure Management		CH ₄	768.4	0.4	96.7
Iron and Steel Production (Metal Production)		CO ₂	631.3	0.3	97.0
Navigation (Transport)	Petroleum	CO ₂	609.5	0.3	97.3
Railways (Transport)	Petroleum	CO ₂	601.0	0.3	97.6
Other (Residential)	Lignite	CH ₄	508.9	0.3	97.9
Other (Industry)	Secondary Coal	CO ₂	429.3	0.2	98.1
Field Burning of Agricultural Residues		CH ₄	406.2	0.2	98.3
Other (Residential)	Biomass	N ₂ O	369.1	0.2	98.5
Chemicals (Industry)	Natural Gas	CO ₂	340.3	0.2	98.7

Table B1. The Key Source Analysis

1994 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	280.2	0.1	98.8
Other (Residential)	Secondary Coal	CO ₂	255.8	0.1	98.9
Chemicals (Industry)	Secondary Coal	CO ₂	230.9	0.1	99.0
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	179.3	0.1	99.1
Rice Cultivation		CH ₄	170.1	0.1	99.2
Other (Residential)	Hard Coal	CH ₄	152.5	0.1	99.3
Ferroalloys Production (Metal Production)		CO ₂	126.8	0.1	99.3
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	125.3	0.1	99.4
Field Burning of Agricultural Residues		N ₂ O	120.9	0.1	99.5
Soda Ash Production and Use (Mineral Products)		CO ₂	112.8	0.1	99.5
Aluminium Production (Metal Production)		CO ₂	107.6	0.1	99.6
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	103.8	0.1	99.6
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	74.8	0.0	99.7
Carbide Production (Chemical Industry)		CO ₂	52.0	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	49.8	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	45.6	0.0	99.7
Other (Residential)	Lignite	N ₂ O	35.1	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	34.4	0.0	99.8
Chemicals (Industry)	Lignite	CO ₂	31.1	0.0	99.8
Other (Residential)	Petroleum	CH ₄	29.3	0.0	99.8
Other (Industry)	Lignite	N ₂ O	27.0	0.0	99.8
Other (Residential)	Petroleum	N ₂ O	25.9	0.0	99.8
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	19.7	0.0	99.8
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	18.5	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	17.9	0.0	99.9
Railways (Transport)	Hard Coal	CO ₂	17.5	0.0	99.9
Other (Residential)	Secondary Coal	CH ₄	17.4	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	16.6	0.0	99.9
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	16.3	0.0	99.9
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	15.5	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	14.7	0.0	99.9
Other (Industry)	Lignite	CH ₄	13.0	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	12.9	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	12.1	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	11.9	0.0	99.9
Other (Residential)	Hard Coal	N ₂ O	10.5	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	10.4	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	9.5	0.0	100.0

Table B1. The Key Source Analysis

1994 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Iron and Steel (Industry)	Natural Gas	CO ₂	8.5	0.0	100.0
Limestone and Dolomite Use (Mineral Products)		CO ₂	7.6	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	7.1	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	6.3	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	6.1	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	5.9	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.0	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	4.9	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.6	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	4.4	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.1	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.0	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	3.5	0.0	100.0
Other (Residential)	Natural Gas	CH ₄	3.3	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.3	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.3	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	2.0	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	1.7	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.5	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.4	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	1.2	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.1	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	1.1	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	1.1	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	1.0	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	1.0	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	1.0	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.9	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.8	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	0.6	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.6	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.4	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.4	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.2	0.0	100.0

Table B1. The Key Source Analysis

1994 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.2	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Other (Industry)	Asphalt	CO ₂	0.0	0.0	100.0
Other (Residential)	Asphalt	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.0	0.0	100.0
Other (Residential)	Asphalt	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.0	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Emission of HFCs		HFC-1	0.0	0.0	100.0
Emission of SF ₆		SF ₆	0.0	0.0	100.0
TOTAL			200479		

Table B1. The Key Source Analysis

1995 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Road Transportation (Transport)	Petroleum	CO ₂	28790.3	13.0	13.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	28405.2	12.9	25.9
Solid Waste		CH ₄	20313.8	9.2	35.1
Enteric Fermentation		CH ₄	16469.1	7.5	42.6
Cement Production (Mineral Products)		CO ₂	13824.7	6.3	48.8
Other (Residential)	Petroleum	CO ₂	11955.5	5.4	54.3
Other (Industry)	Petroleum	CO ₂	8576.8	3.9	58.1
Other (Residential)	Lignite	CO ₂	8138.3	3.7	61.8
Iron and Steel (Industry)	Secondary Coal	CO ₂	7860.4	3.6	65.4
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	7660.4	3.5	68.9
Other (Industry)	Lignite	CO ₂	7409.4	3.4	72.2
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	7372.4	3.3	75.6
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	5479.8	2.5	78.0
Nitric Acid Production (Chemical Industry)		N ₂ O	5088.3	2.3	80.3
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	4366.7	2.0	82.3
Other (Industry)	Natural Gas	CO ₂	4336.4	2.0	84.3
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	3563.9	1.6	85.9
Other (Residential)	Hard Coal	CO ₂	3318.7	1.5	87.4
Other (Industry)	Petroleum Coke	CO ₂	2782.4	1.3	88.7
Civil Aviation (Transport)	Jet Kerosene	CO ₂	2709.6	1.2	89.9
Chemicals (Industry)	Petroleum	CO ₂	2270.1	1.0	90.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	2204.7	1.0	91.9
Other (Residential)	Natural Gas	CO ₂	2111.8	1.0	92.9
Other (Residential)	Biomass	CH ₄	1864.4	0.8	93.7
Iron and Steel (Industry)	Petroleum	CO ₂	1781.3	0.8	94.5
Fugitive (Coal Mining)		CH ₄	1445.4	0.7	95.2
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	977.4	0.4	95.6
Ammonia Production (Chemical Industry)		CO ₂	937.0	0.4	96.1
Lime Production (Mineral Products)		CO ₂	816.6	0.4	96.4
Manure Management		CH ₄	745.5	0.3	96.8
Navigation (Transport)	Petroleum	CO ₂	710.0	0.3	97.1
Railways (Transport)	Petroleum	CO ₂	611.4	0.3	97.4
Iron and Steel Production (Metal Production)		CO ₂	528.1	0.2	97.6
Other (Residential)	Lignite	CH ₄	517.0	0.2	97.8
Field Burning of Agricultural Residues		CH ₄	423.0	0.2	98.0
Other (Residential)	Biomass	N ₂ O	367.0	0.2	98.2
Chemicals (Industry)	Natural Gas	CO ₂	361.5	0.2	98.4
Other (Industry)	Secondary Coal	CO ₂	350.5	0.2	98.5

Table B1. The Key Source Analysis

1995 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	301.2	0.1	98.7
Other (Residential)	Secondary Coal	CO ₂	291.1	0.1	98.8
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	270.1	0.1	98.9
Other (Residential)	Hard Coal	CH ₄	225.5	0.1	99.0
Rice Cultivation		CH ₄	210.0	0.1	99.1
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	201.1	0.1	99.2
Soda Ash Production and Use (Mineral Products)		CO ₂	133.4	0.1	99.3
Field Burning of Agricultural Residues		N ₂ O	126.2	0.1	99.3
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	124.3	0.1	99.4
Ferroalloys Production (Metal Production)		CO ₂	115.1	0.1	99.4
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	114.1	0.1	99.5
Aluminium Production (Metal Production)		CO ₂	110.7	0.1	99.5
Chemicals (Industry)	Hard Coal	CO ₂	104.8	0.0	99.6
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	93.2	0.0	99.6
Other (Industry)	Asphalt	CO ₂	76.8	0.0	99.6
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	71.8	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	49.8	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	49.2	0.0	99.7
Iron and Steel (Industry)	Secondary Coal	N ₂ O	36.8	0.0	99.7
Other (Residential)	Lignite	N ₂ O	35.6	0.0	99.8
Other (Residential)	Petroleum	CH ₄	34.6	0.0	99.8
Other (Residential)	Asphalt	CO ₂	32.5	0.0	99.8
Other (Industry)	Lignite	N ₂ O	32.4	0.0	99.8
Chemicals (Industry)	Lignite	CO ₂	31.1	0.0	99.8
Other (Residential)	Petroleum	N ₂ O	30.6	0.0	99.8
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	27.2	0.0	99.8
Carbide Production (Chemical Industry)		CO ₂	27.1	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	22.0	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	20.4	0.0	99.9
Other (Residential)	Secondary Coal	CH ₄	19.8	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	18.9	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.8	0.0	99.9
Other (Industry)	Lignite	CH ₄	15.7	0.0	99.9
Other (Residential)	Hard Coal	N ₂ O	15.5	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	14.0	0.0	99.9
Limestone and Dolomite Use (Mineral Products)		CO ₂	13.7	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	13.0	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	10.7	0.0	99.9

Table B1. The Key Source Analysis

1995 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Iron and Steel (Industry)	Natural Gas	CO ₂	10.6	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	10.3	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	9.9	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	9.1	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	8.2	0.0	100.0
Railways (Transport)	Hard Coal	CO ₂	7.1	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	6.3	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	6.0	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.8	0.0	100.0
Other (Industry)	Petroleum	CH ₄	5.0	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	4.8	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.7	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	4.6	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	4.3	0.0	100.0
Other (Residential)	Natural Gas	CH ₄	4.0	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.1	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	3.1	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.9	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.5	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	2.4	0.0	100.0
Other (Residential)	Asphalt	CH ₄	2.2	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	2.1	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	2.1	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.8	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	1.6	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	1.4	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.3	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	1.2	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	1.0	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	1.0	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.0	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.9	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	0.8	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	0.7	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.6	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.5	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.5	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.5	0.0	100.0

Table B1. The Key Source Analysis

1995 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.4	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.4	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.3	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.2	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.2	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.2	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.1	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Emission of HFCs		HFC-1	0.0	0.0	100.0
Emission of SF ₆		SF ₆	0.0	0.0	100.0
TOTAL			220722		

Table B1. The Key Source Analysis

1996 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	30896.2	12.8	12.8
Road Transportation (Transport)	Petroleum	CO ₂	30584.2	12.6	25.4
Solid Waste		CH ₄	22694.4	9.4	34.8
Enteric Fermentation		CH ₄	16445.7	6.8	41.6
Cement Production (Mineral Products)		CO ₂	14211.5	5.9	47.4
Other (Residential)	Petroleum	CO ₂	11498.1	4.7	52.2
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	10803.7	4.5	56.6
Iron and Steel (Industry)	Secondary Coal	CO ₂	8756.5	3.6	60.3
Other (Industry)	Petroleum	CO ₂	8286.3	3.4	63.7
Other (Residential)	Lignite	CO ₂	8109.8	3.3	67.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	8063.2	3.3	70.4
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	7771.5	3.2	73.6
Other (Industry)	Lignite	CO ₂	7362.3	3.0	76.6
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	5718.0	2.4	79.0
Other (Industry)	Petroleum Coke	CO ₂	5049.9	2.1	81.1
Nitric Acid Production (Chemical Industry)		N ₂ O	4729.0	2.0	83.0
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4687.5	1.9	85.0
Other (Industry)	Natural Gas	CO ₂	4612.1	1.9	86.9
Other (Residential)	Natural Gas	CO ₂	4011.1	1.7	88.5
Civil Aviation (Transport)	Jet Kerosene	CO ₂	2976.1	1.2	89.7
Other (Residential)	Hard Coal	CO ₂	2692.9	1.1	90.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	2612.2	1.1	91.9
Chemicals (Industry)	Petroleum	CO ₂	2270.1	0.9	92.9
Iron and Steel (Industry)	Petroleum	CO ₂	1924.9	0.8	93.7
Other (Residential)	Biomass	CH ₄	1858.3	0.8	94.4
Fugitive (Coal Mining)		CH ₄	1511.5	0.6	95.1
Other (Industry)	Secondary Coal	CO ₂	1186.5	0.5	95.5
Ammonia Production (Chemical Industry)		CO ₂	967.6	0.4	95.9
Lime Production (Mineral Products)		CO ₂	930.9	0.4	96.3
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	850.3	0.4	96.7
Manure Management		CH ₄	737.2	0.3	97.0
Iron and Steel Production (Metal Production)		CO ₂	708.0	0.3	97.3
Navigation (Transport)	Petroleum	CO ₂	683.9	0.3	97.6
Railways (Transport)	Petroleum	CO ₂	605.0	0.2	97.8
Other (Residential)	Lignite	CH ₄	515.2	0.2	98.0
Field Burning of Agricultural Residues		CH ₄	439.5	0.2	98.2
Emission of SF ₆		SF ₆	373.8	0.2	98.4
Other (Residential)	Secondary Coal	CO ₂	372.1	0.2	98.5

Table B1. The Key Source Analysis

1996 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Other (Residential)	Biomass	N ₂ O	365.8	0.2	98.7
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	331.2	0.1	98.8
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	291.4	0.1	98.9
Chemicals (Industry)	Natural Gas	CO ₂	259.5	0.1	99.0
Rice Cultivation		CH ₄	230.4	0.1	99.1
Other (Residential)	Hard Coal	CH ₄	183.0	0.1	99.2
Soda Ash Production and Use (Mineral Products)		CO ₂	176.3	0.1	99.3
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	135.2	0.1	99.3
Ferroalloys Production (Metal Production)		CO ₂	131.9	0.1	99.4
Field Burning of Agricultural Residues		N ₂ O	130.8	0.1	99.4
Chemicals (Industry)	Hard Coal	CO ₂	124.2	0.1	99.5
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	122.7	0.1	99.5
Aluminium Production (Metal Production)		CO ₂	111.8	0.0	99.6
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	104.8	0.0	99.6
Other (Residential)	Asphalt	CO ₂	57.5	0.0	99.7
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	50.6	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	50.3	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	49.8	0.0	99.7
Carbide Production (Chemical Industry)		CO ₂	45.5	0.0	99.7
Iron and Steel (Industry)	Secondary Coal	N ₂ O	41.0	0.0	99.8
Other (Residential)	Lignite	N ₂ O	35.5	0.0	99.8
Other (Residential)	Petroleum	CH ₄	33.3	0.0	99.8
Other (Industry)	Lignite	N ₂ O	32.2	0.0	99.8
Chemicals (Industry)	Lignite	CO ₂	31.1	0.0	99.8
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	29.9	0.0	99.8
Other (Residential)	Petroleum	N ₂ O	29.5	0.0	99.8
Railways (Transport)	Hard Coal	CO ₂	25.5	0.0	99.8
Other (Residential)	Secondary Coal	CH ₄	25.3	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	24.5	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	23.6	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	21.2	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	19.9	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	19.8	0.0	99.9
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	19.0	0.0	99.9
Limestone and Dolomite Use (Mineral Products)		CO ₂	16.8	0.0	99.9
Other (Industry)	Lignite	CH ₄	15.6	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	14.6	0.0	99.9
Other (Residential)	Hard Coal	N ₂ O	12.6	0.0	99.9

Table B1. The Key Source Analysis

1996 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	12.2	0.0	99.9
Iron and Steel (Industry)	Natural Gas	CO ₂	12.1	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	12.0	0.0	99.9
Other (Industry)	Petroleum Coke	CH ₄	11.4	0.0	100.0
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	11.2	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	8.7	0.0	100.0
Other (Residential)	Natural Gas	CH ₄	7.5	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	6.5	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	6.3	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	6.2	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.8	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	5.6	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	5.0	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	4.9	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.8	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.5	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	4.5	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.1	0.0	100.0
Other (Residential)	Asphalt	CH ₄	3.9	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	3.0	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	2.7	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	2.6	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	2.2	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.2	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	2.2	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	1.7	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.7	0.0	100.0
Railways (Transport)	Lignite	CO ₂	1.6	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.3	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	1.1	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	1.0	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.0	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.6	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.6	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.5	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	0.5	0.0	100.0

Table B1. The Key Source Analysis

1996 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Railways (Transport)	Hard Coal	N ₂ O	0.4	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.3	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.3	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.2	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.1	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Other (Industry)	Asphalt	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
Emission of HFCs		HFC-1	0.0	0.0	100.0
TOTAL			242098		

Table B1. The Key Source Analysis

1997 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	34031.3	13.3	13.3
Road Transportation (Transport)	Petroleum	CO ₂	28815.3	11.3	24.6
Solid Waste		CH ₄	25119.2	9.8	34.4
Enteric Fermentation		CH ₄	15341.7	6.0	40.4
Cement Production (Mineral Products)		CO ₂	14647.2	5.7	46.2
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	12630.0	4.9	51.1
Other (Residential)	Petroleum	CO ₂	11275.1	4.4	55.5
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	9717.5	3.8	59.3
Iron and Steel (Industry)	Secondary Coal	CO ₂	8867.4	3.5	62.8
Other (Residential)	Lignite	CO ₂	8532.3	3.3	66.1
Other (Industry)	Petroleum	CO ₂	8488.9	3.3	69.5
Other (Industry)	Lignite	CO ₂	8465.5	3.3	72.8
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8055.0	3.2	75.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	6236.7	2.4	78.4
Other (Industry)	Natural Gas	CO ₂	5717.1	2.2	80.6
Other (Industry)	Petroleum Coke	CO ₂	5674.0	2.2	82.8
Other (Residential)	Natural Gas	CO ₂	5229.7	2.0	84.9
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4959.3	1.9	86.8
Other (Residential)	Hard Coal	CO ₂	3570.3	1.4	88.2
Nitric Acid Production (Chemical Industry)		N ₂ O	3379.1	1.3	89.5
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3243.8	1.3	90.8
Civil Aviation (Transport)	Jet Kerosene	CO ₂	3133.8	1.2	92.0
Chemicals (Industry)	Petroleum	CO ₂	2271.2	0.9	92.9
Other (Residential)	Biomass	CH ₄	1852.8	0.7	93.6
Iron and Steel (Industry)	Petroleum	CO ₂	1825.0	0.7	94.3
Fugitive (Coal Mining)		CH ₄	1588.2	0.6	95.0
Other (Industry)	Secondary Coal	CO ₂	1104.8	0.4	95.4
Lime Production (Mineral Products)		CO ₂	1065.1	0.4	95.8
Ammonia Production (Chemical Industry)		CO ₂	998.4	0.4	96.2
Iron and Steel Production (Metal Production)		CO ₂	923.9	0.4	96.6
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	771.2	0.3	96.9
Manure Management		CH ₄	687.1	0.3	97.1
Navigation (Transport)	Petroleum	CO ₂	682.6	0.3	97.4
Railways (Transport)	Petroleum	CO ₂	614.9	0.2	97.7
Emission of SF ₆		SF ₆	611.1	0.2	97.9
Chemicals (Industry)	Natural Gas	CO ₂	578.5	0.2	98.1
Other (Residential)	Lignite	CH ₄	542.0	0.2	98.3
Field Burning of Agricultural Residues		CH ₄	445.2	0.2	98.5

Table B1. The Key Source Analysis

1997 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Other (Residential)	Secondary Coal	CO ₂	431.6	0.2	98.7
Other (Residential)	Biomass	N ₂ O	364.7	0.1	98.8
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	303.7	0.1	98.9
Other (Residential)	Hard Coal	CH ₄	242.6	0.1	99.0
Rice Cultivation		CH ₄	231.0	0.1	99.1
Soda Ash Production and Use (Mineral Products)		CO ₂	181.7	0.1	99.2
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	166.9	0.1	99.3
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	157.4	0.1	99.3
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	148.9	0.1	99.4
Ferroalloys Production (Metal Production)		CO ₂	140.8	0.1	99.4
Field Burning of Agricultural Residues		N ₂ O	132.7	0.1	99.5
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	129.4	0.1	99.5
Chemicals (Industry)	Hard Coal	CO ₂	124.2	0.0	99.6
Aluminium Production (Metal Production)		CO ₂	111.6	0.0	99.6
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	59.1	0.0	99.6
Chemicals (Industry)	Lignite	CO ₂	56.1	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	54.8	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	50.8	0.0	99.7
Other (Residential)	Asphalt	CO ₂	49.0	0.0	99.7
Carbide Production (Chemical Industry)		CO ₂	42.3	0.0	99.7
Iron and Steel (Industry)	Secondary Coal	N ₂ O	41.5	0.0	99.8
Other (Residential)	Lignite	N ₂ O	37.3	0.0	99.8
Other (Industry)	Lignite	N ₂ O	37.0	0.0	99.8
Other (Residential)	Petroleum	CH ₄	32.6	0.0	99.8
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	31.6	0.0	99.8
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	29.9	0.0	99.8
Other (Residential)	Secondary Coal	CH ₄	29.3	0.0	99.8
Other (Residential)	Petroleum	N ₂ O	28.9	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	28.6	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	26.6	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	21.7	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	20.6	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	20.1	0.0	99.9
Other (Industry)	Lignite	CH ₄	17.9	0.0	99.9
Other (Residential)	Hard Coal	N ₂ O	16.7	0.0	99.9
Railways (Transport)	Hard Coal	CO ₂	16.3	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	16.0	0.0	99.9
Limestone and Dolomite Use (Mineral Products)		CO ₂	15.2	0.0	99.9

Table B1. The Key Source Analysis

1997 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	15.2	0.0	99.9
Other (Industry)	Petroleum Coke	CH ₄	12.9	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	12.7	0.0	99.9
Iron and Steel (Industry)	Natural Gas	CO ₂	11.7	0.0	100.0
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	11.6	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	10.8	0.0	100.0
Other (Residential)	Natural Gas	CH ₄	9.8	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	7.2	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	7.2	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.8	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	5.4	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	5.4	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	5.2	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.9	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.7	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	4.7	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.3	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	3.7	0.0	100.0
Other (Residential)	Asphalt	CH ₄	3.3	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	3.2	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.1	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	2.9	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	2.5	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	2.1	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	2.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.0	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.7	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.3	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	1.1	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	1.1	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	1.0	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.8	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.7	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.6	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.4	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.4	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.3	0.0	100.0

Table B1. The Key Source Analysis

1997 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.3	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.3	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.2	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.2	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.1	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Other (Industry)	Asphalt	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
Emission of HFCs		HFC-1	0.0	0.0	100.0
TOTAL			255517		

Table B1. The Key Source Analysis

1998 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	37066.9	14.4	14.4
Road Transportation (Transport)	Petroleum	CO ₂	26851.8	10.5	24.9
Solid Waste		CH ₄	26687.8	10.4	35.3
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	15583.1	6.1	41.4
Enteric Fermentation		CH ₄	15050.1	5.9	47.2
Cement Production (Mineral Products)		CO ₂	14872.8	5.8	53.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	11665.0	4.5	57.6
Other (Residential)	Petroleum	CO ₂	10770.7	4.2	61.8
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	7979.4	3.1	64.9
Other (Industry)	Petroleum	CO ₂	7946.7	3.1	68.0
Other (Industry)	Lignite	CO ₂	7945.2	3.1	71.1
Iron and Steel (Industry)	Secondary Coal	CO ₂	7940.0	3.1	74.2
Other (Residential)	Lignite	CO ₂	7323.7	2.9	77.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	6829.8	2.7	79.7
Other (Residential)	Natural Gas	CO ₂	5661.4	2.2	81.9
Other (Industry)	Natural Gas	CO ₂	5300.0	2.1	84.0
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	5177.8	2.0	86.0
Nitric Acid Production (Chemical Industry)		N ₂ O	4203.3	1.6	87.6
Other (Industry)	Petroleum Coke	CO ₂	3708.2	1.4	89.1
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3332.1	1.3	90.4
Civil Aviation (Transport)	Jet Kerosene	CO ₂	3219.8	1.3	91.6
Chemicals (Industry)	Petroleum	CO ₂	2277.0	0.9	92.5
Other (Residential)	Hard Coal	CO ₂	2076.4	0.8	93.3
Other (Residential)	Biomass	CH ₄	1842.0	0.7	94.0
Iron and Steel (Industry)	Petroleum	CO ₂	1729.0	0.7	94.7
Other (Industry)	Secondary Coal	CO ₂	1647.0	0.6	95.3
Fugitive (Coal Mining)		CH ₄	1632.2	0.6	96.0
Lime Production (Mineral Products)		CO ₂	970.0	0.4	96.4
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.8	0.3	96.7
Manure Management		CH ₄	750.9	0.3	97.0
Iron and Steel Production (Metal Production)		CO ₂	731.4	0.3	97.2
Navigation (Transport)	Petroleum	CO ₂	710.1	0.3	97.5
Emission of SF ₆		SF ₆	659.6	0.3	97.8
Railways (Transport)	Petroleum	CO ₂	619.8	0.2	98.0
Ammonia Production (Chemical Industry)		CO ₂	570.7	0.2	98.2
Field Burning of Agricultural Residues		CH ₄	501.0	0.2	98.4
Other (Residential)	Lignite	CH ₄	465.2	0.2	98.6
Other (Residential)	Biomass	N ₂ O	362.5	0.1	98.8

Table B1. The Key Source Analysis

1998 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Other (Residential)	Secondary Coal	CO ₂	297.6	0.1	98.9
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	282.8	0.1	99.0
Rice Cultivation		CH ₄	252.0	0.1	99.1
Soda Ash Production and Use (Mineral Products)		CO ₂	235.3	0.1	99.2
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	186.3	0.1	99.3
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	162.2	0.1	99.3
Field Burning of Agricultural Residues		N ₂ O	150.0	0.1	99.4
Ferroalloys Production (Metal Production)		CO ₂	143.2	0.1	99.4
Other (Residential)	Hard Coal	CH ₄	141.1	0.1	99.5
Chemicals (Industry)	Hard Coal	CO ₂	135.9	0.1	99.5
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	131.0	0.1	99.6
Aluminium Production (Metal Production)		CO ₂	111.2	0.0	99.6
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	73.0	0.0	99.7
Carbide Production (Chemical Industry)		CO ₂	63.2	0.0	99.7
Chemicals (Industry)	Lignite	CO ₂	56.1	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	54.8	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	49.4	0.0	99.7
Iron and Steel (Industry)	Secondary Coal	N ₂ O	37.2	0.0	99.8
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	35.3	0.0	99.8
Other (Industry)	Lignite	N ₂ O	34.8	0.0	99.8
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	32.5	0.0	99.8
Other (Residential)	Lignite	N ₂ O	32.0	0.0	99.8
Other (Residential)	Petroleum	CH ₄	31.2	0.0	99.8
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	29.9	0.0	99.8
Other (Residential)	Petroleum	N ₂ O	27.6	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	20.4	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	20.4	0.0	99.9
Other (Residential)	Asphalt	CO ₂	20.3	0.0	99.9
Other (Residential)	Secondary Coal	CH ₄	20.2	0.0	99.9
Other (Industry)	Asphalt	CO ₂	18.4	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	18.0	0.0	99.9
Railways (Transport)	Hard Coal	CO ₂	17.8	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	17.5	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	17.4	0.0	99.9
Other (Industry)	Lignite	CH ₄	16.8	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	15.6	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	13.3	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	11.5	0.0	99.9

Table B1. The Key Source Analysis

1998 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Iron and Steel (Industry)	Natural Gas	CO ₂	11.3	0.0	99.9
Limestone and Dolomite Use (Mineral Products)		CO ₂	10.8	0.0	99.9
Other (Residential)	Natural Gas	CH ₄	10.6	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	10.0	0.0	100.0
Other (Residential)	Hard Coal	N ₂ O	9.7	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	8.4	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	8.2	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	7.8	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	7.7	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	6.5	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	5.9	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.8	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.7	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.6	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.5	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	4.4	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	4.4	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	3.7	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	3.1	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.1	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	2.9	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.1	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	2.0	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.8	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	1.4	0.0	100.0
Other (Residential)	Asphalt	CH ₄	1.4	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.3	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	1.0	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	1.0	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.9	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.8	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.6	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.4	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.3	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.2	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0

Table B1. The Key Source Analysis

1998 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.1	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.1	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Natural Gas	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Emission of HFCs		HFC-1	0.0	0.0	100.0
TOTAL			256637		

Table B1. The Key Source Analysis

1999 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	38348.2	14.9	14.9
Road Transportation (Transport)	Petroleum	CO ₂	29166.3	11.4	26.3
Solid Waste		CH ₄	27971.6	10.9	37.2
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	16110.3	6.3	43.5
Enteric Fermentation		CH ₄	15107.7	5.9	49.3
Cement Production (Mineral Products)		CO ₂	14269.6	5.6	54.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	12575.1	4.9	59.8
Other (Residential)	Petroleum	CO ₂	10317.8	4.0	63.8
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8199.6	3.2	67.0
Iron and Steel (Industry)	Secondary Coal	CO ₂	8059.0	3.1	70.1
Other (Industry)	Petroleum	CO ₂	7203.1	2.8	73.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	7001.1	2.7	75.7
Other (Industry)	Lignite	CO ₂	6349.7	2.5	78.2
Other (Residential)	Lignite	CO ₂	6311.7	2.5	80.6
Other (Residential)	Natural Gas	CO ₂	6116.9	2.4	83.0
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4803.2	1.9	84.9
Other (Industry)	Petroleum Coke	CO ₂	4757.8	1.9	86.7
Nitric Acid Production (Chemical Industry)		N ₂ O	4374.9	1.7	88.4
Other (Industry)	Natural Gas	CO ₂	3849.3	1.5	89.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3083.3	1.2	91.1
Civil Aviation (Transport)	Jet Kerosene	CO ₂	2833.5	1.1	92.2
Chemicals (Industry)	Petroleum	CO ₂	2277.0	0.9	93.1
Other (Residential)	Biomass	CH ₄	1771.2	0.7	93.8
Other (Residential)	Hard Coal	CO ₂	1724.2	0.7	94.5
Fugitive (Coal Mining)		CH ₄	1588.3	0.6	95.1
Iron and Steel (Industry)	Petroleum	CO ₂	1504.4	0.6	95.7
Lime Production (Mineral Products)		CO ₂	887.6	0.3	96.0
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.8	0.3	96.3
Manure Management		CH ₄	806.1	0.3	96.6
Other (Industry)	Secondary Coal	CO ₂	754.8	0.3	96.9
Navigation (Transport)	Petroleum	CO ₂	644.5	0.3	97.2
Railways (Transport)	Petroleum	CO ₂	621.9	0.2	97.4
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	597.6	0.2	97.7
Chemicals (Industry)	Natural Gas	CO ₂	546.6	0.2	97.9
Emission of SF ₆		SF ₆	516.8	0.2	98.1
Iron and Steel Production (Metal Production)		CO ₂	503.5	0.2	98.3
Field Burning of Agricultural Residues		CH ₄	428.7	0.2	98.4
Other (Residential)	Lignite	CH ₄	400.9	0.2	98.6

Table B1. The Key Source Analysis

1999 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Soda Ash Production and Use (Mineral Products)		CO ₂	357.7	0.1	98.7
Other (Residential)	Biomass	N ₂ O	348.6	0.1	98.9
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	338.5	0.1	99.0
Rice Cultivation		CH ₄	273.0	0.1	99.1
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	186.3	0.1	99.2
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	167.8	0.1	99.3
Ferroalloys Production (Metal Production)		CO ₂	161.1	0.1	99.3
Ammonia Production (Chemical Industry)		CO ₂	160.4	0.1	99.4
Chemicals (Industry)	Hard Coal	CO ₂	135.9	0.1	99.4
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	134.0	0.1	99.5
Field Burning of Agricultural Residues		N ₂ O	128.0	0.0	99.5
Other (Residential)	Hard Coal	CH ₄	117.2	0.0	99.6
Aluminium Production (Metal Production)		CO ₂	111.1	0.0	99.6
Other (Residential)	Secondary Coal	CO ₂	78.1	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	59.8	0.0	99.7
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	58.9	0.0	99.7
Chemicals (Industry)	Lignite	CO ₂	58.5	0.0	99.7
Other (Residential)	Asphalt	CO ₂	47.8	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	46.6	0.0	99.8
Carbide Production (Chemical Industry)		CO ₂	45.7	0.0	99.8
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	38.0	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	37.7	0.0	99.8
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	30.9	0.0	99.8
Other (Residential)	Petroleum	CH ₄	29.8	0.0	99.8
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	28.5	0.0	99.8
Other (Industry)	Lignite	N ₂ O	27.8	0.0	99.9
Other (Residential)	Lignite	N ₂ O	27.6	0.0	99.9
Other (Residential)	Petroleum	N ₂ O	26.4	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	22.3	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	21.0	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	18.5	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	18.3	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	17.9	0.0	99.9
Railways (Transport)	Hard Coal	CO ₂	15.7	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	14.4	0.0	99.9
Other (Industry)	Lignite	CH ₄	13.4	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	12.3	0.0	99.9
Other (Residential)	Natural Gas	CH ₄	11.9	0.0	99.9

Table B1. The Key Source Analysis

1999 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Limestone and Dolomite Use (Mineral Products)		CO ₂	11.9	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	11.9	0.0	99.9
Other (Industry)	Petroleum Coke	CH ₄	10.8	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CO ₂	10.2	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	8.9	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	8.6	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	8.1	0.0	100.0
Other (Residential)	Hard Coal	N ₂ O	8.1	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	7.2	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	6.1	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	6.1	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.8	0.0	100.0
Other (Residential)	Secondary Coal	CH ₄	5.3	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.7	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.2	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.2	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	3.9	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	3.5	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	3.5	0.0	100.0
Other (Residential)	Asphalt	CH ₄	3.3	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.1	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	2.1	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.1	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	1.7	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.6	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.3	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.3	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	1.1	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	1.0	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	1.0	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.9	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.9	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	0.9	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.7	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.6	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.4	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	0.4	0.0	100.0

Table B1. The Key Source Analysis

1999 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.3	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.3	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.3	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.2	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.2	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.1	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Other (Industry)	Asphalt	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
Emission of HFCs		HFC-1	0.0	0.0	100.0
TOTAL			256779		

Table B1. The Key Source Analysis

2000 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	38212.7	13.6	13.6
Road Transportation (Transport)	Petroleum	CO ₂	30813.4	11.0	24.7
Solid Waste		CH ₄	29042.6	10.4	35.0
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	21200.7	7.6	42.6
PublicElectricityandHeatProduction(ElectricityProduction)	Natural Gas	CO ₂	19974.8	7.1	49.7
Cement Production (Mineral Products)		CO ₂	14771.9	5.3	55.0
Enteric Fermentation		CH ₄	14541.6	5.2	60.2
Other (Residential)	Petroleum	CO ₂	11183.3	4.0	64.2
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	10847.0	3.9	68.1
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8539.4	3.1	71.1
Iron and Steel (Industry)	Secondary Coal	CO ₂	8535.8	3.0	74.2
Other (Industry)	Lignite	CO ₂	7514.9	2.7	76.9
Other (Residential)	Natural Gas	CO ₂	7486.5	2.7	79.5
Other (Industry)	Petroleum	CO ₂	7269.4	2.6	82.1
Other (Residential)	Lignite	CO ₂	6133.7	2.2	84.3
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4690.3	1.7	86.0
Other (Industry)	Petroleum Coke	CO ₂	4533.5	1.6	87.6
Nitric Acid Production (Chemical Industry)		N ₂ O	4292.2	1.5	89.1
Other (Industry)	Natural Gas	CO ₂	3332.2	1.2	90.3
Civil Aviation (Transport)	Jet Kerosene	CO ₂	3058.3	1.1	91.4
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3054.8	1.1	92.5
Chemicals (Industry)	Petroleum	CO ₂	2305.2	0.8	93.3
Other (Residential)	Hard Coal	CO ₂	1939.1	0.7	94.0
Other (Residential)	Biomass	CH ₄	1703.2	0.6	94.6
Fugitive (Coal Mining)		CH ₄	1616.8	0.6	95.2
Iron and Steel (Industry)	Petroleum	CO ₂	1539.0	0.5	95.8
Lime Production (Mineral Products)		CO ₂	832.1	0.3	96.1
Emission of HFCs		HFC-1	818.4	0.3	96.4
Other (Industry)	Secondary Coal	CO ₂	812.8	0.3	96.7
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.8	0.3	96.9
Manure Management		CH ₄	722.0	0.3	97.2
Chemicals (Industry)	Natural Gas	CO ₂	652.6	0.2	97.4
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	616.6	0.2	97.7
Navigation (Transport)	Petroleum	CO ₂	610.7	0.2	97.9
Iron and Steel Production (Metal Production)		CO ₂	521.2	0.2	98.1
Field Burning of Agricultural Residues		CH ₄	483.3	0.2	98.2
Railways (Transport)	Petroleum	CO ₂	475.8	0.2	98.4
Other (Residential)	Lignite	CH ₄	389.6	0.1	98.5

Table B1. The Key Source Analysis

2000 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	374.7	0.1	98.7
Other (Residential)	Biomass	N ₂ O	335.2	0.1	98.8
Emission of SF ₆		SF ₆	322.9	0.1	98.9
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	285.3	0.1	99.0
Rice Cultivation		CH ₄	243.6	0.1	99.1
Soda Ash Production and Use (Mineral Products)		CO ₂	227.9	0.1	99.2
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	185.2	0.1	99.2
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	167.2	0.1	99.3
Field Burning of Agricultural Residues		N ₂ O	144.2	0.1	99.4
Chemicals (Industry)	Hard Coal	CO ₂	135.9	0.0	99.4
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	132.4	0.0	99.5
Other (Residential)	Hard Coal	CH ₄	131.8	0.0	99.5
Other (Residential)	Secondary Coal	CO ₂	130.2	0.0	99.5
Ferroalloys Production (Metal Production)		CO ₂	126.4	0.0	99.6
Aluminium Production (Metal Production)		CO ₂	110.7	0.0	99.6
Ammonia Production (Chemical Industry)		CO ₂	104.0	0.0	99.7
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	99.2	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	59.8	0.0	99.7
Chemicals (Industry)	Lignite	CO ₂	58.5	0.0	99.7
Carbide Production (Chemical Industry)		CO ₂	48.6	0.0	99.8
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	48.0	0.0	99.8
Other Chemicals Production (Chemical Industry)		CH ₄	47.4	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	40.0	0.0	99.8
Other (Industry)	Lignite	N ₂ O	32.9	0.0	99.8
Other (Residential)	Petroleum	CH ₄	32.3	0.0	99.8
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	30.9	0.0	99.8
Other (Residential)	Petroleum	N ₂ O	28.7	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	27.8	0.0	99.9
Other (Residential)	Lignite	N ₂ O	26.8	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	21.9	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	21.2	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	19.3	0.0	99.9
Other (Residential)	Asphalt	CO ₂	18.8	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	18.6	0.0	99.9
Other (Industry)	Asphalt	CO ₂	17.5	0.0	99.9
Other (Industry)	Lignite	CH ₄	15.9	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	14.3	0.0	99.9
Other (Residential)	Natural Gas	CH ₄	14.1	0.0	99.9

Table B1. The Key Source Analysis

2000 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Iron and Steel (Industry)	Natural Gas	CO ₂	13.0	0.0	99.9
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	12.4	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	12.4	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	12.0	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	11.1	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	10.3	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	9.4	0.0	100.0
Other (Residential)	Hard Coal	N ₂ O	9.1	0.0	100.0
Other (Residential)	Secondary Coal	CH ₄	8.9	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	8.8	0.0	100.0
Limestone and Dolomite Use (Mineral Products)		CO ₂	8.8	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	8.1	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	7.5	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	6.3	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.9	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.2	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	4.2	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.1	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	3.9	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	3.8	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.7	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.1	0.0	100.0
Railways (Transport)	Hard Coal	CO ₂	1.9	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	1.9	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	1.8	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.5	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.5	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	1.3	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.3	0.0	100.0
Other (Residential)	Asphalt	CH ₄	1.3	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	1.2	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	1.2	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	0.9	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.9	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.9	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	0.8	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.7	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.6	0.0	100.0

Table B1. The Key Source Analysis

2000 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Chemicals (Industry)	Hard Coal	N ₂ O	0.6	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	0.6	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.4	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.4	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.3	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.3	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.1	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.1	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
TOTAL			279968		

Table B1. The Key Source Analysis

2001 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	38035.5	14.5	14.5
Road Transportation (Transport)	Petroleum	CO ₂	30532.4	11.6	26.2
Solid Waste		CH ₄	29113.0	11.1	37.3
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	22385.9	8.5	45.8
Cement Production (Mineral Products)		CO ₂	14667.8	5.6	51.4
Enteric Fermentation		CH ₄	14163.1	5.4	56.8
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	11107.4	4.2	61.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	10535.8	4.0	65.1
Other (Residential)	Petroleum	CO ₂	9003.6	3.4	68.5
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8171.3	3.1	71.6
Iron and Steel (Industry)	Secondary Coal	CO ₂	7913.5	3.0	74.6
Other (Residential)	Natural Gas	CO ₂	6583.3	2.5	77.2
Other (Industry)	Petroleum	CO ₂	6437.7	2.5	79.6
Other (Industry)	Lignite	CO ₂	5937.0	2.3	81.9
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	5207.1	2.0	83.9
Other (Industry)	Natural Gas	CO ₂	4350.4	1.7	85.5
Other (Industry)	Petroleum Coke	CO ₂	3966.7	1.5	87.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3558.2	1.4	88.4
Nitric Acid Production (Chemical Industry)		N ₂ O	3472.9	1.3	89.7
Other (Residential)	Lignite	CO ₂	3362.9	1.3	91.0
Civil Aviation (Transport)	Jet Kerosene	CO ₂	3322.7	1.3	92.3
Chemicals (Industry)	Petroleum	CO ₂	2305.2	0.9	93.1
Other (Residential)	Hard Coal	CO ₂	2000.4	0.8	93.9
Other (Residential)	Biomass	CH ₄	1638.2	0.6	94.5
Fugitive (Coal Mining)		CH ₄	1620.4	0.6	95.2
Iron and Steel (Industry)	Petroleum	CO ₂	1458.1	0.6	95.7
Lime Production (Mineral Products)		CO ₂	876.4	0.3	96.0
Emission of HFCs		HFC-1	871.5	0.3	96.4
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.8	0.3	96.7
Manure Management		CH ₄	784.9	0.3	97.0
Navigation (Transport)	Petroleum	CO ₂	784.9	0.3	97.3
Chemicals (Industry)	Natural Gas	CO ₂	773.4	0.3	97.6
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	614.6	0.2	97.8
Other (Industry)	Secondary Coal	CO ₂	460.9	0.2	98.0
Field Burning of Agricultural Residues		CH ₄	441.1	0.2	98.2
Iron and Steel Production (Metal Production)		CO ₂	400.3	0.2	98.3
Road Transportation (Transport)	Diesel+Fuel Oil	N ₂ O	392.2	0.1	98.5
Railways (Transport)	Petroleum	CO ₂	377.4	0.1	98.6

Table B1. The Key Source Analysis

2001 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Other (Residential)	Biomass	N ₂ O	322.4	0.1	98.7
Emission of SF ₆		SF ₆	308.5	0.1	98.8
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	285.3	0.1	99.0
Rice Cultivation		CH ₄	247.8	0.1	99.0
Other (Residential)	Lignite	CH ₄	213.6	0.1	99.1
Soda Ash Production and Use (Mineral Products)		CO ₂	199.2	0.1	99.2
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	194.1	0.1	99.3
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	166.4	0.1	99.3
Chemicals (Industry)	Hard Coal	CO ₂	151.4	0.1	99.4
Other (Residential)	Hard Coal	CH ₄	135.9	0.1	99.4
Field Burning of Agricultural Residues		N ₂ O	131.4	0.1	99.5
Ammonia Production (Chemical Industry)		CO ₂	130.6	0.0	99.5
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	124.5	0.0	99.6
Aluminium Production (Metal Production)		CO ₂	111.1	0.0	99.6
Ferroalloys Production (Metal Production)		CO ₂	66.0	0.0	99.7
Other (Residential)	Secondary Coal	CO ₂	63.7	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	59.8	0.0	99.7
Chemicals (Industry)	Lignite	CO ₂	58.5	0.0	99.7
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	52.0	0.0	99.8
Other (Residential)	Asphalt	CO ₂	51.2	0.0	99.8
Other Chemicals Production (Chemical Industry)		CH ₄	43.3	0.0	99.8
Carbide Production (Chemical Industry)		CO ₂	38.8	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	37.0	0.0	99.8
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	33.4	0.0	99.8
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	27.0	0.0	99.8
Other (Residential)	Petroleum	CH ₄	26.0	0.0	99.9
Other (Industry)	Lignite	N ₂ O	26.0	0.0	99.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	25.2	0.0	99.9
Other (Residential)	Petroleum	N ₂ O	23.1	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	20.9	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	18.6	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.9	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	16.7	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	16.5	0.0	99.9
Other (Residential)	Lignite	N ₂ O	14.7	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	13.3	0.0	99.9
Other (Industry)	Lignite	CH ₄	12.6	0.0	99.9
Iron and Steel (Industry)	Natural Gas	CO ₂	12.5	0.0	99.9

Table B1. The Key Source Analysis

2001 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	12.4	0.0	99.9
Other (Residential)	Natural Gas	CH ₄	12.4	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	11.8	0.0	99.9
Limestone and Dolomite Use (Mineral Products)		CO ₂	10.6	0.0	100.0
Other (Residential)	Hard Coal	N ₂ O	9.4	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	9.1	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	9.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	8.9	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	8.4	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	8.2	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	8.1	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.9	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.5	0.0	100.0
Other (Residential)	Secondary Coal	CH ₄	4.3	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	3.7	0.0	100.0
Other (Industry)	Petroleum	CH ₄	3.7	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	3.7	0.0	100.0
Other (Residential)	Asphalt	CH ₄	3.5	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.1	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	2.9	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	2.4	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	2.2	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.1	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	2.0	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	1.5	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.4	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	1.3	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.3	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	1.2	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.1	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	1.0	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.9	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	0.8	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.8	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.7	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.6	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	0.6	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0

Table B1. The Key Source Analysis

2001 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.4	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.4	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.3	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.3	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	0.3	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.3	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Other (Industry)	Asphalt	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
TOTAL			262101		

Table B1. The Key Source Analysis

2002 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	31589.8	11.7	11.7
Road Transportation (Transport)	Petroleum	CO ₂	31104.6	11.5	23.2
Solid Waste		CH ₄	28407.7	10.5	33.7
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	23534.1	8.7	42.4
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	18160.7	6.7	49.1
Cement Production (Mineral Products)		CO ₂	15051.7	5.6	54.6
Enteric Fermentation		CH ₄	13224.7	4.9	59.5
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	10339.6	3.8	63.3
Other (Residential)	Petroleum	CO ₂	8745.1	3.2	66.6
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8297.2	3.1	69.6
Iron and Steel (Industry)	Secondary Coal	CO ₂	7527.4	2.8	72.4
Other (Industry)	Petroleum	CO ₂	7405.8	2.7	75.2
Other (Industry)	Lignite	CO ₂	7035.7	2.6	77.8
Other (Residential)	Natural Gas	CO ₂	6710.0	2.5	80.2
Other (Industry)	Natural Gas	CO ₂	5293.0	2.0	82.2
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	5241.1	1.9	84.1
Other (Industry)	Petroleum Coke	CO ₂	5213.9	1.9	86.1
Other (Residential)	Lignite	CO ₂	4583.5	1.7	87.7
Nitric Acid Production (Chemical Industry)		N ₂ O	3997.1	1.5	89.2
Civil Aviation (Transport)	Jet Kerosene	CO ₂	3745.0	1.4	90.6
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3351.3	1.2	91.8
Other (Residential)	Hard Coal	CO ₂	2312.4	0.9	92.7
Chemicals (Industry)	Petroleum	CO ₂	2305.2	0.9	93.6
Other (Residential)	Biomass	CH ₄	1575.8	0.6	94.1
Fugitive (Coal Mining)		CH ₄	1443.3	0.5	94.7
Emission of HFCs		HFC-1	1418.9	0.5	95.2
Iron and Steel (Industry)	Petroleum	CO ₂	1364.1	0.5	95.7
Lime Production (Mineral Products)		CO ₂	1191.6	0.4	96.1
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.8	0.3	96.4
Navigation (Transport)	Petroleum	CO ₂	806.2	0.3	96.7
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	769.5	0.3	97.0
Chemicals (Industry)	Natural Gas	CO ₂	705.0	0.3	97.3
Manure Management		CH ₄	695.9	0.3	97.5
Other (Industry)	Secondary Coal	CO ₂	659.0	0.2	97.8
Ammonia Production (Chemical Industry)		CO ₂	585.0	0.2	98.0
Emission of SF ₆		SF ₆	476.8	0.2	98.2
Field Burning of Agricultural Residues		CH ₄	461.2	0.2	98.3
Road Transportation (Transport)	Diesel+Fuel Oil	N ₂ O	423.5	0.2	98.5

Table B1. The Key Source Analysis

2002 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Railways (Transport)	Petroleum	CO ₂	379.5	0.1	98.6
Other (Residential)	Biomass	N ₂ O	310.2	0.1	98.8
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	293.4	0.1	98.9
Other (Residential)	Lignite	CH ₄	291.2	0.1	99.0
Iron and Steel Production (Metal Production)		CO ₂	261.9	0.1	99.1
Rice Cultivation		CH ₄	252.0	0.1	99.2
Soda Ash Production and Use (Mineral Products)		CO ₂	224.7	0.1	99.2
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	213.1	0.1	99.3
Chemicals (Industry)	Hard Coal	CO ₂	188.1	0.1	99.4
Other (Residential)	Hard Coal	CH ₄	157.1	0.1	99.4
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	138.2	0.1	99.5
Field Burning of Agricultural Residues		N ₂ O	137.6	0.1	99.6
Other (Residential)	Secondary Coal	CO ₂	120.2	0.0	99.6
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	120.0	0.0	99.6
Aluminium Production (Metal Production)		CO ₂	112.5	0.0	99.7
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	85.0	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	59.8	0.0	99.7
Chemicals (Industry)	Lignite	CO ₂	58.5	0.0	99.8
Other Chemicals Production (Chemical Industry)		CH ₄	45.1	0.0	99.8
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	41.1	0.0	99.8
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	37.6	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	35.2	0.0	99.8
Other (Industry)	Lignite	N ₂ O	30.8	0.0	99.8
Carbide Production (Chemical Industry)		CO ₂	28.8	0.0	99.8
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	26.5	0.0	99.8
Other (Residential)	Petroleum	CH ₄	25.3	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	24.4	0.0	99.9
Other (Residential)	Petroleum	N ₂ O	22.4	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	21.3	0.0	99.9
Other (Residential)	Lignite	N ₂ O	20.1	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	19.0	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.1	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	15.7	0.0	99.9
Other (Industry)	Lignite	CH ₄	14.9	0.0	99.9
Iron and Steel (Industry)	Natural Gas	CO ₂	14.8	0.0	99.9
Ferroalloys Production (Metal Production)		CO ₂	14.6	0.0	99.9
Other (Residential)	Natural Gas	CH ₄	13.7	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	13.4	0.0	99.9

Table B1. The Key Source Analysis

2002 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	13.1	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	12.0	0.0	99.9
Other (Industry)	Petroleum Coke	CH ₄	11.8	0.0	99.9
Limestone and Dolomite Use (Mineral Products)		CO ₂	11.0	0.0	100.0
Other (Residential)	Hard Coal	N ₂ O	10.8	0.0	100.0
Other (Industry)	Natural Gas	CH ₄	10.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	9.0	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	9.0	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	8.9	0.0	100.0
Other (Industry)	Asphalt	CO ₂	8.7	0.0	100.0
Other (Residential)	Secondary Coal	CH ₄	8.2	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	6.7	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.9	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.5	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.3	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	4.1	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	3.5	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.1	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	3.1	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.0	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	2.9	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.1	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	2.0	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.7	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	1.5	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	1.4	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	1.4	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.3	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	1.3	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.1	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	1.0	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.9	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	0.8	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.8	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.7	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	0.6	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	0.6	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.5	0.0	100.0

Table B1. The Key Source Analysis

2002 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.4	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.4	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.4	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Other (Residential)	Asphalt	CO ₂	0.1	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	0.0	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Other (Industry)	Asphalt	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Other (Residential)	Asphalt	CH ₄	0.0	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
TOTAL			270620		

Table B1. The Key Source Analysis

2003 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Road Transportation (Transport)	Petroleum	CO ₂	32359.9	11.3	11.3
Solid Waste		CH ₄	29357.4	10.3	21.6
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	26255.5	9.2	30.7
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	26177.3	9.1	39.9
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	21843.8	7.6	47.5
Cement Production (Mineral Products)		CO ₂	15521.3	5.4	52.9
Enteric Fermentation		CH ₄	13235.2	4.6	57.5
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	9269.3	3.2	60.8
Other (Industry)	Natural Gas	CO ₂	8582.3	3.0	63.8
Other (Residential)	Natural Gas	CO ₂	8536.1	3.0	66.8
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8424.4	2.9	69.7
Other (Industry)	Petroleum	CO ₂	8368.8	2.9	72.6
Other (Residential)	Petroleum	CO ₂	8295.0	2.9	75.5
Iron and Steel (Industry)	Secondary Coal	CO ₂	8250.4	2.9	78.4
Other (Industry)	Lignite	CO ₂	7624.8	2.7	81.1
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	7271.1	2.5	83.6
Other (Residential)	Lignite	CO ₂	5284.1	1.8	85.5
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	5222.3	1.8	87.3
Other (Industry)	Petroleum Coke	CO ₂	5125.6	1.8	89.1
Civil Aviation (Transport)	Jet Kerosene	CO ₂	4128.1	1.4	90.5
Nitric Acid Production (Chemical Industry)		N ₂ O	3764.1	1.3	91.8
Other (Residential)	Hard Coal	CO ₂	2580.8	0.9	92.7
Chemicals (Industry)	Petroleum	CO ₂	2305.2	0.8	93.5
Emission of HFCs		HFC-1	1806.7	0.6	94.2
Other (Residential)	Biomass	CH ₄	1516.2	0.5	94.7
Iron and Steel (Industry)	Petroleum	CO ₂	1337.4	0.5	95.2
Fugitive (Coal Mining)		CH ₄	1292.2	0.5	95.6
Lime Production (Mineral Products)		CO ₂	1187.3	0.4	96.0
Navigation (Transport)	Petroleum	CO ₂	873.9	0.3	96.3
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	843.6	0.3	96.6
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.8	0.3	96.9
Chemicals (Industry)	Natural Gas	CO ₂	784.4	0.3	97.2
Manure Management		CH ₄	698.0	0.2	97.4
Other (Industry)	Secondary Coal	CO ₂	581.4	0.2	97.6
Ammonia Production (Chemical Industry)		CO ₂	563.1	0.2	97.8
Other (Industry)	Asphalt	CO ₂	560.8	0.2	98.0
Other (Residential)	Secondary Coal	CO ₂	522.5	0.2	98.2
Emission of SF ₆		SF ₆	479.4	0.2	98.4

Table B1. The Key Source Analysis

2003 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	477.4	0.2	98.5
Field Burning of Agricultural Residues		CH ₄	453.7	0.2	98.7
Railways (Transport)	Petroleum	CO ₂	394.6	0.1	98.8
Other (Residential)	Lignite	CH ₄	335.7	0.1	99.0
Other (Residential)	Biomass	N ₂ O	298.4	0.1	99.1
Iron and Steel Production (Metal Production)		CO ₂	296.3	0.1	99.2
Rice Cultivation		CH ₄	273.0	0.1	99.3
Soda Ash Production and Use (Mineral Products)		CO ₂	242.1	0.1	99.3
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	201.3	0.1	99.4
Other (Residential)	Hard Coal	CH ₄	175.4	0.1	99.5
Field Burning of Agricultural Residues		N ₂ O	135.8	0.0	99.5
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	121.0	0.0	99.6
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	114.9	0.0	99.6
Aluminium Production (Metal Production)		CO ₂	113.7	0.0	99.6
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	102.3	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	68.5	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	51.7	0.0	99.7
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	49.5	0.0	99.7
Ferroalloys Production (Metal Production)		CO ₂	46.0	0.0	99.8
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	41.4	0.0	99.8
Chemicals (Industry)	Lignite	CO ₂	39.8	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	38.6	0.0	99.8
Carbide Production (Chemical Industry)		CO ₂	38.5	0.0	99.8
Other (Residential)	Secondary Coal	CH ₄	35.5	0.0	99.8
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	35.3	0.0	99.8
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	34.0	0.0	99.8
Other (Industry)	Lignite	N ₂ O	33.4	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	24.0	0.0	99.9
Other (Residential)	Petroleum	CH ₄	24.0	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	23.7	0.0	99.9
Other (Residential)	Lignite	N ₂ O	23.1	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	21.6	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	21.4	0.0	99.9
Other (Residential)	Petroleum	N ₂ O	21.3	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	18.7	0.0	99.9
Other (Residential)	Natural Gas	CH ₄	17.0	0.0	99.9
Other (Industry)	Lignite	CH ₄	16.1	0.0	99.9
Other (Industry)	Natural Gas	CH ₄	16.1	0.0	99.9

Table B1. The Key Source Analysis

2003 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Limestone and Dolomite Use (Mineral Products)		CO ₂	14.7	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	14.5	0.0	99.9
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	13.4	0.0	100.0
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	12.2	0.0	100.0
Other (Residential)	Hard Coal	N ₂ O	12.1	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	11.6	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	9.8	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	9.0	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	8.0	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.9	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	5.6	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	5.0	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.8	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	4.8	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.5	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	3.4	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.1	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.1	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	2.7	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	2.6	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	2.4	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	2.2	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.1	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	1.6	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	1.6	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	1.5	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.3	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	1.3	0.0	100.0
Other (Industry)	Asphalt	CH ₄	1.3	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.2	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.2	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.9	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	0.8	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	0.6	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.5	0.0	100.0
Chemicals (Industry)	Natural Gas	N ₂ O	0.4	0.0	100.0

Table B1. The Key Source Analysis

2003 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.3	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.1	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Other (Residential)	Asphalt	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Other (Residential)	Asphalt	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
TOTAL			286286		

Table B1. The Key Source Analysis

2004 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Road Transportation (Transport)	Petroleum	CO ₂	34068.8	11.5	11.5
Solid Waste		CH ₄	27546.1	9.3	20.8
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	27451.0	9.3	30.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	25479.4	8.6	38.6
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	23009.6	7.8	46.4
Cement Production (Mineral Products)		CO ₂	16725.5	5.6	52.0
Enteric Fermentation		CH ₄	13471.9	4.5	56.6
Other (Residential)	Natural Gas	CO ₂	9765.3	3.3	59.8
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	9738.7	3.3	63.1
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	9053.6	3.1	66.2
Other (Residential)	Petroleum	CO ₂	8733.7	2.9	69.1
Other (Industry)	Natural Gas	CO ₂	8558.6	2.9	72.0
Iron and Steel (Industry)	Secondary Coal	CO ₂	8463.6	2.9	74.9
Other (Industry)	Petroleum	CO ₂	8048.3	2.7	77.6
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	7830.3	2.6	80.2
Other (Residential)	Lignite	CO ₂	6845.4	2.3	82.5
Other (Industry)	Lignite	CO ₂	6623.9	2.2	84.8
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	5685.4	1.9	86.7
Other (Industry)	Petroleum Coke	CO ₂	5577.3	1.9	88.6
Civil Aviation (Transport)	Jet Kerosene	CO ₂	4798.7	1.6	90.2
Nitric Acid Production (Chemical Industry)		N ₂ O	3862.4	1.3	91.5
Other (Residential)	Hard Coal	CO ₂	2427.9	0.8	92.3
Chemicals (Industry)	Petroleum	CO ₂	2305.2	0.8	93.1
Emission of HFCs		HFC-1	2228.7	0.8	93.8
Other (Residential)	Biomass	CH ₄	1459.1	0.5	94.3
Lime Production (Mineral Products)		CO ₂	1411.2	0.5	94.8
Fugitive (Coal Mining)		CH ₄	1229.3	0.4	95.2
Navigation (Transport)	Petroleum	CO ₂	1207.0	0.4	95.6
Other (Industry)	Asphalt	CO ₂	1203.3	0.4	96.0
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	1128.2	0.4	96.4
Iron and Steel (Industry)	Petroleum	CO ₂	1045.2	0.4	96.8
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.8	0.3	97.0
Chemicals (Industry)	Natural Gas	CO ₂	795.0	0.3	97.3
Manure Management		CH ₄	760.6	0.3	97.6
Emission of SF ₆		SF ₆	704.6	0.2	97.8
Ammonia Production (Chemical Industry)		CO ₂	641.3	0.2	98.0
Road Transportation (Transport)	Diesel+Fuel Oil	N ₂ O	590.6	0.2	98.2
Other (Residential)	Secondary Coal	CO ₂	512.6	0.2	98.4

Table B1. The Key Source Analysis

2004 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Field Burning of Agricultural Residues		CH ₄	501.3	0.2	98.5
Other (Residential)	Lignite	CH ₄	434.8	0.1	98.7
Railways (Transport)	Petroleum	CO ₂	374.3	0.1	98.8
Iron and Steel Production (Metal Production)		CO ₂	347.0	0.1	98.9
Other (Industry)	Secondary Coal	CO ₂	345.9	0.1	99.1
Rice Cultivation		CH ₄	294.0	0.1	99.2
Other (Residential)	Biomass	N ₂ O	287.2	0.1	99.2
Soda Ash Production and Use (Mineral Products)		CO ₂	255.6	0.1	99.3
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	224.1	0.1	99.4
Other (Residential)	Hard Coal	CH ₄	165.0	0.1	99.5
Field Burning of Agricultural Residues		N ₂ O	150.0	0.1	99.5
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	121.4	0.0	99.6
Aluminium Production (Metal Production)		CO ₂	115.2	0.0	99.6
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	111.5	0.0	99.6
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	107.7	0.0	99.7
Non-Ferrous Metals (Industry)	Lignite	CO ₂	74.7	0.0	99.7
Carbide Production (Chemical Industry)		CO ₂	61.4	0.0	99.7
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	52.1	0.0	99.7
Other Chemicals Production (Chemical Industry)		CH ₄	51.7	0.0	99.8
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	48.1	0.0	99.8
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	45.6	0.0	99.8
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	40.8	0.0	99.8
Chemicals (Industry)	Lignite	CO ₂	39.8	0.0	99.8
Iron and Steel (Industry)	Secondary Coal	N ₂ O	39.6	0.0	99.8
Ferroalloys Production (Metal Production)		CO ₂	37.3	0.0	99.8
Other (Residential)	Secondary Coal	CH ₄	34.8	0.0	99.8
Other (Residential)	Lignite	N ₂ O	30.0	0.0	99.9
Other (Industry)	Lignite	N ₂ O	29.0	0.0	99.9
Other (Industry)	Petroleum Coke	N ₂ O	26.1	0.0	99.9
Other (Residential)	Petroleum	CH ₄	25.3	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	23.2	0.0	99.9
Other (Residential)	Petroleum	N ₂ O	22.4	0.0	99.9
Other (Industry)	Petroleum	N ₂ O	20.6	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	20.1	0.0	99.9
Iron and Steel (Industry)	Secondary Coal	CH ₄	19.2	0.0	99.9
Other (Residential)	Natural Gas	CH ₄	18.4	0.0	99.9
Other (Industry)	Natural Gas	CH ₄	16.1	0.0	99.9
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	15.2	0.0	99.9

Table B1. The Key Source Analysis

2004 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	14.6	0.0	99.9
Other (Industry)	Lignite	CH ₄	14.0	0.0	99.9
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	13.1	0.0	100.0
Other (Industry)	Petroleum Coke	CH ₄	12.6	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CO ₂	12.1	0.0	100.0
Other (Residential)	Hard Coal	N ₂ O	11.4	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	10.3	0.0	100.0
Road Transportation (Transport)	Natural Gas	CO ₂	9.0	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	6.8	0.0	100.0
Limestone and Dolomite Use (Mineral Products)		CO ₂	6.4	0.0	100.0
Chemicals (Industry)	Petroleum	N ₂ O	5.9	0.0	100.0
Other (Industry)	Asphalt	N ₂ O	5.6	0.0	100.0
Other (Residential)	Natural Gas	N ₂ O	5.4	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	5.4	0.0	100.0
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.9	0.0	100.0
Other (Industry)	Natural Gas	N ₂ O	4.8	0.0	100.0
Other (Industry)	Petroleum	CH ₄	4.7	0.0	100.0
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.1	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	N ₂ O	3.0	0.0	100.0
Railways (Transport)	Diesel+FuelOil	N ₂ O	2.9	0.0	100.0
Other (Industry)	Asphalt	CH ₄	2.7	0.0	100.0
Iron and Steel (Industry)	Petroleum	N ₂ O	2.7	0.0	100.0
Other (Residential)	Secondary Coal	N ₂ O	2.4	0.0	100.0
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	2.2	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	2.1	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.1	0.0	100.0
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.7	0.0	100.0
Other (Industry)	Secondary Coal	N ₂ O	1.6	0.0	100.0
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.5	0.0	100.0
Chemicals (Industry)	Natural Gas	CH ₄	1.5	0.0	100.0
Chemicals (Industry)	Petroleum	CH ₄	1.3	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	1.0	0.0	100.0
Other (Industry)	Secondary Coal	CH ₄	0.8	0.0	100.0
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.6	0.0	100.0
Railways (Transport)	Diesel+FuelOil	CH ₄	0.6	0.0	100.0
Iron and Steel (Industry)	Petroleum	CH ₄	0.6	0.0	100.0
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.5	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.5	0.0	100.0

Table B1. The Key Source Analysis

2004 KSA					
CATEGORY	FUEL	GAS	EMISSION	CONTRIBUTION (%)	COMMUTATIVE CONTRIBUTION
Chemicals (Industry)	Natural Gas	N ₂ O	0.4	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.3	0.0	100.0
Road Transportation (Transport)	Natural Gas	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.2	0.0	100.0
Chemicals (Industry)	Lignite	N ₂ O	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.2	0.0	100.0
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.1	0.0	100.0
Chemicals (Industry)	Lignite	CH ₄	0.1	0.0	100.0
Road Transportation (Transport)	Natural Gas	N ₂ O	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	CH ₄	0.0	0.0	100.0
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CO ₂	0.0	0.0	100.0
Railways (Transport)	Lignite	CO ₂	0.0	0.0	100.0
Other (Residential)	Asphalt	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CO ₂	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	CH ₄	0.0	0.0	100.0
Railways (Transport)	Lignite	CH ₄	0.0	0.0	100.0
Other (Residential)	Asphalt	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	CH ₄	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.0	0.0	100.0
Chemicals (Industry)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Navigation (Transport)	Hard Coal	N ₂ O	0.0	0.0	100.0
Railways (Transport)	Lignite	N ₂ O	0.0	0.0	100.0
Other (Residential)	Asphalt	N ₂ O	0.0	0.0	100.0
Chemicals (Industry)	Secondary Coal	N ₂ O	0.0	0.0	100.0
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.0	0.0	100.0
TOTAL			296605		

Appendix C

C. Quality Assurance and Quality Control

After the ratification of the United Nations Framework Convention on Climate Change. The political measures and policies in Turkey have also increased fairly. Some working groups are formed for the air quality management. One of the working groups is “the GHG Emission Inventory Working Group”. The coordination is under the responsibilities of TURKSTAT. The member of this groups are the Ministry of Environment and Forestry, Ministry of Energy and Natural Resources, Turkish Electricity Generation Transmission Corporation, universities and other related organizations. The main aim of this working group is to improve the GHG emission inventories.

TURKSTAT is responsible for preparing the Turkey’s greenhouse gas inventory (GHGI). The inventory was compiled by the related organizations after the study was completed. The critics and their data correction were reflected to the national inventory. The Energy Balance tables were also compiled and there were some small corrections. The consistency check and the corrections are reflected to the CRF tables before the submission. The Ministry of Energy and Natural Resources published these tables as officially.

The industrial establishments directly submit their industrial production data to TURKSTAT by seasonal and annual questionnaires. The necessary production data for the emission inventory is gathered from the related department of TURKSTAT. Moreover, the biggest establishments which have high GHGs also asked for compilations of these production data such as cement productions industries.

The database system was also computerized. The energy balance tables are only copied to the Excell base programme and the calculations are automatically made by programme at detail level and due to the each fuel type as the requirement of CRF tables. The emission factor and all used data could also be seen within the programme. Except for the energy, the activity data have to be entered the database. It is always checked by a second person.

Control of quality of the inventory by experts is carried out both on the basis of the emission factors and activity data.

There is also internal quality control, these are;

- control of consistency to ensure data integrity, its correctness and completeness;
- determination and correction of errors,
- documentation and archiving of material used for the inventory preparation and QC activities.

Appendix D

D. Trend Analysis

In the Following Table D1, the annual trend analyses compared to year 1990 are given. The aim is to observe the changes in the sectors. The basic formula used for the trend analysis is

$$T_x^t = L_x^t * [((E_x^t - E_x^o) / E_x^t) - ((E_{tot}^t - E_{tot}^o) / E_{tot}^t)] \quad (D1)$$

where,

x	: the category
t	: year t
o	: case year
tot	: total emission
T	: trend assessment (%)
L	: emission contribution (%)
E	: emission (unit)

The annual results could be seen in the following Tables D1.

Table D1. Trend Analysis
1991 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1991	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	1374.87	0.8	851.45	0.2382	2.5%	2.5%	38.1%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	5.28	0.0	0.00	0.0027	0.0%	2.5%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	2.5%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	5005.27	2.8	4168.15	0.2801	2.9%	5.4%	16.7%
Railways (Transport)	Hard Coal	CO ₂	21.10	0.0	29.73	0.0055	0.1%	5.5%	-40.9%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	5.5%	0.0%
Other (Residential)	Hard Coal	CO ₂	4741.13	2.6	3845.79	0.3216	3.4%	8.9%	18.9%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	23336.76	12.8	20662.22	0.6310	6.6%	15.5%	11.5%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	82.22	0.0	59.79	0.0094	0.1%	15.6%	27.3%
Chemicals (Industry)	Lignite	CO ₂	43.60	0.0	529.42	0.2685	2.8%	18.4%	-1114.3%
Other (Industry)	Lignite	CO ₂	10800.18	5.9	9948.37	0.0799	0.8%	19.2%	7.9%
Railways (Transport)	Lignite	CO ₂	19.92	0.0	21.87	0.0018	0.0%	19.2%	-9.8%
Other (Residential)	Lignite	CO ₂	9576.45	5.3	9276.74	0.1795	1.9%	21.1%	3.1%
Other (Industry)	Asphalt	CO ₂	58.42	0.0	88.46	0.0186	0.2%	21.3%	-51.4%
Other (Residential)	Asphalt	CO ₂	173.58	0.1	390.56	0.1255	1.3%	22.6%	-125.0%
Iron and Steel (Industry)	Secondary Coal	CO ₂	7705.55	4.2	7681.10	0.2635	2.8%	25.4%	0.3%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	73.36	0.0	73.36	0.0026	0.0%	25.4%	0.0%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	25.4%	0.0%
Other (Industry)	Secondary Coal	CO ₂	1219.95	0.7	679.26	0.2533	2.6%	28.0%	44.3%
Other (Residential)	Secondary Coal	CO ₂	527.88	0.3	635.01	0.0778	0.8%	28.8%	-20.3%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	28.8%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	1005.93	0.6	941.03	0.0005	0.0%	28.9%	6.5%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	2225.15	1.2	3375.90	0.7124	7.4%	36.3%	-51.7%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	3595.83	2.0	3689.24	0.1806	1.9%	38.2%	-2.6%
Iron and Steel (Industry)	Petroleum	CO ₂	1777.98	1.0	1720.93	0.0326	0.3%	38.5%	3.2%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	781.17	0.4	774.22	0.0243	0.3%	38.8%	0.9%
Chemicals (Industry)	Petroleum	CO ₂	1938.71	1.1	1984.26	0.0947	1.0%	39.8%	-2.3%
Other (Industry)	Petroleum	CO ₂	7526.86	4.1	7050.12	0.0086	0.1%	39.9%	6.3%
Road Transportation (Transport)	Petroleum	CO ₂	22582.77	12.4	24035.93	1.6103	16.8%	56.7%	-6.4%
Railways (Transport)	Petroleum	CO ₂	485.00	0.3	465.05	0.0065	0.1%	56.8%	4.1%
Navigation (Transport)	Petroleum	CO ₂	530.73	0.3	494.28	0.0010	0.0%	56.8%	6.9%
Other (Residential)	Petroleum	CO ₂	9457.27	5.2	9153.31	0.1729	1.8%	58.6%	3.2%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	5820.11	3.2	5795.38	0.1956	2.0%	60.6%	0.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	6099.42	3.4	5435.89	0.1454	1.5%	62.1%	10.9%
Iron and Steel (Industry)	Natural Gas	CO ₂	129.73	0.1	0.00	0.0666	0.7%	62.8%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.00	0.0	0.00	0.0000	0.0%	62.8%	0.0%
Chemicals (Industry)	Natural Gas	CO ₂	401.95	0.2	0.00	0.2064	2.2%	65.0%	100.0%
Other (Industry)	Natural Gas	CO ₂	1914.04	1.1	1729.02	0.0329	0.3%	65.3%	9.7%
Road Transportation (Transport)	Natural Gas	CO ₂	0.00	0.0	0.00	0.0000	0.0%	65.3%	0.0%
Other (Residential)	Natural Gas	CO ₂	397.70	0.2	104.21	0.1470	1.5%	66.9%	73.8%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	1034.93	0.6	904.59	0.0344	0.4%	67.2%	12.6%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.31	0.0	0.19	0.0001	0.0%	67.2%	38.1%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.01	0.0	0.00	0.0000	0.0%	67.2%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.2%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	11.34	0.0	9.44	0.0006	0.0%	67.3%	16.7%
Railways (Transport)	Hard Coal	CH ₄	0.05	0.0	0.07	0.0000	0.0%	67.3%	-39.3%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	67.3%	0.0%
Other (Residential)	Hard Coal	CH ₄	322.19	0.2	261.34	0.0219	0.2%	67.5%	18.9%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	4.94	0.0	4.38	0.0001	0.0%	67.5%	11.5%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.17	0.0	0.13	0.0000	0.0%	67.5%	27.3%
Chemicals (Industry)	Lignite	CH ₄	0.09	0.0	1.12	0.0006	0.0%	67.5%	-1114.3%
Other (Industry)	Lignite	CH ₄	22.87	0.0	21.07	0.0002	0.0%	67.5%	7.9%

Table D1. Trend Analysis
1991 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1991	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.05	0.0	0.05	0.0000	0.0%	67.5%	-8.5%
Other (Residential)	Lignite	CH ₄	608.33	0.3	589.29	0.0114	0.1%	67.6%	3.1%
Other (Industry)	Asphalt	CH ₄	0.13	0.0	0.20	0.0000	0.0%	67.6%	-51.4%
Other (Residential)	Asphalt	CH ₄	11.80	0.0	26.54	0.0085	0.1%	67.7%	-125.0%
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.45	0.0	17.40	0.0006	0.0%	67.7%	0.3%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.17	0.0	0.17	0.0000	0.0%	67.7%	0.0%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.7%	0.0%
Other (Industry)	Secondary Coal	CH ₄	2.76	0.0	1.54	0.0006	0.0%	67.7%	44.3%
Other (Residential)	Secondary Coal	CH ₄	35.87	0.0	43.15	0.0053	0.1%	67.8%	-20.3%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	67.8%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	2.28	0.0	2.13	0.0000	0.0%	67.8%	6.5%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	1.93	0.0	2.93	0.0006	0.0%	67.8%	-51.7%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	3.12	0.0	3.20	0.0002	0.0%	67.8%	-2.6%
Iron and Steel (Industry)	Petroleum	CH ₄	1.03	0.0	1.00	0.0000	0.0%	67.8%	3.2%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.45	0.0	0.45	0.0000	0.0%	67.8%	0.9%
Chemicals (Industry)	Petroleum	CH ₄	1.12	0.0	1.15	0.0001	0.0%	67.8%	-2.3%
Other (Industry)	Petroleum	CH ₄	4.35	0.0	4.08	0.0000	0.0%	67.8%	6.3%
Other (Residential)	Petroleum	CH ₄	27.36	0.0	26.48	0.0005	0.0%	67.8%	3.2%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	8.42	0.0	8.38	0.0003	0.0%	67.8%	0.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.29	0.0	2.05	0.0001	0.0%	67.8%	10.9%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.24	0.0	0.00	0.0001	0.0%	67.8%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.8%	0.0%
Chemicals (Industry)	Natural Gas	CH ₄	0.76	0.0	0.00	0.0004	0.0%	67.8%	100.0%
Other (Industry)	Natural Gas	CH ₄	3.60	0.0	3.25	0.0001	0.0%	67.8%	9.7%
Road Transportation (Transport)	Natural Gas	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.8%	0.0%
Other (Residential)	Natural Gas	CH ₄	0.75	0.0	0.20	0.0003	0.0%	67.8%	73.8%
Other (Residential)	Biomass	CH ₄	1902.33	1.0	1901.22	0.0678	0.7%	68.5%	0.1%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	0.89	0.0	1.31	0.0003	0.0%	68.5%	-47.0%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	65.85	0.0	67.91	0.0035	0.0%	68.5%	-3.1%
Railways (Transport)	Diesel+FuelOil	CH ₄	0.77	0.0	0.73	0.0000	0.0%	68.5%	5.2%
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.74	0.0	0.69	0.0000	0.0%	68.5%	7.2%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	6.44	0.0	3.99	0.0011	0.0%	68.6%	38.1%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.02	0.0	0.00	0.0000	0.0%	68.6%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	68.6%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	23.43	0.0	19.51	0.0013	0.0%	68.6%	16.7%
Railways (Transport)	Hard Coal	N ₂ O	0.28	0.0	0.39	0.0001	0.0%	68.6%	-38.6%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	68.6%	0.0%
Other (Residential)	Hard Coal	N ₂ O	22.19	0.0	18.00	0.0015	0.0%	68.6%	18.9%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	102.12	0.1	90.42	0.0028	0.0%	68.6%	11.5%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.36	0.0	0.26	0.0000	0.0%	68.6%	27.3%
Chemicals (Industry)	Lignite	N ₂ O	0.19	0.0	2.32	0.0012	0.0%	68.6%	-1114.3%
Other (Industry)	Lignite	N ₂ O	47.26	0.0	43.53	0.0003	0.0%	68.6%	7.9%
Railways (Transport)	Lignite	N ₂ O	0.25	0.0	0.27	0.0000	0.0%	68.6%	-8.0%
Other (Residential)	Lignite	N ₂ O	41.91	0.0	40.60	0.0008	0.0%	68.6%	3.1%
Other (Industry)	Asphalt	N ₂ O	0.27	0.0	0.41	0.0001	0.0%	68.6%	-51.4%
Other (Residential)	Asphalt	N ₂ O	0.81	0.0	1.83	0.0006	0.0%	68.6%	-125.0%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	36.07	0.0	35.96	0.0012	0.0%	68.7%	0.3%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.34	0.0	0.34	0.0000	0.0%	68.7%	0.0%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	68.7%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	5.71	0.0	3.18	0.0012	0.0%	68.7%	44.3%
Other (Residential)	Secondary Coal	N ₂ O	2.47	0.0	2.97	0.0004	0.0%	68.7%	-20.3%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	68.7%	0.0%

Table D1. Trend Analysis
1991 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1991	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	4.71	0.0	4.41	0.0000	0.0%	68.7%	6.5%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	5.70	0.0	8.65	0.0018	0.0%	68.7%	-51.7%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	9.21	0.0	9.45	0.0005	0.0%	68.7%	-2.6%
Iron and Steel (Industry)	Petroleum	N ₂ O	4.56	0.0	4.41	0.0001	0.0%	68.7%	3.2%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.00	0.0	1.98	0.0001	0.0%	68.7%	0.9%
Chemicals (Industry)	Petroleum	N ₂ O	4.97	0.0	5.08	0.0002	0.0%	68.7%	-2.3%
Other (Industry)	Petroleum	N ₂ O	19.28	0.0	18.06	0.0000	0.0%	68.7%	6.3%
Other (Residential)	Petroleum	N ₂ O	24.23	0.0	23.45	0.0004	0.0%	68.7%	3.2%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	14.91	0.0	14.85	0.0005	0.0%	68.7%	0.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	3.39	0.0	3.02	0.0001	0.0%	68.7%	10.9%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.07	0.0	0.00	0.0000	0.0%	68.7%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	68.7%	0.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.22	0.0	0.00	0.0001	0.0%	68.7%	100.0%
Other (Industry)	Natural Gas	N ₂ O	1.06	0.0	0.96	0.0000	0.0%	68.7%	9.7%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	68.7%	0.0%
Other (Residential)	Natural Gas	N ₂ O	0.22	0.0	0.06	0.0001	0.0%	68.7%	73.8%
Other (Residential)	Biomass	N ₂ O	374.43	0.2	374.21	0.0133	0.1%	68.9%	0.1%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	10.40	0.0	9.08	0.0004	0.0%	68.9%	12.7%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	231.88	0.1	246.86	0.0166	0.2%	69.0%	-6.5%
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.56	0.0	3.36	0.0000	0.0%	69.0%	5.7%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.31	0.0	1.22	0.0000	0.0%	69.0%	7.4%
Cement Production (Mineral Products)		CO ₂	11584.76	6.4	10333.37	0.2713	2.8%	71.9%	10.8%
Lime Production (Mineral Products)		CO ₂	796.53	0.4	645.09	0.0546	0.6%	72.4%	19.0%
Limestone and Dolomite Use (Mineral Products)		CO ₂	7.34	0.0	21.52	0.0081	0.1%	72.5%	-193.1%
Soda Ash Production and Use (Mineral Products)		CO ₂	100.58	0.1	106.30	0.0068	0.1%	72.6%	-5.7%
Ammonia Production (Chemical Industry)		CO ₂	678.06	0.4	713.47	0.0438	0.5%	73.0%	-5.2%
Carbide Production (Chemical Industry)		CO ₂	57.53	0.0	112.25	0.0321	0.3%	73.4%	-95.1%
Aluminium Production (Metal Production)		CO ₂	100.47	0.1	109.62	0.0086	0.1%	73.5%	-9.1%
Iron and Steel Production (Metal Production)		CO ₂	637.78	0.4	770.23	0.0957	1.0%	74.5%	-20.8%
Ferroalloys Production (Metal Production)		CO ₂	111.40	0.1	81.17	0.0126	0.1%	74.6%	27.1%
Other Chemicals Production (Chemical Industry)		CH ₄	48.86	0.0	49.39	0.0020	0.0%	74.6%	-1.1%
Nitric Acid Production (Chemical Industry)		N ₂ O	1099.85	0.6	128.08	0.4945	5.2%	79.8%	88.4%
Enteric Fermentation		CH ₄	17605.35	9.7	17046.76	0.3258	3.4%	83.2%	3.2%
Manure Management		CH ₄	661.01	0.4	613.63	0.0023	0.0%	83.2%	7.2%
Rice Cultivation		CH ₄	168.00	0.1	222.60	0.0360	0.4%	83.6%	-32.5%
Solid Waste		CH ₄	9741.69	5.4	6386.46	1.4937	15.6%	99.2%	34.4%
Fugitive (Coal Mining)		CH ₄	1411.93	0.8	1430.32	0.0609	0.6%	99.9%	-1.3%
Field Burning of Agricultural Residues		CH ₄	468.85	0.3	454.59	0.0090	0.1%	100.0%	3.0%
Field Burning of Agricultural Residues		N ₂ O	139.81	0.1	135.78	0.0028	0.0%	100.0%	2.9%
Emission of HFCs		HFC-	0.00	0.0	0.00	0.0000	0.0%	100.0%	0.0%
Emission of SF ₆		SF ₆	0.00	0.0	0.00	0.0000	0.0%	100.0%	0.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.10	0.0	6.20	0.0018	0.0%	100.0%	-100.0%
TOTAL			181967		170065	9.5656	100.0%		

Table D1. Trend Analysis
1992 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1992	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	2363.83	1.2	851.45	0.6324	4.3%	4.3%	64.0%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	7.76	0.0	0.00	0.0035	0.0%	4.3%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	4.3%	0.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	4339.52	2.2	4168.15	0.1844	1.3%	5.6%	3.9%
Railways (Transport)	Hard Coal	CO ₂	34.06	0.0	29.73	0.0001	0.0%	5.6%	12.7%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	5.6%	0.0%
Other (Residential)	Hard Coal	CO ₂	4230.83	2.2	3845.79	0.0672	0.5%	6.0%	9.1%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	25565.63	13.2	20662.22	0.9247	6.3%	12.3%	19.2%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	82.22	0.0	59.79	0.0064	0.0%	12.4%	27.3%
Chemicals (Industry)	Lignite	CO ₂	43.60	0.0	529.42	0.2536	1.7%	14.1%	-1114.3%
Other (Industry)	Lignite	CO ₂	9069.87	4.7	9948.37	1.0240	7.0%	21.1%	-9.7%
Railways (Transport)	Lignite	CO ₂	1.99	0.0	21.87	0.0104	0.1%	21.1%	-1000.5%
Other (Residential)	Lignite	CO ₂	9807.53	5.1	9276.74	0.3426	2.3%	23.5%	5.4%
Other (Industry)	Asphalt	CO ₂	38.39	0.0	88.46	0.0283	0.2%	23.6%	-130.4%
Other (Residential)	Asphalt	CO ₂	290.41	0.1	390.56	0.0700	0.5%	24.1%	-34.5%
Iron and Steel (Industry)	Secondary Coal	CO ₂	7439.28	3.8	7681.10	0.5926	4.0%	28.1%	-3.3%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	100.53	0.1	73.36	0.0077	0.1%	28.2%	27.0%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	28.2%	0.0%
Other (Industry)	Secondary Coal	CO ₂	749.91	0.4	679.26	0.0107	0.1%	28.3%	9.4%
Other (Residential)	Secondary Coal	CO ₂	954.07	0.5	635.01	0.1048	0.7%	29.0%	33.4%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	29.0%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	1790.61	0.9	941.03	0.3262	2.2%	31.2%	47.4%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	4493.01	2.3	3375.90	0.2944	2.0%	33.2%	24.9%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	3836.55	2.0	3689.24	0.1652	1.1%	34.3%	3.8%
Iron and Steel (Industry)	Petroleum	CO ₂	1989.72	1.0	1720.93	0.0137	0.1%	34.4%	13.5%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	796.44	0.4	774.22	0.0386	0.3%	34.7%	2.8%
Chemicals (Industry)	Petroleum	CO ₂	2033.23	1.0	1984.26	0.1026	0.7%	35.4%	2.4%
Other (Industry)	Petroleum	CO ₂	7469.46	3.9	7050.12	0.2531	1.7%	37.1%	5.6%
Road Transportation (Transport)	Petroleum	CO ₂	23119.82	11.9	24035.93	1.9268	13.1%	50.2%	-4.0%
Railways (Transport)	Petroleum	CO ₂	461.28	0.2	465.05	0.0309	0.2%	50.4%	-0.8%
Navigation (Transport)	Petroleum	CO ₂	623.57	0.3	494.28	0.0276	0.2%	50.6%	20.7%
Other (Residential)	Petroleum	CO ₂	10189.80	5.3	9153.31	0.1054	0.7%	51.3%	10.2%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	5835.84	3.0	5795.38	0.3460	2.4%	53.7%	0.7%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	5535.84	2.9	5435.89	0.2965	2.0%	55.7%	1.8%
Iron and Steel (Industry)	Natural Gas	CO ₂	138.24	0.1	0.00	0.0627	0.4%	56.1%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.00	0.0	0.00	0.0000	0.0%	56.1%	0.0%
Chemicals (Industry)	Natural Gas	CO ₂	425.34	0.2	0.00	0.1929	1.3%	57.4%	100.0%
Other (Industry)	Natural Gas	CO ₂	2917.85	1.5	1729.02	0.4305	2.9%	60.4%	40.7%
Road Transportation (Transport)	Natural Gas	CO ₂	0.00	0.0	0.00	0.0000	0.0%	60.4%	0.0%
Other (Residential)	Natural Gas	CO ₂	791.14	0.4	104.21	0.3050	2.1%	62.4%	86.8%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	1071.10	0.6	904.59	0.0186	0.1%	62.6%	15.5%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.54	0.0	0.19	0.0001	0.0%	62.6%	64.0%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.02	0.0	0.00	0.0000	0.0%	62.6%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	62.6%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	9.83	0.0	9.44	0.0004	0.0%	62.6%	3.9%
Railways (Transport)	Hard Coal	CH ₄	0.08	0.0	0.07	0.0000	0.0%	62.6%	13.7%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	62.6%	0.0%
Other (Residential)	Hard Coal	CH ₄	287.51	0.1	261.34	0.0046	0.0%	62.6%	9.1%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	5.41	0.0	4.38	0.0002	0.0%	62.6%	19.2%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.17	0.0	0.13	0.0000	0.0%	62.6%	27.3%
Chemicals (Industry)	Lignite	CH ₄	0.09	0.0	1.12	0.0005	0.0%	62.6%	-1114.3%
Other (Industry)	Lignite	CH ₄	19.20	0.0	21.07	0.0022	0.0%	62.6%	-9.7%

Table D1. Trend Analysis
1992 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1992	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	62.6%	-988.3%
Other (Residential)	Lignite	CH ₄	623.01	0.3	589.29	0.0218	0.1%	62.8%	5.4%
Other (Industry)	Asphalt	CH ₄	0.09	0.0	0.20	0.0001	0.0%	62.8%	-130.4%
Other (Residential)	Asphalt	CH ₄	19.74	0.0	26.54	0.0048	0.0%	62.8%	-34.5%
Iron and Steel (Industry)	Secondary Coal	CH ₄	16.85	0.0	17.40	0.0013	0.0%	62.8%	-3.3%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.23	0.0	0.17	0.0000	0.0%	62.8%	27.0%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	62.8%	0.0%
Other (Industry)	Secondary Coal	CH ₄	1.70	0.0	1.54	0.0000	0.0%	62.8%	9.4%
Other (Residential)	Secondary Coal	CH ₄	64.83	0.0	43.15	0.0071	0.0%	62.8%	33.4%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	62.8%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	4.06	0.0	2.13	0.0007	0.0%	62.9%	47.4%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	3.90	0.0	2.93	0.0003	0.0%	62.9%	24.9%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	3.33	0.0	3.20	0.0001	0.0%	62.9%	3.8%
Iron and Steel (Industry)	Petroleum	CH ₄	1.15	0.0	1.00	0.0000	0.0%	62.9%	13.5%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.46	0.0	0.45	0.0000	0.0%	62.9%	2.8%
Chemicals (Industry)	Petroleum	CH ₄	1.18	0.0	1.15	0.0001	0.0%	62.9%	2.4%
Other (Industry)	Petroleum	CH ₄	4.32	0.0	4.08	0.0001	0.0%	62.9%	5.6%
Other (Residential)	Petroleum	CH ₄	29.47	0.0	26.48	0.0003	0.0%	62.9%	10.2%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	8.44	0.0	8.38	0.0005	0.0%	62.9%	0.7%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.08	0.0	2.05	0.0001	0.0%	62.9%	1.8%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.26	0.0	0.00	0.0001	0.0%	62.9%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.00	0.0	0.00	0.0000	0.0%	62.9%	0.0%
Chemicals (Industry)	Natural Gas	CH ₄	0.80	0.0	0.00	0.0004	0.0%	62.9%	100.0%
Other (Industry)	Natural Gas	CH ₄	5.49	0.0	3.25	0.0008	0.0%	62.9%	40.7%
Road Transportation (Transport)	Natural Gas	CH ₄	0.00	0.0	0.00	0.0000	0.0%	62.9%	0.0%
Other (Residential)	Natural Gas	CH ₄	1.49	0.0	0.20	0.0006	0.0%	62.9%	86.8%
Other (Residential)	Biomass	CH ₄	1901.39	1.0	1901.22	0.1195	0.8%	63.7%	0.0%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	2.64	0.0	1.31	0.0005	0.0%	63.7%	50.5%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	71.96	0.0	67.91	0.0024	0.0%	63.7%	5.6%
Railways (Transport)	Diesel+FuelOil	CH ₄	0.73	0.0	0.73	0.0000	0.0%	63.7%	0.3%
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.87	0.0	0.69	0.0000	0.0%	63.7%	20.9%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	11.07	0.0	3.99	0.0030	0.0%	63.7%	64.0%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.04	0.0	0.00	0.0000	0.0%	63.7%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	63.7%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	20.31	0.0	19.51	0.0009	0.0%	63.7%	3.9%
Railways (Transport)	Hard Coal	N ₂ O	0.46	0.0	0.39	0.0000	0.0%	63.7%	14.2%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	63.7%	0.0%
Other (Residential)	Hard Coal	N ₂ O	19.81	0.0	18.00	0.0003	0.0%	63.7%	9.1%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	111.88	0.1	90.42	0.0040	0.0%	63.8%	19.2%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.36	0.0	0.26	0.0000	0.0%	63.8%	27.3%
Chemicals (Industry)	Lignite	N ₂ O	0.19	0.0	2.32	0.0011	0.0%	63.8%	-1114.3%
Other (Industry)	Lignite	N ₂ O	39.69	0.0	43.53	0.0045	0.0%	63.8%	-9.7%
Railways (Transport)	Lignite	N ₂ O	0.02	0.0	0.27	0.0001	0.0%	63.8%	-982.0%
Other (Residential)	Lignite	N ₂ O	42.92	0.0	40.60	0.0015	0.0%	63.8%	5.4%
Other (Industry)	Asphalt	N ₂ O	0.18	0.0	0.41	0.0001	0.0%	63.8%	-130.4%
Other (Residential)	Asphalt	N ₂ O	1.36	0.0	1.83	0.0003	0.0%	63.8%	-34.5%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	34.83	0.0	35.96	0.0028	0.0%	63.8%	-3.3%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.47	0.0	0.34	0.0000	0.0%	63.8%	27.0%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	63.8%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	3.51	0.0	3.18	0.0000	0.0%	63.8%	9.4%
Other (Residential)	Secondary Coal	N ₂ O	4.47	0.0	2.97	0.0005	0.0%	63.8%	33.4%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	63.8%	0.0%

Table D1. Trend Analysis

1992 VS. 1990 TREND ANALYSIS									
CATEGORY	FUEL	GAS	EMISSION 1992	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	8.38	0.0	4.41	0.0015	0.0%	63.8%	47.4%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	11.51	0.0	8.65	0.0008	0.0%	63.9%	24.9%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	9.83	0.0	9.45	0.0004	0.0%	63.9%	3.8%
Iron and Steel (Industry)	Petroleum	N ₂ O	5.10	0.0	4.41	0.0000	0.0%	63.9%	13.5%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.04	0.0	1.98	0.0001	0.0%	63.9%	2.8%
Chemicals (Industry)	Petroleum	N ₂ O	5.21	0.0	5.08	0.0003	0.0%	63.9%	2.4%
Other (Industry)	Petroleum	N ₂ O	19.14	0.0	18.06	0.0006	0.0%	63.9%	5.6%
Other (Residential)	Petroleum	N ₂ O	26.11	0.0	23.45	0.0003	0.0%	63.9%	10.2%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	14.95	0.0	14.85	0.0009	0.0%	63.9%	0.7%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	3.07	0.0	3.02	0.0002	0.0%	63.9%	1.8%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.08	0.0	0.00	0.0000	0.0%	63.9%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	63.9%	0.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.24	0.0	0.00	0.0001	0.0%	63.9%	100.0%
Other (Industry)	Natural Gas	N ₂ O	1.62	0.0	0.96	0.0002	0.0%	63.9%	40.7%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	63.9%	0.0%
Other (Residential)	Natural Gas	N ₂ O	0.44	0.0	0.06	0.0002	0.0%	63.9%	86.8%
Other (Residential)	Biomass	N ₂ O	374.24	0.2	374.21	0.0235	0.2%	64.0%	0.0%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	10.89	0.0	9.08	0.0002	0.0%	64.0%	16.6%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	230.15	0.1	246.86	0.0231	0.2%	64.2%	-7.3%
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.39	0.0	3.36	0.0002	0.0%	64.2%	0.9%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.54	0.0	1.22	0.0001	0.0%	64.2%	21.0%
Cement Production (Mineral Products)		CO ₂	11814.06	6.1	10333.37	0.0218	0.1%	64.3%	12.5%
Lime Production (Mineral Products)		CO ₂	738.75	0.4	645.09	0.0019	0.0%	64.4%	12.7%
Limestone and Dolomite Use (Mineral Products)		CO ₂	9.69	0.0	21.52	0.0067	0.0%	64.4%	-122.1%
Soda Ash Production and Use (Mineral Products)		CO ₂	105.97	0.1	106.30	0.0068	0.0%	64.4%	-0.3%
Ammonia Production (Chemical Industry)		CO ₂	647.45	0.3	713.47	0.0748	0.5%	65.0%	-10.2%
Carbide Production (Chemical Industry)		CO ₂	73.31	0.0	112.25	0.0247	0.2%	65.1%	-53.1%
Aluminium Production (Metal Production)		CO ₂	105.45	0.1	109.62	0.0088	0.1%	65.2%	-4.0%
Iron and Steel Production (Metal Production)		CO ₂	685.00	0.4	770.23	0.0871	0.6%	65.8%	-12.4%
Ferroalloys Production (Metal Production)		CO ₂	113.88	0.1	81.17	0.0097	0.1%	65.8%	28.7%
Other Chemicals Production (Chemical Industry)		CH ₄	47.95	0.0	49.39	0.0038	0.0%	65.9%	-3.0%
Nitric Acid Production (Chemical Industry)		N ₂ O	2889.03	1.5	128.08	1.2442	8.5%	74.3%	95.6%
Enteric Fermentation		CH ₄	17433.61	9.0	17046.76	0.8964	6.1%	80.4%	2.2%
Manure Management		CH ₄	660.84	0.3	613.63	0.0172	0.1%	80.5%	7.1%
Rice Cultivation		CH ₄	180.60	0.1	222.60	0.0330	0.2%	80.8%	-23.3%
Solid Waste		CH ₄	13293.25	6.9	6386.46	2.7310	18.6%	99.3%	52.0%
Fugitive (Coal Mining)		CH ₄	1517.40	0.8	1430.32	0.0504	0.3%	99.7%	5.7%
Field Burning of Agricultural Residues		CH ₄	437.43	0.2	454.59	0.0364	0.2%	99.9%	-3.9%
Field Burning of Agricultural Residues		N ₂ O	130.82	0.1	135.78	0.0108	0.1%	100.0%	-3.8%
Emission of HFCs		HFC-	0.00	0.0	0.00	0.0000	0.0%	100.0%	0.0%
Emission of SF6		SF ₆	0.00	0.0	0.00	0.0000	0.0%	100.0%	0.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	6.20	0.0	6.20	0.0004	0.0%	100.0%	0.0%
TOTAL			193642		170065	14.7076	100.0%		

Table D1. Trend Analysis
1993 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1993	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	2293.97	1.1	851.45	0.5202	3.2%	3.2%	62.9%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	7.76	0.0	0.00	0.0032	0.0%	3.2%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	3.2%	0.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	4001.82	2.0	4168.15	0.4078	2.5%	5.8%	-4.2%
Railways (Transport)	Hard Coal	CO ₂	36.37	0.0	29.73	0.0003	0.0%	5.8%	18.2%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	5.8%	0.0%
Other (Residential)	Hard Coal	CO ₂	4091.10	2.0	3845.79	0.2132	1.3%	7.1%	6.0%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	23604.42	11.6	20662.22	0.4819	3.0%	10.1%	12.5%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	74.74	0.0	59.79	0.0012	0.0%	10.1%	20.0%
Chemicals (Industry)	Lignite	CO ₂	37.37	0.0	529.42	0.2443	1.5%	11.6%	-1316.7%
Other (Industry)	Lignite	CO ₂	8373.99	4.1	9948.37	1.4545	9.0%	20.6%	-18.8%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	20.6%	0.0%
Other (Residential)	Lignite	CO ₂	9074.85	4.4	9276.74	0.8388	5.2%	25.8%	-2.2%
Other (Industry)	Asphalt	CO ₂	21.70	0.0	88.46	0.0345	0.2%	26.1%	-307.7%
Other (Residential)	Asphalt	CO ₂	148.54	0.1	390.56	0.1308	0.8%	26.9%	-162.9%
Iron and Steel (Industry)	Secondary Coal	CO ₂	7327.88	3.6	7681.10	0.7705	4.8%	31.6%	-4.8%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	105.96	0.1	73.36	0.0073	0.0%	31.7%	30.8%
Chemicals (Industry)	Secondary Coal	CO ₂	244.53	0.1	0.00	0.0999	0.6%	32.3%	100.0%
Other (Industry)	Secondary Coal	CO ₂	557.00	0.3	679.26	0.1053	0.7%	33.0%	-22.0%
Other (Residential)	Secondary Coal	CO ₂	557.38	0.3	635.01	0.0835	0.5%	33.5%	-13.9%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	33.5%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	2893.89	1.4	941.03	0.7214	4.5%	38.0%	67.5%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	4838.87	2.4	3375.90	0.3227	2.0%	40.0%	30.2%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4447.45	2.2	3689.24	0.0091	0.1%	40.0%	17.0%
Iron and Steel (Industry)	Petroleum	CO ₂	2096.63	1.0	1720.93	0.0133	0.1%	40.1%	17.9%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	715.45	0.4	774.22	0.0871	0.5%	40.6%	-8.2%
Chemicals (Industry)	Petroleum	CO ₂	2032.34	1.0	1984.26	0.1421	0.9%	41.5%	2.4%
Other (Industry)	Petroleum	CO ₂	8057.43	3.9	7050.12	0.1630	1.0%	42.5%	12.5%
Road Transportation (Transport)	Petroleum	CO ₂	28267.61	13.9	24035.93	0.2299	1.4%	44.0%	15.0%
Railways (Transport)	Petroleum	CO ₂	547.03	0.3	465.05	0.0044	0.0%	44.0%	15.0%
Navigation (Transport)	Petroleum	CO ₂	648.82	0.3	494.28	0.0229	0.1%	44.1%	23.8%
Other (Residential)	Petroleum	CO ₂	10691.34	5.2	9153.31	0.1176	0.7%	44.9%	14.4%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	7188.11	3.5	5795.38	0.0968	0.6%	45.5%	19.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	5380.59	2.6	5435.89	0.4657	2.9%	48.4%	-1.0%
Iron and Steel (Industry)	Natural Gas	CO ₂	8.51	0.0	0.00	0.0035	0.0%	48.4%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.00	0.0	0.00	0.0000	0.0%	48.4%	0.0%
Chemicals (Industry)	Natural Gas	CO ₂	542.31	0.3	0.00	0.2216	1.4%	49.7%	100.0%
Other (Industry)	Natural Gas	CO ₂	3713.25	1.8	1729.02	0.6700	4.2%	53.9%	53.4%
Road Transportation (Transport)	Natural Gas	CO ₂	0.00	0.0	0.00	0.0000	0.0%	53.9%	0.0%
Other (Residential)	Natural Gas	CO ₂	1176.07	0.6	104.21	0.4296	2.7%	56.6%	91.1%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	1441.81	0.7	904.59	0.1458	0.9%	57.5%	37.3%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.52	0.0	0.19	0.0001	0.0%	57.5%	62.9%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.02	0.0	0.00	0.0000	0.0%	57.5%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	57.5%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	9.06	0.0	9.44	0.0009	0.0%	57.5%	-4.2%
Railways (Transport)	Hard Coal	CH ₄	0.09	0.0	0.07	0.0000	0.0%	57.5%	19.6%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	57.5%	0.0%
Other (Residential)	Hard Coal	CH ₄	278.01	0.1	261.34	0.0145	0.1%	57.6%	6.0%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	5.00	0.0	4.38	0.0001	0.0%	57.6%	12.5%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.16	0.0	0.13	0.0000	0.0%	57.6%	20.0%
Chemicals (Industry)	Lignite	CH ₄	0.08	0.0	1.12	0.0005	0.0%	57.6%	-1316.7%
Other (Industry)	Lignite	CH ₄	17.73	0.0	21.07	0.0031	0.0%	57.6%	-18.8%

Table D1. Trend Analysis
1993 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1993	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	57.6%	0.0%
Other (Residential)	Lignite	CH ₄	576.47	0.3	589.29	0.0533	0.3%	57.9%	-2.2%
Other (Industry)	Asphalt	CH ₄	0.05	0.0	0.20	0.0001	0.0%	57.9%	-307.7%
Other (Residential)	Asphalt	CH ₄	10.09	0.0	26.54	0.0089	0.1%	58.0%	-162.9%
Iron and Steel (Industry)	Secondary Coal	CH ₄	16.60	0.0	17.40	0.0017	0.0%	58.0%	-4.8%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.24	0.0	0.17	0.0000	0.0%	58.0%	30.8%
Chemicals (Industry)	Secondary Coal	CH ₄	0.55	0.0	0.00	0.0002	0.0%	58.0%	100.0%
Other (Industry)	Secondary Coal	CH ₄	1.26	0.0	1.54	0.0002	0.0%	58.0%	-22.0%
Other (Residential)	Secondary Coal	CH ₄	37.88	0.0	43.15	0.0057	0.0%	58.0%	-13.9%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	58.0%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	6.56	0.0	2.13	0.0016	0.0%	58.0%	67.5%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	4.20	0.0	2.93	0.0003	0.0%	58.0%	30.2%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	3.86	0.0	3.20	0.0000	0.0%	58.0%	17.0%
Iron and Steel (Industry)	Petroleum	CH ₄	1.21	0.0	1.00	0.0000	0.0%	58.0%	17.9%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.41	0.0	0.45	0.0001	0.0%	58.0%	-8.2%
Chemicals (Industry)	Petroleum	CH ₄	1.18	0.0	1.15	0.0001	0.0%	58.0%	2.4%
Other (Industry)	Petroleum	CH ₄	4.66	0.0	4.08	0.0001	0.0%	58.0%	12.5%
Other (Residential)	Petroleum	CH ₄	30.93	0.0	26.48	0.0003	0.0%	58.0%	14.4%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	10.40	0.0	8.38	0.0001	0.0%	58.0%	19.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.02	0.0	2.05	0.0002	0.0%	58.0%	-1.0%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.02	0.0	0.00	0.0000	0.0%	58.0%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.00	0.0	0.00	0.0000	0.0%	58.0%	0.0%
Chemicals (Industry)	Natural Gas	CH ₄	1.02	0.0	0.00	0.0004	0.0%	58.1%	100.0%
Other (Industry)	Natural Gas	CH ₄	6.98	0.0	3.25	0.0013	0.0%	58.1%	53.4%
Road Transportation (Transport)	Natural Gas	CH ₄	0.00	0.0	0.00	0.0000	0.0%	58.1%	0.0%
Other (Residential)	Natural Gas	CH ₄	2.21	0.0	0.20	0.0008	0.0%	58.1%	91.1%
Other (Residential)	Biomass	CH ₄	1885.42	0.9	1901.22	0.1614	1.0%	59.1%	-0.8%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.31	0.0	1.31	0.0001	0.0%	59.1%	0.4%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	85.92	0.0	67.91	0.0018	0.0%	59.1%	21.0%
Railways (Transport)	Diesel+FuelOil	CH ₄	0.87	0.0	0.73	0.0000	0.0%	59.1%	16.4%
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.91	0.0	0.69	0.0000	0.0%	59.1%	24.0%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	10.74	0.0	3.99	0.0024	0.0%	59.1%	62.9%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.04	0.0	0.00	0.0000	0.0%	59.1%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	59.1%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	18.73	0.0	19.51	0.0019	0.0%	59.1%	-4.2%
Railways (Transport)	Hard Coal	N ₂ O	0.49	0.0	0.39	0.0000	0.0%	59.1%	20.2%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	59.1%	0.0%
Other (Residential)	Hard Coal	N ₂ O	19.15	0.0	18.00	0.0010	0.0%	59.1%	6.0%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	103.29	0.1	90.42	0.0021	0.0%	59.1%	12.5%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.33	0.0	0.26	0.0000	0.0%	59.1%	20.0%
Chemicals (Industry)	Lignite	N ₂ O	0.16	0.0	2.32	0.0011	0.0%	59.1%	-1316.7%
Other (Industry)	Lignite	N ₂ O	36.65	0.0	43.53	0.0064	0.0%	59.2%	-18.8%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	59.2%	0.0%
Other (Residential)	Lignite	N ₂ O	39.71	0.0	40.60	0.0037	0.0%	59.2%	-2.2%
Other (Industry)	Asphalt	N ₂ O	0.10	0.0	0.41	0.0002	0.0%	59.2%	-307.7%
Other (Residential)	Asphalt	N ₂ O	0.70	0.0	1.83	0.0006	0.0%	59.2%	-162.9%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	34.30	0.0	35.96	0.0036	0.0%	59.2%	-4.8%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.50	0.0	0.34	0.0000	0.0%	59.2%	30.8%
Chemicals (Industry)	Secondary Coal	N ₂ O	1.14	0.0	0.00	0.0005	0.0%	59.2%	100.0%
Other (Industry)	Secondary Coal	N ₂ O	2.61	0.0	3.18	0.0005	0.0%	59.2%	-22.0%
Other (Residential)	Secondary Coal	N ₂ O	2.61	0.0	2.97	0.0004	0.0%	59.2%	-13.9%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	59.2%	0.0%

Table D1. Trend Analysis
1993 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1993	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	13.55	0.0	4.41	0.0034	0.0%	59.2%	67.5%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	12.40	0.0	8.65	0.0008	0.0%	59.3%	30.2%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	11.39	0.0	9.45	0.0000	0.0%	59.3%	17.0%
Iron and Steel (Industry)	Petroleum	N ₂ O	5.37	0.0	4.41	0.0000	0.0%	59.3%	17.9%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	1.83	0.0	1.98	0.0002	0.0%	59.3%	-8.2%
Chemicals (Industry)	Petroleum	N ₂ O	5.21	0.0	5.08	0.0004	0.0%	59.3%	2.4%
Other (Industry)	Petroleum	N ₂ O	20.64	0.0	18.06	0.0004	0.0%	59.3%	12.5%
Other (Residential)	Petroleum	N ₂ O	27.39	0.0	23.45	0.0003	0.0%	59.3%	14.4%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	18.42	0.0	14.85	0.0002	0.0%	59.3%	19.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	2.99	0.0	3.02	0.0003	0.0%	59.3%	-1.0%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	59.3%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	59.3%	0.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.30	0.0	0.00	0.0001	0.0%	59.3%	100.0%
Other (Industry)	Natural Gas	N ₂ O	2.06	0.0	0.96	0.0004	0.0%	59.3%	53.4%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	59.3%	0.0%
Other (Residential)	Natural Gas	N ₂ O	0.65	0.0	0.06	0.0002	0.0%	59.3%	91.1%
Other (Residential)	Biomass	N ₂ O	371.10	0.2	374.21	0.0318	0.2%	59.5%	-0.8%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	14.56	0.0	9.08	0.0015	0.0%	59.5%	37.6%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	280.46	0.1	246.86	0.0064	0.0%	59.5%	12.0%
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.05	0.0	3.36	0.0000	0.0%	59.5%	17.0%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.61	0.0	1.22	0.0001	0.0%	59.5%	24.2%
Cement Production (Mineral Products)		CO ₂	12725.64	6.2	10333.37	0.1354	0.8%	60.4%	18.8%
Lime Production (Mineral Products)		CO ₂	897.56	0.4	645.09	0.0506	0.3%	60.7%	28.1%
Limestone and Dolomite Use (Mineral Products)		CO ₂	8.84	0.0	21.52	0.0069	0.0%	60.7%	-143.3%
Soda Ash Production and Use (Mineral Products)		CO ₂	113.22	0.1	106.30	0.0058	0.0%	60.7%	6.1%
Ammonia Production (Chemical Industry)		CO ₂	1023.13	0.5	713.47	0.0684	0.4%	61.2%	30.3%
Carbide Production (Chemical Industry)		CO ₂	42.15	0.0	112.25	0.0378	0.2%	61.4%	-166.3%
Aluminium Production (Metal Production)		CO ₂	105.30	0.1	109.62	0.0107	0.1%	61.5%	-4.1%
Iron and Steel Production (Metal Production)		CO ₂	628.57	0.3	770.23	0.1207	0.7%	62.2%	-22.5%
Ferroalloys Production (Metal Production)		CO ₂	117.04	0.1	81.17	0.0080	0.0%	62.3%	30.6%
Other Chemicals Production (Chemical Industry)		CH ₄	44.83	0.0	49.39	0.0059	0.0%	62.3%	-10.2%
Nitric Acid Production (Chemical Industry)		N ₂ O	2885.21	1.4	128.08	1.1164	6.9%	69.2%	95.6%
Enteric Fermentation		CH ₄	17123.93	8.4	17046.76	1.3581	8.4%	77.7%	0.5%
Manure Management		CH ₄	687.83	0.3	613.63	0.0197	0.1%	77.8%	10.8%
Rice Cultivation		CH ₄	188.37	0.1	222.60	0.0321	0.2%	78.0%	-18.2%
Solid Waste		CH ₄	15994.62	7.8	6386.46	3.4063	21.1%	99.1%	60.1%
Fugitive (Coal Mining)		CH ₄	1459.52	0.7	1430.32	0.1047	0.6%	99.8%	2.0%
Field Burning of Agricultural Residues		CH ₄	475.80	0.2	454.59	0.0284	0.2%	99.9%	4.5%
Field Burning of Agricultural Residues		N ₂ O	141.98	0.1	135.78	0.0085	0.1%	100.0%	4.4%
Emission of HFCs		HFC-	0.00	0.0	0.00	0.0000	0.0%	100.0%	0.0%
Emission of SF ₆		SF ₆	0.00	0.0	0.00	0.0000	0.0%	100.0%	0.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	6.20	0.0	6.20	0.0005	0.0%	100.0%	0.0%
TOTAL			203986		170065	16.1179	100.0%		

Table D1. Trend Analysis
1994 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1994	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	2546.26	1.3	851.45	0.6527	3.1%	3.1%	66.6%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	3.1%	0.0%
Chemicals (Industry)	Hard Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	3.1%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	4199.78	2.1	4168.15	0.3020	1.5%	4.6%	0.8%
Railways (Transport)	Hard Coal	CO ₂	17.49	0.0	29.73	0.0074	0.0%	4.6%	-70.0%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	4.6%	0.0%
Other (Residential)	Hard Coal	CO ₂	2243.51	1.1	3845.79	0.9690	4.7%	9.3%	-71.4%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	28638.54	14.3	20662.22	1.8115	8.7%	18.0%	27.9%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	49.83	0.0	59.79	0.0087	0.0%	18.0%	-20.0%
Chemicals (Industry)	Lignite	CO ₂	31.14	0.0	529.42	0.2509	1.2%	19.2%	-1600.0%
Other (Industry)	Lignite	CO ₂	6162.39	3.1	9948.37	2.3548	11.3%	30.6%	-61.4%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	30.6%	0.0%
Other (Residential)	Lignite	CO ₂	8011.03	4.0	9276.74	1.2376	5.9%	36.5%	-15.8%
Other (Industry)	Asphalt	CO ₂	0.00	0.0	88.46	0.0000	0.0%	36.5%	0.0%
Other (Residential)	Asphalt	CO ₂	0.00	0.0	390.56	0.0000	0.0%	36.5%	0.0%
Iron and Steel (Industry)	Secondary Coal	CO ₂	7344.18	3.7	7681.10	0.7238	3.5%	40.0%	-4.6%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	179.33	0.1	73.36	0.0393	0.2%	40.2%	59.1%
Chemicals (Industry)	Secondary Coal	CO ₂	230.95	0.1	0.00	0.0977	0.5%	40.6%	100.0%
Other (Industry)	Secondary Coal	CO ₂	429.29	0.2	679.26	0.1572	0.8%	41.4%	-58.2%
Other (Residential)	Secondary Coal	CO ₂	255.79	0.1	635.01	0.2085	1.0%	42.4%	-148.3%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	74.80	0.0	103.25	0.0199	0.1%	42.5%	-38.0%
Other (Industry)	Petroleum Coke	CO ₂	3150.43	1.6	941.03	0.8637	4.2%	46.6%	70.1%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	5048.60	2.5	3375.90	0.4523	2.2%	48.8%	33.1%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4717.11	2.4	3689.24	0.1558	0.7%	49.6%	21.8%
Iron and Steel (Industry)	Petroleum	CO ₂	1902.82	0.9	1720.93	0.0533	0.3%	49.8%	9.6%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	902.64	0.5	774.22	0.0042	0.0%	49.8%	14.2%
Chemicals (Industry)	Petroleum	CO ₂	1946.53	1.0	1984.26	0.1661	0.8%	50.6%	-1.9%
Other (Industry)	Petroleum	CO ₂	6977.40	3.5	7050.12	0.5643	2.7%	53.4%	-1.0%
Road Transportation (Transport)	Petroleum	CO ₂	26527.50	13.2	24035.93	0.7646	3.7%	57.0%	9.4%
Railways (Transport)	Petroleum	CO ₂	600.98	0.3	465.05	0.0223	0.1%	57.1%	22.6%
Navigation (Transport)	Petroleum	CO ₂	609.55	0.3	494.28	0.0114	0.1%	57.2%	18.9%
Other (Residential)	Petroleum	CO ₂	10119.68	5.0	9153.31	0.2837	1.4%	58.6%	9.5%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	7224.80	3.6	5795.38	0.1663	0.8%	59.4%	19.8%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	6224.90	3.1	5435.89	0.0775	0.4%	59.7%	12.7%
Iron and Steel (Industry)	Natural Gas	CO ₂	8.51	0.0	0.00	0.0036	0.0%	59.7%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.00	0.0	0.00	0.0000	0.0%	59.7%	0.0%
Chemicals (Industry)	Natural Gas	CO ₂	340.27	0.2	0.00	0.1440	0.7%	60.4%	100.0%
Other (Industry)	Natural Gas	CO ₂	3149.67	1.6	1729.02	0.4703	2.3%	62.7%	45.1%
Road Transportation (Transport)	Natural Gas	CO ₂	6.26	0.0	0.00	0.0027	0.0%	62.7%	100.0%
Other (Residential)	Natural Gas	CO ₂	1718.39	0.9	104.21	0.6751	3.2%	66.0%	93.9%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	1618.45	0.8	904.59	0.2336	1.1%	67.1%	44.1%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.58	0.0	0.19	0.0001	0.0%	67.1%	66.6%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.1%	0.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.1%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	9.51	0.0	9.44	0.0007	0.0%	67.1%	0.8%
Railways (Transport)	Hard Coal	CH ₄	0.04	0.0	0.07	0.0000	0.0%	67.1%	-64.2%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	67.1%	0.0%
Other (Residential)	Hard Coal	CH ₄	152.46	0.1	261.34	0.0658	0.3%	67.4%	-71.4%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	6.06	0.0	4.38	0.0004	0.0%	67.4%	27.9%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.11	0.0	0.13	0.0000	0.0%	67.4%	-20.0%
Chemicals (Industry)	Lignite	CH ₄	0.07	0.0	1.12	0.0005	0.0%	67.4%	-1600.0%
Other (Industry)	Lignite	CH ₄	13.05	0.0	21.07	0.0050	0.0%	67.4%	-61.4%

Table D1. Trend Analysis
1994 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1994	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	67.4%	0.0%
Other (Residential)	Lignite	CH ₄	508.89	0.3	589.29	0.0786	0.4%	67.8%	-15.8%
Other (Industry)	Asphalt	CH ₄	0.00	0.0	0.20	0.0000	0.0%	67.8%	0.0%
Other (Residential)	Asphalt	CH ₄	0.00	0.0	26.54	0.0000	0.0%	67.8%	0.0%
Iron and Steel (Industry)	Secondary Coal	CH ₄	16.64	0.0	17.40	0.0016	0.0%	67.8%	-4.6%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.41	0.0	0.17	0.0001	0.0%	67.8%	59.1%
Chemicals (Industry)	Secondary Coal	CH ₄	0.52	0.0	0.00	0.0002	0.0%	67.8%	100.0%
Other (Industry)	Secondary Coal	CH ₄	0.97	0.0	1.54	0.0004	0.0%	67.8%	-58.2%
Other (Residential)	Secondary Coal	CH ₄	17.38	0.0	43.15	0.0142	0.1%	67.9%	-148.3%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.17	0.0	0.23	0.0000	0.0%	67.9%	-38.0%
Other (Industry)	Petroleum Coke	CH ₄	7.14	0.0	2.13	0.0020	0.0%	67.9%	70.1%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	4.38	0.0	2.93	0.0004	0.0%	67.9%	33.1%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.09	0.0	3.20	0.0001	0.0%	67.9%	21.8%
Iron and Steel (Industry)	Petroleum	CH ₄	1.10	0.0	1.00	0.0000	0.0%	67.9%	9.6%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.52	0.0	0.45	0.0000	0.0%	67.9%	14.2%
Chemicals (Industry)	Petroleum	CH ₄	1.13	0.0	1.15	0.0001	0.0%	67.9%	-1.9%
Other (Industry)	Petroleum	CH ₄	4.04	0.0	4.08	0.0003	0.0%	67.9%	-1.0%
Other (Residential)	Petroleum	CH ₄	29.27	0.0	26.48	0.0008	0.0%	67.9%	9.5%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	10.45	0.0	8.38	0.0002	0.0%	67.9%	19.8%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.34	0.0	2.05	0.0000	0.0%	67.9%	12.7%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.02	0.0	0.00	0.0000	0.0%	67.9%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.9%	0.0%
Chemicals (Industry)	Natural Gas	CH ₄	0.64	0.0	0.00	0.0003	0.0%	67.9%	100.0%
Other (Industry)	Natural Gas	CH ₄	5.92	0.0	3.25	0.0009	0.0%	67.9%	45.1%
Road Transportation (Transport)	Natural Gas	CH ₄	0.14	0.0	0.00	0.0001	0.0%	67.9%	100.0%
Other (Residential)	Natural Gas	CH ₄	3.33	0.0	0.20	0.0013	0.0%	67.9%	94.1%
Other (Residential)	Biomass	CH ₄	1875.03	0.9	1901.22	0.1549	0.7%	68.7%	-1.4%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.35	0.0	1.31	0.0001	0.0%	68.7%	3.3%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	103.78	0.1	67.91	0.0100	0.0%	68.7%	34.6%
Railways (Transport)	Diesel+FuelOil	CH ₄	0.97	0.0	0.73	0.0000	0.0%	68.7%	25.3%
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.85	0.0	0.69	0.0000	0.0%	68.7%	19.3%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	11.92	0.0	3.99	0.0031	0.0%	68.7%	66.6%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	68.7%	0.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	68.7%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	19.66	0.0	19.51	0.0014	0.0%	68.7%	0.8%
Railways (Transport)	Hard Coal	N ₂ O	0.24	0.0	0.39	0.0001	0.0%	68.7%	-61.5%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	68.7%	0.0%
Other (Residential)	Hard Coal	N ₂ O	10.50	0.0	18.00	0.0045	0.0%	68.8%	-71.4%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	125.32	0.1	90.42	0.0079	0.0%	68.8%	27.9%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.22	0.0	0.26	0.0000	0.0%	68.8%	-20.0%
Chemicals (Industry)	Lignite	N ₂ O	0.14	0.0	2.32	0.0011	0.0%	68.8%	-1600.0%
Other (Industry)	Lignite	N ₂ O	26.97	0.0	43.53	0.0103	0.0%	68.8%	-61.4%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	68.8%	0.0%
Other (Residential)	Lignite	N ₂ O	35.06	0.0	40.60	0.0054	0.0%	68.9%	-15.8%
Other (Industry)	Asphalt	N ₂ O	0.00	0.0	0.41	0.0000	0.0%	68.9%	0.0%
Other (Residential)	Asphalt	N ₂ O	0.00	0.0	1.83	0.0000	0.0%	68.9%	0.0%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	34.38	0.0	35.96	0.0034	0.0%	68.9%	-4.6%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.84	0.0	0.34	0.0002	0.0%	68.9%	59.1%
Chemicals (Industry)	Secondary Coal	N ₂ O	1.08	0.0	0.00	0.0005	0.0%	68.9%	100.0%
Other (Industry)	Secondary Coal	N ₂ O	2.01	0.0	3.18	0.0007	0.0%	68.9%	-58.2%
Other (Residential)	Secondary Coal	N ₂ O	1.20	0.0	2.97	0.0010	0.0%	68.9%	-148.3%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.35	0.0	0.48	0.0001	0.0%	68.9%	-38.0%

Table D1. Trend Analysis
1994 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1994	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	14.75	0.0	4.41	0.0040	0.0%	68.9%	70.1%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	12.93	0.0	8.65	0.0012	0.0%	68.9%	33.1%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	12.09	0.0	9.45	0.0004	0.0%	68.9%	21.8%
Iron and Steel (Industry)	Petroleum	N ₂ O	4.88	0.0	4.41	0.0001	0.0%	68.9%	9.6%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.31	0.0	1.98	0.0000	0.0%	68.9%	14.2%
Chemicals (Industry)	Petroleum	N ₂ O	4.99	0.0	5.08	0.0004	0.0%	68.9%	-1.9%
Other (Industry)	Petroleum	N ₂ O	17.88	0.0	18.06	0.0014	0.0%	68.9%	-1.0%
Other (Residential)	Petroleum	N ₂ O	25.93	0.0	23.45	0.0007	0.0%	68.9%	9.5%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	18.51	0.0	14.85	0.0004	0.0%	68.9%	19.8%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	3.46	0.0	3.02	0.0000	0.0%	68.9%	12.7%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	68.9%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	68.9%	0.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.19	0.0	0.00	0.0001	0.0%	68.9%	100.0%
Other (Industry)	Natural Gas	N ₂ O	1.75	0.0	0.96	0.0003	0.0%	68.9%	45.1%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	68.9%	100.0%
Other (Residential)	Natural Gas	N ₂ O	0.98	0.0	0.06	0.0004	0.0%	68.9%	94.1%
Other (Residential)	Biomass	N ₂ O	369.05	0.2	374.21	0.0305	0.1%	69.1%	-1.4%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	16.33	0.0	9.08	0.0024	0.0%	69.1%	44.4%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	280.25	0.1	246.86	0.0046	0.0%	69.1%	11.9%
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.57	0.0	3.36	0.0003	0.0%	69.1%	26.5%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.51	0.0	1.22	0.0000	0.0%	69.1%	19.5%
Cement Production (Mineral Products)		CO ₂	13205.08	6.6	10333.37	0.4332	2.1%	71.2%	21.7%
Lime Production (Mineral Products)		CO ₂	847.05	0.4	645.09	0.0366	0.2%	71.4%	23.8%
Limestone and Dolomite Use (Mineral Products)		CO ₂	7.61	0.0	21.52	0.0075	0.0%	71.4%	-182.7%
Soda Ash Production and Use (Mineral Products)		CO ₂	112.83	0.1	106.30	0.0053	0.0%	71.4%	5.8%
Ammonia Production (Chemical Industry)		CO ₂	805.22	0.4	713.47	0.0152	0.1%	71.5%	11.4%
Carbide Production (Chemical Industry)		CO ₂	51.96	0.0	112.25	0.0340	0.2%	71.7%	-116.0%
Aluminium Production (Metal Production)		CO ₂	107.56	0.1	109.62	0.0092	0.0%	71.7%	-1.9%
Iron and Steel Production (Metal Production)		CO ₂	631.31	0.3	770.23	0.1171	0.6%	72.3%	-22.0%
Ferroalloys Production (Metal Production)		CO ₂	126.80	0.1	81.17	0.0132	0.1%	72.4%	36.0%
Other Chemicals Production (Chemical Industry)		CH ₄	45.58	0.0	49.39	0.0054	0.0%	72.4%	-8.4%
Nitric Acid Production (Chemical Industry)		N ₂ O	989.30	0.5	128.08	0.3547	1.7%	74.1%	87.1%
Enteric Fermentation		CH ₄	16849.54	8.4	17046.76	1.3734	6.6%	80.7%	-1.2%
Manure Management		CH ₄	768.40	0.4	613.63	0.0191	0.1%	80.8%	20.1%
Rice Cultivation		CH ₄	170.10	0.1	222.60	0.0391	0.2%	81.0%	-30.9%
Solid Waste		CH ₄	16594.53	8.3	6386.46	3.8361	18.4%	99.4%	61.5%
Fugitive (Coal Mining)		CH ₄	1569.12	0.8	1430.32	0.0495	0.2%	99.6%	8.8%
Field Burning of Agricultural Residues		CH ₄	406.20	0.2	454.59	0.0549	0.3%	99.9%	-11.9%
Field Burning of Agricultural Residues		N ₂ O	120.90	0.1	135.78	0.0166	0.1%	100.0%	-12.3%
Emission of HFCs		HFC-	0.00	0.0	0.00	0.0000	0.0%	100.0%	0.0%
Emission of SF6		SF ₆	0.00	0.0	0.00	0.0000	0.0%	100.0%	0.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	15.50	0.0	6.20	0.0035	0.0%	100.0%	60.0%
TOTAL			200479		170065	20.8054	100.0%		

Table D1. Trend Analysis
1995 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1995	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	2204.69	1.0	851.45	0.3839	1.8%	1.8%	61.4%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	93.16	0.0	0.00	0.0325	0.2%	2.0%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	104.80	0.0	0.00	0.0366	0.2%	2.2%	100.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	4366.69	2.0	4168.15	0.3641	1.7%	3.9%	4.5%
Railways (Transport)	Hard Coal	CO ₂	7.05	0.0	29.73	0.0110	0.1%	3.9%	-321.7%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	3.9%	0.0%
Other (Residential)	Hard Coal	CO ₂	3318.68	1.5	3845.79	0.5839	2.8%	6.7%	-15.9%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	28405.23	12.9	20662.22	0.5544	2.6%	9.4%	27.3%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	49.83	0.0	59.79	0.0097	0.0%	9.4%	-20.0%
Chemicals (Industry)	Lignite	CO ₂	31.14	0.0	529.42	0.2290	1.1%	10.5%	-1600.0%
Other (Industry)	Lignite	CO ₂	7409.37	3.4	9948.37	1.9207	9.1%	19.6%	-34.3%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	19.6%	0.0%
Other (Residential)	Lignite	CO ₂	8138.34	3.7	9276.74	1.3620	6.5%	26.1%	-14.0%
Other (Industry)	Asphalt	CO ₂	76.78	0.0	88.46	0.0133	0.1%	26.2%	-15.2%
Other (Residential)	Asphalt	CO ₂	32.55	0.0	390.56	0.1656	0.8%	27.0%	-1100.0%
Iron and Steel (Industry)	Secondary Coal	CO ₂	7860.42	3.6	7681.10	0.7361	3.5%	30.5%	2.3%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	201.06	0.1	73.36	0.0369	0.2%	30.6%	63.5%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	30.6%	0.0%
Other (Industry)	Secondary Coal	CO ₂	350.50	0.2	679.26	0.1854	0.9%	31.5%	-93.8%
Other (Residential)	Secondary Coal	CO ₂	291.11	0.1	635.01	0.1861	0.9%	32.4%	-118.1%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	71.80	0.0	103.25	0.0217	0.1%	32.5%	-43.8%
Other (Industry)	Petroleum Coke	CO ₂	2782.43	1.3	941.03	0.5449	2.6%	35.1%	66.2%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	5479.82	2.5	3375.90	0.3834	1.8%	36.9%	38.4%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	3563.95	1.6	3689.24	0.4273	2.0%	39.0%	-3.5%
Iron and Steel (Industry)	Petroleum	CO ₂	1781.35	0.8	1720.93	0.1579	0.8%	39.7%	3.4%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	977.44	0.4	774.22	0.0096	0.0%	39.8%	20.8%
Chemicals (Industry)	Petroleum	CO ₂	2270.13	1.0	1984.26	0.1065	0.5%	40.3%	12.6%
Other (Industry)	Petroleum	CO ₂	8576.79	3.9	7050.12	0.2001	1.0%	41.2%	17.8%
Road Transportation (Transport)	Petroleum	CO ₂	28790.27	13.0	24035.93	0.8396	4.0%	45.2%	16.5%
Railways (Transport)	Petroleum	CO ₂	611.42	0.3	465.05	0.0027	0.0%	45.2%	23.9%
Navigation (Transport)	Petroleum	CO ₂	710.02	0.3	494.28	0.0239	0.1%	45.3%	30.4%
Other (Residential)	Petroleum	CO ₂	11955.51	5.4	9153.31	0.0264	0.1%	45.5%	23.4%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	7372.41	3.3	5795.38	0.0521	0.2%	45.7%	21.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	7660.43	3.5	5435.89	0.2113	1.0%	46.7%	29.0%
Iron and Steel (Industry)	Natural Gas	CO ₂	10.63	0.0	0.00	0.0037	0.0%	46.7%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	270.09	0.1	0.00	0.0943	0.4%	47.2%	100.0%
Chemicals (Industry)	Natural Gas	CO ₂	361.54	0.2	0.00	0.1262	0.6%	47.8%	100.0%
Other (Industry)	Natural Gas	CO ₂	4336.37	2.0	1729.02	0.7304	3.5%	51.3%	60.1%
Road Transportation (Transport)	Natural Gas	CO ₂	2.09	0.0	0.00	0.0007	0.0%	51.3%	100.0%
Other (Residential)	Natural Gas	CO ₂	2111.83	1.0	104.21	0.6900	3.3%	54.5%	95.1%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	2709.58	1.2	904.59	0.5360	2.6%	57.1%	66.6%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.50	0.0	0.19	0.0001	0.0%	57.1%	61.4%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.21	0.0	0.00	0.0001	0.0%	57.1%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.24	0.0	0.00	0.0001	0.0%	57.1%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	9.89	0.0	9.44	0.0008	0.0%	57.1%	4.5%
Railways (Transport)	Hard Coal	CH ₄	0.02	0.0	0.07	0.0000	0.0%	57.1%	-303.4%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	57.1%	0.0%
Other (Residential)	Hard Coal	CH ₄	225.52	0.1	261.34	0.0397	0.2%	57.3%	-15.9%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	6.01	0.0	4.38	0.0001	0.0%	57.3%	27.3%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.11	0.0	0.13	0.0000	0.0%	57.3%	-20.0%
Chemicals (Industry)	Lignite	CH ₄	0.07	0.0	1.12	0.0005	0.0%	57.3%	-1600.0%
Other (Industry)	Lignite	CH ₄	15.69	0.0	21.07	0.0041	0.0%	57.3%	-34.3%

Table D1. Trend Analysis
1995 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1995	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	57.3%	0.0%
Other (Residential)	Lignite	CH ₄	516.98	0.2	589.29	0.0865	0.4%	57.7%	-14.0%
Other (Industry)	Asphalt	CH ₄	0.17	0.0	0.20	0.0000	0.0%	57.7%	-15.2%
Other (Residential)	Asphalt	CH ₄	2.21	0.0	26.54	0.0113	0.1%	57.8%	-1100.0%
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.81	0.0	17.40	0.0017	0.0%	57.8%	2.3%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.46	0.0	0.17	0.0001	0.0%	57.8%	63.5%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	57.8%	0.0%
Other (Industry)	Secondary Coal	CH ₄	0.79	0.0	1.54	0.0004	0.0%	57.8%	-93.8%
Other (Residential)	Secondary Coal	CH ₄	19.78	0.0	43.15	0.0126	0.1%	57.8%	-118.1%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.16	0.0	0.23	0.0000	0.0%	57.8%	-43.8%
Other (Industry)	Petroleum Coke	CH ₄	6.30	0.0	2.13	0.0012	0.0%	57.8%	66.2%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	4.76	0.0	2.93	0.0003	0.0%	57.9%	38.4%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	3.09	0.0	3.20	0.0004	0.0%	57.9%	-3.5%
Iron and Steel (Industry)	Petroleum	CH ₄	1.03	0.0	1.00	0.0001	0.0%	57.9%	3.4%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.57	0.0	0.45	0.0000	0.0%	57.9%	20.8%
Chemicals (Industry)	Petroleum	CH ₄	1.31	0.0	1.15	0.0001	0.0%	57.9%	12.6%
Other (Industry)	Petroleum	CH ₄	4.96	0.0	4.08	0.0001	0.0%	57.9%	17.8%
Other (Residential)	Petroleum	CH ₄	34.58	0.0	26.48	0.0001	0.0%	57.9%	23.4%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	10.66	0.0	8.38	0.0001	0.0%	57.9%	21.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	2.88	0.0	2.05	0.0001	0.0%	57.9%	29.0%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.02	0.0	0.00	0.0000	0.0%	57.9%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.51	0.0	0.00	0.0002	0.0%	57.9%	100.0%
Chemicals (Industry)	Natural Gas	CH ₄	0.68	0.0	0.00	0.0002	0.0%	57.9%	100.0%
Other (Industry)	Natural Gas	CH ₄	8.16	0.0	3.25	0.0014	0.0%	57.9%	60.1%
Road Transportation (Transport)	Natural Gas	CH ₄	0.05	0.0	0.00	0.0000	0.0%	57.9%	100.0%
Other (Residential)	Natural Gas	CH ₄	3.97	0.0	0.20	0.0013	0.0%	57.9%	95.1%
Other (Residential)	Biomass	CH ₄	1864.35	0.8	1901.22	0.2106	1.0%	58.9%	-2.0%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	2.12	0.0	1.31	0.0001	0.0%	58.9%	38.4%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	114.09	0.1	67.91	0.0091	0.0%	58.9%	40.5%
Railways (Transport)	Diesel+FuelOil	CH ₄	1.00	0.0	0.73	0.0000	0.0%	58.9%	27.2%
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.99	0.0	0.69	0.0000	0.0%	58.9%	30.6%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	10.32	0.0	3.99	0.0018	0.0%	58.9%	61.4%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.44	0.0	0.00	0.0002	0.0%	58.9%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.49	0.0	0.00	0.0002	0.0%	58.9%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	20.44	0.0	19.51	0.0017	0.0%	58.9%	4.5%
Railways (Transport)	Hard Coal	N ₂ O	0.10	0.0	0.39	0.0001	0.0%	58.9%	-295.1%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	58.9%	0.0%
Other (Residential)	Hard Coal	N ₂ O	15.54	0.0	18.00	0.0027	0.0%	58.9%	-15.9%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	124.30	0.1	90.42	0.0024	0.0%	59.0%	27.3%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.22	0.0	0.26	0.0000	0.0%	59.0%	-20.0%
Chemicals (Industry)	Lignite	N ₂ O	0.14	0.0	2.32	0.0010	0.0%	59.0%	-1600.0%
Other (Industry)	Lignite	N ₂ O	32.42	0.0	43.53	0.0084	0.0%	59.0%	-34.3%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	59.0%	0.0%
Other (Residential)	Lignite	N ₂ O	35.61	0.0	40.60	0.0060	0.0%	59.0%	-14.0%
Other (Industry)	Asphalt	N ₂ O	0.36	0.0	0.41	0.0001	0.0%	59.0%	-15.2%
Other (Residential)	Asphalt	N ₂ O	0.15	0.0	1.83	0.0008	0.0%	59.0%	-1100.0%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	36.80	0.0	35.96	0.0034	0.0%	59.1%	2.3%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.94	0.0	0.34	0.0002	0.0%	59.1%	63.5%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	59.1%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	1.64	0.0	3.18	0.0009	0.0%	59.1%	-93.8%
Other (Residential)	Secondary Coal	N ₂ O	1.36	0.0	2.97	0.0009	0.0%	59.1%	-118.1%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.34	0.0	0.48	0.0001	0.0%	59.1%	-43.8%

Table D1. Trend Analysis
1995 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1995	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	13.03	0.0	4.41	0.0026	0.0%	59.1%	66.2%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	14.04	0.0	8.65	0.0010	0.0%	59.1%	38.4%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	9.13	0.0	9.45	0.0011	0.0%	59.1%	-3.5%
Iron and Steel (Industry)	Petroleum	N ₂ O	4.56	0.0	4.41	0.0004	0.0%	59.1%	3.4%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.50	0.0	1.98	0.0000	0.0%	59.1%	20.8%
Chemicals (Industry)	Petroleum	N ₂ O	5.82	0.0	5.08	0.0003	0.0%	59.1%	12.6%
Other (Industry)	Petroleum	N ₂ O	21.97	0.0	18.06	0.0005	0.0%	59.1%	17.8%
Other (Residential)	Petroleum	N ₂ O	30.63	0.0	23.45	0.0001	0.0%	59.1%	23.4%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	18.89	0.0	14.85	0.0001	0.0%	59.1%	21.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	4.25	0.0	3.02	0.0001	0.0%	59.1%	29.0%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	59.1%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.15	0.0	0.00	0.0001	0.0%	59.1%	100.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.20	0.0	0.00	0.0001	0.0%	59.1%	100.0%
Other (Industry)	Natural Gas	N ₂ O	2.41	0.0	0.96	0.0004	0.0%	59.1%	60.1%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	59.1%	100.0%
Other (Residential)	Natural Gas	N ₂ O	1.17	0.0	0.06	0.0004	0.0%	59.1%	95.1%
Other (Residential)	Biomass	N ₂ O	366.95	0.2	374.21	0.0414	0.2%	59.3%	-2.0%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	27.20	0.0	9.08	0.0054	0.0%	59.3%	66.6%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	301.16	0.1	246.86	0.0067	0.0%	59.4%	18.0%
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.71	0.0	3.36	0.0001	0.0%	59.4%	28.7%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.76	0.0	1.22	0.0001	0.0%	59.4%	30.7%
Cement Production (Mineral Products)		CO ₂	13824.71	6.3	10333.37	0.1443	0.7%	60.0%	25.3%
Lime Production (Mineral Products)		CO ₂	816.61	0.4	645.09	0.0072	0.0%	60.1%	21.0%
Limestone and Dolomite Use (Mineral Products)		CO ₂	13.69	0.0	21.52	0.0050	0.0%	60.1%	-57.1%
Soda Ash Production and Use (Mineral Products)		CO ₂	133.37	0.1	106.30	0.0016	0.0%	60.1%	20.3%
Ammonia Production (Chemical Industry)		CO ₂	937.02	0.4	713.47	0.0039	0.0%	60.1%	23.9%
Carbide Production (Chemical Industry)		CO ₂	27.14	0.0	112.25	0.0414	0.2%	60.3%	-313.5%
Aluminium Production (Metal Production)		CO ₂	110.72	0.1	109.62	0.0110	0.1%	60.4%	1.0%
Iron and Steel Production (Metal Production)		CO ₂	528.11	0.2	770.23	0.1646	0.8%	61.2%	-45.8%
Ferroalloys Production (Metal Production)		CO ₂	115.13	0.1	81.17	0.0034	0.0%	61.2%	29.5%
Other Chemicals Production (Chemical Industry)		CH ₄	49.23	0.0	49.39	0.0052	0.0%	61.2%	-0.3%
Nitric Acid Production (Chemical Industry)		N ₂ O	5088.33	2.3	128.08	1.7182	8.2%	69.4%	97.5%
Enteric Fermentation		CH ₄	16469.08	7.5	17046.76	1.9742	9.4%	78.8%	-3.5%
Manure Management		CH ₄	745.53	0.3	613.63	0.0178	0.1%	78.8%	17.7%
Rice Cultivation		CH ₄	210.00	0.1	222.60	0.0275	0.1%	79.0%	-6.0%
Solid Waste		CH ₄	20313.78	9.2	6386.46	4.1977	20.0%	98.9%	68.6%
Fugitive (Coal Mining)		CH ₄	1445.41	0.7	1430.32	0.1435	0.7%	99.6%	1.0%
Field Burning of Agricultural Residues		CH ₄	423.05	0.2	454.59	0.0583	0.3%	99.9%	-7.5%
Field Burning of Agricultural Residues		N ₂ O	126.17	0.1	135.78	0.0175	0.1%	100.0%	-7.6%
Emission of HFCs		HFC-	0.00	0.0	0.00	0.0000	0.0%	100.0%	0.0%
Emission of SF ₆		SF ₆	0.00	0.0	0.00	0.0000	0.0%	100.0%	0.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.10	0.0	6.20	0.0017	0.0%	100.0%	-100.0%
TOTAL			220722		170065	21.0190	100.0%		

Table D1. Trend Analysis
1996 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1996	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	2612.17	1.1	851.45	0.4062	1.8%	1.8%	67.4%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	104.80	0.0	0.00	0.0304	0.1%	1.9%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	124.21	0.1	0.00	0.0360	0.2%	2.0%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CO ₂	10803.72	4.5	4168.15	1.4131	6.1%	8.1%	61.4%
Railways (Transport)	Hard Coal	CO ₂	25.50	0.0	29.73	0.0049	0.0%	8.1%	-16.6%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	8.1%	0.0%
Other (Residential)	Hard Coal	CO ₂	2692.94	1.1	3845.79	0.8071	3.5%	11.6%	-42.8%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	30896.24	12.8	20662.22	0.4301	1.9%	13.5%	33.1%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	49.83	0.0	59.79	0.0102	0.0%	13.5%	-20.0%
Chemicals (Industry)	Lignite	CO ₂	31.14	0.0	529.42	0.2096	0.9%	14.4%	-1600.0%
Other (Industry)	Lignite	CO ₂	7362.32	3.0	9948.37	1.9730	8.5%	22.9%	-35.1%
Railways (Transport)	Lignite	CO ₂	1.64	0.0	21.87	0.0086	0.0%	23.0%	-1232.6%
Other (Residential)	Lignite	CO ₂	8109.80	3.3	9276.74	1.4787	6.4%	29.3%	-14.4%
Other (Industry)	Asphalt	CO ₂	0.00	0.0	88.46	0.0000	0.0%	29.3%	0.0%
Other (Residential)	Asphalt	CO ₂	57.47	0.0	390.56	0.1446	0.6%	30.0%	-579.6%
Iron and Steel (Industry)	Secondary Coal	CO ₂	8756.51	3.6	7681.10	0.6320	2.7%	32.7%	12.3%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	19.02	0.0	73.36	0.0248	0.1%	32.8%	-285.7%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	32.8%	0.0%
Other (Industry)	Secondary Coal	CO ₂	1186.47	0.5	679.26	0.0637	0.3%	33.1%	42.7%
Other (Residential)	Secondary Coal	CO ₂	372.15	0.2	635.01	0.1543	0.7%	33.7%	-70.6%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	33.7%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	5049.93	2.1	941.03	1.0766	4.6%	38.4%	81.4%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	5717.96	2.4	3375.90	0.2647	1.1%	39.5%	41.0%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4687.46	1.9	3689.24	0.1638	0.7%	40.2%	21.3%
Iron and Steel (Industry)	Petroleum	CO ₂	1924.92	0.8	1720.93	0.1523	0.7%	40.9%	10.6%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	850.25	0.4	774.22	0.0731	0.3%	41.2%	8.9%
Chemicals (Industry)	Petroleum	CO ₂	2270.13	0.9	1984.26	0.1609	0.7%	41.9%	12.6%
Other (Industry)	Petroleum	CO ₂	8286.34	3.4	7050.12	0.5078	2.2%	44.1%	14.9%
Road Transportation (Transport)	Petroleum	CO ₂	30584.22	12.6	24035.93	1.0540	4.5%	48.6%	21.4%
Railways (Transport)	Petroleum	CO ₂	605.04	0.2	465.05	0.0165	0.1%	48.7%	23.1%
Navigation (Transport)	Petroleum	CO ₂	683.88	0.3	494.28	0.0057	0.0%	48.7%	27.7%
Other (Residential)	Petroleum	CO ₂	11498.15	4.7	9153.31	0.4446	1.9%	50.6%	20.4%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	7771.48	3.2	5795.38	0.1389	0.6%	51.2%	25.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	8063.24	3.3	5435.89	0.0943	0.4%	51.6%	32.6%
Iron and Steel (Industry)	Natural Gas	CO ₂	12.14	0.0	0.00	0.0035	0.0%	51.6%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	291.36	0.1	0.00	0.0845	0.4%	52.0%	100.0%
Chemicals (Industry)	Natural Gas	CO ₂	259.46	0.1	0.00	0.0753	0.3%	52.3%	100.0%
Other (Industry)	Natural Gas	CO ₂	4612.09	1.9	1729.02	0.6240	2.7%	55.0%	62.5%
Road Transportation (Transport)	Natural Gas	CO ₂	6.26	0.0	0.00	0.0018	0.0%	55.0%	100.0%
Other (Residential)	Natural Gas	CO ₂	4011.09	1.7	104.21	1.1208	4.8%	59.8%	97.4%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	2976.05	1.2	904.59	0.4899	2.1%	62.0%	69.6%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.59	0.0	0.19	0.0001	0.0%	62.0%	67.4%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.24	0.0	0.00	0.0001	0.0%	62.0%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.28	0.0	0.00	0.0001	0.0%	62.0%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	24.47	0.0	9.44	0.0032	0.0%	62.0%	61.4%
Railways (Transport)	Hard Coal	CH ₄	0.06	0.0	0.07	0.0000	0.0%	62.0%	-13.5%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	62.0%	0.0%
Other (Residential)	Hard Coal	CH ₄	183.00	0.1	261.34	0.0549	0.2%	62.2%	-42.8%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	6.54	0.0	4.38	0.0001	0.0%	62.2%	33.1%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.11	0.0	0.13	0.0000	0.0%	62.2%	-20.0%
Chemicals (Industry)	Lignite	CH ₄	0.07	0.0	1.12	0.0004	0.0%	62.2%	-1600.0%
Other (Industry)	Lignite	CH ₄	15.59	0.0	21.07	0.0042	0.0%	62.2%	-35.1%

Table D1. Trend Analysis
1996 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1996	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	62.2%	-1196.9%
Other (Residential)	Lignite	CH ₄	515.16	0.2	589.29	0.0939	0.4%	62.6%	-14.4%
Other (Industry)	Asphalt	CH ₄	0.00	0.0	0.20	0.0000	0.0%	62.6%	0.0%
Other (Residential)	Asphalt	CH ₄	3.91	0.0	26.54	0.0098	0.0%	62.7%	-579.6%
Iron and Steel (Industry)	Secondary Coal	CH ₄	19.84	0.0	17.40	0.0014	0.0%	62.7%	12.3%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.04	0.0	0.17	0.0001	0.0%	62.7%	-285.7%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	62.7%	0.0%
Other (Industry)	Secondary Coal	CH ₄	2.69	0.0	1.54	0.0001	0.0%	62.7%	42.7%
Other (Residential)	Secondary Coal	CH ₄	25.29	0.0	43.15	0.0105	0.0%	62.7%	-70.6%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	62.7%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	11.44	0.0	2.13	0.0024	0.0%	62.7%	81.4%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	4.96	0.0	2.93	0.0002	0.0%	62.7%	41.0%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.07	0.0	3.20	0.0001	0.0%	62.7%	21.3%
Iron and Steel (Industry)	Petroleum	CH ₄	1.11	0.0	1.00	0.0001	0.0%	62.7%	10.6%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.49	0.0	0.45	0.0000	0.0%	62.7%	8.9%
Chemicals (Industry)	Petroleum	CH ₄	1.31	0.0	1.15	0.0001	0.0%	62.7%	12.6%
Other (Industry)	Petroleum	CH ₄	4.79	0.0	4.08	0.0003	0.0%	62.7%	14.9%
Other (Residential)	Petroleum	CH ₄	33.26	0.0	26.48	0.0013	0.0%	62.7%	20.4%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	11.24	0.0	8.38	0.0002	0.0%	62.7%	25.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	3.03	0.0	2.05	0.0000	0.0%	62.7%	32.6%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.02	0.0	0.00	0.0000	0.0%	62.7%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.55	0.0	0.00	0.0002	0.0%	62.7%	100.0%
Chemicals (Industry)	Natural Gas	CH ₄	0.49	0.0	0.00	0.0001	0.0%	62.7%	100.0%
Other (Industry)	Natural Gas	CH ₄	8.68	0.0	3.25	0.0012	0.0%	62.8%	62.5%
Road Transportation (Transport)	Natural Gas	CH ₄	0.14	0.0	0.00	0.0000	0.0%	62.8%	100.0%
Other (Residential)	Natural Gas	CH ₄	7.55	0.0	0.20	0.0021	0.0%	62.8%	97.4%
Other (Residential)	Biomass	CH ₄	1858.35	0.8	1901.22	0.2461	1.1%	63.8%	-2.3%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	2.15	0.0	1.31	0.0001	0.0%	63.8%	39.3%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	122.71	0.1	67.91	0.0076	0.0%	63.9%	44.7%
Railways (Transport)	Diesel+FuelOil	CH ₄	0.97	0.0	0.73	0.0000	0.0%	63.9%	25.2%
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.96	0.0	0.69	0.0000	0.0%	63.9%	28.0%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	12.23	0.0	3.99	0.0019	0.0%	63.9%	67.4%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.49	0.0	0.00	0.0001	0.0%	63.9%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.58	0.0	0.00	0.0002	0.0%	63.9%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	50.58	0.0	19.51	0.0066	0.0%	63.9%	61.4%
Railways (Transport)	Hard Coal	N ₂ O	0.35	0.0	0.39	0.0001	0.0%	63.9%	-12.0%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	63.9%	0.0%
Other (Residential)	Hard Coal	N ₂ O	12.61	0.0	18.00	0.0038	0.0%	63.9%	-42.8%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	135.20	0.1	90.42	0.0019	0.0%	63.9%	33.1%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.22	0.0	0.26	0.0000	0.0%	63.9%	-20.0%
Chemicals (Industry)	Lignite	N ₂ O	0.14	0.0	2.32	0.0009	0.0%	63.9%	-1600.0%
Other (Industry)	Lignite	N ₂ O	32.22	0.0	43.53	0.0086	0.0%	64.0%	-35.1%
Railways (Transport)	Lignite	N ₂ O	0.02	0.0	0.27	0.0001	0.0%	64.0%	-1180.2%
Other (Residential)	Lignite	N ₂ O	35.49	0.0	40.60	0.0065	0.0%	64.0%	-14.4%
Other (Industry)	Asphalt	N ₂ O	0.00	0.0	0.41	0.0000	0.0%	64.0%	0.0%
Other (Residential)	Asphalt	N ₂ O	0.27	0.0	1.83	0.0007	0.0%	64.0%	-579.6%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	40.99	0.0	35.96	0.0030	0.0%	64.0%	12.3%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.09	0.0	0.34	0.0001	0.0%	64.0%	-285.7%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	64.0%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	5.55	0.0	3.18	0.0003	0.0%	64.0%	42.7%
Other (Residential)	Secondary Coal	N ₂ O	1.74	0.0	2.97	0.0007	0.0%	64.0%	-70.6%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	64.0%	0.0%

Table D1. Trend Analysis
1996 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1996	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	23.64	0.0	4.41	0.0050	0.0%	64.0%	81.4%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	14.65	0.0	8.65	0.0007	0.0%	64.0%	41.0%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	12.01	0.0	9.45	0.0004	0.0%	64.0%	21.3%
Iron and Steel (Industry)	Petroleum	N ₂ O	4.93	0.0	4.41	0.0004	0.0%	64.0%	10.6%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.18	0.0	1.98	0.0002	0.0%	64.0%	8.9%
Chemicals (Industry)	Petroleum	N ₂ O	5.82	0.0	5.08	0.0004	0.0%	64.0%	12.6%
Other (Industry)	Petroleum	N ₂ O	21.23	0.0	18.06	0.0013	0.0%	64.0%	14.9%
Other (Residential)	Petroleum	N ₂ O	29.46	0.0	23.45	0.0011	0.0%	64.1%	20.4%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	19.91	0.0	14.85	0.0004	0.0%	64.1%	25.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	4.48	0.0	3.02	0.0001	0.0%	64.1%	32.6%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	64.1%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.16	0.0	0.00	0.0000	0.0%	64.1%	100.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.14	0.0	0.00	0.0000	0.0%	64.1%	100.0%
Other (Industry)	Natural Gas	N ₂ O	2.56	0.0	0.96	0.0003	0.0%	64.1%	62.5%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	64.1%	100.0%
Other (Residential)	Natural Gas	N ₂ O	2.23	0.0	0.06	0.0006	0.0%	64.1%	97.4%
Other (Residential)	Biomass	N ₂ O	365.77	0.2	374.21	0.0484	0.2%	64.3%	-2.3%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	29.91	0.0	9.08	0.0049	0.0%	64.3%	69.6%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	331.25	0.1	246.86	0.0059	0.0%	64.3%	25.5%
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.55	0.0	3.36	0.0001	0.0%	64.3%	26.2%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.69	0.0	1.22	0.0000	0.0%	64.3%	28.1%
Cement Production (Mineral Products)		CO ₂	14211.48	5.9	10333.37	0.1447	0.6%	64.9%	27.3%
Lime Production (Mineral Products)		CO ₂	930.86	0.4	645.09	0.0036	0.0%	65.0%	30.7%
Limestone and Dolomite Use (Mineral Products)		CO ₂	16.83	0.0	21.52	0.0040	0.0%	65.0%	-27.8%
Soda Ash Production and Use (Mineral Products)		CO ₂	176.28	0.1	106.30	0.0072	0.0%	65.0%	39.7%
Ammonia Production (Chemical Industry)		CO ₂	967.61	0.4	713.47	0.0139	0.1%	65.1%	26.3%
Carbide Production (Chemical Industry)		CO ₂	45.53	0.0	112.25	0.0332	0.1%	65.2%	-146.5%
Aluminium Production (Metal Production)		CO ₂	111.78	0.0	109.62	0.0128	0.1%	65.3%	1.9%
Iron and Steel Production (Metal Production)		CO ₂	708.04	0.3	770.23	0.1127	0.5%	65.7%	-8.8%
Ferroalloys Production (Metal Production)		CO ₂	131.89	0.1	81.17	0.0047	0.0%	65.8%	38.5%
Other Chemicals Production (Chemical Industry)		CH ₄	50.25	0.0	49.39	0.0058	0.0%	65.8%	1.7%
Nitric Acid Production (Chemical Industry)		N ₂ O	4729.03	2.0	128.08	1.3193	5.7%	71.5%	97.3%
Enteric Fermentation		CH ₄	16445.71	6.8	17046.76	2.2694	9.8%	81.3%	-3.7%
Manure Management		CH ₄	737.16	0.3	613.63	0.0396	0.2%	81.4%	16.8%
Rice Cultivation		CH ₄	230.37	0.1	222.60	0.0251	0.1%	81.5%	3.4%
Solid Waste		CH ₄	22694.41	9.4	6386.46	3.9470	17.0%	98.5%	71.9%
Fugitive (Coal Mining)		CH ₄	1511.45	0.6	1430.32	0.1522	0.7%	99.2%	5.4%
Field Burning of Agricultural Residues		CH ₄	439.51	0.2	454.59	0.0602	0.3%	99.5%	-3.4%
Field Burning of Agricultural Residues		N ₂ O	130.82	0.1	135.78	0.0181	0.1%	99.5%	-3.8%
Emission of HFCs		HFC-	0.00	0.0	0.00	0.0000	0.0%	99.5%	0.0%
Emission of SF ₆		SF ₆	373.84	0.2	0.00	0.1085	0.5%	100.0%	100.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	6.20	0.0	6.20	0.0008	0.0%	100.0%	0.0%
TOTAL			242098		170065	23.2104	100.0%		

Table D1. Trend Analysis
1997 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1997	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3243.85	1.3	851.45	0.5117	2.0%	2.0%	73.8%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	166.90	0.1	0.00	0.0435	0.2%	2.2%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	124.21	0.0	0.00	0.0324	0.1%	2.3%	100.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	12629.97	4.9	4168.15	1.6586	6.5%	8.8%	67.0%
Railways (Transport)	Hard Coal	CO ₂	16.33	0.0	29.73	0.0074	0.0%	8.9%	-82.1%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	8.9%	0.0%
Other (Residential)	Hard Coal	CO ₂	3570.32	1.4	3845.79	0.5751	2.3%	11.1%	-7.7%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	34031.34	13.3	20662.22	0.7781	3.1%	14.2%	39.3%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	54.81	0.0	59.79	0.0091	0.0%	14.2%	-9.1%
Chemicals (Industry)	Lignite	CO ₂	56.06	0.0	529.42	0.1926	0.8%	15.0%	-844.4%
Other (Industry)	Lignite	CO ₂	8465.55	3.3	9948.37	1.6883	6.6%	21.6%	-17.5%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	21.6%	0.0%
Other (Residential)	Lignite	CO ₂	8532.29	3.3	9276.74	1.4081	5.5%	27.1%	-8.7%
Other (Industry)	Asphalt	CO ₂	0.00	0.0	88.46	0.0000	0.0%	27.1%	0.0%
Other (Residential)	Asphalt	CO ₂	49.04	0.0	390.56	0.1401	0.6%	27.7%	-696.5%
Iron and Steel (Industry)	Secondary Coal	CO ₂	8867.41	3.5	7681.10	0.6963	2.7%	30.4%	13.4%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	29.89	0.0	73.36	0.0209	0.1%	30.5%	-145.5%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	30.5%	0.0%
Other (Industry)	Secondary Coal	CO ₂	1104.85	0.4	679.26	0.0220	0.1%	30.6%	38.5%
Other (Residential)	Secondary Coal	CO ₂	431.60	0.2	635.01	0.1361	0.5%	31.1%	-47.1%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	31.1%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	5673.96	2.2	941.03	1.1097	4.4%	35.5%	83.4%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	6236.72	2.4	3375.90	0.3033	1.2%	36.7%	45.9%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4959.27	1.9	3689.24	0.1520	0.6%	37.3%	25.6%
Iron and Steel (Industry)	Petroleum	CO ₂	1824.99	0.7	1720.93	0.1981	0.8%	38.0%	5.7%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	771.24	0.3	774.22	0.1021	0.4%	38.4%	-0.4%
Chemicals (Industry)	Petroleum	CO ₂	2271.24	0.9	1984.26	0.1850	0.7%	39.2%	12.6%
Other (Industry)	Petroleum	CO ₂	8488.85	3.3	7050.12	0.5480	2.2%	41.3%	16.9%
Road Transportation (Transport)	Petroleum	CO ₂	28815.30	11.3	24035.93	1.9009	7.5%	48.8%	16.6%
Railways (Transport)	Petroleum	CO ₂	614.90	0.2	465.05	0.0218	0.1%	48.9%	24.4%
Navigation (Transport)	Petroleum	CO ₂	682.64	0.3	494.28	0.0156	0.1%	48.9%	27.6%
Other (Residential)	Petroleum	CO ₂	11275.12	4.4	9153.31	0.6453	2.5%	51.5%	18.8%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8054.98	3.2	5795.38	0.1699	0.7%	52.1%	28.1%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	9717.50	3.8	5435.89	0.4038	1.6%	53.7%	44.1%
Iron and Steel (Industry)	Natural Gas	CO ₂	11.71	0.0	0.00	0.0030	0.0%	53.7%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	157.38	0.1	0.00	0.0410	0.2%	53.9%	100.0%
Chemicals (Industry)	Natural Gas	CO ₂	578.47	0.2	0.00	0.1507	0.6%	54.5%	100.0%
Other (Industry)	Natural Gas	CO ₂	5717.13	2.2	1729.02	0.8125	3.2%	57.7%	69.8%
Road Transportation (Transport)	Natural Gas	CO ₂	7.23	0.0	0.00	0.0019	0.0%	57.7%	100.0%
Other (Residential)	Natural Gas	CO ₂	5229.69	2.0	104.21	1.3215	5.2%	62.9%	98.0%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	3133.76	1.2	904.59	0.4623	1.8%	64.7%	71.1%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.73	0.0	0.19	0.0001	0.0%	64.7%	73.8%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.38	0.0	0.00	0.0001	0.0%	64.7%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.28	0.0	0.00	0.0001	0.0%	64.7%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	28.61	0.0	9.44	0.0038	0.0%	64.7%	67.0%
Railways (Transport)	Hard Coal	CH ₄	0.04	0.0	0.07	0.0000	0.0%	64.7%	-75.6%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	64.7%	0.0%
Other (Residential)	Hard Coal	CH ₄	242.62	0.1	261.34	0.0391	0.2%	64.9%	-7.7%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	7.21	0.0	4.38	0.0002	0.0%	64.9%	39.3%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.12	0.0	0.13	0.0000	0.0%	64.9%	-9.1%
Chemicals (Industry)	Lignite	CH ₄	0.12	0.0	1.12	0.0004	0.0%	64.9%	-844.4%
Other (Industry)	Lignite	CH ₄	17.93	0.0	21.07	0.0036	0.0%	64.9%	-17.5%

Table D1. Trend Analysis
1997 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1997	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	64.9%	0.0%
Other (Residential)	Lignite	CH ₄	542.00	0.2	589.29	0.0894	0.4%	65.2%	-8.7%
Other (Industry)	Asphalt	CH ₄	0.00	0.0	0.20	0.0000	0.0%	65.2%	0.0%
Other (Residential)	Asphalt	CH ₄	3.33	0.0	26.54	0.0095	0.0%	65.3%	-696.5%
Iron and Steel (Industry)	Secondary Coal	CH ₄	20.09	0.0	17.40	0.0016	0.0%	65.3%	13.4%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.07	0.0	0.17	0.0000	0.0%	65.3%	-145.5%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	65.3%	0.0%
Other (Industry)	Secondary Coal	CH ₄	2.50	0.0	1.54	0.0000	0.0%	65.3%	38.5%
Other (Residential)	Secondary Coal	CH ₄	29.33	0.0	43.15	0.0092	0.0%	65.3%	-47.1%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	65.3%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	12.85	0.0	2.13	0.0025	0.0%	65.3%	83.4%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	5.41	0.0	2.93	0.0003	0.0%	65.3%	45.9%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.30	0.0	3.20	0.0001	0.0%	65.3%	25.6%
Iron and Steel (Industry)	Petroleum	CH ₄	1.06	0.0	1.00	0.0001	0.0%	65.3%	5.7%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.45	0.0	0.45	0.0001	0.0%	65.3%	-0.4%
Chemicals (Industry)	Petroleum	CH ₄	1.31	0.0	1.15	0.0001	0.0%	65.3%	12.6%
Other (Industry)	Petroleum	CH ₄	4.91	0.0	4.08	0.0003	0.0%	65.3%	16.9%
Other (Residential)	Petroleum	CH ₄	32.61	0.0	26.48	0.0019	0.0%	65.3%	18.8%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	11.65	0.0	8.38	0.0002	0.0%	65.3%	28.1%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	3.66	0.0	2.05	0.0002	0.0%	65.3%	44.1%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.02	0.0	0.00	0.0000	0.0%	65.3%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.30	0.0	0.00	0.0001	0.0%	65.3%	100.0%
Chemicals (Industry)	Natural Gas	CH ₄	1.09	0.0	0.00	0.0003	0.0%	65.3%	100.0%
Other (Industry)	Natural Gas	CH ₄	10.75	0.0	3.25	0.0015	0.0%	65.3%	69.8%
Road Transportation (Transport)	Natural Gas	CH ₄	0.18	0.0	0.00	0.0000	0.0%	65.4%	100.0%
Other (Residential)	Natural Gas	CH ₄	9.84	0.0	0.20	0.0025	0.0%	65.4%	98.0%
Other (Residential)	Biomass	CH ₄	1852.83	0.7	1901.22	0.2614	1.0%	66.4%	-2.6%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	2.08	0.0	1.31	0.0000	0.0%	66.4%	37.2%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	129.41	0.1	67.91	0.0071	0.0%	66.4%	47.5%
Railways (Transport)	Diesel+FuelOil	CH ₄	1.00	0.0	0.73	0.0000	0.0%	66.4%	27.1%
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.95	0.0	0.69	0.0000	0.0%	66.4%	27.9%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	15.19	0.0	3.99	0.0024	0.0%	66.4%	73.8%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.78	0.0	0.00	0.0002	0.0%	66.4%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.58	0.0	0.00	0.0002	0.0%	66.4%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	59.13	0.0	19.51	0.0078	0.0%	66.5%	67.0%
Railways (Transport)	Hard Coal	N ₂ O	0.23	0.0	0.39	0.0001	0.0%	66.5%	-72.6%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	66.5%	0.0%
Other (Residential)	Hard Coal	N ₂ O	16.71	0.0	18.00	0.0027	0.0%	66.5%	-7.7%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	148.92	0.1	90.42	0.0034	0.0%	66.5%	39.3%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.24	0.0	0.26	0.0000	0.0%	66.5%	-9.1%
Chemicals (Industry)	Lignite	N ₂ O	0.25	0.0	2.32	0.0008	0.0%	66.5%	-844.4%
Other (Industry)	Lignite	N ₂ O	37.05	0.0	43.53	0.0074	0.0%	66.5%	-17.5%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	66.5%	0.0%
Other (Residential)	Lignite	N ₂ O	37.34	0.0	40.60	0.0062	0.0%	66.5%	-8.7%
Other (Industry)	Asphalt	N ₂ O	0.00	0.0	0.41	0.0000	0.0%	66.5%	0.0%
Other (Residential)	Asphalt	N ₂ O	0.23	0.0	1.83	0.0007	0.0%	66.5%	-696.5%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	41.51	0.0	35.96	0.0033	0.0%	66.6%	13.4%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.14	0.0	0.34	0.0001	0.0%	66.6%	-145.5%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	66.6%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	5.17	0.0	3.18	0.0001	0.0%	66.6%	38.5%
Other (Residential)	Secondary Coal	N ₂ O	2.02	0.0	2.97	0.0006	0.0%	66.6%	-47.1%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	66.6%	0.0%

Table D1. Trend Analysis
1997 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1997	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	26.56	0.0	4.41	0.0052	0.0%	66.6%	83.4%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	15.98	0.0	8.65	0.0008	0.0%	66.6%	45.9%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	12.71	0.0	9.45	0.0004	0.0%	66.6%	25.6%
Iron and Steel (Industry)	Petroleum	N ₂ O	4.68	0.0	4.41	0.0005	0.0%	66.6%	5.7%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	1.98	0.0	1.98	0.0003	0.0%	66.6%	-0.4%
Chemicals (Industry)	Petroleum	N ₂ O	5.82	0.0	5.08	0.0005	0.0%	66.6%	12.6%
Other (Industry)	Petroleum	N ₂ O	21.75	0.0	18.06	0.0014	0.0%	66.6%	16.9%
Other (Residential)	Petroleum	N ₂ O	28.89	0.0	23.45	0.0017	0.0%	66.6%	18.8%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	20.64	0.0	14.85	0.0004	0.0%	66.6%	28.1%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	5.40	0.0	3.02	0.0002	0.0%	66.6%	44.1%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	66.6%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.09	0.0	0.00	0.0000	0.0%	66.6%	100.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.32	0.0	0.00	0.0001	0.0%	66.6%	100.0%
Other (Industry)	Natural Gas	N ₂ O	3.18	0.0	0.96	0.0005	0.0%	66.6%	69.8%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.02	0.0	0.00	0.0000	0.0%	66.6%	100.0%
Other (Residential)	Natural Gas	N ₂ O	2.90	0.0	0.06	0.0007	0.0%	66.6%	98.0%
Other (Residential)	Biomass	N ₂ O	364.68	0.1	374.21	0.0515	0.2%	66.8%	-2.6%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	31.58	0.0	9.08	0.0047	0.0%	66.8%	71.2%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	303.66	0.1	246.86	0.0175	0.1%	66.9%	18.7%
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.68	0.0	3.36	0.0001	0.0%	66.9%	28.3%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.69	0.0	1.22	0.0000	0.0%	66.9%	28.0%
Cement Production (Mineral Products)		CO ₂	14647.24	5.7	10333.37	0.2288	0.9%	67.8%	29.5%
Lime Production (Mineral Products)		CO ₂	1065.07	0.4	645.09	0.0250	0.1%	67.9%	39.4%
Limestone and Dolomite Use (Mineral Products)		CO ₂	15.22	0.0	21.52	0.0045	0.0%	67.9%	-41.4%
Soda Ash Production and Use (Mineral Products)		CO ₂	181.69	0.1	106.30	0.0057	0.0%	67.9%	41.5%
Ammonia Production (Chemical Industry)		CO ₂	998.44	0.4	713.47	0.0192	0.1%	68.0%	28.5%
Carbide Production (Chemical Industry)		CO ₂	42.33	0.0	112.25	0.0329	0.1%	68.1%	-165.2%
Aluminium Production (Metal Production)		CO ₂	111.64	0.0	109.62	0.0138	0.1%	68.2%	1.8%
Iron and Steel Production (Metal Production)		CO ₂	923.89	0.4	770.23	0.0608	0.2%	68.4%	16.6%
Ferroalloys Production (Metal Production)		CO ₂	140.82	0.1	81.17	0.0049	0.0%	68.4%	42.4%
Other Chemicals Production (Chemical Industry)		CH ₄	50.77	0.0	49.39	0.0061	0.0%	68.5%	2.7%
Nitric Acid Production (Chemical Industry)		N ₂ O	3379.07	1.3	128.08	0.8301	3.3%	71.7%	96.2%
Enteric Fermentation		CH ₄	15341.74	6.0	17046.76	2.6753	10.5%	82.2%	-11.1%
Manure Management		CH ₄	687.06	0.3	613.63	0.0612	0.2%	82.5%	10.7%
Rice Cultivation		CH ₄	231.00	0.1	222.60	0.0269	0.1%	82.6%	3.6%
Solid Waste		CH ₄	25119.19	9.8	6386.46	4.0437	15.9%	98.5%	74.6%
Fugitive (Coal Mining)		CH ₄	1588.18	0.6	1430.32	0.1461	0.6%	99.1%	9.9%
Field Burning of Agricultural Residues		CH ₄	445.16	0.2	454.59	0.0620	0.2%	99.3%	-2.1%
Field Burning of Agricultural Residues		N ₂ O	132.68	0.1	135.78	0.0186	0.1%	99.4%	-2.3%
Emission of HFCs		HFC-	0.00	0.0	0.00	0.0000	0.0%	99.4%	0.0%
Emission of SF ₆		SF ₆	611.10	0.2	0.00	0.1592	0.6%	100.0%	100.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.10	0.0	6.20	0.0016	0.0%	100.0%	-100.0%
TOTAL			255517		170065	25.4532	100.0%		

Table D1. Trend Analysis
1998 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1998	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3332.07	1.3	851.45	0.5286	1.8%	1.8%	74.4%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	186.31	0.1	0.00	0.0481	0.2%	1.9%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	135.85	0.1	0.00	0.0351	0.1%	2.1%	100.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	15583.09	6.1	4168.15	2.3996	8.1%	10.1%	73.3%
Railways (Transport)	Hard Coal	CO ₂	17.79	0.0	29.73	0.0070	0.0%	10.1%	-67.2%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	10.1%	0.0%
Other (Residential)	Hard Coal	CO ₂	2076.37	0.8	3845.79	0.9624	3.2%	13.4%	-85.2%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	37066.88	14.4	20662.22	1.5200	5.1%	18.5%	44.3%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	54.81	0.0	59.79	0.0091	0.0%	18.5%	-9.1%
Chemicals (Industry)	Lignite	CO ₂	56.06	0.0	529.42	0.1918	0.6%	19.2%	-844.4%
Other (Industry)	Lignite	CO ₂	7945.17	3.1	9948.37	1.8249	6.1%	25.3%	-25.2%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	25.3%	0.0%
Other (Residential)	Lignite	CO ₂	7323.66	2.9	9276.74	1.7237	5.8%	31.1%	-26.7%
Other (Industry)	Asphalt	CO ₂	18.43	0.0	88.46	0.0297	0.1%	31.2%	-380.0%
Other (Residential)	Asphalt	CO ₂	20.29	0.0	390.56	0.1469	0.5%	31.7%	-1824.5%
Iron and Steel (Industry)	Secondary Coal	CO ₂	7939.99	3.1	7681.10	0.9428	3.2%	34.8%	3.3%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	29.89	0.0	73.36	0.0209	0.1%	34.9%	-145.5%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	34.9%	0.0%
Other (Industry)	Secondary Coal	CO ₂	1647.02	0.6	679.26	0.1606	0.5%	35.4%	58.8%
Other (Residential)	Secondary Coal	CO ₂	297.58	0.1	635.01	0.1706	0.6%	36.0%	-113.4%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	36.0%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	3708.23	1.4	941.03	0.5908	2.0%	38.0%	74.6%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	6829.79	2.7	3375.90	0.4481	1.5%	39.5%	50.6%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	5177.77	2.0	3689.24	0.1006	0.3%	39.8%	28.7%
Iron and Steel (Industry)	Petroleum	CO ₂	1728.96	0.7	1720.93	0.2241	0.8%	40.6%	0.5%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.84	0.3	774.22	0.0933	0.3%	40.9%	4.0%
Chemicals (Industry)	Petroleum	CO ₂	2276.99	0.9	1984.26	0.1852	0.6%	41.5%	12.9%
Other (Industry)	Petroleum	CO ₂	7946.72	3.1	7050.12	0.6952	2.3%	43.9%	11.3%
Road Transportation (Transport)	Petroleum	CO ₂	26851.84	10.5	24035.93	2.4323	8.2%	52.0%	10.5%
Railways (Transport)	Petroleum	CO ₂	619.81	0.2	465.05	0.0212	0.1%	52.1%	25.0%
Navigation (Transport)	Petroleum	CO ₂	710.08	0.3	494.28	0.0092	0.0%	52.1%	30.4%
Other (Residential)	Petroleum	CO ₂	10770.67	4.2	9153.31	0.7855	2.6%	54.8%	15.0%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	7979.42	3.1	5795.38	0.1978	0.7%	55.4%	27.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	11665.04	4.5	5435.89	0.8939	3.0%	58.4%	53.4%
Iron and Steel (Industry)	Natural Gas	CO ₂	11.34	0.0	0.00	0.0029	0.0%	58.5%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	0.00	0.0	0.00	0.0000	0.0%	58.5%	0.0%
Chemicals (Industry)	Natural Gas	CO ₂	0.00	0.0	0.00	0.0000	0.0%	58.5%	0.0%
Other (Industry)	Natural Gas	CO ₂	5299.96	2.1	1729.02	0.6948	2.3%	60.8%	67.4%
Road Transportation (Transport)	Natural Gas	CO ₂	8.21	0.0	0.00	0.0021	0.0%	60.8%	100.0%
Other (Residential)	Natural Gas	CO ₂	5661.39	2.2	104.21	1.4212	4.8%	65.6%	98.2%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	3219.78	1.3	904.59	0.4789	1.6%	67.2%	71.9%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.75	0.0	0.19	0.0001	0.0%	67.2%	74.4%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.42	0.0	0.00	0.0001	0.0%	67.2%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.31	0.0	0.00	0.0001	0.0%	67.2%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	35.30	0.0	9.44	0.0054	0.0%	67.2%	73.3%
Railways (Transport)	Hard Coal	CH ₄	0.05	0.0	0.07	0.0000	0.0%	67.2%	-61.4%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	67.2%	0.0%
Other (Residential)	Hard Coal	CH ₄	141.10	0.1	261.34	0.0654	0.2%	67.4%	-85.2%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	7.85	0.0	4.38	0.0003	0.0%	67.4%	44.3%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.12	0.0	0.13	0.0000	0.0%	67.4%	-9.1%
Chemicals (Industry)	Lignite	CH ₄	0.12	0.0	1.12	0.0004	0.0%	67.4%	-844.4%
Other (Industry)	Lignite	CH ₄	16.82	0.0	21.07	0.0039	0.0%	67.4%	-25.2%

Table D1. Trend Analysis
1998 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1998	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	67.4%	0.0%
Other (Residential)	Lignite	CH ₄	465.22	0.2	589.29	0.1095	0.4%	67.8%	-26.7%
Other (Industry)	Asphalt	CH ₄	0.04	0.0	0.20	0.0001	0.0%	67.8%	-380.0%
Other (Residential)	Asphalt	CH ₄	1.38	0.0	26.54	0.0100	0.0%	67.8%	-1824.5%
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.99	0.0	17.40	0.0021	0.0%	67.8%	3.3%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.07	0.0	0.17	0.0000	0.0%	67.8%	-145.5%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.8%	0.0%
Other (Industry)	Secondary Coal	CH ₄	3.73	0.0	1.54	0.0004	0.0%	67.8%	58.8%
Other (Residential)	Secondary Coal	CH ₄	20.22	0.0	43.15	0.0116	0.0%	67.9%	-113.4%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	67.9%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	8.40	0.0	2.13	0.0013	0.0%	67.9%	74.6%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	5.93	0.0	2.93	0.0004	0.0%	67.9%	50.6%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.49	0.0	3.20	0.0001	0.0%	67.9%	28.7%
Iron and Steel (Industry)	Petroleum	CH ₄	1.00	0.0	1.00	0.0001	0.0%	67.9%	0.5%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.47	0.0	0.45	0.0001	0.0%	67.9%	4.0%
Chemicals (Industry)	Petroleum	CH ₄	1.32	0.0	1.15	0.0001	0.0%	67.9%	12.9%
Other (Industry)	Petroleum	CH ₄	4.60	0.0	4.08	0.0004	0.0%	67.9%	11.3%
Other (Residential)	Petroleum	CH ₄	31.15	0.0	26.48	0.0023	0.0%	67.9%	15.0%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	11.54	0.0	8.38	0.0003	0.0%	67.9%	27.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	4.39	0.0	2.05	0.0003	0.0%	67.9%	53.4%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.02	0.0	0.00	0.0000	0.0%	67.9%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.9%	0.0%
Chemicals (Industry)	Natural Gas	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.9%	0.0%
Other (Industry)	Natural Gas	CH ₄	9.97	0.0	3.25	0.0013	0.0%	67.9%	67.4%
Road Transportation (Transport)	Natural Gas	CH ₄	0.21	0.0	0.00	0.0001	0.0%	67.9%	100.0%
Other (Residential)	Natural Gas	CH ₄	10.65	0.0	0.20	0.0027	0.0%	67.9%	98.2%
Other (Residential)	Biomass	CH ₄	1841.97	0.7	1901.22	0.2652	0.9%	68.8%	-3.2%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.98	0.0	1.31	0.0000	0.0%	68.8%	34.0%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	130.98	0.1	67.91	0.0074	0.0%	68.8%	48.2%
Railways (Transport)	Diesel+FuelOil	CH ₄	1.00	0.0	0.73	0.0000	0.0%	68.8%	27.6%
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.99	0.0	0.69	0.0000	0.0%	68.8%	30.7%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	15.60	0.0	3.99	0.0025	0.0%	68.8%	74.4%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.87	0.0	0.00	0.0002	0.0%	68.8%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.64	0.0	0.00	0.0002	0.0%	68.8%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	72.95	0.0	19.51	0.0112	0.0%	68.9%	73.3%
Railways (Transport)	Hard Coal	N ₂ O	0.25	0.0	0.39	0.0001	0.0%	68.9%	-58.7%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	68.9%	0.0%
Other (Residential)	Hard Coal	N ₂ O	9.72	0.0	18.00	0.0045	0.0%	68.9%	-85.2%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	162.21	0.1	90.42	0.0067	0.0%	68.9%	44.3%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.24	0.0	0.26	0.0000	0.0%	68.9%	-9.1%
Chemicals (Industry)	Lignite	N ₂ O	0.25	0.0	2.32	0.0008	0.0%	68.9%	-844.4%
Other (Industry)	Lignite	N ₂ O	34.77	0.0	43.53	0.0080	0.0%	68.9%	-25.2%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	68.9%	0.0%
Other (Residential)	Lignite	N ₂ O	32.05	0.0	40.60	0.0075	0.0%	69.0%	-26.7%
Other (Industry)	Asphalt	N ₂ O	0.09	0.0	0.41	0.0001	0.0%	69.0%	-380.0%
Other (Residential)	Asphalt	N ₂ O	0.10	0.0	1.83	0.0007	0.0%	69.0%	-1824.5%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	37.17	0.0	35.96	0.0044	0.0%	69.0%	3.3%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.14	0.0	0.34	0.0001	0.0%	69.0%	-145.5%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	69.0%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	7.71	0.0	3.18	0.0008	0.0%	69.0%	58.8%
Other (Residential)	Secondary Coal	N ₂ O	1.39	0.0	2.97	0.0008	0.0%	69.0%	-113.4%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	69.0%	0.0%

Table D1. Trend Analysis
1998 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1998	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	17.36	0.0	4.41	0.0028	0.0%	69.0%	74.6%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	17.50	0.0	8.65	0.0011	0.0%	69.0%	50.6%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	13.27	0.0	9.45	0.0003	0.0%	69.0%	28.7%
Iron and Steel (Industry)	Petroleum	N ₂ O	4.43	0.0	4.41	0.0006	0.0%	69.0%	0.5%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.07	0.0	1.98	0.0002	0.0%	69.0%	4.0%
Chemicals (Industry)	Petroleum	N ₂ O	5.83	0.0	5.08	0.0005	0.0%	69.0%	12.9%
Other (Industry)	Petroleum	N ₂ O	20.36	0.0	18.06	0.0018	0.0%	69.0%	11.3%
Other (Residential)	Petroleum	N ₂ O	27.59	0.0	23.45	0.0020	0.0%	69.0%	15.0%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	20.44	0.0	14.85	0.0005	0.0%	69.0%	27.4%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	6.48	0.0	3.02	0.0005	0.0%	69.0%	53.4%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	69.0%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	69.0%	0.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	69.0%	0.0%
Other (Industry)	Natural Gas	N ₂ O	2.94	0.0	0.96	0.0004	0.0%	69.0%	67.4%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.02	0.0	0.00	0.0000	0.0%	69.0%	100.0%
Other (Residential)	Natural Gas	N ₂ O	3.14	0.0	0.06	0.0008	0.0%	69.0%	98.2%
Other (Residential)	Biomass	N ₂ O	362.55	0.1	374.21	0.0522	0.2%	69.2%	-3.2%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	32.49	0.0	9.08	0.0049	0.0%	69.2%	72.0%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	282.81	0.1	246.86	0.0232	0.1%	69.3%	12.7%
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.71	0.0	3.36	0.0001	0.0%	69.3%	28.8%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.76	0.0	1.22	0.0000	0.0%	69.3%	30.8%
Cement Production (Mineral Products)		CO ₂	14872.77	5.8	10333.37	0.1861	0.6%	69.9%	30.5%
Lime Production (Mineral Products)		CO ₂	970.01	0.4	645.09	0.0009	0.0%	69.9%	33.5%
Limestone and Dolomite Use (Mineral Products)		CO ₂	10.82	0.0	21.52	0.0056	0.0%	70.0%	-98.8%
Soda Ash Production and Use (Mineral Products)		CO ₂	235.29	0.1	106.30	0.0193	0.1%	70.0%	54.8%
Ammonia Production (Chemical Industry)		CO ₂	570.66	0.2	713.47	0.1307	0.4%	70.5%	-25.0%
Carbide Production (Chemical Industry)		CO ₂	63.19	0.0	112.25	0.0274	0.1%	70.5%	-77.6%
Aluminium Production (Metal Production)		CO ₂	111.25	0.0	109.62	0.0140	0.0%	70.6%	1.5%
Iron and Steel Production (Metal Production)		CO ₂	731.45	0.3	770.23	0.1113	0.4%	71.0%	-5.3%
Ferroalloys Production (Metal Production)		CO ₂	143.23	0.1	81.17	0.0054	0.0%	71.0%	43.3%
Other Chemicals Production (Chemical Industry)		CH ₄	49.40	0.0	49.39	0.0065	0.0%	71.0%	0.0%
Nitric Acid Production (Chemical Industry)		N ₂ O	4203.34	1.6	128.08	1.0354	3.5%	74.5%	97.0%
Enteric Fermentation		CH ₄	15050.06	5.9	17046.76	2.7563	9.3%	83.7%	-13.3%
Manure Management		CH ₄	750.88	0.3	613.63	0.0452	0.2%	83.9%	18.3%
Rice Cultivation		CH ₄	252.00	0.1	222.60	0.0217	0.1%	84.0%	11.7%
Solid Waste		CH ₄	26687.80	10.4	6386.46	4.4026	14.8%	98.8%	76.1%
Fugitive (Coal Mining)		CH ₄	1632.15	0.6	1430.32	0.1359	0.5%	99.2%	12.4%
Field Burning of Agricultural Residues		CH ₄	501.02	0.2	454.59	0.0478	0.2%	99.4%	9.3%
Field Burning of Agricultural Residues		N ₂ O	150.04	0.1	135.78	0.0142	0.0%	99.4%	9.5%
Emission of HFCs		HFC-	0.00	0.0	0.00	0.0000	0.0%	99.4%	0.0%
Emission of SF ₆		SF ₆	659.64	0.3	0.00	0.1703	0.6%	100.0%	100.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.10	0.0	6.20	0.0016	0.0%	100.0%	-100.0%
TOTAL			256637		170065	29.7691	100.0%		

Table D1. Trend Analysis
1999 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1999	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3083.35	1.2	851.45	0.4637	1.5%	1.5%	72.4%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	186.31	0.1	0.00	0.0481	0.2%	1.6%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	135.93	0.1	0.00	0.0351	0.1%	1.7%	100.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	12575.09	4.9	4168.15	1.6202	5.1%	6.8%	66.9%
Railways (Transport)	Hard Coal	CO ₂	15.65	0.0	29.73	0.0075	0.0%	6.8%	-89.9%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	6.8%	0.0%
Other (Residential)	Hard Coal	CO ₂	1724.24	0.7	3845.79	1.0530	3.3%	10.1%	-123.0%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	38348.24	14.9	20662.22	1.8443	5.8%	15.9%	46.1%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	59.79	0.0	59.79	0.0079	0.0%	15.9%	0.0%
Chemicals (Industry)	Lignite	CO ₂	58.55	0.0	529.42	0.1911	0.6%	16.5%	-804.3%
Other (Industry)	Lignite	CO ₂	6349.72	2.5	9948.37	2.2365	7.0%	23.5%	-56.7%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	23.5%	0.0%
Other (Residential)	Lignite	CO ₂	6311.74	2.5	9276.74	1.9848	6.2%	29.8%	-47.0%
Other (Industry)	Asphalt	CO ₂	0.00	0.0	88.46	0.0000	0.0%	29.8%	0.0%
Other (Residential)	Asphalt	CO ₂	47.83	0.0	390.56	0.1398	0.4%	30.2%	-716.5%
Iron and Steel (Industry)	Secondary Coal	CO ₂	8059.04	3.1	7681.10	0.9127	2.9%	33.1%	4.7%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	38.04	0.0	73.36	0.0188	0.1%	33.1%	-92.9%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	33.1%	0.0%
Other (Industry)	Secondary Coal	CO ₂	754.78	0.3	679.26	0.0699	0.2%	33.3%	10.0%
Other (Residential)	Secondary Coal	CO ₂	78.13	0.0	635.01	0.2271	0.7%	34.1%	-712.7%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	34.1%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	4757.82	1.9	941.03	0.8607	2.7%	36.8%	80.2%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	7001.08	2.7	3375.90	0.4911	1.5%	38.3%	51.8%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4803.20	1.9	3689.24	0.1979	0.6%	38.9%	23.2%
Iron and Steel (Industry)	Petroleum	CO ₂	1504.42	0.6	1720.93	0.2822	0.9%	39.8%	-14.4%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.84	0.3	774.22	0.0934	0.3%	40.1%	4.0%
Chemicals (Industry)	Petroleum	CO ₂	2276.99	0.9	1984.26	0.1855	0.6%	40.7%	12.9%
Other (Industry)	Petroleum	CO ₂	7203.13	2.8	7050.12	0.8877	2.8%	43.5%	2.1%
Road Transportation (Transport)	Petroleum	CO ₂	29166.31	11.4	24035.93	1.8378	5.8%	49.2%	17.6%
Railways (Transport)	Petroleum	CO ₂	621.95	0.2	465.05	0.0207	0.1%	49.3%	25.2%
Navigation (Transport)	Petroleum	CO ₂	644.51	0.3	494.28	0.0263	0.1%	49.4%	23.3%
Other (Residential)	Petroleum	CO ₂	10317.82	4.0	9153.31	0.9034	2.8%	52.2%	11.3%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8199.64	3.2	5795.38	0.1421	0.4%	52.6%	29.3%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	16110.27	6.3	5435.89	2.0383	6.4%	59.0%	66.3%
Iron and Steel (Industry)	Natural Gas	CO ₂	10.21	0.0	0.00	0.0026	0.0%	59.0%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	597.61	0.2	0.00	0.1541	0.5%	59.5%	100.0%
Chemicals (Industry)	Natural Gas	CO ₂	546.57	0.2	0.00	0.1410	0.4%	60.0%	100.0%
Other (Industry)	Natural Gas	CO ₂	3849.31	1.5	1729.02	0.3195	1.0%	61.0%	55.1%
Road Transportation (Transport)	Natural Gas	CO ₂	8.64	0.0	0.00	0.0022	0.0%	61.0%	100.0%
Other (Residential)	Natural Gas	CO ₂	6116.88	2.4	104.21	1.5371	4.8%	65.8%	98.3%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	2833.54	1.1	904.59	0.3786	1.2%	67.0%	68.1%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.70	0.0	0.19	0.0001	0.0%	67.0%	72.4%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.42	0.0	0.00	0.0001	0.0%	67.0%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.31	0.0	0.00	0.0001	0.0%	67.0%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	28.48	0.0	9.44	0.0037	0.0%	67.0%	66.9%
Railways (Transport)	Hard Coal	CH ₄	0.04	0.0	0.07	0.0000	0.0%	67.0%	-83.0%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	67.0%	0.0%
Other (Residential)	Hard Coal	CH ₄	117.17	0.0	261.34	0.0716	0.2%	67.2%	-123.0%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	8.12	0.0	4.38	0.0004	0.0%	67.2%	46.1%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.13	0.0	0.13	0.0000	0.0%	67.2%	0.0%
Chemicals (Industry)	Lignite	CH ₄	0.12	0.0	1.12	0.0004	0.0%	67.2%	-804.3%
Other (Industry)	Lignite	CH ₄	13.45	0.0	21.07	0.0047	0.0%	67.2%	-56.7%

Table D1. Trend Analysis
1999 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1999	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	67.2%	0.0%
Other (Residential)	Lignite	CH ₄	400.94	0.2	589.29	0.1261	0.4%	67.6%	-47.0%
Other (Industry)	Asphalt	CH ₄	0.00	0.0	0.20	0.0000	0.0%	67.6%	0.0%
Other (Residential)	Asphalt	CH ₄	3.25	0.0	26.54	0.0095	0.0%	67.7%	-716.5%
Iron and Steel (Industry)	Secondary Coal	CH ₄	18.26	0.0	17.40	0.0021	0.0%	67.7%	4.7%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.09	0.0	0.17	0.0000	0.0%	67.7%	-92.9%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	67.7%	0.0%
Other (Industry)	Secondary Coal	CH ₄	1.71	0.0	1.54	0.0002	0.0%	67.7%	10.0%
Other (Residential)	Secondary Coal	CH ₄	5.31	0.0	43.15	0.0154	0.0%	67.7%	-712.7%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	67.7%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	10.78	0.0	2.13	0.0019	0.0%	67.7%	80.2%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	6.08	0.0	2.93	0.0004	0.0%	67.7%	51.8%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.17	0.0	3.20	0.0002	0.0%	67.7%	23.2%
Iron and Steel (Industry)	Petroleum	CH ₄	0.87	0.0	1.00	0.0002	0.0%	67.7%	-14.4%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.47	0.0	0.45	0.0001	0.0%	67.7%	4.0%
Chemicals (Industry)	Petroleum	CH ₄	1.32	0.0	1.15	0.0001	0.0%	67.7%	12.9%
Other (Industry)	Petroleum	CH ₄	4.17	0.0	4.08	0.0005	0.0%	67.7%	2.1%
Other (Residential)	Petroleum	CH ₄	29.84	0.0	26.48	0.0026	0.0%	67.7%	11.3%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	11.86	0.0	8.38	0.0002	0.0%	67.7%	29.3%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	6.06	0.0	2.05	0.0008	0.0%	67.7%	66.3%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.02	0.0	0.00	0.0000	0.0%	67.7%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	1.12	0.0	0.00	0.0003	0.0%	67.7%	100.0%
Chemicals (Industry)	Natural Gas	CH ₄	1.03	0.0	0.00	0.0003	0.0%	67.7%	100.0%
Other (Industry)	Natural Gas	CH ₄	7.24	0.0	3.25	0.0006	0.0%	67.8%	55.1%
Road Transportation (Transport)	Natural Gas	CH ₄	0.22	0.0	0.00	0.0001	0.0%	67.8%	100.0%
Other (Residential)	Natural Gas	CH ₄	11.88	0.0	0.20	0.0030	0.0%	67.8%	98.3%
Other (Residential)	Biomass	CH ₄	1771.18	0.7	1901.22	0.2836	0.9%	68.7%	-7.3%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.29	0.0	1.31	0.0002	0.0%	68.7%	-1.5%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	133.98	0.1	67.91	0.0081	0.0%	68.7%	49.3%
Railways (Transport)	Diesel+FuelOil	CH ₄	1.01	0.0	0.73	0.0000	0.0%	68.7%	28.0%
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.90	0.0	0.69	0.0000	0.0%	68.7%	23.8%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	14.43	0.0	3.99	0.0022	0.0%	68.7%	72.4%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.87	0.0	0.00	0.0002	0.0%	68.7%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.64	0.0	0.00	0.0002	0.0%	68.7%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	58.87	0.0	19.51	0.0076	0.0%	68.7%	66.9%
Railways (Transport)	Hard Coal	N ₂ O	0.22	0.0	0.39	0.0001	0.0%	68.7%	-79.9%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	68.7%	0.0%
Other (Residential)	Hard Coal	N ₂ O	8.07	0.0	18.00	0.0049	0.0%	68.7%	-123.0%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	167.81	0.1	90.42	0.0081	0.0%	68.7%	46.1%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.26	0.0	0.26	0.0000	0.0%	68.7%	0.0%
Chemicals (Industry)	Lignite	N ₂ O	0.26	0.0	2.32	0.0008	0.0%	68.8%	-804.3%
Other (Industry)	Lignite	N ₂ O	27.79	0.0	43.53	0.0098	0.0%	68.8%	-56.7%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	68.8%	0.0%
Other (Residential)	Lignite	N ₂ O	27.62	0.0	40.60	0.0087	0.0%	68.8%	-47.0%
Other (Industry)	Asphalt	N ₂ O	0.00	0.0	0.41	0.0000	0.0%	68.8%	0.0%
Other (Residential)	Asphalt	N ₂ O	0.22	0.0	1.83	0.0007	0.0%	68.8%	-716.5%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	37.73	0.0	35.96	0.0043	0.0%	68.8%	4.7%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.18	0.0	0.34	0.0001	0.0%	68.8%	-92.9%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	68.8%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	3.53	0.0	3.18	0.0003	0.0%	68.8%	10.0%
Other (Residential)	Secondary Coal	N ₂ O	0.37	0.0	2.97	0.0011	0.0%	68.8%	-712.7%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	68.8%	0.0%

Table D1. Trend Analysis
1999 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 1999	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	22.27	0.0	4.41	0.0040	0.0%	68.8%	80.2%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	17.94	0.0	8.65	0.0013	0.0%	68.8%	51.8%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	12.31	0.0	9.45	0.0005	0.0%	68.8%	23.2%
Iron and Steel (Industry)	Petroleum	N ₂ O	3.85	0.0	4.41	0.0007	0.0%	68.9%	-14.4%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.07	0.0	1.98	0.0002	0.0%	68.9%	4.0%
Chemicals (Industry)	Petroleum	N ₂ O	5.83	0.0	5.08	0.0005	0.0%	68.9%	12.9%
Other (Industry)	Petroleum	N ₂ O	18.45	0.0	18.06	0.0023	0.0%	68.9%	2.1%
Other (Residential)	Petroleum	N ₂ O	26.43	0.0	23.45	0.0023	0.0%	68.9%	11.3%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	21.01	0.0	14.85	0.0004	0.0%	68.9%	29.3%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	8.95	0.0	3.02	0.0011	0.0%	68.9%	66.3%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	68.9%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.33	0.0	0.00	0.0001	0.0%	68.9%	100.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.30	0.0	0.00	0.0001	0.0%	68.9%	100.0%
Other (Industry)	Natural Gas	N ₂ O	2.14	0.0	0.96	0.0002	0.0%	68.9%	55.1%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.02	0.0	0.00	0.0000	0.0%	68.9%	100.0%
Other (Residential)	Natural Gas	N ₂ O	3.51	0.0	0.06	0.0009	0.0%	68.9%	98.3%
Other (Residential)	Biomass	N ₂ O	348.61	0.1	374.21	0.0558	0.2%	69.1%	-7.3%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	30.85	0.0	9.08	0.0044	0.0%	69.1%	70.6%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	338.53	0.1	246.86	0.0088	0.0%	69.1%	27.1%
Railways (Transport)	Diesel+FuelOil	N ₂ O	4.74	0.0	3.36	0.0001	0.0%	69.1%	29.2%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.60	0.0	1.22	0.0001	0.0%	69.1%	24.0%
Cement Production (Mineral Products)		CO ₂	14269.57	5.6	10333.37	0.3437	1.1%	70.2%	27.6%
Lime Production (Mineral Products)		CO ₂	887.58	0.3	645.09	0.0223	0.1%	70.2%	27.3%
Limestone and Dolomite Use (Mineral Products)		CO ₂	11.87	0.0	21.52	0.0053	0.0%	70.3%	-81.3%
Soda Ash Production and Use (Mineral Products)		CO ₂	357.68	0.1	106.30	0.0509	0.2%	70.4%	70.3%
Ammonia Production (Chemical Industry)		CO ₂	160.40	0.1	713.47	0.2365	0.7%	71.2%	-344.8%
Carbide Production (Chemical Industry)		CO ₂	45.71	0.0	112.25	0.0319	0.1%	71.3%	-145.6%
Aluminium Production (Metal Production)		CO ₂	111.07	0.0	109.62	0.0140	0.0%	71.3%	1.3%
Iron and Steel Production (Metal Production)		CO ₂	503.47	0.2	770.23	0.1701	0.5%	71.8%	-53.0%
Ferroalloys Production (Metal Production)		CO ₂	161.08	0.1	81.17	0.0099	0.0%	71.9%	49.6%
Other Chemicals Production (Chemical Industry)		CH ₄	46.59	0.0	49.39	0.0072	0.0%	71.9%	-6.0%
Nitric Acid Production (Chemical Industry)		N ₂ O	4374.86	1.7	128.08	1.0785	3.4%	75.3%	97.1%
Enteric Fermentation		CH ₄	15107.66	5.9	17046.76	2.7420	8.6%	83.9%	-12.8%
Manure Management		CH ₄	806.06	0.3	613.63	0.0311	0.1%	84.0%	23.9%
Rice Cultivation		CH ₄	273.00	0.1	222.60	0.0163	0.1%	84.0%	18.5%
Solid Waste		CH ₄	27971.58	10.9	6386.46	4.7275	14.8%	98.8%	77.2%
Fugitive (Coal Mining)		CH ₄	1588.26	0.6	1430.32	0.1474	0.5%	99.3%	9.9%
Field Burning of Agricultural Residues		CH ₄	428.74	0.2	454.59	0.0665	0.2%	99.5%	-6.0%
Field Burning of Agricultural Residues		N ₂ O	128.03	0.0	135.78	0.0199	0.1%	99.6%	-6.1%
Emission of HFCs		HFC-	0.00	0.0	0.00	0.0000	0.0%	99.6%	0.0%
Emission of SF6		SF ₆	516.81	0.2	0.00	0.1333	0.4%	100.0%	100.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.10	0.0	6.20	0.0016	0.0%	100.0%	-100.0%
TOTAL			256779		170065	31.8884	100.0%		

Table D1. Trend Analysis
2000 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 2000	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3054.85	1.1	851.45	0.3587	1.1%	1.1%	72.1%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	185.19	0.1	0.00	0.0402	0.1%	1.2%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	135.93	0.0	0.00	0.0295	0.1%	1.3%	100.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	21200.74	7.6	4168.15	3.1111	9.6%	10.9%	80.3%
Railways (Transport)	Hard Coal	CO ₂	1.91	0.0	29.73	0.0102	0.0%	11.0%	-1458.4%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	11.0%	0.0%
Other (Residential)	Hard Coal	CO ₂	1939.08	0.7	3845.79	0.9529	2.9%	13.9%	-98.3%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	38212.72	13.6	20662.22	0.9108	2.8%	16.7%	45.9%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	59.79	0.0	59.79	0.0084	0.0%	16.8%	0.0%
Chemicals (Industry)	Lignite	CO ₂	58.55	0.0	529.42	0.1764	0.5%	17.3%	-804.3%
Other (Industry)	Lignite	CO ₂	7514.91	2.7	9948.37	1.9229	5.9%	23.2%	-32.4%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	23.2%	0.0%
Other (Residential)	Lignite	CO ₂	6133.66	2.2	9276.74	1.9827	6.1%	29.4%	-51.2%
Other (Industry)	Asphalt	CO ₂	17.46	0.0	88.46	0.0278	0.1%	29.5%	-406.6%
Other (Residential)	Asphalt	CO ₂	18.75	0.0	390.56	0.1354	0.4%	29.9%	-1982.6%
Iron and Steel (Industry)	Secondary Coal	CO ₂	8535.82	3.0	7681.10	0.8916	2.8%	32.6%	10.0%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	285.29	0.1	73.36	0.0357	0.1%	32.7%	74.3%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	32.7%	0.0%
Other (Industry)	Secondary Coal	CO ₂	812.82	0.3	679.26	0.0663	0.2%	32.9%	16.4%
Other (Residential)	Secondary Coal	CO ₂	130.24	0.0	635.01	0.1986	0.6%	33.6%	-387.6%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	33.6%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	4533.50	1.6	941.03	0.6475	2.0%	35.6%	79.2%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	10847.04	3.9	3375.90	1.1477	3.5%	39.1%	68.9%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	4690.34	1.7	3689.24	0.3001	0.9%	40.0%	21.3%
Iron and Steel (Industry)	Petroleum	CO ₂	1538.95	0.5	1720.93	0.2808	0.9%	40.9%	-11.8%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.84	0.3	774.22	0.1015	0.3%	41.2%	4.0%
Chemicals (Industry)	Petroleum	CO ₂	2305.25	0.8	1984.26	0.2086	0.6%	41.9%	13.9%
Other (Industry)	Petroleum	CO ₂	7269.44	2.6	7050.12	0.9409	2.9%	44.8%	3.0%
Road Transportation (Transport)	Petroleum	CO ₂	30813.41	11.0	24035.93	1.8997	5.9%	50.6%	22.0%
Railways (Transport)	Petroleum	CO ₂	475.82	0.2	465.05	0.0629	0.2%	50.8%	2.3%
Navigation (Transport)	Petroleum	CO ₂	610.65	0.2	494.28	0.0441	0.1%	51.0%	19.1%
Other (Residential)	Petroleum	CO ₂	11183.34	4.0	9153.31	0.8430	2.6%	53.6%	18.2%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8539.41	3.1	5795.38	0.2172	0.7%	54.2%	32.1%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	19974.77	7.1	5435.89	2.3923	7.4%	61.6%	72.8%
Iron and Steel (Industry)	Natural Gas	CO ₂	12.96	0.0	0.00	0.0028	0.0%	61.6%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	616.61	0.2	0.00	0.1338	0.4%	62.1%	100.0%
Chemicals (Industry)	Natural Gas	CO ₂	652.60	0.2	0.00	0.1416	0.4%	62.5%	100.0%
Other (Industry)	Natural Gas	CO ₂	3332.22	1.2	1729.02	0.1054	0.3%	62.8%	48.1%
Road Transportation (Transport)	Natural Gas	CO ₂	8.82	0.0	0.00	0.0019	0.0%	62.8%	100.0%
Other (Residential)	Natural Gas	CO ₂	7486.49	2.7	104.21	1.5871	4.9%	67.7%	98.6%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	3058.29	1.1	904.59	0.3404	1.1%	68.8%	70.4%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.69	0.0	0.19	0.0001	0.0%	68.8%	72.1%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.42	0.0	0.00	0.0001	0.0%	68.8%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.31	0.0	0.00	0.0001	0.0%	68.8%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	48.02	0.0	9.44	0.0070	0.0%	68.8%	80.3%
Railways (Transport)	Hard Coal	CH ₄	0.00	0.0	0.07	0.0000	0.0%	68.8%	-1384.4%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	68.8%	0.0%
Other (Residential)	Hard Coal	CH ₄	131.77	0.0	261.34	0.0648	0.2%	69.0%	-98.3%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	8.09	0.0	4.38	0.0002	0.0%	69.0%	45.9%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.13	0.0	0.13	0.0000	0.0%	69.0%	0.0%
Chemicals (Industry)	Lignite	CH ₄	0.12	0.0	1.12	0.0004	0.0%	69.0%	-804.3%
Other (Industry)	Lignite	CH ₄	15.91	0.0	21.07	0.0041	0.0%	69.0%	-32.4%

Table D1. Trend Analysis

2000 VS. 1990 TREND ANALYSIS									
CATEGORY	FUEL	GAS	EMISSION 2000	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	69.0%	0.0%
Other (Residential)	Lignite	CH ₄	389.63	0.1	589.29	0.1259	0.4%	69.4%	-51.2%
Other (Industry)	Asphalt	CH ₄	0.04	0.0	0.20	0.0001	0.0%	69.4%	-406.6%
Other (Residential)	Asphalt	CH ₄	1.27	0.0	26.54	0.0092	0.0%	69.4%	-1982.6%
Iron and Steel (Industry)	Secondary Coal	CH ₄	19.34	0.0	17.40	0.0020	0.0%	69.4%	10.0%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.65	0.0	0.17	0.0001	0.0%	69.4%	74.3%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	69.4%	0.0%
Other (Industry)	Secondary Coal	CH ₄	1.84	0.0	1.54	0.0002	0.0%	69.4%	16.4%
Other (Residential)	Secondary Coal	CH ₄	8.85	0.0	43.15	0.0135	0.0%	69.5%	-387.6%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	69.5%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	10.27	0.0	2.13	0.0015	0.0%	69.5%	79.2%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	9.41	0.0	2.93	0.0010	0.0%	69.5%	68.9%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.07	0.0	3.20	0.0003	0.0%	69.5%	21.3%
Iron and Steel (Industry)	Petroleum	CH ₄	0.89	0.0	1.00	0.0002	0.0%	69.5%	-11.8%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.47	0.0	0.45	0.0001	0.0%	69.5%	4.0%
Chemicals (Industry)	Petroleum	CH ₄	1.33	0.0	1.15	0.0001	0.0%	69.5%	13.9%
Other (Industry)	Petroleum	CH ₄	4.21	0.0	4.08	0.0005	0.0%	69.5%	3.0%
Other (Residential)	Petroleum	CH ₄	32.35	0.0	26.48	0.0024	0.0%	69.5%	18.2%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	12.35	0.0	8.38	0.0003	0.0%	69.5%	32.1%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	7.51	0.0	2.05	0.0009	0.0%	69.5%	72.8%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.02	0.0	0.00	0.0000	0.0%	69.5%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	1.16	0.0	0.00	0.0003	0.0%	69.5%	100.0%
Chemicals (Industry)	Natural Gas	CH ₄	1.23	0.0	0.00	0.0003	0.0%	69.5%	100.0%
Other (Industry)	Natural Gas	CH ₄	6.27	0.0	3.25	0.0002	0.0%	69.5%	48.1%
Road Transportation (Transport)	Natural Gas	CH ₄	0.25	0.0	0.00	0.0001	0.0%	69.5%	100.0%
Other (Residential)	Natural Gas	CH ₄	14.08	0.0	0.20	0.0030	0.0%	69.5%	98.6%
Other (Residential)	Biomass	CH ₄	1703.16	0.6	1901.22	0.3096	1.0%	70.5%	-11.6%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.48	0.0	1.31	0.0001	0.0%	70.5%	11.8%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	132.45	0.0	67.91	0.0045	0.0%	70.5%	48.7%
Railways (Transport)	Diesel+FuelOil	CH ₄	0.78	0.0	0.73	0.0001	0.0%	70.5%	6.9%
Navigation (Transport)	Diesel+FuelOil	CH ₄	0.86	0.0	0.69	0.0001	0.0%	70.5%	19.7%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	14.30	0.0	3.99	0.0017	0.0%	70.5%	72.1%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.87	0.0	0.00	0.0002	0.0%	70.5%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.64	0.0	0.00	0.0001	0.0%	70.5%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	99.25	0.0	19.51	0.0146	0.0%	70.5%	80.3%
Railways (Transport)	Hard Coal	N ₂ O	0.03	0.0	0.39	0.0001	0.0%	70.5%	-1351.0%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	70.5%	0.0%
Other (Residential)	Hard Coal	N ₂ O	9.08	0.0	18.00	0.0045	0.0%	70.6%	-98.3%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	167.22	0.1	90.42	0.0040	0.0%	70.6%	45.9%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.26	0.0	0.26	0.0000	0.0%	70.6%	0.0%
Chemicals (Industry)	Lignite	N ₂ O	0.26	0.0	2.32	0.0008	0.0%	70.6%	-804.3%
Other (Industry)	Lignite	N ₂ O	32.89	0.0	43.53	0.0084	0.0%	70.6%	-32.4%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	70.6%	0.0%
Other (Residential)	Lignite	N ₂ O	26.84	0.0	40.60	0.0087	0.0%	70.6%	-51.2%
Other (Industry)	Asphalt	N ₂ O	0.08	0.0	0.41	0.0001	0.0%	70.6%	-406.6%
Other (Residential)	Asphalt	N ₂ O	0.09	0.0	1.83	0.0006	0.0%	70.6%	-1982.6%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	39.96	0.0	35.96	0.0042	0.0%	70.6%	10.0%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	1.34	0.0	0.34	0.0002	0.0%	70.6%	74.3%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	70.6%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	3.81	0.0	3.18	0.0003	0.0%	70.6%	16.4%
Other (Residential)	Secondary Coal	N ₂ O	0.61	0.0	2.97	0.0009	0.0%	70.6%	-387.6%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	70.6%	0.0%

Table D1. Trend Analysis

2000 VS. 1990 TREND ANALYSIS									
CATEGORY	FUEL	GAS	EMISSION 2000	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	21.22	0.0	4.41	0.0030	0.0%	70.7%	79.2%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	27.79	0.0	8.65	0.0029	0.0%	70.7%	68.9%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	12.02	0.0	9.45	0.0008	0.0%	70.7%	21.3%
Iron and Steel (Industry)	Petroleum	N ₂ O	3.94	0.0	4.41	0.0007	0.0%	70.7%	-11.8%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.07	0.0	1.98	0.0003	0.0%	70.7%	4.0%
Chemicals (Industry)	Petroleum	N ₂ O	5.91	0.0	5.08	0.0005	0.0%	70.7%	13.9%
Other (Industry)	Petroleum	N ₂ O	18.62	0.0	18.06	0.0024	0.0%	70.7%	3.0%
Other (Residential)	Petroleum	N ₂ O	28.65	0.0	23.45	0.0022	0.0%	70.7%	18.2%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	21.88	0.0	14.85	0.0006	0.0%	70.7%	32.1%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	11.09	0.0	3.02	0.0013	0.0%	70.7%	72.8%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	70.7%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.34	0.0	0.00	0.0001	0.0%	70.7%	100.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.36	0.0	0.00	0.0001	0.0%	70.7%	100.0%
Other (Industry)	Natural Gas	N ₂ O	1.85	0.0	0.96	0.0001	0.0%	70.7%	48.1%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.03	0.0	0.00	0.0000	0.0%	70.7%	100.0%
Other (Residential)	Natural Gas	N ₂ O	4.16	0.0	0.06	0.0009	0.0%	70.7%	98.6%
Other (Residential)	Biomass	N ₂ O	335.23	0.1	374.21	0.0609	0.2%	70.9%	-11.6%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	30.85	0.0	9.08	0.0035	0.0%	70.9%	70.6%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	374.67	0.1	246.86	0.0069	0.0%	70.9%	34.1%
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.69	0.0	3.36	0.0004	0.0%	70.9%	9.0%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.52	0.0	1.22	0.0001	0.0%	70.9%	19.8%
Cement Production (Mineral Products)		CO ₂	14771.91	5.3	10333.37	0.4859	1.5%	72.4%	30.0%
Lime Production (Mineral Products)		CO ₂	832.06	0.3	645.09	0.0499	0.2%	72.6%	22.5%
Limestone and Dolomite Use (Mineral Products)		CO ₂	8.80	0.0	21.52	0.0058	0.0%	72.6%	-144.6%
Soda Ash Production and Use (Mineral Products)		CO ₂	227.86	0.1	106.30	0.0115	0.0%	72.6%	53.3%
Ammonia Production (Chemical Industry)		CO ₂	104.01	0.0	713.47	0.2323	0.7%	73.3%	-586.0%
Carbide Production (Chemical Industry)		CO ₂	48.63	0.0	112.25	0.0295	0.1%	73.4%	-130.8%
Aluminium Production (Metal Production)		CO ₂	110.70	0.0	109.62	0.0151	0.0%	73.5%	1.0%
Iron and Steel Production (Metal Production)		CO ₂	521.18	0.2	770.23	0.1620	0.5%	74.0%	-47.8%
Ferroalloys Production (Metal Production)		CO ₂	126.41	0.0	81.17	0.0016	0.0%	74.0%	35.8%
Other Chemicals Production (Chemical Industry)		CH ₄	47.35	0.0	49.39	0.0074	0.0%	74.0%	-4.3%
Nitric Acid Production (Chemical Industry)		N ₂ O	4292.19	1.5	128.08	0.8855	2.7%	76.7%	97.0%
Enteric Fermentation		CH ₄	14541.62	5.2	17046.76	2.9337	9.1%	85.8%	-17.2%
Manure Management		CH ₄	721.99	0.3	613.63	0.0625	0.2%	86.0%	15.0%
Rice Cultivation		CH ₄	243.60	0.1	222.60	0.0267	0.1%	86.1%	8.6%
Solid Waste		CH ₄	29042.56	10.4	6386.46	4.0202	12.4%	98.5%	78.0%
Fugitive (Coal Mining)		CH ₄	1616.80	0.6	1430.32	0.1601	0.5%	99.0%	11.5%
Field Burning of Agricultural Residues		CH ₄	483.29	0.2	454.59	0.0575	0.2%	99.2%	5.9%
Field Burning of Agricultural Residues		N ₂ O	144.15	0.1	135.78	0.0172	0.1%	99.2%	5.8%
Emission of HFCs		HFC-	818.43	0.3	0.00	0.1776	0.5%	99.8%	100.0%
Emission of SF ₆		SF ₆	322.89	0.1	0.00	0.0701	0.2%	100.0%	100.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	12.40	0.0	6.20	0.0005	0.0%	100.0%	50.0%
TOTAL			279968		170065	32.3607	100.0%		

Table D1. Trend Analysis

2001 VS. 1990 TREND ANALYSIS									
CATEGORY	FUEL	GAS	EMISSION 2001	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3558.20	1.4	851.45	0.5560	1.6%	1.6%	76.1%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	194.07	0.1	0.00	0.0480	0.1%	1.7%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	151.38	0.1	0.00	0.0375	0.1%	1.8%	100.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	11107.40	4.2	4168.15	1.1594	3.3%	5.1%	62.5%
Railways (Transport)	Hard Coal	CO ₂	0.00	0.0	29.73	0.0000	0.0%	5.1%	0.0%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	5.1%	0.0%
Other (Residential)	Hard Coal	CO ₂	2000.41	0.8	3845.79	0.9721	2.8%	7.9%	-92.3%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	38035.47	14.5	20662.22	1.5327	4.4%	12.3%	45.7%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	59.79	0.0	59.79	0.0080	0.0%	12.3%	0.0%
Chemicals (Industry)	Lignite	CO ₂	58.55	0.0	529.42	0.1875	0.5%	12.9%	-804.3%
Other (Industry)	Lignite	CO ₂	5937.03	2.3	9948.37	2.3259	6.6%	19.5%	-67.6%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	19.5%	0.0%
Other (Residential)	Lignite	CO ₂	3362.90	1.3	9276.74	2.7069	7.7%	27.2%	-175.9%
Other (Industry)	Asphalt	CO ₂	0.00	0.0	88.46	0.0000	0.0%	27.2%	0.0%
Other (Residential)	Asphalt	CO ₂	51.21	0.0	390.56	0.1363	0.4%	27.6%	-662.7%
Iron and Steel (Industry)	Secondary Coal	CO ₂	7913.48	3.0	7681.10	0.9715	2.8%	30.4%	2.9%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	285.29	0.1	73.36	0.0426	0.1%	30.5%	74.3%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	30.5%	0.0%
Other (Industry)	Secondary Coal	CO ₂	460.87	0.2	679.26	0.1451	0.4%	30.9%	-47.4%
Other (Residential)	Secondary Coal	CO ₂	63.66	0.0	635.01	0.2265	0.6%	31.6%	-897.6%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	31.6%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	3966.72	1.5	941.03	0.6230	1.8%	33.3%	76.3%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	10535.80	4.0	3375.90	1.3202	3.8%	37.1%	68.0%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	5207.09	2.0	3689.24	0.1185	0.3%	37.5%	29.1%
Iron and Steel (Industry)	Petroleum	CO ₂	1458.12	0.6	1720.93	0.2956	0.8%	38.3%	-18.0%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.84	0.3	774.22	0.0957	0.3%	38.6%	4.0%
Chemicals (Industry)	Petroleum	CO ₂	2305.25	0.9	1984.26	0.1864	0.5%	39.1%	13.9%
Other (Industry)	Petroleum	CO ₂	6437.75	2.5	7050.12	1.0961	3.1%	42.2%	-9.5%
Road Transportation (Transport)	Petroleum	CO ₂	30532.37	11.6	24035.93	1.6119	4.6%	46.8%	21.3%
Railways (Transport)	Petroleum	CO ₂	377.44	0.1	465.05	0.0840	0.2%	47.1%	-23.2%
Navigation (Transport)	Petroleum	CO ₂	784.90	0.3	494.28	0.0057	0.0%	47.1%	37.0%
Other (Residential)	Petroleum	CO ₂	9003.59	3.4	9153.31	1.2634	3.6%	50.7%	-1.7%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8171.33	3.1	5795.38	0.1882	0.5%	51.2%	29.1%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	22385.91	8.5	5435.89	3.4678	9.9%	61.1%	75.7%
Iron and Steel (Industry)	Natural Gas	CO ₂	12.52	0.0	0.00	0.0031	0.0%	61.2%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	614.61	0.2	0.00	0.1522	0.4%	61.6%	100.0%
Chemicals (Industry)	Natural Gas	CO ₂	773.45	0.3	0.00	0.1915	0.5%	62.1%	100.0%
Other (Industry)	Natural Gas	CO ₂	4350.44	1.7	1729.02	0.4173	1.2%	63.3%	60.3%
Road Transportation (Transport)	Natural Gas	CO ₂	8.85	0.0	0.00	0.0022	0.0%	63.3%	100.0%
Other (Residential)	Natural Gas	CO ₂	6583.32	2.5	104.21	1.5900	4.5%	67.9%	98.4%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	3322.73	1.3	904.59	0.4774	1.4%	69.2%	72.8%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.81	0.0	0.19	0.0001	0.0%	69.2%	76.1%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.44	0.0	0.00	0.0001	0.0%	69.2%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.34	0.0	0.00	0.0001	0.0%	69.2%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	25.16	0.0	9.44	0.0026	0.0%	69.2%	62.5%
Railways (Transport)	Hard Coal	CH ₄	0.00	0.0	0.07	0.0000	0.0%	69.2%	0.0%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	69.2%	0.0%
Other (Residential)	Hard Coal	CH ₄	135.94	0.1	261.34	0.0661	0.2%	69.4%	-92.3%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	8.05	0.0	4.38	0.0003	0.0%	69.4%	45.7%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.13	0.0	0.13	0.0000	0.0%	69.4%	0.0%
Chemicals (Industry)	Lignite	CH ₄	0.12	0.0	1.12	0.0004	0.0%	69.4%	-804.3%
Other (Industry)	Lignite	CH ₄	12.57	0.0	21.07	0.0049	0.0%	69.4%	-67.6%

Table D1. Trend Analysis

2001 VS. 1990 TREND ANALYSIS									
CATEGORY	FUEL	GAS	EMISSION 2001	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	69.4%	0.0%
Other (Residential)	Lignite	CH ₄	213.62	0.1	589.29	0.1719	0.5%	69.9%	-175.9%
Other (Industry)	Asphalt	CH ₄	0.00	0.0	0.20	0.0000	0.0%	69.9%	0.0%
Other (Residential)	Asphalt	CH ₄	3.48	0.0	26.54	0.0093	0.0%	70.0%	-662.7%
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.93	0.0	17.40	0.0022	0.0%	70.0%	2.9%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.65	0.0	0.17	0.0001	0.0%	70.0%	74.3%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	70.0%	0.0%
Other (Industry)	Secondary Coal	CH ₄	1.04	0.0	1.54	0.0003	0.0%	70.0%	-47.4%
Other (Residential)	Secondary Coal	CH ₄	4.33	0.0	43.15	0.0154	0.0%	70.0%	-897.6%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	70.0%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	8.99	0.0	2.13	0.0014	0.0%	70.0%	76.3%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	9.14	0.0	2.93	0.0011	0.0%	70.0%	68.0%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.52	0.0	3.20	0.0001	0.0%	70.0%	29.1%
Iron and Steel (Industry)	Petroleum	CH ₄	0.84	0.0	1.00	0.0002	0.0%	70.0%	-18.0%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.47	0.0	0.45	0.0001	0.0%	70.0%	4.0%
Chemicals (Industry)	Petroleum	CH ₄	1.33	0.0	1.15	0.0001	0.0%	70.0%	13.9%
Other (Industry)	Petroleum	CH ₄	3.72	0.0	4.08	0.0006	0.0%	70.0%	-9.5%
Other (Residential)	Petroleum	CH ₄	26.04	0.0	26.48	0.0037	0.0%	70.0%	-1.7%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	11.82	0.0	8.38	0.0003	0.0%	70.0%	29.1%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	8.42	0.0	2.05	0.0013	0.0%	70.0%	75.7%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.02	0.0	0.00	0.0000	0.0%	70.0%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	1.16	0.0	0.00	0.0003	0.0%	70.0%	100.0%
Chemicals (Industry)	Natural Gas	CH ₄	1.45	0.0	0.00	0.0004	0.0%	70.0%	100.0%
Other (Industry)	Natural Gas	CH ₄	8.18	0.0	3.25	0.0008	0.0%	70.0%	60.3%
Road Transportation (Transport)	Natural Gas	CH ₄	0.26	0.0	0.00	0.0001	0.0%	70.0%	100.0%
Other (Residential)	Natural Gas	CH ₄	12.42	0.0	0.20	0.0030	0.0%	70.1%	98.4%
Other (Residential)	Biomass	CH ₄	1638.16	0.6	1901.22	0.3198	0.9%	71.0%	-16.1%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.43	0.0	1.31	0.0001	0.0%	71.0%	8.5%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	124.47	0.0	67.91	0.0049	0.0%	71.0%	45.4%
Railways (Transport)	Diesel+FuelOil	CH ₄	0.62	0.0	0.73	0.0001	0.0%	71.0%	-17.1%
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.11	0.0	0.69	0.0000	0.0%	71.0%	37.8%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	16.66	0.0	3.99	0.0026	0.0%	71.0%	76.1%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.91	0.0	0.00	0.0002	0.0%	71.0%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.71	0.0	0.00	0.0002	0.0%	71.0%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	52.00	0.0	19.51	0.0054	0.0%	71.0%	62.5%
Railways (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.39	0.0000	0.0%	71.0%	0.0%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	71.0%	0.0%
Other (Residential)	Hard Coal	N ₂ O	9.36	0.0	18.00	0.0046	0.0%	71.0%	-92.3%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	166.45	0.1	90.42	0.0067	0.0%	71.0%	45.7%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.26	0.0	0.26	0.0000	0.0%	71.0%	0.0%
Chemicals (Industry)	Lignite	N ₂ O	0.26	0.0	2.32	0.0008	0.0%	71.0%	-804.3%
Other (Industry)	Lignite	N ₂ O	25.98	0.0	43.53	0.0102	0.0%	71.1%	-67.6%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	71.1%	0.0%
Other (Residential)	Lignite	N ₂ O	14.72	0.0	40.60	0.0118	0.0%	71.1%	-175.9%
Other (Industry)	Asphalt	N ₂ O	0.00	0.0	0.41	0.0000	0.0%	71.1%	0.0%
Other (Residential)	Asphalt	N ₂ O	0.24	0.0	1.83	0.0006	0.0%	71.1%	-662.7%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	37.05	0.0	35.96	0.0045	0.0%	71.1%	2.9%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	1.34	0.0	0.34	0.0002	0.0%	71.1%	74.3%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	71.1%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	2.16	0.0	3.18	0.0007	0.0%	71.1%	-47.4%
Other (Residential)	Secondary Coal	N ₂ O	0.30	0.0	2.97	0.0011	0.0%	71.1%	-897.6%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	71.1%	0.0%

Table D1. Trend Analysis

2001 VS. 1990 TREND ANALYSIS									
CATEGORY	FUEL	GAS	EMISSION 2001	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	18.57	0.0	4.41	0.0029	0.0%	71.1%	76.3%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	26.99	0.0	8.65	0.0034	0.0%	71.1%	68.0%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	13.34	0.0	9.45	0.0003	0.0%	71.1%	29.1%
Iron and Steel (Industry)	Petroleum	N ₂ O	3.74	0.0	4.41	0.0008	0.0%	71.1%	-18.0%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.07	0.0	1.98	0.0002	0.0%	71.1%	4.0%
Chemicals (Industry)	Petroleum	N ₂ O	5.91	0.0	5.08	0.0005	0.0%	71.1%	13.9%
Other (Industry)	Petroleum	N ₂ O	16.49	0.0	18.06	0.0028	0.0%	71.2%	-9.5%
Other (Residential)	Petroleum	N ₂ O	23.07	0.0	23.45	0.0032	0.0%	71.2%	-1.7%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	20.93	0.0	14.85	0.0005	0.0%	71.2%	29.1%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	12.43	0.0	3.02	0.0019	0.0%	71.2%	75.7%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	71.2%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.34	0.0	0.00	0.0001	0.0%	71.2%	100.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.43	0.0	0.00	0.0001	0.0%	71.2%	100.0%
Other (Industry)	Natural Gas	N ₂ O	2.42	0.0	0.96	0.0002	0.0%	71.2%	60.3%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.03	0.0	0.00	0.0000	0.0%	71.2%	100.0%
Other (Residential)	Natural Gas	N ₂ O	3.67	0.0	0.06	0.0009	0.0%	71.2%	98.4%
Other (Residential)	Biomass	N ₂ O	322.43	0.1	374.21	0.0630	0.2%	71.4%	-16.1%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	33.39	0.0	9.08	0.0048	0.0%	71.4%	72.8%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	392.15	0.1	246.86	0.0029	0.0%	71.4%	37.0%
Railways (Transport)	Diesel+FuelOil	N ₂ O	2.94	0.0	3.36	0.0006	0.0%	71.4%	-14.3%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	1.96	0.0	1.22	0.0000	0.0%	71.4%	37.9%
Cement Production (Mineral Products)		CO ₂	14667.82	5.6	10333.37	0.3114	0.9%	72.3%	29.6%
Lime Production (Mineral Products)		CO ₂	876.36	0.3	645.09	0.0292	0.1%	72.3%	26.4%
Limestone and Dolomite Use (Mineral Products)		CO ₂	10.61	0.0	21.52	0.0056	0.0%	72.4%	-102.8%
Soda Ash Production and Use (Mineral Products)		CO ₂	199.17	0.1	106.30	0.0087	0.0%	72.4%	46.6%
Ammonia Production (Chemical Industry)		CO ₂	130.62	0.0	713.47	0.2399	0.7%	73.1%	-446.2%
Carbide Production (Chemical Industry)		CO ₂	38.80	0.0	112.25	0.0332	0.1%	73.2%	-189.3%
Aluminium Production (Metal Production)		CO ₂	111.11	0.0	109.62	0.0143	0.0%	73.2%	1.3%
Iron and Steel Production (Metal Production)		CO ₂	400.26	0.2	770.23	0.1948	0.6%	73.8%	-92.4%
Ferroalloys Production (Metal Production)		CO ₂	65.96	0.0	81.17	0.0146	0.0%	73.8%	-23.1%
Other Chemicals Production (Chemical Industry)		CH ₄	43.31	0.0	49.39	0.0081	0.0%	73.8%	-14.1%
Nitric Acid Production (Chemical Industry)		N ₂ O	3472.88	1.3	128.08	0.8109	2.3%	76.1%	96.3%
Enteric Fermentation		CH ₄	14163.10	5.4	17046.76	2.9977	8.6%	84.7%	-20.4%
Manure Management		CH ₄	784.91	0.3	613.63	0.0398	0.1%	84.8%	21.8%
Rice Cultivation		CH ₄	247.80	0.1	222.60	0.0236	0.1%	84.9%	10.2%
Solid Waste		CH ₄	29113.00	11.1	6386.46	4.7705	13.6%	98.5%	78.1%
Fugitive (Coal Mining)		CH ₄	1620.42	0.6	1430.32	0.1446	0.4%	98.9%	11.7%
Field Burning of Agricultural Residues		CH ₄	441.13	0.2	454.59	0.0642	0.2%	99.1%	-3.1%
Field Burning of Agricultural Residues		N ₂ O	131.44	0.1	135.78	0.0193	0.1%	99.2%	-3.3%
Emission of HFCs		HFC-	871.48	0.3	0.00	0.2157	0.6%	99.8%	100.0%
Emission of SF6		SF ₆	308.45	0.1	0.00	0.0764	0.2%	100.0%	100.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.10	0.0	6.20	0.0016	0.0%	100.0%	-100.0%
TOTAL			262101		170065	35.0214	100.0%		

Table D1. Trend Analysis

2002 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 2002	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	3351.27	1.2	851.45	0.4636	1.3%	1.3%	74.6%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	213.13	0.1	0.00	0.0495	0.1%	1.5%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	188.06	0.1	0.00	0.0437	0.1%	1.6%	100.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	18160.72	6.7	4168.15	2.6770	7.7%	9.3%	77.0%
Railways (Transport)	Hard Coal	CO ₂	0.00	0.0	29.73	0.0000	0.0%	9.3%	0.0%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	9.3%	0.0%
Other (Residential)	Hard Coal	CO ₂	2312.40	0.9	3845.79	0.8841	2.5%	11.8%	-66.3%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	31589.77	11.7	20662.22	0.2994	0.9%	12.7%	34.6%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	59.79	0.0	59.79	0.0082	0.0%	12.7%	0.0%
Chemicals (Industry)	Lignite	CO ₂	58.55	0.0	529.42	0.1820	0.5%	13.3%	-804.3%
Other (Industry)	Lignite	CO ₂	7035.75	2.6	9948.37	2.0423	5.9%	19.1%	-41.4%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	19.1%	0.0%
Other (Residential)	Lignite	CO ₂	4583.55	1.7	9276.74	2.3636	6.8%	25.9%	-102.4%
Other (Industry)	Asphalt	CO ₂	8.75	0.0	88.46	0.0307	0.1%	26.0%	-911.1%
Other (Residential)	Asphalt	CO ₂	0.09	0.0	390.56	0.1443	0.4%	26.4%	-433233.3%
Iron and Steel (Industry)	Secondary Coal	CO ₂	7527.38	2.8	7681.10	1.0903	3.1%	29.6%	-2.0%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	293.44	0.1	73.36	0.0410	0.1%	29.7%	75.0%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	29.7%	0.0%
Other (Industry)	Secondary Coal	CO ₂	659.02	0.2	679.26	0.0980	0.3%	30.0%	-3.1%
Other (Residential)	Secondary Coal	CO ₂	120.20	0.0	635.01	0.2067	0.6%	30.6%	-428.3%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	30.6%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	5213.88	1.9	941.03	0.8630	2.5%	33.0%	82.0%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	10339.58	3.8	3375.90	1.1536	3.3%	36.4%	67.3%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	5241.07	1.9	3689.24	0.1462	0.4%	36.8%	29.6%
Iron and Steel (Industry)	Petroleum	CO ₂	1364.09	0.5	1720.93	0.3192	0.9%	37.7%	-26.2%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.84	0.3	774.22	0.0987	0.3%	38.0%	4.0%
Chemicals (Industry)	Petroleum	CO ₂	2305.25	0.9	1984.26	0.1979	0.6%	38.6%	13.9%
Other (Industry)	Petroleum	CO ₂	7405.78	2.7	7050.12	0.8854	2.5%	41.1%	4.8%
Road Transportation (Transport)	Petroleum	CO ₂	31104.56	11.5	24035.93	1.6588	4.8%	45.9%	22.7%
Railways (Transport)	Petroleum	CO ₂	379.52	0.1	465.05	0.0837	0.2%	46.1%	-22.5%
Navigation (Transport)	Petroleum	CO ₂	806.23	0.3	494.28	0.0046	0.0%	46.1%	38.7%
Other (Residential)	Petroleum	CO ₂	8745.10	3.2	9153.31	1.3516	3.9%	50.0%	-4.7%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8297.17	3.1	5795.38	0.2148	0.6%	50.6%	30.2%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	23534.10	8.7	5435.89	3.4563	9.9%	60.6%	76.9%
Iron and Steel (Industry)	Natural Gas	CO ₂	14.77	0.0	0.00	0.0034	0.0%	60.6%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	769.54	0.3	0.00	0.1787	0.5%	61.1%	100.0%
Chemicals (Industry)	Natural Gas	CO ₂	705.03	0.3	0.00	0.1637	0.5%	61.6%	100.0%
Other (Industry)	Natural Gas	CO ₂	5293.04	2.0	1729.02	0.5902	1.7%	63.3%	67.3%
Road Transportation (Transport)	Natural Gas	CO ₂	8.99	0.0	0.00	0.0021	0.0%	63.3%	100.0%
Other (Residential)	Natural Gas	CO ₂	6709.96	2.5	104.21	1.5197	4.4%	67.6%	98.4%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	3745.02	1.4	904.59	0.5354	1.5%	69.2%	75.8%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	0.76	0.0	0.19	0.0001	0.0%	69.2%	74.6%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.48	0.0	0.00	0.0001	0.0%	69.2%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.43	0.0	0.00	0.0001	0.0%	69.2%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	41.14	0.0	9.44	0.0061	0.0%	69.2%	77.0%
Railways (Transport)	Hard Coal	CH ₄	0.00	0.0	0.07	0.0000	0.0%	69.2%	0.0%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	69.2%	0.0%
Other (Residential)	Hard Coal	CH ₄	157.14	0.1	261.34	0.0601	0.2%	69.4%	-66.3%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	6.69	0.0	4.38	0.0001	0.0%	69.4%	34.6%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.13	0.0	0.13	0.0000	0.0%	69.4%	0.0%
Chemicals (Industry)	Lignite	CH ₄	0.12	0.0	1.12	0.0004	0.0%	69.4%	-804.3%
Other (Industry)	Lignite	CH ₄	14.90	0.0	21.07	0.0043	0.0%	69.4%	-41.4%

Table D1. Trend Analysis
2002 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 2002	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	69.4%	0.0%
Other (Residential)	Lignite	CH ₄	291.16	0.1	589.29	0.1501	0.4%	69.8%	-102.4%
Other (Industry)	Asphalt	CH ₄	0.02	0.0	0.20	0.0001	0.0%	69.8%	-911.1%
Other (Residential)	Asphalt	CH ₄	0.01	0.0	26.54	0.0098	0.0%	69.9%	-433233.3%
Iron and Steel (Industry)	Secondary Coal	CH ₄	17.05	0.0	17.40	0.0025	0.0%	69.9%	-2.0%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.66	0.0	0.17	0.0001	0.0%	69.9%	75.0%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	69.9%	0.0%
Other (Industry)	Secondary Coal	CH ₄	1.49	0.0	1.54	0.0002	0.0%	69.9%	-3.1%
Other (Residential)	Secondary Coal	CH ₄	8.17	0.0	43.15	0.0140	0.0%	69.9%	-428.3%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	69.9%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	11.81	0.0	2.13	0.0020	0.0%	69.9%	82.0%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	8.97	0.0	2.93	0.0010	0.0%	69.9%	67.3%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.55	0.0	3.20	0.0001	0.0%	69.9%	29.6%
Iron and Steel (Industry)	Petroleum	CH ₄	0.79	0.0	1.00	0.0002	0.0%	69.9%	-26.2%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.47	0.0	0.45	0.0001	0.0%	69.9%	4.0%
Chemicals (Industry)	Petroleum	CH ₄	1.33	0.0	1.15	0.0001	0.0%	69.9%	13.9%
Other (Industry)	Petroleum	CH ₄	4.28	0.0	4.08	0.0005	0.0%	69.9%	4.8%
Other (Residential)	Petroleum	CH ₄	25.30	0.0	26.48	0.0039	0.0%	69.9%	-4.7%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	12.00	0.0	8.38	0.0003	0.0%	69.9%	30.2%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	8.85	0.0	2.05	0.0013	0.0%	69.9%	76.9%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.03	0.0	0.00	0.0000	0.0%	69.9%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	1.45	0.0	0.00	0.0003	0.0%	69.9%	100.0%
Chemicals (Industry)	Natural Gas	CH ₄	1.33	0.0	0.00	0.0003	0.0%	69.9%	100.0%
Other (Industry)	Natural Gas	CH ₄	9.96	0.0	3.25	0.0011	0.0%	69.9%	67.3%
Road Transportation (Transport)	Natural Gas	CH ₄	0.25	0.0	0.00	0.0001	0.0%	69.9%	100.0%
Other (Residential)	Natural Gas	CH ₄	13.74	0.0	0.20	0.0031	0.0%	69.9%	98.6%
Other (Residential)	Biomass	CH ₄	1575.82	0.6	1901.22	0.3366	1.0%	70.9%	-20.6%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.72	0.0	1.31	0.0001	0.0%	70.9%	24.0%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	119.99	0.0	67.91	0.0028	0.0%	70.9%	43.4%
Railways (Transport)	Diesel+FuelOil	CH ₄	0.62	0.0	0.73	0.0001	0.0%	70.9%	-16.5%
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.14	0.0	0.69	0.0000	0.0%	70.9%	39.4%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	15.69	0.0	3.99	0.0022	0.0%	70.9%	74.6%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	1.00	0.0	0.00	0.0002	0.0%	70.9%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.88	0.0	0.00	0.0002	0.0%	70.9%	100.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	85.02	0.0	19.51	0.0125	0.0%	71.0%	77.0%
Railways (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.39	0.0000	0.0%	71.0%	0.0%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	71.0%	0.0%
Other (Residential)	Hard Coal	N ₂ O	10.83	0.0	18.00	0.0041	0.0%	71.0%	-66.3%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	138.24	0.1	90.42	0.0013	0.0%	71.0%	34.6%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.26	0.0	0.26	0.0000	0.0%	71.0%	0.0%
Chemicals (Industry)	Lignite	N ₂ O	0.26	0.0	2.32	0.0008	0.0%	71.0%	-804.3%
Other (Industry)	Lignite	N ₂ O	30.79	0.0	43.53	0.0089	0.0%	71.0%	-41.4%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	71.0%	0.0%
Other (Residential)	Lignite	N ₂ O	20.06	0.0	40.60	0.0103	0.0%	71.0%	-102.4%
Other (Industry)	Asphalt	N ₂ O	0.04	0.0	0.41	0.0001	0.0%	71.0%	-911.1%
Other (Residential)	Asphalt	N ₂ O	0.00	0.0	1.83	0.0007	0.0%	71.0%	-433233.3%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	35.24	0.0	35.96	0.0051	0.0%	71.1%	-2.0%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	1.37	0.0	0.34	0.0002	0.0%	71.1%	75.0%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	71.1%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	3.09	0.0	3.18	0.0005	0.0%	71.1%	-3.1%
Other (Residential)	Secondary Coal	N ₂ O	0.56	0.0	2.97	0.0010	0.0%	71.1%	-428.3%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	71.1%	0.0%

Table D1. Trend Analysis

2002 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 2002	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	24.41	0.0	4.41	0.0040	0.0%	71.1%	82.0%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	26.49	0.0	8.65	0.0030	0.0%	71.1%	67.3%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	13.43	0.0	9.45	0.0004	0.0%	71.1%	29.6%
Iron and Steel (Industry)	Petroleum	N ₂ O	3.49	0.0	4.41	0.0008	0.0%	71.1%	-26.2%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.07	0.0	1.98	0.0003	0.0%	71.1%	4.0%
Chemicals (Industry)	Petroleum	N ₂ O	5.91	0.0	5.08	0.0005	0.0%	71.1%	13.9%
Other (Industry)	Petroleum	N ₂ O	18.97	0.0	18.06	0.0023	0.0%	71.1%	4.8%
Other (Residential)	Petroleum	N ₂ O	22.40	0.0	23.45	0.0035	0.0%	71.1%	-4.7%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	21.26	0.0	14.85	0.0006	0.0%	71.1%	30.2%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	13.07	0.0	3.02	0.0019	0.0%	71.1%	76.9%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	71.1%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.43	0.0	0.00	0.0001	0.0%	71.1%	100.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.39	0.0	0.00	0.0001	0.0%	71.1%	100.0%
Other (Industry)	Natural Gas	N ₂ O	2.94	0.0	0.96	0.0003	0.0%	71.1%	67.3%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.03	0.0	0.00	0.0000	0.0%	71.1%	100.0%
Other (Residential)	Natural Gas	N ₂ O	4.06	0.0	0.06	0.0009	0.0%	71.1%	98.6%
Other (Residential)	Biomass	N ₂ O	310.16	0.1	374.21	0.0663	0.2%	71.3%	-20.6%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	37.63	0.0	9.08	0.0054	0.0%	71.3%	75.9%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	423.52	0.2	246.86	0.0071	0.0%	71.3%	41.7%
Railways (Transport)	Diesel+FuelOil	N ₂ O	2.95	0.0	3.36	0.0006	0.0%	71.3%	-13.7%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	2.01	0.0	1.22	0.0000	0.0%	71.3%	39.5%
Cement Production (Mineral Products)		CO ₂	15051.68	5.6	10333.37	0.3231	0.9%	72.3%	31.3%
Lime Production (Mineral Products)		CO ₂	1191.60	0.4	645.09	0.0383	0.1%	72.4%	45.9%
Limestone and Dolomite Use (Mineral Products)		CO ₂	10.98	0.0	21.52	0.0054	0.0%	72.4%	-96.0%
Soda Ash Production and Use (Mineral Products)		CO ₂	224.69	0.1	106.30	0.0129	0.0%	72.4%	52.7%
Ammonia Production (Chemical Industry)		CO ₂	585.04	0.2	713.47	0.1278	0.4%	72.8%	-22.0%
Carbide Production (Chemical Industry)		CO ₂	28.81	0.0	112.25	0.0348	0.1%	72.9%	-289.7%
Aluminium Production (Metal Production)		CO ₂	112.50	0.0	109.62	0.0144	0.0%	72.9%	2.6%
Iron and Steel Production (Metal Production)		CO ₂	261.86	0.1	770.23	0.2238	0.6%	73.6%	-194.1%
Ferroalloys Production (Metal Production)		CO ₂	14.56	0.0	81.17	0.0266	0.1%	73.7%	-457.5%
Other Chemicals Production (Chemical Industry)		CH ₄	45.09	0.0	49.39	0.0078	0.0%	73.7%	-9.5%
Nitric Acid Production (Chemical Industry)		N ₂ O	3997.13	1.5	128.08	0.8809	2.5%	76.2%	96.8%
Enteric Fermentation		CH ₄	13224.69	4.9	17046.76	3.2281	9.3%	85.5%	-28.9%
Manure Management		CH ₄	695.89	0.3	613.63	0.0652	0.2%	85.7%	11.8%
Rice Cultivation		CH ₄	252.00	0.1	222.60	0.0237	0.1%	85.8%	11.7%
Solid Waste		CH ₄	28407.69	10.5	6386.46	4.2368	12.2%	97.9%	77.5%
Fugitive (Coal Mining)		CH ₄	1443.31	0.5	1430.32	0.1934	0.6%	98.5%	0.9%
Field Burning of Agricultural Residues		CH ₄	461.24	0.2	454.59	0.0609	0.2%	98.7%	1.4%
Field Burning of Agricultural Residues		N ₂ O	137.64	0.1	135.78	0.0182	0.1%	98.7%	1.4%
Emission of HFCs		HFCs	1418.94	0.5	0.00	0.3295	0.9%	99.7%	100.0%
Emission of SF ₆		SF ₆	476.76	0.2	0.00	0.1107	0.3%	100.0%	100.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.10	0.0	6.20	0.0016	0.0%	100.0%	-100.0%
TOTAL			270620		170065	34.7637	100.0%		

Table D1. Trend Analysis
2003 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 2003	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	7271.15	2.5	851.45	1.2113	3.3%	3.3%	88.3%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	201.29	0.1	0.00	0.0418	0.1%	3.4%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	3.4%	0.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	21843.80	7.6	4168.15	3.0766	8.4%	11.8%	80.9%
Railways (Transport)	Hard Coal	CO ₂	0.00	0.0	29.73	0.0000	0.0%	11.8%	0.0%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	11.8%	0.0%
Other (Residential)	Hard Coal	CO ₂	2580.85	0.9	3845.79	0.8078	2.2%	14.0%	-49.0%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	26255.52	9.2	20662.22	1.7694	4.8%	18.9%	21.3%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	68.51	0.0	59.79	0.0067	0.0%	18.9%	12.7%
Chemicals (Industry)	Lignite	CO ₂	39.82	0.0	529.42	0.1767	0.5%	19.4%	-1229.4%
Other (Industry)	Lignite	CO ₂	7624.77	2.7	9948.37	1.8928	5.2%	24.5%	-30.5%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	24.5%	0.0%
Other (Residential)	Lignite	CO ₂	5284.15	1.8	9276.74	2.1439	5.9%	30.4%	-75.6%
Other (Industry)	Asphalt	CO ₂	560.80	0.2	88.46	0.0855	0.2%	30.6%	84.2%
Other (Residential)	Asphalt	CO ₂	0.00	0.0	390.56	0.0000	0.0%	30.6%	0.0%
Iron and Steel (Industry)	Secondary Coal	CO ₂	8250.35	2.9	7681.10	0.9711	2.7%	33.3%	6.9%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	35.32	0.0	73.36	0.0183	0.0%	33.3%	-107.7%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	33.3%	0.0%
Other (Industry)	Secondary Coal	CO ₂	581.45	0.2	679.26	0.1166	0.3%	33.7%	-16.8%
Other (Residential)	Secondary Coal	CO ₂	522.48	0.2	635.01	0.1134	0.3%	34.0%	-21.5%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	34.0%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	5125.57	1.8	941.03	0.7348	2.0%	36.0%	81.6%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	9269.28	3.2	3375.90	0.7442	2.0%	38.0%	63.6%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	5222.32	1.8	3689.24	0.2050	0.6%	38.6%	29.4%
Iron and Steel (Industry)	Petroleum	CO ₂	1337.38	0.5	1720.93	0.3236	0.9%	39.5%	-28.7%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.84	0.3	774.22	0.1030	0.3%	39.7%	4.0%
Chemicals (Industry)	Petroleum	CO ₂	2305.25	0.8	1984.26	0.2148	0.6%	40.3%	13.9%
Other (Industry)	Petroleum	CO ₂	8368.83	2.9	7050.12	0.7261	2.0%	42.3%	15.8%
Road Transportation (Transport)	Petroleum	CO ₂	32359.94	11.3	24035.93	1.6811	4.6%	46.9%	25.7%
Railways (Transport)	Petroleum	CO ₂	394.58	0.1	465.05	0.0806	0.2%	47.1%	-17.9%
Navigation (Transport)	Petroleum	CO ₂	873.90	0.3	494.28	0.0087	0.0%	47.1%	43.4%
Other (Residential)	Petroleum	CO ₂	8294.97	2.9	9153.31	1.4761	4.0%	51.2%	-10.3%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	8424.40	2.9	5795.38	0.2763	0.8%	51.9%	31.2%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	26177.31	9.1	5435.89	3.5330	9.7%	61.6%	79.2%
Iron and Steel (Industry)	Natural Gas	CO ₂	0.00	0.0	0.00	0.0000	0.0%	61.6%	0.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	843.57	0.3	0.00	0.1750	0.5%	62.1%	100.0%
Chemicals (Industry)	Natural Gas	CO ₂	784.41	0.3	0.00	0.1628	0.4%	62.5%	100.0%
Other (Industry)	Natural Gas	CO ₂	8582.28	3.0	1729.02	1.1769	3.2%	65.7%	79.9%
Road Transportation (Transport)	Natural Gas	CO ₂	9.00	0.0	0.00	0.0019	0.0%	65.7%	100.0%
Other (Residential)	Natural Gas	CO ₂	8536.12	3.0	104.21	1.7348	4.7%	70.5%	98.8%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	4128.06	1.4	904.59	0.5406	1.5%	71.9%	78.1%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	1.65	0.0	0.19	0.0003	0.0%	71.9%	88.3%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.46	0.0	0.00	0.0001	0.0%	71.9%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	71.9%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	49.48	0.0	9.44	0.0070	0.0%	72.0%	80.9%
Railways (Transport)	Hard Coal	CH ₄	0.00	0.0	0.07	0.0000	0.0%	72.0%	0.0%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	72.0%	0.0%
Other (Residential)	Hard Coal	CH ₄	175.38	0.1	261.34	0.0549	0.1%	72.1%	-49.0%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	5.56	0.0	4.38	0.0004	0.0%	72.1%	21.3%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.15	0.0	0.13	0.0000	0.0%	72.1%	12.7%
Chemicals (Industry)	Lignite	CH ₄	0.08	0.0	1.12	0.0004	0.0%	72.1%	-1229.4%
Other (Industry)	Lignite	CH ₄	16.15	0.0	21.07	0.0040	0.0%	72.1%	-30.5%

Table D1. Trend Analysis
2003 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 2003	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	72.1%	0.0%
Other (Residential)	Lignite	CH ₄	335.67	0.1	589.29	0.1362	0.4%	72.5%	-75.6%
Other (Industry)	Asphalt	CH ₄	1.27	0.0	0.20	0.0002	0.0%	72.5%	84.2%
Other (Residential)	Asphalt	CH ₄	0.00	0.0	26.54	0.0000	0.0%	72.5%	0.0%
Iron and Steel (Industry)	Secondary Coal	CH ₄	18.69	0.0	17.40	0.0022	0.0%	72.5%	6.9%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.08	0.0	0.17	0.0000	0.0%	72.5%	-107.7%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	72.5%	0.0%
Other (Industry)	Secondary Coal	CH ₄	1.32	0.0	1.54	0.0003	0.0%	72.5%	-16.8%
Other (Residential)	Secondary Coal	CH ₄	35.51	0.0	43.15	0.0077	0.0%	72.5%	-21.5%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	72.5%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	11.61	0.0	2.13	0.0017	0.0%	72.5%	81.6%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	8.04	0.0	2.93	0.0006	0.0%	72.5%	63.6%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.53	0.0	3.20	0.0002	0.0%	72.5%	29.4%
Iron and Steel (Industry)	Petroleum	CH ₄	0.77	0.0	1.00	0.0002	0.0%	72.5%	-28.7%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.47	0.0	0.45	0.0001	0.0%	72.5%	4.0%
Chemicals (Industry)	Petroleum	CH ₄	1.33	0.0	1.15	0.0001	0.0%	72.5%	13.9%
Other (Industry)	Petroleum	CH ₄	4.84	0.0	4.08	0.0004	0.0%	72.5%	15.8%
Other (Residential)	Petroleum	CH ₄	23.99	0.0	26.48	0.0043	0.0%	72.5%	-10.3%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	12.18	0.0	8.38	0.0004	0.0%	72.6%	31.2%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	9.85	0.0	2.05	0.0013	0.0%	72.6%	79.2%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.00	0.0	0.00	0.0000	0.0%	72.6%	0.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	1.59	0.0	0.00	0.0003	0.0%	72.6%	100.0%
Chemicals (Industry)	Natural Gas	CH ₄	1.48	0.0	0.00	0.0003	0.0%	72.6%	100.0%
Other (Industry)	Natural Gas	CH ₄	16.14	0.0	3.25	0.0022	0.0%	72.6%	79.9%
Road Transportation (Transport)	Natural Gas	CH ₄	0.25	0.0	0.00	0.0001	0.0%	72.6%	100.0%
Other (Residential)	Natural Gas	CH ₄	17.04	0.0	0.20	0.0035	0.0%	72.6%	98.8%
Other (Residential)	Biomass	CH ₄	1516.21	0.5	1901.22	0.3495	1.0%	73.5%	-25.4%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.16	0.0	1.31	0.0002	0.0%	73.5%	-13.1%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	120.96	0.0	67.91	0.0014	0.0%	73.5%	43.9%
Railways (Transport)	Diesel+FuelOil	CH ₄	0.65	0.0	0.73	0.0001	0.0%	73.5%	-12.0%
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.23	0.0	0.69	0.0000	0.0%	73.5%	44.1%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	34.04	0.0	3.99	0.0057	0.0%	73.5%	88.3%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	0.94	0.0	0.00	0.0002	0.0%	73.5%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	73.5%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	102.26	0.0	19.51	0.0144	0.0%	73.6%	80.9%
Railways (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.39	0.0000	0.0%	73.6%	0.0%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	73.6%	0.0%
Other (Residential)	Hard Coal	N ₂ O	12.08	0.0	18.00	0.0038	0.0%	73.6%	-49.0%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	114.90	0.0	90.42	0.0077	0.0%	73.6%	21.3%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.30	0.0	0.26	0.0000	0.0%	73.6%	12.7%
Chemicals (Industry)	Lignite	N ₂ O	0.17	0.0	2.32	0.0008	0.0%	73.6%	-1229.4%
Other (Industry)	Lignite	N ₂ O	33.37	0.0	43.53	0.0083	0.0%	73.6%	-30.5%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	73.6%	0.0%
Other (Residential)	Lignite	N ₂ O	23.12	0.0	40.60	0.0094	0.0%	73.7%	-75.6%
Other (Industry)	Asphalt	N ₂ O	2.63	0.0	0.41	0.0004	0.0%	73.7%	84.2%
Other (Residential)	Asphalt	N ₂ O	0.00	0.0	1.83	0.0000	0.0%	73.7%	0.0%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	38.62	0.0	35.96	0.0045	0.0%	73.7%	6.9%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.17	0.0	0.34	0.0001	0.0%	73.7%	-107.7%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	73.7%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	2.72	0.0	3.18	0.0005	0.0%	73.7%	-16.8%
Other (Residential)	Secondary Coal	N ₂ O	2.45	0.0	2.97	0.0005	0.0%	73.7%	-21.5%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	73.7%	0.0%

Table D1. Trend Analysis

2003 VS. 1990 TREND ANALYSIS									
CATEGORY	FUEL	GAS	EMISSION 2003	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESSMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	23.99	0.0	4.41	0.0034	0.0%	73.7%	81.6%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	23.75	0.0	8.65	0.0019	0.0%	73.7%	63.6%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	13.38	0.0	9.45	0.0005	0.0%	73.7%	29.4%
Iron and Steel (Industry)	Petroleum	N ₂ O	3.43	0.0	4.41	0.0008	0.0%	73.7%	-28.7%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.07	0.0	1.98	0.0003	0.0%	73.7%	4.0%
Chemicals (Industry)	Petroleum	N ₂ O	5.91	0.0	5.08	0.0006	0.0%	73.7%	13.9%
Other (Industry)	Petroleum	N ₂ O	21.44	0.0	18.06	0.0019	0.0%	73.7%	15.8%
Other (Residential)	Petroleum	N ₂ O	21.25	0.0	23.45	0.0038	0.0%	73.7%	-10.3%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	21.58	0.0	14.85	0.0007	0.0%	73.7%	31.2%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	14.54	0.0	3.02	0.0020	0.0%	73.7%	79.2%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	73.7%	0.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.47	0.0	0.00	0.0001	0.0%	73.7%	100.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.44	0.0	0.00	0.0001	0.0%	73.7%	100.0%
Other (Industry)	Natural Gas	N ₂ O	4.77	0.0	0.96	0.0007	0.0%	73.7%	79.9%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.03	0.0	0.00	0.0000	0.0%	73.7%	100.0%
Other (Residential)	Natural Gas	N ₂ O	5.03	0.0	0.06	0.0010	0.0%	73.7%	98.8%
Other (Residential)	Biomass	N ₂ O	298.43	0.1	374.21	0.0688	0.2%	73.9%	-25.4%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	41.42	0.0	9.08	0.0054	0.0%	73.9%	78.1%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	477.36	0.2	246.86	0.0128	0.0%	74.0%	48.3%
Railways (Transport)	Diesel+FuelOil	N ₂ O	3.07	0.0	3.36	0.0005	0.0%	74.0%	-9.4%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	2.18	0.0	1.22	0.0000	0.0%	74.0%	44.2%
Cement Production (Mineral Products)		CO ₂	15521.29	5.4	10333.37	0.3888	1.1%	75.0%	33.4%
Lime Production (Mineral Products)		CO ₂	1187.25	0.4	645.09	0.0210	0.1%	75.1%	45.7%
Limestone and Dolomite Use (Mineral Products)		CO ₂	14.74	0.0	21.52	0.0045	0.0%	75.1%	-46.0%
Soda Ash Production and Use (Mineral Products)		CO ₂	242.11	0.1	106.30	0.0131	0.0%	75.1%	56.1%
Ammonia Production (Chemical Industry)		CO ₂	563.14	0.2	713.47	0.1324	0.4%	75.5%	-26.7%
Carbide Production (Chemical Industry)		CO ₂	38.50	0.0	112.25	0.0312	0.1%	75.6%	-191.5%
Aluminium Production (Metal Production)		CO ₂	113.65	0.0	109.62	0.0147	0.0%	75.6%	3.5%
Iron and Steel Production (Metal Production)		CO ₂	296.31	0.1	770.23	0.2076	0.6%	76.2%	-159.9%
Ferroalloys Production (Metal Production)		CO ₂	46.01	0.0	81.17	0.0188	0.1%	76.2%	-76.4%
Other Chemicals Production (Chemical Industry)		CH ₄	51.67	0.0	49.39	0.0065	0.0%	76.3%	4.4%
Nitric Acid Production (Chemical Industry)		N ₂ O	3764.12	1.3	128.08	0.7363	2.0%	78.3%	96.6%
Enteric Fermentation		CH ₄	13235.17	4.6	17046.76	3.2082	8.8%	87.0%	-28.8%
Manure Management		CH ₄	698.00	0.2	613.63	0.0695	0.2%	87.2%	12.1%
Rice Cultivation		CH ₄	273.00	0.1	222.60	0.0211	0.1%	87.3%	18.5%
Solid Waste		CH ₄	29357.41	10.3	6386.46	3.8608	10.5%	97.8%	78.2%
Fugitive (Coal Mining)		CH ₄	1292.15	0.5	1430.32	0.2315	0.6%	98.5%	-10.7%
Field Burning of Agricultural Residues		CH ₄	453.71	0.2	454.59	0.0646	0.2%	98.6%	-0.2%
Field Burning of Agricultural Residues		N ₂ O	135.78	0.0	135.78	0.0193	0.1%	98.7%	0.0%
Emission of HFCs		HFC-	1806.71	0.6	0.00	0.3749	1.0%	99.7%	100.0%
Emission of SF ₆		SF ₆	479.43	0.2	0.00	0.0995	0.3%	100.0%	100.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.10	0.0	6.20	0.0015	0.0%	100.0%	-100.0%
TOTAL			286286		170065	36.5990	100.0%		

Table D1. Trend Analysis
2004 VS. 1990 TREND ANALYSIS

CATEGORY	FUEL	GAS	EMISSION 2004	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CO ₂	9738.70	3.3	851.45	1.5955	4.4%	4.4%	91.3%
Non-Ferrous Metals (Industry)	Hard Coal	CO ₂	224.07	0.1	0.00	0.0433	0.1%	4.6%	100.0%
Chemicals (Industry)	Hard Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	4.6%	0.0%
Other (Cement Production,Sugar,Fertilizer and Other Industries)	Hard Coal	CO ₂	23009.62	7.8	4168.15	3.0427	8.5%	13.0%	81.9%
Railways (Transport)	Hard Coal	CO ₂	0.00	0.0	29.73	0.0000	0.0%	13.0%	0.0%
Navigation (Transport)	Hard Coal	CO ₂	0.00	0.0	3.19	0.0000	0.0%	13.0%	0.0%
Other (Residential)	Hard Coal	CO ₂	2427.93	0.8	3845.79	0.8273	2.3%	15.3%	-58.4%
Public Electricity and Heat Production (Electricity Production)	Lignite	CO ₂	25479.44	8.6	20662.22	2.0408	5.7%	21.0%	18.9%
Non-Ferrous Metals (Industry)	Lignite	CO ₂	74.74	0.0	59.79	0.0057	0.0%	21.0%	20.0%
Chemicals (Industry)	Lignite	CO ₂	39.82	0.0	529.42	0.1708	0.5%	21.5%	-1229.4%
Other (Industry)	Lignite	CO ₂	6623.87	2.2	9948.37	2.0736	5.8%	27.2%	-50.2%
Railways (Transport)	Lignite	CO ₂	0.00	0.0	21.87	0.0000	0.0%	27.2%	0.0%
Other (Residential)	Lignite	CO ₂	6845.35	2.3	9276.74	1.8044	5.0%	32.3%	-35.5%
Other (Industry)	Asphalt	CO ₂	1203.26	0.4	88.46	0.2028	0.6%	32.8%	92.6%
Other (Residential)	Asphalt	CO ₂	0.00	0.0	390.56	0.0000	0.0%	32.8%	0.0%
Iron and Steel (Industry)	Secondary Coal	CO ₂	8463.61	2.9	7681.10	0.9536	2.7%	35.5%	9.2%
Non-Ferrous Metals (Industry)	Secondary Coal	CO ₂	40.76	0.0	73.36	0.0169	0.0%	35.5%	-80.0%
Chemicals (Industry)	Secondary Coal	CO ₂	0.00	0.0	0.00	0.0000	0.0%	35.5%	0.0%
Other (Industry)	Secondary Coal	CO ₂	345.90	0.1	679.26	0.1621	0.5%	36.0%	-96.4%
Other (Residential)	Secondary Coal	CO ₂	512.64	0.2	635.01	0.1150	0.3%	36.3%	-23.9%
Non-Ferrous Metals (Industry)	Petroleum Coke	CO ₂	0.00	0.0	103.25	0.0000	0.0%	36.3%	0.0%
Other (Industry)	Petroleum Coke	CO ₂	5577.26	1.9	941.03	0.7609	2.1%	38.4%	83.1%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CO ₂	7830.33	2.6	3375.90	0.3755	1.0%	39.5%	56.9%
Petroleum Refining (Electricity Production)	Petroleum	CO ₂	5685.38	1.9	3689.24	0.1448	0.4%	39.9%	35.1%
Iron and Steel (Industry)	Petroleum	CO ₂	1045.18	0.4	1720.93	0.3782	1.1%	40.9%	-64.7%
Non-Ferrous Metals (Industry)	Petroleum	CO ₂	806.84	0.3	774.22	0.1051	0.3%	41.2%	4.0%
Chemicals (Industry)	Petroleum	CO ₂	2305.25	0.8	1984.26	0.2234	0.6%	41.8%	13.9%
Other (Industry)	Petroleum	CO ₂	8048.33	2.7	7050.12	0.8211	2.3%	44.1%	12.4%
Road Transportation (Transport)	Petroleum	CO ₂	34068.85	11.5	24035.93	1.5178	4.2%	48.3%	29.4%
Railways (Transport)	Petroleum	CO ₂	374.27	0.1	465.05	0.0844	0.2%	48.6%	-24.3%
Navigation (Transport)	Petroleum	CO ₂	1207.01	0.4	494.28	0.0667	0.2%	48.7%	59.0%
Other (Residential)	Petroleum	CO ₂	8733.71	2.9	9153.31	1.3977	3.9%	52.6%	-4.8%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CO ₂	9053.60	3.1	5795.38	0.2037	0.6%	53.2%	36.0%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CO ₂	27451.00	9.3	5435.89	3.4739	9.7%	62.9%	80.2%
Iron and Steel (Industry)	Natural Gas	CO ₂	12.14	0.0	0.00	0.0023	0.0%	62.9%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CO ₂	1128.16	0.4	0.00	0.2181	0.6%	63.5%	100.0%
Chemicals (Industry)	Natural Gas	CO ₂	795.04	0.3	0.00	0.1537	0.4%	63.9%	100.0%
Other (Industry)	Natural Gas	CO ₂	8558.59	2.9	1729.02	1.0715	3.0%	66.9%	79.8%
Road Transportation (Transport)	Natural Gas	CO ₂	9.01	0.0	0.00	0.0017	0.0%	66.9%	100.0%
Other (Residential)	Natural Gas	CO ₂	9765.28	3.3	104.21	1.8526	5.2%	72.0%	98.9%
Civil Aviation (Transport)	Jet Kerosene	CO ₂	4798.68	1.6	904.59	0.6227	1.7%	73.8%	81.1%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	CH ₄	2.21	0.0	0.19	0.0004	0.0%	73.8%	91.3%
Non-Ferrous Metals (Industry)	Hard Coal	CH ₄	0.51	0.0	0.00	0.0001	0.0%	73.8%	100.0%
Chemicals (Industry)	Hard Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	73.8%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	CH ₄	52.12	0.0	9.44	0.0069	0.0%	73.8%	81.9%
Railways (Transport)	Hard Coal	CH ₄	0.00	0.0	0.07	0.0000	0.0%	73.8%	0.0%
Navigation (Transport)	Hard Coal	CH ₄	0.00	0.0	0.01	0.0000	0.0%	73.8%	0.0%
Other (Residential)	Hard Coal	CH ₄	164.99	0.1	261.34	0.0562	0.2%	73.9%	-58.4%
Public Electricity and Heat Production (Electricity Production)	Lignite	CH ₄	5.40	0.0	4.38	0.0004	0.0%	73.9%	18.9%
Non-Ferrous Metals (Industry)	Lignite	CH ₄	0.16	0.0	0.13	0.0000	0.0%	73.9%	20.0%
Chemicals (Industry)	Lignite	CH ₄	0.08	0.0	1.12	0.0004	0.0%	73.9%	-1229.4%
Other (Industry)	Lignite	CH ₄	14.03	0.0	21.07	0.0044	0.0%	74.0%	-50.2%

Table D1. Trend Analysis

2004 VS. 1990 TREND ANALYSIS									
CATEGORY	FUEL	GAS	EMISSION 2004	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Railways (Transport)	Lignite	CH ₄	0.00	0.0	0.05	0.0000	0.0%	74.0%	0.0%
Other (Residential)	Lignite	CH ₄	434.84	0.1	589.29	0.1146	0.3%	74.3%	-35.5%
Other (Industry)	Asphalt	CH ₄	2.73	0.0	0.20	0.0005	0.0%	74.3%	92.6%
Other (Residential)	Asphalt	CH ₄	0.00	0.0	26.54	0.0000	0.0%	74.3%	0.0%
Iron and Steel (Industry)	Secondary Coal	CH ₄	19.17	0.0	17.40	0.0022	0.0%	74.3%	9.2%
Non-Ferrous Metals (Industry)	Secondary Coal	CH ₄	0.09	0.0	0.17	0.0000	0.0%	74.3%	-80.0%
Chemicals (Industry)	Secondary Coal	CH ₄	0.00	0.0	0.00	0.0000	0.0%	74.3%	0.0%
Other (Industry)	Secondary Coal	CH ₄	0.78	0.0	1.54	0.0004	0.0%	74.3%	-96.4%
Other (Residential)	Secondary Coal	CH ₄	34.84	0.0	43.15	0.0078	0.0%	74.3%	-23.9%
Non-Ferrous Metals (Industry)	Petroleum Coke	CH ₄	0.00	0.0	0.23	0.0000	0.0%	74.3%	0.0%
Other (Industry)	Petroleum Coke	CH ₄	12.63	0.0	2.13	0.0017	0.0%	74.3%	83.1%
Public Electricity and Heat Production (Electricity Production)	Petroleum	CH ₄	6.79	0.0	2.93	0.0003	0.0%	74.3%	56.9%
Petroleum Refining (Electricity Production)	Petroleum	CH ₄	4.93	0.0	3.20	0.0001	0.0%	74.3%	35.1%
Iron and Steel (Industry)	Petroleum	CH ₄	0.60	0.0	1.00	0.0002	0.0%	74.3%	-64.7%
Non-Ferrous Metals (Industry)	Petroleum	CH ₄	0.47	0.0	0.45	0.0001	0.0%	74.3%	4.0%
Chemicals (Industry)	Petroleum	CH ₄	1.33	0.0	1.15	0.0001	0.0%	74.3%	13.9%
Other (Industry)	Petroleum	CH ₄	4.66	0.0	4.08	0.0005	0.0%	74.3%	12.4%
Other (Residential)	Petroleum	CH ₄	25.26	0.0	26.48	0.0040	0.0%	74.3%	-4.8%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	CH ₄	13.09	0.0	8.38	0.0003	0.0%	74.3%	36.0%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	CH ₄	10.33	0.0	2.05	0.0013	0.0%	74.3%	80.2%
Iron and Steel (Industry)	Natural Gas	CH ₄	0.02	0.0	0.00	0.0000	0.0%	74.3%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	CH ₄	2.12	0.0	0.00	0.0004	0.0%	74.3%	100.0%
Chemicals (Industry)	Natural Gas	CH ₄	1.50	0.0	0.00	0.0003	0.0%	74.3%	100.0%
Other (Industry)	Natural Gas	CH ₄	16.10	0.0	3.25	0.0020	0.0%	74.3%	79.8%
Road Transportation (Transport)	Natural Gas	CH ₄	0.25	0.0	0.00	0.0000	0.0%	74.3%	100.0%
Other (Residential)	Natural Gas	CH ₄	18.40	0.0	0.20	0.0035	0.0%	74.3%	98.9%
Other (Residential)	Biomass	CH ₄	1459.12	0.5	1901.22	0.3589	1.0%	75.3%	-30.3%
Civil Aviation (Transport)	Jet Kerosene	CH ₄	1.54	0.0	1.31	0.0001	0.0%	75.3%	15.4%
Road Transportation (Transport)	Diesel+FuelOil	CH ₄	121.35	0.0	67.91	0.0006	0.0%	75.3%	44.0%
Railways (Transport)	Diesel+FuelOil	CH ₄	0.62	0.0	0.73	0.0001	0.0%	75.3%	-18.1%
Navigation (Transport)	Diesel+FuelOil	CH ₄	1.71	0.0	0.69	0.0001	0.0%	75.3%	59.7%
Public Electricity and Heat Production (Electricity Production)	Hard Coal	N ₂ O	45.59	0.0	3.99	0.0075	0.0%	75.4%	91.3%
Non-Ferrous Metals (Industry)	Hard Coal	N ₂ O	1.05	0.0	0.00	0.0002	0.0%	75.4%	100.0%
Chemicals (Industry)	Hard Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	75.4%	0.0%
Other (Cement Production, Sugar, Fertilizer and Other Industries)	Hard Coal	N ₂ O	107.72	0.0	19.51	0.0142	0.0%	75.4%	81.9%
Railways (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.39	0.0000	0.0%	75.4%	0.0%
Navigation (Transport)	Hard Coal	N ₂ O	0.00	0.0	0.01	0.0000	0.0%	75.4%	0.0%
Other (Residential)	Hard Coal	N ₂ O	11.37	0.0	18.00	0.0039	0.0%	75.4%	-58.4%
Public Electricity and Heat Production (Electricity Production)	Lignite	N ₂ O	111.50	0.0	90.42	0.0089	0.0%	75.4%	18.9%
Non-Ferrous Metals (Industry)	Lignite	N ₂ O	0.33	0.0	0.26	0.0000	0.0%	75.4%	20.0%
Chemicals (Industry)	Lignite	N ₂ O	0.17	0.0	2.32	0.0007	0.0%	75.4%	-1229.4%
Other (Industry)	Lignite	N ₂ O	28.99	0.0	43.53	0.0091	0.0%	75.5%	-50.2%
Railways (Transport)	Lignite	N ₂ O	0.00	0.0	0.27	0.0000	0.0%	75.5%	0.0%
Other (Residential)	Lignite	N ₂ O	29.96	0.0	40.60	0.0079	0.0%	75.5%	-35.5%
Other (Industry)	Asphalt	N ₂ O	5.63	0.0	0.41	0.0009	0.0%	75.5%	92.6%
Other (Residential)	Asphalt	N ₂ O	0.00	0.0	1.83	0.0000	0.0%	75.5%	0.0%
Iron and Steel (Industry)	Secondary Coal	N ₂ O	39.62	0.0	35.96	0.0045	0.0%	75.5%	9.2%
Non-Ferrous Metals (Industry)	Secondary Coal	N ₂ O	0.19	0.0	0.34	0.0001	0.0%	75.5%	-80.0%
Chemicals (Industry)	Secondary Coal	N ₂ O	0.00	0.0	0.00	0.0000	0.0%	75.5%	0.0%
Other (Industry)	Secondary Coal	N ₂ O	1.62	0.0	3.18	0.0008	0.0%	75.5%	-96.4%
Other (Residential)	Secondary Coal	N ₂ O	2.40	0.0	2.97	0.0005	0.0%	75.5%	-23.9%
Non-Ferrous Metals (Industry)	Petroleum Coke	N ₂ O	0.00	0.0	0.48	0.0000	0.0%	75.5%	0.0%

Table D1. Trend Analysis

2004 VS. 1990 TREND ANALYSIS									
CATEGORY	FUEL	GAS	EMISSION 2004	CONTRIBUTION (%)	EMISSION 1990	TREND ASSESMENT	CONTRIBUTION	CUMULATIVE TOTAL	TREND
Other (Industry)	Petroleum Coke	N ₂ O	26.11	0.0	4.41	0.0036	0.0%	75.5%	83.1%
Public Electricity and Heat Production (Electricity Production)	Petroleum	N ₂ O	20.06	0.0	8.65	0.0010	0.0%	75.5%	56.9%
Petroleum Refining (Electricity Production)	Petroleum	N ₂ O	14.57	0.0	9.45	0.0004	0.0%	75.5%	35.1%
Iron and Steel (Industry)	Petroleum	N ₂ O	2.68	0.0	4.41	0.0010	0.0%	75.5%	-64.7%
Non-Ferrous Metals (Industry)	Petroleum	N ₂ O	2.07	0.0	1.98	0.0003	0.0%	75.5%	4.0%
Chemicals (Industry)	Petroleum	N ₂ O	5.91	0.0	5.08	0.0006	0.0%	75.5%	13.9%
Other (Industry)	Petroleum	N ₂ O	20.62	0.0	18.06	0.0021	0.0%	75.5%	12.4%
Other (Residential)	Petroleum	N ₂ O	22.38	0.0	23.45	0.0036	0.0%	75.5%	-4.8%
Manufacture of Solid Fuels and Other Energy Industries	Petroleum	N ₂ O	23.20	0.0	14.85	0.0005	0.0%	75.5%	36.0%
Public Electricity and Heat Production (Electricity Production)	Natural Gas	N ₂ O	15.25	0.0	3.02	0.0019	0.0%	75.5%	80.2%
Iron and Steel (Industry)	Natural Gas	N ₂ O	0.01	0.0	0.00	0.0000	0.0%	75.5%	100.0%
Non-Ferrous Metals (Industry)	Natural Gas	N ₂ O	0.63	0.0	0.00	0.0001	0.0%	75.5%	100.0%
Chemicals (Industry)	Natural Gas	N ₂ O	0.44	0.0	0.00	0.0001	0.0%	75.5%	100.0%
Other (Industry)	Natural Gas	N ₂ O	4.75	0.0	0.96	0.0006	0.0%	75.5%	79.8%
Road Transportation (Transport)	Natural Gas	N ₂ O	0.04	0.0	0.00	0.0000	0.0%	75.5%	100.0%
Other (Residential)	Natural Gas	N ₂ O	5.43	0.0	0.06	0.0010	0.0%	75.6%	98.9%
Other (Residential)	Biomass	N ₂ O	287.19	0.1	374.21	0.0706	0.2%	75.7%	-30.3%
Civil Aviation (Transport)	Jet Kerosene	N ₂ O	48.10	0.0	9.08	0.0062	0.0%	75.8%	81.1%
Road Transportation (Transport)	Diesel+FuelOil	N ₂ O	590.56	0.2	246.86	0.0309	0.1%	75.9%	58.2%
Railways (Transport)	Diesel+FuelOil	N ₂ O	2.91	0.0	3.36	0.0006	0.0%	75.9%	-15.3%
Navigation (Transport)	Diesel+FuelOil	N ₂ O	3.03	0.0	1.22	0.0002	0.0%	75.9%	59.8%
Cement Production (Mineral Products)		CO ₂	16725.48	5.6	10333.37	0.2507	0.7%	76.6%	38.2%
Lime Production (Mineral Products)		CO ₂	1411.24	0.5	645.09	0.0553	0.2%	76.7%	54.3%
Limestone and Dolomite Use (Mineral Products)		CO ₂	6.41	0.0	21.52	0.0060	0.0%	76.7%	-235.5%
Soda Ash Production and Use (Mineral Products)		CO ₂	255.57	0.1	106.30	0.0136	0.0%	76.8%	58.4%
Ammonia Production (Chemical Industry)		CO ₂	641.25	0.2	713.47	0.1166	0.3%	77.1%	-11.3%
Carbide Production (Chemical Industry)		CO ₂	61.38	0.0	112.25	0.0260	0.1%	77.2%	-82.9%
Aluminium Production (Metal Production)		CO ₂	115.20	0.0	109.62	0.0147	0.0%	77.2%	4.8%
Iron and Steel Production (Metal Production)		CO ₂	346.98	0.1	770.23	0.1926	0.5%	77.7%	-122.0%
Ferroalloys Production (Metal Production)		CO ₂	37.31	0.0	81.17	0.0202	0.1%	77.8%	-117.5%
Other Chemicals Production (Chemical Industry)		CH ₄	51.71	0.0	49.39	0.0067	0.0%	77.8%	4.5%
Nitric Acid Production (Chemical Industry)		N ₂ O	3862.41	1.3	128.08	0.7035	2.0%	79.8%	96.7%
Enteric Fermentation		CH ₄	13471.87	4.5	17046.76	3.1430	8.7%	88.5%	-26.5%
Manure Management		CH ₄	760.60	0.3	613.63	0.0599	0.2%	88.7%	19.3%
Rice Cultivation		CH ₄	294.00	0.1	222.60	0.0182	0.1%	88.7%	24.3%
Solid Waste		CH ₄	27546.11	9.3	6386.46	3.1718	8.8%	97.5%	76.8%
Fugitive (Coal Mining)		CH ₄	1229.33	0.4	1430.32	0.2446	0.7%	98.2%	-16.3%
Field Burning of Agricultural Residues		CH ₄	501.31	0.2	454.59	0.0564	0.2%	98.4%	9.3%
Field Burning of Agricultural Residues		N ₂ O	150.04	0.1	135.78	0.0168	0.0%	98.4%	9.5%
Emission of HFCs		HFC-	2228.73	0.8	0.00	0.4308	1.2%	99.6%	100.0%
Emission of SF6		SF ₆	704.57	0.2	0.00	0.1362	0.4%	100.0%	100.0%
Changes in Forest and Other Woody Biomass Stocks		N ₂ O	3.10	0.0	6.20	0.0015	0.0%	100.0%	-100.0%
TOTAL			296605		170065	35.9685	100.0%		

Appendix E

E. Emission Factors

Turkey's greenhouse gas emission inventory is in accordance with the Revised 1996 IPCC Guidelines. Emission factors used for this national inventory are provided in Annex E. The emission factors as given in the following Table E1 are;

Table E1. Emission Factors used for Turkish National Emission Inventory

Sector	Gas	Unit	Emission Factor	Sector	Gas	Unit	Emission Factor
Energy				Energy - Industry			
Hard Coal	CO ₂	tC/TJ	25.8	Natural Gas	N ₂ O	KG/TJ	0.1
Lignite	CO ₂	tC/TJ	27.6	Energy - Other			
Asphalt	CO ₂	tC/TJ	25.8	Hard Coal	N ₂ O	KG/TJ	1.4
Secondary Fuel Coal	CO ₂	tC/TJ	25.8	Lignite	N ₂ O	KG/TJ	1.4
Petroleum Coke	CO ₂	tC/TJ	25.8	Asphalt	N ₂ O	KG/TJ	1.4
Petroleum	CO ₂	tC/TJ	20.0	Secondary Fuel Coal	N ₂ O	KG/TJ	1.4
Natural Gases	CO ₂	tC/TJ	15.3	Petroleum Coke	N ₂ O	KG/TJ	1.4
Jet Kerosene	CO ₂	tC/TJ	19.5	Petroleum (Residential)	N ₂ O	KG/TJ	0.6
Energy - Electricity Production				Petroleum (Agriculture)	N ₂ O	KG/TJ	0.6
Hard Coal	CH ₄	KG/TJ	1.0	Natural Gas	N ₂ O	KG/TJ	0.1
Lignite	CH ₄	KG/TJ	1.0	Bomass (Residential)	N ₂ O	KG/TJ	4.0
Asphalt	CH ₄	KG/TJ	1.0	Energy - Transport			
Secondary Fuel Coal	CH ₄	KG/TJ	1.0	Hard Coal	N ₂ O	KG/TJ	1.4
Petroleum Coke	CH ₄	KG/TJ	1.0	Lignite	N ₂ O	KG/TJ	1.4
Petroleum	CH ₄	KG/TJ	3.0	Asphalt	N ₂ O	KG/TJ	1.4
Natural Gas	CH ₄	KG/TJ	1.0	Secondary Fuel Coal	N ₂ O	KG/TJ	1.4
Energy - Industry				Petroleum Coke	N ₂ O	KG/TJ	1.4
Hard Coal	CH ₄	KG/TJ	10.0	Petroleum	N ₂ O	KG/TJ	0.6
Lignite	CH ₄	KG/TJ	10.0	Natural Gas	N ₂ O	KG/TJ	0.1
Asphalt	CH ₄	KG/TJ	10.0	Jet Kerosene	N ₂ O	KG/TJ	2.0
Secondary Fuel Coal	CH ₄	KG/TJ	10.0	Fuel-oil	N ₂ O	KG/TJ	0.6
Petroleum Coke	CH ₄	KG/TJ	10.0	Diesel	N ₂ O	KG/TJ	0.6
Petroleum	CH ₄	KG/TJ	2.0	Gasoline	N ₂ O	KG/TJ	0.6
Natural Gas	CH ₄	KG/TJ	5.0	Energy - Electricity Production			
Energy - Other				Hard Coal	NO _x	KG/TJ	300.0
Hard Coal	CH ₄	KG/TJ	300.0	Lignite	NO _x	KG/TJ	300.0
Lignite	CH ₄	KG/TJ	300.0	Asphalt	NO _x	KG/TJ	300.0
Asphalt	CH ₄	KG/TJ	300.0	Secondary Fuel Coal	NO _x	KG/TJ	300.0
Secondary Fuel Coal	CH ₄	KG/TJ	300.0	Petroleum Coke	NO _x	KG/TJ	300.0
Petroleum Coke	CH ₄	KG/TJ	300.0	Petroleum	NO _x	KG/TJ	200.0
Petroleum (Residential)	CH ₄	KG/TJ	10.0	Natural Gas	NO _x	KG/TJ	150.0
Petroleum (Agriculture)	CH ₄	KG/TJ	5.0	Energy - Industry			
Natural Gas	CH ₄	KG/TJ	5.0	Hard Coal	NO _x	KG/TJ	300.0
Bomass (Residential)	CH ₄	KG/TJ	300.0	Lignite	NO _x	KG/TJ	300.0
Energy - Transport				Asphalt	NO _x	KG/TJ	300.0
Hard Coal	CH ₄	KG/TJ	10.0	Secondary Fuel Coal	NO _x	KG/TJ	300.0
Lignite	CH ₄	KG/TJ	10.0	Petroleum Coke	NO _x	KG/TJ	300.0
Asphalt	CH ₄	KG/TJ	10.0	Petroleum	NO _x	KG/TJ	200.0
Secondary Fuel Coal	CH ₄	KG/TJ	10.0	Natural Gas	NO _x	KG/TJ	150.0
Petroleum Coke	CH ₄	KG/TJ	10.0	Energy - Other			
Petroleum	CH ₄	KG/TJ	5.0	Hard Coal	NO _x	KG/TJ	100.0
Natural Gas	CH ₄	KG/TJ	50.0	Lignite	NO _x	KG/TJ	100.0
Jet Kerosene	CH ₄	KG/TJ	0.5	Asphalt	NO _x	KG/TJ	100.0
Fuel-oil	CH ₄	KG/TJ	5.0	Secondary Fuel Coal	NO _x	KG/TJ	100.0
Diesel	CH ₄	KG/TJ	5.0	Petroleum Coke	NO _x	KG/TJ	100.0
Gasoline	CH ₄	KG/TJ	20.0	Petroleum (Residential)	NO _x	KG/TJ	100.0
Energy - Electricity Production				Petroleum (Agriculture)	NO _x	KG/TJ	1200.0
Hard Coal	N ₂ O	KG/TJ	1.4	Natural Gas	NO _x	KG/TJ	50.0
Lignite	N ₂ O	KG/TJ	1.4	Bomass (Residential)	NO _x	KG/TJ	100.0
Asphalt	N ₂ O	KG/TJ	1.4	Energy - Transport			
Secondary Fuel Coal	N ₂ O	KG/TJ	1.4	Hard Coal	NO _x	KG/TJ	300.0
Petroleum Coke	N ₂ O	KG/TJ	1.4	Lignite	NO _x	KG/TJ	300.0
Petroleum	N ₂ O	KG/TJ	0.6	Asphalt	NO _x	KG/TJ	300.0
Natural Gas	N ₂ O	KG/TJ	0.1	Secondary Fuel Coal	NO _x	KG/TJ	300.0
Energy - Industry				Petroleum Coke	NO _x	KG/TJ	300.0
Hard Coal	N ₂ O	KG/TJ	1.4	Natural Gas	NO _x	KG/TJ	600.0
Lignite	N ₂ O	KG/TJ	1.4	Jet Kerosene	NO _x	KG/TJ	300.0
Asphalt	N ₂ O	KG/TJ	1.4	Fuel-oil (Railway)	NO _x	KG/TJ	1200.0
Secondary Fuel Coal	N ₂ O	KG/TJ	1.4	Diesel (Railway)	NO _x	KG/TJ	1200.0
Petroleum Coke	N ₂ O	KG/TJ	1.4	Gasoline	NO _x	KG/TJ	600.0
Petroleum	N ₂ O	KG/TJ	0.6	Fuel-oil (Navigation)	NO _x	KG/TJ	1500.0

Table E1. Emission Factors used for Turkish National Emission Inventory

Sector	Gas	Unit	Emission Factor	Sector	Gas	Unit	Emission Factor
Energy - Transport				Energy - Transport			
Diesel (Navigation)	NO _x	KG/TJ	1500.0	Hard Coal	NMVOC	KG/TJ	20.0
Fuel-oil (Road Trans.)	NO _x	KG/TJ	800.0	Lignite	NMVOC	KG/TJ	20.0
Diesel (Road Trans.)	NO _x	KG/TJ	800.0	Asphalt	NMVOC	KG/TJ	20.0
Energy - Electricity Production				Secondary Fuel Coal	NMVOC	KG/TJ	20.0
Hard Coal	CO	KG/TJ	20.0	Petroleum Coke	NMVOC	KG/TJ	20.0
Lignite	CO	KG/TJ	20.0	Petroleum	NMVOC	KG/TJ	200.0
Asphalt	CO	KG/TJ	20.0	Natural Gas	NMVOC	KG/TJ	5.0
Secondary Fuel Coal	CO	KG/TJ	20.0	Jet Kerosene	NMVOC	KG/TJ	50.0
Petroleum Coke	CO	KG/TJ	20.0	Fuel-oil	NMVOC	KG/TJ	200.0
Petroleum	CO	KG/TJ	15.0	Diesel	NMVOC	KG/TJ	200.0
Natural Gas	CO	KG/TJ	20.0	Gasoline	NMVOC	KG/TJ	1500.0
Energy - Industry				Energy - Fugitive Emission			
Hard Coal	CO	KG/TJ	150.0	Coal Mining			
Lignite	CO	KG/TJ	150.0	Underground mining	CH ₄	m ³ /tonnes	17.5
Asphalt	CO	KG/TJ	150.0	Surface mining	CH ₄	m ³ /tonnes	1.2
Secondary Fuel Coal	CO	KG/TJ	150.0	Industrial Processes			
Petroleum Coke	CO	KG/TJ	150.0	Cement Production			
Petroleum	CO	KG/TJ	10.0	Clinker	CO ₂	tone CO ₂ /tonne	0.51025
Natural Gas	CO	KG/TJ	30.0	Lime Production			
Energy - Other				CaO Production	CO ₂	Kg CO ₂ /tonne	0.91
Hard Coal	CO	KG/TJ	2000.0	Limestone and Dolomite Use			
Lignite	CO	KG/TJ	2000.0	limestone	CO ₂	Kg CO ₂ /tonne	440*f
Asphalt	CO	KG/TJ	2000.0	Dolomite	CO ₂	Kg CO ₂ /tonne	477*f
Secondary Fuel Coal	CO	KG/TJ	2000.0	Note: f is the fractional purity, which is taken as 1			
Petroleum Coke	CO	KG/TJ	2000.0	Soda Ash Production and Use			
Petroleum (Residential)	CO	KG/TJ	20.0	Soda Ash Use (Na ₂ CO ₃)	CO ₂	Kg CO ₂ /tonne	415.0
Petroleum (Agriculture)	CO	KG/TJ	1000.0	Road Paving with Asphalt			
Natural Gas	CO	KG/TJ	50.0	Asphalt plant	NO _x	Kg/tonne	0.084
Bomass (Residential)	CO	KG/TJ	5000.0	Asphalt plant	CO ₂	Kg/tonne	0.035
Energy - Transport				Asphalt plant	NMVOC	Kg/tonne	0.023
Hard Coal	CO	KG/TJ	150.0	Road Surface	MNVOC	Kg/tonne	320
Lignite	CO	KG/TJ	150.0	Asphalt Roofing Production			
Asphalt	CO	KG/TJ	150.0	Asphalt Roofing	MNVOC	Kg/tonne	0.16
Secondary Fuel Coal	CO	KG/TJ	150.0	Asphalt Roofing	CO	Kg/tonne	0.0095
Petroleum Coke	CO	KG/TJ	150.0	Ammonia Production			
Petroleum	CO	KG/TJ	1000.0	NH ₃	CO ₂	tonne CO ₂ /tonne	1.6
Natural Gas	CO	KG/TJ	400.0	Desulphurisation	TOC	Kg/tonne	3.6
Jet Kerosene	CO	KG/TJ	100.0	Carbondioxide regenerator	TOC	Kg/tonne	0.5
Fuel-oil	CO	KG/TJ	1000.0	Condensate steam stripper	TOC	Kg/tonne	0.6
Diesel	CO	KG/TJ	1000.0	Desulphurisation	CO	Kg/tonne	6.9
Gasoline	CO	KG/TJ	8000.0	Carbondioxide regenerator	CO	Kg/tonne	1.0
Energy - Electricity Production				Nitric Acid Production			
Hard Coal	NMVOC	KG/TJ	5.0	Nitric Acid	N ₂ O	Kg/tonne	19.0
Lignite	NMVOC	KG/TJ	5.0	Nitric Acid	NO _x	Kg/tonne	12.0
Asphalt	NMVOC	KG/TJ	5.0	Calcium Carbide Production			
Secondary Fuel Coal	NMVOC	KG/TJ	5.0	limestone	CO ₂	Kg/tonne	760.0
Petroleum Coke	NMVOC	KG/TJ	5.0	Reduction	CO ₂	Kg/tonne	1090.0
Petroleum	NMVOC	KG/TJ	5.0	Use of product	CO ₂	Kg/tonne	1100.0
Natural Gas	NMVOC	KG/TJ	5.0	Production of Other Chemicals			
Energy - Industry				Carbon Black	CH ₄	g/Kg	11.0
Hard Coal	NMVOC	KG/TJ	20.0	Ethylene	CH ₄	g/Kg	1.0
Lignite	NMVOC	KG/TJ	20.0	Styrene	CH ₄	g/Kg	4.0
Asphalt	NMVOC	KG/TJ	20.0	Methanol	CH ₄	g/Kg	2.0
Secondary Fuel Coal	NMVOC	KG/TJ	20.0	Coke	CH ₄	g/Kg	0.5
Petroleum Coke	NMVOC	KG/TJ	20.0	Carbon Black	NO _x	Kg/tonne	0.4
Petroleum	NMVOC	KG/TJ	5.0	Acrylonitrile	NMVOC	Kg/tonne	1.0
Natural Gas	NMVOC	KG/TJ	5.0	Ethylene	NMVOC	Kg/tonne	1.4
Energy - Other				Propylene	NMVOC	Kg/tonne	1.4
Hard Coal	NMVOC	KG/TJ	200.0	Carbon Black	NMVOC	Kg/tonne	40.0
Lignite	NMVOC	KG/TJ	200.0	Formaldehyde	NMVOC	Kg/tonne	5.0
Asphalt	NMVOC	KG/TJ	200.0	Phthalic anhydride	NMVOC	Kg/tonne	6.0
Secondary Fuel Coal	NMVOC	KG/TJ	200.0	Polypropylene	NMVOC	Kg/tonne	12.0
Petroleum Coke	NMVOC	KG/TJ	200.0	Polystyrene	NMVOC	Kg/tonne	5.4
Petroleum (Residential)	NMVOC	KG/TJ	5.0	Polyethylene-low density	NMVOC	Kg/tonne	3.0
Petroleum (Agriculture)	NMVOC	KG/TJ	200.0	Polyethylene-high density	NMVOC	Kg/tonne	6.4
Natural Gas	NMVOC	KG/TJ	5.0	Polyvinylchloride	NMVOC	Kg/tonne	8.5
Bomass (Residential)	NMVOC	KG/TJ	600.0	Styrene	NMVOC	Kg/tonne	18.0

Table E1. Emission Factors used for Turkish National Emission Inventory

Sector	Gas	Unit	Emission Factor	Sector	Gas	Unit	Emission Factor
Production of Other Chemicals				Enteric Fermentation			
Styrene butadiene	NMVOC	Kg/tonne	5.8	Buffalo	CH ₄	Kg/head/year	55.0
Carbon Black	CO	Kg/tonne	10.0	Sheep	CH ₄	Kg/head/year	5.0
Iron and Steel				Goats	CH ₄	Kg/head/year	5.0
Iron Production	CO ₂	tonne/tonne	1.6	Camels	CH ₄	Kg/head/year	46.0
Steel Production	CO ₂	tonne/tonne	1.6	Horse	CH ₄	Kg/head/year	18.0
Ferrochromium	CO ₂	tonne/tonne	1.3	Swine	CH ₄	Kg/head/year	1.0
Ferromanganese	CO ₂	tonne/tonne	1.6	Mules&Dankeys	CH ₄	Kg/head/year	10.0
Iron production-Pig Iron Tap.	NMVOC	g/tonne	20.0	Manure Mangement			
Iron production-Blast Fur.	NMVOC	g/tonne	100.0	Dairy Cattle (Clim.R. Temp.)	CH ₄	Kg/head/year	16.0
Steel Production	NMVOC	g/tonne	30.0	Other Cattle (Clim.R. Temp.)	CH ₄	Kg/head/year	1.0
Iron production-Pig Iron Tap.	CO	g/tonne	112.0	Buffalo (Clim.R. Temp.)	CH ₄	Kg/head/year	2.0
Iron production-Blast Fur.	CO	g/tonne	1330.0	Sheep (Clim.R. Temp.)	CH ₄	Kg/head/year	0.2
Steel Production	CO	g/tonne	1.0	Goats (Clim.R. Temp.)	CH ₄	Kg/head/year	0.17
Iron production	NO _x	g/tonne	76.0	Camels (Clim.R. Temp.)	CH ₄	Kg/head/year	1.9
Steel Production	NO _x	g/tonne	40.0	Horse (Clim.R. Temp.)	CH ₄	Kg/head/year	1.6
Aluminium				Mules&Dankeys (C.R.Temp.)	CH ₄	Kg/head/year	0.9
Aluminium Production	CO ₂	tonne/tonne	1.8	Swine (Clim.R. Temp.)	CH ₄	Kg/head/year	4.0
Aluminium Production	NO _x	Kg/tonne	2.15	Poultry (Clim.R. Temp.)	CH ₄	Kg/head/year	0.018
Aluminium Production	CO	Kg/tonne	135.0	Rice Cultivation			
Pulp and Paper				Rice	CH ₄	g/m ²	20.0
Pulp and Paper Production	NO _x	Kg/tonne	1.5	Note: Integrated emission factor (arithmetic mean)			
Pulp and Paper Production	VOC	Kg/tonne	3.7	Agricultural Burning			
Pulp and Paper Production	CO	Kg/tonne	5.6	Wheat, Barley, Maize, Oat, Rye	CH ₄	Emission Ratios*	0.05
Alcoholic Beverages				Wheat, Barley, Maize, Oat, Rye	CO	Emission Ratios*	0.06
Wine	NMVOC	Kg/Liter	0.08	Wheat, Barley, Maize, Oat, Rye	N ₂ O	Emission Ratios*	0.007
Beer	NMVOC	Kg/Liter	0.035	Wheat, Barley, Maize, Oat, Rye	NO _x	Emission Ratios*	0.121
Spirits (unspecified)	NMVOC	Kg/Liter	15.0	Note: Dry Matter fraction (arithmetic mean)			
Whiskey	NMVOC	Kg/Liter	15.0	Waste			
Bread making and other food				CH ₄ emission from waste disposal side			
Meat, fish and poultry	NMVOC	Kg/tonne	0.3	$= (MSW_T * MSW_F * MCF * DOC * DOC_F * F * 16/12 - R) \times (1 - OX)$			
Sugar	NMVOC	Kg/tonne	10.0	MSW _T	Collected	Gg/year	-
Margarine-solid cooking fats	NMVOC	Kg/tonne	10.0	MSW _F	Fraction	-	1.0
Cakes, biscuits, bre.cereals	NMVOC	Kg/tonne	1.0	MCF (Uncont. Landfill)	Corr. Fact.	-	0.6
Bread	NMVOC	Kg/tonne	8.0	MCF (Cont. Landfill)	Corr. Fact.	-	1.0
Animal feed	NMVOC	Kg/tonne	1.0	DOC	Deg.Org.C	-	0.15
Agriculture				DOC _F	Fraction	-	0.77
Enteric Fermentation				F	Fra.in land	-	0.5
Dairy Cattle	CH ₄	Kg/head/year	56.0	R	Recovered	Gg/year	-
Other Cattle	CH ₄	Kg/head/year	44.0	OX	Oxi. Fact.	-	0.0