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## AIR EMISSIONS IN FRANCE

Mainland France

# Substances causing acidification, eutrophication and photochemical pollution

(Emissions\_FRmt\_AEPEN)

**Note** : *the data presented in this document are revised annually in order to take into account the continuous improvements in knowledge, methodologies and reporting rules. Users are advised to ensure they are working from the most recent updates which may be published without prior notice.  
Figures and data tables are not translated.*

**These results come from work carried out with the financial support of Ministry of Ecology,  
Energy, Sustainable Development and Spatial Planning (MEEDDAT) / Department of  
Environment and Industry (SEI)**

**(last updated May 2008)**

## Substances and index currently monitored

*Acidification, eutrophication and photochemical pollution* : SO<sub>2</sub>, NO<sub>x</sub>, NH<sub>3</sub>, NMVOCs (total and speciation relating to 20 different families), CO, acid equivalent index (Aeq).

Emissions in relation to key indicators such as population, area, gross domestic product (GDP), primary energy consumption, etc.

Emissions are presented in the form of charts for each substance and the main source categories in five-year intervals until 2000 and, thereafter, annually. The years corresponding to the maximum and minimum values are also included. Results are provisional for 2007. More detailed data highlighting various parameters such as sectors, fuels, etc. are available (by downloading the complete report : [www.citepa.org/emissions/nationale/index\\_en.htm](http://www.citepa.org/emissions/nationale/index_en.htm)). Data are also available on CD-ROM at CITEPA.

## 1 Sulphur Dioxide – SO<sub>2</sub>

Source : CITEPA / CORALIE / SECTEN format - last updated 28 February 2008

Emissions		Variations	
Survey period :	since 1960	Variation 2006 / 1980 :	-86 %
Emissions in 2006 :	452 kt	Variation 2006 / 1990 :	-66 %
Maximum observed :	3 765 kt in 1973	Variation 2006 / maximum :	-88 %
Minimum observed :	452 kt in 2006	Variation 2006 / minimum :	0 %

### Main emitters

Main emitters in 2006 (sub-sectors ≥ 95 % of total emissions) :

1 - Petroleum refining	23 %
2 - Electricity production	20 %
3 - Chemical industry	10 %
4 - Residential	8.0 %
5 - Non-metallic mineral and construction materials	7.5 %
6 - Tertiary, commercial and institutional	5.2 %
7 - Iron and steel industry	4.5 %
8 - Food and drink industry	3.5 %
9 - Paper, cardboard	3.5 %
10 - Other agriculture	2.2 %
11 - Non-ferrous metal smelting	2.1 %
12 - District heating	2.1 %
13 - French maritime traffic	1.6 %
14 - Gaseous fuel extraction and distribution	1.5 %

## Comments

In the year 2006, emissions reached their lowest levels since 1960 (452 kt). It represented 7.5% improvement compare to 2005.

The energy conversion sector was the main one contributing to SO<sub>2</sub> emissions (48% of total emissions in mainland France in 2006), especially due to petroleum refining and electricity production.

Emissions have sharply decreased since 1980 (-86%, i.e. -2 761 kt) when between 1990 and 2006, they fell less sharply (-66%, i.e. -880 kt). All the sectors are concerned by this diminution.

Since 1980, the decrease is a result of :

- the reduction in fossil fuel consumption following the implementation of the French nuclear power plant programme,
- energy conservation measures,
- environmental legislation,
- productivity improvements in industry especially through the retrofitting of plants and the development of new technologies. Lower sulphur content in petroleum products in the last few years has enabled the most recent progress.

However, the levels observed in 1991, 1998 and 2003 are due to particular weather conditions (colder years) and/or technical events (lower availability of nuclear power plants, higher fossil fuel consumption) and/or particular events. It shows how sensitive emissions are in relation to this parameter, especially in energy conversion and residential/tertiary sectors.

The reduction trends should continue in the coming years due to more legislations for large combustion plants and lower sulphur content in petroleum products, such as diesel and gasoline in 2009 and domestic fuel since 1<sup>st</sup> January 2008. This is consistent with the stringent target set under the NEC Directive for 2010, emissions requiring a reduction of about 17% compared to the current level.



## EMISSIONS DANS L'AIR EN FRANCE METROPOLITAINE (unité Gg = kt)

Source CITEPA / CORALIE / format SECTEN

mise à jour : 28 février 2008

Secten\_niv\_1\_AEP-d/SO2.xls

Année	Transformation énergie	Industrie manufacturière	Résidentiel / tertiaire	Agriculture/sylviculture hors UTCF (**)	Transport routier	Autres transports (*)	UTCF (**)	TOTAL	Hors total (*)
1960	637	695	297	13	34	105	0	<b>1 782</b>	109
1965	940	827	331	20	56	77	0	<b>2 251</b>	139
1970	1 177	905	535	32	89	41	0	<b>2 778</b>	263
1973	1 828	1 132	606	40	124	34	0	<b>3 765</b>	392
1975	1 533	1 016	410	33	109	32	0	<b>3 134</b>	334
1980	1 743	930	349	32	134	24	0	<b>3 213</b>	258
1985	691	457	205	19	106	15	0	<b>1 493</b>	127
1990	590	440	125	21	140	16	0	<b>1 332</b>	152
1995	425	318	83	15	114	14	0	<b>970</b>	125
2000	304	198	67	11	22	13	0	<b>615</b>	159
2001	255	190	69	10	23	13	0	<b>561</b>	136
2002	246	166	57	11	24	13	0	<b>516</b>	127
2003	257	144	61	10	24	13	0	<b>509</b>	149
2004	245	150	63	11	24	12	0	<b>504</b>	171
2005	242	156	63	10	4	11	0	<b>486</b>	157
2006	216	151	60	10	4	10	0	<b>452</b>	140
2007 (e)	220	149	53	10	4	10	0	<b>446</b>	144

(\*) selon définitions de la CEE-NU - les émissions répertoriées hors total ne sont pas incluses, à savoir les émissions maritimes et aériennes internationales, ainsi que les émissions des sources biotiques des forêts et les émissions des sources non-anthropiques.

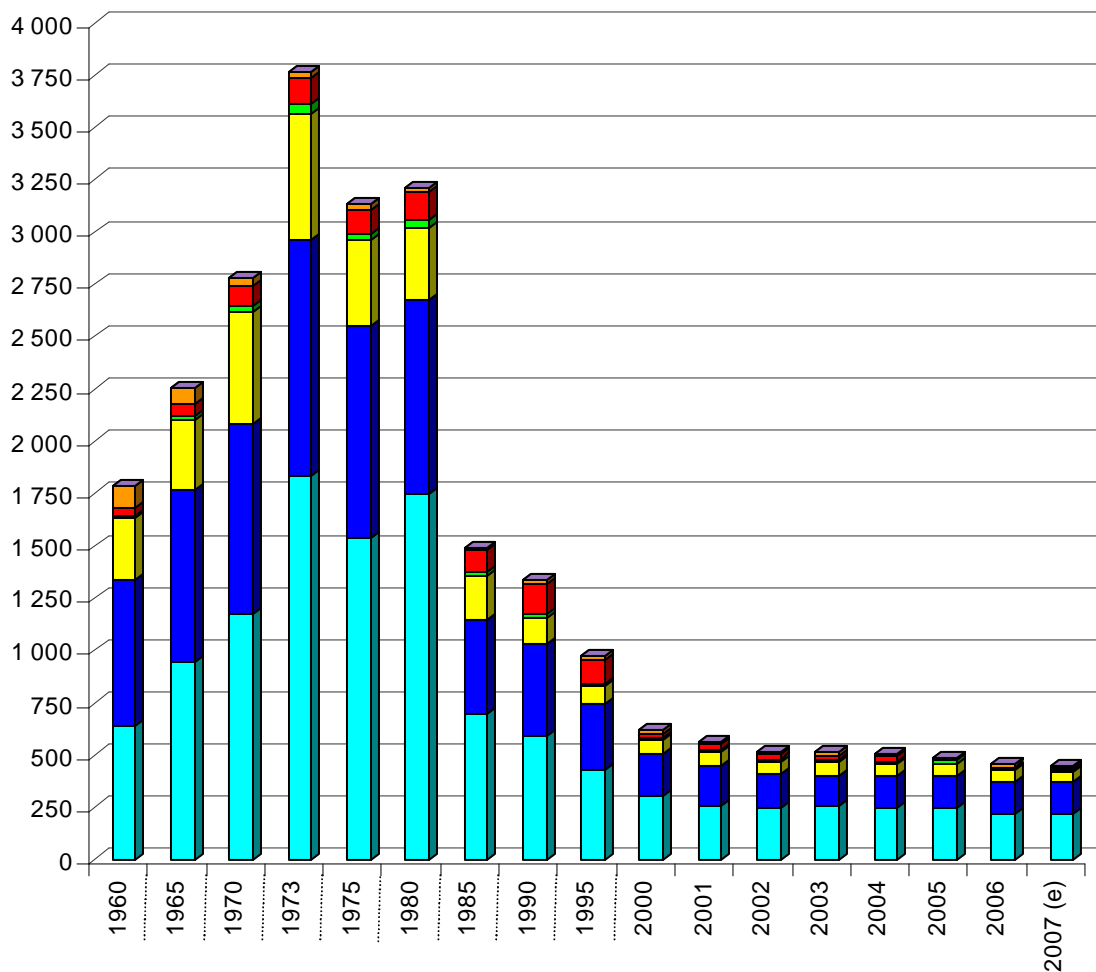
(\*\*) Utilisation des Terres, leur Changement et la Forêt

(e) estimation préliminaire

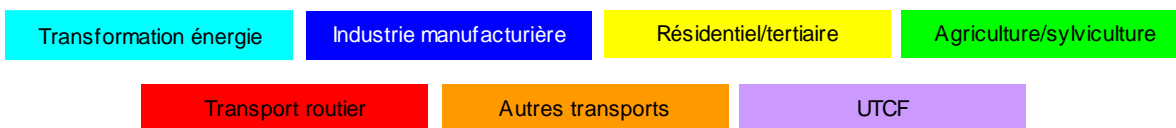
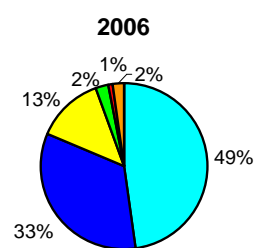
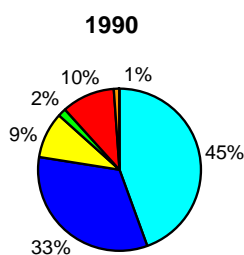
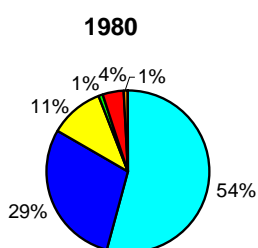
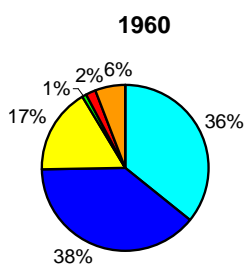
**Avertissement : ces valeurs sont régulièrement révisées et complétées afin de tenir compte de l'amélioration permanente des connaissances, des méthodes d'estimation et des règles de restitution. Les utilisateurs sont invités à s'assurer de l'existence de mises à jour plus récentes.**

SO<sub>2</sub>

Emissions atmosphériques par secteur en France métropolitaine en kt



(e) estimation préliminaire



## 2 Nitrogen monoxide and dioxide – NOx

Source : CITEPA / CORALIE / SECTEN format - last updated 28 February 2008

Emissions		Variations	
Survey period :	since 1960	Variation 2006 / 1980 :	-32 %
Emissions in 2006 :	1 351 kt	Variation 2006 / 1990 :	-27 %
Maximum observed :	1 995 kt in 1980	Variation 2006 / maximum :	-32 %
Minimum observed :	900 kt in 1960	Variation 2006 / minimum :	+50 %

### Main emitters

Main emitters in 2006 (sub-sectors  $\geq$  95 % of total emissions) :

1 - Diesel-engined heavy duty vehicles	25 %
2 - Catalysed diesel-engined passenger cars	10 %
3 - Other agriculture sources	6.5 %
4 - Electricity production	5.9 %
5 - Residential	5.0 %
6 - Crops	4.8 %
7 - Catalysed diesel-engined light duty vehicles	4.6 %
8 - Non-catalysed gasoline-engined passenger cars	4.1 %
9 - Non-metallic mineral and construction materials	3.9 %
10 - Non-catalysed diesel-engined passenger cars	2.9 %
11 - Tertiary, commercial and institutional	2.8 %
12 - Non-catalysed diesel-engined light duty vehicles	2.8 %
13 - Inland navigation	2.5 %
14 - Catalysed gasoline-engined passenger cars	2.4 %
15 - Chemical industry	2.2 %
16 - Petroleum refining	1.8 %
17 - French maritime traffic	1.7 %
18 - Iron and steel industry	1.6 %
19 - Food and drink industry	1.3 %
20 - Non-catalysed gasoline-engined light duty vehicles	1.1 %
21 - Paper, cardboard	0.9 %
22 - Other energy conversion sectors	0.8 %

## Comments

The level of NO<sub>x</sub> emissions observed in 2006 reached 1 351 kt. It is a bit more than 4.4% reduction compared to 2005.

1980 constituted the year of the highest level of emissions in Mainland France during the period (1 995 kt).

Since 1960, emissions from energy conversion increase sharply reaching their highest level in 1980 (358 kt). The main source is electricity production in account of increasing demand (improved comfort, household electrical appliances development, ...).

During the 1980s, emissions start to diminish in a result of the implementation of the French nuclear power plant programme, energy conservation and environmental legislation for, in one hand, industry and in the other hand, road transport.

In 2006, nearly every sector contributed to NO<sub>x</sub> emissions in variable proportions, but the main source was still road transport (53% of total mainland France emissions). Emissions are decreasing since 1991 (-562 kt, i.e. -29% for the period 1991-2006). This reduction was essentially observed in manufacturing industry and energy conversion.

Road transport emission contribution has been falling steadily since 1993. It is the result of vehicles gradually being fitted with catalytic converters.

Moreover, emissions continued to decrease especially due to improvements introduced under the programmes EURO III in 2002 for the heavy duty vehicles and EURO 4 in 2005 for the passenger cars with a stability of the traffic between 2002 and 2006.

NO<sub>x</sub> emissions were also decreasing in the manufacturing industry and the energy conversion sectors since 1980, in a result of best techniques introduced in the industrial installations.

More reductions should be observed in the next years, thanks to the change of the directive on the large combustion installations (new emission ceilings for 2008).

The target set for 2010 under the NEC Directive requires a diminution of 40% of the emissions compared to the current level.



## EMISSIONS DANS L'AIR EN FRANCE METROPOLITAINE (unité Gg = kt)

Source CITEPA / CORALIE / format SECTEN

mise à jour : 28 février 2008

Secten\_niv\_1\_AEP-d/NOx.xls

Année	Transformation énergie	Industrie manufacturière	Résidentiel / tertiaire	Agriculture/sylviculture hors UTCF (**)	Transport routier	Autres transports (*)	UTCF (**)	TOTAL	Hors total (*)
1960	154	250	54	139	212	90	1,4	<b>900</b>	106
1965	208	327	69	166	347	96	1,4	<b>1 214</b>	133
1970	225	356	121	217	519	93	1,4	<b>1 532</b>	240
1975	250	344	122	216	724	100	1,4	<b>1 757</b>	293
1980	358	317	121	227	883	89	1,5	<b>1 995</b>	255
1985	213	241	117	204	941	69	1,5	<b>1 787</b>	168
1990	150	205	100	208	1 121	71	1,2	<b>1 856</b>	187
1995	128	177	103	186	1 030	71	0,8	<b>1 696</b>	174
2000	152	167	102	185	886	66	0,9	<b>1 559</b>	228
2001	127	164	110	178	865	71	0,9	<b>1 516</b>	199
2002	136	159	99	178	836	74	0,8	<b>1 483</b>	196
2003	138	162	105	169	800	76	0,9	<b>1 450</b>	209
2004	134	161	109	169	784	74	0,7	<b>1 431</b>	232
2005	157	163	109	161	747	75	0,7	<b>1 413</b>	217
2006	132	156	106	157	726	74	0,7	<b>1 351</b>	225
2007 (e)	129	155	99	156	709	74	0,7	<b>1 323</b>	232

(\*) selon définitions de la CEE-NU - les émissions répertoriées hors total ne sont pas incluses, à savoir les émissions maritimes et aériennes internationales, ainsi que les émissions des sources biotiques des forêts et les émissions des sources non-anthropiques.

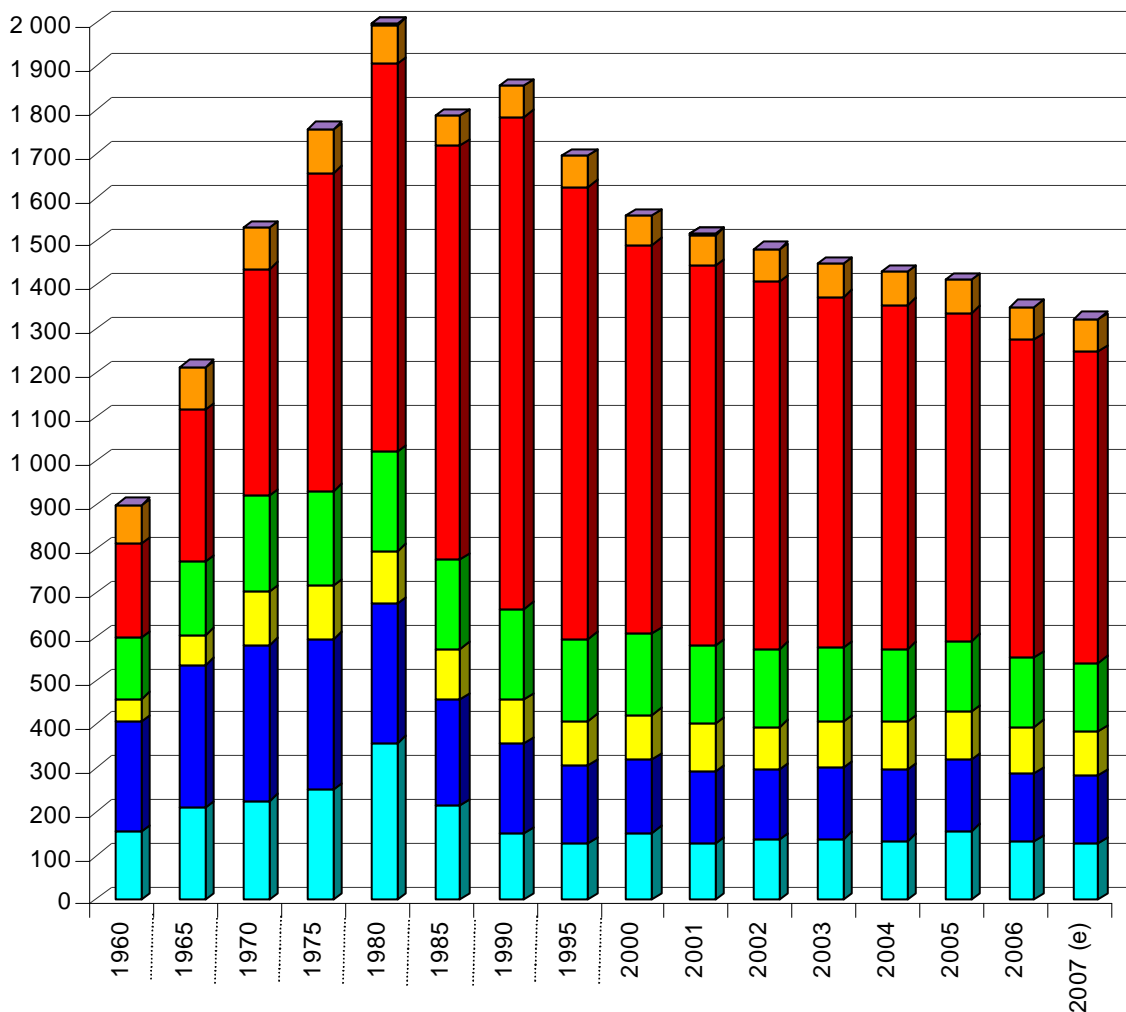
(\*\*) Utilisation des Terres, leur Changement et la Forêt

(e) estimation préliminaire

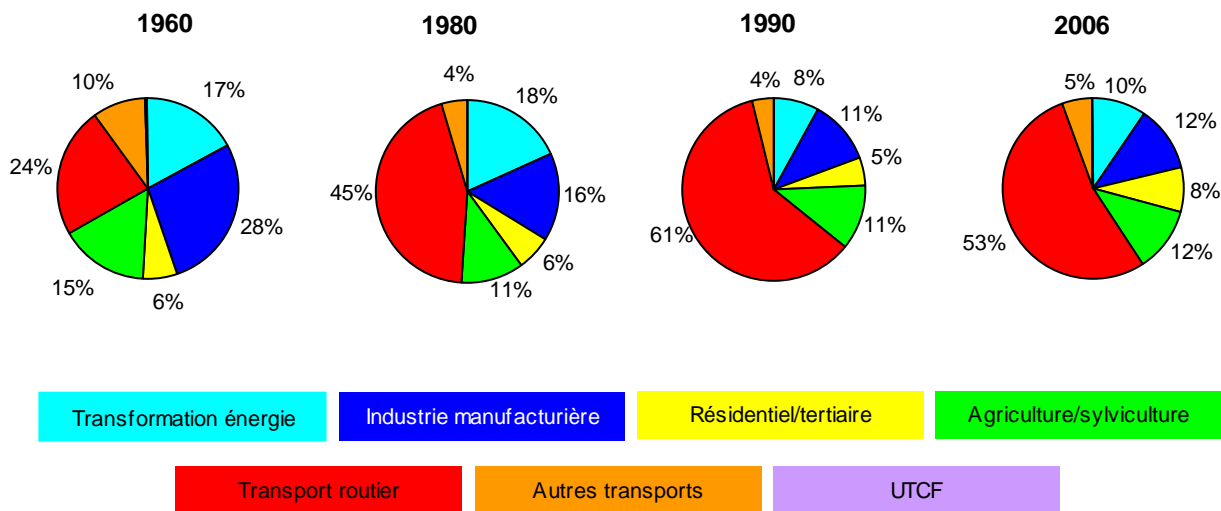
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# NOx

## Emissions atmosphériques par secteur en France métropolitaine en kt



(e) estimation préliminaire



### 3 Ammonia – NH<sub>3</sub>

Source : CITEPA / CORALIE / SECTEN format - last updated 28 February 2008

#### Emissions

Survey period : since 1980  
 Emissions in 2006 : 740 kt  
 Maximum observed : 809 kt in 1983  
 Minimum observed : 740 kt in 2006

#### Variations

Variation 2006 / 1980 : -7 %  
 Variation 2006 / 1990 : -6 %  
 Variation 2006 / maximum : -9 %  
 Variation 2006 / minimum : 0 %

#### Main emitters

Main emitters in 2006 (sub-sectors ≥ 95 % of total emissions) :

1 - Livestock 77 %  
 2 - Crops 20 %

#### Comments

The level of NH<sub>3</sub> emissions observed in 2006 attains 740 kt. A slight decrease was observed during the period 1980-2006 (-7%, i.e. -52 kt). However, very few changes have occurred in ammonia emissions over the period observed.

Only three sources contributed to the emissions : agriculture and forestry (around 98% of total mainland France emissions in 2006), then come manufacturing industry and road transport sectors for less than 1.5% each.

The agriculture and forestry emissions were reducing during the studied period, but the changes observed depend on the livestock numbers and spread fertilizers.

Manufacturing industry emissions were relatively steady between 1980 and 2006.

Even if road transport emissions were low, they increase regularly due to vehicles being fitted with catalytic converters.

The current level of emissions was lower than the target for 2010 (the target is at 780 kt) under the NEC Directive. But additional measures will be necessary, given the increase in the livestock numbers in the coming years.



### EMISSIONS DANS L'AIR EN FRANCE METROPOLITAINE (unité Gg = kt)

Source CITEPA / CORALIE / format SECTEN				mise à jour : 28 février 2008			Secten_niv_1_AEP-d/NH3.xls		
Année	Transformation énergie	Industrie manufacturière	Résidentiel / tertiaire	Agriculture/sylviculture hors UTCF (**)	Transport routier	Autres transports (*)	UTCF (**)	TOTAL	Hors total (*)
1980	0	9,9	0	782	0,3	0	0	792	0,2
1983	0	9,3	0	799	0,3	0	0	809	0,4
1985	0	9,3	0	780	0,3	0	0	789	0,5
1990	0	10,0	0	780	0,4	0	0	791	0,8
1995	0	9,6	0	761	2,3	0	0	773	0,3
2000	0	9,4	0	782	5,7	0	0	797	0,2
2001	0	9,5	0	768	5,7	0	0	783	0,2
2002	0	9,5	0	770	5,7	0	0	785	0,6
2003	0	10,2	0	742	5,6	0	0	758	0,6
2004	0	10,6	0	735	5,4	0	0	751	0,1
2005	0	10,5	0	730	4,9	0	0	745	0,2
2006	0	9,3	0	726	4,7	0	0	740	0,1
2007 (e)	0	10,0	0	722	4,6	0	0	737	0,1

(\*) selon définitions de la CEE-NU - les émissions répertoriées hors total ne sont pas incluses, à savoir les émissions maritimes et aériennes internationales, ainsi que les émissions des sources biotiques des forêts et les émissions des sources non-anthropiques.

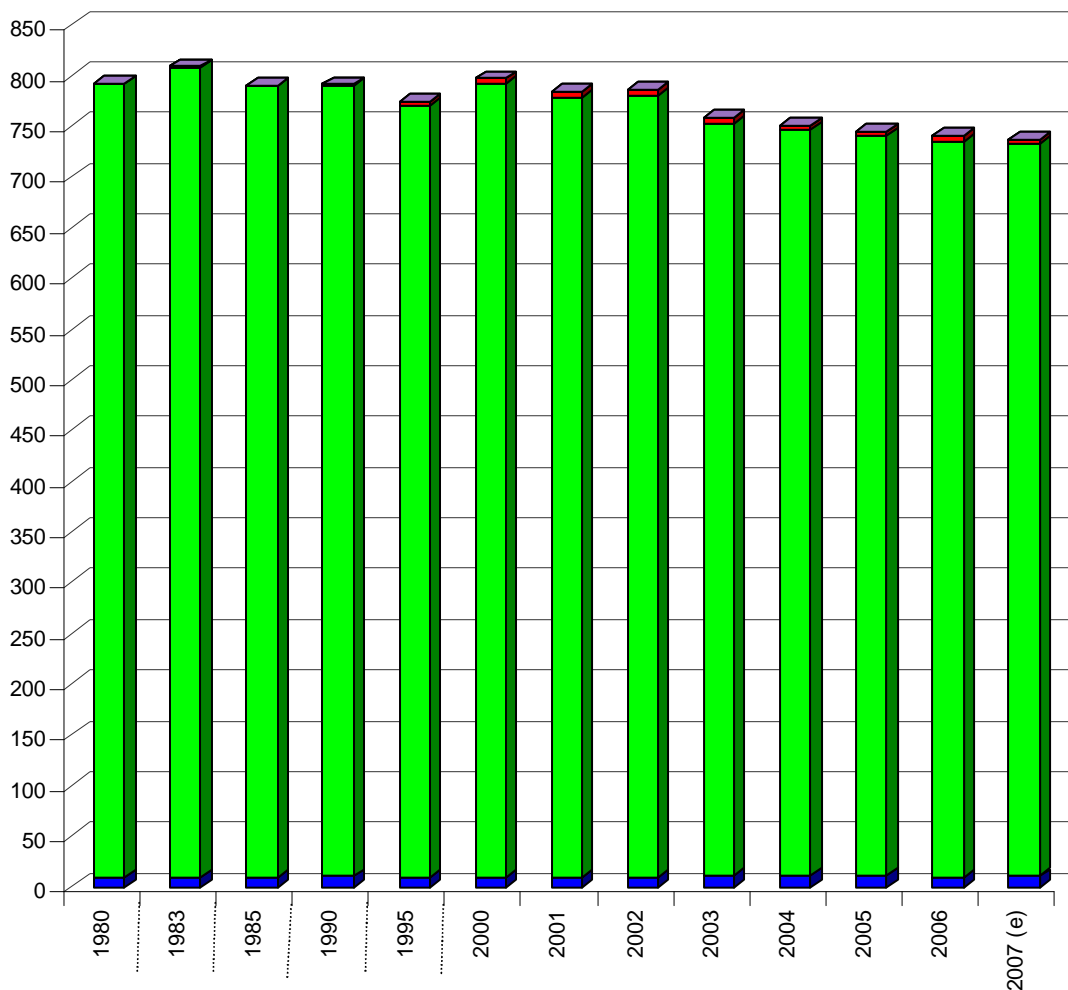
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(e) estimation préliminaire

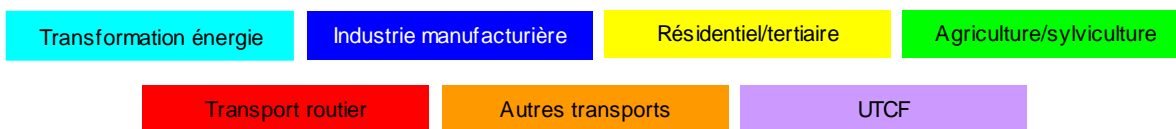
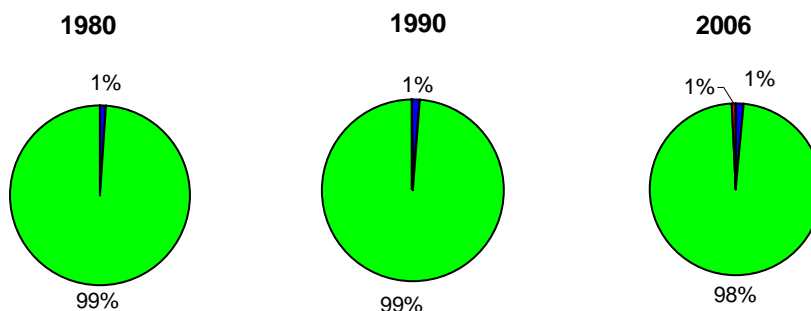
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**NH<sub>3</sub>**

Emissions atmosphériques par secteur en France métropolitaine  
en kt



(e) estimation préliminaire



## 4 Acid equivalent – Aeq

This index aims to assess the overall amount of acidifying substances emitted into the atmosphere. At different spatial and temporal scales, these substances contribute to the acidification of soil, air and the aquatic environment. It is based on the potential fixation of H<sup>+</sup> ion. The calculation only takes into account SO<sub>2</sub>, NO<sub>x</sub> and NH<sub>3</sub>, because it is quite obvious that other acidifying substances such as HCl, only have a marginal effect, given their low emissions level compared to the other three substances. The index is calculated by using weighted coefficients : 0,0313 for SO<sub>2</sub>, 0,0217 for NO<sub>x</sub> and 0,0588 for NH<sub>3</sub>.

Source : CITEPA / CORALIE / SECTEN format - last updated 28 February 2008

### Emissions

Survey period :	since 1980
Emissions in 2006 :	87 kt
Maximum observed :	190 kt in 1980
Minimum observed :	87 kt in 2006

### Variations

Variation 2006 / 1980 :	-54 %
Variation 2006 / 1990 :	-32 %
Variation 2006 / maximum :	-54 %
Variation 2006 / minimum :	0 %

acidification et  
eutrophisation

## EMISSIONS DANS L'AIR EN FRANCE METROPOLITAINE (\*) avec la part respective d'Aeq par polluant

Source CITEPA / CORALIE / format SECTEN		mise à jour : 28 février 2008			Emi_indic-d/aep.xls
Année	SO <sub>2</sub> % Aeq	NO <sub>x</sub> % Aeq	NH <sub>3</sub> % Aeq	Aeq (**) kt	
1980	53	23	24	190	
1985	35	29	35	132	
1990	32	31	36	128	
1995	27	33	40	113	
2000	19	34	47	100	
2001	18	34	48	97	
2002	17	34	49	94	
2003	17	34	48	92	
2004	17	34	49	91	
2005	17	34	49	90	
2006	16	34	50	87	
2007 (e)	16	33	50	86	

(\*) selon définitions de la CEE-NU - les émissions répertoriées hors total ne sont pas incluses, à savoir les émissions

(\*\*) Aeq : indicateur acide équivalent calculé sur la base de la part en masse des ions H<sup>+</sup>

soit : 0,0313 pour SO<sub>2</sub>, 0,0217 pour NO<sub>x</sub> et 0,0588 pour NH<sub>3</sub>.

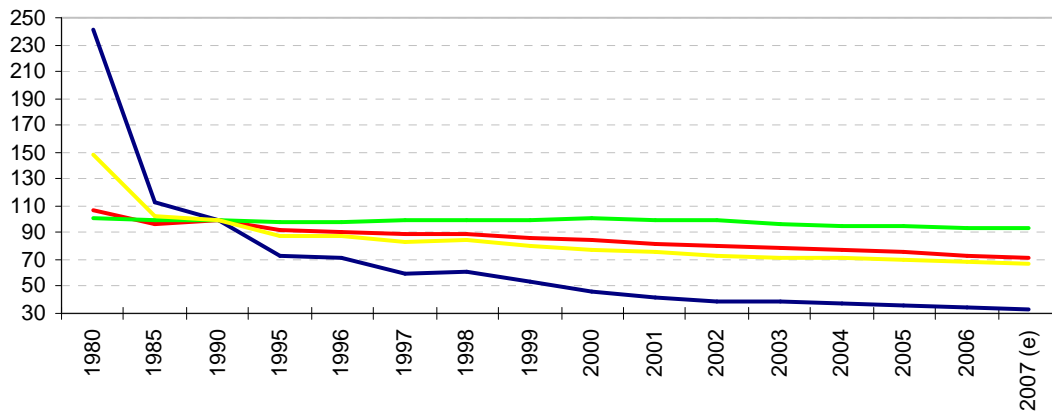
(e) estimation préliminaire

Comments

The following figures show the distribution between the pollutants for the Acid equivalent has changed during the years. In 1980, Aeq emissions were mainly due to SO<sub>2</sub> (53%), whereas in 2006, SO<sub>2</sub> emissions represent only 16% of total Aeq emissions. On the contrary, ammonia weighted 24% in 1980 versus 50% in 2006 of these emissions.

Significant changes are observed due to these 3 substances during the same period, and by the weighted coefficient which is different for each pollutant with the highest for NH<sub>3</sub>.

**Aeq** Emissions en France métropolitaine en base 100 en 1990



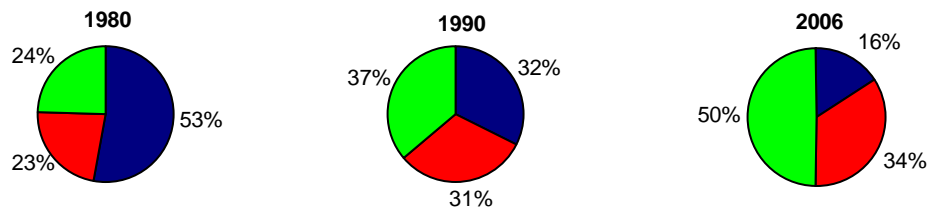
(e) estimation préliminaire

CITEPA / CORALIE /format SECTEN - février 2008

Emi\_indic-d/aep.xls



**Aeq** Part respective des différents polluants contribuant à l'Aeq en %



CITEPA / CORALIE /format SECTEN - février 2008

Emi\_indic-d/aep.xls



## 5 Non Methane Volatile Organic Compounds – NMVOCs

Source : CITEPA / CORALIE / SECTEN format - last updated 28 February 2008

<b>Emissions</b>		<b>Variations</b>	
Survey period :	since 1988		
Emissions in 2006 :	1 336 kt	Variation 2006 / 1990 :	-51 %
Maximum observed :	2 793 kt in 1991	Variation 2006 / maximum :	-52 %
Minimum observed :	1 336 kt in 2006	Variation 2006 / minimum :	0 %

### Main emitters

Main emitters in 2006 (sub-sectors  $\geq$  95 % of total emissions) :

1 - Residential	31 %
2 - Crops	12 %
3 - Construction	9.1 %
4 - Other manufacturing industry	8.4 %
5 - Catalysed gasoline-engined passenger cars	5.9 %
6 - Capital goods, mobile machinery	4.1 %
7 - Non-catalysed gasoline-engined passenger cars	4.1 %
8 - Chemical industry	3.8 %
9 - Inland navigation	3.2 %
10 - Food and drink industry	2.9 %
11 - Other agriculture	2.3 %
12 - Liquid fuels extraction and distribution	2.2 %
13 - Motorcycles	2.0 %
14 - Diesel-engined heavy duty vehicles	1.3 %
15 - Non-catalysed gasoline-engined light duty vehicles	1.1 %
16 - Petroleum refining	1.1 %
17 - Tertiary, commercial and institutional	0.7 %

## Comments

NMVOCs emissions amounted to approximately 1 336 kt in 2006. They were decreasing regularly since 1988 (-51%, i.e. -1 385 kt between 1988 and 2006).

The distribution of the emissions among the sectors has sharply changed during the period observed. In 1990, road transport was the main sector with 38% of total emissions, whereas in 2006, residential/tertiary is the first sector with 32% (road transport contributing only for 16%).

NMVOCs emissions resulting from fossil fuel combustion are generally low except for road vehicle engines. Specific emissions are generally higher when using biomass fuels.

A major proportion of NMVOCs is generated by the evaporation process during manufacturing and processing of products containing solvents.

Biotic sources are also significant in relation to total emissions. A slight part of biotic sources emissions comes from the agriculture/forestry sector. The most part comes from forests and grasslands (from 1 200 kt to 1 500 kt per year during the period), but those emissions are accounted in the memo items. However, these emissions contribute to the photochemical reactions in the atmosphere which lead to the formation of tropospheric ozone in particular.

A decrease of the emissions between 1988 and 2006 has been observed :

- in the road transport sector (-80%, i.e. -882 kt), mainly due to cars being fitted with catalytic converters since 1993, but also due to the increase of diesel-engined vehicles emitting less NMVOCs.
- in energy conversion since progress achieved in petroleum product storage and distribution (-75%, i.e. -156 kt),
- in manufacturing industry due to, the substitution of products by other containing less solvent, emission reduction techniques used for some processes and improvements made in a lot of sectors to reduce source emissions (-33%, i.e. -200 kt),
- in residential/tertiary sector mainly imputable to the substitution of products by other containing less solvent or no solvent and improvements made in combustion of biomass by more preformed and less emitting equipments (-32%, i.e. -170 kt).

Further significant improvements are expected in the coming years and therefore, will facilitate compliance with the target set for 2010 by the Directive on National Emission Ceilings (a reduction of 21% of the emissions compared to the current level).

# COVNM

## EMISSIONS DANS L'AIR EN FRANCE METROPOLITAINE (unité Gg = kt)

Source CITEPA / CORALIE / format SECTEN

mise à jour : 28 février 2008

Secten\_niv\_1\_AEP-d/COVNM.xls

Année	Transfor- mation énergie	Industrie manufac- turière	Rési- dentiel / tertiaire	Agricul- ture/syl- viculture hors UTCF (**)	Transport routier	Autres transports (*)	UTCF (**)	TOTAL	Hors total (*)
1988	207	600	596	173	1 101	45	0	<b>2 722</b>	1 228
1990	157	606	704	194	1 053	30	0	<b>2 744</b>	1 223
1991	143	580	822	187	1 034	27	0	<b>2 793</b>	1 199
1995	99	531	695	199	814	36	0	<b>2 373</b>	1 268
2000	72	537	593	185	506	41	0	<b>1 935</b>	1 246
2001	65	516	554	177	456	42	0	<b>1 810</b>	1 213
2002	61	484	495	178	397	47	0	<b>1 662</b>	1 184
2003	56	444	501	209	348	47	0	<b>1 606</b>	1 563
2004	53	432	482	182	307	48	0	<b>1 505</b>	1 240
2005	53	420	460	187	259	46	0	<b>1 425</b>	1 341
2006	51	400	426	195	219	46	0	<b>1 336</b>	1 463
2007 (e)	49	413	407	195	186	45	0	<b>1 294</b>	1 463

(\*) selon définitions de la CEE-NU - les émissions répertoriées hors total ne sont pas incluses, à savoir les émissions maritimes et aériennes internationales, ainsi que les émissions des sources biotiques des forêts et les émissions des sources non-anthropiques.

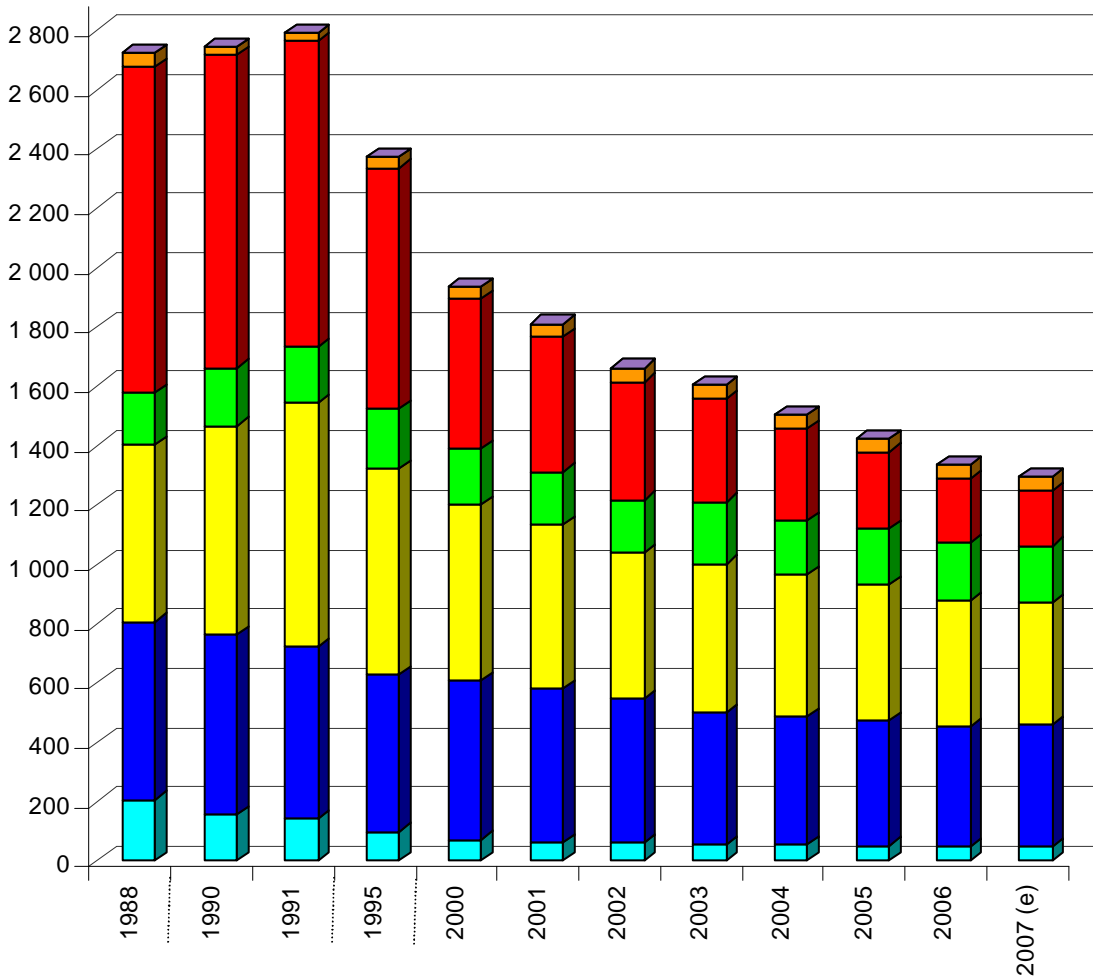
(\*\*) Utilisation des Terres, leur Changement et la Forêt

(e) estimation préliminaire

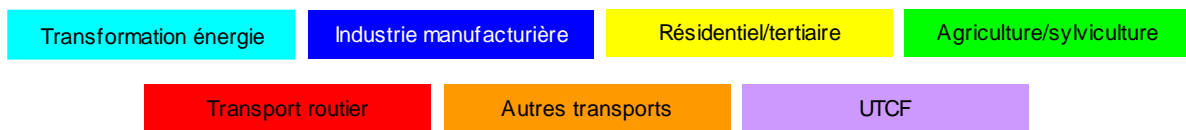
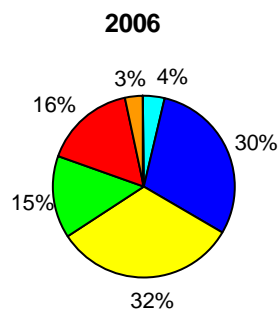
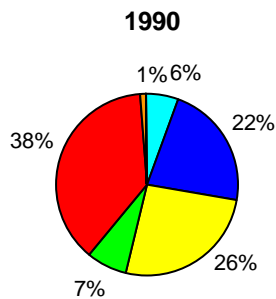
**Avertissement : ces valeurs sont régulièrement révisées et complétées afin de tenir compte de l'amélioration permanente des connaissances, des méthodes d'estimation et des règles de restitution. Les utilisateurs sont invités à s'assurer de l'existence de mises à jour plus récentes.**

**COVNM**

Emissions atmosphériques par secteur en France métropolitaine  
en kt



(e) estimation préliminaire



## 6 Carbon monoxide – CO

Source : CITEPA / CORALIE / SECTEN format - last updated 28 February 2008

<b>Emissions</b>		<b>Variations</b>	
Survey period :	since 1960	Variation 2006 / 1980 :	-66 %
Emissions in 2006 :	5 179 kt	Variation 2006 / 1990 :	-53 %
Maximum observed :	17 197 kt in 1973	Variation 2006 / maximum :	-70 %
Minimum observed :	5 179 kt in 2006	Variation 2006 / minimum :	0 %

### Main emitters

Main emitters in 2006 (sub-sectors  $\geq$  95 % of total emissions) :

1 - Residential	33 %
2 - Iron and steel industry	29 %
3 - Catalysed gasoline-engined passenger cars	7.9 %
4 - Non-catalysed gasoline-engined passenger cars	6.7 %
5 - Other agriculture sources	6.3 %
6 - Inland navigation	2.6 %
7 - Non-catalysed gasoline-engined light duty vehicles	2.6 %
8 - Motorcycles	2.1 %
9 - Diesel-engined heavy duty vehicles	1.8 %
10 - Non-metallic mineral and construction materials	0.8 %
11 - Chemical industry	0.7 %
12 - Catalysed diesel-engined light duty vehicles	0.6 %
13 - Non-catalysed diesel-engined passenger cars	0.6 %

## Comments

The level of CO emissions observed in 2006 attained 5 179 kt. After having increased sharply between 1960 and 1973 (+7 844 kt, i.e. +80%), the emissions are decreasing steadily since then (-70%, a diminution of -11 089 kt during the period 1973-2006). Those changes are due, in one hand, to the great variations of production of iron and steel and the diminution of the emission factor and, on the other hand, to measures implemented early 1970s to vehicles and especially cars being fitted with catalytic converters since 1993 for gasoline passenger cars and 1997 for diesel passenger cars.

After a stabilisation of the emissions between 2003 and 2004, emissions are decreasing again (-1 004 kt, a diminution of 16% between 2004 and 2006). The decline is observed in every sector except LULUCF which stays steady.

All the sectors contribute to CO emissions. Their distribution changes according to the years. In 1960, the main sector was manufacturing industry with 37% of total emissions while road transport represented only 26% of total emissions.

In 2006, the three main sectors emitting CO were :

- residential/tertiary (33% of total emissions in mainland France),
- manufacturing industry (32%),
- road transport (24%).



## EMISSIONS DANS L'AIR EN FRANCE METROPOLITAINE (unité Gg = kt)

Source CITEPA / CORALIE / format SECTEN

mise à jour : 28 février 2008

Secten\_niv\_1\_AEP-d/CO.xls

Année	Transformation énergie	Industrie manufacturière	Résidentiel / tertiaire	Agriculture/sylviculture hors UTCF (**)	Transport routier	Autres transports (*)	UTCF (**)	TOTAL	Hors total (*)
1960	65	3 678	2 336	884	2 563	179	49	<b>9 754</b>	287
1965	78	4 038	2 313	793	4 186	172	50	<b>11 630</b>	402
1970	89	4 775	2 324	548	6 563	164	50	<b>14 512</b>	408
1973	96	5 720	2 355	464	8 347	164	51	<b>17 197</b>	505
1975	86	4 945	2 417	363	8 251	155	51	<b>16 268</b>	379
1980	88	4 204	2 254	337	8 227	155	52	<b>15 317</b>	359
1985	63	2 895	2 700	336	7 617	142	53	<b>13 805</b>	430
1990	49	1 703	2 603	359	6 204	92	42	<b>11 054</b>	538
1995	40	1 980	2 563	334	4 608	113	30	<b>9 668</b>	476
2000	46	1 685	2 221	361	2 657	130	32	<b>7 131</b>	486
2001	47	1 494	2 092	333	2 444	132	31	<b>6 575</b>	452
2002	43	1 761	1 873	365	2 103	147	29	<b>6 320</b>	496
2003	43	1 646	1 965	321	1 873	147	30	<b>6 026</b>	510
2004	45	1 934	1 926	373	1 730	151	24	<b>6 183</b>	457
2005	42	1 801	1 855	355	1 446	145	24	<b>5 668</b>	475
2006	43	1 647	1 751	340	1 230	145	24	<b>5 179</b>	446
2007 (e)	42	1 635	1 692	340	1 066	140	24	<b>4 939</b>	447

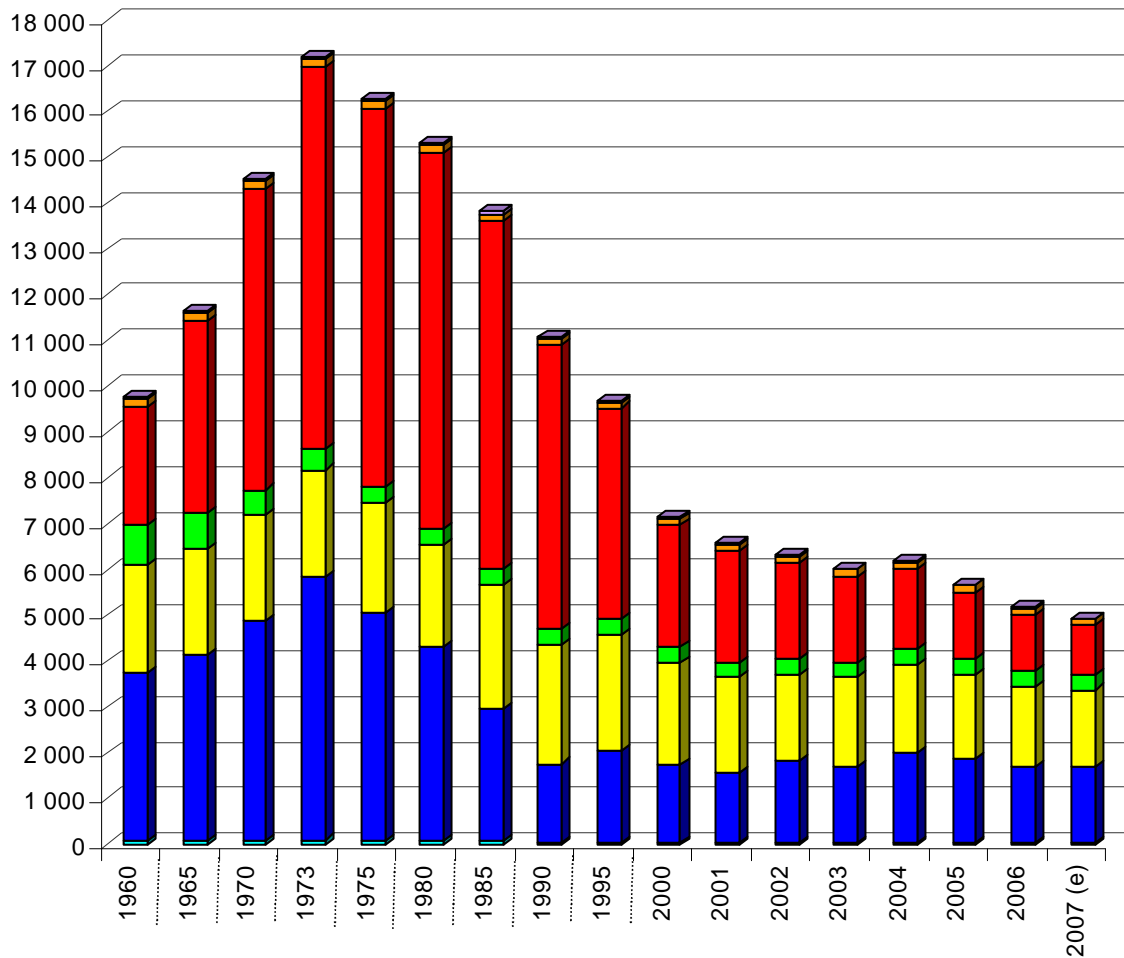
(\*) selon définitions de la CEE-NU - les émissions répertoriées hors total ne sont pas incluses, à savoir les émissions maritimes et aériennes internationales, ainsi que les émissions des sources biotiques des forêts et les émissions des sources non-anthropiques.

(\*\*) Utilisation des Terres, leur Changement et la Forêt

(e) estimation préliminaire

**Avertissement : ces valeurs sont régulièrement révisées et complétées afin de tenir compte de l'amélioration permanente des connaissances, des méthodes d'estimation et des règles de restitution. Les utilisateurs sont invités à s'assurer de l'existence de mises à jour plus récentes.**

**CO** Emissions atmosphériques par secteur en France métropolitaine en kt



(e) estimation préliminaire

