

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, 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

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$$EM_{\text{adjustment}} = AD_{\text{current}} * EF_{\text{current}} - AD_{\text{current}} * EF_{\text{original}} = AD_{\text{current}} * (EF_{\text{current}} - EF_{\text{original}}) = EM_{\text{current}} - EM_{\text{current-artificial}}$$

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 (2020).

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 6.02 (Knörr et al., 2019a) 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.

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cf. Also related columns in the Excel table "Annex_VII_Adjustments_summary_template_extended2_V2_Aprill15.xlsx" for road transport).

Table: Aggregated impact of adjustments on NO_x emissions from NFR 1.A.3.b

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Table 1: Resulting adjustment proposal 2020

> for year	= 2010	= 2011	= 2012	= 2013	= 2014	= 2015	= 2016	= 2017	= 2018									
~ proposed adjustment	~##red	-297.8##	~##red	-302.3##	~##red	-301.3##	~##red	-306.1##	~##red	-294.5##	~##red	-269.0##	~##red	-244.3##	~##red	-214.9##	~##red	-174.6##

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		2.079.608	2.079.608	0%			0%	645.965.162	349.851.206	296.113.956	-40%
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	88.138.909	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	5.802.765	-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	41.365.028	-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	102.764.428	-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	368.06	-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%	61.546.575	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%	49.026.874	50.634.714	-1.607.840	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%	45.032.996	47.786.817	-2.753.820	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%	999.199	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%	91.380.700	106.809.376	-15.428.676	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		2.202.890	2.202.890	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	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	13,685	13,685	0%	584.75	514.25	-12%	7,955,060	6,996,917	-958,143	-12%	
		Car 1	36,541	36,541	0%	338.50	297.71	-10%	25,915,925	19,189,262	-7,716,663	-30%	
		Car 2	96,425	96,425	0%	172.95	135.03	-22%	16,580,020	13,020,026	-3,559,994	-22%	
		Car 3	133,139	133,139	0%	58.51	70.18	20%	7,790,384	9,343,433	1,553,029	20%	
		Car 4	444,991	444,991	0%	42.27	42.19	0%	18,911,389	18,773,529	-137,859	0%	
		Car 5	31,234	31,234	0%	18.61	42.19	127%	581,142	1,317,737	736,595	127%	
	Car 6	0	0	0%	25.08	42.19	62%	2	2	0	0%		
	Gasoline total	795,957	795,957	0%	92.55	84.99	-8%	77,646,642	67,656,586	-9,990,056	-13%		
	Diesel Oil	pre-Cars	1,915	1,915	0%	318.13	264.95	-17%	583,760	527,256	-56,504	-10%	
		Car 1	10,339	10,339	0%	294.42	245.17	-17%	3,044,428	2,741,387	-303,041	-10%	
Car 2		50,088	50,088	0%	406.90	279.19	-40%	29,372,795	19,974,210	-9,398,584	-32%		
Car 3		134,025	134,025	0%	542.54	170.54	-69%	72,645,173	23,929,276	-48,715,897	-67%		
1.A.3.b.i. Light Duty Vehicles (LDVs)	Gasoline	Car 4	279,154	279,154	0%	304.37	140.58	-53%	167,299,160	39,243,811	-128,055,349	-77%	
		Car 5	53,547	53,547	0%	434.70	140.58	-68%	23,276,735	7,527,796	-15,748,939	-68%	
		Car 6	334	334	0%	257.62	140.58	-45%	85,044	46,953	-38,091	-45%	
		Gasoline total	529,380	529,380	0%	429.45	160.55	-63%	227,347,096	84,970,461	-142,376,635	-63%	
		Pkx Total	1,325,337	1,325,337	0%	238.12	155.14	-36%	364,985,938	152,627,047	-212,358,891	-58%	
		Diesel Oil	pre-Cars	1,249	1,249	0%	627.99	640.95	10%	783,320	906,871	123,551	16%
	Car 1		367	367	0%	361.95	297.39	-19%	369,969	186,620	-183,349	-50%	
	Car 2		1,393	1,393	0%	264.75	184.41	-30%	369,840	256,917	-112,923	-31%	
	Car 3		856	856	0%	82.47	30.83	-63%	70,631	77,625	6,994	10%	
	1.A.3.b.ii. Heavy Duty Vehicles (HDVs)	Gasoline	Car 4	2,420	2,420	0%	36.32	44.90	24%	87,967	188,679	100,712	115%
Car 5			49	49	0%	15.34	44.90	193%	750	2,218	1,468	193%	
Car 6			0	0	0%	0	0	0%	0	0	0	0%	
Gasoline total			6,345	6,345	0%	255.87	254.75	-0%	1,419,832	1,356,126	-63,706	-4%	
Diesel Oil			pre-Cars	4,876	4,876	0%	425.99	386.79	-9%	2,077,142	1,436,903	-640,239	-31%
			Car 1	9,989	9,989	0%	398.18	276.24	-30%	2,369,095	1,289,636	-1,079,459	-46%
		Car 2	13,126	13,126	0%	336.76	153.18	-54%	4,420,260	2,534,731	-1,885,529	-43%	
		Car 3	33,249	33,249	0%	531.91	150.58	-72%	17,655,883	5,085,760	-12,570,123	-72%	
1.A.3.b.iii. Heavy Duty Trucks & Lorries		Diesel Oil	Car 4	54,581	54,581	0%	491.42	80.69	-84%	26,021,036	4,940,722	-21,080,314	-81%
			Car 5	1,629	1,629	0%	427.50	80.69	-79%	696,296	144,434	-551,862	-79%
	Car 6		0	0	0%	15.73	80.69	-81%	7	4	-3	-43%	
	Diesel oil total		113,450	113,450	0%	476.34	134.94	-72%	54,043,533	15,351,584	-38,691,949	-72%	
	LDVs Total		119,775	119,775	0%	464.70	139.18	-70%	55,658,966	16,688,913	-38,969,953	-70%	
	Diesel Oil		pre-Cars	3,382	3,382	0%	1096.25	1028.78	-6%	3,674,067	3,432,644	-241,423	-7%
		Car 1	2,826	2,826	0%	749.41	732.14	-2%	2,117,871	2,125,595	7,723	0%	
		Car 2	10,152	10,152	0%	801.96	643.47	-20%	8,140,119	6,532,213	-1,607,906	-20%	
		Car 3	15,090	15,090	0%	633.22	437.25	-30%	10,065,776	7,269,299	-2,796,477	-28%	
	1.A.3.b.iv. Motorised Two-Wheelers (MTWs)	Gasoline	Car 4	5,461	5,461	0%	448.63	351.65	-22%	2,650,016	1,921,527	-728,489	-27%
Car 5			10,326	10,326	0%	337.28	182.33	-46%	3,882,417	1,882,644	-1,999,773	-51%	
Car 6			0	0	0%	0	0	0%	0	0	0	0%	
Bikes Total			48,044	48,044	0%	623.80	482.55	-23%	29,931,266	23,183,732	-6,747,534	-23%	
Diesel Oil			pre-Cars	10,185	10,185	0%	1040.16	787.37	-24%	10,510,623	7,754,136	-2,756,487	-26%
			Car 1	5,677	5,677	0%	758.59	575.55	-24%	4,261,383	3,267,681	-993,702	-23%
		Car 2	38,558	38,558	0%	817.62	524.79	-35%	31,525,526	20,234,619	-11,290,907	-36%	
		Car 3	169,023	169,023	0%	636.26	274.48	-57%	161,136,182	59,617,271	-101,518,911	-63%	
1.A.3.d. Road Transport		Gasoline	Car 4	69,636	69,636	0%	368.34	280.62	-24%	27,183,867	20,146,636	-7,037,231	-26%
			Car 5	283,934	283,934	0%	276.62	151.65	-45%	78,643,643	43,115,897	-35,527,746	-45%
	Car 6		0	0	0%	0	0	0%	0	0	0	0%	
	Trucks Total		566,741	566,741	0%	446.67	271.83	-39%	293,148,243	154,696,160	-138,452,083	-48%	
	Diesel Oil		pre-Cars	7,973	7,973	0%	122.80	149.18	22%	972,721	1,189,393	216,672	22%
			Car 1	5,231	5,231	0%	123.77	165.74	34%	647,479	887,039	239,560	34%
		Car 2	3,587	3,587	0%	141.16	184.21	30%	585,362	696,661	111,299	19%	
		Car 3	2,950	2,950	0%	38.11	184.21	387%	116,199	567,032	450,833	387%	
	Car 4	0	0	0%	0	0	0%	0	0	0	0%		
	Car 5	0	0	0%	0	0	0%	0	0	0	0%		
MTWs Total	19,712	19,712	0%	113.68	168.43	48%	2,243,149	3,326,034	1,082,885	48%			
Total	2,879,688	2,879,688	0%	219.62	168.23	-46%	645,965,162	349,851,296	-296,113,866	-46%			

Adjustment details for 2021

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	13,063	13,063	0%	592.96	534.68	-9%	7,720,235	6,979,435	-740,801	-10%	
		Car 1	61,979	61,979	0%	347.96	240.16	-31%	21,540,430	14,884,561	-6,655,870	-31%	
		Car 2	87,083	87,083	0%	178.38	136.58	-24%	15,620,983	11,883,782	-3,737,201	-24%	
		Car 3	124,330	124,330	0%	61.94	71.52	16%	7,683,891	8,891,671	1,207,780	16%	
		Car 4	442,185	442,185	0%	43.94	43.68	0%	19,384,914	19,376,439	-8,475	0%	
		Car 5	66,057	66,057	0%	18.58	43.68	135%	1,227,381	2,085,636	1,658,255	135%	
	Gasoline total	794,688	794,688	0%	92.69	81.65	-11%	73,165,851	64,851,551	-8,314,300	-11%		
	Diesel Oil	pre-Cars	1,711	1,711	0%	318.13	264.95	-17%	511,863	453,197	-58,666	-11%	
		Car 1	8,426	8,426	0%	297.32	245.85	-17%	2,585,115	2,239,987	-345,128	-13%	
		Car 2	42,514	42,514	0%	407.93	279.27	-31%	17,384,549	13,921,916	-3,462,633	-20%	
Car 3		121,429	121,429	0%	555.36	170.55	-69%	67,437,053	21,681,366	-45,755,687	-69%		
1.A.3.a.ii. Light Duty Vehicles (LDVs)	Gasoline	Car 4	264,943	264,943	0%	388.88	143.48	-63%	162,917,881	39,089,755	-123,828,126	-76%	
		Car 5	113,047	113,047	0%	435.12	143.48	-67%	49,536,960	16,332,974	-33,203,986	-67%	
		Car 6	695	695	0%	259.59	143.48	-45%	180,582	99,754	-80,828	-45%	
		Diesel oil total	553,564	553,564	0%	434.12	159.92	-63%	249,713,791	80,138,959	-169,574,832	-63%	
		Pkx Total	1,348,252	1,348,252	0%	232.52	133.47	-43%	713,499,642	152,990,510	-560,509,132	-78%	
		Gasoline	pre-Cars	1,084	1,084	0%	629.25	640.95	10%	682,074	760,373	78,299	11%
	Car 1		283	283	0%	818.74	584.47	-29%	243,289	86,158	-157,131	-65%	
	Car 2		1,184	1,184	0%	268.66	191.66	-29%	310,529	223,189	-87,340	-28%	
	Car 3		783	783	0%	85.97	35.39	-59%	67,320	74,782	7,462	11%	
	1.A.3.a.iii. Heavy Duty Vehicle Fleets	Diesel Oil	Car 4	2,562	2,562	0%	37.38	46.51	24%	95,786	119,162	23,376	24%
Car 5			241	241	0%	16.13	46.51	189%	3,882	11,190	7,308	189%	
Car 6			0	0	0%	15.33	46.51	203%	1	2	1	203%	
Gasoline total			6,118	6,118	0%	229.35	186.57	-18%	1,483,081	1,254,776	-228,305	-15%	
Diesel Oil			pre-Cars	3,995	3,995	0%	425.99	386.79	-9%	1,989,260	1,225,652	-763,608	-38%
			Car 1	4,787	4,787	0%	398.71	276.24	-30%	1,984,260	1,030,426	-953,834	-48%
		Car 2	10,816	10,816	0%	336.90	153.18	-54%	3,644,582	2,091,063	-1,553,519	-43%	
		Car 3	28,876	28,876	0%	541.53	150.54	-72%	15,037,249	4,345,870	-10,691,379	-71%	
1.A.3.b.i. Heavy Duty Vehicle Fleets		Diesel Oil	Car 4	60,032	60,032	0%	493.82	80.69	-84%	30,039,914	5,429,011	-24,610,903	-81%
			Car 5	6,009	6,009	0%	448.95	80.69	-80%	2,930,198	584,364	-2,345,834	-80%
	Car 6		0	0	0%	154.21	80.69	-47%	14	8	-6	-43%	
	Diesel oil total		115,967	115,967	0%	485.55	126.90	-74%	55,848,598	14,780,142	-41,068,456	-74%	
	LDVs total		122,085	122,085	0%	468.92	130.51	-72%	57,247,589	15,932,958	-41,314,631	-72%	
	Diesel Oil		pre-Cars	2,620	2,620	0%	1062.63	1118.76	4%	2,836,189	2,671,331	-164,758	-6%
		Car 1	2,250	2,250	0%	752.91	751.43	0%	1,099,787	1,096,297	-3,489	0%	
		Car 2	9,074	9,074	0%	804.17	847.36	5%	7,287,125	5,837,689	-1,449,436	-20%	
		Car 3	16,887	16,887	0%	573.45	417.38	-27%	9,425,090	6,069,054	-3,356,036	-35%	
	1.A.3.b.ii. Heavy Duty Vehicle Fleets	Diesel Oil	Car 4	51,531	51,531	0%	448.88	351.61	-21%	2,363,338	1,885,374	-477,964	-20%
Car 5			13,266	13,266	0%	336.60	182.62	-46%	6,569,052	2,446,399	-4,122,653	-63%	
Car 6			0	0	0%	0	0	0%	0	0	0	0%	
Buses total			47,796	47,795	0%	592.65	448.99	-24%	2,801,221	2,156,323	-644,898	-23%	
Diesel Oil			pre-Cars	8,044	8,044	0%	10,617	783.88	-26%	8,395,423	6,144,933	-2,250,490	-27%
			Car 1	4,384	4,384	0%	758.16	504.04	-33%	3,288,422	2,516,377	-772,044	-23%
Diesel Oil		Car 2	29,277	29,277	0%	817.97	520.51	-36%	23,947,723	15,233,223	-8,714,500	-36%	
		Car 3	52,121	52,121	0%	804.17	517.81	-35%	37,271,620	26,542,342	-10,729,278	-29%	
		Car 4	68,430	68,430	0%	390.25	289.43	-26%	22,977,784	16,969,685	-6,008,099	-26%	
		Car 5	342,175	342,175	0%	278.30	152.03	-45%	95,469,479	62,619,687	-32,849,792	-34%	
1.A.3.b.iii. Heavy Duty Vehicle Fleets	Diesel Oil	Car 6	0	0	0%	0	0	0%	0	0	0	0%	
		Trucks total	563,891	563,891	0%	418.38	244.97	-40%	231,631,271	136,136,342	-95,494,929	-40%	
		Diesel Oil	pre-Cars	7,389	7,389	0%	102.58	150.34	22%	965,586	1,110,176	144,590	22%
			Car 1	4,085	4,085	0%	124.72	180.25	32%	599,299	880,547	281,248	32%
		Gasoline	Car 2	3,544	3,544	0%	137.85	194.58	41%	440,552	680,633	240,081	41%
			Car 3	3,550	3,550	0%	39.55	194.58	382%	140,563	630,634	490,071	382%
	Gasoline	Car 4	0	0	0%	0	0	0%	0	0	0	0%	
		Car 5	0	0	0%	0	0	0%	0	0	0	0%	
	MDVs total	79,819	79,819	0%	118.75	171.64	54%	2,177,082	3,295,152	1,118,070	54%		
	1.A.3.b. Road Transport	Total	2,160,883	2,160,883	0%	305.90	157.85	-48%	532,365,736	331,625,655	-200,740,081	-38%	

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	-2%	7,036,041	6,189,786	-846,255	-9%	
		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	-26%	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	12,735	5,396	74%	
		Gasoline total	790,957	790,957	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	33,957	33,957	0%	406.82	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%	
1.A.3.b.i. Light Duty Vehicles (LDVs)	Gasoline	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	1,346,202	1,346,202	0%	234.61	119.29	-51%	386,442,896	146,673,567	-239,769,329	-62%	
		Diesel Oil	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%	199,985	70,295	-129,690	-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	67,459	464%
			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	19,070	182%	
	Diesel Oil	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	-12%	1,238,540	1,692,662	454,122	37%	
		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%	1,445,960	787,634	-658,326	-46%	
		Car 2	8,479	8,479	0%	336.40	133.28	-60%	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	3,565,086	-9,485,195	-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%		
1.A.3.b.ii. Heavy Duty Vehicles (HDVs)	Gasoline	Car 6	1	1	0%	15.14	89.85	-81%	122	72	-50	-41%	
		Diesel oil total	114,350	114,350	0%	485.91	126.17	-74%	55,186,382	13,741,354	-41,445,028	-74%	
		LDVs Total	129,008	129,008	0%	489.51	125.61	-74%	56,344,903	14,824,656	-41,520,247	-74%	
		Diesel Oil	pre-Cars	1,326	1,326	0%	1091.46	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%	629.34	437.51	-31%	9,073,137	6,089,744	-2,983,393	-33%
			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	-48%	
	Diesel Oil	Car 6	73	73	0%	64.52	182.99	283%	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%	
		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	-24%	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	-26%		
Car 5		485,981	485,981	0%	261.24	152.32	-42%	116,149,955	61,626,577	-54,523,378	-47%		
1.A.3.b.iii. Heavy Duty Vehicle Tractors & Lorries	Gasoline	Car 6	2,380	2,380	0%	188.487	360.323	191%	188,487	360,323	171,836	223%	
		Trucks Total	589,585	589,585	0%	385.33	224.69	-41%	224,829,180	132,064,153	-92,765,027	-41%	
		pre-Cars	6,780	6,780	0%	122.76	151.03	23%	822,530	1,011,520	188,990	23%	
		Car 1	4,386	4,386	0%	124.61	171.38	39%	536,615	738,050	201,435	39%	
		Car 2	3,287	3,287	0%	136.22	184.55	35%	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%	
	MOWs Total	16,268	16,268	0%	107.43	175.28	61%	1,982,546	3,165,438	1,182,891	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	-220,340,095	-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.b.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	-21%	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	-200,408	-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	748,114	748,114	0%	88.35	74.85	-2%	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%	406.84	279.91	-31%	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%	87,588,471	33,225,566	-54,362,905	-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	1,338,245	1,338,245	0%	237.49	111.77	-53%	317,723,135	146,576,886	-171,146,249	-54%		
1.A.3.b.ii. Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	981	981	0%	633.81	645.95	2%	1,048,320	1,075,291	26,971	3%
		Car 1	184	184	0%	803.50	386.22	-52%	187,281	59,328	-127,953	-68%
		Car 2	836	836	0%	274.42	291.18	6%	229,520	188,285	-41,235	-18%
		Car 3	784	784	0%	52.66	191.79	268%	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	193%	15,187	47,268	32,081	193%
		Car 6	1	1	0%	17.66	48.89	176%	26	72	46	176%
		Gasoline total	5,578	5,578	0%	262.86	184.67	-3%	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%	1,166,762	634,566	-532,196	-46%
		Car 2	6,982	6,982	0%	336.92	133.28	-60%	2,340,147	1,350,674	-989,473	-42%
		Car 3	20,421	20,421	0%	558.52	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%	27,776,440	5,046,416	-22,728,024	-82%
		Car 5	29,024	29,024	0%	641.97	90.45	-86%	13,181,325	2,687,964	-10,493,361	-80%
		Car 6	41	41	0%	51.128	90.45	-43%	6,169	2,688	-3,481	-56%
Diesel oil total	118,777	118,777	0%	488.60	174.93	-76%	57,983,533	13,656,488	-44,327,045	-78%		
LDVs total	124,354	124,354	0%	488.14	176.63	-7%	58,214,742	14,677,425	-43,537,317	-75%		
1.A.3.b.iii. Heavy Duty Vehicles (HDVs)	Diesel Oil	pre-Cars	1,172	1,172	0%	1006.09	119.23	-4%	1,249,028	1,144,143	-104,885	-8%
		Car I	1,091	1,091	0%	727.88	170.59	-76%	786,620	79,811	-706,809	-90%
		Car II	6,940	6,940	0%	534.968	4,376.21	-87%	5,334,968	4,376,211	-958,757	-18%
		Car III	12,187	12,187	0%	638.43	457.65	-27%	2,862,880	5,986,226	3,123,346	109%
		Car IV	4,946	4,946	0%	468.55	361.71	-24%	2,270,061	1,739,796	-530,265	-24%
		Car V	34,096	34,096	0%	368.98	183.48	-50%	8,435,683	4,420,743	-4,014,940	-48%
		Car VI	637	637	0%	44.76	183.48	210%	34,047	89,672	55,625	163%
		Diesel total	11,176	11,176	0%	509.54	340.06	-29%	28,390,969	18,620,843	-9,770,126	-34%
	Gasoline	pre-Cars	5,863	5,863	0%	1078.72	737.35	-29%	6,072,170	4,322,888	-1,749,282	-29%
		Car I	2,944	2,944	0%	748.17	588.27	-21%	2,178,941	1,650,959	-527,982	-24%
		Car II	19,685	19,685	0%	815.17	170.59	-79%	15,060,881	9,440,975	-5,619,906	-37%
		Car III	35,130	35,130	0%	653.93	487.63	-26%	27,887,440	27,188,840	-698,600	-2%
		Car IV	42,781	42,781	0%	356.99	287.27	-21%	19,936,987	12,289,770	-7,647,217	-38%
		Car V	436,980	436,980	0%	261.70	152.65	-42%	123,151,334	66,786,496	-56,364,837	-46%
		Car VI	18,020	18,020	0%	58.67	152.65	261%	913,082	2,750,630	1,837,548	201%
Trucks Total	680,139	680,139	0%	393.86	280.13	-28%	211,887,331	124,180,449	-87,696,882	-41%		
1.A.3.b.iv. Heavy Duty Trucks, Tractors & Lorries	Diesel Oil	pre-Cars	6,352	6,352	0%	123.07	151.79	23%	61,736	964,179	152,443	23%
		Car 1	4,013	4,013	0%	125.11	173.15	39%	562,073	634,880	72,807	39%
		Car 2	3,362	3,362	0%	132.24	195.58	49%	436,660	645,894	209,234	48%
		Car 3	4,562	4,562	0%	39.81	195.58	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%
		Car 6	0	0	0%	0	0	0%	0	0	0	0%
		MDDs Total	18,029	18,029	0%	104.34	175.38	68%	1,962,088	3,741,638	1,779,551	90%
	1.A.3.b.v. Road Transport	pre-Cars	2,132,683	2,132,683	0%	268.88	145.76	-56%	616,079,063	390,854,331	-225,224,732	-38%

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	6 327 484	-795 844	-11%	
		Car 1	30 667	30 667	0%	368.77	343.93	-32%	11 062 246	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	19 536 099	-523 557	-3%	
		Car 5	171 270	171 270	0%	18.59	47.80	151%	3 183 252	0 187 581	5 004 299	151%	
	Car 6	10 315	10 315	0%	25.97	47.80	84%	267 855	433 096	-225 246	-84%		
	Gasoline total	752 526	752 526	0%	76.03	73.89	-4%	57 215 533	54 598 521	-2 616 412	-4%		
	Diesel Oil	pre-Cars	1 341	1 341	0%	311.73	284.66	-55%	417 967	362 246	-55 722	-55%	
		Car 1	4 992	4 992	0%	298.92	267.29	-11%	1 482 264	1 387 643	-155 951	-11%	
Car 2		23 934	23 934	0%	406.71	320.45	-46%	9 734 484	5 276 480	-4 458 004	-46%		
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. - Heavy Duty Vehicles - Buses	Gasoline	Car 4	211 237	211 237	0%	297.27	151.77	-62%	83 917 680	32 059 973	-51 857 706	-62%	
		Car 5	285 011	285 011	0%	436.38	151.77	-65%	124 721 396	43 370 380	-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	99 613 892	-173 262 169	-62%	
		Pkx Total	1 338 571	1 338 571	0%	298.44	152.15	-53%	338 091 594	154 612 453	-175 479 251	-53%	
		Diesel Oil	pre-Cars	986	986	0%	632.14	645.95	-2%	160 583	176 124	-15 844	-2%
	Car 1		173	173	0%	968.27	989.96	-64%	150 074	53 575	-96 499	-64%	
	Car 2		748	748	0%	204.73	287.11	-21%	212 988	154 839	-58 829	-21%	
	Car 3		771	771	0%	98.62	185.21	7%	75 992	81 070	-5 078	7%	
	1.A.3.b.ii. - Heavy Duty Vehicles - Trucks & Lorries	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	-2%	1 112 584	1 031 852	-80 732	-2%	
Diesel Oil			pre-Cars	2 537	2 537	0%	428.16	386.79	-21%	1 985 919	776 259	-1 209 659	-21%
			Car 1	2 589	2 589	0%	393.82	276.25	-49%	987 136	539 898	-447 328	-49%
		Car 2	6 087	6 087	0%	338.91	133.25	-42%	1 385 995	1 180 889	-205 126	-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. - Heavy Duty Vehicles - Motorised Two-Wheelers (MOW)		Diesel Oil	Car 4	52 361	52 361	0%	498.70	91.69	-82%	26 164 486	4 703 746	-21 460 740	-82%
			Car 5	46 749	46 749	0%	438.64	91.69	-79%	20 696 234	4 258 626	-16 437 608	-79%
	Car 6		187	187	0%	151.18	91.69	-60%	29 829	17 974	-11 855	-60%	
	Diesel oil total		128 578	128 578	0%	415.56	170.94	-77%	61 146 575	14 267 237	-46 879 338	-77%	
	LNW Total		134 423	134 423	0%	463.16	153.81	-75%	62 259 160	15 298 849	-46 960 311	-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	170.99	-2%	929 232	628 359	-300 873	-2%	
		Car 2	5 596	5 596	0%	704.95	643.67	-95%	4 284 320	3 683 441	-598 807	-95%	
		Car 3	11 221	11 221	0%	621.20	458.38	-21%	7 082 740	5 143 628	-1 939 228	-21%	
	1.A.3.b.iv. - Heavy Duty Vehicles - Motorised Two-Wheelers (MOW)	Diesel Oil	Car 4	4 270	4 270	0%	461.10	351.79	-24%	1 972 610	1 584 978	-387 632	-24%
Car 5			22 042	22 042	0%	368.55	183.99	-49%	7 726 921	4 065 632	-3 661 389	-49%	
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	-6 208 881	-27%	
Trucks & Lorries			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	-362 326	-22%
		Car 2	13 623	13 623	0%	817.90	510.38	-38%	11 445 865	6 565 736	-4 880 129	-38%	
		Car 3	54 685	54 685	0%	632.52	384.41	-42%	36 589 677	19 927 835	-16 661 841	-42%	
1.A.3.b.v. - Road Transport		Gasoline	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	153.65	-46%	110 112 782	59 688 643	-50 424 139	-46%
	Car 6		34 214	34 214	0%	63.96	153.65	189%	3 937 089	11 368 582	-7 421 413	189%	
	Trucks Total		572 154	572 154	0%	314.85	196.65	-38%	179 874 133	112 285 562	-67 588 571	-38%	
	Motorised Two-Wheelers (MOW)		pre-Cars	6 185	6 185	0%	122.85	158.64	29%	795 185	974 388	-179 203	29%
			Car 1	3 037	3 037	0%	134.71	174.84	40%	478 514	670 859	-192 345	40%
		Car 2	3 365	3 365	0%	128.94	186.25	52%	433 874	680 370	-246 504	52%	
		Car 3	5 385	5 385	0%	38.53	186.25	386%	299 722	1 041 189	-821 467	386%	
	MOWs Total	Car 4	0	0	0%	0	0	0%	0	0	0	0%	
		Car 5	0	0	0%	0	0	0%	0	0	0	0%	
MOWs Total	Car 6	18 673	18 673	0%	108.59	179.24	78%	1 878 294	3 346 794	-1 468 499	78%		
	Total	2 153 563	2 153 563	0%	277.27	140.35	-49%	597 120 297	362 252 271	-234 868 025	-49%		

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%	7,266,112	6,191,942	-1,074,169	-14%	
		Car 1	34,112	34,112	0%	371.34	346.71	-34%	8,963,881	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	-2,819,126	-32%	
		Car 3	72,871	72,871	0%	73.86	74.74	1%	5,381,361	5,446,237	-64,877	-1%	
		Car 4	363,474	363,474	0%	52.36	49.62	-6%	18,485,637	17,326,221	-1,159,416	-6%	
		Car 5	180,783	180,783	0%	19.11	49.62	84%	3,454,481	0,881,456	5,406,915	157%	
	Gasoline total	715,156	715,156	0%	76.38	71.73	-4%	53,196,187	51,380,983	-1,809,895	-4%		
	Diesel Oil	pre-Cars	1,382	1,382	0%	310.33	284.66	-55%	367,917	339,733	-28,184	-55%	
		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	320.36	-46%	8,913,587	4,338,719	-4,574,868	-46%	
Car 3		71,044	71,044	0%	595.91	179.64	-70%	42,271,648	12,719,962	-29,551,685	-70%		
1.A.3.b.i. - Heavy Duty Vehicle Fleets	Gasoline	Car 4	182,410	182,410	0%	401.42	154.67	-62%	77,237,655	29,644,450	-47,593,205	-62%	
		Car 5	364,346	364,346	0%	434.67	154.67	-65%	132,290,433	46,090,424	-86,400,009	-65%	
		Car 6	62,576	62,576	0%	259.76	154.67	-41%	13,657,082	0,180,384	-13,476,698	-41%	
		Diesel oil total	645,565	645,565	0%	426.19	159.88	-63%	275,138,233	183,163,591	-91,974,732	-63%	
		Pkx Total	1,368,721	1,368,721	0%	245.28	153.52	-53%	368,331,020	154,444,484	-213,886,536	-53%	
		Diesel Oil	pre-Cars	979	979	0%	664.37	645.95	-1%	1,375,361	1,617,977	-242,616	-1%
	Car 1		150	150	0%	895.63	911.93	-61%	134,523	46,851	-87,672	-61%	
	Car 2		629	629	0%	298.27	212.94	-29%	187,533	133,879	-53,654	-29%	
	Car 3		781	781	0%	105.50	186.62	3%	73,969	76,155	-2,186	3%	
	1.A.3.b.ii. Heavy Duty Vehicle Fleets (LHV)	Gasoline	Car 4	1,720	1,720	0%	47.06	51.30	9%	80,950	80,240	7,290	9%
Car 5			1,620	1,620	0%	18.41	51.30	179%	29,912	83,086	-53,274	179%	
Car 6			94	94	0%	18.71	51.30	174%	1,752	4,884	-3,132	174%	
Gasoline total			5,793	5,793	0%	187.52	172.88	-8%	1,083,507	1,080,999	-25,508	-8%	
Diesel Oil			pre-Cars	2,323	2,323	0%	418.91	386.79	-26%	968,185	712,531	-255,654	-26%
			Car 1	2,186	2,186	0%	391.47	276.25	-49%	924,270	453,227	-471,043	-49%
		Car 2	5,025	5,025	0%	324.91	133.25	-49%	1,632,296	971,296	-660,928	-49%	
		Car 3	15,781	15,781	0%	588.35	150.67	-74%	9,112,414	2,382,713	-6,740,701	-74%	
1.A.3.b.iii. Heavy Duty Vehicle Fleets (LHV)		Gasoline	Car 4	47,480	47,480	0%	501.73	91.74	-82%	23,782,396	4,346,290	-19,436,098	-82%
			Car 5	62,116	62,116	0%	436.13	91.74	-79%	27,090,214	5,686,295	-21,403,918	-79%
	Car 6		635	635	0%	154.91	91.74	-40%	87,758	68,230	-19,528	-40%	
	Diesel oil total		135,386	135,386	0%	488.26	187.96	-77%	63,565,843	16,681,890	-46,883,953	-77%	
	LHV total		141,098	141,098	0%	492.76	170.62	-74%	64,589,530	16,888,499	-47,699,031	-74%	
	Diesel Oil		pre-Cars	979	979	0%	1076.34	1019.23	-5%	1,048,312	926,656	-121,656	-5%
		Car 1	781	781	0%	738.26	701.91	-6%	645,471	581,626	-63,845	-6%	
		Car 2	5,211	5,211	0%	767.43	644.46	-16%	4,183,687	3,398,604	-785,083	-16%	
		Car 3	11,282	11,282	0%	633.90	458.67	-28%	7,141,732	5,174,590	-1,966,822	-28%	
	1.A.3.b.iv. Heavy Duty Vehicle Fleets (LHV)	Gasoline	Car 4	4,586	4,586	0%	488.70	361.59	-26%	2,156,006	1,614,177	-531,829	-26%
Car 5			24,267	24,267	0%	368.77	184.68	-49%	9,737,068	4,877,641	-4,859,427	-49%	
Car 6			5,224	5,224	0%	63.13	184.68	241%	277,542	964,225	-686,684	241%	
Buses Total			12,877	12,877	0%	438.96	327.99	-29%	23,997,871	17,149,448	-6,848,319	-29%	
pre-Cars			4,319	4,319	0%	1034.89	737.35	-29%	4,488,521	3,184,428	-1,304,143	-29%	
Car 1			11,083	11,083	0%	748.71	553.48	-26%	1,387,291	1,026,551	-360,740	-26%	
Diesel Oil		Car 2	11,082	11,082	0%	817.30	584.79	-29%	1,307,940	933,440	-374,501	-29%	
		Car 3	43,481	43,481	0%	524.56	314.54	-40%	27,460,779	16,722,811	-10,737,967	-40%	
		Car 4	29,223	29,223	0%	356.86	263.72	-26%	11,572,860	8,294,190	-3,278,769	-26%	
		Car 5	309,736	309,736	0%	264.17	153.69	-42%	80,413,973	50,456,496	-29,957,477	-42%	
Trucks Total	579,787	579,787	0%	57.48	183.49	161%	8,913,354	26,262,617	17,349,264	161%			
1.A.3.b.v. Motorized Two-Wheelers (MOWs)	Gasoline	pre-Cars	5,544	5,544	0%	125.41	157.28	25%	720,441	903,470	183,028	25%	
		Car 1	1,517	1,517	0%	127.40	170.22	33%	448,086	619,819	171,733	33%	
		Car 2	3,382	3,382	0%	127.35	186.53	46%	430,660	665,965	236,305	55%	
		Car 3	0,811	0,811	0%	49.29	196.53	389%	234,136	1,144,416	910,280	389%	
		Car 4	6	6	0%	15.96		-180%	69	884	736	1061%	
		Car 5	0	0	0%			0%	0	0	0	0%	
	MOWs Total	18,459	18,459	0%	99.52	180.65	82%	1,833,382	3,334,472	1,501,090	82%		
	1.A.3.b.v. Road Transport Total	2,161,901	2,161,901	0%	266.39	130.26	-48%	575,931,265	381,697,536	-194,233,678	-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%	636.75	644.11	-14%	7,470,914	6,410,967	-1,059,947
		Car 1	20,270	20,270	0%	372.25	341.68	-35%	7,545,483	4,986,888	-2,558,595
		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	-1%	17,363,364	16,777,445	-585,919
		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	86%	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	1,380	1,380	0%	364.76	254.56	-30%	386,262	339,172	-47,090
		Car 1	3,749	3,749	0%	294.36	269.64	-9%	1,122,449	1,011,625	-111,425
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%	36,981,999	11,085,409	-25,896,590	
1.A.3.b.i - Light Duty Vehicles (LDV)	Gasoline	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%	39,427,555	10,232,785	-29,194,770
		Diesel oil total	625,119	625,119	0%	418.36	160.76	-61%	277,947,660	188,535,230	-89,412,430
		Flx Total	1,380,391	1,380,391	0%	235.75	154.41	-35%	327,736,627	199,070,280	-128,666,347
		Diesel Oil	pre-Cars	910	910	0%	602.79	645.95	-1%	593,186	547,543
	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
	1.A.3.b.ii - Heavy Duty Vehicles (HDV)	Diesel Oil	Car 4	1,684	1,684	0%	43.06	52.36	7%	78,714	84,003
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			5,506	5,506	0%	388.27	171.66	-5%	1,068,292	1,013,478	-54,814
pre-Cars			2,189	2,189	0%	414.81	386.79	-7%	899,849	846,433	-53,416
Car 1			1,780	1,780	0%	391.89	276.25	-29%	780,189	385,371	-394,818
Diesel Oil		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	-72%	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		
LDVs Total	148,994	148,994	0%	445.21	188.29	-58%	66,781,025	16,271,484	-50,509,541		
1.A.3.b.iii - Heavy Duty Vehicles (HDV)	Diesel Oil	pre-Cars	881	881	0%	1076.81	1319.23	-2%	964,197	988,234	24,037
		Car 1	583	583	0%	731.36	732.67	0%	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	-27%	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	16,885,117	-6,197,072	
	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	-22%	1,163,482	789,813	-373,669
Car 2		8,876	8,876	0%	817.75	585.42	-29%	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	
1.A.3.b.iv - Heavy Duty Trucks & Lorries	Diesel Oil	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%	287.22	153.60	-46%	74,680,233	39,676,610	-35,003,623
		Car 6	261,480	261,480	0%	61.77	153.60	149%	16,149,289	40,304,036	24,154,747
		Trucks Total	594,013	594,013	0%	226.31	180.97	-20%	134,431,899	101,496,262	-32,935,637
		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
	Gasoline	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	381%	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
MDVs Total	18,185	18,185	0%	95.14	181.68	89%	1,885,897	3,452,476	1,566,579		
1.A.3.b - Road Transport	Total	2,287,339	2,287,339	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	in [%]	current	adjusted	difference	in [%]	current	adjusted	difference	in [%]
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	12,282	12,282	0%	636.73	644.11	-14%	7,814,267	6,480,187	-1,326,080	-14%	
		Car 1	17,449	17,449	0%	372.96	341.68	-35%	6,588,311	4,217,644	-2,370,667	-36%	
		Car 2	30,435	30,435	0%	217.43	141.75	-35%	6,617,570	4,374,140	-2,243,430	-34%	
		Car 3	54,271	54,271	0%	78.48	76.27	-3%	4,254,938	4,139,376	-115,562	-3%	
		Car 4	315,086	315,086	0%	54.96	51.26	-7%	17,316,320	16,511,881	-804,439	-5%	
		Car 5	180,240	180,240	0%	19.17	51.26	163%	3,485,382	9,239,815	5,754,433	163%	
		Car 6	114,791	114,791	0%	25.65	51.26	102%	3,060,235	5,884,372	2,824,136	92%	
		Gasoline total	724,571	724,571	0%	87.66	80.88	-8%	49,046,874	40,534,474	-8,512,400	-17%	
	Diesel Oil	pre-Cars	1,370	1,370	0%	364.96	254.56	-30%	386,963	347,626	-39,337	-10%	
		Car 1	3,360	3,360	0%	294.17	271.67	-8%	1,082,286	910,182	-172,104	-16%	
		Car 2	13,788	13,788	0%	407.17	222.43	-45%	5,914,130	3,066,393	-2,847,737	-48%	
		Car 3	52,128	52,128	0%	808.95	179.65	-78%	31,696,478	9,364,788	-22,331,690	-71%	
		Car 4	187,947	187,947	0%	418.16	158.34	-61%	64,733,485	24,983,323	-39,750,162	-61%	
		Car 5	283,480	283,480	0%	423.99	158.34	-63%	120,187,695	44,873,190	-75,314,505	-63%	
		Car 6	184,768	184,768	0%	262.61	158.34	-40%	48,521,163	29,255,985	-19,265,178	-40%	
		Diesel oil total	686,582	686,582	0%	394.65	161.95	-59%	272,126,081	112,890,721	-159,235,359	-59%	
		Flx Total	1,421,142	1,421,142	0%	245.98	155.61	-36%	521,152,955	163,425,191	-357,727,764	-69%	
	Gasoline	pre-Cars	940	940	0%	611.41	645.95	-1%	612,247	566,878	-45,369	-7%	
		Car 1	124	124	0%	308.23	312.78	-6%	112,083	39,682	-72,401	-64%	
		Car 2	485	485	0%	302.12	221.62	-27%	140,344	102,950	-37,394	-27%	
		Car 3	596	596	0%	118.57	115.36	-3%	65,955	68,812	2,857	4%	
		Car 4	1,476	1,476	0%	58.72	53.38	-9%	74,877	78,816	3,939	5%	
		Car 5	1,680	1,680	0%	21.73	53.38	146%	35,240	89,034	53,794	160%	
Car 6		910	910	0%	19.18	53.38	187%	17,052	49,080	31,928	187%		
Gasoline total		6,186	6,186	0%	171.55	167.18	-2%	1,058,799	1,034,211	-24,588	-2%		
Diesel Oil	pre-Cars	2,067	2,067	0%	413.41	386.79	-7%	860,499	811,163	-49,336	-6%		
	Car 1	1,538	1,538	0%	398.47	276.25	-30%	680,795	331,158	-349,637	-51%		
	Car 2	3,580	3,580	0%	321.26	153.04	-52%	1,143,793	687,293	-456,500	-40%		
	Car 3	11,684	11,684	0%	556.30	150.79	-73%	6,940,879	1,758,747	-5,182,132	-75%		
	Car 4	39,050	39,050	0%	506.70	33.69	-93%	19,789,647	3,635,035	-16,154,612	-82%		
	Car 5	75,789	75,789	0%	432.66	33.69	-92%	32,790,965	7,054,945	-25,736,020	-78%		
	Car 6	19,625	19,625	0%	151.71	33.69	-78%	2,977,439	1,026,876	-1,950,563	-66%		
	Diesel oil total	153,284	153,284	0%	404.66	183.89	-55%	65,083,900	15,925,216	-49,158,684	-76%		
	LDVs Total	159,470	159,470	0%	414.83	186.35	-55%	67,152,729	16,999,427	-50,153,302	-75%		
1.A.3.a.ii - Heavy Duty Vehicles (HDV)	Diesel Oil	pre-Cars	736	736	0%	1073.33	1118.23	-4%	790,239	750,425	-39,814	-5%	
		Car 1	411	411	0%	731.37	752.57	-3%	380,684	380,682	-2	-0%	
		Car 2	3,325	3,325	0%	787.31	645.49	-18%	2,820,280	2,147,440	-672,840	-24%	
		Car 3	8,670	8,670	0%	812.41	543.40	-33%	5,473,440	3,984,065	-1,489,375	-27%	
		Car 4	3,823	3,823	0%	474.87	562.49	-16%	1,910,367	1,947,607	37,240	2%	
		Car 5	21,913	21,913	0%	363.82	185.64	-49%	7,937,567	4,663,648	-3,273,919	-41%	
		Car 6	14,586	14,586	0%	58.52	185.64	216%	86,215	272,630	186,415	216%	
		Diesel total	53,382	53,382	0%	378.80	286.71	-23%	19,793,981	15,384,828	-4,409,153	-23%	
	Gasoline	pre-Cars	3,680	3,680	0%	120.43	171.35	-29%	3,730,272	2,659,676	-1,070,596	-29%	
		Car 1	1,311	1,311	0%	748.03	408.38	-43%	980,842	614,151	-366,690	-37%	
		Car 2	7,087	7,087	0%	817.96	583.45	-29%	5,794,870	3,580,026	-2,214,844	-38%	
		Car 3	26,886	26,886	0%	638.17	365.72	-42%	19,642,611	9,583,881	-1,008,729	-51%	
		Car 4	29,082	29,082	0%	397.77	279.34	-30%	7,966,416	6,187,646	-1,778,770	-22%	
		Car 5	264,365	264,365	0%	140.36	171.35	-18%	59,788,789	49,365,362	-10,423,427	-17%	
		Car 6	335,065	335,065	0%	65.92	174.35	165%	21,985,366	11,798,641	-10,186,725	-46%	
		Gasoline total	588,263	588,263	0%	199.82	175.92	-10%	116,611,141	105,268,508	-11,342,633	-10%	
	LDVs Total	pre-Cars	5,336	5,336	0%	125.51	157.19	-20%	671,088	830,789	159,701	25%	
		Car 1	3,257	3,257	0%	126.39	177.86	-41%	411,617	579,244	167,627	41%	
		Car 2	3,396	3,396	0%	122.55	180.33	-62%	415,280	673,540	258,260	62%	
		Car 3	6,741	6,741	0%	49.22	180.33	363%	271,187	1,336,596	1,065,409	393%	
		Car 4	430	430	0%	19.28	180.33	980%	7,862	85,270	77,408	980%	
		Car 5	0	0	0%	0.00	180.33	0%	0	0	0	0%	
		LDVs total	19,160	19,160	0%	92.83	183.39	98%	1,786,674	5,933,187	1,785,514	98%	
1.A.3.b Road Transport Total		2,291,407	2,291,407	0%	233.43	135.23	-42%	525,549,954	384,840,596	-140,709,358	-27%		

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	-10%	7,790,965	6,648,721	-1,142,234	-15%
		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	-13%	3,487,781	3,388,617	-99,164	-3%
		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	8,725,668	5,497,386	170%
	Diesel Oil	pre-Cars	699,007	699,007	0%	64.40	68.36	-6%	45,032,966	47,786,817	2,753,851	6%
		Car 1	1,383	1,383	0%	303.16	241.16	-19%	386,446	351,173	-35,273	-9%
		Car 2	2,949	2,949	0%	298.17	272.65	-9%	862,432	775,165	-87,267	-10%
		Car 3	10,784	10,784	0%	402.20	222.87	-45%	4,391,393	2,453,536	-1,937,858	-45%
		Car 4	40,786	40,786	0%	612.49	193.24	-71%	24,932,029	7,333,241	-17,598,788	-71%
		Car 5	130,534	130,534	0%	414.71	180.40	-56%	54,133,837	20,937,329	-33,196,508	-61%
	Trucks & Lorries	pre-Cars	251,212	251,212	0%	416.25	180.40	-56%	104,585,786	40,253,731	-64,332,055	-61%
		Car 5	228,685	228,685	0%	254.87	180.40	-31%	58,284,140	35,680,446	-22,603,700	-39%
		Diesel oil total	666,074	666,074	0%	375.66	163.38	-56%	247,596,063	188,748,684	-158,847,459	-56%
1.A.3.a.i - Passenger Cars		1,365,181	1,365,181	0%	214.34	154.68	-28%	262,589,060	156,555,421	-106,033,639	-40%	
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	911	911	0%	604.51	645.95	-7%	596,851	582,662	-14,189	-2%
		Car 1	188	188	0%	911.58	312.78	-66%	98,528	33,895	-64,633	-66%
		Car 2	377	377	0%	303.84	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	69,278	3,988	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%	318.56	153.88	-51%	965,389	550,789	-414,600	-43%
		Car 5	9,383	9,383	0%	558.10	150.74	-73%	5,689,152	1,411,299	-4,277,853	-75%
	Trucks & Lorries	pre-Cars	33,232	33,232	0%	508.42	93.81	-82%	15,929,185	3,117,457	-12,811,728	-80%
		Diesel oil total	66,283	66,283	0%	432.92	93.81	-79%	28,684,080	6,217,660	-22,466,420	-78%
	1.A.3.b.i - Light Duty Vehicles (LDVs)		154,299	154,299	0%	184.71	129.69	-31%	39,344,525	55,840,310	16,495,785	42%
1.A.3.b.ii - Heavy Duty Vehicles (HDVs)	Gasoline	pre-Cars	180,574	180,574	0%	375.86	184.94	-51%	69,343,125	36,851,449	-32,491,676	-47%
		Car 1	547	547	0%	1078.15	1919.23	-45%	589,267	557,147	-32,120	-5%
		Car 2	737	737	0%	732.77	732.57	0%	173,678	178,388	4,710	3%
		Car 3	2,270	2,270	0%	787.83	646.33	-18%	1,780,686	1,487,437	-293,249	-16%
		Car 4	6,757	6,757	0%	638.89	459.32	-29%	4,262,734	3,183,482	-1,079,252	-25%
		Car 5	3,043	3,043	0%	473.16	382.73	-19%	1,439,790	1,073,333	-366,457	-26%
	Diesel Oil	pre-Cars	18,189	18,189	0%	362.42	186.37	-49%	6,463,265	3,376,016	-3,087,249	-48%
		Car 1	20,670	20,670	0%	64.89	186.37	288%	1,176,026	3,682,314	2,506,288	213%
		Car 2	91,634	91,634	0%	309.75	283.53	-9%	15,993,546	13,687,186	-2,306,360	-15%
		Car 3	3,262	3,262	0%	1034.82	737.35	-29%	3,375,359	2,485,071	-890,288	-26%
		Car 4	1,094	1,094	0%	747.82	488.39	-35%	918,052	512,378	-405,674	-44%
		Car 5	5,544	5,544	0%	817.44	581.68	-29%	4,532,180	2,781,516	-1,750,664	-39%
	Trucks & Lorries	pre-Cars	20,583	20,583	0%	629.54	563.68	-10%	12,967,751	7,277,279	-5,690,472	-44%
		Diesel oil total	15,912	15,912	0%	358.89	276.23	-23%	6,334,421	4,386,424	-1,947,997	-31%
	1.A.3.b.ii - Heavy Duty Vehicles (HDVs)		154,963	154,963	0%	250.40	154.68	-38%	45,964,153	24,283,389	-21,680,764	-47%
1.A.3.b.iii - Motorised Two-Wheelers (MTWs)	Gasoline	pre-Cars	381,799	381,799	0%	68.78	154.68	125%	28,251,482	69,665,886	41,414,404	146%
		Car 1	585,186	585,186	0%	515.18	172.19	-66%	188,173,537	180,760,889	-7,412,648	-4%
		Car 2	4,940	4,940	0%	128.95	186.61	45%	622,656	783,451	160,795	26%
		Car 3	2,966	2,966	0%	128.14	177.73	41%	374,114	527,294	153,180	41%
		Car 4	3,221	3,221	0%	128.33	186.64	45%	387,596	639,833	252,237	65%
		Car 5	6,241	6,241	0%	48.24	186.64	284%	251,126	1,239,686	988,560	394%
	Diesel Oil	pre-Cars	1,130	1,130	0%	58.41	186.64	220%	23,066	224,682	201,616	874%
		Car 1	0	0	0%	0.00	186.64	0%	0	0	0	0%
		Car 2	18,487	18,487	0%	85.66	186.61	118%	1,658,558	3,454,767	1,796,209	108%
		Car 3	2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-39%
		Car 4	2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-39%
		Car 5	2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-39%
	1.A.3.b.iii - Motorised Two-Wheelers (MTWs)		18,487	18,487	0%	85.66	186.61	118%	1,658,558	3,454,767	1,796,209	108%
	1.A.3.b - Road Transport		2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-39%

	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)										
Change against Adjustment 2020										

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](#)

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