

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	-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	5.802.765	-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	41.365.008	-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	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	177.262.169	-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	47.279.338	-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	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	-15%	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	-30%		
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	1%	783,320	906,871	123,551	16%
	Car 1		367	367	0%	961.95	297.39	-69%	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	-30%	
	Car 3		856	856	0%	82.47	90.83	10%	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%		
Gasoline total			6,345	6,345	0%	255.87	254.75	-0%	1,478,832	1,596,126	117,294	8%	
Diesel Oil			pre-Cars	4,876	4,876	0%	425.99	386.79	-9%	2,077,142	1,436,983	-640,159	-30%
			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		Gasoline	Car 4	54,581	54,581	0%	491.42	80.69	-84%	26,021,036	4,940,722	-21,080,314	-80%
			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	45%	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	16,683,913	-38,975,053	-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	15,890	15,890	0%	633.22	437.25	-30%	10,865,776	7,269,299	-3,596,477	-30%	
	1.A.3.b.iv. Motorized Two-Wheelers (M2Ws)	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	-50%	
Car 6			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	-23%	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%	626.26	274.48	-56%	161,136,182	59,617,271	-101,518,911	-63%	
1.A.3.b.v. Road Transport		Gasoline	Car 4	69,636	69,636	0%	368.34	290.62	-20%	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%		
	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	194.21	30%	585,362	696,661	111,299	19%	
		Car 3	2,950	2,950	0%	38.11	184.21	381%	116,199	647,032	530,833	381%	
	M2Ws Total	Car 4	0	0	0%	0%	0%	0	0	0	0%		
		Car 5	0	0	0%	0%	0%	0	0	0	0%		
Car 6		0	0	0%	0%	0%	0	0	0	0%			
M2Ws Total		19,172	19,172	0%	113.68	168.43	48%	2,243,149	3,326,034	1,082,885	48%		
1.A.3.b. Road Transport	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	-9%
		Car 1	61,979	61,979	0%	347.96	240.16	-31%	21,540,430	14,884,961	-6,655,470	-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%
		Car 6	1	1	0%	25.05	43.68	65%	17	20	3	15%
		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%	318.16	264.95	-15%	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	-30%	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%
		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%
1.A.3.b.i. Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	1,084	1,084	0%	626.25	640.95	1%	482,074	760,373	278,299	58%
		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%	710,529	223,189	-487,340	-68%
		Car 3	783	783	0%	85.97	95.39	11%	67,320	74,782	7,462	11%
		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	-21%	1,483,081	1,254,776	-228,305	-15%
	Diesel Oil	pre-Cars	3,995	3,995	0%	425.99	386.79	-9%	1,988,280	1,225,682	-762,598	-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	4,346,870	-10,690,379	-72%
		Car 4	60,032	60,032	0%	493.82	80.69	-84%	30,039,914	5,429,011	-24,610,903	-81%
1.A.3.b.ii. Heavy Duty Vehicle Buses	Diesel Oil	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%	56,848,598	14,780,142	-42,068,456	-74%	
LDVs total		122,085	122,085	0%	468.92	130.51	-72%	17,247,399	19,532,958	2,285,559	13%	
pre-Cars		2,250	2,250	0%	1062.63	1918.76	80%	2,836,189	2,671,331	-164,788	-6%	
Car 1		2,620	2,620	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		16,987	16,987	0%	573.45	417.38	-27%	9,425,090	6,069,054	-3,356,036	-33%	
1.A.3.b.iii. Heavy Duty Vehicle Trucks & Lorries	Diesel Oil	Car 4	51,531	51,531	0%	448.88	361.61	-20%	2,363,338	1,885,374	-477,964	-20%
Car 5		13,396	13,396	0%	336.60	182.62	-46%	6,569,052	2,446,399	-4,122,653	-63%	
Buses total		47,946	47,946	0%	592.65	448.99	-24%	20,921,221	21,256,323	3,354,102	16%	
pre-Cars		8,083	8,083	0%	10,816	783.88	-26%	8,395,423	6,144,933	-2,250,490	-26%	
Car 1		29,277	29,277	0%	758.16	504.04	-33%	3,288,422	2,516,377	-772,044	-23%	
Car 2		43,384	43,384	0%	817.97	520.51	-36%	23,947,723	15,233,223	-8,714,500	-36%	
Car 3		121,521	121,521	0%	1,021.51	671.84	-34%	77,271,620	46,342,942	-30,928,678	-34%	
Car 4		68,430	68,430	0%	390.25	289.43	-26%	22,977,784	16,969,686	-6,008,098	-26%	
1.A.3.b.iv. Motorized Two-Wheelers (M2Ws)	Gasoline	Car 5	342,175	342,175	0%	278.30	152.03	-46%	95,469,479	52,619,687	-42,849,792	-44%
Car 6		0	0	0%	0	0	0%	0	0	0	0%	
M2Ws total		79,819	79,819	0%	118.79	171.64	54%	2,177,082	3,299,152	1,162,069	54%	
1.A.3.b. Road Transport	Total	2,160,883	2,160,883	0%	305.90	157.85	-48%	332,365,736	331,625,655	-740,081	0%	

Adjustment details for 2023

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-Euro	11,581	11,581	0%	607.72	635.38	-32%	7,026,041	6,189,785	-836,256	-9%	
		Euro 1	47,487	47,487	0%	348.56	281.60	-31%	16,571,746	11,426,129	-5,145,617	-31%	
		Euro 2	72,781	72,781	0%	194.27	137.92	-29%	13,487,749	10,035,380	-3,452,369	-26%	
		Euro 3	189,443	189,443	0%	63.89	72.62	14%	6,927,963	7,875,172	947,209	14%	
		Euro 4	489,541	489,541	0%	45.39	45.13	-1%	18,541,881	18,436,736	-105,145	-1%	
		Euro 5	181,961	181,961	0%	18.61	45.13	142%	1,887,355	4,681,311	2,793,956	142%	
		Euro 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	78.89	-8%	64,379,964	58,577,229	-5,802,735	-9%	
	Diesel Oil	pre-Euro	1,487	1,487	0%	311.98	284.56	-9%	463,963	383,872	-80,091	-17%	
		Euro 1	6,660	6,660	0%	267.79	246.44	-11%	1,980,364	1,771,787	-208,577	-11%	
		Euro 2	33,957	33,957	0%	406.82	279.27	-40%	13,987,432	7,445,646	-6,541,787	-40%	
		Euro 3	183,539	183,539	0%	564.82	176.63	-69%	58,398,037	18,434,837	-39,963,200	-69%	
		Euro 4	234,943	234,943	0%	398.41	146.46	-62%	91,724,190	34,488,997	-57,235,193	-62%	
		Euro 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.ii. Heavy Duty Vehicles (LDNs)	Gasoline	Euro 6	1,557	1,557	0%	259.84	146.46	-44%	484,664	220,086	-264,578	-44%	
		Diesel oil total	555,245	555,245	0%	455.96	158.66	-64%	242,962,982	88,096,639	-154,866,343	-64%	
		PKs Total	1,346,202	1,346,202	0%	234.67	152.29	-54%	386,442,896	146,673,597	-239,769,298	-62%	
		Diesel Oil	pre-Euro	962	962	0%	632.36	645.95	2%	607,779	621,146	13,417	2%
			Euro 1	232	232	0%	803.24	383.22	-52%	189,985	70,295	-119,690	-60%
			Euro 2	989	989	0%	271.16	195.74	-28%	268,134	133,538	-134,596	-28%
			Euro 3	835	835	0%	89.38	98.33	10%	34,623	82,092	47,469	10%
			Euro 4	2,030	2,030	0%	38.49	47.58	24%	78,155	96,691	18,536	24%
	Euro 5		610	610	0%	16.36	47.58	182%	9,941	29,011	19,069	182%	
	Diesel Oil	Euro 6	0	0	0%	15.37	47.58	210%	2	6	4	210%	
		Gasoline total	5,657	5,657	0%	218.93	193.15	-12%	1,238,546	1,000,662	-237,884	-19%	
		pre-Euro	3,281	3,281	0%	424.46	386.79	-9%	1,368,754	982,093	-386,661	-28%	
		Euro 1	3,666	3,666	0%	398.34	276.24	-30%	1,445,980	787,634	-658,346	-46%	
		Euro 2	8,479	8,479	0%	336.40	133.39	-40%	2,852,325	1,639,772	-1,212,553	-43%	
Euro 3		23,785	23,785	0%	558.53	150.44	-73%	13,050,281	3,546,082	-9,504,199	-73%		
Euro 4		59,485	59,485	0%	494.22	89.85	-82%	29,369,070	5,337,395	-24,031,675	-82%		
Euro 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.iii. Heavy Duty Vehicles (Trucks & Lorries)	Gasoline	Euro 6	1	1	0%	15.14	89.85	-81%	122	72	-50	-41%	
		Diesel oil total	114,550	114,550	0%	485.91	126.17	-74%	55,186,382	13,741,354	-41,445,028	-74%	
		LDNs Total	129,088	129,088	0%	489.51	123.61	-74%	56,344,903	14,834,656	-41,510,247	-74%	
		Diesel Oil	pre-Euro	1,326	1,326	0%	1091.46	1918.45	4%	1,410,640	1,352,283	-58,357	-4%
			Euro 1	1,248	1,248	0%	727.34	731.15	1%	987,476	937,184	-50,292	-5%
			Euro 2	7,789	7,789	0%	703.46	643.34	-9%	5,085,091	4,597,478	-487,613	-9%
			Euro 3	14,483	14,483	0%	629.94	457.61	-27%	9,073,137	6,889,744	-2,183,393	-24%
			Euro 4	5,331	5,331	0%	468.10	361.85	-23%	2,642,179	1,677,777	-964,402	-37%
	Euro 5		20,752	20,752	0%	347.84	182.99	-47%	7,219,563	3,787,467	-3,432,096	-47%	
	Euro 6		73	73	0%	64.52	182.99	236%	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-Euro	6,922	6,922	0%	1036.95	758.82	-27%	7,107,543	5,252,345	-1,855,198	-27%	
		Euro 1	3,630	3,630	0%	743.70	570.57	-24%	2,721,305	2,071,111	-650,194	-24%	
		Euro 2	23,577	23,577	0%	818.27	516.43	-37%	19,262,253	12,175,855	-7,086,398	-37%	
Euro 3		96,735	96,735	0%	634.65	370.21	-42%	61,387,137	35,888,665	-25,498,472	-42%		
Euro 4		60,550	60,550	0%	366.50	288.44	-21%	19,962,680	14,880,877	-5,081,723	-27%		
Euro 5		485,981	485,981	0%	261.24	152.32	-42%	116,149,955	61,626,577	-54,523,378	-47%		
Euro 6		2,380	2,380	0%	188.487	360.323	345%	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%		
1.A.3.b.iv. Two-Wheelers (Mopeds)	Gasoline	pre-Euro	6,780	6,780	0%	122.76	151.03	23%	822,539	1,011,520	188,981	23%	
		Euro 1	4,386	4,386	0%	134.61	171.39	28%	536,615	738,050	201,435	38%	
		Euro 2	3,267	3,267	0%	136.22	184.55	43%	445,087	636,853	191,766	43%	
		Euro 3	3,984	3,984	0%	38.66	184.55	382%	18,386	778,616	760,230	382%	
		Euro 4	0	0	0%	0	0	0%	0	0	0	0%	
		Euro 5	0	0	0%	0	0	0%	0	0	0	0%	
		Mopeds Total	18,268	18,268	0%	107.43	173.28	61%	1,982,546	3,165,439	1,182,893	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	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-Euro	11,680	11,680	0%	618.27	649.35	-5%	7,011,641	5,967,452	-1,044,189	-15%	
		Euro 1	37,743	37,743	0%	353.78	341.68	-3%	13,362,966	9,129,436	-4,233,530	-32%	
		Euro 2	62,680	62,680	0%	188.93	139.33	-21%	11,889,922	8,722,244	-3,167,678	-27%	
		Euro 3	97,782	97,782	0%	66.38	73.19	10%	6,481,618	7,156,920	675,302	10%	
		Euro 4	397,911	397,911	0%	47.22	46.52	-1%	18,790,345	18,589,937	-200,407	-1%	
		Euro 5	138,063	138,063	0%	18.60	46.52	150%	2,583,150	6,439,691	3,856,541	150%	
		Euro 6	2,714	2,714	0%	25.99	46.52	79%	70,526	126,237	55,711	79%	
	Gasoline total	748,158	748,158	0%	88.35	74.85	-16%	68,190,887	56,671,737	-11,519,150	-17%		
	Diesel Oil	pre-Euro	1,389	1,389	0%	312.32	284.56	-9%	433,081	368,136	-64,945	-15%	
		Euro 1	5,426	5,426	0%	268.42	246.79	-8%	1,678,472	1,580,688	-97,784	-6%	
		Euro 2	28,437	28,437	0%	406.84	279.91	-40%	11,563,522	6,253,531	-5,309,991	-46%	
		Euro 3	92,795	92,795	0%	574.33	176.67	-69%	53,284,956	16,579,373	-36,705,583	-69%	
Euro 4		222,583	222,583	0%	393.55	149.27	-62%	87,598,471	33,225,566	-54,372,905	-62%		
1.A.3.b.i. Heavy Duty Vehicles Buses	Gasoline	Euro 5	233,766	233,766	0%	435.42	149.27	-66%	101,787,275	34,884,788	-66,902,487	-66%	
		Euro 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%	
		PKs Total	1,338,245	1,338,245	0%	237.49	111.77	-53%	317,723,735	160,570,886	-157,152,849	-53%	
		Diesel Oil	pre-Euro	981	981	0%	633.81	645.95	2%	568,320	575,293	6,973	1%
			Euro 1	184	184	0%	803.50	383.22	-52%	187,281	59,328	-127,953	-60%
			Euro 2	836	836	0%	274.42	291.18	6%	229,520	188,285	-41,235	-18%
	Euro 3		784	784	0%	52.66	191.79	10%	72,691	79,780	7,089	10%	
	Euro 4		1,089	1,089	0%	43.70	48.89	12%	77,284	82,833	5,549	7%	
	1.A.3.b.ii. Light Duty Vehicles (LDVs)	Gasoline	Euro 5	965	965	0%	16.37	48.89	193%	15,187	47,268	32,081	193%
			Euro 6	1	1	0%	17.66	48.89	170%	26	72	46	170%
			Gasoline total	5,578	5,578	0%	262.86	184.67	-30%	1,137,289	1,696,727	559,438	49%
Diesel Oil			pre-Euro	2,744	2,744	0%	424.37	386.79	-9%	1,168,757	944,928	-223,829	-19%
			Euro 1	2,945	2,945	0%	398.34	276.24	-30%	1,166,762	634,566	-532,196	-46%
			Euro 2	6,982	6,982	0%	336.92	133.39	-40%	2,340,147	1,260,674	-1,079,473	-46%
			Euro 3	20,421	20,421	0%	568.12	150.38	-73%	11,437,995	3,070,913	-8,367,082	-73%
		Euro 4	55,087	55,087	0%	497.72	90.45	-82%	27,776,440	5,048,416	-22,728,024	-82%	
1.A.3.b.iii. Heavy Duty Vehicles Trucks & Lorries		Diesel Oil	Euro 5	29,024	29,024	0%	441.97	90.45	-80%	13,181,325	2,687,964	-10,493,361	-80%
			Euro 6	41	41	0%	51.26	90.45	-43%	6,160	3,688	-2,472	-40%
			Diesel oil total	118,777	118,777	0%	488.66	114.93	-76%	47,083,533	13,656,488	-33,427,045	-76%
			LDVs total	124,354	124,354	0%	484.14	118.03	-76%	18,214,142	5,647,275	-12,566,867	-76%
	Gasoline		pre-Euro	1,172	1,172	0%	1096.89	119.23	-44%	1,249,028	1,184,143	-64,885	-5%
			Euro 1	1,091	1,091	0%	727.98	170.38	-76%	766,020	735,181	-30,839	-4%
			Euro 2	6,884	6,884	0%	794.37	643.49	-19%	5,324,968	4,357,271	-967,697	-18%
		Euro 3	13,187	13,187	0%	628.43	457.65	-27%	8,262,880	5,988,226	-2,274,655	-27%	
		Euro 4	6,945	6,945	0%	488.55	361.71	-26%	2,270,061	1,739,796	-530,265	-23%	
	1.A.3.b.iv. Motorized Two-Wheelers (MOWs)	Gasoline	Euro V	36,096	36,096	0%	384.68	183.48	-40%	8,435,633	4,420,733	-4,014,901	-40%
			Euro VI	537	537	0%	44.76	183.48	310%	34,047	86,572	52,524	310%
			Buses Total	11,176	11,176	0%	509.54	388.06	-24%	28,760,969	18,620,843	-10,140,126	-24%
Euro 1			5,863	5,863	0%	109.72	73.35	-29%	6,072,104	4,322,888	-1,749,216	-29%	
Euro 2			2,945	2,945	0%	743.27	585.27	-21%	1,150,848	1,065,909	-84,939	-7%	
Euro 3			1,688	1,688	0%	118.17	510.47	-34%	1,059,881	2,440,953	1,381,072	34%	
Euro 4			35,130	35,130	0%	83.53	471.43	-82%	17,837,440	27,181,882	9,344,442	82%	
Diesel Oil		Euro V	42,781	42,781	0%	326.93	287.27	-12%	16,536,987	12,989,770	-3,547,217	-21%	
		Euro VI	436,960	436,960	0%	261.70	152.65	-41%	193,181,324	66,786,496	-126,394,827	-41%	
		Euro VI	18,020	18,020	0%	58.67	152.65	261%	913,082	2,750,630	1,837,548	261%	
		Trucks Total	291,739	291,739	0%	353.86	287.53	-21%	211,887,531	124,188,049	-87,699,482	-41%	
		pre-Euro	6,362	6,362	0%	123.07	151.79	23%	181,736	964,179	152,443	23%	
1.A.3.b.v. Motorized Two-Wheelers (MOWs)	Gasoline	Euro 1	4,013	4,013	0%	125.11	173.15	39%	562,073	894,880	332,807	39%	
		Euro 2	3,362	3,362	0%	132.24	195.58	49%	436,668	645,804	209,136	49%	
		Euro 3	4,562	4,562	0%	39.81	195.58	391%	181,610	882,175	716,565	391%	
		Euro 4	0	0	0%	0	0	0%	0	0	0	0%	
		Euro 5	0	0	0%	0	0	0%	0	0	0	0%	
		MOWs Total	18,029	18,029	0%	104.34	175.38	68%	5,968,088	5,187,618	-780,470	-13%	
		1.A.3.b.vi. Road Transport	2,132,683	2,132,683	0%	288.88	145.76	-50%	616,079,063	390,854,371	-225,224,692	-37%	

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	89%	1,768,917	3,327,855	1,558,938	
	Gasoline total	715,272	715,272	0%	78.93	70.65	-9%	58,736,267	50,535,049	-8,201,218	
	Diesel Oil	pre-Cars	1,380	1,380	0%	368.76	254.56	-31%	385,262	339,172	-46,090
		Car 1	3,749	3,749	0%	298.36	269.64	-9%	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%	36,981,999	11,085,409	-25,896,590	
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	1,780	1,780	0%	414.81	386.79	-7%	899,549	885,433	-14,116
		Car 1	1,780	1,780	0%	391.89	276.25	-29%	780,189	385,371	-394,818
		Car 2	4,223	4,223	0%	323.43	153.71	-52%	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%	456.12	185.62	-77%	65,712,732	15,256,007	-50,456,725	
	LDVs total	148,994	148,994	0%	445.21	188.29	-76%	66,781,025	16,226,684	-50,554,341	
	1.A.3.b.ii - Heavy Duty Vehicles - Buses	Gasoline	pre-Cars	881	881	0%	1076.81	1119.23	-5%	954,197	988,234
Car 1			583	583	0%	731.36	732.67	1%	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	1,686,881	-430,338
Car 5			34,380	34,380	0%	366.36	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	-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	
1.A.3.b.iii - Heavy Duty Vehicles - Trucks & Lorries	Gasoline	pre-Cars	12,282	12,282	0%	636.75	644.11	-14%	7,916,267	6,480,187	-1,436,080
		Car 1	17,449	17,449	0%	372.96	341.68	-35%	6,588,211	4,217,644	-2,370,567
		Car 2	30,435	30,435	0%	217.43	141.75	-35%	6,617,570	4,314,140	-2,303,430
		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	167%	3,485,382	9,239,815	5,754,433
	Car 6	114,791	114,791	0%	25.65	51.26	102%	3,063,235	5,884,372	2,821,137	
	Gasoline total	724,571	724,571	0%	67.66	60.88	-10%	49,046,874	30,534,734	-18,512,140	
	Diesel Oil	pre-Cars	1,780	1,780	0%	368.76	254.56	-31%	385,262	339,172	-46,090
		Car 1	3,749	3,749	0%	298.36	269.64	-9%	1,122,449	1,011,625	-110,824
Car 2		13,788	13,788	0%	407.17	221.43	-46%	6,720,132	3,653,964	-3,066,168	
Car 3		52,128	52,128	0%	808.95	179.65	-78%	31,696,478	9,364,788	-22,331,690	
1.A.3.b.iv - Motorized Two-Wheelers (M2Ws)	Gasoline	pre-Cars	1,780	1,780	0%	413.41	386.79	-7%	899,549	885,433	-14,116
		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	-92%	32,790,965	7,054,965	-25,736,000
	Car 6	19,625	19,625	0%	151.71	33.69	-78%	2,977,439	1,026,876	-1,950,563	
	M2Ws total	161,815	161,815	0%	366.14	181.68	-50%	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	137.62	-46%	93,799,558	362,891,620	256,891,738

Adjustment details for 2018

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.b.i - Passenger Cars	Gasoline	pre-Cars	12,219	12,219	0%	637.58	644.11	-6%	7,780,965	6,648,721	-1,132,234	-15%	
		Car 1	14,362	14,362	0%	374.34	341.68	-8%	5,371,161	3,448,643	-1,922,518	-36%	
		Car 2	34,285	34,285	0%	221.97	111.68	-50%	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	3,358,617	-129,164	-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	-63%	3,228,282	8,725,668	5,497,386	170%	
	Diesel Oil	pre-Cars	159,041	159,041	0%	6.00	52.30	-88%	4,190,422	6,718,250	2,527,828	60%	
		Car 1	2,949	2,949	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	222.87	-9%	4,981,983	2,483,536	-2,498,447	-50%	
		Car 3	40,786	40,786	0%	612.49	180.15	-71%	24,932,029	7,333,241	-17,598,788	-71%	
		Car 4	130,534	130,534	0%	414.71	180.40	-56%	54,133,837	20,937,329	-33,196,508	-61%	
		Car 5	251,212	251,212	0%	416.25	180.40	-56%	104,585,786	40,293,731	-64,292,055	-61%	
	LGN	pre-Cars	220,685	220,685	0%	254.87	180.40	-31%	58,284,140	35,680,440	-22,603,700	-39%	
		Car 1	666,074	666,074	0%	375.66	163.38	-56%	247,596,063	188,748,684	-158,767,459	-64%	
		Car 2	1,365,181	1,365,181	0%	214.34	154.68	-28%	262,589,060	156,555,421	-106,033,639	-40%	
		Car 3	911	911	0%	604.51	645.95	11%	596,851	582,652	-14,199	-2%	
		Car 4	189	189	0%	911.58	312.78	-66%	98,528	33,895	-64,633	-66%	
		Car 5	377	377	0%	303.84	224.45	-26%	114,682	84,713	-29,969	-26%	
1.A.3.b.ii - Light Duty Vehicles (LDV)	Gasoline	pre-Cars	377	377	0%	111.92	116.84	4%	57,282	60,739	3,457	6%	
		Car 1	511	511	0%	52.02	54.36	4%	65,290	69,270	3,980	4%	
		Car 2	1,483	1,483	0%	23.70	54.36	129%	35,160	80,626	45,466	129%	
		Car 3	1,643	1,643	0%	19.18	54.36	182%	39,550	89,326	49,776	182%	
		Car 4	6,315	6,315	0%	154.22	160.11	4%	999,199	1,011,138	11,939	1%	
		Car 5	1,872	1,872	0%	411.51	386.79	-6%	771,337	574,742	-196,595	-26%	
	Diesel Oil	pre-Cars	1,285	1,285	0%	389.94	276.25	-29%	483,129	272,286	-210,843	-44%	
		Car 1	2,942	2,942	0%	318.56	153.88	-51%	965,389	550,790	-414,599	-43%	
		Car 2	9,363	9,363	0%	558.10	150.74	-73%	5,689,152	1,411,297	-4,277,855	-75%	
		Car 3	33,232	33,232	0%	508.42	93.81	-82%	15,929,185	3,117,457	-12,811,728	-80%	
		Car 4	66,283	66,283	0%	432.92	93.81	-78%	28,684,080	6,217,860	-22,466,220	-78%	
		Car 5	148,282	148,282	0%	158.79	93.81	-41%	5,941,615	3,686,228	-2,255,387	-38%	
	LGN	pre-Cars	154,299	154,299	0%	384.71	182.69	-53%	59,344,525	15,880,316	-43,464,210	-73%	
		Car 1	180,574	180,574	0%	375.86	184.94	-51%	69,343,125	26,851,449	-42,491,676	-61%	
		Car 2	547	547	0%	1078.15	1919.23	78%	589,267	557,147	-32,120	-5%	
		Car 3	237	237	0%	732.78	752.57	3%	173,678	176,368	2,690	2%	
		Car 4	2,270	2,270	0%	787.83	646.33	-18%	1,780,688	1,487,437	-293,251	-16%	
		Car 5	6,757	6,757	0%	638.89	459.32	-29%	4,262,734	3,183,482	-1,079,252	-25%	
1.A.3.b.iii - Heavy Duty Vehicles (HDV)	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	213%	
		Car 3	91,634	91,634	0%	309.75	283.53	-8%	15,993,526	13,687,186	-2,306,340	-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%	
	LGN	pre-Cars	5,544	5,544	0%	817.44	581.68	-29%	4,532,180	2,781,516	-1,750,664	-39%	
		Car 1	20,583	20,583	0%	629.54	563.68	-11%	12,367,751	7,277,279	-5,090,472	-41%	
		Car 2	15,912	15,912	0%	358.89	276.23	-23%	6,334,421	4,386,424	-1,947,997	-31%	
		Car 3	154,983	154,983	0%	250.40	154.68	-38%	45,964,153	24,283,389	-21,680,764	-47%	
		Car 4	381,799	381,799	0%	68.78	154.68	125%	28,251,482	69,665,886	41,414,404	146%	
		Car 5	16,487	16,487	0%	1078.15	181.11	-83%	1,658,558	3,454,767	1,796,209	108%	
	1.A.3.b.iv - Motorised Two-Wheelers (M2W)	Gasoline	pre-Cars	2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-39%
			Car 1	2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-39%
			Car 2	2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-39%
			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%
Diesel Oil		pre-Cars	13,588	13,588	0%	628.58	644.11	-6%	8,664,621	7,382,686	-1,281,935	-15%	
		Car 1	12,427	12,427	0%	378.32	341.68	-9%	4,781,480	3,083,383	-1,698,096	-36%	
		Car 2	20,086	20,086	0%	225.58	92.59	-59%	4,531,070	1,858,018	-2,673,052	-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%	
LGN		pre-Cars	285,636	285,636	0%	25.63	53.29	180%	5,285,099	11,010,782	5,725,683	108%	
		Car 1	184,631	184,631	0%	62.36	68.45	10%	43,981,941	48,238,025	4,256,084	10%	
		Car 2	3,745	3,745	0%	313.70	244.92	-22%	913,180	734,921	-178,259	-21%	
		Car 3	2,545	2,545	0%	298.80	272.65	-9%	784,913	687,786	-97,127	-12%	
		Car 4	8,891	8,891	0%	407.19	229.16	-44%	3,420,286	2,037,480	-1,382,806	-40%	
		Car 5	33,079	33,079	0%	615.11	180.42	-71%	20,310,125	5,967,483	-14,342,642	-71%	
1.A.3.b.v - Light Duty Vehicles (LDV)	Gasoline	pre-Cars	111,335	111,335	0%	419.17	182.44	-56%	48,688,685	10,085,228	-38,603,457	-81%	
		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%	62,183,230	44,429,184	-17,754,046	-29%	
		Car 3	663,841	663,841	0%	345.81	165.67	-52%	229,566,088	189,582,982	-139,983,106	-61%	
		Car 4	1,368,532	1,368,532	0%	699.83	155.32	-78%	273,668,009	157,821,687	-115,846,322	-42%	
		Car 5	909	909	0%	644.89	645.95	1%	687,449	581,962	-105,487	-15%	
	Diesel Oil	pre-Cars	87	87	0%	915.20	312.78	-66%	89,953	30,396	-59,557	-66%	
		Car 1	316	316	0%	304.63	224.45	-26%	96,158	70,848	-25,310	-26%	
		Car 2	447	447	0%	112.68	121.47	8%	59,355	54,283	-5,072	-9%	
		Car 3	1,126	1,126	0%	53.08	55.26	4%	59,652	62,199	2,547	4%	
		Car 4	1,361	1,361	0%	25.34	55.26	119%	34,240	74,680	40,440	119%	
		Car 5	2,420	2,420	0%	18.75	55.26	180%	45,383	133,753	88,370	190%	
	LGN	pre-Cars	6,483	6,483	0%	146.88	153.25	9%	974,279	1,044,150	69,871	7%	
		Car 1	1,744	1,744	0%	418.96	386.79	-6%	725,111	541,376	-183,735	-26%	
		Car 2	1,079	1,079	0%	389.52	276.25	-29%	420,285	232,256	-188,029	-44%	
		Car 3	2,334	2,334	0%	315.90	194.79	-39%	737,682	454,630	-283,052	-39%	
		Car 4	7,649	7,649	0%	601.11	150.79	-75%	2,037,480	596,743	-1,440,737	-71%	

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