

Adjustment DE-A regarding NO_x from Road Vehicles

PREFACE

When deriving proposals for national emission ceilings for negotiations of the 1999 Gothenburg Protocol, sector-specific emission estimates for the year 2010 were calculated at IIASA using a set of scenarios which assumed various technological abatement measures, policy incentives, and legislation available / in place or planned at that time. As a result, the 2010 emission by road transport in Germany was estimated at NO_x (IIASA, 1999) ¹⁾. The over-all 2010 national emission ceiling (NEC) for NO_x was set to 1,081 kt. When negotiating the EU NEC Directive two years later, Germany agreed to reduce its NO_x emissions further, resulting in a NEC of 1,051 kt.

In its 2016 NEC emissions reporting, Germany provided a national total for NO_x, emissions of 1,337 kt for 2010. However, this total includes emissions from agricultural soils and other source categories not accounted for when setting the NEC. In addition, some assumptions made in 1999, including on emission factors from road traffic, turned out to be wrong in reality. Like in many other European countries, non-compliance with the 2010 NEC as set in 1999 was partly not caused by failed national mitigation policies, but by changes beyond the control of, and unforeseen by, the individual Party or Member State.

In order to differentiate such changes from policy failures in the responsibility of the individual Parties to the Gothenburg Protocol, a procedure (Inventory Adjustment) allowing the adjustment of emissions resulting from new emission categories, changes in estimation methodologies, emission factors etc. provided within the EMEP/EEA Guidebook, or other effects beyond national control with respect to complying to emission reduction obligations (EB, 2012a & c) ^{2), 3)} was agreed. This procedure is applicable also for existing NECs (EB, 2012b) ⁴⁾.

With respect to road transport, such an unforeseeable effect was the partial failure of several so-called “Euro norms” set on the EU level to reduce emissions from road vehicles. In this report, Germany presents an estimate of the NO_x emissions resulting from the partial failure of the mitigation policy reflected by the Euro norms, and lays out the calculations leading to these estimates.

REASONS FOR MISSING THE GOTHENBURG CEILINGS

The TREMOD methodology applied for estimating emissions from road transportation in Germany has changed over time. These changes include updates of emission factors (EF) for various pollutants and other changes such as an extension of vehicle classification (and thus inclusion of emission factors associated with these new vehicle sub-categories) to improve the estimation's accuracy.

The main changes occurred for the emission factors and for the Heavy Duty Vehicles (HDV) fleet structure. This last point led to changes in emissions because of the reallocation of activities (consumption/traffic) between the sub-categories of vehicles.

For the formalism of the adjustments, it is difficult to flag whether the modifications for road transport are due to “methodological changes” or due to “changes of emission factor”. Therefore, only the term “change of methodology” will be used (even if at the NFR reporting level this may seem like a simple change in EFs).

So far as road transport is concerned, the inability to attain the emission ceiling is most likely to have been affected by a combination of technological changes within the fleet (which of course made their way into the several versions of TREMOD) combined with greater than originally expected dieselisation of the fleet.

ANALYSING THE PROBLEM: THE EUROPEAN PERSPECTIVE BASED ON COPERT

Already in 2011, these effects were demonstrated by Ntziachristos and Papageorgiou (2011) ⁵⁾. Here, the impacts of changing model versions and activity data in the context of meeting the EU NEC Directive ceiling commitments were examined for four European countries including Germany. Unfortunately, this comparison study was carried out within a COPERT environment. Therefore, the results gained cannot be transferred to the German TREMOD environment on a one-to-one level but nonetheless allow a highly illustrative insight in the reasons for not meeting the set ceiling. The study modeled fuel consumption and NO_x emissions for four selected countries (Germany, France, Netherlands and Belgium) and found higher NO_x emissions were estimated for the road transport sector than originally modelled by the RAINS model of IIASA (which underpinned the setting of 2010 ceilings). For Germany, this study shows that with the same activity data set (LIFE+

EC4MACS data from Amann et al. (2010)), NO_x emissions estimated with COPERT II vs. COPERT 4 (v8.0) increase from 410 kt to 518 kt due to methodological changes, a difference of 282 kt. An additional consideration of changes in AD would lead to 620 kt of NO_x. However, as changes in AD are no valid adjustment reason, the latter value is for information only.

This was mainly due to: * NO_x “artificial” current emissions = virtual current emissions assuming no changes in emission factors emission factors updated in COPERT 4 that did not follow the reductions as set by the emission standards for diesel passenger cars; * important part of diesel fuel consumption in the total fuel consumption of the road traffic.

The results of this study showed that it is the combination of different parameters which might affect the ability (to different extents) of a Party to attain the emission ceilings. In other words, the exceeding of NO_x ceilings for road transport is due to:

Changes in methodology and emission factors

As these technologically driven changes (as reflected in the evolution of the different so-called Euro norms) lie outside the country's responsibility, current methodology and EFs have to be adjusted in a way to allow the comparison of the actual inventory and the Gothenburg ceilings.

Changes in the activity data

As the development of mileage driven and fuels used within a country (Germany: stronger dieselisation then originally expected) is of the country's responsibility, this effect has to be excluded from any adjustment estimation.

IN-COUNTRY ANALYSIS: THE TREMOD PERSPECTIVE

INITIAL ASSUMPTION

In order to estimate the effect of NO_x emissions resulting from the failure of the so-called Euro norms, the following procedure has been agreed by expert review teams in the last two years:



proposed amount of adjustable emissions = current AD x current EF - current AD x original EF = current AD x (current EF - original EF)
= current EM - “artificial” current EM¹

¹ “artificial” current emissions = virtual current emissions assuming no changes in emission factors



$$\begin{aligned} EM_{\text{adjustment}} &= AD_{\text{current}} * EF_{\text{current}} - AD_{\text{current}} * EF_{\text{original}} \\ &= AD_{\text{current}} * (EF_{\text{current}} - EF_{\text{original}}) \\ &= EM_{\text{current}} - EM_{\text{current "artificial"}} \end{aligned}$$

with

- **EM „adjustment,,** = amount of emissions to be subtracted from National Totals
- **AD „current,,** = AD from latest TREMOD version as used for current submission
- **EF „current,,** = EF from latest TREMOD version as used for current submission
- **EF „original,,** = EF from TREMOD version used at the time NEC ceilings were set (here: TREMOD 3.1)
- **EM „current,,** = EM estimated from AD and EF from latest TREMOD version = EM reported for NFR 1.A.3.b with latest submission
- **EM „current-“artificial”,,** = EM estimated from AD from latest TREMOD version and EF from TREMOD version used at the time NEC ceilings were set (here: TREMOD 3.1)

APPLYING THE ORIGINAL METHODOLOGY

FRAMEWORK INFORMATION

The methodology used for estimating Germany's exhaust emissions from road transport when determining emissions ceilings of the Gothenburg Protocol (1999), was the second version of the EMEP/CORINAIR guidebook corresponding to COPERT II software. This method proposed NO_x emission factors for

- passenger cars (PC): up to Euro 1
- light commercial vehicles (LCV2): up to Euro 1
- heavy duty vehicles (HDV): pre-EURO I only (conventional)

Back then, without better knowledge, the emission factors for the most recent standards were derived by directly applying the expected reductions in emission standards.

However, as Germany does not use COPERT for compiling its road transport emissions inventory but a national model called TREMOD, the following comparison has to be carried out between the oldest version of TREMOD still available and the version as applied for the current inventory submission (2021).

Unfortunately, the oldest TREMOD version available for such comparison is TREMOD 3.1 from 2002 ⁶⁾, including the following set of NO_x emission factors:

- passenger cars (PC): up to Euro 4
- light commercial vehicles (LCV): up to Euro 4
- heavy duty vehicles (HDV) only up to EURO V

However, as this version includes the technological development since 1999 (when the ceilings were set based on COPERT II), the results from this analysis and the adjustment proposal based upon these results are likely to slightly underestimate the effect of technological changes since 1999 and must therefore be considered conservative.

THE COMPARISON

Application of the original NO_x methodology to the current road transport background activity data

The *basic activity data* (such as over-all fuel sold and traffic mileages by vehicle type, by fuel or by Euro regulation) implemented in TREMOD 3.1 differ significantly from those of the current TREMOD version especially for the more recent years as of 2005. In addition, *specific activity data* (such as fuel consumptions per vehicle type, per fuel or per Euro regulation) strongly depend on the TREMOD version.

Within this report, Germany re-estimates the NO_x emission within the TREMOD 3.1 model. To isolate the requested information, the original TREMOD 3.1 activity data was combined with emission factors from both TREMOD 3.1 and the currently used TREMOD 6.12 (Knörr et al., 2021a) ⁷⁾.

Description of the updated methodology used

The updated methodology, used in 2019 (for NFR submission 2021) and implemented in version 6.12 of the TREMOD software, considers emission factors of

- passenger cars (PC) up to Euro 6d
- light commercial vehicles (LCV) up to Euro 6d
- heavy duty vehicles (HDV) up to EURO VI

and

- motorized two-wheelers (M2W) up to Euro 4

Comparison of emission estimates made using the original and updated methodologies

The values of NO_x emissions presented in the table below are estimated with:

- TREMOD 3.1 model equations as initial methodology

and ,

- TREMOD 6.12 equations as methodology applied for NEC submission 2021.

The activity data applied to initial (here: oldest available) and most recent methodology, are those of the latest inventory provided with NEC submission 2021.

Table 1: Resulting adjustment proposal 2020

for year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
proposed adjustment	-296.1	-300.7	-300.4	-305.2	-294.9	-274.9	-250.9	-221.1	-179.6	-144.8

The following screenshots show the TREMOD 3.1 / TREMOD 6.12 implementation comparisons per vehicle type/fuel/Euro regulation.

Activity Data

- **current:** from TREMOD 6.12, as reported with the latest inventory submission
- **adjusted:** has to be similar to **current** AD!
- **difference:** as only recent AD are to be used for adjustment estimations, this value must be zero!

Implied Emission Factor

- **current:** representing the ratio of current emissions and current AD
- **adjusted:** representing the ratio of adjusted emissions and current AD
- **difference:** shows percentual difference

NO_x Emissions

- **current:** from TREMOD 6.12, as reported with the latest inventory submission
- **adjusted:** estimated based on TREMOD 3.1 methodology and TREMOD 6.12 AD
- **adjustment:** adjusted emissions minus current emissions
- **difference:** percentual difference between current and adjusted emissions

Adjustment overview for years 2010 to 2019

NFR Code	Fuel	Year	Activity Data			Implied Emission Factor			NO _x Emissions			
			current	adjusted	difference	current	adjusted	difference	current	adjusted	adjustment	difference
			in [TJ]		in [%]	in [kg/TJ]		in [%]	in [kg]			in [%]
1.A.3.b.i	gasoline		795.957	795.957	0%	97.55	84.99	-13%	77.64.842	67.690.906	9.993.935	-13%
1.A.3.b.i	diesel oil		629.380	629.380	0%	429.45	160.51	-63%	227.341.096	84.970.461	142.370.635	-63%
1.A.3.b.ii	gasoline		6.325	6.325	0%	255.87	214.75	-16%	1.618.432	1.358.328	260.104	-16%
1.A.3.b.ii	diesel oil		113.450	113.450	0%	476.34	134.96	-72%	54.040.533	15.311.584	38.728.949	-72%
1.A.3.b.iii	gasoline		48.844	48.844	0%	823.00	482.55	-42%	29.931.266	23.183.732	6.747.534	-23%
1.A.3.b.iii	diesel oil		566.741	566.741	0%	446.67	271.83	-39%	253.148.243	154.056.160	99.092.083	-39%
1.A.3.b.iv	gasoline		19.712	19.712	0%	113.68	168.43	48%	2.240.749	3.320.034	-1.079.285	48%
1.A.3.b TOTAL	2010		2.079.688	2.079.688	0%			0%	645.965.162	349.851.206	296.113.956	-46%
1.A.3.b.i	gasoline		794.688	794.688	0%	92.09	81.61	-11%	73.185.851	64.851.951	8.333.900	-11%
1.A.3.b.i	diesel oil		553.564	553.564	0%	434.12	159.22	-63%	240.313.791	88.138.959	152.174.832	-63%
1.A.3.b.ii	gasoline		6.118	6.118	0%	229.35	198.57	-13%	1.403.081	1.214.776	188.305	-13%
1.A.3.b.ii	diesel oil		115.967	115.967	0%	481.55	126.92	-74%	55.844.518	14.718.142	41.126.376	-74%
1.A.3.b.iii	gasoline		47.355	47.355	0%	592.65	448.99	-24%	28.071.221	21.268.323	6.804.898	-24%
1.A.3.b.iii	diesel oil		563.891	563.891	0%	410.38	244.97	-40%	231.410.271	138.135.342	93.273.929	-40%
1.A.3.b.iv	gasoline		19.289	19.289	0%	110.79	171.60	54%	2.137.002	3.299.162	-1.162.160	54%
1.A.3.b TOTAL	2011		2.106.883	2.106.883	0%			0%	632.365.736	331.625.655	300.740.081	-48%
1.A.3.b.i	gasoline		750.957	750.957	0%	85.73	78.00	-9%	64.379.994	58.677.229	5.692.765	-9%
1.A.3.b.i	diesel oil		555.245	555.245	0%	435.96	158.66	-64%	242.062.902	88.096.699	153.966.203	-64%
1.A.3.b.ii	gasoline		5.657	5.657	0%	218.93	193.15	-12%	1.238.520	1.092.662	145.859	-12%
1.A.3.b.ii	diesel oil		114.350	114.350	0%	481.91	128.17	-75%	55.106.362	13.741.354	41.365.008	-75%
1.A.3.b.iii	gasoline		50.902	50.902	0%	533.22	384.33	-28%	27.141.913	19.563.200	7.578.704	-28%
1.A.3.b.iii	diesel oil		589.585	589.585	0%	381.33	224.00	-41%	234.829.180	132.064.753	92.764.428	-41%
1.A.3.b.iv	gasoline		18.268	18.268	0%	107.43	173.28	61%	1.962.546	3.165.439	-1.202.893	61%
1.A.3.b TOTAL	2012		2.084.964	2.084.964	0%			0%	616.721.438	316.391.343	300.429.094	-49%
1.A.3.b.i	gasoline		749.114	749.114	0%	89.35	74.85	-7%	60.190.007	56.071.797	4.118.211	-7%
1.A.3.b.i	diesel oil		589.131	589.131	0%	437.14	158.71	-64%	257.633.728	93.499.010	164.134.718	-64%
1.A.3.b.ii	gasoline		5.578	5.578	0%	202.80	184.07	-9%	1.131.209	1.026.727	104.482	-9%
1.A.3.b.ii	diesel oil		118.777	118.777	0%	480.60	114.93	-76%	57.083.533	13.690.488	43.433.045	-76%
1.A.3.b.iii	gasoline		51.716	51.716	0%	509.64	360.06	-29%	26.350.969	18.620.843	7.730.126	-29%
1.A.3.b.iii	diesel oil		600.139	600.139	0%	353.06	287.93	-19%	211.887.531	124.788.469	87.099.062	-41%
1.A.3.b.iv	gasoline		18.229	18.229	0%	104.34	175.38	68%	1.902.688	3.197.038	-1.294.351	68%
1.A.3.b TOTAL	2013		2.132.683	2.132.683	0%			0%	616.079.063	316.854.371	300.224.692	-50%
1.A.3.b.i	gasoline		752.526	752.526	0%	76.03	73.09	-4%	57.215.533	54.988.921	2.216.612	-4%
1.A.3.b.i	diesel oil		626.845	626.845	0%	435.87	159.12	-63%	272.876.061	95.613.892	173.262.169	-63%
1.A.3.b.ii	gasoline		5.845	5.845	0%	190.34	176.49	-7%	1.112.584	1.031.612	80.972	-7%
1.A.3.b.ii	diesel oil		128.578	128.578	0%	475.56	110.96	-77%	61.146.575	14.267.237	46.879.338	-77%
1.A.3.b.iii	gasoline		49.143	49.143	0%	468.37	339.99	-27%	23.017.115	16.708.234	6.308.881	-27%
1.A.3.b.iii	diesel oil		572.754	572.754	0%	314.05	196.05	-38%	179.874.133	112.285.582	67.588.551	-38%
1.A.3.b.iv	gasoline		18.673	18.673	0%	100.59	179.24	78%	1.878.294	3.345.794	-1.467.499	78%
1.A.3.b TOTAL	2014		2.153.563	2.153.563	0%			0%	597.120.297	302.252.271	294.868.025	-49%
1.A.3.b.i	gasoline		715.156	715.156	0%	74.38	71.73	-4%	53.190.787	51.300.983	1.889.805	-4%
1.A.3.b.i	diesel oil		645.555	645.555	0%	426.19	159.80	-63%	275.130.233	103.163.501	171.966.732	-63%
1.A.3.b.ii	gasoline		5.793	5.793	0%	187.12	172.80	-8%	1.083.927	1.000.999	82.928	-8%
1.A.3.b.ii	diesel oil		135.386	135.386	0%	489.35	187.96	-77%	63.605.443	14.607.490	48.997.953	-77%
1.A.3.b.iii	gasoline		52.287	52.287	0%	458.96	327.99	-29%	23.997.817	17.149.448	6.848.370	-29%
1.A.3.b.iii	diesel oil		589.411	589.411	0%	266.69	187.51	-30%	157.189.675	110.620.703	46.568.973	-30%
1.A.3.b.iv	gasoline		18.459	18.459	0%	99.32	180.65	82%	1.833.362	3.334.472	-1.501.090	82%
1.A.3.b TOTAL	2015		2.161.376	2.161.376	0%			0%	575.931.265	301.877.596	274.053.670	-48%
1.A.3.b.i	gasoline		715.272	715.272	0%	79.93	76.65	-4%	50.736.367	50.535.049	201.318	0%
1.A.3.b.i	diesel oil		675.119	675.119	0%	410.36	160.76	-61%	277.041.660	108.535.230	168.506.430	-61%
1.A.3.b.ii	gasoline		5.926	5.926	0%	180.27	171.05	-5%	1.068.292	1.013.678	54.614	-5%
1.A.3.b.ii	diesel oil		144.068	144.068	0%	456.12	185.62	-77%	65.712.732	15.216.007	50.496.725	-77%
1.A.3.b.iii	gasoline		54.157	54.157	0%	424.73	388.24	-7%	23.002.109	16.683.117	6.308.992	-27%
1.A.3.b.iii	diesel oil		594.013	594.013	0%	226.31	180.97	-20%	134.431.699	107.496.262	26.935.437	-20%
1.A.3.b.iv	gasoline		18.785	18.785	0%	95.14	181.66	89%	1.805.897	3.412.476	-1.606.579	89%
1.A.3.b TOTAL	2016		2.207.339	2.207.339	0%			0%	553.790.558	302.901.820	250.897.738	-45%
1.A.3.b.i	gasoline		724.571	724.571	0%	67.66	69.88	3%	49.026.074	50.634.714	-1.607.640	3%
1.A.3.b.i	diesel oil		696.592	696.592	0%	390.65	161.95	-59%	272.126.091	112.810.721	159.315.370	-59%
1.A.3.b.ii	gasoline		6.186	6.186	0%	171.15	167.18	-2%	1.058.799	1.034.211	24.588	-2%
1.A.3.b.ii	diesel oil		153.284	153.284	0%	424.66	183.89	-76%	65.093.930	15.925.216	49.168.714	-76%
1.A.3.b.iii	gasoline		53.382	53.382	0%	379.80	286.71	-23%	19.793.901	15.304.828	4.489.073	-23%
1.A.3.b.iii	diesel oil		596.263	596.263	0%	195.02	175.92	-10%	116.671.141	106.246.508	11.424.633	-10%
1.A.3.b.iv	gasoline		19.160	19.160	0%	92.83	183.39	98%	1.778.674	3.513.787	-1.735.114	98%
1.A.3.b TOTAL	2017		2.251.437	2.251.437	0%			0%	525.549.410	304.469.986	221.079.424	-42%
1.A.3.b.i	gasoline		699.027	699.027	0%	64.42	68.36	6%	45.032.566	47.786.817	-2.753.250	6%
1.A.3.b.i	diesel oil		666.074	666.074	0%	371.66	163.30	-56%	247.556.063	108.768.604	138.787.459	-56%
1.A.3.b.ii	gasoline		6.315	6.315	0%	158.22	160.11	1%	999.159	1.011.138	-11.939	1%
1.A.3.b.ii	diesel oil		154.259	154.259	0%	384.71	182.69	-73%	59.344.525	15.840.310	43.504.215	-73%
1.A.3.b.iii	gasoline		51.634	51.634	0%	309.75	263.53	-15%	15.993.526	13.607.106	2.386.420	-15%
1.A.3.b.iii	diesel oil		585.186	585.186	0%	171.18	172.10	1%	180.173.337	180.710.869	-537.532	1%
1.A.3.b.iv	gasoline		18.497	18.497	0%	89.66	184.61	106%	1.658.588	3.414.767	-1.756.209	106%
1.A.3.b TOTAL	2018		2.180.993	2.180.993	0%			0%	478.758.206	291.139.612	179.618.593	-38%
1.A.3.b.i	gasoline		704.691	704.691	0%	62.30	68.45	10%	43.901.941	48.238.025	-4.336.084	10%
1.A.3.b.i	diesel oil		663.841	663.841	0%	345.81	165.07	-52%	229.566.088	109.582.982	119.983.106	-52%
1.A.3.b.ii	gasoline		6.683	6.683	0%	146.08	153.25	5%	976.219	1.034.150	-57.931	5%
1.A.3.b.ii	diesel oil		159.183	159.183	0%	347.42	181.90	-71%	55.303.535	16.221.445	39.082.090	-71%
1.A.3.b.iii	gasoline		52.939	52.939	0%	274.41	247.81	-10%	14.527.012	13.118.578	1.408.434	-10%
1.A.3.b.iii	diesel oil		595.913	595.913	0%	153.35	169.17	10%	91.380.760	106.809.376	-15.428.616	10%
1.A.3.b.iv	gasoline		18.750	18.750	0%	86.05	186.83	117%	1.613.450	3.502.941	-1.889.491	117%
1.A.3.b TOTAL	2019		2.202.899	2.202.899	0%			0%	437.268.744	292.497.697	144.771.048	-33%

Adjustment details for 2020

NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions				
		current	adjusted	difference	current	adjusted	difference	current	adjusted	difference		
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [kg]	in [kg]	in [kg]		
1.A.3.a.i. Passenger Cars	Gasoline	pre-Cars	13,686	13,686	0%	584.75	514.25	-12%	7,955,060	6,996,917	-958,143	
		Car 1	36,541	36,541	0%	338.50	297.71	-10%	25,915,925	19,189,262	-7,716,663	
		Car 2	96,425	96,425	0%	172.95	135.63	-22%	16,580,020	13,020,026	-3,559,994	
		Car 3	133,139	133,139	0%	58.51	70.18	20%	7,790,384	9,343,433	1,553,029	
		Car 4	444,991	444,991	0%	42.27	42.19	0%	18,911,389	18,773,529	-137,859	
		Car 5	31,234	31,234	0%	18.61	42.19	127%	581,142	1,317,737	736,595	
	Car 6	0	0	0%	25.08	42.19	62%	2	3	1		
	Gasoline total	795,957	795,957	0%	92.55	84.39	-9%	77,646,642	67,656,586	-9,990,056		
	Diesel Oil	pre-Cars	1,915	1,915	0%	318.13	264.95	-17%	583,760	527,256	-56,504	
		Car 1	10,339	10,339	0%	294.42	245.17	-17%	3,044,428	2,741,387	-303,041	
Car 2		50,088	50,088	0%	406.90	279.19	-31%	29,372,795	19,974,210	-9,398,584		
Car 3		134,025	134,025	0%	542.54	176.54	-67%	72,645,173	23,929,276	-48,715,897		
1.A.3.b.i. Light Duty Vehicles (LDVs)	Gasoline	Car 4	279,154	279,154	0%	304.37	140.58	-53%	167,299,180	39,243,811	-128,055,369	
		Car 5	53,547	53,547	0%	434.70	140.58	-68%	23,276,735	7,527,796	-15,748,939	
		Car 6	334	334	0%	257.62	140.58	-45%	85,044	46,553	-38,491	
		Diesel oil total	529,380	529,380	0%	429.45	160.55	-63%	227,347,096	84,970,461	-142,376,635	
		PHE total	1,325,337	1,325,337	0%	238.12	155.14	-36%	364,985,938	152,421,367	-212,564,571	
		pre-Cars	1,249	1,249	0%	627.99	540.95	-13%	783,320	696,871	-86,449	
	Diesel Oil	Car 1	367	367	0%	361.95	297.39	-18%	364,969	186,620	-178,349	
		Car 2	1,393	1,393	0%	264.75	184.41	-30%	368,548	256,917	-111,631	
		Car 3	856	856	0%	82.47	30.83	-63%	70,631	77,625	6,994	
		Car 4	2,420	2,420	0%	36.32	44.90	24%	87,967	188,679	100,712	
1.A.3.b.ii. Heavy Duty Vehicles (HDVs)	Gasoline	Car 5	49	49	0%	15.34	44.90	193%	750	2,218	1,468	
		Car 6	0	0	0%	0	0	0%	0	0	0	
		Gasoline total	49	49	0%	15.34	44.90	193%	750	2,218	1,468	
		Diesel Oil	pre-Cars	4,325	4,325	0%	255.87	254.75	-0%	1,418,832	1,398,326	-20,506
			Car 1	4,876	4,876	0%	425.99	386.79	-9%	2,077,142	1,496,983	-580,159
			Car 2	9,989	9,989	0%	398.18	276.24	-30%	2,389,095	1,289,636	-1,099,459
	Car 3		13,126	13,126	0%	336.76	153.18	-54%	4,420,280	2,534,731	-1,885,549	
	Diesel Oil	Car 4	33,249	33,249	0%	531.91	150.58	-72%	17,655,883	5,086,760	-12,569,123	
		Car 5	54,581	54,581	0%	491.42	80.69	-84%	26,021,036	4,840,722	-21,180,314	
		Car 6	1,629	1,629	0%	427.50	80.69	-79%	696,296	144,434	-551,862	
Car 7		0	0	0%	151.73	80.69	-47%	7	4	-3		
1.A.3.b.iii. Heavy Duty Vehicle Buses	Diesel Oil	Diesel oil total	113,450	113,450	0%	416.34	134.96	-72%	54,043,533	15,351,584	-38,691,949	
		LDVs Total	119,175	119,175	0%	464.70	139.18	-70%	55,658,966	16,648,953	-39,010,013	
		pre-Cars	pre-Cars	3,382	3,382	0%	1096.25	1028.78	-6%	3,674,067	3,452,644	-221,423
			Car 1	2,826	2,826	0%	749.96	726.14	-3%	2,117,871	2,125,595	7,723
			Car 2	10,122	10,122	0%	801.96	643.47	-20%	8,140,119	6,532,213	-1,607,906
			Car 3	15,090	15,090	0%	633.22	437.25	-30%	10,865,776	7,289,299	-3,576,477
	Diesel Oil	Car 4	5,461	5,461	0%	448.63	351.65	-21%	2,650,016	1,921,527	-728,489	
		Car 5	10,326	10,326	0%	337.28	182.33	-46%	3,882,417	1,882,644	-1,999,773	
		Car 6	0	0	0%	0	0	0%	0	0	0	
		Buses Total	48,044	48,044	0%	623.80	482.55	-23%	29,931,266	23,183,732	-6,747,534	
1.A.3.b.iv. Heavy Duty Vehicle Trucks & Lorries	Diesel Oil	pre-Cars	10,185	10,185	0%	1040.16	787.37	-24%	10,510,623	7,754,136	-2,756,487	
		Car 1	5,677	5,677	0%	758.59	575.55	-24%	4,261,383	3,287,681	-973,702	
		Car 2	38,558	38,558	0%	817.62	524.79	-35%	31,525,526	20,234,619	-11,290,907	
		Car 3	169,023	169,023	0%	636.28	274.48	-57%	161,136,182	59,617,271	-101,518,911	
		Car 4	69,636	69,636	0%	368.34	280.62	-24%	27,183,867	20,146,636	-7,037,231	
		Car 5	283,934	283,934	0%	276.62	151.65	-45%	78,643,643	43,115,897	-35,527,746	
	Car 6	0	0	0%	0	0	0%	0	0	0		
	Trucks Total	565,141	565,141	0%	446.67	271.83	-39%	293,148,243	154,696,160	-138,452,083		
	1.A.3.b.v. Motorised Two-Wheelers (MTWs)	Gasoline	pre-Cars	7,973	7,973	0%	122.80	149.18	22%	972,721	1,189,383	216,662
			Car 1	5,231	5,231	0%	123.77	165.74	34%	647,479	887,039	239,560
Car 2			3,587	3,587	0%	141.16	184.21	30%	585,362	696,661	111,299	
Car 3			2,950	2,950	0%	38.11	184.21	387%	116,188	657,032	540,844	
Car 4			0	0	0%	0	0	0%	0	0	0	
Car 5			0	0	0%	0	0	0%	0	0	0	
MTWs Total	19,172	19,172	0%	113.68	168.23	48%	2,243,149	3,320,034	1,076,885			
1.A.3.b. Road Transport	Total	2,079,688	2,079,688	0%	219.62	168.23	-46%	545,965,162	349,851,296	-196,113,866		

Adjustment details for 2021

NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions	
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Adjustment details for 2023

NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions				
		current	adjusted	difference	current	adjusted	difference	current	adjusted	difference		
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [kg]	in [kg]	in [%]		
1.A.3.a.i. Passenger Cars	Gasoline	pre-Cars	11,581	11,581	0%	607.72	635.38	-32%	7,035,041	6,189,785	-845,256	-12%
		Car 1	47,487	47,487	0%	348.56	341.62	-2%	16,571,746	11,426,129	-5,145,617	-31%
		Car 2	72,781	72,781	0%	194.27	137.82	-29%	13,487,749	10,035,380	-3,452,369	-26%
		Car 3	189,443	189,443	0%	63.89	72.62	14%	6,927,963	7,875,172	947,209	14%
		Car 4	489,541	489,541	0%	45.39	45.13	-1%	18,541,881	18,436,736	-105,145	-1%
		Car 5	181,961	181,961	0%	18.61	45.13	143%	1,887,355	4,681,311	2,793,956	143%
	Car 6	282	282	0%	25.05	45.13	78%	7,339	12,736	5,396	74%	
	Gasoline total	750,267	750,267	0%	85.73	78.88	-8%	64,379,964	58,577,229	-5,802,735	-9%	
	Diesel Oil	pre-Cars	1,487	1,487	0%	311.98	284.56	-9%	463,963	383,872	-80,091	-17%
		Car 1	6,660	6,660	0%	297.79	286.44	-4%	1,980,364	1,771,787	-208,577	-11%
Car 2		33,967	33,967	0%	408.82	279.27	-32%	13,887,432	7,445,646	-6,441,787	-46%	
Car 3		183,539	183,539	0%	564.82	176.63	-69%	58,389,037	18,434,837	-39,954,200	-68%	
Car 4		234,943	234,943	0%	398.41	146.46	-63%	91,724,190	34,488,997	-57,235,193	-62%	
Car 5		173,112	173,112	0%	434.89	146.46	-66%	75,284,364	25,353,375	-49,930,989	-66%	
Car 6	1,557	1,557	0%	259.84	146.46	-44%	484,664	220,086	-264,578	-54%		
Diesel oil total	555,245	555,245	0%	455.96	158.66	-65%	242,962,982	88,096,639	-154,866,343	-64%		
FCs Total	1,305,262	1,305,262	0%	234.61	152.29	-35%	386,442,896	146,673,867	-239,769,029	-62%		
1.A.3.b.ii. Heavy Duty Vehicles (LDV)	Gasoline	pre-Cars	962	962	0%	632.38	645.95	2%	607,779	621,160	13,381	2%
		Car 1	232	232	0%	803.24	183.22	-77%	189,985	70,295	-119,690	-60%
		Car 2	989	989	0%	271.16	195.74	-28%	268,134	133,538	-134,596	-50%
		Car 3	835	835	0%	89.38	98.33	10%	14,623	82,082	7,459	10%
		Car 4	2,030	2,030	0%	38.49	47.58	24%	78,155	96,691	18,536	24%
		Car 5	610	610	0%	16.36	47.58	182%	9,941	29,011	19,069	182%
	Car 6	0	0	0%	15.37	47.58	210%	2	6	4	210%	
	Gasoline total	5,657	5,657	0%	218.93	183.15	-16%	1,238,520	1,692,662	454,142	37%	
	Diesel Oil	pre-Cars	3,281	3,281	0%	424.46	386.79	-9%	1,368,754	982,093	-386,661	-28%
		Car 1	3,666	3,666	0%	398.34	276.24	-31%	1,445,980	787,634	-658,346	-46%
Car 2		8,479	8,479	0%	336.40	133.28	-59%	2,852,325	1,639,772	-1,212,553	-43%	
Car 3		23,785	23,785	0%	558.53	150.44	-73%	13,050,281	3,565,082	-9,485,199	-73%	
Car 4		59,485	59,485	0%	494.22	89.85	-82%	29,369,070	5,337,395	-24,031,675	-82%	
Car 5		15,964	15,964	0%	442.70	89.85	-80%	7,040,461	1,420,906	-5,619,555	-80%	
Car 6	1	1	0%	15.14	89.85	-81%	122	72	-50	-41%		
Diesel oil total	114,350	114,350	0%	485.91	120.17	-75%	55,186,382	13,741,354	-41,445,028	-75%		
LCVs Total	129,008	129,008	0%	489.51	123.61	-74%	56,344,903	14,834,696	-41,510,207	-74%		
1.A.3.b.iii. Heavy Duty Vehicles Buses	Gasoline	pre-Cars	1,326	1,326	0%	1093.46	1119.45	4%	1,410,640	1,352,283	-58,357	-4%
		Car 1	1,245	1,245	0%	727.34	731.15	1%	1,017,476	1,017,184	-292	-0%
		Car 2	7,789	7,789	0%	703.46	643.34	-9%	5,085,091	4,597,478	-487,613	-10%
		Car 3	14,483	14,483	0%	629.94	457.61	-27%	9,073,137	6,689,744	-2,383,393	-27%
		Car 4	5,331	5,331	0%	468.10	361.85	-23%	2,642,179	1,675,777	-966,402	-37%
		Car 5	20,752	20,752	0%	347.84	182.99	-47%	7,219,563	3,787,467	-3,432,096	-47%
	Car 6	73	73	0%	64.52	182.99	284%	3,961	13,295	9,334	236%	
	Buses Total	50,962	50,962	0%	533.22	384.33	-28%	27,141,913	19,965,288	-7,176,625	-26%	
	Diesel Oil	pre-Cars	6,922	6,922	0%	1036.95	758.82	-27%	7,107,543	5,252,345	-1,855,198	-27%
		Car 1	3,630	3,630	0%	743.70	570.57	-23%	2,721,305	2,071,111	-650,194	-24%
Car 2		23,577	23,577	0%	818.27	516.43	-37%	19,262,253	12,175,855	-7,086,398	-37%	
Car 3		96,735	96,735	0%	634.65	370.21	-42%	61,387,137	35,888,665	-25,498,472	-42%	
Car 4		50,550	50,550	0%	356.50	288.44	-19%	19,982,680	14,880,877	-5,101,723	-27%	
Car 5		485,981	485,981	0%	261.24	152.32	-42%	116,149,955	61,626,577	-54,523,378	-47%	
Car 6	2,380	2,380	0%	188.487	360.323	191%	188,487	360,323	171,836	91%		
Trucks Total	589,585	589,585	0%	385.33	224.69	-41%	224,829,180	132,064,153	-92,765,027	-41%		
1.A.3.b.iv. Two-Wheelers (MOTV)	Gasoline	pre-Cars	6,780	6,780	0%	122.76	151.03	23%	822,539	1,011,520	188,981	23%
		Car 1	4,386	4,386	0%	124.61	171.39	38%	536,615	738,050	201,435	38%
		Car 2	3,287	3,287	0%	136.22	184.55	45%	445,087	636,853	191,766	43%
		Car 3	3,984	3,984	0%	38.66	184.55	382%	18,386	778,616	760,230	382%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
MOTV Total	18,268	18,268	0%	107.43	173.28	61%	1,982,548	3,163,439	1,180,891	61%		
1.A.3.b. Road Transport	Total	2,084,964	2,084,964	0%	295.79	151.71	-49%	616,721,438	396,381,343	-220,340,094	-49%	

Adjustment details for 2023

NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions				
		current	adjusted	difference	current	adjusted	difference	current	adjusted	difference		
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [kg]	in [kg]	in [%]		
1.A.3.a.i. Passenger Cars	Gasoline	pre-Cars	11,680	11,680	0%	618.27	649.35	5%	7,011,641	6,967,452	-44,189	-1%
		Car 1	37,743	37,743	0%	353.78	341.68	-3%	13,362,966	9,129,436	-4,233,530	-32%
		Car 2	62,680	62,680	0%	188.93	139.33	-27%	11,889,922	8,722,244	-3,167,678	-27%
		Car 3	97,782	97,782	0%	66.38	73.19	10%	6,481,618	7,156,920	675,302	10%
		Car 4	397,911	397,911	0%	47.22	46.52	-1%	18,790,345	18,589,937	-200,407	-1%
		Car 5	138,063	138,063	0%	18.60	46.52	150%	2,583,150	6,439,691	3,856,541	150%
	Car 6	2,714	2,714	0%	25.99	46.52	79%	70,526	126,237	55,711	79%	
	Gasoline total	748,116	748,116	0%	88.35	74.85	-16%	68,190,887	56,671,737	-11,519,150	-17%	
	Diesel Oil	pre-Cars	1,389	1,389	0%	312.32	284.56	-9%	433,081	368,136	-64,945	-15%
		Car 1	5,425	5,425	0%	298.42	286.79	-4%	1,678,472	1,640,688	-37,784	-2%
		Car 2	28,437	28,437	0%	408.84	279.91	-32%	11,563,522	6,253,531	-5,309,991	-46%
		Car 3	92,795	92,795	0%	574.33	176.67	-69%	53,284,956	16,579,373	-36,705,583	-69%
		Car 4	222,583	222,583	0%	393.55	149.27	-62%	87,598,471	33,225,566	-54,372,905	-62%
		Car 5	233,786	233,786	0%	435.42	149.27	-66%	101,787,275	34,884,788	-66,902,487	-66%
	Car 6	4,536	4,536	0%	259.53	149.27	-42%	1,177,151	677,045	-500,106	-42%	
Diesel oil total	589,131	589,131	0%	437.14	158.71	-64%	257,533,128	83,899,619	-173,633,509	-64%		
FCs Total	1,337,245	1,337,245	0%	237.49	111.77	-53%	317,723,135	146,571,356	-171,151,779	-54%		
Gasoline	pre-Cars	981	981	0%	633.81	645.95	2%	568,320	575,293	6,973	1%	
	Car 1	184	184	0%	803.50	183.22	-77%	187,281	59,328	-127,953	-68%	
	Car 2	836	836	0%	274.42	291.18	7%	229,520	188,285	-41,235	-18%	
	Car 3	784	784	0%	52.66	191.79	266%	72,691	79,780	7,089	10%	
	Car 4	1,089	1,089	0%	43.70	48.89	13%	77,284	82,833	5,549	7%	
	Car 5	965	965	0%	16.37	48.89	183%	15,187	47,268	32,081	183%	
	Car 6	1	1	0%	17.65	48.89	176%	26	72	46	176%	
	Gasoline total	5,578	5,578	0%	262.86	184.67	-30%	1,137,299	1,696,727	559,428	49%	
Diesel Oil	pre-Cars	2,744	2,744	0%	424.37	386.79	-9%	1,168,757	944,928	-223,829	-19%	
	Car 1	2,945	2,945	0%	398.34	276.24	-31%	1,166,782	634,566	-532,216	-46%	
	Car 2	6,982	6,982	0%	336.92	133.28	-59%	2,340,147	1,260,674	-1,079,473	-46%	
	Car 3	20,421	20,421	0%	568.12	150.38	-73%	11,437,995	3,070,913	-8,367,082	-73%	
	Car 4	55,087	55,087	0%	497.72	90.45	-82%	27,746,440	5,048,416	-22,738,024	-82%	
Car 5	29,024	29,024	0%	141.37	90.45	-36%	12,181,325	2,687,964	-9,493,361	-60%		
Car 6	41	41	0%	151.28	90.45	-40%	6,160	2,638	-3,522	-57%		
Diesel oil total	118,177	118,177	0%	488.66	114.63	-77%	57,083,523	13,656,480	-43,427,043	-76%		
LDNs Total	124,754	124,754	0%	464.14	116.03	-75%	58,214,142	14,677,216	-43,537,926	-75%		
1.A.3.a.ii. Heavy Duty Vehicles (HDV)	Diesel Oil	pre-Cars	1,172	1,172	0%	1066.69	1018.23	-5%	1,249,023	1,194,143	-54,880	-4%
		Car 1	1,054	1,054	0%	727.98	750.99	3%	766,620	731,181	-35,439	-5%
		Car 2	6,084	6,084	0%	784.07	643.48	-18%	5,234,981	4,270,721	-964,260	-18%
		Car 3	13,187	13,187	0%	626.43	581.86	-7%	12,032,580	10,980,988	-1,051,592	-9%
		Car 4	4,946	4,946	0%	888.55	812.70	-9%	2,279,061	1,739,214	-539,846	-24%
		Car 5	24,096	24,096	0%	358.88	183.44	-49%	8,435,643	4,420,134	-4,015,509	-48%
	Car 6	537	537	0%	44.76	183.44	316%	30,407	86,672	56,265	185%	
	Diesel total	51,776	51,776	0%	509.54	366.06	-29%	26,390,969	19,620,883	-7,770,126	-29%	
	Gasoline	pre-Cars	5,083	5,083	0%	1205.72	737.35	-39%	6,072,190	4,322,888	-1,749,302	-29%
		Car 1	2,985	2,985	0%	743.27	587.27	-21%	2,176,945	1,650,969	-525,977	-24%
Car 2		18,444	18,444	0%	818.17	513.47	-37%	15,089,981	9,489,975	-5,600,006	-37%	
Car 3		75,130	75,130	0%	633.53	367.33	-42%	47,581,440	27,787,360	-19,794,080	-42%	
Car 4	42,781	42,781	0%	366.90	287.37	-22%	16,936,887	12,280,770	-4,656,117	-28%		
Car 5	636,998	636,998	0%	361.70	152.65	-58%	123,145,324	66,786,746	-56,358,578	-46%		
Car 6	19,020	19,020	0%	63.87	152.65	239%	913,082	2,750,630	1,837,548	201%		
Gasoline total	680,139	680,139	0%	519.36	287.63	-44%	211,871,351	124,188,409	-87,682,942	-41%		
1.A.3.b.i. Motorized Two-Wheelers (M2W)	Diesel Oil	pre-Cars	6,362	6,362	0%	123.57	117.19	-5%	181,736	164,179	-17,557	-10%
		Car 1	4,013	4,013	0%	125.11	175.15	41%	582,073	694,880	112,807	30%
		Car 2	3,382	3,382	0%	132.24	195.68	48%	435,668	645,804	209,136	48%
		Car 3	4,682	4,682	0%	39.81	195.68	381%	181,610	882,175	700,565	381%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
Car 5	0	0	0%	0	0	0%	0	0	0	0%		
Diesel total	18,229	18,229	0%	104.34	175.38	68%	1,962,085	5,181,678	3,219,593	68%		
1.A.3.b. Road Transport Total		2,132,083	2,132,083	0%	208.88	145.35	-30%	616,079,063	390,854,371	-225,224,692	-37%	

Adjustment details for 2024

NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions					
		current	adjusted	difference	current	adjusted	difference	current	adjusted	adjustment	difference		
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [kg]	in [kg]	in [kg]	in [kg]		
1.A.3.a.i. - Passenger Cars	Gasoline	pre-Cars	11,647	11,647	0%	812.37	844.11	-11%	7,132,688	6,337,484	-795,844	-11%	
		Car 1	30,667	30,667	0%	368.77	343.93	-32%	11,082,246	7,480,541	-3,621,706	-32%	
		Car 2	53,486	53,486	0%	198.58	140.31	-29%	10,514,477	7,584,432	-3,018,844	-29%	
		Car 3	87,374	87,374	0%	65.31	73.93	7%	6,955,585	6,459,757	-494,218	-7%	
		Car 4	387,759	387,759	0%	45.16	47.80	-3%	19,093,585	18,536,009	-523,557	-3%	
		Car 5	171,270	171,270	0%	18.59	47.80	151%	3,183,252	8,187,581	5,004,299	151%	
	Gasoline total	752,526	752,526	0%	36.80	73.89	-4%	57,215,533	54,988,521	-2,216,412	-4%		
	Diesel Oil	pre-Cars	1,341	1,341	0%	311.73	284.66	-5%	417,967	365,246	-42,722	-5%	
		Car 1	4,892	4,892	0%	298.92	267.28	-11%	1,482,284	1,387,643	-156,951	-11%	
		Car 2	23,934	23,934	0%	408.71	320.45	-40%	9,734,484	5,276,480	-4,458,004	-40%	
Car 3		82,749	82,749	0%	585.53	176.81	-69%	48,451,830	14,796,245	-33,655,585	-69%		
1.A.3.b.i. - Light Duty Vehicles (LDVs)	Gasoline	Car 4	211,237	211,237	0%	297.27	151.77	-42%	83,917,680	32,059,973	-51,857,706	-42%	
		Car 5	285,011	285,011	0%	436.38	151.77	-65%	124,721,396	43,370,300	-81,343,096	-65%	
		Car 6	16,081	16,081	0%	259.34	151.77	-41%	4,170,580	2,440,686	-1,729,814	-41%	
		Diesel oil total	626,045	626,045	0%	415.87	159.12	-62%	272,876,061	89,613,892	-173,262,169	-62%	
		Flx Total	1,338,571	1,338,571	0%	298.44	152.15	-53%	588,091,594	154,612,413	-433,479,181	-53%	
		Diesel Oil	pre-Cars	986	986	0%	632.14	645.95	64%	160,583	176,124	15,844	2%
	Car 1		173	173	0%	968.27	989.98	44%	150,074	53,575	-96,499	-64%	
	Car 2		748	748	0%	204.73	287.11	31%	212,888	154,839	-58,029	-27%	
	Car 3		771	771	0%	58.62	185.21	7%	75,982	81,070	5,078	7%	
	1.A.3.b.ii. - Heavy Duty Vehicle Buses	Gasoline	Car 4	1,087	1,087	0%	43.47	50.15	15%	81,139	83,618	2,479	15%
Car 5			1,374	1,374	0%	17.11	50.15	193%	23,517	68,918	45,401	193%	
Car 6			17	17	0%	18.06	50.15	179%	212	670	657	179%	
Gasoline total			5,845	5,845	0%	198.34	176.49	-4%	1,112,584	1,031,852	-80,732	-2%	
Diesel Oil			pre-Cars	2,537	2,537	0%	428.16	386.79	-21%	1,985,819	1,725,595	-257,559	-21%
			Car 1	2,588	2,588	0%	393.82	276.25	-40%	987,136	539,898	-447,328	-40%
		Car 2	6,087	6,087	0%	338.91	133.25	-42%	1,385,995	1,180,889	-428,126	-42%	
		Car 3	18,220	18,220	0%	571.75	150.58	-74%	10,417,076	2,742,056	-7,675,020	-74%	
1.A.3.b.iii. - Motorised Two-Wheelers (MOWs)		Gasoline	Car 4	52,361	52,361	0%	488.70	91.89	-82%	26,164,486	4,703,746	-21,394,748	-82%
			Car 5	46,749	46,749	0%	438.64	91.89	-79%	20,696,234	4,258,626	-16,237,709	-79%
	Car 6		187	187	0%	151.18	91.89	-40%	29,829	17,974	-11,855	-40%	
	Diesel oil total		128,528	128,528	0%	475.56	150.96	-77%	65,148,575	14,241,237	-48,897,318	-77%	
	LDVs Total		134,423	134,423	0%	463.56	153.81	-75%	62,299,160	15,298,849	-46,998,311	-75%	
	Diesel Oil		pre-Cars	984	984	0%	1099.48	1919.23	-5%	1,062,384	1,062,921	48,443	5%
		Car 1	837	837	0%	728.12	130.99	-2%	959,232	628,359	-328,127	-2%	
		Car 2	5,586	5,586	0%	704.95	643.67	-10%	4,284,320	3,683,441	-798,857	-10%	
		Car 3	11,221	11,221	0%	621.20	458.38	-21%	7,082,740	5,143,520	-1,939,220	-21%	
	1.A.3.b.iv. - Heavy Duty Vehicle Trucks & Lorries	Gasoline	Car 4	4,270	4,270	0%	461.10	361.79	-24%	1,972,610	1,584,978	-467,632	-24%
Car 5			22,042	22,042	0%	368.55	183.99	-40%	7,726,921	4,065,632	-3,671,389	-40%	
Car 6			4,182	4,182	0%	42.78	183.99	330%	178,913	789,476	610,563	330%	
Buses Total			49,143	49,143	0%	468.37	339.99	-27%	23,017,115	16,788,234	-6,308,881	-27%	
pre-Cars			4,182	4,182	0%	1034.34	737.35	-29%	4,945,942	3,525,898	-1,420,134	-29%	
Car 1			2,285	2,285	0%	748.66	581.41	-22%	1,600,085	1,237,759	-412,648	-22%	
Diesel Oil		Car 2	13,623	13,623	0%	817.90	510.38	-30%	11,445,865	6,565,736	-4,891,131	-30%	
		Car 3	54,685	54,685	0%	632.52	364.41	-42%	36,589,677	19,927,835	-16,661,841	-42%	
		Car 4	34,037	34,037	0%	396.37	285.34	-30%	13,481,158	9,711,896	-3,779,262	-30%	
		Car 5	389,263	389,263	0%	282.92	153.66	-46%	110,112,782	59,688,643	-50,424,148	-46%	
Trucks Total	741,214	741,214	0%	63.96	153.66	189%	3,937,089	11,368,582	7,421,413	189%			
1.A.3.b.v. - Motorised Two-Wheelers (MOWs)	Gasoline	Trucks Total	572,754	572,754	0%	314.85	196.65	-38%	179,874,133	112,285,562	-67,588,571	-38%	
		pre-Cars	6,185	6,185	0%	122.85	158.64	29%	795,185	974,388	218,152	29%	
		Car 1	3,037	3,037	0%	134.71	174.84	40%	478,514	670,859	192,346	40%	
		Car 2	3,365	3,365	0%	128.94	186.25	52%	433,874	680,370	226,504	52%	
		Car 3	5,385	5,385	0%	38.53	186.25	380%	299,722	1,041,189	821,467	380%	
		Car 4	0	0	0%	0	0	0%	0	0	0	0%	
	Diesel Oil	Car 5	0	0	0%	0	0	0%	0	0	0	0%	
		MOWs Total	18,673	18,673	0%	108.59	179.24	78%	1,878,294	3,381,794	1,488,499	78%	
		1.A.3.b. Road Transport	Total	2,153,563	2,153,563	0%	277.27	140.35	-48%	597,120,297	362,252,271	-234,868,025	-48%

Adjustment details for 2025

NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions				
		current	adjusted	difference	current	adjusted	difference	current	adjusted	adjustment	difference	
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [kg]	in [kg]	in [kg]	in [%]	
1.A.3.a.i. - Passenger Cars	Gasoline	pre-Cars	11,380	11,380	0%	823.37	844.11	-14%	7,264,112	6,191,942	-1,014,168	-14%
		Car 1	34,112	34,112	0%	371.34	345.71	-34%	8,963,681	5,924,574	-3,029,228	-34%
		Car 2	42,925	42,925	0%	207.78	142.69	-32%	8,918,785	6,099,659	-2,819,648	-32%
		Car 3	72,871	72,871	0%	73.86	74.74	1%	5,381,351	5,446,237	64,887	1%
		Car 4	363,474	363,474	0%	52.36	49.62	-5%	18,485,637	17,326,221	-1,159,416	-5%
		Car 5	180,783	180,783	0%	19.11	49.62	151%	3,454,481	0,881,456	-5,406,375	151%
		Car 6	29,612	29,612	0%	25.70	49.62	84%	790,781	1,451,433	659,752	84%
		Gasoline total	715,156	715,156	0%	74.38	71.73	-4%	53,196,187	51,380,983	-1,889,895	-4%
	Diesel Oil	pre-Cars	1,382	1,382	0%	313.30	284.66	-5%	367,913	339,733	-28,180	-5%
		Car 1	4,279	4,279	0%	298.14	267.84	-10%	1,261,930	1,129,989	-132,821	-10%
		Car 2	19,689	19,689	0%	407.80	320.38	-40%	8,913,587	4,338,719	-4,574,868	-40%
		Car 3	71,044	71,044	0%	595.91	179.64	-70%	42,271,648	12,719,962	-29,551,686	-70%
		Car 4	182,410	182,410	0%	401.42	154.07	-62%	77,237,655	29,644,450	-47,593,206	-62%
LDNs Total	645,545	645,545	0%	426.19	159.68	-63%	275,133,233	183,163,511	-91,969,722	-63%		
1.A.3.b.i. - Heavy Duty Vehicles (LDVs)	Gasoline	pre-Cars	1,364,721	1,364,721	0%	245.98	113.52	-53%	348,317,960	154,484,848	-171,856,536	-53%
		Car 1	675	675	0%	66.37	645.95	1%	135,380	64,617	-70,763	-44%
		Car 2	160	160	0%	69.63	111.93	46%	134,623	46,851	-87,772	-61%
		Car 2	629	629	0%	208.27	212.94	2%	187,533	133,879	-53,654	-29%
		Car 3	781	781	0%	95.50	188.62	3%	73,969	76,155	2,186	3%
		Car 4	1,720	1,720	0%	47.06	51.30	9%	80,958	82,248	7,290	9%
		Car 5	1,020	1,020	0%	18.61	51.30	179%	29,912	82,086	52,174	179%
		Car 6	84	84	0%	18.71	51.30	174%	1,752	4,884	3,162	174%
	Gasoline total	5,763	5,763	0%	187.52	122.88	-3%	1,083,927	1,086,999	30,428	3%	
	Diesel Oil	pre-Cars	2,283	2,283	0%	416.91	386.78	-26%	986,186	732,511	-253,664	-26%
		Car 1	2,196	2,196	0%	399.47	275.25	-40%	854,270	453,227	-401,043	-40%
		Car 2	5,025	5,025	0%	380.91	183.29	-49%	1,632,286	975,688	-656,598	-49%
		Car 3	15,781	15,781	0%	588.35	190.67	-67%	9,112,414	2,362,713	-6,749,701	-74%
Car 4		47,480	47,480	0%	501.73	91.74	-82%	23,732,396	3,486,298	-19,246,098	-82%	
LDVs Total	135,356	135,356	0%	406.35	187.96	-77%	63,565,843	16,681,490	-46,884,353	-77%		
1.A.3.b.ii. - Heavy Duty Vehicle Buses	Diesel Oil	LDNs Total	141,098	141,098	0%	472.76	130.62	-76%	64,989,320	15,688,490	-49,300,831	-76%
		pre-Cars	979	979	0%	1070.34	1019.23	-5%	1,048,312	992,256	-56,056	-5%
		Car 1	747	747	0%	728.26	151.91	-3%	545,471	611,636	66,165	3%
		Car 2	5,211	5,211	0%	767.42	644.46	-16%	4,163,687	3,359,634	-804,053	-16%
		Car 3	11,282	11,282	0%	633.90	458.67	-28%	7,141,732	5,174,989	-1,966,822	-28%
		Car 4	4,586	4,586	0%	468.70	351.99	-25%	2,154,066	1,614,177	-539,829	-25%
		Car 5	34,257	34,257	0%	368.77	184.58	-49%	8,727,060	4,277,641	-4,449,427	-49%
		Car 6	5,224	5,224	0%	63.13	184.58	241%	277,542	964,225	686,684	241%
	Buses Total	52,887	52,887	0%	436.96	327.99	-29%	23,987,817	17,149,448	-6,848,378	-29%	
	Diesel Oil	pre-Cars	4,379	4,379	0%	1034.89	737.35	-29%	4,468,571	3,184,428	-1,284,143	-29%
		Car 1	1,083	1,083	0%	748.71	553.48	-26%	1,387,281	1,025,551	-361,740	-26%
		Car 2	11,082	11,082	0%	817.38	587.94	-30%	3,072,940	5,623,440	-2,439,381	-30%
		Car 3	43,481	43,481	0%	965.55	361.64	-63%	27,460,779	9,123,426	-18,337,377	-63%
Car 4		29,223	29,223	0%	966.35	286.72	-69%	11,572,868	8,284,180	-3,278,708	-69%	
LDNs Total	309,726	309,726	0%	264.17	153.49	-46%	93,413,973	60,456,492	-32,957,487	-46%		
Trucks Total	570,787	570,787	0%	67.48	183.49	161%	8,913,354	26,282,637	18,369,684	161%		
1.A.3.b.iii. - Heavy Duty Vehicle Trucks & Lorries	Diesel Oil	LDNs Total	589,481	589,481	0%	264.68	153.49	-38%	197,189,625	170,520,387	-26,669,237	-13%
		pre-Cars	5,744	5,744	0%	125.41	157.28	25%	720,441	983,470	263,028	25%
		Car 1	3,517	3,517	0%	127.40	170.22	33%	444,086	619,819	171,733	33%
		Car 2	3,382	3,382	0%	127.35	186.53	45%	430,660	665,965	236,305	45%
		Car 3	5,011	5,011	0%	49.29	186.53	389%	234,126	1,144,415	910,289	389%
		Car 4	6	6	0%	15.96		-180%	69	884	736	1061%
		Car 5	0	0	0%			0%	0	0	0	0%
		MWNS Total	18,459	18,459	0%	99.52	180.65	82%	1,833,382	5,334,472	3,501,090	82%
	Road Transport	Total	2,161,950	2,161,950	0%	266.39	139.26	-48%	575,937,265	381,697,596	-194,853,678	-48%

Adjustment details for 2026

NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions			
		current	adjusted	difference	current	adjusted	difference	current	adjusted	difference	
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [t]	in [t]	in [%]	
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	11,782	11,782	0%	634.75	644.11	-14%	7,470,914	6,410,967	-1,059,947
		Car 1	20,270	20,270	0%	372.25	201.68	-35%	7,545,483	4,988,888	-2,556,595
		Car 2	36,062	36,062	0%	212.73	143.11	-33%	7,671,581	5,180,897	-2,490,684
		Car 3	83,039	83,039	0%	76.17	75.50	-1%	4,881,482	4,759,259	-122,223
		Car 4	334,413	334,413	0%	53.74	50.17	-7%	17,369,364	16,777,445	-591,919
		Car 5	183,374	183,374	0%	19.09	50.17	163%	3,580,745	9,189,834	5,609,089
		Car 6	65,332	65,332	0%	25.67	50.17	89%	1,768,917	3,327,855	1,558,938
	Gasoline total	715,272	715,272	0%	78.93	70.65	-9%	58,736,967	50,535,049	-8,201,918	
	Diesel Oil	pre-Cars	1,280	1,280	0%	304.76	264.56	-14%	386,262	339,172	-47,090
		Car 1	3,749	3,749	0%	1,122.49	1,011.625	-10%	1,122,449	1,011,625	-110,824
		Car 2	16,584	16,584	0%	407.19	221.43	-46%	6,720,132	3,653,964	-3,066,168
		Car 3	81,398	81,398	0%	802.50	179.24	-78%	35,991,999	11,085,409	-24,906,590
		Car 4	175,940	175,940	0%	405.76	156.24	-61%	71,362,220	27,474,086	-43,888,134
		Car 5	299,654	299,654	0%	433.34	156.24	-64%	130,032,044	46,019,229	-83,912,815
Car 6		116,084	116,084	0%	268.75	156.24	-42%	30,427,555	10,232,785	-20,194,770	
Diesel oil total	625,119	625,119	0%	418.36	160.76	-61%	277,947,660	188,535,230	-89,412,430		
Flx Total	1,340,391	1,340,391	0%	235.75	154.41	-51%	327,778,627	199,070,280	-128,708,347		
1.A.3.b.i - Heavy Duty Vehicles (HDV)	Gasoline	pre-Cars	910	910	0%	602.79	645.95	-1%	593,186	587,543	-5,643
		Car 1	136	136	0%	308.31	312.78	-6%	122,126	42,425	-79,701
		Car 2	540	540	0%	308.39	217.84	-29%	162,311	117,737	-44,574
		Car 3	650	650	0%	108.43	111.57	-3%	70,432	72,731	2,299
		Car 4	1,684	1,684	0%	43.06	52.36	7%	78,714	84,003	5,289
		Car 5	1,724	1,724	0%	19.82	52.36	164%	34,157	80,258	46,101
		Car 6	363	363	0%	19.85	52.36	181%	6,764	19,992	13,228
	Gasoline total	5,606	5,606	0%	388.27	371.66	-5%	1,068,292	1,013,478	-54,814	
	Diesel Oil	pre-Cars	2,189	2,189	0%	414.81	386.79	-7%	899,849	866,433	-33,416
		Car 1	1,780	1,780	0%	391.89	276.25	-30%	780,189	385,371	-394,818
		Car 2	4,223	4,223	0%	323.43	153.31	-53%	1,365,994	676,452	-689,542
		Car 3	13,582	13,582	0%	588.91	150.77	-74%	8,064,323	2,940,233	-5,124,090
		Car 4	43,141	43,141	0%	504.48	32.40	-93%	21,783,989	3,986,141	-17,797,848
		Car 5	74,231	74,231	0%	434.16	32.40	-93%	32,223,283	6,658,780	-25,564,503
Car 6		4,921	4,921	0%	113.49	32.40	-71%	755,285	454,676	-300,609	
Diesel oil total	148,068	148,068	0%	454.12	185.62	-59%	65,712,732	15,256,007	-50,456,725		
Flx Total	148,068	148,068	0%	454.12	185.62	-59%	65,712,732	15,256,007	-50,456,725		
1.A.3.b.ii - Heavy Duty Vehicle: Buses	Diesel Oil	pre-Cars	881	881	0%	1076.81	1119.23	-5%	954,197	988,234	34,037
		Car 1	583	583	0%	731.36	732.67	-2%	433,675	446,236	12,561
		Car 2	4,375	4,375	0%	708.25	645.03	-9%	3,440,614	2,822,621	-617,993
		Car 3	10,333	10,333	0%	632.87	458.91	-28%	6,539,364	4,741,827	-1,797,537
		Car 4	4,449	4,449	0%	475.90	382.29	-20%	2,117,219	1,666,881	-450,338
		Car 5	34,380	34,380	0%	364.36	185.22	-49%	8,935,974	4,517,517	-4,418,457
		Car 6	9,126	9,126	0%	62.79	185.22	196%	573,066	1,680,431	1,107,365
	Buses Total	54,157	54,157	0%	404.73	388.24	-2%	23,082,189	19,685,117	-3,397,072	
	Diesel Oil	pre-Cars	3,933	3,933	0%	1034.81	737.35	-29%	4,087,249	2,980,379	-1,106,870
		Car 1	1,555	1,555	0%	748.16	587.92	-21%	1,163,482	789,813	-373,669
		Car 2	8,875	8,875	0%	817.75	585.42	-28%	7,258,047	4,486,626	-2,771,421
		Car 3	34,167	34,167	0%	638.91	568.04	-11%	21,553,280	12,251,155	-9,302,125
		Car 4	34,287	34,287	0%	394.94	281.86	-28%	9,640,364	6,885,621	-2,754,743
		Car 5	269,735	269,735	0%	267.22	153.60	-42%	74,680,233	39,676,610	-35,003,623
Car 6		261,480	261,480	0%	61.77	153.60	149%	16,149,289	40,244,036	24,094,747	
Trucks Total	594,013	594,013	0%	226.31	180.97	-20%	134,431,899	101,486,262	-32,945,637		
1.A.3.b.iii - Heavy Duty Vehicle: Trucks & Lorries	Gasoline	pre-Cars	5,543	5,543	0%	125.59	155.78	24%	696,072	883,289	187,217
		Car 1	3,360	3,360	0%	127.11	177.29	39%	427,113	585,796	158,683
		Car 2	3,375	3,375	0%	125.94	187.68	50%	421,961	687,078	265,117
		Car 3	6,443	6,443	0%	48.36	187.68	281%	209,627	1,273,671	1,064,044
		Car 4	85	85	0%	17.47	187.68	1031%	1,134	12,632	11,498
		Car 5	0	0	0%	0	0	0%	0	0	0%
		Gasoline total	16,185	16,185	0%	95.14	181.68	89%	1,885,897	3,452,476	1,566,579
	MWVs Total	16,185	16,185	0%	95.14	181.68	89%	1,885,897	3,452,476	1,566,579	
	1.A.3.b - Road Transport	Total	2,267,339	2,267,339	0%	258.89	137.22	-46%	553,799,598	362,981,620	-190,817,978

Adjustment details for 2027

NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions			
		current	adjusted	difference	current	adjusted	difference	current	adjusted	difference	
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [t]	in [t]	in [%]	
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	12,282	12,282	0%	636.73	644.11	-14%	7,914,267	6,680,187	-1,126,106
		Car 1	17,449	17,449	0%	372.96	241.68	-35%	6,588,311	4,217,644	-2,370,667
		Car 2	30,435	30,435	0%	217.43	141.75	-35%	6,617,570	4,714,140	-1,903,430
		Car 3	54,271	54,271	0%	78.48	76.27	-3%	4,254,938	4,139,376	-115,562
		Car 4	315,086	315,086	0%	54.96	51.26	-7%	17,316,320	16,511,881	-804,439
		Car 5	180,240	180,240	0%	19.17	51.26	163%	3,485,382	9,239,815	5,754,433
		Car 6	114,791	114,791	0%	25.65	51.26	82%	3,063,235	5,884,372	2,821,137
		Gasoline total	724,571	724,571	0%	87.66	80.88	-8%	49,046,874	40,534,731	-8,512,143
	Diesel Oil	pre-Cars	1,370	1,370	0%	364.96	254.56	-30%	386,963	347,626	-39,337
		Car 1	3,749	3,749	0%	294.37	271.67	-8%	1,082,298	910,182	-172,116
		Car 2	13,788	13,788	0%	407.17	222.44	-45%	5,914,130	3,066,393	-2,847,737
		Car 3	52,128	52,128	0%	808.95	179.65	-78%	31,696,478	9,364,788	-22,331,690
		Car 4	187,947	187,947	0%	418.16	158.34	-61%	64,733,485	24,983,323	-39,750,162
		Car 5	283,480	283,480	0%	423.99	158.34	-63%	120,187,655	44,073,190	-76,114,465
Diesel oil total	686,562	686,562	0%	394.65	161.95	-59%	272,126,081	112,890,717	-159,235,364		
Flx Total	1,421,142	1,421,142	0%	225.98	155.61	-31%	321,152,955	163,425,448	-157,727,507		
Gasoline	pre-Cars	940	940	0%	611.41	645.95	-1%	612,247	596,878	-15,369	
	Car 1	124	124	0%	308.23	312.78	-6%	112,083	39,682	-72,401	
	Car 2	485	485	0%	302.12	221.62	-27%	140,344	102,950	-37,394	
	Car 3	596	596	0%	118.57	115.36	-3%	65,955	68,812	2,857	
	Car 4	1,476	1,476	0%	50.72	53.38	5%	74,877	78,816	3,939	
	Car 5	1,680	1,680	0%	21.73	53.38	146%	35,240	89,034	53,794	
	Car 6	910	910	0%	19.18	53.38	187%	17,052	49,080	32,028	
	Gasoline total	6,186	6,186	0%	171.55	167.18	-2%	1,058,799	1,034,211	-24,588	
Diesel Oil	pre-Cars	2,087	2,087	0%	413.41	386.79	-7%	860,499	811,163	-49,336	
	Car 1	1,538	1,538	0%	398.47	276.25	-30%	680,795	331,158	-349,637	
	Car 2	3,580	3,580	0%	321.26	153.04	-52%	1,143,793	687,293	-456,500	
	Car 3	11,684	11,684	0%	556.30	150.79	-73%	6,940,879	1,758,747	-5,182,132	
	Car 4	39,050	39,050	0%	506.70	33.69	-93%	19,789,647	3,635,035	-16,154,612	
	Car 5	75,789	75,789	0%	432.66	33.69	-70%	32,790,956	7,054,965	-25,736,011	
Diesel oil total	153,284	153,284	0%	424.66	183.89	-76%	65,083,930	15,925,296	-49,168,714		
Flx Total	199,470	199,470	0%	414.83	186.35	-74%	66,152,129	16,949,427	-49,193,302		
Diesel Oil	pre-Cars	736	736	0%	707.33	619.23	-13%	790,259	750,425	-39,834	
	Car 1	411	411	0%	721.97	732.57	3%	300,684	309,062	8,408	
	Car 2	3,325	3,325	0%	797.91	642.49	-19%	2,820,287	2,147,480	-672,806	
	Car 3	8,878	8,878	0%	621.73	459.12	-26%	4,478,440	3,948,747	-529,693	
	Car 4	3,823	3,823	0%	474.97	365.49	-23%	1,932,180	1,347,630	-584,550	
	Car 5	15,913	15,913	0%	363.90	185.64	-49%	7,937,974	4,053,646	-3,884,319	
Diesel oil total	34,686	34,686	0%	58.82	185.64	218%	86,215	272,590	186,375		
Bees Total	53,382	53,382	0%	318.80	280.71	-23%	19,793,981	15,384,828	-4,409,153		
Diesel Oil	pre-Cars	3,686	3,686	0%	1034.40	713.35	-29%	3,730,272	2,659,676	-1,070,596	
	Car 1	1,311	1,311	0%	748.03	468.38	-37%	980,942	614,151	-366,808	
	Car 2	7,087	7,087	0%	817.66	583.45	-30%	5,746,836	3,580,026	-2,166,810	
	Car 3	26,886	26,886	0%	838.17	350.72	-44%	15,942,611	9,583,881	-6,358,729	
	Car 4	90,082	90,082	0%	797.77	276.34	-30%	7,666,416	4,679,166	-2,987,250	
	Car 5	39,246	39,246	0%	364.96	185.64	-47%	9,280,799	31,536,367	27,756,568	
Trucks Total	398,263	398,263	0%	66.82	154.35	131%	31,985,366	41,798,611	9,813,245		
Trucks Total	598,263	598,263	0%	599.82	179.92	-96%	116,611,141	105,268,508	-11,342,633		
Diesel Oil	pre-Cars	5,336	5,336	0%	125.91	157.19	25%	671,885	830,789	158,903	
	Car 1	3,257	3,257	0%	126.39	177.86	41%	411,617	579,244	167,627	
	Car 2	3,396	3,396	0%	122.55	180.33	48%	415,280	673,548	258,268	
	Car 3	6,741	6,741	0%	40.22	180.33	363%	271,187	1,336,956	1,065,769	
	Car 4	430	430	0%	19.29	180.33	983%	7,862	85,270	77,408	
	Car 5	0	0	0%	0.00		0%	0	0	0	
M2Ws Total	19,180	19,180	0%	92.83	183.39	96%	5,788,674	5,653,187	-135,487		
1.A.3.b.i - Motorized Two-Wheelers (M2Ws)		2,291,437	2,291,437	0%	234.33	135.23	-42%	525,549,490	384,489,596	-141,059,894	
1.A.3.b. Road Transport											

Adjustment details for 2018

ACTIVITY DATA												
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions				
		current	adjusted	difference	current	adjusted	difference	current	adjusted	difference		
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [t]	in [t]	in [%]		
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	12,219	12,219	0%	637.58	644.11	-65%	7,780,965	6,648,721	-1,132,234	-55%
		Car 1	14,362	14,362	0%	374.34	341.68	-9%	5,371,161	3,448,643	-1,922,518	-36%
		Car 2	34,285	34,285	0%	221.97	111.68	-60%	5,360,977	2,688,163	-2,672,814	-50%
		Car 3	43,642	43,642	0%	88.16	76.96	-4%	3,487,781	3,389,617	-98,164	-4%
		Car 4	278,738	278,738	0%	55.98	52.30	-7%	15,683,488	14,576,755	-1,106,733	-7%
		Car 5	186,830	186,830	0%	19.35	52.30	170%	3,228,282	8,725,688	5,497,406	170%
	Diesel Oil	pre-Cars	193,041	193,041	0%	6.00	52.30	0%	4,190,422	6,718,250	2,527,828	89%
		Car 1	3,949	3,949	0%	303.16	254.96	-16%	45,032,966	47,786,817	2,753,851	6%
		Car 2	10,784	10,784	0%	298.17	272.65	-9%	962,432	775,165	-187,267	-6%
		Car 3	40,786	40,786	0%	407.20	222.87	-45%	4,981,983	2,483,536	-2,498,447	-50%
		Car 4	130,534	130,534	0%	612.49	180.15	-71%	24,932,029	7,333,241	-17,598,788	-71%
		Car 5	231,212	231,212	0%	414.71	180.40	-56%	54,133,837	20,937,329	-33,196,508	-61%
	FCA Total	pre-Cars	220,685	220,685	0%	254.87	180.43	-31%	104,586,786	40,293,731	-64,293,055	-61%
		Car 1	646,074	646,074	0%	375.66	163.38	-56%	58,284,140	35,680,446	-22,603,694	-37%
		Car 2	1,365,181	1,365,181	0%	214.34	154.68	-28%	247,596,063	188,748,684	-158,847,459	-56%
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	917	917	0%	644.51	645.95	1%	596,851	582,652	-14,199	-2%
		Car 1	189	189	0%	911.58	312.78	-66%	98,528	33,895	-64,633	-66%
		Car 2	377	377	0%	303.64	224.45	-26%	114,682	84,713	-29,969	-26%
		Car 3	511	511	0%	111.92	116.84	5%	57,282	60,739	3,457	6%
		Car 4	1,275	1,275	0%	52.02	54.36	4%	65,290	69,270	3,980	4%
		Car 5	1,483	1,483	0%	23.70	54.36	129%	35,160	80,626	45,466	129%
	Diesel Oil	pre-Cars	1,643	1,643	0%	19.18	54.36	182%	39,550	89,326	49,776	182%
		Car 1	6,315	6,315	0%	154.22	160.11	4%	999,199	1,011,138	11,939	1%
		Car 2	1,872	1,872	0%	411.51	386.79	-6%	771,337	574,742	-196,595	-26%
		Car 3	1,285	1,285	0%	389.94	276.25	-29%	483,129	272,296	-210,833	-44%
		Car 4	2,942	2,942	0%	318.18	133.88	-58%	965,389	550,789	-414,599	-43%
		Car 5	9,383	9,383	0%	558.10	150.74	-73%	5,689,152	1,411,299	-4,277,853	-75%
	FCA Total	pre-Cars	33,232	33,232	0%	508.42	33.81	-93%	15,929,185	3,117,457	-12,811,728	-80%
		Car 1	66,283	66,283	0%	432.92	33.81	-92%	28,684,080	6,217,860	-22,466,220	-78%
		Car 2	39,482	39,482	0%	158.79	33.81	-79%	5,941,615	3,686,228	-2,255,387	-38%
1.A.3.b.ii - Heavy Duty Vehicles (HDVs)	Gasoline	pre-Cars	180,574	180,574	0%	384.71	182.69	-53%	98,344,525	55,880,316	-42,464,209	-53%
		Car 1	180,574	180,574	0%	375.86	184.94	-51%	69,343,125	36,851,449	-32,491,676	-51%
		Car 2	547	547	0%	1078.15	1919.23	78%	589,267	557,147	-32,120	-5%
		Car 3	732	732	0%	732.67	732.67	0%	173,678	178,368	4,690	3%
		Car 4	2,270	2,270	0%	787.83	646.33	-18%	1,780,686	1,487,437	-293,249	-16%
		Car 5	6,757	6,757	0%	638.89	459.32	-29%	4,262,734	3,183,482	-1,079,252	-25%
	Diesel Oil	pre-Cars	3,043	3,043	0%	473.16	382.73	-19%	1,439,790	1,073,333	-366,457	-25%
		Car 1	18,189	18,189	0%	362.42	186.37	-49%	6,463,265	3,376,016	-3,087,249	-48%
		Car 2	20,670	20,670	0%	64.89	186.37	289%	1,176,026	3,682,314	2,506,288	214%
		Car 3	51,634	51,634	0%	309.75	283.53	-8%	15,993,546	13,687,186	-2,306,360	-15%
		Car 4	3,262	3,262	0%	1034.82	737.35	-29%	3,375,359	2,485,071	-890,288	-26%
		Car 5	1,094	1,094	0%	747.82	488.39	-35%	918,052	512,378	-405,674	-44%
	FCA Total	pre-Cars	5,544	5,544	0%	817.44	581.68	-29%	4,532,190	2,781,516	-1,750,674	-39%
		Car 1	20,583	20,583	0%	629.54	563.68	-10%	12,367,751	7,277,279	-5,090,472	-44%
		Car 2	15,912	15,912	0%	358.89	276.23	-23%	6,334,421	4,386,424	-1,947,997	-31%
1.A.3.b.iii - Heavy Duty Vehicles (HDVs) - Trucks & Lorries	Gasoline	pre-Cars	154,983	154,983	0%	250.40	154.68	-37%	45,964,153	24,283,389	-21,680,764	-47%
		Car 1	381,799	381,799	0%	68.78	154.68	125%	28,251,482	69,665,886	41,414,404	146%
		Car 2	585,186	585,186	0%	515.18	172.19	-66%	188,173,537	180,760,889	-7,412,648	-4%
		Car 3	4,940	4,940	0%	128.95	188.61	46%	622,666	783,451	160,785	26%
		Car 4	2,966	2,966	0%	128.14	177.79	41%	374,114	527,294	153,180	41%
		Car 5	3,221	3,221	0%	128.33	188.64	46%	387,596	639,833	252,237	65%
	Diesel Oil	pre-Cars	6,241	6,241	0%	48.24	188.64	288%	20,126	1,239,686	1,219,560	598%
		Car 1	1,130	1,130	0%	58.41	188.64	323%	23,066	224,682	201,616	875%
		Car 2	0	0	0%	0.00	188.64	0%	0	0	0	0%
		Car 3	18,487	18,487	0%	85.66	188.61	198%	1,658,568	3,454,767	1,796,199	108%
		Car 4	2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-38%
		Car 5	2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-38%

Adjustment details for 2019

Detailed Data for 2022												
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions				
		current	adjusted	difference	current	adjusted	difference	current	adjusted	difference		
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [t]	in [t]	in [%]		
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	13,688	13,688	0%	638.68	644.11	-5%	8,664,621	7,382,686	-1,281,935	-52%
		Car 1	12,427	12,427	0%	378.32	341.68	-36%	4,781,480	3,083,383	-1,698,096	-36%
		Car 2	20,086	20,086	0%	225.58	92.58	-59%	4,531,070	1,858,018	-2,672,852	-59%
		Car 3	38,216	38,216	0%	82.22	76.12	-7%	2,977,840	2,829,186	-148,654	-5%
		Car 4	295,220	295,220	0%	57.04	53.29	-7%	14,588,285	13,589,621	-998,664	-7%
		Car 5	180,537	180,537	0%	19.77	53.29	170%	3,173,728	8,054,356	4,880,628	154%
	Diesel Oil	pre-Cars	285,636	285,636	0%	25.63	53.29	180%	5,295,099	11,010,782	5,715,683	180%
		Car 1	194,631	194,631	0%	62.36	68.45	10%	43,961,941	48,238,025	4,276,084	10%
		Car 2	3,745	3,745	0%	313.70	254.96	-19%	193,180	174,621	-18,559	-10%
		Car 3	2,545	2,545	0%	298.80	272.65	-9%	764,913	687,786	-77,127	-6%
		Car 4	8,891	8,891	0%	407.19	226.16	-44%	3,620,286	2,037,480	-1,582,806	-44%
		Car 5	33,079	33,079	0%	615.11	180.42	-71%	20,310,125	5,967,483	-14,342,642	-71%
	FCA Total	pre-Cars	111,335	111,335	0%	419.37	182.44	-56%	48,688,685	10,885,228	-37,803,457	-78%
		Car 1	231,784	231,784	0%	419.37	182.44	-56%	95,117,643	37,650,997	-57,466,646	-60%
		Car 2	273,511	273,511	0%	227.36	182.44	-20%	62,189,230	44,429,184	-17,760,046	-29%
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	643,841	643,841	0%	345.81	165.67	-52%	229,566,088	189,582,982	-139,983,106	-61%
		Car 1	1,368,532	1,368,532	0%	699.83	155.32	-78%	273,668,009	157,821,687	-115,846,322	-42%
		Car 2	909	909	0%	644.89	645.95	1%	687,449	581,962	-105,487	-15%
		Car 3	87	87	0%	915.20	312.78	-66%	89,953	30,396	-59,557	-66%
		Car 4	316	316	0%	304.63	224.45	-26%	96,158	70,848	-25,310	-26%
		Car 5	447	447	0%	112.68	121.47	8%	59,355	54,283	-5,072	-8%
	Diesel Oil	pre-Cars	1,126	1,126	0%	53.08	55.26	4%	59,652	62,199	2,547	4%
		Car 1	1,361	1,361	0%	25.34	55.26	180%	34,240	74,680	40,440	180%
		Car 2	2,420	2,420	0%	18.75	55.26	180%	45,383	133,753	88,370	180%
		Car 3	6,483	6,483	0%	144.88	153.25	5%	974,279	1,044,150	69,871	7%
		Car 4	1,744	1,744	0%	418.96	386.79	-6%	725,111	541,376	-183,735	-26%
		Car 5	1,079	1,079	0%	389.92	276.25	-29%	420,285	232,256	-188,029	-44%
	FCA Total	pre-Cars	2,334	2,334	0%	315.90	194.79	-39%	737,682	454,630	-283,052	-39%
		Car 1	7,649	7,649	0%	601.11	150.79	-75%	4,537,943	1,152,446	-3,385,497	-75%
1.A.3.a.ii - Heavy Duty Vehicles (HDVs)	Diesel Oil	Car 2	20,711	20,711	0%	512.28	94.57	-82%	14,768,300	2,716,154	-11,992,145	-82%
		Car 3	58,734	58,734	0%	434.30	94.57	-78%	35,499,480	5,552,420	-29,947,060	-78%
		Car 5	58,931	58,931	0%	156.18	94.57	-39%	6,811,586	5,572,893	-1,238,694	-39%
		LDVs total	159,183	159,183	0%	367.47	191.99	-47%	55,383,335	35,291,485	-20,091,850	-37%
		LDVs total	165,866	165,866	0%	339.31	183.97	-46%	56,279,584	37,245,596	-19,033,988	-34%
		pre-Cars	489	489	0%	1080.23	1915.23	-43%	588,987	476,258	-112,729	-19%
	Diesel Oil	Car 1	147	147	0%	736.37	752.57	2%	108,212	110,593	2,381	2%
		Car 3	1,611	1,611	0%	703.47	645.77	-9%	1,277,445	1,041,621	-235,824	-19%
		Car 5	5,709	5,709	0%	3,265.61	2,623.79	-19%	3,661,581	2,623,797	-1,037,784	-28%
		Car 6	2,747	2,747	0%	473.92	1,822.04	-74%	1,362,054	969,413	-392,641	-29%
		Car V	17,190	17,190	0%	362.91	186.64	-49%	6,213,175	3,186,731	-3,026,444	-50%
		Car VI	25,135	25,135	0%	68.43	186.64	269%	5,518,961	1,490,133	-4,028,828	-74%
	Diesel Total	pre-Cars	52,939	52,939	0%	214.81	247.85	-13%	14,527,012	15,158,978	631,966	4%
		Car 1	3,140	3,140	0%	929.98	737.35	-20%	3,250,020	2,376,443	-873,577	-29%
		Car 3	989	989	0%	747.60	480.39	-35%	724,240	453,754	-270,486	-37%
Car 5		4,560	4,560	0%	817.42	581.04	-29%	3,734,343	2,288,967	-1,445,376	-39%	
Car VI		16,377	16,377	0%	628.94	351.48	-44%	19,380,323	5,756,580	-13,623,743	-70%	
Car VII		13,127	13,127	0%	394.86	275.43	-30%	1,225,679	3,636,330	2,410,651	198%	
1.A.3.b.ii - Medium Duty Vehicles (MDVs)	Diesel Oil	Car 1	185,039	185,039	0%	265.13	154.92	-41%	98,949,999	59,417,417	-39,532,582	-40%
		Car 2	432,490	432,490	0%	72.38	154.92	112%	31,375,486	67,689,853	36,314,367	116%
		Trucks Total	595,913	595,913	0%	93.95	169.17	-45%	95,380,190	180,893,365	85,513,175	89%
		pre-Cars	4,913	4,913	0%	125.89	144.79	11%	664,997	752,771	87,774	13%
1.A.3.b.iii - Motorized Two-Wheelers (MTWs)	Gasoline	Car 1	2,835	2,835	0%	125.89	177.29	41%	35,456	582,589	187,133	41%
		Car 2	3,084	3,084	0%	119.33	180.06	67%	38,224	615,317	246,993	67%
		Car 3	6,082	6,082	0%	49.03	180.06	367%	249,284	1,183,617	933,333	381%
		Car 5	2,085	2,085	0%	21.60	180.06	817%	43,489	380,667	336,178	817%
MTWs Total	pre-Cars	18,150	18,150	0%	86.95	186.83	157%	5,615,490	5,562,941	-52,549	-1%	
	Trucks Total	2,262,080	2,262,080	0%	138.98	132.83	-33%	437,268,744	292,497,437	-144,771,307	-33%	

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Adjustment 2014 (accepted)	-105.6	-101.3	-95.7	-91.7						
Adjustment 2015 (accepted)	-100.3	-95.5	-89.9	-85.1						
Adjustment 2016 (accepted)	-151.3	-146.9	-145.1	-142.5	-128.1					
Adjustment 2017 (accepted)	-151.3	-146.8	-145.0	-142.4	-127.2	-100.9				
Adjustment 2018 (accepted)	-172.3	-174.5	-177.4	-180.4	-171.5	-148.9	-123.2			
Adjustment 2019 (accepted)	-172.3	-174.5	-177.4	-180.3	-171.4	-148.8	-123.3	93.7		
Adjustment 2020 (accepted)	-297.8	-302.3	-301.3	-306.1	-294.5	-269.0	-244.3	-214.9	-174.6	
Adjustment 2021 (proposal)	-296.1	-300.7	-300.4	-305.2	-294.9	-274.9	-250.9	-221.1	-179.6	-144.8
Change against Adjustment 2020	1.7	1.6	0.9	0.9	-0.4	-5.9	-6.6	-6.2	-5.0	

The noticeable differences between the 2017 and 2018 adjustment proposals resulted from an ad-hoc revision of the *Handbook Emission Factors for Road Transport* (HBEFA, version 3.3) in the aftermath of the so-called “Diesel-gate”.⁸⁾

The even bigger changes between adjustment 2019 and adjustment proposal 2020 result from an additional rather fundamental revision of the *Handbook Emission Factors for Road Transport* now available in version 4.1 >⁹⁾ strongly effecting the TREMOD model underlying Germany's emission reporting for road transport and hence any adjustments of NO_x, emissions.

With such major model revision between submissions 2019 and 2020, the current adjustment proposal differs significantly from the adjustment applied for and accepted in 2019.

Adjustment description as provided in IIRs 2014 and 2015:

[image Description%20Adjustment%20DE-A%20-%20NOx%20from%201.A.3.b%20Road%20transport%20-%20IIRs%202014%20%26%202015.pdf](#)

bibliography : 1 : EB, 2012a: CLRTAP EB Decision 2012/3, ECE/EB.AIR/111/Add.1: Adjustments under the Gothenburg Protocol to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them URL: http://www.unece.org/fileadmin/DAM/env/documents/2013/air/ECE_EB.AIR_111_Add.1_ENG_DECISION_3.pdf : 2 : EB, 2012b: CLRTAP EB Decision 2012/4: Provisional Application of Amendment to the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone URL: http://www.unece.org/fileadmin/DAM/env/documents/2013/air/ECE_EB.AIR_111_Add.1_ENG_DECISION_4.pdf : 3 : EB, 2012c: CLRTAP EB Decision 2012/12: Guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them URL: http://www.unece.org/fileadmin/DAM/env/documents/2012/EB/Decision_2012_12.pdf : 4 : IIASA, 1999: Amann, M.; Bertok, I.; Cofala, J.; Gyarfas, F.; Heyes, Chr.; Klimont, Zb.; Syri, S.; Schöpp, W.: Further analysis of scenario results obtained with the RAINS model - Interim Report to the Ministère de L'Aménagement du Territoire et de l'Environnement Direction de la Prévention des Pollutions et des Risques 20, avenue de Ségur 75302 Paris 07 SP, April 1999 - URL: <https://iiasa.ac.at/web/home/research/researchPrograms/air/policy/france3b.pdf> : 5 : ifeu, 2002: Final report to UFOPLAN study FKZ 201 45 112 (German version only): Aktualisierung des Daten- und Rechenmodells: Energieverbrauch und Schadstoffemissionen des motorisierten Verkehrs in Deutschland 1980-2020; Im Auftrag des Umweltbundesamtes; ifeu Institut für Energie- und Umweltforschung Heidelberg GmbH (Institute for Energy and Environmental Research), Wilckensstraße 3, D-69120 Heidelberg, Germany, phone: +49 (0) 6221 / 47 67 -0, fax: +49 (0) 6221 / 47 67 -19, Heidelberg, 31. Oktober 2002 : 6 : Knörr et al. (2019a): Knörr, W., Heidt, C., Gores, S., & Bergk, F.: ifeu Institute for Energy and Environmental Research (Institut für Energie- und Umweltforschung Heidelberg gGmbH, ifeu): Fortschreibung des Daten- und Rechenmodells: Energieverbrauch und Schadstoffemissionen des motorisierten Verkehrs in Deutschland 1960-2035, sowie TREMOD, im Auftrag des Umweltbundesamtes, Heidelberg & Berlin, 2019. : 7 : UBA, 2018: CLRTAP submission 2018, Dessau, 2018 : 8 : ECE/EB.AIR/113/Add.1, 2012: Report of the Executive Body on its thirty-first session, Decision 2012/12 on Guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them; URL: http://www.unece.org/fileadmin/DAM/env/documents/2012/EB/ECE_EB.AIR_113_Add.1_ENG_1_.pdf : 9 : CEIP, 2014a: Centre on Emission Inventories and Projections (CEIP): CEIP/Adjustment RR/2014/GERMANY: Review of the 2014 Adjustment Application by Germany, URL: https://webdab01.umweltbundesamt.at/download/adjustments2014/Adjustment_Review_Report_GERMANY_2014.pdf?cgiproxy_skip=1, 5 August 2014 : 10 : CEIP, 2014b: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2014/10: Review of adjustment applications 2014; URL: http://www.ceip.at/fileadmin/inhalte/emep/pdf/2015/ece.eb.air.ge.1.2014.10.edited.ae_formatting_accepted.ko.pdf, 5 August 2014 : 11 : CEIP, 2015a: Centre on Emission Inventories and Projections (CEIP): CEIP/Adjustment RR/2015/Germany: Review of the 2015 Adjustment Application by Germany, URL:

https://webdab01.umweltbundesamt.at/download/adjustments2015/Germany2015-adj.pdf?cgiproxy_skip=1, September 2015 : 12 : CEIP, 2015b: Centre on Emission Inventories and Projections (CEIP): CE/EB.AIR/GE.1/2015/10–ECE/EB.AIR/WG.1/2015/13: Review of adjustment applications 2015; URL: http://www.ceip.at/fileadmin/inhalte/emep/Adjustments/ece.eb.air.ge.1.2015.10_ece.eb.air.wg.1.2015.13.AV.pdf, 6 July 2015 : 13 : CEIP, 2016a: Centre on Emission Inventories and Projections (CEIP): Review of the 2016 Adjustment Application by Germany, URL: https://webdab01.umweltbundesamt.at/download/adjustments2016/Germany2016-adj.pdf?cgiproxy_skip=1, 2016 : 14 : CEIP, 2016b: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2016/10–ECE/EB.AIR/WG.1/2016/18: Review of adjustment applications 2016; URL: http://www.ceip.at/fileadmin/inhalte/emep/pdf/2016/ECE_EB.AIR_GE.1_2016_10_E.pdf, 2016 : 15 : CEIP, 2017a: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2017/10–ECE/EB.AIR/WG.1/2017/20: Review of adjustment applications 2017; URL: http://www.ceip.at/fileadmin/inhalte/emep/pdf/2017/Advance_ece_eb_air_ge_1_2017_10_ece_eb_air_wg_1_2017.pdf, 2017 : 16 : CEIP, 2018a: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2018/10–ECE/EB.AIR/WG.1/2018/21: Review of adjustment applications 2018; URL: https://www.ceip.at/fileadmin/inhalte/emep/pdf/2018/ADJ_ece.eb.air.ge.1.2018.10-ece.eb.air.wg.1.2018.21_advance.pdf, 2018 : 17 : CEIP, 2019a: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2019/10–ECE/EB.AIR/WG.1/2019/22: Review of adjustment applications 2019; URL: https://www.ceip.at/fileadmin/inhalte/emep/pdf/2019/ECE_EB.AIR_GE.1_2019_10-1909789E.pdf, 2019 : 18 : Keller et al. (2017): Keller, M., Hausberger, S., Matzer, C., Wüthrich, P., & Notter, B.: Handbook Emission Factors for Road Transport, version 3.3 (Handbuch Emissionsfaktoren des Straßenverkehrs 3.3) URL: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwj0y67pi5foAhWB16QKHfpYDIgQFjAAegQIAhAB&url=https%3A%2F%2Fwww.hbefa.net%2Fd%2Fdocuments%2FHBEFA33_Hintergrundbericht.pdf&usq=AOvVaw2sOF884KtccVyWLItdt1CIZ - Dokumentation, Bern, 2017. : 19 : Notter et al. (2019): Keller, M., Althaus, H.-J., Cox, B., Knörr, W., Heidt, Ch., Biemann, K., Räder, D.: Handbook Emission Factors for Road Transport, version 4.1 (Handbuch Emissionsfaktoren des Straßenverkehrs 4.1), HBEFA 4.1 Development Report; URL: https://www.hbefa.net/e/documents/HBEFA41_Development_Report.pdf, Bern, Heidelberg, 21. August 2019. [bibliography](#)

¹⁾ (bibcite 4)

²⁾ (bibcite 1)

³⁾ (bibcite 3)

⁴⁾ (bibcite 2)

⁵⁾ (bibcite 4)

⁶⁾ (bibcite 5)

⁷⁾ (bibcite 6)

⁸⁾ (bibcite 18)

⁹⁾ (bibcite 19)