



DANISH EMISSION INVENTORIES FOR ROAD TRANSPORT AND OTHER MOBILE SOURCES

Inventories until the year 2010

Scientific Report from DCE – Danish Centre for Environment and Energy

No.24

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Abstract:	This report explains the parts of the Danish emission inventories related to road transport and other mobile sources. Emission results are shown for CO ₂ , CH ₄ , N ₂ O, SO ₂ , NO _x , NMVOC, CO, particulate matter (PM), heavy metals, dioxins and PAH. From 1990-2010 the fuel consumption and CO ₂ emissions for road transport increased by 30 %, and CH ₄ emissions have decreased by 74 %. A N ₂ O emission increase of 29 % is related to the relatively high emissions from older gasoline catalyst cars. The 1985-2010 emission decrease for NO _x , NMVOC, CO and particulates (exhaust only: Size is below PM _{2.5}) -52, -84, -81, and -65 %, respectively, due to the introduction of vehicles complying with gradually stricter emission standards. For SO ₂ the emission drop 99 % (due to reduced sulphur content in the diesel fuel), whereas the NH ₃ emissions increased by 2232 % (due to the introduction of catalyst cars). For other mobile sources the calculated emission changes for CO ₂ (and fuel use), CH ₄ and N ₂ O were -2, 5 and -1 %, from 1990 to 2010. The emissions of SO ₂ , particulates (all size fractions), NO _x , NMVOC and CO decreased by 88, 65, 17, 28 and 2 % from 1985 to 2010. For NH ₃ the emissions increased by 17 % in the same time period. Uncertainties for the emissions and trends were estimated.
Keywords:	Road transport, military, railways, domestic navigation, domestic aviation, working equipment and machinery, SO ₂ , NO _x , NMVOC, CH ₄ , CO, CO ₂ , N ₂ O, PM, heavy metals, dioxin, PAH, greenhouse gases, acidifying components.
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Preface

DCE - Danish Centre for Environment and Energy - prepares the Danish atmospheric emission inventories and reports the results on an annual basis to the UNFCCC (United Nations Framework Convention on Climate Change) and the UNECE LRTAP (United Nations Economic Commission for Europe Convention on Long Range Transboundary Pollutants) conventions. This report explains the parts of the Danish emission inventories related to road transport and other mobile sources. In the report emission results are shown for CO₂, CH₄ and N₂O in a time-series from 1990-2010 as reported to the UNFCCC convention. For SO₂, NO_x, NMVOC, CO, NH₃ and particulate matter (PM) emission results are shown from 1985-2010, and for heavy metals, dioxins and PAH emission results are shown from 1990-2010, as reported to the UNECE LRTAP convention. All results are grouped according to the UNFCCC Common Reporting Format (CRF) and UNECE National Format for Reporting (NFR) codes.

Summary

This report explains the emission inventories for road transport and other mobile sources, which are part of the annual Danish emission inventories reported to the UNFCCC (United Nations Framework Convention on Climate Change) and the UNECE LRTAP (United Nations Economic Commission for Europe Long Range Transboundary Pollution) convention. The sub-sectors for other mobile sources are military, railways, navigation, fisheries, civil aviation and non-road machinery in agriculture, forestry, industry and household/gardening.

The emissions of CO₂, CH₄, N₂O, SO₂, NO_x, NMVOC, CO, NH₃, particulate matter (PM), heavy metals, dioxins and PAH are shown in time-series as required by the UNFCCC and the UNECE LRTAP conventions, and grouped according to the UNFCCC Common Reporting Format (CRF) and UNECE National Format for Reporting (NFR) classification codes.

Table 0.1 Mobile sources and CRF codes.

SNAP classification	CRF/NFR classification
Road transport	1A3b Transport-Road
Military	1A5 Other
Railways	1A3c Railways
Inland waterways	1A3d Transport-Navigation
National sea traffic	1A3d Transport-Navigation
National fishing	1A4c Agriculture/forestry/fisheries
International sea traffic	1A3d Transport-Navigation (international)
Dom. airport traffic (LTO < 1000 m)	1A3a Transport-Civil aviation
Int. airport traffic (LTO < 1000 m)	1A3a Transport-Civil aviation (international)
Dom. cruise traffic (> 1000 m)	1A3a Transport-Civil aviation
Int. cruise traffic (> 1000 m)	1A3a Transport-Civil aviation (international)
Agriculture	1A4c Agriculture/forestry/fisheries
Forestry	1A4c Agriculture/forestry/fisheries
Industry	1A2f Industry-Other
Household and gardening	1A4b Residential
Commercial and institutional	1A4a Commercial and institutional

Methodologies

The emission calculations for road transport are made with an internal DCE model, with a structure similar to the European COPERT IV (COmputer Programme to calculate the Emissions from Road Transport) methodology. The emissions are calculated for operationally hot engines, during cold start and fuel evaporation. The model also includes the emission effect of catalyst wear. Input data for vehicle stock and mileage is obtained from DTU Transport, and is grouped according to average fuel consumption and emission behaviour. The emissions are estimated by combining vehicle and annual mileage numbers with hot emission factors, cold:hot ratios and evaporation factors.

For air traffic the 2001-2010 estimates are made on a city-pair level, using flight data from the Danish Transport Authority and landing/take off (LTO) and distance related emission factors from the EMEP/CORINAIR guide-

book. For previous years the background data consist of LTO/aircraft type statistics from Copenhagen Airport and total LTO numbers from the Danish Transport Authority. With appropriate assumptions a consistent time-series of emissions is produced back to 1985 using also the findings from a Danish city-pair emission inventory in 1998 (Winther, 2001b).

National sea transport is split into regional ferries, small ferries, freight transport between Denmark and Greenland/Faroe Islands, and other national sea transport. For regional ferries, the fuel consumption and emissions are calculated as a product of number of round trips, sailing time per round trip, engine size, engine load factor and fuel consumption/emission factor. For small ferries, freight transport between Denmark and Greenland/Faroe Islands, and other national sea transport, the calculations are simply fuel based using the fuel consumption findings from Danish surveys in combination with average fuel related emission factors.

Non-road working machines and equipment, and recreational craft are grouped in the following sectors: Agriculture, Forestry, Industry, Household/Gardening, Commercial/Institutional and Inland Waterways. In general the emissions are calculated by combining information on the number of different machine types and their respective load factors, engine sizes, annual working hours and emission factors.

For military, railways and fisheries the emissions are calculated as the product of fuel use and emission factors.

Fuel sales data are obtained from the Danish energy statistics provided by the Danish Energy Agency (DEA). For road transport and aviation the emission results are adjusted in a fuel balance to ensure that all statistical fuel sold is accounted for in the calculations. For national sea transport, the fuel consumption of heavy oil and gas oil is calculated directly by DCE. Fuel adjustments are made in the fishery sector (gas oil) and stationary industry sources (heavy fuel oil) in order to maintain the grand national energy balance. In order to comply with the IPCC guidelines the fuel consumption by vessels between Denmark and Greenland/Faroe Islands are subtracted from the DEA fuel sales figures for international sea transport, and added to the national part of the emission inventories.

Emissions from road transport

Set in relation to the Danish national emission totals, the largest emission shares for road transport are noted for NO_x, CO, CO₂, NMVOC, TSP, PM_{2.5} and PM₁₀. In 2010 the emission percentages were 34, 27, 26, 15, 10, 10 and 9, respectively. The emissions of NH₃, N₂O, CH₄ and SO₂ have marginal shares of 1.9, 2.0, 0.2 and 0.5 %, respectively.

From 1990 to 2010 the calculated emission changes for CO₂ (and fuel use), CH₄ and N₂O are 30, -74 and 29 %. For NO_x, NMVOC, CO and particulates (exhaust only: Size is below PM_{2.5}), the 1985-2010 emission changes are -52, -84, -81, and -65 %.

The most significant emission changes from 1985 to 2010 occur for SO₂ and NH₃. For SO₂ the emission drop is 99 % (due to reduced sulphur content in the diesel fuel), whereas the NH₃ emissions increase by 2232 % (due to the introduction of catalyst cars).

Table 0.2 Emissions from road transport in 2010, changes from 1985 (1990¹) to 2010, and 2010 shares of national emission totals.

CRF ID	SO ₂ [tonnes]	NO _x [tonnes]	NMVOC [tonnes]	CH ₄ [tonnes]	CO [tonnes]	CO ₂ [ktonnes]	N ₂ O [tonnes]	NH ₃ [tonnes]	TSP [tonnes]	PM ₁₀ [tonnes]	PM _{2.5} [tonnes]
Road (1A3b)	76	44159	12514	644	105972	12108	385	1433	1513	1513	1513
Total Road non-exhaust	0	0	0	0	0	0	0	0	2482	1604	868
Total Road	76	44159	12514	644	105972	12108	385	1433	3995	3117	2382
National total	14038	128772	86158	263537	399352	46602	19055	74583	40106	31723	25695
Road- % of national total, 2010	0,5	34	15	0,2	27	26	2,0	1,9	10	10	9,3
Road- % change 1985-2010	-99	-52	-84	-74 ¹	-81	30 ¹	29 ¹	2232	-65 ²	-65 ²	-65 ²

Road transport exhaust PM emissions almost solely come from diesel fuelled vehicles. The largest source is passenger cars followed by light duty trucks and heavy-duty vehicles in decreasing order. Since the mid-1990s the emissions from light and heavy duty vehicles have decreased significantly due to gradually stricter Euro emission standards. The environmental benefit of introducing diesel private cars with lower particulate emissions since 1990 is more than outbalanced by an increase in sales of new vehicles in recent years.

The trend in non-exhaust PM follows the traffic growth in general, and in 2010 the TSP (total particulate matter), PM₁₀ and PM_{2.5} shares were 62, 51 and 36 % of the respective road traffic totals. The non-exhaust PM is gaining more relative importance, in pace with the year by year reductions of exhaust PM.

Historically the emission totals of NO_x and especially NMVOC and CO have been dominated by the contributions coming from gasoline passenger cars. However, the emissions from this vehicle type have been reduced since the introduction of gradually more and more emission-efficient catalyst cars from 1990. A negative side effect of this technology though is the increase in N₂O and NH₃ emissions. The NO_x, NMVOC and CO emissions reductions are fortified by the introduction of new gradually stricter Euro emission standards for all other vehicle classes.

Emissions from other mobile sources

For other mobile sources the emissions of NO_x, CO, SO₂, NMVOC and CO₂ have the largest shares of the national totals in 2010. The shares are 33, 33, 14, 13 and 9 %, respectively. The 2010 TSP, PM₁₀ and PM_{2.5} emission shares are 5, 7 and 8 %, respectively, whereas the emissions of N₂O, NH₃ and CH₄ have marginal shares of 1 % or less in 2010.

From 1990 to 2010 the calculated emission changes for CO₂ (and fuel use), CH₄ and N₂O are -2, 5 and -1 %. The emissions of SO₂, particulates (all size fractions), NO_x, NMVOC and CO have decreased by 88, 65, 17, 28 and 2 % from 1985 to 2010.

¹ For the greenhouse gases CO₂, CH₄ and N₂O, the emission changes are relative to 1990.

² Exhaust only.

Table 0.3 Emissions from other mobile sources in 2010, changes from 1985 (1990³) to 2010, and 2010 shares of national emission totals.

CRF ID	SO ₂ [tonnes]	NO _x [tonnes]	NMVOC [tonnes]	CH ₄ [tonnes]	CO [tonnes]	CO ₂ [ktonnes]	N ₂ O [tonnes]	NH ₃ [tonnes]	TSP [tonnes]	PM ₁₀ [tonnes]	PM _{2.5} [tonnes]
Industry-Other (1A2f)	31	8540	1173	37	6446	1037	44	3	686	686	686
Civil Aviation (1A3a)	50	623	109	4	688	156	8	0	3	3	3
Railways (1A3c)	2	2818	189	7	481	242	7	1	95	95	95
Navigation (1A3d)	1440	9582	937	35	5841	593	35	0	307	305	304
Comm./Inst. (1A4a)	1	217	4423	160	72338	173	3	0	67	67	67
Residential (1A4b)	0	87	2032	65	25616	63	1	0	14	14	14
Ag./for./fish. (1A4c)	404	20770	2374	113	19380	1865	91	4	957	955	954
Military (1A5)	20	438	41	4	309	107	4	0	9	9	9
Total other mobile	1947	43075	11279	425	131100	4235	192	8	2138	2135	2133
National total	14038	128772	86158	263537	399352	46602	19055	74583	40106	31723	25695
Other mobile- % of national total, 2010	14	33	13	0.2	33	9.1	1.0	0.0	5.3	6.7	8.3
Other mobile- % change 1985-2010	-88	-17	-28	5 ³	-2	-2 ³	-1 ³	17	-65	-65	-65

The largest source of NO_x and particulate emissions are agriculture/forestry/fisheries, followed by industry and navigation. For NMVOC and CO most of the emissions come from gasoline fuelled working machinery in the commercial/institutional and residential sectors.

Heavy metals

Heavy metal emissions are calculated for fuel and engine oil as well as for tyre, brake and road wear. The road transport shares for copper (Cu), zinc (Zn), lead (Pb), cadmium (Cd) and chromium (Cr) are 94, 71, 59, 22 and 21 % of national totals in 2010. For other mobile sources the nickel (Ni), Arsenic (As) and Pb shares are 39, 15 and 10 %. For the remaining components, the emission shares are less than 6 %.

The most important exhaust related emissions (fuel and engine oil) for road transport (% of national total in brackets) are Zn (19 %), Cd (19 %) and Cr (10 %). The most important wear related emissions are Cu (93 %) and Pb (58 %) almost solely coming from tyre wear, and Zn (52 %) from brake and tyre wear. For other mobile sources, the emissions of Ni and As arise from the use of marine diesel oil and residual oil in fisheries and navigation. The emissions of Pb almost solely come from the use of aviation gasoline.

In general terms the development in emissions follows the trends in fuel/engine oil consumption and vehicle mileage (wear related emissions). It must be noted, however, that there has been an almost 100 % decline in the exhaust related emissions of Pb, due to the phasing out of leaded gasoline fuels until 1994.

PAH's

The PAH emission shares for road transport and other mobile sources are 3 % or less of the national total in 2010.

³ For the greenhouse gases CO₂, CH₄ and N₂O, the emission changes are relative to 1990.

Uncertainties

For mobile sources in 2010 the CO₂ emissions are determined with the highest accuracy, followed by the CH₄, TSP, SO₂, PM₁₀, PM_{2.5}, NMVOC, NO_x, CO and N₂O emissions with increasing levels of uncertainties. The uncertainties are 5, 27, 48, 49, 51, 54, 55, 56, 60 and 152 %, respectively. The uncertainties for the 1990-2010 emission trends are 6, 5, 6, 3, 4, 3, 9, 11, 16 and 54 % for the emissions in the same consecutive order. For NH₃, heavy metals and PAH's the 2010 emissions have uncertainty levels of between 700 and 1000 %. In this case the emission trend uncertainties are significantly lower; still large fluctuations exist between the calculated values for the different emission components.

Sammenfatning

Denne rapport dokumenterer de årlige danske emissionsopgørelser for vejtransport og andre mobile kilder. Opgørelserne laves som en del af de samlede danske opgørelser, og rapporteres til UNFCCC (United Nations Framework Convention on Climate Change) og UNECE LRTAP (United Nations Economic Commission for Europe Long Range Transboundary Pollution) konventionerne. Underkategorierne for andre mobile kilder er: Militær, jernbane, søfart, fiskeri, civil flyvning, og arbejdsredskaber- og maskiner i landbrug, skovbrug, industri samt have/hushold.

For CO₂, CH₄, N₂O, SO₂, NO_x, NMVOC, CO, partikler (PM), tungmetaller, dioxin og PAH er de beregnede emissioner vist i tidsserier iht. til UNFCCC og UNECE LRTAP konventionernes krav, og resultaterne grupperes i henhold til UNFCCCs Common Reporting Format (CRF) og UNECEs National Format for Reporting (NFR) rapporteringskoder.

Tabel 0.1 Mobile kilder og CRF koder.

Mobile kilder	CRF koder
Vejtrafik	1A3b Transport-Road
Militær	1A5 Other
Jernbane	1A3c Railways
Småbåde og fritidsfartøjer	1A3d Transport-Navigation
Indenrigs skibstrafik	1A3d Transport-Navigation
Indenrigs fiskeri	1A4c Agriculture/forestry/fisheries
Udenrigs skibstrafik	1A3d Transport-Navigation (international)
Indenrigs flytrafik (LTO < 1000 m)	1A3a Transport-Civil aviation
Udenrigs flytrafik (LTO < 1000 m)	1A3a Transport-Civil aviation (international)
Indenrigs cruise trafik (> 1000 m)	1A3a Transport-Civil aviation
Udenrigs cruise trafik (> 1000 m)	1A3a Transport-Civil aviation (international)
Landbrug	1A4c Agriculture/forestry/fisheries
Skovbrug	1A4c Agriculture/forestry/fisheries
Industri	1A2f Industry-Other
Have- og hushold	1A4b Residential
Handel og service	1A4a Commercial and institutional

Metoder

Emissionerne for vejtrafik beregnes med en intern DCE-model, der benytter samme modelprincip som den europæiske emissionsmodel COPERT IV (Computer Programme to calculate the Emissions from Road Transport). I DCE-modellen beregnes emissionerne for køretøjer med driftsvarme motorer, under koldstart og som følge af brændstoffordampning. Modellen tager også højde for de forøgede emissioner som følge af katalysatorslid. Input data for køretøjsbestand og årskørsler oplyses af DTU Transport og køretøjerne grupperes iht. gennemsnitligt brændstofferbrug og emissioner. Emissionerne beregnes som produktet af antal køretøjer, årskørsler, varme emissionsfaktorer, kold/varm-forhold og fordampningsfaktorer.

For luftfart opgøres emissionerne for 2001-2010 på city-pair basis. Til beregningerne bruges flydata fra Trafikstyrelsen samt landing/take off (LTO) og cruise emissionsfaktorer pr. flojet distance fra EMEP/CORINAIR guidebo-

gen. For årene før 2001 bruges som baggrundsdata en LTO/flytype statistik fra Københavns Lufthavn samt Trafikstyrelsens tal for antallet af starter og landinger. En konsistent emissionsopgørelse er beregnet tilbage til 1985 ved at gøre passende antagelser og ved at bruge resultaterne fra en dansk city-pair emissionsopgørelse for 1998.

National søfart er opdelt i regionale færger, småfærger, godstransport mellem Danmark og Grønland/Færøerne og øvrig søtransport. For regionale færger beregnes emissionerne som produktet af antallet af dobbeltture, sejltid pr. dobbelttur, motorstørrelsen, motorlastfaktoren og emissionsfaktoren. For små færger, godstransport mellem Danmark og Grønland/Færøerne og øvrig søtransport beregnes emissionerne som produktet af emissionsfaktorer og totalt brændstofforbrug, der bestemmes i danske undersøgelser.

For militær, jernbane og fiskeri beregnes emissionerne som produktet af brændstofsalg og emissionsfaktorer.

For arbejdsredskaber og -maskiner indenfor landbrug, skovbrug, industri, have/hushold, handel/service samt småbåde og fritidsfartøjer beregnes emissionerne som produktet af antallet af maskiner, lastfaktorer, motorstørrelser, årlige driftstider og emissionsfaktorer.

Data for energiforbrug stammer fra Energistyrelsens (ENS) energistatistik. For vejtransport og luftfart justeres emissionsresultaterne ud fra en brændstofbalance. For national søtransport beregner DCE brændstofforbruget direkte for diesel og tung olie, og efterfølgende justeres brændstofforbruget for fiskeri (diesel) og stationære kilder indenfor industri. Brændstofbalancerne sikrer, at hele det oplyste brændstofsalg ligger til grund for emissionsopgørelserne. I henhold til IPCC's retningslinjer fratækkes energiforbruget for skibstrafikken mellem Danmark og Grønland/Færøerne ENS totalen for international søtransport og overføres til den nationale del af opgørelserne.

Emissioner fra vejtrafik

Set i forhold til landets samlede emissionstotal beregnes vejtrafikkens største emissionsandele for NO_x, CO, CO₂, NMVOC, TSP, PM_{2.5} og PM₁₀. Procentandelene for disse stoffer ligger på hhv. 34, 27, 26, 15, 10, 10 og 9. Emissionsandelene for NH₃, N₂O, CH₄ og SO₂ er små og ligger på hhv. 1.9, 2.0, 0.2 og 0.5 %

De beregnede emissionsændringer fra 1990-2010 er på hhv. 30, -74 og 29 % for CO₂ (og energiforbrug), CH₄ og N₂O. For NO_x, NMVOC, CO og partikler (kun udstødning: < PM_{2.5}), er de beregnede ændringer på hhv. --52, -84, -81 og -65 % i perioden 1985-2010.

De mest markante emissionsændringer fra 1985 til 2010 sker for SO₂ og NH₃. SO₂-emissionerne falder med 99 % (pga. et lavere svovlindhold i diesel), hvorimod NH₃-emissionerne stiger med 2232 % (pga. indførelsen af katalysatorbiler).

Tabel 0.2 Emissioner fra vejtrafik i 2010, ændringer fra 1985 (1990⁴) til 2010, og 2010 andele af den samlede danske emissionstotal.

CRF ID	SO ₂ [tons]	NO _x [tons]	NMVOC [tons]	CH ₄ [tons]	CO [tons]	CO ₂ [ktons]	N ₂ O [tons]	NH ₃ [tons]	TSP [tons]	PM ₁₀ [tons]	PM _{2,5} [tons]
Vej (1A3b)	76	44159	12514	644	105972	12108	385	1433	1513	1513	1513
Vej, slidrelateret	0	0	0	0	0	0	0	0	2482	1604	868
Total Vej	76	44159	12514	644	105972	12108	385	1433	3995	3117	2382
Total national	14038	128772	86158	263537	399352	46602	19055	74583	40106	31723	25695
Vej- % af national, 2010	0,5	34	15	0,2	27	26	2,0	1,9	10	10	9,3
Vej- % ændring 1985-2010	-99	-52	-84	-74 ¹	-81	30 ¹	29 ¹	2232	-65 ⁵	-65 ²	-65 ²

Partikelemissionerne fra vejtrafikkens udstødning kommer næsten udelukkende fra dieselmotorer. De største emissionskilder er personbiler, fulgt af varebiler og tunge køretøjer. Emissionerne fra varebiler og tunge køretøjer er faldet markant siden midten af 1990'erne pga. gradvist skærpede emissionsnormer, mens den miljømæssige fordel ved at indføre dieselpersonbiler med lavere partikelemissioner, siden 1990, mere end opvejes af de senere års stigende dieselpersonbilsalg.

Emissionsudviklingen for partikler fra dæk-, bremse-, og vejslid følger trafikkens generelle vækst. I forhold til vejtrafikkens samlede emissioner var TSP, PM₁₀ og PM_{2,5} emissionsandelene i 2010 på hhv. 62, 51 og 36 %. De slidrelaterede partikelemissioner bliver mere og mere vigtige, i takt med at emissionerne fra udstødning falder år efter år.

Historisk set har benzinpribilernes emissionsbidrag domineret totalerne for NO_x, og specielt NMVOC og CO. Emissionerne for benzinpribiler er dog faldet en del i årene efter at katalysatorteknologien blev indført i 1990. En negativ sideeffekt af brugen af katalysatorer er, at N₂O-emissionerne er steget i samme periode. Faldet i NO-, NMVOC- og CO-emissionerne forstærkes yderligere af de gradvist skærpede Euro-emissionsnormer for alle andre køretøjskategorier.

Emissioner fra andre mobile kilder

Andre mobile kilders NO_x, CO, SO₂, NMVOC og CO₂-emissioner udgjorde i 2010 hhv. 33, 33, 14, 13 og 9 % af landets total. I 2010 er emissionsandelene for TSP, PM₁₀ og PM_{2,5} hhv. 5, 7 og 8 %, mens andelene for N₂O, NH₃ og CH₄ kun er på 1 % eller mindre.

Fra 1990-2010 beregnes emissionsændringer for CO₂ (og energiforbrug), CH₄ og N₂O på hhv. -2, 5 og -1 %. Fra 1985-2010 falder emissionerne for SO₂, partikler (alle størrelsesfraktioner), NO_x, NMVOC og CO med hhv. 88, 65, 17, 28 og 2 %.

⁴ For drivhusgasserne CO₂, CH₄ og N₂O er ændringerne ift. 1990.

⁵ Kun partikler fra udstødning.

Tabel 0.3 Emissioner fra andre mobile kilder i 2010, ændringer fra 1985 (1990⁶) til 2010, og 2010 andele af den samlede danske emissionstotal.

CRF ID	SO ₂ [tons]	NO _x [tons]	NMVOC [tons]	CH ₄ [tons]	CO [tons]	CO ₂ [ktons]	N ₂ O [tons]	NH ₃ [tons]	TSP [tons]	PM ₁₀ [tons]	PM _{2,5} [tons]
Industri, arbejdsredskaber (1A2f)	31	8540	1173	37	6446	1037	44	3	686	686	686
Civil luftfart (1A3a)	50	623	109	4	688	156	8	0	3	3	3
Jernbane (1A3c)	2	2818	189	7	481	242	7	1	95	95	95
National søfart (1A3d)	1440	9582	937	35	5841	593	35	0	307	305	304
Handel og service	1	217	4423	160	72338	173	3	0	67	67	67
Have-hushold (1A4b)	0	87	2032	65	25616	63	1	0	14	14	14
Landbrug/skovbrug/fiskeri (1A4c)	404	20770	2374	113	19380	1865	91	4	957	955	954
Militær (1A5)	20	438	41	4	309	107	4	0	9	9	9
Total andre mobile	1947	43075	11279	425	131100	4235	192	8	2138	2135	2133
Total national	14038	128772	86158	263537	399352	46602	19055	74583	40106	31723	25695
Andre mobile - % af national, 2010	14	33	13	0,2	33	9,1	1,0	0,0	5,3	6,7	8,3
Andre mobile - %-ændring 1985-2010	-88	-17	-28	5 ³	-2	-2 ³	-1 ³	17	-65	-65	-65

De største emissionskilder for NO_x og partikler er dieselmotorer, der bruges indenfor landbrug/skovbrug/fiskeri, efterfulgt af industri og nationalt søfart. Den største del af NMVOC- og CO-emissionerne kommer fra benzin-drevne arbejdsredskaber og maskiner indenfor handel og service og have- og hushold.

Tungmetaller

Tungmetalemisioner beregnes for brændstofforbrug og motorolie samt for dæk-, bremse- og vejslid. For tungmetaller følger emissionerne udviklingen i energiforbruget. I 2010 er vejtraffikkens emissionsandele af de nationale totaler for kobber (Cu), zink (Zn), bly (Pb), cadmium (Cd) og krom (Cr) på hhv. 94, 71, 59, 22 og 21 %. For andre mobile kilder er nikkel (Ni), Arsen (As) og Pb andelene på 39, 15 and 10 %. For de øvrige komponenter er emissionsandelene på mindre end 6 %.

For vejtrafik beregnes de største udstødningsrelaterede emissionsandele (% af national total) for Zn (19 %), Cd (19 %) og Cr (10 %). De slidrelaterede emissionsandele for Cu (93 %) og Pb (58 %) kommer næsten udelukkende fra dækslid, og Zn (52 %) kommer fra bremse- og dækslid. Ni og As emissionerne fra andre mobile kilder skyldes forbruget af marin diesel og tung olie indenfor fiskeri og nationalt søfart og Pb emissionen stammer fra forbruget af flybenzin.

Overordnet set følger tungmetalemisionerne udviklingen i forbruget af brændstof og motorolie samt trafikarbejdet (for slidrelaterede emissioner). Dog har der været et fald på næsten 100 % for Pb, pga. udfasningen af bly i benzin til vejtransport frem til 1994.

PAH

PAH emissionsandelene for vejtransport og andre mobile kilder udgør 3 % eller mindre af de nationale totaler i 2010.

⁶ For drivhusgasserne CO₂, CH₄ og N₂O er ændringerne ift. 1990

Usikkerheder

I 2010 er CO₂-emissionerne de mest præcise, fulgt af CH₄, TSP, SO₂, PM₁₀, PM_{2,5}, NMVOC, NO_x, CO og N₂O-estimaterne med stigende usikkerheder. Usikkerhederne er på hhv. 5, 27, 48, 49, 51, 54, 55, 56, 60 og 152 %. I samme emissionsrækkefølge er usikkerheden på emissionsudviklingen fra 1990 til 2010 på hhv. 6, 5, 6, 3, 4, 3, 9, 11, 16 og 54 %. For NH₃, tungmetaller og PAH er 2010-emissionerne bestemt med en usikkerhed på mellem 700 og 1000 %. Her er usikkerheden på 1990-2010 emissionsudviklingen signifikant lavere, men varierer dog meget fra stof til stof.

1 Introduction

The Danish atmospheric emission inventories are prepared on an annual basis and the results are reported to the *UN Framework Convention on Climate Change* (UNFCCC or Climate Convention) and to the UNECE LRTAP (United Nations Economic Commission for Europe Long Range Transboundary Pollution) convention. Furthermore, the greenhouse gas emission inventory is reported to the EU, because the EU – as well as the individual member states – is party to the Climate Convention. The Danish atmospheric emission inventories are prepared by the Department of Environmental Science (ENVS)/Danish Centre for Environment and Energy (DCE), Aarhus University (former: the Danish National Environmental Research Institute (NERI)).

This report documents the Danish emission inventories for road transport and other mobile sources in the sectors military, railways, navigation, fisheries, civil aviation and non-road machinery in agriculture, forestry, industry and household/gardening.

In Chapter 2 an overview of the Danish emissions in 2010, the UNFCCC and UNECE conventions and the Danish emission reduction targets is provided. A brief overview of the inventory structure is given in Chapter 3. In Chapter 4 and 5, the inventory input data and calculation methods are shown for road transport and other mobile sources, respectively, while fuel use data and emission results are provided in Chapters 4 and 5, respectively. Fuel consumption and emission results are described in Chapter 6, whereas uncertainties and time-series inconsistencies are explained in Chapters 7.

2 Total Danish emissions, international conventions and reduction targets

2.1 Total Danish emissions

The total Danish emissions in 2010 are listed in the Tables 2.1-2.4. A thorough documentation of the Danish inventory can be seen in Nielsen et al (2012a) for greenhouse gases reported to the UNFCCC convention, and in Nielsen et al. (2012b) for the remaining emission components reported to the LRTAP Convention. The emission reports are organised in six main source categories and a number of sub categories. The emission source 1 *Energy* covers combustion in stationary and mobile sources as well as fugitive emissions from the energy sector.

Links to the latest emission inventories can be found on the ENVS/DCE home page <http://www.dmu.dk/luft/emissioner/emissioninventory/>. Information of the individual Danish inventory sectors, documentation reports of targeted emission surveys and updated emission factors are also available on the ENVS/DCE homepage.

Note that according to convention decisions the emissions from international transport as well as CO₂ emissions from renewable fuels are not included in the inventory emission totals. Although estimated, these emissions are reported as memo items only.

Further emission data for mobile sources are provided in Chapter 6.

Table 2.1 Greenhouse gas emissions 2010 reported to the UNFCCC convention.

	CH ₄ [Mg]	CO ₂ [Gg]	N ₂ O [Mg]
1. Energy	25 602	47 872	1 225
2. Industrial Processes		833	
3. Solvent and Other Product Use		62	46
4. Agriculture	197 444		17 334
5. Land-Use Change and Forestry	1	-2 184	41
6. Waste	40 491	18	409
National total	263 537	46 602	19 055
International transport (air) ⁷	39	2 421	83
International transport (sea)	51	2 073	130

⁷ Emissions for international aviation reported to the UNFCCC convention comprise the emissions from international LTO and cruise, c.f. Chapter 3.

Table 2.2 Emissions 2010 reported to the LRTAP Convention.

	SO ₂ [Mg]	NO _x [Mg]	NMVOC [Mg]	CO [Mg]	NH ₃ [Mg]	TSP [Mg]	PM ₁₀ [Mg]	PM _{2,5} [Mg]
1. Energy	13 415	128 564		52 065	393 537	1 647	27 952	25 451
2. Industrial Processes		11	21		4 971	239	523	222
3. Solvent and Other Product Use		40	41		26 784	2 279	36	355
4. Agriculture		11	89		2 160	2 173	71 760	11 566
5. Land-Use Change and Forestry								
6. Waste		561	57		178	1 124	616	11
National total	14 038	128 772		86 158	399 352	74 583	40 106	31 723
International transport (air) ⁸		743	9 567		294	1 167		37
International transport (sea)		8 262	51 332		1 636	5 397		940
								931
								926

Table 2.3 Heavy metal emissions 2010 reported to the LRTAP Convention.

Pollutant	As [kg]	Cd [kg]	Cr [kg]	Cu [kg]	Hg [kg]	Ni [kg]	Pb [kg]	Se [kg]	Zn [kg]
1. Energy	274	173	619	47 464	377	4 388	9 989	1 375	34 350
2. Industrial Processes	13	13	47	59	14	86	472	191	1 097
3. Solvent and Other Product Use	9	4	205	2 410	1	164	43	6	1 540
4. Agriculture	2	2	8	0	0	7	32	1	1
5. Land-Use Change and Forestry									
6. Waste	0	0	1	4	47	1	131	1	520
Total Danish emission	299	192	880	49 937	440	4 646	10 666	1 574	37 508
International transport (sea, air)	206	14	88	206	21	11 614	104	208	481

Table 2.4 PAH emissions 2010 reported to the LRTAP Convention.

Pollutant	Benzo(a)-pyrene kg	Benzo(b)fluoranthene kg	Benzo(k)fluoranthene kg	Indeno(1,2,3-c,d)pyrene kg	
1. Energy	4 741		4 902		2 796
2. Industrial Processes	0		1		1
3. Solvent and Other Product Use	1		0		0
4. Agriculture		103		101	40
5. Land-Use Change and Forestry					
6. Waste	56		68		55
Total Danish emission	4 901		5 072		2 891
International transport (sea, air)	3		10		5
					17

2.2 International conventions and reduction targets

Denmark is a party to two international conventions and two EU directives with regard to emissions from road transport and other mobile sources:

The UNECE Convention on Long Range Transboundary Air Pollution (LRTAP Convention or the Geneva Convention)

The National Emission Ceilings Directive (NECD)

The UN Framework Convention on Climate Change (UNFCCC)

The EU Monitoring Mechanism Decision

⁸ Emissions for international aviation reported to the LRTAP convention comprise the emissions from domestic and international LTO, c.f. Chapter 3.

The LRTAP Convention is a framework convention and has been expanded to cover eight protocols:

EMEP Protocol, 1984 (Geneva).

Protocol on Reduction of Sulphur Emissions, 1985 (Helsinki).

Protocol concerning the Control of Emissions of Nitrogen Oxides, 1988 (Sofia).

Protocol concerning the Control of Emissions of Volatile Organic Compounds, 1991 (Geneva).

Protocol on Further Reduction of Sulphur Emissions, 1994 (Oslo).

Protocol on Heavy Metals, 1988 (Aarhus).

Protocol on Persistent Organic Pollutants (POPs), 1998 (Aarhus).

Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, 1999 (Gothenburg).

The reduction targets/emission ceilings included in the Gothenburg protocol (in brackets) are valid for 2010 and the following pollutants: SO₂ (55 Gg), NO_x (127 Gg), NMVOC (85 Gg) and NH₃ (69 Gg).

Further, in the EU NECD ("The National Emission Ceilings Directive) the national emission ceilings given in the Gothenburg protocol, has been implemented.

The UN Framework Convention on Climate Change (UNFCCC) - also called the Climate Convention - is a framework convention from 1992. The Kyoto protocol is a protocol to the Climate Convention.

The Kyoto protocol sets legally binding emission targets and time-tables for six greenhouse gases: CO₂, CH₄, N₂O, HFC, PFC and SF₆. The greenhouse gas emission of each of the six pollutants is combined to CO₂ equivalents, which can be summed up to produce total greenhouse gas (GHG) emissions in CO₂ equivalents. Denmark is obliged to reduce the average 2008-2012 GHG emissions by 21 % compared to the 1990 emission level.

EU is a party to the Climate Convention and, thereby, EU member countries are obliged to submit emission data to the EU Monitoring Mechanism Decision for CO₂ and other Greenhouse Gases.

3 Inventory structure

In the Danish emission database, all activity rates and emissions are defined in SNAP sector categories (Selected Nomenclature for Air Pollution), according to the CollectER system. The emission inventories are prepared from a complete emission database based on the SNAP sectors.

For mobile sources, the aggregation of emission results into the formats used by the UNFCCC and UNECE Conventions is made by using the code correspondence information shown in Table 3.1. In the case of mobile sources, the CRF (Common Reporting Format) and NFR (National Format for Reporting) used by the UNFCCC and UNECE Conventions, respectively, are similar.

Table 3.20 SNAP – CRF/NFR correspondence table for transport.

SNAP classification	CRF/NFR classification
07 Road transport	1A3b Transport-Road
0801 Military	1A5 Other
0802 Railways	1A3c Railways
0803 Inland waterways	1A3d Transport-Navigation
080402 National sea traffic	1A3d Transport-Navigation
080403 National fishing	1A4c Agriculture/forestry/fisheries
080404 International sea traffic	1A3d Transport-Navigation (international)
080501 Dom. airport traffic (LTO < 1000 m)	1A3a Transport-Civil aviation
080502 Int. airport traffic (LTO < 1000 m)	1A3a Transport-Civil aviation (international)
080503 Dom. cruise traffic (> 1000 m)	1A3a Transport-Civil aviation
080504 Int. cruise traffic (> 1000 m)	1A3a Transport-Civil aviation (international)
0806 Agriculture	1A4c Agriculture/forestry/fisheries
0807 Forestry	1A4c Agriculture/forestry/fisheries
0808 Industry	1A2f Industry-Other
0809 Household and gardening	1A4b Residential
0811 Commercial and institutional	1A4a Commercial and institutional

Military transport activities (land and air) refer to the CRF/NFR sector Other (1A5), while the Transport-Navigation sector (1A3d) comprises national sea transport (ship movements between two Danish ports) and recreational craft (SNAP code 0803).

For aviation, LTO (Landing and Take Off)⁹ refers to the part of flying, which is below 1000 m. This part of the aviation emissions (SNAP codes 080501 and 080502) are included in the national emissions total as prescribed by the UNECE reporting rules. According to UNFCCC the national emissions for aviation comprise the emissions from domestic LTO (0805010) and domestic cruise (080503) and flights between Denmark and Greenland or the Faroe Islands are regarded as domestic flights. The fuel consumption and emission development explained in the following are based on these latter results, in order to be consistent with the Danish NIR report.

The working machinery and equipment in industry (SNAP code 0808) is grouped in Industry-Other (1A2f), while agricultural and forestry non-road

⁹ A LTO cycle consists of the flying modes approach/descent, taxiing, take off and climb out. In principle the actual times-in-modes rely on the actual traffic circumstances, the airport configuration, and the aircraft type in question.

machinery (SNAP codes 0806 and 0807) is accounted for in the Agriculture/forestry/fisheries (1A4c) sector together with fishing activities.

For mobile sources, internal database models for road transport, air traffic, sea transport and non road machinery have been set up at Department of Environmental Science (ENVS)/Danish Centre for Environment and Energy (DCE), Aarhus University (former NERI), in order to produce the emission inventories. The output results from the DCE models are calculated in a SNAP format, as activity rates (fuel consumption) and emission factors, which are then exported directly to the central Danish CollectER database.

Apart from national inventories, the DCE models are used also as a calculation tool in research projects, environmental impact assessment studies, and to produce basic emission information which requiring various aggregation levels.

4 Input data and calculation methods for road transport

For road transport, the detailed methodology is used to make annual estimates of the Danish emissions, as described in the EMEP/EEA Air Pollutant Emission Inventory Guidebook (EMEP/EEA, 2009). The actual calculations are made with a model developed by DCE, using the European COPERT IV model methodology explained by (EMEP/EEA, 2009). In COPERT, fuel consumption and emission simulations can be made for operationally hot engines, taking into account gradually stricter emission standards and emission degradation due to catalyst wear. Furthermore, the emission effects of cold-start and evaporation are simulated.

4.1 Vehicle fleet and mileage data

Corresponding to the COPERT IV fleet classification, all present and future vehicles in the Danish fleet are grouped into vehicle classes, sub-classes and layers. The layer classification is a further division of vehicle sub-classes into groups of vehicles with the same average fuel consumption and emission behaviour, according to EU emission legislation levels. Table 4.1 provides an overview of the different model classes and sub-classes, and the layer level with implementation years are shown in Annex 1.

Table 4.1 Model vehicle classes and sub-classes and trip speeds.

Vehicle classes	Fuel type	Engine size/weight	Trip speed [km pr h]		
			Urban	Rural	Highway
PC	Gasoline	< 1.4 l.	40	70	100
PC	Gasoline	1.4 - 2 l.	40	70	100
PC	Gasoline	> 2 l.	40	70	100
PC	Diesel	< 2 l.	40	70	100
PC	Diesel	> 2 l.	40	70	100
PC	LPG		40	70	100
PC	2-stroke		40	70	100
LDV	Gasoline		40	65	80
LDV	Diesel		40	65	80
LDV	LPG		40	65	80
Trucks	Gasoline		35	60	80
Trucks	Diesel	Rigid 3.5 - 7,5t	35	60	80
Trucks	Diesel	Rigid 7,5 - 12t	35	60	80
Trucks	Diesel	Rigid 12 - 14 t	35	60	80
Trucks	Diesel	Rigid 14 - 20t	35	60	80
Trucks	Diesel	Rigid 20 - 26t	35	60	80
Trucks	Diesel	Rigid 26 - 28t	35	60	80
Trucks	Diesel	Rigid 28 - 32t	35	60	80
Trucks	Diesel	Rigid >32t	35	60	80
Trucks	Diesel	TT/AT 14 - 20t	35	60	80
Trucks	Diesel	TT/AT 20 - 28t	35	60	80
Trucks	Diesel	TT/AT 28 - 34t	35	60	80
Trucks	Diesel	TT/AT 34 - 40t	35	60	80
Trucks	Diesel	TT/AT 40 - 50t	35	60	80
Trucks	Diesel	TT/AT 50 - 60t	35	60	80
Trucks	Diesel	TT/AT >60t	35	60	80
Urban buses	Gasoline		30	50	70
Urban buses	Diesel	< 15 tonnes	30	50	70
Urban buses	Diesel	15-18 tonnes	30	50	70
Urban buses	Diesel	> 18 tonnes	30	50	70
Coaches	Gasoline		35	60	80
Coaches	Diesel	< 15 tonnes	35	60	80
Coaches	Diesel	15-18 tonnes	35	60	80
Coaches	Diesel	> 18 tonnes	35	60	80
Mopeds	Gasoline		30	30	-
Motorcycles	Gasoline	2 stroke	40	70	100
Motorcycles	Gasoline	< 250 cc.	40	70	100
Motorcycles	Gasoline	250 - 750 cc.	40	70	100
Motorcycles	Gasoline	> 750 cc.	40	70	100

To support the emission calculations a project has been carried out by DTU Transport, in order to provide fleet and annual mileage data for the vehicle categories present in COPERT IV (Jensen and Kveiborg, 2011). The latter source also provides information of the mileage split between urban, rural and highway driving. The respective average speeds come from The Danish Road Directorate (Ekman, 2005). Additional data for the moped fleet and motorcycle fleet disaggregation information is given by The National Motorcycle Association (Markamp, 2011).

In addition data from a survey made by the Danish Road Directorate (Hansen, 2010) has information on the total mileage driven by foreign trucks on Danish roads in 2009. This mileage contribution has been added to the total mileage for Danish trucks on Danish roads, for trucks > 16 tonnes of gross vehicle weight. The data has been further processed by DTU Transport; by using appropriate assumptions, the mileages have been backcasted to 1985 and forecasted to 2010.

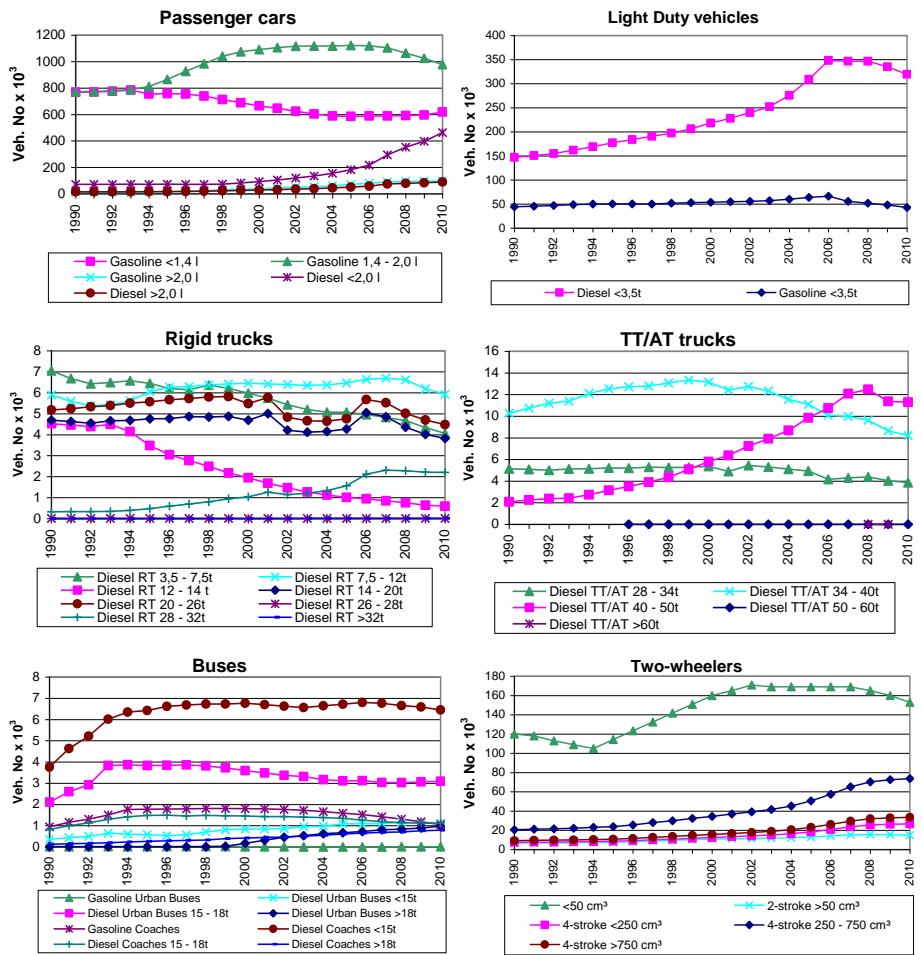


Figure 4.1 Number of vehicles in sub-classes in 1990-2010.

For passenger cars, the engine size differentiation is less certain for the years before 2005. The increase in the total number of passenger cars is mostly due to a growth in the number of gasoline cars with engine sizes between 1.4 and 2 litres (from 1990-2002) and an increase in the number of gasoline cars (>2 litres) and diesel cars (< 2 litres). Until 2005, there was a decrease in the number of cars with an engine size smaller than 1.4 litres.

There was a considerable growth in the number of diesel light-duty vehicles from 1985 to 2006, the number of vehicles has however decreased somewhat after 2006.

For the truck-trailer and articulated truck combinations there is a tendency towards the use of increasingly larger trucks throughout the time period. The decline in fleet numbers for many of the truck categories in 2007/2008 and until 2009, was caused by the impact of the global financial crisis and the reflagging of Danish commercial trucks to companies based in the neighbouring countries.

The number of urban buses was almost constant between 1985 and 2008. The sudden change in the level of coach numbers from 1994 to 1995 is due to uncertain fleet data.

The reason for the significant growth in the number of mopeds from 1994 to 2002 is the introduction of the so-called Moped 45 vehicle type. For motorcycles, the number of vehicles grew in general throughout the entire 1985-2010

period. The increase is, however, most visible from the mid-1990s and onwards.

The vehicle numbers are summed up in EU emission layers for each year (Figure 4.2) by using the correspondence between layers and first year of registration:

$$N_{j,y} = \sum_{i=FYear(j)}^{LYear(j)} N_{i,y} \quad (1)$$

Where N = number of vehicles, j = layer, y = year, i = first year of registration.

Weighted annual mileages pr layer are calculated as the sum of all mileage driven pr first registration year divided by the total number of vehicles in the specific layer.

$$M_{j,y} = \frac{\sum_{i=FYear(j)}^{LYear(j)} N_{i,y} \cdot M_{i,y}}{\sum_{i=FYear(j)}^{LYear(j)} N_{i,y}} \quad (2)$$

Since 2006 economical incentives were targeted at private vehicle owners to encourage them to buy Euro 5 diesel passenger cars and vans in order to bring down the particulate emissions from diesel vehicles. The estimated sales between 2006 and 2010 have been examined by the Danish EPA and are included in the fleet data behind the Danish inventory (Winther, 2011).

For heavy duty trucks, there is a slight deviation from the strict correspondence between EU emission layers and first registration year. In this case, specific Euro class information for most of the vehicles from 2001 onwards is incorporated into the fleet and mileage data model developed by Jensen and Kveiborg (2011). For inventory years before 2001, and for vehicles with no Euro information the normal correspondence between layers and first year of registration is used.

Vehicle numbers and weighted annual mileages pr layer are shown in Annex 1 and 2 for 1990-2010. The trends in vehicle numbers pr layer are also shown in Figure 4.2. The latter figure shows how vehicles complying with the gradually stricter EU emission levels (EURO I, II, III etc.) have been introduced into the Danish motor fleet.

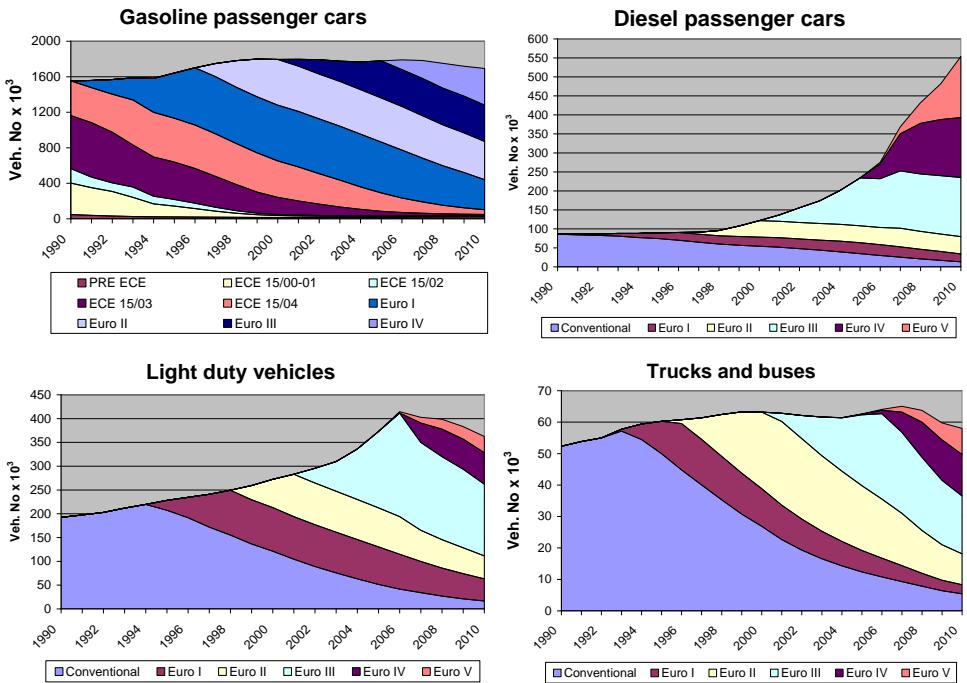


Figure 4.2 Layer distribution of vehicle numbers pr vehicle type in 1990-2010.

4.2 Emission legislation

The EU 443/2009 regulation sets new emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO₂ emissions from light-duty vehicles. Some key elements of the adopted text are as follows:

- **Limit value curve:** the fleet average to be achieved by all cars registered in the EU is 130 gram CO₂ pr kilometre (g pr km). A so-called limit value curve implies that heavier cars are allowed higher emissions than lighter cars while preserving the overall fleet average.
- **Further reduction:** A further reduction of 10 g CO₂ pr km, or equivalent if technically necessary, will be delivered by other technological improvements and by an increased use of sustainable biofuels.
- **Phasing-in of requirements:** in 2012, 65% of each manufacturer's newly registered cars must comply on average with the limit value curve set by the legislation. This will rise to 75% in 2013, 80% in 2014, and 100% from 2015 onwards.
- **Lower penalty payments for small excess emissions until 2018:** If the average CO₂ emissions of a manufacturer's fleet exceed its limit value in any year from 2012, the manufacturer has to pay an excess emissions premium for each car registered. This premium amounts to €5 for the first g pr km of exceedance, €15 for the second g pr km, €25 for the third g pr km, and €95 for each subsequent g pr km. From 2019, already the first g pr km of exceedance will cost €95.
- **Long-term target:** a target of 95g CO₂ pr km is specified for the year 2020. The modalities for reaching this target and the aspects of its implementation including the excess emissions premium will have to be defined in a review to be completed no later than the beginning of 2013.
- **Eco-innovations:** because the test procedure used for vehicle type approval is outdated, certain innovative technologies cannot demonstrate their CO₂-reducing effects under the type approval test. As an interim

procedure until the test procedure is reviewed by 2014, manufacturers can be granted a maximum of 7g pr km of emission credits on average for their fleet if they equip vehicles with innovative technologies, based on independently verified data.

The EU 510/2011 regulation sets new emission performance standards for new light commercial vehicles (vans). Some key elements of the regulation are as follows:

- **Target dates:** The EU fleet average of 175 g CO₂/km will be phased in between 2014 and 2017. In 2014 an average of 70 % of each manufacturer's newly registered vans must comply with the limit value curve set by the legislation. This proportion will rise to 75% in 2015, 80% in 2016, and 100% from 2017 onwards.
- **Limit value curve:** emissions limits are set according to the mass of vehicle, using a limit value curve. The curve is set in such a way that a fleet average of 175 grams of CO₂ pr kilometre is achieved. A so-called limit value curve of 100% implies that heavier vans are allowed higher emissions than lighter vans while preserving the overall fleet average. Only the fleet average is regulated, so manufacturers will still be able to make vehicles with emissions above the limit value curve provided these are balanced by other vehicles which are below the curve.
- **Vehicles affected:** the vehicles affected by the legislation are vans, which account for around 12% of the market for light-duty vehicles. This includes vehicles used to carry goods weighing up to 3.5t (vans and car-derived vans, known as N1) and which weigh less than 2610 kg when empty.
- **Long-term target:** A target of 147g CO₂/km is specified for the year 2020. This needs to be confirmed in a review of the vans Regulation, based on an updated assessment of its costs and benefits that is to be completed no later than the beginning of 2013. The modalities for reaching this target and aspects of its implementation, including the excess emissions premium, will also be defined as part of the review.
- **Excess emissions premium for small excess emissions until 2018:** If the average CO₂ emissions of a manufacturer's fleet exceed its limit value in any year from 2014, the manufacturer has to pay an excess emissions premium for each van registered. This premium amounts to €5 for the first g/km of exceedance, €15 for the second g/km, €25 for the third g/km, and €95 for each subsequent g/km. From 2019, the first g/km of exceedance will cost €95. This value is equivalent to the premium for passenger cars.
- **Super-credits:** vehicles with extremely low emissions (below 50g pr km) will be given additional incentives whereby each low-emitting van will be counted as 3.5 vehicles in 2014 and 2015, 2.5 in 2016 and 1.5 vehicles in 2017
- **Eco-innovations:** because the test procedure used for vehicle type approval is outdated, certain innovative technologies cannot demonstrate their CO₂-reducing effects under the type approval test. As an interim procedure until the test procedure is reviewed by 2014, manufacturers can be granted a maximum of 7g pr km of emission credits on average for their fleet if they equip vehicles with innovative technologies, based on independently verified data.
- **Other flexibilities:** manufacturers may group together to form a pool and act jointly in meeting the specific emissions targets. Independent manufacturers who sell fewer than 22,000 vehicles pr year can also apply to the Commission for an individual target instead.

For Euro 1-4 passenger cars and light duty trucks, the chassis dynamometer test cycle used in the EU for measuring fuel is the NEDC (New European Driving Cycle), see Nørgaard and Hansen (2004). The test cycle is also used also for emissions testing. The NEDC cycle consists of two parts, the first part being a 4-time repetition (driving length: 4 km) of the ECE test cycle. The latter test cycle is the so-called urban driving cycle¹⁰ (average speed: 19 km pr h). The second part of the test is the run-through of the EUDC (Extra Urban Driving Cycle) test driving segment, simulating the fuel consumption under rural and highway driving conditions. The driving length of EUDC is seven km at an average speed of 63 km pr h. More information regarding the fuel measurement procedure can be found in the EU-directive 80/1268/EØF.

For NO_x, VOC (NMVOC + CH₄), CO and PM, the emissions from road transport vehicles have to comply with the different EU directives listed in Table 4.2. The emission directives distinguish between three vehicle classes according to vehicle reference mass¹¹: Passenger cars and light duty trucks (<1305 kg), light duty trucks (1305-1760 kg) and light duty trucks (>1760 kg). The specific emission limits are shown in Annex 3.

¹⁰ For Euro 3 and on, the emission approval test procedure was slightly changed. The 40 s engine warm up phase before start of the urban driving cycle was removed.

¹¹ Reference mass: net vehicle weight + mass of fuel and other liquids + 100 kg.

Table 4.2 Overview of the existing EU emission directives for road transport vehicles.

Vehicle category	Emission layer	EU directive	First reg. date
Passenger cars (gasoline)	PRE ECE	-	-
	ECE 15/00-01	70/220 - 74/290	1972 ^a
	ECE 15/02	77/102	1981 ^b
	ECE 15/03	78/665	1982 ^c
	ECE 15/04	83/351	1987 ^d
	Euro I	91/441	1.10.1990 ^e
	Euro II	94/12	1.1.1997
	Euro III	98/69	1.1.2001
	Euro IV	98/69	1.1.2006
	Euro V	715/2007	1.1.2011
	Euro VI	715/2007	1.9.2015
Passenger cars (diesel and LPG)	Conventional	-	-
	ECE 15/04	83/351	1987 ^d
	Euro I	91/441	1.10.1990 ^e
	Euro II	94/12	1.1.1997
	Euro III	98/69	1.1.2001
	Euro IV	98/69	1.1.2006
	Euro V	715/2007	1.1.2011
	Euro VI	715/2007	1.9.2015
Light duty trucks (gasoline and diesel)	Conventional	-	-
	ECE 15/00-01	70/220 - 74/290	1972 ^a
	ECE 15/02	77/102	1981 ^b
	ECE 15/03	78/665	1982 ^c
	ECE 15/04	83/351	1987 ^d
	Euro I	93/59	1.10.1994
	Euro II	96/69	1.10.1998
	Euro III	98/69	1.1.2002
	Euro IV	98/69	1.1.2007
	Euro V	715/2007	1.1.2012
	Euro VI	715/2007	1.9.2016
Heavy duty vehicles	Euro 0	88/77	1.10.1990
	Euro I	91/542	1.10.1993
	Euro II	91/542	1.10.1996
	Euro III	1999/96	1.10.2001
	Euro IV	1999/96	1.10.2006
	Euro V	1999/96	1.10.2009
	Euro VI	595/2009	1.10.2013
Mopeds	Conventional	-	-
	Euro I	97/24	2000
	Euro II	2002/51	2004
Motor cycles	Conventional	-	-
	Euro I	97/24	2000
	Euro II	2002/51	2004
	Euro III	2002/51	2007

a,b,c,d: Expert judgement suggest that Danish vehicles enter into the traffic before EU directive first registration dates. The effective inventory starting years are a: 1970; b: 1979; c: 1981; d: 1986.

e: The directive came into force in Denmark in 1991 (EU starting year: 1993).

In practice, the emissions from vehicles in traffic are different from the legislation limit values and, therefore, the latter figures are considered to be too inaccurate for total emission calculations. A major constraint is that the

emission approval test conditions reflect only to a small degree the large variety of emission influencing factors in the real traffic situation, such as cumulated mileage driven, engine and exhaust after treatment maintenance levels and driving behaviour.

Therefore, in order to represent the Danish fleet and to support average national emission estimates, emission factors must be chosen, which derive from numerous emissions measurements, using a broad range of real world driving patterns and a sufficient number of test vehicles. It is similarly important to have separate fuel consumption and emission data for cold-start emission calculations and gasoline evaporation (hydrocarbons).

For heavy-duty vehicles (trucks and buses), the emission limits are given in g pr kWh and the measurements are carried out for engines in a test bench, using the EU ESC (European Stationary Cycle) and ETC (European Transient Cycle) test cycles, depending on the Euro norm and exhaust gas after-treatment system installed. A description of the test cycles is given by Nørgaard and Hansen, 2004). Measurement results in g pr kWh from emission approval tests cannot be directly used for inventory work. Instead, emission factors used for national estimates must be transformed into g pr km, and derived from a sufficient number of measurements, which represent the different vehicle size classes, Euro engine levels and real world variations in driving behaviour.

4.3 Fuel consumption and emission factors

Trip-speed dependent basis factors for fuel consumption and emissions are taken from the COPERT model using trip speeds as shown in Table 4.1. The factors are listed in Annex 4. For EU emission levels not represented by actual data, the emission factors are scaled according to the reduction factors given in Annex 5.

The fuel consumption and emission factors used in the Danish inventory come from the COPERT IV model. The source for these data is various European measurement programmes. In general the COPERT data are transformed into trip-speed dependent fuel consumption and emission factors for all vehicle categories and layers.

For passenger cars, real measurement results are behind the emission factors for Euro 1-4 vehicles, and those earlier. For light duty trucks the measurements represent Euro 1 and prior vehicle technologies. For mopeds and motorcycles, updated fuel consumption and emission figures are behind the conventional and Euro 1-3 technologies. For heavy-duty trucks and buses the experimental basis is computer simulated emission factors for Euro 0-V engines.

4.3.1 Adjustment for fuel efficient vehicles

In order to account for the trend towards more fuel efficient vehicles being sold in Denmark in the later years, fuel consumption factors for Euro 5 and Euro 6 passenger cars are estimated in the following way.

An aggregated CO₂ emission factor (g per km) for new registered passenger cars in the years 2009 and 2010 have been calculated from 1) type approval fuel economy values incorporated in the DTU Transport fleet and mileage

statistics and 2) fuel specific CO₂ emission factors. The aggregated CO₂ emission factor for 2010 is used in combination with the overall EU target of 130 g CO₂ per km in 2015 and 95 g CO₂ per km in 2020 in order to calculate an interpolated time series of type approval related CO₂ emission factors for the years 2011-2014 and 2016-2019 (year specific CO₂ emission factors).

By assuming that the fuel type/engine size specific COPERT IV fuel consumption factors for Euro 4 cars relate to cars from 2009, Euro 5 and 6 COPERT corresponding factors for each fuel type/engine size combination are calculated for each year in the forecast period by multiplying the Euro 4 factor with the ratio between the year specific aggregated CO₂ emission factor and the aggregated CO₂ emission factor for 2009. The fuel specific CO₂ emission factors (g per MJ) for gasoline and diesel are finally used to transform the km related CO₂ emission factors into fuel consumption factors.

4.3.2 Adjustment for EGR, SCR and filter retrofits

In COPERT IV updated emission factors have recently been made available for Euro V heavy duty vehicles using EGR and SCR exhaust emission after-treatment systems, respectively. The estimated new sales of Euro V diesel trucks equipped with EGR and SCR during the 2006-2010 time periods has been examined by Hjelgaard and Winther (2011). These inventory fleet data are used in the Danish inventory to calculate weighted emission factors for Euro V trucks in different size categories.

During the 2000's urban environmental zones have been established in Danish cities in order to bring down the particulate emissions from diesel fuelled heavy duty vehicles. Driving in these environmental zones prescribe the use of diesel particulate filters. The Danish EPA has provided the estimated number of Euro I-III urban buses and Euro II-III trucks and tourist buses, which have been retrofitted with filters during the 2000's. These retrofit data are included in the Danish inventory by assuming that particulate emissions are lowered by 80 % compared with the emissions from the same Euro technology with no filter installed (Winther, 2011).

For all vehicle categories/technology levels not represented by measurements, the emission factors are produced by using reduction factors. The latter factors are determined by assessing the EU emission limits and the relevant emission approval test conditions, for each vehicle type and Euro class.

4.3.3 Adjustment for biofuel usage

For CO₂ the neat gasoline/diesel emission factors shown in Table 4.3 are country specific values, and come from the DEA. From 2006 and 2008, respectively, bio ethanol and biodiesel has become available from a limited number of gas filling stations in Denmark. Following the IPCC guideline definitions, bio ethanol is regarded as CO₂ neutral for the transport sector as such. The sulphur content for bio ethanol/biodiesel is assumed to be zero, and hence, the aggregated CO₂ (and SO₂) factors for gasoline/diesel have been adjusted, on the basis of the energy content of neat gasoline/diesel and bio ethanol/biodiesel, respectively, in the available fuels.

At present, the Danish road transport fuels only have low biofuel (BF) shares (Table 4.3), and hence, no thermal efficiency changes are expected for the fuels. Consequently, the energy based fuel consumption factors (MJ per km) derived from COPERT IV are used also in this case.

As a function of the current ethanol/biodiesel energy percentage, $BF\%_E$, (Table 4.3) the average fuel related CO₂ emission factors, $EF_{CO_2,E}(BF\%)$ become:

$$EF_{CO_2,E}(BF\%) = EF_{CO_2,E}(BF0) \cdot (100 - BF\%_E) \quad (3)$$

Where:

$EF_{CO_2,E}(BF\%)$ = average fuel related CO₂ emission factor (g MJ⁻¹) for current BF%

$EF_{CO_2,E}(BF0)$ = fuel related CO₂ emission factor (g MJ⁻¹) for fossil fuels

The kilometre based average CO₂ emission factor is subsequently calculated as the product of the fuel related CO₂ emission factor from equation 3 and the energy based fuel consumption factor, $FC_{CO_2,E}(BF0)$, derived from COPERT IV:

$$EF_{CO_2,km}(BF\%) = EF_{CO_2,E}(BF\%) \cdot FC_E(BF0) \quad (4)$$

A literature review carried out in the Danish research project REBECA revealed no significant changes in emission factors between neat gasoline and E5 gasoline-ethanol blends for the combustion related emission components; NO_x, CO and VOC (Winther et al., 2012). Hence, due to the current low ethanol content in today's road transport gasoline, no modifications of the neat gasoline based COPERT emission factors are made in the inventories in order to account for ethanol usage.

REBECA results published by Winther (2009) have shown that the emission impact of using diesel-biodiesel blends is very small at low biodiesel blend ratios. Until now, the biodiesel percentage content in Danish road transport diesel has been approximately zero, and consequently no bio fuel emission factor adjustments are needed for diesel vehicles as well. However, adjustment of the emission factors for diesel vehicles will be made if the biodiesel content of road transport diesel fuel increases to a more significant level in the future.

The fuel related CO₂ emission factors for neat gasoline/diesel, bio ethanol/biodiesel, and aggregated CO₂ factors are shown in Table 4.3.

Table 4.3 Fuel-specific CO₂ emission factors and biofuel shares for road transport in Denmark.

Fuel type	Emission factors (g/MJ)					
	1990-2005	2006	2007	2008	2009	2010
Neat gasoline	73	73	73	73	73	73
Neat diesel	74	74	74	74	74	74
LPG	63.1	63.1	63.1	63.1	63.1	63.1
Bio ethanol	0	0	0	0	0	0
Biodiesel	0	0	0	0	0	0
Gasoline, average	73	72.9	72.8	72.8	72.8	71.7
Diesel, average	74	74	74	74	73.9	74
Biofuel share (BF%) of Danish road transport fuels						
Fuel type	1990-2005	2006	2007	2008	2009	2010
Bio ethanol	0	0.20	0.33	0.29	0.31	1.75
Biodiesel	0	0	0	0.01	0.14	0.02

4.4 Deterioration factors

For three-way catalyst cars the emissions of NO_x, NMVOC and CO gradually increase due to catalyst wear and are, therefore, modified as a function of total mileage by the so-called deterioration factors. Even though the emission curves may be serrated for the individual vehicles, on average, the emissions from catalyst cars stabilise after a given cut-off mileage is reached due to OBD (On Board Diagnostics) and the Danish inspection and maintenance programme.

For each year, the deterioration factors are calculated pr first registration year by using deterioration coefficients and cut-off mileages, as given in EMEP/EEA (2009), for the corresponding layer. The deterioration coefficients are given for the two driving cycles: "Urban Driving Cycle" (UDF) and "Extra Urban Driving Cycle" (EUDF: urban and rural), with trip speeds of 19 and 63 km pr h, respectively.

Firstly, the deterioration factors are calculated for the corresponding trip speeds of 19 and 63 km pr h in each case determined by the total cumulated mileage less than or exceeding the cut-off mileage. The Formulas 5 and 6 show the calculations for the "Urban Driving Cycle":

$$UDF = U_A \cdot MTC + U_B, \text{ MTC} < U_{MAX} \quad (5)$$

$$UDF = U_A \cdot U_{MAX} + U_B, \text{ MTC} \geq U_{MAX} \quad (6)$$

where UDF is the urban deterioration factor, U_A and U_B the urban deterioration coefficients, MTC = total cumulated mileage and U_{MAX} urban cut-off mileage.

In the case of trip speeds below 19 km pr h the deterioration factor, DF, equals UDF, whereas for trip speeds exceeding 63 km pr h, DF=EUDF. For trip speeds between 19 and 63 km pr h the deterioration factor, DF, is found as an interpolation between UDF and EUDF. Secondly, the deterioration factors, one for each of the three road types, are aggregated into layers by taking into account vehicle numbers and annual mileage levels pr first registration year:

$$DF_{j,y} = \frac{\sum_{i=FYear(j)}^{LYear(j)} DF_{i,y} \cdot N_{i,y} \cdot M_{i,y}}{\sum_{i=FYear(j)}^{LYear(j)} DF_{i,y} \cdot N_{i,y}} \quad (7)$$

where DF is the deterioration factor.

For N₂O and NH₃, COPERT IV takes into account deterioration as a linear function of mileage for gasoline fuelled EURO 1-4 passenger cars and light duty vehicles. The level of emission deterioration also relies on the content of sulphur in the fuel. The deterioration coefficients are given in EMEP/EEA (2009), for the corresponding layer. A cut-off mileage of 120 000 km (pers. comm. Leonidas Ntziachristos, University of Thessaloniki, 2007) is behind the calculation of the modified emission factors, and for the Danish situation the low sulphur level interval is assumed to be the most representative.

4.5 Calculation method

4.5.1 Emissions and fuel consumption for hot engines

Emissions and fuel consumption results for operationally hot engines are calculated for each year and for layer and road type. The procedure is to combine fuel consumption and emission factors (and deterioration factors for catalyst vehicles), number of vehicles, annual mileage levels and the relevant road-type shares given in Table 4.1. For non-catalyst vehicles this yields:

$$E_{j,k,y} = EF_{j,k,y} \cdot S_k \cdot N_{j,y} \cdot M_{j,y} \quad (8)$$

Here E = fuel consumption/emission, EF = fuel consumption/emission factor, S = road type share and k = road type.

For catalyst vehicles the calculation becomes:

$$E_{j,k,y} = DF_{j,k,y} \cdot EF_{j,k,y} \cdot S_k \cdot N_{j,y} \cdot M_{j,y} \quad (9)$$

4.5.2 Extra emissions and fuel consumption for cold engines

Extra emissions of NO_x, VOC, CH₄, CO, PM, N₂O, NH₃ and fuel consumption from cold start are simulated separately. For SO₂ and CO₂, the extra emissions are derived from the cold start fuel consumption results.

Each trip is associated with a certain cold-start emission level and is assumed to take place under urban driving conditions. The number of trips is distributed evenly across the months. First, cold emission factors are calculated as the hot emission factor times the cold:hot emission ratio. Secondly, the extra emission factor during cold start is found by subtracting the hot emission factor from the cold emission factor. Finally, this extra factor is applied on the fraction of the total mileage driven with a cold engine (the β -factor) for all vehicles in the specific layer.

The cold:hot ratios depend on the average trip length and the monthly ambient temperature distribution. The Danish temperatures for 2010 are given in Cappelen (2011). For previous years, temperature data are taken from similar reports available from The Danish Meteorological Institute (www.dmi.dk). The cold:hot ratios are equivalent for gasoline fuelled conventional passenger cars and vans and for diesel passenger cars and vans, respectively, see EMEP/EEA (2009). For conventional gasoline and all diesel vehicles the extra emissions become:

$$CE_{j,y} = \beta \cdot N_{j,y} \cdot M_{j,y} \cdot EF_{U,j,y} \cdot (CEr - 1) \quad (10)$$

Where CE is the cold extra emissions, β = cold driven fraction, CEr = Cold:Hot ratio.

For catalyst cars, the cold:hot ratio is also trip speed dependent. The ratio is, however, unaffected by catalyst wear. The Euro I cold:hot ratio is used for all future catalyst technologies. However, in order to comply with gradually stricter emission standards, the catalyst light-off temperature must be reached in even shorter periods of time for future EURO standards. Correspondingly, the β -factor for gasoline vehicles is reduced step-wise for Euro II vehicles and their successors.

For catalyst vehicles the cold extra emissions are found from:

$$CE_{j,y} = \beta_{red} \cdot \beta_{EUROI} \cdot N_{j,y} \cdot M_{j,y} \cdot EF_{U,j,y} \cdot (CEr_{EUROI} - 1) \quad (11)$$

where β_{red} = the β reduction factor.

For CH₄, specific emission factors for cold driven vehicles are included in COPERT IV. The β and β_{red} factors for VOC are used to calculate the cold driven fraction for each relevant vehicle layer. The NMVOC emissions during cold start are found as the difference between the calculated results for VOC and CH₄.

For N₂O and NH₃, specific cold start emission factors are also proposed by COPERT IV. For catalyst vehicles, however, just like in the case of hot emission factors, the emission factors for cold start are functions of cumulated mileage (emission deterioration). The level of emission deterioration also relies on the content of sulphur in the fuel. The deterioration coefficients are given in EMEP/EEA (2009), for the corresponding layer. For cold start, the cut-off mileage and sulphur level interval for hot engines are used, as described in the deterioration factors paragraph.

4.5.3 Evaporative emissions from gasoline vehicles

For each year, evaporative emissions of hydrocarbons are simulated in the forecast model as hot and warm running losses, hot and warm soak loss and diurnal emissions. The calculation approach is the same as in COPERT III. All emission types depend on RVP (Reid Vapour Pressure) and ambient temperature. The emission factors are shown in EMEP/EEA (2009).

Running loss emissions originate from vapour generated in the fuel tank while the vehicle is running. The distinction between hot and warm running loss emissions depends on engine temperature. In the model, hot and warm running losses occur for hot and cold engines, respectively. The emissions

are calculated as annual mileage (broken down into cold and hot mileage totals using the β -factor) times the respective emission factors. For vehicles equipped with evaporation control (catalyst cars), the emission factors are only one tenth of the uncontrolled factors used for conventional gasoline vehicles.

$$R_{j,y} = N_{j,y} \cdot M_{j,y} \cdot ((1 - \beta) \cdot HR + \beta \cdot WR) \quad (12)$$

where R is running loss emissions and HR and WR are the hot and warm running loss emission factors, respectively.

In the model, hot and warm soak emissions for carburettor vehicles also occur for hot and cold engines, respectively. These emissions are calculated as number of trips (broken down into cold and hot trip numbers using the β -factor) times respective emission factors:

$$S_{j,y}^C = N_{j,y} \cdot \frac{M_{j,y}}{l_{trip}} \cdot ((1 - \beta) \cdot HS + \beta \cdot WS) \quad (13)$$

where S^C is the soak emission, l_{trip} = the average trip length, and HS and WS are the hot and warm soak emission factors, respectively. Since all catalyst vehicles are assumed to be carbon canister controlled, no soak emissions are estimated for this vehicle type. Average maximum and minimum temperatures pr month are used in combination with diurnal emission factors to estimate the diurnal emissions from uncontrolled vehicles $E^d(U)$:

$$E_{j,y}^d(U) = 365 \cdot N_{j,y} \cdot e^d(U) \quad (14)$$

Each year's total is the sum of each layer's running loss, soak loss and diurnal emissions.

4.5.4 Fuel consumption balance

The calculated fuel consumption in COPERT IV must equal the statistical fuel sale totals according to the UNFCCC and UNECE emissions reporting format. The statistical fuel sales for road transport are derived from the Danish Energy Agency data (see DEA, 2011). The DEA data are further processed for gasoline in order to account for e.g. non road and recreational craft fuel consumption, which are not directly stated in the statistics, please refer to paragraph 5.1.2 for further information regarding the transformation of DEA fuel data.

The standard approach to achieve a fuel balance in annual emission inventories is to multiply the annual mileage with a fuel balance factor derived as the ratio between simulated and statistical fuel figures for gasoline and diesel, respectively. This method is also used in the present model.

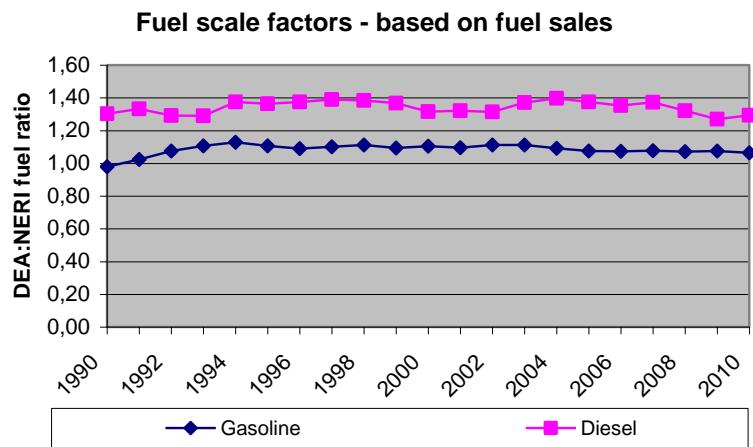


Figure 4.3 DEA:DCE Fuel ratios and diesel mileage adjustment factor based on DEA fuel sales data and DCE fuel consumption estimates.

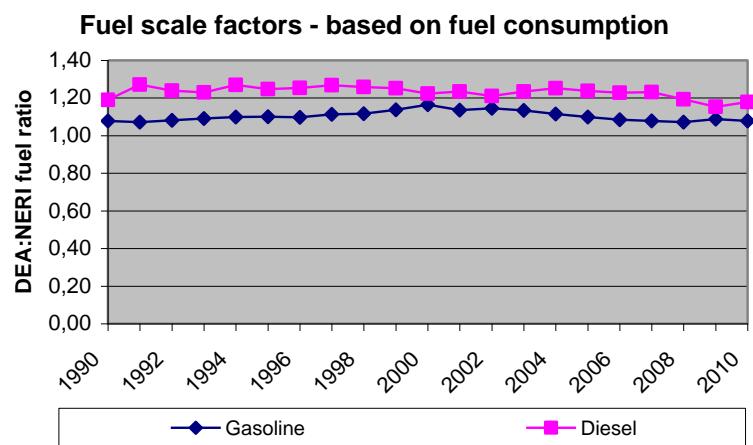


Figure 4.4. DEA:DCE Fuel ratios and diesel mileage adjustment factor based on DEA fuel consumption data and DCE fuel consumption estimates.

In Figure 4.3 and Figure 4.4 the COPERT IV:DEA gasoline and diesel fuel consumption ratios are shown for fuel sales and fuel consumption from 1990-2010. The data behind the figures are also listed in Annex 8. The fuel consumption figures are related to the traffic on Danish roads.

Pr fuel type, all mileage numbers are equally scaled in order to obtain fuel equilibrium, and hence the mileage factors used are the reciprocal values of the COPERT IV:DEA fuel consumption: fuel sales ratio.

The reasons for the differences between DEA sales figures and bottom-up fuel estimates are mostly due to a combination of the uncertainties related to COPERT IV fuel consumption factors, allocation of vehicle numbers in sub-categories, annual mileage, trip speeds and mileage splits for urban, rural and highway driving conditions.

The final fuel consumption and emission factors pr vehicle type are shown in Annex 7 for 1990-2010. The total fuel consumption and emissions are shown in Annex 8, pr vehicle category and as grand totals, for 1990-2010 (and CRF format in Annex 16). In Annex 15, fuel consumption and emission factors as well as total emissions are given in CollectER format for 1990 and 2010.

The following Figures 4.5 – 4.12 show the fuel consumption factors as well as fuel and km related emission factors per vehicle type and fuel type for the Danish road transport. The factors for CO₂ (km related only), CH₄ and N₂O are shown for the 1990-2010 period (relevant for UNFCCC reporting), and the factors for NO_x, NMVOC, CO and TSP are shown for the 1985-2010 period (relevant for UNECE reporting).

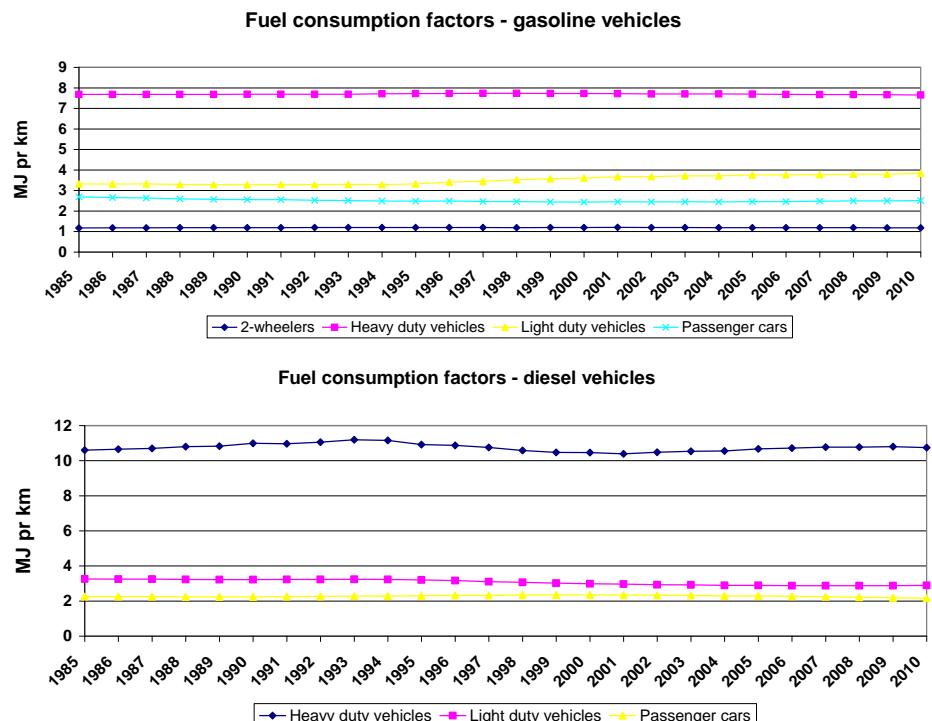


Figure 4.5 Km related fuel consumption factors pr vehicle type for Danish road transport (1985-2010).

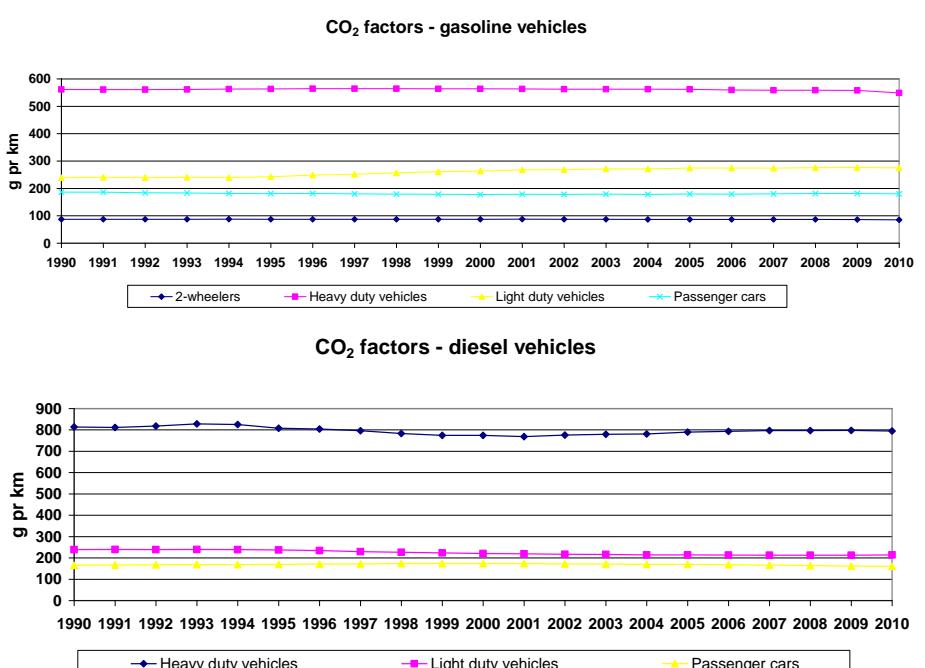


Figure 4.6 Km related CO₂ emission factors pr vehicle type for Danish road transport (1990-2010).

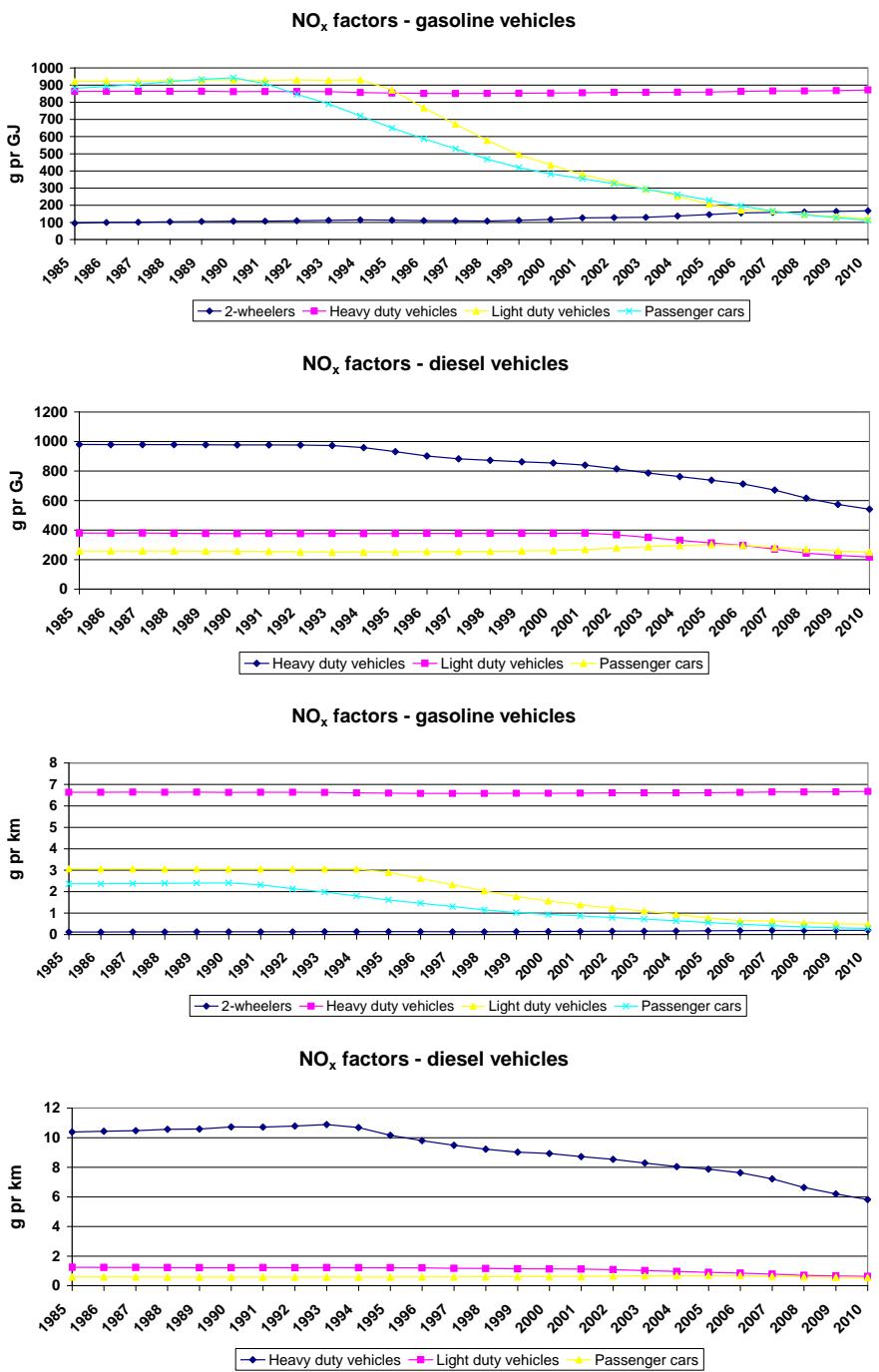


Figure 4.7 Fuel and km related NO_x emission factors pr vehicle type for Danish road transport (1985-2010).

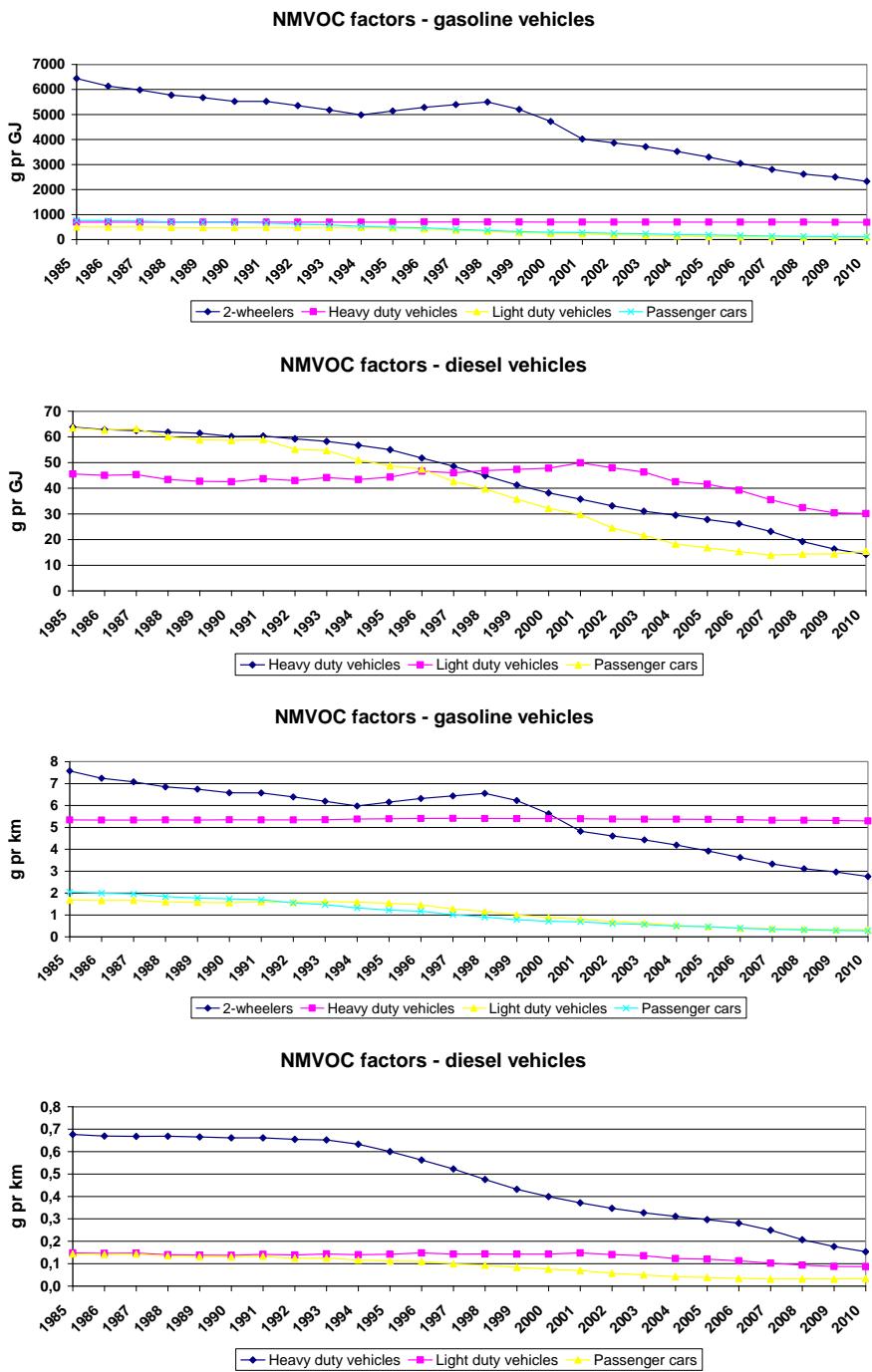


Figure 4.8 Fuel and km related NMVOC emission factors pr vehicle type for Danish road transport (1985-2010).

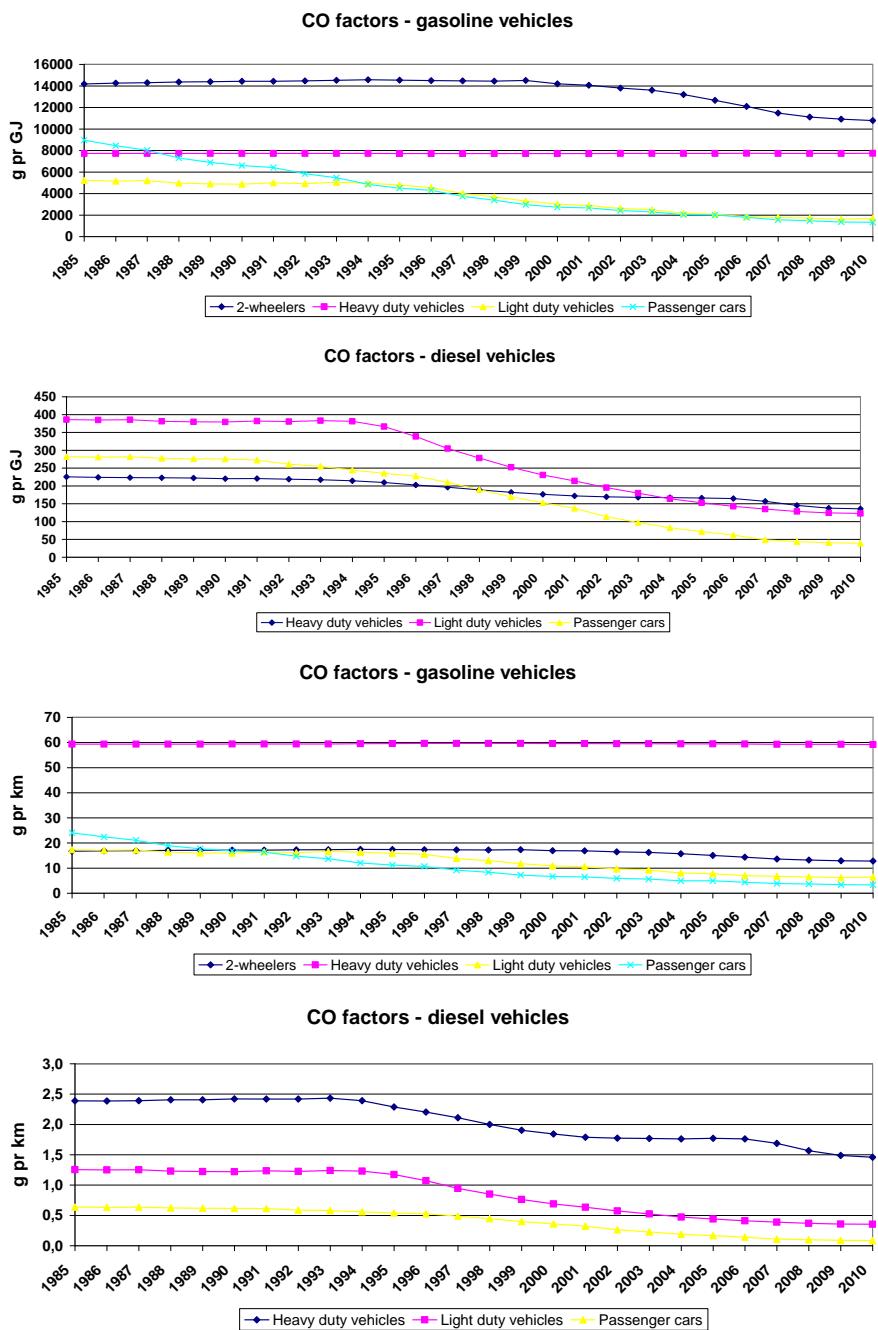


Figure 4.9 Fuel and km related CO emission factors pr vehicle type for Danish road transport (1985-2010).

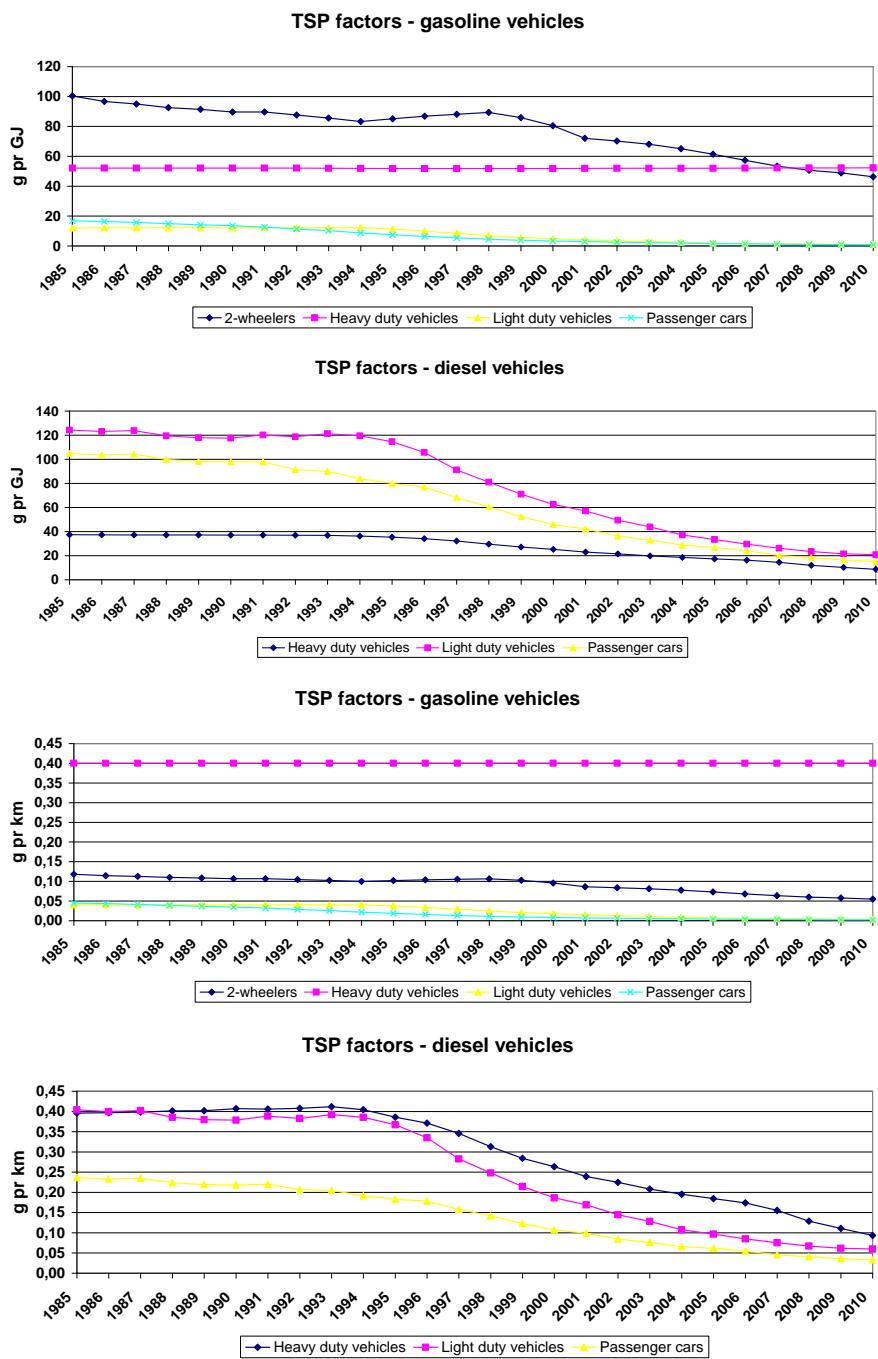


Figure 4.10 Fuel and km related TSP emission factors pr vehicle type for Danish road transport (1985-2010).

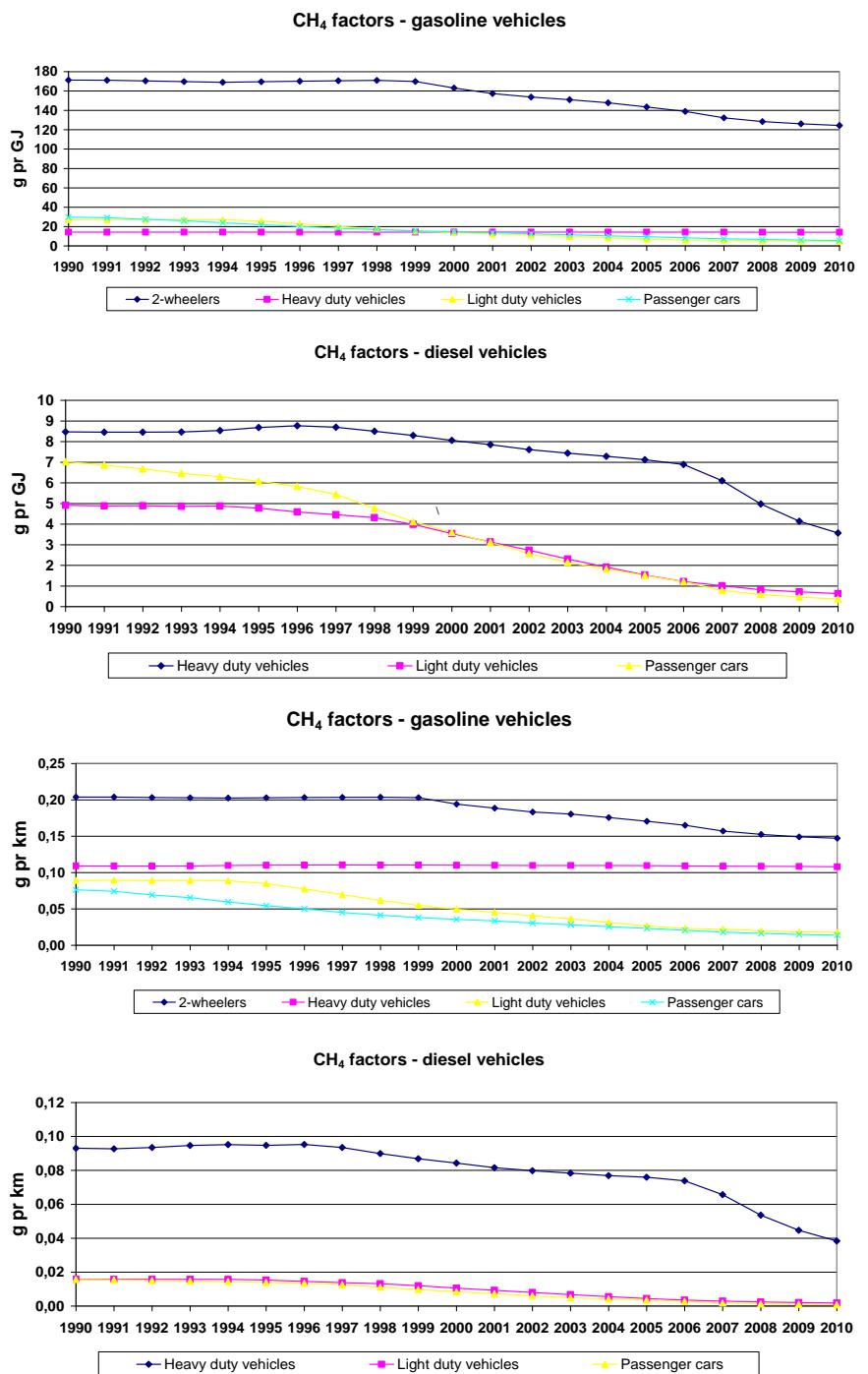
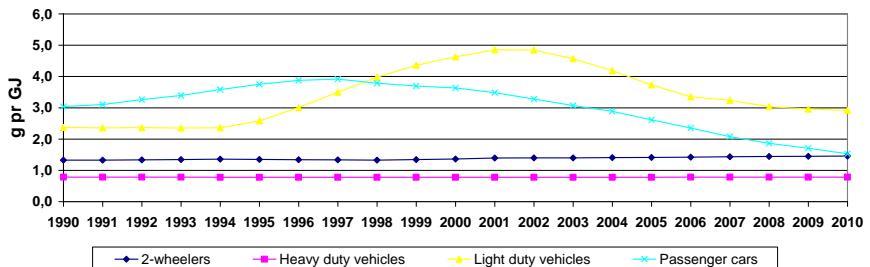
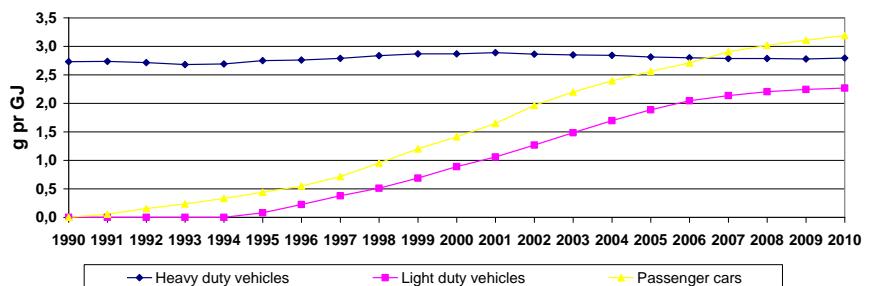


Figure 4.11 Fuel and km related CH₄ emission factors pr vehicle type for Danish road transport (1990-2010).

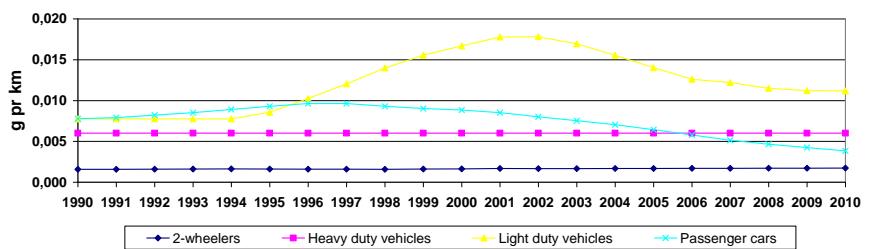
N₂O factors - gasoline vehicles



N₂O factors - diesel vehicles



N₂O factors - gasoline vehicles



N₂O factors - diesel vehicles

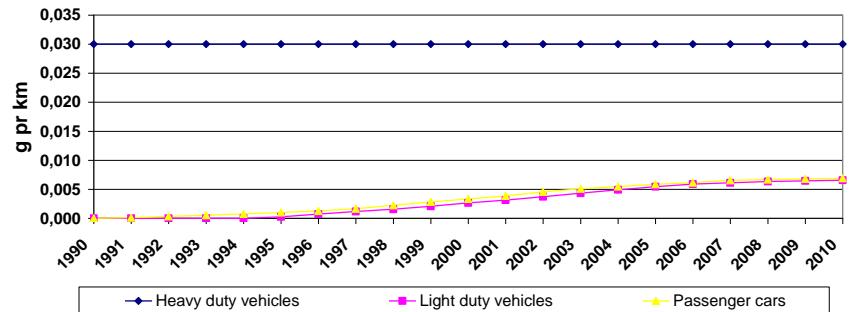


Figure 4.12 Fuel and km related N₂O emission factors pr vehicle type for Danish road transport (1990-2010).

5 Input data and calculation methods for other mobile sources

Other mobile sources are divided into several sub-sectors: sea transport, fishery, air traffic, railways, military, and working machinery and equipment in the sectors agriculture, forestry, industry and residential. The emission calculations are made using the detailed Tier 3 method as described in the EMEP/EEA air pollutant emission inventory guidebook (EMEP/EEA, 2009) for air traffic, off-road working machinery and equipment, and ferries, while for the remaining sectors the simple Tier 1 method is used.

5.1 Activity data

5.1.1 Air traffic

The activity data for air traffic consists of air traffic statistics provided by the Danish Transport Authority and Copenhagen Airport. Fuel statistics for jet fuel consumption and aviation gasoline are obtained from the Danish energy statistics (DEA, 2011).

For 2001 onwards, pr flight records are provided by the Danish Transport Authority as data codes for aircraft type, and origin and destination airports (city-pairs).

Subsequently the aircraft types are separated by DCE into larger aircraft using jet fuel (jet engines, turbo props, helicopters) and small aircraft types with piston engines using aviation gasoline. This is done by using different aircraft dictionaries, internet look-ups and by communication with the Danish Transport Authority. Each of the larger aircraft type is then matched with a representative type for which fuel consumption and emission data are available from the EMEP/EEA emission inventory guidebook (EMEP/EEA, 2009). Relevant for this selection is aircraft maximum take off mass, engine types, and number of engines. A more thorough explanation is given in Winther (2001a, b).

Annex 10 shows the correspondence table between the actual aircraft type codes and representative aircraft types behind the Danish inventory. Annex 10 also show the number of LTO's per representative aircraft type for domestic and international flights starting from Copenhagen Airport and other airports, respectively¹², in a time series from 2001-2010. The airport split is necessary to make due to the differences in LTO emission factors (c.f. section 5.4.1).

The same type of LTO activity data for the flights for Greenland and the Faroe Islands are shown in Annex 10 also, further detailed into an origin-destination airport matrix and having flight distances attached. This level of detail satisfies the demand from UNFCCC to provide precise documentation

¹² Excluding flights for Greenland and the Faroe Islands. These flights are separately listed in Annex 10.

for the part of the inventory for the Kingdom of Denmark being outside the Danish mainland.

In the later years many flights in Denmark are being made by the new aircraft types CRJ9, E70, E170 and E175. These aircraft types are not represented by data in the EMEP/EEA databank. Instead new fuel consumption and emission factors have been calculated using fuel consumption and emission indexes from the ICAO Engine Exhaust Emission Database (www.caa.co.uk) for the CFM34-8C5 engine type which is installed in CRJ9, E70, E170 and E175. For LTO the fuel consumption and emission indexes are directly available from the ICAO database. For cruise, distance related indexes are calculated by weighting the baseline CFM34-8C5 indexes with the development in distance related emission indexes for the B737 400 representative aircraft type taken from the EMEP/EEA database.

The ideal flying distance (great circle distance) between the city-pairs is calculated by DCE in a separate database. The calculation algorithm uses a global latitude/altitude coordinate table for airports. In cases when airport coordinates are not present in the DCE database, these are looked up on the internet and entered into the database accordingly.

For inventory years prior to 2001, detailed LTO/aircraft type statistics are obtained from Copenhagen Airport (for this airport only), while information of total take-off numbers for other Danish airports are provided by the Danish Transport Authority. The assignment of representative aircraft types for Copenhagen Airport is done as described above. For the remaining Danish airports representative aircraft types are not directly assigned. Instead appropriate average assumptions are made relating to the fuel consumption and emission data part.

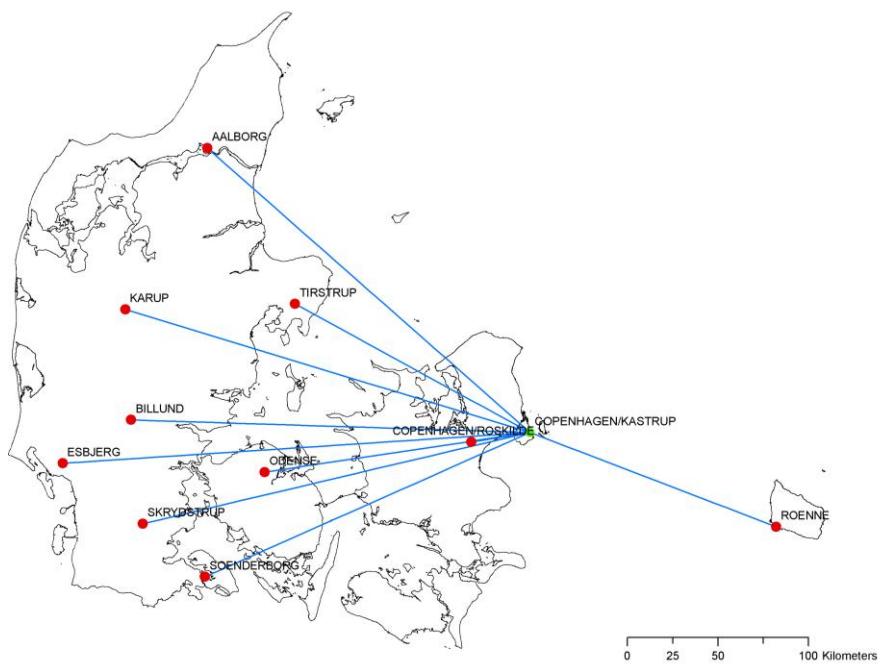


Figure 5.1 Most frequent domestic flying routes for large aircraft in Denmark.

Copenhagen Airport is the starting or end point for most of the domestic aviation made by large aircraft in Denmark (Figure 5.1; routes to Greenland/Faroe Islands are not shown). Even though many domestic flights not touching Copenhagen Airport are also reported in the flight statistics kept

by the Danish Transport Authority, these flights, however, are predominantly made with small piston engine aircraft using aviation gasoline. Hence, the consumption of jet fuel by flights not using Copenhagen is marginal.

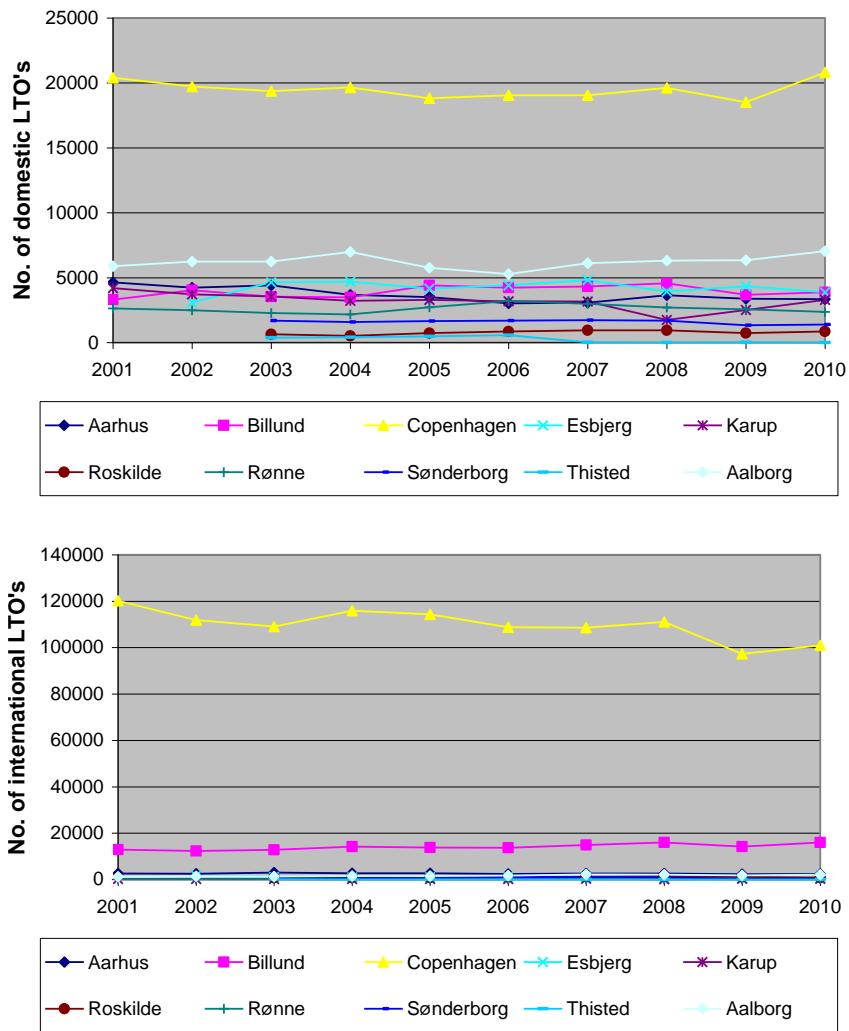


Figure 5.2 No. of LTO's for the most important airports in Denmark 2001-2010.

Figure 5.2 shows the number of domestic and international LTO's for Danish airports¹³, in a time series from 2001-2010.

5.1.2 Non-road working machinery and equipment

Non-road working machinery and equipment are used in agriculture, forestry and industry, for household/gardening purposes and in inland waterways (recreational craft). Information on the number of different types of machines, their respective load factors, engine sizes and annual working hours has been provided by Winther and Nielsen (2006). The stock developments from 1985-2010 for the most important types of machinery are shown in Figures 5.3-5.10 below. The stock data are also listed in Annex 11, together with figures for load factors, engine sizes and annual working hours. As regards stock data for the remaining machinery types, please refer to (Winther and Nielsen, 2006).

¹³ Flights for Greenland and the Faroe Islands are included under domestic in the figure.

It is important to note that from key experts in the field of industrial non road activities a significant decrease in the activities has occurred for 2009 due to the global financial crisis. This reduction is in the order of 25 % for 2009 for industrial non road in general (pers. comm. Per Stjernqvist, Volvo Construction Equipment 2010). For fork lifts roughly 5 % and 20 % reductions has been noted for 2008 and 2009, respectively (pers. comm. Peter H. Møller, Rocla A/S).

For agriculture, the total number of agricultural tractors and harvesters per year are shown in the Figures 5.3-5.4, respectively. The figures clearly show a decrease in the number of small machines, these being replaced by machines in the large engine-size ranges.

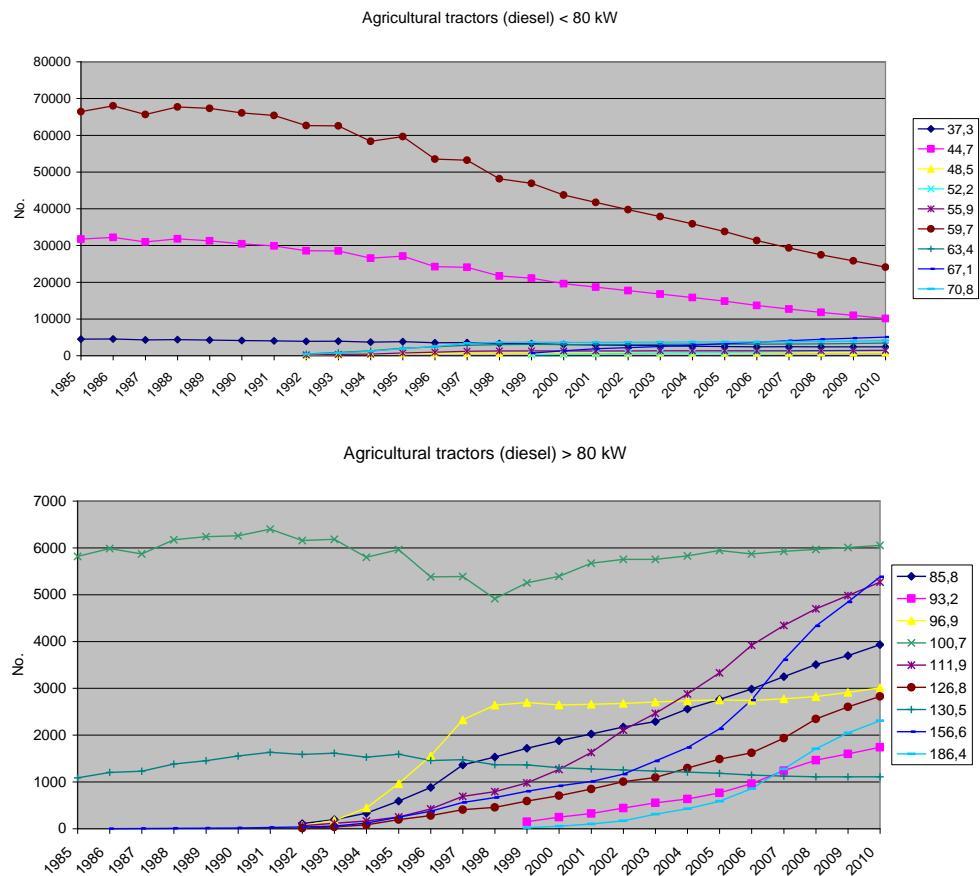


Figure 5.3 Total numbers in kW classes for tractors from 1985 to 2010.

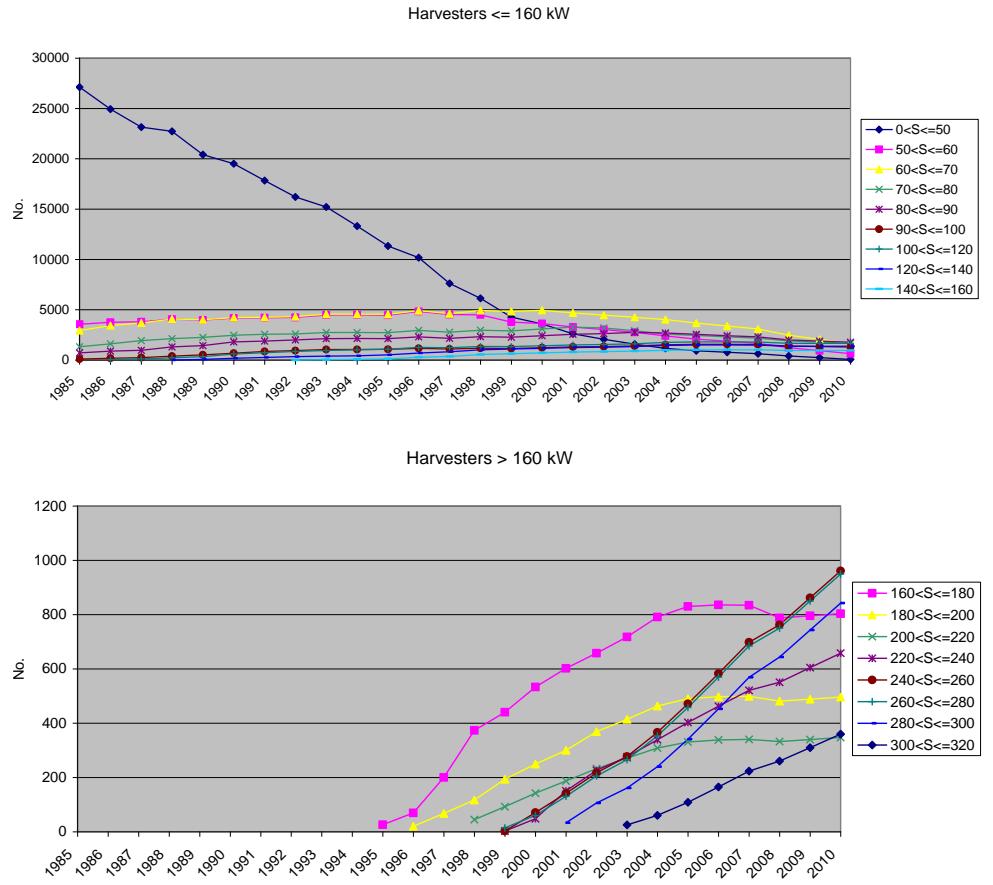


Figure 5.4 Total numbers in kW classes for harvesters from 1985 to 2010.

The tractor and harvester developments towards fewer vehicles and larger engines, shown in Figure 5.5, are very clear. From 1985 to 2010, tractor and harvester numbers decreased by around 20 % and 54 %, respectively, whereas the average increase in engine size for tractors was 32 %, and 175 % for harvesters, in the same time period.

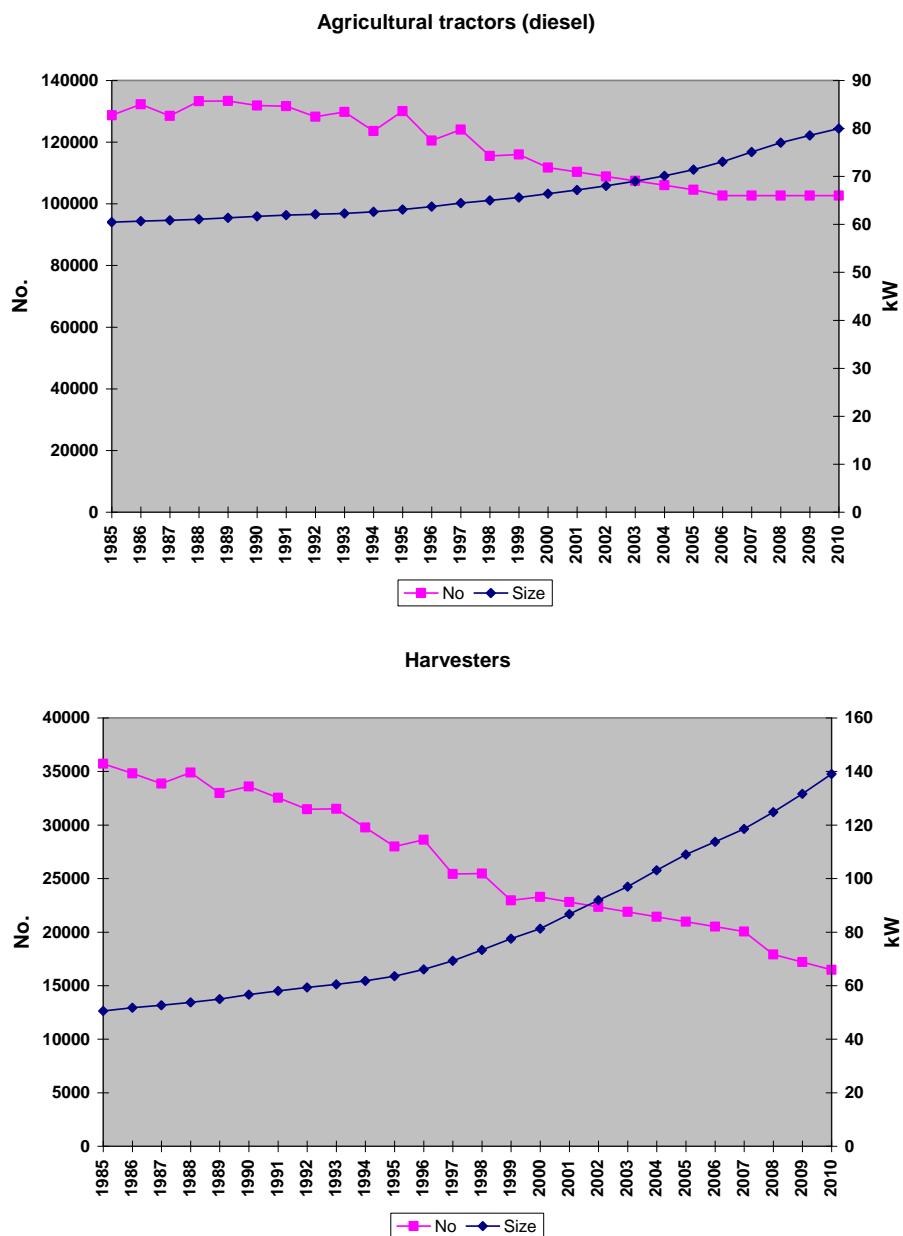


Figure 5.5 Total numbers and average engine size for tractors and harvesters from 1985 to 2010.

The most important machinery types for industrial use are different types of construction machinery and fork lifts. The Figures 5.6 and 5.7 show the 1985-2010 stock development for specific types of construction machinery and diesel fork lifts. Due to lack of data, the construction machinery stock for 1990 is used also for 1985-1989. For most of the machinery types there was an increase in machinery numbers from 1990 onwards, due to increased construction activities. It is assumed that track type excavators/wheel type loaders (0-5 tonnes), and telescopic loaders first enter into use in 1991 and 1995, respectively.

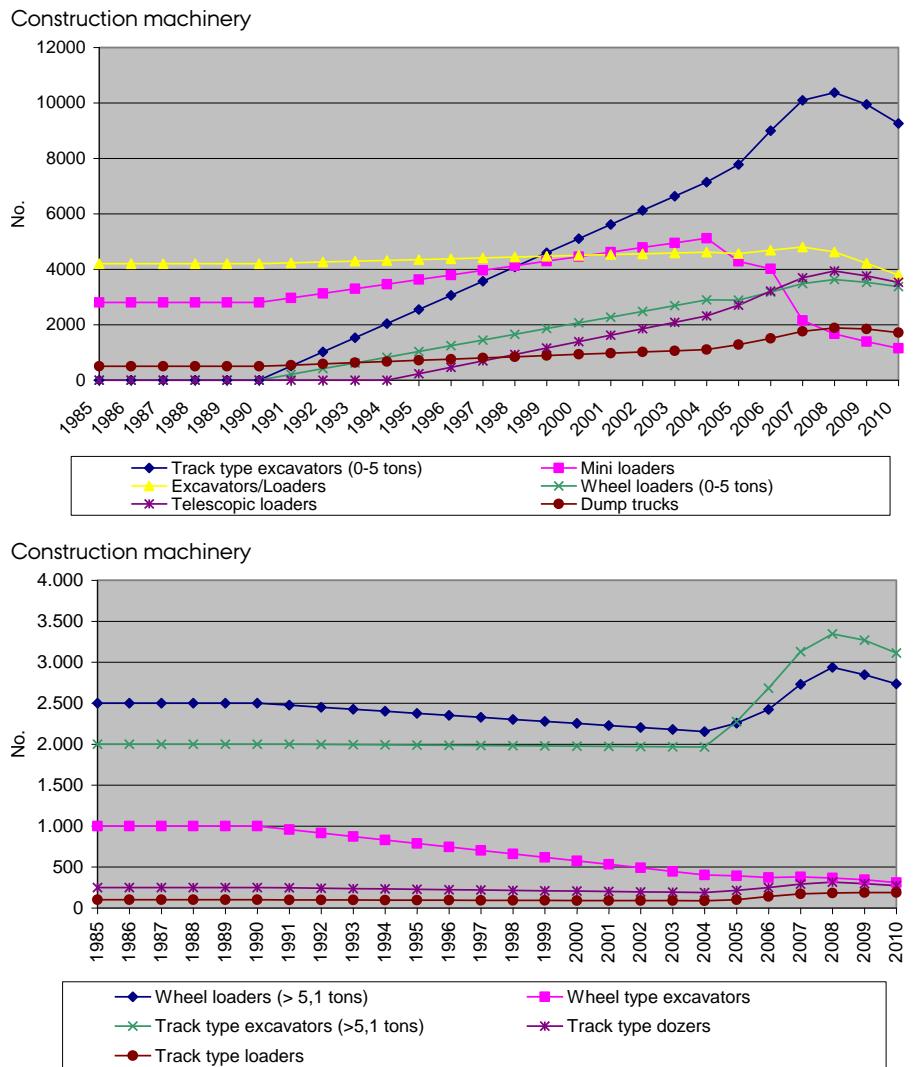


Figure 5.6 1985-2010 stock development for specific types of construction machinery.

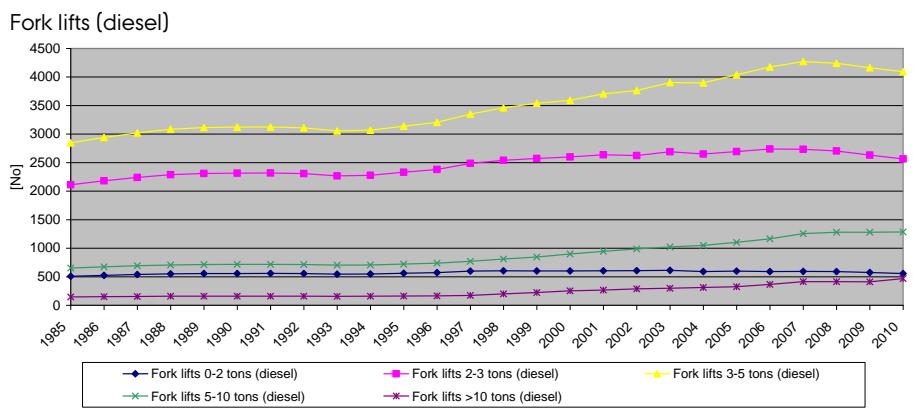


Figure 5.7 Total numbers of diesel fork lifts in kW classes from 1985 to 2010.

The emission level shares for tractors, harvesters, construction machinery and diesel fork lifts are shown in Figure 5.8, and present an overview of the market penetration of the different pre-Euro engine classes, and engine stages complying with the gradually stricter EU stage I and II emission limits. The average lifetimes of 30, 25, 20 and 10 years for tractors, harvesters, fork lifts and construction machinery, respectively, influence the individual engine technology turn-over speeds.

The EU emission directive Stage I and II implementation years relate to engine size, and for all four machinery groups the emission level shares for the specific size segments will differ slightly from the picture shown in Figure 5.8. Due to scarce data for construction machinery, the emission level penetration rates are assumed to be linear and the general technology turnover pattern is as shown in Figure 5.8.

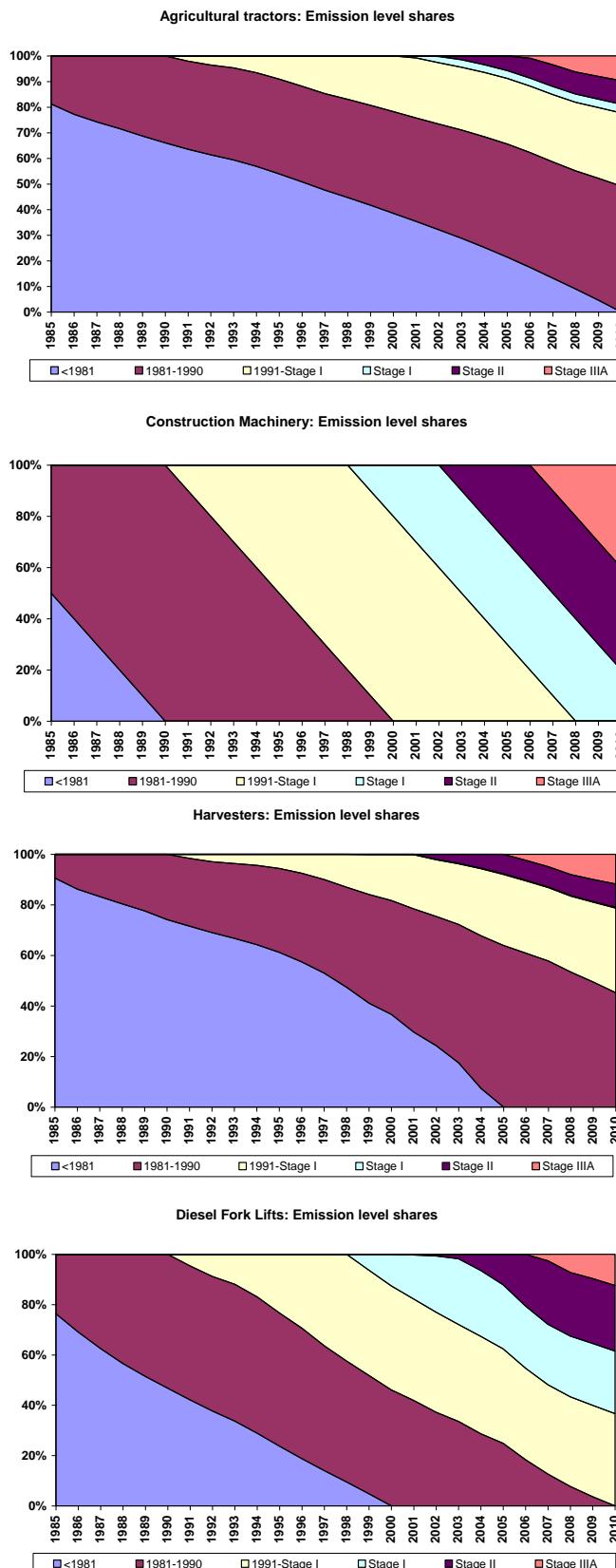


Figure 5.8 Emission level shares for tractors, harvesters, construction machinery and diesel fork lifts (1985 to 2010).

The 1985-2010 stock development for the most important household and gardening machinery types is shown in Figure 5.9.

For lawn movers and cultivators, the machinery stock remains approximately the same for all years, whereas the stock figures for riders, chain saws,

shrub clearers, trimmers and hedge cutters increased from 1990 onwards. The yearly stock increases, in most cases, become larger after 2000. The lifetimes for gasoline machinery are short and, therefore, the new emission levels (not shown) penetrate rapidly.

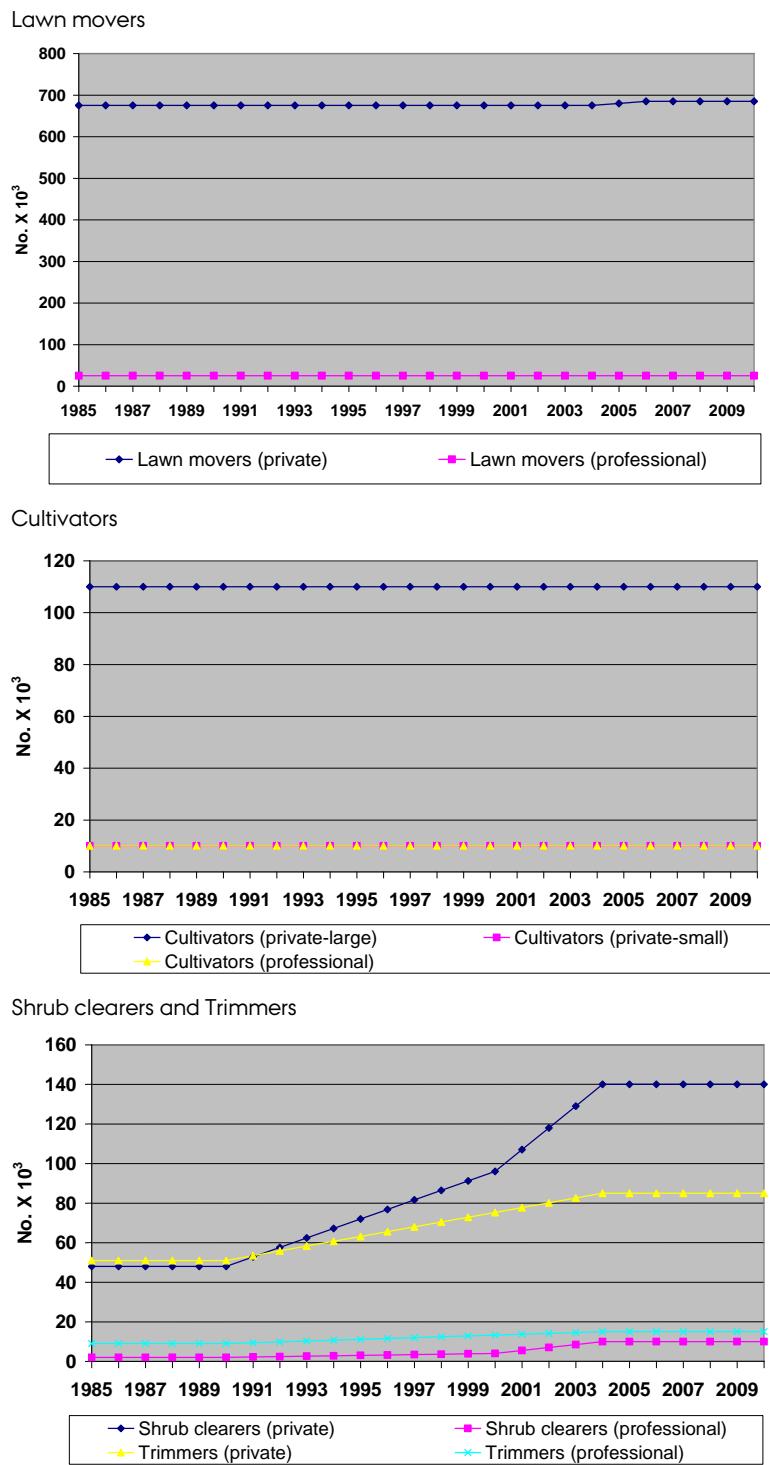
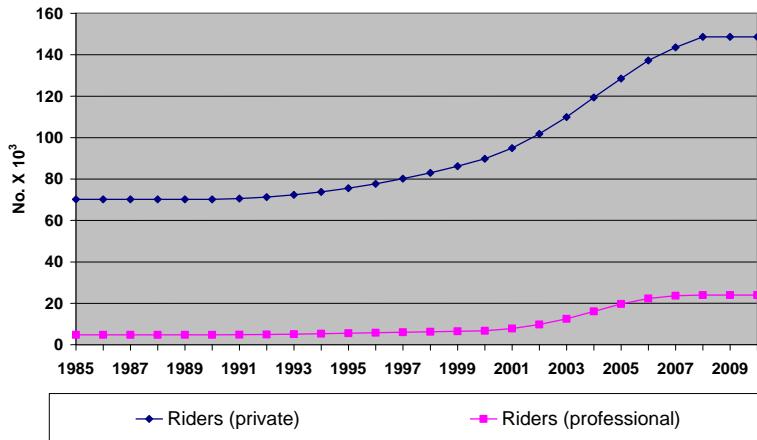


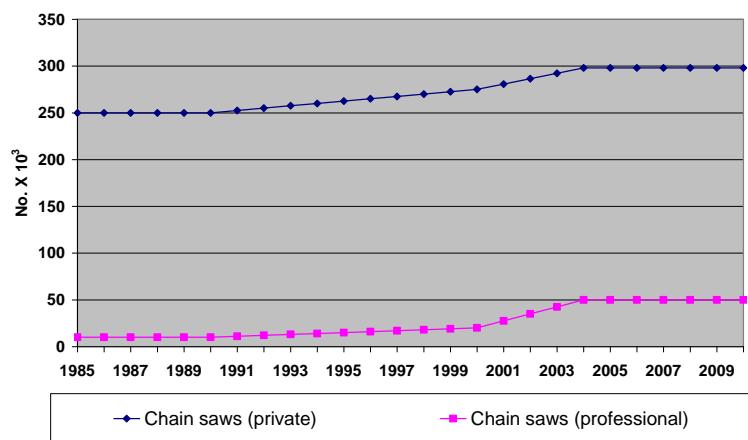
Figure 5.9 Stock development 1985-2010 for the most important household and gardening machinery types

Table 5.9 *Continued*

Riders



Chain saws



Hedge cutters

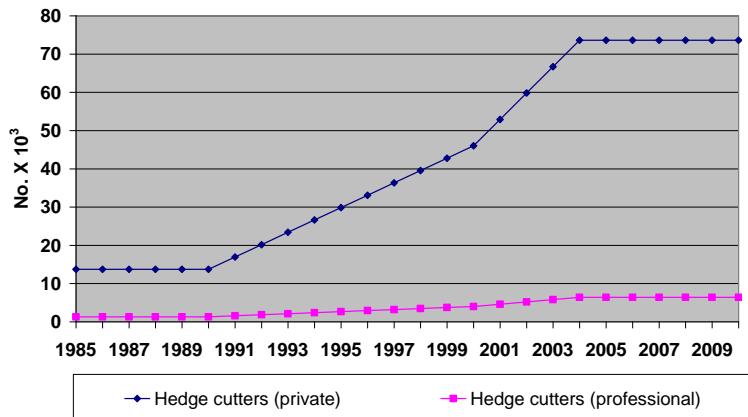


Figure 5.9 Stock development 1985-2010 for the most important household and gardening machinery types.

Figure 5.10 shows the development in numbers of different recreational craft from 1985-2010. The 2004 stock data for recreational craft are repeated for 2005+, since no new fleet information has been obtained.

For diesel boats, increases in stock and engine size are expected during the whole period, except for the number of motor boats (< 27 ft.) and the engine sizes for sailing boats (<26 ft.), where the figures remain unchanged. A decrease in the total stock of sailing boats (<26 ft.) by 21 % and increases in the total stock of yawls/cabin boats and other boats (<20 ft.) by around 25 % are expected. Due to a lack of information specific to Denmark, the shifting rate

from 2-stroke to 4-stroke gasoline engines is based on a German non-road study (IFEU, 2004).

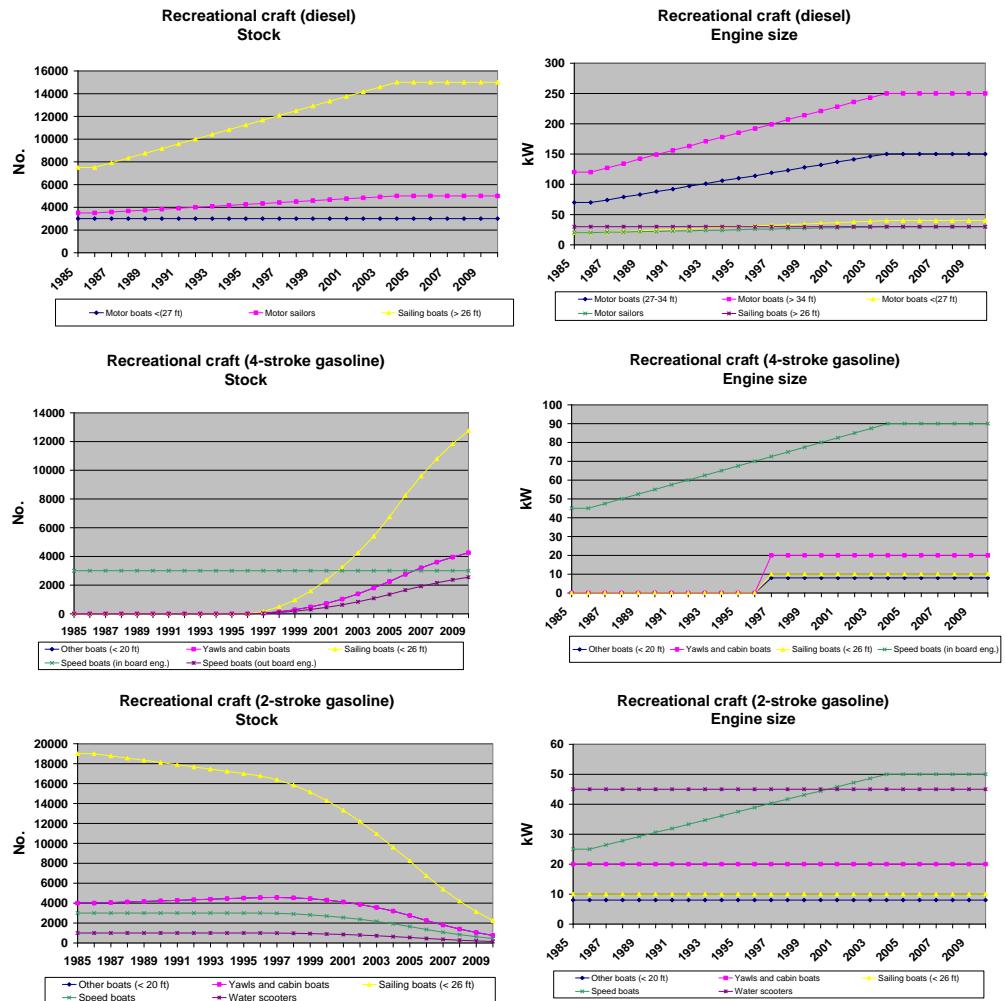


Figure 5.10 1985-2010 Stock and engine size development for recreational craft.

5.1.3 National sea transport

A new methodology is used to estimate the fuel consumption figures for national sea transport, based on fleet activity estimates for regional ferries, local ferries and other national sea transport (Winther, 2008).

Table 5.1 lists the most important domestic ferry routes in Denmark in the period 1990-2010. For these ferry routes and the years 1990-2005, the following detailed traffic and technical data have been gathered by Winther (2008): Ferry name, year of service, engine size (MCR), engine type, fuel type, average load factor, auxiliary engine size and sailing time (single trip).

For 2006-2010, the above mentioned traffic and technical data for specific ferries have been provided by Kristensen (2011) in the case of Mols-Linien (Sjællands Odde-Ebeltoft, Sjællands Odde-Århus, Kalundborg-Århus), by Hjortberg (2011) for Bornholmstrafikken (Køge-Rønne) and by Simonsen (2011) for Langelandstrafikken A/S (Tårs-Spodsbjerg). For Esbjerg/Hanstholm/Hirtshals-Torshavn traffic and technical data have been provided by Dávastovu (2011).

Table 5.1 Domestic ferry routes comprised in the Danish inventory.

Ferry service	Service period
Esbjerg-Torshavn	1990-1995, 2009+
Halsskov-Knudshoved	1990-1999
Hanstholm-Torshavn	1991-1992, 1999+
Hirtshals-Torshavn	2010
Hundested-Grenaa	1990-1996
Kalundborg-Juelsminde	1990-1996
Kalundborg-Samsø	1990+
Kalundborg-Århus	1990+
Korsør-Nyborg, DSB	1990-1997
Korsør-Nyborg, Vognmandsruten	1990-1999
København-Rønne	1990-2004
Køge-Rønne	2004+
Sjællands Odde-Ebeltoft	1990+
Sjællands Odde-Århus	1999+
Tårs-Spøsbjerg	1990+

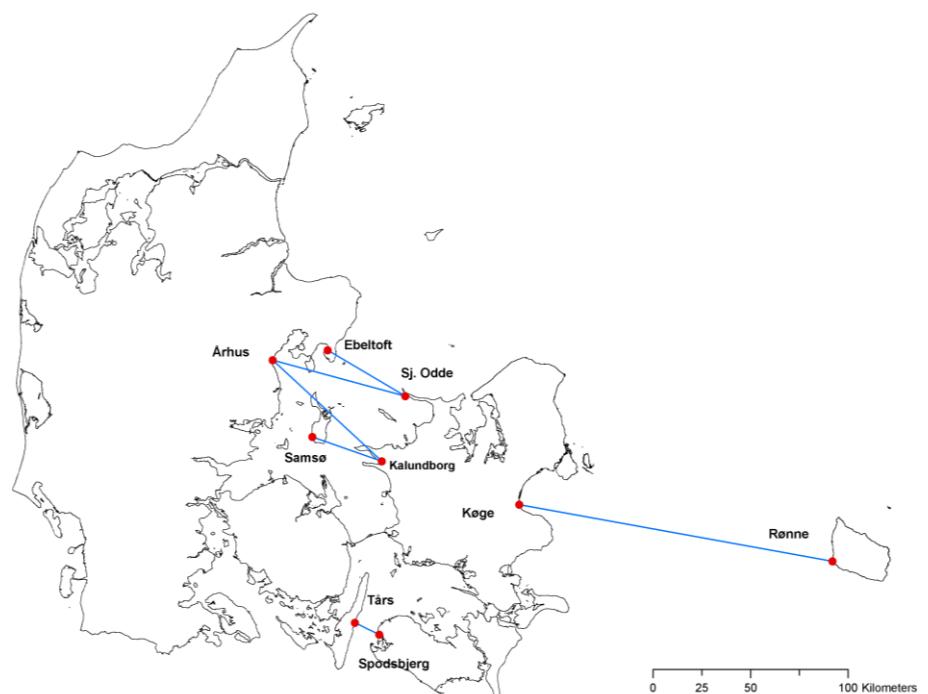


Figure 5.11 Domestic regional ferry routes in Denmark (2010).

The number of round trips pr ferry route from 1990 to 2010 is provided by Statistics Denmark (2011), see Figure 5.11 (Esbjerg/Hanstholm/Hirtshals-Torshavn not shown). The traffic data are also listed in Annex 12, together with different ferry specific technical and operational data.

For each ferry, Annex 12 lists the relevant information as regards ferry route, name, year of service, engine size (MCR), engine type, fuel type, average load factor, auxiliary engine size and sailing time (single trip). There is a lack of historical traffic data for 1985-1989, and hence, data for 1990 is used for these years, to support the fuel consumption and emission calculations.

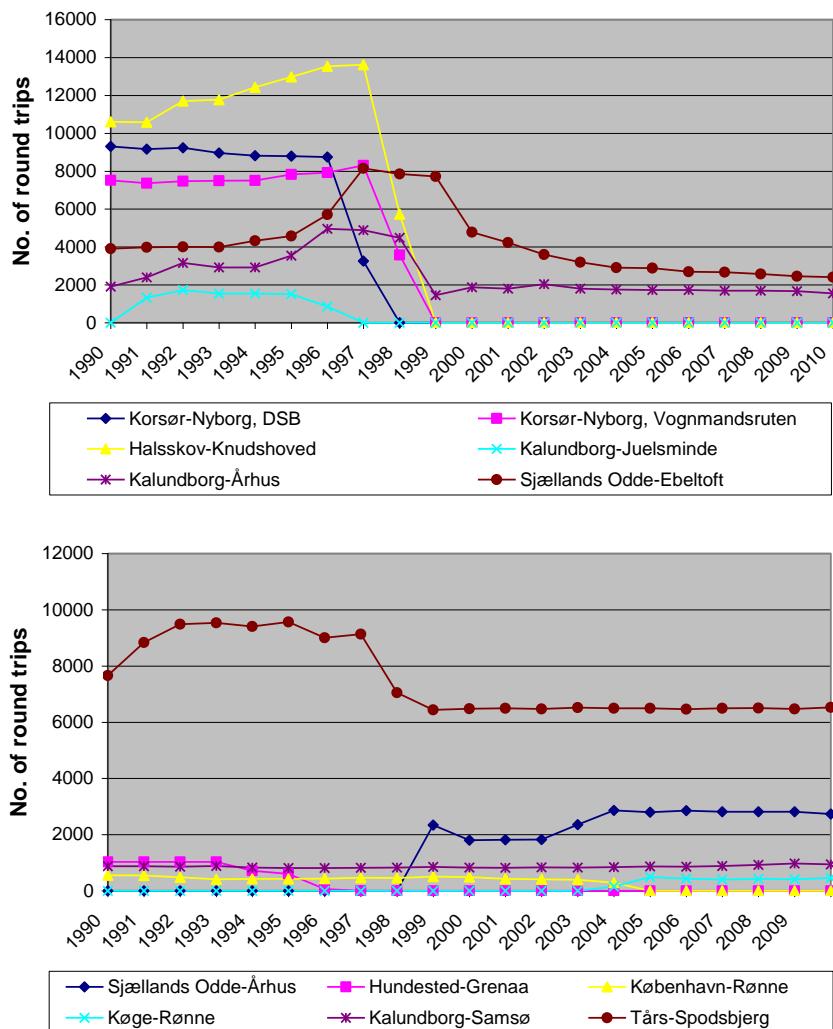


Figure 5.12 No. of round trips for the most important ferry routes in Denmark 1990-2010.

It can be seen from Table 5.1 (and Figure 5.12) that several ferry routes were closed in the time period from 1996-1998, mainly due to the opening of the Great Belt Bridge (connecting Zealand and Funen) in 1997. Hundested-Grenaa and Kalundborg-Juelsminde was closed in 1996, Korsør-Nyborg (DSB) closed in 1997, and Halsskov-Knudshoved and Korsør-Nyborg (Vognmandsruten) was closed in 1998. The ferry line København-Rønne was replaced by Køge-Rønne in 2004 and from 1999 a new ferry connection was opened between Sjælland Odde and Århus.

For the local ferries, a bottom-up estimate of fuel consumption for 1996 has been taken from the Danish work in Wismann (2001). The latter project calculated fuel consumption and emissions for all sea transport in Danish waters in 1995/1996 and 1999/2000. In order to cover the entire 1990-2010 inventory period, the fuel figure for 1996 has been adjusted according to the developments in local ferry route traffic shown in Annex 12.

Fuel sold for freight transport by Royal Arctic Line between Aalborg (Denmark) and Greenland and by Eim Skip - East route between Aarhus (Denmark) and Torshavn (Faroe Islands) are included under other national sea transport in the Danish inventories. In both cases all fuel is being bought in Denmark (Rasmussen, 2011 and Thorarensen, 2011).

For the remaining part of the traffic between two Danish ports, other national sea transport, bottom-up estimates for fuel consumption have been calculated for the years 1995 and 1999 by Wismann (2007). These fuel consumption estimates are used as activity data for the inventory years until 1995 and 1999 onwards. Interpolated figures are used for the inventory years 1996-1998.

The calculations use the database set up for Denmark in the Wismann (2001) study, with actual traffic data from the Lloyd's LMIS database (not including ferries). The database was split into three vessel types: bulk carriers, container ships, and general cargo ships; and five size classes: 0-1000, 1000-3000, 3000-10000, 10000-20000 and >20000 DWT. The calculations assume that bulk carriers and container ships use heavy fuel oil, and that general cargo ships use gas oil. For further information regarding activity data for local ferries and other national sea transport, please refer to Winther (2008).

The fleet activity data for regional ferries, and the fleet activity based fuel consumption estimates for local ferries and other national sea transport replace the fuel based activity data, which originated directly from the DEA statistics.

5.1.4 Other sectors

The activity data for military, railways, international sea transport and fishery consists of fuel consumption information from DEA (2011). For international sea transport, the basis is fuel sold in Danish ports for vessels with a foreign destination, as prescribed by the IPCC guidelines.

However, it must be noted that fuel sold for sailing activities between Denmark and Greenland/Faroe Islands are reported as international in the DEA energy statistics. Hence, for inventory purposes in order to follow the IPCC guidelines the bottom-up fuel estimates for the ferry routes Esbjerg/Hanstholm-Torshavn, and fuel reports from Royal Arctic Line and Eim Skip is being subtracted from the fuel sales figures for international sea transport prior to inventory fuel input.

For fisheries, the calculation methodology described by Winther (2008) remains fuel based. However, the input fuel data differ from the fuel sales figures previously used. The changes are the result of further data processing of the DEA reported gas oil sales for national sea transport and fisheries, prior to inventory input. For years when the fleet activity estimates of fuel consumption for national sea transport (not including trips to Greenland/Faroe Islands) are smaller than DEA reported fuel sold for national sea transport, fuel is added to fisheries in the inventory. In the opposite case, fuel is being subtracted from the original DEA fisheries fuel sales figure in order to make up the final fuel consumption input for fisheries in the inventories.

The updated fuel consumption time series for national sea transport lead, in turn, to changes in the energy statistics for fisheries (gas oil) and industry (heavy fuel oil), so the national energy balance can remain unchanged.

For all sectors, fuel consumption figures are given in Annex 15 for the years 1990 and 2010 in CollectER format.

5.2 Emission legislation

For the engines used by other mobile sources, no legislative limits exist for specific fuel consumption. And no legislative limits exist for the emissions of CO₂, which are directly fuel dependent. The engines, however, do have to comply with the emission legislation limits agreed by the EU and, except for ships, the VOC emission limits influence the emissions of CH₄, these forming part of total VOC.

For non-road working machinery and equipment, and recreational craft and railway locomotives/motor cars, the emission directives list specific emission limit values (g pr kWh) for CO, VOC, NO_x (or VOC + NO_x) and TSP, depending on engine size (kW for diesel, ccm for gasoline) and date of implementation (referring to engine market date).

For diesel, the directives 97/68 and 2004/26 relate to non-road machinery other than agricultural and forestry tractors, and the directives have different implementation dates for machinery operating under transient and constant loads. The latter directive also comprises emission limits for railway machinery. For tractors the relevant directives are 2000/25 and 2005/13. For gasoline, the directive 2002/88 distinguishes between hand-held (SH) and not hand-held (NS) types of machinery.

For engine type approval, the emissions (and fuel consumption) are measured using various test cycles (ISO 8178). Each test cycle consists of a number of measurement points for specific engine loads during constant operation. The specific test cycle used depends on the machinery type in question and the test cycles are described in more details in the directives.

Table 5.2 Overview of EU emission directives relevant for diesel fuelled non-road machinery.

Stage/ Engine size [kW]	CO	VOC	NO _x	VOC+NO _x	PM	Diesel machinery			Tractors	
						[g pr kWh]	EU Directive	Implement. date Transient	Constant	EU directive
Stage I										
37<=P<75	6.5	1.3	9.2	-	0.85	97/68	1/4 1999	-	2000/25	1/7 2001
Stage II										
130<=P<560	3.5	1	6	-	0.2	97/68	1/1 2002	1/1 2007	2000/25	1/7 2002
75<=P<130	5	1	6	-	0.3		1/1 2003	1/1 2007		1/7 2003
37<=P<75	5	1.3	7	-	0.4		1/1 2004	1/1 2007		1/1 2004
18<=P<37	5.5	1.5	8	-	0.8		1/1 2001	1/1 2007		1/1 2002
Stage IIIA										
130<=P<560	3.5	-	-	4	0.2	2004/26	1/1 2006	1/1 2011	2005/13	1/1 2006
75<=P<130	5	-	-	4	0.3		1/1 2007	1/1 2011		1/1 2007
37<=P<75	5	-	-	4.7	0.4		1/1 2008	1/1 2012		1/1 2008
19<=P<37	5.5	-	-	7.5	0.6		1/1 2007	1/1 2011		1/1 2007
Stage IIIB										
130<=P<560	3.5	0.19	2	-	0.025	2004/26	1/1 2011	-	2005/13	1/1 2011
75<=P<130	5	0.19	3.3	-	0.025		1/1 2012	-		1/1 2012
56<=P<75	5	0.19	3.3	-	0.025		1/1 2012	-		1/1 2012
37<=P<56	5	-	-	4.7	0.025		1/1 2013	-		1/1 2013
Stage IV										
130<=P<560	3.5	0.19	0.4	-	0.025	2004/26	1/1 2014		2005/13	1/1 2014
56<=P<130	5	0.19	0.4	-	0.025		1/10 2014			1/10 2014

Table 5.3 Overview of the EU Emission Directive 2002/88 for gasoline fuelled non-road machinery.

Catego-	Engine size	CO	HC	NO _x	HC+NO _x	Implemen-
ry	[ccm]	[g pr kWh]	[g pr kWh]	[g pr kWh]	[g pr kWh]	tation date
Stage I						
Hand held	SH1 S<20	805	295	5.36	-	1/2 2005
	SH2 20=<S<50	805	241	5.36	-	1/2 2005
	SH3 50=<S	603	161	5.36	-	1/2 2005
Not hand held	SN3 100=<S<225	519	-	-	16.1	1/2 2005
	SN4 225=<S	519	-	-	13.4	1/2 2005
Stage II						
Hand held	SH1 S<20	805	-	-	50	1/2 2008
	SH2 20=<S<50	805	-	-	50	1/2 2008
	SH3 50=<S	603	-	-	72	1/2 2009
Not hand held	SN1 S<66	610	-	-	50	1/2 2005
	SN2 66=<S<100	610	-	-	40	1/2 2005
	SN3 100=<S<225	610	-	-	16.1	1/2 2008
	SN4 225=<S	610	-	-	12.1	1/2 2007

For recreational craft, Directive 2003/44 comprises the emission legislation limits for diesel engines, and for 2-stroke and 4-stroke gasoline engines, respectively. The CO and VOC emission limits depend on engine size (kW) and the inserted parameters presented in the calculation formulas in Table 5.4. For NO_x, a constant limit value is given for each of the three engine types. For TSP, the constant emission limit regards diesel engines only.

Table 5.4 Overview of the EU Emission Directive 2003/44 for recreational craft.

Engine type	Impl. date	CO=A+B/P ⁿ			HC=A+B/P ⁿ			NO _x	TSP
		A	B	n	A	B	n		
2-stroke gasoline	1/1 2007	150.0	600.0	1.0	30.0	100.0	0.75	10.0	-
4-stroke gasoline	1/1 2006	150.0	600.0	1.0	6.0	50.0	0.75	15.0	-
Diesel	1/1 2006	5.0	0.0	0	1.5	2.0	0.5	9.8	1.0

Table 5.5 Overview of the EU Emission Directive 2004/26 for railway locomotives and motorcars.

Engine size [kW]	CO	HC	NO _x	HC+NO _x	PM	Implement.
	[g pr kWh]	[g pr kWh]	[g pr kWh]	[g pr kWh]	[g pr kWh]	date
Locomotives Stage IIIA						
130=<P<560	RL A	3.5	-	-	4	0.2
560=<P	RH A	3.5	0.5	6	-	0.2
2000=<P and piston displacement =>= 5 l/cyl.	RH A	3.5	0.4	7.4	-	0.2
Stage IIIB						
	RB	3.5	-	-	4	0.025
Motor cars Stage IIIA						
130=<P	RC A	3.5	-	-	4	0.2
Stage IIIB						
130=<P	RC B	3.5	0.19	2	-	0.025
						1/1 2012

Aircraft engine emissions of NO_x, CO, VOC and smoke are regulated by ICAO (International Civil Aviation Organization). The engine emission certification standards are contained in Annex 16 – Environmental Protection, Volume II – Aircraft Engine Emissions to the Convention on International Civil Aviation (ICAO Annex 16, 1993). The emission standards relate to the total emissions (in grams) from the so-called LTO (Landing and Take Off) cycle divided by the rated engine thrust (kN). The ICAO LTO cycle contains

the idealised aircraft movements below 3000 ft (915 m) during approach, landing, airport taxiing, take off and climb out.

For smoke, all aircraft engines manufactured from 1 January 1983 have to meet the emission limits agreed by ICAO. For NO_x, CO and VOC, the emission legislation is relevant for aircraft engines with a rated engine thrust larger than 26.7 kN. In the case of CO and VOC, the ICAO regulations apply for engines manufactured from 1 January 1983.

For NO_x, the emission regulations fall in four categories:

- a) For engines of a type or model for which the date of manufacture of the first individual production model is on or before 31 December 1995, and for which the production date of the individual engine is on or before 31 December 1999.
- b) For engines of a type or model for which the date of manufacture of the first individual production model is after 31 December 1995, or for individual engines with a production date after 31 December 1999.
- c) For engines of a type or model for which the date of manufacture of the first individual production model is after 31 December 2003.
- d) For engines of a type or model for which the date of manufacture of the first individual production model is after 31 December 2007.

The regulations published by ICAO are given in the form of the total quantity of pollutants (D_p) emitted in the LTO cycle divided by the maximum sea level thrust (F_{oo}) and plotted against engine pressure ratio at maximum sea level thrust.

The limit values for NO_x are given by the formula in Table 5.6.

Table 5.6 Current certification limits for NO_x for turbo jet and turbo fan engines.

	Engines first produced before 31.12.1995 & for engines manufactured up to 31.12.1999	Engines first produced after 31.12.1995 & for engines manufactured after 31.12.1999	Engines for which the date of manufacture of the first individual production model was after 31 December 2003	Engines for which the date of manufacture of the first individual production model was after 31 December 2007
Applies to engines >26.7 kN	$D_p/F_{\infty} = 40 + 2\pi_{\infty}$	$D_p/F_{\infty} = 32 + 1.6\pi_{\infty}$		
Engines of pressure ratio less than 30				
Thrust more than 89 kN			$D_p/F_{\infty} = 19 + 1.6\pi_{\infty}$	$D_p/F_{\infty} = 16.72 + 1.4080\pi_{\infty}$
Thrust between 26.7 kN and not more than 89 kN			$D_p/F_{\infty} = 37.572 + 1.6\pi_{\infty} - 0.208F_{\infty}$	$D_p/F_{\infty} = 38.54862 + (1.6823\pi_{\infty}) - (0.2453F_{\infty}) - (0.00308\pi_{\infty}F_{\infty})$
Engines of pressure ratio more than 30 and less than 62.5				
Thrust more than 89 kN			$D_p/F_{\infty} = 7 + 2.0\pi_{\infty}$	$D_p/F_{\infty} = -1.04 + (2.0*\pi_{\infty})$
Thrust between 26.7 kN and not more than 89 kN			$D_p/F_{\infty} = 42.71 + 1.4286\pi_{\infty} - 0.4013F_{\infty} + 0.00642\pi_{\infty}F_{\infty}$	$D_p/F_{\infty} = 46.1600 + (1.4286\pi_{\infty}) - (0.5303F_{\infty}) - (0.00642\pi_{\infty}F_{\infty})$
Engines with pressure ratio 82.6 or more			$D_p/F_{\infty} = 32 + 1.6\pi_{\infty}$	$D_p/F_{\infty} = 32 + 1.6\pi_{\infty}$

Source: International Standards and Recommended Practices, Environmental Protection, ICAO Annex 16 Volume II Part III Paragraph 2.3.2, 2nd edition July 1993, plus amendments: Amendment 3 (20 March 1997), Amendment 4 (4 November 1999), Amendment 5 (24 November 2005).

where:

D_p = the sum of emissions in the LTO cycle in g

F_{∞} = thrust at sea level take-off (100 %)

π_{∞} = pressure ratio at sea level take-off thrust point (100 %)

The equivalent limits for HC and CO are $D_p/F_{\infty} = 19.6$ for HC and $D_p/F_{\infty} = 118$ for CO (ICAO Annex 16 Vol. II paragraph 2.2.2). Smoke is limited to a regulatory smoke number = 83 (F_{∞})^{-0.274} or a value of 50, whichever is the lower.

A further description of the technical definitions in relation to engine certification as well as actual engine exhaust emission measurement data can be found in the ICAO Engine Exhaust Emission Database. The latter database is accessible from <http://www.caa.co.uk>, hosted by the UK Civil Aviation Authority.

For seagoing vessels, NO_x emissions are regulated as explained in Marpol 73/78 Annex VI, formulated by IMO (International Maritime Organisation). The legislation is relevant for diesel engines with a power output higher than 130 kW, which are installed on a ship constructed on or after 1 January 2000 and diesel engines with a power output higher than 130 kW which undergo major conversion on or after 1 January 2000.

The NO_x emission limits for ship engines in relation to their rated engine speed (n) given in RPM (Revolutions Per Minute) are the following:

- 17 g pr kWh, n < 130 RPM.
- 45 x n-0.2 g pr kWh, 130 ≤ n < 2000 RPM.
- 9.8 g pr kWh, n ≥ 2000 RPM.

Further, the Marine Environment Protection Committee (MEPC) of IMO agreed amendments to MARPOL Annex VI in October 2008 in order to strengthen the emission standards for NO_x and the sulphur contents of heavy fuel oil used by ship engines.

For NO_x emission regulations, a three tiered approach is considered, which comprises the following:

- Tier I: Diesel engines (> 130 kW) installed on a ship constructed on or after 1 January 2000 and prior to 1 January 2011.
- Tier II: Diesel engines (> 130 kW) installed on a ship constructed on or after 1 January 2011.
- Tier III¹⁴: Diesel engines (> 130 kW) installed on a ship constructed on or after 1 January 2016.

As for the existing NO_x emission limits, the new Tier I-III NO_x legislation values rely on the rated engine speeds. The emission limit equations are shown in Table 5.7.

Table 5.7 Tier I-III NO_x emission limits for ship engines (amendments to MARPOL Annex VI).

	NO _x limit	RPM (n)
Tier I	17 g pr kWh	n < 130
	45 x n-0.2 g pr kWh	130 ≤ n < 2000
	9.8 g pr kWh	n ≥ 2000
Tier II	14.4 g pr kWh	n < 130
	44 x n-0.23 g pr kWh	130 ≤ n < 2000
	7.7 g pr kWh	n ≥ 2000
Tier III	3.4 g pr kWh	n < 130
	9 x n-0.2 g pr kWh	130 ≤ n < 2000
	2 g pr kWh	n ≥ 2000

The Tier I emission limits are identical with the existing emission limits from MARPOL Annex VI.

Also agreed by IMO in October 2008, the NO_x Tier I limits are to be applied for existing engines with a power output higher than 5000 kW and a displacement pr cylinder at or above 90 litres, installed on a ship constructed on or after 1 January 1990 but prior to 1 January 2000.

In relation to the sulphur content in heavy fuel and marine gas oil used by ship engines, Table 5.8 shows the current legislation in force, and the further amendment of MARPOL Annex VI agreed by IMO in October 2008.

¹⁴ For ships operating in a designated Emission Control Area. Outside a designated Emission Control Area, Tier II limits apply.

Table 5.8 Current legislation in relation to marine fuel quality.

Legislation	Heavy fuel oil		Gas oil	
	S- %	Impl. date (day/month/yea r)	S- %	Impl. date
EU-directive 93/12	None		0.2 ¹	1.10.1994
EU-directive 1999/32	None		0.2	1.1.2000
EU-directive 2005/33 ²	SECA - Baltic sea 1.5	11.08.2006	0.1	1.1.2008
	SECA - North sea Outside SECA's	1.5 None	0.1	1.1.2008
MARPOL Annex VI	SECA - Baltic sea SECA - North sea Outside SECA	1.5 1.5 4.5	19.05.2006 21.11.2007 19.05.2006	
MARPOL Annex VI amendments	SECA's SECA's Outside SECA's Outside SECA's	1 0.1 3.5 0.5	01.03.2010 01.01.2015 01.01.2012 01.01.2020 ³	

¹ Sulphur content limit for fuel sold inside EU.² From 1.1.2010 fuel with a sulphur content higher than 0.1 % must not be used in EU ports for ships at berth exceeding two hours³ Subject to a feasibility review to be completed no later than 2018. If the conclusion of such a review becomes negative the effective date would default 1 January 2025.

For non road machinery, the EU directive 2003/17/EC gives a limit value of 50 ppm sulphur in diesel (from 2005).

5.3 Fuel consumption and emission factors

The CO₂ emission factors are country-specific and come from the DEA. The N₂O emission factors are taken from the EMEP/EEA guidebook (EMEP/EEA, 2009).

The SO₂ emission factors are fuel related, and rely on the sulphur contents given in the relevant EU fuel directives or in the Danish legal announcements. However, for jet fuel the default factor from IPCC (2000) is used. Road transport diesel is assumed to be used by engines in military and railways, and road transport gasoline is assumed to be used by non road working machinery and recreational craft. Hence, these types of machinery have the same SO₂ emission factors, as for road transport.

For all mobile sources, the emission factor source for NH₃, heavy metals and PAH is the EMEP/EEA guidebook (EMEP/EEA, 2009). The heavy metal emission factors for road transport and other mobile sources except national sea transport and fisheries originate from Winther and Slentø (2010). For civil aviation jet fuel, no heavy metal emission factors are proposed due to lack of data.

For military ground equipment, aggregated emission factors for gasoline and diesel are derived from road traffic emission simulations. For piston engine aircraft using aviation gasoline, aggregated emission factors for conventional cars are used.

For railways, specific Danish measurements from the Danish State Railways (DSB) (Delvig, 2011) are used to calculate the emission factors of NO_x, VOC, CO and TSP, and a NMVOC/CH₄ split is made based on expert judgment.

For agriculture, forestry, industry, household gardening and inland waterways, the NO_x, VOC, CO and TSP emission factors are derived from various European measurement programmes and the current EU emission legislation; see IFEU (2004) and Winther and Nielsen (2006). The NMVOC/CH₄ split is taken from USEPA (2004). The baseline emission factors are shown in Annex 11.

For national sea transport and fisheries, the NO_x emission factors predominantly come from the engine manufacturer MAN Diesel, as a function of engine production year. The CO, VOC and TSP emission factors come from the Danish TEMA2000 emission model (Ministry of Transport, 2000), whereas the PM₁₀ and PM_{2.5} size fractions are obtained from MAN Diesel.

Specifically for the ferries used by Mols Linjen new NO_x, VO and CO emission factors are provided by Kristensen (2008), originating from measurement results by Hansen and Jensen (2004), Wismann (1999) and PHP (1996).

For ship engines VOC/CH₄ splits are taken from EMEP/EEA (2009), and all emission factors are shown in Annex 13.

The source for aviation (jet fuel) emission factors is the EMEP/EEA guidebook (EMEP/EEA, 2009). For a number of different representative aircraft types, the EMEP/EEA guidebook comprises fuel flow and NO_x, CO and VOC emission indices for the four LTO modes and distance based emission factors for cruise.

For all sectors, emission factors are given in CollectER format in Annex 15 for 2010. Table 5.9 shows the aggregated emission factors in 2010 for CO₂, CH₄, N₂O, SO₂, NO_x, NMVOC, CO, NH₃ and TSP used to calculate the emissions from other mobile sources in Denmark.

Table 5.9 Fuel-specific emission factors for other mobile sources in Denmark.

Emission factors ¹⁵		CH ₄	CO ₂	N ₂ O	SO ₂	NO _x	NMVOC	CO	NH ₃	TSP
Category	Fuel type	g pr GJ	kg pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ
Military	AvGas	21.90	73.00	2.00	22.99	859.00	1242.60	6972.00	1.60	10.00
Military	Diesel	1.76	74.00	2.80	0.47	362.43	18.55	99.64	0.36	13.88
Military	Gasoline	7.28	73.00	1.58	0.44	114.24	166.31	1499.83	21.86	1.59
Military	Jet fuel	2.65	72.00	2.30	22.99	250.57	24.94	229.89	0.00	1.16
Railways	Diesel	2.22	74.00	2.04	0.47	861.00	57.78	147.00	0.20	29.00
Inland waterways	Diesel	2.61	74.00	2.97	46.84	834.21	160.37	443.15	0.17	98.22
Inland waterways	Gasoline	62.64	73.00	1.46	0.46	536.58	1176.04	13132.16	0.10	36.12
National sea traffic	Diesel	1.51	74.00	4.68	46.84	950.95	51.95	84.45	0.00	21.55
National sea traffic	Residual oil	1.93	78.00	4.89	489.00	1901.30	62.53	206.29	0.00	43.98
Fishing	Diesel	1.78	74.00	4.68	46.84	1373.14	57.40	189.36	0.00	21.55
International sea traffic	Diesel	1.76	74.00	4.68	489.00	2114.39	62.58	206.46	0.00	43.98
International sea traffic	Residual oil	1.94	78.00	4.89	22.83	859.00	1242.60	6972.00	1.60	10.00
Air Dom. LTO, other airports	AvGas	21.90	73.00	2.00	22.99	284.91	12.67	135.85	0.00	1.16
Air Dom. LTO, other airports	Jet fuel	1.35	72.00	10.60	22.83	859.00	1242.60	6972.00	1.60	10.00
Air Int. LTO, other airports	AvGas	21.90	73.00	2.00	22.99	300.20	21.33	172.31	0.00	1.16
Air Int. LTO, other airports	Jet fuel	2.27	72.00	7.43	22.99	259.66	8.48	107.16	0.00	1.16
Air Dom. cruise, other airports	Jet fuel	0.90	72.00	2.30	22.99	238.78	6.06	50.18	0.00	1.16
Air Int. cruise, other airports	Jet fuel	0.64	72.00	2.30	2.34	597.19	57.54	339.56	0.18	45.70
Agriculture	Diesel	0.94	74.00	3.17	0.46	111.24	1198.22	21839.49	1.52	31.17
Agriculture	Gasoline	160.47	73.00	1.72	2.34	410.67	30.56	245.71	0.18	27.30
Forestry	Diesel	0.50	74.00	3.21	0.46	65.70	5061.02	17576.18	0.09	80.63
Forestry	Gasoline	40.93	73.00	0.45	2.34	553.14	60.60	320.23	0.18	52.14
Industry	Diesel	0.99	74.00	3.10	0.46	209.05	1535.64	13878.11	0.10	17.69
Industry	Gasoline	108.73	73.00	1.48	0.00	1328.11	146.09	104.85	0.21	4.89
Industry	LPG	7.69	63.10	3.50	0.46	100.65	2363.13	29784.64	0.09	16.72
Household and gardening	Gasoline	75.84	73.00	1.25	0.46	91.81	1867.73	30544.46	0.09	28.18
Commercial and institutional	Gasoline	67.37	73.00	1.12	22.83	859.00	1242.60	6972.00	1.60	10.00
Air Dom. LTO, Copenhagen	AvGas	21.90	73.00	2.00	22.99	277.85	14.59	181.79	0.00	1.16
Air Dom. LTO, Copenhagen	Jet fuel	1.55	72.00	7.00	22.83	859.00	1242.60	6972.00	1.60	10.00
Air Int. LTO, Copenhagen	AvGas	21.90	73.00	2.00	22.99	336.87	32.23	239.55	0.00	1.16
Air Int. LTO, Copenhagen	Jet fuel	3.42	72.00	3.96	22.99	269.07	11.59	59.94	0.00	1.16
Air Dom. cruise, Copenhagen	Jet fuel	1.23	72.00	2.30	22.99	305.04	9.40	32.03	0.00	1.16
Air Int. cruise, Copenhagen	Jet fuel	1.00	72.00	2.30	22.99	859.00	1242.60	6972.00	1.60	10.00

¹⁵ References. CO₂ and SO₂: Country-specific. N₂O and NH₃: EMEP/EEA. NO_x, VOC, CO and TSP: Railways: Danish State Railways; Agriculture, forestry, industry, household gardening and inland waterways: IFEU; National sea transport and fishing: MAN B&W (NO_x) and TEMA2000 (VOC, CO, TSP); Aviation - jet fuel: EMEP/EEA. NMVOC/CH₄-split: Railways: DSB/DCE; Agriculture/Forestry/Industry/Household-Gardening: IFEU/USEPA; National sea traffic/Fishing/International sea traffic: Trafikministeriet/EMEP/EEA; Aviation - jet fuel: EMEP/EEA. Aviation - av.gasoline: Aggregated emission factors for conventional gasoline cars. Military: Aggregated emission factors for road transport.

Factors for deterioration, transient loads and gasoline evaporation for non road machinery

The emission effects of engine wear are taken into account for diesel and gasoline engines by using the so-called deterioration factors. For diesel engines alone, transient factors are used in the calculations, to account for the emission changes caused by varying engine loads. The evaporative emissions of NMVOC are estimated for gasoline fuelling and tank evaporation. The factors for deterioration, transient loads and gasoline evaporation are taken from IFEU (2004), and are shown in Annex 11. For more details regarding the use of these factors, please refer to paragraph 5.4.2 or Winther and Nielsen (2006).

5.4 Calculation method

5.4.1 Air traffic

For aviation, the domestic and international estimates are made separately for landing and take-off (LTOs < 3000 ft), and cruising (> 3000 ft).

By using the LTO mode specific fuel flow and emission indices from EMEP/EEA (2009), the fuel consumption and emission factors for the full LTO cycle can be estimated for each of the representative aircraft types used in the Danish inventory.

The fuel consumption for one LTO cycle is calculated according to the following sum formula:

$$FC_{LTO}^a = \sum_{m=1}^4 t_m \cdot ff_{a,m} \quad (15)$$

Where FC = fuel consumption (kg), m = LTO mode (approach/landing, taxiing, take off, climb out), t = times in mode (s), ff = fuel flow (kg pr s), a = representative aircraft type.

The emissions for one LTO cycle are estimated as follows:

$$E_{LTO}^a = \sum_{m=1}^4 FC_{a,m} \cdot EI_{a,m} \quad (16)$$

Due to lack of specific airport data, for approach/descent, take off and climb out, standardised times-in-modes of 4, 0.7 and 2.2 mins are used as defined by ICAO (ICAO, 1999), whereas for taxiing the appropriate time interval is 13 mins in Copenhagen Airport and 5 mins in other airports present in the Danish inventory.

For each representative aircraft type, the calculated fuel consumption and emission factors per LTO are shown in Annex 10 for Copenhagen Airport and other airports.

The calculations for cruise use the distance specific fuel consumption and emissions given by EMEP/EEA (2009) per representative aircraft type. Data interpolations or extrapolations are made – in each case determined by the great circle distance between the origin and the destination airports.

If the great circle distance, y , is smaller than the maximum distance for which fuel consumption and emission data are known the fuel consumption or emission $E(y)$ becomes:

$$E(y) = E_{x_i} + \frac{(y - x_i)}{x_{i+1} - x_i} \cdot (E_{x_{i+1}} - E_{x_i}) \quad y < x_{\max}, i = 0, 1, 2, \dots, \max-1 \quad (17)$$

In (15) x_i and x_{\max} denote the separate distances and the maximum distance, respectively, with known fuel consumption and emissions. If the flight distance y exceeds x_{\max} the maximum figures for fuel consumption and emissions must be extrapolated and the equation then becomes:

$$E(y) = E_{x_{\max}} + \frac{(y - x_{\max})}{x_{\max} - x_{\max-1}} \cdot (E_{x_{\max}} - E_{x_{\max-1}}) \quad y > x_{\max} \quad (18)$$

Total results are summed up and categorised according to each flight's destination airport code in order to distinguish between domestic and international flights.

Annex 10 shows the average fuel consumption and emission factors per representative aircraft type for cruise flying, as well as total distance flown, for 2010¹⁶. The factors are split between Copenhagen Airport and other airports and distinguish between domestic and international flights. Factors for the full 2001-2010 time series can be accessed via
<http://www.dmu.dk/luft/emissioner/emissioninventory/>

Specifically for flights between Denmark and Greenland or the Faroe Islands, for each representative aircraft type, the flight distances are directly shown in Annex 10, which go into the cruise calculation expressions 17 and 18.

The overall fuel precision in the model is around 0.8, derived as the fuel ratio between model estimates and statistical sales. The fuel difference is accounted for by adjusting cruising fuel consumption and emissions in the model according to domestic and international cruising fuel shares.

Prior to 2001, the calculation procedure was first to estimate each year's fuel consumption and emissions for LTO. Secondly, total cruising fuel consumption was found year by year as the statistical fuel consumption total minus the calculated fuel consumption for LTO. Lastly, the cruising fuel consumption was split into a domestic and international part by using the results from a Danish city-pair emission inventory in 1998 (Winther, 2001a). For more details of this latter fuel allocation procedure, see Winther (2001b).

5.4.2 Non-road working machinery and recreational craft

Prior to adjustments for deterioration effects and transient engine operations, the fuel consumption and emissions in year X , for a given machinery type, engine size and engine age, are calculated as:

$$E_{Basis}(X)_{i,j,k} = N_{i,j,k} \cdot HRS_{i,j,k} \cdot P \cdot LF_i \cdot EF_{y,z} \quad (19)$$

¹⁶ Excluding flights for Greenland and the Faroe Islands.

where E_{Basis} = fuel consumption/emissions in the basic situation, N = number of engines, HRS = annual working hours, P = average rated engine size in kW, LF = load factor, EF = fuel consumption/emission factor in g pr kWh, i = machinery type, j = engine size, k = engine age, y = engine-size class and z = emission level. The basic fuel consumption and emission factors are shown in Annex 11.

The deterioration factor for a given machinery type, engine size and engine age in year X depends on the engine-size class (only for gasoline), y, and the emission level, z. The deterioration factors for diesel and gasoline 2-stroke engines are found from:

$$DF_{i,j,k}(X) = \frac{K_{i,j,k}}{LT_i} \cdot DF_{y,z} \quad (20)$$

where DF = deterioration factor, K = engine age, LT = lifetime, i = machinery type, j = engine size, k = engine age, y = engine-size class and z = emission level.

For gasoline 4-stroke engines the deterioration factors are calculated as:

$$DF_{i,j,k}(X) = \sqrt{\frac{K_{i,j,k}}{LT_i}} \cdot DF_{y,z} \quad (21)$$

The deterioration factors inserted in (20) and (21) are shown in Annex 11. No deterioration is assumed for fuel consumption (all fuel types) or for LPG engine emissions and, hence, DF = 1 in these situations.

The transient factor for a given machinery type, engine size and engine age in year X, relies only on emission level and load factor, and is denominated as:

$$TF_{i,j,k}(X) = TF_z \quad (22)$$

Where i = machinery type, j = engine size, k = engine age and z = emission level.

The transient factors inserted in (20) are shown in Annex 11. No transient corrections are made for gasoline and LPG engines and, hence, $TF_z = 1$ for these fuel types.

The final calculation of fuel consumption and emissions in year X for a given machinery type, engine size and engine age, is the product of the expressions 19-22:

$$E(X)_{i,j,k} = E_{Basis}(X)_{i,j,k} \cdot TF(X)_{i,j,k} \cdot (1 + DF(X)_{i,j,k}) \quad (23)$$

The evaporative hydrocarbon emissions from fuelling are calculated as:

$$E_{Evap,fueling,i} = FC_i \cdot EF_{Evap,fueling} \quad (24)$$

Where $E_{\text{Evap,fueling}}$ = hydrocarbon emissions from fuelling, i = machinery type, FC = fuel consumption in kg, $EF_{\text{Evap,fueling}}$ = emission factor in g NMVOC pr kg fuel.

For tank evaporation, the hydrocarbon emissions are found from:

$$E_{\text{Evap,tank},i} = N_i \cdot EF_{\text{Evap,tank},i} \quad (25)$$

Where $E_{\text{Evap,tank},i}$ = hydrocarbon emissions from tank evaporation, N = number of engines, i = machinery type and $EF_{\text{Evap,fueling}}$ = emission factor in g NMVOC pr year.

5.4.3 Ferries, other national sea transport and fisheries

The fuel consumption and emissions in year X, for regional ferries are calculated as:

$$E(X) = \sum_i N_i \cdot T_i \cdot S_{i,j} \cdot P_i \cdot LF_j \cdot EF_{k,l,y} \quad (26)$$

Where E = fuel consumption/emissions, N = number of round trips, T = sailing time pr round trip in hours, S = ferry share of ferry service round trips, P = engine size in kW, LF = engine load factor, EF = fuel consumption/emission factor in g pr kWh, i = ferry service, j = ferry, k = fuel type, l = engine type, y = engine year.

For the remaining navigation categories, the emissions are calculated using a simplified approach:

$$E(X) = \sum_i EC_{i,k} EF_{k,l,y} \quad (27)$$

Where E = fuel consumption/emissions, EC = energy consumption, EF = fuel consumption/emission factor in g pr kg fuel, i = category (local ferries, other national sea, fishery, international sea), k = fuel type, l = engine type, y = average engine year.

The emission factor inserted in (27) is found as an average of the emission factors representing the engine ages which are comprised by the average lifetime in a given calculation year, X:

$$EF_{k,l,y} = \frac{\sum_{\text{year}=X-LT}^{year=X} EF_{k,l}}{LT_{k,l}} \quad (28)$$

5.4.4 Other sectors

For military and railways, the emissions are estimated with the simple method using fuel-related emission factors and fuel consumption from the DEA:

$$E = FC \cdot EF \quad (29)$$

where E = emission, FC = fuel consumption and EF = emission factor. The calculated emissions for other mobile sources are shown in CollectER format in Annex 15 for the years 1990 and 2010 and as time series 1990-2010 in Annex 16 (CRF format).

5.5 Fuel balance between DEA statistics and inventory estimates

Following convention rules, the DEA statistical fuel sales figures are the basis for the full Danish inventory. However, in some cases for mobile sources the DEA statistical sectors do not fully match the inventory sectors. This is the case for non road machinery, where relevant DEA statistical sectors also include fuel consumed by stationary sources.

In other situations, fuel consumption figures estimated by DCE from specific bottom-up calculations are regarded as more reliable than DEA reported sales. This is the case for national sea transport.

In the following the transferral of fuel consumption data from DEA statistics into inventory relevant categories is explained for national sea transport and fisheries, non road machinery and recreational craft, and road transport. A full list of all fuel consumption data, DEA figures as well as intermediate fuel consumption data, and final inventory input figures is shown in Annex 14.

National sea transport and fisheries

For national sea transport in Denmark, the fuel consumption estimates obtained by DCE (see 5.1.3 Activity data – national sea transport) are regarded as more accurate than the DEA fuel sales data, since the large fluctuations in reported fuel sales cannot be explained by the actual development in the traffic between different national ports. As a consequence, the bottom-up estimates from DCE are used in the Danish inventory for national sea transport.

There are different potential reasons for the differences between estimated fuel consumption and reported sales for national sea transport in Denmark. According to the DEA, the latter fuel differences are most likely explained by inaccurate customer specifications made by the oil suppliers. This inaccuracy can be caused by a sector misallocation in the sales statistics between national sea transport and fisheries for gas oil, and between national sea transport and industry for heavy fuel oil (Peter Dal, DEA, personal communication, 2007). Further, fuel sold for vessels sailing between Denmark and Greenland/Faroe Islands are reported as international in the DEA statistics, and this fuel categorisation is different from the IPCC guideline definitions (see following paragraph “Bunkers”).

Following this, for fisheries and industry the updated fuel consumption time series for national sea transport lead, in turn, to changes in the fuel activity data for fisheries (gas oil), industry (heavy fuel oil) and international sea transport, so the national energy balance can remain unchanged.

For fisheries, fuel investigations made prior to the initiation of the work made by Winther (2008) have actually pointed out a specific issue of inaccuracy in the DEA statistics. No engines installed in fishing vessels use heavy fuel oil, even though a certain amount of heavy fuel oil is listed in the DEA

numbers for some statistical years (H. Amdissen, Danish Fishermen's Association, personal communication, 2006). Hence, for fisheries small amounts of fuel oil are transferred to national sea transport, and in addition small amounts of gasoline and diesel are transferred to recreational craft.

Non road machinery and recreational craft

For diesel and LPG, the non-road fuel consumption estimated by DCE is partly covered by the fuel consumption amounts in the following DEA sectors: agriculture and forestry, market gardening, and building and construction. The remaining quantity of non-road diesel and LPG is taken from the DEA industry sector.

For gasoline, the DEA residential sector, together with the DEA sectors mentioned for diesel and LPG, contribute to the non-road fuel consumption total. In addition, a certain amount of fuel from road transport is needed to reach the fuel consumption goal.

The amount of diesel and LPG in DEA industry not being used by non-road machinery is included in the sectors, "Combustion in manufacturing industry" (0301) and "Non-industrial combustion plants" (0203) in the Danish emission inventory.

For recreational craft, the calculated fuel consumption totals for diesel and gasoline are subsequently subtracted from the DEA fishery sector. For gasoline, the DEA reported fuel consumption for fisheries is far too small to fill the fuel gap, and hence the missing fuel amount is taken from the DEA road transport sector.

5.6 Bunker fuel definition by IPCC

The distinction between domestic and international emissions from aviation and navigation should be in accordance with the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. For the national emission inventory, this, in principle, means that fuel sold (and associated emissions) for flights/sea transportation starting from a seaport/airport in the Kingdom of Denmark (Denmark, Greenland and the Faroe Islands), with destinations inside or outside the Kingdom of Denmark, are regarded as domestic or international, respectively.

Aviation

As prescribed by the IPCC guidelines, for aviation, the fuel consumption and emissions associated with flights inside the Kingdom of Denmark are counted as domestic.

This report includes flights from airports in Denmark and associated jet fuel sales. Hence, the flights between airports in Denmark and flights from Denmark to Greenland and the Faroe Islands are classified as domestic and flights from Danish airports with destinations outside the Kingdom of Denmark are classified as international flights.

In Greenland and in the Faroe Islands, the jet fuel sold is treated as domestic. This decision becomes reasonable when considering that almost no fuel is bunkered in Greenland/the Faroe Islands by flights other than those going to Denmark.

Navigation

In DEA statistics, the domestic fuel total consists of fuel sold to Danish ferries and other ships sailing between two Danish ports. The DEA international fuel total consists of the fuel sold in Denmark to international ferries, international warships, other ships with foreign destinations, transport to Greenland and the Faroe Islands, tank vessels and foreign fishing boats.

In order to follow the IPCC guidelines the bottom-up fuel estimates for the ferry routes between Denmark and the Faroe Islands, and freight transport between Denmark and Greenland/Faroe Islands are being subtracted from the fuel sales figures for international sea transport prior to inventory fuel input.

In Greenland, all marine fuel sales are treated as domestic. In the Faroe Islands, fuel sold in Faroese ports for Faroese fishing vessels and other Faroese ships is treated as domestic. The fuel sold to Faroese ships bunkering outside Faroese waters and the fuel sold to foreign ships in Faroese ports or outside Faroese waters is classified as international (Lastein and Winther, 2003).

Conclusively, the domestic/international fuel split (and associated emissions) for navigation is not determined with the same precision as for aviation. It is considered, however, that the potential of incorrectly allocated fuel quantities is only a small part of the total fuel sold for navigational purposes in the Kingdom of Denmark.

6 Fuel consumption and emissions

Table 6.1 Fuel consumption [PJ] for domestic transport in 2010 in CRF sectors.

CRF ID	Fuel consumption (PJ)
Industry-Other (1A2f)	14.2
Civil Aviation (1A3a)	2.2
Road (1A3b)	165.6
Railways (1A3c)	3.3
Navigation (1A3d)	7.9
Comm./Inst. (1A4a)	2.4
Residential (1A4b)	0.9
Agri./for./fish. (1A4c)	25.2
Military (1A5)	1.5
Total	223.0

Table 6.1 shows the fuel consumption for domestic transport based on DEA statistics for 2010 in NFR sectors. The fuel consumption figures in time series 1985-2010 are given in Annex 16 (NFR format) and are shown for 2010 in Annex 15 (CollectER format). Road transport has a major share of the fuel consumption for domestic transport. In 2010 this sector's fuel consumption share was 74 %, while the fuel consumption shares for Agriculture/forestry/fisheries and Industry-Other were 11 and 6 %, respectively. For the remaining sectors, the total fuel consumption share was 9 %.

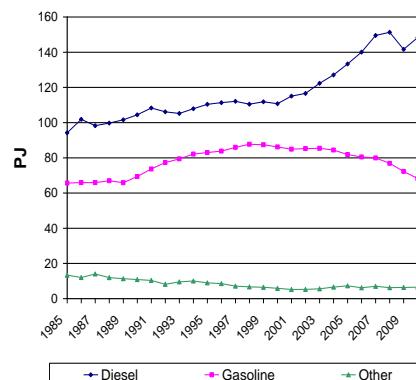


Figure 6.1 Fuel consumption pr fuel type for domestic transport 1985-2010.

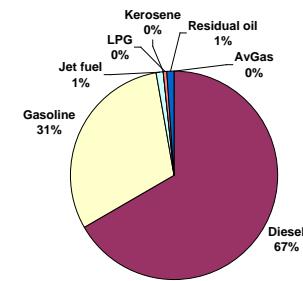


Figure 6.2 Fuel consumption share pr fuel type for domestic transport in 2010.

From 1985 to 2010, diesel and gasoline fuel consumption increased by 57 % and 4 %, respectively, and in 2010 the fuel consumption shares for diesel and gasoline were 67 % and 31 %, respectively (Figures 6.1 and 6.2). Other fuels only had a 2 % share of the domestic transport total. Almost all gasoline was used in road transportation vehicles. Gardening machinery and recreational craft were merely small consumers. Regarding diesel, there was considerable fuel consumption in most of the domestic transport categories, whereas a more limited use of residual oil and jet fuel was being used in the navigation sector and by aviation (civil and military flights), respectively.

Road transport

As shown in Figure 6.1, the fuel consumption for road transport¹⁷ generally increased until 2007, except from a small fuel consumption decline noted in 2000. The impact of the global financial crisis on fuel consumption for road transport became visible for 2008 and 2009. This fuel consumption development was due to a slight decreasing trend in the use of gasoline fuels from 1999 onwards combined with a steady growth in the use of diesel until 2007. Within sub-sectors, passenger cars represent the most fuel-consuming vehicle category, followed by heavy-duty vehicles, light duty vehicles and 2-wheelers, in decreasing order (Figure 6.4).

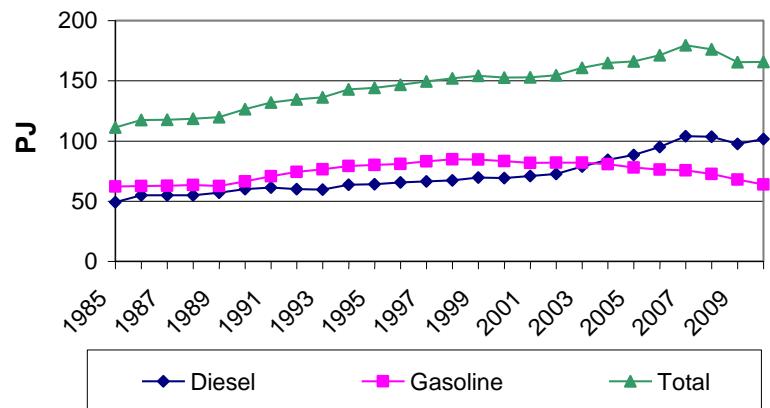


Figure 6.3 Fuel consumption pr fuel type and as totals for road transport 1985-2010.

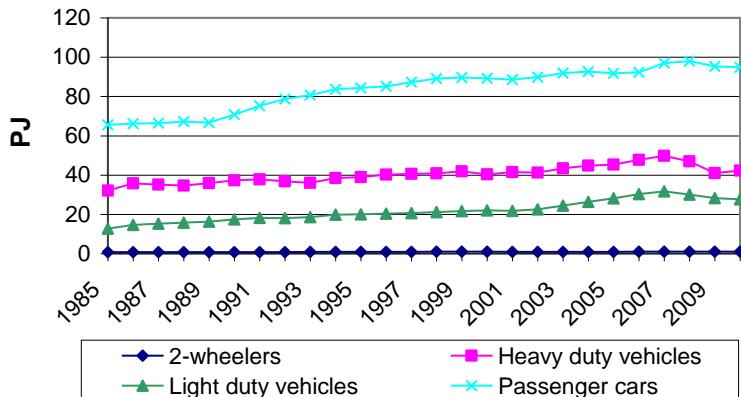


Figure 6.4 Total fuel consumption pr vehicle type for road transport 1985-2010.

As shown in Figure 6.5 fuel consumption for gasoline passenger cars dominated the overall gasoline consumption trend. The development in diesel fuel consumption in recent years (Figure 6.6) was characterised by increasing fuel consumption for diesel passenger cars, while declines in the fuel consumption for trucks and buses (heavy-duty vehicles) and light duty vehicles were noted for 2008 and 2009.

¹⁷ The gasoline and diesel fuel sums include small amounts of bio ethanol and bio diesel; 1.7 % and 0.02 %, respectively in 2010.

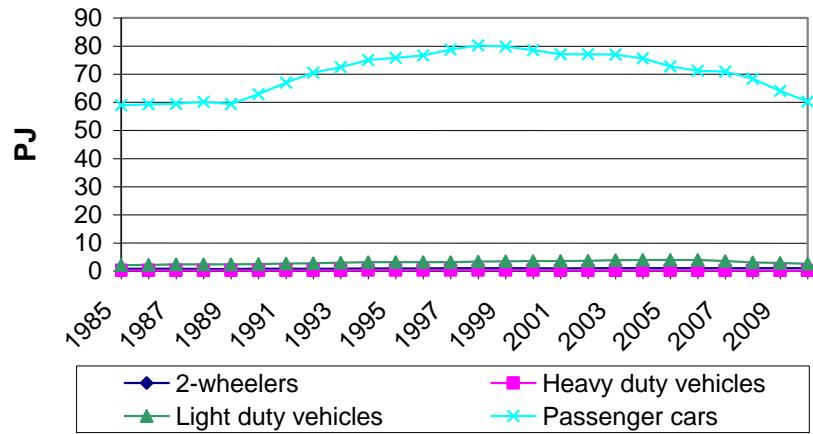


Figure 6.5 Gasoline fuel consumption pr vehicle type for road transport 1985-2010.

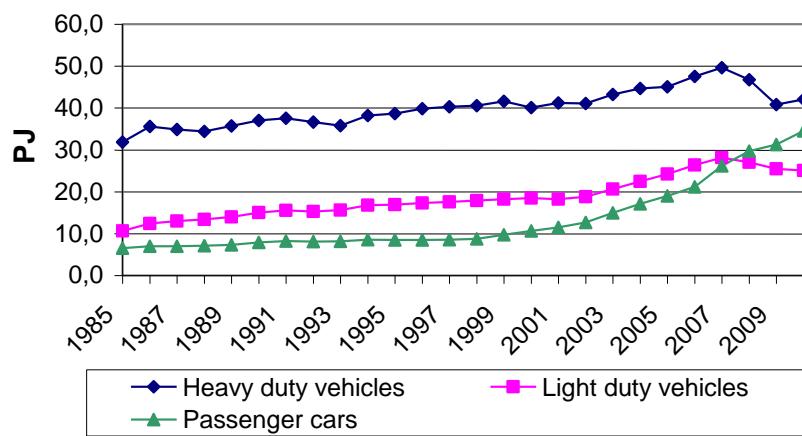


Figure 6.6 Diesel fuel consumption pr vehicle type for road transport 1985-2010.

In 2010, fuel consumption shares for gasoline passenger cars, heavy-duty vehicles, diesel passenger cars, diesel light duty vehicles and gasoline light duty vehicles were 36, 25, 21, 15 and 2 %, respectively (Figure 6.7).

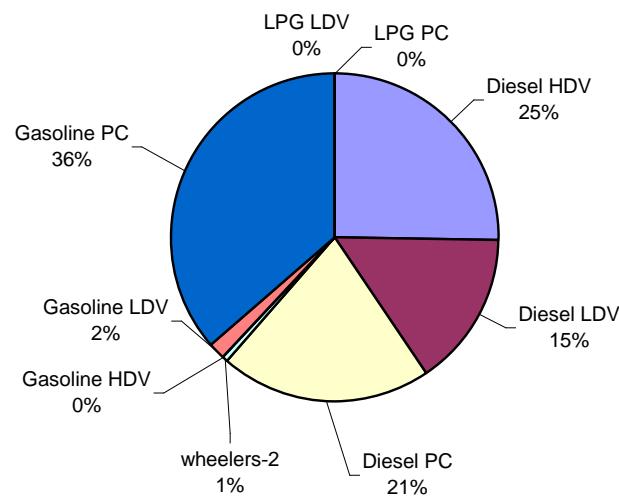


Figure 6.7 Fuel consumption share (PJ) per vehicle type for road transport in 2010.

Other mobile sources

It must be noted that the fuel consumption figures behind the Danish inventory for mobile equipment in the agriculture, forestry, industry, household and gardening (residential), and inland waterways (part of navigation) sectors, are less certain than for other mobile sectors. For these types of machin-

ery, the DEA statistical figures do not directly provide fuel consumption information, and fuel consumption totals are subsequently estimated from activity data and fuel consumption factors. For recreational craft the latest historical year is 2004.

As seen in Figure 6.8, classified according to CRF the most important sectors are Agriculture/forestry/fisheries (1A4c), Industry-other (mobile machinery part of 1A2f) and Navigation (1A3d). Minor fuel consuming sectors were Civil Aviation (1A3a), Railways (1A3c), Other (military mobile fuel consumption: 1A5), Commercial/institutional (1A4a) and Residential (1A4b).

The 1985-2010 time series are shown pr fuel type in Figures 6.9-6.12 for diesel, gasoline and jet fuel, respectively.

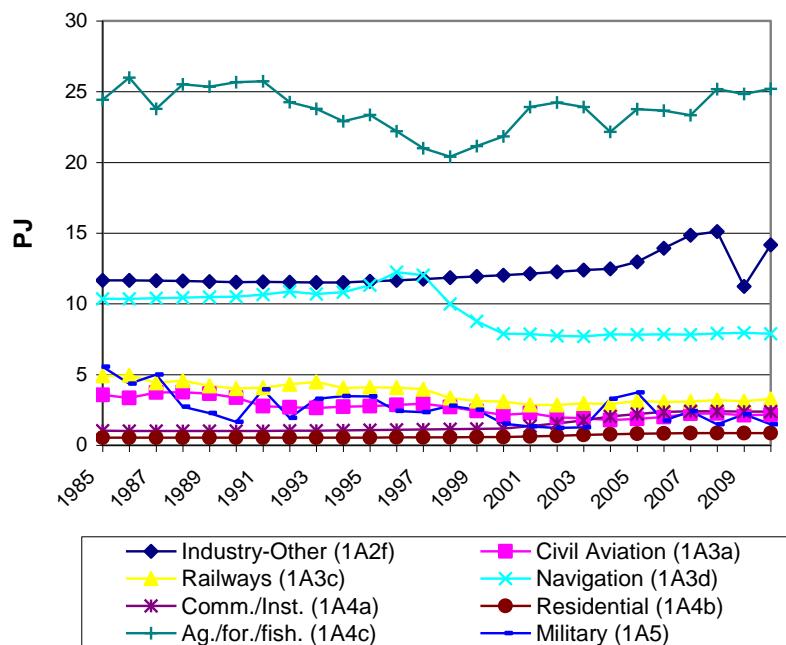


Figure 6.8 Total fuel consumption in CRF sectors for other mobile sources 1985-2010.

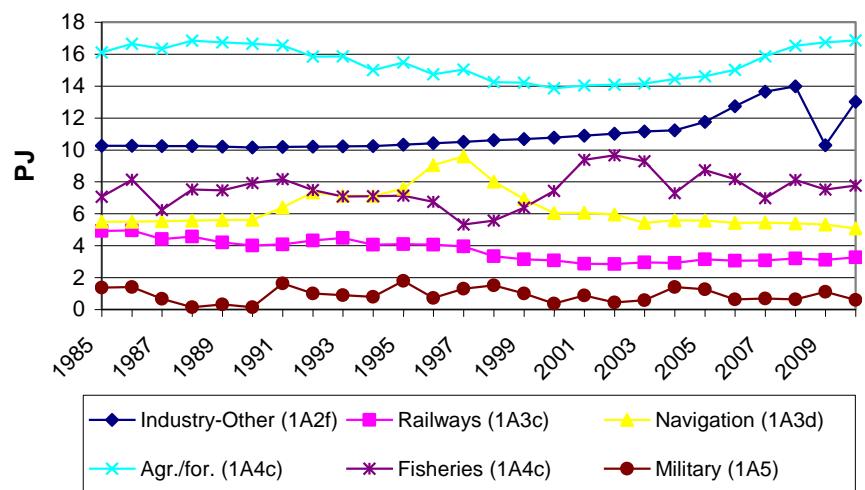


Figure 6.9 Diesel fuel consumption in CRF sectors for other mobile sources 1985-2010.

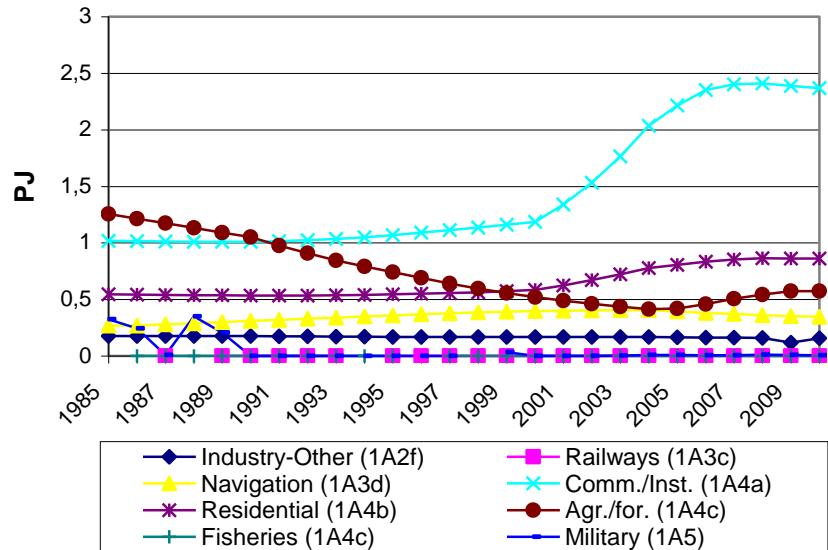


Figure 6.10 Gasoline fuel consumption in CRF sectors for other mobile source 1985-2010.

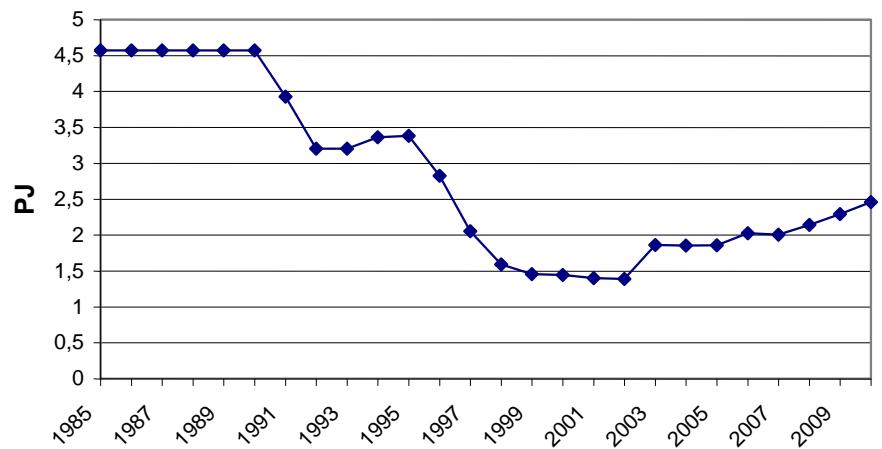


Figure 6.11 Residual oil fuel consumption in CRF sectors for other mobile sources 1985-2010.

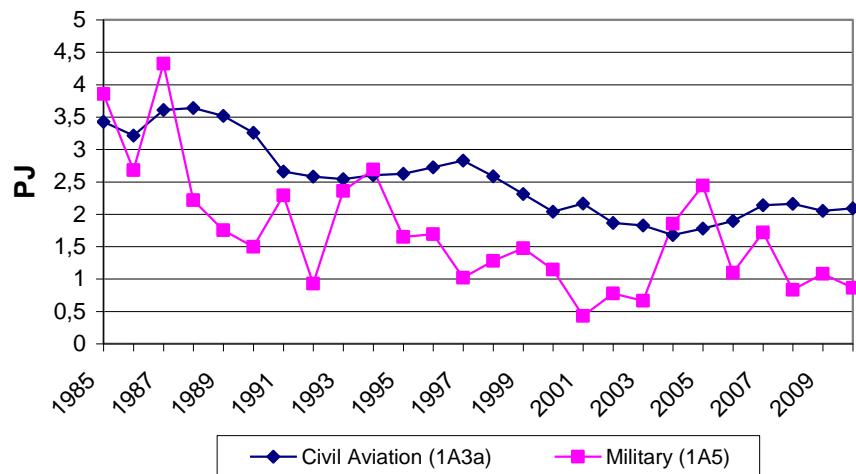


Figure 6.12 Jet fuel consumption in CRF sectors for other mobile sources 1985-2010.

In terms of diesel, the fuel consumption decreased for agricultural machines until 2000, due to fewer numbers of tractors and harvesters. After that, the increase in the engine sizes of new sold machines more than outbalanced the trend towards smaller total stock numbers. The fuel consumption for industry increased from the beginning of the 1990's due to an increase in the activities for construction machinery. The fuel consumption increase was very pronounced in 2005-2008; however, for 2009 the global financial crisis had a significant impact on the building and construction activities. For fisheries, the development in fuel consumption reflects the activities in this sector.

The Navigation sector comprises national sea transport (fuel consumption between two Danish ports including sea travel directly between Denmark and Greenland/Faroe Islands) and recreational craft. For the latter category, fuel consumption increased significantly from 1990 to 2004 due to the rising number of diesel-fuelled private boats. For national sea transport, the diesel fuel consumption curve reflects the combination of traffic and ferries in use for regional ferries. From 1998 to 2000, a significant decline in fuel consumption is apparent. The most important explanation here is the closing of ferry service routes in connection with the opening of the Great Belt Bridge in 1997. For railways, the gradual shift towards electrification explains the lowering trend in diesel fuel consumption and the emissions for this transport sector. The fuel consumed (and associated emissions) to produce electricity is accounted for in the stationary combustion part of the Danish inventories.

The largest gasoline fuel consumption is found for household and gardening machinery in the Commercial/Institutional (1A4a) and Residential (1A4b) sectors. Especially from 2001-2006, a significant fuel consumption increase is apparent due to considerable growth in the machinery stock. The decline in gasoline fuel consumption for Agriculture/forestry/fisheries (1A4c) is due to the gradual phasing out of gasoline-fuelled agricultural tractors.

In terms of residual oil there was a substantial decrease in the fuel consumption for regional ferries. The fuel consumption decline was most significant from 1990-1992 and from 1997-1999.

The considerable variations from one year to another in military jet fuel consumption are due to planning and budgetary reasons, and the passing demand for flying activities. Consequently, for some years, a certain amount of jet fuel stock-building might disturb the real picture of aircraft fuel consumption. Civil aviation decreased until 2004, since the opening of the Great Belt Bridge in 1997, both in terms of number of flights and total jet fuel consumption. After 2004 an increase in the consumption of jet fuel is noted until 2007/2008.

Bunkers

The residual oil and diesel oil fuel consumption fluctuations reflect the quantity of fuel sold in Denmark to international ferries, international warships, other ships with foreign destinations, transport to Greenland and the Faroe Islands, tank vessels and foreign fishing boats. For jet petrol, the sudden fuel consumption drop in 2002 is explained by the recession in the air traffic sector due to the events of September 11, 2001 and structural changes in the aviation business. In 2009, the impact of the global financial crisis on flying activities becomes very visible.

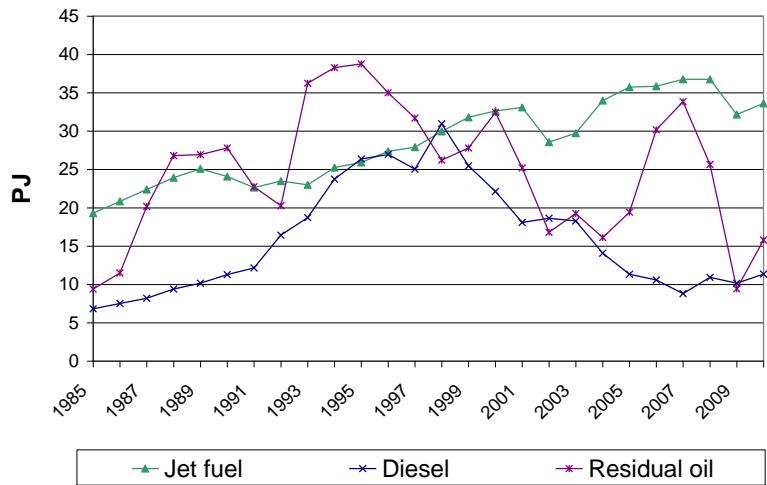


Figure 6.13 Bunker fuel consumption 1985-2010.

6.1 Emissions of CO₂, CH₄ and N₂O

In Table 6.2 the CO₂, CH₄ and N₂O emissions for road transport and other mobile sources are shown for 2010 in CRF sectors. The emission figures in time series 1990-2010 are given in Annex 16 (CRF format) and are shown for 1990 and 2010 in Annex 15 (CollectER format).

From 1990 to 2010 the road transport emissions of CO₂ and N₂O increased by 30 and 24 %, respectively, whereas the emissions of CH₄ decreased by 74 % (from Figures 3.3.14 - 616). From 1990 to 2010 the other mobile CO₂ emissions decreased by 2 %, (from Figures 6.18 - 6.20).

Table 6.2 Emissions of CO₂, CH₄ and N₂O in 2010 for road transport and other mobile sources.

CRF Sector	CH ₄ tonnes	CO ₂ ktonnes	N ₂ O tonnes
Industry-Other (1A2f)	37	1 037	44
Civil Aviation (1A3a)	4	156	8
Railways (1A3c)	7	242	7
Navigation (1A3d)	35	593	35
Comm./Inst. (1A4a)	160	173	3
Residential (1A4b)	65	63	1
Ag./for./fish. (1A4c)	113	1 865	91
Military (1A5)	4	107	4
Total other mobile	425	4 235	192
Road (1A3b)	644	12 108	385
Total mobile	1 069	16 343	577

Road transport

CO₂ emissions are directly fuel consumption dependent and, in this way, the development in the emission reflects the trend in fuel consumption. As shown in Figure 6.14, the most important emission source for road transport is passenger cars, followed by heavy-duty vehicles, light-duty vehicles and 2-wheelers in decreasing order. In 2010, the respective emission shares were 56, 26, 17 and 1 %, respectively (Figure 6.17).

The majority of CH₄ emissions from road transport came from gasoline passenger cars (Figure 6.15). The emission drop from 1992 onwards is explained by the penetration of catalyst cars into the Danish fleet. The 2010 emission shares for CH₄ were 53, 24, 19 and 4 % for passenger cars, heavy-duty vehicles, 2-wheelers and light-duty vehicles, respectively (Figure 6.17).

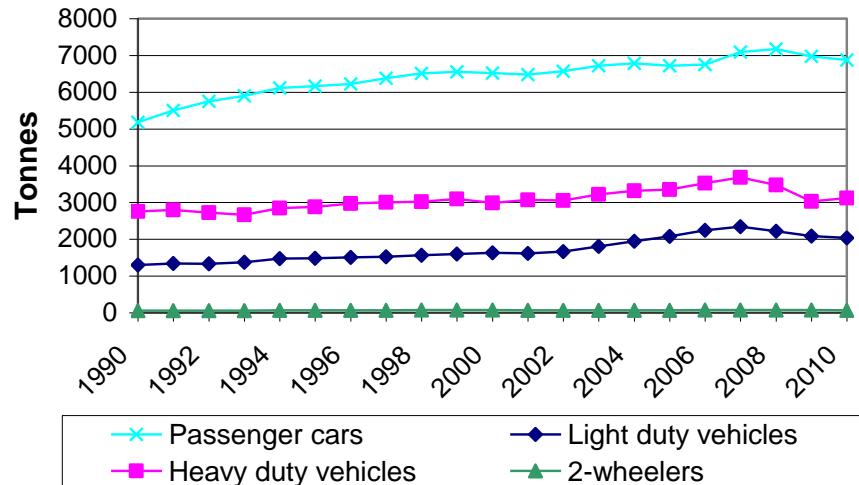


Figure 6.14 CO₂ emissions (k-tonnes) pr vehicle type for road transport 1990-2010.

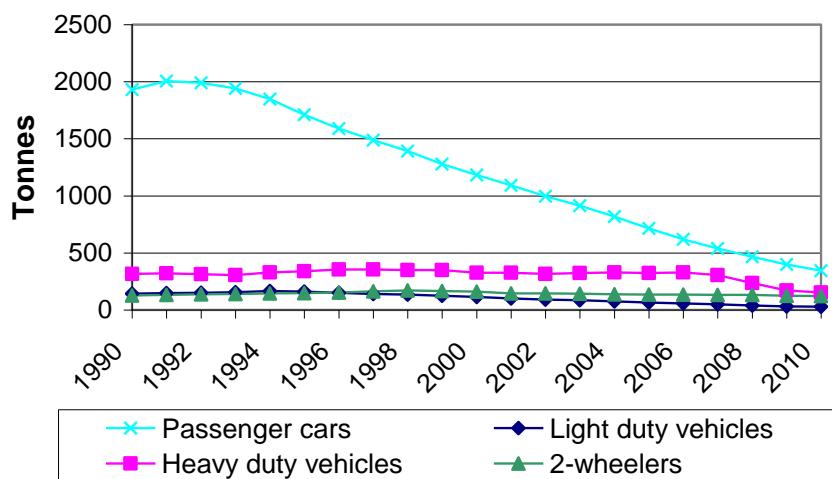


Figure 6.15 CH₄ emissions (tonnes) pr vehicle type for road transport 1990-2010.

An undesirable environmental side effect of the introduction of catalyst cars is the increase in the emissions of N₂O from the first generation of catalyst cars (Euro 1) compared to conventional cars. The emission factors for later catalytic converter technologies are considerably lower than the ones for Euro 1, thus causing the emissions to decrease from 1998 onwards (Figure 6.16). In 2010, emission shares for passenger cars, heavy and light-duty vehicles were 52, 31 and 17 %, of the total road transport N₂O, respectively (Figure 6.17).

Referring to the second IPCC assessment report, 1 g CH₄ and 1 g N₂O has the greenhouse effect of 21 and 310 g CO₂, respectively. In spite of the relatively large CH₄ and N₂O global warming potentials, the largest contribution to the total CO₂ emission equivalents for road transport comes from CO₂, and the CO₂ emission equivalent shares pr vehicle category are almost the same as the CO₂ shares.

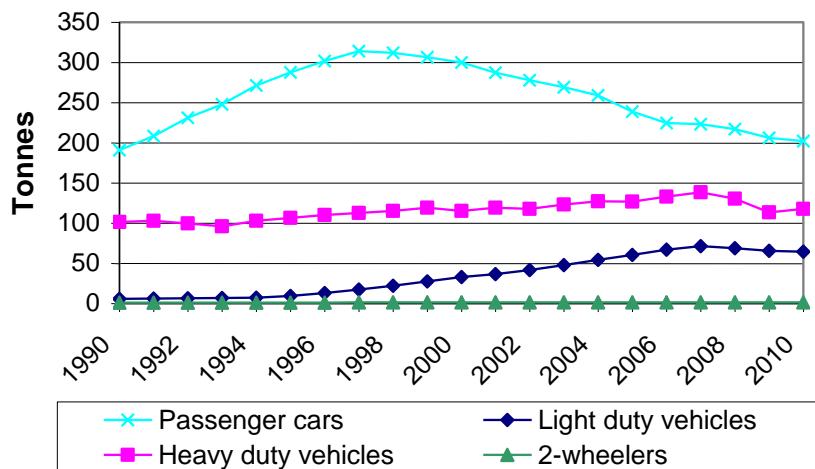


Figure 6.16 N₂O emissions (tonnes) pr vehicle type for road transport 1990-2010.

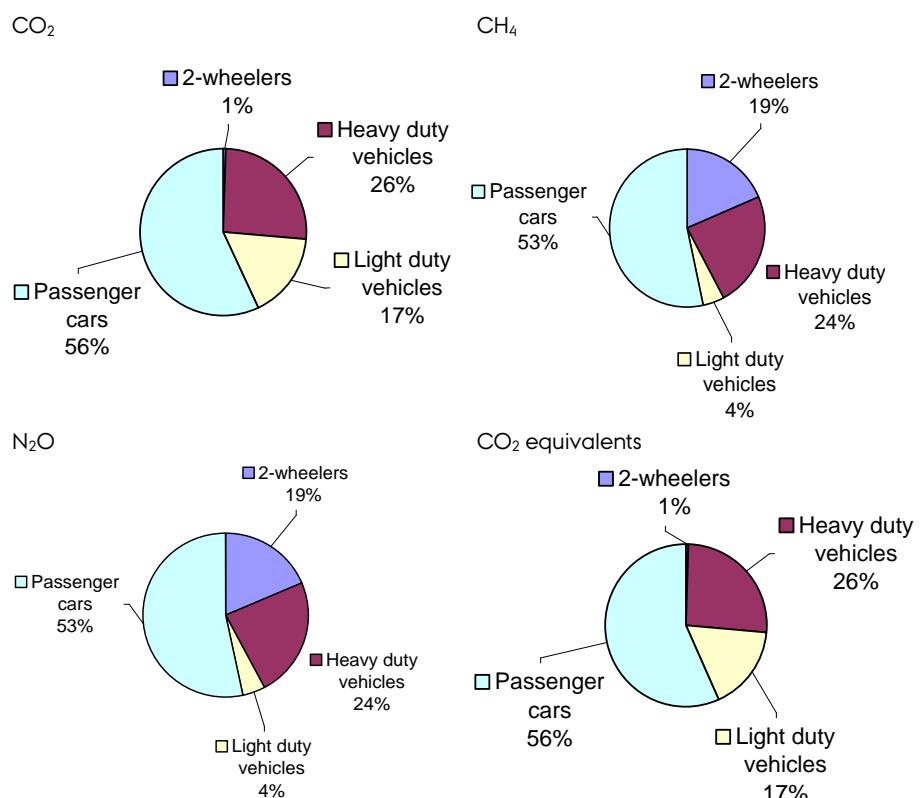


Figure 6.17 CO₂, CH₄ and N₂O emission shares and GHG equivalent emission distribution for road transport in 2010.

Other mobile sources

For other mobile sources, the highest CO₂ emissions in 2010 came from Agriculture/forestry/fisheries (1A4c), Industry-other (1A2f) and Navigation (1A3d), with shares of 44, 24 and 14 %, respectively (Figure 6.21). The 1990-2010 emission trend is directly related to the fuel consumption development in the same time-period. Minor CO₂ emission contributors were sectors such as Commercial/Institutional (1A4a), Residential (1A4b), Railways (1A3c), Civil Aviation (1A3a) and Military (1A5).

For CH₄, far the most important sources were the gasoline fuelled gardening machinery in the Commercial/Institutional (1A4a) and Residential (1A4b) sectors, see Figure 6.21. The emission shares were 38 % and 15 %, respective-

ly in 2010. The 2010 emission shares for Agriculture/forestry/fisheries (1A4c), Industry (1A2f) and Navigation (1A3d) were 26, 9 and 8 %, respectively, whereas the remaining sectors had emission shares of 2 % or less.

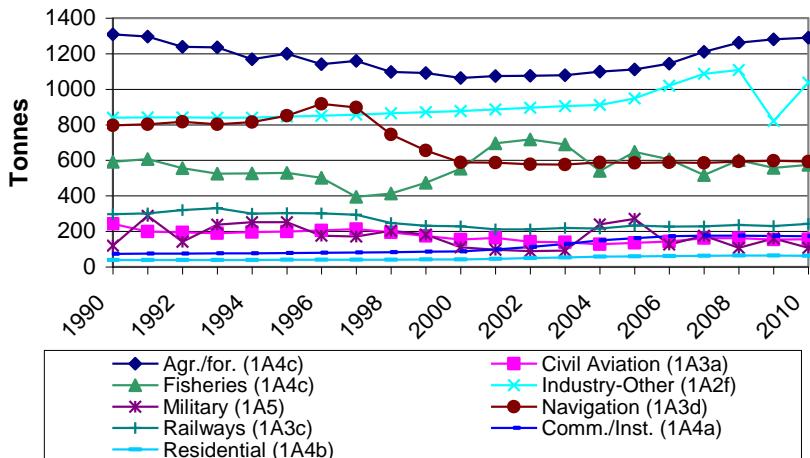


Figure 6.18 CO₂ emissions (ktonnes) in CRF sectors for other mobile sources 1990-2010.

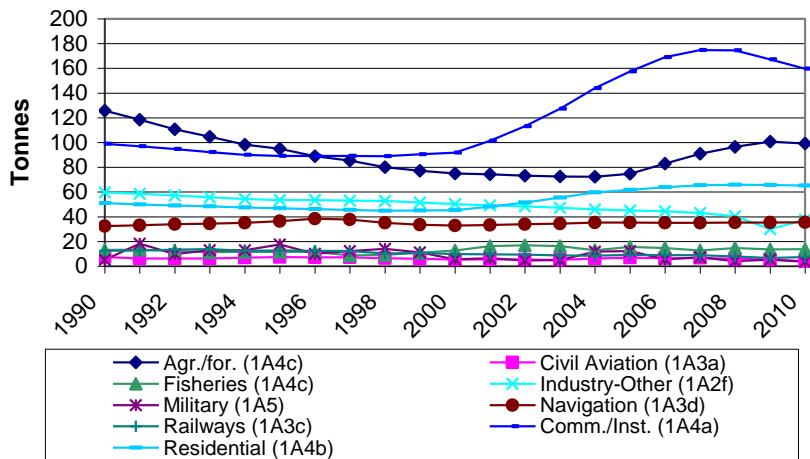


Figure 6.19 CH₄ emissions (tonnes) in CRF sectors for other mobile sources 1990-2010.

For N₂O, the emission trend in sub-sectors is the same as for fuel consumption and CO₂ emissions (Figure 6.20).

As for road transport, CO₂ alone contributed with by far the most CO₂ emission equivalents in the case of other mobile sources, and pr sector the CO₂ emission equivalent shares were almost the same as those for CO₂, itself (Figure 6.21).

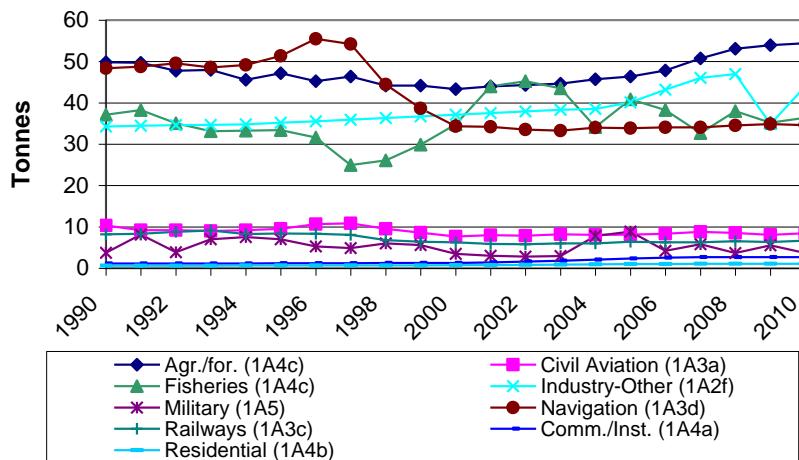


Figure 6.20 N₂O emissions (tonnes) in CRF sectors for other mobile sources 1990-2010.

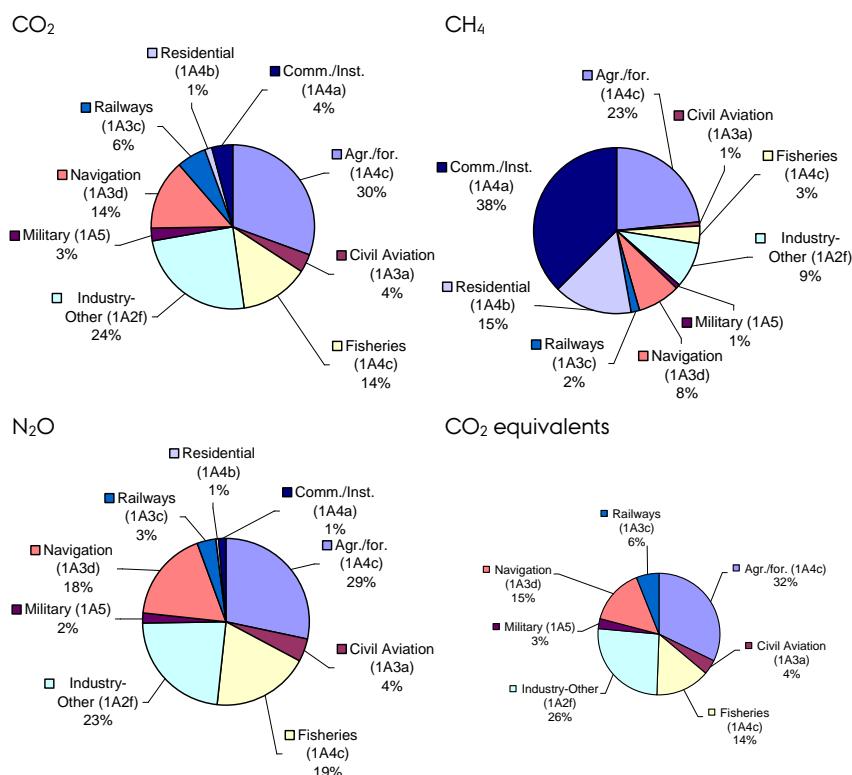


Figure 6.21 CO₂, CH₄ and N₂O emission shares and GHG equivalent emission distribution for other mobile sources in 2010.

6.2 Emissions of SO₂, NO_x, NMVOC, CO, NH₃, TSP, PM₁₀ and PM_{2.5}

In Table 6.3 the SO₂, NO_x, NMVOC, CO, NH₃, TSP, PM₁₀ and PM_{2.5} emissions for road transport and other mobile sources are shown for 2010 in NFR sectors. For particulate matter (PM; TSP, PM₁₀ and PM_{2.5}), only the exhaust emission contributions are included in Table 6.3. Non-exhaust TSP, PM₁₀ and PM_{2.5} emissions are treated in a separate section below. The emission figures in the time series 1985-2010 are given in Annex 16 (CRF format) and are shown for 2010 in Annex 15 (CollectER format).

From 1985 to 2010, the road transport emissions of SO₂, NO_x, NMVOC, CO and PM (all size fractions) decreased by 99, 52, 84, 72 and 65 %, respectively

(Figures 6.22-6.26), whereas the NH₃ emissions increased by 2232 % during the same time period (Figure 6.27).

For other mobile sources, the emission changes for SO₂, NO_x, NMVOC, CO and PM (all size fractions) were -88, -17, -28, -8 and -65 %, respectively (Figures 6.29-6.33). The NH₃ emissions increased by 17 % during the same time period (Figure 6.34).

Table 6.3 Emissions of SO₂, NO_x, NMVOC, CO, NH₃, TSP, PM₁₀ and PM_{2.5} in 2010 for road transport and other mobile sources.

NFR ID	SO ₂	NO _x	NMVOC	CO	NH ₃	TSP	PM ₁₀	PM _{2.5}
	tonnes	tonnes	tonnes	tonnes	tonnes	TSP	tonnes	tonnes
Industry-Other (1A2f)	31	8 540	1 173	6 446	3	686	686	686
Civil Aviation (1A3a)	50	623	109	688	0	3	3	3
Railways (1A3c)	2	2 818	189	481	1	95	95	95
Navigation (1A3d)	1 440	9 582	937	5 841	0	307	305	304
Comm./Inst. (1A4a)	1	217	4 423	72 338	0	67	67	67
Residential (1A4b)	0	87	2 032	25 616	0	14	14	14
Ag./for./fish. (1A4c)	404	20 770	2 374	19 380	4	957	955	954
Military (1A5)	20	438	41	309	0	9	9	9
Total other mobile	1 947	43 075	11 279	131 100	8	2 138	2 135	2 133
Road (1A3b)		76	44 159	12 514	105 972	1 433	1 513	1 513
Total mobile	2 023	87 235	23 793	237 072	1441	6 133	5 252	4 514

Road transport

The step-wise lowering of the sulphur content in diesel fuel has given rise to a substantial decrease in the road transport emissions of SO₂ (Figure 6.22). In 1999, the sulphur content was reduced from 500 ppm to 50 ppm (reaching gasoline levels), and for both gasoline and diesel the sulphur content was reduced to 10 ppm in 2005. Since Danish diesel and gasoline fuels have the same sulphur percentages, at present, the 2010 shares for SO₂ emissions and fuel consumption for passenger cars, heavy-duty vehicles, light-duty vehicles and 2-wheelers were the same in each case: 56, 26, 17 and 1 %, respectively (Figure 6.28).

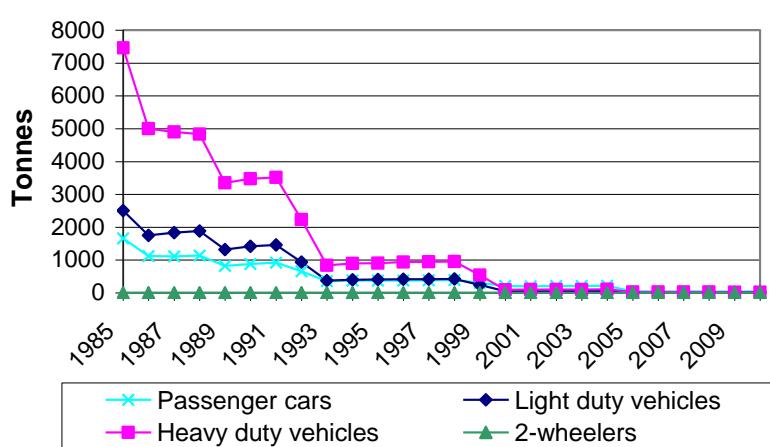


Figure 6.22 SO₂ emissions (tonnes) per vehicle type for road transport 1985-2010.

Historically, the emission totals of NMVOC and CO have been very dominated by the contributions coming from private cars, as shown in Figures 6.24-6.25. However, the NMVOC and CO (and NO_x) emissions from this vehicle type have shown a steady decreasing tendency since the introduction of private catalyst cars in 1990 (EURO I) and the introduction of even more

emission-efficient EURO II, III and IV private cars (introduced in 1997, 2001 and 2006, respectively).

In the case of NO_x, the real traffic emissions for heavy duty vehicles do not follow the reductions as intended by the EU emission legislation. This is due to the so-called engine cycle-beating effect. Outside the legislative test cycle stationary measurement points, the electronic engine control for heavy duty Euro II and III engines switches to a fuel efficient engine running mode, thus leading to increasing NO_x emissions (Figure 3.62).

Exhaust particulate emissions from road transportation vehicles are well below PM_{2.5}. The emissions from light- and heavy-duty vehicles significantly decreased since the mid-1990s due to gradually stricter EURO emission standards. The environmental benefit of introducing diesel private cars with lower particulate emissions since 1990 was more than outbalanced by an increase in sales of new vehicles in recent years (Figure 6.23).

An undesirable environmental side effect of the introduction of catalyst cars is the increase in the emissions of NH₃ from the first two generations of catalyst cars (Euro I and II) compared to conventional cars. The emission factors for later catalytic converter technologies are considerably lower than the ones for Euro I and II, thus causing the emissions to decrease from 2001 onwards (Figure 6.27).

The 2010 emission shares for heavy-duty vehicles, passenger cars, light-duty vehicles and 2-wheelers for NO_x (52, 35, 13 and 0 %), NMVOC (5, 58, 8 and 18 %), CO (6, 77, 7, 10 %), PM (25, 37, 35 and 3 %) and NH₃ (1, 96, 3 and 0 %), are also shown in Figure 6.28.

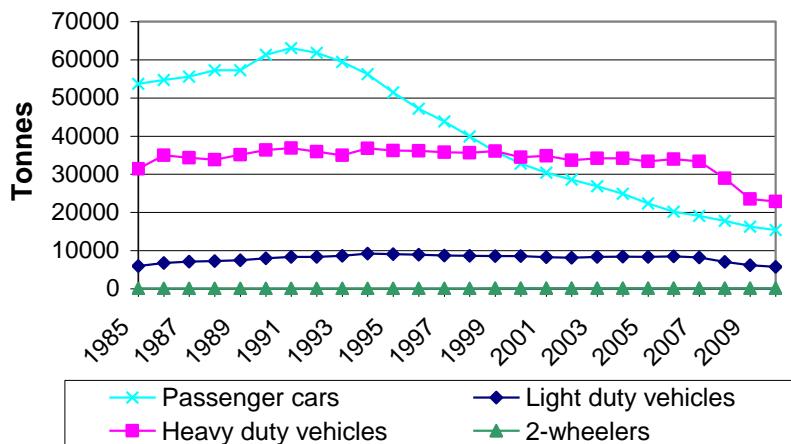


Figure 6.23 NO_x emissions (tonnes) per vehicle type for road transport 1985-2010.

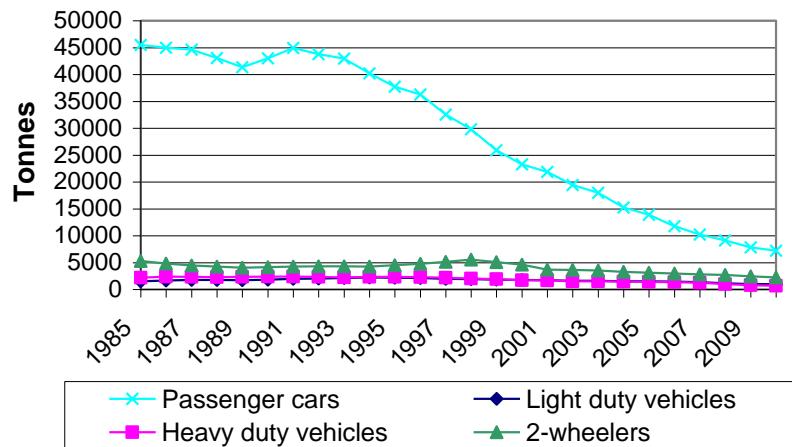


Figure 6.24 NMVOC emissions (tonnes) per vehicle type for road transport 1985-2010.

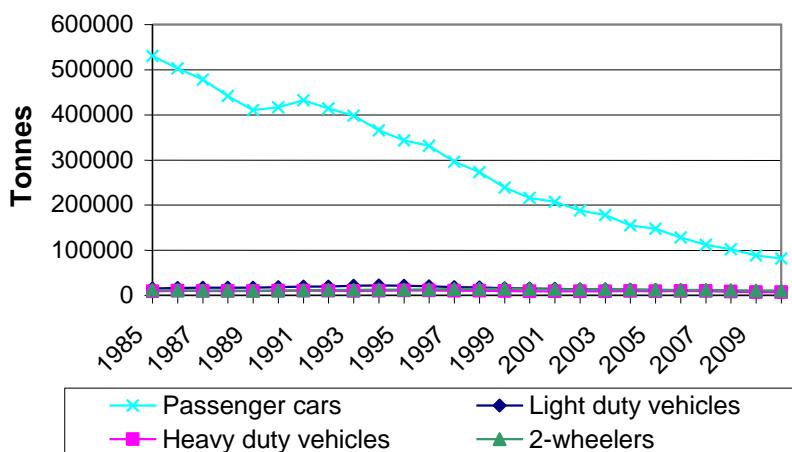


Figure 6.25 CO emissions (tonnes) per vehicle type for road transport 1985-2010.

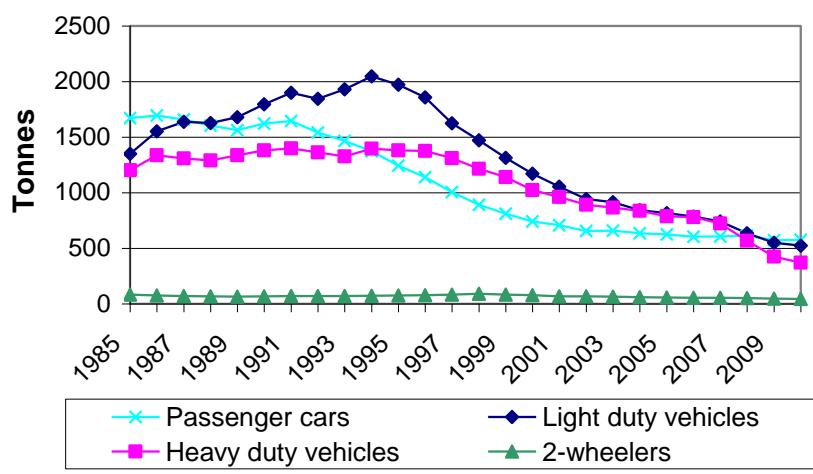


Figure 6.26 PM emissions (tonnes) per vehicle type for road transport 1985-2010.

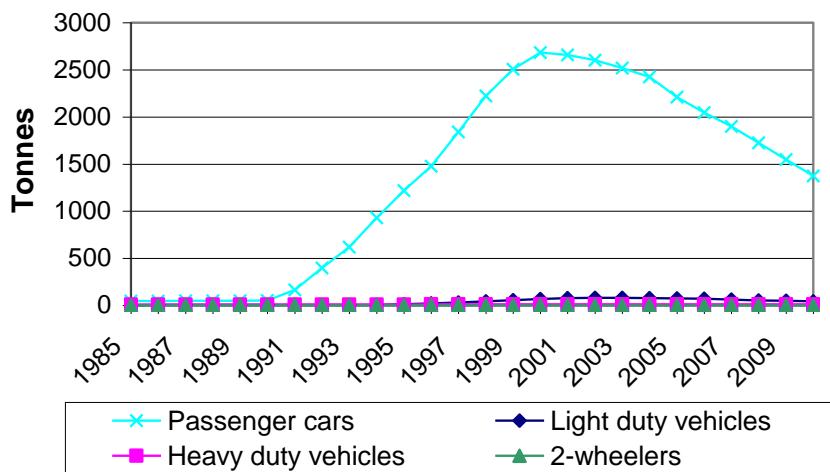


Figure 6.27 NH₃ emissions (tonnes) pr vehicle type for road transport 1985-2010.

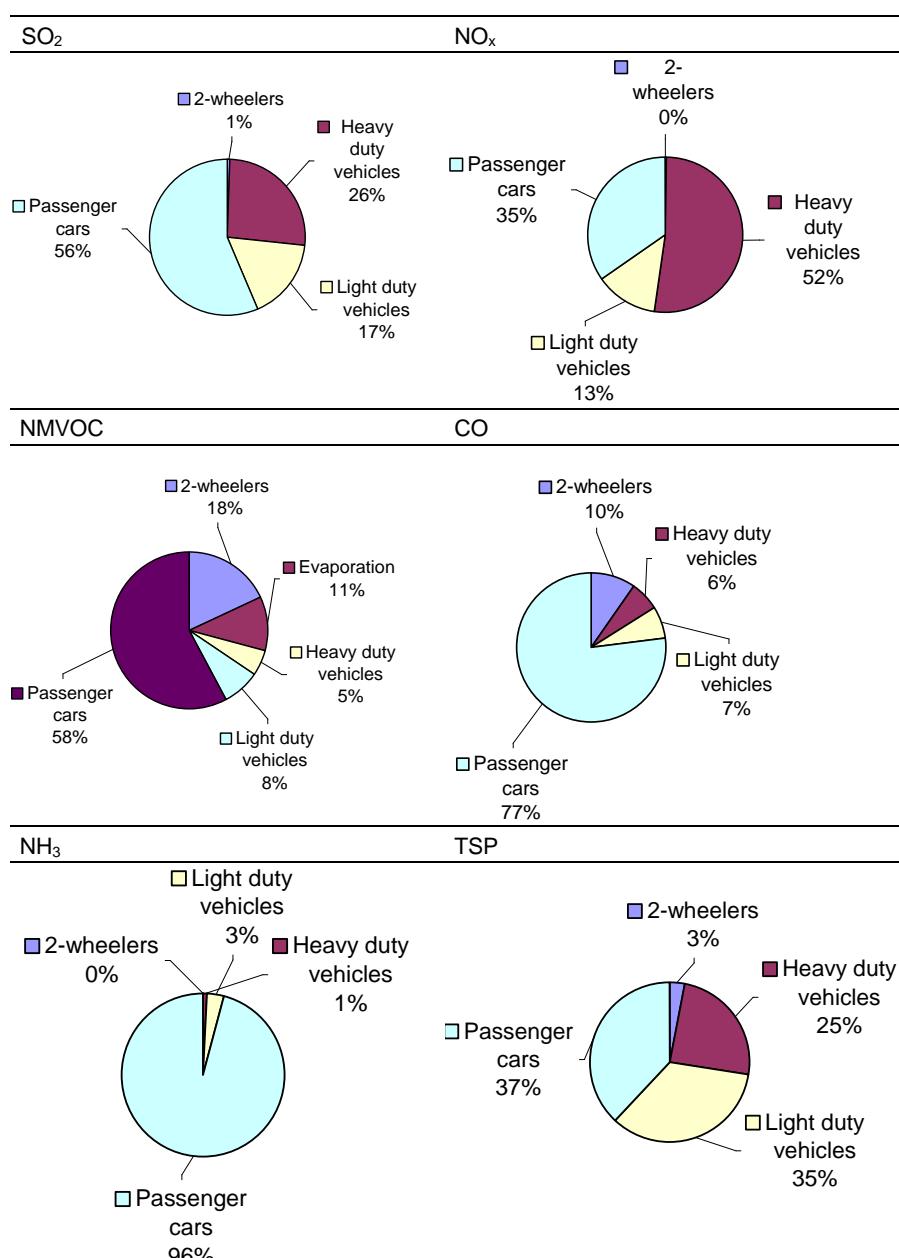


Figure 6.28 SO₂, NO_x, NMVOC, CO, NH₃ and PM emission shares pr vehicle type for road transport in 2010.

Other mobile sources

For SO₂ the trends in the Navigation (1A3d) emissions shown in Figure 6.29 mainly follow the development of the heavy fuel oil consumption (Figure 6.11). Though, from 1993 to 1995 relatively higher contents of sulphur in the fuel (estimated from sales) caused a significant increase in the emissions of SO₂. The SO₂ emissions for Fisheries (1A4c) correspond with the development in the consumption of marine gas oil. The main explanation for the development of the SO₂ emission curves for Railways (1A3c) and non-road machinery in Agriculture/forestry (1A4c) and Industry (1A2f), are the step-wise sulphur content reductions for diesel used by machinery in these sectors.

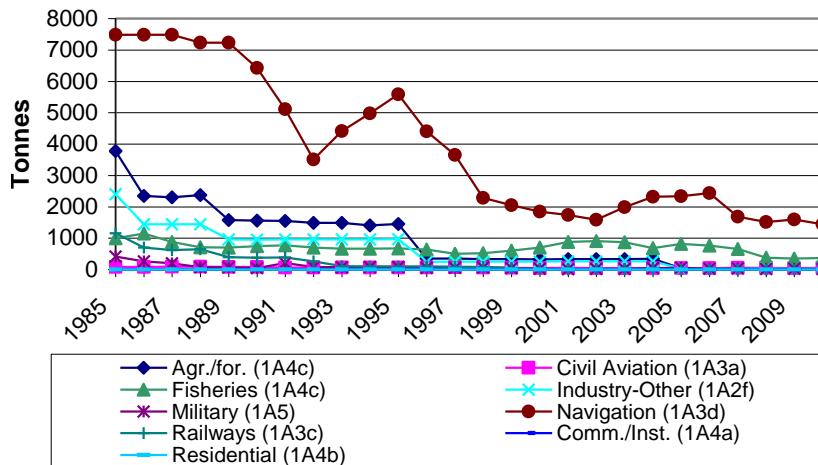


Figure 6.29 SO₂ emissions (k-tonnes) in NFR sectors for other mobile sources 1985-2010.

In general, the emissions of NO_x, NMVOC and CO from diesel-fuelled working equipment and machinery in agriculture, forestry and industry decreased slightly since the end of the 1990s due to gradually strengthened emission standards given by the EU emission legislation directives. For industry, the emission impact from the global financial crisis became very visible for 2009.

NO_x emissions mainly come from diesel machinery, and the most important sources are Agriculture/forestry/fisheries (1A4c), Navigation (1A3d), Industry (1A2f) and Railways (1A3c), as shown in Figure 6.30. The 2010 emission shares were 48, 22, 20 and 7 %, respectively (Figure 6.33). Minor emissions came from the sectors, Civil Aviation (1A3a), Military (1A5) and Residential (1A4b).

The NO_x emission trend for Navigation, Fisheries and Agriculture is determined by fuel consumption fluctuations for these sectors, and the development of emission factors. For ship engines the emission factors tend to increase for new engines until mid-1990s. After that, the emission factors gradually reduced until 2000, bringing them to a level comparable with the emission limits for new engines in this year. For agricultural machines, there were somewhat higher NO_x emission factors for 1991-stage I machinery, and an improved emission performance for stage I and II machinery since the late 1990s.

The emission development from 1985 to 2008 for industry NO_x is the product of a fuel consumption increase, most pronounced from 2005-2008, and a development in emission factors as explained for agricultural machinery. For railways, the gradual shift towards electrification explains the declining

trend in diesel fuel consumption and NO_x emissions for this part of the transport sector until 2001.

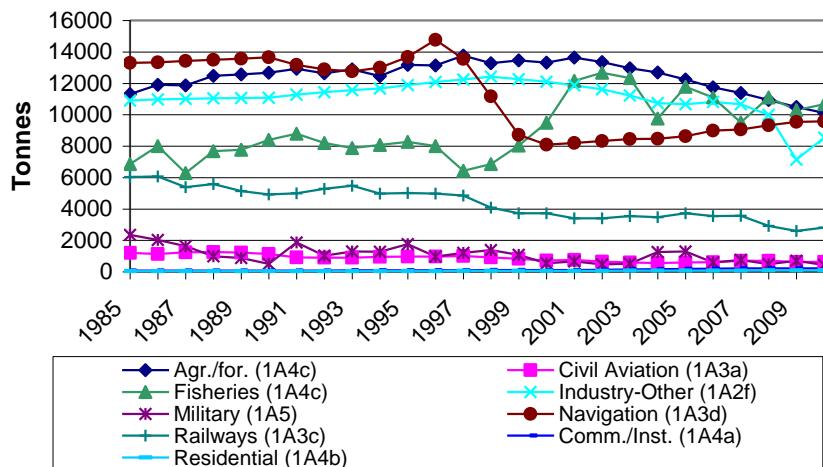


Figure 6.30 NO_x emissions (tonnes) in NFR sectors for other mobile sources 1985-2010.

The 1985-2010 time series of NMVOC and CO emissions are shown in Figures 6.31 and 6.32 for other mobile sources. The 2010 sector emission shares are shown in Figure 6.35. For NMVOC, the most important sectors are Commercial/Institutional (1A4a), Agriculture/forestry/-fisheries (1A4c), Residential (1A4b), Industry (1A2f) and Navigation (1A3d) with 2010 emission shares of 40, 21, 18, 10 and 8 %, respectively. The same five sectors also contributed with most of the CO emissions. For Commercial/Institutional (1A4a), Residential (1A4b), Agriculture/forestry/fisheries (1A4c), Industry (1A2f) and Navigation (1A3d) the emission shares were 55, 20, 15, 5 and 4 %, respectively. Minor NMVOC and CO emissions came from Railways (1A3c), Civil Aviation (1A3a) and Military (1A5).

For NMVOC and CO, the significant emission increases for the commercial/institutional and residential sectors after 2000 were due to the increased number of gasoline working machines. Improved NMVOC emission factors for diesel machinery in agriculture and gasoline equipment in forestry (chain saws) are the most important explanations for the NMVOC emission decline in the Agriculture/forestry/fisheries sector. This explanation also applies for the industrial sector, which is dominated by diesel-fuelled machinery. From 1997 onwards, the NMVOC emissions from Navigation decreased due to the gradual phase-out of the 2-stroke engine technology for recreational craft. The main reason for the significant 1985-2006 CO emission decrease for Agriculture/forestry-/fisheries is the phasing out of gasoline tractors.

As shown in Figure 6.35, for other mobile sources the largest TSP contributors in 2010 were Agriculture/forestry/fisheries (1A4c), Industry (1A2f) and Navigation (1A3d), with emission shares of 46, 32 and 14 %, respectively. The remaining sectors: Railways (1A3c), Civil aviation (1A3a), Military (1A5) and Residential (1A4b) represented only minor emission sources.

The 1985-2009 TSP emissions for navigation and fisheries were determined by the fuel consumption fluctuations in these years, and the development of the emission factors, which to a major extent is a function of the fuel sulphur content. The emission development for Agriculture/forestry was determined by the generally decreasing total diesel fuel consumption and gradually reducing emission factors over the time period.

The TSP emission development for industrial non-road machinery is the product of a fuel consumption increase from 1985 to 2008 and development in emission factors, as explained for agricultural machinery. The TSP emission explanations for railways are the same as for NO_x (Figure 6.30).

The amounts of NH₃ emissions calculated for other mobile sources are very small. The largest emission sources were Agriculture-/forestry/fisheries (1A4c), Industry (1A2f), Railways (1A3c) and Military (1A5), with emission shares of 49, 26, 8 and 8 %, respectively.

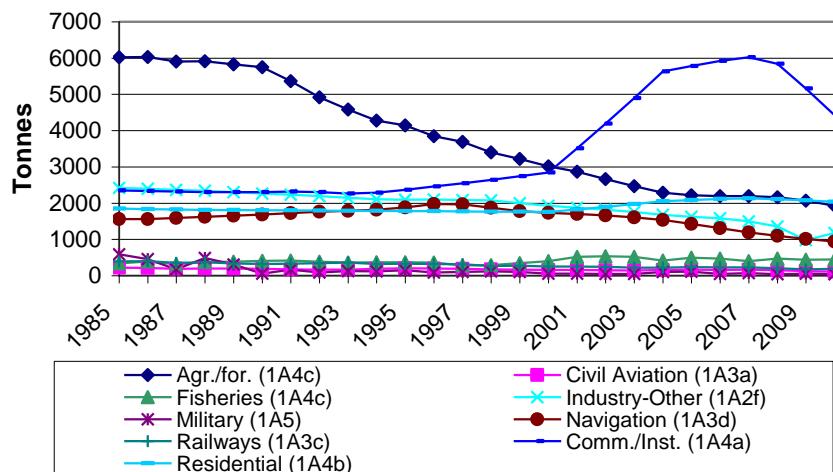


Figure 6.31 NMVOC emissions (tonnes) in NFR sectors for other mobile sources 1985-2010.

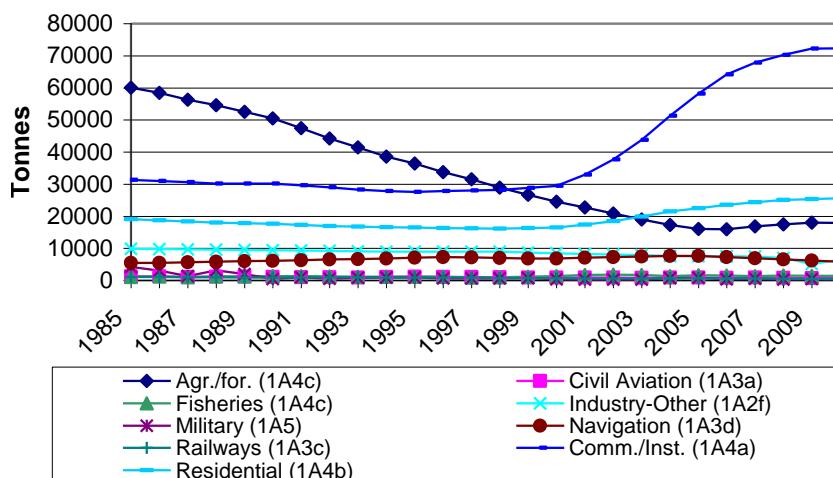


Figure 6.32 CO emissions (tonnes) in NFR sectors for other mobile sources 1985-2010.

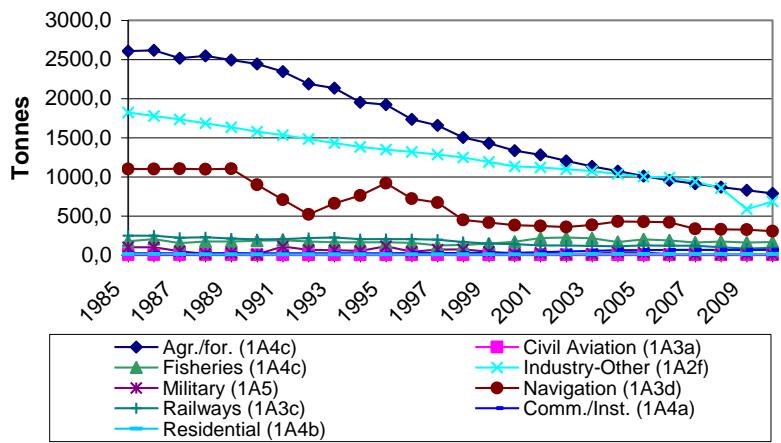


Figure 6.33 TSP emissions (tonnes) in NFR sectors for other mobile sources 1985-2010.

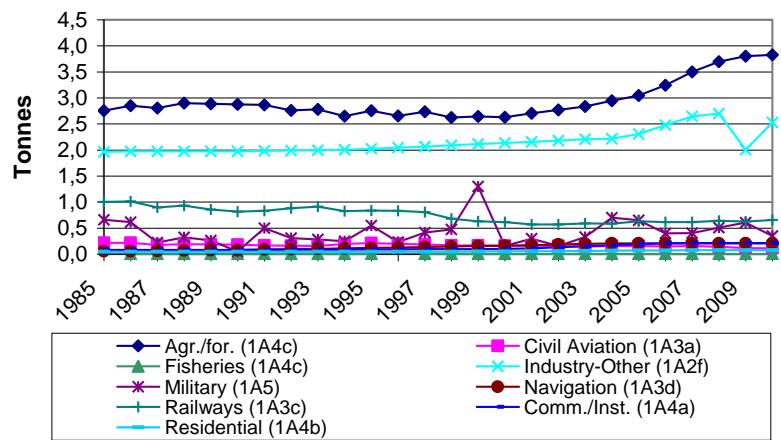


Figure 6.34 NH₃ emissions (tonnes) in NFR sectors for other mobile sources 1985-2010.

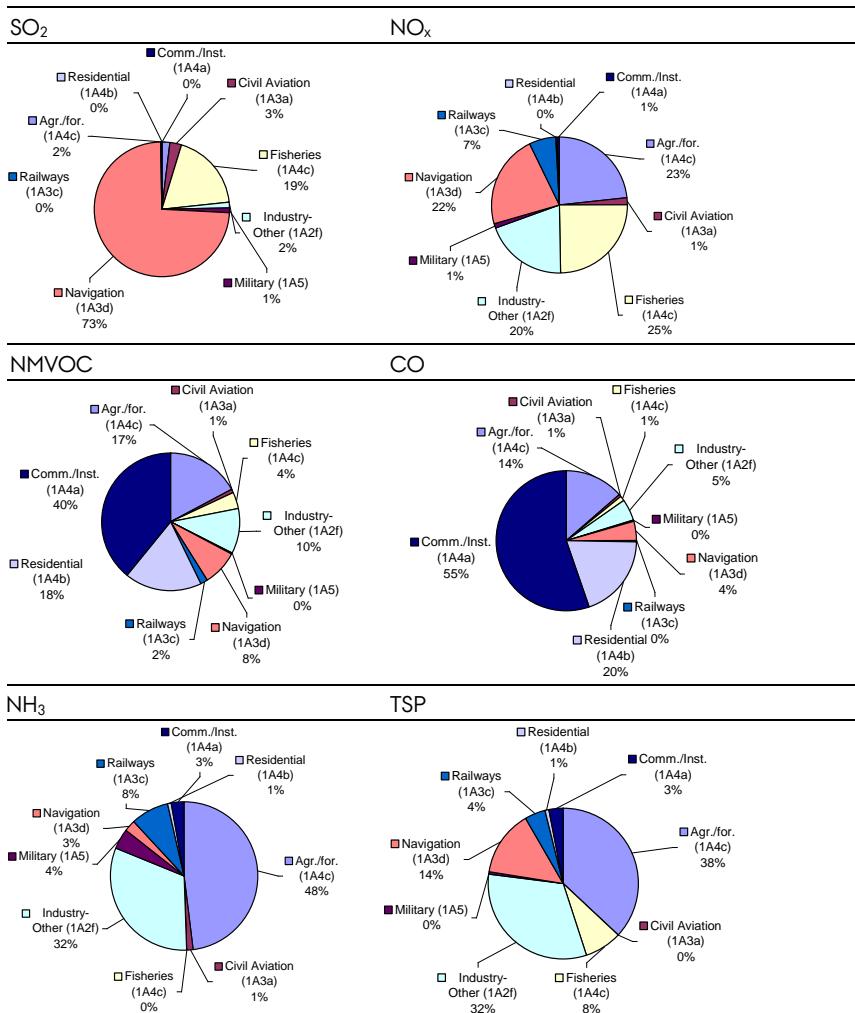


Figure 6.35 SO₂, NO_x, NMVOC, CO, NH₃ and PM emission shares pr vehicle type for other mobile sources in 2010.

Non-exhaust emissions of TSP, PM₁₀ and PM_{2.5}

Apart from the exhaust emission estimates of particulate matter (PM), the Danish emission inventories also comprise the non-exhaust PM emissions coming from road transport brake and tyre wear, and road abrasion.

In Table 6.4, the non-exhaust TSP, PM₁₀ and PM_{2.5} emissions for road transport are shown for 2010 in NFR sectors. The activity data and emission factors are also shown in Annex 15.

Table 6.4 Emissions of TSP, PM₁₀ and PM_{2.5} in 2009 from road transport and other mobile sources.

NFR Sector	TSP	PM ₁₀	PM _{2.5}
	tonnes	tonnes	tonnes
Road brake wear	577	566	225
Road tyre wear	861	516	361
Road abrasion	1 044	522	282
Total Road non-exhaust	2 482	1 604	868

The respective source category distributions for TSP, PM₁₀ and PM_{2.5} emissions are identical for each of the non-exhaust emission type's brake wear, tyre wear and road abrasion, and, hence, only the PM₁₀ distributions are shown in Figure 6.36. For tyre wear and road abrasion passenger cars caused

the highest emissions in 2010, followed by trucks, light-duty vehicles, buses and 2-wheelers. For brake wear the most dominant emissions came from passenger cars followed by light-duty vehicles, trucks, buses and 2-wheelers.

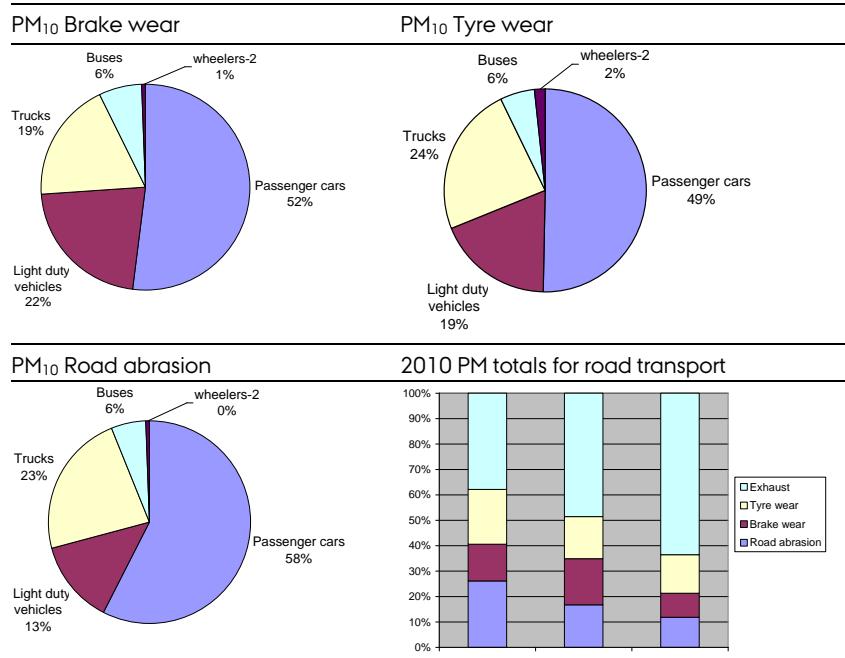


Figure 6.36 Brake and tyre wear and road abrasion PM₁₀ emission shares and PM exhaust/non-exhaust distributions for road traffic in 2010.

Figure 6.36 also shows the exhaust/non-exhaust distribution of the total particulate emissions from road transport, for each of the size classes TSP, PM₁₀ and PM_{2.5}. The exhaust emission shares of total road transport TSP, PM₁₀ and PM_{2.5} were 38, 49 and 64 %, respectively, in 2010. For brake and tyre wear and road abrasion the TSP shares were 14, 22 and 26 %, respectively. The same three sources had PM₁₀ shares of 18, 17 and 17 %, respectively, and PM_{2.5} shares of 9, 15 and 12 %, respectively. In general, the non-exhaust shares of total particulate emissions are expected to increase in the future as total exhaust emissions decline. The latter emission trend is due to the step-wise strengthening of exhaust emission standards for all vehicle types.

6.3 Heavy metals

In Table 6.5, the heavy metal emissions for road transport and other mobile sources are shown for 2010 in NFR sectors. The emission figures in the time series 1990-2010 are given in Annex 16 (NFR format) and are shown for 1990 and 2010 in Annex 15 (CollectER format).

Table 6.5 Heavy metal emissions in 2010 for road transport and other mobile sources.

NFR Sector	As kg	Cd kg	Cr kg	Cu kg	Hg kg	Ni kg	Pb kg	Se kg	Zn kg
Industry-Other (1A2f)	0	3	9	7	2	3	15	0	519
Civil Aviation (1A3a)	0	0	0	0	0	0	929	0	3
Railways (1A3c)	0	1	2	2	0	1	4	0	122
Navigation (1A3d)	35	3	17	36	6	1811	23	43	157
Comm./Inst. (1A4a)	0	1	1	2	0	1	2	0	119
Residential (1A4b)	0	0	0	1	0	0	1	0	43
Agric./forestry/fish. (1A4c)	9	5	19	17	11	16	37	36	749
Military (1A5)	0	0	0	0	0	0	80	0	24
Total other mobile	44	12	48	65	20	1 831	1 090	80	1 737
Road exhaust (1A3b)	1	36	92	111	25	39	168	1	7 171
Road Brake wear	6	5	66	46 603		64	6 041	12	9 855
Road Tyre wear	1	2	3	13		22	69	17	9 411
Road abrasion	0	0	21	10	0	17	49	0	79
Total Road non-exhaust	6	7	89	46 627	0	102	6 159	29	19 345
Total mobile	51	55	230	46 803	45	1 972	7 417	109	28 252

The heavy metal emission estimates for road transport are based on a national research study made by Winther and Slentø (2010). The latter study calculated the exhaust related emissions from fuel and engine oil as well as the wear related emissions from tyre, brake and road wear. Apart from Pb, the emission factors only deviated to a small extent due to changes in fleet and mileage composition over the years, which caused relative changes in fuel consumption per fuel type, engine oil use and aggregated emission factors for brake, tyre and road wear.

The most important exhaust related emissions for road transport are Cd, Cr, Hg and Zn. The most important wear related emissions are Cu and Pb almost solely coming from tyre wear, and Zn from brake and tyre wear. For other mobile sources, the most important emission contributions are calculated for Ni, Se and As, coming from the use of marine diesel oil in fisheries and navigation and residual oil in navigation.

The Figures 6.37 and 6.38 show the heavy metal emission distributions for all road transport sources split into vehicle categories, and for other mobile sectors, respectively.

For non road mobile machinery in agriculture, forestry, industry, commercial/institutional and recreational, as well as military and railways, fuel related emission factors from road transport were used derived for the year 2009.

For civil aviation jet fuel no emissions were estimated due to lack of emission data, whereas for aviation gasoline fuel related emission factors for road transport gasoline was used derived for the year 2009, except for Pb where national data exist.

For navigation and fisheries, the heavy metal emission factors are fuel related, and are taken from the EMEP/EEA guidebook.

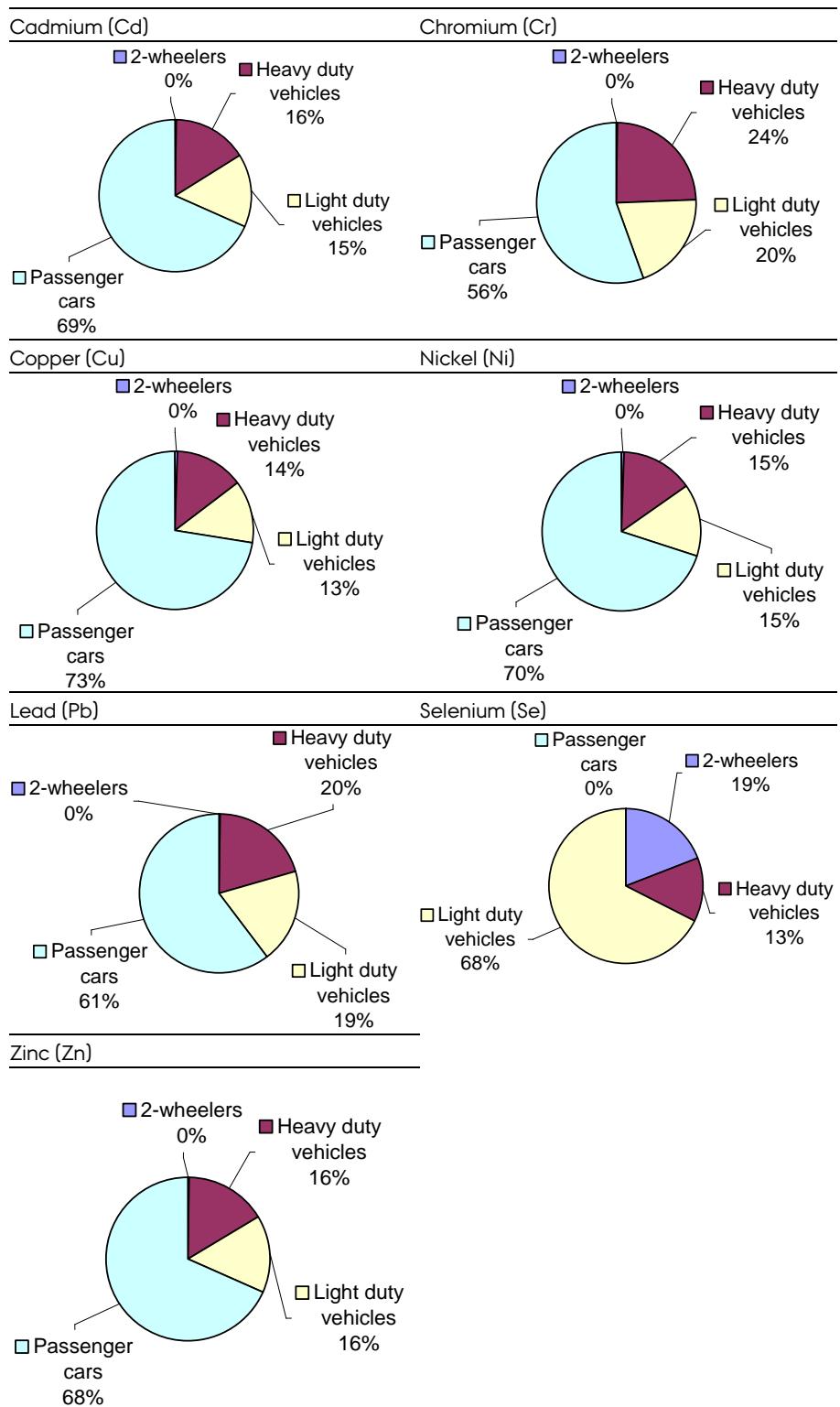


Figure 6.37 Heavy metal emission shares for road transport in 2010.

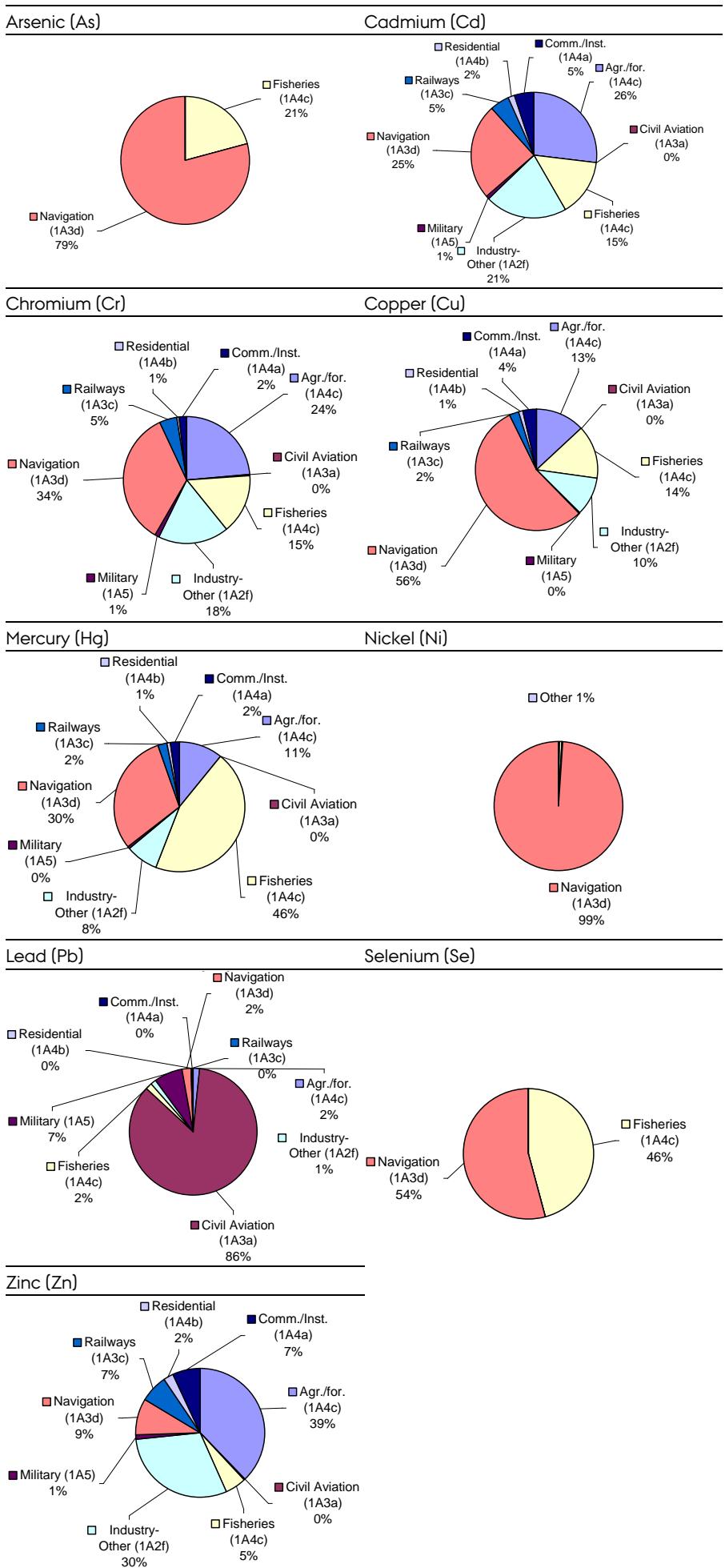


Figure 6.38 Heavy metal emission shares for other mobile sources in 2010.

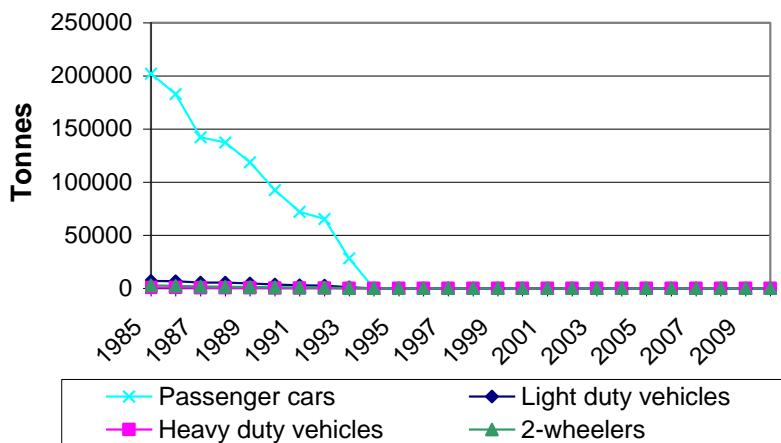


Figure 6.39 Pb emissions (kg) per vehicle type for road transport 1985-2010.

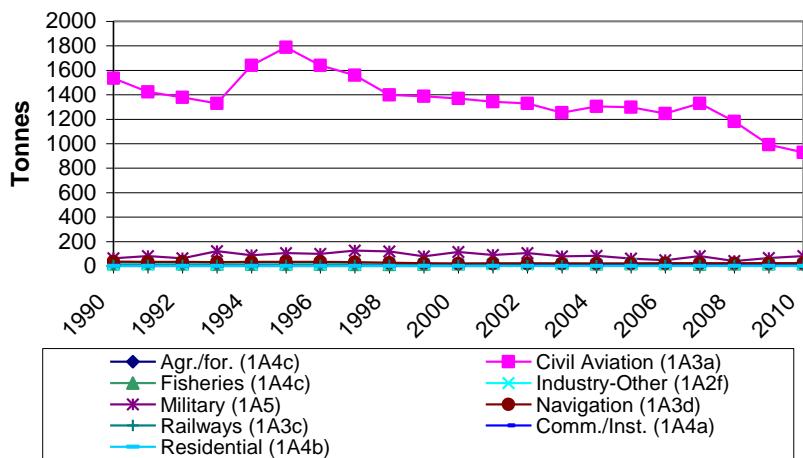


Figure 6.40 Pb emissions (kg) in NFR sectors for other mobile sources 1990-2010.

Dioxin and PAH

In Table 6.6, the dioxin and PAH emissions for road transport and other mobile sources are shown for 2010 in NFR sectors. The emission figures in the time series 1990-2010 are given in Annex 16 (NFR format) and are shown for 1990 and 2010 in Annex 15 (CollectER format).

Table 6.6 Dioxin and PAH emissions in 2010 for road transport and other mobile sources.

NFR ID	Dioxins/ Furans		Flouran-thene		Benzo(b) flouranthene		Benzo(k) flouranthene		Benzo(a)flouranthene		Benzo-(g,h,i)Indeno (1,2,3-c,d)pyrene	
	g	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
Industry-Other (1A2f)	0.008	45	5	5	3	5	3	5	5	5	3	3
Civil Aviation (1A3a)	0.000	0	0	0	0	0	0	0	0	0	0	0
Railways (1A3c)	0.002	4	1	1	0	0	0	0	0	0	0	0
Navigation (1A3d)	0.085	50	4	2	1	7	1	2	1	7	6	6
Comm./Inst. (1A4a)	0.012	10	0	0	0	2	0	0	0	2	1	1
Residential (1A4b)	0.004	4	0	0	0	0	0	0	0	1	0	0
Agri./for./fish. (1A4c)	0.105	131	14	11	5	19	5	11	5	19	13	13
Military (1A5)	0.001	5	1	1	0	1	0	1	0	1	0	0
Total other mobile	0.218	250	25	20	10	34	10	20	10	34	23	23
Road (1A3b)	0.110	755	70	79	56	106	56	79	56	106	61	61
Total mobile	0.329	1 005	95	99	66	140	66	99	66	140	84	84

For mobile sources, road transport displays the largest emission of dioxins and PAH. The dioxin emission share for road transport was 33 % of all mobile emissions in 2010, whereas Agriculture/forestry-/fisheries and Navigation had smaller shares of 33 and 26 %. For the different PAH components, road transport shares were around 80 % of total emissions for mobile sources. The remaining emissions almost solely came from Agriculture/-forestry/fisheries, Navigation and Industry with Agriculture/forestry/-fisheries as the largest source.

Figures 6.41 and 6.42 show the dioxin and PAH emission distributions into vehicle categories and other mobile sectors, respectively.

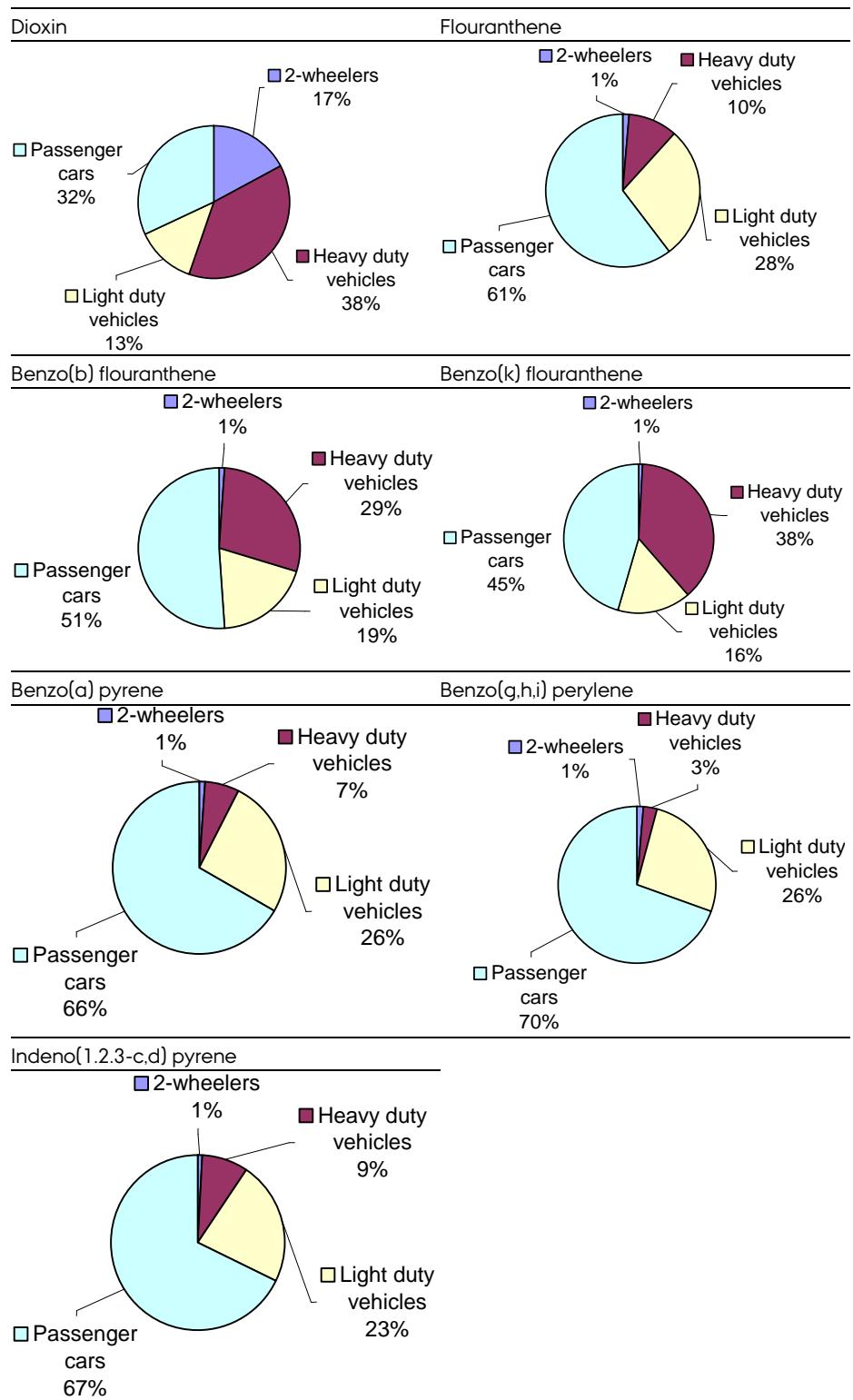


Figure 6.41 Dioxin and PAH emission shares for road transport in 2010.

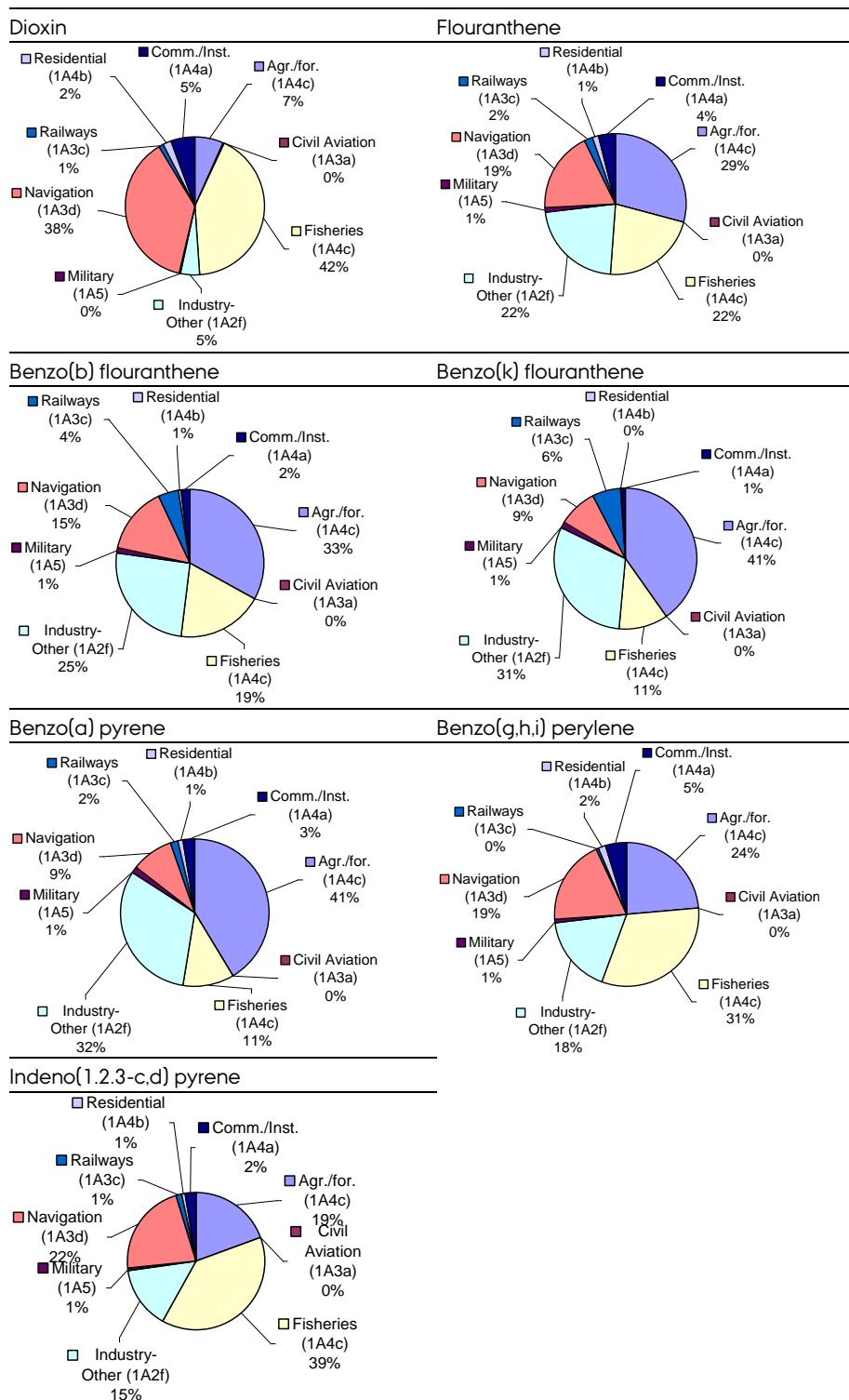


Figure 6.42 Dioxin and PAH emission shares for other mobile sources in 2010.

6.4 Bunkers

The most important emissions from bunker fuel consumption (fuel consumption for international transport) are SO₂, NO_x and CO₂ and TSP. However, compared with the Danish national emission total (all sources), the greenhouse gas emissions from bunkers are small. The bunker emission totals are shown in Table 6.7 for 2010, split into sea transport and civil aviation. All emission figures in the 1990-2010 time series are given in Annex 16

(CRF format). In Annex 15, the emissions are also given in CollectER format for the years 1990 and 2010.

Table 6.7 Emissions in 2010 for international transport.

CRF sector	SO ₂ tonnes	NO _x tonnes	NMVOC tonnes	CH ₄ tonnes	CO tonnes	CO ₂ k-tonnes	N ₂ O tonnes	TSP tonnes
Navigation int. (1A3d)	8262	51332	1636	51	5397	2073	130	940
Civil Aviation int. (1A3a)	773	10110	367	39	1716	2421	83	39
International total	9035	61442	2003	90	7113	4494	214	979

The differences in emissions between navigation and civil aviation are much larger than the differences in fuel consumption (and derived CO₂ emissions), and display a poor emission performance for international sea transport. In broad terms, the emission trends shown in Figure 6.43 are similar to the fuel consumption development.

However, for navigation minor differences occur for the emissions of SO₂, NO_x and CO₂ due to varying amounts of marine gas oil and residual oil, and for SO₂ and NO_x the development in the emission factors also have an impact on the emission trends. For civil aviation, apart from the annual consumption of jet fuel, the development of the NO_x emissions is also due to yearly variations in LTO/aircraft type (earlier than 2001) and city-pair statistics (2001 onwards).

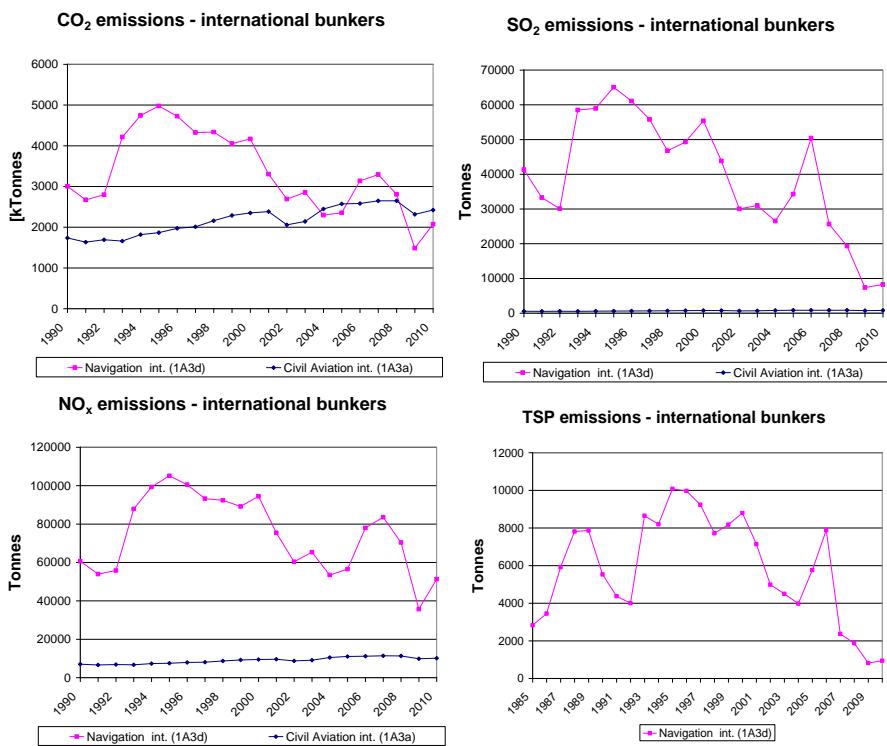


Figure 6.43 CO₂, SO₂ and NO_x emissions for international transport 1990-2010.

7 Uncertainties

Uncertainty estimates for greenhouse gases on Tier 1 and Tier 2 levels, are made for road transport and other mobile sources using the guidelines formulated in the Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (IPCC, 2000). For road transport, railways and fisheries, these guidelines provide uncertainty factors for activity data that are used in the Danish situation. For other sectors, the factors reflect specific national knowledge (Winther and Nielsen, 2006 and Winther, 2008). These sectors are (SNAP categories): Inland Waterways (a part of 1A3d: Navigation), Agriculture and Forestry (parts of 1A4c: Agriculture-/forestry/fisheries), Industry (mobile part of 1A2f: Industry-other), Residential (1A4b) and National sea transport (a part of 1A3d: Navigation).

The activity data uncertainty factor for civil aviation is based on expert judgement.

The calculations for Tier 1 are shown in Annex 17 for all emission components. Please refer to Nielsen et al. (2012a) and Fauser et al. (2012) for further information regarding the calculation procedure for Tier 2 uncertainty calculations.

Table 7.1 Tier 1 Uncertainties for activity data, emission factors and total emissions in 2010 and as a trend.

Category	Activity data	CO ₂	CH ₄	N ₂ O
	%	%	%	%
Road transport	2	5	40	50
Military	2	5	100	1000
Railways	2	5	100	1000
Navigation (small boats)	41	5	100	1000
Navigation (large vessels)	11	5	100	1000
Fisheries	2	5	100	1000
Agriculture	24	5	100	1000
Forestry	30	5	100	1000
Industry (mobile)	41	5	100	1000
Residential	35	5	100	1000
Commercial/Institutional	35	5	100	1000
Civil aviation	10	5	100	1000
Overall uncertainty in 2010		5.2	27.1	151.5
Trend uncertainty		6.1	5.0	53.8

Table 7.2 Tier 2 Uncertainty factors for activity data and emission factors in 2010.

Category	Activity data	CO ₂	CH ₄	N ₂ O
	%	%	%	%
Road transport	2	5	40	500
Military	2	5	100	1000
Railways	2	5	100	1000
Pleasure craft	41	5	100	1000
Regional ferries	20	5	100	1000
Local ferries	20	5	100	1000
Fisheries	2	5	100	1000
Greenland & Faroe Islands	20	5	100	1000
Other national sea transport	20	5	100	1000
Civil aviation	10	5	100	1000
Agriculture	24	5	100	1000
Forestry	30	5	100	1000
Industry	41	5	100	1000
Household and gardening	35	5	100	1000
Commercial and institutional	35	5	100	1000

Table 7.3 Tier 2 Uncertainty estimates for CO₂, CH₄, N₂O and CO₂-eq. in 2010.

	1990			2010			1990-2010		
	Median	Uncertainty (%)		Median	Uncertainty (%)		Median	Uncertainty (%)	
		Emission	Lower		Emission	Lower		Emission	Lower
		(-)	(+)		(-)	(+)		(-)	(+)
CO ₂ ktonnes	13622	5	5	16385	5	5	20	7	7
CH ₄ tonnes	2981	29	40	1123	26	36	-62	33	47
N ₂ O Tonnes	701	46	200	789	43	178	13	207	279
CO ₂ -eq. Ktonnes	13931	5	6	16682	5	6	20	7	7

For the emission components reported to the UNECE LRTAP convention, the emission uncertainty estimates are also made using the guidelines formulated in the Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (IPCC, 2000). The emission factor uncertainties come from Pulles et al. (2001). The latter source only indicates single values for road transport and other mobile sources, respectively, and hence only rough emission uncertainty calculations can be made. For TSP, Pulles et al. (2001) indicates no uncertainty factor and, instead, this factor is based on own judgement.

The activity data uncertainty factor is assumed to be 2 and 10 % for road transport and other mobile sources, respectively, based on expert judgement.

For all emission components, the uncertainty estimates should be regarded as preliminary only and may be subject to changes in future inventory documentation. The calculations are shown in Annex 17 for all emission components.

Table 7.4 Uncertainties for activity data, emission factors and total emissions in 2010 and as a trend.

Pollutant	Emission factor uncertainties [%]		Emission uncertainties [%]	
	Road	Other	Overall 2010	Trend
SO ₂	50	50	49	3
NO _x	50	100	56	11
NMVOC	50	100	55	9
CO	50	100	60	16
NH ₃	1 000	1 000	994	2 004
TSP	50	100	48	6
PM ₁₀	50	100	51	4
PM _{2.5}	50	100	54	3
Arsenic	1 000	1 000	872	66
Cadmium	1 000	1 000	809	136
Chromium	1 000	1 000	819	178
Copper	1 000	1 000	999	5
Mercury	1 000	1 000	711	108
Nickel	1 000	1 000	931	34
Lead	1 000	1 000	865	13
Selenium	1 000	1 000	779	124
Zinc	1 000	1 000	941	33
Dioxins	1 000	1 000	748	182
Flouranthene	1 000	1 000	792	7
Benzo(b) flouranthene	1 000	1 000	779	35
Benzo(k) flouranthene	1 000	1 000	820	62
Benzo(a) pyrene	1 000	1 000	861	54
Benzo(g,h,i) perylene	1 000	1 000	797	46
indeno(1,2,3-c,d) pyrene	1 000	1 000	775	144

8 Future improvements

Some improvements are envisaged in the future inventories mainly focusing on road transport. These improvements relate to the distribution of total mileage within vehicle categories and between road types, calculation of modified type approval fuel economy values for passenger cars and estimation of CO₂ emissions from the consumption of lube oil and urea.

Based on data processing of new data for the year 2008 collected in the Danish vehicle inspection and maintenance programme, new annual mileage distributions per first registration year can be calculated for all vehicle types except two-wheelers. Further, a revised split of total mileage between urban, rural and highway driving conditions can be made for based on new traffic count data from the Danish Road Directorate.

Also, modifications of type approval fuel economy values can be calculated for passenger cars on the basis of new research performed by TU Graz, Infras and Emisia (University of Thessaloniki). Input for these modified values will be fuel type, engine capacity (cm³), vehicle reference mass and type approval fuel economy value (l per 100 km) for the individual vehicle. The calculation parameters are a part of the fleet registry data underpinning the national fleet data provided by DTU Transport. The modified type approval values will have an impact on the adjusted fuel consumption factors described in paragraph 4.3.

In the future inventories, CO₂ emissions from lube oil consumption will be estimated based on amount of lube oil consumed (kg) by Danish road transport vehicles and CO₂ emission factors for lube oil. Functions for the lube oil consumption are already established as a part of the HM estimations from lube oil in the Danish inventory. The CO₂ emissions from urea usage by SCR equipped diesel vehicles will be calculated based on the urea consumption (l) and a CO₂ emission factor for urea, as explained by Ntziachristos (2011).

The methodologies for calculating CO₂ from lube oil and urea are included in the newest version of COPERT IV (v9.0) released in November 2011.

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Annex1: Fleet data 1985-2010 for road transport (No. vehicles)

Sector	Subsector	Tech 2	FYear	LYear	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Passenger Cars	Gasoline <1,4 l	PRE ECE	0	1969	75564	16627	13368	10706	8571	7246	6992	6618	6159	5646	5194
Passenger Cars	Gasoline <1,4 l	ECE 15/00-01	1970	1978	404441	179963	156167	134583	102209	66638	55669	43359	30440	19722	12950
Passenger Cars	Gasoline <1,4 l	ECE 15/02	1979	1980	97500	87416	63723	53008	61799	45282	38690	30726	21910	14275	8539
Passenger Cars	Gasoline <1,4 l	ECE 15/03	1981	1985	152241	318622	330062	307289	254029	235152	221928	204914	179982	150784	119474
Passenger Cars	Gasoline <1,4 l	ECE 15/04	1986	1990		165103	178393	209260	261580	258381	253651	249450	243072	232062	220895
Passenger Cars	Gasoline <1,4 l	Euro I	1991	1996			28375	60724	96923	141546	180780	219477	218990	216002	214711
Passenger Cars	Gasoline <1,4 l	Euro II	1997	2000									39547	74071	107025
Passenger Cars	Gasoline <1,4 l	Euro III	2001	2005											
Passenger Cars	Gasoline <1,4 l	Euro IV	2006	2010											
Passenger Cars	Gasoline 1,4 - 2,0 l	PRE ECE	0	1969	90872	28856	23474	19524	15744	13167	12527	11642	10624	9570	8659
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/00-01	1970	1978	344505	171158	152919	137410	110812	76213	63961	50125	35583	23605	15800
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/02	1979	1980	87587	74393	54644	44813	52998	40866	35395	28785	21181	14516	9144
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/03	1981	1985	210664	276842	281144	261222	218176	205239	196225	184150	165329	142253	115689
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/04	1986	1990		221807	211098	215194	242499	240697	238039	236139	232642	225250	217019
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro I	1991	1996			51521	101611	148509	235536	319571	414973	413070	407030	404816
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro II	1997	2000									105322	217501	303709
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro III	2001	2005											
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro IV	2006	2010											
Passenger Cars	Gasoline >2,0 l	PRE ECE	0	1969	3246	1388	1186	1033	897	911	945	971	986	987	989
Passenger Cars	Gasoline >2,0 l	ECE 15/00-01	1970	1978	3113	3661	3581	3373	3096	2800	2589	2352	2039	1657	1381
Passenger Cars	Gasoline >2,0 l	ECE 15/02	1979	1980	1078	564	531	687	859	865	865	846	773	702	599
Passenger Cars	Gasoline >2,0 l	ECE 15/03	1981	1985	4087	2263	2037	1700	1575	1659	1801	1950	2055	2081	2018
Passenger Cars	Gasoline >2,0 l	ECE 15/04	1986	1990		4323	3630	3161	2668	2810	3052	3331	3638	3874	4089
Passenger Cars	Gasoline >2,0 l	Euro I	1991	1996			1263	2350	3350	5384	7888	10682	11000	11250	11334
Passenger Cars	Gasoline >2,0 l	Euro II	1997	2000									3980	8667	14011
Passenger Cars	Gasoline >2,0 l	Euro III	2001	2005											
Passenger Cars	Gasoline >2,0 l	Euro IV	2006	2010											
Passenger Cars	Diesel <2,0 l	Conventional	0	1990	69406	71018	70198	69500	68720	65169	62762	59117	54631	50590	48238
Passenger Cars	Diesel <2,0 l	Euro I	1991	1996			979	2163	3799	6613	9919	13122	13689	14318	15305
Passenger Cars	Diesel <2,0 l	Euro II	1997	2000									3064	8535	18568
Passenger Cars	Diesel <2,0 l	Euro III	2001	2005											
Passenger Cars	Diesel <2,0 l	Euro IV	2006	2010											
Passenger Cars	Diesel <2,0 l	Euro V	2011	2014											
Passenger Cars	Diesel >2,0 l	Conventional	0	1990	14055	14871	13888	13012	12136	11757	11413	10708	10043	9269	8435
Passenger Cars	Diesel >2,0 l	Euro I	1991	1996			1017	1988	3035	4323	5638	7401	7600	7595	7716

Continued

Passenger Cars	Diesel >2,0 l	Euro II	1997	2000								2079	5072	9087
Passenger Cars	Diesel >2,0 l	Euro III	2001	2005										
Passenger Cars	Diesel >2,0 l	Euro IV	2006	2010										
Passenger Cars	Diesel >2,0 l	Euro V	2011	2014										
Passenger Cars	LPG cars	Conventional	0	1990	1136	1163	1166	1173	1184	734	495	310	171	96
Passenger Cars	LPG cars	Euro I	1991	1996				1	4	4	3	1	1	56
Passenger Cars	LPG cars	Euro II	1997	2000										
Passenger Cars	LPG cars	Euro III	2001	2005										
Passenger Cars	LPG cars	Euro IV	2006	2010										
Passenger Cars	2-Stroke	Conventional	0	9999	4823	5417	4804	4308	3747	3029	2443	1824	1248	761
Passenger Cars	Electric cars	Conventional	0	9999	130	133	133	134	136	155	163	187	230	292
Light Duty Vehicles	Gasoline <3,5t	Conventional	0	1994	34172	44442	45625	46865	48934	49865	46712	42710	37987	34274
Light Duty Vehicles	Gasoline <3,5t	Euro I	1995	1998								3773	7509	12025
Light Duty Vehicles	Gasoline <3,5t	Euro II	1999	2001										17352
Light Duty Vehicles	Gasoline <3,5t	Euro III	2002	2006										5272
Light Duty Vehicles	Gasoline <3,5t	Euro IV	2007	2011										
Light Duty Vehicles	Diesel <3,5t	Conventional	0	1994	113019	146986	150898	154999	161842	169142	160228	148520	133718	120795
Light Duty Vehicles	Diesel <3,5t	Euro I	1995	1998								16899	35370	56836
Light Duty Vehicles	Diesel <3,5t	Euro II	1999	2001										76717
Light Duty Vehicles	Diesel <3,5t	Euro III	2002	2006										24555
Light Duty Vehicles	Diesel <3,5t	Euro IV	2007	2011										
Light Duty Vehicles	Diesel <3,5t	Euro V	2012	2015										
Light Duty Vehicles	LPG <3,5t	Conventional	0	1994	684	889	913	938	979	632	462	295	196	125
Light Duty Vehicles	LPG <3,5t	Euro I	1995	1998										90
Light Duty Vehicles	LPG <3,5t	Euro II	1999	2001										1
Light Duty Vehicles	LPG <3,5t	Euro III	2002	2006										1
Light Duty Vehicles	LPG <3,5t	Euro IV	2007	2011										
Light Duty Vehicles	Electric <3,5t	Conventional	0	9999	3	4	4	4	4	3	2	2	1	1
Heavy Duty Vehicles	Gasoline >3,5t	Conventional	0	9999	621	530	510	497	503	455	412	365	326	336
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Conventional	0	1993	8686	7049	6675	6430	6419	6194	5738	5137	4646	4156
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro I	1994	1996										3518
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro II	1997	2001										906
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro III	2002	2006										1782
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro IV	2007	2009										
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro V	2010	2013										
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Conventional	0	1993	7266	5897	5584	5379	5375	5316	5373	5207	4854	4491
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro I	1994	1996					51	298	671	968	1002	1081
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro II	1997	2001								94	429	798
														1200

Continued

Continued

			2010	2013										
Heavy Duty Vehicles	Diesel RT >32t	Euro V												
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Conventional	0	1993	5617	5132	5080	5011	5065	4783	4448	4025	3645	3208
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro I	1994	1996					63	356	759	1069	1076	1051
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro II	1997	2001								104	570	1000
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro III	2002	2006										1467
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro IV	2007	2009										
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro V	2010	2013										
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Conventional	0	1993	8359	10252	10740	11202	11174	10480	8917	7262	5877	4730
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro I	1994	1996						204	1616	3609	4958	4683
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro II	1997	2001								495	2223	4240
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro III	2002	2006										5939
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro IV	2007	2009										
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro V	2010	2013										
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Conventional	0	1993	1672	2083	2242	2382	2379	2398	2257	2045	1799	1469
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro I	1994	1996						49	333	888	1316	1327
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro II	1997	2001								143	778	1564
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro III	2002	2006										2540
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro IV	2007	2009										
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro V	2010	2013										
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro I	1994	1996								1	1	1
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro II	1997	2001									1	1
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro IV	2007	2009										
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro V	2010	2013										
Buses	Gasoline Urban Buses	Conventional	0	9999	8	8	9	11	14	11	11	16	17	17
Buses	Diesel Urban Buses <15t	Conventional	0	1993	347	352	433	488	639	558	494	411	335	281
Buses	Diesel Urban Buses <15t	Euro I	1994	1996						49	81	122	130	132
Buses	Diesel Urban Buses <15t	Euro II	1997	2001								103	295	438
Buses	Diesel Urban Buses <15t	Euro III	2002	2006										
Buses	Diesel Urban Buses <15t	Euro IV	2007	2009										
Buses	Diesel Urban Buses <15t	Euro V	2010	2013										
Buses	Diesel Urban Buses 15 - 18t	Conventional	0	1993	2083	2109	2597	2928	3833	3475	3205	2861	2691	2353
Buses	Diesel Urban Buses 15 - 18t	Euro I	1994	1996						397	632	985	989	891
Buses	Diesel Urban Buses 15 - 18t	Euro II	1997	2001								183	568	817
Buses	Diesel Urban Buses 15 - 18t	Euro III	2002	2006										
Buses	Diesel Urban Buses 15 - 18t	Euro IV	2007	2009										
Buses	Diesel Urban Buses 15 - 18t	Euro V	2010	2013										
Buses	Diesel Urban Buses >18t	Conventional	0	1993	5	5	6	7	9	8	6	7	6	3
Buses	Diesel Urban Buses >18t	Euro I	1994	1996						1	1	3	3	2

Continued

Buses	Diesel Urban Buses >18t	Euro II	1997	2001											6	20	
Buses	Diesel Urban Buses >18t	Euro III	2002	2006													
Buses	Diesel Urban Buses >18t	Euro IV	2007	2009													
Buses	Diesel Urban Buses >18t	Euro V	2010	2013													
Buses	Gasoline Coaches	Conventional	0	9999	931	942	1161	1309	1508	1762	1775	1786	1791	1808	1810		
Buses	Diesel Coaches <15t	Conventional	0	1993	3710	3756	4627	5215	6010	5926	5739	5506	5208	4941	4629		
Buses	Diesel Coaches <15t	Euro I	1994	1996							420	682	1113	1103	1091	1056	
Buses	Diesel Coaches <15t	Euro II	1997	2001											370	695	1039
Buses	Diesel Coaches <15t	Euro III	2002	2006													
Buses	Diesel Coaches <15t	Euro IV	2007	2009													
Buses	Diesel Coaches <15t	Euro V	2010	2013													
Buses	Diesel Coaches 15 - 18t	Conventional	0	1993	804	814	1003	1131	1303	1389	1393	1342	1253	1241	1184		
Buses	Diesel Coaches 15 - 18t	Euro I	1994	1996							35	89	153	162	163	159	
Buses	Diesel Coaches 15 - 18t	Euro II	1997	2001											44	77	119
Buses	Diesel Coaches 15 - 18t	Euro III	2002	2006													
Buses	Diesel Coaches 15 - 18t	Euro IV	2007	2009													
Buses	Diesel Coaches 15 - 18t	Euro V	2010	2013													
Buses	Diesel Coaches >18t	Conventional	0	1993	122	123	152	171	197	210	221	211	193	193	206		
Buses	Diesel Coaches >18t	Euro I	1994	1996							20	42	78	84	82	81	
Buses	Diesel Coaches >18t	Euro II	1997	2001											25	54	99
Buses	Diesel Coaches >18t	Euro III	2002	2006													
Buses	Diesel Coaches >18t	Euro IV	2007	2009													
Buses	Diesel Coaches >18t	Euro V	2010	2013													
Mopeds	<50 cm ³	Conventional	0	1999	151000	120000	118000	113000	109000	105000	114167	123333	132500	141667	150833		
Mopeds	<50 cm ³	Euro I	2000	2003													
Mopeds	<50 cm ³	Euro II	2004	9999													
Motorcycles	2-stroke >50 cm ³	Conventional	0	1999	6209	6617	6804	6904	7111	7406	7672	8214	8980	9598	10385		
Motorcycles	4-stroke <250 cm ³	Conventional	0	1999	7037	7499	7712	7824	8059	8394	8695	9310	10177	10878	11769		
Motorcycles	4-stroke <250 cm ³	Euro I	2000	2003													
Motorcycles	4-stroke <250 cm ³	Euro II	2004	2006													
Motorcycles	4-stroke <250 cm ³	Euro III	2007	9999													
Motorcycles	4-stroke 250 - 750 cm ³	Conventional	0	1999	19352	20622	21207	21516	22162	23083	23911	25602	27986	29914	32365		
Motorcycles	4-stroke 250 - 750 cm ³	Euro I	2000	2003													
Motorcycles	4-stroke 250 - 750 cm ³	Euro II	2004	2006													
Motorcycles	4-stroke 250 - 750 cm ³	Euro III	2007	9999													
Motorcycles	4-stroke >750 cm ³	Conventional	0	1999	8796	9374	9639	9780	10074	10492	10869	11637	12721	13597	14712		
Motorcycles	4-stroke >750 cm ³	Euro I	2000	2003													
Motorcycles	4-stroke >750 cm ³	Euro II	2004	2006													

Continued

Motorcycles	4-stroke >750 cm ³	Euro III	2007	9999												
Sector	Subsector	Tech 2	FYear	LYear	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Passenger Cars	Gasoline <1,4 l	PRE ECE	0	1969	4994	4949	4963	5045	5223	5417	5720	6082	6467	6725	6926	
Passenger Cars	Gasoline <1,4 l	ECE 15/00-01	1970	1978	9402	7791	6441	5527	4770	4352	4074	4103	4094	4147	4114	
Passenger Cars	Gasoline <1,4 l	ECE 15/02	1979	1980	5582	4146	3061	2228	1672	1270	1027	857	728	634	570	
Passenger Cars	Gasoline <1,4 l	ECE 15/03	1981	1985	95486	78149	62695	47507	35638	25239	18617	13047	9408	6534	4744	
Passenger Cars	Gasoline <1,4 l	ECE 15/04	1986	1990	203911	188827	166452	145685	119764	96438	73966	56842	40817	29940	20925	
Passenger Cars	Gasoline <1,4 l	Euro I	1991	1996	212883	211037	207661	203273	197813	189161	177736	161965	144902	127481	107674	
Passenger Cars	Gasoline <1,4 l	Euro II	1997	2000	132974	131683	130255	129818	128942	127649	126013	122908	119230	116047	111745	
Passenger Cars	Gasoline <1,4 l	Euro III	2001	2005		20508	43702	64814	94621	136765	135422	134549	133140	132632	131095	
Passenger Cars	Gasoline <1,4 l	Euro IV	2006	2010							46184	87915	132696	172453	231452	
Passenger Cars	Gasoline 1,4 - 2,0 l	PRE ECE	0	1969	8291	8215	8200	8321	8638	9068	9589	10256	10936	11399	11659	
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/00-01	1970	1978	11566	9555	7938	6866	5944	5373	5149	5260	5419	5580	5670	
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/02	1979	1980	6258	4775	3690	2780	2170	1670	1386	1183	1020	895	801	
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/03	1981	1985	94495	78552	64108	49671	37838	27501	20744	15212	11502	8468	6409	
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/04	1986	1990	203364	190772	171667	153308	129613	107638	85474	67960	51210	39584	29267	
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro I	1991	1996	402938	402008	397847	391775	383212	370014	348949	317429	286209	256600	220109	
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro II	1997	2000	363267	359633	355644	355739	352843	349396	344681	334040	320023	310538	298463	
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro III	2001	2005		51628	107387	148845	196878	250957	248647	251018	247684	246743	243808	
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro IV	2006	2010							55169	101832	129710	145251	160859	
Passenger Cars	Gasoline >2,0 l	PRE ECE	0	1969	1024	1079	1128	1237	1391	1600	2060	2628	3224	3589	3776	
Passenger Cars	Gasoline >2,0 l	ECE 15/00-01	1970	1978	1181	1034	936	859	830	841	1031	1314	1735	2009	2238	
Passenger Cars	Gasoline >2,0 l	ECE 15/02	1979	1980	520	479	444	399	369	318	311	330	319	297	271	
Passenger Cars	Gasoline >2,0 l	ECE 15/03	1981	1985	1904	1798	1696	1572	1431	1299	1182	1129	1031	935	835	
Passenger Cars	Gasoline >2,0 l	ECE 15/04	1986	1990	4161	4188	4196	4099	3992	3847	3772	3641	3404	3151	2818	
Passenger Cars	Gasoline >2,0 l	Euro I	1991	1996	11470	11572	11776	11983	12425	12702	13039	13204	12844	12336	11594	
Passenger Cars	Gasoline >2,0 l	Euro II	1997	2000	18867	18776	18757	18984	19326	19848	20510	21171	20918	20652	20096	
Passenger Cars	Gasoline >2,0 l	Euro III	2001	2005		4628	9892	14692	21393	29899	30850	32713	33204	33810	33934	
Passenger Cars	Gasoline >2,0 l	Euro IV	2006	2010							7690	14232	17902	19391	21351	
Passenger Cars	Diesel <2,0 l	Conventional	0	1990	46384	44480	41523	38006	34340	30089	26006	22027	17996	14360	10988	
Passenger Cars	Diesel <2,0 l	Euro I	1991	1996	16471	17245	18106	19220	20895	21616	21549	20568	19152	17776	15909	
Passenger Cars	Diesel <2,0 l	Euro II	1997	2000	30074	30082	30026	30342	30592	30774	31125	33912	32640	32025	31709	
Passenger Cars	Diesel <2,0 l	Euro III	2001	2005		12723	30100	46644	70013	100191	102310	119573	119892	121697	123348	
Passenger Cars	Diesel <2,0 l	Euro IV	2006	2010							32073	82104	114599	127116	135759	
Passenger Cars	Diesel <2,0 l	Euro V	2011	2014							3564	15517	48853	84084	145874	
Passenger Cars	Diesel >2,0 l	Conventional	0	1990	7728	7120	6345	5723	5039	4460	3895	3402	2906	2515	2094	

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Passenger Cars	Diesel >2,0l	Euro I	1991	1996	7698	7640	7463	7353	7287	7147	6943	6586	6016	5573	5022
Passenger Cars	Diesel >2,0l	Euro II	1997	2000	13139	13250	13151	13303	13569	13890	13944	14951	14421	14008	13616
Passenger Cars	Diesel >2,0l	Euro III	2001	2005		3892	8650	12988	18896	25773	26255	31305	31519	32057	32304
Passenger Cars	Diesel >2,0l	Euro IV	2006	2010							6437	15561	18440	20382	22310
Passenger Cars	Diesel >2,0l	Euro V	2011	2014							715	2819	5822	9752	14524
Passenger Cars	LPG cars	Conventional	0	1990	30	24	17	11	10	10	10	7	8	7	6
Passenger Cars	LPG cars	Euro I	1991	1996	2	2	3	2	4	4	3	2	2	2	3
Passenger Cars	LPG cars	Euro II	1997	2000			1	2	1	1	1			1	1
Passenger Cars	LPG cars	Euro III	2001	2005								1	2	4	3
Passenger Cars	LPG cars	Euro IV	2006	2010									1	1	
Passenger Cars	2-Stroke	Conventional	0	9999	300	200	150	100	50						
Passenger Cars	Electric cars	Conventional	0	9999	322	301	280	250	211	183	183	188	191	273	348
Light Duty Vehicles	Gasoline <3,5t	Conventional	0	1994	27140	23832	21083	18787	16405	14063	11895	9932	7990	6333	4955
Light Duty Vehicles	Gasoline <3,5t	Euro I	1995	1998	17103	16862	16703	16454	16011	15464	14728	13331	12214	11199	10027
Light Duty Vehicles	Gasoline <3,5t	Euro II	1999	2001	9655	14319	14153	14012	13791	13616	13420	10302	9608	8984	8074
Light Duty Vehicles	Gasoline <3,5t	Euro III	2002	2006			3784	8014	13934	20623	26271	18997	18312	17579	15860
Light Duty Vehicles	Gasoline <3,5t	Euro IV	2007	2011							3184	3811	4024	4055	
Light Duty Vehicles	Diesel <3,5t	Conventional	0	1994	94102	80466	67925	56940	46624	37412	29736	24088	18849	14736	11426
Light Duty Vehicles	Diesel <3,5t	Euro I	1995	1998	74373	72684	71182	69081	66775	63284	58501	52343	46832	41793	36667
Light Duty Vehicles	Diesel <3,5t	Euro II	1999	2001	49951	74831	73532	72069	70326	68384	65625	55257	49899	45253	40307
Light Duty Vehicles	Diesel <3,5t	Euro III	2002	2006			27192	54236	92157	139815	191430	165441	156158	147666	134874
Light Duty Vehicles	Diesel <3,5t	Euro IV	2007	2011							37658	53994	59145	62080	
Light Duty Vehicles	Diesel <3,5t	Euro V	2012	2015							2831	11914	20867	26410	34043
Light Duty Vehicles	LPG <3,5t	Conventional	0	1994	60	36	27	21	14	10	9	7	5	4	4
Light Duty Vehicles	LPG <3,5t	Euro I	1995	1998	1	1									
Light Duty Vehicles	LPG <3,5t	Euro II	1999	2001	1				1	3	3	2	2	3	3
Light Duty Vehicles	LPG <3,5t	Euro III	2002	2006							5	7	7	8	8
Light Duty Vehicles	LPG <3,5t	Euro IV	2007	2011							1	3	4	3	
Light Duty Vehicles	Electric <3,5t	Conventional	0	9999	1							1	7	4	
Heavy Duty Vehicles	Gasoline >3,5t	Conventional	0	9999	307	295	291	283	268	287	296	328	324	340	343
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Conventional	0	1993	3011	2552	2088	1709	1430	1244	1075	937	793	653	540
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro I	1994	1996	834	769	715	656	594	492	437	360	290	234	189
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro II	1997	2001	2136	2254	2161	2078	2003	1901	1722	1504	1250	1062	898
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro III	2002	2006		166	460	755	1049	1437	1677	1662	1576	1448	1311
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro IV	2007	2009							53	364	758	911	931
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro V	2010	2013							2	5	27	191	
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Conventional	0	1993	3782	3406	3069	2766	2503	2241	2077	1899	1682	1418	1251
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro I	1994	1996	1099	1070	1040	985	948	885	827	747	666	544	475

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Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro II	1997	2001	1575	1783	1840	1884	1858	1838	1706	1587	1357	1207	1085
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro III	2002	2006		155	443	713	1061	1501	1936	1996	1908	1784	1640
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro IV	2007	2009		2	2	2	2	3	93	427	823	890	940
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro V	2010	2013			1	1	1	1	2	42	180	345	535
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Conventional	0	1993	1368	1094	896	734	612	500	435	367	295	224	191
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro I	1994	1996	278	274	248	203	174	152	138	113	99	85	68
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro II	1997	2001	298	312	291	285	278	273	267	239	200	157	137
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro III	2002	2006		10	32	46	58	82	99	108	107	103	95
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro IV	2007	2009				1	1	2	25	49	63	65	
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro V	2010	2013								8	11	33	
Heavy Duty Vehicles	Diesel RT 14 - 20t	Conventional	0	1993	2143	1897	1382	1158	1003	884	895	724	531	427	351
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro I	1994	1996	905	983	787	701	638	562	574	461	334	246	207
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro II	1997	2001	1642	1926	1653	1586	1587	1564	1711	1454	1081	855	735
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro III	2002	2006		194	389	665	919	1245	1740	1655	1464	1326	1208
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro IV	2007	2009		4	4	6	7	14	101	457	697	747	762
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro V	2010	2013					3	21	106	255	414	562	
Heavy Duty Vehicles	Diesel RT 20 - 26t	Conventional	0	1993	2097	1769	1231	984	797	655	623	463	306	217	163
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro I	1994	1996	1204	1206	935	815	728	643	654	515	361	271	212
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro II	1997	2001	2179	2589	2176	2053	1970	1846	1969	1668	1245	986	829
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro III	2002	2006		197	487	803	1143	1583	2273	2160	1903	1747	1598
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro IV	2007	2009		3	3	3	3	26	126	593	907	985	1000
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro V	2010	2013					7	24	124	292	490	678	
Heavy Duty Vehicles	Diesel RT 26 - 28t	Conventional	0	1993	4	4	4	4	4	4	4	4	3	2	2
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro I	1994	1996	1	2	1	1	1	0	1	1	1	0	1
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro II	1997	2001	3	3	2	2	2	2	2	2	1	1	1
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro III	2002	2006			0	2	2	3	3	3	3	3	3
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro IV	2007	2009						3	3	3	1	2	
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro V	2010	2013						1	1	1	1	1	
Heavy Duty Vehicles	Diesel RT 28 - 32t	Conventional	0	1993	185	139	93	70	50	42	36	22	12	9	6
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro I	1994	1996	239	241	190	157	134	114	95	68	41	27	22
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro II	1997	2001	618	792	670	641	637	639	702	590	442	332	283
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro III	2002	2006		82	193	341	509	747	1189	1157	1025	932	884
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro IV	2007	2009		0	1	1	21	86	400	606	661	672	
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro V	2010	2013						10	69	157	254	338	
Heavy Duty Vehicles	Diesel RT >32t	Conventional	0	1993	2	2	1	2	2	2	1	1	1		
Heavy Duty Vehicles	Diesel RT >32t	Euro I	1994	1996	0	1	1	1	1	1	1	1	1	1	1
Heavy Duty Vehicles	Diesel RT >32t	Euro II	1997	2001	1	1	0								
Heavy Duty Vehicles	Diesel RT >32t	Euro III	2002	2006		1	1	2	1	2	3	3	3	3	3

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Heavy Duty Vehicles	Diesel RT >32t	Euro IV	2007	2009						1	1	1	0
Heavy Duty Vehicles	Diesel RT >32t	Euro V	2010	2013							1	1	
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Conventional	0	1993	2481	1887	1804	1515	1250	1033	756	655	548
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro I	1994	1996	1025	954	1006	898	781	648	475	407	337
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro II	1997	2001	1862	1872	2119	2035	1942	1802	1407	1275	1084
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro III	2002	2006		188	497	852	1123	1432	1434	1454	1468
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro IV	2007	2009		3	6	8	8	15	83	402	701
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro V	2010	2013						3	17	93	256
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro V	2010	2013							415	563	
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Conventional	0	1993	3173	2250	1980	1585	1255	973	705	576	453
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro I	1994	1996	2884	2100	1834	1472	1214	979	713	596	466
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro II	1997	2001	7098	7055	6586	5636	4638	3653	2744	2272	1777
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro III	2002	2006		1009	2342	3625	4439	5378	5558	4873	4142
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro IV	2007	2009		4	7	6	10	76	213	992	1630
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro V	2010	2013		1	1	1		27	151	672	1159
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro V	2010	2013							1543	1979	
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Conventional	0	1993	1029	708	549	388	287	219	170	123	94
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro I	1994	1996	1215	1060	967	781	616	482	352	286	177
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro II	1997	2001	3548	4062	4016	3731	3293	2841	2248	1798	1240
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro III	2002	2006		552	1706	3011	4472	6217	7584	7031	5987
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro IV	2007	2009		1	5	6	6	82	328	2117	3548
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro V	2010	2013		1	2	2	2	1	68	722	1421
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro V	2010	2013							1894	2648	
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro I	1994	1996	1	1	1	1	1	1			
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro II	1997	2001	1	1	1	1	1	1	1	1	1
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro IV	2007	2009							1	1	1
Heavy Duty Vehicles	Diesel TT/AT >60t	Euro V	2010	2013								1	3
Buses	Gasoline Urban Buses	Conventional	0	9999	11	9	7	1	2	2	2	4	7
Buses	Diesel Urban Buses <15t	Conventional	0	1993	200	183	154	123	101	80	68	56	49
Buses	Diesel Urban Buses <15t	Euro I	1994	1996	118	118	96	106	88	84	75	57	53
Buses	Diesel Urban Buses <15t	Euro II	1997	2001	525	542	553	569	535	545	494	427	367
Buses	Diesel Urban Buses <15t	Euro III	2002	2006		56	155	248	378	461	438	433	416
Buses	Diesel Urban Buses <15t	Euro IV	2007	2009							119	261	433
Buses	Diesel Urban Buses <15t	Euro V	2010	2013									165
Buses	Diesel Urban Buses 15 - 18t	Conventional	0	1993	1701	1506	1175	1030	880	758	621	538	451
Buses	Diesel Urban Buses 15 - 18t	Euro I	1994	1996	845	810	749	691	620	561	476	399	338
Buses	Diesel Urban Buses 15 - 18t	Euro II	1997	2001	1049	1165	1156	1136	1066	1061	1032	1002	919
Buses	Diesel Urban Buses 15 - 18t	Euro III	2002	2006		288	456	596	733	991	992	989	962
Buses	Diesel Urban Buses 15 - 18t	Euro IV	2007	2009							107	327	624
Buses	Diesel Urban Buses 15 - 18t	Euro V	2010	2013									217
Buses	Diesel Urban Buses >18t	Conventional	0	1993	37	47	45	25	24	23	16	7	5
													2

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Buses	Diesel Urban Buses >18t	Euro I	1994	1996	28	44	52	51	42	44	44	23	6	4	2
Buses	Diesel Urban Buses >18t	Euro II	1997	2001	106	220	225	224	218	217	215	213	161	147	142
Buses	Diesel Urban Buses >18t	Euro III	2002	2006			135	228	337	388	448	439	414	398	389
Buses	Diesel Urban Buses >18t	Euro IV	2007	2009							124	247	338	340	
Buses	Diesel Urban Buses >18t	Euro V	2010	2013											97
Buses	Gasoline Coaches	Conventional	0	9999	1796	1788	1763	1722	1663	1586	1521	1422	1306	1186	1052
Buses	Diesel Coaches <15t	Conventional	0	1993	4340	3989	3649	3360	3029	2726	2438	2162	1928	1661	1439
Buses	Diesel Coaches <15t	Euro I	1994	1996	1079	1053	1031	982	956	920	873	814	732	664	614
Buses	Diesel Coaches <15t	Euro II	1997	2001	1347	1658	1694	1740	1908	2023	2144	2144	2078	2010	1914
Buses	Diesel Coaches <15t	Euro III	2002	2006			253	482	751	1052	1351	1423	1439	1463	1454
Buses	Diesel Coaches <15t	Euro IV	2007	2009							227	478	790	822	
Buses	Diesel Coaches <15t	Euro V	2010	2013											204
Buses	Diesel Coaches 15 - 18t	Conventional	0	1993	1133	1061	1013	957	914	847	758	682	598	520	463
Buses	Diesel Coaches 15 - 18t	Euro I	1994	1996	148	161	173	176	176	184	177	177	176	184	179
Buses	Diesel Coaches 15 - 18t	Euro II	1997	2001	173	208	221	220	230	240	238	236	226	245	258
Buses	Diesel Coaches 15 - 18t	Euro III	2002	2006			19	46	61	71	90	81	99	106	107
Buses	Diesel Coaches 15 - 18t	Euro IV	2007	2009							11	38	69	66	
Buses	Diesel Coaches 15 - 18t	Euro V	2010	2013											41
Buses	Diesel Coaches >18t	Conventional	0	1993	192	177	157	142	138	121	92	77	56	49	38
Buses	Diesel Coaches >18t	Euro I	1994	1996	78	76	79	74	70	65	60	56	49	46	36
Buses	Diesel Coaches >18t	Euro II	1997	2001	145	190	196	201	192	192	202	199	173	164	156
Buses	Diesel Coaches >18t	Euro III	2002	2006			32	92	152	230	293	302	312	321	322
Buses	Diesel Coaches >18t	Euro IV	2007	2009							55	114	180	194	
Buses	Diesel Coaches >18t	Euro V	2010	2013											39
Mopeds	<50 cm ³	Conventional	0	1999	143607	136249	128209	120305	112262	103829	94855	86621	78814	71067	63633
Mopeds	<50 cm ³	Euro I	2000	2003	16393	28751	42791	48695	46069	43455	40746	37826	35231	32572	30009
Mopeds	<50 cm ³	Euro II	2004	9999					10669	21715	33399	44553	50954	56361	59358
Motorcycles	2-stroke >50 cm ³	Conventional	0	1999	11054	11367	11582	11850	12326	13158	14241	15400	15790	15474	14877
Motorcycles	4-stroke <250 cm ³	Conventional	0	1999	11909	12331	12662	13098	13716	14486	15411	16311	16873	17111	17168
Motorcycles	4-stroke <250 cm ³	Euro I	2000	2003	619	1074	1568	2088	2087	2144	2240	2373	2462	2488	2497
Motorcycles	4-stroke <250 cm ³	Euro II	2004	2006					694	1791	3236	3221	3196	3132	3067
Motorcycles	4-stroke <250 cm ³	Euro III	2007	9999							1798	3021	3649	4045	
Motorcycles	4-stroke 250 - 750 cm ³	Conventional	0	1999	32749	33910	34821	36019	37720	39837	42380	44855	46402	47054	47213
Motorcycles	4-stroke 250 - 750 cm ³	Euro I	2000	2003	1703	2953	4311	5742	5739	5897	6159	6527	6769	6843	6868
Motorcycles	4-stroke 250 - 750 cm ³	Euro II	2004	2006					1910	4925	8898	8857	8788	8614	8435
Motorcycles	4-stroke 250 - 750 cm ³	Euro III	2007	9999							4945	8307	10034	11123	
Motorcycles	4-stroke >750 cm ³	Conventional	0	1999	14886	15414	15828	16372	17146	18108	19264	20388	21092	21388	21461
Motorcycles	4-stroke >750 cm ³	Euro I	2000	2003	774	1342	1960	2610	2609	2681	2800	2967	3077	3110	3122

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Motorcycles	4-stroke >750 cm ³	Euro II	2004	2006	868	2239	4045	4026	3995	3915	3834
Motorcycles	4-stroke >750 cm ³	Euro III	2007	9999				2248	3776	4561	5056

Annex2: Mileage data 1985-2010 for road transport (km)

Sector	Subsector	Tech 2	FYear	LYear	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Passenger Cars	Gasoline <1,4 l	PRE ECE	0	1969	6898	5036	5020	4943	4673	4504	4045	3621	3335	3050	2744
Passenger Cars	Gasoline <1,4 l	ECE 15/00-01	1970	1978	11952	9124	9315	9465	9104	8935	8056	7246	6688	6086	5464
Passenger Cars	Gasoline <1,4 l	ECE 15/02	1979	1980	15828	12187	12126	11958	11339	11098	10021	9034	8382	7701	7030
Passenger Cars	Gasoline <1,4 l	ECE 15/03	1981	1985	18153	15198	15457	15563	14954	14699	13299	12029	11221	10402	9502
Passenger Cars	Gasoline <1,4 l	ECE 15/04	1986	1990		19297	21313	20826	19613	19184	17328	15634	14538	13432	12228
Passenger Cars	Gasoline <1,4 l	Euro I	1991	1996			13079	20210	22114	22138	22063	21152	21962	20228	18379
Passenger Cars	Gasoline <1,4 l	Euro II	1997	2000									13663	19661	20283
Passenger Cars	Gasoline <1,4 l	Euro III	2001	2005											
Passenger Cars	Gasoline <1,4 l	Euro IV	2006	2010											
Passenger Cars	Gasoline 1,4 - 2,0 l	PRE ECE	0	1969	8160	6115	6116	6100	5825	5614	5036	4501	4137	3778	3392
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/00-01	1970	1978	14463	10969	11159	11343	10885	10701	9655	8692	8036	7327	6590
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/02	1979	1980	19291	14852	14777	14614	13831	13540	12229	11031	10238	9411	8586
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/03	1981	1985	21834	18592	18837	18953	18207	17880	16173	14625	13636	12624	11513
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/04	1986	1990		23244	26518	25834	24228	23698	21402	19308	17952	16579	15090
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro I	1991	1996			16047	24225	26429	26559	26647	25578	27351	25181	22862
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro II	1997	2000									16672	23262	25144
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro III	2001	2005											
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro IV	2006	2010											
Passenger Cars	Gasoline >2,0 l	PRE ECE	0	1969	9805	7331	7272	7165	6780	6612	5940	5318	4900	4488	4043
Passenger Cars	Gasoline >2,0 l	ECE 15/00-01	1970	1978	16733	12955	13258	13416	13025	12726	11473	10336	9561	8813	7985
Passenger Cars	Gasoline >2,0 l	ECE 15/02	1979	1980	24142	18422	18247	18037	17270	16905	15279	13773	12797	11791	10705
Passenger Cars	Gasoline >2,0 l	ECE 15/03	1981	1985	27306	23829	23741	23384	22167	21704	19580	17656	16427	15159	13795
Passenger Cars	Gasoline >2,0 l	ECE 15/04	1986	1990		28853	33993	32962	30950	30306	27330	24598	22851	21104	19203
Passenger Cars	Gasoline >2,0 l	Euro I	1991	1996			20240	30057	32754	33711	32616	31675	33844	31105	28213
Passenger Cars	Gasoline >2,0 l	Euro II	1997	2000									20657	28412	29771
Passenger Cars	Gasoline >2,0 l	Euro III	2001	2005											
Passenger Cars	Gasoline >2,0 l	Euro IV	2006	2010											
Passenger Cars	Diesel <2,0 l	Conventional	0	1990	32155	38541	39573	37387	36179	37017	34100	31914	30123	27778	25630
Passenger Cars	Diesel <2,0 l	Euro I	1991	1996			65391	84050	77145	67118	62343	60019	60341	50849	44321
Passenger Cars	Diesel <2,0 l	Euro II	1997	2000									40538	50785	48691
Passenger Cars	Diesel <2,0 l	Euro III	2001	2005											
Passenger Cars	Diesel <2,0 l	Euro IV	2006	2010											
Passenger Cars	Diesel <2,0 l	Euro V	2011	2014											
Passenger Cars	Diesel >2,0 l	Conventional	0	1990	46264	53249	53444	45968	41172	40970	37093	34359	32040	29482	27287

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Passenger Cars	Diesel >2,0 l	Euro I	1991	1996	73922	98829	96065	97027	90763	83591	82535	63238	51172			
Passenger Cars	Diesel >2,0 l	Euro II	1997	2000								63924	84599	77084		
Passenger Cars	Diesel >2,0 l	Euro III	2001	2005												
Passenger Cars	Diesel >2,0 l	Euro IV	2006	2010												
Passenger Cars	Diesel >2,0 l	Euro V	2011	2014												
Passenger Cars	LPG cars	Conventional	0	1990	19437	20317	21540	22701	23076	22930	20921	19064	17909	16523	15301	
Passenger Cars	LPG cars	Euro I	1991	1996				50845	46204	44966	44030	39027	36223	33377	34870	
Passenger Cars	LPG cars	Euro II	1997	2000												
Passenger Cars	LPG cars	Euro III	2001	2005												
Passenger Cars	LPG cars	Euro IV	2006	2010												
Passenger Cars	2-Stroke	Conventional	0	9999	17823	15382	15347	15187	14504	14198	12814	11547	10718	9875	8972	
Passenger Cars	Electric cars	Conventional	0	9999	11658	12344	13110	13845	14116	17157	16281	14919	14394	13460	13737	
Light Duty Vehicles	Gasoline <3,5t	Conventional	0	1994	17881	16906	17319	17990	18103	18964	18746	17579	16799	16095	15204	
Light Duty Vehicles	Gasoline <3,5t	Euro I	1995	1998								14993	20931	21758	21886	24249
Light Duty Vehicles	Gasoline <3,5t	Euro II	1999	2001											14121	
Light Duty Vehicles	Gasoline <3,5t	Euro III	2002	2006												
Light Duty Vehicles	Gasoline <3,5t	Euro IV	2007	2011												
Light Duty Vehicles	Diesel <3,5t	Conventional	0	1994	29031	31758	31868	30545	29838	30783	30397	28749	27220	25447	23936	
Light Duty Vehicles	Diesel <3,5t	Euro I	1995	1998							23800	33458	35423	36060	38876	
Light Duty Vehicles	Diesel <3,5t	Euro II	1999	2001											22770	
Light Duty Vehicles	Diesel <3,5t	Euro III	2002	2006												
Light Duty Vehicles	Diesel <3,5t	Euro IV	2007	2011												
Light Duty Vehicles	Diesel <3,5t	Euro V	2012	2015												
Light Duty Vehicles	LPG <3,5t	Conventional	0	1994	16914	15982	16371	17004	17110	17029	15916	15322	14658	13958	13040	
Light Duty Vehicles	LPG <3,5t	Euro I	1995	1998									18592	34023		
Light Duty Vehicles	LPG <3,5t	Euro II	1999	2001												
Light Duty Vehicles	LPG <3,5t	Euro III	2002	2006												
Light Duty Vehicles	LPG <3,5t	Euro IV	2007	2011												
Light Duty Vehicles	Electric <3,5t	Conventional	0	9999	8346	7895	8089	8402	8456	8708	6937	6318	8434	7850	7183	
Heavy Duty Vehicles	Gasoline >3,5t	Conventional	0	9999	21156	19192	20660	21163	19525	18688	18802	17867	16851	15925	16000	
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Conventional	0	1993	31577	30571	33054	29490	24866	24174	25842	23826	22069	20712	18897	
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro I	1994	1996					20754	23816	33598	35053	37440	34688	31372	
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro II	1997	2001								22262	24890	29087	32264	
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro III	2002	2006												
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro IV	2007	2009												
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro V	2010	2013												
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Conventional	0	1993	35381	34158	36921	32934	27760	27083	29125	26789	24841	23413	21356	

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Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro I	1994	1996				23771	27223	36875	39999	43102	39923	36017		
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro II	1997	2001							25498	29613	36054	36597		
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro III	2002	2006												
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro IV	2007	2009												
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro V	2010	2013												
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Conventional	0	1993	28543	31445	34106	32527	27693	30447	30623	25147	23906	23653	25610	
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro I	1994	1996					22369	30180	41679	37797	40184	39158	41670	
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro II	1997	2001								23450	26721	36760	46467	
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro III	2002	2006												
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro IV	2007	2009												
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro V	2010	2013												
Heavy Duty Vehicles	Diesel RT 14 - 20t	Conventional	0	1993	47566	52415	56851	54218	46211	51455	52070	42803	40823	40463	43512	
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro I	1994	1996					36330	47626	61552	59731	66448	64783	68835	
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro II	1997	2001								38086	44241	58918	69595	
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro III	2002	2006												
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro IV	2007	2009												
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro V	2010	2013												
Heavy Duty Vehicles	Diesel RT 20 - 26t	Conventional	0	1993	75373	83146	78512	83072	79757	79515	77648	75508	67041	66058	58006	
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro I	1994	1996					60796	69440	88873	100795	105755	102894	89413	
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro II	1997	2001								64908	71163	92551	90591	
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro III	2002	2006												
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro IV	2007	2009												
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro V	2010	2013												
Heavy Duty Vehicles	Diesel RT 26 - 28t	Conventional	0	1993	73707	81339	76954	81334	77957	81279	79781	80178	69911	67861	58458	
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro I	1994	1996								112697	87402	109362	105438	91468
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro II	1997	2001								65722	79051	81209	92406	
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro III	2002	2006												
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro IV	2007	2009												
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro V	2010	2013												
Heavy Duty Vehicles	Diesel RT 28 - 32t	Conventional	0	1993	81567	90014	85161	90008	87117	89994	87174	84244	74920	74454	65581	
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro I	1994	1996					61934	72773	87231	99988	107395	104246	90473	
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro II	1997	2001								65722	71485	91030	88752	
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro III	2002	2006												
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro IV	2007	2009												
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro V	2010	2013												
Heavy Duty Vehicles	Diesel RT >32t	Conventional	0	1993	59804	65997	62439	65992	63253	60159	80838	54865	47831	77251	67015	
Heavy Duty Vehicles	Diesel RT >32t	Euro I	1994	1996							64455	98396	111670	108396	87291	

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Heavy Duty Vehicles	Diesel RT >32t	Euro II	1997	2001									65722	79429	111234	59026		
Heavy Duty Vehicles	Diesel RT >32t	Euro III	2002	2006														
Heavy Duty Vehicles	Diesel RT >32t	Euro IV	2007	2009														
Heavy Duty Vehicles	Diesel RT >32t	Euro V	2010	2013														
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Conventional	0	1993	51513	57170	62045	59093	50993	56747	57319	47507	45573	45055	48204			
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro I	1994	1996								39923	52387	67789	65871	73373	71695	76046
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro II	1997	2001											41921	48779	65145	76850
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro III	2002	2006														
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro IV	2007	2009														
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro V	2010	2013														
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Conventional	0	1993	82664	88351	84555	81135	82070	85575	79845	80836	75719	71864	65188			
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro I	1994	1996							57281	67012	78849	97650	112854	103407	97109	
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro II	1997	2001										62509	76667	89662	97570	
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro III	2002	2006														
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro IV	2007	2009														
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro V	2010	2013														
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Conventional	0	1993	107012	111733	108316	98187	101912	106526	94437	94229	91732	82757	77559			
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro I	1994	1996							74677	87663	95089	116300	134272	119004	110151	
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro II	1997	2001										75360	88695	102707	106992	
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro III	2002	2006														
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro IV	2007	2009														
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro V	2010	2013														
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro I	1994	1996										134176	132165	114243	108634	
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro II	1997	2001											69882	132901		
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro IV	2007	2009														
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro V	2010	2013														
Buses	Gasoline Urban Buses	Conventional	0	9999	28119	27614	22913	21004	16584	24890	22570	18774	20954	20270	17859			
Buses	Diesel Urban Buses <15t	Conventional	0	1993	178201	202121	164267	138931	106475	115554	106869	101303	95018	91205	81174			
Buses	Diesel Urban Buses <15t	Euro I	1994	1996								91234	135731	138230	151691	142301	125821	
Buses	Diesel Urban Buses <15t	Euro II	1997	2001											86798	114360	128118	
Buses	Diesel Urban Buses <15t	Euro III	2002	2006														
Buses	Diesel Urban Buses <15t	Euro IV	2007	2009														
Buses	Diesel Urban Buses <15t	Euro V	2010	2013														
Buses	Diesel Urban Buses 15 - 18t	Conventional	0	1993	169795	192827	156723	132557	101596	110825	102563	98901	91958	87443	79633			
Buses	Diesel Urban Buses 15 - 18t	Euro I	1994	1996								91234	136323	133072	151602	142559	125315	
Buses	Diesel Urban Buses 15 - 18t	Euro II	1997	2001										86798	111710	128861		
Buses	Diesel Urban Buses 15 - 18t	Euro III	2002	2006														

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Sector	Subsector	Tech 2	FYear	LYear	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Passenger Cars	Gasoline <1,4 l	PRE ECE	0	1969	2505	2305	2204	2088	1971	1772	1616	1500	1379	1250	1137
Passenger Cars	Gasoline <1,4 l	ECE 15/00-01	1970	1978	4954	4539	4285	4015	3730	3308	2964	2684	2436	2190	1973
Passenger Cars	Gasoline <1,4 l	ECE 15/02	1979	1980	6464	5985	5714	5433	5116	4608	4184	3868	3558	3228	2931
Passenger Cars	Gasoline <1,4 l	ECE 15/03	1981	1985	8791	8276	7956	7570	7185	6502	5970	5336	4973	4502	4085
Passenger Cars	Gasoline <1,4 l	ECE 15/04	1986	1990	11295	10582	10205	9735	9273	8408	7725	7060	6565	5977	5454
Passenger Cars	Gasoline <1,4 l	Euro I	1991	1996	16912	15695	15053	14304	13521	12188	11134	10323	9558	8732	7985
Passenger Cars	Gasoline <1,4 l	Euro II	1997	2000	20496	21281	20393	19345	18266	16390	14905	13874	12745	11556	10509
Passenger Cars	Gasoline <1,4 l	Euro III	2001	2005		12643	18141	20266	20046	18959	20866	19458	17859	16182	14709
Passenger Cars	Gasoline <1,4 l	Euro IV	2006	2010							12372	17930	18560	18493	17259
Passenger Cars	Gasoline 1,4 - 2,0 l	PRE ECE	0	1969	3091	2837	2712	2568	2426	2182	1990	1854	1707	1548	1408
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/00-01	1970	1978	5990	5480	5181	4858	4519	3996	3571	3249	2934	2636	2378
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/02	1979	1980	7899	7291	6969	6626	6243	5615	5097	4736	4346	3944	3580
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/03	1981	1985	10639	9913	9522	9039	8553	7692	7021	6408	5916	5349	4855
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/04	1986	1990	13929	12963	12492	11909	11321	10230	9357	8643	7979	7248	6593
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro I	1991	1996	21034	19511	18705	17763	16783	15114	13796	12787	11817	10773	9837
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro II	1997	2000	25394	25961	24869	23586	22269	19993	18188	16891	15537	14090	12816
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro III	2001	2005		15494	22341	25376	25267	23985	24945	23191	21352	19368	17618
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro IV	2006	2010							15158	22119	24021	23625	22009
Passenger Cars	Gasoline >2,0 l	PRE ECE	0	1969	3676	3373	3238	3080	2927	2654	2450	2307	2134	1939	1764
Passenger Cars	Gasoline >2,0 l	ECE 15/00-01	1970	1978	7339	6776	6463	6099	5743	5056	4411	3944	3525	3157	2861
Passenger Cars	Gasoline >2,0 l	ECE 15/02	1979	1980	9872	9096	8714	8280	7800	6989	6337	5887	5390	4889	4448
Passenger Cars	Gasoline >2,0 l	ECE 15/03	1981	1985	12704	11696	11216	10646	10058	9023	8190	7625	6983	6321	5747
Passenger Cars	Gasoline >2,0 l	ECE 15/04	1986	1990	17707	16301	15650	14876	14075	12654	11523	10748	9875	8962	8175
Passenger Cars	Gasoline >2,0 l	Euro I	1991	1996	25933	23894	22857	21662	20462	18382	16728	15538	14279	12952	11785
Passenger Cars	Gasoline >2,0 l	Euro II	1997	2000	30442	32640	31249	29623	27964	25097	22811	21136	19454	17640	16039
Passenger Cars	Gasoline >2,0 l	Euro III	2001	2005		19170	27446	30525	30428	29248	31201	28857	26552	24099	21928
Passenger Cars	Gasoline >2,0 l	Euro IV	2006	2010							18725	27438	29806	29543	27488
Passenger Cars	Diesel <2,0 l	Conventional	0	1990	22745	21289	19979	19914	19320	17886	16591	11394	11186	9990	9422

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Passenger Cars	Diesel <2,0 l	Euro I	1991	1996	38263	33888	31038	30250	28739	25920	23508	17942	16697	14747	13789	
Passenger Cars	Diesel <2,0 l	Euro II	1997	2000	47378	50015	44648	42796	40183	35485	31475	26529	24198	21258	19846	
Passenger Cars	Diesel <2,0 l	Euro III	2001	2005		28653	37698	43030	42443	39538	41367	36182	32578	28596	26678	
Passenger Cars	Diesel <2,0 l	Euro IV	2006	2010							24865	32533	35294	35054	33605	
Passenger Cars	Diesel <2,0 l	Euro V	2011	2014							24865	28908	28253	30916	30228	
Passenger Cars	Diesel >2,0 l	Conventional	0	1990	24140	20380	18827	18424	17539	15546	13812	12463	10891	9522	8868	
Passenger Cars	Diesel >2,0 l	Euro I	1991	1996	43038	35677	32263	30994	28943	25285	22279	20287	17587	15365	14268	
Passenger Cars	Diesel >2,0 l	Euro II	1997	2000	69425	67770	53118	46099	41563	35872	31358	27287	24305	21246	19781	
Passenger Cars	Diesel >2,0 l	Euro III	2001	2005		45589	61667	66611	61080	54224	52262	39979	34245	29581	27345	
Passenger Cars	Diesel >2,0 l	Euro IV	2006	2010							35790	47348	50916	44411	38914	
Passenger Cars	Diesel >2,0 l	Euro V	2011	2014							35790	41659	45556	45700	45128	
Passenger Cars	LPG cars	Conventional	0	1990	14846	13717	12218	10556	9806	8692	7851	6109	5267	4621	3768	
Passenger Cars	LPG cars	Euro I	1991	1996	28759	26291	23458	22787	22494	19728	16926	14750	13368	12005	11073	
Passenger Cars	LPG cars	Euro II	1997	2000			43768	37006	40514	39833	39231			20077	18543	
Passenger Cars	LPG cars	Euro III	2001	2005								20002	27043	26386	24238	
Passenger Cars	LPG cars	Euro IV	2006	2010									17582	31815		
Passenger Cars	2-Stroke	Conventional	0	9999	8247	7570	7258	6886	6501							
Passenger Cars	Electric cars	Conventional	0	9999	13340	13406	13072	12352	11223	10054	9349	6755	7594	7696	8924	
Light Duty Vehicles	Gasoline <3,5t	Conventional	0	1994	14616	13566	13032	12507	11751	10376	9288	9578	8081	7680	7422	
Light Duty Vehicles	Gasoline <3,5t	Euro I	1995	1998	22825	20675	19530	18492	17255	15127	13526	14008	12007	11636	11621	
Light Duty Vehicles	Gasoline <3,5t	Euro II	1999	2001	20896	21150	24338	23019	21451	18778	16781	17351	14859	14372	14339	
Light Duty Vehicles	Gasoline <3,5t	Euro III	2002	2006			13917	19847	20585	19958	19628	23201	19882	19214	19179	
Light Duty Vehicles	Gasoline <3,5t	Euro IV	2007	2011								13912	21825	22626	22850	
Light Duty Vehicles	Diesel <3,5t	Conventional	0	1994	21822	19569	18352	18091	17336	15668	14061	13973	12283	11368	11287	
Light Duty Vehicles	Diesel <3,5t	Euro I	1995	1998	34817	30590	28287	27538	26176	23485	21082	20958	18449	17088	17041	
Light Duty Vehicles	Diesel <3,5t	Euro II	1999	2001	31033	31438	35527	34559	32821	29387	26367	26186	23046	21303	21244	
Light Duty Vehicles	Diesel <3,5t	Euro III	2002	2006			20258	30170	31499	30733	29954	35281	31113	28771	28717	
Light Duty Vehicles	Diesel <3,5t	Euro IV	2007	2011								20870	31321	33151	34025	
Light Duty Vehicles	Diesel <3,5t	Euro V	2012	2015								19651	24679	28916	31296	31989
Light Duty Vehicles	LPG <3,5t	Conventional	0	1994	12711	11299	10423	9277	7618	6008	5864	5408	4221	4122	4000	
Light Duty Vehicles	LPG <3,5t	Euro I	1995	1998	32025	27762										
Light Duty Vehicles	LPG <3,5t	Euro II	1999	2001	18316				27349	23470	22276	21885	20179	18381	17836	
Light Duty Vehicles	LPG <3,5t	Euro III	2002	2006							22965	27145	25718	24751	24426	
Light Duty Vehicles	LPG <3,5t	Euro IV	2007	2011							16378	25518	29713	29154		
Light Duty Vehicles	Electric <3,5t	Conventional	0	9999	6761								8923	8622	10534	
Heavy Duty Vehicles	Gasoline >3,5t	Conventional	0	9999	15471	16386	17426	16472	15933	14390	15767	17431	16055	14867	15235	
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Conventional	0	1993	17998	19427	17832	17427	17356	13770	12326	11299	9527	7503	7335	

Continued

Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro I	1994	1996	29567	31641	28972	28313	28171	22483	20536	19157	16533	13396	13498
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro II	1997	2001	33621	38852	37231	36385	36178	28983	26510	24630	21322	17270	17427
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro III	2002	2006	23999	30457	37037	40438	33904	33864	33957	29442	23883	24144	
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro IV	2007	2009						21495	24072	27799	28066	31249	
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro V	2010	2013						21330	26509	20103	20500		
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Conventional	0	1993	20385	21977	20204	19835	19740	15661	14103	12881	10762	8522	8199
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro I	1994	1996	34028	36267	33253	32312	32138	25565	23309	21638	18652	15249	15270
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro II	1997	2001	38039	43965	42648	41760	41691	33322	30444	28296	24580	20104	20096
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro III	2002	2006	27938	35690	43799	45881	38559	37944	38831	34004	27959	28122	
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro IV	2007	2009	27347	50073	43000	42745	31082	25152	29235	32789	33756	35450	
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro V	2010	2013			42615	42362	33706	27678	25018	27054	28476	32060	
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Conventional	0	1993	19428	19932	18403	17977	17596	16328	14851	13724	11802	9451	9655
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro I	1994	1996	31236	31904	29199	28575	27842	25897	23692	21822	18862	15220	15387
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro II	1997	2001	36467	39369	36463	35771	34936	32685	30039	27915	24400	19565	19935
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro III	2002	2006	24773	31764	38763	39702	38256	39574	39863	34739	28046	28613	
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro IV	2007	2009				43062	40064	30462	26732	32423	32216	37073	
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro V	2010	2013						23342	32517	27743			
Heavy Duty Vehicles	Diesel RT 14 - 20t	Conventional	0	1993	32862	33635	30971	30536	29809	27892	25357	23336	20040	15985	16119
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro I	1994	1996	51549	52457	48183	47430	46367	43139	39394	36454	31410	25315	25739
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro II	1997	2001	57665	64423	61815	60780	59420	55441	50761	47189	40825	32993	33611
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro III	2002	2006	41358	53911	61347	66642	65459	64274	65746	57079	46091	47215	
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro IV	2007	2009	39875	62922	64039	71783	56467	46090	48277	57189	55784	59133	
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro V	2010	2013				42569	47256	47763	50168	48542	55490		
Heavy Duty Vehicles	Diesel RT 20 - 26t	Conventional	0	1993	54320	48744	45352	44778	43238	39974	36392	33774	28941	23205	23132
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro I	1994	1996	82609	73422	67978	67079	64314	59362	54134	50451	43464	35271	35456
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro II	1997	2001	92771	89979	86706	85646	82303	76040	69477	64932	56155	45672	46012
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro III	2002	2006	57240	72653	88121	92122	89652	88352	92512	80247	65446	66214	
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro IV	2007	2009	55991	96623	101964	91312	61937	68990	66793	78889	77283	81664	
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro V	2010	2013				58803	73185	66845	70129	66931	75787		
Heavy Duty Vehicles	Diesel RT 26 - 28t	Conventional	0	1993	56076	49143	46523	44877	42931	39707	35968	33382	28908	22389	23889
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro I	1994	1996	84127	72631	67577	66326	62299	62261	56064	52032	44700	38083	37994
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro II	1997	2001	100442	89831	83181	81643	78782	73085	65810	60681	54484	42466	48097
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro III	2002	2006	58837	73291	99846	100664	93424	80261	65257	69630			
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro IV	2007	2009						57095	87698	82535	88489		
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro V	2010	2013						57095	98102	79762	85108		
Heavy Duty Vehicles	Diesel RT 28 - 32t	Conventional	0	1993	61225	54790	50623	49375	47758	44506	40728	37044	32070	25640	28165
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro I	1994	1996	83315	74284	69375	68365	65209	60404	54354	50250	43011	35164	37770

Continued

Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro II	1997	2001	88982	90606	90550	89296	85683	79627	72049	67121	58005	47481	50916
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro III	2002	2006		56936	74759	87145	91990	89917	86613	93909	81853	66906	71585
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro IV	2007	2009			56049	75899	110131	62495	71635	66913	79090	77509	87209
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro V	2010	2013						57521	64027	70613	67878	82098	
Heavy Duty Vehicles	Diesel RT >32t	Conventional	0	1993	62601	58944	54842	33182	31817	29603	24520	22757	19550		
Heavy Duty Vehicles	Diesel RT >32t	Euro I	1994	1996	77588	70375	70188	68889	65902	61136	55051	51092	43893	35688	40635
Heavy Duty Vehicles	Diesel RT >32t	Euro II	1997	2001	74901	101905	97999								
Heavy Duty Vehicles	Diesel RT >32t	Euro III	2002	2006		56325	104812	91020	96425	82252	77789	76167	69980	71115	75882
Heavy Duty Vehicles	Diesel RT >32t	Euro IV	2007	2009								57095	98102	79762	52060
Heavy Duty Vehicles	Diesel RT >32t	Euro V	2010	2013										79762	63863
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Conventional	0	1993	36076	34714	31912	31679	31465	29326	27630	25994	23311	17470	19092
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro I	1994	1996	56115	53711	49296	48918	48698	45272	42683	40442	36612	27930	30900
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro II	1997	2001	62828	66074	63335	62750	62418	58145	54696	52002	47267	36175	40350
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro III	2002	2006		42316	55119	63223	69921	68620	69299	72567	66101	50517	56565
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro IV	2007	2009		40799	64332	65996	75262	59079	49746	53335	66363	61232	71317
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro V	2010	2013						44538	50839	52517	58052	53295	66437
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Conventional	0	1993	59837	51470	47377	47198	46345	42965	41598	39893	36626	28318	31436
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro I	1994	1996	88793	77589	71212	70815	69287	64202	62048	59312	54020	41602	46677
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro II	1997	2001	97141	96740	93155	93303	91674	84982	83403	79107	71782	55184	61440
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro III	2002	2006		64475	81407	95848	102774	101252	112344	120094	110384	85386	94695
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro IV	2007	2009		58478	89659	111095	86241	72927	83389	82946	106080	98463	114013
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro V	2010	2013		60693	112110	112129		66899	85541	88563	107392	97527	116118
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Conventional	0	1993	73942	77821	71029	68073	63925	57917	54553	50254	42285	36771	33357
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro I	1994	1996	103698	109404	100120	96430	91138	83280	78475	73799	62772	57395	54418
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro II	1997	2001	110324	134290	131843	127772	121151	111339	104759	97068	81876	74135	69609
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro III	2002	2006		85450	105378	123178	128215	126280	131263	140652	121314	111852	105841
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro IV	2007	2009		83955	97398	140287	147386	145858	129694	98969	94782	114344	129025
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro V	2010	2013		83955	118025	153422	145858	129694	86281	92355	110209	119657	120157
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro I	1994	1996	102248	112188	102762	99064	94180	86654					
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro II	1997	2001	125089	137250	125719	121194	115219	106012	101625	95118	81958	75984	72075
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro IV	2007	2009								87082	150067	139129	131971
Heavy Duty Vehicles	Diesel TT/AT >60t	Euro V	2010	2013									80250	102649	
Buses	Gasoline Urban Buses	Conventional	0	9999	15801	15469	15262	14610	12816	17679	17823	33299	30963	34224	30311
Buses	Diesel Urban Buses <15t	Conventional	0	1993	73704	69555	65973	63516	60209	55726	50795	47221	44449	39163	36136
Buses	Diesel Urban Buses <15t	Euro I	1994	1996	113375	105491	98660	94825	90297	82525	76773	73252	66207	59119	55131
Buses	Diesel Urban Buses <15t	Euro II	1997	2001	126818	125943	122778	118677	113321	103362	96682	92361	83241	75928	72292
Buses	Diesel Urban Buses <15t	Euro III	2002	2006		77218	104396	123458	120207	122546	133140	120242	106697	100328	

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Buses	Diesel Urban Buses <15t	Euro IV	2007	2009									80502	106873	111220	131333		
Buses	Diesel Urban Buses <15t	Euro V	2010	2013												74487		
Buses	Diesel Urban Buses 15 - 18t	Conventional	0	1993	72610	68150	64917	62950	60082	55042	52409	50205	46021	41624	39883			
Buses	Diesel Urban Buses 15 - 18t	Euro I	1994	1996	112238	103891	96819	92706	88492	80900	75874	72615	65528	58620	55334			
Buses	Diesel Urban Buses 15 - 18t	Euro II	1997	2001	123334	124475	125185	120556	115115	104997	98202	94098	85460	76384	72149			
Buses	Diesel Urban Buses 15 - 18t	Euro III	2002	2006			77218	123225	129727	124894	117172	131589	119314	106491	100100			
Buses	Diesel Urban Buses 15 - 18t	Euro IV	2007	2009								80502	100595	106405	133010			
Buses	Diesel Urban Buses 15 - 18t	Euro V	2010	2013											74487			
Buses	Diesel Urban Buses >18t	Conventional	0	1993	85502	80053	75911	73414	69467	64654	60909	56380	53371	43923	40378			
Buses	Diesel Urban Buses >18t	Euro I	1994	1996	109194	102039	97540	93824	89504	81849	76464	74727	62198	55090	50827			
Buses	Diesel Urban Buses >18t	Euro II	1997	2001	97862	113068	136013	130814	124514	113816	106091	101716	91824	82521	77396			
Buses	Diesel Urban Buses >18t	Euro III	2002	2006			77218	120043	124379	129423	123893	128295	116682	104390	98193			
Buses	Diesel Urban Buses >18t	Euro IV	2007	2009								80502	112083	118033	129601			
Buses	Diesel Urban Buses >18t	Euro V	2010	2013											74487			
Buses	Gasoline Coaches	Conventional	0	9999	15331	14610	14368	13776	13279	12518	11817	11340	10805	9917	9239			
Buses	Diesel Coaches <15t	Conventional	0	1993	25816	24981	24029	24070	23909	22168	20561	19793	17929	15846	15032			
Buses	Diesel Coaches <15t	Euro I	1994	1996	35800	34011	32350	32035	31604	29178	26916	25823	23414	20740	19736			
Buses	Diesel Coaches <15t	Euro II	1997	2001	39702	40077	41985	41416	40778	37702	34880	33573	30504	27047	25740			
Buses	Diesel Coaches <15t	Euro III	2002	2006			25866	40567	44023	44313	43678	46855	42426	37560	35755			
Buses	Diesel Coaches <15t	Euro IV	2007	2009								28605	38702	39423	46768			
Buses	Diesel Coaches <15t	Euro V	2010	2013											26662			
Buses	Diesel Coaches 15 - 18t	Conventional	0	1993	32808	31527	30668	30759	30634	28915	27028	26295	24133	21777	20969			
Buses	Diesel Coaches 15 - 18t	Euro I	1994	1996	59248	56132	53179	52678	51874	47871	43982	42185	38089	33805	32103			
Buses	Diesel Coaches 15 - 18t	Euro II	1997	2001	63867	66866	69171	68608	67457	61924	56923	54622	49646	43951	41971			
Buses	Diesel Coaches 15 - 18t	Euro III	2002	2006			42553	61143	77824	75987	72217	75315	67838	59795	56739			
Buses	Diesel Coaches 15 - 18t	Euro IV	2007	2009								47058	58106	63988	77970			
Buses	Diesel Coaches 15 - 18t	Euro V	2010	2013											43862			
Buses	Diesel Coaches >18t	Conventional	0	1993	67418	64351	61817	61719	61578	56880	52648	51019	46690	40889	39438			
Buses	Diesel Coaches >18t	Euro I	1994	1996	94564	89990	86004	84786	83217	76411	70956	67835	61629	54514	51947			
Buses	Diesel Coaches >18t	Euro II	1997	2001	101528	103472	113133	112138	110603	101413	92833	88694	80654	71976	68493			
Buses	Diesel Coaches >18t	Euro III	2002	2006			67697	93888	114101	114157	116516	123137	111570	98836	94266			
Buses	Diesel Coaches >18t	Euro IV	2007	2009								74865	105169	109410	121458			
Buses	Diesel Coaches >18t	Euro V	2010	2013											69779			
Mopeds	<50 cm ³	Conventional	0	1999	1939	1528	1550	1551	1523	1500	1497	1503	1514	1498	1485			
Mopeds	<50 cm ³	Euro I	2000	2003	1939	1528	1550	1551	1523	1500	1497	1503	1514	1498	1485			
Mopeds	<50 cm ³	Euro II	2004	9999								1523	1500	1497	1503	1514	1498	1485
Motorcycles	2-stroke >50 cm ³	Conventional	0	1999	6945	6567	6354	6017	5540	5076	4722	4426	4250	3971	3973			

Motorcycles	4-stroke <250 cm ³	Conventional	0	1999	6945	6567	6354	6017	5540	5076	4722	4426	4250	3971	3973
Motorcycles	4-stroke <250 cm ³	Euro I	2000	2003	6945	6567	6354	6017	5540	5076	4722	4426	4250	3971	3973
Motorcycles	4-stroke <250 cm ³	Euro II	2004	2006					5540	5076	4722	4426	4250	3971	3973
Motorcycles	4-stroke <250 cm ³	Euro III	2007	9999							4426	4250	3971	3973	
Motorcycles	4-stroke 250 - 750 cm ³	Conventional	0	1999	6945	6567	6354	6017	5540	5076	4722	4426	4250	3971	3973
Motorcycles	4-stroke 250 - 750 cm ³	Euro I	2000	2003	6945	6567	6354	6017	5540	5076	4722	4426	4250	3971	3973
Motorcycles	4-stroke 250 - 750 cm ³	Euro II	2004	2006					5540	5076	4722	4426	4250	3971	3973
Motorcycles	4-stroke 250 - 750 cm ³	Euro III	2007	9999							4426	4250	3971	3973	
Motorcycles	4-stroke >750 cm ³	Conventional	0	1999	6945	6567	6354	6017	5540	5076	4722	4426	4250	3971	3973
Motorcycles	4-stroke >750 cm ³	Euro I	2000	2003	6945	6567	6354	6017	5540	5076	4722	4426	4250	3971	3973
Motorcycles	4-stroke >750 cm ³	Euro II	2004	2006					5540	5076	4722	4426	4250	3971	3973
Motorcycles	4-stroke >750 cm ³	Euro III	2007	9999							4426	4250	3971	3973	

Annex 3: EU directive emission limits for road transportation vehicles

Private cars and light duty vehicles I (<1305 kg).

G prkm		EURO 1	EURO 2	EURO 3 ¹⁾	EURO 4	EURO 5	EURO 6
<u>Normal temp.</u>							
CO	Gasoline	2.72	2.2	2.3	1.0	1.0	1.0
	Diesel	2.72	1.0	0.64	0.5	0.5	0.5
HC	Gasoline	-	-	0.20	0.10	0.1	0.1
NMHC	Gasoline	-	-	-	-	0.068	0.068
NO _x	Gasoline	-	-	0.15	0.08	0.06	0.06
	Diesel	-	-	0.5	0.25	0.18	0.08
HC+NO _x	Gasoline	0.97	0.5	-	-	-	-
	Diesel	0.97	0.7/0.9 ²⁾	0.56	0.30	0.23	0.17
Particulates	Diesel	0.14	0.08/0.10 ²⁾	0.05	0.025	0.005	0.005
Particulates (#)		-	-	-	-	-	6x10 ^{11 4)}
<u>Low temp.</u>							
CO	Gasoline	-	-	-	15	15	15
HC	Gasoline	-	-	-	1.8	1.8	1.8
<u>Evaporation</u>							
HC ³⁾	Gasoline	2.0	2.0	2.0	2.0	2.0	2.0

¹⁾ Changed test procedure at normal temperatures (40 s warm-up phase omitted) and for evaporation measurements.

²⁾ Less stringent emission limits for direct injection diesel engines.

³⁾ Unit: g/test.

⁴⁾ Applicable for diesel and gasoline direct injection (GDI). 6x10¹² within first three years of Euro 6 effective dates

Light duty vehicles II (1305-1760 kg)

G pr km		EURO 1	EURO 2	EURO 3 ¹⁾	EURO 4	EURO 5	EURO 6
<u>Normal temp.</u>							
CO	Gasoline	5.17	4.0	4.17	1.81	1.81	1.81
	Diesel	5.17	1.25	0.80	0.63	0.63	0.63
HC	Gasoline	-	-	0.25	0.13	0.13	0.13
NMHC	Gasoline	-	-	-	-	0.9	0.9
NO _x	Gasoline	-	-	0.18	0.10	0.75	0.75
	Diesel	-	-	0.65	0.33	0.235	0.105
HC+NO _x	Gasoline	1.4	0.6	-	-	-	-
	Diesel	1.4	1.0/1.3 ²⁾	0.72	0.39	0.295	0.195
Particulates	Gasoline					0.005	0.005
	Diesel	0.19	0.12/0.14 ²⁾	0.07	0.04	0.005	0.005
Particulates (#)		-	-	-	-	-	6x10 ^{11 4)}
<u>Low temp.</u>							
CO	Gasoline	-	-	-	24	24	24
HC	Gasoline	-	-	-	2.7	2.7	2.7
<u>Evaporation</u>							
HC ³⁾	Gasoline	2.0	2.0	2.0	2.0	2.0	2.0

¹⁾ Changed test procedure at normal temperatures (40 s warm-up phase omitted) and for evaporation measurements.

²⁾ Less stringent emission limits for direct injection diesel engines.

³⁾ Unit: g/test.

⁴⁾ Applicable for diesel and gasoline direct injection (GDI). 6x10¹² within first three years of Euro 6 effective dates

Light duty vehicles III (>1760 kg).

G pr km		EURO 1	EURO 2	EURO 3 ¹⁾	EURO 4	EURO 5	EURO 6
<u>Normal temp.</u>							
CO	Gasoline	6.9	5.0	5.22	2.27	2.27	2.27
	Diesel	6.9	1.5	0.95	0.74	0.74	0.74
HC	Gasoline	-	-	0.29	0.16	0.16	0.16
NMHC	Gasoline					0.108	0.108
NO _x	Gasoline	-	-	0.21	0.11	0.082	0.082
	Diesel	-	-	0.78	0.39	0.28	0.125
HC+NO _x	Gasoline	1.7	0.7	-	-	-	-
	Diesel	1.7	1.2/1.6 ²⁾	0.86	0.46	0.35	0.215
Particulates	Gasoline					0.005	0.005
	Diesel	0.25	0.17/0.20 ²⁾	0.10	0.06	0.005	0.005
Particulates (#)		-	-	-	-	-	6x10 ¹¹ ⁴⁾
<u>Low temp.</u>							
CO	Gasoline	-	-	-	30	30	30
HC	Gasoline	-	-	-	3.2	3.2	3.2
<u>Evaporation</u>							
HC ³⁾	Gasoline	2.0	2.0	2.0	2.0	2.0	2.0

¹⁾ Changed test procedure at normal temperatures (40 s warm-up phase omitted) and for evaporation measurements

²⁾ Less stringent emission limits for direct injection diesel engines

³⁾ Unit: g/test

⁴⁾ Applicable for diesel and gasoline direct injection (GDI). 6x10¹² within first three years of Euro 6 effective dates

Heavy duty diesel vehicles.

(g pr kWh)	EURO I	EURO II	EURO III	EURO IV	EURO V	EURO VI	EEV ²⁾
Test ¹⁾	1993	1996	2001	2006	2009	2014	2000
CO	ECE/ESC	4.5	4.0	2.1	1.5	1.5	1.5
	ETC	-	-	(5.45)	4.0	4.0	3.0
HC	ECE/ESC	1.1	1.1	0.66	0.46	0.46	0.13
	ETC	-	-	(0.78)	0.55	0.55	0.16
NO _x	ECE/ESC	8.0	7.0	5.0	3.5	2.0	0.4
	ETC	-	-	(5.0)	3.5	2.0	2.0
Particulates ³⁾	ECE/ESC	0.36/0.61	0.15/0.25	0.10/0.13	0.02	0.02	0.01
	ETC	-	-	(0.16/0.21)	0.03	0.03	0.01
	ELR	-	-	0.8	0.5	0.5	0.15
NH ₃	ECE/ESC					10 (ppm)	
	ETC					10 (ppm)	

¹⁾ Test procedure: Euro 1 og Euro 2: ECE (stationary)

Euro 3: ESC (stationary) + ELR (load response)

Euro 4, Euro 5 og EEV: ESC (stationary) + ETC (transient) + ELR (load response)

²⁾ EEV: Emission limits for extra environmental friendly vehicles, used as a basis for economical incitements (gas fueled vehicles).

³⁾ For Euro 1, Euro 2 og Euro 3 less stringent emission limits apply for small engines:

Euro 1: <85 kW

Euro 2: <0.7 l

Euro 3: <0.75 l

Annex 4: Basis emission factors (g pr km)

Sector	Subsector	Tech 2	FYear	LYear	FCu	FCr	FCh	COu	COr	COh	PMu	PMr	PMh	NOxu	NOxr	NOxh
Passenger Cars	Gasoline <1,4 l	PRE ECE	0	1969	67,499	55,000	62,743	27,505	19,333	15,520	0,063	0,044	0,041	1,849	2,062	2,023
Passenger Cars	Gasoline <1,4 l	ECE 15/00-01	1970	1978	58,240	44,460	48,600	18,966	14,480	18,620	0,063	0,044	0,041	1,849	2,062	2,023
Passenger Cars	Gasoline <1,4 l	ECE 15/02	1979	1980	53,248	45,170	51,200	15,859	8,200	8,260	0,063	0,044	0,041	1,619	2,102	2,909
Passenger Cars	Gasoline <1,4 l	ECE 15/03	1981	1985	53,248	45,170	51,200	16,752	8,793	7,620	0,042	0,029	0,029	1,680	2,253	3,276
Passenger Cars	Gasoline <1,4 l	ECE 15/04	1986	1990	51,420	43,440	47,700	9,087	4,956	4,292	0,030	0,020	0,020	1,691	2,089	2,662
Passenger Cars	Gasoline <1,4 l	Euro I	1991	1996	47,399	41,954	46,055	1,765	1,372	1,765	0,003	0,002	0,002	0,273	0,281	0,458
Passenger Cars	Gasoline <1,4 l	Euro II	1997	2000	46,486	39,509	44,016	0,659	0,575	0,749	0,003	0,002	0,002	0,154	0,154	0,181
Passenger Cars	Gasoline <1,4 l	Euro III	2001	2005	48,687	42,255	45,323	0,519	0,691	1,148	0,001	0,001	0,001	0,076	0,060	0,052
Passenger Cars	Gasoline <1,4 l	Euro IV	2006	2010	50,038	44,193	48,285	0,195	0,287	0,529	0,001	0,001	0,001	0,054	0,030	0,019
Passenger Cars	Gasoline 1,4 - 2,0 l	PRE ECE	0	1969	79,277	67,000	76,386	27,505	19,333	15,520	0,063	0,044	0,041	2,164	2,683	3,130
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/00-01	1970	1978	67,779	51,090	60,300	18,966	14,480	18,620	0,063	0,044	0,041	2,164	2,683	3,130
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/02	1979	1980	61,731	50,686	59,680	15,859	8,200	8,260	0,063	0,044	0,041	1,831	2,377	3,283
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/03	1981	1985	61,731	50,686	59,680	16,752	8,793	7,620	0,042	0,029	0,029	1,917	2,580	3,472
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/04	1986	1990	61,652	49,112	52,052	9,087	4,956	4,292	0,030	0,020	0,020	2,122	2,757	3,524
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro I	1991	1996	57,521	48,522	51,518	1,765	1,372	1,765	0,003	0,002	0,002	0,273	0,281	0,458
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro II	1997	2000	56,324	47,687	48,786	0,659	0,575	0,749	0,003	0,002	0,002	0,154	0,154	0,181
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro III	2001	2005	58,259	49,897	53,092	0,519	0,691	1,148	0,001	0,001	0,001	0,076	0,060	0,052
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro IV	2006	2010	60,486	52,793	55,293	0,195	0,287	0,529	0,001	0,001	0,001	0,054	0,030	0,019
Passenger Cars	Gasoline >2,0 l	PRE ECE	0	1969	96,536	80,000	88,267	27,505	19,333	15,520	0,063	0,044	0,041	2,860	4,090	5,500
Passenger Cars	Gasoline >2,0 l	ECE 15/00-01	1970	1978	73,798	57,090	66,300	18,966	14,480	18,620	0,063	0,044	0,041	2,860	4,090	5,500
Passenger Cars	Gasoline >2,0 l	ECE 15/02	1979	1980	75,270	63,260	70,700	15,859	8,200	8,260	0,063	0,044	0,041	2,066	2,675	3,680
Passenger Cars	Gasoline >2,0 l	ECE 15/03	1981	1985	75,270	63,260	70,700	16,752	8,793	7,620	0,042	0,029	0,029	2,806	3,441	4,604
Passenger Cars	Gasoline >2,0 l	ECE 15/04	1986	1990	71,055	58,080	69,900	9,087	4,956	4,292	0,030	0,020	0,020	2,293	2,750	3,687
Passenger Cars	Gasoline >2,0 l	Euro I	1991	1996	74,616	61,902	65,020	1,765	1,372	1,765	0,003	0,002	0,002	0,273	0,281	0,458
Passenger Cars	Gasoline >2,0 l	Euro II	1997	2000	76,837	65,226	66,732	0,659	0,575	0,749	0,003	0,002	0,002	0,154	0,154	0,181
Passenger Cars	Gasoline >2,0 l	Euro III	2001	2005	70,798	57,424	56,826	0,519	0,691	1,148	0,001	0,001	0,001	0,076	0,060	0,052
Passenger Cars	Gasoline >2,0 l	Euro IV	2006	2010	86,099	67,877	65,859	0,195	0,287	0,529	0,001	0,001	0,001	0,054	0,030	0,019
Passenger Cars	Diesel <2,0 l	Conventional	0	1990	57,529	41,209	50,089	0,651	0,472	0,384	0,199	0,132	0,170	0,520	0,433	0,528
Passenger Cars	Diesel <2,0 l	Euro I	1991	1996	47,836	42,807	48,388	0,419	0,215	0,208	0,057	0,062	0,107	0,603	0,562	0,663
Passenger Cars	Diesel <2,0 l	Euro II	1997	2000	50,442	44,117	48,779	0,343	0,110	0,035	0,047	0,039	0,050	0,651	0,555	0,665
Passenger Cars	Diesel <2,0 l	Euro III	2001	2005	48,920	43,427	45,585	0,099	0,041	0,012	0,029	0,030	0,045	0,716	0,665	0,750
Passenger Cars	Diesel <2,0 l	Euro IV	2006	2010	48,920	43,427	45,585	0,083	0,034	0,021	0,029	0,024	0,026	0,539	0,424	0,576
Passenger Cars	Diesel <2,0 l	Euro V	2011	2014	48,920	43,427	45,585	0,083	0,034	0,021	0,006	0,005	0,005	0,388	0,305	0,415

Continued

Passenger Cars	Diesel >2,0 l	Conventional	0	1990	57,529	41,209	50,089	0,651	0,472	0,384	0,199	0,132	0,170	0,824	0,723	0,861
Passenger Cars	Diesel >2,0 l	Euro I	1991	1996	65,267	58,299	64,360	0,419	0,215	0,208	0,057	0,062	0,107	0,603	0,562	0,663
Passenger Cars	Diesel >2,0 l	Euro II	1997	2000	65,267	58,299	64,360	0,343	0,110	0,035	0,047	0,039	0,050	0,651	0,555	0,665
Passenger Cars	Diesel >2,0 l	Euro III	2001	2005	65,267	58,299	64,360	0,099	0,041	0,012	0,029	0,030	0,045	0,716	0,665	0,750
Passenger Cars	Diesel >2,0 l	Euro IV	2006	2010	65,267	58,299	64,360	0,083	0,034	0,021	0,029	0,024	0,026	0,539	0,424	0,576
Passenger Cars	Diesel >2,0 l	Euro V	2011	2014	65,267	58,299	64,360	0,083	0,034	0,021	0,006	0,005	0,005	0,388	0,305	0,415
Passenger Cars	LPG cars	Conventional	0	1990	59,000	45,000	54,000	2,043	2,373	9,723	0,040	0,030	0,025	2,203	2,584	2,861
Passenger Cars	LPG cars	Euro I	1991	1996	49,145	45,155	54,125	1,310	1,445	3,560	0,040	0,030	0,025	0,340	0,283	0,298
Passenger Cars	LPG cars	Euro II	1997	2000	49,145	45,155	54,125	0,891	0,982	2,421	0,040	0,030	0,025	0,122	0,102	0,107
Passenger Cars	LPG cars	Euro III	2001	2005	49,145	45,155	54,125	0,733	0,809	1,993	0,040	0,030	0,025	0,082	0,068	0,071
Passenger Cars	LPG cars	Euro IV	2006	2010	49,145	45,155	54,125	0,445	0,491	1,210	0,040	0,030	0,025	0,044	0,037	0,039
Light Duty Vehicles	Gasoline <3,5t	Conventional	0	1994	82,270	59,883	56,470	14,925	6,075	7,389	0,040	0,040	0,040	2,671	3,118	3,387
Light Duty Vehicles	Gasoline <3,5t	Euro I	1995	1998	96,450	70,388	66,450	4,187	0,862	1,087	0,003	0,002	0,002	0,427	0,400	0,429
Light Duty Vehicles	Gasoline <3,5t	Euro II	1999	2001	96,450	70,388	66,450	2,554	0,526	0,663	0,003	0,002	0,002	0,145	0,136	0,146
Light Duty Vehicles	Gasoline <3,5t	Euro III	2002	2006	96,450	70,388	66,450	2,177	0,448	0,565	0,001	0,001	0,001	0,090	0,084	0,090
Light Duty Vehicles	Gasoline <3,5t	Euro IV	2007	2011	96,450	70,388	66,450	1,172	0,241	0,304	0,001	0,001	0,001	0,043	0,040	0,043
Light Duty Vehicles	Diesel <3,5t	Conventional	0	1994	76,718	65,934	72,142	1,124	1,009	1,060	0,285	0,303	0,322	1,673	0,843	0,834
Light Duty Vehicles	Diesel <3,5t	Euro I	1995	1998	68,860	58,185	63,660	0,393	0,328	0,423	0,070	0,066	0,090	1,138	0,975	1,022
Light Duty Vehicles	Diesel <3,5t	Euro II	1999	2001	68,860	58,185	63,660	0,393	0,328	0,423	0,070	0,066	0,090	1,138	0,975	1,022
Light Duty Vehicles	Diesel <3,5t	Euro III	2002	2006	68,860	58,185	63,660	0,322	0,269	0,347	0,047	0,044	0,061	0,740	0,634	0,664
Light Duty Vehicles	Diesel <3,5t	Euro IV	2007	2011	68,860	58,185	63,660	0,255	0,213	0,275	0,024	0,023	0,032	0,319	0,273	0,286
Light Duty Vehicles	Diesel <3,5t	Euro V	2012	2015	68,860	58,185	63,660	0,255	0,213	0,275	0,003	0,003	0,004	0,228	0,195	0,204
Light Duty Vehicles	LPG <3,5t	Conventional	0	1994	88,500	67,500	81,000	3,064	3,559	14,584	0,060	0,045	0,038	3,305	3,876	4,291
Light Duty Vehicles	LPG <3,5t	Euro II	1999	2001	73,718	67,733	81,188	1,336	1,474	3,631	0,060	0,045	0,038	0,183	0,153	0,161
Light Duty Vehicles	LPG <3,5t	Euro III	2002	2006	73,718	67,733	81,188	1,100	1,214	2,990	0,060	0,045	0,038	0,122	0,102	0,107
Light Duty Vehicles	LPG <3,5t	Euro IV	2007	2011	73,718	67,733	81,188	0,668	0,737	1,815	0,060	0,045	0,038	0,066	0,055	0,058
Heavy Duty Vehicles	Gasoline >3,5t	Conventional	0	9999	225,000	150,000	165,000	70,000	55,000	55,000	0,400	0,400	0,400	4,500	7,500	7,500
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Conventional	0	1993	125,002	110,985	112,984	2,060	1,509	1,351	0,321	0,240	0,216	4,211	4,104	4,476
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro I	1994	1996	100,036	91,682	104,222	0,668	0,501	0,546	0,126	0,095	0,090	2,939	2,938	3,316
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro II	1997	2001	94,988	88,592	101,003	0,534	0,466	0,461	0,059	0,053	0,061	3,223	3,118	3,414
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro III	2002	2006	101,379	92,883	105,924	0,660	0,481	0,452	0,067	0,048	0,041	2,499	2,300	2,498
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro IV	2007	2009	98,559	92,910	106,610	0,342	0,270	0,258	0,015	0,013	0,014	1,707	1,645	1,801
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro V	2010	2013	99,641	93,536	106,995	0,344	0,270	0,259	0,015	0,013	0,014	1,012	0,972	1,062
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Conventional	0	1993	183,253	153,117	150,068	2,358	1,698	1,525	0,330	0,236	0,207	7,928	7,236	7,499
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro I	1994	1996	155,870	135,518	136,666	1,086	0,817	0,766	0,201	0,144	0,131	4,729	4,306	4,464
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro II	1997	2001	148,625	131,263	133,537	0,868	0,727	0,717	0,094	0,080	0,093	5,152	4,593	4,682

Continued

Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro III	2002	2006	157,573	137,771	138,996	1,084	0,771	0,733	0,104	0,073	0,063	3,997	3,536	3,485
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro IV	2007	2009	151,450	136,152	138,554	0,553	0,418	0,369	0,023	0,019	0,019	2,728	2,512	2,488
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro V	2010	2013	153,617	137,425	139,289	0,560	0,421	0,374	0,023	0,019	0,019	1,647	1,483	1,468
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Conventional	0	1993	198,513	163,310	159,212	2,546	1,876	1,693	0,351	0,254	0,233	8,826	7,718	7,748
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro I	1994	1996	170,171	144,307	143,334	1,200	0,918	0,866	0,218	0,159	0,147	5,321	4,638	4,638
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro II	1997	2001	163,223	140,030	139,590	0,985	0,820	0,804	0,103	0,087	0,103	5,815	4,975	4,889
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro III	2002	2006	172,146	146,082	144,611	1,176	0,873	0,835	0,109	0,078	0,071	4,745	3,881	3,702
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro IV	2007	2009	163,114	142,925	143,274	0,599	0,448	0,410	0,024	0,020	0,020	3,208	2,754	2,620
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro V	2010	2013	165,111	144,096	144,035	0,606	0,452	0,413	0,025	0,020	0,020	1,909	1,634	1,552
Heavy Duty Vehicles	Diesel RT 14 - 20t	Conventional	0	1993	261,662	205,735	193,152	3,512	2,514	2,221	0,483	0,341	0,298	11,287	9,455	9,120
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro I	1994	1996	212,834	172,142	164,411	1,612	1,206	1,117	0,298	0,209	0,181	6,721	5,601	5,385
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro II	1997	2001	204,313	167,263	160,324	1,267	1,025	1,002	0,129	0,105	0,122	7,473	6,118	5,804
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro III	2002	2006	215,351	173,802	164,914	1,601	1,150	1,096	0,153	0,106	0,090	6,139	4,859	4,431
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro IV	2007	2009	201,093	168,074	161,976	0,829	0,602	0,523	0,031	0,024	0,023	4,079	3,400	3,171
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro V	2010	2013	205,393	169,743	162,354	0,869	0,625	0,536	0,032	0,025	0,023	2,460	2,028	1,883
Heavy Duty Vehicles	Diesel RT 20 - 26t	Conventional	0	1993	315,898	243,280	222,355	2,558	1,885	1,712	0,482	0,353	0,319	12,251	9,862	9,114
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro I	1994	1996	269,815	211,940	195,827	2,068	1,563	1,437	0,383	0,264	0,231	8,634	6,952	6,468
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro II	1997	2001	261,049	207,213	191,812	1,620	1,285	1,399	0,172	0,137	0,157	9,465	7,549	6,947
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro III	2002	2006	272,733	213,630	195,690	2,025	1,487	1,403	0,189	0,130	0,113	7,649	6,024	5,545
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro IV	2007	2009	257,598	207,458	192,565	1,003	0,728	0,628	0,041	0,031	0,028	5,146	4,223	3,967
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro V	2010	2013	260,560	209,253	193,919	1,015	0,735	0,634	0,041	0,031	0,028	3,062	2,508	2,353
Heavy Duty Vehicles	Diesel RT 26 - 28t	Conventional	0	1993	333,975	257,930	233,499	2,703	1,987	1,810	0,512	0,375	0,336	12,868	10,379	9,526
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro I	1994	1996	286,465	225,388	206,076	2,162	1,647	1,535	0,398	0,281	0,244	9,122	7,308	6,742
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro II	1997	2001	276,892	220,156	201,909	1,682	1,346	1,457	0,185	0,148	0,167	9,876	7,848	7,164
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro III	2002	2006	289,328	227,449	206,788	2,121	1,582	1,481	0,201	0,141	0,118	7,733	6,089	5,633
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro IV	2007	2009	277,178	222,906	203,989	1,044	0,752	0,640	0,044	0,033	0,029	5,258	4,284	4,029
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro V	2010	2013	280,496	224,942	205,435	1,056	0,760	0,647	0,044	0,033	0,029	3,127	2,544	2,388
Heavy Duty Vehicles	Diesel RT 28 - 32t	Conventional	0	1993	369,813	292,229	265,715	2,928	2,149	2,047	0,567	0,415	0,376	14,515	11,942	11,008
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro I	1994	1996	324,707	259,936	238,178	2,377	1,862	1,795	0,436	0,314	0,281	10,453	8,509	7,843
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro II	1997	2001	313,359	251,467	240,101	1,930	1,574	1,563	0,211	0,172	0,195	11,232	9,043	8,280
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro III	2002	2006	327,617	262,877	239,852	2,325	1,732	1,685	0,214	0,153	0,135	8,883	7,017	6,445
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro IV	2007	2009	316,735	259,706	237,679	1,145	0,834	0,714	0,049	0,038	0,034	5,978	5,101	4,533
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro V	2010	2013	320,475	262,095	239,548	1,159	0,844	0,722	0,049	0,038	0,034	3,554	3,030	2,690
Heavy Duty Vehicles	Diesel RT >32t	Euro I	1994	1996	328,394	256,124	232,416	2,482	1,894	1,795	0,453	0,317	0,286	10,614	8,446	7,666
Heavy Duty Vehicles	Diesel RT >32t	Euro III	2002	2006	330,977	257,873	232,502	2,398	1,789	1,725	0,219	0,153	0,135	9,225	7,224	6,550
Heavy Duty Vehicles	Diesel RT >32t	Euro IV	2007	2009	316,444	252,503	229,586	1,151	0,839	0,723	0,049	0,037	0,033	6,270	5,071	4,708

Continued

				2010	2013	319,806	254,559	231,118	1,166	0,847	0,729	0,049	0,037	0,033	3,735	3,012	2,790
Heavy Duty Vehicles	Diesel RT >32t	Euro V		0	1993	332,114	254,391	227,288	2,560	1,899	1,804	0,488	0,361	0,339	13,305	10,460	9,286
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Conventional		1994	1996	297,033	229,431	205,352	2,173	1,665	1,602	0,380	0,277	0,261	9,509	7,408	6,570
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro I		1997	2001	280,137	219,605	203,132	1,746	1,372	1,500	0,191	0,152	0,174	10,046	7,771	6,867
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro II		2002	2006	294,936	228,574	203,723	2,067	1,559	1,515	0,184	0,132	0,120	8,110	6,154	5,397
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro III		2007	2009	283,202	224,159	200,624	0,990	0,709	0,618	0,043	0,031	0,028	5,531	4,329	3,837
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro IV		2010	2013	286,144	226,034	202,156	1,002	0,717	0,625	0,043	0,032	0,028	3,297	2,575	2,277
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro V		0	1993	385,216	290,623	255,748	3,006	2,216	2,091	0,579	0,419	0,384	15,378	11,908	10,419
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Conventional		1994	1996	338,164	257,767	227,915	2,561	1,946	1,861	0,464	0,324	0,293	10,891	8,408	7,387
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro I		1997	2001	329,707	253,289	223,868	2,056	1,607	1,775	0,227	0,177	0,201	11,695	8,978	7,885
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro II		2002	2006	341,490	259,512	227,377	2,453	1,826	1,775	0,223	0,155	0,136	9,414	7,197	6,354
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro III		2007	2009	327,133	254,126	224,236	1,157	0,830	0,704	0,050	0,036	0,032	6,398	5,061	4,523
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro IV		2010	2013	330,656	256,284	225,882	1,168	0,837	0,715	0,050	0,037	0,032	3,814	3,008	2,681
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Conventional		0	1993	427,609	323,566	283,490	3,242	2,400	2,283	0,622	0,462	0,425	17,311	13,363	11,617
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro I		1994	1996	376,029	287,195	252,542	2,823	2,135	2,079	0,500	0,358	0,333	12,142	9,377	8,189
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro II		1997	2001	364,063	281,631	253,871	2,313	1,826	1,823	0,257	0,201	0,227	12,955	9,936	8,683
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro III		2002	2006	380,024	289,287	252,570	2,675	1,999	1,959	0,240	0,170	0,146	10,432	7,969	6,995
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro IV		2007	2009	367,275	285,007	249,788	1,241	0,894	0,759	0,054	0,040	0,035	7,035	5,657	4,952
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro V		2010	2013	371,248	287,356	251,512	1,256	0,902	0,765	0,055	0,040	0,035	4,187	3,365	2,944
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro II		1997	2001	439,443	338,240	299,997	2,783	2,192	2,191	0,317	0,246	0,275	15,566	11,836	10,222
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro IV		2007	2009	440,973	342,585	300,013	1,445	1,038	0,878	0,064	0,047	0,041	8,477	6,746	5,764
Buses	Gasoline Urban Buses	Conventional		0	9999	225,000	150,000	165,000	70,000	55,000	55,000	0,400	0,400	0,400	4,500	7,500	7,500
Buses	Diesel Urban Buses <15t	Conventional		0	1993	265,880	211,064	197,424	4,479	3,144	2,830	0,729	0,490	0,413	9,347	7,678	7,133
Buses	Diesel Urban Buses <15t	Euro I		1994	1996	214,880	174,564	162,024	1,568	1,120	0,981	0,261	0,199	0,178	6,945	5,531	4,861
Buses	Diesel Urban Buses <15t	Euro II		1997	2001	207,395	170,373	158,652	1,391	0,958	0,806	0,129	0,107	0,103	7,552	5,971	5,224
Buses	Diesel Urban Buses <15t	Euro III		2002	2006	219,770	179,899	167,027	1,509	1,028	0,926	0,130	0,100	0,093	6,425	4,515	3,631
Buses	Diesel Urban Buses <15t	Euro IV		2007	2009	204,146	174,431	172,127	0,800	0,542	0,422	0,032	0,025	0,022	4,076	3,101	2,593
Buses	Diesel Urban Buses <15t	Euro V		2010	2013	207,620	176,864	174,491	0,813	0,551	0,430	0,032	0,025	0,023	2,432	1,845	1,545
Buses	Diesel Urban Buses 15 - 18t	Conventional		0	1993	338,177	261,819	230,080	4,720	3,242	2,606	0,656	0,439	0,351	15,108	12,139	10,803
Buses	Diesel Urban Buses 15 - 18t	Euro I		1994	1996	288,515	228,326	202,771	2,204	1,612	1,330	0,359	0,258	0,226	9,289	7,392	6,426
Buses	Diesel Urban Buses 15 - 18t	Euro II		1997	2001	279,657	224,821	202,070	1,892	1,310	1,120	0,179	0,146	0,137	9,989	7,828	6,822
Buses	Diesel Urban Buses 15 - 18t	Euro III		2002	2006	293,115	235,088	211,025	2,070	1,382	1,257	0,174	0,132	0,115	8,427	6,044	4,919
Buses	Diesel Urban Buses 15 - 18t	Euro IV		2007	2009	276,404	230,306	217,637	1,045	0,709	0,556	0,044	0,033	0,028	5,452	4,181	3,521
Buses	Diesel Urban Buses 15 - 18t	Euro V		2010	2013	280,396	232,974	220,038	1,057	0,716	0,563	0,044	0,033	0,029	3,250	2,486	2,089
Buses	Diesel Urban Buses >18t	Conventional		0	1993	424,462	330,433	285,157	6,145	4,310	3,420	0,833	0,575	0,455	19,310	15,492	13,433
Buses	Diesel Urban Buses >18t	Euro I		1994	1996	369,176	292,254	253,780	2,882	2,132	1,965	0,451	0,336	0,311	11,840	9,361	8,043

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Buses	Diesel Urban Buses >18t	Euro II	1997	2001	358,097	288,482	265,154	2,541	1,716	1,467	0,241	0,194	0,178	12,472	9,751	8,334
Buses	Diesel Urban Buses >18t	Euro III	2002	2006	373,469	299,269	262,705	2,691	1,778	1,703	0,209	0,151	0,142	10,561	7,685	6,305
Buses	Diesel Urban Buses >18t	Euro IV	2007	2009	359,379	300,406	272,408	1,287	0,869	0,664	0,054	0,039	0,032	7,106	5,505	4,635
Buses	Diesel Urban Buses >18t	Euro V	2010	2013	363,797	303,565	275,335	1,297	0,877	0,671	0,054	0,039	0,033	4,234	3,275	2,755
Buses	Gasoline Coaches	Conventional	0	9999	225,000	150,000	165,000	70,000	55,000	55,000	0,400	0,400	0,400	4,500	7,500	7,500
Buses	Diesel Coaches <15t	Conventional	0	1993	306,332	225,195	199,049	2,712	1,738	1,372	0,490	0,328	0,269	11,324	8,822	8,156
Buses	Diesel Coaches <15t	Euro I	1994	1996	280,973	207,851	184,178	2,199	1,466	1,186	0,395	0,260	0,209	8,768	6,699	6,147
Buses	Diesel Coaches <15t	Euro II	1997	2001	279,483	208,488	184,973	1,775	1,203	1,092	0,186	0,137	0,120	10,033	7,549	6,840
Buses	Diesel Coaches <15t	Euro III	2002	2006	303,872	224,218	197,656	2,308	1,464	1,283	0,223	0,145	0,115	8,591	6,046	5,368
Buses	Diesel Coaches <15t	Euro IV	2007	2009	290,989	221,962	197,681	1,241	0,813	0,689	0,048	0,034	0,030	5,666	4,225	3,842
Buses	Diesel Coaches <15t	Euro V	2010	2013	298,215	226,393	200,893	1,288	0,842	0,696	0,049	0,034	0,030	3,434	2,544	2,291
Buses	Diesel Coaches 15 - 18t	Conventional	0	1993	306,332	225,195	199,049	2,712	1,738	1,372	0,490	0,328	0,269	11,324	8,822	8,156
Buses	Diesel Coaches 15 - 18t	Euro I	1994	1996	280,973	207,851	184,178	2,199	1,466	1,186	0,395	0,260	0,209	8,768	6,699	6,147
Buses	Diesel Coaches 15 - 18t	Euro II	1997	2001	279,483	208,488	184,973	1,775	1,203	1,092	0,186	0,137	0,120	10,033	7,549	6,840
Buses	Diesel Coaches 15 - 18t	Euro III	2002	2006	303,872	224,218	197,656	2,308	1,464	1,283	0,223	0,145	0,115	8,591	6,046	5,368
Buses	Diesel Coaches 15 - 18t	Euro IV	2007	2009	290,989	221,962	197,681	1,241	0,813	0,689	0,048	0,034	0,030	5,666	4,225	3,842
Buses	Diesel Coaches 15 - 18t	Euro V	2010	2013	298,215	226,393	200,893	1,288	0,842	0,696	0,049	0,034	0,030	3,434	2,544	2,291
Buses	Diesel Coaches >18t	Conventional	0	1993	371,932	272,817	240,539	3,104	2,042	1,732	0,572	0,388	0,331	14,084	10,772	9,735
Buses	Diesel Coaches >18t	Euro I	1994	1996	329,598	243,565	215,080	2,511	1,722	1,458	0,452	0,302	0,246	10,737	8,049	7,206
Buses	Diesel Coaches >18t	Euro II	1997	2001	323,939	241,571	213,608	2,031	1,395	1,290	0,214	0,161	0,143	11,883	8,817	7,837
Buses	Diesel Coaches >18t	Euro III	2002	2006	335,657	242,331	211,644	2,557	1,669	1,439	0,242	0,156	0,126	9,681	6,781	5,889
Buses	Diesel Coaches >18t	Euro IV	2007	2009	319,737	238,136	211,184	1,328	0,875	0,742	0,052	0,036	0,032	6,428	4,728	4,226
Buses	Diesel Coaches >18t	Euro V	2010	2013	328,400	243,537	215,269	1,363	0,896	0,758	0,053	0,037	0,032	3,881	2,845	2,536
Mopeds	<50 cm ³	Conventional	0	1999	25,000	25,000	0,000	13,800	13,800	0,000	0,188	0,188	0,000	0,020	0,020	0,000
Mopeds	<50 cm ³	Euro I	2000	2003	15,000	15,000	0,000	5,600	5,600	0,000	0,076	0,076	0,000	0,020	0,020	0,000
Mopeds	<50 cm ³	Euro II	2004	9999	12,080	12,080	0,000	1,300	1,300	0,000	0,038	0,038	0,000	0,260	0,260	0,000
Motorcycles	2-stroke >50 cm ³	Conventional	0	1999	27,115	28,317	39,640	15,605	19,285	28,470	0,200	0,200	0,200	0,029	0,030	0,035
Motorcycles	4-stroke <250 cm ³	Conventional	0	1999	24,800	27,499	36,055	15,258	17,209	24,960	0,020	0,020	0,020	0,237	0,428	0,655
Motorcycles	4-stroke <250 cm ³	Euro I	2000	2003	27,015	30,386	40,330	10,391	14,456	24,910	0,020	0,020	0,020	0,304	0,424	0,567
Motorcycles	4-stroke <250 cm ³	Euro II	2004	2006	22,260	25,160	33,756	3,708	5,765	9,135	0,005	0,005	0,005	0,323	0,447	0,598
Motorcycles	4-stroke <250 cm ³	Euro III	2007	9999	19,262	20,359	25,932	2,060	3,201	5,092	0,005	0,005	0,005	0,253	0,382	0,612
Motorcycles	4-stroke 250 - 750 cm ³	Conventional	0	1999	26,648	23,766	26,620	20,461	19,486	22,990	0,020	0,020	0,020	0,196	0,300	0,548
Motorcycles	4-stroke 250 - 750 cm ³	Euro I	2000	2003	37,374	35,472	41,400	10,599	9,003	10,460	0,020	0,020	0,020	0,258	0,400	0,610
Motorcycles	4-stroke 250 - 750 cm ³	Euro II	2004	2006	34,197	33,450	41,276	2,230	2,436	6,092	0,005	0,005	0,005	0,257	0,390	0,577
Motorcycles	4-stroke 250 - 750 cm ³	Euro III	2007	9999	30,983	30,719	38,129	1,228	1,345	3,357	0,005	0,005	0,005	0,076	0,132	0,265
Motorcycles	4-stroke >750 cm ³	Conventional	0	1999	35,731	35,542	43,748	20,461	19,486	22,990	0,020	0,020	0,020	0,019	0,030	0,086

Motorcycles	4-stroke >750 cm ³	Euro I	2000	2003	43,101	41,041	47,500	10,599	9,003	10,460	0,020	0,020	0,020	0,125	0,178	0,392
Motorcycles	4-stroke >750 cm ³	Euro II	2004	2006	42,110	38,004	41,895	2,230	2,436	6,092	0,005	0,005	0,005	0,143	0,244	0,459
Motorcycles	4-stroke >750 cm ³	Euro III	2007	9999	40,343	37,470	43,083	1,228	1,345	3,357	0,005	0,005	0,005	0,104	0,200	0,484

Sector	Subsector	Tech 2	FYear	LYear	CH ₄ u	CH ₄ r	CH ₄ h	N ₂ Ou	N ₂ Or	N ₂ Oh	NH ₃ u	NH ₃ r	NH ₃ h	VOCu	VOCr	VOCh
Passenger Cars	Gasoline <1,4 l	PRE ECE	0	1969	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	2,354	1,597	1,247
Passenger Cars	Gasoline <1,4 l	ECE 15/00-01	1970	1978	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,862	1,256	1,121
Passenger Cars	Gasoline <1,4 l	ECE 15/02	1979	1980	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,849	1,061	0,950
Passenger Cars	Gasoline <1,4 l	ECE 15/03	1981	1985	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,849	1,061	0,950
Passenger Cars	Gasoline <1,4 l	ECE 15/04	1986	1990	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,480	0,895	0,698
Passenger Cars	Gasoline <1,4 l	Euro I	1991	1996	0,026	0,016	0,014	0,024	0,009	0,005	0,070	0,132	0,074	0,177	0,121	0,111
Passenger Cars	Gasoline <1,4 l	Euro II	1997	2000	0,017	0,013	0,011	0,012	0,005	0,003	0,163	0,149	0,084	0,071	0,047	0,042
Passenger Cars	Gasoline <1,4 l	Euro III	2001	2005	0,003	0,002	0,004	0,001	0,000	0,000	0,002	0,030	0,065	0,015	0,015	0,025
Passenger Cars	Gasoline <1,4 l	Euro IV	2006	2010	0,002	0,002	0,000	0,002	0,000	0,000	0,002	0,029	0,065	0,012	0,014	0,017
Passenger Cars	Gasoline 1,4 - 2,0 l	PRE ECE	0	1969	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	2,354	1,597	1,247
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/00-01	1970	1978	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,862	1,256	1,121
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/02	1979	1980	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,849	1,061	0,950
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/03	1981	1985	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,849	1,061	0,950
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/04	1986	1990	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,480	0,895	0,698
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro I	1991	1996	0,026	0,016	0,014	0,024	0,009	0,005	0,070	0,132	0,074	0,177	0,121	0,111
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro II	1997	2000	0,017	0,013	0,011	0,012	0,005	0,003	0,163	0,149	0,084	0,071	0,047	0,042
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro III	2001	2005	0,003	0,002	0,004	0,001	0,000	0,000	0,002	0,030	0,065	0,015	0,015	0,025
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro IV	2006	2010	0,002	0,002	0,000	0,002	0,000	0,000	0,002	0,029	0,065	0,012	0,014	0,017
Passenger Cars	Gasoline >2,0 l	PRE ECE	0	1969	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	2,354	1,597	1,247
Passenger Cars	Gasoline >2,0 l	ECE 15/00-01	1970	1978	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,862	1,256	1,121
Passenger Cars	Gasoline >2,0 l	ECE 15/02	1979	1980	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,849	1,061	0,950
Passenger Cars	Gasoline >2,0 l	ECE 15/03	1981	1985	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,849	1,061	0,950
Passenger Cars	Gasoline >2,0 l	ECE 15/04	1986	1990	0,092	0,029	0,026	0,010	0,007	0,007	0,002	0,002	0,002	1,480	0,895	0,698
Passenger Cars	Gasoline >2,0 l	Euro I	1991	1996	0,026	0,016	0,014	0,024	0,009	0,005	0,070	0,132	0,074	0,177	0,121	0,111
Passenger Cars	Gasoline >2,0 l	Euro II	1997	2000	0,017	0,013	0,011	0,012	0,005	0,003	0,163	0,149	0,084	0,071	0,047	0,042
Passenger Cars	Gasoline >2,0 l	Euro III	2001	2005	0,003	0,002	0,004	0,001	0,000	0,000	0,002	0,030	0,065	0,015	0,015	0,025
Passenger Cars	Gasoline >2,0 l	Euro IV	2006	2010	0,002	0,002	0,000	0,002	0,000	0,000	0,002	0,029	0,065	0,012	0,014	0,017
Passenger Cars	Diesel <2,0 l	Conventional	0	1990	0,028	0,012	0,008	0,000	0,000	0,000	0,001	0,001	0,001	0,145	0,086	0,062
Passenger Cars	Diesel <2,0 l	Euro I	1991	1996	0,011	0,009	0,003	0,002	0,004	0,004	0,001	0,001	0,001	0,053	0,031	0,026
Passenger Cars	Diesel <2,0 l	Euro II	1997	2000	0,007	0,003	0,002	0,004	0,006	0,006	0,001	0,001	0,001	0,034	0,021	0,015
Passenger Cars	Diesel <2,0 l	Euro III	2001	2005	0,003	0,000	0,000	0,009	0,004	0,004	0,001	0,001	0,001	0,018	0,011	0,009

Continued

Passenger Cars	Diesel <2,0 l	Euro IV	2006	2010	0,000	0,000	0,000	0,009	0,004	0,004	0,001	0,001	0,001	0,038	0,017	0,012
Passenger Cars	Diesel <2,0 l	Euro V	2011	2014	0,000	0,000	0,000	0,009	0,004	0,004	0,001	0,001	0,001	0,038	0,017	0,012
Passenger Cars	Diesel >2,0 l	Conventional	0	1990	0,028	0,012	0,008	0,000	0,000	0,000	0,001	0,001	0,001	0,145	0,086	0,062
Passenger Cars	Diesel >2,0 l	Euro I	1991	1996	0,011	0,009	0,003	0,002	0,004	0,004	0,001	0,001	0,001	0,080	0,046	0,034
Passenger Cars	Diesel >2,0 l	Euro II	1997	2000	0,007	0,003	0,002	0,004	0,006	0,006	0,001	0,001	0,001	0,098	0,058	0,038
Passenger Cars	Diesel >2,0 l	Euro III	2001	2005	0,003	0,000	0,000	0,009	0,004	0,004	0,001	0,001	0,001	0,038	0,017	0,012
Passenger Cars	Diesel >2,0 l	Euro IV	2006	2010	0,000	0,000	0,000	0,009	0,004	0,004	0,001	0,001	0,001	0,011	0,006	0,006
Passenger Cars	Diesel >2,0 l	Euro V	2011	2014	0,000	0,000	0,000	0,009	0,004	0,004	0,001	0,001	0,001	0,011	0,006	0,006
Passenger Cars	LPG cars	Conventional	0	1990	0,080	0,035	0,025	0,000	0,000	0,000	0,000	0,000	0,000	1,082	0,667	0,490
Passenger Cars	LPG cars	Euro I	1991	1996	0,080	0,035	0,025	0,021	0,013	0,008	0,000	0,000	0,000	0,239	0,071	0,083
Passenger Cars	LPG cars	Euro II	1997	2000	0,019	0,008	0,006	0,013	0,003	0,002	0,000	0,000	0,000	0,050	0,015	0,017
Passenger Cars	LPG cars	Euro III	2001	2005	0,013	0,006	0,004	0,005	0,002	0,001	0,000	0,000	0,000	0,036	0,011	0,012
Passenger Cars	LPG cars	Euro IV	2006	2010	0,004	0,002	0,001	0,005	0,002	0,001	0,000	0,000	0,000	0,007	0,002	0,002
Light Duty Vehicles	Gasoline <3,5t	Conventional	0	1994	0,150	0,040	0,025	0,010	0,007	0,007	0,002	0,002	0,002	1,877	0,729	0,446
Light Duty Vehicles	Gasoline <3,5t	Euro I	1995	1998	0,026	0,016	0,014	0,034	0,020	0,010	0,070	0,132	0,074	0,220	0,109	0,078
Light Duty Vehicles	Gasoline <3,5t	Euro II	1999	2001	0,017	0,013	0,011	0,023	0,013	0,008	0,163	0,149	0,084	0,053	0,026	0,019
Light Duty Vehicles	Gasoline <3,5t	Euro III	2002	2006	0,003	0,002	0,004	0,007	0,001	0,001	0,002	0,030	0,065	0,031	0,015	0,011
Light Duty Vehicles	Gasoline <3,5t	Euro IV	2007	2011	0,002	0,002	0,000	0,001	0,000	0,000	0,002	0,029	0,065	0,013	0,007	0,005
Light Duty Vehicles	Diesel <3,5t	Conventional	0	1994	0,028	0,012	0,008	0,000	0,000	0,000	0,001	0,001	0,001	0,131	0,106	0,101
Light Duty Vehicles	Diesel <3,5t	Euro I	1995	1998	0,011	0,009	0,003	0,002	0,004	0,004	0,001	0,001	0,001	0,131	0,106	0,101
Light Duty Vehicles	Diesel <3,5t	Euro II	1999	2001	0,007	0,003	0,002	0,004	0,006	0,006	0,001	0,001	0,001	0,131	0,106	0,101
Light Duty Vehicles	Diesel <3,5t	Euro III	2002	2006	0,003	0,000	0,000	0,009	0,004	0,004	0,001	0,001	0,001	0,081	0,065	0,063
Light Duty Vehicles	Diesel <3,5t	Euro IV	2007	2011	0,000	0,000	0,000	0,009	0,004	0,004	0,001	0,001	0,001	0,030	0,024	0,023
Light Duty Vehicles	Diesel <3,5t	Euro V	2012	2015	0,000	0,000	0,000	0,009	0,004	0,004	0,001	0,001	0,001	0,030	0,024	0,023
Light Duty Vehicles	LPG <3,5t	Conventional	0	1994	0,120	0,053	0,038	0,000	0,000	0,000	0,000	0,000	0,000	1,623	1,000	0,735
Light Duty Vehicles	LPG <3,5t	Euro II	1999	2001	0,029	0,013	0,009	0,020	0,005	0,003	0,000	0,000	0,000	0,075	0,022	0,026
Light Duty Vehicles	LPG <3,5t	Euro III	2002	2006	0,019	0,008	0,006	0,008	0,003	0,002	0,000	0,000	0,000	0,054	0,016	0,019
Light Duty Vehicles	LPG <3,5t	Euro IV	2007	2011	0,006	0,003	0,002	0,008	0,003	0,002	0,000	0,000	0,000	0,011	0,003	0,004
Heavy Duty Vehicles	Gasoline >3,5t	Conventional	0	9999	0,140	0,110	0,070	0,006	0,006	0,006	0,002	0,002	0,002	7,000	5,500	3,500
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Conventional	0	1993	0,085	0,023	0,020	0,030	0,030	0,030	0,003	0,003	0,003	1,298	0,789	0,576
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro I	1994	1996	0,085	0,023	0,020	0,030	0,030	0,030	0,003	0,003	0,003	0,253	0,167	0,130
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro II	1997	2001	0,054	0,020	0,019	0,030	0,030	0,030	0,003	0,003	0,003	0,171	0,111	0,086
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro III	2002	2006	0,048	0,021	0,018	0,030	0,030	0,030	0,003	0,003	0,003	0,162	0,102	0,077
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro IV	2007	2009	0,003	0,002	0,001	0,030	0,030	0,030	0,003	0,003	0,003	0,022	0,017	0,017
Heavy Duty Vehicles	Diesel RT 3,5 - 7,5t	Euro V	2010	2013	0,003	0,002	0,001	0,030	0,030	0,030	0,003	0,003	0,003	0,022	0,017	0,017
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Conventional	0	1993	0,085	0,023	0,020	0,030	0,030	0,030	0,003	0,003	0,003	0,957	0,589	0,449

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Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro I	1994	1996	0,085	0,023	0,020	0,030	0,030	0,030	0,003	0,003	0,003	0,389	0,258	0,208
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro II	1997	2001	0,054	0,020	0,019	0,030	0,030	0,030	0,003	0,003	0,003	0,263	0,172	0,137
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro III	2002	2006	0,048	0,021	0,018	0,030	0,030	0,030	0,003	0,003	0,003	0,252	0,157	0,120
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro IV	2007	2009	0,003	0,002	0,001	0,030	0,030	0,030	0,003	0,003	0,003	0,035	0,025	0,022
Heavy Duty Vehicles	Diesel RT 7,5 - 12t	Euro V	2010	2013	0,003	0,002	0,001	0,030	0,030	0,030	0,003	0,003	0,003	0,035	0,026	0,022
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Conventional	0	1993	0,085	0,023	0,020	0,030	0,030	0,030	0,003	0,003	0,003	1,012	0,646	0,509
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro I	1994	1996	0,085	0,023	0,020	0,030	0,030	0,030	0,003	0,003	0,003	0,429	0,279	0,229
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro II	1997	2001	0,054	0,020	0,019	0,030	0,030	0,030	0,003	0,003	0,003	0,281	0,186	0,150
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro III	2002	2006	0,048	0,021	0,018	0,030	0,030	0,030	0,003	0,003	0,003	0,260	0,168	0,134
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro IV	2007	2009	0,003	0,002	0,001	0,030	0,030	0,030	0,003	0,003	0,003	0,034	0,025	0,024
Heavy Duty Vehicles	Diesel RT 12 - 14 t	Euro V	2010	2013	0,003	0,002	0,001	0,030	0,030	0,030	0,003	0,003	0,003	0,034	0,025	0,024
Heavy Duty Vehicles	Diesel RT 14 - 20t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	1,510	0,971	0,768
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,606	0,403	0,325
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro II	1997	2001	0,112	0,070	0,065	0,030	0,030	0,030	0,003	0,003	0,003	0,409	0,267	0,213
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro III	2002	2006	0,098	0,074	0,064	0,030	0,030	0,030	0,003	0,003	0,003	0,378	0,243	0,196
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro IV	2007	2009	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,046	0,032	0,028
Heavy Duty Vehicles	Diesel RT 14 - 20t	Euro V	2010	2013	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,047	0,033	0,029
Heavy Duty Vehicles	Diesel RT 20 - 26t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,819	0,517	0,406
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,728	0,476	0,380
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro II	1997	2001	0,112	0,070	0,065	0,030	0,030	0,030	0,003	0,003	0,003	0,489	0,314	0,248
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro III	2002	2006	0,098	0,074	0,064	0,030	0,030	0,030	0,003	0,003	0,003	0,453	0,287	0,225
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro IV	2007	2009	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,059	0,040	0,035
Heavy Duty Vehicles	Diesel RT 20 - 26t	Euro V	2010	2013	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,059	0,041	0,035
Heavy Duty Vehicles	Diesel RT 26 - 28t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,842	0,541	0,430
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,736	0,488	0,394
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro II	1997	2001	0,112	0,070	0,065	0,030	0,030	0,030	0,003	0,003	0,003	0,499	0,327	0,262
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro III	2002	2006	0,098	0,074	0,064	0,030	0,030	0,030	0,003	0,003	0,003	0,467	0,304	0,243
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro IV	2007	2009	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,064	0,045	0,037
Heavy Duty Vehicles	Diesel RT 26 - 28t	Euro V	2010	2013	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,065	0,045	0,037
Heavy Duty Vehicles	Diesel RT 28 - 32t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,874	0,560	0,444
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,778	0,518	0,419
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro II	1997	2001	0,112	0,070	0,065	0,030	0,030	0,030	0,003	0,003	0,003	0,523	0,344	0,276
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro III	2002	2006	0,098	0,074	0,064	0,030	0,030	0,030	0,003	0,003	0,003	0,491	0,317	0,252
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro IV	2007	2009	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,070	0,051	0,043
Heavy Duty Vehicles	Diesel RT 28 - 32t	Euro V	2010	2013	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,071	0,051	0,043
Heavy Duty Vehicles	Diesel RT >32t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,812	0,527	0,419

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Heavy Duty Vehicles	Diesel RT >32t	Euro III	2002	2006	0,098	0,074	0,064	0,030	0,030	0,030	0,003	0,003	0,003	0,496	0,316	0,249
Heavy Duty Vehicles	Diesel RT >32t	Euro IV	2007	2009	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,070	0,048	0,041
Heavy Duty Vehicles	Diesel RT >32t	Euro V	2010	2013	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,070	0,049	0,041
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,736	0,476	0,380
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,678	0,450	0,363
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro II	1997	2001	0,112	0,070	0,065	0,030	0,030	0,030	0,003	0,003	0,003	0,450	0,296	0,238
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro III	2002	2006	0,098	0,074	0,064	0,030	0,030	0,030	0,003	0,003	0,003	0,415	0,269	0,215
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro IV	2007	2009	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,059	0,041	0,036
Heavy Duty Vehicles	Diesel TT/AT 28 - 34t	Euro V	2010	2013	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,060	0,042	0,036
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,877	0,555	0,438
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,805	0,524	0,420
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro II	1997	2001	0,112	0,070	0,065	0,030	0,030	0,030	0,003	0,003	0,003	0,538	0,343	0,270
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro III	2002	2006	0,098	0,074	0,064	0,030	0,030	0,030	0,003	0,003	0,003	0,494	0,312	0,244
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro IV	2007	2009	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,071	0,048	0,041
Heavy Duty Vehicles	Diesel TT/AT 34 - 40t	Euro V	2010	2013	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,072	0,049	0,041
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,901	0,570	0,450
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,844	0,546	0,433
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro II	1997	2001	0,112	0,070	0,065	0,030	0,030	0,030	0,003	0,003	0,003	0,558	0,358	0,282
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro III	2002	2006	0,098	0,074	0,064	0,030	0,030	0,030	0,003	0,003	0,003	0,510	0,323	0,253
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro IV	2007	2009	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,077	0,053	0,045
Heavy Duty Vehicles	Diesel TT/AT 40 - 50t	Euro V	2010	2013	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,078	0,053	0,045
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro II	1997	2001	0,112	0,070	0,065	0,030	0,030	0,030	0,003	0,003	0,003	0,626	0,406	0,323
Heavy Duty Vehicles	Diesel TT/AT 50 - 60t	Euro IV	2007	2009	0,005	0,006	0,004	0,030	0,030	0,030	0,003	0,003	0,003	0,090	0,063	0,053
Buses	Gasoline Urban Buses	Conventional	0	9999	0,140	0,110	0,070	0,006	0,006	0,006	0,002	0,002	0,002	7,000	5,500	3,500
Buses	Diesel Urban Buses <15t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	2,628	1,738	1,490
Buses	Diesel Urban Buses <15t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,507	0,364	0,312
Buses	Diesel Urban Buses <15t	Euro II	1997	2001	0,114	0,052	0,046	0,030	0,030	0,030	0,003	0,003	0,003	0,350	0,245	0,209
Buses	Diesel Urban Buses <15t	Euro III	2002	2006	0,103	0,047	0,041	0,030	0,030	0,030	0,003	0,003	0,003	0,318	0,220	0,199
Buses	Diesel Urban Buses <15t	Euro IV	2007	2009	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,043	0,034	0,032
Buses	Diesel Urban Buses <15t	Euro V	2010	2013	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,044	0,034	0,033
Buses	Diesel Urban Buses 15 - 18t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	1,602	0,977	0,762
Buses	Diesel Urban Buses 15 - 18t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,659	0,431	0,351
Buses	Diesel Urban Buses 15 - 18t	Euro II	1997	2001	0,114	0,052	0,046	0,030	0,030	0,030	0,003	0,003	0,003	0,451	0,296	0,248
Buses	Diesel Urban Buses 15 - 18t	Euro III	2002	2006	0,103	0,047	0,041	0,030	0,030	0,030	0,003	0,003	0,003	0,416	0,269	0,232
Buses	Diesel Urban Buses 15 - 18t	Euro IV	2007	2009	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,061	0,045	0,040
Buses	Diesel Urban Buses 15 - 18t	Euro V	2010	2013	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,061	0,046	0,040

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Buses	Diesel Urban Buses >18t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	1,666	1,018	0,791
Buses	Diesel Urban Buses >18t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,720	0,477	0,386
Buses	Diesel Urban Buses >18t	Euro II	1997	2001	0,114	0,052	0,046	0,030	0,030	0,030	0,003	0,003	0,003	0,491	0,332	0,263
Buses	Diesel Urban Buses >18t	Euro III	2002	2006	0,103	0,047	0,041	0,030	0,030	0,030	0,003	0,003	0,003	0,446	0,291	0,241
Buses	Diesel Urban Buses >18t	Euro IV	2007	2009	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,074	0,055	0,047
Buses	Diesel Urban Buses >18t	Euro V	2010	2013	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,075	0,056	0,048
Buses	Gasoline Coaches	Conventional	0	9999	0,140	0,110	0,070	0,006	0,006	0,006	0,002	0,002	0,002	7,000	5,500	3,500
Buses	Diesel Coaches <15t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,907	0,533	0,393
Buses	Diesel Coaches <15t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,830	0,516	0,397
Buses	Diesel Coaches <15t	Euro II	1997	2001	0,114	0,052	0,046	0,030	0,030	0,030	0,003	0,003	0,003	0,586	0,359	0,272
Buses	Diesel Coaches <15t	Euro III	2002	2006	0,103	0,047	0,041	0,030	0,030	0,030	0,003	0,003	0,003	0,577	0,351	0,271
Buses	Diesel Coaches <15t	Euro IV	2007	2009	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,072	0,048	0,039
Buses	Diesel Coaches <15t	Euro V	2010	2013	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,074	0,049	0,039
Buses	Diesel Coaches 15 - 18t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,907	0,533	0,393
Buses	Diesel Coaches 15 - 18t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,830	0,516	0,397
Buses	Diesel Coaches 15 - 18t	Euro II	1997	2001	0,114	0,052	0,046	0,030	0,030	0,030	0,003	0,003	0,003	0,586	0,359	0,272
Buses	Diesel Coaches 15 - 18t	Euro III	2002	2006	0,103	0,047	0,041	0,030	0,030	0,030	0,003	0,003	0,003	0,577	0,351	0,271
Buses	Diesel Coaches 15 - 18t	Euro IV	2007	2009	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,072	0,048	0,039
Buses	Diesel Coaches 15 - 18t	Euro V	2010	2013	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,074	0,049	0,039
Buses	Diesel Coaches >18t	Conventional	0	1993	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	1,013	0,623	0,482
Buses	Diesel Coaches >18t	Euro I	1994	1996	0,175	0,080	0,070	0,030	0,030	0,030	0,003	0,003	0,003	0,915	0,581	0,457
Buses	Diesel Coaches >18t	Euro II	1997	2001	0,114	0,052	0,046	0,030	0,030	0,030	0,003	0,003	0,003	0,630	0,392	0,305
Buses	Diesel Coaches >18t	Euro III	2002	2006	0,103	0,047	0,041	0,030	0,030	0,030	0,003	0,003	0,003	0,608	0,371	0,286
Buses	Diesel Coaches >18t	Euro IV	2007	2009	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,076	0,050	0,042
Buses	Diesel Coaches >18t	Euro V	2010	2013	0,005	0,002	0,002	0,030	0,030	0,030	0,003	0,003	0,003	0,078	0,051	0,042
Mopeds	<50 cm ³	Conventional	0	1999	0,219	0,219	0,000	0,001	0,001	0,001	0,001	0,001	0,001	13,910	13,910	0,000
Mopeds	<50 cm ³	Euro I	2000	2003	0,044	0,044	0,000	0,001	0,001	0,001	0,001	0,001	0,001	2,730	2,730	0,000
Mopeds	<50 cm ³	Euro II	2004	9999	0,024	0,024	0,000	0,001	0,001	0,001	0,001	0,001	0,001	1,560	1,560	0,000
Motorcycles	2-stroke >50 cm ³	Conventional	0	1999	0,150	0,150	0,150	0,002	0,002	0,002	0,002	0,002	0,002	8,393	7,078	9,800
Motorcycles	4-stroke <250 cm ³	Conventional	0	1999	0,200	0,200	0,200	0,002	0,002	0,002	0,002	0,002	0,002	0,128	0,104	0,138
Motorcycles	4-stroke <250 cm ³	Euro I	2000	2003	0,142	0,144	0,132	0,002	0,002	0,002	0,002	0,002	0,002	1,242	0,866	0,976
Motorcycles	4-stroke <250 cm ³	Euro II	2004	2006	0,136	0,092	0,092	0,002	0,002	0,002	0,002	0,002	0,002	1,042	0,843	0,965
Motorcycles	4-stroke <250 cm ³	Euro III	2007	9999	0,082	0,032	0,028	0,002	0,002	0,002	0,002	0,002	0,002	0,456	0,441	0,511
Motorcycles	4-stroke 250 - 750 cm ³	Conventional	0	1999	0,200	0,200	0,200	0,002	0,002	0,002	0,002	0,002	0,002	0,545	0,487	0,361
Motorcycles	4-stroke 250 - 750 cm ³	Euro I	2000	2003	0,148	0,174	0,156	0,002	0,002	0,002	0,002	0,002	0,002	2,390	1,522	1,079
Motorcycles	4-stroke 250 - 750 cm ³	Euro II	2004	2006	0,156	0,120	0,122	0,002	0,002	0,002	0,002	0,002	0,002	1,326	0,925	0,828

Continued

Motorcycles	4-stroke 250 - 750 cm ³	Euro III	2007	9999	0,094	0,042	0,036	0,002	0,002	0,002	0,002	0,002	0,598	0,499	0,615
Motorcycles	4-stroke >750 cm ³	Conventional	0	1999	0,200	0,200	0,200	0,002	0,002	0,002	0,002	0,002	0,392	0,337	0,556
Motorcycles	4-stroke >750 cm ³	Euro I	2000	2003	0,092	0,092	0,154	0,002	0,002	0,002	0,002	0,002	2,495	1,643	1,554
Motorcycles	4-stroke >750 cm ³	Euro II	2004	2006	0,084	0,062	0,102	0,002	0,002	0,002	0,002	0,002	1,088	0,674	0,656
Motorcycles	4-stroke >750 cm ³	Euro III	2007	9999	0,050	0,022	0,030	0,002	0,002	0,002	0,002	0,002	0,384	0,309	0,416

Annex 5: Reduction factors

Sector	Subsector	Tech 2	FYear	LYear	FCuR	FCrR	FCuR	COuR	COrR	COhR	PMuR	PMrR	PMhR	NOxuR	NOxrR	NOxhR	VOCuR	VOCrR	VOChR
Passenger Cars	Gasoline <1,4 l	PRE ECE	0	1969	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	
Passenger Cars	Gasoline <1,4 l	ECE 15/00-01	1970	1978	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	
Passenger Cars	Gasoline <1,4 l	ECE 15/02	1979	1980	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	
Passenger Cars	Gasoline <1,4 l	ECE 15/03	1981	1985	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	
Passenger Cars	Gasoline <1,4 l	ECE 15/04	1986	1990	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	
Passenger Cars	Gasoline <1,4 l	Euro I	1991	1996	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	
Passenger Cars	Gasoline <1,4 l	Euro II	1997	2000	1,93	5,83	4,43	62,65	58,10	57,55	0,00	0,00	0,00	43,59	45,20	60,45	60,19	61,27	62,09
Passenger Cars	Gasoline <1,4 l	Euro III	2001	2005	-2,72	-0,72	1,59	70,59	49,62	34,95	60,25	54,57	37,37	72,16	78,49	88,69	91,74	87,53	77,02
Passenger Cars	Gasoline <1,4 l	Euro IV	2006	2010	-5,57	-5,34	-4,84	88,95	79,10	70,06	60,25	54,57	37,37	80,12	89,24	95,86	93,34	88,71	84,51
Passenger Cars	Gasoline 1,4 - 2,0 l	PRE ECE	0	1969	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	
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/00-01	1970	1978	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	
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/02	1979	1980	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	
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/03	1981	1985	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	
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/04	1986	1990	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	
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro I	1991	1996	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	
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro II	1997	2000	2,08	1,72	5,30	62,65	58,10	57,55	0,00	0,00	0,00	43,59	45,20	60,45	60,19	61,27	62,09
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro III	2001	2005	-1,28	-2,83	-3,05	70,59	49,62	34,95	60,25	54,57	37,37	72,16	78,49	88,69	91,74	87,53	77,02
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro IV	2006	2010	-5,15	-8,80	-7,33	88,95	79,10	70,06	60,25	54,57	37,37	80,12	89,24	95,86	93,34	88,71	84,51
Passenger Cars	Gasoline >2,0 l	PRE ECE	0	1969	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	
Passenger Cars	Gasoline >2,0 l	ECE 15/00-01	1970	1978	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	
Passenger Cars	Gasoline >2,0 l	ECE 15/02	1979	1980	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	
Passenger Cars	Gasoline >2,0 l	ECE 15/03	1981	1985	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	
Passenger Cars	Gasoline >2,0 l	ECE 15/04	1986	1990	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	
Passenger Cars	Gasoline >2,0 l	Euro I	1991	1996	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	
Passenger Cars	Gasoline >2,0 l	Euro II	1997	2000	-2,98	-5,37	-2,63	62,65	58,10	57,55	0,00	0,00	0,00	43,59	45,20	60,45	60,19	61,27	62,09
Passenger Cars	Gasoline >2,0 l	Euro III	2001	2005	5,12	7,23	12,60	70,59	49,62	34,95	60,25	54,57	37,37	72,16	78,49	88,69	91,74	87,53	77,02
Passenger Cars	Gasoline >2,0 l	Euro IV	2006	2010	-15,39	-9,65	-1,29	88,95	79,10	70,06	60,25	54,57	37,37	80,12	89,24	95,86	93,34	88,71	84,51
Passenger Cars	Diesel <2,0 l	Conventional	0	1990	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	
Passenger Cars	Diesel <2,0 l	Euro I	1991	1996	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	
Passenger Cars	Diesel <2,0 l	Euro II	1997	2000	-5,45	-3,06	-0,81	18,08	48,77	83,05	17,92	36,92	53,22	-7,94	1,18	-0,20	34,81	33,43	41,61
Passenger Cars	Diesel <2,0 l	Euro III	2001	2005	-2,27	-1,45	5,79	76,38	81,12	94,30	48,53	51,90	58,32	-18,71	-18,46	-12,98	65,94	63,35	66,25
Passenger Cars	Diesel <2,0 l	Euro IV	2006	2010	-2,27	-1,45	5,79	80,09	84,22	89,72	49,02	60,57	75,83	10,60	24,53	13,19	27,61	44,26	51,85
Passenger Cars	Diesel <2,0 l	Euro V	2011	2014	-2,27	-1,45	5,79	80,09	84,22	89,72	89,80	92,11	95,17	35,63	45,66	37,49	27,61	44,26	51,85

Continued

Passenger Cars	Diesel >2,0l	Conventional	0	1990	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	0,00
Passenger Cars	Diesel >2,0l	Euro I	1991	1996	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	0,00
Passenger Cars	Diesel >2,0l	Euro II	1997	2000	0,00	0,00	0,00	18,08	48,77	83,05	17,92	36,92	53,22	-7,94	1,18	-0,20	-22,14	-25,38	-11,51	
Passenger Cars	Diesel >2,0l	Euro III	2001	2005	0,00	0,00	0,00	76,38	81,12	94,30	48,53	51,90	58,32	-18,71	-18,46	-12,98	52,23	62,67	63,93	
Passenger Cars	Diesel >2,0l	Euro IV	2006	2010	0,00	0,00	0,00	80,09	84,22	89,72	49,02	60,57	75,83	10,60	24,53	13,19	86,39	86,10	83,20	
Passenger Cars	Diesel >2,0l	Euro V	2011	2014	0,00	0,00	0,00	80,09	84,22	89,72	89,80	92,11	95,17	35,63	45,66	37,49	86,39	86,10	83,20	
Passenger Cars	LPG cars	Conventional	0	1990	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	0,00
Passenger Cars	LPG cars	Euro I	1991	1996	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	0,00
Passenger Cars	LPG cars	Euro II	1997	2000	0,00	0,00	0,00	32,00	32,00	32,00	0,00	0,00	0,00	64,00	64,00	64,00	79,00	79,00	79,00	
Passenger Cars	LPG cars	Euro III	2001	2005	0,00	0,00	0,00	44,00	44,00	44,00	0,00	0,00	0,00	76,00	76,00	76,00	85,00	85,00	85,00	
Passenger Cars	LPG cars	Euro IV	2006	2010	0,00	0,00	0,00	66,00	66,00	66,00	0,00	0,00	0,00	87,00	87,00	87,00	97,00	97,00	97,00	
Passenger Cars	Electric cars	Conventional	0	9999	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	0,00
Light Duty Vehicles	Gasoline <3,5t	Conventional	0	1994	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	0,00
Light Duty Vehicles	Gasoline <3,5t	Euro I	1995	1998	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	0,00
Light Duty Vehicles	Gasoline <3,5t	Euro II	1999	2001	0,00	0,00	0,00	39,00	39,00	39,00	0,00	0,00	0,00	66,00	66,00	66,00	76,00	76,00	76,00	
Light Duty Vehicles	Gasoline <3,5t	Euro III	2002	2006	0,00	0,00	0,00	48,00	48,00	48,00	60,25	54,57	37,37	79,00	79,00	79,00	86,00	86,00	86,00	
Light Duty Vehicles	Gasoline <3,5t	Euro IV	2007	2011	0,00	0,00	0,00	72,00	72,00	72,00	60,25	54,57	37,37	90,00	90,00	90,00	94,00	94,00	94,00	
Light Duty Vehicles	Diesel <3,5t	Conventional	0	1994	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	0,00
Light Duty Vehicles	Diesel <3,5t	Euro I	1995	1998	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	0,00
Light Duty Vehicles	Diesel <3,5t	Euro II	1999	2001	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	0,00
Light Duty Vehicles	Diesel <3,5t	Euro III	2002	2006	0,00	0,00	0,00	18,00	18,00	18,00	33,00	33,00	33,00	35,00	35,00	35,00	38,00	38,00	38,00	
Light Duty Vehicles	Diesel <3,5t	Euro IV	2007	2011	0,00	0,00	0,00	35,00	35,00	35,00	65,00	65,00	65,00	72,00	72,00	72,00	77,00	77,00	77,00	
Light Duty Vehicles	Diesel <3,5t	Euro V	2012	2015	0,00	0,00	0,00	35,00	35,00	35,00	95,63	95,63	95,63	80,00	80,00	80,00	77,00	77,00	77,00	
Light Duty Vehicles	LPG <3,5t	Conventional	0	1994	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	0,00
Light Duty Vehicles	LPG <3,5t	Euro II	1999	2001	0,00	0,00	0,00	32,00	32,00	32,00	0,00	0,00	0,00	64,00	64,00	64,00	79,00	79,00	79,00	
Light Duty Vehicles	LPG <3,5t	Euro III	2002	2006	0,00	0,00	0,00	44,00	44,00	44,00	0,00	0,00	0,00	76,00	76,00	76,00	85,00	85,00	85,00	
Light Duty Vehicles	LPG <3,5t	Euro IV	2007	2011	0,00	0,00	0,00	66,00	66,00	66,00	0,00	0,00	0,00	87,00	87,00	87,00	97,00	97,00	97,00	
Light Duty Vehicles	Electric <3,5t	Conventional	0	9999	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	
Heavy Duty Veh.	Gasoline >3,5t	Conventional	0	9999	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	0,00
Heavy Duty Veh.	Diesel RT 3,5 - 7,5t	Conventional	0	1993	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	0,00
Heavy Duty Veh.	Diesel RT 3,5 - 7,5t	Euro I	1994	1996	19,97	17,39	7,76	67,55	66,82	59,55	60,69	60,33	58,47	30,21	28,42	25,92	80,53	78,89	77,38	
Heavy Duty Veh.	Diesel RT 3,5 - 7,5t	Euro II	1997	2001	24,01	20,18	10,60	74,08	69,13	65,86	81,61	77,85	71,87	23,47	24,02	23,73	86,86	85,98	85,16	
Heavy Duty Veh.	Diesel RT 3,5 - 7,5t	Euro III	2002	2006	18,90	16,31	6,25	67,98	68,13	66,52	79,28	80,07	80,84	40,66	43,96	44,20	87,56	87,06	86,71	
Heavy Duty Veh.	Diesel RT 3,5 - 7,5t	Euro IV	2007	2009	21,15	16,29	5,64	83,37	82,11	80,91	95,44	94,65	93,58	59,45	59,91	59,77	98,28	97,79	97,11	
Heavy Duty Veh.	Diesel RT 3,5 - 7,5t	Euro V	2010	2013	20,29	15,72	5,30	83,30	82,11	80,82	95,45	94,62	93,60	75,97	76,32	76,28	98,27	97,79	97,13	
Heavy Duty Veh.	Diesel RT 7,5 - 12t	Conventional	0	1993	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	

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Heavy Duty Veh.	Diesel RT 7,5 - 12t	Euro I	1994	1996	14,94	11,49	8,93	53,96	51,87	49,75	39,18	39,03	36,52	40,35	40,49	40,47	59,34	56,17	53,69
Heavy Duty Veh.	Diesel RT 7,5 - 12t	Euro II	1997	2001	18,90	14,27	11,02	63,18	57,16	53,02	71,53	66,12	55,10	35,02	36,53	37,57	72,55	70,85	69,48
Heavy Duty Veh.	Diesel RT 7,5 - 12t	Euro III	2002	2006	14,01	10,02	7,38	54,03	54,57	51,94	68,40	69,00	69,32	49,58	51,13	53,53	73,67	73,28	73,21
Heavy Duty Veh.	Diesel RT 7,5 - 12t	Euro IV	2007	2009	17,35	11,08	7,67	76,57	75,39	75,78	93,10	92,09	90,79	65,60	65,29	66,82	96,38	95,67	95,13
Heavy Duty Veh.	Diesel RT 7,5 - 12t	Euro V	2010	2013	16,17	10,25	7,18	76,27	75,18	75,47	93,04	92,07	90,83	79,22	79,51	80,43	96,34	95,66	95,14
Heavy Duty Veh.	Diesel RT 12 - 14 t	Conventional	0	1993	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
Heavy Duty Veh.	Diesel RT 12 - 14 t	Euro I	1994	1996	14,28	11,64	9,97	52,86	51,03	48,87	37,82	37,42	37,06	39,71	39,91	40,14	57,63	56,88	54,97
Heavy Duty Veh.	Diesel RT 12 - 14 t	Euro II	1997	2001	17,78	14,26	12,32	61,29	56,29	52,49	70,72	65,68	55,94	34,11	35,54	36,90	72,19	71,22	70,63
Heavy Duty Veh.	Diesel RT 12 - 14 t	Euro III	2002	2006	13,28	10,55	9,17	53,81	53,44	50,67	68,93	69,17	69,39	46,23	49,71	52,23	74,33	74,00	73,71
Heavy Duty Veh.	Diesel RT 12 - 14 t	Euro IV	2007	2009	17,83	12,48	10,01	76,48	76,13	75,80	93,03	92,25	91,58	63,65	64,32	66,18	96,64	96,09	95,32
Heavy Duty Veh.	Diesel RT 12 - 14 t	Euro V	2010	2013	16,83	11,77	9,53	76,18	75,91	75,63	92,99	92,24	91,61	78,37	78,82	79,97	96,61	96,08	95,34
Heavy Duty Veh.	Diesel RT 14 - 20t	Conventional	0	1993	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
Heavy Duty Veh.	Diesel RT 14 - 20t	Euro I	1994	1996	18,66	16,33	14,88	54,10	52,05	49,69	38,29	38,82	39,43	40,46	40,76	40,96	59,89	58,50	57,65
Heavy Duty Veh.	Diesel RT 14 - 20t	Euro II	1997	2001	21,92	18,70	17,00	63,94	59,22	54,89	73,27	69,36	59,06	33,79	35,29	36,36	72,92	72,50	72,28
Heavy Duty Veh.	Diesel RT 14 - 20t	Euro III	2002	2006	17,70	15,52	14,62	54,42	54,24	50,66	68,29	69,01	69,76	45,61	48,61	51,42	74,94	75,03	74,44
Heavy Duty Veh.	Diesel RT 14 - 20t	Euro IV	2007	2009	23,15	18,31	16,14	76,40	76,04	76,43	93,48	92,87	92,25	63,86	64,05	65,23	96,97	96,70	96,31
Heavy Duty Veh.	Diesel RT 14 - 20t	Euro V	2010	2013	21,50	17,49	15,95	75,25	75,14	75,86	93,36	92,81	92,21	78,21	78,55	79,35	96,86	96,61	96,25
Heavy Duty Veh.	Diesel RT 20 - 26t	Conventional	0	1993	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
Heavy Duty Veh.	Diesel RT 20 - 26t	Euro I	1994	1996	14,59	12,88	11,93	19,16	17,09	16,07	20,49	25,29	27,75	29,52	29,51	29,03	11,17	8,06	6,45
Heavy Duty Veh.	Diesel RT 20 - 26t	Euro II	1997	2001	17,36	14,83	13,74	36,69	31,82	18,28	64,44	61,13	50,94	22,74	23,45	23,78	40,30	39,31	39,01
Heavy Duty Veh.	Diesel RT 20 - 26t	Euro III	2002	2006	13,66	12,19	11,99	20,84	21,10	18,05	60,89	63,32	64,58	37,56	38,91	39,16	44,75	44,58	44,64
Heavy Duty Veh.	Diesel RT 20 - 26t	Euro IV	2007	2009	18,46	14,72	13,40	60,80	61,35	63,31	91,59	91,35	91,18	58,00	57,18	56,47	92,84	92,20	91,51
Heavy Duty Veh.	Diesel RT 20 - 26t	Euro V	2010	2013	17,52	13,99	12,79	60,33	61,00	62,95	91,54	91,32	91,17	75,01	74,57	74,18	92,77	92,15	91,47
Heavy Duty Veh.	Diesel RT 26 - 28t	Conventional	0	1993	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
Heavy Duty Veh.	Diesel RT 26 - 28t	Euro I	1994	1996	14,23	12,62	11,74	20,03	17,07	15,21	22,33	25,06	27,38	29,11	29,59	29,23	12,60	9,85	8,38
Heavy Duty Veh.	Diesel RT 26 - 28t	Euro II	1997	2001	17,09	14,65	13,53	37,76	32,22	19,50	63,87	60,48	50,30	23,25	24,39	24,79	40,81	39,59	39,01
Heavy Duty Veh.	Diesel RT 26 - 28t	Euro III	2002	2006	13,37	11,82	11,44	21,52	20,38	18,17	60,68	62,36	64,94	39,91	41,33	40,87	44,52	43,89	43,54
Heavy Duty Veh.	Diesel RT 26 - 28t	Euro IV	2007	2009	17,01	13,58	12,64	61,39	62,14	64,62	91,49	91,19	91,37	59,14	58,72	57,71	92,39	91,72	91,36
Heavy Duty Veh.	Diesel RT 26 - 28t	Euro V	2010	2013	16,01	12,79	12,02	60,92	61,74	64,28	91,43	91,15	91,35	75,70	75,49	74,93	92,31	91,66	91,32
Heavy Duty Veh.	Diesel RT 28 - 32t	Conventional	0	1993	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
Heavy Duty Veh.	Diesel RT 28 - 32t	Euro I	1994	1996	12,20	11,05	10,36	18,82	13,37	12,31	23,04	24,44	25,14	27,98	28,75	28,76	10,90	7,44	5,56
Heavy Duty Veh.	Diesel RT 28 - 32t	Euro II	1997	2001	15,27	13,95	9,64	34,08	26,77	23,67	62,75	58,53	48,13	22,62	24,28	24,79	40,10	38,55	37,82
Heavy Duty Veh.	Diesel RT 28 - 32t	Euro III	2002	2006	11,41	10,04	9,73	20,60	19,39	17,71	62,16	63,07	64,05	38,80	41,24	41,46	43,86	43,33	43,19
Heavy Duty Veh.	Diesel RT 28 - 32t	Euro IV	2007	2009	14,35	11,13	10,55	60,90	61,17	65,11	91,34	90,97	90,96	58,81	57,29	58,82	91,98	90,92	90,30
Heavy Duty Veh.	Diesel RT 28 - 32t	Euro V	2010	2013	13,34	10,31	9,85	60,41	60,74	64,74	91,27	90,91	90,93	75,51	74,62	75,57	91,91	90,86	90,25
Heavy Duty Veh.	Diesel RT >32t	Euro I	1994	1996	12,62	11,53	10,93	16,13	13,50	12,48	20,12	23,79	25,25	28,73	28,95	28,74	8,76	5,59	4,01

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Heavy Duty Veh.	Diesel RT >32t	Euro III	2002	2006	11,93	10,92	10,90	18,97	18,29	15,90	61,41	63,24	64,69	38,06	39,23	39,11	44,27	43,43	42,99
Heavy Duty Veh.	Diesel RT >32t	Euro IV	2007	2009	15,80	12,78	12,01	61,10	61,71	64,74	91,36	91,17	91,27	57,90	57,34	56,23	92,18	91,31	90,51
Heavy Duty Veh.	Diesel RT >32t	Euro V	2010	2013	14,90	12,07	11,43	60,60	61,33	64,46	91,29	91,12	91,26	74,92	74,66	74,06	92,09	91,27	90,50
Heavy Duty Veh.	Diesel TT/AT 28 - 34t	Conventional	0	1993	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
Heavy Duty Veh.	Diesel TT/AT 28 - 34t	Euro I	1994	1996	10,56	9,81	9,65	15,13	12,34	11,18	22,12	23,23	22,95	28,53	29,18	29,25	7,82	5,31	4,45
Heavy Duty Veh.	Diesel TT/AT 28 - 34t	Euro II	1997	2001	15,65	13,67	10,63	31,82	27,73	16,83	60,81	57,94	48,69	24,49	25,71	26,04	38,86	37,80	37,36
Heavy Duty Veh.	Diesel TT/AT 28 - 34t	Euro III	2002	2006	11,19	10,15	10,37	19,25	17,89	15,99	62,26	63,46	64,44	39,05	41,17	41,88	43,54	43,44	43,48
Heavy Duty Veh.	Diesel TT/AT 28 - 34t	Euro IV	2007	2009	14,73	11,88	11,73	61,31	62,64	65,74	91,27	91,29	91,77	58,43	58,62	58,68	91,95	91,29	90,55
Heavy Duty Veh.	Diesel TT/AT 28 - 34t	Euro V	2010	2013	13,84	11,15	11,06	60,85	62,25	65,37	91,19	91,23	91,73	75,22	75,38	75,48	91,88	91,23	90,51
Heavy Duty Veh.	Diesel TT/AT 34 - 40t	Conventional	0	1993	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
Heavy Duty Veh.	Diesel TT/AT 34 - 40t	Euro I	1994	1996	12,21	11,31	10,88	14,79	12,18	10,98	19,78	22,63	23,62	29,18	29,40	29,10	8,18	5,48	4,19
Heavy Duty Veh.	Diesel TT/AT 34 - 40t	Euro II	1997	2001	14,41	12,85	12,47	31,60	27,45	15,10	60,77	57,68	47,54	23,95	24,61	24,32	38,67	38,17	38,36
Heavy Duty Veh.	Diesel TT/AT 34 - 40t	Euro III	2002	2006	11,35	10,70	11,09	18,41	17,61	15,12	61,53	63,00	64,68	38,79	39,57	39,01	43,62	43,84	44,36
Heavy Duty Veh.	Diesel TT/AT 34 - 40t	Euro IV	2007	2009	15,08	12,56	12,32	61,51	62,53	66,34	91,40	91,31	91,63	58,39	57,50	56,59	91,92	91,32	90,66
Heavy Duty Veh.	Diesel TT/AT 34 - 40t	Euro V	2010	2013	14,16	11,82	11,68	61,16	62,20	65,81	91,32	91,25	91,60	75,20	74,74	74,26	91,84	91,26	90,62
Heavy Duty Veh.	Diesel TT/AT 40 - 50t	Conventional	0	1993	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
Heavy Duty Veh.	Diesel TT/AT 40 - 50t	Euro I	1994	1996	12,06	11,24	10,92	12,93	11,05	8,95	19,65	22,36	21,85	29,86	29,82	29,51	6,26	4,20	3,76
Heavy Duty Veh.	Diesel TT/AT 40 - 50t	Euro II	1997	2001	14,86	12,96	10,45	28,66	23,92	20,16	58,75	56,55	46,55	25,17	25,64	25,26	38,00	37,21	37,26
Heavy Duty Veh.	Diesel TT/AT 40 - 50t	Euro III	2002	2006	11,13	10,59	10,91	17,51	16,69	14,19	61,42	63,23	65,66	39,74	40,37	39,79	43,37	43,37	43,77
Heavy Duty Veh.	Diesel TT/AT 40 - 50t	Euro IV	2007	2009	14,11	11,92	11,89	61,73	62,77	66,78	91,26	91,37	91,76	59,36	57,67	57,38	91,47	90,74	89,97
Heavy Duty Veh.	Diesel TT/AT 40 - 50t	Euro V	2010	2013	13,18	11,19	11,28	61,26	62,40	66,49	91,17	91,30	91,72	75,82	74,82	74,66	91,38	90,68	89,95
Heavy Duty Veh.	Diesel TT/AT 50 - 60t	Euro II	1997	2001	15,12	13,22	11,08	27,35	21,99	18,67	57,33	55,25	45,19	26,42	26,84	26,77	38,07	36,01	34,82
Heavy Duty Veh.	Diesel TT/AT 50 - 60t	Euro IV	2007	2009	14,82	12,10	11,08	62,26	63,07	67,40	91,40	91,54	91,89	59,93	58,30	58,71	91,05	90,11	89,38
Buses	Gasoline Urban Buses	Conventional	0	9999	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
Buses	Diesel Urban Buses <15t	Conventional	0	1993	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
Buses	Diesel Urban Buses <15t	Euro I	1994	1996	19,18	17,29	17,93	64,98	64,38	65,34	64,18	59,36	56,81	25,70	27,96	31,85	80,69	79,04	79,08
Buses	Diesel Urban Buses <15t	Euro II	1997	2001	22,00	19,28	19,64	68,95	69,53	71,53	82,28	78,21	74,97	19,20	22,23	26,76	86,68	85,91	86,00
Buses	Diesel Urban Buses <15t	Euro III	2002	2006	17,34	14,77	15,40	66,31	67,30	67,27	82,14	79,67	77,43	31,27	41,19	49,10	87,89	87,33	86,64
Buses	Diesel Urban Buses <15t	Euro IV	2007	2009	23,22	17,36	12,81	82,13	82,75	85,07	95,64	94,92	94,57	56,39	59,61	63,64	98,36	98,06	97,83
Buses	Diesel Urban Buses <15t	Euro V	2010	2013	21,91	16,20	11,62	81,85	82,49	84,81	95,57	94,91	94,51	73,98	75,97	78,34	98,34	98,04	97,80
Buses	Diesel Urban Buses 15 - 18t	Conventional	0	1993	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
Buses	Diesel Urban Buses 15 - 18t	Euro I	1994	1996	14,69	12,79	11,87	53,30	50,29	48,97	45,25	41,27	35,52	38,51	39,11	40,52	58,83	55,91	53,90
Buses	Diesel Urban Buses 15 - 18t	Euro II	1997	2001	17,30	14,13	12,17	59,92	59,59	57,00	72,71	66,78	60,84	33,88	35,52	36,86	71,87	69,67	67,40
Buses	Diesel Urban Buses 15 - 18t	Euro III	2002	2006	13,33	10,21	8,28	56,14	57,37	51,77	73,49	70,02	67,33	44,22	50,21	54,47	74,05	72,45	69,52

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Buses	Diesel Urban Buses 15 - 18t	Euro IV	2007	2009	18,27	12,04	5,41	77,87	78,14	78,66	93,34	92,51	91,91	63,91	65,56	67,41	96,21	95,37	94,76
Buses	Diesel Urban Buses 15 - 18t	Euro V	2010	2013	17,09	11,02	4,36	77,61	77,91	78,39	93,29	92,44	91,82	78,49	79,52	80,66	96,18	95,33	94,71
Buses	Diesel Urban Buses >18t	Conventional	0	1993	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
Buses	Diesel Urban Buses >18t	Euro I	1994	1996	13,02	11,55	11,00	53,10	50,54	42,55	45,84	41,58	31,51	38,69	39,58	40,12	56,81	53,19	51,17
Buses	Diesel Urban Buses >18t	Euro II	1997	2001	15,64	12,70	7,01	58,65	60,18	57,11	71,05	66,18	60,82	35,41	37,06	37,96	70,55	67,39	66,73
Buses	Diesel Urban Buses >18t	Euro III	2002	2006	12,01	9,43	7,87	56,20	58,74	50,21	74,88	73,79	68,82	45,31	50,39	53,06	73,26	71,41	69,52
Buses	Diesel Urban Buses >18t	Euro IV	2007	2009	15,33	9,09	4,47	79,06	79,83	80,58	93,56	93,24	92,92	63,20	64,47	65,49	95,53	94,57	94,05
Buses	Diesel Urban Buses >18t	Euro V	2010	2013	14,29	8,13	3,44	78,89	79,66	80,38	93,49	93,15	92,82	78,07	78,86	79,49	95,49	94,52	93,98
Buses	Gasoline Coaches	Conventional	0	9999	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
Buses	Diesel Coaches <15t	Conventional	0	1993	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
Buses	Diesel Coaches <15t	Euro I	1994	1996	8,28	7,70	7,47	18,93	15,68	13,60	19,31	20,59	22,44	22,57	24,07	24,64	8,47	3,14	-1,19
Buses	Diesel Coaches <15t	Euro II	1997	2001	8,76	7,42	7,07	34,56	30,80	20,45	62,13	58,30	55,34	11,40	14,43	16,14	35,38	32,63	30,64
Buses	Diesel Coaches <15t	Euro III	2002	2006	0,80	0,43	0,70	14,91	15,75	6,50	54,54	55,87	57,10	24,13	31,47	34,19	36,41	34,05	30,99
Buses	Diesel Coaches <15t	Euro IV	2007	2009	5,01	1,44	0,69	54,25	53,24	49,77	90,25	89,66	88,99	49,96	52,11	52,89	92,04	91,07	90,12
Buses	Diesel Coaches <15t	Euro V	2010	2013	2,65	-0,53	-0,93	52,50	51,58	49,26	90,05	89,49	88,84	69,67	71,16	71,91	91,83	90,88	89,96
Buses	Diesel Coaches 15 - 18t	Conventional	0	1993	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
Buses	Diesel Coaches 15 - 18t	Euro I	1994	1996	8,28	7,70	7,47	18,93	15,68	13,60	19,31	20,59	22,44	22,57	24,07	24,64	8,47	3,14	-1,19
Buses	Diesel Coaches 15 - 18t	Euro II	1997	2001	8,76	7,42	7,07	34,56	30,80	20,45	62,13	58,30	55,34	11,40	14,43	16,14	35,38	32,63	30,64
Buses	Diesel Coaches 15 - 18t	Euro III	2002	2006	0,80	0,43	0,70	14,91	15,75	6,50	54,54	55,87	57,10	24,13	31,47	34,19	36,41	34,05	30,99
Buses	Diesel Coaches 15 - 18t	Euro IV	2007	2009	5,01	1,44	0,69	54,25	53,24	49,77	90,25	89,66	88,99	49,96	52,11	52,89	92,04	91,07	90,12
Buses	Diesel Coaches 15 - 18t	Euro V	2010	2013	2,65	-0,53	-0,93	52,50	51,58	49,26	90,05	89,49	88,84	69,67	71,16	71,91	91,83	90,88	89,96
Buses	Diesel Coaches >18t	Conventional	0	1993	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
Buses	Diesel Coaches >18t	Euro I	1994	1996	11,38	10,72	10,58	19,11	15,65	15,87	21,00	21,97	25,46	23,77	25,28	25,99	9,71	6,78	5,13
Buses	Diesel Coaches >18t	Euro II	1997	2001	12,90	11,45	11,20	34,56	31,66	25,53	62,65	58,54	56,71	15,63	18,15	19,50	37,83	37,12	36,81
Buses	Diesel Coaches >18t	Euro III	2002	2006	9,75	11,17	12,01	17,62	18,24	16,92	57,74	59,71	61,98	31,26	37,05	39,51	39,99	40,51	40,69
Buses	Diesel Coaches >18t	Euro IV	2007	2009	14,03	12,71	12,20	57,22	57,13	57,19	90,88	90,59	90,41	54,36	56,11	56,59	92,52	91,99	91,37
Buses	Diesel Coaches >18t	Euro V	2010	2013	11,70	10,73	10,51	56,10	56,11	56,24	90,69	90,43	90,28	72,44	73,59	73,96	92,33	91,84	91,19
Mopeds	<50 cm ³	Conventional	0	1999	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
Mopeds	<50 cm ³	Euro I	2000	2003	40,00	40,00	0,00	59,42	59,42	0,00	59,84	59,84	0,00	0,00	0,00	0,00	80,37	80,37	0,00
Mopeds	<50 cm ³	Euro II	2004	9999	51,68	51,68	0,00	90,58	90,58	0,00	80,00	80,00	0,00	-1200,00	-1200,00	0,00	88,79	88,79	0,00
Motorcycles	2-stroke >50 cm ³	Conventional	0	1999	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
Motorcycles	4-stroke <250 cm ³	Conventional	0	1999	8,20	9,50	10,60	0,00	0,00	0,00	0,00	0,00	0,00	22,10	-0,90	-15,50	89,70	88,00	85,90
Motorcycles	4-stroke <250 cm ³	Euro I	2000	2003	0,00	0,00	0,00	31,90	16,00	0,20	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Motorcycles	4-stroke <250 cm ³	Euro II	2004	2006	17,60	17,20	16,30	75,70	66,50	63,40	75,00	75,00	75,00	-6,10	-5,40	-5,50	16,10	2,60	1,10
Motorcycles	4-stroke <250 cm ³	Euro III	2007	9999	28,70	33,00	35,70	86,50	81,40	79,60	75,00	75,00	16,90	9,90	-7,90	63,30	49,10	47,60	

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Motorcycles	4-stroke 250 - 750 cm ³	Conventional	0	1999	28,70	33,00	35,70	0,00	0,00	0,00	0,00	0,00	24,10	24,90	10,10	77,20	68,00	66,50	
Motorcycles	4-stroke 250 - 750 cm ³	Euro I	2000	2003	0,00	0,00	0,00	48,20	53,80	54,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	
Motorcycles	4-stroke 250 - 750 cm ³	Euro II	2004	2006	8,50	5,70	0,30	89,10	87,50	73,50	75,00	75,00	75,00	0,20	2,50	5,40	44,50	39,20	23,30
Motorcycles	4-stroke 250 - 750 cm ³	Euro III	2007	9999	17,10	13,40	7,90	94,00	93,10	85,40	75,00	75,00	75,00	70,40	67,00	56,50	75,00	67,20	43,00
Motorcycles	4-stroke >750 cm ³	Conventional	0	1999	17,10	13,40	7,90	0,00	0,00	0,00	0,00	0,00	85,00	83,20	78,10	84,30	79,50	64,20	
Motorcycles	4-stroke >750 cm ³	Euro I	2000	2003	0,00	0,00	0,00	48,20	53,80	54,50	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Motorcycles	4-stroke >750 cm ³	Euro II	2004	2006	2,30	7,40	11,80	89,10	87,50	73,50	75,00	75,00	75,00	-14,20	-37,30	-17,00	56,40	59,00	57,80
Motorcycles	4-stroke >750 cm ³	Euro III	2007	9999	6,40	8,70	9,30	94,00	93,10	85,40	75,00	75,00	75,00	16,90	-12,40	-23,50	84,60	81,20	73,20

Annex 6: Deterioration factors

Sector	Subsector	Tech 2	FYear	LYear	COU	COR	COH	NOxU	NOxR	NOxH	VOCU	VOCR	VOCH
Passenger Cars	Gasoline <1,4 l	PRE ECE	0	1969	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline <1,4 l	ECE 15/00-01	1970	1978	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline <1,4 l	ECE 15/02	1979	1980	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline <1,4 l	ECE 15/03	1981	1985	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline <1,4 l	ECE 15/04	1986	1990	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline <1,4 l	Euro I	1991	1996	2,456763636	2,5358	2,5358	2,0508818	1,888	1,888	1,8627364	1,5974	1,5974
Passenger Cars	Gasoline <1,4 l	Euro II	1997	2000	2,456763636	2,5358	2,5358	2,0508818	1,888	1,888	1,8627364	1,5974	1,5974
Passenger Cars	Gasoline <1,4 l	Euro III	2001	2005	1,417018479	1,144042107	1,144042107		1	1	1,1679608	1	1
Passenger Cars	Gasoline <1,4 l	Euro IV	2006	2010	1,080190658	1,030184039	1,030184039		1	1	1,032483	1	1
Passenger Cars	Gasoline 1,4 - 2,0 l	PRE ECE	0	1969	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/00-01	1970	1978	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/02	1979	1980	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/03	1981	1985	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline 1,4 - 2,0 l	ECE 15/04	1986	1990	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro I	1991	1996	1,848646364	1,76984	1,76984	2,0508818	1,888	1,888	1,8916591	1,7868	1,7868
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro II	1997	2000	1,848646364	1,76984	1,76984	2,0508818	1,888	1,888	1,8916591	1,7868	1,7868
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro III	2001	2005	1,184210095	1	1	1,2745755	1	1	1	1	1
Passenger Cars	Gasoline 1,4 - 2,0 l	Euro IV	2006	2010	1,082566466	1	1	1,1222334	1	1	1	1	1
Passenger Cars	Gasoline >2,0 l	PRE ECE	0	1969	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline >2,0 l	ECE 15/00-01	1970	1978	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline >2,0 l	ECE 15/02	1979	1980	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline >2,0 l	ECE 15/03	1981	1985	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline >2,0 l	ECE 15/04	1986	1990	1	1	1	1	1	1	1	1	1
Passenger Cars	Gasoline >2,0 l	Euro I	1991	1996	1,446653636	1,19748	1,19748	2,0508818	1,888	1,888	1,6774609	1,45388	1,45388
Passenger Cars	Gasoline >2,0 l	Euro II	1997	2000	1,446653636	1,19748	1,19748	2,0508818	1,888	1,888	1,6774609	1,45388	1,45388
Passenger Cars	Gasoline >2,0 l	Euro III	2001	2005	1,198355499	1	1	1,295693	1	1	1	1	1
Passenger Cars	Gasoline >2,0 l	Euro IV	2006	2010	1,114643111	1	1	1,1707201	1	1	1	1	1
Passenger Cars	Diesel <2,0 l	Conventional	0	1990	1	1	1	1	1	1	1	1	1
Passenger Cars	Diesel <2,0 l	Euro I	1991	1996	1	1	1	1	1	1	1	1	1
Passenger Cars	Diesel <2,0 l	Euro II	1997	2000	1	1	1	1	1	1	1	1	1
Passenger Cars	Diesel <2,0 l	Euro III	2001	2005	1	1	1	1	1	1	1	1	1
Passenger Cars	Diesel <2,0 l	Euro IV	2006	2010	1	1	1	1	1	1	1	1	1
Passenger Cars	Diesel <2,0 l	Euro V	2011	2014	1	1	1	1	1	1	1	1	1

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Passenger Cars	Diesel >2,0 l	Conventional	0	1990	1	1	1	1	1	1	1	1	1
Passenger Cars	Diesel >2,0 l	Euro I	1991	1996	1	1	1	1	1	1	1	1	1
Passenger Cars	Diesel >2,0 l	Euro II	1997	2000	1	1	1	1	1	1	1	1	1
Passenger Cars	Diesel >2,0 l	Euro III	2001	2005	1	1	1	1	1	1	1	1	1
Passenger Cars	Diesel >2,0 l	Euro IV	2006	2010	1	1	1	1	1	1	1	1	1
Passenger Cars	Diesel >2,0 l	Euro V	2011	2014	1	1	1	1	1	1	1	1	1
Passenger Cars	LPG cars	Conventional	0	1990	1	1	1	1	1	1	1	1	1
Passenger Cars	LPG cars	Euro I	1991	1996	1	1	1	1	1	1	1	1	1
Passenger Cars	LPG cars	Euro II	1997	2000	1	1	1	1	1	1	1	1	1
Passenger Cars	LPG cars	Euro III	2001	2005	1	1	1	1	1	1	1	1	1
Passenger Cars	LPG cars	Euro IV	2006	2010	1	1	1	1	1	1	1	1	1
Passenger Cars	Electric cars	Conventional	0	9999	1	1	1	1	1	1	1	1	1
Light Duty Vehicles	Gasoline <3,5t	Conventional	0	1994	1	1	1	1	1	1	1	1	1
Light Duty Vehicles	Gasoline <3,5t	Euro I	1995	1998	2,456763636	2,5358	2,5358	2,0508818	1,888	1,888	1,8627364	1,5974	1,5974
Light Duty Vehicles	Gasoline <3,5t	Euro II	1999	2001	2,456763636	2,5358	2,5358	2,0508818	1,888	1,888	1,8627364	1,5974	1,5974
Light Duty Vehicles	Gasoline <3,5t	Euro III	2002	2006	1,148767586	1	1	1,221664	1	1	1	1	1
Light Duty Vehicles	Gasoline <3,5t	Euro IV	2007	2011	1,0721928	1	1	1,1073467	1	1	1	1	1

Annex 7: Fuel consumption factors (MJ/km) and emission factors (g/km)

Sector	Forecast Year	FCu (MJ)	FCr (MJ)	FCh (MJ)	CO ₂ u	CO ₂ r	CO ₂ h	CH ₄ u	CH ₄ r	CH ₄ h	N ₂ Ou	N ₂ Or	N ₂ Oh	SO ₂ u	SO ₂ r	SO ₂ h	NO _x u	NO _x r	NO _x h
Passenger Cars	1985	3,388	2,108	2,435	248	154	178	0.147	0.027	0.024	0,009	0,006	0,006	0.086	0.052	0.063	1,884	2,175	2,682
Passenger Cars	1986	3,335	2,095	2,415	244	153	177	0.146	0.027	0.024	0,009	0,006	0,006	0.057	0.034	0.042	1,853	2,163	2,722
Passenger Cars	1987	3,313	2,083	2,390	242	152	175	0.147	0.027	0.024	0,009	0,006	0,006	0.056	0.034	0.041	1,851	2,172	2,772
Passenger Cars	1988	3,237	2,074	2,370	237	152	173	0.145	0.027	0.024	0,009	0,006	0,006	0.055	0.034	0.041	1,833	2,183	2,814
Passenger Cars	1989	3,199	2,066	2,353	234	151	172	0.144	0.027	0.024	0,009	0,006	0,006	0.040	0.025	0.030	1,821	2,184	2,835
Passenger Cars	1990	3,180	2,059	2,338	232	151	171	0.144	0.027	0.024	0,009	0,006	0,006	0.040	0.025	0.030	1,821	2,190	2,853
Passenger Cars	1991	3,192	2,055	2,323	233	150	170	0.141	0.026	0.023	0,009	0,006	0,006	0.040	0.025	0.029	1,773	2,106	2,749
Passenger Cars	1992	3,149	2,051	2,305	230	150	169	0.131	0.026	0.022	0,010	0,006	0,006	0.026	0.017	0.020	1,666	1,949	2,551
Passenger Cars	1993	3,152	2,044	2,282	230	149	167	0.124	0.025	0.022	0,011	0,006	0,005	0.014	0.009	0,010	1,585	1,804	2,366
Passenger Cars	1994	3,110	2,043	2,268	227	149	166	0.112	0.023	0.020	0,011	0,006	0,005	0.014	0.009	0,010	1,459	1,616	2,138
Passenger Cars	1995	3,108	2,044	2,258	227	149	165	0.102	0.022	0.019	0,012	0,007	0,005	0.014	0.009	0,010	1,356	1,443	1,924
Passenger Cars	1996	3,132	2,047	2,251	229	150	165	0.093	0.021	0.018	0,013	0,007	0,005	0.014	0.009	0,010	1,273	1,291	1,738
Passenger Cars	1997	3,082	2,048	2,238	225	150	164	0.083	0.020	0.017	0,013	0,007	0,005	0.013	0.009	0,010	1,170	1,144	1,551
Passenger Cars	1998	3,077	2,049	2,222	225	150	162	0.075	0.019	0.016	0,013	0,007	0,005	0.013	0.009	0,010	1,072	1,002	1,362
Passenger Cars	1999	3,055	2,049	2,209	223	150	162	0.068	0.017	0.015	0,013	0,006	0,004	0.010	0.007	0.008	0,985	0,879	1,196
Passenger Cars	2000	3,037	2,050	2,202	222	150	161	0.063	0.016	0.014	0,013	0,006	0,004	0.007	0.005	0,005	0,924	0,791	1,074
Passenger Cars	2001	3,063	2,052	2,200	224	150	161	0.058	0.015	0.013	0,012	0,006	0,004	0.007	0.005	0,005	0,885	0,733	0,990
Passenger Cars	2002	3,037	2,057	2,200	222	150	161	0.052	0.014	0.012	0,012	0,006	0,004	0.007	0.005	0,005	0,832	0,672	0,900
Passenger Cars	2003	3,042	2,060	2,200	223	151	161	0.047	0.012	0.011	0,012	0,005	0,003	0.007	0.005	0,005	0,783	0,612	0,813
Passenger Cars	2004	2,993	2,062	2,200	219	151	161	0.041	0.011	0.010	0,011	0,005	0,003	0.007	0.005	0,005	0,726	0,554	0,729
Passenger Cars	2005	3,020	2,064	2,198	221	151	161	0.037	0.010	0.009	0,011	0,005	0,003	0.001	0,001	0,001	0,678	0,497	0,646
Passenger Cars	2006	3,001	2,067	2,198	219	151	161	0.032	0.008	0.008	0,010	0,004	0,003	0.001	0,001	0,001	0,619	0,441	0,568
Passenger Cars	2007	2,981	2,073	2,201	218	152	161	0.026	0.007	0.006	0,010	0,004	0,003	0.001	0,001	0,001	0,567	0,392	0,503
Passenger Cars	2008	2,976	2,065	2,191	218	151	160	0.023	0.006	0.005	0,009	0,003	0,003	0.001	0,001	0,001	0,529	0,356	0,456
Passenger Cars	2009	2,945	2,053	2,176	215	150	159	0.020	0.005	0.004	0,009	0,003	0,002	0,001	0,001	0,001	0,499	0,330	0,421
Passenger Cars	2010	2,955	2,033	2,155	214	148	156	0.017	0.004	0.004	0,009	0,003	0,002	0,001	0,001	0,001	0,480	0,310	0,394
Light Duty Vehicles	1985	4,021	2,786	2,987	297	206	221	0.049	0.017	0.011	0,002	0,001	0,001	0,771	0,555	0,607	2,072	1,208	1,244
Light Duty Vehicles	1986	4,001	2,788	2,993	295	206	221	0.048	0.016	0.011	0,001	0,001	0,001	0,467	0,337	0,369	2,054	1,186	1,220
Light Duty Vehicles	1987	4,013	2,788	2,993	296	206	221	0.048	0.016	0.011	0,001	0,001	0,001	0,468	0,337	0,368	2,061	1,187	1,221
Light Duty Vehicles	1988	3,958	2,788	2,993	292	206	221	0.048	0.016	0.011	0,001	0,001	0,001	0,462	0,337	0,369	2,026	1,185	1,218
Light Duty Vehicles	1989	3,935	2,789	2,997	290	206	221	0.047	0.016	0.010	0,001	0,001	0,001	0,310	0,227	0,248	2,008	1,170	1,201
Light Duty Vehicles	1990	3,930	2,790	2,998	290	206	221	0.046	0.016	0.010	0,001	0,001	0,001	0,310	0,227	0,249	2,004	1,165	1,196
Light Duty Vehicles	1991	3,968	2,789	2,997	293	206	221	0.047	0.016	0.010	0,001	0,001	0,001	0,312	0,227	0,248	2,028	1,171	1,202

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Light Duty Vehicles	1992	3,956	2,787	2,991	292	206	221	0.048	0.016	0.011	0,002	0,001	0,001	0.200	0.146	0.160	2,025	1,194	1,228
Light Duty Vehicles	1993	3,995	2,786	2,989	295	206	221	0.049	0.016	0.011	0,002	0,001	0,001	0.078	0.056	0.062	2,050	1,203	1,238
Light Duty Vehicles	1994	3,970	2,786	2,988	293	206	221	0.049	0.016	0.011	0,002	0,001	0,001	0.078	0.057	0.062	2,034	1,197	1,232
Light Duty Vehicles	1995	3,964	2,770	2,971	293	205	219	0.046	0.016	0.010	0,002	0,001	0,001	0.078	0.056	0.062	1,980	1,170	1,205
Light Duty Vehicles	1996	3,964	2,738	2,938	293	202	217	0.042	0.015	0.009	0,002	0,002	0,002	0.078	0.056	0.061	1,889	1,125	1,160
Light Duty Vehicles	1997	3,879	2,706	2,904	286	200	214	0.038	0.014	0.008	0,003	0,002	0,002	0.077	0.055	0.060	1,755	1,087	1,124
Light Duty Vehicles	1998	3,856	2,680	2,874	285	198	212	0.034	0.013	0.008	0,004	0,003	0,003	0.076	0.055	0.060	1,663	1,058	1,097
Light Duty Vehicles	1999	3,816	2,656	2,847	282	196	210	0.031	0.012	0.007	0,004	0,004	0,003	0.042	0.030	0.033	1,572	1,029	1,070
Light Duty Vehicles	2000	3,784	2,636	2,824	279	195	209	0.027	0.011	0.006	0,005	0,004	0,004	0.009	0.006	0,007	1,497	1,010	1,052
Light Duty Vehicles	2001	3,800	2,619	2,805	281	193	207	0.024	0.010	0.006	0,006	0,005	0,004	0.009	0.006	0,007	1,453	0,992	1,035
Light Duty Vehicles	2002	3,757	2,604	2,789	277	192	206	0.021	0.008	0.005	0,007	0,005	0,005	0.009	0.006	0,007	1,357	0,951	0,994
Light Duty Vehicles	2003	3,747	2,589	2,776	277	191	205	0.018	0.007	0.004	0,008	0,005	0,004	0.009	0.006	0,006	1,265	0,894	0,935
Light Duty Vehicles	2004	3,681	2,576	2,765	272	190	204	0.015	0.006	0.003	0,009	0,005	0,004	0.009	0.006	0,006	1,150	0,836	0,876
Light Duty Vehicles	2005	3,701	2,564	2,755	273	189	204	0.013	0.004	0.003	0,010	0,005	0,004	0.002	0.001	0,001	1,075	0,780	0,817
Light Duty Vehicles	2006	3,671	2,554	2,748	271	189	203	0.010	0.003	0.002	0,011	0,005	0,004	0.002	0.001	0,001	0,996	0,732	0,767
Light Duty Vehicles	2007	3,635	2,543	2,743	268	188	203	0.009	0.003	0.002	0,011	0,004	0,004	0.002	0.001	0,001	0,912	0,676	0,708
Light Duty Vehicles	2008	3,641	2,536	2,739	269	187	202	0.007	0.002	0.001	0,011	0,004	0,004	0.002	0.001	0,001	0,825	0,608	0,637
Light Duty Vehicles	2009	3,635	2,534	2,737	268	187	202	0.006	0.002	0.001	0,012	0,004	0,004	0.002	0.001	0,001	0,772	0,570	0,598
Light Duty Vehicles	2010	3,684	2,530	2,735	272	187	202	0.006	0.002	0.001	0,012	0,004	0,004	0.002	0.001	0,001	0,747	0,541	0,567
Heavy Duty Vehicles	1985	12,721	9,865	8,986	941	730	665	0.150	0.064	0.056	0,030	0,030	0,030	2,967	2,302	2,095	11,955	9,685	8,925
Heavy Duty Vehicles	1986	12,852	9,956	9,058	951	737	670	0.151	0.065	0.057	0,030	0,030	0,030	1,799	1,395	1,268	12,076	9,765	8,983
Heavy Duty Vehicles	1987	12,933	10,012	9,102	957	741	673	0.152	0.066	0.057	0,030	0,030	0,030	1,811	1,403	1,274	12,149	9,813	9,017
Heavy Duty Vehicles	1988	13,094	10,123	9,190	969	749	680	0.154	0.067	0.058	0,030	0,030	0,030	1,834	1,418	1,287	12,303	9,918	9,093
Heavy Duty Vehicles	1989	13,150	10,162	9,221	973	752	682	0.154	0.067	0.058	0,030	0,030	0,030	1,228	0,950	0,861	12,357	9,953	9,119
Heavy Duty Vehicles	1990	13,432	10,358	9,374	994	766	694	0.156	0.068	0.060	0,030	0,030	0,030	1,255	0,968	0,876	12,613	10,123	9,239
Heavy Duty Vehicles	1991	13,400	10,336	9,356	992	765	692	0.156	0.068	0.060	0,030	0,030	0,030	1,252	0,966	0,874	12,593	10,111	9,230
Heavy Duty Vehicles	1992	13,566	10,450	9,448	1004	773	699	0.158	0.069	0.060	0,030	0,030	0,030	0,824	0,635	0,574	12,739	10,209	9,302
Heavy Duty Vehicles	1993	13,802	10,613	9,575	1021	785	708	0.160	0.070	0.061	0,030	0,030	0,030	0,322	0,248	0,224	12,925	10,327	9,377
Heavy Duty Vehicles	1994	13,781	10,600	9,558	1020	784	707	0.160	0.071	0.062	0,030	0,030	0,030	0,322	0,248	0,223	12,739	10,163	9,218
Heavy Duty Vehicles	1995	13,450	10,372	9,370	995	768	693	0.160	0.071	0.062	0,030	0,030	0,030	0,314	0,243	0,219	12,096	9,661	8,780
Heavy Duty Vehicles	1996	13,452	10,377	9,362	995	768	693	0.160	0.072	0.063	0,030	0,030	0,030	0,315	0,243	0,219	11,728	9,334	8,456
Heavy Duty Vehicles	1997	13,311	10,288	9,287	985	761	687	0.155	0.071	0.063	0,030	0,030	0,030	0,311	0,241	0,217	11,395	9,045	8,180
Heavy Duty Vehicles	1998	13,072	10,134	9,171	967	750	679	0.146	0.070	0.062	0,030	0,030	0,030	0,306	0,237	0,215	11,111	8,805	7,961
Heavy Duty Vehicles	1999	12,941	10,054	9,113	958	744	674	0.138	0.069	0.062	0,030	0,030	0,030	0,167	0,129	0,117	10,937	8,644	7,803
Heavy Duty Vehicles	2000	12,950	10,073	9,135	958	745	676	0.131	0.068	0.061	0,030	0,030	0,030	0,030	0,024	0,021	10,892	8,585	7,731
Heavy Duty Vehicles	2001	12,817	9,993	9,082	948	739	672	0.123	0.067	0.061	0,030	0,030	0,030	0,023	0,021	0,021	10,613	8,361	7,534

Continued

Heavy Duty Vehicles	2002	12,997	10,114	9,163	962	748	678	0.118	0.067	0.060	0.030	0,030	0,030	0,030	0,024	0,021	10,441	8,195	7,363
Heavy Duty Vehicles	2003	13,099	10,180	9,198	969	753	681	0.113	0.067	0.060	0.030	0,030	0,030	0,031	0,024	0,022	10,150	7,948	7,134
Heavy Duty Vehicles	2004	13,149	10,211	9,208	973	756	681	0.109	0.067	0.060	0.030	0,030	0,030	0,031	0,024	0,022	9,865	7,715	6,924
Heavy Duty Vehicles	2005	13,366	10,359	9,310	989	767	689	0.106	0.068	0.060	0.030	0,030	0,030	0,006	0,005	0,004	9,688	7,554	6,766
Heavy Duty Vehicles	2006	13,450	10,420	9,348	995	771	692	0.101	0.067	0.059	0.030	0,030	0,030	0,006	0,005	0,004	9,409	7,319	6,551
Heavy Duty Vehicles	2007	13,531	10,493	9,394	1001	776	695	0.088	0.060	0.052	0.030	0,030	0,030	0,006	0,005	0,004	8,933	6,886	6,127
Heavy Duty Vehicles	2008	13,532	10,516	9,401	1001	778	696	0.069	0.048	0.041	0.030	0,030	0,030	0,006	0,005	0,004	8,271	6,274	5,527
Heavy Duty Vehicles	2009	13,563	10,556	9,428	1002	780	697	0.056	0.039	0.034	0.030	0,030	0,030	0,006	0,005	0,004	7,803	5,810	5,061
Heavy Duty Vehicles	2010	13,479	10,504	9,381	997	777	694	0.048	0.034	0.029	0.030	0,030	0,030	0,006	0,005	0,004	7,482	5,430	4,666
Buses	1985	13,770	10,397	9,025	1019	769	667	0.174	0.081	0.070	0.030	0,029	0,029	3,180	2,389	2,035	13,534	10,591	9,165
Buses	1986	13,773	10,401	9,027	1019	769	668	0.174	0.081	0.070	0.030	0,029	0,029	1,910	1,436	1,224	13,540	10,591	9,165
Buses	1987	13,777	10,408	9,033	1019	770	668	0.174	0.081	0.070	0.030	0,029	0,029	1,911	1,437	1,225	13,552	10,604	9,176
Buses	1988	13,783	10,419	9,044	1020	771	669	0.174	0.081	0.070	0.030	0,029	0,029	1,913	1,440	1,228	13,573	10,626	9,195
Buses	1989	13,786	10,422	9,046	1020	771	669	0.174	0.081	0.070	0.030	0,029	0,029	1,276	0,961	0,820	13,577	10,626	9,195
Buses	1990	13,776	10,404	9,028	1019	770	668	0.174	0.081	0.070	0.030	0,029	0,029	1,275	0,959	0,818	13,543	10,588	9,162
Buses	1991	13,774	10,401	9,026	1019	770	668	0.174	0.081	0.070	0.030	0,029	0,029	1,275	0,958	0,818	13,539	10,585	9,159
Buses	1992	13,768	10,391	9,019	1019	769	667	0.174	0.081	0.070	0.030	0,029	0,029	0,827	0,621	0,530	13,524	10,576	9,152
Buses	1993	13,760	10,379	9,008	1018	768	666	0.174	0.081	0.070	0.030	0,029	0,029	0,318	0,239	0,204	13,501	10,555	9,134
Buses	1994	13,619	10,281	8,939	1008	761	661	0.174	0.081	0.070	0,029	0,029	0,029	0,314	0,236	0,201	13,131	10,290	8,933
Buses	1995	13,391	10,095	8,804	991	747	651	0.174	0.081	0.070	0,029	0,029	0,029	0,308	0,231	0,197	12,505	9,806	8,569
Buses	1996	13,206	9,951	8,700	977	736	643	0.174	0.081	0.070	0,029	0,029	0,029	0,303	0,227	0,194	11,987	9,406	8,271
Buses	1997	13,021	9,845	8,628	963	728	638	0,171	0,080	0,069	0,029	0,029	0,029	0,299	0,225	0,193	11,626	9,136	8,063
Buses	1998	12,739	9,697	8,546	942	717	632	0,163	0,077	0,067	0,029	0,029	0,029	0,292	0,221	0,191	11,254	8,872	7,885
Buses	1999	12,483	9,566	8,477	924	708	627	0,156	0,074	0,064	0,029	0,029	0,029	0,158	0,120	0,105	10,885	8,610	7,709
Buses	2000	12,379	9,519	8,448	916	704	625	0,150	0,071	0,062	0,029	0,029	0,029	0,029	0,022	0,020	10,689	8,458	7,588
Buses	2001	12,368	9,525	8,450	915	705	625	0,146	0,069	0,061	0,029	0,029	0,029	0,029	0,022	0,020	10,601	8,374	7,510
Buses	2002	12,370	9,543	8,461	915	706	626	0,141	0,067	0,059	0,029	0,029	0,029	0,029	0,022	0,020	10,355	8,155	7,329
Buses	2003	12,383	9,575	8,484	916	708	627	0,135	0,064	0,057	0,029	0,029	0,029	0,029	0,022	0,020	10,088	7,896	7,104
Buses	2004	12,421	9,605	8,500	919	711	629	0,131	0,062	0,055	0,030	0,029	0,029	0,029	0,022	0,020	9,895	7,691	6,916
Buses	2005	12,406	9,610	8,506	918	711	629	0,127	0,060	0,053	0,030	0,029	0,029	0,006	0,004	0,004	9,697	7,490	6,726
Buses	2006	12,417	9,631	8,521	919	712	630	0,123	0,058	0,052	0,030	0,029	0,029	0,006	0,005	0,004	9,518	7,303	6,546
Buses	2007	12,432	9,669	8,558	920	715	633	0,115	0,054	0,048	0,030	0,029	0,029	0,006	0,005	0,004	9,240	7,066	6,333
Buses	2008	12,374	9,679	8,591	915	716	635	0,101	0,048	0,044	0,030	0,030	0,029	0,006	0,005	0,004	8,748	6,704	6,032
Buses	2009	12,338	9,709	8,642	912	717	638	0,086	0,042	0,038	0,030	0,030	0,029	0,006	0,005	0,004	8,233	6,324	5,714
Buses	2010	12,292	9,723	8,673	909	719	641	0,073	0,036	0,033	0,030	0,030	0,030	0,006	0,005	0,004	7,853	5,952	5,379
Mopeds	1985	1,095	1,095		80	80	0,219	0,219		0,001	0,001		0,003	0,003		0,020	0,020		

Continued

Mopeds	1986	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1987	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1988	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1989	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1990	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1991	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1992	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1993	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1994	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1995	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1996	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1997	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1998	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	1999	1,095	1,095		80	80	0.219	0.219	0,001	0,001	0.003	0.003	0,020	0,020				
Mopeds	2000	1,050	1,050		77	77	0.201	0.201	0,001	0,001	0.002	0.002	0,020	0,020				
Mopeds	2001	1,019	1,019		74	74	0.188	0.188	0,001	0,001	0.002	0.002	0,020	0,020				
Mopeds	2002	0.985	0.985		72	72	0.175	0.175	0,001	0,001	0.002	0.002	0,020	0,020				
Mopeds	2003	0.969	0.969		71	71	0.169	0.169	0,001	0,001	0.002	0.002	0,020	0,020				
Mopeds	2004	0.940	0.940		69	69	0.159	0.159	0,001	0,001	0.002	0.002	0,035	0,035				
Mopeds	2005	0.910	0.910		66	66	0.149	0.149	0,001	0,001	0.000	0.000	0,051	0,051				
Mopeds	2006	0.876	0.876		64	64	0.138	0.138	0,001	0,001	0.000	0.000	0,067	0,067				
Mopeds	2007	0.848	0.848		62	62	0.128	0.128	0,001	0,001	0.000	0.000	0,083	0,083				
Mopeds	2008	0.827	0.827		60	60	0.121	0.121	0,001	0,001	0.000	0.000	0,094	0,094				
Mopeds	2009	0.806	0.806		59	59	0.115	0.115	0,001	0,001	0.000	0.000	0,105	0,105				
Mopeds	2010	0.790	0.790		57	57	0.109	0.109	0,001	0,001	0.000	0.000	0,113	0,113				
Motorcycles	1985	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0.002	0.003	0.003	0.140	0.224	0.391
Motorcycles	1986	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0.003	0.003	0.140	0.224	0.391
Motorcycles	1987	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0.003	0.003	0.140	0.224	0.391
Motorcycles	1988	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0.003	0.003	0.140	0.224	0.391
Motorcycles	1989	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0.003	0.003	0.140	0.224	0.391
Motorcycles	1990	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0.003	0.003	0.140	0.224	0.391
Motorcycles	1991	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0.003	0.003	0.140	0.224	0.391
Motorcycles	1992	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0.003	0.003	0.140	0.224	0.391
Motorcycles	1993	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0.003	0.003	0.140	0.224	0.391
Motorcycles	1994	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0.003	0.003	0.140	0.224	0.391
Motorcycles	1995	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0.003	0.003	0.140	0.224	0.391

Continued

Motorcycles	1996	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0,003	0,003	0,003	0,140	0,224	0,391
Motorcycles	1997	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0,003	0,003	0,003	0,140	0,224	0,391
Motorcycles	1998	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0,003	0,003	0,003	0,140	0,224	0,391
Motorcycles	1999	1,241	1,208	1,481	91	88	108	0.193	0.193	0.193	0,002	0,002	0,002	0,003	0,003	0,003	0,140	0,224	0,391
Motorcycles	2000	1,256	1,224	1,499	92	89	109	0.190	0.190	0.190	0,002	0,002	0,002	0,003	0,003	0,003	0,143	0,228	0,395
Motorcycles	2001	1,266	1,233	1,509	92	90	110	0.188	0.189	0.189	0,002	0,002	0,002	0,003	0,003	0,003	0,146	0,231	0,400
Motorcycles	2002	1,276	1,243	1,519	93	91	111	0.187	0.188	0.188	0,002	0,002	0,002	0,003	0,003	0,003	0,148	0,235	0,404
Motorcycles	2003	1,285	1,251	1,528	94	91	112	0.185	0.187	0.187	0,002	0,002	0,002	0,003	0,003	0,003	0,151	0,238	0,409
Motorcycles	2004	1,290	1,257	1,534	94	92	112	0.184	0.184	0.185	0,002	0,002	0,002	0,003	0,003	0,004	0,154	0,243	0,413
Motorcycles	2005	1,299	1,265	1,545	95	92	113	0.181	0.180	0.181	0,002	0,002	0,002	0,001	0,001	0,001	0,158	0,248	0,419
Motorcycles	2006	1,306	1,273	1,554	95	93	113	0.179	0.175	0.177	0,002	0,002	0,002	0,001	0,001	0,001	0,162	0,254	0,426
Motorcycles	2007	1,310	1,277	1,559	95	93	113	0.172	0.166	0.168	0,002	0,002	0,002	0,001	0,001	0,001	0,158	0,249	0,421
Motorcycles	2008	1,311	1,278	1,560	95	93	114	0.169	0.161	0.163	0,002	0,002	0,002	0,001	0,001	0,001	0,157	0,247	0,420
Motorcycles	2009	1,312	1,279	1,560	95	93	114	0.167	0.159	0.160	0,002	0,002	0,002	0,001	0,001	0,001	0,156	0,246	0,420
Motorcycles	2010	1,312	1,279	1,560	94	92	112	0.166	0.158	0.159	0,002	0,002	0,002	0,001	0,001	0,001	0,156	0,246	0,421

Sector	ForecastYear	NMVOCu (exh)	NMVOCr (exh)	NMVOCCh (exh)	NMVOCu (tot)	NMVOCr (tot)	NMVOCCh (tot)	COu	COr	COh	NH3u	NH3r	NH3h	TSPu	TSPr	TSPh
Passenger Cars	1985	3,237	1,047	0,923	5,341	1,421	0,977	39,399	10,545	11,644	0,002	0,002	0,002	0,096	0,050	0,053
Passenger Cars	1986	3,137	1,013	0,892	5,246	1,387	0,946	36,856	9,698	10,490	0,002	0,002	0,002	0,095	0,049	0,052
Passenger Cars	1987	3,112	0,983	0,859	5,208	1,354	0,912	35,289	8,909	9,428	0,002	0,002	0,002	0,093	0,047	0,051
Passenger Cars	1988	2,877	0,956	0,829	5,057	1,340	0,884	31,432	8,287	8,533	0,002	0,002	0,002	0,086	0,045	0,049
Passenger Cars	1989	2,753	0,929	0,800	4,957	1,316	0,855	29,276	7,750	7,764	0,002	0,002	0,002	0,084	0,044	0,048
Passenger Cars	1990	2,688	0,910	0,778	4,889	1,294	0,832	28,035	7,363	7,236	0,002	0,002	0,002	0,082	0,043	0,047
Passenger Cars	1991	2,697	0,863	0,735	4,768	1,224	0,786	27,914	6,886	6,695	0,004	0,007	0,005	0,079	0,040	0,044
Passenger Cars	1992	2,507	0,793	0,673	4,445	1,129	0,720	25,422	6,287	6,116	0,008	0,017	0,010	0,070	0,036	0,040
Passenger Cars	1993	2,463	0,720	0,607	4,175	1,016	0,648	24,342	5,577	5,416	0,011	0,026	0,015	0,065	0,033	0,037
Passenger Cars	1994	2,231	0,634	0,533	3,779	0,900	0,570	21,489	4,893	4,733	0,016	0,038	0,022	0,058	0,029	0,034
Passenger Cars	1995	2,131	0,559	0,471	3,470	0,789	0,502	20,275	4,402	4,317	0,021	0,050	0,028	0,053	0,026	0,030
Passenger Cars	1996	2,112	0,493	0,415	3,233	0,685	0,442	19,894	3,971	3,958	0,025	0,060	0,034	0,049	0,023	0,027
Passenger Cars	1997	1,839	0,427	0,360	2,829	0,597	0,384	17,032	3,528	3,578	0,032	0,072	0,040	0,041	0,020	0,024
Passenger Cars	1998	1,682	0,364	0,307	2,481	0,500	0,325	15,581	3,077	3,174	0,041	0,082	0,046	0,035	0,017	0,021
Passenger Cars	1999	1,462	0,308	0,259	2,143	0,424	0,275	13,417	2,680	2,822	0,048	0,090	0,051	0,032	0,016	0,019
Passenger Cars	2000	1,332	0,268	0,226	1,781	0,344	0,236	12,210	2,403	2,580	0,054	0,095	0,054	0,029	0,014	0,018
Passenger Cars	2001	1,294	0,240	0,202	1,679	0,305	0,211	12,013	2,222	2,437	0,054	0,095	0,055	0,029	0,014	0,017
Passenger Cars	2002	1,135	0,210	0,178	1,471	0,266	0,186	10,635	2,037	2,291	0,052	0,090	0,055	0,026	0,013	0,016
Passenger Cars	2003	1,046	0,180	0,154	1,320	0,226	0,160	9,969	1,833	2,113	0,048	0,085	0,055	0,025	0,012	0,016

Continued

Passenger Cars	2004	0.871	0.152	0.131	1,097	0.190	0.136	8,385	1,634	1,934	0.045	0.080	0.054	0.023	0.012	0.016
Passenger Cars	2005	0.834	0.125	0.109	1,024	0.157	0.113	8,367	1,433	1,745	0.041	0.074	0.054	0.023	0.012	0.016
Passenger Cars	2006	0.709	0.101	0.090	0.864	0.127	0.093	7,218	1,235	1,542	0.036	0.067	0.052	0.022	0.011	0.015
Passenger Cars	2007	0.589	0.080	0.072	0.704	0.099	0.074	6,009	1,018	1,300	0.031	0.059	0.049	0.021	0.011	0.014
Passenger Cars	2008	0.533	0.066	0.060	0.622	0.080	0.061	5,492	0.864	1,125	0.026	0.052	0.047	0.022	0.011	0.014
Passenger Cars	2009	0.470	0.055	0.051	0.547	0.068	0.053	4,862	0.753	0,998	0.023	0.047	0.045	0.021	0.010	0.013
Passenger Cars	2010	0.444	0.046	0.043	0.504	0.056	0.044	4,633	0.640	0.862	0.020	0.042	0.042	0.022	0.010	0.012
Light Duty Vehicles	1985	0.758	0.189	0.146	1,073	0.241	0.156	7,118	1,810	2,091	0.001	0.001	0.001	0.487	0.261	0.277
Light Duty Vehicles	1986	0.716	0.184	0.143	1,016	0.232	0.153	6,697	1,763	2,031	0.001	0.001	0.001	0.482	0.264	0.279
Light Duty Vehicles	1987	0.727	0.184	0.143	1,025	0.232	0.153	6,791	1,765	2,033	0.001	0.001	0.001	0.489	0.264	0.279
Light Duty Vehicles	1988	0.678	0.183	0.143	0.988	0.234	0.153	6,361	1,760	2,027	0.001	0.001	0.001	0.451	0.264	0.280
Light Duty Vehicles	1989	0.642	0.179	0.141	0.944	0.228	0.150	6,018	1,727	1,984	0.001	0.001	0.001	0.441	0.266	0.282
Light Duty Vehicles	1990	0.633	0.178	0.140	0.930	0.226	0.149	5,927	1,716	1,971	0.001	0.001	0.001	0.439	0.266	0.282
Light Duty Vehicles	1991	0.669	0.180	0.141	0.967	0.227	0.150	6,251	1,729	1,987	0.001	0.001	0.001	0.462	0.266	0.281
Light Duty Vehicles	1992	0.684	0.186	0.144	1,008	0.238	0.154	6,437	1,780	2,053	0.001	0.001	0.001	0.444	0.263	0.279
Light Duty Vehicles	1993	0.726	0.188	0.145	1,046	0.239	0.155	6,828	1,800	2,078	0.001	0.001	0.001	0.465	0.262	0.277
Light Duty Vehicles	1994	0.701	0.186	0.144	1,031	0.239	0.154	6,617	1,791	2,055	0.001	0.001	0.001	0.451	0.262	0.278
Light Duty Vehicles	1995	0.683	0.179	0.140	0.986	0.227	0.149	6,392	1,679	1,925	0.002	0.002	0.002	0.437	0.248	0.264
Light Duty Vehicles	1996	0.659	0.165	0.132	0.907	0.204	0.140	6,055	1,478	1,699	0.002	0.004	0.003	0.415	0.220	0.237
Light Duty Vehicles	1997	0.576	0.153	0.126	0.793	0.187	0.132	5,230	1,295	1,496	0.003	0.006	0.004	0.341	0.193	0.210
Light Duty Vehicles	1998	0.549	0.144	0.121	0.727	0.172	0.126	4,977	1,152	1,340	0.004	0.008	0.005	0.300	0.168	0.186
Light Duty Vehicles	1999	0.500	0.135	0.116	0.651	0.159	0.120	4,482	1,017	1,194	0.005	0.010	0.006	0.257	0.146	0.165
Light Duty Vehicles	2000	0.465	0.129	0.112	0.566	0.145	0.115	4,187	0,919	1,090	0.007	0.012	0.007	0.222	0.127	0.146
Light Duty Vehicles	2001	0.459	0.124	0.108	0.542	0.137	0.111	4,091	0,830	0,993	0.008	0.014	0.008	0.208	0.111	0.131
Light Duty Vehicles	2002	0.409	0.116	0.103	0.481	0.127	0.105	3,681	0,749	0,906	0.008	0.014	0.009	0.175	0.097	0.117
Light Duty Vehicles	2003	0.375	0.107	0.095	0.432	0.115	0.097	3,369	0,667	0,813	0.007	0.012	0.008	0.158	0.085	0.104
Light Duty Vehicles	2004	0.312	0.097	0.088	0.357	0.104	0.089	2,812	0,586	0,721	0.006	0.011	0.008	0.129	0.074	0.092
Light Duty Vehicles	2005	0.293	0.089	0.081	0.329	0.094	0.082	2,620	0,509	0,631	0.005	0.010	0.008	0.121	0.064	0.082
Light Duty Vehicles	2006	0.257	0.082	0.075	0.285	0.086	0.076	2,252	0,448	0,561	0.005	0.008	0.007	0.107	0.057	0.074
Light Duty Vehicles	2007	0.227	0.074	0.069	0.249	0.078	0.069	1,924	0,410	0,515	0.004	0.007	0.007	0.096	0.051	0.067
Light Duty Vehicles	2008	0.206	0.066	0.061	0.223	0.069	0.062	1,725	0,370	0,468	0.003	0.006	0.006	0.088	0.045	0.060
Light Duty Vehicles	2009	0.191	0.062	0.057	0.205	0.064	0.058	1,633	0,352	0,445	0.003	0.006	0.006	0.081	0.041	0.055
Light Duty Vehicles	2010	0.194	0.058	0.054	0.206	0.060	0.055	1,623	0,335	0,425	0.003	0.006	0.006	0.083	0.039	0.052
Heavy Duty Vehicles	1985	0.865	0.581	0.442	0.865	0.581	0.442	3,120	2,307	2,152	0.003	0.003	0.003	0.479	0.349	0.318
Heavy Duty Vehicles	1986	0.855	0.575	0.438	0.855	0.575	0.438	3,088	2,282	2,127	0.003	0.003	0.003	0.482	0.352	0.320
Heavy Duty Vehicles	1987	0.851	0.572	0.436	0.851	0.572	0.436	3,085	2,279	2,125	0.003	0.003	0.003	0.484	0.353	0.321
Heavy Duty Vehicles	1988	0.843	0.567	0.433	0.843	0.567	0.433	3,079	2,275	2,120	0.003	0.003	0.003	0.488	0.356	0.324

Continued

Heavy Duty Vehicles	1989	0.839	0.564	0.431	0.839	0.564	0.431	3,061	2,260	2,106	0.003	0.003	0.003	0.490	0.357	0.325
Heavy Duty Vehicles	1990	0.825	0.556	0.425	0.825	0.556	0.425	3,056	2,257	2,104	0.003	0.003	0.003	0.497	0.362	0.330
Heavy Duty Vehicles	1991	0.829	0.558	0.427	0.829	0.558	0.427	3,063	2,262	2,109	0.003	0.003	0.003	0.496	0.362	0.330
Heavy Duty Vehicles	1992	0.821	0.553	0.424	0.821	0.553	0.424	3,078	2,274	2,122	0.003	0.003	0.003	0.500	0.365	0.332
Heavy Duty Vehicles	1993	0.808	0.545	0.418	0.808	0.545	0.418	3,080	2,277	2,127	0.003	0.003	0.003	0.505	0.368	0.336
Heavy Duty Vehicles	1994	0.788	0.534	0.410	0.788	0.534	0.410	2,999	2,218	2,074	0.003	0.003	0.003	0.500	0.363	0.331
Heavy Duty Vehicles	1995	0.762	0.519	0.399	0.762	0.519	0.399	2,883	2,139	2,003	0.003	0.003	0.003	0.481	0.349	0.317
Heavy Duty Vehicles	1996	0.719	0.492	0.380	0.719	0.492	0.380	2,768	2,063	1,943	0.003	0.003	0.003	0.466	0.336	0.307
Heavy Duty Vehicles	1997	0.671	0.459	0.354	0.671	0.459	0.354	2,628	1,971	1,879	0.003	0.003	0.003	0.431	0.312	0.289
Heavy Duty Vehicles	1998	0.617	0.421	0.323	0.617	0.421	0.323	2,482	1,876	1,818	0.003	0.003	0.003	0.385	0.281	0.266
Heavy Duty Vehicles	1999	0.570	0.387	0.297	0.570	0.387	0.297	2,361	1,798	1,770	0.003	0.003	0.003	0.345	0.255	0.247
Heavy Duty Vehicles	2000	0.533	0.360	0.275	0.533	0.360	0.275	2,280	1,748	1,744	0.003	0.003	0.003	0.317	0.236	0.235
Heavy Duty Vehicles	2001	0.499	0.334	0.254	0.499	0.334	0.254	2,209	1,701	1,705	0.003	0.003	0.003	0.286	0.214	0.217
Heavy Duty Vehicles	2002	0.475	0.315	0.239	0.475	0.315	0.239	2,225	1,711	1,715	0.003	0.003	0.003	0.270	0.202	0.204
Heavy Duty Vehicles	2003	0.453	0.296	0.225	0.453	0.296	0.225	2,228	1,706	1,703	0.003	0.003	0.003	0.256	0.190	0.189
Heavy Duty Vehicles	2004	0.435	0.282	0.214	0.435	0.282	0.214	2,231	1,701	1,691	0.003	0.003	0.003	0.242	0.179	0.175
Heavy Duty Vehicles	2005	0.420	0.269	0.204	0.420	0.269	0.204	2,265	1,719	1,701	0.003	0.003	0.003	0.234	0.171	0.164
Heavy Duty Vehicles	2006	0.403	0.255	0.194	0.403	0.255	0.194	2,277	1,720	1,692	0.003	0.003	0.003	0.223	0.162	0.152
Heavy Duty Vehicles	2007	0.358	0.226	0.172	0.358	0.226	0.172	2,211	1,666	1,619	0.003	0.003	0.003	0.199	0.144	0.133
Heavy Duty Vehicles	2008	0.291	0.184	0.141	0.291	0.184	0.141	2,068	1,554	1,482	0.003	0.003	0.003	0.163	0.118	0.108
Heavy Duty Vehicles	2009	0.245	0.156	0.119	0.245	0.156	0.119	2,003	1,505	1,412	0.003	0.003	0.003	0.140	0.101	0.092
Heavy Duty Vehicles	2010	0.214	0.136	0.105	0.214	0.136	0.105	1,971	1,483	1,375	0.003	0.003	0.003	0.117	0.084	0.077
Buses	1985	1,517	0.973	0.696	1,517	0.973	0.696	5,571	4,331	4,505	0.003	0.003	0.003	0.629	0.411	0.320
Buses	1986	1,509	0.963	0.686	1,509	0.963	0.686	5,493	4,235	4,351	0.003	0.003	0.003	0.629	0.410	0.320
Buses	1987	1,511	0.964	0.688	1,511	0.964	0.688	5,482	4,224	4,340	0.003	0.003	0.003	0.629	0.411	0.320
Buses	1988	1,512	0.965	0.689	1,512	0.965	0.689	5,453	4,191	4,295	0.003	0.003	0.003	0.630	0.412	0.321
Buses	1989	1,506	0.958	0.682	1,506	0.958	0.682	5,398	4,124	4,187	0.003	0.003	0.003	0.630	0.412	0.320
Buses	1990	1,501	0.954	0.676	1,501	0.954	0.676	5,416	4,140	4,200	0.003	0.003	0.003	0.629	0.410	0.319
Buses	1991	1,503	0.956	0.679	1,503	0.956	0.679	5,441	4,169	4,245	0.003	0.003	0.003	0.628	0.410	0.319
Buses	1992	1,510	0.966	0.688	1,510	0.966	0.688	5,537	4,286	4,427	0.003	0.003	0.003	0.628	0.410	0.319
Buses	1993	1,512	0.969	0.690	1,512	0.969	0.690	5,594	4,352	4,522	0.003	0.003	0.003	0.627	0.409	0.319
Buses	1994	1,455	0.954	0.692	1,455	0.954	0.692	5,657	4,536	4,894	0.003	0.003	0.003	0.604	0.397	0.313
Buses	1995	1,349	0.907	0.662	1,349	0.907	0.662	5,659	4,649	5,091	0.003	0.003	0.003	0.568	0.376	0.300
Buses	1996	1,247	0.853	0.625	1,247	0.853	0.625	5,529	4,577	4,992	0.003	0.003	0.003	0.537	0.359	0.289
Buses	1997	1,152	0.801	0.595	1,152	0.801	0.595	5,261	4,385	4,810	0.003	0.003	0.003	0.503	0.340	0.277
Buses	1998	1,049	0.747	0.565	1,049	0.747	0.565	4,968	4,192	4,668	0.003	0.003	0.003	0.455	0.314	0.261
Buses	1999	0,943	0,688	0,530	0,943	0,688	0,530	4,631	3,949	4,453	0,003	0,003	0,003	0,409	0,288	0,245

Continued

Buses	2000	0.867	0.647	0.507	0.867	0.647	0.507	4,433	3,819	4,359	0,003	0,003	0,003	0,375	0,269	0,232
Buses	2001	0,813	0,614	0,485	0,813	0,614	0,485	4,244	3,656	4,183	0,003	0,003	0,003	0,335	0,245	0,217
Buses	2002	0,748	0,577	0,463	0,748	0,577	0,463	4,077	3,529	4,070	0,003	0,003	0,003	0,308	0,230	0,206
Buses	2003	0,683	0,532	0,433	0,683	0,532	0,433	3,810	3,273	3,773	0,003	0,003	0,003	0,272	0,206	0,189
Buses	2004	0,639	0,500	0,408	0,639	0,500	0,408	3,642	3,091	3,524	0,003	0,003	0,003	0,257	0,196	0,180
Buses	2005	0,597	0,469	0,386	0,597	0,469	0,386	3,469	2,918	3,312	0,003	0,003	0,003	0,233	0,180	0,167
Buses	2006	0,560	0,442	0,367	0,560	0,442	0,367	3,322	2,769	3,132	0,003	0,003	0,003	0,221	0,171	0,159
Buses	2007	0,515	0,408	0,340	0,515	0,408	0,340	3,125	2,579	2,896	0,003	0,003	0,003	0,204	0,159	0,148
Buses	2008	0,459	0,368	0,311	0,459	0,368	0,311	2,909	2,402	2,703	0,003	0,003	0,003	0,181	0,141	0,132
Buses	2009	0,394	0,320	0,274	0,394	0,320	0,274	2,645	2,174	2,438	0,003	0,003	0,003	0,156	0,123	0,117
Buses	2010	0,337	0,275	0,239	0,337	0,275	0,239	2,456	1,973	2,165	0,003	0,003	0,003	0,135	0,106	0,100
Mopeds	1985	13,691	13,691		14,110	13,838		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1986	13,691	13,691		14,118	13,841		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1987	13,691	13,691		14,115	13,840		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1988	13,691	13,691		14,144	13,850		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1989	13,691	13,691		14,161	13,856		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1990	13,691	13,691		14,151	13,853		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1991	13,691	13,691		14,131	13,846		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1992	13,691	13,691		14,135	13,847		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1993	13,691	13,691		14,106	13,837		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1994	13,691	13,691		14,124	13,843		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1995	13,691	13,691		14,125	13,844		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1996	13,691	13,691		14,108	13,838		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1997	13,691	13,691		14,131	13,846		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1998	13,691	13,691		14,111	13,839		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	1999	13,691	13,691		14,157	13,855		13,800	13,800		0,001	0,001		0,188	0,188	
Mopeds	2000	12,563	12,563		12,948	12,699		12,960	12,960		0,001	0,001		0,176	0,176	
Mopeds	2001	11,773	11,773		12,193	11,921		12,371	12,371		0,001	0,001		0,168	0,168	
Mopeds	2002	10,937	10,937		11,368	11,089		11,748	11,748		0,001	0,001		0,160	0,160	
Mopeds	2003	10,520	10,520		10,948	10,671		11,437	11,437		0,001	0,001		0,156	0,156	
Mopeds	2004	9,924	9,924		10,353	10,075		10,776	10,776		0,001	0,001		0,148	0,148	
Mopeds	2005	9,299	9,299		9,766	9,464		10,085	10,085		0,001	0,001		0,140	0,140	
Mopeds	2006	8,636	8,636		9,119	8,806		9,353	9,353		0,001	0,001		0,131	0,131	
Mopeds	2007	8,023	8,023		8,496	8,190		8,669	8,669		0,001	0,001		0,123	0,123	
Mopeds	2008	7,588	7,588		8,047	7,749		8,189	8,189		0,001	0,001		0,118	0,118	
Mopeds	2009	7,169	7,169		7,637	7,334		7,727	7,727		0,001	0,001		0,112	0,112	
Mopeds	2010	6,817	6,817		7,261	6,973		7,342	7,342		0,001	0,001		0,108	0,108	

Continued

Motorcycles	1985	1,426	1,186	1,588	2,189	1,401	1,624	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1986	1,426	1,186	1,588	2,196	1,403	1,624	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1987	1,426	1,186	1,588	2,192	1,401	1,624	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1988	1,426	1,186	1,588	2,226	1,410	1,625	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1989	1,426	1,186	1,588	2,244	1,414	1,625	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1990	1,426	1,186	1,588	2,241	1,412	1,625	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1991	1,426	1,186	1,588	2,228	1,408	1,624	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1992	1,426	1,186	1,588	2,238	1,410	1,624	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1993	1,426	1,186	1,588	2,204	1,400	1,623	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1994	1,426	1,186	1,588	2,234	1,407	1,624	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1995	1,426	1,186	1,588	2,236	1,407	1,623	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1996	1,426	1,186	1,588	2,218	1,402	1,622	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1997	1,426	1,186	1,588	2,262	1,413	1,624	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1998	1,426	1,186	1,588	2,241	1,406	1,623	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	1999	1,426	1,186	1,588	2,278	1,416	1,624	18,848	19,069	24,147	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	2000	1,503	1,232	1,624	2,181	1,415	1,653	18,476	18,693	23,725	0.002	0.002	0.002	0.047	0.047	0.047
Motorcycles	2001	1,511	1,228	1,600	2,188	1,409	1,628	18,260	18,455	23,434	0.002	0.002	0.002	0.046	0.046	0.046
Motorcycles	2002	1,519	1,223	1,575	2,220	1,408	1,603	18,047	18,219	23,145	0.002	0.002	0.002	0.045	0.045	0.045
Motorcycles	2003	1,524	1,216	1,548	2,226	1,402	1,577	17,851	18,002	22,877	0.002	0.002	0.002	0.044	0.044	0.044
Motorcycles	2004	1,498	1,193	1,513	2,224	1,385	1,542	17,330	17,497	22,330	0.002	0.002	0.002	0.043	0.043	0.043
Motorcycles	2005	1,485	1,178	1,484	2,272	1,386	1,516	16,604	16,797	21,579	0.002	0.002	0.002	0.041	0.041	0.041
Motorcycles	2006	1,475	1,165	1,458	2,300	1,383	1,491	15,823	16,046	20,773	0.002	0.002	0.002	0.040	0.040	0.040
Motorcycles	2007	1,424	1,132	1,420	2,249	1,348	1,453	14,954	15,190	19,752	0.002	0.002	0.002	0.038	0.038	0.038
Motorcycles	2008	1,380	1,099	1,379	2,200	1,313	1,411	14,464	14,697	19,156	0.002	0.002	0.002	0.037	0.037	0.037
Motorcycles	2009	1,337	1,065	1,334	2,182	1,285	1,367	14,245	14,467	18,862	0.002	0.002	0.002	0.035	0.035	0.035
Motorcycles	2010	1,296	1,031	1,288	2,109	1,243	1,320	14,103	14,310	18,655	0.002	0.002	0.002	0.034	0.034	0.034

Annex 8: Fuel consumption (GJ) and emissions (tonnes) per vehicle category and as totals

Sector	Year	FC (PJ)	SO2	NOx	NMVOc	CH4	CO	CO2	N2O	NH3	TSP
Passenger Cars	1985	65,6	1657	53694	69153	1756	530222	4792	171	47	1672
Passenger Cars	1986	66,3	1116	54682	69163	1780	502728	4845	174	48	1695
Passenger Cars	1987	66,5	1114	55580	68858	1803	478298	4858	176	48	1658
Passenger Cars	1988	67,3	1133	57253	68847	1831	441728	4919	180	50	1605
Passenger Cars	1989	66,7	823	57248	67317	1815	410172	4876	179	49	1561
Passenger Cars	1990	70,8	881	61299	70630	1931	416786	5176	191	53	1622
Passenger Cars	1991	75,3	924	63019	72507	2006	432028	5505	208	166	1646
Passenger Cars	1992	78,7	652	61810	70857	1989	414275	5751	231	398	1540
Passenger Cars	1993	80,7	356	59406	67515	1942	398195	5898	248	618	1466
Passenger Cars	1994	83,6	372	56202	63295	1849	365718	6112	271	929	1374
Passenger Cars	1995	84,3	372	51422	57853	1711	343506	6165	288	1220	1245
Passenger Cars	1996	85,1	373	47170	53176	1588	331359	6224	302	1477	1140
Passenger Cars	1997	87,3	380	43810	47947	1489	296092	6380	314	1842	1005
Passenger Cars	1998	89,0	389	39871	42437	1391	273244	6508	312	2222	891
Passenger Cars	1999	89,6	307	35944	36797	1280	238468	6549	307	2506	810
Passenger Cars	2000	89,2	204	32784	30394	1182	215843	6519	300	2682	742
Passenger Cars	2001	88,6	203	30416	27907	1091	206787	6479	287	2659	707
Passenger Cars	2002	89,8	206	28568	24736	996	187506	6567	278	2601	656
Passenger Cars	2003	91,9	211	26870	22407	914	177974	6721	269	2519	659
Passenger Cars	2004	92,7	213	24891	18936	818	154698	6783	259	2424	634
Passenger Cars	2005	91,8	42	22323	16936	714	147170	6718	239	2211	625
Passenger Cars	2006	92,3	42	20147	14286	619	128092	6748	225	2045	604
Passenger Cars	2007	97,0	44	19083	12146	538	112065	7091	223	1900	608
Passenger Cars	2008	98,0	45	17761	10681	465	101924	7172	217	1726	614
Passenger Cars	2009	95,3	44	16233	9123	398	88048	6970	206	1548	571
Passenger Cars	2010	94,8	43	15372	8218	344	81554	6879	202	1376	574
Light Duty Vehicles	1985	12,7	2503	5966	2081	108	14785	941	5	5	1351
Light Duty Vehicles	1986	14,6	1747	6772	2277	121	16165	1081	5	5	1552
Light Duty Vehicles	1987	15,4	1831	7105	2397	127	17079	1133	5	5	1637
Light Duty Vehicles	1988	15,8	1886	7282	2414	131	16881	1166	6	6	1627
Light Duty Vehicles	1989	16,4	1317	7487	2411	133	16795	1210	6	6	1679
Light Duty Vehicles	1990	17,6	1414	7995	2547	142	17762	1296	6	6	1797
Light Duty Vehicles	1991	18,2	1462	8326	2705	148	19031	1344	6	6	1900

Continued

Light Duty Vehicles	1992	18,1	936	8372	2806	151	19505	1336	7	6	1845
Light Duty Vehicles	1993	18,6	373	8659	2952	156	20837	1374	7	7	1930
Light Duty Vehicles	1994	20,0	401	9245	3134	167	21866	1473	7	7	2046
Light Duty Vehicles	1995	20,0	403	9086	3013	160	21049	1478	9	12	1971
Light Duty Vehicles	1996	20,4	412	8917	2824	150	19934	1505	13	22	1857
Light Duty Vehicles	1997	20,6	418	8708	2577	141	17792	1525	17	32	1623
Light Duty Vehicles	1998	21,2	426	8654	2443	135	17123	1563	22	43	1471
Light Duty Vehicles	1999	21,6	242	8575	2279	125	15810	1597	27	56	1314
Light Duty Vehicles	2000	22,0	51	8525	2067	114	15003	1626	33	69	1171
Light Duty Vehicles	2001	21,8	51	8260	1955	101	14198	1609	37	77	1054
Light Duty Vehicles	2002	22,5	52	8151	1827	92	13273	1661	42	82	942
Light Duty Vehicles	2003	24,4	57	8313	1794	84	13133	1801	48	81	914
Light Duty Vehicles	2004	26,3	61	8386	1669	76	12131	1945	54	79	843
Light Duty Vehicles	2005	28,1	13	8367	1632	65	11831	2078	60	74	817
Light Duty Vehicles	2006	30,3	14	8468	1561	56	11101	2241	67	70	785
Light Duty Vehicles	2007	31,7	15	8184	1453	49	10164	2340	72	63	741
Light Duty Vehicles	2008	30,1	14	7007	1227	38	8663	2220	69	53	635
Light Duty Vehicles	2009	28,3	13	6187	1069	32	7728	2087	65	49	549
Light Duty Vehicles	2010	27,6	13	5753	1015	28	7362	2038	64	45	523
Heavy Duty Vehicles	1985	25,0	5837	24341	1474	199	5972	1852	73	7	902
Heavy Duty Vehicles	1986	28,2	3951	27421	1628	225	6599	2088	81	8	1015
Heavy Duty Vehicles	1987	27,7	3875	26876	1580	221	6429	2047	79	8	994
Heavy Duty Vehicles	1988	27,2	3806	26381	1522	217	6231	2011	77	8	973
Heavy Duty Vehicles	1989	28,3	2643	27461	1570	226	6421	2093	80	8	1012
Heavy Duty Vehicles	1990	29,1	2719	28191	1560	232	6473	2154	81	8	1036
Heavy Duty Vehicles	1991	29,6	2763	28678	1596	235	6608	2189	83	8	1054
Heavy Duty Vehicles	1992	29,0	1763	28112	1534	232	6449	2148	80	8	1031
Heavy Duty Vehicles	1993	28,1	656	27093	1440	224	6154	2079	76	8	993
Heavy Duty Vehicles	1994	30,0	701	28517	1506	241	6412	2220	82	8	1048
Heavy Duty Vehicles	1995	30,2	706	27894	1503	247	6358	2234	84	8	1035
Heavy Duty Vehicles	1996	31,0	725	27668	1462	255	6297	2293	86	9	1026
Heavy Duty Vehicles	1997	31,5	737	27513	1399	258	6183	2331	89	9	980
Heavy Duty Vehicles	1998	32,0	748	27597	1320	257	6078	2365	91	9	913
Heavy Duty Vehicles	1999	33,2	427	28381	1272	261	6117	2457	96	10	871
Heavy Duty Vehicles	2000	32,1	75	27164	1140	245	5745	2372	92	9	780
Heavy Duty Vehicles	2001	33,2	78	27613	1107	248	5835	2455	96	10	742

Continued

Heavy Duty Vehicles	2002	33.0	77	26640	1029	240	5778	2444	95	10	689
Heavy Duty Vehicles	2003	34.8	81	27034	1016	248	6027	2572	99	10	676
Heavy Duty Vehicles	2004	36.0	84	27088	1000	253	6200	2662	103	10	653
Heavy Duty Vehicles	2005	36.5	17	26536	959	251	6266	2700	103	10	623
Heavy Duty Vehicles	2006	39.0	18	27315	969	260	6656	2883	109	11	624
Heavy Duty Vehicles	2007	40.9	19	26824	895	239	6705	3025	114	11	577
Heavy Duty Vehicles	2008	38.4	18	22966	684	179	5840	2842	107	11	442
Heavy Duty Vehicles	2009	32.7	15	18088	491	124	4777	2417	91	9	321
Heavy Duty Vehicles	2010	33.8	16	17594	445	111	4866	2498	94	9	279
Buses	1985	7.0	1622	7041	713	74	2939	521	17	2	300
Buses	1986	7.6	1047	7568	761	79	3099	561	19	2	322
Buses	1987	7.4	1026	7419	746	77	3028	549	18	2	316
Buses	1988	7.5	1031	7455	749	78	3016	551	19	2	317
Buses	1989	7.6	704	7630	762	79	3044	564	19	2	324
Buses	1990	8.1	751	8133	810	85	3267	602	20	2	345
Buses	1991	8.2	752	8150	813	85	3295	604	20	2	346
Buses	1992	7.8	467	7785	783	81	3227	577	19	2	331
Buses	1993	7.9	182	7874	795	82	3314	584	20	2	334
Buses	1994	8.4	194	8273	833	88	3686	624	21	2	349
Buses	1995	8.7	200	8325	823	93	3954	647	22	2	347
Buses	1996	9.2	209	8492	813	98	4129	678	24	2	349
Buses	1997	9.1	208	8285	761	97	3966	673	24	2	331
Buses	1998	8.9	203	7996	698	92	3757	657	24	2	301
Buses	1999	8.6	109	7652	628	87	3483	638	24	2	270
Buses	2000	8.3	19	7282	566	81	3254	614	23	2	243
Buses	2001	8.3	19	7195	532	79	3108	612	23	2	219
Buses	2002	8.3	19	6992	494	76	2986	611	23	2	203
Buses	2003	8.7	20	7135	477	77	2919	643	24	2	190
Buses	2004	8.9	21	7103	455	75	2821	657	24	2	183
Buses	2005	8.8	4	6861	422	72	2644	649	24	2	166
Buses	2006	8.7	4	6658	394	69	2498	645	24	2	156
Buses	2007	8.9	4	6551	369	66	2371	657	25	2	147
Buses	2008	8.5	4	5960	318	56	2119	629	24	2	125
Buses	2009	8.2	4	5435	266	46	1858	608	23	2	105
Buses	2010	8.4	4	5279	234	41	1742	624	23	2	93
Mopeds	1985	0.4	1	7	4929	77	4858	28	0	0	66

Continued

Mopeds	1986	0.3	1	6	4424	69	4359	25	0	0	59
Mopeds	1987	0.3	1	6	4095	64	4035	23	0	0	55
Mopeds	1988	0.3	1	5	3855	60	3793	22	0	0	52
Mopeds	1989	0.3	1	5	3660	57	3598	21	0	0	49
Mopeds	1990	0.3	1	5	3722	58	3660	21	0	0	50
Mopeds	1991	0.3	1	5	3820	60	3761	22	0	0	51
Mopeds	1992	0.3	1	5	3844	60	3784	22	0	0	52
Mopeds	1993	0.3	1	5	3806	60	3752	22	0	0	51
Mopeds	1994	0.3	1	5	3745	59	3689	21	0	0	50
Mopeds	1995	0.3	1	6	3992	62	3931	23	0	0	54
Mopeds	1996	0.3	1	6	4247	66	4186	24	0	0	57
Mopeds	1997	0.4	1	7	4614	72	4542	26	0	0	62
Mopeds	1998	0.4	1	7	4972	78	4900	28	0	0	67
Mopeds	1999	0.4	1	6	4519	71	4443	26	0	0	61
Mopeds	2000	0.3	1	6	3987	62	4021	24	0	0	55
Mopeds	2001	0.3	1	5	3046	48	3118	19	0	0	42
Mopeds	2002	0.3	1	5	2984	46	3115	19	0	0	42
Mopeds	2003	0.3	1	5	2841	44	2998	19	0	0	41
Mopeds	2004	0.2	1	9	2636	41	2774	18	0	0	38
Mopeds	2005	0.2	0	13	2445	38	2557	17	0	0	35
Mopeds	2006	0.2	0	17	2276	35	2367	16	0	0	33
Mopeds	2007	0.2	0	21	2128	33	2203	16	0	0	31
Mopeds	2008	0.2	0	24	1981	30	2046	15	0	0	29
Mopeds	2009	0.2	0	25	1801	27	1852	14	0	0	27
Mopeds	2010	0.2	0	26	1624	25	1669	13	0	0	24
Motorcycles	1985	0.4	1	71	628	67	6792	32	1	1	16
Motorcycles	1986	0.4	1	71	630	67	6799	32	1	1	16
Motorcycles	1987	0.4	1	69	614	65	6636	31	1	1	16
Motorcycles	1988	0.4	1	70	628	66	6722	32	1	1	16
Motorcycles	1989	0.4	1	69	620	65	6606	31	1	1	16
Motorcycles	1990	0.5	1	74	665	70	7099	33	1	1	17
Motorcycles	1991	0.5	1	76	681	72	7299	34	1	1	17
Motorcycles	1992	0.5	1	82	731	77	7818	37	1	1	19
Motorcycles	1993	0.5	1	87	765	81	8277	39	1	1	20
Motorcycles	1994	0.6	1	92	819	86	8783	41	1	1	21
Motorcycles	1995	0.6	1	93	821	86	8807	41	1	1	21

Continued

Motorcycles	1996	0,6	1	93	822	87	8876	42	1	1	21
Motorcycles	1997	0,6	1	97	868	91	9248	43	1	1	22
Motorcycles	1998	0,6	1	101	894	94	9595	45	1	1	23
Motorcycles	1999	0,6	1	103	915	95	9718	46	1	1	23
Motorcycles	2000	0,7	1	108	926	97	9873	48	1	1	24
Motorcycles	2001	0,7	2	111	930	97	9812	48	1	1	24
Motorcycles	2002	0,7	2	115	954	99	9901	50	1	1	24
Motorcycles	2003	0,7	2	117	957	98	9836	50	1	1	23
Motorcycles	2004	0,7	2	118	945	97	9511	50	1	1	23
Motorcycles	2005	0,7	0	123	971	97	9294	52	1	1	22
Motorcycles	2006	0,7	0	132	1022	99	9315	54	1	1	22
Motorcycles	2007	0,8	0	138	1055	100	9331	57	1	1	22
Motorcycles	2008	0,8	0	140	1060	101	9298	59	1	1	22
Motorcycles	2009	0,8	0	135	1001	95	8783	57	1	1	21
Motorcycles	2010	0,8	0	136	976	96	8780	57	1	1	20
Total	1985	111,2	11621	91119	78978	2281	565567	8165	267	61	4307
Total	1986	117,5	7862	96521	78883	2341	539748	8631	280	64	4659
Total	1987	117,7	7847	97055	78290	2357	515504	8642	280	64	4675
Total	1988	118,4	7857	98447	78014	2382	478371	8700	283	66	4589
Total	1989	119,7	5488	99900	76340	2375	446637	8795	285	66	4641
Total	1990	126,3	5767	105699	79934	2518	455048	9282	299	70	4867
Total	1991	132,0	5903	108255	82122	2605	472022	9697	318	183	5014
Total	1992	134,4	3820	106166	80556	2590	455058	9870	338	415	4817
Total	1993	136,1	1569	103124	77271	2544	440529	9995	352	635	4794
Total	1994	142,9	1669	102335	73332	2489	410153	10491	383	948	4887
Total	1995	144,2	1682	96825	68005	2359	387606	10588	405	1244	4671
Total	1996	146,6	1721	92346	63344	2245	374781	10766	426	1511	4451
Total	1997	149,5	1744	88420	58165	2147	337823	10978	446	1886	4023
Total	1998	152,0	1768	84227	52763	2047	314697	11167	451	2278	3666
Total	1999	154,0	1088	80661	46410	1919	278038	11312	455	2575	3348
Total	2000	152,5	352	75869	39079	1783	253738	11203	449	2764	3015
Total	2001	152,8	353	73599	35477	1664	242858	11223	445	2749	2787
Total	2002	154,5	357	70472	32024	1549	222559	11352	438	2696	2556
Total	2003	160,6	371	69474	29492	1465	212885	11806	442	2613	2502
Total	2004	164,8	381	67595	25642	1359	188134	12115	442	2517	2374
Total	2005	166,1	77	64224	23365	1237	179761	12214	428	2299	2287

Continued

Total	2006	171,3	79	62738	20509	1139	160030	12587	426	2130	2224
Total	2007	179,5	83	60801	18046	1025	142838	13187	434	1979	2126
Total	2008	176,0	81	53858	15951	869	129890	12937	417	1793	1868
Total	2009	165,5	76	46103	13751	723	113046	12154	386	1610	1594
Total	2010	165,6	76	44159	12514	644	105972	12108	385	1433	1513

Annex 9: COPERT IV:DEA statistics fuel use ratios and mileage adjustment factors

Sales			1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Fuel ratio	Gasoline	DEA:COPERT IV	1,03	0,98	1,02	1,08	1,11	1,13	1,11	1,09	1,10	1,11	1,09
	Diesel	DEA:COPERT IV	1,19	1,30	1,33	1,29	1,29	1,37	1,36	1,37	1,39	1,38	1,37
<i>Consumption</i>													
Fuel ratio	Gasoline	DEA:COPERT IV	1,07	1,08	1,07	1,08	1,09	1,10	1,10	1,10	1,11	1,12	1,14
	Diesel	DEA:COPERT IV	1,11	1,19	1,27	1,24	1,23	1,27	1,25	1,25	1,27	1,26	1,25
<i>Continued</i>													
Sales			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Fuel ratio	Gasoline	DEA:COPERT IV	1,11	1,10	1,11	1,11	1,09	1,08	1,07	1,08	1,07	1,08	1,06
	Diesel	DEA:COPERT IV	1,32	1,32	1,31	1,37	1,40	1,37	1,35	1,37	1,32	1,27	1,29
<i>Consumption</i>													
Fuel ratio	Gasoline	DEA:COPERT IV	1,16	1,14	1,14	1,13	1,11	1,10	1,09	1,08	1,07	1,09	1,08
	Diesel	DEA:COPERT IV	1,22	1,23	1,21	1,23	1,25	1,24	1,23	1,23	1,19	1,15	1,18

Annex 10: Actual vs. representative aircraft types, no. of LTO's from Danish airports, no. of flights between Denmark and Greenland/Faroe Islands, LTO and average cruise fuel consumption and emission factors

Correspondence table between actual aircraft type codes and representative aircraft types

ICAO code	Representative aircraft	Type	ICAO code	Representative aircraft	Type	ICAO code	Representative aircraft	Type
B73	B737 400	L2J	BN2T	Cessna 208 Caravan	L2T	H60	S61	H2T
739	B737 400	L2J	BSTP	S61	H2T	HA4T	RJ 100	L2J
7474	B737 400	L2J	C10T	Cessna 208 Caravan	L1T	HEL	Shorts 360 300	
757	B757	L2J	C130	Lockheed C-130H Hercules	L4T	HF20	RJ 100	L2J
A109	S61	H2T	C141	DC10-30	L4J	HR16	F50	L2T
A124	B747 400	L4J	C160	F50	L2T	HS25	RJ 100	L2J
A139	S61	H2T	C17	A340	L4J	HS74	F50	L2T
A300	A310	L2J	C17C	A340	L4J	HTA0	BAe Jetstream 31	L2T
A304	A310	L2J	C208	Cessna 208 Caravan	L1T	HU30	S61	H1P
A306	A310	L2J	C20A	Shorts 360 300	L2T	HU50	Shorts 360 300	L2T
A30B	A310	L2J	C212	Shorts 360 300	L2T	IL18	Lockheed P- Orion	L4T
A310	A310	L2J	C25A	RJ 100	L2J	IL62	B767 300 ER	L4J
A318	A320	L2J	C25B	RJ 100	L2J	IL76	B767 300 ER	L4J
A319	A320	L2J	C27J	Dash8 400	L2T	IL86	A340	L4J
A320	A320	L2J	C30J	Lockheed C-130H Hercules	L4T	IL96	A340	L4J
A321	A320	L2J	C406	Shorts 360 300	L2T	J32	BAe Jetstream 31	L2T
A322	A320	L2J	C425	Reims F406 Caravan II	L2T	J328	RJ 100	L2J
A330	A330	L2J	C441	Reims F406 Caravan II	L2T	JET	RJ 100	
A332	A330	L2J	C5	DC10-30	L4J	JS20	BAe Jetstream 31	L2T
A333	A330	L2J	C500	RJ 100	L2J	JS31	BAe Jetstream 31	L2T
A340	A340	L4J	C501	RJ 100	L2J	JS32	BAe Jetstream 31	L2T
A343	A340	L4J	C510	RJ 100	L2J	JS41	BAe Jetstream 41	L2T
A550	S61	H1P	C525	RJ 100	L2J	JSTA	Shorts 360 300	L2T
A748	Shorts 360 300	L2T	C550	RJ 100	L2J	JSTB	Shorts 360 300	L2T
AB30	A310	L2J	C551	RJ 100	L2J	KA27	S61 De Havilland DHC-3 Turbo-Otter	H2T
AC14	Shorts 360 300	L2T	C560	RJ 100	L2J	KODI		L1T
AC6T	Shorts 360 300	L2T	C56X	RJ 100	L2J	L101	DC10-30	L3J
AC90	Shorts 360 300	L2T	C650	RJ 100	L2J	L188	Dash8 400	L4T
AC95	Shorts 360 300	L2T	C680	RJ 100	L2J	L29A	BAe146	L4J
AL03	S61	H1T	C750	RJ 100	L2J	L29B	BAe146	L4J
AN12	Dash8 400 Lockheed C-130H Hercules	L4T	CL3	RJ 100	L2J	L329	BAe146	L4J
AN22		L4T	CL30	RJ 100	L2J	L382	Shorts 360 300	L2T
AN24	F50	L2T	CL60	RJ 100	L2J	LJ24	RJ 100	L2J
AN26	Antonov 26	L2T	CL65	RJ 100	L2J	LJ25	RJ 100	L2J
AN28	Shorts 360 300	L2T	CN35	F50	L2T	LJ31	RJ 100	L2J
AN30	Antonov 26	L2T	CRJ	RJ 100	L2J	LJ35	RJ 100	L2J
AN32	Antonov 26	L2T	CRJ1	RJ 100	L2J	LJ36	RJ 100	L2J
AN7	BAC1-11	L2J	CRJ2	RJ 100	L2J	LJ40	RJ 100	L2J
AN72	BAC1-11	L2J	CRJ7	RJ 100	L2J	LJ45	RJ 100	L2J
AN74	BAC1-11	L2J	CRJ9	CRJ9	L2J	LJ55	RJ 100	L2J
ANF	Dash8 400	L4T	CV44	Dash8 400	L2T	LJ60	RJ 100	L2J
APF	ATR 42-320	L2T	CV58	Dash8 400	L2T	LR24	RJ 100	L2J
AS32	S61	H2T	CVLT	Dash8 400	L2T	LR25	RJ 100	L2J
AS35	S61	H1T	D228	Dornier 328-110	L2T	LR31	RJ 100	L2J
AS50	S61	H1T	D328	Shorts 360 300	L2T	LR35	RJ 100	L2J
AS55	S61	H2T	DA10	RJ 100	L2J	LR36	RJ 100	L2J
AS65	S61	H2T	DA20	RJ 100	L2J	LR55	RJ 100	L2J

ASJ	Shorts 360 300	L2T	DA30	RJ 100	L2J	LR60	RJ 100	L2J
ASTR	RJ 100	L2J	DA50	RJ 100	L3J	LYNX	S61	H2T
AT42	ATR 42-320	L2T	DA90	RJ 100	L3J	M20K	Shorts 360 300	L2T
AT43	ATR 42-320	L2T	DC10	DC10-30	L3J	M7T	Cessna 208 Caravan	L1T
AT44	ATR 42-320	L2T	DC8	B767 300 ER	L2J	MD11	DC10-30	L3J
AT45	ATR 42-320	L2T	DC85	B767 300 ER	L4J	MD52	S61	H1T
AT5	ATR 42-320	L2T	DC86	B767 300 ER	L4J	MD80	MD 82	L2J
AT72	ATR 72-200	L2T	DC87	B767 300 ER	L4J	MD81	MD 82	L2J
ATP	S2000	L2T	DC8F	B767 300 ER	L2J	MD82	MD 82	L2J
ATR	ATR 42-320	L2T	DC8S	B767 300 ER	L4J	MD83	MD 82	L2J
ATR4	ATR 42-320	L2T	DC9	DC9	L2J	MD87	MD 82	L2J
ATR7	ATR 72-200	L2T	DC93	RJ 100	L2J	MD88	MD 82	L2J
AVRO	BAe146	L4J	DC94	DC9	L2J	MD90	B737 400	L2J
AW13	S61	H2T	DC95	DC9	L2J	MI14	S61	H2T
B06	S61	H1T	DF2	RJ 100	L2J	MI2	S61	H2T
B105	S61	H2T	DH 7	DHC7 De Havilland DHC-3 Turbo- Otter	L2T	MI8	S61	H2T
B12	S61	H2T	DH2T		L1T	MU2	Shorts 360 300	L2T
B190	Beech 1900C Airliner	L2T	DH4	Dash8 400	L2T	MU20	Shorts 360 300	L2T
B200	Shorts 360 300	L2T	DH6	Shorts 360 300	L2T	MU30	RJ 100	L2J
B206	S61	H1T	DH7	DHC7	L2T	N24A	Shorts 360 300	L2T
B212	S61	H2T	DH8	Dash8 400	L2T	N262	Shorts 360 300	L2T
B222	S61	H2T	DH8A	Dash8 400	L2T	ND26	Shorts 360 300	L2T
B321	A320	L2J	DH8C	Dash8 400	L2T	NH90	S61	L1P
B350	Beech Super King Air 350	L2T	DH8D	Dash8 400	L2T	NOMA	Shorts 360 300	L2T
B378	B737 400	L2J	DHC6	Shorts 360 300	L2T	OTH	F50	L2T
B407	S61	H1T	DHC8	Dash8 400	L2T	P180	Embraer 110P2A	L2T
B412	S61	H2T	E110	Embraer 110P2A	L2T	P46T	Cessna 208 Caravan	L1T
B429	S61	H2T	E120	Shorts 360 300	L2T	P750	Cessna 208 Caravan	L1T
B430	S61	H2T	E121	Embraer 110P2A	L2T	PA42	Reims F406 Caravan II	L2T
B461	BAe146	L4J	E135	RJ 100	L2J	PA60	Cessna 208 Caravan	L2T
B462	BAe146	L4J	E145	RJ 100	L2J	PAT4	Shorts 360 300	L2T
B463	BAe146	L4J	E170	CRJ9	L2J	PAY1	Reims F406 Caravan II	L2T
B46C	BAe146	L4J	E175	CRJ9	L2J	PAY2	Reims F406 Caravan II	L2T
B703	B757	L4J	E19	B737 100	L2J	PAY3	Reims F406 Caravan II	L2T
B707	B757	L2J	E190	B737 100	L2J	PAY4	Shorts 360 300	L2T
B712	B737 100	L2J	E195	B737 100	L2J	PAZT	Shorts 360 300	L2T
B717	DC9	L2J	E70	CRJ9	L2J	PC12	Cessna 208 Caravan	L1T
B720	B757	L4J	E90	B737 100	L2J	PC7	Cessna 208 Caravan	L1T
B721	B727	L3J	EA19	A320	L2J	PC9	Cessna 208 Caravan	L1T
B722	B727	L3J	EA30	A310	L2J	PRM1	RJ 100	L2J
B727	B727	L2J	EA31	A310	L2J	PUMA	S61	H2T
B72S	B727	L3J	EA32	A320	L2J	R22	S61	H1P
B732	B737 400	L2J	EA33	A330	L2J	R44	S61	H1P
B733	B737 400	L2J	EA34	A340	L4J	RH22	Shorts 360 300	L2T
B734	B737 400	L2J	EA50	RJ 100	L2J	RH44	S61	H1P
B735	B737 400	L2J	EC12	S61	H1P	RJ1H	BAe146	L4J
B736	B737 400	L2J	EC20	S61	H1T	RJ70	RJ 100	L4J
B737	B737 400	L2J	EC25	S61	H2T	RJ85	RJ 100	L4J
B738	B737 400	L2J	EC30	S61	H1T	S210	DC9	L2J
B739	B737 400	L2J	EC35	S61	H2T	S269	S61	H1P
B73A	B737 100	L2J	EC45	S61	H2T	S330	S61	H1T
B7	B737 400	L2J	EC55	S61	H2T	S350	F50	L2T
B73C	B737 400	L2J	EH10	S61	H3T	S355	S61	H1T
B73E	B737 400	L2J	EMB	Shorts 360 300	L2T	S365	S61	H1T

B73G	B737 400	L2J	EN28	S61	H1P	S601	RJ 100	L2J
B73S	B737 400	L2J	ER3	RJ 100	L2J	S61	S61	H2T
B741	B747 100-300	L4J	EXPL	S61	H2T	S65C	S61	H2T
B742	B747 100-300	L4J	F100	F100	L2J	S76	S61	H2T
B743	B747 100-300	L4J	F26T	Cessna 208 Caravan	L1T	S893	Shorts 360 300	L2T
B744	B747 400	L4J	F27	Fokker 27 Friendship	L2T	S92	S61	H2T
B747	B747 400	L4J	F28	F28	L2T	SA22	Shorts 360 300	L2T
B74A	B747 400	L4J	F2TH	RJ 100	L2J	SB05	RJ 100	L2J
B74B	B747 400	L4J	F406	Reims F406 Caravan II	L2T	SB20	S2000	L2T
B74D	B747 400	L4J	F50	F50	L2T	SBR1	RJ 100	L2J
B74F	B747 400	L4J	F70	F28	L2T	SC7	Shorts SC.7 Srs3M-200	L2T
B74S	B747 100-300	L4J	F71	F28	L2J	SF34	Saab 340B	L2T
B752	B757	L2J	F900	RJ 100	L3J	SH33	Shorts 330	L2T
B757	B757	L2J	FA10	RJ 100	L2J	SH36	Shorts 360 300	L2T
B762	B767 300 ER	L2J	FA20	RJ 100	L2J	SH60	S61	H2T
B763	B767 300 ER	L2J	FA50	RJ 100	L3J	SH7	Shorts 360 300	L2T
B764	B767 300 ER	L2J	FA7X	RJ 100	L3J	SK61	S61	H2T
B767	B767 300 ER	L2J	FK10	F100	L2J	SK76	S61	H2T
B772	B777	L2J	FK27	F50	L2T	STAR	Shorts 360 300	L2T
B773	B777	L2J	FK28	F28	L2J	SW2	Swearingen Metro III	L2T
B777	B777	L2J	FK50	F50	L2T	SW3	Swearingen Metro III	L2T
BA11	BAC1-11	L2J	FK70	F28	L2J	SW4	Swearingen Metro III	L2T
BA14	BAe146	L4J	FOUG	RJ 100	L2J	SW4A	S61	H1T
BA31	Shorts 360 300	L2T	G159	Shorts 360 300	L2T	SW4B	S61	H1T
BA32	Shorts 360 300	L2T	G2	Shorts 360 300	L2T	T134	F100	L2J
BA41	Shorts 360 300	L2T	G222	F28	L2T	T154	B727	L3J
BA46	BAe146	L4J	G3	F50	L2T	T204	B757	L2J
BAE1	BAe146	L4J	G4	CRJ9	L2J	TB21	Shorts 360 300	L2T
BATP	F50	L2T	GALX	RJ 100	L2J	TB9	Shorts 360 300	L2T
BE02	Shorts 360 300 Beech Super King Air	L2T	GAZL	S61	H1T	TBM7	Cessna 208 Caravan	L1T
BE10	200B Beech Super King Air	L2T	GIV	CRJ9	L2J	TBM8	Cessna 208 Caravan	L1T
BE20	200B	L2T	GLEX	RJ 100	L2J	TEX2	Cessna 208 Caravan	L1T
BE30	Beech Super King Air 350	L2T	GLF2	RJ 100	L2J	TOR	RJ 100	L2J
BE40	RJ 100 Beech Super King Air	L2J	GLF3	RJ 100	L2J	TU34	F100	L2J
BE90	200B Beech Super King Air	L2T	GLF4	RJ 100	L2J	TU54	B757	L2J
BE99	200B	L2T	GLF5	RJ 100	L2J	UH1	S61	H1T
BE9L	Reims F406 Caravan II	L2T	GULF	F50	L2T	VC10	B757	L4J
BE9T	Reims F406 Caravan II	L2T	H25A	RJ 100	L2J	VF14	RJ 100	L2J
BH06	S61	H1T	H25B	RJ 100	L2J	W3	S61	H2T
BH12	S61	H1T	H25C	RJ 100	L2J	WW24	RJ 100	L2J
BH21	S61	H1T	H269	S61	H1P	WW25	F50	L2T
BH41	S61	H1T	H36	S61	H1P	Y12	Shorts 360 300	L2T
BK17	S61	H2T	H46	S61	H2T	YK40	RJ 100	L3J
BN2	Shorts 360 300	L2T	H500	S61	H1T	YK42	DC9	L3J

LTO no. per representative aircraft type for domestic and int. flights (Copenhagen and other airports)

Flight	Airport name	Rep Aircraft	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Domestic	Copenhagen	A310	37	1	1	3	1	1	1	1	1	1
Domestic	Copenhagen	A320	71	83	110	77	115	237	263	554	536	497
Domestic	Copenhagen	A330	4	28	213	228	228	228	232	211	225	223
Domestic	Copenhagen	A340	7	3	5	1				1		
Domestic	Copenhagen	Antonov 26				91	284	246	253	253	249	63
Domestic	Copenhagen	ATR 42-320	4494	5333	4951	2933	804	3320	3393	3820	2455	2925
Domestic	Copenhagen	ATR 72-200	2358	2783	4495	5218	6664	5775	5449	7005	5697	6763
Domestic	Copenhagen	B727			1							
Domestic	Copenhagen	B737 400	2264	1722	2212	959	514	549	1258	1376	2240	3521
Domestic	Copenhagen	B747 400					1		1			1
Domestic	Copenhagen	B757	227	264	152	146	100	101	141	154	112	85
Domestic	Copenhagen	B767 300 ER	206	182	24	1			1	24	15	1
Domestic	Copenhagen	BAe146	491	532	581	665	1034	1286	1078	1171	1032	934
Domestic	Copenhagen	Beech Super King Air 200B	3	12	5	9	8	7	2	5	7	10
Domestic	Copenhagen	Cessna 208 Caravan				1		2	1	1		
Domestic	Copenhagen	CRJ9	2	3	2	3	1	1		65	1890	2792
Domestic	Copenhagen	Dash8 400	2016	3849	4188	8107	6686	4152	2462		1	1
Domestic	Copenhagen	DC10-30				1		1				
Domestic	Copenhagen	DC9	113	5								
Domestic	Copenhagen	Dornier 328-110						1				
Domestic	Copenhagen	F100					1		39	10		
Domestic	Copenhagen	F28									2	
Domestic	Copenhagen	F50	292	167	20	3	7	1	54	74		
Domestic	Copenhagen	MD 82	4498	3131	1571	469	1345	1783	2686	2974	2130	1161
Domestic	Copenhagen	Reims F406 Caravan II	2	2	8	11	6	3	1	1	1	
Domestic	Copenhagen	RJ 100	2318	1048	325	327	560	882	1674	1802	1531	1472
Domestic	Copenhagen	S2000	19	10								
Domestic	Copenhagen	S61		1	1	8	3	3	3		4	15
Domestic	Copenhagen	Shorts 330		7								
Domestic	Copenhagen	Shorts 360 300	948	525	471	378	431	453	19	8	13	7
Domestic	Copenhagen	Swearingen Metro III	29	27	29	14	13	19	31	10	6	15
Domestic	Copenhagen	Saab 340B		6	4		16		15	93	372	313
Flight	Airport name	Rep Aircraft	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
International	Copenhagen	A310	2488	1900	1179	1081	1142	1318	1181	1164	747	614
International	Copenhagen	A320	3895	7851	11850	17052	16184	18835	21042	24157	22594	24778
International	Copenhagen	A330	363	306	692	804	783	884	854	818	803	841
International	Copenhagen	A340	456	1807	1845	2049	2028	1939	1752	1756	1488	1436
International	Copenhagen	Antonov 26	702	516	517	521	552	549	592	542	416	269
International	Copenhagen	ATR 42-320	2817	1097	1226	666	312	196	1020	821	1160	802
International	Copenhagen	ATR 72-200		1311	1059	1235	791	571	461	434	651	291
International	Copenhagen	B727	2051	1143	109	2	1	1	1		4	1
International	Copenhagen	B737 100						4	219	288	345	448
International	Copenhagen	B737 400	29665	25656	27987	25883	24782	19369	20690	25053	22285	25416
International	Copenhagen	B747 400	718	556	612	726	900	1084	1055	970	922	872
International	Copenhagen	B757	1701	2062	2285	2189	2011	2082	2625	2228	1867	1840
International	Copenhagen	B767 300 ER	3026	1103	546	91	151	285	414	678	639	731
International	Copenhagen	B777	40	266	150	157	168	171	242	264	267	394
International	Copenhagen	BAC1-11	1	1	5		5	4	3	5	1	1
International	Copenhagen	BAe146	4510	5849	5131	3878	4540	4098	3723	7660	3202	2280

International	Copenhagen	Beech Super King Air 200B	13	12	16	16	48	37	60	37	37	30
International	Copenhagen	Cessna 208 Caravan	6	1		1	4	5	6	10	1	3
International	Copenhagen	CRJ9	56	48	43	70	443	1054	1398	1451	7235	12981
International	Copenhagen	Dash8 400	8122	10809	13457	14213	13972	14831	11580	630	1620	2071
International	Copenhagen	DC10-30	147	51	154	157	151	69	131	158	148	28
International	Copenhagen	DC9	5424	277	91	6	15	3	10	2	27	3
International	Copenhagen	Dornier 328-110		3	6	9		1		1	2	1
International	Copenhagen	F100	625	464	6	307	666	664	750	1250	626	447
International	Copenhagen	F28	1433	832	716	727	554	648	390	539	430	128
International	Copenhagen	F50	6511	3335	6075	5107	4292	3268	2901	2634	794	679
International	Copenhagen	MD 82	32740	32219	23211	28009	28432	26979	24648	22120	15547	11841
International	Copenhagen	Reims F406 Caravan II	6	19	16	12	23	17	24	19	8	8
International	Copenhagen	RJ 100	5925	6637	7266	8647	8941	9060	9934	13795	12301	9836
International	Copenhagen	S2000		386	1029	346	496	1426	331	33	2	4
International	Copenhagen	S61	3541	3121	3	1	1	2	3	1	4	
International	Copenhagen	Shorts 330		125		1						
International	Copenhagen	Shorts 360 300	545	89	154	137	280	63	73	224	201	157
International	Copenhagen	Swearingen Metro III	723	963	943	453	459	462	488	468	453	181
International	Copenhagen	Saab 340B	71	801	1145	1670	509	21	265	695	843	1303
Flight	Airport name	Rep Aircraft	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Domestic	Other airports	A310		31	3		6		1			
Domestic	Other airports	A320		115	126	98	38	156	357	342	573	552
Domestic	Other airports	A330		9	5	2	7	4		2	1	3
Domestic	Other airports	A340		6	2	1		1				
Domestic	Other airports	Antonov 26			1		83	274	249	254	252	252
Domestic	Other airports	ATR 42-320	3182	4143	5143	3189	1773	3966	3714	3875	2579	3289
Domestic	Other airports	ATR 72-200	2342	2751	4629	5446	7368	5649	5324	6082	5506	6103
Domestic	Other airports	B727						1			1	
Domestic	Other airports	B737 400	2754	1755	2236	798	505	501	1295	1443	2246	3500
Domestic	Other airports	B747 400			1							
Domestic	Other airports	B757		46	41	50	43	16	17	21	9	4
Domestic	Other airports	B767 300 ER		3	6	7		1		3	19	19
Domestic	Other airports	BAe Jetstream 31	249	328	349	331	626	699	582	331	147	89
Domestic	Other airports	BAe Jetstream 41		46	67	43	49	7		1		
Domestic	Other airports	BAe146		46	60	62	100	231	261	259	281	173
Domestic	Other airports	Beech 1900C Airliner	135	370	668	928	651	35	5	3	1	
Domestic	Other airports	Beech Super King Air 200B	194	155	245	241	218	231	153	118	80	66
Domestic	Other airports	Beech Super King Air 350	18	2	6	7	3	1	86	46	11	9
Domestic	Other airports	Cessna 208 Caravan	11	24	58	86	98	155	101	129	104	75
Domestic	Other airports	CRJ9							49	1899	2792	
Domestic	Other airports	Dash8 400	2038	3828	4192	8105	6705	4157	2462			
Domestic	Other airports	DC10-30					3					
Domestic	Other airports	DC9	113	6								
Domestic	Other airports	De Havilland DHC-3 Turbo-Otter					1	2				
Domestic	Other airports	Dornier 328-110					2		1	1		
Domestic	Other airports	Embraer 110P2A	132	118	455	371	457	638	20	47	30	36
Domestic	Other airports	F100							37	1		
Domestic	Other airports	F50	140	183	9	2	2	1	53	69	4	1
Domestic	Other airports	Fokker 27 Friendship	63	1			1	3		8		
Domestic	Other airports	Lockheed C-130H Hercules	17	12	13	46	54	27	46	38	44	69
Domestic	Other airports	MD 82	4505	3140	1567	454	1358	1782	2692	3033	2155	1265

Domestic	Other airports	Reims F406 Caravan II	264	298	262	159	134	68	109	71	53	21
Domestic	Other airports	RJ 100	3160	2387	1930	1618	1107	1639	2718	2754	2403	2235
Domestic	Other airports	S2000	93	91	86	41	26	18	2	1		
Domestic	Other airports	S61	220	3018	4452	4432	4209	4760	5451	4744	4995	4562
Domestic	Other airports	Shorts 330	7									
Domestic	Other airports	Shorts 360 300	389	207	144	63	145	131	317	465	530	266
Domestic	Other airports	Shorts SC.7 Srs3M-200	173			1		6	4			
Domestic	Other airports	Swearingen Metro III	135	155	263	97	124	211	172	89	93	67
Domestic	Other airports	Saab 340B	510	389		401	892	925	1015	973	888	
Flight	Airport name	Rep Aircraft	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
International	Other airports	A310	151	19	28	20	9	12	13	4	1	2
International	Other airports	A320	937	1004	834	849	924	1192	1090	1156	1038	1307
International	Other airports	A330	60	11	3	13	3	7	10	5	2	13
International	Other airports	A340				2	3					
International	Other airports	Antonov 26	2	2		2	12	11	42	17	18	11
International	Other airports	ATR 42-320	161	242	403	527	1122	715	463	122	109	415
International	Other airports	ATR 72-200	15	45	82	46	140	264	363	458	431	451
International	Other airports	B727	82	90	77	26	26	46	1			
International	Other airports	B737 100	6					7	2		2	252
International	Other airports	B737 400	6906	6492	6680	6839	6734	4575	5592	6866	6179	7698
International	Other airports	B747 100-300		1		2	10		1		2	5
International	Other airports	B747 400	2	7	10	16	10	5	15	8	8	6
International	Other airports	B757	107	137	188	150	79	114	88	64	70	266
International	Other airports	B767 300 ER	48	71	55	69	37	15	19	39	52	51
International	Other airports	BAC1-11		1	2	2	2	1				
International	Other airports	BAe Jetstream 31	1885	1802	2124	2718	2298	1811	1099	792	876	757
International	Other airports	BAe Jetstream 41	739	905	983	689	118	2		5	2	3
International	Other airports	BAe146	284	229	414	229	335	538	506	974	979	225
International	Other airports	Beech 1900C Airliner	92	1083	579	548	441	32	8	7	6	4
International	Other airports	Beech Super King Air 200B	89	123	281	288	339	404	349	361	231	203
International	Other airports	Beech Super King Air 350	162	28	26	22	34	22	30	38	36	52
International	Other airports	Cessna 208 Caravan	27	33	164	201	208	227	202	391	360	180
International	Other airports	CRJ9						443	874	261		1
International	Other airports	Dash8 400	19	147	498	68	97	62	38	31	43	78
International	Other airports	DC10-30		1	1	1	6	3		1		1
International	Other airports	DC9		1	3	6			2			
International	Other airports	De Havilland DHC-3 Turbo-Otter			5	2	2		3			
International	Other airports	Dornier 328-110	1	3	7	6	7	9	12	8	26	10
International	Other airports	Embraer 110P2A	43	24	127	23	18	68	46	94	78	83
International	Other airports	F100	10		1	2	3	751	838	150	64	62
International	Other airports	F28						7	254	257	228	261
International	Other airports	F50	241	164	59	2	7	38	5	44	300	48
International	Other airports	Fokker 27 Friendship	551	359	4	1	10	150	5	3	1	
International	Other airports	Lockheed C-130H Hercules	4	1	4	4	7	13	8	5	6	3
International	Other airports	MD 82	141	168	140	227	461	513	979	963	704	411
International	Other airports	Reims F406 Caravan II	195	410	394	267	268	197	254	131	94	45
International	Other airports	RJ 100	2740	3047	4544	5980	4083	4827	5706	6999	5866	7296
International	Other airports	S2000	430	472	651	760	811	101	10	14	3	31
International	Other airports	S61	33	55	108	120	106	163	168	136	104	95
International	Other airports	Shorts 330	12									
International	Other airports	Shorts 360 300	564	538	127	78	1680	2894	3074	2264	2044	1592

International	Other airports	Shorts SC.7 Srs3M-200		5	4	5	7	1	3		
International	Other airports	Swearingen Metro III	290	309	328	290	374	453	481	427	249
International	Other airports	Saab 340B	6	56	112	11	222	713	637	790	407

No. of flights per representative aircraft type and flying distance between Danish airports and airports in Greenland/Faroe Islands

Area	Destination	Airport name	Distance NM	Rep Aircraft	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Greenland	Narsarsuaq	Copenhagen	1797	B737 400	2	9	10	7	4	5		5	1	
Greenland	Narsarsuaq	Copenhagen	1797	B757	68	73	65	63	61	66	77	72	50	39
Greenland	Narsarsuaq	Copenhagen	1797	F50				1						
Greenland	Narsarsuaq	Copenhagen	1797	MD 82	4									
Greenland	Narsarsuaq	Copenhagen	1797	RJ 100					1	1	1			1
Greenland	Narsarsuaq	Roskilde	1783	Lockheed C-130H Hercules										1
Greenland	Narsarsuaq	Roskilde	1783	RJ 100								1		
Greenland	Narsarsuaq	Sønderborg	1739	RJ 100										1
Greenland	Narsarsuaq	Aalborg	1671	A320					1					
Greenland	Narsarsuaq	Aalborg	1671	B737 400					1	5	12	12	2	
Greenland	Narsarsuaq	Aalborg	1671	B757			1	7	6	8	2			
Greenland	Narsarsuaq	Aalborg	1671	MD 82								2	11	
Greenland	Narsarsuaq	Aalborg	1671	RJ 100					1					
Greenland	Narsarsuaq	Aarhus	1717	RJ 100	1									
Greenland	Søndre Strømfjord	Billund	1767	B737 400										1
Greenland	Søndre Strømfjord	Billund	1767	MD 82										1
Greenland	Søndre Strømfjord	Billund	1767	RJ 100	1	1				1				
Greenland	Søndre Strømfjord	Copenhagen	1853	A310									1	
Greenland	Søndre Strømfjord	Copenhagen	1853	A320							47	44		
Greenland	Søndre Strømfjord	Copenhagen	1853	A330		25	209	207	212	212	219	196	222	219
Greenland	Søndre Strømfjord	Copenhagen	1853	A340			1						1	
Greenland	Søndre Strømfjord	Copenhagen	1853	B737 400	1	12		1						
Greenland	Søndre Strømfjord	Copenhagen	1853	B757	112	136	22	30	30	26	51	77	57	45
Greenland	Søndre Strømfjord	Copenhagen	1853	B767 300 ER	191	167	8					8	1	
Greenland	Søndre Strømfjord	Copenhagen	1853	DC10-30					1					
Greenland	Søndre Strømfjord	Copenhagen	1853	MD 82									1	
Greenland	Søndre Strømfjord	Copenhagen	1853	RJ 100		2	1	1	3	1	4	2	2	
Greenland	Søndre Strømfjord	Copenhagen	1853	Shorts 360 300								1		
Greenland	Søndre Strømfjord	Roskilde	1842	F50								1		
Greenland	Søndre Strømfjord	Roskilde	1842	Lockheed C-130H Hercules							1		1	
Greenland	Søndre Strømfjord	Roskilde	1842	RJ 100				1					1	
Greenland	Søndre Strømfjord	Sønderborg	1816	RJ 100		13	6	6	4	1	13	11	13	
Greenland	Søndre Strømfjord	Aalborg	1725	B737 400					1					
Greenland	Søndre Strømfjord	Aalborg	1725	RJ 100								4		
Greenland	Thule	Copenhagen	2084	A330				12	13	13	12	12		

LTO fuel consumption and emission factors per representative aircraft type for Copenhagen Airport and other airports.

Origin	Representative aircraft	Fuel kg_LTO	Fuel GJ_LTO	SO2 kg_LTO	NOx kg_LTO	VOC kg_LTO	NMVOC kg_LTO	CH4 kg_LTO	CO kg_LTO	CO2 tons_LTO	N2O kg_LTO	TSP kg_LTO
Copenhagen	A310	1200,971	52,242	1,201	21,747	2,417	2,185	0,242	11,518	3,761	0,100	0,070
Copenhagen	A320	609,300	26,505	0,609	9,940	1,595	1,442	0,160	11,029	1,908	0,100	0,070
Copenhagen	A330	1727,520	75,147	1,728	33,754	0,974	0,881	0,097	9,860	5,411	0,100	0,070
Copenhagen	A340	1573,488	68,447	1,573	33,462	8,487	7,672	0,849	22,757	4,928	0,100	0,070
Copenhagen	Antonov 26	143,310	6,234	0,143	0,202	7,559	6,833	0,756	10,907	0,449	0,100	0,070
Copenhagen	ATR 42-320	120,720	5,251	0,121	1,056	0,000	0,000	0,000	0,926	0,378	0,100	0,070
Copenhagen	ATR 72-200	144,130	6,270	0,144	1,514	0,000	0,000	0,000	0,775	0,451	0,100	0,070
Copenhagen	B727	1028,975	44,760	1,029	11,222	3,366	3,043	0,337	12,941	3,223	0,100	0,070
Copenhagen	B737 100	669,320	29,115	0,669	7,107	0,340	0,307	0,034	2,456	2,096	0,100	0,070
Copenhagen	B737 400	613,619	26,692	0,614	7,350	0,296	0,268	0,030	5,455	1,922	0,100	0,070
Copenhagen	B747 100-300	2603,373	113,247	2,603	53,265	16,181	14,627	1,618	34,464	8,154	0,100	0,070
Copenhagen	B747 400	2638,978	114,796	2,639	52,985	1,170	1,058	0,117	9,011	8,265	0,100	0,070
Copenhagen	B757	957,844	41,666	0,958	18,518	0,566	0,511	0,057	5,729	3,000	0,100	0,070
Copenhagen	B767 300 ER	1270,887	55,284	1,271	24,567	0,448	0,405	0,045	3,019	3,980	0,100	0,070
Copenhagen	B777	2022,840	87,994	2,023	50,760	10,356	9,362	1,036	27,738	6,336	0,100	0,070
Copenhagen	BAC1-11	474,566	20,644	0,475	4,466	9,648	8,722	0,965	17,460	1,486	0,100	0,070
Copenhagen	BAe Jetstream 31	47,110	2,049	0,047	0,381	0,048	0,044	0,005	0,551	0,148	0,100	0,070
Copenhagen	BAe Jetstream 41	64,920	2,824	0,065	0,483	0,096	0,087	0,010	0,884	0,203	0,100	0,070
Copenhagen	BAe146	422,117	18,362	0,422	3,590	0,528	0,477	0,053	4,714	1,322	0,100	0,070
Copenhagen	Beech 1900C Airliner	62,630	2,724	0,063	0,262	0,677	0,612	0,068	2,366	0,196	0,100	0,070
Copenhagen	Beech Super King Air 200B	54,170	2,356	0,054	0,251	0,140	0,127	0,014	0,814	0,170	0,100	0,070
Copenhagen	Beech Super King Air 350	60,770	2,643	0,061	0,252	0,251	0,227	0,025	2,001	0,190	0,100	0,070
Copenhagen	Cessna 208 Caravan	29,710	1,292	0,030	0,158	0,028	0,025	0,003	0,306	0,093	0,100	0,070
Copenhagen	CRJ9	365,221	15,887	0,365	3,877	0,020	0,018	0,002	2,028	1,144	0,100	0,070
Copenhagen	Dash8 400	124,022	5,395	0,124	0,884	0,605	0,547	0,061	1,432	0,388	0,100	0,070
Copenhagen	DC10-30	1836,099	79,870	1,836	39,603	10,300	9,311	1,030	27,670	5,751	0,100	0,070
Copenhagen	DC9	634,784	27,613	0,635	6,463	0,422	0,381	0,042	2,698	1,988	0,100	0,070
Copenhagen	De Havilland Dash 7	146,920	6,391	0,147	0,781	0,206	0,186	0,021	1,600	0,460	0,100	0,070
Copenhagen	De Havilland DHC-3 Turbo-Otter	32,400	1,409	0,032	0,177	0,018	0,016	0,002	0,284	0,101	0,100	0,070
Copenhagen	Dornier 328-110	130,990	5,698	0,131	1,246	0,000	0,000	0,000	0,757	0,410	0,100	0,070
Copenhagen	Embraer 110P2A	50,490	2,196	0,050	0,284	0,026	0,024	0,003	0,400	0,158	0,100	0,070
Copenhagen	F100	532,667	23,171	0,533	5,442	0,719	0,650	0,072	6,527	1,668	0,100	0,070
Copenhagen	F28	468,141	20,364	0,468	4,669	14,505	13,113	1,451	15,260	1,466	0,100	0,070
Copenhagen	F50	130,370	5,671	0,130	1,293	0,000	0,000	0,000	0,777	0,408	0,100	0,070
Copenhagen	Fokker 27 Friendship	169,480	7,372	0,169	0,346	1,862	1,684	0,186	8,035	0,531	0,100	0,070

Copenhagen	Lockheed C-130H Hercules	287,800	12,519	0.288	1,975	0.945	0.855	0.095	2,021	0.901	0.100	0.070
Copenhagen	Lockheed P- Orion	265,340	11,542	0.265	1,792	0.907	0.820	0.091	1,926	0.831	0.100	0.070
Copenhagen	MD 82	758,573	32,998	0.759	11,365	1,065	0.963	0.106	3,433	2,376	0.100	0.070
Copenhagen	Reims F406 Caravan II	42,010	1,827	0.042	0,216	0.040	0.036	0,004	0,475	0,132	0,100	0,070
Copenhagen	RJ 100	161,020	7,004	0.161	1,122	0.236	0.214	0.024	2,542	0.504	0.100	0.070
Copenhagen	S2000	103,169	4,488	0.103	0,593	0.038	0.034	0,004	0,734	0,323	0,100	0,070
Copenhagen	S61	48,676	2,117	0.049	0,385	0.028	0.025	0,003	0,378	0,152	0,100	0,070
Copenhagen	Shorts 330	73,080	3,179	0.073	0,389	0.126	0,114	0,013	0,851	0,229	0,100	0,070
Copenhagen	Shorts 360 300	86,790	3,775	0.087	0,412	0.738	0,667	0,074	3,440	0,272	0,100	0,070
Copenhagen	Shorts SC.7 Srs3M-200	25,060	1,090	0.025	0,181	0.714	0,645	0,071	0,529	0,078	0,100	0,070
Copenhagen	Swearingen Metro III	47,650	2,073	0.048	0,390	0,047	0,043	0,005	0,544	0,149	0,100	0,070
Copenhagen	Saab 340B	78,190	3,401	0.078	0,510	0.238	0,215	0,024	0,456	0,245	0,100	0,070
Origin	Representative aircraft	Fuel kg_LTO	Fuel GJ_LTO	SO2 kg_LTO	NOx kg_LTO	VOC kg_LTO	NMVOC kg_LTO	CH4 kg_LTO	CO kg_LTO	CO2 tons_LTO	N2O kg_LTO	TSP kg_LTO
Other airports	A310	1065,140	46,334	1,065	21,167	1,166	1,054	0,117	5,789	3,336	0,100	0,070
Other airports	A320	532,087	23,146	0,532	9,582	1,464	1,323	0,146	8,403	1,666	0,100	0,070
Other airports	A330	1525,920	66,378	1,526	32,805	0,519	0,469	0,052	5,204	4,779	0,100	0,070
Other airports	A340	1394,928	60,679	1,395	32,697	4,380	3,960	0,438	11,634	4,369	0,100	0,070
Other airports	Antonov 26	105,450	4,587	0,105	0,164	3,701	3,346	0,370	5,980	0,330	0,100	0,070
Other airports	ATR 42-320	89,400	3,889	0,089	0,849	0,000	0,000	0,000	0,557	0,280	0,100	0,070
Other airports	ATR 72-200	107,950	4,696	0,108	1,243	0,000	0,000	0,000	0,475	0,338	0,100	0,070
Other airports	B727	875,431	38,081	0,875	10,682	1,832	1,656	0,183	7,569	2,742	0,100	0,070
Other airports	B737 100	569,168	24,759	0,569	6,760	0,244	0,221	0,024	1,511	1,783	0,100	0,070
Other airports	B737 400	528,911	23,008	0,529	6,988	0,148	0,134	0,015	2,905	1,657	0,100	0,070
Other airports	B747 100-300	2279,174	99,144	2,279	52,194	7,752	7,007	0,775	16,956	7,138	0,100	0,070
Other airports	B747 400	2333,706	101,516	2,334	51,524	0,899	0,812	0,090	4,817	7,309	0,100	0,070
Other airports	B757	839,780	36,530	0,840	18,033	0,299	0,270	0,030	3,002	2,630	0,100	0,070
Other airports	B767 300 ER	1132,405	49,260	1,132	23,981	0,275	0,249	0,028	1,796	3,547	0,100	0,070
Other airports	B777	1806,840	78,598	1,807	49,609	5,389	4,871	0,539	14,282	5,659	0,100	0,070
Other airports	BAC1-11	391,766	17,042	0,392	4,280	4,950	4,475	0,495	9,347	1,227	0,100	0,070
Other airports	BAe Jetstream 31	36,250	1,577	0,036	0,330	0,027	0,024	0,003	0,317	0,114	0,100	0,070
Other airports	BAe Jetstream 41	48,600	2,114	0,049	0,401	0,049	0,044	0,005	0,484	0,152	0,100	0,070
Other airports	BAe146	363,161	15,798	0,363	3,348	0,334	0,302	0,033	2,723	1,137	0,100	0,070
Other airports	Beech 1900C Airliner	47,450	2,064	0,047	0,218	0,364	0,329	0,036	1,409	0,149	0,100	0,070
Other airports	Beech Super King Air 200B	42,350	1,842	0,042	0,212	0,066	0,060	0,007	0,472	0,133	0,100	0,070
Other airports	Beech Super King Air 350	47,150	2,051	0,047	0,210	0,125	0,113	0,012	1,214	0,148	0,100	0,070
Other airports	Cessna 208 Caravan	24,250	1,055	0,024	0,138	0,014	0,012	0,001	0,168	0,076	0,100	0,070
Other airports	CRJ9	318,925	13,873	0,319	3,664	0,014	0,013	0,001	1,184	0,999	0,100	0,070

Other airports	Dash8 400	78,842	3.430	0.079	0.712	0.302	0.273	0.030	0.732	0.247	0.100	0.070
Other airports	DC10-30	1618,066	70,386	1,618	38,762	5,286	4,778	0,529	14,088	5,068	0,100	0,070
Other airports	DC9	538,259	23,414	0,538	6,142	0,281	0,254	0,028	1,636	1,686	0,100	0,070
Other airports	De Havilland Dash 7	115,600	5,029	0,116	0,668	0,097	0,087	0,010	0,909	0,362	0,100	0,070
Other airports	De Havilland DHC-3 Turbo-Otter	26,400	1,148	0,026	0,153	0,008	0,008	0,001	0,156	0,083	0,100	0,070
Other airports	Dornier 328-110	93,850	4,082	0,094	0,968	0,000	0,000	0,000	0,456	0,294	0,100	0,070
Other airports	Embraer 110P2A	40,350	1,755	0,040	0,239	0,014	0,013	0,001	0,227	0,126	0,100	0,070
Other airports	F100	447,982	19,487	0,448	5,301	0,440	0,398	0,044	3,666	1,403	0,100	0,070
Other airports	F28	388,971	16,920	0,389	4,460	7,163	6,475	0,716	8,274	1,218	0,100	0,070
Other airports	F50	95,750	4,165	0,096	1,043	0,000	0,000	0,000	0,466	0,300	0,100	0,070
Other airports	Fokker 27 Friendship	132,400	5,759	0,132	0,320	0,977	0,883	0,098	4,649	0,415	0,100	0,070
Other airports	Lockheed C-130H Hercules	214,000	9,309	0,214	1,555	0,501	0,452	0,050	1,170	0,670	0,100	0,070
Other airports	Lockheed P- Orion	194,300	8,452	0,194	1,389	0,479	0,433	0,048	1,107	0,609	0,100	0,070
Other airports	MD 82	660,780	28,744	0,661	10,974	0,725	0,655	0,072	2,198	2,070	0,100	0,070
Other airports	Reims F406 Caravan II	32,950	1,433	0,033	0,180	0,021	0,019	0,002	0,270	0,103	0,100	0,070
Other airports	RJ 100	130,900	5,694	0,131	1,007	0,117	0,106	0,012	1,257	0,410	0,100	0,070
Other airports	S2000	64,769	2,817	0,065	0,439	0,018	0,016	0,002	0,388	0,203	0,100	0,070
Other airports	S61	48,676	2,117	0,049	0,385	0,028	0,025	0,003	0,378	0,152	0,100	0,070
Other airports	Shorts 330	58,200	2,532	0,058	0,337	0,059	0,053	0,006	0,482	0,182	0,100	0,070
Other airports	Shorts 360 300	67,650	2,943	0,068	0,354	0,380	0,344	0,038	1,904	0,212	0,100	0,070
Other airports	Shorts SC.7 Srs3M-200	21,700	0,944	0,022	0,173	0,349	0,316	0,035	0,333	0,068	0,100	0,070
Other airports	Swearingen Metro III	37,150	1,616	0,037	0,341	0,027	0,024	0,003	0,319	0,116	0,100	0,070
Other airports	Saab 340B	58,450	2,543	0,058	0,448	0,151	0,137	0,015	0,278	0,183	0,100	0,070

Total distance flown (NM) and average cruise fuel consumption and emission factors per representative aircraft type

Year	Airport name	Flight	Rep Aircraft	NM total	Fuel kg_NM	Fuel GJ_NM	SO2 g_NM	NOx g_NM	VOC g_NM	NMVOC g_NM	CH4 g_NM	CO g_NM	CO2 kg_NM	N2O g_NM	TSP g_NM
2010	Copenhagen	Domestic	A320	59873	6,738	0.293	6,738	136,353	1,188	1,188	0	8,693	21,104	0.673	1,347
2010	Copenhagen	Domestic	A330	495	14,886	0.647	14,886	415,692	16,039	16,039	0	32,448	46,624	1,488	2,977
2010	Copenhagen	Domestic	Antonov 26	8096	2,805	0.122	2,805	5,093	103,303	103,303	0	173,834	8,787	0.28	0,561
2010	Copenhagen	Domestic	ATR 42-320	313576	1,745	0.075	1,745	15,25	0	0	0	17,353	5,467	0,174	0,349
2010	Copenhagen	Domestic	ATR 72-200	741336	1,716	0.074	1,716	19,457	0	0	0	11,359	5,377	0,171	0,343
2010	Copenhagen	Domestic	B737 400	428834	6,206	0.269	6,206	75,221	1,198	1,198	0	19,259	19,439	0.62	1,241
2010	Copenhagen	Domestic	B747 400	119	23,429	1,019	23,429	496,492	32,189	32,189	0	96,557	73,381	2,342	4,685
2010	Copenhagen	Domestic	B757	129	9,319	0.405	9,319	265,445	9,782	9,782	0	18,737	29,187	0,931	1,863
2010	Copenhagen	Domestic	B767 300 ER	129	11,275	0.49	11,275	207,091	1,957	1,957	0	28,886	35,314	1,127	2,255
2010	Copenhagen	Domestic	BAe146	761	5,393	0.234	5,393	68,942	2,802	2,802	0	11,419	16,892	0,539	1,078
2010	Copenhagen	Domestic	Beech Super King Air 200B	623	0,788	0.034	0,788	3,818	2,372	2,372	0	14,118	2,47	0,078	0,157
2010	Copenhagen	Domestic	CRJ9	294482	3,856	0.167	3,856	34,368	0,316	0,316	0	7,587	12,08	0,385	0,771
2010	Copenhagen	Domestic	Dash8 400	106	3,393	0.147	3,393	54,08	6,105	6,105	0	15,746	10,628	0,339	0,678
2010	Copenhagen	Domestic	MD 82	133714	8,783	0.382	8,783	149,587	4,801	4,801	0	14,436	27,51	0,878	1,756
2010	Copenhagen	Domestic	RJ 100	152773	2,956	0.128	2,956	29,216	2,368	2,368	0	22,459	9,26	0,295	0,591
2010	Copenhagen	Domestic	S61	814	3,502	0.152	3,502	27,666	1,996	1,996	0	27,211	10,968	0,35	0,7
2010	Copenhagen	Domestic	Shorts 360 300	847	1,612	0,07	1,612	9,335	7,659	7,659	0	40,788	5,049	0,161	0,322
2010	Copenhagen	Domestic	Swearingen Metro III	1747	0,811	0,035	0,811	8,043	0,455	0,455	0	5,738	2,541	0,081	0,162
2010	Copenhagen	Domestic	Saab 340B	24506	1,477	0,064	1,477	14,831	3,77	3,77	0	7,66	4,627	0,147	0,295
2010	Copenhagen	International	A310	310913	8,998	0,391	8,998	138,726	1,517	1,517	0	7,533	28,182	0,899	1,799
2010	Copenhagen	International	A320	16036754	5,462	0,237	5,462	80,453	0,954	0,954	0	5,281	17,109	0,546	1,092
2010	Copenhagen	International	A330	2695237	12,03	0,523	12,03	158,493	11,499	11,499	0	16,111	37,678	1,203	2,406
2010	Copenhagen	International	A340	5765183	12,811	0,557	12,811	210,076	10,137	10,137	0	13,634	40,126	1,281	2,562
2010	Copenhagen	International	Antonov 26	81493	2,71	0,117	2,71	3,575	78,834	78,834	0	174,031	8,49	0,271	0,542
2010	Copenhagen	International	ATR 42-320	299441	1,622	0,07	1,622	13,342	0	0	0	15,323	5,08	0,162	0,324
2010	Copenhagen	International	ATR 72-200	84323	1,716	0,074	1,716	17,441	0	0	0	10	5,376	0,171	0,343
2010	Copenhagen	International	B727	2405	8,314	0,361	8,314	73,944	3,397	3,397	0	13,426	26,04	0,831	1,662
2010	Copenhagen	International	B737 100	203965	5,681	0,247	5,681	53,787	4,759	4,759	0	11,83	17,794	0,568	1,136
2010	Copenhagen	International	B737 400	15838727	5,587	0,243	5,587	54,964	0,564	0,564	0	10,134	17,499	0,558	1,117
2010	Copenhagen	International	B747 400	3224130	19,63	0,853	19,63	278,838	4,978	4,978	0	19,255	61,482	1,963	3,926
2010	Copenhagen	International	B757	3258903	7,155	0,311	7,155	97,083	6,878	6,878	0	9,854	22,411	0,715	1,431
2010	Copenhagen	International	B767 300 ER	2478830	9,729	0,423	9,729	127,652	4,777	4,777	0	10,891	30,473	0,972	1,945
2010	Copenhagen	International	B777	1059442	14,362	0,624	14,362	232,196	14,159	14,159	0	18,438	44,981	1,436	2,872
2010	Copenhagen	International	BAC1-11	1323	4,628	0,201	4,628	48,958	0,72	0,72	0	4,524	14,497	0,462	0,925
2010	Copenhagen	International	BAe146	1042265	5,114	0,222	5,114	40,762	1,977	1,977	0	7,09	16,017	0,511	1,022

2010	Copenhagen	International	Beech Super King Air 200B	10264	0.745	0.032	0.745	3,015	3,487	3,487	0	19,556	2,336	0.074	0.149
2010	Copenhagen	International	Cessna 208 Caravan	1038	0.548	0.023	0.548	3,175	0.068	0,068	0	1,981	1,717	0.054	0.109
2010	Copenhagen	International	CRJ9	4545342	3,52	0,153	3,52	27,078	0,202	0,202	0	5,106	11,027	0.352	0.704
2010	Copenhagen	International	Dash8 400	772135	3,117	0,135	3,117	41,092	5,773	5,773	0	16,649	9,765	0,311	0.623
2010	Copenhagen	International	DC10-30	19542	16,02	0,696	16,02	308,499	35,283	35,283	0	35,438	50,177	1,602	3,204
2010	Copenhagen	International	DC9	3138	5,62	0,244	5,62	50,017	3,184	3,184	0	8,129	17,601	0,562	1,124
2010	Copenhagen	International	Dornier 328-110	336	1,409	0,061	1,409	12,227	0	0	0	11,262	4,413	0,14	0.281
2010	Copenhagen	International	F100	223465	4,927	0,214	4,927	43,646	1,991	1,991	0	7,429	15,433	0,492	0.985
2010	Copenhagen	International	F28	52599	4,692	0,204	4,692	49,974	9,074	9,074	0	8,682	14,696	0,469	0.938
2010	Copenhagen	International	F50	235829	2,169	0,094	2,169	26,33	0	0	0	11,123	6,794	0,216	0.433
2010	Copenhagen	International	MD 82	5698249	7,124	0,309	7,124	97,859	3,601	3,601	0	10,634	22,312	0,712	1,424
2010	Copenhagen	International	Reims F406 Caravan II	2046	0,583	0,025	0,583	2,906	0,639	0,639	0	7,675	1,826	0,058	0,116
2010	Copenhagen	International	RJ 100	3965628	2,441	0,106	2,441	19,94	1,021	1,021	0	9,252	7,647	0,244	0.488
2010	Copenhagen	International	S2000	49288	2,681	0,116	2,681	27,027	0,18	0,18	0	10,331	8,399	0,268	0.536
2010	Copenhagen	International	Shorts 360 300	32755	1,544	0,067	1,544	8,352	6,435	6,435	0	38,023	4,838	0,154	0,308
2010	Copenhagen	International	Swearingen Metro III	40444	0,802	0,034	0,802	7,949	0,476	0,476	0	6,351	2,513	0,08	0,16
2010	Copenhagen	International	Saab 340B	262111	1,43	0,062	1,43	14,543	3,483	3,483	0	6,692	4,481	0,143	0,286
2010	Other airports	Domestic	A320	64514	6,738	0,293	6,738	136,336	1,188	1,188	0	8,692	21,104	0,673	1,347
2010	Other airports	Domestic	A330	119	14,897	0,648	14,897	416,925	16,044	16,044	0	32,433	46,657	1,489	2,979
2010	Other airports	Domestic	Antonov 26	8096	2,805	0,122	2,805	5,093	103,303	103,303	0	173,834	8,787	0,28	0,561
2010	Other airports	Domestic	ATR 42-320	355910	1,745	0,075	1,745	15,243	0	0	0	17,345	5,466	0,174	0,349
2010	Other airports	Domestic	ATR 72-200	671453	1,716	0,074	1,716	19,453	0	0	0	11,356	5,377	0,171	0,343
2010	Other airports	Domestic	B737 400	426951	6,205	0,269	6,205	75,187	1,198	1,198	0	19,251	19,436	0,62	1,241
2010	Other airports	Domestic	B757	247	9,338	0,406	9,338	266,73	9,802	9,802	0	18,778	29,247	0,933	1,867
2010	Other airports	Domestic	B767 300 ER	129	11,275	0,49	11,275	207,091	1,957	1,957	0	28,886	35,314	1,127	2,255
2010	Other airports	Domestic	BAe Jetstream 31	5188	1,034	0,044	1,034	10,272	0,62	0,62	0	7,992	3,239	0,103	0,206
2010	Other airports	Domestic	BAe146	1355	5,398	0,234	5,398	69,306	2,811	2,811	0	11,46	16,907	0,539	1,079
2010	Other airports	Domestic	Beech Super King Air 200B	6581	0,788	0,034	0,788	3,812	2,38	2,38	0	14,157	2,469	0,078	0,157
2010	Other airports	Domestic	Beech Super King Air 350	692	0,861	0,037	0,861	3,499	4,321	4,321	0	34,085	2,697	0,086	0,172
2010	Other airports	Domestic	Cessna 208 Caravan	5544	0,514	0,022	0,514	2,994	0,1	0,1	0	2,113	1,61	0,051	0,102
2010	Other airports	Domestic	CRJ9	294349	3,857	0,167	3,857	34,368	0,316	0,316	0	7,587	12,08	0,385	0,771
2010	Other airports	Domestic	Embraer 110P2A	2181	0,846	0,036	0,846	5	0,183	0,183	0	3,276	2,65	0,084	0,169
2010	Other airports	Domestic	F50	24	2,428	0,105	2,428	33,071	0	0	0	14,854	7,607	0,242	0,485
2010	Other airports	Domestic	Lockheed C-130H Hercules	7645	6,637	0,288	6,637	80,325	8,52	8,52	0	20,747	20,788	0,663	1,327
2010	Other airports	Domestic	MD 82	143405	8,781	0,382	8,781	149,466	4,8	4,8	0	14,433	27,504	0,878	1,756
2010	Other airports	Domestic	Reims F406 Caravan II	1853	0,584	0,025	0,584	3,149	0,425	0,425	0	5,526	1,831	0,058	0,116
2010	Other airports	Domestic	RJ 100	203945	2,952	0,128	2,952	29,139	2,357	2,357	0	22,35	9,247	0,295	0,59

2010	Other airports	Domestic	S61	480906	3,535	0,153	3,535	27,928	2,015	2,015	0	27,468	11,072	0,353	0,707
2010	Other airports	Domestic	Shorts 360 300	15563	1,615	0,07	1,615	9,391	7,728	7,728	0	40,942	5,061	0,161	0,323
2010	Other airports	Domestic	Swearingen Metro III	6320	0,811	0,035	0,811	8,038	0,456	0,456	0	5,772	2,54	0,081	0,162
2010	Other airports	Domestic	Saab 340B	38315	1,477	0,064	1,477	14,831	3,77	3,77	0	7,66	4,627	0,147	0,295
2010	Other Airports	International	A310	1057	8,829	0,384	8,829	129,173	1,425	1,425	0	6,879	27,652	0,882	1,765
2010	Other Airports	International	A320	1937726	5,07	0,22	5,07	66,985	0,882	0,882	0	4,151	15,881	0,507	1,014
2010	Other Airports	International	A330	24375	12,323	0,536	12,323	172,796	11,893	11,893	0	17,28	38,597	1,232	2,464
2010	Other Airports	International	Antonov 26	12315	2,664	0,115	2,664	2,784	65,445	65,445	0	173,704	8,345	0,266	0,532
2010	Other Airports	International	ATR 42-320	91975	1,665	0,072	1,665	14,008	0	0	0	16,03	5,215	0,166	0,333
2010	Other Airports	International	ATR 72-200	103421	1,716	0,074	1,716	17,803	0	0	0	10,244	5,376	0,171	0,343
2010	Other Airports	International	B737 100	81842	5,985	0,26	5,985	59,699	5,53	5,53	0	14,289	18,747	0,598	1,197
2010	Other Airports	International	B737 400	6098691	5,589	0,243	5,589	54,028	0,498	0,498	0	9,232	17,505	0,558	1,117
2010	Other Airports	International	B747 100-300	15886	21,384	0,93	21,384	374,682	6,168	6,168	0	19,116	66,975	2,138	4,276
2010	Other Airports	International	B747 400	17222	18,908	0,822	18,908	262,927	5,459	5,459	0	20,313	59,221	1,89	3,781
2010	Other Airports	International	B757	186699	7,516	0,326	7,516	125,595	7,411	7,411	0	11,664	23,54	0,751	1,503
2010	Other Airports	International	B767 300 ER	76261	9,253	0,402	9,253	125,33	4,181	4,181	0	12,142	28,98	0,925	1,85
2010	Other Airports	International	BAe Jetstream 31	172476	0,981	0,042	0,981	10,123	0,497	0,497	0	6,821	3,073	0,098	0,196
2010	Other Airports	International	BAe Jetstream 41	3308	1,357	0,059	1,357	13,622	0,373	0,373	0	6,821	4,252	0,135	0,271
2010	Other Airports	International	BAe146	77269	5,134	0,223	5,134	45,058	2,132	2,132	0	8,059	16,082	0,513	1,026
2010	Other Airports	International	Beech 1900C Airliner	1343	0,928	0,04	0,928	3,85	9,052	9,052	0	40,299	2,909	0,092	0,185
2010	Other Airports	International	Beech Super King Air 200B	63219	0,749	0,032	0,749	3,074	3,405	3,405	0	19,154	2,346	0,074	0,149
2010	Other Airports	International	Beech Super King Air 350	27982	0,83	0,036	0,83	3,091	4,052	4,052	0	34,933	2,6	0,083	0,166
2010	Other Airports	International	Cessna 208 Caravan	72273	0,551	0,023	0,551	3,192	0,065	0,065	0	1,97	1,727	0,055	0,11
2010	Other Airports	International	CRJ9	240	3,597	0,156	3,597	28,399	0,262	0,262	0	6,366	11,267	0,359	0,719
2010	Other Airports	International	Dash8 400	49736	3,066	0,133	3,066	38,489	5,708	5,708	0	16,852	9,603	0,306	0,613
2010	Other Airports	International	DC10-30	3119	16,077	0,699	16,077	283,952	12,994	12,994	0	16,23	50,353	1,607	3,215
2010	Other Airports	International	Dornier 328-110	4585	1,399	0,06	1,399	11,953	0	0	0	11,212	4,383	0,139	0,279
2010	Other Airports	International	Embraer 110P2A	28603	0,913	0,039	0,913	5,299	0,197	0,197	0	3,532	2,86	0,091	0,182
2010	Other Airports	International	F100	25455	5,023	0,218	5,023	46,936	2,129	2,129	0	8,218	15,733	0,502	1,004
2010	Other Airports	International	F28	70241	4,856	0,211	4,856	52,87	11,814	11,814	0	12,491	15,21	0,485	0,971
2010	Other Airports	International	F50	23932	2,128	0,092	2,128	25,259	0	0	0	10,528	6,665	0,212	0,425
2010	Other Airports	International	Lockheed C-130H Hercules	2366	6,826	0,296	6,826	71,544	2,259	2,259	0	12,401	21,38	0,682	1,365
2010	Other Airports	International	MD 82	504793	6,41	0,278	6,41	76,156	2,936	2,936	0	8,514	20,076	0,641	1,282
2010	Other Airports	International	Reims F406 Caravan II	18754	0,582	0,025	0,582	2,816	0,715	0,715	0	8,436	1,823	0,058	0,116
2010	Other Airports	International	RJ 100	3230976	2,42	0,105	2,42	19,556	0,965	0,965	0	8,699	7,581	0,242	0,484
2010	Other Airports	International	S2000	5006	2,715	0,118	2,715	27,632	0,212	0,212	0	10,64	8,505	0,271	0,543
2010	Other Airports	International	S61	17863	3,682	0,16	3,682	29,093	2,099	2,099	0	28,614	11,534	0,368	0,736

2010	Other Airports	International	Shorts 360 300	516952	1,506	0.065	1,506	7,787	5,744	5,744	0	36,483	4,717	0,15	0,301
2010	Other Airports	International	Swearingen Metro III	86837	0,799	0,034	0,799	7,921	0,483	0,483	0	6,544	2,504	0,079	0,159
2010	Other Airports	International	Saab 340B	69798	1,423	0,061	1,423	14,496	3,435	3,435	0	6,532	4,457	0,142	0,284

Annex 11: Basis fuel consumption and emission factors, deterioration factors, transient factors, specific operational data and stock data for non road working machinery and equipment, and recreational craft

Basis factors for diesel fuelled non road machinery.

Engine size [P=kW]	Emission Level	NO _x	VOC	CO	N ₂ O [g pr kWh]	NH ₃	TSP	Fuel
P<19	<1981	12.0	5.0	7	0.035	0.002	2.8	300
P<19	1981-1990	11.5	3.8	6	0.035	0.002	2.3	285
P<19	1991-Stage I	11.2	2.5	5	0.035	0.002	1.6	270
P<19	Stage I	11.2	2.5	5	0.035	0.002	1.6	270
P<19	Stage II	11.2	2.5	5	0.035	0.002	1.6	270
P<19	Stage IIIA	11.2	2.5	5	0.035	0.002	1.6	270
P<19	Stage IIIB	11.2	2.5	5	0.035	0.002	1.6	270
P<19	Stage IV	11.2	2.5	5	0.035	0.002	1.6	270
19<=P<37	<1981	18.0	2.5	6.5	0.035	0.002	2	300
19<=P<37	1981-1990	18.0	2.2	5.5	0.035	0.002	1.4	281
19<=P<37	1991-Stage I	9.8	1.8	4.5	0.035	0.002	1.4	262
19<=P<37	Stage I	9.8	1.8	4.5	0.035	0.002	1.4	262
19<=P<37	Stage II	6.5	0.6	2.2	0.035	0.002	0.4	262
19<=P<37	Stage IIIA	6.2	0.6	2.2	0.035	0.002	0.4	262
19<=P<37	Stage IIIB	6.2	0.6	2.2	0.035	0.002	0.4	262
19<=P<37	Stage IV	6.2	0.6	2.2	0.035	0.002	0.4	262
37<=P<56	<1981	7.7	2.4	6	0.035	0.002	1.8	290
37<=P<56	1981-1990	8.6	2.0	5.3	0.035	0.002	1.2	275
37<=P<56	1991-Stage I	11.5	1.5	4.5	0.035	0.002	0.8	260
37<=P<56	Stage I	7.7	0.6	2.2	0.035	0.002	0.4	260
37<=P<56	Stage II	5.5	0.4	2.2	0.035	0.002	0.2	260
37<=P<56	Stage IIIA	3.9	0.4	2.2	0.035	0.002	0.2	260
37<=P<56	Stage IIIB	3.9	0.4	2.2	0.035	0.002	0.0225	260
37<=P<56	Stage IV	3.9	0.4	2.2	0.035	0.002	0.0225	260
56<=P<75	<1981	7.7	2.0	5	0.035	0.002	1.4	290
56<=P<75	1981-1990	8.6	1.6	4.3	0.035	0.002	1	275
56<=P<75	1991-Stage I	11.5	1.2	3.5	0.035	0.002	0.4	260
56<=P<75	Stage I	7.7	0.4	1.5	0.035	0.002	0.2	260
56<=P<75	Stage II	5.5	0.3	1.5	0.035	0.002	0.2	260
56<=P<75	Stage IIIA	4.0	0.3	1.5	0.035	0.002	0.2	260
56<=P<75	Stage IIIB	3.0	0.2	1.5	0.035	0.002	0.0225	260
56<=P<75	Stage IV	0.4	0.2	1.5	0.035	0.002	0.0225	260
75<=P<130	<1981	10.5	2.0	5	0.035	0.002	1.4	280
75<=P<130	1981-1990	11.8	1.6	4.3	0.035	0.002	1	268
75<=P<130	1991-Stage I	13.3	1.2	3.5	0.035	0.002	0.4	255
75<=P<130	Stage I	8.1	0.4	1.5	0.035	0.002	0.2	255
75<=P<130	Stage II	5.2	0.3	1.5	0.035	0.002	0.2	255
75<=P<130	Stage IIIA	3.4	0.3	1.5	0.035	0.002	0.2	255
75<=P<130	Stage IIIB	3.0	0.2	1.5	0.035	0.002	0.0225	255
75<=P<130	Stage IV	0.4	0.2	1.5	0.035	0.002	0.0225	255
130<=P<560	<1981	17.8	1.5	2.5	0.035	0.002	0.9	270
130<=P<560	1981-1990	12.4	1.0	2.5	0.035	0.002	0.8	260
130<=P<560	1991-Stage I	11.2	0.5	2.5	0.035	0.002	0.4	250
130<=P<560	Stage I	7.6	0.3	1.5	0.035	0.002	0.2	250
130<=P<560	Stage II	5.2	0.3	1.5	0.035	0.002	0.1	250
130<=P<560	Stage IIIA	3.4	0.3	1.5	0.035	0.002	0.1	250
130<=P<560	Stage IIIB	3.0	0.2	1.5	0.035	0.002	0.0225	250
130<=P<560	Stage IV	0.4	0.2	1.5	0.035	0.002	0.0225	250

Basis factors for 4-stroke gasoline non road machinery.

Engine	Size code	Size classe [S=ccm]	Emission Level	NO _x	VOC	CO	N ₂ O	NH ₃	TSP	Fuel
[g pr kWh]										
4-stroke	SH2	20<=S<50	<1981	2.4	33	198	0.002	0.03	0.08	496
4-stroke	SH2	20<=S<50	1981-1990	3.5	27.5	165	0.002	0.03	0.08	474
4-stroke	SH2	20<=S<50	1991-Stage I	4.7	22	132	0.002	0.03	0.08	451
4-stroke	SH2	20<=S<50	Stage I	4.7	22	132	0.002	0.03	0.08	406
4-stroke	SH2	20<=S<50	Stage II	4.7	22	132	0.002	0.03	0.08	406
4-stroke	SH3	S>=50	<1981	2.4	33	198	0.002	0.03	0.08	496
4-stroke	SH3	S>=50	1981-1990	3.5	27.5	165	0.002	0.03	0.08	474
4-stroke	SH3	S>=50	1991-Stage I	4.7	22	132	0.002	0.03	0.08	451
4-stroke	SH3	S>=50	Stage I	4.7	22	132	0.002	0.03	0.08	406
4-stroke	SH3	S>=50	Stage II	4.7	22	132	0.002	0.03	0.08	406
4-stroke	SN1	S<66	<1981	1.2	26.9	822	0.002	0.03	0.08	603
4-stroke	SN1	S<66	1981-1990	1.8	22.5	685	0.002	0.03	0.08	603
4-stroke	SN1	S<66	1991-Stage I	2.4	18	548	0.002	0.03	0.08	603
4-stroke	SN1	S<66	Stage I	4.3	16.1	411	0.002	0.03	0.08	475
4-stroke	SN1	S<66	Stage II	4.3	16.1	411	0.002	0.03	0.08	475
4-stroke	SN2	66<=S<100	<1981	2.3	10.5	822	0.002	0.03	0.08	627
4-stroke	SN2	66<=S<100	1981-1990	3.5	8.7	685	0.002	0.03	0.08	599
4-stroke	SN2	66<=S<100	1991-Stage I	4.7	7	548	0.002	0.03	0.08	570
4-stroke	SN2	66<=S<100	Stage I	4.7	7	467	0.002	0.03	0.08	450
4-stroke	SN2	66<=S<100	Stage II	4.7	7	467	0.002	0.03	0.08	450
4-stroke	SN3	100<=S<225	<1981	2.6	19.1	525	0.002	0.03	0.08	601
4-stroke	SN3	100<=S<225	1981-1990	3.8	15.9	438	0.002	0.03	0.08	573
4-stroke	SN3	100<=S<225	1991-Stage I	5.1	12.7	350	0.002	0.03	0.08	546
4-stroke	SN3	100<=S<225	Stage I	5.1	11.6	350	0.002	0.03	0.08	546
4-stroke	SN3	100<=S<225	Stage II	5.1	9.4	350	0.002	0.03	0.08	546
4-stroke	SN4	S>=225	<1981	1.3	11.1	657	0.002	0.03	0.08	539
4-stroke	SN4	S>=225	1981-1990	2	9.3	548	0.002	0.03	0.08	514
4-stroke	SN4	S>=225	1991-Stage I	2.6	7.4	438	0.002	0.03	0.08	490
4-stroke	SN4	S>=225	Stage I	2.6	7.4	438	0.002	0.03	0.08	490
4-stroke	SN4	S>=225	Stage II	2.6	7.4	438	0.002	0.03	0.08	490

Basis factors for 2-stroke gasoline non road machinery.

Engine	Size code	Size classe [ccm]	Emission Level	NO _x	VOC	CO	N ₂ O	NH ₃	TSP	Fuel
[g pr kWh]										
2-stroke	SH2	20<=S<50	<1981	1	305	695	0.002	0.01	7	882
2-stroke	SH2	20<=S<50	1981-1990	1	300	579	0.002	0.01	5.3	809
2-stroke	SH2	20<=S<50	1991-Stage I	1.1	203	463	0.002	0.01	3.5	735
2-stroke	SH2	20<=S<50	Stage I	1.5	188	379	0.002	0.01	3.5	720
2-stroke	SH2	20<=S<50	Stage II	1.5	44	379	0.002	0.01	3.5	500
2-stroke	SH3	S>=50	<1981	1.1	189	510	0.002	0.01	3.6	665
2-stroke	SH3	S>=50	1981-1990	1.1	158	425	0.002	0.01	2.7	609
2-stroke	SH3	S>=50	1991-Stage I	1.2	126	340	0.002	0.01	1.8	554
2-stroke	SH3	S>=50	Stage I	2	126	340	0.002	0.01	1.8	529
2-stroke	SH3	S>=50	Stage II	1.2	64	340	0.002	0.01	1.8	500
2-stroke	SN1	S<66	<1981	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN1	S<66	1981-1990	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN1	S<66	1991-Stage I	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN1	S<66	Stage I	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN1	S<66	Stage II	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN2	66<=S<100	<1981	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN2	66<=S<100	1981-1990	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN2	66<=S<100	1991-Stage I	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN2	66<=S<100	Stage I	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN2	66<=S<100	Stage II	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN3	100<=S<225	<1981	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN3	100<=S<225	1981-1990	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN3	100<=S<225	1991-Stage I	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN3	100<=S<225	Stage I	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN3	100<=S<225	Stage II	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN4	S>=225	<1981	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN4	S>=225	1981-1990	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN4	S>=225	1991-Stage I	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN4	S>=225	Stage I	0.5	155	418	0.002	0.01	2.6	652
2-stroke	SN4	S>=225	Stage II	0.5	155	418	0.002	0.01	2.6	652

Fuel consumption and emission factors for LPG fork lifts.

NO _x [g pr kWh]	VOC [g pr kWh]	CO [g pr kWh]	NH ₃ [g pr kWh]	N ₂ O [g pr kWh]	TSP [g pr kWh]	FC [g pr kWh]
19	2.2	1.5	0.003	0.05	0.07	311

Fuel consumption and emission factors for All Terrain Vehicles (ATV's).

ATV type	NO _x [g pr GJ]	VOC [g pr GJ]	CO [g pr GJ]	NH ₃ [g pr GJ]	N ₂ O [g pr GJ]	TSP [g pr GJ]	Fuel [kg pr hour]
Professional	108	1077	16306	2	2	32	1.125
Private	128	1527	22043	2	2	39	0.75

Fuel consumption and emission factors for recreational craft.

Fuel type	Vessel type	Engine	Engine type	Direktiv	Engine size	CO	VOC	N ₂ O	NH ₃	NO _x	TSP	Fuel
											[g pr kWh]	
Gasoline	Other boats (< 20 ft)	Out board	2-stroke	2003/44	8	202.5	45.9	0.01	0.002	2	10	791
Gasoline	Other boats (< 20 ft)	Out board	2-stroke	Konv.	8	427	257.0	0.01	0.002	2	10	791
Gasoline	Other boats (< 20 ft)	Out board	4-stroke	2003/44	8	202.5	24.0	0.03	0.002	7	0.08	426
Gasoline	Other boats (< 20 ft)	Out board	4-stroke	Konv.	8	520	24.0	0.03	0.002	7	0.08	426
Gasoline	Yawls and cabin boats	Out board	2-stroke	2003/44	20	162	36.5	0.01	0.002	3	10	791
Gasoline	Yawls and cabin boats	Out board	2-stroke	Konv.	20	374	172.0	0.01	0.002	3	10	791
Gasoline	Yawls and cabin boats	Out board	4-stroke	2003/44	20	162	14.0	0.03	0.002	10	0.08	426
Gasoline	Yawls and cabin boats	Out board	4-stroke	Konv.	20	390	14.0	0.03	0.002	10	0.08	426
Gasoline	Sailing boats (< 26 ft)	Out board	2-stroke	2003/44	10	189	43.0	0.01	0.002	2	10	791
Gasoline	Sailing boats (< 26 ft)	Out board	2-stroke	Konv.	10	427	257.0	0.01	0.002	2	10	791
Gasoline	Sailing boats (< 26 ft)	Out board	4-stroke	2003/44	10	189	24.0	0.03	0.002	7	0.08	426
Gasoline	Sailing boats (< 26 ft)	Out board	4-stroke	Konv.	10	520	24.0	0.03	0.002	7	0.08	426
Gasoline	Speed boats	In board	4-stroke	2003/44	90	141	10.0	0.03	0.002	12	0.08	426
Gasoline	Speed boats	In board	4-stroke	Konv.	90	346	10.0	0.03	0.002	12	0.08	426
Gasoline	Speed boats	Out board	2-stroke	2003/44	50	145.8	31.8	0.01	0.002	3	10	791
Gasoline	Speed boats	Out board	2-stroke	Konv.	50	374	172.0	0.01	0.002	3	10	791
Gasoline	Speed boats	Out board	4-stroke	2003/44	50	145.8	14.0	0.03	0.002	10	0.08	426
Gasoline	Speed boats	Out board	4-stroke	Konv.	50	390	14.0	0.03	0.002	10	0.08	426
Gasoline	Water scooters	Built in	2-stroke	2003/44	45	147	32.2	0.01	0.002	3	10	791
Gasoline	Water scooters	Built in	2-stroke	Konv.	45	374	172.0	0.01	0.002	3	10	791
Gasoline	Water scooters	Built in	4-stroke	2003/44	45	147	14.0	0.03	0.002	10	0.08	426
Gasoline	Water scooters	Built in	4-stroke	Konv.	45	390	14.0	0.03	0.002	10	0.08	426
Diesel	Motor boats (27-34 ft)	In board		2003/44	150	5	1.7	0.035	0.002	8.6	1	275
Diesel	Motor boats (27-34 ft)	In board		Konv.	150	5.3	2.0	0.035	0.002	8.6	1.2	275
Diesel	Motor boats (> 34 ft)	In board		2003/44	250	5	1.6	0.035	0.002	8.6	1	275
Diesel	Motor boats (> 34 ft)	In board		Konv.	250	5.3	2.0	0.035	0.002	8.6	1.2	275
Diesel	Motor boats (< 27 ft)	In board		2003/44	40	5	1.8	0.035	0.002	9.8	1	281
Diesel	Motor boats (< 27 ft)	In board		Konv.	40	5.5	2.2	0.035	0.002	18	1.4	281
Diesel	Motor sailors	In board		2003/44	30	5	1.9	0.035	0.002	9.8	1	281
Diesel	Motor sailors	In board		Konv.	30	5.5	2.2	0.035	0.002	18	1.4	281
Diesel	Sailing boats (> 26 ft)	In board		2003/44	30	5	1.9	0.035	0.002	9.8	1	281
Diesel	Sailing boats (> 26 ft)	In board		Konv.	30	5.5	2.2	0.035	0.002	18	1.4	281

CH₄ shares of VOC for diesel, gasoline and LPG.

Fuel type	CH ₄ share of VOC
Diesel	0.016
Gasoline 4-stroke	0.1
Gasoline 2-stroke	0.009
LPG	0.05

Deterioration factors for diesel machinery.

Emission Level	NO _x	VOC	CO	TSP
<1981	0.024	0.047	0.185	0.473
1981-1990	0.024	0.047	0.185	0.473
1991-Stage I	0.024	0.047	0.185	0.473
Stage I	0.024	0.036	0.101	0.473
Stage II	0.009	0.034	0.101	0.473
Stage IIIA	0.008	0.027	0.151	0.473
Stage IIIB	0.008	0.027	0.151	0.473
Stage IV	0.008	0.027	0.151	0.473

Deterioration factors for gasoline 2-stroke machinery.

Engine	Size code	Size classe	Emission Level	NO _x	VOC	CO	TSP
2-stroke	SH2	20<=S<50	<1981	0	0.2	0.2	0
2-stroke	SH2	20<=S<50	1981-1990	0	0.2	0.2	0
2-stroke	SH2	20<=S<50	1991-Stage I	0	0.2	0.2	0
2-stroke	SH2	20<=S<50	Stage I	0	0.29	0.24	0
2-stroke	SH2	20<=S<50	Stage II	0	0.29	0.24	0
2-stroke	SH3	S>=50	<1981	-0.031	0.2	0.2	0
2-stroke	SH3	S>=50	1981-1990	-0.031	0.2	0.2	0
2-stroke	SH3	S>=50	1991-Stage I	-0.031	0.2	0.2	0
2-stroke	SH3	S>=50	Stage I	0	0.266	0.231	0
2-stroke	SH3	S>=50	Stage II	0	0.266	0.231	0
2-stroke	SN1	S<66	<1981	-0.6	0.201	0.9	1.1
2-stroke	SN1	S<66	1981-1990	-0.6	0.201	0.9	1.1
2-stroke	SN1	S<66	1991-Stage I	-0.6	0.201	0.9	1.1
2-stroke	SN1	S<66	Stage I	-0.33	0.266	1.109	5.103
2-stroke	SN1	S<66	Stage II	-0.33	0	1.109	5.103
2-stroke	SN2	66<=S<100	<1981	-0.6	0.201	0.9	1.1
2-stroke	SN2	66<=S<100	1981-1990	-0.6	0.201	0.9	1.1
2-stroke	SN2	66<=S<100	1991-Stage I	-0.6	0.201	0.9	1.1
2-stroke	SN2	66<=S<100	Stage I	-0.33	0.266	1.109	5.103
2-stroke	SN2	66<=S<100	Stage II	-0.33	0	1.109	5.103
2-stroke	SN3	100<=S<225	<1981	-0.6	0.201	0.9	1.1
2-stroke	SN3	100<=S<225	1981-1990	-0.6	0.201	0.9	1.1
2-stroke	SN3	100<=S<225	1991-Stage I	-0.6	0.201	0.9	1.1
2-stroke	SN3	100<=S<225	Stage I	-0.33	0.266	1.109	5.103
2-stroke	SN3	100<=S<225	Stage II	-0.33	0	1.109	5.103
2-stroke	SN4	S>=225	<1981	-0.6	0.201	0.9	1.1
2-stroke	SN4	S>=225	1981-1990	-0.6	0.201	0.9	1.1
2-stroke	SN4	S>=225	1991-Stage I	-0.6	0.201	0.9	1.1
2-stroke	SN4	S>=225	Stage I	-0.274	0	0.887	1.935
2-stroke	SN4	S>=225	Stage II	-0.274	0	0.887	1.935

Deterioration factors for gasoline 4-stroke machinery.

Engine	Size code	Size classe	Emission Level	NO _x	VOC	CO	TSP
4-stroke	SN1	S<66	<1981	-0.6	1.1	0.9	1.1
4-stroke	SN1	S<66	1981-1990	-0.6	1.1	0.9	1.1
4-stroke	SN1	S<66	1991-Stage I	-0.6	1.1	0.9	1.1
4-stroke	SN1	S<66	Stage I	-0.3	1.753	1.051	1.753
4-stroke	SN1	S<66	Stage II	-0.3	1.753	1.051	1.753
4-stroke	SN2	66<=S<100	<1981	-0.6	1.1	0.9	1.1
4-stroke	SN2	66<=S<100	1981-1990	-0.6	1.1	0.9	1.1
4-stroke	SN2	66<=S<100	1991-Stage I	-0.6	1.1	0.9	1.1
4-stroke	SN2	66<=S<100	Stage I	-0.3	1.753	1.051	1.753
4-stroke	SN2	66<=S<100	Stage II	-0.3	1.753	1.051	1.753
4-stroke	SN3	100<=S<225	<1981	-0.6	1.1	0.9	1.1
4-stroke	SN3	100<=S<225	1981-1990	-0.6	1.1	0.9	1.1
4-stroke	SN3	100<=S<225	1991-Stage I	-0.6	1.1	0.9	1.1
4-stroke	SN3	100<=S<225	Stage I	-0.3	1.753	1.051	1.753
4-stroke	SN3	100<=S<225	Stage II	-0.3	1.753	1.051	1.753
4-stroke	SN4	S>=225	<1981	-0.6	1.1	0.9	1.1
4-stroke	SN4	S>=225	1981-1990	-0.6	1.1	0.9	1.1
4-stroke	SN4	S>=225	1991-Stage I	-0.6	1.1	0.9	1.1
4-stroke	SN4	S>=225	Stage I	-0.599	1.095	1.307	1.095
4-stroke	SN4	S>=225	Stage II	-0.599	1.095	1.307	1.095
4-stroke	SH2	20<=S<50	<1981	0	0	0	0
4-stroke	SH2	20<=S<50	1981-1990	0	0	0	0
4-stroke	SH2	20<=S<50	1991-Stage I	0	0	0	0
4-stroke	SH2	20<=S<50	Stage I	0	0	0	0
4-stroke	SH2	20<=S<50	Stage II	0	0	0	0
4-stroke	SH3	S>=50	<1981	0	0	0	0
4-stroke	SH3	S>=50	1981-1990	0	0	0	0
4-stroke	SH3	S>=50	1991-Stage I	0	0	0	0
4-stroke	SH3	S>=50	Stage I	0	0	0	0
4-stroke	SH3	S>=50	Stage II	0	0	0	0

Transient factors for diesel machinery.

Emission Level	Load	NO _x	VOC	CO	TSP	Fuel
<1981	High	0.95	1.05	1.53	1.23	1.01
1981-1990	High	0.95	1.05	1.53	1.23	1.01
1991-Stage I	High	0.95	1.05	1.53	1.23	1.01
Stage I	High	0.95	1.05	1.53	1.23	1.01
Stage II	High	0.95	1.05	1.53	1.23	1.01
Stage IIIA	High	0.95	1.05	1.53	1.23	1.01
Stage IIIB	High	1	1	1	1	1
Stage IV	High	1	1	1	1	1
<1981	Low	1.1	2.29	2.57	1.97	1.18
1981-1990	Low	1.1	2.29	2.57	1.97	1.18
1991-Stage I	Low	1.1	2.29	2.57	1.97	1.18
Stage I	Low	1.1	2.29	2.57	1.97	1.18
Stage II	Low	1.1	2.29	2.57	1.97	1.18
Stage IIIA	Low	1.1	2.29	2.57	1.97	1.18
Stage IIIB	Low	1	1	1	1	1
Stage IV	Low	1	1	1	1	1

Annual working hours, load factors and lifetimes for agricultural tractors.

Tractor type	Annual working hours	Load factor	Lifetime (yrs)
Diesel	500 (0-7 years)	0.5	30
	500-100 (7-16 years)		
	100 (>16 years)		
Gasoline (certified)	100	0.4	37
Gasoline (non certified)	50	0.4	37

Annual working hours, load factors and lifetimes for harvesters.

Annual working hours	Load factor	Lifetime (yrs)
250-100 (linear decrease 0-24 years)	0.8	25

Annual working hours, load factors and lifetime for machine pool machinery.

Tractor type	Hours pr yr	Load factor	Lifetime (yrs)
Tractors	750	0.5	7
Harvesters	100	0.8	11
Self-propelled vehicles	500	0.75	6

Operational data for other machinery types in agriculture.

Machinery type	Fuel type	Load factor	Lifetime (yrs)	Hours	Size (kW)
ATV private	Gasoline	-	6	250	-
ATV professional	Gasoline	-	8	400	-
Bedding machines	Gasoline	0.3	10	50	3
Fodder trucks	Gasoline	0.4	10	200	8
Other (gasoline)	Gasoline	0.4	10	50	5
Scrapers	Gasoline	0.3	10	50	3
Self-propelled vehicles	Diesel	0.75	15	150	60
Sweepers	Gasoline	0.3	10	50	3

Annual working hours, load factors and lifetimes for forestry machinery.

Machinery type	Hours	Load factors	Lifetime
Chippers	1200	0.5	6
Tractors (other)	100 (1990)	0.5	15
	400 (2004)		
Tractors (silvicultural)	800	0.5	6
Harvesters	1200	0.5	8
Forwarders	1200	0.5	8
Chain saws (forestry)	800	0.4	3

Annual working hours, load factors and lifetime for fork lifts.

Hours pr yr	Load factor	Lifetime (yrs)
1200 (>=50 kW and <=10 years old)	0.27	20
650 (>=50 kW and >10 years old)		
650 (<50 kW)		

Operational data for construction machinery.

Machinery type	Load factor	Lifetime	Hours	Size
Track type dozers	0.5	10	1100	140
Track type loaders	0.5	10	1100	100 (1990) 150 (2004)
Wheel loaders (0-5 tonness)	0.5	10	1200	20
Wheel loaders (> 5,1 tonnes)	0.5	10	1200	120
Wheel type excavators	0.6	10	1200	100
Track type excavators (0-5 tonnes)	0.6	10	1100	20
Track type excavators (>5,1 tonnes)	0.6	10	1100	120
Excavators/Loaders	0.45	10	700	50
Dump trucks	0.4	10	900 (1990) 1200 (2004)	60 (1990) 180 (2004)
Mini loaders	0.5	14	700	30
Telescopic loaders	0.5	14	1000	35

Stock and operational data for other machinery types in industry.

Sector	Fuel type	Machinery type	Size (kW)	No	Load Factor	Hours
Construction machinery	Diesel	Tampers/Land rollers	30	2800	0.45	600
Construction machinery	Diesel	Generators (diesel)	45	5000	0.5	200
Construction machinery	Diesel	Kompressors (diesel)	45	5000	0.5	500
Construction machinery	Diesel	Pumps (diesel)	75	1000	0.5	5
Construction machinery	Diesel	Asphalt pavers	80	300	0.35	700
Construction machinery	Diesel	Motor graders	100	100	0.4	700
Construction machinery	Diesel	Refuse compressors	160	100	0.25	1300
Construction machinery	Gasoline	Generators (gasoline)	2.5	11000	0.4	80
Construction machinery	Gasoline	Pumps (gasoline)	4	10000	0.4	300
Construction machinery	Gasoline	Kompressors (gasoline)	4	500	0.35	15
Industry	Diesel	Refrigerating units (distribution)	8	3000	0.5	1250
Industry	Diesel	Refrigerating units (long distance)	15	3500	0.5	200
Industry	Diesel	Tractors (transport, industry)	50	3000	0.4	500
Airport GSE and other	Diesel	Airport GSE and other (light duty)	100	500	0.5	400
Airport GSE and other	Diesel	Airport GSE and other (medium duty)	125	350	0.5	300
Airport GSE and other	Diesel	Airport GSE and other (Heavy duty)	175	650	0.5	200
Building and construction	Diesel	Vibratory plates	6	3500	0.6	300
Building and construction	Diesel	Aerial lifts (diesel)	30	150	0.4	400
Building and construction	Diesel	Sweepers (diesel)	30	200	0.4	300
Building and construction	Diesel	High pressure cleaners (diesel)	30	50	0.8	500
Building and construction	Gasoline	Rammers	2.5	3000	0.4	80
Building and construction	Gasoline	Drills	3	100	0.4	10
Building and construction	Gasoline	Vibratory plates (gasoline)	4	2500	0.5	200
Building and construction	Gasoline	Cutters	4	800	0.5	50
Building and construction	Gasoline	Other (gasoline)	5	1000	0.5	40
Building and construction	Gasoline	High pressure cleaners (gasoline)	5	500	0.6	200
Building and construction	Gasoline	Sweepers (gasoline)	10	500	0.4	150
Building and construction	Gasoline	Slicers	10	100	0.7	150
Building and construction	Gasoline	Aerial lifts (gasoline)	20	50	0.4	400

Operational data for the most important types of household and gardening machinery.

Machinery type	Engine	Size (kW)	Hours	Load factor	Lifetime (yrs)
Chain saws (private)	2-stroke	2	5	0.3	10
Chain saws (professional)	2-stroke	3	270	0.4	3
Cultivators (private-large)	4-stroke	3.7	5	0.6	5
Cultivators (private-small)	4-stroke	1	5	0.6	15
Cultivators (professional)	4-stroke	7	360	0.6	8
Hedge cutters (private)	2-stroke	0.9	10	0.5	10
Hedge cutters (professional)	2-stroke	2	300	0.5	4
		2.5 (2000)	25		
Lawn movers (private)	4-stroke	3.5 (2004)		0.4	8
		2.5 (2000)	250		
Lawn movers (professional)	4-stroke	3.5 (2004)		0.4	4
Riders (private)	4-stroke	11	50	0.5	12
Riders (professional)	4-stroke	13	330	0.5	5
Shrub clearers (private)	2-stroke	1	15	0.6	10
Shrub clearers (professional)	2-stroke	2	300	0.6	4
Trimmers (private)	2-stroke	0.9	20	0.5	10
Trimmers (professional)	2-stroke	0.9	200	0.5	4

Stock and operational data for other machines in household and gardening.

Machinery type	Engine	No.	Size (kW)	Hours	Load factor	Lifetime (yrs)
Chippers	2-stroke	200	10	100	0.7	10
Garden shredders	2-stroke	500	3	20	0.7	10
Other (gasoline)	2-stroke	200	2	20	0.5	10
Suction machines	2-stroke	300	4	80	0.5	10
Wood cutters	4-stroke	100	4	15	0.5	10

Operational data for recreational craft.

Fuel type	Vessel type	Engine type	Stroke	Hours	Lifetime	Load factor
Gasoline	Other boats (<20 ft)	Out board engine	2-stroke	30	10	0.5
Gasoline	Other boats (<20 ft)	Out board engine	4-stroke	30	10	0.5
Gasoline	Yawls and cabin boats	Out board engine	2-stroke	50	10	0.5
Gasoline	Yawls and cabin boats	Out board engine	4-stroke	50	10	0.5
Gasoline	Sailing boats (<26ft)	Out board engine	2-stroke	5	10	0.5
Gasoline	Sailing boats (<26ft)	Out board engine	4-stroke	5	10	0.5
Gasoline	Speed boats	In board engine	4-stroke	75	10	0.5
Gasoline	Speed boats	Out board engine	2-stroke	50	10	0.5
Gasoline	Speed boats	Out board engine	4-stroke	50	10	0.5
Gasoline	Water scooters	Built in	2-stroke	10	10	0.5
Gasoline	Water scooters	Built in	4-stroke	10	10	0.5
Diesel	Motor boats (27-34 ft)	In board engine		150	15	0.5
Diesel	Motor boats (>34 ft)	In board engine		100	15	0.5
Diesel	Motor boats (<27 ft)	In board engine		75	15	0.5
Diesel	Motor sailors	In board engine		75	15	0.5
Diesel	Sailing boats (<26ft)	In board engine		25	15	0.5

Stock data for diesel tractors 1985-2010.

Size (kW)	Emission Level	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
37	<1981	3882	3792	3542	3543	3403	3234	3106	2922	2861	2610	2605	2273	2193	1918	1796
37	1981-1990	635	731	760	835	855	879	889	883	915	887	945	883	918	869	888
37	1991-Stage I							25	107	153	201	278	354	445	496	554
37	Stage I															
37	Stage II															
37	Stage IIIA															
45	<1981	25988	25387	23709	23718	22781	21650	20796	19563	19154	17475	17441	15219	14684	12840	12025
45	1981-1990	5740	6808	7263	8075	8476	8770	8867	8805	9128	8848	9419	8807	9151	8668	8856
45	1991-Stage I							203	202	209	203	216	202	210	199	203
49	1991-Stage I								154	281	485	602	618	702	749	765
52	1991-Stage I															247
52	Stage I															
52	Stage II															
52	Stage IIIA															
56	1991-Stage I								201	338	428	747	943	1181	1280	1307
60	<1981	54651	53387	49857	49877	47907	45529	43732	41140	40278	36747	36676	32004	30879	27001	25287
60	1981-1990	11751	14613	15795	17797	19395	20542	20770	20624	21380	20725	22063	20628	21434	20304	20744
60	1991-Stage I							863	857	888	861	917	857	891	844	862
63	1991-Stage I								468	855	1325	2014	2384	2837	3011	3076
67	1991-Stage I															671
67	Stage I															
67	Stage II															
67	Stage IIIA															
71	1991-Stage I								411	715	1179	1949	2507	3344	3594	3672
78	<1981	14558	14221	13281	13286	12761	12128	11649	10959	10729	9789	9770	8525	8226	7192	6736
78	1981-1990	4592	6152	7196	8559	10026	11323	11448	11368	11785	11424	12162	11371	11815	11192	11434
78	1991-Stage I							1233	1503	1713	1945	2429	2561	2946	2994	3287
78	Stage I															
78	Stage II															
78	Stage IIIA															
86	1991-Stage I								108	193	333	589	880	1364	1532	1718
86	Stage I															
86	Stage II															
86	Stage IIIA															
93	1991-Stage I															149

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Continued

Size (kW)	Emission Level	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2009	2010
37	<1981	1601	1449	1298	1148	993	833	664	504	342	176	176	
37	1981-1990	871	876	882	892	900	906	903	914	930	959	959	991
37	1991-Stage I	568	572	576	582	587	592	590	597	607	626	626	647
37	Stage I	33	56	83	84	84	84	85	85	86	89	89	92

37	Stage II						23	53	162	324	330	340	340	351
37	Stage IIIA										109	205	205	333
45	<1981	10715	9700	8690	7685	6646	5577	4447	3376	2290	1180	1180		
45	1981-1990	8681	8731	8800	8894	8974	9037	9006	9116	9274	9563	9563	9883	
45	1991-Stage I	199	200	202	204	206	207	207	209	213	219	219	227	
49	1991-Stage I	750	754	760	768	775	780	778	787	801	826	826	853	
52	1991-Stage I	358	360	363	367	370	373	372	376	383	395	395	408	
52	Stage I		132	242	377	381	383	382	387	393	406	406	419	
52	Stage II					68	147	241	347	353	364	364	377	
52	Stage IIIA									86	133	133	202	
56	1991-Stage I	1281	1289	1299	1313	1325	1334	1329	1346	1369	1412	1412	1459	
60	<1981	22533	20397	18273	16162	13976	11729	9351	7099	4815	2482	2482		
60	1981-1990	20333	20451	20612	20834	21019	21167	21096	21353	21723	22401	22401	23150	
60	1991-Stage I	845	850	856	866	873	879	876	887	903	931	931	962	
63	1991-Stage I	3015	3033	3057	3090	3117	3139	3128	3167	3221	3322	3322	3433	
67	1991-Stage I	1343	1351	1361	1376	1388	1398	1393	1410	1435	1479	1479	1529	
67	Stage I		533	835	1113	1123	1131	1127	1141	1161	1197	1197	1237	
67	Stage II					375	729	1144	1524	1550	1599	1599	1652	
67	Stage IIIA									303	472	472	658	
71	1991-Stage I	3600	3620	3649	3688	3721	3747	3735	3780	3846	3966	3966	4098	
78	<1981	6002	5433	4868	4305	3723	3124	2491	1891	1283	661	661		
78	1981-1990	11208	11273	11361	11484	11586	11668	11628	11770	11974	12348	12348	12761	
78	1991-Stage I	3436	3727	3756	3797	3830	3857	3844	3891	3959	4082	4082	4219	
78	Stage I			325	329	332	334	333	337	343	354	354	365	
78	Stage II				227	310	400	463	469	477	492	492	508	
78	Stage IIIA								63	121	147	147	183	
86	1991-Stage I	1876	2023	2039	2061	2079	2094	2087	2112	2149	2216	2216	2290	
86	Stage I			134	136	137	138	137	139	142	146	146	151	
86	Stage II				91	343	530	760	769	783	807	807	834	
86	Stage IIIA								226	434	529	529	657	
93	1991-Stage I	245	325	327	331	334	336	335	339	345	356	356	368	
93	Stage I			114	115	116	117	116	118	120	123	123	128	
93	Stage II				107	186	313	512	518	527	544	544	562	
93	Stage IIIA								264	470	574	574	682	
97	1991-Stage I	2642	2657	2678	2707	2731	2750	2741	2774	2822	2911	2911	3008	
101	<1981	1921	1739	1558	1378	1191	1000	797	605	410	212	212		
101	1981-1990	2353	2367	2385	2411	2432	2449	2441	2471	2514	2592	2592	2679	

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101	1991-Stage I	1116	1567	1579	1596	1611	1622	1616	1636	1664	1716	1716	1774
101	Stage I			232	234	236	238	237	240	244	252	252	260
101	Stage II				136	357	635	776	785	799	824	824	851
101	Stage IIIA							188	336	410	410	487	
112	1991-Stage I	1265	1626	1639	1656	1671	1683	1677	1698	1727	1781	1781	1841
112	Stage I			465	470	474	478	476	482	490	505	505	522
112	Stage II				337	732	1170	1763	1785	1815	1872	1872	1935
112	Stage IIIA							378	663	823	823	971	
127	1991-Stage I	707	847	854	863	871	877	874	884	900	928	928	959
127	Stage I			152	154	155	156	156	158	161	166	166	171
127	Stage II				78	268	453	591	599	609	628	628	649
127	Stage IIIA							292	675	880	880	1048	
131	<1981	329	298	267	236	204	171	137	104	70	36	36	
131	1981-1990	878	883	890	899	907	914	911	922	938	967	967	999
131	1991-Stage I	95	96	96	97	98	99	99	100	102	105	105	108
157	1981-1990	15	15	15	15	16	16	16	16	16	17	17	17
157	1991-Stage I	900	905	912	922	930	937	934	945	961	991	991	1025
157	Stage I			89	89	90	91	92	91	92	94	97	100
157	Stage II				149	415	695	1089	1085	1098	1117	1152	1152
157	Stage IIIA							623	1453	2140	2586	2586	3047
186	1991-Stage I	53	54	54	55	55	56	55	56	57	59	59	61
186	Stage I			47	48	48	49	49	49	50	52	52	54
186	Stage II				68	207	320	481	480	486	494	509	526
186	Stage IIIA							272	685	1103	1427	1427	1665

Stock data for gasoline tractors 1985-2005.

Size (kW)	Emission Level	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Certified	<1981	13176	12541	11906	11270	10635	10000	9053	8148	7285	6465	5687	4951	4258	3607	2998
Non certified	<1981	26352	25082	23811	22541	21270	20000	19042	18041	16998	15913	14785	13616	12403	11149	9852

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Size (kW)	Emission Level	2000	2001	2002	2003	2004	2005
Certified	<1981	2432	1908	1427	987	591	236
Non certified	<1981	8512	7131	5707	4240	2732	1180

Stock data for harvesters 1985-2010.

Size Group	Emission Level	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	
0<S<=50	<1981	26601	24394	22599	22144	19842	18915	17241	15607	14575	12673	10700	9491	6966	5446	3589	
0<S<=50	1981-1990	519	534	550	582	566	591	594	601	635	636	633	683	641	686	672	
50<S<=60	<1981	2703	2648	2634	2785	2711	2828	2847	2876	3040	3044	3029	3271	3068	2930	2235	
50<S<=60	1981-1990	853	1102	1164	1275	1258	1333	1341	1355	1432	1434	1427	1541	1446	1548	1516	
50<S<=60	1991-Stage I							8	8	8	8	9	9	9	9	9	
60<S<=70	<1981	1786	1750	1741	1841	1792	1869	1881	1901	2009	2012	2002	2162	2028	2171	2127	
60<S<=70	1981-1990	1138	1679	1943	2237	2213	2348	2363	2388	2524	2527	2515	2716	2547	2727	2671	
60<S<=70	1991-Stage I							8	16	18	21	22	24	23	24	24	
70<S<=80	<1981	929	910	905	958	932	972	979	989	1045	1046	1041	1125	1055	1129	1106	
70<S<=80	1981-1990	383	699	1026	1165	1318	1493	1502	1518	1604	1606	1598	1726	1619	1733	1698	
70<S<=80	1991-Stage I							72	77	83	86	87	96	91	98	96	
70<S<=80	Stage I															1	
80<S<=90	<1981	323	317	315	333	324	338	340	344	363	364	362	391	367	393	385	
80<S<=90	1981-1990	383	562	645	967	1107	1466	1475	1491	1575	1577	1570	1695	1590	1702	1667	
80<S<=90	1991-Stage I							61	158	181	200	200	217	207	222	217	
80<S<=90	Stage I															1	
90<S<=100	1981-1990	89	175	235	387	515	670	674	681	720	721	717	775	726	778	762	
90<S<=100	1991-Stage I							180	257	320	329	351	382	367	393	385	
90<S<=100	Stage I															1	
100<S<=120	1981-1990		54	106	219	334	589	592	599	633	634	630	681	639	684	670	
100<S<=120	1991-Stage I							129	253	316	375	440	567	586	673	660	
100<S<=120	Stage I															2	
120<S<=140	1981-1990				4	69	183	184	186	197	197	196	212	199	213	208	
120<S<=140	1991-Stage I							70	148	189	215	319	484	626	804	860	
120<S<=140	Stage I															21	
120<S<=140	Stage II																
120<S<=140	Stage IIIA																
140<S<=160	1991-Stage I									8	36	69	112	271	354	554	632
140<S<=160	Stage II																
140<S<=160	Stage IIIA																
160<S<=180	1991-Stage I												26	69	200	374	440
160<S<=180	Stage II																
160<S<=180	Stage IIIA																
180<S<=200	1991-Stage I												20	67	117	193	
180<S<=200	Stage II																

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180<S<=200	Stage IIIA											
200<S<=220	1991-Stage I										45	92
200<S<=220	Stage II											
200<S<=220	Stage IIIA											
220<S<=240	1991-Stage I											3
220<S<=240	Stage II											
220<S<=240	Stage IIIA											
240<S<=260	1991-Stage I											3
240<S<=260	Stage II											
240<S<=260	Stage IIIA											
260<S<=280	1991-Stage I											14
260<S<=280	Stage II											
260<S<=280	Stage IIIA											
280<S<=300	1991-Stage I											
280<S<=300	Stage II											
280<S<=300	Stage IIIA											
300<S<=320	Stage II											
300<S<=320	Stage IIIA											

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Size Group	Emission Level	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0<S<=50	<1981	2873	1854	1275	754	269						
0<S<=50	1981-1990	715	758	778	816	882	913	779	628	448	268	78
50<S<=60	<1981	1999	1570	1260	897	391						
50<S<=60	1981-1990	1612	1711	1755	1841	1990	2060	1856	1645	1335	1034	730
50<S<=60	1991-Stage I	10	10	10	11	12	12	12	12	12	12	13
60<S<=70	<1981	2073	1648	1340	981	482						
60<S<=70	1981-1990	2841	3014	3093	3243	3506	3630	3344	3062	2659	2284	1922
60<S<=70	1991-Stage I	25	27	27	29	31	32	32	32	32	33	35
70<S<=80	<1981	1176	1248	1105	735	216						
70<S<=80	1981-1990	1806	1916	1966	2061	2229	2307	2164	2043	1939	1862	1813
70<S<=80	1991-Stage I	102	109	112	117	126	131	130	129	131	134	141
70<S<=80	Stage I	1	1	1	1	1	1	1	1	1	1	2
80<S<=90	<1981	409	434	445	467	216						
80<S<=90	1981-1990	1773	1881	1931	2024	2189	2266	2123	2002	1897	1819	1768
80<S<=90	1991-Stage I	231	245	252	264	285	295	294	292	295	303	317
80<S<=90	Stage I	1	1	1	1	1	1	1	1	1	1	2

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90<S<=100	1981-1990	810	860	882	925	1000	1035	1031	1023	986	964	957
90<S<=100	1991-Stage I	410	435	446	468	506	524	521	518	523	538	563
90<S<=100	Stage I	1	1	1	1	1	1	1	1	1	1	2
100<S<=120	1981-1990	712	756	775	813	879	910	906	900	909	934	978
100<S<=120	1991-Stage I	702	744	764	801	866	896	892	886	896	920	963
100<S<=120	Stage I	2	2	2	3	3	3	3	3	3	3	3
120<S<=140	1981-1990	222	235	241	253	274	283	282	280	283	291	304
120<S<=140	1991-Stage I	918	977	1003	1051	1137	1177	1172	1163	1176	1208	1264
120<S<=140	Stage I	26	31	32	33	36	37	37	37	37	38	40
120<S<=140	Stage II					3	4	4	4	4	4	4
120<S<=140	Stage IIIA							1	1	1	4	5
140<S<=160	1991-Stage I	715	795	816	855	925	957	953	946	957	983	1028
140<S<=160	Stage II			20	35	48	56	56	56	56	58	60
140<S<=160	Stage IIIA						5	8	12	16	18	
160<S<=180	1991-Stage I	533	602	618	648	700	725	722	716	724	744	779
160<S<=180	Stage II			40	70	91	105	105	104	105	108	113
160<S<=180	Stage IIIA						9	14	20	24	27	
180<S<=200	1991-Stage I	249	300	308	323	349	362	360	357	361	371	389
180<S<=200	Stage II			61	91	114	129	128	127	129	132	138
180<S<=200	Stage IIIA						9	14	20	24	27	
200<S<=220	1991-Stage I	142	187	192	201	218	225	224	223	225	231	242
200<S<=220	Stage II			40	70	91	105	105	104	105	108	113
200<S<=220	Stage IIIA						9	14	20	24	27	
220<S<=240	1991-Stage I	48	151	155	162	175	181	181	179	181	186	195
220<S<=240	Stage II			72	114	164	221	220	219	221	227	238
220<S<=240	Stage IIIA						61	123	196	237	276	
240<S<=260	1991-Stage I	71	142	145	152	165	170	170	169	170	175	183
240<S<=260	Stage II			72	125	201	301	299	297	301	309	323
240<S<=260	Stage IIIA						113	232	371	450	525	
260<S<=280	1991-Stage I	61	131	134	140	152	157	157	155	157	161	169
260<S<=280	Stage II			72	125	201	301	299	297	301	309	323
260<S<=280	Stage IIIA						113	232	371	450	525	
280<S<=300	1991-Stage I	33.2	34	36	39	40	40	40	40	40	41	43
280<S<=300	Stage II			72	125	201	301	299	297	301	309	323
280<S<=300	Stage IIIA						113	232	371	450	525	
300<S<=320	Stage II				25	60	108	108	107	108	111	116

Continued

300<S<=320 Stage IIIA

57 116 185 225 262

Stock data for fork lifts 1985-2010.

FuelCode	Size (kW)	Emission Level	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
205B	35	<1981	387	361	336	311	285	260	234	209	183	158	133	107	84	58	30
205B	35	1981-1990	120	162	202	239	270	297	297	297	297	297	297	297	297	297	297
205B	35	1991-Stage I							26	49	65	93	131	168	218	247	275
205B	35	Stage II															
205B	35	Stage IIIA															
205B	45	<1981	1612	1506	1400	1294	1188	1082	976	870	764	658	552	446	349	243	126
205B	45	1981-1990	499	674	839	994	1122	1233	1233	1233	1233	1233	1233	1233	1233	1233	1233
205B	45	1991-Stage I							108	203	270	386	544	699	905	1063	1063
205B	45	Stage I															151
205B	45	Stage II															
205B	45	Stage IIIA															
205B	50	<1981	2173	2031	1888	1745	1602	1459	1316	1174	1031	888	745	602	471	328	170
205B	50	1981-1990	673	909	1131	1340	1512	1662	1662	1662	1662	1662	1662	1662	1662	1662	1662
205B	50	1991-Stage I							145	273	363	519	732	940	1217	1469	1469
205B	50	Stage I															240
205B	50	Stage II															
205B	50	Stage IIIA															
205B	75	<1981	497	465	432	399	367	334	301	269	236	203	170	138	108	75	39
205B	75	1981-1990	154	208	259	307	347	382	382	382	382	382	382	382	382	382	382
205B	75	1991-Stage I							33	63	84	120	169	217	281	354	354
205B	75	Stage I															70
205B	75	Stage II															
205B	75	Stage IIIA															
205B	120	<1981	111	103	96	89	81	74	67	60	52	45	38	31	24	17	9
205B	120	1981-1990	34	46	57	68	77	85	85	85	85	85	85	85	85	85	85
205B	120	1991-Stage I							7	14	19	27	38	49	63	97	97
205B	120	Stage I															32
205B	120	Stage II															
205B	120	Stage IIIA															
3030	33		5420	5427	5390	5323	5265	5215	5156	5068	4947	4863	4835	4792	4732	4765	4712
3030	40		4917	4923	4889	4828	4775	4730	4676	4596	4486	4410	4384	4344	4289	4295	4223
3030	50		2149	2151	2137	2110	2087	2067	2044	2008	1960	1926	1915	1897	1874	1926	1941
3030	78		97	97	96	95	94	93	92	91	89	88	88	87	86	90	92
3030	120														1	2	

Continued

FuelCode	Size (kW)	Emission Level	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
205B	35	<1981											
205B	35	1981-1990	297	277	249	232	198	177	135	95	58	27	
205B	35	1991-Stage I	304	304	304	304	304	304	304	304	304	304	304
205B	35	Stage II		23	53	75	89	117	152	152	152	152	152
205B	35	Stage IIIA								41	76	92	99
205B	45	<1981											
205B	45	1981-1990	1233	1151	1036	964	820	734	559	394	239	111	
205B	45	1991-Stage I	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063	1063
205B	45	Stage I	303	422	524	664	664	664	664	664	664	664	664
205B	45	Stage II					104	232	452	612	612	612	612
205B	45	Stage IIIA								126	181	225	
205B	50	<1981											
205B	50	1981-1990	1662	1551	1396	1299	1105	989	753	531	322	150	
205B	50	1991-Stage I	1469	1469	1469	1469	1469	1469	1469	1469	1469	1469	1469
205B	50	Stage I	461	682	897	1135	1135	1135	1135	1135	1135	1135	1135
205B	50	Stage II					187	447	818	1134	1134	1134	1134
205B	50	Stage IIIA								181	275	354	
205B	75	<1981											
205B	75	1981-1990	382	357	321	299	255	228	174	123	75	35	
205B	75	1991-Stage I	354	354	354	354	354	354	354	354	354	354	354
205B	75	Stage I	162	234	311	311	311	311	311	311	311	311	311
205B	75	Stage II				58	129	208	326	326	326	326	326
205B	75	Stage IIIA								142	213	252	294
205B	120	<1981											
205B	120	1981-1990	85	80	72	67	57	51	39	28	17	8	
205B	120	1991-Stage I	97	97	97	97	97	97	97	97	97	97	97
205B	120	Stage I	71	89	118	118	118	118	118	118	118	118	118
205B	120	Stage II				16	38	58	112	112	112	112	112
205B	120	Stage IIIA								58	70	76	140
3030	33		4718	4677	4655	4595	4494	4345	4220	4154	4043	3941	3746
3030	40		4218	4214	4244	4224	4166	4116	4048	4005	3951	3878	3723
3030	50		1897	1938	2003	2020	2018	2029	2061	2136	2198	2192	2142
3030	78		88	95	98	99	104	104	114	123	147	149	151
3030	120		2	2	3	3	3	3	3	3	3	3	7

Stock data for construction machinery 1985-2010.

EquipmentName [Eng]	Emission Level	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	
Track type dozers	<1981	125	100	75	50	25											
Track type dozers	1981-1990	125	150	175	200	225	250	221	193	166	139	114	89	66	43	21	
Track type dozers	1991-Stage I							25	48	71	93	114	134	153	172	189	
Track type dozers	Stage II																
Track type dozers	Stage IIIA																
Track type loaders	<1981	50	40	30	20	10											
Track type loaders	1981-1990	50	60	70	80	90	100	89	79	68	58	48	38	28	19	9	
Track type loaders	1991-Stage I								10	20	29	39	48	57	66	75	83
Track type loaders	Stage II																
Track type loaders	Stage IIIA																
Wheel loaders (0-5 tonnes)	1981-1990								186	331	434	496	517	496	434	331	186
Wheel loaders (0-5 tonnes)	1991-Stage I								21	83	186	331	517	744	1013	1323	1674
Wheel loaders (0-5 tonnes)	Stage II																
Wheel loaders (0-5 tonnes)	Stage IIIA																
Wheel loaders (> 5,1 tonnes)	<1981	1250	1000	750	500	250											
Wheel loaders (> 5,1 tonnes)	1981-1990	1250	1500	1750	2000	2250	2500	2228	1960	1698	1441	1188	941	698	460	228	
Wheel loaders (> 5,1 tonnes)	1991-Stage I								248	490	728	960	1188	1411	1629	1841	1822
Wheel loaders (> 5,1 tonnes)	Stage I															228	
Wheel loaders (> 5,1 tonnes)	Stage II																
Wheel loaders (> 5,1 tonnes)	Stage IIIA																
Wheel type excavators	<1981	500	400	300	200	100											
Wheel type excavators	1981-1990	500	600	700	800	900	1000	862	732	611	498	394	298	211	132	62	
Wheel type excavators	1991-Stage I								96	183	262	332	394	447	491	528	493
Wheel type excavators	Stage I															62	
Wheel type excavators	Stage II																
Wheel type excavators	Stage IIIA																
Track type excavators (0-5 tonnes)	1981-1990								459	816	1071	1224	1275	1224	1071	816	459
Track type excavators (0-5 tonnes)	1991-Stage I								51	204	459	816	1275	1837	2500	3265	4132
Track type excavators (0-5 tonnes)	Stage II																
Track type excavators (0-5 tonnes)	Stage IIIA																
Track type excavators (>5,1 tonnes)	<1981	1000	800	600	400	200											
Track type excavators (>5,1 tonnes)	1981-1990	1000	1200	1400	1600	1800	2000	1798	1596	1394	1194	993	794	594	396	198	
Track type excavators (>5,1 tonnes)	1991-Stage I								200	399	598	796	993	1190	1387	1583	1581
Track type excavators (>5,1 tonnes)	Stage I															198	
Track type excavators (>5,1 tonnes)	Stage II																

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EquipmentName (Eng)	Emission Level	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Track type dozers	<1981											
Track type dozers	1981-1990											
Track type dozers	1991-Stage I	206	201	177	154	132	128	125	116	95	59	27
Track type dozers	Stage II			20	38	56	86	100	116	126	119	109
Track type dozers	Stage IIIA							25	58	95	119	137
Track type loaders	<1981											
Track type loaders	1981-1990											
Track type loaders	1991-Stage I	91	91	81	71	62	61	71	68	55	38	19
Track type loaders	Stage II			9	18	26	40	56	68	73	76	75
Track type loaders	Stage IIIA							14	34	55	76	94
Wheel loaders (0-5 tonnes)	1981-1990											
Wheel loaders (0-5 tonnes)	1991-Stage I	2067	2046	1984	1881	1736	1444	1269	1045	726	353	

Continued

Wheel loaders (0-5 tonnes)	Stage II		227	496	806	1158	1444	1903	2090	2177	2117	2024
Wheel loaders (0-5 tonnes)	Stage IIIA								348	726	1058	1349
Wheel loaders (> 5,1 tonnes)	<1981											
Wheel loaders (> 5,1 tonnes)	1981-1990											
Wheel loaders (> 5,1 tonnes)	1991-Stage I	1802	1559	1322	1089	861	677	485	273			
Wheel loaders (> 5,1 tonnes)	Stage I	450	668	881	871	861	902	969	1092	1174	854	547
Wheel loaders (> 5,1 tonnes)	Stage II				218	431	677	969	1092	1174	1138	1094
Wheel loaders (> 5,1 tonnes)	Stage IIIA								273	587	854	1094
Wheel type excavators	<1981											
Wheel type excavators	1981-1990											
Wheel type excavators	1991-Stage I	459	372	293	223	162	118	74	38			
Wheel type excavators	Stage I	115	160	196	179	162	157	148	152	146	103	62
Wheel type excavators	Stage II				45	81	118	148	152	146	138	124
Wheel type excavators	Stage IIIA								38	73	103	124
Track type excavators (0-5 tonnes)	1981-1990											
Track type excavators (0-5 tonnes)	1991-Stage I	5101	5050	4897	4642	4285	3889	3599	3027	2073	995	
Track type excavators (0-5 tonnes)	Stage II		561	1224	1990	2857	3889	5399	6054	6220	5968	5554
Track type excavators (0-5 tonnes)	Stage IIIA								1009	2073	2984	3702
Track type excavators (>5,1 tonnes)	<1981											
Track type excavators (>5,1 tonnes)	1981-1990											
Track type excavators (>5,1 tonnes)	1991-Stage I	1579	1380	1181	983	785	683	536	313			
Track type excavators (>5,1 tonnes)	Stage I	395	591	787	786	785	910	1073	1251	1338	980	623
Track type excavators (>5,1 tonnes)	Stage II				197	393	683	1073	1251	1338	1307	1245
Track type excavators (>5,1 tonnes)	Stage IIIA								313	669	980	1245
Excavators/Loaders	<1981											
Excavators/Loaders	1981-1990											
Excavators/Loaders	1991-Stage I	3599	3170	2735	2295	1848	1370	938	481			
Excavators/Loaders	Stage I	900	1359	1824	2295	2310	2283	2344	2403	2314	1688	1137
Excavators/Loaders	Stage II				462	913	1406	1922	1851	1688	1516	
Excavators/Loaders	Stage IIIA								463	844	1137	
Dump trucks	<1981											
Dump trucks	1981-1990											
Dump trucks	1991-Stage I	745	682	611	530	442	385	301	176			
Dump trucks	Stage I	186	292	407	530	552	642	752	880	943	739	514
Dump trucks	Stage II				110	257	451	704	754	739	685	
Dump trucks	Stage IIIA								189	369	514	

Continued

Mini loaders	<1981											
Mini loaders	1981-1990	1273	990	684	354							
Mini loaders	1991-Stage I	3183	3301	3419	3537	3656	2756	2294	1077	715	498	329
Mini loaders	Stage II		330	684	1061	1462	1531	1720	923	715	597	494
Mini loaders	Stage IIIA								154	238	299	329
Telescopic loaders	1981-1990	398	348	265	149							
Telescopic loaders	1991-Stage I	994	1160	1326	1491	1657	1740	1837	1846	1687	1343	1009
Telescopic loaders	Stage II		116	265	447	663	966	1378	1582	1687	1612	1514
Telescopic loaders	Stage IIIA								264	562	806	1009

Stock data for machine pools 1985-2010.

EquipmentName (Eng)	Emission Level	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Tractors (machine pools)	<1981	1236	627													
Tractors (machine pools)	1981-1990	3091	3763	4575	4515	4370	4100	3643	2808	2368	1786	1214	604			
Tractors (machine pools)	1991-Stage I							607	1123	1776	2382	3035	3624	4324	4210	4336
Tractors (machine pools)	Stage I															
Tractors (machine pools)	Stage II															
Tractors (machine pools)	Stage IIIA															
Harvesters (machine pools)	<1981	969	776	661	472	287	139									
Harvesters (machine pools)	1981-1990	807	932	1157	1257	1294	1385	1385	1197	927	794	712	512	421	282	162
Harvesters (machine pools)	1991-Stage I							139	266	348	454	593	615	737	751	729
Harvesters (machine pools)	Stage II															
Harvesters (machine pools)	Stage IIIA															
Self-propelled vehicles (machine pools)	1981-1990										72	61	38			
Self-propelled vehicles (machine pools)	1991-Stage I										72	122	190	263	278	277
Self-propelled vehicles (machine pools)	Stage II															
Self-propelled vehicles (machine pools)	Stage IIIA															

Continued

EquipmentName (Eng)	Emission Level	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Tractors (machine pools)	<1981											
Tractors (machine pools)	1981-1990											
Tractors (machine pools)	1991-Stage I	3956	4069	3323	2566	2066	1421	927	487			
Tractors (machine pools)	Stage I			554	513	517	474	464	487	487		
Tractors (machine pools)	Stage II				513	1033	1421	1855	1946	1946	1946	1460
Tractors (machine pools)	Stage IIIA							487	973	1460	1460	1946
Harvesters (machine pools)	<1981											
Harvesters (machine pools)	1981-1990	78										
Harvesters (machine pools)	1991-Stage I	778	779	651	531	472	300	257	211	169	127	85
Harvesters (machine pools)	Stage II			65	118	177	171	172	169	169	169	169
Harvesters (machine pools)	Stage IIIA							43	85	127	169	211
Self-propelled vehicles (machine pools)	1981-1990											
Self-propelled vehicles (machine pools)	1991-Stage I	289	314	237	203	153	99	49				
Self-propelled vehicles (machine pools)	Stage II			47	102	153	199	194	189	142	94	47
Self-propelled vehicles (machine pools)	Stage IIIA							49	94	142	189	236

Stock data for household and gardening 1985-2010

SNAP	EquipmentName (Eng)	Emission Level	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
0809	Lawn movers (private)	<1981	253125	168750	84375												
0809	Lawn movers (private)	1981-1990	421875	506250	590625	675000	675000	675000	590625	506250	421875	337500	253125	168750	84375		
0809	Lawn movers (private)	1991-Stage I							84375	168750	253125	337500	421875	506250	590625	675000	675000
0809	Lawn movers (private)	Stage I															
0809	Lawn movers (private)	Stage II															
0809	Cultivators (private-large)	<1981	73333	66000	58667	51333	44000	36667	29333	22000	14667	7333					
0809	Cultivators (private-large)	1981-1990	36667	44000	51333	58667	66000	73333	73333	73333	73333	73333	66000	58667	51333	44000	
0809	Cultivators (private-large)	1991-Stage I							7333	14667	22000	29333	36667	44000	51333	58667	66000
0809	Cultivators (private-large)	Stage II															
0809	Cultivators (private-small)	1981-1990	10000	10000	10000	10000	10000	10000	8000	6000	4000	2000					
0809	Cultivators (private-small)	1991-Stage I							2000	4000	6000	8000	10000	10000	10000	10000	10000
0809	Cultivators (private-small)	Stage II															
0809	Chain saws (private)	<1981	125000	100000	75000	50000	25000										
0809	Chain saws (private)	1981-1990	125000	150000	175000	200000	225000	250000	227250	204000	180250	156000	131250	106000	80250	54000	27250
0809	Chain saws (private)	1991-Stage I							25250	51000	77250	104000	131250	159000	187250	216000	245250
0809	Chain saws (private)	Stage I															
0809	Chain saws (private)	Stage II															
0809	Riders (private)	<1981	40950	35100	29250	23400	17550	11700	5880								
0809	Riders (private)	1981-1990	29250	35100	40950	46800	52650	58500	58796	59388	54248	49167	44056	38828	33392	27660	21544
0809	Riders (private)	1991-Stage I							5880	11878	18083	24583	31469	38828	46748	55320	64631
0809	Riders (private)	Stage I															
0809	Riders (private)	Stage II															
0809	Shrub clearers (private)	<1981	24000	19200	14400	9600	4800										
0809	Shrub clearers (private)	1981-1990	24000	28800	33600	38400	43200	48000	47520	46080	43680	40320	36000	30720	24480	17280	9120
0809	Shrub clearers (private)	1991-Stage I							5280	11520	18720	26880	36000	46080	57120	69120	82080
0809	Shrub clearers (private)	Stage I															
0809	Shrub clearers (private)	Stage II															
0809	Hedge cutters (private)	<1981	6850	5480	4110	2740	1370										
0809	Hedge cutters (private)	1981-1990	6850	8220	9590	10960	12330	13700	15237	16128	16373	15972	14925	13232	10893	7908	4277
0809	Hedge cutters (private)	1991-Stage I							1693	4032	7017	10648	14925	19848	25417	31632	38493
0809	Hedge cutters (private)	Stage I															
0809	Hedge cutters (private)	Stage II															
0809	Trimmers (private)	<1981	25500	20400	15300	10200	5100										
0809	Trimmers (private)	1981-1990	25500	30600	35700	40800	45900	51000	48086	44686	40800	36429	31571	26229	20400	14086	7286
0809	Trimmers (private)	1991-Stage I							5343	11171	17486	24286	31571	39343	47600	56343	65571

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SNAP	EquipmentName (Eng)	Emission Level	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0809	Lawn movers (private)	<1981											
0809	Lawn movers (private)	1981-1990											
0809	Lawn movers (private)	1991-Stage I	675000	675000	675000	675000	675000	595000	513750	428125	342500	256875	171250

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0809	Lawn movers (private)	Stage I					85000	171250	256875	256875	256875	
0809	Lawn movers (private)	Stage II							85625	171250	256875	
0809	Cultivators (private-large)	<1981										
0809	Cultivators (private-large)	1981-1990	36667	29333	22000	14667	7333					
0809	Cultivators (private-large)	1991-Stage I	73333	80667	88000	95333	102667	102667	95333	88000	80667	73333 66000
0809	Cultivators (private-large)	Stage II					7333	14667	22000	29333	36667	44000
0809	Cultivators (private-small)	1981-1990										
0809	Cultivators (private-small)	1991-Stage I	10000	10000	10000	10000	10000	8000	6000	4000	2000	
0809	Cultivators (private-small)	Stage II						2000	4000	6000	8000	10000 10000
0809	Chain saws (private)	<1981										
0809	Chain saws (private)	1981-1990										
0809	Chain saws (private)	1991-Stage I	275000	280750	286500	292250	298000	268200	238400	208600	178800	149000 119200
0809	Chain saws (private)	Stage I						29800	59600	89400	89400	89400
0809	Chain saws (private)	Stage II							29800	59600	89400	
0809	Riders (private)	<1981										
0809	Riders (private)	1981-1990	14954	7910								
0809	Riders (private)	1991-Stage I	74771	87015	101775	109920	119360	117741	114313	107663	99047	86666 74285
0809	Riders (private)	Stage I						10704	22863	23925	24762	24762
0809	Riders (private)	Stage II							11963	24762	37143	49523
0809	Shrub clearers (private)	<1981										
0809	Shrub clearers (private)	1981-1990										
0809	Shrub clearers (private)	1991-Stage I	96000	107000	118000	129000	140000	126000	112000	98000	84000	70000 56000
0809	Shrub clearers (private)	Stage I						14000	28000	42000	42000	42000
0809	Shrub clearers (private)	Stage II							14000	28000	42000	
0809	Hedge cutters (private)	<1981										
0809	Hedge cutters (private)	1981-1990										
0809	Hedge cutters (private)	1991-Stage I	46000	52900	59800	66700	73600	66240	58880	51520	44160	36800 29440
0809	Hedge cutters (private)	Stage I						7360	14720	22080	22080	22080
0809	Hedge cutters (private)	Stage II							7360	14720	22080	
0809	Trimmers (private)	<1981										
0809	Trimmers (private)	1981-1990										
0809	Trimmers (private)	1991-Stage I	75286	77714	80143	82571	85000	76500	68000	59500	51000	42500 34000
0809	Trimmers (private)	Stage I						8500	17000	25500	25500	25500
0809	Trimmers (private)	Stage II							8500	17000	25500	
0811	Lawn movers (professional)	1981-1990										
0811	Lawn movers (professional)	1991-Stage I	25000	25000	25000	25000	25000	18750	12500	6250		

Continued

0811	Lawn movers (professional)	Stage I					6250	12500	18750	18750	12500	6250
0811	Lawn movers (professional)	Stage II							6250	12500	18750	
0811	Cultivators (professional)	<1981										
0811	Cultivators (professional)	1981-1990										
0811	Cultivators (professional)	1991-Stage I	10000	10000	10000	10000	8750	7500	6250	5000	3750	2500
0811	Cultivators (professional)	Stage I					1250	2500	3750	3750	3750	3750
0811	Cultivators (professional)	Stage II							1250	2500	3750	
0811	Chain saws (professional)	1981-1990										
0811	Chain saws (professional)	1991-Stage I	20000	27500	35000	42500	50000	33333	16667			
0811	Chain saws (professional)	Stage I					16667	33333	50000	50000	33333	16667
0811	Chain saws (professional)	Stage II							16667	33333		
0811	Riders (professional)	1981-1990										
0811	Riders (professional)	1991-Stage I	6720	7802	9726	12492	16100	15728	13398	9444	4800	
0811	Riders (professional)	Stage I					3932	8932	9444	9600	9600	4800
0811	Riders (professional)	Stage II						4722	9600	14400	14400	19200
0811	Shrub clearers (professional)	1981-1990										
0811	Shrub clearers (professional)	1991-Stage I	4000	5500	7000	8500	10000	7500	5000	2500		
0811	Shrub clearers (professional)	Stage I					2500	5000	7500	7500	5000	2500
0811	Shrub clearers (professional)	Stage II							2500	5000	7500	
0811	Hedge cutters (professional)	1981-1990										
0811	Hedge cutters (professional)	1991-Stage I	4000	4600	5200	5800	6400	4800	3200	1600		
0811	Hedge cutters (professional)	Stage I					1600	3200	4800	4800	3200	1600
0811	Hedge cutters (professional)	Stage II							1600	3200	4800	
0811	Trimmers (professional)	1981-1990										
0811	Trimmers (professional)	1991-Stage I	13286	13714	14143	14571	15000	11250	7500	3750		
0811	Trimmers (professional)	Stage I					3750	7500	11250	11250	7500	3750
0811	Trimmers (professional)	Stage II						3750	7500	11250		

Stock data for small boats and pleasure crafts 1985-2010.

Fuel type	Motor type	Boat type	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Diesel		Motor boats (27-34 ft)	1550	1550	1719	1889	2058	2228	2397	2567	2736	2906	3075	3244	3414	3583	3753
Diesel		Motor boats (> 34 ft)	450	450	503	556	608	661	714	767	819	872	925	978	1031	1083	1136
Diesel		Motor boats <(27 ft)	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Diesel		Motor sailors	3500	3500	3583	3667	3750	3833	3917	4000	4083	4167	4250	4333	4417	4500	4583
Diesel		Sailing boats (> 26 ft)	7500	7500	7917	8333	8750	9167	9583	10000	10417	10833	11250	11667	12083	12500	12917
Fuel	2-stroke	Other boats (< 20 ft)	4000	4000	4056	4111	4167	4222	4278	4333	4389	4444	4500	4556	4565	4527	4439
Fuel	2-stroke	Yawls and cabin boats	4000	4000	4056	4111	4167	4222	4278	4333	4389	4444	4500	4556	4565	4527	4439
Fuel	2-stroke	Sailing boats (< 26 ft)	19000	19000	18778	18556	18333	18111	17889	17667	17444	17222	17000	16778	16390	15843	15144
Fuel	2-stroke	Speed boats	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	2970	2910	2820
Fuel	2-stroke	Water scooters	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	990	970	940
Fuel	4-stroke	Other boats (< 20 ft)													46	140	283
Fuel	4-stroke	Yawls and cabin boats													46	140	283
Fuel	4-stroke	Sailing boats (< 26 ft)													166	490	967
Fuel	4-stroke	Speed boats	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Fuel	4-stroke	Speed boats													30	90	180
Fuel	4-stroke	Water scooters													10	30	60

Fuel type	Motor type	Boat type	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Diesel		Motor boats (27-34 ft)	3922	4092	4261	4431	4600	4600	4600	4600	4600	4600	4600
Diesel		Motor boats (> 34 ft)	1189	1242	1294	1347	1400	1400	1400	1400	1400	1400	1400
Diesel		Motor boats <(27 ft)	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Diesel		Motor sailors	4667	4750	4833	4917	5000	5000	5000	5000	5000	5000	5000
Diesel		Sailing boats (> 26 ft)	13333	13750	14167	14583	15000	15000	15000	15000	15000	15000	15000
Fuel	2-stroke	Other boats (< 20 ft)	4300	4108	3862	3560	3200	2750	2250	1800	1400	1050	750
Fuel	2-stroke	Yawls and cabin boats	4300	4108	3862	3560	3200	2750	2250	1800	1400	1050	750
Fuel	2-stroke	Sailing boats (< 26 ft)	14300	13317	12201	10960	9600	8250	6750	5400	4200	3150	2250
Fuel	2-stroke	Speed boats	2700	2550	2370	2160	1920	1650	1350	1080	840	630	450
Fuel	2-stroke	Water scooters	900	850	790	720	640	550	450	360	280	210	150
Fuel	4-stroke	Other boats (< 20 ft)	478	725	1027	1384	1800	2250	2750	3200	3600	3950	4250
Fuel	4-stroke	Yawls and cabin boats	478	725	1027	1384	1800	2250	2750	3200	3600	3950	4250
Fuel	4-stroke	Sailing boats (< 26 ft)	1589	2350	3243	4262	5400	6750	8250	9600	10800	11850	12750
Fuel	4-stroke	Speed boats	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Fuel	4-stroke	Speed boats	300	450	630	840	1080	1350	1650	1920	2160	2370	2550
Fuel	4-stroke	Water scooters	100	150	210	280	360	450	550	640	720	790	850

Engine sizes (kW) for recreational craft 1985-2010.

Motor type	Boat type	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004-2010
2-stroke	Other boats (< 20 ft)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
2-stroke	Yawls and cabin boats	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
2-stroke	Sailing boats (< 26 ft)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
2-stroke	Speed boats	25	31	32	33	35	36	38	39	40	42	43	44	46	47	49	50
2-stroke	Water scooters	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
4-stroke	Other boats (< 20 ft)									8	8	8	8	8	8	8	8
4-stroke	Yawls and cabin boats									20	20	20	20	20	20	20	20
4-stroke	Sailing boats (< 26 ft)									10	10	10	10	10	10	10	10
4-stroke	Speed boats (in board eng.)	45	55	58	60	63	65	68	70	73	75	78	80	83	85	88	90
4-stroke	Speed boats (out board eng.)									40	42	43	44	46	47	49	50
4-stroke	Water scooters									45	45	45	45	45	45	45	45
Diesel	Motor boats (27-34 ft)	70	88	92	97	101	106	110	114	119	123	128	132	137	141	146	150
Diesel	Motor boats (> 34 ft)	120	149	156	163	171	178	185	192	199	207	214	221	228	236	243	250
Diesel	Motor boats <(27 ft)	20	24	26	27	28	29	30	31	32	33	34	36	37	38	39	40
Diesel	Motor sailors	20	22	23	23	24	24	25	26	26	27	27	28	28	29	29	30
Diesel	Sailing boats (> 26 ft)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

Annex 12: Traffic data and different technical and operational data for Danish domestic ferries

Annual traffic data for ferries (no. of round trips) for Danish domestic ferries.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Korsør-Nyborg, DSB	9305	9167	9237	8959	8813	8789	8746	3258	0	0
Korsør-Nyborg, Vognmandsruten	7512	7363	7468	7496	7502	7828	7917	8302	3576	0
Halsskov-Knudshoved	10601	10582	11701	11767	12420	12970	13539	13612	5732	0
Kalundborg-Juelsminde	0	1326	1733	1542	1541	1508	856	0	0	0
Kalundborg-Århus	1907	2400	3162	2921	2913	3540	4962	4888	4483	1454
Sjællands Odde-Ebeltoft	3908	3978	4008	3988	4325	4569	5712	8153	7851	7720
Sjællands Odde-Århus	0	0	0	0	0	0	0	0	0	2339
Hundested-Grenaa	1026	1025	1032	1030	718	602	67	0	0	0
København-Rønne	558	545	484	412	427	426	437	465	458	506
Køge-Rønne	0	0	0	0	0	0	0	0	0	0
Kalundborg-Samsø	873	873	860	881	826	811	813	823	824	850
Tårs-Spodsbjerg	7656	8835	9488	9535	9402	9562	9000	9129	7052	6442
Hirtshals-Torshavn	0	0	0	0	0	0	0	0	0	0
Hanstholm-Torshavn	0	14	15	0	0	0	0	0	0	48
Esbjerg-Torshavn	9	9	9	15	14	13	0	0	0	0
Local ferries	176891	179850	181834	178419	202445	209129	182750	197489	200027	202054
<i>Continued</i>	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Korsør-Nyborg, DSB	0	0	0	0	0	0	0	0	0	0
Korsør-Nyborg, Vognmandsruten	0	0	0	0	0	0	0	0	0	0
Halsskov-Knudshoved	0	0	0	0	0	0	0	0	0	0
Kalundborg-Juelsminde	0	0	0	0	0	0	0	0	0	0
Kalundborg-Århus	1870	1804	2037	1800	1750	1725	1724	1695	1694	1668
Sjællands Odde-Ebeltoft	4775	4226	3597	3191	2906	2889	2690	2670	2577	2454
Sjællands Odde-Århus	1799	1817	1825	2359	2863	2795	2853	2810	2814	2810
Hundested-Grenaa	0	0	0	0	0	0	0	0	0	0
København-Rønne	491	430	413	397	293	0	0	0	0	0
Køge-Rønne	0	0	0	0	154	488	436	399	428	407
Kalundborg-Samsø	828	817	833	831	841	867	862	887	921	969
Tårs-Spodsbjerg	6477	6498	6468	6516	6497	6494	6460	6493	6504	6474
Hirtshals-Torshavn	0	0	0	0	0	0	0	0	0	13
Hanstholm-Torshavn	67	94	85	50	59	51	51	48	52	27
Esbjerg-Torshavn	0	0	0	0	0	0	0	0	0	30
Local ferries	201833	200130	208396	208501	206297	205564	203413	205260	210089	209082
										205461

Ferry data: Service, name, engine year, main engine MCR (kW), engine type, specific fuel consumption (sfc), aux. engine (kW).

Ferry service	Ferry name	Engine year	Main engine MCR (kW)	Engine type	Sfc (g/kWh)	Fuel type	Aux engine (kW)
Esbjerg-Torshavn	Gamle Norrøna	1973	11768	Medium speed (4-stroke)	239	Diesel	2354
Esbjerg-Torshavn	Nye Norrøna	2003	21600	Medium speed (4-stroke)	190	Fuel	4320
Halsskov-Knudshoved	ARVEPRINS KNUD	1963	8238	Slow speed (2-stroke)	220	Fuel	1666
Halsskov-Knudshoved	DRONNING MARGRETHE II	1973	8826	Medium speed (4-stroke)	230	Diesel	1692
Halsskov-Knudshoved	HEIMDAL	1983	8309	Medium speed (4-stroke)	220	Diesel	740
Halsskov-Knudshoved	KNUDSHOVED	1961	6400	Slow speed (2-stroke)	220	Fuel	1840
Halsskov-Knudshoved	KONG FREDERIK IX	1954	6767	Slow speed (2-stroke)	225	Fuel	1426
Halsskov-Knudshoved	KRAKA	1982	8309	Medium speed (4-stroke)	220	Diesel	740
Halsskov-Knudshoved	LODBROG	1982	8309	Medium speed (4-stroke)	220	Diesel	740
Halsskov-Knudshoved	PRINSESSE ANNE-MARIE	1960	8238	Slow speed (2-stroke)	220	Fuel	1360
Halsskov-Knudshoved	PRINSESSE ELISABETH	1964	8238	Slow speed (2-stroke)	220	Fuel	1360
Halsskov-Knudshoved	ROMSØ	1973	8826	Medium speed (4-stroke)	230	Diesel	1728
Halsskov-Knudshoved	SPROGØ	1962	6400	Slow speed (2-stroke)	220	Fuel	1840
Hanstholm-Torshavn	Gamle Norrøna	1973	11768	Medium speed (4-stroke)	239	Diesel	2354
Hanstholm-Torshavn	Nye Norrøna	2003	21600	Medium speed (4-stroke)	190	Fuel	4320
Hirtshals-Torshavn	Nye Norrøna	2003	21600	Medium speed (4-stroke)	190	Fuel	4320
Hundested-Grenaa	DJURSLAND	1974	9856	Medium speed (4-stroke)	230	Diesel	900
Hundested-Grenaa	KATTEGAT	1995	23200	High speed (4-stroke)	205	Diesel	1223
Hundested-Grenaa	KONG FREDERIK IX	1954	6767	Slow speed (2-stroke)	235	Fuel	1375
Hundested-Grenaa	PRINSESSE ANNE-MARIE	1960	8238	Slow speed (2-stroke)	220	Fuel	1360
Kalundborg-Juelsminde	Mercandia I	1989	2950	High speed (4-stroke)	220	Diesel	0
Kalundborg-Juelsminde	Mercandia II	1989	2950	High speed (4-stroke)	220	Diesel	0
Kalundborg-Juelsminde	Mercandia III	1989	2950	High speed (4-stroke)	220	Diesel	0
Kalundborg-Juelsminde	Mercandia IV	1989	2950	High speed (4-stroke)	220	Diesel	0
Kalundborg-Samsø	HOLGER DANSKE	1976	2354	High speed (4-stroke)	225	Diesel	600
Kalundborg-Samsø	KALUNDBORG	1952	3825	Slow speed (2-stroke)	235	Fuel	570
Kalundborg-Samsø	KYHOLM	1998	2940	High speed (4-stroke)	195	Diesel	864
Kalundborg-Samsø	VESBORG	1995	1770	High speed (4-stroke)	200	Diesel	494
Kalundborg-Århus	ASK	1984	8826	Medium speed (4-stroke)	215	Diesel	2220
Kalundborg-Århus	ASK	1984	8826	Medium speed (4-stroke)	215	Diesel	3000
Kalundborg-Århus	ASK	1984	9840	Medium speed (4-stroke)	215	Diesel	3000
Kalundborg-Århus	CAT-LINK I	1995	17280	High speed (4-stroke)	205	Diesel	1160
Kalundborg-Århus	CAT-LINK II	1995	17280	High speed (4-stroke)	205	Diesel	1160
Kalundborg-Århus	CAT-LINK III	1995	22000	High speed (4-stroke)	205	Diesel	800
Kalundborg-Århus	CAT-LINK IV	1998	28320	High speed (4-stroke)	205	Diesel	920

Continued

Kalundborg-Århus	CAT-LINK V	1998	28320	High speed (4-stroke)	205	Diesel	920
Kalundborg-Århus	KATTEGAT SYD	1979	7650	Medium speed (4-stroke)	225	Diesel	1366
Kalundborg-Århus	KNUDSHOVED	1961	6400	Slow speed (2-stroke)	220	Fuel	1840
Kalundborg-Århus	KONG FREDERIK IX	1954	6767	Slow speed (2-stroke)	225	Fuel	1426
Kalundborg-Århus	KRAKA	1982	8309	Medium speed (4-stroke)	220	Diesel	740
Kalundborg-Århus	MAREN MOLS	1996	11700	Slow speed (2-stroke)	180	Diesel	2530
Kalundborg-Århus	METTE MOLS	1996	11700	Slow speed (2-stroke)	180	Diesel	2530
Kalundborg-Århus	NIELS KLIM	1986	12474	Slow speed (2-stroke)	215	Fuel	4440
Kalundborg-Århus	PEDER PAARS	1985	12474	Slow speed (2-stroke)	215	Fuel	4440
Kalundborg-Århus	PRINSESSE ELISABETH	1964	8238	Slow speed (2-stroke)	220	Fuel	1360
Kalundborg-Århus	ROSTOCK LINK	1975	8385	Medium speed (4-stroke)	230	Diesel	2500
Kalundborg-Århus	SØLØVEN/SØBJØRNEN	1992	4000	High speed (4-stroke)	210	Diesel	272
Kalundborg-Århus	URD	1981	8826	Medium speed (4-stroke)	215	Diesel	2220
Kalundborg-Århus	URD	1981	8826	Medium speed (4-stroke)	215	Diesel	3000
Kalundborg-Århus	URD	1981	9840	Medium speed (4-stroke)	215	Diesel	3000
Korsør-Nyborg, DSB	ASA-THOR	1965	6472	Slow speed (2-stroke)	220	Fuel	1305
Korsør-Nyborg, DSB	DRONNING INGRID	1980	18720	Medium speed (4-stroke)	220	Diesel	2932
Korsør-Nyborg, DSB	DRONNING MARGRETHE II	1973	8826	Medium speed (4-stroke)	230	Diesel	1692
Korsør-Nyborg, DSB	KONG FREDERIK IX	1954	6767	Slow speed (2-stroke)	225	Fuel	1426
Korsør-Nyborg, DSB	KRONPRINS FREDERIK	1981	18720	Medium speed (4-stroke)	220	Diesel	2932
Korsør-Nyborg, DSB	PRINS JOACHIM	1980	18720	Medium speed (4-stroke)	220	Diesel	2932
Korsør-Nyborg, DSB	SPROGØ/KNUDSHOVED	1962	6400	Slow speed (2-stroke)	220	Fuel	1840
Korsør-Nyborg, Vognmandsruten	Superflex Alfa	1989	2950	High speed (4-stroke)	220	Diesel	0
Korsør-Nyborg, Vognmandsruten	Superflex Bravo	1989	2950	High speed (4-stroke)	220	Diesel	0
Korsør-Nyborg, Vognmandsruten	Superflex Charlie	1988	2950	High speed (4-stroke)	220	Diesel	0
København-Rønne	JENS KOFOED	1979	12950	Medium speed (4-stroke)	233	Fuel	2889
København-Rønne	JENS KOFOED	2009	12950	Medium speed (4-stroke)	190	Fuel	2889
København-Rønne	POVL ANKER	1979	12950	Medium speed (4-stroke)	233	Fuel	2889
København-Rønne	POVL ANKER	2009	12950	Medium speed (4-stroke)	190	Fuel	2889
Køge-Rønne	DUEODDE	2005	8640	Medium speed (4-stroke)	190	Fuel	1545
Køge-Rønne	HAMMERODDE	2005	8640	Medium speed (4-stroke)	190	Fuel	1545
Køge-Rønne	JENS KOFOED	1979	12950	Medium speed (4-stroke)	233	Fuel	2889
Køge-Rønne	POVL ANKER	1979	12950	Medium speed (4-stroke)	233	Fuel	2889
Køge-Rønne	POVL ANKER	2009	12950	Medium speed (4-stroke)	190	Fuel	2889
Sjællands Odde-Ebeltoft	MAI MOLS	1996	24800	Gas turbine	240	Diesel	752
Sjællands Odde-Ebeltoft	MAREN MOLS	1975	12062	Medium speed (4-stroke)	230	Fuel	1986

Continued

Sjællands Odde-Ebeltoft	MAREN MOLS 2	1996	11700	Slow speed (2-stroke)	180	Diesel	2530
Sjællands Odde-Ebeltoft	METTE MOLS	1975	12062	Medium speed (4-stroke)	230	Fuel	1986
Sjællands Odde-Ebeltoft	METTE MOLS 2	1996	11700	Slow speed (2-stroke)	180	Diesel	2530
Sjællands Odde-Ebeltoft	MIE MOLS	1971	5884	Medium speed (4-stroke)	230	Diesel	
Sjællands Odde-Ebeltoft	MIE MOLS 2	1996	24800	Gas turbine	240	Diesel	752
Sjællands Odde-Århus	MADS MOLS	1998	28320	High speed (4-stroke)	205	Diesel	920
Sjællands Odde-Århus	MAI MOLS	1996	24800	Gas turbine	240	Diesel	752
Sjællands Odde-Århus	MAX MOLS	1998	28320	High speed (4-stroke)	205	Diesel	920
Sjællands Odde-Århus	MIE MOLS	1996	24800	Gas turbine	240	Diesel	752
Tårs-Spodsbjerg	FRIGG SYDFYEN	1984	1300	Medium speed (4-stroke)	220	Diesel	780
Tårs-Spodsbjerg	ODIN SYDFYEN	1982	1180	Medium speed (4-stroke)	220	Diesel	780
Tårs-Spodsbjerg	SPODSBJERG	1972	1530	Medium speed (4-stroke)	225	Diesel	300
Tårs-Spodsbjerg	SPODSBJERG	2006	1545	Medium speed (4-stroke)	190	Diesel	300
Tårs-Spodsbjerg	THOR SYDFYEN	1978	1176	Medium speed (4-stroke)	225	Diesel	300
Tårs-Spodsbjerg	THOR SYDFYEN	2008	1176	Medium speed (4-stroke)	190	Diesel	300
Sjællands Odde-Århus	MIE MOLS	1996	24800	Gas turbine	240	Diesel	752
Tårs-Spodsbjerg	FRIGG SYDFYEN	1984	1300	Medium speed (4-stroke)	220	Diesel	780
Tårs-Spodsbjerg	ODIN SYDFYEN	1982	1180	Medium speed (4-stroke)	220	Diesel	780
Tårs-Spodsbjerg	SPODSBJERG	1972	1530	Medium speed (4-stroke)	225	Diesel	300
Tårs-Spodsbjerg	SPODSBJERG	2006	1545	Medium speed (4-stroke)	190	Diesel	300
Tårs-Spodsbjerg	THOR SYDFYEN	1978	1176	Medium speed (4-stroke)	225	Diesel	300
Tårs-Spodsbjerg	THOR SYDFYEN	2008	1176	Medium speed (4-stroke)	190	Diesel	300

Ferry data: Sailing time (single trip).

Ferry service	Ferry name	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006-2009	2010
Esbjerg-Torshavn	Gamle Norrøna	1860	1860	1860	1860	1860	1860	1860	1860	1860	1860	1860	1860	1860	1860	1860	1860	1860	
Esbjerg-Torshavn	Nye Norrøna																1860	1860	
Halsskov-Knudshoved	ARVEPRINS KNUD	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Halsskov-Knudshoved	DRONNING MARGRETHE II	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Halsskov-Knudshoved	HEIMDAL	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Halsskov-Knudshoved	KNUDSHOVED	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Halsskov-Knudshoved	KONG FREDERIK IX	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Halsskov-Knudshoved	KRAKA	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Halsskov-Knudshoved	LODBROG	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Halsskov-Knudshoved	PRINSESSE ANNE-MARIE	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Halsskov-Knudshoved	PRINSESSE ELISABETH	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Halsskov-Knudshoved	ROMSØ	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Halsskov-Knudshoved	SPROGØ	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
Hanstholm-Torshavn	Gamle Norrøna	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	1740	
Hanstholm-Torshavn	Nye Norrøna																1740	1740	
Hirtshals-Torshavn	Nye Norrøna																	1740	
Hundested-Grenaa	DJURSLAND	160	160	160	160	160													
Hundested-Grenaa	KATTEGAT														90	90			
Hundested-Grenaa	KONG FREDERIK IX															170			
Hundested-Grenaa	PRINSESSE ANNE-MARIE															165			
Kalundborg-Juelsminde	Mercandia I	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Kalundborg-Juelsminde	Mercandia II	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Kalundborg-Juelsminde	Mercandia III	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Kalundborg-Juelsminde	Mercandia IV	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	
Kalundborg-Samsø	HOLGER DANSKE														120	120	120	120	
Kalundborg-Samsø	KALUNDBORG	120	120	120															
Kalundborg-Samsø	KYHOLM																110	110	
Kalundborg-Samsø	VESBORG																	120	
Kalundborg-Århus	ASK														195	195	195	195	
Kalundborg-Århus	CAT-LINK I															80	85	90	95
Kalundborg-Århus	CAT-LINK II															80	85	90	95
Kalundborg-Århus	CAT-LINK III															85	90	95	
Kalundborg-Århus	CAT-LINK IV																	80	80
Kalundborg-Århus	CAT-LINK V																	80	80
Kalundborg-Århus	KATTEGAT SYD																	195	
Kalundborg-Århus	KNUDSHOVED														190				

Continued

Kalundborg-Århus	KONG FREDERIK IX	190	190	190	190	190	190																			
Kalundborg-Århus	KRAKA							195																		
Kalundborg-Århus	MAREN MOLS								160	160	155	155	155	155	155	165	165									
Kalundborg-Århus	METTE MOLS								160	160	155	155	155	155	155	165	165									
Kalundborg-Århus	NIELS KLIM	185	185																							
Kalundborg-Århus	PEDER PAARS	185	185																							
Kalundborg-Århus	PRINSESSE ELISABETH		185																							
Kalundborg-Århus	ROSTOCK LINK							195																		
Kalundborg-Århus	SØLØVEN/SØBJØRNEN	90	90	90	90	90	90																			
Kalundborg-Århus	URD	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195				
Korsør-Nyborg, DSB	ASA-THOR	65	65	65	65	65	65	65	65	65	65	65	65	65	65											
Korsør-Nyborg, DSB	DRONNING INGRID	65	65	65	65	65	65	65	65	65	65	65	65	65	65											
Korsør-Nyborg, DSB	DRONNING MARGRETHE II	65	65	65	65	65	65	65	65	65	65	65	65	65	65											
Korsør-Nyborg, DSB	KONG FREDERIK IX	75	75	75	75	75	75	75	75	75	75	75	75	75	75											
Korsør-Nyborg, DSB	KRONPRINS FREDERIK	65	65	65	65	65	65	65	65	65	65	65	65	65	65											
Korsør-Nyborg, DSB	PRINS JOACHIM	65	65	65	65	65	65	65	65	65	65	65	65	65	65											
Korsør-Nyborg, DSB	SPROGØ/KNUDSHOVED	75	75	75	75	75	75	75	75	75	75	75	75	75	75											
Korsør-Nyborg, Vognmandsruten	Superflex Alfa	70	70	70	70	70	70	70	70	70	70	70	70	70	70											
Korsør-Nyborg, Vognmandsruten	Superflex Bravo	70	70	70	70	70	70	70	70	70	70	70	70	70	70											
Korsør-Nyborg, Vognmandsruten	Superflex Charlie	70	70	70	70	70	70	70	70	70	70	70	70	70	70											
København-Rønne	JENS KOFOED	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420			
København-Rønne	POVL ANKER	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420	420			
Køge-Rønne	DUEODDE																			375	375	375				
Køge-Rønne	HAMMERODDE																			375	375	375				
Køge-Rønne	JENS KOFOED																			375	375	375				
Køge-Rønne	POVL ANKER																			375	375	375				
Sjælland Odde-Ebeltoft	MAI MOLS							45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	50	50		
Sjælland Odde-Ebeltoft	MAREN MOLS	100	100	100	100	100	100	100																		
Sjælland Odde-Ebeltoft	MAREN MOLS 2							100	100	100	100	100	100	100	100	100	100	100	100	100	100	100				
Sjælland Odde-Ebeltoft	METTE MOLS	100	100	100	100	100	100	100																		
Sjælland Odde-Ebeltoft	METTE MOLS 2							100	100	100	100	100	100	100	100	100	100	100	100	100	100	100				
Sjælland Odde-Ebeltoft	MIE MOLS	105	105	105	105	105	105	105	105																	
Sjælland Odde-Ebeltoft	MIE MOLS 2							45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	50	50		
Sjælland Odde-Århus	MADS MOLS																		60	65	65	65	65	70	70	
Sjælland Odde-Århus	MAI MOLS																			65	65	65	65	65	68	68
Sjælland Odde-Århus	MAX MOLS																		60	65	65	65	65	70	70	
Sjælland Odde-Århus	MIE MOLS																			65	65	65	65	65	68	68

Continued

Tårs-Spodsbjerg	FRIGG SYDFYEN	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Tårs-Spodsbjerg	ODIN SYDFYEN	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Tårs-Spodsbjerg	SPODSBJERG	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Tårs-Spodsbjerg	THOR SYDFYEN	45	45	45	45	45	17	45	45	45	45	45	45	45	45	45	45	45	45

Ferry data: Load factor (% MCR).

Ferry service	Ferry name	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Esbjerg-Torshavn	Gamle Norrøna	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	
Esbjerg-Torshavn	Nye Norrøna																					
Halsskov-Knudshoved	ARVEPRINS KNUD	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Halsskov-Knudshoved	DRONNING MARGRETHE II	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Halsskov-Knudshoved	HEIMDAL	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Halsskov-Knudshoved	KNUDSHOVED	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Halsskov-Knudshoved	KONG FREDERIK IX	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Halsskov-Knudshoved	KRAKA	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Halsskov-Knudshoved	LODBROG	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Halsskov-Knudshoved	PRINSESSE ANNE-MARIE	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Halsskov-Knudshoved	PRINSESSE ELISABETH	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Halsskov-Knudshoved	ROMSØ	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Halsskov-Knudshoved	SPROGØ	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
Hanstholm-Torshavn	Gamle Norrøna	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	
Hanstholm-Torshavn	Nye Norrøna																					
Hirtshals-Torshavn	Nye Norrøna																				90	
Hundested-Grenaa	DJURSLAND	80	80	80	80	80																
Hundested-Grenaa	KATTEGAT																					
Hundested-Grenaa	KONG FREDERIK IX																					
Hundested-Grenaa	PRINSESSE ANNE-MARIE																					
Kalundborg-Juelsminde	Mercandia I	75	75	75	75	75	75	75	75													
Kalundborg-Juelsminde	Mercandia II	70	70	70	70	70	70	70	70													
Kalundborg-Juelsminde	Mercandia III	70	70	70	70	70	70	70	70													
Kalundborg-Juelsminde	Mercandia IV	70	70	70	70	70	70	70	70													
Kalundborg-Samsø	HOLGER DANSKE																					
Kalundborg-Samsø	KALUNDBORG	80	80	80																		
Kalundborg-Samsø	KYHOLM																					
Kalundborg-Samsø	VESBORG																					
Kalundborg-Århus	ASK	85	85	85	80	80	80	80	80													
Kalundborg-Århus	CAT-LINK I																					
Kalundborg-Århus	CAT-LINK II																					
Kalundborg-Århus	CAT-LINK III																					
Kalundborg-Århus	CAT-LINK IV																					

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Kalundborg-Århus	CAT-LINK V													95	95
Kalundborg-Århus	KATTEGAT SYD													85	
Kalundborg-Århus	KNUDSHOVED	85													
Kalundborg-Århus	KONG FREDERIK IX	85	85	85	85	85	85								
Kalundborg-Århus	KRAKA												85		
Kalundborg-Århus	MAREN MOLS												85	85	85
Kalundborg-Århus	METTE MOLS												85	85	85
Kalundborg-Århus	NIELS KLIM	85	85												
Kalundborg-Århus	PEDER PAARS	85	85												
Kalundborg-Århus	PRINSESSE ELISABETH	80													
Kalundborg-Århus	ROSTOCK LINK												80		
Kalundborg-Århus	SØLØVEN/SØBJØRNEN	90	90	90	90	90	90								
Kalundborg-Århus	URD	85	85	85	85	85	85	85	85	80	80				
Korsør-Nyborg, DSB	ASA-THOR	85	85	85	85	85	85	85	85						
Korsør-Nyborg, DSB	DRONNING INGRID	60	60	60	60	60	60	60	60	60					
Korsør-Nyborg, DSB	DRONNING MARGRETHE II	85	85	85	85	85	85	85	85	85					
Korsør-Nyborg, DSB	KONG FREDERIK IX	70	70	70	70	70	70	70	70	70					
Korsør-Nyborg, DSB	KRONPRINS FREDERIK	60	60	60	60	60	60	60	60	60					
Korsør-Nyborg, DSB	PRINS JOACHIM	60	60	60	60	60	60	60	60	60					
Korsør-Nyborg, DSB	SPROGØ/KNUDSHOVED	70	70	70	70	70	70	70	70	70					
Korsør-Nyborg, Vognmandsruten	Superflex Alfa	70	70	70	70	70	70	70	70	70	70				
Korsør-Nyborg, Vognmandsruten	Superflex Bravo	70	70	70	70	70	70	70	70	70	70				
Korsør-Nyborg, Vognmandsruten	Superflex Charlie	70	70	70	70	70	70	70	70	70	70				
København-Rønne	JENS KOFOED	31	31	31	31	31	31	31	31	31	31	31	31	31	31
København-Rønne	POVL ANKER	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Køge-Rønne	DUEODDE													69	65
Køge-Rønne	HAMMERODDE													69	65
Køge-Rønne	JENS KOFOED													31	31
Køge-Rønne	POVL ANKER													31	31
Sjælland Odde-Ebeltoft	MAI MOLS													45	49
Sjælland Odde-Ebeltoft	MAREN MOLS	75	75	75	75	75	75	75						49	49
Sjælland Odde-Ebeltoft	MAREN MOLS 2													49	49
Sjælland Odde-Ebeltoft	METTE MOLS	75	75	75	75	75	75	75							
Sjælland Odde-Ebeltoft	METTE MOLS 2													80	80

Ferry data: Round trip shares (%).

Ferry service	Ferry name	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007-2009	2010
Esbjerg-Torshavn	Gamle Norrøna	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
Esbjerg-Torshavn	Nye Norrøna																	100	100	
Halsskov-Knudshoved	ARVEPRINS KNUD	21	20	20	20	21	19	19	18	20										
Halsskov-Knudshoved	DRONNING MARGRETHE II	2	0	0	0	0	0	0	0	0										
Halsskov-Knudshoved	HEIMDAL	23	24	22	24	23	21	21	19	22										
Halsskov-Knudshoved	KNUDSHOVED	0	0	0	0	0	0	2	5	0										
Halsskov-Knudshoved	KONG FREDERIK IX	0	0	0	0	0	0	0	0	0										
Halsskov-Knudshoved	KRAKA	24	25	23	23	21	20	20	20	21										
Halsskov-Knudshoved	LODBROG	0	0	0	0	0	0	0	7	14										
Halsskov-Knudshoved	PRINSESSE ANNE-MARIE	0	0	0	0	0	6	2	0	0										
Halsskov-Knudshoved	PRINSESSE ELISABETH	0	0	0	3	0	0	0	0	0										
Halsskov-Knudshoved	ROMSØ	21	22	21	16	20	19	21	21	23										
Halsskov-Knudshoved	SPROGØ	9	9	15	14	15	15	14	11	1										
Hanstholm-Torshavn	Gamle Norrøna	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
Hanstholm-Torshavn	Nye Norrøna																	100	100	
Hirtshals-Torshavn	Nye Norrøna																	100	100	
Hundested-Grenaa	DJURSLAND	100	100	100	100	50														
Hundested-Grenaa	KATTEGAT						100	100												
Hundested-Grenaa	KONG FREDERIK IX						5													
Hundested-Grenaa	PRINSESSE ANNE-MARIE						45													
Kalundborg-Juelsminde	Mercandia I	25	25	25	25	25	25	25	25											
Kalundborg-Juelsminde	Mercandia II	25	25	25	25	25	25	25	25											
Kalundborg-Juelsminde	Mercandia III	25	25	25	25	25	25	25	25											
Kalundborg-Juelsminde	Mercandia IV	25	25	25	25	25	25	25	25											
Kalundborg-Samsø	HOLGER DANSKE				95	100	100	100	100	92										
Kalundborg-Samsø	KALUNDBORG	100	100	5																
Kalundborg-Samsø	KYHOLM										6	100	100	100	100	100	100	100	100	
Kalundborg-Samsø	VESBORG										2									
Kalundborg-Århus	ASK	16	32	26	33	27	18	11	12	2										
Kalundborg-Århus	CAT-LINK I						17	25	28	11										
Kalundborg-Århus	CAT-LINK II							1	23	28	8									
Kalundborg-Århus	CAT-LINK III								8	24	19									
Kalundborg-Århus	CAT-LINK IV									23	26									
Kalundborg-Århus	CAT-LINK V										15	26								
Kalundborg-Århus	KATTEGAT SYD										2									
Kalundborg-Århus	KNUDSHOVED		4																	

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Tårs-Spodsbjerg	ODIN SYDFYEN	41	40	39	38	36	36	36	32	33	45	45	45	45	45	45	45	45	45	45	45
Tårs-Spodsbjerg	SPODSBJERG	4	2	8	8	9	8	8	19	20	10	10	10	10	10	10	10	10	10	10	10
Tårs-Spodsbjerg	THOR SYDFYEN	14	18	14	16	19	20	20	17	14	0	0	0	0	0	0	0	0	0	0	0

Annex 13 Fuel consumption and emission factors, engine specific (NO_x, CO, VOC (NMVOC and CH₄)), and fuel type specific (S-%, SO₂, PM) for ship engines

Specific fuel consumption and NO_x emission factors (g pr kWh) per engine year for diesel ship engines.

Year	High speed	Medium speed	Slow speed	High speed	Medium speed	Slow speed
	4-stroke sfc (g pr kWh)	4-stroke sfc (g pr kWh)	2-stroke sfc (g pr kWh)	4-stroke NO _x (g pr kWh)	4-stroke NO _x (g pr kWh)	2-stroke NO _x (g pr kWh)
1949	265.5	255.5	235.5	7.3	8.0	14.5
1950	265.0	255.0	235.0	7.3	8.0	14.5
1951	264.5	254.5	234.5	7.3	8.0	14.5
1952	264.0	254.0	234.0	7.3	8.0	14.5
1953	263.5	253.5	233.5	7.3	8.0	14.5
1954	263.0	253.0	233.0	7.3	8.0	14.5
1955	262.4	252.4	232.4	7.3	8.0	14.5
1956	261.9	251.9	231.9	7.4	8.1	14.6
1957	261.3	251.3	231.3	7.5	8.2	14.7
1958	260.7	250.7	230.7	7.6	8.3	14.8
1959	260.1	250.1	230.1	7.7	8.4	14.9
1960	259.5	249.5	229.5	7.8	8.5	15.0
1961	258.9	248.9	228.9	7.9	8.6	15.1
1962	258.2	248.2	228.2	8.0	8.7	15.1
1963	257.6	247.6	227.6	8.1	8.8	15.2
1964	256.9	246.9	226.9	8.2	8.9	15.3
1965	256.1	246.1	226.1	8.3	9.0	15.4
1966	255.4	245.4	225.4	8.3	9.1	15.5
1967	254.6	244.6	224.6	8.4	9.2	15.6
1968	253.8	243.8	223.8	8.5	9.3	15.7
1969	253.0	243.0	223.0	8.6	9.4	15.8
1970	252.1	242.1	222.1	8.7	9.5	15.9
1971	251.2	241.2	221.2	8.8	9.6	16.0
1972	250.3	240.3	220.3	8.9	9.7	16.1
1973	249.3	239.3	219.3	9.0	9.8	16.2
1974	248.3	238.3	218.3	9.1	9.9	16.3
1975	247.3	237.3	217.3	9.2	10.0	16.4
1976	246.2	236.2	216.2	9.3	10.1	16.4
1977	245.0	235.0	215.0	9.3	10.2	16.5
1978	243.8	233.8	213.8	9.4	10.3	16.6
1979	242.6	232.6	212.6	9.5	10.4	16.7
1980	241.3	231.3	211.3	9.6	10.5	16.8
1981	239.9	229.9	209.9	9.7	10.6	16.9
1982	238.5	228.5	208.5	9.8	10.7	17.0
1983	237.0	227.0	207.0	9.9	10.8	17.4
1984	235.5	225.5	205.5	10.0	10.9	17.8
1985	233.9	223.9	203.9	10.1	11.0	18.2
1986	232.2	222.2	202.2	10.2	11.1	18.6
1987	230.5	220.5	200.5	10.3	11.3	19.0
1988	228.6	218.6	198.6	10.5	11.4	19.3
1989	226.7	216.7	196.7	10.6	11.6	19.5
1990	224.8	214.8	194.8	10.7	11.7	19.8
1991	222.7	212.7	192.7	10.9	11.9	20.0
1992	220.5	210.5	190.5	11.0	12.0	19.8
1993	218.3	208.3	188.3	11.1	12.1	19.6
1994	216.0	206.0	186.0	11.3	12.3	19.4
1995	213.6	203.6	183.6	11.4	12.4	19.3
1996	211.0	201.0	181.0	11.5	12.6	19.1
1997	208.4	198.4	178.4	11.7	12.7	18.9
1998	205.7	195.7	175.7	11.8	12.9	18.7

Continued						
Year	High speed 4-stroke sfc (g pr kWh)	Medium speed 4-stroke sfc (g pr kWh)	Slow speed 2-stroke sfc (g pr kWh)	High speed 4-stroke NOx (g pr kWh)	Medium speed 4-stroke NOx (g pr kWh)	
					Slow speed 2-stroke NOx (g pr kWh)	
1999	202.9	192.9	172.9	11.9	13.0	18.5
2000	199.9	189.9	169.9	11.0	12.0	16.0

CO, VOC, NMVOC and CH₄ emission factors (g/kg fuel) for ship engines

	High speed 4-stroke CO	Medium speed 4-stroke CO	Slow speed 2-stroke CO	High speed 4-stroke VOC	Medium speed 4-stroke VOC	Slow speed 2-stroke VOC
1949	6.03	6.26	6.79	1.88	1.96	2.12
1950	6.04	6.27	6.81	1.89	1.96	2.13
1951	6.05	6.29	6.82	1.89	1.96	2.13
1952	6.06	6.30	6.84	1.89	1.97	2.14
1953	6.07	6.31	6.85	1.90	1.97	2.14
1954	6.08	6.33	6.87	1.90	1.98	2.15
1955	6.10	6.34	6.88	1.91	1.98	2.15
1956	6.11	6.35	6.90	1.91	1.99	2.16
1957	6.12	6.37	6.92	1.91	1.99	2.16
1958	6.14	6.38	6.93	1.92	1.99	2.17
1959	6.15	6.40	6.95	1.92	2.00	2.17
1960	6.17	6.41	6.97	1.93	2.00	2.18
1961	6.18	6.43	6.99	1.93	2.01	2.18
1962	6.20	6.45	7.01	1.94	2.01	2.19
1963	6.21	6.46	7.03	1.94	2.02	2.20
1964	6.23	6.48	7.05	1.95	2.03	2.20
1965	6.25	6.50	7.08	1.95	2.03	2.21
1966	6.26	6.52	7.10	1.96	2.04	2.22
1967	6.28	6.54	7.12	1.96	2.04	2.23
1968	6.30	6.56	7.15	1.97	2.05	2.23
1969	6.32	6.58	7.17	1.98	2.06	2.24
1970	6.35	6.61	7.20	1.98	2.06	2.25
1971	6.37	6.63	7.23	1.99	2.07	2.26
1972	6.39	6.66	7.26	2.00	2.08	2.27
1973	6.42	6.69	7.29	2.01	2.09	2.28
1974	6.44	6.71	7.33	2.01	2.10	2.29
1975	6.47	6.74	7.36	2.02	2.11	2.30
1976	6.50	6.77	7.40	2.03	2.12	2.31
1977	6.53	6.81	7.44	2.04	2.13	2.33
1978	6.56	6.84	7.48	2.05	2.14	2.34
1979	6.60	6.88	7.53	2.06	2.15	2.35
1980	6.63	6.92	7.57	2.07	2.16	2.37
1981	6.67	6.96	7.62	2.08	2.17	2.38
1982	6.71	7.00	7.67	2.10	2.19	2.40
1983	6.75	7.05	7.73	2.11	2.20	2.42
1984	6.79	7.10	7.79	2.12	2.22	2.43
1985	6.84	7.15	7.85	2.14	2.23	2.45
1986	6.89	7.20	7.91	2.15	2.25	2.47
1987	6.94	7.26	7.98	2.17	2.27	2.49
1988	7.00	7.32	8.05	2.19	2.29	2.52
1989	7.06	7.38	8.13	2.21	2.31	2.54
1990	7.12	7.45	8.22	2.22	2.33	2.57
1991	7.18	7.52	8.30	2.25	2.35	2.59
1992	7.25	7.60	8.40	2.27	2.37	2.62
1993	7.33	7.68	8.50	2.29	2.40	2.66
1994	7.41	7.77	8.60	2.31	2.43	2.69

Continued

1995	7.49	7.86	8.72	2.34	2.46	2.72
1996	7.58	7.96	8.84	2.37	2.49	2.76
1997	7.68	8.06	8.97	2.40	2.52	2.80
1998	7.78	8.18	9.11	2.43	2.56	2.85
1999	7.89	8.30	9.26	2.46	2.59	2.89
2000	8.00	8.43	9.42	2.50	2.63	2.94

Year	High speed	Medium speed	Slow speed	High speed	Medium speed	Slow speed
	4-stroke	4-stroke	2-stroke	4-stroke	4-stroke	2-stroke
	NMVOC	NMVOC	NMVOC	CH ₄	CH ₄	CH ₄
1949	1.83	1.90	2.06	0.06	0.06	0.06
1950	1.83	1.90	2.06	0.06	0.06	0.06
1951	1.83	1.91	2.07	0.06	0.06	0.06
1952	1.84	1.91	2.07	0.06	0.06	0.06
1953	1.84	1.91	2.08	0.06	0.06	0.06
1954	1.84	1.92	2.08	0.06	0.06	0.06
1955	1.85	1.92	2.09	0.06	0.06	0.06
1956	1.85	1.93	2.09	0.06	0.06	0.06
1957	1.86	1.93	2.10	0.06	0.06	0.06
1958	1.86	1.93	2.10	0.06	0.06	0.07
1959	1.86	1.94	2.11	0.06	0.06	0.07
1960	1.87	1.94	2.11	0.06	0.06	0.07
1961	1.87	1.95	2.12	0.06	0.06	0.07
1962	1.88	1.95	2.13	0.06	0.06	0.07
1963	1.88	1.96	2.13	0.06	0.06	0.07
1964	1.89	1.96	2.14	0.06	0.06	0.07
1965	1.89	1.97	2.14	0.06	0.06	0.07
1966	1.90	1.98	2.15	0.06	0.06	0.07
1967	1.90	1.98	2.16	0.06	0.06	0.07
1968	1.91	1.99	2.17	0.06	0.06	0.07
1969	1.92	2.00	2.17	0.06	0.06	0.07
1970	1.92	2.00	2.18	0.06	0.06	0.07
1971	1.93	2.01	2.19	0.06	0.06	0.07
1972	1.94	2.02	2.20	0.06	0.06	0.07
1973	1.95	2.03	2.21	0.06	0.06	0.07
1974	1.95	2.04	2.22	0.06	0.06	0.07
1975	1.96	2.04	2.23	0.06	0.06	0.07
1976	1.97	2.05	2.24	0.06	0.06	0.07
1977	1.98	2.06	2.26	0.06	0.06	0.07
1978	1.99	2.07	2.27	0.06	0.06	0.07
1979	2.00	2.09	2.28	0.06	0.06	0.07
1980	2.01	2.10	2.30	0.06	0.06	0.07
1981	2.02	2.11	2.31	0.06	0.07	0.07
1982	2.03	2.12	2.33	0.06	0.07	0.07
1983	2.05	2.14	2.34	0.06	0.07	0.07
1984	2.06	2.15	2.36	0.06	0.07	0.07
1985	2.07	2.17	2.38	0.06	0.07	0.07
1986	2.09	2.18	2.40	0.06	0.07	0.07
1987	2.10	2.20	2.42	0.07	0.07	0.07
1988	2.12	2.22	2.44	0.07	0.07	0.08
1989	2.14	2.24	2.47	0.07	0.07	0.08
1990	2.16	2.26	2.49	0.07	0.07	0.08
1991	2.18	2.28	2.52	0.07	0.07	0.08
1992	2.20	2.30	2.55	0.07	0.07	0.08
1993	2.22	2.33	2.58	0.07	0.07	0.08
1994	2.25	2.35	2.61	0.07	0.07	0.08

Continued

1995	2.27	2.38	2.64	0.07	0.07	0.08
1996	2.30	2.41	2.68	0.07	0.07	0.08
1997	2.33	2.44	2.72	0.07	0.08	0.08
1998	2.36	2.48	2.76	0.07	0.08	0.09
1999	2.39	2.51	2.81	0.07	0.08	0.09
2000	2.43	2.55	2.85	0.08	0.08	0.09

S-%, SO₂ and PM emission factors (g per kg fuel and g per GJ) per fuel type for diesel ship engines

Fuel type	SNAPCode	Year	S %	SO ₂ (g/kg)	TSP (g/kg)	PM ₁₀ (g/kg)	PM _{2.5} (g/kg)	SO ₂ (g/GJ)	TSP (g/GJ)	PM ₁₀ (g/GJ)	PM _{2.5} (g/GJ)
Fuel	National sea	1990	2,64	52,8	6,1	6,0	6,0	1291,0	149,2	147,8	147,0
Fuel	National sea	1991	2,35	47,0	4,9	4,9	4,8	1149,1	120,2	119,0	118,4
Fuel	National sea	1992	1,80	36,0	3,3	3,2	3,2	880,2	79,8	79,0	78,6
Fuel	National sea	1993	2,39	47,8	5,1	5,0	5,0	1168,7	123,9	122,6	122,0
Fuel	National sea	1994	2,62	52,4	6,0	6,0	5,9	1281,2	147,0	145,6	144,8
Fuel	National sea	1995	2,95	59,0	7,7	7,6	7,6	1442,5	188,0	186,1	185,2
Fuel	National sea	1996	2,57	51,4	5,8	5,7	5,7	1256,7	141,7	140,2	139,5
Fuel	National sea	1997	2,74	54,8	6,6	6,5	6,5	1339,9	160,8	159,2	158,4
Fuel	National sea	1998	1,97	39,4	3,7	3,7	3,6	963,3	90,6	89,7	89,2
Fuel	National sea	1999	1,97	39,4	3,7	3,7	3,6	963,3	90,6	89,7	89,2
Fuel	National sea	2000	1,81	36,2	3,3	3,3	3,2	885,1	80,4	79,6	79,2
Fuel	National sea	2001	1,70	34,0	3,0	3,0	3,0	831,3	74,1	73,4	73,0
Fuel	National sea	2002	1,51	30,2	2,6	2,6	2,6	738,4	64,3	63,7	63,3
Fuel	National sea	2003	1,62	32,4	2,9	2,8	2,8	792,2	69,8	69,1	68,8
Fuel	National sea	2004	1,98	39,6	3,7	3,7	3,7	968,2	91,3	90,4	89,9
Fuel	National sea	2005	2,00	40,0	3,8	3,8	3,7	978,0	92,6	91,7	91,3
Fuel	National sea	2006	1,94	38,8	3,6	3,6	3,6	948,7	88,6	87,7	87,3
Fuel	National sea	2007	1,20	24,0	2,1	2,1	2,1	586,8	51,0	50,5	50,3
Fuel	National sea	2008	1,20	24,0	2,1	2,1	2,1	586,8	51,0	50,5	50,3
Fuel	National sea	2009	1,20	24,0	2,1	2,1	2,1	586,8	51,0	50,5	50,3
Fuel	International sea	1990	2,96	59,2	7,7	7,7	7,6	1447,4	189,4	187,5	186,6
Fuel	International sea	1991	2,89	57,8	7,4	7,3	7,2	1413,2	179,8	178,0	177,1
Fuel	International sea	1992	2,88	57,6	7,3	7,2	7,2	1408,3	178,5	176,7	175,8
Fuel	International sea	1993	3,20	64,0	9,3	9,2	9,1	1564,8	226,5	224,2	223,1
Fuel	International sea	1994	3,03	60,6	8,2	8,1	8,0	1481,7	199,6	197,6	196,6
Fuel	International sea	1995	3,30	66,0	10,0	9,9	9,8	1613,7	244,0	241,6	240,4
Fuel	International sea	1996	3,42	68,4	10,9	10,8	10,8	1672,4	266,9	264,2	262,9
Fuel	International sea	1997	3,45	69,0	11,2	11,0	11,0	1687,0	272,9	270,2	268,8
Fuel	International sea	1998	3,42	68,4	10,9	10,8	10,8	1672,4	266,9	264,2	262,9
Fuel	International sea	1999	3,45	69,0	11,2	11,0	11,0	1687,0	272,9	270,2	268,8
Fuel	International sea	2000	3,36	67,2	10,4	10,3	10,3	1643,0	255,2	252,6	251,4
Fuel	International sea	2001	3,42	68,4	10,9	10,8	10,8	1672,4	266,9	264,2	262,9
Fuel	International sea	2002	3,44	68,8	11,1	11,0	10,9	1682,2	270,9	268,2	266,8
Fuel	International sea	2003	3,11	62,2	8,7	8,6	8,5	1520,8	211,8	209,7	208,6
Fuel	International sea	2004	3,20	64,0	9,3	9,2	9,1	1564,8	226,5	224,2	223,1
Fuel	International sea	2005	3,50	70,0	11,6	11,5	11,4	1711,5	283,2	280,4	279,0

Continued

Fuel	International sea	2006	3,35	67,0	10,4	10,3	10,2	1638,1	253,3	250,8	249,5
Fuel	International sea	2007	1,50	30,0	2,6	2,6	2,6	733,5	63,8	63,2	62,9
Fuel	International sea	2008	1,50	30,0	2,6	2,6	2,6	733,5	63,8	63,2	62,9
Fuel	International sea	2009	1,50	30,0	2,6	2,6	2,6	733,5	63,8	63,2	62,9
Fuel	International sea	1990	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	1991	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	1992	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	1993	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	1994	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	1995	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	1996	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	1997	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	1998	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	1999	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	2000	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	2001	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	2002	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	2003	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	2004	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	2005	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	2006	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	2007	0,20	4,0	1,0	1,0	1,0	93,7	23,2	23,0	22,9
Diesel	-	2008	0,10	2,0	0,9	0,9	0,9	46,8	21,5	21,3	21,2
Diesel	-	2009	0,10	2,0	0,9	0,9	0,9	46,8	21,5	21,3	21,2

Annex 14: Fuel sales figures from DEA, and further processed fuel consumption data suited for the Danish inventory

Enhed: TJ	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agriculture and forestry, DEA statistics															
- LPG	88	84	354	311	457	438	412	359	234	205	204	212	184	219	162
- gasoline	425	184	315	317	304	274	251	240	208	166	161	191	70	61	56
- gas/diesel oil	9 199	9 634	9 498	9 520	10 605	10 528	10 700	11 028	11 423	11 494	11 585	13 088	13 875	13 310	13 909
Nurseries, DEA statistics															
- LPG	8	5	47	47	53	50	47	39	26	23	23	22	20	24	17
- gasoline	10	3	6	6	11	10	10	12	23	18	18	19	7	6	6
- gas/diesel oil	1 705	1 270	1 405	1 383	1 231	1 409	1 687	1 887	1 205	963	1 138	487	356	341	347
Fishery, DEA statistics															
- LPG	-	-	34	29	50	42	34	30	12	18	16	36	5	1	16
- gasoline	-	1	2	2	9	9	10	8	7	7	8	7	6	6	60
- kerosene	7	2	9	5	12	26	9	5	4	3	4	3	3	2	0
- gas/diesel oil	9 152	10 248	8 390	9 499	10 038	10 422	10 809	10 868	8 843	8 796	8 277	8 750	8 748	9 186	9 282
- fuel oil	27	5	82	68	251	285	113	231	146	8	19	219	260	27	-
Manufacturing industry, DEA statistics															
- LPG	2 860	2 839	2 688	2 553	2 080	2 032	2 076	1 827	1 858	2 029	2 234	2 404	2 106	2 017	1 917
- gasoline	262	273	453	326	136	177	161	158	145	138	110	86	82	137	80
- gas/diesel oil	15 576	15 441	14 743	13 346	12 670	12 259	12 934	11 901	11 323	10 154	10 401	10 184	8 921	8 720	8 852
- fuel oil	29 465	29 451	21 518	19 056	16 741	15 989	17 133	16 694	14 600	15 438	14 000	12 632	11 009	10 943	8 704
Building and construction, DEA statistics															
- LPG	305	343	500	451	575	500	573	708	579	522	501	509	471	575	422
- gasoline	19	85	52	48	36	34	26	24	20	23	25	34	27	23	27
- gas/diesel oil	5 313	4 962	4 378	4 220	3 945	3 548	3 797	3 839	3 871	4 145	5 317	5 572	6 079	5 947	6 556
Housing, DEA statistics															
- gasoline	1 006	1 046	1 073	1 114	1 128	1 131	1 146	1 158	1 168	1 194	1 233	1 258	1 299	1 317	1 357
- gas/dieselolie	74 257	69 392	68 349	59 832	46 935	41 152	45 219	38 406	45 029	39 770	40 004	41 836	36 491	34 902	32 936
Tower blocks															
- gas/dieselolie	10 584	9 968	10 112	7 266	7 350	5 311	5 420	4 507	4 938	3 909	3 284	3 460	3 105	2 948	2 739
Road transport, DEA statistics															
- gasoline	66 037	68 670	70 502	73 151	74 152	74 326	75 290	76 084	76 697	78 425	80 998	82 656	85 341	86 520	89 129
- gas/diesel oil	45 609	49 738	49 626	49 686	51 854	54 746	58 427	57 511	56 796	58 755	58 561	59 851	60 528	61 072	63 619
- bioethanol	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- biodiesel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Non-road, DEA statistics															
- LPG	2 955	2 929	3 089	2 911	2 590	2 520	2 535	2 224	2 118	2 257	2 461	2 638	2 310	2 260	2 097
- gasoline	1 722	1 590	1 898	1 810	1 616	1 626	1 595	1 592	1 563	1 540	1 547	1 589	1 485	1 545	1 526
- gas/diesel oil	31 793	31 307	30 025	28 469	28 451	27 744	29 118	28 655	27 822	26 755	28 441	29 331	29 231	28 319	29 665
Non-road, NERI model															
- LPG	1 232	1 233	1 225	1 209	1 196	1 185	1 172	1 151	1 124	1 105	1 099	1 088	1 075	1 086	1 077
- gasoline	2 998	2 950	2 903	2 856	2 813	2 770	2 702	2 641	2 587	2 550	2 521	2 499	2 479	2 463	2 456
- gas/diesel oil	26 357	26 895	26 577	27 075	26 940	26 800	26 734	26 046	26 073	25 235	25 798	25 139	25 536	24 844	24 885
Recreational craft, NERI model															
- gasoline	270	270	279	289	299	309	319	329	339	348	358	368	377	385	391
- gas/diesel oil	219	219	247	277	309	343	378	415	454	495	537	581	628	676	726
Non-road, added 0202															
- gas/diesel oil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-road, added 0203 and 0301															
- gas/diesel oil	5 436	4 412	3 448	1 395	1 510	944	2 384	2 609	1 748	1 521	2 642	4 192	3 695	3 475	4 780
- LPG	1 724	1 696	1 864	1 701	1 393	1 335	1 363	1 073	994	1 152	1 362	1 549	1 235	1 175	1 020
Non-road, added 0203															
- gas/diesel oil	1 864	1 537	1 252	534	628	406	1 014	1 176	794	708	1 182	1 940	1 799	1 675	2 297
- LPG	56	52	242	209	274	259	247	192	122	116	125	137	109	126	87
Non-road, added 0301															
- gas/diesel oil	3 572	2 875	2 196	860	882	538	1 370	1 433	955	813	1 460	2 252	1 896	1 800	2 483
- LPG	1 668	1 644	1 622	1 492	1 119	1 076	1 116	881	872	1 036	1 237	1 412	1 126	1 048	933
Non-road, added road transport															
- gasoline	-1 276	-1 360	-1 005	-1 046	-1 197	-1 145	-1 107	-1 049	-1 023	-1 010	-975	-909	-994	-918	-931
Fisheries, added national sea transport															
- fuel oil	27	5	82	68	251	285	113	231	146	8	19	219	260	27	0
Fisheries, consumed by recreational craft															
- gasoline	0	1	2	2	9	9	10	8	7	7	8	7	6	6	60
National sea transport, input NERI model															
- LPG	3	1	3	-	2	2	2	3	16	1	2	1	2	3	1
- kerosene	5	-	5	3	1	0	2	1	1	1	1	1	0	1	0
- gas/diesel oil	3 074	3 045	3 032	3 230	2 669	2 782	3 313	3 501	4 971	5 035	6 049	6 764	5 899	4 113	3 409
- fuel oil	2 541	3 424	3 922	2 795	4 228	3 845	4 429	3 646	2 797	2 160	1 592	1 379	1 210	1 367	1 435
Fisheries, input NERI model															
- LPG	-	-	34	29	50	42	34	30	12	18	16	36	5	1	16
- gasoline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

- kerosene	7	2	9	5	12	26	9	5	4	3	4	3	3	2	0
- gas/diesel oil	8 932	10 029	8 143	9 222	9 729	10 080	10 431	10 453	8 389	8 301	7 740	8 169	8 120	8 510	8 556
International sea transport, input NERI model															
- gas/diesel oil	7 171	7 867	8 547	9 743	10 514	11 633	12 590	16 881	19 114	24 123	26 743	27 231	25 325	31 243	26 085
- fuel oil	10 123	12 236	20 883	27 532	27 667	28 543	23 470	20 998	36 988	39 024	39 509	35 739	32 427	26 952	28 526
National sea transport, output NERI model															
- gas/diesel oil	5285	5285	5285	5285	5285	5285	6015	6920	6673	6618	7028	8465	8967	7333	6201
- fuel oil	4571	4571	4571	4571	4571	4571	3926	3202	3201	3362	3382	2826	2052	1590	1455
- kerosene	5	0	5	3	1	0	2	1	1	1	1	1	0	1	0
- LPG	3	1	3	0	2	2	2	3	16	1	2	1	2	3	1
Fisheries, output NERI model															
- gas/diesel oil	7064	8131	6233	7509	7455	7920	8170	7482	7075	7097	7134	6744	5328	5566	6375
- kerosene	7	2	9	5	12	26	9	5	4	3	4	3	3	2	0
- LPG	0	0	34	29	50	42	34	30	12	18	16	36	5	1	16
International sea transport, output NERI model															
- gas/diesel oil	6828	7524	8204	9400	10171	11289	12149	16433	18726	23742	26370	26955	25049	30967	25474
- fuel oil	9394	11507	20155	26804	26938	27815	22742	20269	36259	38296	38780	35010	31698	26223	27797
National sea transport, added 0301															
- fuel oil	-2 030	-1 147	- 649	-1 776	- 343	- 726	504	445	- 404	-1 201	-1 789	-1 447	- 842	- 223	- 20
Road transport, NERI excl. traded fuels															
- gasoline	64 492	67 041	69 220	71 819	72 664	72 882	73 874	74 714	75 342	77 074	79 674	81 385	83 976	85 223	87 867
- gas/diesel oil	45 609	49 738	49 626	49 686	51 854	54 746	58 427	57 511	56 796	58 755	58 561	59 851	60 528	61 072	63 619
- bioethanol	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- biodiesel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Road transport, input NERI model incl. traded fuels															
- gasoline	62 077	62 442	62 716	63 442	62 546	66 279	70 589	74 320	76 459	79 209	80 101	80 958	83 089	84 832	84 506
- gas/diesel oil	49 016	54 939	54 827	54 887	57 055	59 947	61 296	59 950	59 522	63 561	64 013	65 590	66 374	67 206	69 501
- bioethanol	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- biodiesel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Continued</i>															
Enhed: TJ	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010				
Agriculture and forestry, DEA statistics															
- LPG	179	190	159	153	138	121	116	110	103	114	126				
- gasoline	38	39	28	42	51	52	20	21	20	31	31				
- gas/diesel oil	13 689	13 437	13 706	13 463	12 934	12 464	13 047	12 481	13 658	14 346	14 471				
Nurseries, DEA statistics															

- LPG	19	20	17	16	14	12	12	11	10	11	13
- gasoline	4	4	3	5	6	6	2	2	2	3	3
- gas/diesel oil	698	581	529	556	488	407	391	418	483	508	513

Fishery, DEA statistics

- LPG	13	19	21	20	18	20	20	18	12	12	12
- gasoline	67	3	3	0	0	0	1	1	1	1	1
- kerosene	25	1	1	1	1	1	0	0	0	0	0
- gas/diesel oil	9 347	8 908	8888	8428	7337	7340	7362	6854	6258	6075	6037
- fuel oil	-	-	4	84	35	126	86	13	14	17	0

Manufacturing industry, DEA statistics

- LPG	1 819	1 526	1405	1472	1488	1478	1482	1216	1178	1029	1093
- gasoline	97	69	42	26	30	21	32	16	15	97	84
- gas/diesel oil	8 635	10 099	9155	9964	10515	10022	9132	8170	7449	6141	6244
- fuel oil	8 221	7 395	7818	6916	6940	6055	8527	6422	5319	4256	5281

Building and construction, DEA statistics

- LPG	165	179	236	226	228	224	248	222	172	103	94
- gasoline	33	24	26	27	27	27	27	28	26	20	22
- gas/diesel oil	5 950	6 356	6226	6226	6227	6338	6187	6410	6339	5429	5341

Housing, DEA statistics

- gasoline	1 355	1 317	1313	1303	1288	1250	1216	1193	1135	1092	1016
- gas/dieselolie	27 929	28 996	26967	24932	22863	21712	19572	18012	16585	15625	16536

Tower blocks

- gas/dieselolie	2 346	2 511	2031	2095	2427	2151	1625	1411	1610	1658	1460
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Road transport, DEA statistics

- gasoline	88 975	86 474	86 247	85 611	84 629	82 118	79 822	78 325	74 545	71 689	66 750
- gas/diesel oil	64 282	66 254	66 814	70 875	75 422	79 476	86 223	93 111	93 437	88 454	92 718
- bioethanol	-	-	-	-	-	-	151	252	210	204	1 118
- biodiesel	-	-	-	-	-	-	-	-	10	139	16

Non-road, DEA statistics

- LPG	2 018	1 736	1 581	1 641	1 640	1 612	1 610	1 337	1 292	1 155	1 232
- gasoline	1 525	1 453	1 412	1 404	1 402	1 356	1 296	1 259	1 199	1 242	1 155
- gas/diesel oil	28 972	30 473	29 616	30 209	30 164	29 232	28 757	27 479	27 929	26 425	26 569

Non-road, NERI model

- LPG	1071	1073	1084	1079	1065	1049	1038	1040	986	817	985
- gasoline	2458	2622	2833	3090	3391	3604	3807	3923	3975	3942	3957
- gas/diesel oil	24630	24923	25100	25301	25670	26361	27733	29495	30490	27022	29882

Recreational craft, NERI model

- gasoline	396	400	403	404	404	393	382	371	361	353	346
- gas/diesel oil	777	831	886	944	1002	1002	1002	1002	1002	1002	1002
Non-road, added 0202											
- gas/diesel oil	0	0	0	0	0	0	0	-2016	-2561	-598	-3314
Non-road, added 0203 and 0301											
- gas/diesel oil	4342	5550	4516	4908	4494	2871	1025	0	0	0	0
- LPG	947	662	497	563	575	562	572	298	306	338	247
Non-road, added 0203											
- gas/diesel oil	2156	2553	2171	2278	2000	1264	479	0	0	0	0
- LPG	93	80	55	58	53	46	46	27	27	37	28
Non-road, added 0301											
- gas/diesel oil	2186	2997	2346	2630	2494	1607	546	0	0	0	0
- LPG	854	582	442	505	522	516	526	271	279	301	219
Non-road, added road transport											
- gasoline	-932	-1169	-1421	-1686	-1990	-2248	-2511	-2663	-2776	-2700	-2802
Fisheries, added national sea transport											
- fuel oil	0	0	4	84	35	126	86	13	14	17	0
Fisheries, consumed by recreational craft											
- gasoline	67	3	3	0	0	0	1	1	1	1	1
National sea transport, input NERI model											
- LPG	0	-	-	0	0	0	0	0	-	-	-
- kerosene	1	1	1	1	1	1	0	-	-	-	-
- gas/diesel oil	5 348	5 608	5 855	6 009	5 259	6 646	5 986	5 233	6 954	6 489	5 665
- fuel oil	1 509	1 513	2 068	1 907	1 704	1 506	1 367	1 110	1 174	1 062	868
Fisheries, input NERI model											
- LPG	13	19	21	20	18	20	20	18	12	12	12
- gasoline	-	-	-	-	-	-	-	-	-	-	-
- kerosene	25	1	1	1	1	1	0	0	0	-	-
- gas/diesel oil	8 570	8 077	8 001	7 484	6 335	6 338	6 360	5 852	5 256	5 073	5 035
International sea transport, input NERI model											
- gas/diesel oil	20 892	19 022	19 505	18 549	14 357	11 630	10 829	9 124	11 218	10 433	11 493
- fuel oil	33 165	25 924	17 547	20 462	17 298	20 591	31 565	35 243	27 164	11 091	17 493
National sea transport, output NERI model											
- gas/diesel oil	5258	5233	5061	4475	4591	4559	4427	4435	4393	4315	4071
- fuel oil	1444	1400	1387	1862	1853	1859	2026	2005	2142	2289	2459
- kerosene	1	1	1	1	1	1	0	0	0	0	0

- LPG	0	0	0	0	0	0	0	0	0	0	0	12
Fisheries, output NERI model												
- gas/diesel oil	7422	9384	9664	9294	7286	8725	8166	6966	8106	7517	7768	
- kerosene	25	1	1	1	1	1	0	0	0	0	0	
- LPG	13	19	21	20	18	20	20	18	12	12	0	
International sea transport, output NERI model												
- gas/diesel oil	22129	18090	18636	18273	14074	11330	10583	8809	10928	10164	11356	
- fuel oil	32437	25195	16818	19247	16118	19411	30172	33848	25650	9416	15808	
National sea transport, added 0301												
- fuel oil	65	113	681	45	- 148	- 353	- 659	- 895	- 968	- 1 227	- 1 591	
Road transport, NERI excl. traded fuels												
- gasoline	87 713	84 907	84 426	83 521	82 235	79 477	76 930	75 292	71 409	68 637	63 603	
- gas/diesel oil	64 282	66 254	66 814	70 875	75 422	79 476	86 223	93 111	93 437	88 454	92 718	
- bioethanol	-	-	-	-	-	-	-	151	252	210	204	1 118
- biodiesel	-	-	-	-	-	-	-	-	-	10	139	16
Road transport, input NERI model incl. traded fuels												
- gasoline	83 312	81 852	81 963	81 878	80 593	77 835	76 109	75 292	71 409	67 815	62 782	
										103	101	
- gas/diesel oil	69 196	70 916	72 552	78 766	84 209	88 264	95 010	103 871	480	97 421	685	
- bioethanol	-	-	-	-	-	-	-	151	252	210	204	1 118
- biodiesel	-	-	-	-	-	-	-	-	-	10	139	16

Annex 15: Emission factors and total emissions in CollectER format

1990 emission factors for CO₂, CH₄, N₂O, SO₂, NO_x, NMVOC, NH₃ and TSP.

Year	SNAP ID	Category	Fuel type	SO ₂		NO _x		NMVOC		CH ₄		CO		CO ₂		N ₂ O		NH ₃	
				g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ	g pr GJ
1990 A 070101	Passenger cars	Highway	Diesel	93.68	281.80	25.07	3.74	179.70	74.00	0.00	0.47	79.48							
1990 A 070101	Passenger cars	Highway	Gasoline	2.28	1341.85	372.77	10.99	3471.98	73.00	2.75	0.85	12.32							
1990 A 070101	Passenger cars	Highway	LPG	0.00	1151.70	187.09	10.06	3914.25	63.10	0.00	0.00	10.06							
1990 A 070102	Passenger cars	Rural	Diesel	93.68	282.97	42.09	6.82	268.08	74.00	0.00	0.57	75.13							
1990 A 070102	Passenger cars	Rural	Gasoline	2.28	1157.33	489.92	13.86	3975.56	73.00	3.09	0.95	14.22							
1990 A 070102	Passenger cars	Rural	LPG	0.00	1248.46	305.18	16.91	1146.38	63.10	0.00	0.00	14.49							
1990 A 070103	Passenger cars	Urban	Diesel	93.68	228.36	83.84	8.41	317.11	74.00	0.00	0.35	122.24							
1990 A 070103	Passenger cars	Urban	Gasoline	2.28	616.49	943.13	49.98	9909.86	73.00	3.10	0.62	13.42							
1990 A 070103	Passenger cars	Urban	LPG	0.00	620.57	439.16	23.63	1315.38	63.10	0.00	0.00	11.82							
1990 A 070201	Light duty vehicles	Highway	Diesel	93.68	270.67	30.19	2.60	344.14	74.00	0.00	0.32	104.48							
1990 A 070201	Light duty vehicles	Highway	Gasoline	2.28	1369.26	170.29	10.11	2987.40	73.00	2.63	0.81	16.17							
1990 A 070201	Light duty vehicles	Highway	LPG	0.00	1151.70	187.09	10.06	3914.25	63.10	0.00	0.00	10.06							
1990 A 070202	Light duty vehicles	Rural	Diesel	93.68	299.25	33.22	4.26	358.42	74.00	0.00	0.36	107.73							
1990 A 070202	Light duty vehicles	Rural	Gasoline	2.28	1188.86	262.59	15.25	2316.18	73.00	2.48	0.76	15.25							
1990 A 070202	Light duty vehicles	Rural	LPG	0.00	1248.46	305.18	16.91	1146.38	63.10	0.00	0.00	14.49							
1990 A 070203	Light duty vehicles	Urban	Diesel	93.68	487.30	55.86	6.31	411.00	74.00	0.00	0.26	131.44							
1990 A 070203	Light duty vehicles	Urban	Gasoline	2.28	626.69	712.66	40.57	7326.15	73.00	2.22	0.44	8.90							
1990 A 070203	Light duty vehicles	Urban	LPG	0.00	620.31	439.26	23.62	1316.15	63.10	0.00	0.00	11.81							
1990 A 070301	Heavy duty vehicles	Highway	Diesel	93.68	987.62	45.46	6.46	204.32	74.00	3.21	0.32	35.10							
1990 A 070301	Heavy duty vehicles	Highway	Gasoline	2.28	1037.78	474.61	9.69	7610.35	73.00	0.83	0.28	55.35							
1990 A 070302	Heavy duty vehicles	Rural	Diesel	93.68	984.23	57.01	6.77	210.50	74.00	2.89	0.29	35.69							
1990 A 070302	Heavy duty vehicles	Rural	Gasoline	2.28	1141.55	820.40	16.74	8371.39	73.00	0.91	0.30	60.88							
1990 A 070303	Heavy duty vehicles	Urban	Diesel	93.68	957.32	74.12	11.98	243.37	74.00	2.21	0.22	39.97							
1990 A 070303	Heavy duty vehicles	Urban	Gasoline	2.28	456.62	696.09	14.21	7102.99	73.00	0.61	0.20	40.59							
1990 A 070400	Mopeds	Urban	Gasoline	2.28	18.26	12503.20	200.00	12602.74	73.00	0.91	0.91	171.69							
1990 A 070501	Motorcycles	Highway	Gasoline	2.28	264.11	1072.19	129.96	16302.60	73.00	1.35	1.35	31.73							
1990 A 070502	Motorcycles	Rural	Gasoline	2.28	185.41	981.69	159.32	15782.07	73.00	1.66	1.66	38.90							
1990 A 070503	Motorcycles	Urban	Gasoline	2.28	112.92	1149.21	155.11	15187.59	73.00	1.61	1.61	37.87							
1990 A 080100	Military		AvGas	22.83	859.00	1242.60	21.90	6972.00	73.00	2.00	1.60	10.00							
1990 A 080100	Military		Diesel	93.68	785.58	58.23	7.33	258.20	74.00	1.72	0.30	65.61							
1990 A 080100	Military		Gasoline	2.28	932.90	1154.80	31.10	6608.56	73.00	2.99	0.78	14.43							
1990 A 080100	Military		Jet fuel	22.99	250.57	24.94	2.65	229.89	72.00	2.30	0.00	1.16							

1990	A	080200	Railways	Diesel	93,68	1225,13	79,94	3,07	223,21	74,00	2,04	0,20	50,26
1990	A	080200	Railways	Kerosene	5,00	50,00	3,00	7,00	20,00	72,00	2,00	0,00	121,95
1990	A	080300	Inland waterways	Diesel	93,68	983,64	171,79	2,79	453,65	74,00	2,96	0,17	106,93
1990	A	080300	Inland waterways	Gasoline	2,28	291,33	3606,55	50,38	13853,27	73,00	0,78	0,08	182,44
1990	A	080402	National sea traffic	Diesel	93,68	1104,18	50,57	1,56	166,83	74,00	4,68	0,00	23,21
1990	A	080402	National sea traffic	Kerosene	2,30	50,00	3,00	7,00	20,00	72,00	0,00	0,00	5,00
1990	A	080402	National sea traffic	LPG	0,00	1249,00	384,94	20,26	443,00	63,10	0,00	0,00	0,20
1990	A	080402	National sea traffic	Residual oil	1290,95	1615,26	53,44	1,65	176,29	78,00	4,89	0,00	149,25
1990	A	080403	Fishing	Diesel	93,68	1052,12	49,13	1,52	162,08	74,00	4,68	0,00	23,21
1990	A	080403	Fishing	Kerosene	2,30	50,00	3,00	7,00	20,00	72,00	0,00	0,00	5,00
1990	A	080403	Fishing	LPG	0,00	1249,00	384,94	20,26	443,00	63,10	0,00	0,00	0,20
1990	A	080404	International sea traffic	Diesel	93,68	1208,60	49,46	1,53	163,17	74,00	4,68	0,00	23,21
1990	A	080404	International sea traffic	Residual oil	1447,43	1689,57	53,98	1,67	178,09	78,00	4,89	0,00	189,43
1990	A	080501	Air traffic, Dom. < 3000 ft.	AvGas	22,83	859,00	1242,60	21,90	6972,00	73,00	2,00	1,60	10,00
1990	A	080501	Air traffic, Dom. < 3000 ft.	Jet fuel	22,99	314,51	14,93	1,59	90,41	72,00	5,70	0,00	1,16
1990	A	080502	Air traffic, Int. < 3000 ft.	AvGas	22,83	859,00	1242,60	21,90	6972,00	73,00	2,00	1,60	10,00
1990	A	080502	Air traffic, Int. < 3000 ft.	Jet fuel	22,99	309,25	16,47	1,75	168,98	72,00	7,10	0,00	1,16
1990	A	080503	Air traffic, Dom. > 3000 ft.	Jet fuel	22,99	330,11	12,36	1,31	90,75	72,00	2,30	0,00	1,16
1990	A	080504	Air traffic, Int. > 3000 ft.	Jet fuel	22,99	244,20	6,48	0,69	54,10	72,00	2,30	0,00	1,16
1990	A	080600	Agriculture	Diesel	93,68	758,87	156,85	2,55	635,53	74,00	2,93	0,17	144,45
1990	A	080600	Agriculture	Gasoline	2,28	31,60	949,55	88,42	47524,17	73,00	1,28	0,09	6,56
1990	A	080700	Forestry	Diesel	93,68	857,48	156,47	2,54	645,65	74,00	2,97	0,17	149,05
1990	A	080700	Forestry	Gasoline	2,28	40,39	7206,91	60,42	18057,40	73,00	0,37	0,07	101,22
1990	A	080800	Industry	Diesel	93,68	933,58	178,23	2,90	655,80	74,00	2,94	0,17	154,50
1990	A	080800	Industry	Gasoline	2,28	136,27	1610,77	120,61	14797,46	73,00	1,33	0,09	12,40
1990	A	080800	Industry	LPG	0,00	1328,11	146,09	7,69	104,85	63,10	3,50	0,21	4,89
1990	A	080900	Household and gardening	Gasoline	2,28	63,98	3366,01	95,22	32901,19	73,00	1,15	0,08	20,75
1990	A	081100	Commercial and institutional	Gasoline	2,28	68,83	2280,66	97,87	29887,31	73,00	1,09	0,08	24,00
1990	P	080501	Air traffic, Dom. < 3000 ft.	AvGas	22,83	859,00	1242,60	21,90	6972,00	73,00	2,00	1,60	10,00
1990	P	080501	Air traffic, Dom. < 3000 ft.	Jet fuel	22,99	283,87	20,73	2,20	129,70	72,00	4,58	0,00	1,16
1990	P	080502	Air traffic, Int. < 3000 ft.	AvGas	22,83	859,00	1242,60	21,90	6972,00	73,00	2,00	1,60	10,00
1990	P	080502	Air traffic, Int. < 3000 ft.	Jet fuel	22,99	324,87	34,25	3,64	157,15	72,00	3,79	0,00	1,16
1990	P	080503	Air traffic, Dom. > 3000 ft.	Jet fuel	22,99	314,86	11,78	1,25	84,05	72,00	2,30	0,00	1,16
1990	P	080504	Air traffic, Int. > 3000 ft.	Jet fuel	22,99	290,20	10,08	1,07	37,65	72,00	2,30	0,00	1,16

2009 emission factors for CO₂, CH₄, N₂O, SO₂, NO_x; NMVOC, NH₃ and TSP.

Year	SNAP ID	Category	Fuel type	SO ₂ g pr GJ	NOx g pr GJ	NMVOC g pr GJ	CH ₄ g pr GJ	CO g pr GJ	CO ₂ g pr GJ	N ₂ O g pr GJ	NH ₃ g pr GJ	TSP g pr GJ		
2010	A	070101	Passenger cars	Highway	Diesel	0,47	284,85	5,92	0,11	12,74	73,99	2,02	0,49	13,92
2010	A	070101	Passenger cars	Highway	Gasoline	0,44	121,50	28,25	2,64	632,54	71,72	0,63	30,82	0,83
2010	A	070101	Passenger cars	Highway	LPG	0,00	186,36	29,88	4,13	1272,01	63,10	0,91	0,00	10,04
2010	A	070102	Passenger cars	Rural	Diesel	0,47	241,95	8,57	0,22	24,56	73,99	2,15	0,53	11,52
2010	A	070102	Passenger cars	Rural	Gasoline	0,44	99,05	31,18	3,20	487,36	71,72	1,19	32,47	0,77
2010	A	070102	Passenger cars	Rural	LPG	0,00	204,10	43,03	6,93	523,16	63,10	1,88	0,00	14,45
2010	A	070103	Passenger cars	Urban	Diesel	0,47	242,76	26,57	0,62	65,38	73,99	4,76	0,38	19,49
2010	A	070103	Passenger cars	Urban	Gasoline	0,44	118,76	217,20	8,76	2381,85	71,72	2,20	10,20	0,82
2010	A	070103	Passenger cars	Urban	LPG	0,00	126,34	105,19	10,96	809,82	63,10	3,79	0,00	13,34
2010	A	070201	Light duty vehicles	Highway	Diesel	0,47	212,34	20,08	0,20	126,33	73,99	1,52	0,37	20,34
2010	A	070201	Light duty vehicles	Highway	Gasoline	0,44	146,85	17,21	2,62	513,88	71,72	1,46	22,97	1,24
2010	A	070201	Light duty vehicles	Highway	LPG	0,00	78,50	11,18	1,84	889,72	63,10	0,44	0,00	10,04
2010	A	070202	Light duty vehicles	Rural	Diesel	0,47	221,92	22,73	0,45	108,30	73,99	1,66	0,40	16,61
2010	A	070202	Light duty vehicles	Rural	Gasoline	0,44	128,51	25,37	2,77	388,59	71,72	2,24	21,80	1,10
2010	A	070202	Light duty vehicles	Rural	LPG	0,00	86,46	15,69	3,08	398,46	63,10	0,99	0,00	14,45
2010	A	070203	Light duty vehicles	Urban	Diesel	0,47	213,35	41,33	0,97	136,53	73,99	3,16	0,28	25,16
2010	A	070203	Light duty vehicles	Urban	Gasoline	0,44	112,14	150,53	6,68	3040,41	71,72	3,84	5,51	0,76
2010	A	070203	Light duty vehicles	Urban	LPG	0,00	57,09	41,77	4,96	458,44	63,10	2,28	0,00	13,56
2010	A	070301	Heavy duty vehicles	Highway	Diesel	0,47	506,51	11,35	3,17	135,97	73,99	3,22	0,32	8,38
2010	A	070301	Heavy duty vehicles	Highway	Gasoline	0,44	1037,78	474,61	9,69	7610,35	71,72	0,83	0,28	55,35
2010	A	070302	Heavy duty vehicles	Rural	Diesel	0,47	532,88	13,72	3,29	131,60	73,99	2,89	0,29	8,42
2010	A	070302	Heavy duty vehicles	Rural	Gasoline	0,44	1141,55	820,40	16,74	8371,39	71,72	0,91	0,30	60,88
2010	A	070303	Heavy duty vehicles	Urban	Diesel	0,47	582,20	17,38	4,29	141,03	73,99	2,29	0,23	9,32
2010	A	070303	Heavy duty vehicles	Urban	Gasoline	0,44	456,62	696,09	14,21	7102,99	71,72	0,61	0,20	40,59
2010	A	070400	Mopeds	Urban	Gasoline	0,44	143,26	8633,88	138,08	9299,22	71,72	1,27	1,27	136,26
2010	A	070501	Motorcycles	Highway	Gasoline	0,44	270,09	826,21	101,94	11962,07	71,72	1,28	1,28	22,07
2010	A	070502	Motorcycles	Rural	Gasoline	0,44	192,34	806,39	123,40	11187,72	71,72	1,56	1,56	26,91
2010	A	070503	Motorcycles	Urban	Gasoline	0,44	118,68	987,22	126,73	10745,90	71,72	1,52	1,52	26,22
2010	A	080100	Military		AvGas	22,99	859,00	1242,60	21,90	6972,00	73,00	2,00	1,60	10,00
2010	A	080100	Military		Diesel	0,47	362,43	18,55	1,76	99,64	74,00	2,80	0,36	13,88
2010	A	080100	Military		Gasoline	0,44	114,24	166,31	7,28	1499,83	73,00	1,58	21,86	1,59
2010	A	080100	Military		Jet fuel	22,99	250,57	24,94	2,65	229,89	72,00	2,30	0,00	1,16
2010	A	080200	Railways		Diesel	0,47	861,00	57,78	2,22	147,00	74,00	2,04	0,20	29,00
2010	A	080300	Inland waterways		Diesel	46,84	834,21	160,37	2,61	443,15	74,00	2,97	0,17	98,22
2010	A	080300	Inland waterways		Gasoline	0,46	536,58	1176,04	62,64	13132,16	73,00	1,46	0,10	36,12
2010	A	080402	National sea traffic		Diesel	46,84	950,95	51,95	1,51	84,45	74,00	4,68	0,00	21,55
2010	A	080402	National sea traffic		Residual oil	489,00	1901,30	62,53	1,93	206,29	78,00	4,89	0,00	43,98
2010	A	080403	Fishing		Diesel	46,84	1373,14	57,40	1,78	189,36	74,00	4,68	0,00	21,55
2010	A	080403	Fishing		LPG									

2010	A	080404	International sea traffic	Residual oil	489.00	2114,39	62,58	1,94	206,46	78,00	4,89	0,00	43,98
2010	A	080501	Air traffic, Dom. < 3000 ft.	AvGas	22,83	859,00	1242,60	21,90	6972,00	73,00	2,00	1,60	10,00
2010	A	080501	Air traffic, Dom. < 3000 ft.	Jet fuel	22,99	284,91	12,67	1,35	135,85	72,00	10,60	0,00	1,16
2010	A	080502	Air traffic, Int. < 3000 ft.	AvGas	22,83	859,00	1242,60	21,90	6972,00	73,00	2,00	1,60	10,00
2010	A	080502	Air traffic, Int. < 3000 ft.	Jet fuel	22,99	300,20	21,33	2,27	172,31	72,00	7,43	0,00	1,16
2010	A	080503	Air traffic, Dom. > 3000 ft.	Jet fuel	22,99	259,66	8,48	0,90	107,16	72,00	2,30	0,00	1,16
2010	A	080504	Air traffic, Int. > 3000 ft.	Jet fuel	22,99	238,78	6,06	0,64	50,18	72,00	2,30	0,00	1,16
2010	A	080600	Agriculture	Diesel	2,34	597,19	57,54	0,94	339,56	74,00	3,17	0,18	45,70
2010	A	080600	Agriculture	Gasoline	0,46	111,24	1198,22	160,47	21839,49	73,00	1,72	1,52	31,17
2010	A	080700	Forestry	Diesel	2,34	410,67	30,56	0,50	245,71	74,00	3,21	0,18	27,30
2010	A	080700	Forestry	Gasoline	0,46	65,70	5061,02	40,93	17576,18	73,00	0,45	0,09	80,63
2010	A	080800	Industry	Diesel	2,34	553,14	60,60	0,99	320,23	74,00	3,10	0,18	52,14
2010	A	080800	Industry	Gasoline	0,46	209,05	1535,64	108,73	13878,11	73,00	1,48	0,10	17,69
2010	A	080800	Industry	LPG	0,00	1328,11	146,09	7,69	104,85	63,10	3,50	0,21	4,89
2010	A	080900	Household and gardening	Gasoline	0,46	100,65	2363,13	75,84	29784,64	73,00	1,25	0,09	16,72
2010	A	081100	Commercial and institutional	Gasoline	0,46	91,81	1867,73	67,37	30544,46	73,00	1,12	0,09	28,18
2010	P	080501	Air traffic, Dom. < 3000 ft.	AvGas	22,83	859,00	1242,60	21,90	6972,00	73,00	2,00	1,60	10,00
2010	P	080501	Air traffic, Dom. < 3000 ft.	Jet fuel	22,99	277,85	14,59	1,55	181,79	72,00	7,00	0,00	1,16
2010	P	080502	Air traffic, Int. < 3000 ft.	AvGas	22,83	859,00	1242,60	21,90	6972,00	73,00	2,00	1,60	10,00
2010	P	080502	Air traffic, Int. < 3000 ft.	Jet fuel	22,99	336,87	32,23	3,42	239,55	72,00	3,96	0,00	1,16
2010	P	080503	Air traffic, Dom. > 3000 ft.	Jet fuel	22,99	269,07	11,59	1,23	59,94	72,00	2,30	0,00	1,16
2010	P	080504	Air traffic, Int. > 3000 ft.	Jet fuel	22,99	305,04	9,40	1,00	32,03	72,00	2,30	0,00	1,16

1990 emissions for CO₂, CH₄, N₂O, SO₂, NO_x; NMVOC, NH₃ and TSP.

Year	SNAP ID	Category		Fuel type	Fuel	SO ₂	NO _x	NMVOC	CH ₄	CO	CO ₂	N ₂ O	NH ₃	TSP	
				PJ	tonnes	tonnes	tonnes	tonnes	tonnes	tonnes	ktonnes	tonnes	tonnes	tonnes	
1990	A	070101	Passenger cars	Highway	Diesel	1,3624	127,63	383,94	34,15	5,10	244,82	100,82	0,00	0,64	108,29
1990	A	070101	Passenger cars	Highway	Gasoline	10,513	24,00	14106,72	3918,93	115,49	36500,40	767,44	28,88	8,88	129,48
1990	A	070101	Passenger cars	Highway	LPG	0,0106	0,00	12,21	1,98	0,11	41,48	0,67	0,00	0,00	0,11
1990	A	070102	Passenger cars	Rural	Diesel	2,8483	266,82	806,00	119,90	19,42	763,57	210,78	0,00	1,62	213,99
1990	A	070102	Passenger cars	Rural	Gasoline	23,727	54,17	27460,47	11624,47	328,81	94329,55	1732,10	73,38	22,58	337,30
1990	A	070102	Passenger cars	Rural	LPG	0,0224	0,00	28,02	6,85	0,38	25,73	1,42	0,00	0,00	0,33
1990	A	070103	Passenger cars	Urban	Diesel	3,6613	342,98	836,08	306,97	30,81	1161,04	270,93	0,00	1,27	447,55
1990	A	070103	Passenger cars	Urban	Gasoline	28,626	65,36	17647,76	26998,31	1430,70	283681,58	2089,71	88,80	17,76	384,24
1990	A	070103	Passenger cars	Urban	LPG	0,0289	0,00	17,92	12,68	0,68	37,98	1,82	0,00	0,00	0,34
1990	A	070201	Light duty vehicles	Highway	Diesel	2,0446	191,53	553,43	61,73	5,31	703,63	151,30	0,00	0,66	213,62
1990	A	070201	Light duty vehicles	Highway	Gasoline	0,2642	0,60	361,80	45,00	2,67	789,37	19,29	0,69	0,21	4,27
1990	A	070201	Light duty vehicles	Highway	LPG	0,0075	0,00	8,67	1,41	0,08	29,47	0,48	0,00	0,00	0,08
1990	A	070202	Light duty vehicles	Rural	Diesel	6,5399	612,64	1957,06	217,28	27,88	2344,06	483,95	0,00	2,32	704,56
1990	A	070202	Light duty vehicles	Rural	Gasoline	0,9806	2,24	1165,83	257,50	14,96	2271,31	71,59	2,43	0,75	14,96
1990	A	070202	Light duty vehicles	Rural	LPG	0,022	0,00	27,41	6,70	0,37	25,17	1,39	0,00	0,00	0,32
1990	A	070203	Light duty vehicles	Urban	Diesel	6,4489	604,11	3142,56	360,27	40,67	2650,51	477,22	0,00	1,68	847,63
1990	A	070203	Light duty vehicles	Urban	Gasoline	1,2168	2,78	762,54	867,15	49,36	8914,36	88,83	2,71	0,54	10,82
1990	A	070203	Light duty vehicles	Urban	LPG	0,026	0,00	16,13	11,42	0,61	34,22	1,64	0,00	0,00	0,31
1990	A	070301	Heavy duty vehicles	Highway	Diesel	8,6373	809,11	8530,39	392,61	55,81	1764,75	639,16	27,68	2,77	303,17
1990	A	070301	Heavy duty vehicles	Highway	Gasoline	0,0467	0,11	48,43	22,15	0,45	355,19	3,41	0,04	0,01	2,58
1990	A	070302	Heavy duty vehicles	Rural	Diesel	15,813	1481,29	15563,42	901,53	107,06	3328,63	1170,15	45,62	4,56	564,38
1990	A	070302	Heavy duty vehicles	Rural	Gasoline	0,0815	0,19	93,08	66,89	1,37	682,60	5,95	0,07	0,02	4,96
1990	A	070303	Heavy duty vehicles	Urban	Diesel	12,591	1179,53	12054,04	933,28	150,80	3064,32	931,77	27,82	2,78	503,32
1990	A	070303	Heavy duty vehicles	Urban	Gasoline	0,0766	0,17	35,00	53,36	1,09	544,44	5,60	0,05	0,02	3,11
1990	A	070400	Mopeds	Urban	Gasoline	0,2904	0,66	5,30	3631,21	58,08	3660,12	21,20	0,27	0,27	49,86
1990	A	070501	Motorcycles	Highway	Gasoline	0,0704	0,16	18,59	75,46	9,15	1147,38	5,14	0,10	0,10	2,23
1990	A	070502	Motorcycles	Rural	Gasoline	0,1687	0,39	31,28	165,63	26,88	2662,69	12,32	0,28	0,28	6,56
1990	A	070503	Motorcycles	Urban	Gasoline	0,2166	0,49	24,46	248,88	33,59	3289,15	15,81	0,35	0,35	8,20
1990	A	080100	Military		AvGas	0,0049	0,11	4,22	6,11	0,11	34,26	0,36	0,01	0,01	0,05
1990	A	080100	Military		Diesel	0,1462	13,69	114,82	8,51	1,07	37,74	10,82	0,25	0,04	9,59
1990	A	080100	Military		Gasoline	0,001	0,00	0,92	1,14	0,03	6,51	0,07	0,00	0,00	0,01
1990	A	080100	Military		Jet fuel	1,4968	34,41	375,06	37,33	3,96	344,09	107,77	3,44		1,74
1990	A	080200	Railways		Diesel	4,01	375,64	4912,78	320,54	12,32	895,07	296,74	8,18	0,82	201,55
1990	A	080200	Railways		Gasoline	0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
1990	A	080300	Inland waterways		Diesel	0,3426	32,10	337,02	58,86	0,96	155,43	25,35	1,01	0,06	36,64

Continued

1990	A	080300	Inland waterways	Gasoline	0.3091	0.71	90.06	1114.91	15.58	4282.54	22.57	0.24	0.02	56.40
1990	A	080402	National sea traffic	Diesel	5.2854	495.12	5836.01	267.28	8.27	881.74	391.12	24.76		122.69
1990	A	080402	National sea traffic	Residual oil	4.5713	5901.32	7383.82	244.28	7.56	805.87	356.56	22.35		682.25
1990	A	080403	Fishing	Diesel	7.9199	741.91	8332.71	389.10	12.03	1283.63	586.07	37.10		183.85
1990	A	080403	Fishing	Gasoline	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1990	A	080403	Fishing	Residual oil	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1990	A	080404	International sea traffic	Diesel	11.289	1057.56	13644.52	558.38	17.27	1842.07	835.42	52.88		262.07
1990	A	080404	International sea traffic	Residual oil	27.815	40259.78	46994.61	1501.54	46.44	4953.54	2169.54	136.01		5268.82
1990	A	080501	Air traffic, Dom. < 3000 ft.	AvGas	0.1049	2.40	90.15	130.41	2.30	731.69	7.66	0.21	0.17	1.05
1990	A	080501	Air traffic, Dom. < 3000 ft.	Jet fuel	0.4222	9.71	132.78	6.30	0.67	38.17	30.40	2.40		0.49
1990	A	080502	Air traffic, Int. < 3000 ft.	AvGas	0.0307	0.70	26.34	38.10	0.67	213.76	2.24	0.06	0.05	0.31
1990	A	080502	Air traffic, Int. < 3000 ft.	Jet fuel	0.1323	3.04	40.93	2.18	0.23	22.36	9.53	0.94		0.15
1990	A	080503	Air traffic, Dom. > 3000 ft.	Jet fuel	1.026	23.59	338.70	12.68	1.35	93.11	73.87	2.36		1.19
1990	A	080504	Air traffic, Int. > 3000 ft.	Jet fuel	1,6119	37.06	393.62	10.45	1.11	87.20	116.06	3.71		1.87
1990	A	080600	Agriculture	Diesel	16.496	1545.32	12518.46	2587.36	42.07	10483.86	1220.72	48.34	2.76	2382.90
1990	A	080600	Agriculture	Gasoline	0.7089	1.62	22.40	673.10	62.68	33688.19	51.75	0.91	0.06	4.65
1990	A	080700	Forestry	Diesel	0.1453	13.62	124.63	22.74	0.37	93.84	10.76	0.43	0.02	21.66
1990	A	080700	Forestry	Gasoline	0.3414	0.78	13.79	2460.65	20.63	6165.33	24.92	0.13	0.03	34.56
1990	A	080800	Industry	Diesel	10.158	951.61	9483.66	1810.53	29.44	6661.90	751.72	29.87	1.71	1569.49
1990	A	080800	Industry	Gasoline	0.1752	0.40	23.88	282.25	21.13	2592.92	12.79	0.23	0.02	2.17
1990	A	080800	Industry	LPG	1,1849	0.00	1573.62	173.10	9.11	124.23	74.76	4.14	0.25	5.80
1990	A	080900	Household and gardening	Gasoline	0.5351	1.22	34.24	1801.26	50.96	17606.46	39.06	0.62	0.04	11.10
1990	A	081100	Commercial and institutional	Gasoline	1.0098	2.31	69.51	2303.07	98.83	30181.04	73.72	1.10	0.08	24.24
1990	P	080501	Air traffic, Dom. < 3000 ft.	AvGas	0.0086	0.20	7.42	10.74	0.19	60.25	0.63	0.02	0.01	0.09
1990	P	080501	Air traffic, Dom. < 3000 ft.	Jet fuel	0.5022	11.54	142.54	10.41	1.11	65.13	36.16	2.30		0.58
1990	P	080502	Air traffic, Int. < 3000 ft.	AvGas	0.0056	0.13	4.82	6.97	0.12	39.13	0.41	0.01	0.01	0.06
1990	P	080502	Air traffic, Int. < 3000 ft.	Jet fuel	2.0012	46.00	650.12	68.54	7.28	314.49	144.09	7.58		2.32
1990	P	080503	Air traffic, Dom. > 3000 ft.	Jet fuel	1,3052	30.00	410.96	15.38	1.63	109.71	93.97	3.00		1.51
1990	P	080504	Air traffic, Int. > 3000 ft.	Jet fuel	20.33	467.36	5899.81	204.92	21.76	765.45	1463.78	46.74		23.58

2009 emissions for CO₂, CH₄, N₂O, SO₂, NO_x; NMVOC, NH₃ and TSP.

Year	SNAP ID	Category		Fuel type	Fuel	SO ₂	NO _x	NMVOC	CH ₄	CO	CO ₂	N ₂ O	NH ₃	TSP	
					PJ	tonnes	tonnes	tonnes	tonnes	tonnes	ktonnes	tonnes	tonnes	tonnes	
2010	A	070101	Passenger cars	Highway	Diesel	6,4666	3,03	1841,97	38,27	0,73	82,38	478,45	13,03	3,19	89,98
2010	A	070101	Passenger cars	Highway	Gasoline	10,76	4,77	1307,36	303,95	28,45	6806,03	771,73	6,82	331,58	8,98
2010	A	070101	Passenger cars	Highway	LPG	9E-05	0,00	0,02	0,00	0,00	0,11	0,01	0,00	0,00	0,00
2010	A	070102	Passenger cars	Rural	Diesel	13,997	6,55	3386,42	119,91	3,13	343,79	1035,58	30,07	7,37	161,17
2010	A	070102	Passenger cars	Rural	Gasoline	23,492	10,42	2326,86	732,57	75,16	11448,93	1684,92	28,01	762,84	18,10
2010	A	070102	Passenger cars	Rural	LPG	0,0002	0,00	0,03	0,01	0,00	0,09	0,01	0,00	0,00	0,00
2010	A	070103	Passenger cars	Urban	Diesel	14,088	6,60	3420,03	374,30	8,72	921,12	1042,34	67,00	5,42	274,60
2010	A	070103	Passenger cars	Urban	Gasoline	26,01	11,54	3088,90	5649,29	227,80	61951,38	1865,53	57,20	265,19	21,35
2010	A	070103	Passenger cars	Urban	LPG	0,0002	0,00	0,02	0,02	0,00	0,15	0,01	0,00	0,00	0,00
2010	A	070201	Light duty vehicles	Highway	Diesel	3,7375	1,75	793,62	75,04	0,73	472,16	276,53	5,68	1,37	76,02
2010	A	070201	Light duty vehicles	Highway	Gasoline	0,3037	0,13	44,60	5,23	0,80	156,06	21,78	0,44	6,97	0,38
2010	A	070201	Light duty vehicles	Highway	LPG	0,0002	0,00	0,02	0,00	0,00	0,18	0,01	0,00	0,00	0,00
2010	A	070202	Light duty vehicles	Rural	Diesel	10,854	5,08	2408,59	246,66	4,89	1175,43	803,03	18,04	4,36	180,28
2010	A	070202	Light duty vehicles	Rural	Gasoline	1,0221	0,45	131,35	25,93	2,83	397,19	73,31	2,29	22,28	1,12
2010	A	070202	Light duty vehicles	Rural	LPG	0,0006	0,00	0,05	0,01	0,00	0,22	0,03	0,00	0,00	0,01
2010	A	070203	Light duty vehicles	Urban	Diesel	10,485	4,91	2237,06	433,33	10,21	1431,60	775,79	33,16	2,95	263,83
2010	A	070203	Light duty vehicles	Urban	Gasoline	1,2265	0,54	137,53	184,62	8,19	3728,99	87,97	4,71	6,76	0,93
2010	A	070203	Light duty vehicles	Urban	LPG	0,0005	0,00	0,03	0,02	0,00	0,24	0,03	0,00	0,00	0,01
2010	A	070301	Heavy duty vehicles	Highway	Diesel	10,936	5,12	5539,16	124,13	34,65	1487,02	809,14	35,19	3,52	91,61
2010	A	070301	Heavy duty vehicles	Highway	Gasoline	0,0285	0,01	29,55	13,52	0,28	216,72	2,04	0,02	0,01	1,58
2010	A	070302	Heavy duty vehicles	Rural	Diesel	18,166	8,51	9680,08	249,28	59,84	2390,59	1344,05	52,57	5,26	152,95
2010	A	070302	Heavy duty vehicles	Rural	Gasoline	0,0463	0,02	52,89	38,01	0,78	387,86	3,32	0,04	0,01	2,82
2010	A	070303	Heavy duty vehicles	Urban	Diesel	12,972	6,07	7552,31	225,52	55,65	1829,45	959,78	29,73	2,97	120,95
2010	A	070303	Heavy duty vehicles	Urban	Gasoline	0,0416	0,02	19,01	28,99	0,59	295,77	2,99	0,03	0,01	1,69
2010	A	070400	Mopeds	Urban	Gasoline	0,1794	0,08	25,71	1549,32	24,78	1668,71	12,87	0,23	0,23	24,45
2010	A	070501	Motorcycles	Highway	Gasoline	0,1358	0,06	36,68	112,21	13,84	1624,55	9,74	0,17	0,17	3,00
2010	A	070502	Motorcycles	Rural	Gasoline	0,2972	0,13	57,16	239,63	36,67	3324,58	21,31	0,46	0,46	8,00
2010	A	070503	Motorcycles	Urban	Gasoline	0,3565	0,16	42,31	351,93	45,18	3830,78	25,57	0,54	0,54	9,35
2010	A	080100	Military		AvGas	0,0062	0,14	5,32	7,69	0,14	43,15	0,45	0,01	0,01	0,06
2010	A	080100	Military		Diesel	0,5963	0,28	216,13	11,06	1,05	59,42	44,13	1,67	0,21	8,28
2010	A	080100	Military		Gasoline	0,0057	0,00	0,65	0,95	0,04	8,52	0,41	0,01	0,12	0,01
2010	A	080100	Military		Jet fuel	0,8618	19,81	215,95	21,49	2,28	198,12	62,05	1,98	0,00	1,00
2010	A	080200	Railways		Diesel	3,2728	1,53	2817,86	189,10	7,27	481,10	242,19	6,68	0,65	94,91
2010	A	080200	Railways		Gasoline	0	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2010	A	080300	Inland waterways		Diesel	1,0021	46,94	836,00	160,72	2,61	444,10	74,16	2,98	0,17	98,43

Continued

2010	A	080300	Inland waterways	Gasoline	0.3458	0.16	185.55	406.67	21.66	4541.02	25.24	0.50	0.04	12.49
2010	A	080402	National sea traffic	Diesel	4.0709	190.67	3871.19	211.47	6.13	343.78	301.24	19.07	0.00	87.71
2010	A	080402	National sea traffic	Residual oil	2,4588	1202.35	4674.93	153.75	4.76	507.22	191.79	12.02		108.15
2010	A	080403	Fishing	Diesel	7,7679	363.84	10666.46	445.87	13.79	1470.92	574.83	36.38	0.00	167.38
2010	A	080403	Fishing	Gasoline	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	A	080404	International sea traffic	Diesel	11,356	531.89	17907.60	646.66	20.00	2133.32	840.33	53.19		244.68
2010	A	080404	International sea traffic	Residual oil	15,808	7730.14	33424.56	989.32	30.60	3263.74	1233.03	77.30		695.29
2010	A	080501	Air traffic, Dom. < 3000 ft.	AvGas	0.0682	1.56	58.62	84.80	1.49	475.78	4,98	0.14	0.11	0.68
2010	A	080501	Air traffic, Dom. < 3000 ft.	Jet fuel	0.2571	5.91	73.26	3.26	0.35	34.93	18.51	2.73		0.30
2010	A	080502	Air traffic, Int. < 3000 ft.	AvGas	0.0007	0.01	0.56	0.81	0.01	4.54	0.05	0.00	0.00	0.01
2010	A	080502	Air traffic, Int. < 3000 ft.	Jet fuel	0.3084	7.09	92.59	6.58	0.70	53.14	22.21	2.29		0.36
2010	A	080503	Air traffic, Dom. > 3000 ft.	Jet fuel	0.5834	13.41	151.48	4.95	0.53	62.52	42.00	1.34		0.68
2010	A	080504	Air traffic, Int. > 3000 ft.	Jet fuel	3,4263	78.77	818.13	20.77	2.21	171.92	246.69	7.88		3.97
2010	A	080600	Agriculture	Diesel	16,708	39.13	9977.82	961.34	15.63	5673.29	1236.39	53.02	3.03	763.57
2010	A	080600	Agriculture	Gasoline	0.501	0.23	55.73	600.29	80.39	10941.16	36.57	0.86	0.76	15.62
2010	A	080700	Forestry	Diesel	0,1591	0.37	65.32	4.86	0.08	39.08	11.77	0.51	0.03	4.34
2010	A	080700	Forestry	Gasoline	0.0714	0.03	4.69	361.53	2.92	1255.55	5.21	0.03	0.01	5.76
2010	A	080800	Industry	Diesel	13,015	30.48	7199.37	788.73	12.82	4167.94	963.14	40.30	2.30	678.64
2010	A	080800	Industry	Gasoline	0,1567	0.07	32.75	240.60	17.04	2174.38	11.44	0.23	0.02	2.77
2010	A	080800	Industry	LPG	0.9849	0.00	1308.04	143.88	7.57	103.27	62.15	3.44	0.21	4.82
2010	A	080900	Household and gardening	Gasoline	0.86	0.39	86.56	2032.41	65.22	25616.27	62.78	1.08	0.08	14.38
2010	A	081100	Commercial and institutional	Gasoline	2,3683	1.08	217.44	4423.32	159.55	72338.05	172.88	2.65	0.21	66.75
2010	P	080501	Air traffic, Dom. < 3000 ft.	AvGas	0,0005	0.01	0.47	0.68	0.01	3.81	0.04	0.00	0.00	0.01
2010	P	080501	Air traffic, Dom. < 3000 ft.	Jet fuel	0.2971	6.83	82.55	4.33	0.46	54.01	21.39	2.08		0.34
2010	P	080502	Air traffic, Int. < 3000 ft.	AvGas	9E-05	0.00	0.08	0.12	0.00	0.66	0.01	0.00	0.00	0.00
2010	P	080502	Air traffic, Int. < 3000 ft.	Jet fuel	2,5457	58.52	857.57	82.06	8.71	609.82	183.29	10.09	0.00	2.95
2010	P	080503	Air traffic, Dom. > 3000 ft.	Jet fuel	0.954	21.93	256.68	11.05	1.17	57.18	68.68	2.19	0.00	1.11
2010	P	080504	Air traffic, Int. > 3000 ft.	Jet fuel	27,343	628.57	8340.59	257.10	27.30	875.66	1968.68	62.86	0.00	31.72

Annex 16: Fuel consumption and emissions in CRF format

Fuel IPCC ID	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Industry-Other (1A2f)	11,7	11,7	11,6	11,6	11,6	11,5	11,5	11,5	11,5	11,5	11,6	11,7	11,7	11,9	11,9
Civil Aviation (1A3a)	3,6	3,3	3,7	3,8	3,6	3,4	2,8	2,7	2,6	2,7	2,8	2,8	2,9	2,7	2,4
Road (1A3b)	111,2	117,5	117,7	118,4	119,7	126,3	132,0	134,4	136,1	142,9	144,2	146,6	149,5	152,0	154,0
Railways (1A3c)	4,9	4,9	4,4	4,6	4,2	4,0	4,1	4,3	4,5	4,1	4,1	4,1	4,0	3,3	3,1
Navigation (1A3d)	10,4	10,3	10,4	10,4	10,5	10,5	10,6	10,9	10,7	10,8	11,3	12,2	12,0	10,0	8,8
Comm./Inst. (1A4a)	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,1	1,1	1,1	1,1	1,2
Residential (1A4b)	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,6	0,6	0,6
Ag./for./fish. (1A4c)	24,4	26,0	23,8	25,5	25,3	25,7	25,7	24,3	23,8	22,9	23,4	22,2	21,0	20,4	21,1
Military (1A5)	5,5	4,3	5,0	2,7	2,3	1,6	3,9	1,9	3,3	3,5	3,4	2,4	2,3	2,8	2,5
Navigation int. (1A3d)	16,2	19,0	28,4	36,2	37,1	39,1	34,9	36,7	55,0	62,0	65,1	62,0	56,7	57,2	53,3
Civil Aviation int. (1A3a)	19,3	20,9	22,4	24,0	25,1	24,1	22,7	23,5	23,0	25,2	25,9	27,4	27,9	30,0	31,8

Continued

IPCC ID	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Industry-Other (1A2f)	12,0	12,1	12,3	12,4	12,5	13,0	13,9	14,8	15,1	11,2	14,2
Civil Aviation (1A3a)	2,1	2,3	2,0	1,9	1,8	1,9	2,0	2,2	2,2	2,1	2,2
Road (1A3b)	152,5	152,8	154,5	160,6	164,8	166,1	171,3	179,5	176,0	165,5	165,6
Railways (1A3c)	3,1	2,9	2,8	3,0	2,9	3,1	3,1	3,1	3,2	3,1	3,3
Navigation (1A3d)	7,9	7,9	7,7	7,7	7,9	7,8	7,8	7,8	7,9	8,0	7,9
Comm./Inst. (1A4a)	1,2	1,3	1,5	1,8	2,0	2,2	2,4	2,4	2,4	2,4	2,4
Residential (1A4b)	0,6	0,6	0,7	0,7	0,8	0,8	0,8	0,9	0,9	0,9	0,9
Ag./for./fish. (1A4c)	21,8	23,9	24,2	23,9	22,2	23,8	23,7	23,3	25,2	24,8	25,2
Military (1A5)	1,5	1,3	1,2	1,3	3,3	3,7	1,7	2,4	1,5	2,2	1,5
Navigation int. (1A3d)	54,6	43,3	35,5	37,5	30,2	30,7	40,8	42,7	36,6	19,6	27,2
Civil Aviation int. (1A3a)	32,6	33,1	28,6	29,7	34,0	35,7	35,9	36,8	36,8	32,2	33,6

Emissions 1985-1999

pol_name	IPCC ID	Unit	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
SO ₂	Industry-Other (1A2f)	[tonnes]	2402	1441	1440	1438	956	952	955	957	957	959	968	244	246	249	251
SO ₂	Civil Aviation (1A3a)	[tonnes]	82	77	85	86	83	77	64	62	61	63	63	65	68	62	56
SO ₂	Road (1A3b)	[tonnes]	11621	7862	7847	7857	5488	5767	5903	3820	1569	1669	1682	1721	1744	1768	1088
SO ₂	Railways (1A3c)	[tonnes]	1152	695	618	641	393	376	382	263	105	95	96	95	93	78	40
SO ₂	Navigation (1A3d)	[tonnes]	7480	7480	7484	7228	7231	6429	5111	3506	4410	4974	5588	4400	3650	2283	2051
SO ₂	Comm./Inst. (1A4a)	[tonnes]	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3
SO ₂	Residential (1A4b)	[tonnes]	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
SO ₂	Ag./for./fish. (1A4c)	[tonnes]	4766	3484	3173	3073	2269	2303	2317	2186	2150	2072	2120	978	853	856	931
SO ₂	Military (1A5)	[tonnes]	408	260	193	72	70	48	206	82	76	80	80	56	54	65	47
SO ₂	Navigation int. (1A3d)	[tonnes]	17037	20752	35647	46755	47058	41317	33277	30084	58492	58965	65049	61075	55822	46756	49282
SO ₂	Civil Aviation int. (1A3a)	[tonnes]	444	480	515	551	578	554	521	541	530	580	596	629	642	689	731
NO _x	Industry-Other (1A2f)	[tonnes]	10903	10964	11011	11044	11065	11081	11282	11440	11558	11677	11882	12080	12248	12425	12262
NO _x	Civil Aviation (1A3a)	[tonnes]	1203	1132	1237	1252	1208	1123	920	902	900	940	958	971	998	911	815
NO _x	Road (1A3b)	[tonnes]	91119	96521	97055	98447	99900	105699	108255	106166	103124	102335	96825	92346	88420	84227	80661
NO _x	Railways (1A3c)	[tonnes]	6025	6063	5391	5589	5145	4913	4995	5284	5485	4971	5015	4977	4846	4089	3730
NO _x	Navigation (1A3d)	[tonnes]	13299	13339	13414	13486	13568	13649	13180	12882	12753	12999	13679	14757	13544	11175	8720
NO _x	Comm./Inst. (1A4a)	[tonnes]	66	67	68	70	70	70	75	80	85	89	93	95	98	101	102
NO _x	Residential (1A4b)	[tonnes]	31	32	33	34	34	34	36	38	40	42	43	45	46	48	49
NO _x	Ag./for./fish. (1A4c)	[tonnes]	18159	19915	18153	20143	20342	21066	21722	20824	20763	20524	21442	21138	20176	20119	21495
NO _x	Military (1A5)	[tonnes]	2353	2026	1627	992	882	495	1864	1014	1296	1279	1760	958	1197	1386	1074
NO _x	Navigation int. (1A3d)	[tonnes]	22455	26921	42068	54983	56940	60639	53939	55808	87852	99296	105113	100507	93239	92360	89143
NO _x	Civil Aviation int. (1A3a)	[tonnes]	5663	6129	6569	7035	7313	7016	6586	6846	6702	7317	7517	7904	8058	8662	9204
NMVOC	Industry-Other (1A2f)	[tonnes]	2422	2395	2368	2339	2304	2266	2231	2191	2147	2107	2088	2095	2083	2074	1997
NMVOC	Civil Aviation (1A3a)	[tonnes]	216	213	190	198	193	186	168	164	161	191	206	194	186	169	162
NMVOC	Road (1A3b)	[tonnes]	78978	78883	78290	78014	76340	79934	82122	80556	77271	73332	68005	63344	58165	52763	46410
NMVOC	Railways (1A3c)	[tonnes]	393	396	352	365	336	321	326	345	358	324	327	325	316	267	276
NMVOC	Navigation (1A3d)	[tonnes]	1560	1560	1592	1622	1654	1686	1719	1761	1786	1820	1879	1975	1969	1873	1776
NMVOC	Comm./Inst. (1A4a)	[tonnes]	2347	2333	2318	2303	2303	2303	2314	2302	2265	2285	2367	2458	2547	2636	2741
NMVOC	Residential (1A4b)	[tonnes]	1844	1833	1821	1809	1805	1801	1797	1792	1789	1785	1780	1774	1767	1759	1758
NMVOC	Ag./for./fish. (1A4c)	[tonnes]	6357	6417	6216	6284	6207	6149	5777	5298	4944	4638	4516	4208	3966	3691	3563
NMVOC	Military (1A5)	[tonnes]	587	457	172	483	309	53	162	87	122	119	148	90	103	114	105
NMVOC	Navigation int. (1A3d)	[tonnes]	825	974	1472	1892	1947	2060	1839	1928	2933	3318	3501	3343	3082	3102	2929
NMVOC	Civil Aviation int. (1A3a)	[tonnes]	261	288	313	342	361	331	309	316	309	308	343	360	365	386	395
CH ₄	Industry-Other (1A2f)	[tonnes]	63	63	62	61	61	60	58	57	56	54	53	53	53	53	51

Continued

CH ₄	Civil Aviation (1A3a)	[tonnes]	8	8	8	8	8	7	6	6	6	7	7	7	7	7	6
CH ₄	Road (1A3b)	[tonnes]	2281	2341	2357	2382	2375	2518	2605	2590	2544	2489	2359	2245	2147	2047	1919
CH ₄	Railways (1A3c)	[tonnes]	15	15	14	14	13	12	13	13	14	12	13	12	12	10	11
CH ₄	Navigation (1A3d)	[tonnes]	30	30	31	31	32	32	33	34	34	35	36	38	38	35	34
CH ₄	Comm./Inst. (1A4a)	[tonnes]	104	102	100	99	99	99	97	95	92	90	89	89	89	89	90
CH ₄	Residential (1A4b)	[tonnes]	55	54	53	52	51	51	50	49	48	48	47	46	45	45	45
CH ₄	Ag./for./fish. (1A4c)	[tonnes]	155	154	147	146	142	139	132	123	116	110	106	100	94	89	88
CH ₄	Military (1A5)	[tonnes]	30	25	17	18	13	5	18	10	13	13	18	10	12	14	11
CH ₄	Navigation int. (1A3d)	[tonnes]	26	30	46	59	60	64	57	60	91	103	108	103	95	96	91
CH ₄	Civil Aviation int. (1A3a)	[tonnes]	25	27	30	32	33	31	29	30	29	31	35	37	38	40	41
CO	Industry-Other (1A2f)	[tonnes]	9863	9784	9702	9611	9502	9379	9294	9188	9070	8956	8910	8963	8939	8907	8647
CO	Civil Aviation (1A3a)	[tonnes]	1256	1241	1118	1167	1140	1098	989	955	930	1098	1180	1117	1085	973	932
CO	Road (1A3b)	[tonnes]	565567	539748	515504	478371	446637	455048	472022	455058	440529	410153	387606	374781	337823	314697	278038
CO	Railways (1A3c)	[tonnes]	1098	1105	982	1018	937	895	910	963	999	906	914	907	883	745	717
CO	Navigation (1A3d)	[tonnes]	5472	5473	5636	5797	5962	6126	6297	6491	6623	6805	7057	7246	7150	6983	6779
CO	Comm./Inst. (1A4a)	[tonnes]	31348	30972	30583	30181	30181	30181	29610	28987	28319	27809	27575	27800	28012	28211	28817
CO	Residential (1A4b)	[tonnes]	19086	18725	18352	17968	17789	17606	17238	16880	16708	16556	16422	16311	16217	16136	16286
CO	Ag./for./fish. (1A4c)	[tonnes]	61165	59707	57256	55768	53717	51734	48771	45427	42608	39735	37673	34858	32455	29823	27820
CO	Military (1A5)	[tonnes]	4171	3074	1306	3133	1936	423	1001	507	841	865	876	613	590	669	675
CO	Navigation int. (1A3d)	[tonnes]	2722	3214	4855	6243	6424	6796	6065	6361	9677	10946	11548	11030	10168	10233	9662
CO	Civil Aviation int. (1A3a)	[tonnes]	1103	1207	1289	1416	1564	1442	1357	1399	1388	1342	1421	1502	1564	1662	1743
CO ₂	Industry-Other (1A2f)	[ktonnes]	850	849	848	846	843	839	841	841	839	839	846	851	858	865	871
CO ₂	Civil Aviation (1A3a)	[ktonnes]	256	241	268	271	262	243	199	193	190	196	199	205	212	194	174
CO ₂	Road (1A3b)	[ktonnes]	8165	8631	8642	8700	8795	9282	9697	9870	9995	10491	10588	10766	10978	11167	11312
CO ₂	Railways (1A3c)	[ktonnes]	364	366	326	338	311	297	302	319	331	300	303	301	293	247	232
CO ₂	Navigation (1A3d)	[ktonnes]	784	784	787	790	793	796	803	817	803	814	850	917	898	745	655
CO ₂	Comm./Inst. (1A4a)	[ktonnes]	74	74	74	74	74	74	74	75	75	77	78	80	81	83	85
CO ₂	Residential (1A4b)	[ktonnes]	40	40	39	39	39	39	39	39	39	39	40	40	41	41	42
CO ₂	Ag./for./fish. (1A4c)	[ktonnes]	1806	1922	1758	1887	1874	1899	1903	1794	1760	1695	1728	1642	1554	1510	1564
CO ₂	Military (1A5)	[ktonnes]	402	316	361	196	165	119	287	141	237	252	252	176	171	204	182
CO ₂	Navigation int. (1A3d)	[ktonnes]	1238	1454	2179	2786	2854	3005	2673	2797	4214	4744	4976	4725	4326	4337	4053
CO ₂	Civil Aviation int. (1A3a)	[ktonnes]	1391	1503	1613	1725	1809	1736	1632	1693	1659	1818	1867	1971	2010	2159	2290
N ₂ O	Industry-Other (1A2f)	[tonnes]	34	34	34	34	34	34	34	35	35	35	35	36	36	36	37
N ₂ O	Civil Aviation (1A3a)	[tonnes]	10	10	11	11	10	9	9	9	9	10	11	11	9	9	9
N ₂ O	Road (1A3b)	[tonnes]	267	280	280	283	285	299	318	338	352	383	405	426	446	451	455

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N ₂ O	Railways (1A3c)	[tonnes]	10	10	9	9	9	8	8	9	9	8	8	8	8	7	6
N ₂ O	Navigation (1A3d)	[tonnes]	48	48	48	48	48	48	49	50	49	49	51	55	54	44	39
N ₂ O	Comm./Inst. (1A4a)	[tonnes]	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N ₂ O	Residential (1A4b)	[tonnes]	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N ₂ O	Ag./for./fish. (1A4c)	[tonnes]	81	87	78	85	85	87	88	83	81	79	81	77	71	70	74
N ₂ O	Military (1A5)	[tonnes]	12	9	11	6	5	4	8	4	7	8	7	5	5	6	6
N ₂ O	Navigation int. (1A3d)	[tonnes]	78	92	137	175	179	189	168	176	265	298	313	297	272	273	255
N ₂ O	Civil Aviation int. (1A3a)	[tonnes]	47	50	54	58	61	59	56	58	57	63	64	69	70	75	80
NH ₃	Industry-Other (1A2f)	[tonnes]	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
NH ₃	Civil Aviation (1A3a)	[tonnes]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NH ₃	Road (1A3b)	[tonnes]	61	64	64	66	66	70	183	415	635	948	1244	1511	1886	2278	2575
NH ₃	Railways (1A3c)	[tonnes]	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
NH ₃	Navigation (1A3d)	[tonnes]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NH ₃	Comm./Inst. (1A4a)	[tonnes]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NH ₃	Residential (1A4b)	[tonnes]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NH ₃	Ag./for./fish. (1A4c)	[tonnes]	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
NH ₃	Military (1A5)	[tonnes]	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1
NH ₃	Navigation int. (1A3d)	[tonnes]	0							0	0						
NH ₃	Civil Aviation int. (1A3a)	[tonnes]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TSP	Industry-Other (1A2f)	[tonnes]	1823	1778	1733	1686	1634	1577	1533	1484	1433	1383	1349	1317	1284	1249	1193
TSP	Civil Aviation (1A3a)	[tonnes]	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4
TSP	Road (1A3b)	[tonnes]	4307	4659	4675	4589	4641	4867	5014	4817	4794	4887	4671	4451	4023	3666	3348
TSP	Railways (1A3c)	[tonnes]	247	249	222	229	211	202	205	217	225	204	206	204	199	168	146
TSP	Navigation (1A3d)	[tonnes]	1099	1099	1103	1098	1103	898	710	519	660	762	919	723	670	451	417
TSP	Comm./Inst. (1A4a)	[tonnes]	24	24	24	24	24	24	24	23	22	23	24	25	27	28	29
TSP	Residential (1A4b)	[tonnes]	12	12	12	12	11	11	11	11	11	11	11	11	11	11	11
TSP	Ag./for./fish. (1A4c)	[tonnes]	2783	2820	2673	2723	2665	2628	2534	2362	2300	2119	2087	1892	1783	1633	1576
TSP	Military (1A5)	[tonnes]	100	100	49	18	26	11	112	66	62	54	114	44	70	73	44
TSP	Navigation int. (1A3d)	[tonnes]	2832	3448	5914	7810	7866	5531	4371	3999	8648	8194	10076	9968	9231	7717	8177
TSP	Civil Aviation int. (1A3a)	[tonnes]	23	24	26	28	30	28	27	28	27	29	30	32	32	35	37
PM ₁₀	Industry-Other (1A2f)	[tonnes]	1823	1778	1733	1686	1634	1577	1533	1484	1433	1383	1349	1317	1284	1249	1193
PM ₁₀	Civil Aviation (1A3a)	[tonnes]	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4
PM ₁₀	Road (1A3b)	[tonnes]	4307	4659	4675	4589	4641	4867	5014	4817	4794	4887	4671	4451	4023	3666	3348
PM ₁₀	Railways (1A3c)	[tonnes]	247	249	222	229	211	202	205	217	225	204	206	204	199	168	146
PM ₁₀	Navigation (1A3d)	[tonnes]	1089	1089	1093	1088	1093	890	704	515	655	756	911	717	664	448	414

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PM ₁₀	Comm./Inst. (1A4a)	[tonnes]	24	24	24	24	24	24	24	23	22	23	24	25	27	28	29
PM ₁₀	Residential (1A4b)	[tonnes]	12	12	12	12	11	11	11	11	11	11	11	11	11	11	11
PM ₁₀	Ag./for./fish. (1A4c)	[tonnes]	2781	2818	2671	2721	2663	2626	2532	2360	2298	2117	2086	1891	1782	1632	1575
PM ₁₀	Military (1A5)	[tonnes]	100	100	49	18	26	11	112	66	62	54	114	44	70	73	44
PM ₁₀	Navigation int. (1A3d)	[tonnes]	2803	3413	5855	7732	7788	5476	4327	3959	8561	8112	9975	9869	9139	7639	8095
PM ₁₀	Civil Aviation int. (1A3a)	[tonnes]	23	24	26	28	30	28	27	28	27	29	30	32	32	35	37
PM _{2.5}	Industry-Other (1A2f)	[tonnes]	1823	1778	1733	1686	1634	1577	1533	1484	1433	1383	1349	1317	1284	1249	1193
PM _{2.5}	Civil Aviation (1A3a)	[tonnes]	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4
PM _{2.5}	Road (1A3b)	[tonnes]	4307	4659	4675	4589	4641	4867	5014	4817	4794	4887	4671	4451	4023	3666	3348
PM _{2.5}	Railways (1A3c)	[tonnes]	247	249	222	229	211	202	205	217	225	204	206	204	199	168	146
PM _{2.5}	Navigation (1A3d)	[tonnes]	1084	1084	1088	1083	1088	886	701	513	652	753	907	714	662	446	413
PM _{2.5}	Comm./Inst. (1A4a)	[tonnes]	24	24	24	24	24	24	24	23	22	23	24	25	27	28	29
PM _{2.5}	Residential (1A4b)	[tonnes]	12	12	12	12	11	11	11	11	11	11	11	11	11	11	11
PM _{2.5}	Ag./for./fish. (1A4c)	[tonnes]	2780	2817	2670	2720	2662	2625	2531	2359	2297	2116	2085	1890	1781	1631	1574
PM _{2.5}	Military (1A5)	[tonnes]	100	100	49	18	26	11	112	66	62	54	114	44	70	73	44
PM _{2.5}	Navigation int. (1A3d)	[tonnes]	2789	3396	5825	7693	7748	5448	4305	3939	8518	8071	9925	9819	9093	7601	8054
PM _{2.5}	Civil Aviation int. (1A3a)	[tonnes]	23	24	26	28	30	28	27	28	27	29	30	32	32	35	37
Arsenic	Industry-Other (1A2f)	[kg]							0	0	0	0	0	0	0	0	0
Arsenic	Civil Aviation (1A3a)	[kg]							0	0	0	0	0	0	0	0	0
Arsenic	Road (1A3b)	[kg]							1	1	1	1	1	1	1	1	1
Arsenic	Railways (1A3c)	[kg]							0	0	0	0	0	0	0	0	0
Arsenic	Navigation (1A3d)	[kg]							62	55	47	47	49	50	44	36	28
Arsenic	Comm./Inst. (1A4a)	[kg]							0	0	0	0	0	0	0	0	0
Arsenic	Residential (1A4b)	[kg]							0	0	0	0	0	0	0	0	0
Arsenic	Ag./for./fish. (1A4c)	[kg]							9	10	9	8	8	8	8	6	7
Arsenic	Military (1A5)	[kg]							0	0	0	0	0	0	0	0	0
Arsenic	Navigation int. (1A3d)	[kg]							353	292	267	465	496	505	325	417	357
Arsenic	Civil Aviation int. (1A3a)	[kg]							0	0	0	0	0	0	0	0	0
Cadmium	Industry-Other (1A2f)	[kg]							2	2	2	2	2	2	2	2	2
Cadmium	Civil Aviation (1A3a)	[kg]							0	0	0	0	0	0	0	0	0
Cadmium	Road (1A3b)	[kg]							26	27	28	29	30	30	31	31	32
Cadmium	Railways (1A3c)	[kg]							1	1	1	1	1	1	1	1	1
Cadmium	Navigation (1A3d)	[kg]							5	4	4	4	4	4	4	3	3
Cadmium	Comm./Inst. (1A4a)	[kg]							0	0	0	0	0	0	0	0	0
Cadmium	Residential (1A4b)	[kg]							0	0	0	0	0	0	0	0	0

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Cadmium	Ag./for./fish. (1A4c)	[kg]		5	5	5	5	5	5	4	4	4	4
Cadmium	Military (1A5)	[kg]		0	0	0	0	0	0	0	0	0	0
Cadmium	Navigation int. (1A3d)	[kg]		23	20	19	31	34	35	20	29	26	26
Cadmium	Civil Aviation int. (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Chromium	Industry-Other (1A2f)	[kg]		7	7	7	7	7	7	7	7	7	7
Chromium	Civil Aviation (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Chromium	Road (1A3b)	[kg]		60	63	63	64	67	68	69	71	72	73
Chromium	Railways (1A3c)	[kg]		3	3	3	3	3	3	3	3	3	2
Chromium	Navigation (1A3d)	[kg]		28	25	23	22	23	24	22	19	15	14
Chromium	Comm./Inst. (1A4a)	[kg]		0	0	0	0	0	0	0	0	0	0
Chromium	Residential (1A4b)	[kg]		0	0	0	0	0	0	0	0	0	0
Chromium	Ag./for./fish. (1A4c)	[kg]		19	19	18	17	17	17	16	15	15	16
Chromium	Military (1A5)	[kg]		0	1	1	1	1	1	0	1	1	1
Chromium	Navigation int. (1A3d)	[kg]		147	123	115	195	210	214	131	178	157	160
Chromium	Civil Aviation int. (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Copper	Industry-Other (1A2f)	[kg]		5	5	5	5	5	5	6	6	6	6
Copper	Civil Aviation (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Copper	Road (1A3b)	[kg]		88	92	96	98	102	103	104	107	109	109
Copper	Railways (1A3c)	[kg]		2	2	2	2	2	2	2	2	2	1
Copper	Navigation (1A3d)	[kg]		63	56	48	47	49	50	45	36	29	26
Copper	Comm./Inst. (1A4a)	[kg]		1	1	1	1	1	1	1	1	1	1
Copper	Residential (1A4b)	[kg]		1	1	1	1	1	1	1	1	1	1
Copper	Ag./for./fish. (1A4c)	[kg]		18	18	17	16	16	16	17	14	14	15
Copper	Military (1A5)	[kg]		0	1	0	0	0	1	0	1	1	0
Copper	Navigation int. (1A3d)	[kg]		353	292	267	465	496	505	325	417	357	369
Copper	Civil Aviation int. (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Mercury	Industry-Other (1A2f)	[kg]		1	1	1	1	1	1	1	1	1	1
Mercury	Civil Aviation (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Mercury	Road (1A3b)	[kg]		21	22	22	23	24	24	24	25	25	25
Mercury	Railways (1A3c)	[kg]		0	1	1	1	1	1	1	0	0	0
Mercury	Navigation (1A3d)	[kg]		9	9	10	9	10	10	11	12	10	8
Mercury	Comm./Inst. (1A4a)	[kg]		0	0	0	0	0	0	0	0	0	0
Mercury	Residential (1A4b)	[kg]		0	0	0	0	0	0	0	0	0	0
Mercury	Ag./for./fish. (1A4c)	[kg]		12	12	11	10	10	10	10	8	8	9
Mercury	Military (1A5)	[kg]		0	0	0	0	0	0	0	0	0	0

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Mercury	Navigation int. (1A3d)	[kg]	27	25	29	40	47	50	14	45	49	43
Mercury	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0
Nickel	Industry-Other (1A2f)	[kg]	2	2	2	2	2	2	2	2	2	2
Nickel	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0
Nickel	Road (1A3b)	[kg]	29	31	32	32	34	34	35	36	36	37
Nickel	Railways (1A3c)	[kg]	1	1	1	1	1	1	1	1	1	1
Nickel	Navigation (1A3d)	[kg]	3362	2889	2360	2359	2477	2492	2087	1520	1179	1077
Nickel	Comm./Inst. (1A4a)	[kg]	0	0	0	0	0	0	0	0	0	0
Nickel	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0
Nickel	Ag./for./fish. (1A4c)	[kg]	16	17	16	15	15	15	14	12	12	13
Nickel	Military (1A5)	[kg]	0	0	0	0	0	0	0	0	0	0
Nickel	Navigation int. (1A3d)	[kg]	20420	16701	14894	26627	28129	28488	19451	23291	19285	20431
Nickel	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0
Lead	Industry-Other (1A2f)	[kg]	12	12	12	12	12	12	12	12	12	12
Lead	Civil Aviation (1A3a)	[kg]	1534	1423	1378	1328	1639	1788	1640	1559	1399	1387
Lead	Road (1A3b)	[kg]	97617	75968	68889	29932	123	125	126	129	131	133
Lead	Railways (1A3c)	[kg]	4	5	5	5	5	5	5	4	4	4
Lead	Navigation (1A3d)	[kg]	35	34	33	32	33	34	35	32	26	23
Lead	Comm./Inst. (1A4a)	[kg]	1	1	1	1	1	1	1	1	1	1
Lead	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0
Lead	Ag./for./fish. (1A4c)	[kg]	38	38	36	35	34	35	33	30	29	31
Lead	Military (1A5)	[kg]	63	81	62	121	86	104	99	125	118	79
Lead	Navigation int. (1A3d)	[kg]	162	140	138	221	243	251	132	214	201	196
Lead	Civil Aviation int. (1A3a)	[kg]	490	465	452	456	153	175	126	145	145	124
Selenium	Industry-Other (1A2f)	[kg]	0	0	0	0	0	0	0	0	0	0
Selenium	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0
Selenium	Road (1A3b)	[kg]	0	0	0	0	1	1	1	1	1	1
Selenium	Railways (1A3c)	[kg]	0	0	0	0	0	0	0	0	0	0
Selenium	Navigation (1A3d)	[kg]	69	67	64	63	64	66	67	62	50	43
Selenium	Comm./Inst. (1A4a)	[kg]	0	0	0	0	0	0	0	0	0	0
Selenium	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0
Selenium	Ag./for./fish. (1A4c)	[kg]	37	38	35	33	33	33	32	25	26	30
Selenium	Military (1A5)	[kg]	0	0	0	0	0	0	0	0	0	0
Selenium	Navigation int. (1A3d)	[kg]	325	279	275	442	486	503	264	427	402	391
Selenium	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0

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Zinc	Industry-Other (1A2f)	[kg]		419	420	420	419	419	422	425	428	432	435
Zinc	Civil Aviation (1A3a)	[kg]		6	5	5	5	6	7	6	6	5	5
Zinc	Road (1A3b)	[kg]		5196	5460	5628	5723	6002	6072	6123	6267	6372	6449
Zinc	Railways (1A3c)	[kg]		150	152	161	167	151	153	152	148	124	117
Zinc	Navigation (1A3d)	[kg]		191	187	184	183	188	195	202	193	165	151
Zinc	Comm./Inst. (1A4a)	[kg]		51	51	52	52	53	54	55	56	57	59
Zinc	Residential (1A4b)	[kg]		27	27	27	27	27	27	28	28	28	29
Zinc	Ag./for./fish. (1A4c)	[kg]		766	762	724	717	683	698	664	655	626	632
Zinc	Military (1A5)	[kg]		6	62	37	34	30	67	27	49	57	39
Zinc	Navigation int. (1A3d)	[kg]		744	643	638	1017	1121	1162	595	991	940	910
Zinc	Civil Aviation int. (1A3a)	[kg]		2	2	2	2	1	1	0	1	1	0
Dioxins/furans	Industry-Other (1A2f)	[g]		0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Civil Aviation (1A3a)	[g]		0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Road (1A3b)	[g]		1	1	1	1	1	1	1	1	0	0
Dioxins/furans	Railways (1A3c)	[g]		0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Navigation (1A3d)	[g]		0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Comm./Inst. (1A4a)	[g]		0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Residential (1A4b)	[g]		0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Ag./for./fish. (1A4c)	[g]		0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Military (1A5)	[g]		0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Navigation int. (1A3d)	[g]		1	0	0	1	1	1	1	1	1	1
Dioxins/furans	Civil Aviation int. (1A3a)	[g]		0	0	0	0	0	0	0	0	0	0
Flouranthene	Industry-Other (1A2f)	[kg]		45	44	45	46	45	46	46	46	46	46
Flouranthene	Civil Aviation (1A3a)	[kg]		0	0	0	0	1	1	1	0	0	0
Flouranthene	Road (1A3b)	[kg]		813	833	813	789	773	723	680	652	621	599
Flouranthene	Railways (1A3c)	[kg]		5	5	6	6	6	6	6	6	5	4
Flouranthene	Navigation (1A3d)	[kg]		66	68	71	70	70	74	82	82	67	58
Flouranthene	Comm./Inst. (1A4a)	[kg]		4	4	4	4	5	5	5	5	5	5
Flouranthene	Residential (1A4b)	[kg]		2	2	2	2	2	2	2	2	2	2
Flouranthene	Ag./for./fish. (1A4c)	[kg]		136	135	128	127	121	124	117	107	104	110
Flouranthene	Military (1A5)	[kg]		1	7	4	4	3	8	3	6	6	4
Flouranthene	Navigation int. (1A3d)	[kg]		198	184	205	288	334	355	344	316	338	304
Flouranthene	Civil Aviation int. (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(b) flouranthene	Industry-Other (1A2f)	[kg]		6	6	6	6	6	6	6	6	6	6
Benzo(b) flouranthene	Civil Aviation (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0

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Benzo(b) fluoranthene	Road (1A3b)	[kg]		66	68	67	66	67	65	63	62	61	60
Benzo(b) fluoranthene	Railways (1A3c)	[kg]		1	1	1	2	1	1	1	1	1	1
Benzo(b) fluoranthene	Navigation (1A3d)	[kg]		5	5	6	5	5	6	7	7	6	5
Benzo(b) fluoranthene	Comm./Inst. (1A4a)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(b) fluoranthene	Residential (1A4b)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(b) fluoranthene	Ag./for./fish. (1A4c)	[kg]		15	15	14	14	13	13	13	12	11	12
Benzo(b) fluoranthene	Military (1A5)	[kg]		0	1	1	1	0	1	0	1	1	1
Benzo(b) fluoranthene	Navigation int. (1A3d)	[kg]		13	12	15	19	23	25	24	22	25	22
Benzo(b) fluoranthene	Civil Aviation int. (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(k) fluoranthene	Industry-Other (1A2f)	[kg]		6	6	6	6	6	6	6	6	6	6
Benzo(k) fluoranthene	Civil Aviation (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(k) fluoranthene	Road (1A3b)	[kg]		66	68	68	67	69	69	69	68	68	68
Benzo(k) fluoranthene	Railways (1A3c)	[kg]		2	2	2	2	2	2	2	2	1	1
Benzo(k) fluoranthene	Navigation (1A3d)	[kg]		2	2	2	2	2	3	3	3	3	2
Benzo(k) fluoranthene	Comm./Inst. (1A4a)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(k) fluoranthene	Residential (1A4b)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(k) fluoranthene	Ag./for./fish. (1A4c)	[kg]		12	12	11	11	11	11	10	10	9	9
Benzo(k) fluoranthene	Military (1A5)	[kg]		0	1	1	1	0	1	0	1	1	1
Benzo(k) fluoranthene	Navigation int. (1A3d)	[kg]		6	6	7	9	11	11	11	10	12	10
Benzo(k) fluoranthene	Civil Aviation int. (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Industry-Other (1A2f)	[kg]		3	3	3	3	3	3	3	3	3	3
Benzo(a) pyrene	Civil Aviation (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Road (1A3b)	[kg]		47	48	48	47	48	46	44	44	43	43
Benzo(a) pyrene	Railways (1A3c)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Navigation (1A3d)	[kg]		1	1	1	1	1	1	2	2	1	1
Benzo(a) pyrene	Comm./Inst. (1A4a)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Residential (1A4b)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Ag./for./fish. (1A4c)	[kg]		6	6	6	6	5	5	5	5	5	5
Benzo(a) pyrene	Military (1A5)	[kg]		0	0	0	0	0	1	0	0	0	0
Benzo(a) pyrene	Navigation int. (1A3d)	[kg]		4	3	4	5	6	7	6	6	6	6
Benzo(a) pyrene	Civil Aviation int. (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(g,h,i) perylene	Industry-Other (1A2f)	[kg]		6	6	6	6	5	6	5	5	5	5
Benzo(g,h,i) perylene	Civil Aviation (1A3a)	[kg]		0	0	0	0	0	0	0	0	0	0
Benzo(g,h,i) perylene	Road (1A3b)	[kg]		99	102	101	99	99	94	90	88	86	84
Benzo(g,h,i) perylene	Railways (1A3c)	[kg]		0	0	0	0	0	0	0	0	0	0

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Benzo(g,h,i) perylene	Navigation (1A3d)	[kg]	8	9	11	10	10	11	13	14	11	10
Benzo(g,h,i) perylene	Comm./Inst. (1A4a)	[kg]	1	1	1	1	1	1	1	1	1	1
Benzo(g,h,i) perylene	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0
Benzo(g,h,i) perylene	Ag./for./fish. (1A4c)	[kg]	21	21	20	19	19	19	18	16	15	16
Benzo(g,h,i) perylene	Military (1A5)	[kg]	0	1	1	1	0	1	0	1	1	0
Benzo(g,h,i) perylene	Navigation int. (1A3d)	[kg]	23	23	29	36	44	48	48	44	51	44
Benzo(g,h,i) perylene	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0
indeno(1,2,3-c,d) pyrene	Industry-Other (1A2f)	[kg]	3	3	3	3	3	3	3	3	3	3
indeno(1,2,3-c,d) pyrene	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0
indeno(1,2,3-c,d) pyrene	Road (1A3b)	[kg]	45	46	47	47	48	47	47	47	47	48
indeno(1,2,3-c,d) pyrene	Railways (1A3c)	[kg]	0	0	0	0	0	0	0	0	0	0
indeno(1,2,3-c,d) pyrene	Navigation (1A3d)	[kg]	7	7	8	8	8	9	10	11	9	8
indeno(1,2,3-c,d) pyrene	Comm./Inst. (1A4a)	[kg]	0	0	0	0	0	0	0	0	0	0
indeno(1,2,3-c,d) pyrene	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0
indeno(1,2,3-c,d) pyrene	Ag./for./fish. (1A4c)	[kg]	14	15	14	13	13	13	12	11	11	11
indeno(1,2,3-c,d) pyrene	Military (1A5)	[kg]	0	0	0	0	0	1	0	0	0	0
indeno(1,2,3-c,d) pyrene	Navigation int. (1A3d)	[kg]	19	19	23	29	36	39	39	36	42	36
indeno(1,2,3-c,d) pyrene	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0

Emissions 2000-2010

pol_name	IPCC ID	Unit	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
SO ₂	Industry-Other (1A2f)	[tonnes]	253	256	258	261	263	28	30	32	33	24	31
SO ₂	Civil Aviation (1A3a)	[tonnes]	49	52	45	44	41	43	46	51	52	49	50
SO ₂	Road (1A3b)	[tonnes]	352	353	357	371	381	77	79	83	81	76	76
SO ₂	Railways (1A3c)	[tonnes]	7	7	7	7	7	1	1	1	1	1	2
SO ₂	Navigation (1A3d)	[tonnes]	1844	1733	1582	1984	2319	2339	2431	1686	1510	1593	1440
SO ₂	Comm./Inst. (1A4a)	[tonnes]	3	3	4	4	5	1	1	1	1	1	1
SO ₂	Residential (1A4b)	[tonnes]	1	1	2	2	2	0	0	0	0	0	0
SO ₂	Ag./for./fish. (1A4c)	[tonnes]	1021	1209	1236	1203	1022	852	800	690	419	392	404
SO ₂	Military (1A5)	[tonnes]	27	12	19	17	46	57	26	40	19	25	20
SO ₂	Navigation int. (1A3d)	[tonnes]	55367	43830	30036	30982	26540	34283	50417	25652	19326	7383	8262
SO ₂	Civil Aviation int. (1A3a)	[tonnes]	750	761	657	683	781	822	824	845	845	740	773
NO _x	Industry-Other (1A2f)	[tonnes]	12096	11869	11617	11214	10744	10664	10807	10667	9978	7137	8540
NO _x	Civil Aviation (1A3a)	[tonnes]	723	752	641	595	551	583	602	693	697	635	623
NO _x	Road (1A3b)	[tonnes]	75869	73599	70472	69474	67595	64224	62738	60801	53858	46103	44159
NO _x	Railways (1A3c)	[tonnes]	3727	3396	3396	3540	3478	3724	3542	3555	2920	2603	2818
NO _x	Navigation (1A3d)	[tonnes]	8087	8197	8315	8443	8469	8634	8979	9057	9316	9534	9582
NO _x	Comm./Inst. (1A4a)	[tonnes]	104	112	124	138	155	177	199	215	222	220	217
NO _x	Residential (1A4b)	[tonnes]	50	54	59	64	69	72	76	79	82	84	87
NO _x	Ag./for./fish. (1A4c)	[tonnes]	22807	25787	26036	25286	22447	24009	22832	20889	22027	20790	20770
NO _x	Military (1A5)	[tonnes]	544	670	465	511	1252	1287	597	752	477	696	438
NO _x	Navigation int. (1A3d)	[tonnes]	94441	75429	60383	65339	53439	56540	78012	83555	70401	35658	51332
NO _x	Civil Aviation int. (1A3a)	[tonnes]	9446	9600	8724	9084	10472	11025	11158	11402	11292	9843	10110
NMVOC	Industry-Other (1A2f)	[tonnes]	1926	1873	1815	1754	1676	1620	1583	1498	1357	976	1173
NMVOC	Civil Aviation (1A3a)	[tonnes]	156	155	151	144	158	165	156	164	146	125	109
NMVOC	Road (1A3b)	[tonnes]	39079	35477	32024	29492	25642	23365	20509	18046	15951	13751	12514
NMVOC	Railways (1A3c)	[tonnes]	253	248	243	223	217	235	230	231	205	174	189
NMVOC	Navigation (1A3d)	[tonnes]	1731	1702	1661	1602	1534	1423	1305	1190	1096	1013	937
NMVOC	Comm./Inst. (1A4a)	[tonnes]	2845	3504	4188	4897	5631	5775	5922	6022	5844	5159	4423
NMVOC	Residential (1A4b)	[tonnes]	1757	1824	1894	1972	2053	2084	2115	2134	2109	2071	2032
NMVOC	Ag./for./fish. (1A4c)	[tonnes]	3414	3378	3199	2987	2698	2712	2662	2598	2631	2504	2374
NMVOC	Military (1A5)	[tonnes]	55	53	45	45	100	106	51	68	40	56	41
NMVOC	Navigation int. (1A3d)	[tonnes]	3045	2433	1989	2130	1731	1792	2418	2563	2195	1160	1636
NMVOC	Civil Aviation int. (1A3a)	[tonnes]	407	404	388	397	448	460	469	472	456	383	367
CH ₄	Industry-Other (1A2f)	[tonnes]	50	49	48	47	46	45	44	43	40	30	37

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CH ₄	Civil Aviation (1A3a)	[tonnes]	5	6	5	5	6	7	6	7	6	5	4
CH ₄	Road (1A3b)	[tonnes]	1783	1664	1549	1465	1359	1237	1139	1025	869	723	644
CH ₄	Railways (1A3c)	[tonnes]	10	10	9	9	8	9	9	9	8	7	7
CH ₄	Navigation (1A3d)	[tonnes]	33	33	34	34	35	35	35	35	35	35	35
CH ₄	Comm./Inst. (1A4a)	[tonnes]	92	101	113	127	144	157	169	175	174	167	160
CH ₄	Residential (1A4b)	[tonnes]	45	48	51	55	60	62	64	65	66	66	65
CH ₄	Ag./for./fish. (1A4c)	[tonnes]	88	90	90	89	85	90	97	104	111	114	113
CH ₄	Military (1A5)	[tonnes]	6	6	5	5	12	12	6	7	4	5	4
CH ₄	Navigation int. (1A3d)	[tonnes]	94	75	62	66	54	55	75	79	68	36	51
CH ₄	Civil Aviation int. (1A3a)	[tonnes]	42	42	40	41	47	48	50	50	48	40	39
CO	Industry-Other (1A2f)	[tonnes]	8395	8227	8030	7842	7600	7497	7515	7383	7010	5123	6446
CO	Civil Aviation (1A3a)	[tonnes]	895	891	863	835	858	861	842	902	823	717	688
CO	Road (1A3b)	[tonnes]	253738	242858	222559	212885	188134	179761	160030	142838	129890	113046	105972
CO	Railways (1A3c)	[tonnes]	694	637	627	611	599	648	626	629	526	450	481
CO	Navigation (1A3d)	[tonnes]	6832	7034	7217	7408	7601	7631	7281	6915	6565	6213	5841
CO	Comm./Inst. (1A4a)	[tonnes]	29423	32889	37681	43798	51239	58128	64197	67870	70290	72227	72338
CO	Residential (1A4b)	[tonnes]	16451	17390	18463	19890	21444	22482	23547	24366	25092	25341	25616
CO	Ag./for./fish. (1A4c)	[tonnes]	25842	24444	22571	20670	18575	17655	17414	18148	18992	19445	19380
CO	Military (1A5)	[tonnes]	396	304	309	297	697	790	376	534	302	410	309
CO	Navigation int. (1A3d)	[tonnes]	10044	8025	6562	7025	5709	5912	7977	8454	7243	3826	5397
CO	Civil Aviation int. (1A3a)	[tonnes]	1790	1795	1608	1668	1848	1907	1852	1906	1979	1690	1716
CO ₂	Industry-Other (1A2f)	[ktonnes]	877	886	895	905	910	948	1019	1087	1108	821	1037
CO ₂	Civil Aviation (1A3a)	[ktonnes]	154	163	141	138	128	135	143	161	162	153	156
CO ₂	Road (1A3b)	[ktonnes]	11203	11223	11352	11806	12115	12214	12587	13187	12937	12154	12108
CO ₂	Railways (1A3c)	[ktonnes]	228	211	210	218	216	232	227	228	237	230	242
CO ₂	Navigation (1A3d)	[ktonnes]	588	587	578	576	588	585	588	586	593	598	593
CO ₂	Comm./Inst. (1A4a)	[ktonnes]	87	98	112	129	149	162	172	175	176	174	173
CO ₂	Residential (1A4b)	[ktonnes]	43	46	49	53	57	59	61	62	63	63	63
CO ₂	Ag./for./fish. (1A4c)	[ktonnes]	1615	1769	1793	1768	1639	1758	1750	1727	1863	1837	1865
CO ₂	Military (1A5)	[ktonnes]	111	97	89	92	239	271	126	175	108	160	107
CO ₂	Navigation int. (1A3d)	[ktonnes]	4168	3304	2691	2853	2299	2352	3136	3292	2809	1487	2073
CO ₂	Civil Aviation int. (1A3a)	[ktonnes]	2350	2384	2058	2141	2447	2574	2581	2647	2647	2316	2421
N ₂ O	Industry-Other (1A2f)	[tonnes]	37	38	38	38	39	40	43	46	47	35	44
N ₂ O	Civil Aviation (1A3a)	[tonnes]	8	8	8	8	8	8	9	9	8	8	8
N ₂ O	Road (1A3b)	[tonnes]	449	445	438	442	442	428	426	434	417	386	385

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N ₂ O	Railways (1A3c)	[tonnes]	6	6	6	6	6	6	6	6	6	7	6	7
N ₂ O	Navigation (1A3d)	[tonnes]	34	34	34	33	34	34	34	34	34	35	35	35
N ₂ O	Comm./Inst. (1A4a)	[tonnes]	1	1	2	2	2	2	3	3	3	3	3	3
N ₂ O	Residential (1A4b)	[tonnes]	1	1	1	1	1	1	1	1	1	1	1	1
N ₂ O	Ag./for./fish. (1A4c)	[tonnes]	78	88	90	88	80	87	86	83	91	89	91	91
N ₂ O	Military (1A5)	[tonnes]	3	3	3	3	8	9	4	6	4	6	4	4
N ₂ O	Navigation int. (1A3d)	[tonnes]	262	208	170	180	145	148	197	207	177	94	130	
N ₂ O	Civil Aviation int. (1A3a)	[tonnes]	82	82	72	75	85	89	89	91	91	79	83	
NH ₃	Industry-Other (1A2f)	[tonnes]	2	2	2	2	2	2	2	3	3	2	3	
NH ₃	Civil Aviation (1A3a)	[tonnes]	0	0	0	0	0	0	0	0	0	0	0	
NH ₃	Road (1A3b)	[tonnes]	2764	2749	2696	2613	2517	2299	2130	1979	1793	1610	1433	
NH ₃	Railways (1A3c)	[tonnes]	1	1	1	1	1	1	1	1	1	1	1	
NH ₃	Navigation (1A3d)	[tonnes]	0	0	0	0	0	0	0	0	0	0	0	
NH ₃	Comm./Inst. (1A4a)	[tonnes]	0	0	0	0	0	0	0	0	0	0	0	
NH ₃	Residential (1A4b)	[tonnes]	0	0	0	0	0	0	0	0	0	0	0	
NH ₃	Ag./for./fish. (1A4c)	[tonnes]	3	3	3	3	3	3	3	3	3	4	4	
NH ₃	Military (1A5)	[tonnes]	0	0	0	0	1	1	0	0	1	1	0	
NH ₃	Navigation int. (1A3d)	[tonnes]												
NH ₃	Civil Aviation int. (1A3a)	[tonnes]	0	0	0	0	0	0	0	0	0	0	0	
TSP	Industry-Other (1A2f)	[tonnes]	1135	1121	1098	1075	1037	1002	991	938	854	587	686	
TSP	Civil Aviation (1A3a)	[tonnes]	3	4	3	3	3	3	3	3	3	3	3	
TSP	Road (1A3b)	[tonnes]	3015	2787	2556	2502	2374	2287	2224	2126	1868	1594	1513	
TSP	Railways (1A3c)	[tonnes]	141	125	124	119	115	124	120	120	101	84	95	
TSP	Navigation (1A3d)	[tonnes]	383	373	357	387	430	425	421	336	327	327	307	
TSP	Comm./Inst. (1A4a)	[tonnes]	30	38	46	55	63	65	66	66	67	67	67	
TSP	Residential (1A4b)	[tonnes]	11	11	12	13	13	13	14	14	14	14	14	
TSP	Ag./for./fish. (1A4c)	[tonnes]	1507	1498	1429	1351	1244	1213	1144	1076	1045	992	957	
TSP	Military (1A5)	[tonnes]	15	31	15	18	38	33	15	15	12	18	9	
TSP	Navigation int. (1A3d)	[tonnes]	8791	7143	4988	4501	3978	5761	7888	2365	1873	820	940	
TSP	Civil Aviation int. (1A3a)	[tonnes]	38	38	33	35	40	42	42	43	43	37	39	
PM ₁₀	Industry-Other (1A2f)	[tonnes]	1135	1121	1098	1075	1037	1002	991	938	854	587	686	
PM ₁₀	Civil Aviation (1A3a)	[tonnes]	3	4	3	3	3	3	3	3	3	3	3	
PM ₁₀	Road (1A3b)	[tonnes]	3015	2787	2556	2502	2374	2287	2224	2126	1868	1594	1513	
PM ₁₀	Railways (1A3c)	[tonnes]	141	125	124	119	115	124	120	120	101	84	95	
PM ₁₀	Navigation (1A3d)	[tonnes]	381	371	355	384	427	422	418	334	325	324	305	

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PM ₁₀	Comm./Inst. (1A4a)	[tonnes]	30	38	46	55	63	65	66	66	67	67	67
PM ₁₀	Residential (1A4b)	[tonnes]	11	11	12	13	13	13	14	14	14	14	14
PM ₁₀	Ag./for./fish. (1A4c)	[tonnes]	1505	1496	1426	1349	1242	1211	1143	1074	1043	991	955
PM ₁₀	Military (1A5)	[tonnes]	15	31	15	18	38	33	15	15	12	18	9
PM ₁₀	Navigation int. (1A3d)	[tonnes]	8703	7072	4938	4456	3938	5703	7809	2341	1854	812	931
PM ₁₀	Civil Aviation int. (1A3a)	[tonnes]	38	38	33	35	40	42	42	43	43	37	39
PM _{2.5}	Industry-Other (1A2f)	[tonnes]	1135	1121	1098	1075	1037	1002	991	938	854	587	686
PM _{2.5}	Civil Aviation (1A3a)	[tonnes]	3	4	3	3	3	3	3	3	3	3	3
PM _{2.5}	Road (1A3b)	[tonnes]	3015	2787	2556	2502	2374	2287	2224	2126	1868	1594	1513
PM _{2.5}	Railways (1A3c)	[tonnes]	141	125	124	119	115	124	120	120	101	84	95
PM _{2.5}	Navigation (1A3d)	[tonnes]	379	370	354	383	425	421	417	333	324	323	304
PM _{2.5}	Comm./Inst. (1A4a)	[tonnes]	30	38	46	55	63	65	66	66	67	67	67
PM _{2.5}	Residential (1A4b)	[tonnes]	11	11	12	13	13	13	14	14	14	14	14
PM _{2.5}	Ag./for./fish. (1A4c)	[tonnes]	1504	1495	1425	1348	1242	1210	1142	1073	1042	990	954
PM _{2.5}	Military (1A5)	[tonnes]	15	31	15	18	38	33	15	15	12	18	9
PM _{2.5}	Navigation int. (1A3d)	[tonnes]	8659	7036	4913	4434	3918	5675	7770	2330	1845	808	926
PM _{2.5}	Civil Aviation int. (1A3a)	[tonnes]	38	38	33	35	40	42	42	43	43	37	39
Arsenic	Industry-Other (1A2f)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Arsenic	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Arsenic	Road (1A3b)	[kg]	1	1	1	1	1	1	1	1	1	1	1
Arsenic	Railways (1A3c)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Arsenic	Navigation (1A3d)	[kg]	24	23	23	28	28	28	30	30	31	33	35
Arsenic	Comm./Inst. (1A4a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Arsenic	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Arsenic	Ag./for./fish. (1A4c)	[kg]	9	11	11	11	9	10	10	8	10	9	9
Arsenic	Military (1A5)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Arsenic	Navigation int. (1A3d)	[kg]	422	329	227	257	213	250	381	424	326	127	206
Arsenic	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Cadmium	Industry-Other (1A2f)	[kg]	2	2	2	2	2	2	3	3	3	2	3
Cadmium	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Cadmium	Road (1A3b)	[kg]	32	32	33	34	35	35	36	37	37	36	36
Cadmium	Railways (1A3c)	[kg]	1	1	1	1	1	1	1	1	1	1	1
Cadmium	Navigation (1A3d)	[kg]	3	2	2	3	3	3	3	3	3	3	3
Cadmium	Comm./Inst. (1A4a)	[kg]	0	0	0	0	1	1	1	1	1	1	1
Cadmium	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0	0

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Cadmium	Ag./for./fish. (1A4c)	[kg]	4	5	5	5	4	5	5	5	5	5	5	5
Cadmium	Military (1A5)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Cadmium	Navigation int. (1A3d)	[kg]	29	23	17	18	15	17	24	27	21	9	14	
Cadmium	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Chromium	Industry-Other (1A2f)	[kg]	7	7	7	8	8	8	9	9	9	7	9	
Chromium	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Chromium	Road (1A3b)	[kg]	73	74	75	80	83	85	88	94	94	90	92	
Chromium	Railways (1A3c)	[kg]	2	2	2	2	2	2	2	2	2	2	2	2
Chromium	Navigation (1A3d)	[kg]	13	12	12	14	14	14	15	15	15	16	17	
Chromium	Comm./Inst. (1A4a)	[kg]	0	0	1	1	1	1	1	1	1	1	1	1
Chromium	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Chromium	Ag./for./fish. (1A4c)	[kg]	16	18	19	18	17	18	18	17	19	18	19	
Chromium	Military (1A5)	[kg]	0	1	0	0	1	1	0	0	0	0	1	0
Chromium	Navigation int. (1A3d)	[kg]	179	140	100	111	92	106	157	174	136	56	88	
Chromium	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Copper	Industry-Other (1A2f)	[kg]	6	6	6	6	6	6	7	7	7	5	7	
Copper	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Copper	Road (1A3b)	[kg]	109	109	111	114	116	115	116	120	117	112	111	
Copper	Railways (1A3c)	[kg]	1	1	1	1	1	1	1	1	1	1	1	2
Copper	Navigation (1A3d)	[kg]	25	24	24	29	29	29	31	31	31	32	34	36
Copper	Comm./Inst. (1A4a)	[kg]	1	1	1	2	2	2	2	2	2	2	2	2
Copper	Residential (1A4b)	[kg]	1	1	1	1	1	1	1	1	1	1	1	1
Copper	Ag./for./fish. (1A4c)	[kg]	16	18	18	18	16	17	17	16	18	17	17	
Copper	Military (1A5)	[kg]	0	0	0	0	1	1	0	0	0	0	1	0
Copper	Navigation int. (1A3d)	[kg]	422	329	227	257	213	250	381	424	326	127	206	
Copper	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Mercury	Industry-Other (1A2f)	[kg]	1	1	1	1	1	1	2	2	2	1	2	
Mercury	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Mercury	Road (1A3b)	[kg]	25	25	25	26	26	26	27	28	27	26	25	
Mercury	Railways (1A3c)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Mercury	Navigation (1A3d)	[kg]	7	7	7	6	6	6	6	6	6	6	6	6
Mercury	Comm./Inst. (1A4a)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Mercury	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
Mercury	Ag./for./fish. (1A4c)	[kg]	11	13	13	13	10	12	12	10	12	11	11	
Mercury	Military (1A5)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0

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Mercury	Navigation int. (1A3d)	[kg]	42	34	30	31	24	23	27	27	25	17	21
Mercury	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Nickel	Industry-Other (1A2f)	[kg]	2	2	2	2	2	2	3	3	3	2	3
Nickel	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Nickel	Road (1A3b)	[kg]	36	36	37	38	39	39	40	41	41	39	39
Nickel	Railways (1A3c)	[kg]	1	1	1	1	1	1	1	1	1	1	1
Nickel	Navigation (1A3d)	[kg]	1068	1036	1026	1374	1367	1371	1494	1479	1578	1687	1811
Nickel	Comm./Inst. (1A4a)	[kg]	0	0	0	1	1	1	1	1	1	1	1
Nickel	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Nickel	Ag./for./fish. (1A4c)	[kg]	15	18	19	18	15	17	16	15	17	16	16
Nickel	Military (1A5)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Nickel	Navigation int. (1A3d)	[kg]	23829	18510	12366	14147	11846	14256	22148	24842	18832	6924	11614
Nickel	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Lead	Industry-Other (1A2f)	[kg]	13	13	13	13	13	14	15	16	16	12	15
Lead	Civil Aviation (1A3a)	[kg]	1369	1343	1328	1252	1304	1297	1245	1329	1182	991	929
Lead	Road (1A3b)	[kg]	133	135	138	145	152	154	160	169	169	163	168
Lead	Railways (1A3c)	[kg]	3	3	3	3	3	4	3	3	4	3	4
Lead	Navigation (1A3d)	[kg]	21	20	20	21	21	21	22	22	22	23	23
Lead	Comm./Inst. (1A4a)	[kg]	1	1	1	1	2	2	2	2	2	2	2
Lead	Residential (1A4b)	[kg]	0	0	1	1	1	1	1	1	1	1	1
Lead	Ag./for./fish. (1A4c)	[kg]	33	38	39	38	34	37	36	34	38	37	37
Lead	Military (1A5)	[kg]	114	89	106	79	84	60	47	81	40	66	80
Lead	Navigation int. (1A3d)	[kg]	210	166	126	137	112	121	172	186	151	70	104
Lead	Civil Aviation int. (1A3a)	[kg]	118	114	113	106	111	117	22	10	113	52	10
Selenium	Industry-Other (1A2f)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Selenium	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Selenium	Road (1A3b)	[kg]	1	1	1	1	1	1	1	1	1	1	1
Selenium	Railways (1A3c)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Selenium	Navigation (1A3d)	[kg]	39	38	37	39	40	40	41	40	42	43	43
Selenium	Comm./Inst. (1A4a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Selenium	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Selenium	Ag./for./fish. (1A4c)	[kg]	35	44	45	44	34	41	38	33	38	35	36
Selenium	Military (1A5)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Selenium	Navigation int. (1A3d)	[kg]	421	331	252	274	224	243	345	372	302	140	208
Selenium	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0

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Zinc	Industry-Other (1A2f)	[kg]	438	443	447	452	455	474	510	544	555	411	519
Zinc	Civil Aviation (1A3a)	[kg]	5	5	5	5	5	5	5	5	4	4	3
Zinc	Road (1A3b)	[kg]	6430	6461	6593	6854	7065	7044	7193	7491	7408	7125	7171
Zinc	Railways (1A3c)	[kg]	115	106	106	110	109	117	114	115	119	116	122
Zinc	Navigation (1A3d)	[kg]	142	143	143	149	152	152	153	152	154	156	157
Zinc	Comm./Inst. (1A4a)	[kg]	60	68	77	89	103	112	119	121	122	121	119
Zinc	Residential (1A4b)	[kg]	29	32	34	36	39	41	42	43	44	44	43
Zinc	Ag./for./fish. (1A4c)	[kg]	630	658	662	659	645	668	678	698	738	741	749
Zinc	Military (1A5)	[kg]	14	31	15	21	51	46	23	25	24	42	24
Zinc	Navigation int. (1A3d)	[kg]	973	766	588	637	519	560	788	848	692	326	481
Zinc	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Industry-Other (1A2f)	[g]	0	0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Civil Aviation (1A3a)	[g]	0	0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Road (1A3b)	[g]	0	0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Railways (1A3c)	[g]	0	0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Navigation (1A3d)	[g]	0	0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Comm./Inst. (1A4a)	[g]	0	0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Residential (1A4b)	[g]	0	0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Ag./for./fish. (1A4c)	[g]	0	0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Military (1A5)	[g]	0	0	0	0	0	0	0	0	0	0	0
Dioxins/furans	Navigation int. (1A3d)	[g]	1	1	0	0	0	0	1	1	0	0	0
Dioxins/furans	Civil Aviation int. (1A3a)	[g]	0	0	0	0	0	0	0	0	0	0	0
Flouranthene	Industry-Other (1A2f)	[kg]	48	48	49	49	50	52	56	60	61	45	57
Flouranthene	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Flouranthene	Road (1A3b)	[kg]	581	567	571	601	629	649	686	758	777	763	794
Flouranthene	Railways (1A3c)	[kg]	4	4	4	4	4	4	4	4	5	4	5
Flouranthene	Navigation (1A3d)	[kg]	52	51	50	49	50	50	49	49	50	50	49
Flouranthene	Comm./Inst. (1A4a)	[kg]	5	6	7	8	9	10	10	10	10	10	10
Flouranthene	Residential (1A4b)	[kg]	3	3	3	3	3	3	4	4	4	4	4
Flouranthene	Ag./for./fish. (1A4c)	[kg]	118	133	135	132	119	130	128	123	134	131	133
Flouranthene	Military (1A5)	[kg]	2	4	2	3	6	6	3	3	3	5	3
Flouranthene	Navigation int. (1A3d)	[kg]	298	238	208	215	171	164	203	205	187	114	149
Flouranthene	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(b) flouranthene	Industry-Other (1A2f)	[kg]	6	6	6	6	6	7	7	7	5	7	
Benzo(b) flouranthene	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0

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Benzo(b) fluoranthene	Road (1A3b)	[kg]	59	58	59	62	64	65	68	74	73	70	72
Benzo(b) fluoranthene	Railways (1A3c)	[kg]	1	1	1	1	1	1	1	1	1	1	1
Benzo(b) fluoranthene	Navigation (1A3d)	[kg]	4	4	4	4	4	4	4	4	4	4	4
Benzo(b) fluoranthene	Comm./Inst. (1A4a)	[kg]	0	0	0	0	0	0	0	1	1	0	0
Benzo(b) fluoranthene	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(b) fluoranthene	Ag./for./fish. (1A4c)	[kg]	12	13	13	13	12	13	13	13	14	13	14
Benzo(b) fluoranthene	Military (1A5)	[kg]	0	0	0	0	1	1	0	0	0	1	0
Benzo(b) fluoranthene	Navigation int. (1A3d)	[kg]	21	17	15	16	12	11	13	12	12	8	10
Benzo(b) fluoranthene	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(k) fluoranthene	Industry-Other (1A2f)	[kg]	6	5	5	6	6	6	7	7	7	5	6
Benzo(k) fluoranthene	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(k) fluoranthene	Road (1A3b)	[kg]	67	67	68	71	74	75	79	84	83	78	80
Benzo(k) fluoranthene	Railways (1A3c)	[kg]	1	1	1	1	1	1	1	1	1	1	1
Benzo(k) fluoranthene	Navigation (1A3d)	[kg]	2	2	2	2	2	2	2	2	2	2	2
Benzo(k) fluoranthene	Comm./Inst. (1A4a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(k) fluoranthene	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(k) fluoranthene	Ag./for./fish. (1A4c)	[kg]	9	10	10	10	9	10	10	10	11	11	11
Benzo(k) fluoranthene	Military (1A5)	[kg]	0	0	0	0	1	1	0	0	0	1	0
Benzo(k) fluoranthene	Navigation int. (1A3d)	[kg]	10	8	7	7	6	5	6	6	6	4	5
Benzo(k) fluoranthene	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Industry-Other (1A2f)	[kg]	3	3	3	3	3	3	3	4	4	3	3
Benzo(a) pyrene	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Road (1A3b)	[kg]	43	42	43	45	48	49	52	57	58	57	58
Benzo(a) pyrene	Railways (1A3c)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Navigation (1A3d)	[kg]	1	1	1	1	1	1	1	1	1	1	1
Benzo(a) pyrene	Comm./Inst. (1A4a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Ag./for./fish. (1A4c)	[kg]	5	5	5	5	5	5	5	5	6	5	6
Benzo(a) pyrene	Military (1A5)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(a) pyrene	Navigation int. (1A3d)	[kg]	6	4	4	4	3	3	4	4	3	2	3
Benzo(a) pyrene	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(g,h,i) perylene	Industry-Other (1A2f)	[kg]	5	5	5	5	5	6	6	6	7	5	6
Benzo(g,h,i) perylene	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0
Benzo(g,h,i) perylene	Road (1A3b)	[kg]	83	81	83	87	90	93	97	107	109	107	110
Benzo(g,h,i) perylene	Railways (1A3c)	[kg]	0	0	0	0	0	0	0	0	0	0	0

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Benzo(g,h,i) perylene	Navigation (1A3d)	[kg]	8	8	8	7	7	7	7	7	7	7	7	7
Benzo(g,h,i) perylene	Comm./Inst. (1A4a)	[kg]	1	1	1	1	1	2	2	2	2	2	2	2
Benzo(g,h,i) perylene	Residential (1A4b)	[kg]	0	0	0	0	1	1	1	1	1	1	1	1
Benzo(g,h,i) perylene	Ag./for./fish. (1A4c)	[kg]	18	20	21	20	17	20	19	18	20	19	19	19
Benzo(g,h,i) perylene	Military (1A5)	[kg]	0	0	0	0	1	1	0	0	0	0	1	0
Benzo(g,h,i) perylene	Navigation int. (1A3d)	[kg]	40	32	31	31	24	21	23	21	22	17	20	
Benzo(g,h,i) perylene	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
indeno(1,2,3-c,d) pyrene	Industry-Other (1A2f)	[kg]	3	3	3	3	3	3	3	4	4	3	3	3
indeno(1,2,3-c,d) pyrene	Civil Aviation (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
indeno(1,2,3-c,d) pyrene	Road (1A3b)	[kg]	47	47	48	51	53	55	57	62	63	61	63	
indeno(1,2,3-c,d) pyrene	Railways (1A3c)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
indeno(1,2,3-c,d) pyrene	Navigation (1A3d)	[kg]	7	7	6	6	6	6	6	6	6	6	6	5
indeno(1,2,3-c,d) pyrene	Comm./Inst. (1A4a)	[kg]	0	0	0	0	0	1	1	1	1	1	1	1
indeno(1,2,3-c,d) pyrene	Residential (1A4b)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
indeno(1,2,3-c,d) pyrene	Ag./for./fish. (1A4c)	[kg]	13	15	15	15	13	14	14	13	14	13	13	14
indeno(1,2,3-c,d) pyrene	Military (1A5)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0
indeno(1,2,3-c,d) pyrene	Navigation int. (1A3d)	[kg]	33	26	25	25	20	17	19	17	18	14	17	
indeno(1,2,3-c,d) pyrene	Civil Aviation int. (1A3a)	[kg]	0	0	0	0	0	0	0	0	0	0	0	0

Annex 17: Uncertainty estimates

Uncertainty estimation, CO₂

Gas	Base year emission		Year t emission		Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
	Input data	Input data	Input data	Input data									
	Gg	Gg	%	%	%	%	%	%	%	%	%	%	%
Road transport	CO ₂	9282	12108	2	5	5,385	3,990	0,06894462	0,8911	0,3447	2,5205	2,5440	
Military	CO ₂	119	107	2	5	5,385	0,035	-0,0026576	0,0079	-0,0133	0,0223	0,0259	
Railways	CO ₂	297	242	2	5	5,385	0,080	-0,0084443	0,0178	-0,0422	0,0504	0,0658	
Navigation (small boats)	CO ₂	48	99	41	5	41,304	0,251	0,00307343	0,0073	0,0154	0,4242	0,4245	
Navigation (large vessels)	CO ₂	748	494	11	5	12,083	0,365	-0,0298481	0,0363	-0,1492	0,5653	0,5847	
Fisheries	CO ₂	591	575	2	5	5,385	0,189	-0,0099746	0,0423	-0,0499	0,1197	0,1296	
Agriculture	CO ₂	1272	1273	24	5	24,515	1,910	-0,0189445	0,0937	-0,0947	3,1800	3,1814	
Forestry	CO ₂	36	17	30	5	30,414	0,032	-0,0019086	0,0013	-0,0095	0,0530	0,0539	
Industry (mobile)	CO ₂	839	1037	41	5	41,304	2,620	0,00199985	0,0763	0,0100	4,4243	4,4243	
Residential	CO ₂	39	63	35	5	35,355	0,136	0,00116245	0,0046	0,0058	0,2287	0,2288	
Commercial/Institutional	CO ₂	74	173	35	5	35,355	0,374	0,00619781	0,0127	0,0310	0,6298	0,6306	
Civil aviation	CO ₂	243	156	10	5	11,180	0,106	-0,0100308	0,0115	-0,0502	0,1620	0,1696	
Total		13.587	16343				26,699				36,7952		
Total uncertainties				Year (%):			5,167			Trend (%):		6,066	

Uncertainty estimation, CH₄

Gas	Base year emission	Year t emission	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
								Input data	Input data	Input data	Input data
	Mg	Mg	%	%	%	%	%	%	%	%	%
Road transport	CH ₄	2518	644	2	40	40.050	24,121	-0,0939264	0,2203	-3,7571	0,6230
Military	CH ₄	5	4	2	100	100,020	0,328	0,00055275	0,0012	0,0553	0,0034
Railways	CH ₄	12	7	2	100	100,020	0,680	0,00094452	0,0025	0,0945	0,0070
Navigation (small boats)	CH ₄	17	24	41	100	108,079	2,454	0,00623542	0,0083	0,6235	0,4815
Navigation (large vessels)	CH ₄	16	11	11	100	100,603	1,046	0,00181933	0,0038	0,1819	0,0592
Fisheries	CH ₄	13	14	2	100	100,020	1,290	0,00308187	0,0047	0,3082	0,0133
Agriculture	CH ₄	105	96	24	100	102,840	9,237	0,0197364	0,0329	1,9736	1,1150
Forestry	CH ₄	21	3	30	100	104,403	0,293	-0,0016	0,0010	-0,1600	0,0436
Industry (mobile)	CH ₄	60	37	41	100	108,079	3,784	0,00533736	0,0128	0,5337	0,7425
Residential	CH ₄	51	65	35	100	105,948	6,464	0,01593453	0,0223	1,5935	1,1044
Commercial/Institutional	CH ₄	99	160	35	100	105,948	15,811	0,04220095	0,0546	4,2201	2,7016
Civil aviation	CH ₄	7	4	10	100	100,499	0,377	0,00046654	0,0014	0,0467	0,0194
Total		2923	1069				732,838				25,0317
Total uncertainties				Year (%):			27,071		Trend (%):		5,003

Uncertainty estimation, N₂O

Gas	Base year emission	Year t emission	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by activity data uncertainty	% uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
							Input data	Input data			
	Mg	Mg	%	%	%	%	%	%	%	%	%
Road transport	N ₂ O	299	385	2	50	50,040	33,407	0,07021027	0,7825	3,5105	2,2134
Military	N ₂ O	4	4	2	1000	1000,002	6,359	-0,0013644	0,0075	-1,3644	0,0211
Railways	N ₂ O	8	7	2	1000	1000,002	11,564	-0,0059063	0,0136	-5,9063	0,0383
Navigation (small boats)	N ₂ O	1	3	41	1000	1000,840	6,032	0,00407682	0,0071	4,0768	0,4096
Navigation (large vessels)	N ₂ O	47	31	11	1000	1000,060	53,854	-0,0489403	0,0631	-48,9403	0,9819
Fisheries	N ₂ O	37	36	2	1000	1000,002	63,018	-0,0144001	0,0739	-14,4001	0,2089
Agriculture	N ₂ O	49	54	24	1000	1000,288	93,352	-0,0078106	0,1094	-7,8106	3,7129
Forestry	N ₂ O	1	1	30	1000	1000,450	0,939	-0,000233	0,0011	-0,2330	0,0467
Industry (mobile)	N ₂ O	34	44	41	1000	1000,840	76,228	0,0077842	0,0893	7,7842	5,1765
Residential	N ₂ O	1	1	35	1000	1000,612	1,866	0,00071793	0,0022	0,7179	0,1082
Commercial/Institutional	N ₂ O	1	3	35	1000	1000,612	4,601	0,0027744	0,0054	2,7744	0,2668
Civil aviation	N ₂ O	10	8	10	1000	1000,050	14,683	-0,007273	0,0172	-7,2730	0,2434
Total		493	577				22943,418				2889,9973
Total uncertainties			Year (%):				151,471		Trend (%):		53,759

Uncertainty estimation, SO₂.

Gas	Base year emission			Year t emission			Activity data uncertainty			Emission factor uncertainty			Combined uncertainty			Combined uncertainty as % of total national emissions in year t			Type A sensitivity			Type B sensitivity			Uncertainty in trend in national emissions introduced by activity data uncertainty			
	Input data Gg SO ₂		Input data Gg SO ₂		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %			
Road Transportation	SO ₂	5767	76	2			50	50,040	1,851	0,041620218	0,0048	-2,0810109	0,013470813	2,08105448														
Other mobile sources	SO ₂	10186	1977	10			50	50,990	49,104	0,041505666	0,1240	2,07528329	1,753033839	2,71660236														
Total		15952,627	2053,4359						2414,588																		11,7107161	
Total uncertainties					Year (%):																						3,422	

Uncertainty estimation, NO_x.

Gas	Base year emission			Year t emission			Activity data uncertainty			Emission factor uncertainty			Combined uncertainty			Combined uncertainty as % of total national emissions in year t			Type A sensitivity			Type B sensitivity			Uncertainty in trend in national emissions introduced by emission factor uncertainty			Uncertainty in trend in national emissions introduced by activity data uncertainty		
	Input data Gg NO _x		Input data Gg NO _x		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %		Input data %					
Road Transportation	NO _x	105699	44159	2			50	50,040	25,174	0,091254746	0,2793	-4,5627373	0,790007314	4,63062448																
Other mobile sources	NO _x	52403	43618	10			100	100,499	49,939	0,091561345	0,2759	9,15613454	3,901609297	9,95275615																
Total	NO _x	158101,66	87777,281						3127,695																		120,500038			
Total uncertainties					Year (%):																						10,977			

Uncertainty estimation, NMVOC.

Gas	Base year emission		Year t emission		Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Combined uncertainty as % of total national emissions in year t		Type A sensitivity		Type B sensitivity		Uncertainty in trend in national emissions introduced by emission factor uncertainty		Uncertainty in trend in national emissions introduced by activity data uncertainty		Uncertainty introduced into the trend in total national emissions	
	Input data Gg NMVOC		Input data Gg NMVOC		Input data %		Input data %		Input data %		%		%		%		%		%		%	
Road Transportation	NMVOC	79934	12514	2	50	50,040	26,237	0,079645792	0,1320	-3,9822896	0,373408286	3,99975804										
Other mobile sources	NMVOC	14853	11353	10	100	100,499	47,805	0,080191789	0,1198	8,01917887	1,693842002	8,19611679										
Total	NMVOC	94786,56	23866,543				2973,722															83,1743949
Total uncertainties					Year (%):		54,532		Trend (%):												9,120	

Uncertainty estimation, CO.

Gas	Base year emission		Year t emission		Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Combined uncertainty as % of total national emissions in year t		Type A sensitivity		Type B sensitivity		Uncertainty in trend in national emissions introduced by emission factor uncertainty		Uncertainty in trend in national emissions introduced by activity data uncertainty		Uncertainty introduced into the trend in total national emissions	
	Input data Gg CO		Input data Gg CO		Input data %		Input data %		Input data %		%		%		%		%		%		%	
Road Transportation	CO	455048	105972	2	50	50,040	22,316	-0,143350118	0,1850	-7,1675059	0,523208576	7,18657693										
Other mobile sources	CO	117830	131648	10	100	100,499	55,679	0,144192201	0,2298	14,4192201	3,24988753	14,7809227										
Total	CO	572877,23	237620,26				3598,185															270,122564
Total uncertainties					Year (%):		59,985		Trend (%):												16,435	

Uncertainty estimation, NH₃.

	Gas	Base year emission				Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
		Input data Gg NH ₃	Input data Gg NH ₃	Input data %	Input data %								
Road Transportation	NH ₃	70	1433	2	1000	1000.002	994,482	1,410350764	18,8033	1410,35076	53,18370968	1411,35317	
Other mobile sources	NH ₃	6	8	10	1000	1000.050	5,521	1,422165666	0,1044	-1422,1657	1,476143592	1422,16643	
Total	NH ₃	76,235271	1441,4306			989023,976						4014475,14	
Total uncertainties					Year (%):		994,497			Trend (%):		2004	

Uncertainty estimation, TSP.

	Gas	Base year emission				Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
		Input data Gg TSP	Input data Gg TSP	Input data %	Input data %									
Road Transportation	TSP	6669	3995	2	50	50,040	32,586	0,049021232	0,3322	2,45106161	0,939595579	2,62498436		
Other mobile sources	TSP	5357	2140	10	100	100,499	35,053	0,049074505	0,1779	-4,9074505	2,516273054	5,51495245		
Total	TSP	12025,777	6134,6444			2290,600						37,3052434		
Total uncertainties					Year (%):		47,860			Trend (%):		6,108		

Uncertainty estimation, Arsenic.

	Gas	Base year emission				Year t emission				Activity data uncertainty				Emission factor uncertainty				Combined uncertainty				Combined uncertainty as % of total national emissions in year t				Type A sensitivity				Type B sensitivity				Uncertainty in trend in national emissions introduced by emission factor uncertainty				Uncertainty in trend in national emissions introduced by activity data uncertainty				Uncertainty introduced into the trend in total national emissions			
		Input data	Input data	Input data	Input data					%	%	%	%					%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%									
Road Transportation	Arsenic	5	7	2	1000	1000,002	139,390	0,046536591	0,0928	46,536591	0,262597388	46,5373319																																	
Other mobile sources	Arsenic	71	44	10	1000	1000,050	860,653	-0,04613958	0,5732	-46,13958	8,106532833	46,8463097																																	
Total	Arsenic	76,775782	51,137326							760153,275																								4360,3											
Total uncertainties																																			871,868	Trend (%):	66,033								

Uncertainty estimation, Cadmium.

	Gas	Base year emission				Year t emission				Activity data uncertainty				Emission factor uncertainty				Combined uncertainty				Combined uncertainty as % of total national emissions in year t				Type A sensitivity				Type B sensitivity				Uncertainty in trend in national emissions introduced by emission factor uncertainty				Uncertainty in trend in national emissions introduced by activity data uncertainty				Uncertainty introduced into the trend in total national emissions			
		Input data	Input data	Input data	Input data					%	%	%	%					%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%											
Road Transportation	Cadmium	31	43	2	1000	1000,002	778,137	0,096055936	0,9696	96,0559365	2,742408251	96,0950766																																	
Other mobile sources	Cadmium	13	12	10	1000	1000,050	221,876	0,096439982	0,2765	-96,439982	3,909631254	96,5191971																																	
Total	Cadmium	44,16223	55,027923							654725,571																							18550,2191												
Total uncertainties																																		809,151	Trend (%):	136,199									

Uncertainty estimation, Chromium.

		Gas		Base year emission		Year t emission		Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Combined uncertainty as % of total national emissions in year t		Type A sensitivity		Type B sensitivity		Uncertainty in trend in national emissions introduced by emission factor uncertainty		Uncertainty in trend in national emissions introduced by activity data uncertainty		Uncertainty introduced into the trend in total national emissions	
				Input data kg	Input data kg	Input data %	Input data %																		
Road Transportation	Chromium	127	182	2	1000	1000,002	791,726	0,125587331	0,9914	125,587331	-	2,804156915	125,618633												
Other mobile sources	Chromium	57	48	10	1000	1000,050	208,286	0,126064946	0,2608	-126,06495	3,688381535	126,118892													
Total	Chromium	183,33713	229,57974				670213,469						31686,0158												
Total uncertainties								Year (%):		818,666				Trend (%):										178,006	

Uncertainty estimation, Copper.

		Gas		Base year emission		Year t emission		Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Combined uncertainty as % of total national emissions in year t		Type A sensitivity		Type B sensitivity		Uncertainty in trend in national emissions introduced by emission factor uncertainty		Uncertainty in trend in national emissions introduced by activity data uncertainty		Uncertainty introduced into the trend in total national emissions	
				Input data kg	Input data kg	Input data %	Input data %																		
Road Transportation	Copper	32373	46738	2	1000	1000,002	998,618	0,001963829	1,4398	1,9638294	4,072268317	4,52106129													
Other mobile sources	Copper	90	65	10	1000	1000,050	1,384	0,001983359	0,0020	-1,9833588	0,028223721	1,98355956													
Total	Copper	32462,239	46802,758				997239,374																	24,3745037	
Total uncertainties								Year (%):		998,619														4,937	

Uncertainty estimation, Mercury.

		Gas	Base year emission	Year t emission	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
			Input data kg	Input data kg	Input data %	Input data %	Input data %	Input data %					
Road Transportation	Mercury		21	25	2	1000	1000,002	554,197	0,076299349	0,5868	76,2993488	1,659803956	76,3174002
Other mobile sources	Mercury		22	20	10	1000	1000,050	445,827	0,076271707	0,4721	-76,271707	6,67586829	76,5633107
Total	Mercury		42,859538	45,3833				505895,468					11686,2861
Total uncertainties					Year (%):			711,263		Trend (%):			108,103

Uncertainty estimation, Nickel.

		Gas	Base year emission	Year t emission	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
			Input data kg	Input data kg	Input data %	Input data %	Input data %	Input data %					
Road Transportation	Nickel		104	141	2	1000	1000,002	71,699	0,023601062	0,0406	23,601062	0,114734977	23,6013409
Other mobile sources	Nickel		3382	1831	10	1000	1000,050	928,348	-0,02338133	0,5252	-23,38133	7,42754162	24,5327325
Total	Nickel		3486,2029	1972,3941				866970,617					1158,87826
Total uncertainties					Year (%):			931,113		Trend (%):			34,042

Uncertainty estimation, Lead.

	Gas	Base year emission	Year t emission	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
		Input data kg	Input data kg	Input data %	Input data %	%	%	%	%	%	%	%
Road Transportation	Lead	101864	6327	2	1000	1000,002	851,822	0,008995644	0,0608	-8,9956444	0,171992755	8,99728842
Other mobile sources	Lead	2178	1101	10	1000	1000,050	148,187	0,009081817	0,0106	9,08181669	0,149596004	9,08304868
Total	Lead	104042,34	7427,2348				747560,509					163,452972
Total uncertainties				Year (%):			864,616			Trend (%):		12,785

Uncertainty estimation, Selenium.

	Gas	Base year emission	Year t emission	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
		Input data kg	Input data kg	Input data %	Input data %	%	%	%	%	%	%	%
Road Transportation	Selenium	21	29	2	1000	1000,002	269,025	0,087849574	0,2291	87,8495736	0,647865753	87,8519624
Other mobile sources	Selenium	107	80	10	1000	1000,050	731,012	0,087267027	0,6224	-87,267027	8,801683563	87,7097693
Total	Selenium	127,82368	108,83268				606752,974					15410,9709
Total uncertainties				Year (%):			778,943			Trend (%):		124,141

Uncertainty estimation, Zinc.

	Gas	Base year emission	Year t emission	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
		Input data kg	Input data kg	Input data %	Input data %	Input data %	Input data %					
Road Transportation	Zinc	18940	26516	2	1000	1000,002	938,530	0,023388611	1,2899	23,388611	3,648322606	23,6714466
Other mobile sources	Zinc	1617	1737	10	1000	1000,050	61,475	0,023585554	0,0845	-23,585554	1,194787195	23,6157968
Total	Zinc	20556,641	28252,246				884618,165					1118,04324
Total uncertainties							940,541					33,437

Uncertainty estimation, Dioxins.

	Gas	Base year emission	Year t emission	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
		Input data g dioxins	Input data g dioxins	Input data %	Input data %	Input data %	Input data %					
Road Transportation	Dioxins	1	0	2	1000	1000,002	328,109	0,128682003	0,0960	-128,682	0,271500794	128,682289
Other mobile sources	Dioxins	0	0	10	1000	1000,050	671,925	0,129378781	0,1966	129,378781	2,779861006	129,408642
Total	Dioxins	1,1310127	0,3308844				559139,057					33305,7282
Total uncertainties							747,756					182,499

Uncertainty estimation, Flouanthene.

	Gas	Base year emission	Year t emission	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
		Input data kg	Input data kg	Input data %	Input data %	%	%	%	%	%	%	%
Road Transportation	Flouanthene	813	794	2	1000	1000,002	752,614	0,004317785	0,7394	-4,317785	2,091409389	4,79763073
Other mobile sources	Flouanthene	261	261	10	1000	1000,050	247,400	0,004339928	0,2431	4,3399281	3,437290057	5,53623869
Total	Flouanthene	1074,3659	1055,5408				627634,190					53,6671994
Total uncertainties							Year (%):	792,234		Trend (%):		7,326

Uncertainty estimation, Benzo(b) flouanthene.

	Gas	Base year emission	Year t emission	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in year t	Type A sensitivity	Type B sensitivity	Uncertainty in trend in national emissions introduced by emission factor uncertainty	Uncertainty in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced into the trend in total national emissions
		Input data kg	Input data kg	Input data %	Input data %	%	%	%	%	%	%	%
Road Transportation	Benzo(b) flouanthene	66	72	2	1000	1000,002	730,923	0,024306763	0,7674	24,3067633	2,170412062	24,4034717
Other mobile sources	Benzo(b) flouanthene	27	26	10	1000	1000,050	269,092	0,024407393	0,2825	-24,407393	3,995041377	24,7321894
Total	Benzo(b) flouanthene	93,468557	98,127837				606658,512					1207,21062
Total uncertainties							Year (%):	778,883		Trend (%):		34,745

Uncertainty estimation, Benzo(k) flouranthene.

		Base year emission		Year t emission		Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Type A sensitivity		Type B sensitivity		Uncertainty in trend in national emissions introduced by emission factor uncertainty		Uncertainty in trend in national emissions introduced by activity data uncertainty		Uncertainty introduced into the trend in total national emissions	
		Input data	Input data	Input data	Input data	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
	Gas	kg	kg	kg	kg	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Road Transportation	Benzo(k) flouranthene	66	80	2	1000	1000,002	793,186	0,043634199	0,9143	43,6341989	2,586138048	43,7107701									
Other mobile sources	Benzo(k) flouranthene	21	21	10	1000	1000,050	206,826	-0,04385623	0,2384	-43,85623	3,371561141	43,9856375									
Total	Benzo(k) flouranthene	87,725326	101,12478				671920,889												3845,36773		
Total uncertainties								Year (%):	819,708						Trend (%):	62,011					

Uncertainty estimation, Benzo(a) pyrene.

		Base year emission		Year t emission		Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Type A sensitivity		Type B sensitivity		Uncertainty in trend in national emissions introduced by emission factor uncertainty		Uncertainty in trend in national emissions introduced by activity data uncertainty		Uncertainty introduced into the trend in total national emissions	
		Input data	Input data	Input data	Input data	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
	Gas	kg	kg	kg	kg	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Road Transportation	Benzo(a) pyrene	47	58	2	1000	1000,002	846,839	0,037908225	1,0212	37,9082246	2,888366225	38,018103									
Other mobile sources	Benzo(a) pyrene	11	11	10	1000	1000,050	153,171	0,038146715	0,1847	-38,146715	2,61201926	38,2360372									
Total	Benzo(a) pyrene	57,226763	69,009143				740596,993												2907,37069		
Total uncertainties								Year (%):	860,579						Trend (%):	53,920					

Uncertainty estimation, Benzo(g,h,i) perylene.

Gas		Base year emission		Year t emission		Activity Data uncertainty		Emission factor uncertainty		Combined uncertainty		Type A sensitivity		Type B sensitivity		Uncertainty in trend in national emissions introduced by emission factor uncertainty		Uncertainty in trend in national emissions introduced by activity data uncertainty		Uncertainty introduced into the trend in total national emissions	
		Input data	Input data	Input data	Input data	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
		kg	kg	%	%																
Road Transportation	Benzo(g,h,i) perylene	99	110	2	1000	1000,002	759,630	0,032369112	0,8152	32,3691122	2,305801714	32,4511347	-	-	-	-	-	-	-	-	
Other mobile sources	Benzo(g,h,i) perylene	37	35	10	1000	1000,050	240,383	0,032517122	0,2580	-32,517122	3,648155151	32,7211286	-	-	-	-	-	-	-	-	
Total	Benzo(g,h,i) perylene	135,32256	145,22648				634822,170													2123,7484	
Total uncertainties																				46,084	

Uncertainty estimation, indeno(1,2,3-c,d) pyrene.

Gas		Base year emission		Year t emission		Activity data uncertainty		Emission factor uncertainty		Combined uncertainty		Combined uncertainty as % of total national emissions in year t		Type A sensitivity		Type B sensitivity		Uncertainty in trend in national emissions introduced by emission factor uncertainty		Uncertainty in trend in national emissions introduced by activity data uncertainty		Uncertainty introduced into the trend in total national emissions	
		Input data	Input data	Input data	Input data	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%		
		kg	kg	%	%																		
Road Transportation	indeno(1,2,3-c,d) pyr.	45	63	2	1000	1000,002	725,078	0,101607319	0,9020	101,607319	2,551359636	101,639347	-	-	-	-	-	-	-	-	-		
Other mobile sources	indeno(1,2,3-c,d) pyr.	25	24	10	1000	1000,050	274,937	0,101896635	0,3420	-101,89663	4,836929779	102,011372	-	-	-	-	-	-	-	-	-		
Total	indeno(1,2,3-c,d) pyr.	69,407503	86,347406				601328,497														20736,8768		
Total uncertainties																					144,003		

DANISH EMISSION INVENTORIES FOR ROAD TRANSPORT AND OTHER MOBILE SOURCES

Inventories until the year 2010

This report explains the parts of the Danish emission inventories related to road transport and other mobile sources. Emission results are shown for CO₂, CH₄, N₂O, SO₂, NO_x, NMVOC, CO, particulate matter (PM), heavy metals, dioxins and PAH. From 1990-2010 the fuel consumption and CO₂ emissions for road transport increased by 30 %, and CH₄ emissions have decreased by 74 %. A N₂O emission increase of 29 % is related to the relatively high emissions from older gasoline catalyst cars. The 1985-2010 emission decrease for NO_x, NMVOC, CO and particulates (exhaust only: Size is below PM_{2,5}) -52, -84, -81, and -65 %, respectively, due to the introduction of vehicles complying with gradually stricter emission standards. For SO₂ the emission drop 99 % (due to reduced sulphur content in the diesel fuel), whereas the NH₃ emissions increased by 2232 % (due to the introduction of catalyst cars). For other mobile sources the calculated emission changes for CO₂ (and fuel use), CH₄ and N₂O were -2,5 and -1 %, from 1990 to 2010. The emissions of SO₂, particulates (all size fractions), NO_x, NMVOC and CO decreased by 88, 65, 17, 28 and 2 % from 1985 to 2010. For NH₃ the emissions increased by 17 % in the same time period. Uncertainties for the emissions and trends were estimated.