

Adjustment DE-A regarding NO_x from Road Vehicles

PREFACE

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

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

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

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

REASONS FOR MISSING THE GOTHENBURG CEILINGS

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

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

For the formalism of the adjustments, it is difficult to flag whether the modifications for road transport are due to “methodological changes” or due to “changes of emission factor”. Therefore, only the term

“change of methodology” will be used (even if at the NFR reporting level this may seem like a simple change in EFs).

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

ANALYSING THE PROBLEM: THE EUROPEAN PERSPECTIVE BASED ON COPERT

Already in 2011, these effects were demonstrated by Ntziachristos and Papageorgiou (2011)⁵⁾. Here, the impacts of changing model versions and activity data in the context of meeting the EU NEC Directive ceiling commitments were examined for four European countries including Germany. Unfortunately, this comparison study was carried out within a COPERT environment. Therefore, the results gained cannot be transferred to the German TREMOD environment on a one-to-one level but nonetheless allow a highly illustrative insight in the reasons for not meeting the set ceiling. The study modeled fuel consumption and NO_x emissions for four selected countries (Germany, France, Netherlands and Belgium) and found higher NO_x emissions were estimated for the road transport sector than originally modelled by the RAINS model of IIASA (which underpinned the setting of 2010 ceilings). For Germany, this study shows that with the same activity data set (LIFE+ EC4MACS data from Amann et al. (2010)), NO_x emissions estimated with COPERT II vs. COPERT 4 (v8.0) increase from 410 kt to 518 kt due to methodological changes, a difference of 282 kt. An additional consideration of changes in AD would lead to 620 kt of NO_x. However, as changes in AD are no valid adjustment reason, the latter value is for information only.

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

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

Changes in methodology and emission factors

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

Changes in the activity data

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

IN-COUNTRY ANALYSIS: THE TREMOD PERSPECTIVE

INITIAL ASSUMPTION

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



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

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



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

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 (2021).

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

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

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

THE COMPARISON

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

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

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

Description of the updated methodology used

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

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

and

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

Comparison of emission estimates made using the original and updated methodologies

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

- TREMOD 3.1 model equations as initial methodology

and ,

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

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

Table 1: Resulting adjustment proposal 2020

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

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

Activity Data

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

Implied Emission Factor

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

NO_x Emissions

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

Adjustment overview for years 2010 to 2019

NFR Code	Fuel	Year	Activity Data			Implied Emission Factor			NO _x Emissions			
			current	adjusted	difference	current	adjusted	difference	current	adjusted	adjustment	difference
			in [TJ]	in [TJ]	in [%]	in [kg/TJ]	in [kg/TJ]	in [%]	in [kg]	in [kg]	in [kg]	in [%]
1.A.3.b.i	gasoline		756.957	756.957	0%	97.55	84.99	-13%	77.644.842	67.650.906	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	diesel oil		48.844	48.844	0%	823.00	482.55	-23%	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	diesel oil		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	diesel oil		50.902	50.902	0%	533.22	384.33	-28%	27.141.913	19.563.200	7.578.704	-28%
1.A.3.b.iii	diesel oil		589.585	589.585	0%	381.33	224.00	-41%	234.829.180	132.064.753	92.764.428	-41%
1.A.3.b.iv	gasoline		18.268	18.268	0%	107.43	173.28	61%	1.962.546	3.165.439	-1.202.893	61%
1.A.3.b TOTAL	2012		2.084.964	2.084.964	0%			0%	616.721.438	316.391.343	300.420.094	-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	diesel oil		51.716	51.716	0%	509.64	260.06	-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	-41%	211.887.531	124.788.469	87.099.062	-41%
1.A.3.b.iv	gasoline		18.229	18.229	0%	104.34	175.30	68%	1.902.068	3.197.038	-1.294.951	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	99.613.892	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	diesel oil		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	3.346.794	-1.468.499	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%	74.30	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	diesel oil		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		2.161.976	2.161.976	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	diesel oil		54.157	54.157	0%	424.73	388.24	-27%	23.002.109	16.693.117	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	diesel oil		53.382	53.382	0%	370.80	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	diesel oil		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	diesel oil		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		2.202.886	2.202.886	0%			0%	437.268.744	292.497.497	144.771.248	-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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i. Passenger Cars	Gasoline	pre-Cars	13.685	13.685	0%	584.75	514.25	-12%	7.955.060	6.986.917	-658.143	-8%
		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	135.63	-22%	16.580.020	13.020.026	-3.569.995	-22%
		Car 3	133.139	133.139	0%	58.51	70.19	20%	7.790.384	9.343.433	1.553.129	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	795.057	795.057	0%	99.25	84.39	-13%	77.646.042	67.650.586	-9.995.455	-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%	266.42	265.17	-1%	3.064.428	2.741.387	-323.041	-11%
		Car 2	50.088	50.088	0%	406.90	299.19	-40%	29.372.795	10.974.210	-18.398.584	-60%
		Car 3	134.025	134.025	0%	542.54	170.54	-67%	72.645.173	23.929.276	-48.715.897	-67%
		Car 4	279.154	279.154	0%	304.37	140.58	-53%	107.299.180	39.243.811	-68.055.369	-63%
		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%
		Diesel oil 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	152.621.367	-152.364.570	-56%
	Gasoline	pre-Cars	1.249	1.249	0%	627.99	640.95	2%	783.320	986.871	203.551	26%
		Car 1	367	367	0%	361.95	297.39	-16%	361.969	186.620	-175.349	-49%
		Car 2	1.393	1.393	0%	264.75	184.41	-30%	368.840	256.917	-111.923	-30%
		Car 3	856	856	0%	82.47	30.83	-10%	70.631	77.625	6.994	10%
		Car 4	2.420	2.420	0%	36.32	44.90	24%	87.987	188.679	20.772	24%
		Car 5	49	49	0%	15.34	44.90	183%	750	2.218	1.468	183%
		Car 6	0	0	0%	0	0	0%	0	0	0	0%
		Gasoline total	6.345	6.345	0%	255.87	254.75	-1%	1.478.832	1.358.128	-120.704	-8%
1.A.3.b.i. Light Duty Vehicles (LDVs)	Gasoline	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%	399.18	276.24	-40%	2.389.080	1.289.636	-1.099.444	-46%
		Car 2	13.126	13.126	0%	336.76	153.18	-54%	4.420.280	2.534.731	-1.885.549	-43%
		Car 3	33.249	33.249	0%	531.91	150.58	-72%	17.655.883	5.085.760	-12.569.123	-72%
		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	-551.772	-79%
		Car 6	0	0	0%	15.73	80.69	-82%	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	16.689.913	-38.969.053	-70%
	Diesel Oil	pre-Cars	3.382	3.382	0%	1096.25	1028.78	-6%	3.674.087	3.452.644	-221.443	-6%
		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%	13.065.776	7.269.299	-5.796.477	-44%
		Car 4	5.461	5.461	0%	448.63	351.65	-22%	2.650.016	1.921.527	-728.489	-28%
		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%
		Buses 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	-25%	10.510.623	7.754.136	-2.756.486	-26%
		Car 1	5.677	5.677	0%	758.59	575.55	-24%	4.261.383	3.287.681	-973.702	-23%
		Car 2	38.555	38.555	0%	817.62	524.79	-36%	31.525.526	20.234.619	-11.290.907	-36%
		Car 3	169.023	169.023	0%	636.28	374.48	-41%	161.136.182	99.617.271	-61.518.911	-41%
		Car 4	69.635	69.635	0%	368.34	280.62	-24%	27.183.867	20.166.636	-7.017.231	-26%
		Car 5	283.934	283.934	0%	276.42	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	-47%
	Gasoline	pre-Cars	7.973	7.973	0%	122.80	149.18	22%	372.721	1.189.393	216.502	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	686.681	101.319	30%
		Car 3	2.950	2.950	0%	38.11	184.21	387%	116.180	687.032	570.852	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%
		LDVs Total	19.172	19.172	0%	113.68	168.43	48%	2.243.149	3.326.034	1.072.885	48%
		1.A.3.b. Road Transport	2.879.688	2.879.688	0%	219.62	168.23	-26%	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 [t]	in [t]	in [t]	in [t]	
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%	347.86	340.16	-2%	21.560.430	14.884.961	-6.675.479	-31%
		Car 2	87.083	87.083	0%	178.38	136.58	-24%	15.620.983	11.883.782	-3.737.191	-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	-8.333.800	-11%	
	Diesel Oil	pre-Cars	1.711	1.711	0%	319.80	264.95	-15%	511.683	453.187	-58.496	-11%
		Car 1	8.426	8.426	0%	297.32	266.85	-11%	2.585.115	2.299.987	-285.128	-11%
		Car 2	42.514	42.514	0%	407.93	279.27	-40%	17.384.549	9.321.916	-7.962.634	-46%
		Car 3	121.429	121.429	0%	555.36	170.55	-69%	67.437.053	21.681.386	-45.755.667	-69%
		Car 4	264.943	264.943	0%	388.88	143.48	-63%	162.817.881	30.889.755	-131.928.126	-81%
		Car 5	113.047	113.047	0%	435.12	143.48	-67%	49.536.960	16.332.974	-33.203.984	-67%
	Diesel oil total	695	695	0%	259.59	143.48	-45%	180.582	99.754	-80.828	-45%	
	Pkx Total	553.564	553.564	0%	434.12	159.92	-63%	249.713.791	88.138.959	-161.574.832	-63%	
1.A.3.a.ii. Light Duty Vehicles (LDV)	Gasoline	pre-Cars	1.348.252	1.348.252	0%	232.52	133.47	-43%	713.499.642	559.990.510	-153.509.132	-22%
		Car 1	1.084	1.084	0%	626.75	646.96	3%	482.074	760.373	278.299	29%
		Car 2	283	283	0%	818.74	584.47	-29%	243.289	86.158	-157.132	-65%
		Car 3	1.184	1.184	0%	268.66	191.68	-29%	310.529	223.189	-87.340	-28%
		Car 4	783	783	0%	85.97	35.39	-11%	67.320	74.782	7.462	11%
		Car 5	2.562	2.562	0%	37.38	46.51	24%	95.786	119.162	23.376	24%
	Diesel Oil	pre-Cars	241	241	0%	16.13	46.51	189%	3.882	11.190	7.308	189%
		Car 1	0	0	0%	15.33	46.51	283%	1	2	1	203%
		Gasoline total	6.118	6.118	0%	229.35	186.52	-18%	1.483.081	1.254.776	-228.305	-15%
		pre-Cars	3.995	3.995	0%	425.99	386.79	-9%	1.986.280	1.225.682	-760.598	-38%
		Car 1	4.787	4.787	0%	399.71	276.24	-40%	1.984.260	1.030.426	-953.835	-48%
		Car 2	10.816	10.816	0%	336.90	153.29	-54%	3.644.582	2.091.063	-1.553.519	-43%
	Diesel Oil	pre-Cars	28.876	28.876	0%	541.53	150.54	-72%	15.037.249	4.346.870	-10.690.379	-72%
		Car 1	60.032	60.032	0%	449.82	89.29	-80%	39.029.914	5.429.816	-33.600.098	-80%
		Car 2	6.609	6.609	0%	449.82	89.29	-80%	2.930.190	584.354	-2.345.836	-80%
Car 3		0	0	0%	16.21	89.29	-43%	1	0	-1	-43%	
Diesel oil total		115.967	115.967	0%	405.55	126.92	-74%	55.844.558	15.708.142	-40.136.416	-74%	
LDVs Total		122.085	122.085	0%	406.92	130.55	-72%	57.247.599	19.932.858	-37.314.741	-72%	
1.A.3.a.iii. Heavy Duty Vehicles (HDV)	Diesel Oil	pre-Cars	2.620	2.620	0%	702.89	1919.78	26%	2.836.189	2.671.331	-164.778	-6%
		Car 1	2.258	2.258	0%	1050.91	751.40	-28%	1.699.781	1.036.297	-663.484	-39%
		Car 2	9.074	9.074	0%	804.17	645.36	-20%	7.129.125	5.557.659	-1.571.466	-22%
		Car 3	14.887	14.887	0%	823.96	417.28	-49%	12.448.880	6.889.054	-5.559.826	-45%
		Car 4	5.131	5.131	0%	448.86	361.81	-20%	2.363.330	1.681.274	-681.056	-29%
		Car 5	13.396	13.396	0%	336.60	182.62	-46%	4.589.052	2.486.399	-2.092.653	-46%
	Diesel Oil total	47.365	47.365	0%	592.65	448.99	-24%	28.071.271	21.286.323	-6.884.948	-24%	
	Trucks & Lorries	pre-Cars	8.044	8.044	0%	1.030.67	783.88	-26%	8.365.423	6.144.933	-2.210.491	-26%
		Car 1	4.384	4.384	0%	758.16	574.04	-23%	3.288.422	2.536.377	-752.044	-23%
		Car 2	29.277	29.277	0%	817.37	550.61	-33%	23.947.723	15.233.223	-8.714.499	-36%
		Car 3	121.581	121.581	0%	538.56	472.69	-13%	127.131.520	115.352.437	-11.778.083	-9%
		Car 4	59.430	59.430	0%	395.26	299.43	-25%	32.977.784	16.969.685	-16.008.100	-50%
		Car 5	342.752	342.752	0%	278.30	162.03	-41%	96.589.479	52.019.687	-44.569.792	-45%
	Trucks Total	563.891	563.891	0%	418.38	244.97	-40%	219.470.121	136.136.342	-82.973.829	-40%	
	1.A.3.b.i. Motorized Two-Wheelers (M2W)	Gasoline	pre-Cars	7.389	7.389	0%	122.96	150.24	22%	969.588	1.110.170	201.582
Car 1			4.085	4.085	0%	124.72	108.26	-25%	599.299	889.547	290.248	48%
Car 2			3.544	3.544	0%	137.85	134.58	-4%	488.552	688.693	201.851	41%
Car 3			3.560	3.560	0%	39.59	134.58	382%	160.553	688.693	528.140	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%
M2Ws Total		19.289	19.289	0%	119.78	171.64	54%	217.082	3.299.162	3.082.080	54%	
1.A.3.b. Road Transport		Total	2.160.883	2.160.883	0%	305.90	157.85	-49%	632.365.736	321.625.655	-310.740.081	-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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i. - Passenger Cars	Gasoline	pre-Euro	11,581	11,581	0%	607.72	635.38	-52%	7,035,041	6,189,785	-836,256	-52%
		Euro 1	47,487	47,487	0%	348.56	341.62	-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	-3,372,369	-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%	25.06	45.13	74%	7,339	12,736	5,399	74%
		Gasoline total	790,267	790,267	0%	85.73	78.88	-8%	64,379,964	58,577,229	-5,802,735	-9%
	Diesel Oil	pre-Euro	1,447	1,447	0%	311.98	284.56	-9%	463,963	383,872	-80,091	-9%
		Euro 1	6,660	6,660	0%	267.79	246.44	-11%	1,980,264	1,771,787	-208,477	-11%
		Euro 2	33,967	33,967	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%	58,389,037	18,434,837	-39,954,200	-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%
		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%	415.96	158.66	-64%	242,962,982	88,096,639	-154,866,343	-64%
		Pkcs Total	1,345,512	1,345,512	0%	234.61	115.29	-50%	386,442,896	146,673,867	-239,769,029	-50%
	Gasoline	pre-Euro	962	962	0%	632.36	645.95	2%	607,779	621,166	13,411	2%
		Euro 1	232	232	0%	803.24	193.22	-86%	199,985	70,295	-129,691	-86%
		Euro 2	989	989	0%	271.16	195.74	-28%	269,134	133,538	-135,596	-28%
		Euro 3	835	835	0%	89.38	98.33	10%	74,623	82,092	7,469	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%
		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%	1,238,520	1,092,662	-145,858	-12%
	Diesel Oil	pre-Euro	3,281	3,281	0%	424.46	386.79	-9%	1,368,754	1,062,093	-306,661	-9%
		Euro 1	3,666	3,666	0%	399.34	276.24	-30%	1,445,980	1,017,634	-428,346	-30%
		Euro 2	8,479	8,479	0%	336.46	133.39	-49%	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	3,565,082	-9,485,199	-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%
		Euro 6	1	1	0%	15.14	89.85	-81%	122	72	-50	-81%
		Diesel oil total	114,550	114,550	0%	485.91	126.17	-75%	55,186,382	13,741,354	-41,445,028	-75%
		LDVs Total	129,088	129,088	0%	489.51	123.61	-74%	56,344,903	14,834,656	-41,510,247	-74%
1.A.3.b.ii. - Heavy Duty Vehicles - Buses	Gasoline	pre-Euro	1,326	1,326	0%	1093.46	1919.46	4%	1,410,640	1,352,283	-58,357	-4%
		Euro 1	1,246	1,246	0%	727.34	731.15	1%	1,017,476	1,017,184	-292	-1%
		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%	9,073,197	6,889,744	-2,183,453	-27%
		Euro 4	5,331	5,331	0%	468.16	361.86	-23%	2,642,179	1,675,777	-966,402	-23%
		Euro 5	20,752	20,752	0%	347.84	182.99	-47%	7,219,563	2,787,467	-4,432,096	-47%
		Euro 6	73	73	0%	64.52	182.99	236%	3,961	13,296	9,334	236%
		Buses Total	50,962	50,962	0%	533.22	384.33	-28%	27,141,913	19,565,288	-7,576,624	-28%
	Diesel Oil	pre-Euro	6,922	6,922	0%	1036.95	158.82	-21%	7,107,543	5,252,345	-1,855,198	-21%
		Euro 1	3,630	3,630	0%	749.70	570.57	-24%	2,721,326	2,071,111	-650,215	-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	96,736	96,736	0%	634.65	270.21	-42%	61,387,137	35,888,665	-25,498,472	-42%
		Euro 4	60,550	60,550	0%	366.50	288.44	-21%	19,982,680	14,680,877	-5,301,723	-27%
		Euro 5	485,981	485,981	0%	261.24	152.32	-40%	116,149,955	61,626,577	-54,523,378	-40%
		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%
	Gasoline	pre-Euro	6,780	6,780	0%	122.76	151.03	23%	822,539	1,011,920	189,381	23%
		Euro 1	4,386	4,386	0%	124.61	171.39	39%	536,615	738,050	201,435	39%
		Euro 2	3,267	3,267	0%	136.22	184.56	45%	445,087	636,853	191,766	43%
		Euro 3	3,984	3,984	0%	38.66	184.56	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%
		MDVs Total	18,268	18,268	0%	107.43	175.28	61%	1,982,546	3,165,439	1,182,893	61%
		1.A.3.b. - Road Transport	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 in [t]	adjusted in [t]	difference in [%]	current in [g/t]	adjusted in [g/t]	difference in [%]	current in [t]	adjusted in [t]	adjustment in [t]	difference in [%]		
1.A.3.a.i. - Passenger Cars	Gasoline	pre-Euro	11,680	11,680	0%	619.27	649.35	-5%	7,011,641	6,967,452	-1,644,808	-5%	
		Euro 1	37,743	37,743	0%	353.78	261.98	-32%	13,362,966	9,129,436	-4,233,531	-32%	
		Euro 2	62,680	62,680	0%	188.93	139.33	-27%	11,889,922	8,722,244	-3,167,678	-27%	
		Euro 3	97,792	97,792	0%	66.38	73.19	10%	6,481,618	7,156,920	685,303	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%	
	Gasoline total	748,154	748,154	0%	88.35	74.85	-7%	68,190,687	56,671,737	-11,518,951	-17%		
	Diesel Oil	pre-Euro	1,389	1,389	0%	312.32	264.56	-15%	433,081	368,136	-64,945	-15%	
		Euro 1	5,426	5,426	0%	268.42	246.79	-11%	1,678,472	1,680,688	17,884	11%	
		Euro 2	28,437	28,437	0%	406.84	279.91	-40%	11,563,522	6,253,531	-5,309,991	-40%	
Euro 3		92,795	92,795	0%	574.33	176.67	-69%	53,284,956	16,579,373	-36,705,583	-69%		
1.A.3.a.ii - Light Duty Vehicles (LDVs)	Gasoline	Euro 4	222,583	222,583	0%	393.55	149.27	-62%	87,598,471	33,225,566	-54,372,905	-62%	
		Euro 5	233,766	233,766	0%	435.42	149.27	-66%	101,787,275	34,884,768	-66,902,507	-66%	
		Euro 6	4,536	4,536	0%	259.53	149.27	-42%	5,177,151	677,046	-4,500,105	-42%	
		Diesel oil total	589,131	589,131	0%	437.14	158.71	-64%	257,533,128	83,899,619	-173,633,509	-64%	
		Pkcs Total	1,338,245	1,338,245	0%	237.49	111.77	-53%	317,723,735	146,576,886	-171,146,849	-53%	
		Diesel Oil	pre-Euro	981	981	0%	633.81	645.95	2%	1,683,320	1,751,293	67,973	2%
	Euro 1		194	194	0%	803.50	193.22	-86%	187,281	59,328	-127,953	-86%	
	Euro 2		836	836	0%	274.42	291.18	21%	229,520	189,285	-41,235	-21%	
	Euro 3		784	784	0%	52.66	191.79	10%	72,691	79,780	7,089	10%	
	1.A.3.a.iii - Heavy Duty Vehicles (HDVs)	Gasoline	Euro 4	1,089	1,089	0%	43.70	48.89	20%	77,284	82,833	5,549	20%
Euro 5			965	965	0%	16.67	48.89	183%	16,187	47,268	31,081	183%	
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	-3%	1,131,299	1,096,727	-34,572	-3%	
Diesel Oil			pre-Euro	2,744	2,744	0%	424.37	376.79	-9%	1,168,757	944,928	-223,829	-9%
			Euro 1	2,946	2,946	0%	399.75	276.24	-30%	1,166,782	834,566	-332,216	-30%
		Euro 2	6,982	6,982	0%	336.92	133.38	-42%	2,340,147	1,260,674	-1,079,473	-42%	
		Euro 3	20,421	20,421	0%	568.00	160.46	-72%	7,475,561	3,070,913	-4,404,648	-72%	
1.A.3.a.iv - Heavy Duty Trucks & Trailers		Diesel Oil	Euro 4	55,887	55,887	0%	497.72	304.46	-42%	1,047,806	5,046,426	-22,728,829	-42%
			Euro 5	29,024	29,024	0%	141.97	304.46	80%	11,181,325	2,837,584	-8,343,741	-80%
	Euro 6		41	41	0%	105.30	304.46	80%	6,160	2,688	-3,472	-80%	
	Diesel oil total		118,777	118,777	0%	488.66	114.90	-76%	57,883,533	13,566,088	-44,317,445	-76%	
	LDVs total		124,564	124,564	0%	404.14	118.63	-70%	58,214,142	14,677,275	-43,537,867	-70%	
	Diesel Oil		pre-Euro	1,152	1,152	0%	1066.68	1019.23	-5%	1,249,028	1,154,143	-94,885	-4%
		Euro 1	1,064	1,064	0%	727.68	750.98	3%	786,620	791,181	24,561	3%	
		Euro 2	6,984	6,984	0%	754.01	641.78	-16%	2,378,084	4,376,271	1,998,187	16%	
		Euro 3	13,187	13,187	0%	826.83	477.63	-42%	8,862,880	5,986,228	-2,876,652	-42%	
	1.A.3.a.v - Heavy Duty Trucks & Trailers	Diesel Oil	Euro 4	6,946	6,946	0%	883.55	363.71	-54%	2,550,961	1,779,796	-770,165	-30%
Euro 5			26,096	26,096	0%	358.88	183.48	-49%	8,835,653	4,420,743	-4,414,910	-50%	
Euro 6			537	537	0%	44.76	183.48	310%	30,407	86,572	74,526	260%	
Buses Total			51,776	51,776	0%	509.54	340.06	-29%	26,390,989	18,620,843	-7,770,146	-29%	
pre-Euro			5,083	5,083	0%	1039.72	737.35	-29%	6,072,170	4,322,880	-1,749,303	-29%	
Euro 1			2,945	2,945	0%	743.27	580.98	-21%	2,176,946	1,690,969	-485,977	-21%	
Diesel Oil		Euro 2	19,446	19,446	0%	818.17	515.47	-37%	15,089,881	9,480,975	-5,608,906	-37%	
		Euro 3	75,130	75,130	0%	638.43	447.63	-30%	47,087,440	27,588,228	-19,499,212	-30%	
		Euro 4	42,781	42,781	0%	396.90	287.27	-27%	16,936,867	12,280,770	-4,656,097	-27%	
		Euro 5	436,960	436,960	0%	267.70	152.65	-43%	123,151,324	66,796,246	-56,355,078	-46%	
Trucks Total	680,139	680,139	0%	55.87	289.20	41%	211,887,331	124,188,109	-87,699,222	-41%			
1.A.3.a.vi - Motorized Two-Wheelers (M2Ws)	Gasoline	pre-Euro	6,362	6,362	0%	123.07	151.79	23%	781,736	964,179	182,443	23%	
		Euro 1	4,013	4,013	0%	125.11	173.15	39%	562,073	694,880	132,807	39%	
		Euro 2	3,362	3,362	0%	132.24	185.58	40%	436,668	645,804	209,136	40%	
		Euro 3	4,562	4,562	0%	39.81	185.58	381%	181,610	802,175	716,565	381%	
		Euro 4	0	0	0%	0	0	0%	0	0	0	0%	
		Euro 5	0	0	0%	0	0	0%	0	0	0	0%	
	M2Ws Total	18,229	18,229	0%	104.34	175.38	68%	1,962,088	3,181,638	1,294,951	68%		
	1.A.3.b - Road Transport	Total	2,132,683	2,132,683	0%	268.88	147.76	-50%	616,079,063	290,854,731	-325,224,692	-50%	

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 [t]	in [t]	in [t]	in [t]		
1.A.3.a.i. - Passenger Cars	Gasoline	pre-Cars	11.647	11.647	0%	812.37	844.11	-11%	7.132.688	6.337.484	-796.844	-11%	
		Car 1	30.667	30.667	0%	368.77	343.93	-32%	11.082.246	7.480.641	-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%	6.955.589	6.459.797	-494.218	-7%	
		Car 4	387.759	387.759	0%	45.16	47.80	-3%	19.093.585	18.536.099	-523.557	-3%	
		Car 5	171.270	171.270	0%	18.59	47.80	151%	3.183.282	0.187.581	-5.004.299	151%	
	Car 6	10.315	10.315	0%	25.97	47.80	84%	267.855	433.096	225.248	84%		
	Gasoline total	752.526	752.526	0%	36.80	73.89	4%	57.215.533	54.988.501	-2.216.412	-4%		
	Diesel Oil	pre-Cars	1.341	1.341	0%	311.73	284.66	-5%	417.947	366.246	-42.722	-5%	
		Car 1	4.892	4.892	0%	298.92	267.28	-11%	1.482.284	1.387.643	-156.951	-11%	
		Car 2	23.934	23.934	0%	408.71	320.45	-49%	9.734.484	5.276.480	-4.458.004	-49%	
		Car 3	82.749	82.749	0%	585.53	176.81	-89%	48.481.830	14.796.245	-33.685.585	-89%	
		Car 4	211.237	211.237	0%	297.27	151.77	-62%	103.917.680	32.059.973	-71.857.706	-62%	
		Car 5	285.011	285.011	0%	436.38	151.77	-65%	124.721.396	43.370.300	-81.343.896	-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%			
Pkcs Total	1.338.571	1.338.571	0%	298.44	152.15	-53%	138.091.584	154.652.853	-175.478.269	-53%			
1.A.3.b.i. - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	986	986	0%	632.44	645.95	2%	1463.683	1276.724	-186.844	-13%	
		Car 1	173	173	0%	968.27	989.98	64%	150.074	53.575	-96.499	-64%	
		Car 2	748	748	0%	204.73	287.11	31%	212.888	154.839	-58.029	-27%	
		Car 3	771	771	0%	98.62	185.21	7%	75.982	81.070	5.078	7%	
		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	183%	23.517	68.918	45.401	183%	
	Car 6	17	17	0%	18.06	50.15	179%	212	670	657	179%		
	Gasoline total	5.845	5.845	0%	598.34	176.49	-7%	1.112.584	1.031.852	-88.732	-7%		
	Diesel Oil	pre-Cars	2.537	2.537	0%	428.16	386.79	-21%	1.985.919	1.76.259	-287.559	-21%	
		Car 1	2.588	2.588	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	-428.126	-42%	
		Car 3	18.220	18.220	0%	571.75	150.58	-74%	18.417.076	2.742.656	-17.674.828	-74%	
		Car 4	52.361	52.361	0%	498.70	91.69	-82%	26.164.486	4.703.746	-21.394.748	-82%	
		Car 5	46.749	46.749	0%	438.44	91.69	-79%	20.696.234	4.258.626	-16.237.709	-79%	
	Car 6	187	187	0%	151.18	91.69	-60%	29.829	17.974	-11.855	-60%		
Diesel oil total	128.528	128.528	0%	415.56	170.96	-77%	61.146.575	14.267.237	-46.879.338	-77%			
LDVs Total	134.423	134.423	0%	463.56	153.81	-75%	62.299.160	15.298.849	-46.968.311	-75%			
1.A.3.b.ii. - Heavy Duty Vehicles (HDVs)	Diesel Oil	pre-Cars	984	984	0%	1099.48	1919.23	-5%	1.062.384	1.062.921	-48.443	-5%	
		Car 1	837	837	0%	728.12	130.98	-3%	989.232	628.359	-360.873	-3%	
		Car 2	5.586	5.586	0%	704.95	643.67	-9%	4.284.320	3.683.441	-798.887	-9%	
		Car 3	11.221	11.221	0%	621.20	458.38	-21%	7.082.740	5.143.628	-1.939.228	-21%	
		Car 4	4.270	4.270	0%	461.10	361.79	-24%	1.972.610	1.584.978	-467.632	-24%	
		Car 5	22.042	22.042	0%	368.55	183.99	-49%	7.726.921	4.065.632	-3.671.389	-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	-6.308.881	-27%		
	1.A.3.b.iii. - Heavy Duty Vehicles (HDVs) - Trucks & Lorries	Diesel Oil	pre-Cars	4.182	4.182	0%	1034.34	737.35	-29%	4.945.942	3.525.898	-1.428.134	-29%
			Car 1	2.285	2.285	0%	748.66	581.41	-22%	1.800.689	1.237.759	-562.948	-22%
			Car 2	13.623	13.623	0%	817.90	510.38	-38%	11.446.862	6.565.738	-4.891.123	-38%
			Car 3	54.685	54.685	0%	632.52	384.41	-42%	36.589.677	19.927.835	-16.661.841	-42%
			Car 4	34.037	34.037	0%	396.37	285.34	-30%	13.481.158	9.711.896	-3.779.262	-30%
			Car 5	389.263	389.263	0%	282.92	153.66	-46%	110.112.782	59.688.643	-50.424.748	-46%
		Car 6	34.214	34.214	0%	63.96	153.66	189%	3.937.089	11.368.582	7.421.413	189%	
Trucks Total		572.754	572.754	0%	314.85	196.65	-38%	179.874.133	112.285.582	-67.588.551	-38%		
1.A.3.b.iv. - Motorised Two-Wheelers (MOWs)		Gasoline	pre-Cars	6.185	6.185	0%	122.85	158.64	29%	795.185	974.388	218.182	29%
	Car 1		3.037	3.037	0%	124.71	174.84	40%	478.514	670.859	192.346	40%	
	Car 2		3.365	3.365	0%	128.94	186.25	52%	433.874	680.378	226.504	52%	
	Car 3		5.385	5.385	0%	38.53	186.25	380%	299.722	1.041.189	821.467	380%	
	Car 4		0	0	0%	0	0	0%	0	0	0	0%	
	Car 5		0	0	0%	0	0	0%	0	0	0	0%	
MOWs Total	18.673	18.673	0%	108.59	179.24	78%	1.878.294	3.386.734	1.488.499	78%			
1.A.3.b. - Road Transport	Total	2.153.563	2.153.563	0%	277.27	140.35	-49%	597.128.287	362.252.271	-234.858.625	-49%		

Adjustment details for 2026												
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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	11 782	11 782	0%	634.75	644.11	-14%	7 470 914	6 410 967	-1 059 947	-14%
		Car 1	20 270	20 270	0%	372.25	341.68	-8%	7 545 483	4 986 888	-2 558 595	-34%
		Car 2	36 062	36 062	0%	212.73	143.11	-33%	7 671 581	5 180 897	-2 490 684	-33%
		Car 3	83 039	83 039	0%	76.17	75.50	-1%	4 881 482	4 759 259	-122 223	-1%
		Car 4	334 413	334 413	0%	53.74	50.17	-1%	17 363 364	16 777 445	-585 919	-3%
		Car 5	183 374	183 374	0%	19.09	50.17	163%	3 580 745	9 189 834	5 609 089	163%
	Diesel Oil	Car 6	65 332	65 332	0%	25.67	50.17	89%	1 768 917	3 327 855	1 558 938	88%
		Gasoline total	715 272	715 272	0%	70.93	70.65	-0%	58 736 267	50 535 049	-8 201 218	-14%
		pre-Cars	1 380	1 380	0%	364.76	254.56	-30%	364 262	239 173	-125 089	-34%
		Car 1	3 749	3 749	0%	298.36	269.66	-9%	1 122 449	1 011 626	-110 823	-10%
		Car 2	16 584	16 584	0%	407.19	221.43	-46%	6 720 132	3 653 964	-3 066 168	-46%
		Car 3	81 398	81 398	0%	802.50	179.24	-78%	36 981 999	11 085 409	-25 896 590	-70%
	Diesel Oil	Car 4	175 040	175 040	0%	405.76	156.24	-61%	71 362 220	27 474 086	-43 888 134	-61%
		Car 5	299 054	299 054	0%	433.34	156.24	-64%	130 032 044	46 019 229	-84 012 815	-64%
		Car 6	116 034	116 034	0%	268.75	156.24	-41%	30 427 555	10 232 785	-20 194 770	-66%
		Diesel oil total	625 119	625 119	0%	418.36	160.76	-61%	277 941 660	188 535 230	-89 406 430	-61%
		Pkx Total	1 380 391	1 380 391	0%	235.75	154.41	-35%	327 778 627	199 070 280	-128 708 347	-39%
1.A.3.b.i - Light Duty Vehicles (LDV)	Gasoline	pre-Cars	910	910	0%	602.79	645.95	-1%	593 186	547 543	-45 643	-8%
		Car 1	136	136	0%	908.31	312.78	-66%	122 126	42 425	-79 701	-65%
		Car 2	540	540	0%	308.39	217.84	-30%	162 311	117 737	-44 574	-28%
		Car 3	650	650	0%	108.43	111.57	3%	70 432	72 731	2 299	3%
		Car 4	1 684	1 684	0%	43.06	52.36	21%	73 714	84 003	10 289	14%
		Car 5	1 724	1 724	0%	19.82	52.36	164%	34 157	80 258	46 101	164%
	Diesel Oil	Car 6	363	363	0%	19.85	52.36	181%	6 764	19 992	13 228	181%
		Gasoline total	5 506	5 506	0%	588.27	171.66	-70%	1 068 292	1 013 678	-54 614	-5%
		pre-Cars	2 189	2 189	0%	414.81	386.79	-7%	899 549	885 433	-14 116	-2%
		Car 1	1 780	1 780	0%	391.89	276.25	-30%	780 189	385 371	-394 818	-50%
		Car 2	4 223	4 223	0%	323.43	153.31	-53%	1 365 594	676 452	-689 142	-50%
		Car 3	13 582	13 582	0%	588.91	150.77	-74%	8 064 323	2 040 233	-6 024 090	-74%
	Diesel Oil	Car 4	43 141	43 141	0%	504.48	32.40	-93%	21 783 989	3 986 141	-17 797 848	-82%
		Car 5	74 231	74 231	0%	434.16	32.40	-93%	32 223 283	6 658 780	-25 564 503	-79%
		Car 6	4 921	4 921	0%	113.49	32.40	-72%	755 285	454 676	-300 609	-40%
		Diesel oil total	148 068	148 068	0%	456.12	185.62	-77%	65 712 732	15 256 007	-50 456 725	-77%
		LDVs Total	149 994	149 994	0%	445.23	188.29	-76%	66 781 025	16 229 684	-50 551 341	-76%
1.A.3.b.ii - Heavy Duty Vehicles (HDV)	Gasoline	pre-Cars	891	891	0%	1076.81	1919.23	-43%	964 197	988 234	24 037	2%
		Car 1	583	583	0%	731.36	1732.57	-58%	433 675	446 236	12 561	3%
		Car 2	4 375	4 375	0%	708.25	645.03	-9%	3 440 614	2 822 621	-617 993	-18%
		Car 3	10 333	10 333	0%	632.87	458.91	-28%	6 539 364	4 741 827	-1 797 536	-27%
		Car 4	4 449	4 449	0%	475.90	382.29	-20%	2 117 219	1 586 881	-530 338	-25%
		Car 5	34 380	34 380	0%	366.36	185.22	-49%	8 935 974	4 517 517	-4 418 457	-49%
	Diesel Oil	Car 6	9 126	9 126	0%	62.79	185.22	196%	573 066	1 680 431	1 107 365	196%
		Buses Total	54 157	54 157	0%	404.73	388.24	-2%	23 082 189	16 885 117	-6 197 072	-27%
		pre-Cars	3 933	3 933	0%	1034.81	737.35	-29%	4 087 249	2 980 379	-1 106 870	-29%
		Car 1	1 555	1 555	0%	748.16	587.92	-21%	1 163 482	789 813	-373 669	-33%
		Car 2	8 876	8 876	0%	817.75	585.42	-29%	7 258 047	4 486 626	-2 771 421	-38%
		Car 3	34 167	34 167	0%	638.91	588.66	-8%	21 553 280	12 251 155	-9 302 125	-43%
	Diesel Oil	Car 4	34 287	34 287	0%	396.94	281.86	-29%	9 640 384	6 885 621	-2 754 763	-29%
		Car 5	269 735	269 735	0%	287.22	153.60	-46%	74 680 233	39 976 610	-34 703 623	-46%
		Car 6	261 480	261 480	0%	61.77	153.60	149%	16 149 289	40 284 036	24 134 748	149%
		Trucks Total	584 013	584 013	0%	226.31	180.97	-20%	134 431 899	101 496 262	-32 935 637	-24%
		pre-Cars	5 543	5 543	0%	125.59	155.78	24%	696 072	883 289	187 218	24%
		Car 1	3 360	3 360	0%	127.11	177.29	39%	427 113	585 796	158 683	39%
		Car 2	3 375	3 375	0%	125.94	187.68	50%	421 961	687 078	265 117	63%
		Car 3	6 443	6 443	0%	48.36	187.68	381%	209 627	1 273 671	1 064 044	508%
		Car 4	85	85	0%	17.47	187.68	1031%	1 134	12 632	11 498	1015%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
		HDVs Total	16 185	16 185	0%	96.14	181.68	89%	1 885 897	3 452 476	1 566 579	83%
		1.A.3.b - Road Transport	2 287 339	2 287 339	0%	258.89	137.22	-46%	553 799 598	362 981 820	-190 817 778	-46%

Adjustment details for 2027												
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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	12 282	12 282	0%	636.73	644.11	-11%	7 814 287	6 680 187	-1 126 100	-14%
		Car 1	17 449	17 449	0%	372.96	341.68	-8%	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	4 314 140	-2 303 430	-35%
		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	167%	3 485 382	9 239 815	5 754 433	167%
	Car 6	114 791	114 791	0%	25.65	51.26	82%	3 063 235	5 884 372	2 821 137	82%	
	Gasoline total	724 571	724 571	0%	67.66	60.88	-10%	49 046 874	38 634 374	-10 412 500	-21%	
	pre-Cars	1 780	1 780	0%	364.96	254.56	-30%	489 963	347 626	-142 337	-30%	
	Car 1	3 360	3 360	0%	298.17	271.67	-9%	1 082 288	910 182	-172 106	-16%	
	Car 2	13 788	13 788	0%	407.17	222.44	-45%	5 614 130	3 066 393	-2 547 736	-45%	
	Car 3	52 128	52 128	0%	808.95	179.65	-78%	31 696 478	9 364 788	-22 331 690	-70%	
	Car 4	187 047	187 047	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	44 073 190	-76 114 505	-63%	
	Car 6	184 768	184 768	0%	262.61	158.34	-40%	48 521 183	29 255 985	-19 265 198	-40%	
	Diesel oil total	686 582	686 582	0%	394.65	161.95	-59%	272 126 081	112 890 717	-159 235 364	-59%	
	Pkx Total	1 421 142	1 421 142	0%	225.98	155.61	-30%	121 152 965	163 445 435	42 292 470	35%	
1.A.3.b.i - Light Duty Vehicles (LDV)	Gasoline	pre-Cars	940	940	0%	611.41	645.95	-6%	612 247	686 978	7 432	1%
		Car 1	124	124	0%	908.23	312.78	-66%	112 083	39 682	-72 401	-65%
		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	4%	65 955	68 812	2 857	4%
		Car 4	1 476	1 476	0%	50.72	53.38	5%	74 877	78 816	3 938	5%
		Car 5	1 680	1 680	0%	21.73	53.38	146%	35 240	89 034	53 794	146%
	Car 6	910	910	0%	19.18	53.38	180%	17 052	49 080	32 028	180%	
	Gasoline total	6 186	6 186	0%	171.55	167.18	-2%	1 058 799	1 034 211	-24 588	-2%	
	pre-Cars	2 067	2 067	0%	413.41	386.79	-6%	860 499	831 183	-29 316	-3%	
	Car 1	1 538	1 538	0%	398.47	276.25	-30%	680 795	331 158	-349 636	-50%	
Car 2	3 580	3 580	0%	321.26	193.64	-40%	1 543 793	887 293	-656 500	-43%		
Car 3	11 054	11 054	0%	395.30	150.79	-61%	5 240 325	1 789 552	-3 450 773	-65%		
Car 4	39 050	39 050	0%	866.78	30.69	-97%	19 789 647	3 626 025	-16 163 622	-82%		
Car 5	75 789	75 789	0%	432.95	30.69	-93%	32 790 566	7 054 565	-25 736 011	-79%		
Car 6	19 625	19 625	0%	161.71	30.69	-81%	2 977 329	1 626 875	-1 350 454	-45%		
Diesel oil total	153 284	153 284	0%	424.66	181.89	-57%	65 083 930	15 925 274	-49 158 656	-74%		
LDVs total	199 470	199 470	0%	414.83	186.35	-54%	86 152 129	16 959 427	-69 192 702	-79%		
1.A.3.b.ii - Heavy Duty Vehicles (HDVs)	Diesel Oil	pre-Cars	736	736	0%	1073.33	1019.23	-5%	790 259	150 425	-639 834	-81%
		Car 1	411	411	0%	731.97	732.57	0%	300 684	389 062	8 459	3%
		Car 2	3 325	3 325	0%	707.91	664.79	-7%	2 620 087	2 147 480	-472 606	-18%
		Car 3	8 678	8 678	0%	824.32	419.12	-49%	6 457 480	3 984 085	-2 473 395	-39%
		Car 4	3 923	3 923	0%	474.07	362.49	-23%	2 812 380	1 347 600	-1 464 780	-52%
		Car 5	21 613	21 613	0%	363.92	186.49	-49%	7 937 975	4 050 686	-3 884 291	-49%
Car 6	14 586	14 586	0%	68.52	186.49	270%	864 215	2 712 580	1 848 375	214%		
Diesel total	53 582	53 582	0%	318.80	286.71	-9%	19 193 981	15 384 682	-3 809 299	-20%		
pre-Cars	3 686	3 686	0%	1034.43	1 171.25	-29%	3 730 272	2 659 076	-1 071 256	-29%		
Car 1	1 311	1 311	0%	807.46	408.38	-37%	900 942	614 151	-286 790	-37%		
Car 2	7 087	7 087	0%	817.66	543.45	-33%	5 794 876	3 580 626	-2 214 250	-38%		
Car 3	20 062	20 062	0%	538.17	279.34	-48%	16 581 727	8 952 452	-7 629 275	-46%		
Car 4	30 062	30 062	0%	307.77	279.34	-9%	7 965 414	6 587 045	-1 368 369	-17%		
Car 5	264 365	264 365	0%	266.16	154.36	-42%	49 280 789	31 635 347	-17 645 342	-36%		
Car 6	335 065	335 065	0%	65.52	154.36	135%	21 985 366	51 718 641	29 733 275	136%		
Trucks total	588 263	588 263	0%	195.92	175.92	-10%	116 617 141	105 246 588	-11 370 553	-10%		
pre-Cars	5 336	5 336	0%	125.91	157.19	25%	671 088	830 789	159 801	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	47%	416 290	673 540	257 249	62%		
Car 3	6 711	6 711	0%	41.22	180.33	263%	271 187	1 396 566	1 065 849	283%		
Car 4	430	430	0%	16.26	180.33	987%	7 982	85 275	77 293	968%		
Car 5	0	0	0%	0.00	0.00	0%	0	0	0	0%		
M2Ws total	19 160	19 160	0%	92.81	183.39	98%	1 738 674	5 551 381	3 755 714	98%		
1.A.3.b - Road Transport	Total	2 251 471	2 251 471	0%	213.43	175.23	-17%	525 549 430	384 485 986	-141 063 444	-27%	

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.a.i - Passenger Cars	Gasoline	pre-Cars	12,219	12,219	0%	637.58	644.11	-6%	7,780,965	6,668,721	-1,112,234	-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	-50%	5,360,977	2,688,163	-2,672,814	-50%
		Car 3	43,642	43,642	0%	88.16	76.96	-13%	3,897,781	3,358,617	-539,164	-14%
		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	-100%	4,190,422	8,716,255	4,525,833	108%
	Gasoline total	689,027	689,027	0%	64.42	64.34	0%	45,032,266	47,386,047	2,353,680	5%	
	Diesel Oil	pre-Cars	1,591	1,591	0%	303.16	264.96	-15%	338,146	305,173	-32,973	-10%
		Car 1	2,949	2,949	0%	294.17	272.65	-8%	862,432	776,165	-86,267	-10%
		Car 2	10,784	10,784	0%	409.20	222.67	-45%	4,391,383	2,483,536	-1,907,848	-43%
		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%
	Diesel Oil total	228,685	228,685	0%	254.87	180.40	-30%	58,284,140	35,680,446	-22,603,694	-39%	
	1.A.3.a.i - Passenger Cars	1,365,181	1,365,181	0%	371.66	163.38	-56%	247,596,063	188,768,684	-158,767,459	-64%	
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	1,365,181	1,365,181	0%	214.34	154.68	-28%	262,589,060	156,555,421	-106,033,639	-40%
		Car 1	911	911	0%	664.51	645.95	-3%	599,851	582,662	-17,189	-3%
		Car 2	189	189	0%	911.58	512.78	-44%	99,529	33,895	-65,634	-66%
		Car 3	377	377	0%	303.84	224.45	-26%	114,682	84,713	-29,969	-26%
		Car 4	511	511	0%	111.92	116.84	4%	57,282	60,739	3,457	6%
		Car 5	1,275	1,275	0%	52.02	54.36	4%	66,290	69,270	2,980	4%
	Gasoline total	6,315	6,315	0%	62.02	54.36	-12%	35,160	80,626	45,466	129%	
	Diesel Oil	pre-Cars	1,643	1,643	0%	19.18	54.36	182%	30,550	89,326	58,776	192%
		Car 1	6,315	6,315	0%	154.22	160.11	4%	999,199	1,011,136	11,937	1%
		Car 2	1,872	1,872	0%	411.51	386.79	-6%	771,337	574,432	-196,905	-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	9,363	9,363	0%	558.10	150.74	-73%	5,689,152	1,411,299	-4,277,853	-75%
	Diesel Oil total	33,232	33,232	0%	508.42	93.81	-82%	16,929,185	3,117,457	-13,811,728	-82%	
	LDVs total	66,283	66,283	0%	432.92	93.81	-78%	28,684,080	6,217,860	-22,466,220	-78%	
LDVs total	154,269	154,269	0%	158.79	93.81	-41%	5,941,615	3,686,228	-2,255,387	-38%		
1.A.3.b.ii - Heavy Duty Vehicles (HDVs)	Gasoline	pre-Cars	180,574	180,574	0%	384.71	184.94	-52%	59,344,545	35,840,306	-23,504,239	-39%
		Car 1	547	547	0%	1078.16	1919.23	78%	589,267	557,147	-32,120	-5%
		Car 2	237	237	0%	732.78	752.57	3%	173,676	176,388	2,712	2%
		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%	628.89	459.32	-27%	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%	6,663,265	3,376,016	-3,287,249	-49%
	Car 1	20,670	20,670	0%	64.89	186.37	289%	1,176,026	3,662,314	2,486,288	212%	
	Buses Total	91,634	91,634	0%	309.75	283.53	-8%	15,993,546	13,687,186	-2,306,360	-15%	
	Trucks Total	pre-Cars	3,262	3,262	0%	1034.82	737.35	-29%	3,375,359	2,485,071	-890,288	-26%
		Car 1	1,094	1,094	0%	747.82	488.39	-35%	918,052	512,378	-405,674	-44%
		Car 2	5,544	5,544	0%	817.44	581.68	-29%	4,532,180	2,781,510	-1,750,670	-39%
		Car 3	20,583	20,583	0%	629.54	355.68	-44%	12,967,751	7,277,279	-5,690,472	-44%
		Car 4	15,912	15,912	0%	358.89	276.23	-23%	6,334,421	4,386,424	-1,947,997	-31%
		Car 5	154,963	154,963	0%	250.40	154.68	-38%	45,964,153	24,283,389	-21,680,764	-47%
Trucks Total	381,799	381,799	0%	68.78	154.68	125%	26,251,482	59,665,886	33,414,404	126%		
1.A.3.b - Road Transport	585,186	585,186	0%	515.18	172.19	-66%	188,173,537	180,760,889	-7,412,648	-4%		
1.A.3.b.iii - Motorised Two-Wheelers (MTWs)	Gasoline	pre-Cars	4,940	4,940	0%	128.95	158.61	23%	622,656	783,451	160,795	26%
		Car 1	2,966	2,966	0%	128.14	177.79	41%	374,114	527,294	153,180	41%
		Car 2	3,221	3,221	0%	128.33	188.64	46%	387,596	639,833	252,237	65%
		Car 3	6,241	6,241	0%	48.24	188.64	288%	20,126	1,239,686	1,219,560	598%
		Car 4	1,130	1,130	0%	58.41	188.64	323%	23,066	224,682	201,616	873%
		Car 5	0	0	0%	0.00	188.64	0%	0	0	0	0%
	MTWs Total	18,487	18,487	0%	85.86	188.65	119%	1,658,558	3,454,767	1,796,209	108%	
	1.A.3.b - Road Transport	2,189,983	2,189,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-39%	

REVISION OF ADJUSTMENT PROPOSAL COMPARED TO SUBMISSIONS 2014 to 2019

Table 2: annual NO_x, adjustment proposals, in kilotonnes

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

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

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

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

Adjustment description as provided in IIRs 2014 and 2015:

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

bibliography : 1 : EB, 2012a: CLRTAP EB Decision 2012/3, ECE/EB.AIR/111/Add.1: Adjustments under the Gothenburg Protocol to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them URL:

http://www.unece.org/fileadmin/DAM/env/documents/2013/air/ECE_EB.AIR_111_Add.1_ENG_DECISION_3.pdf : 2 : EB, 2012b: CLRTAP EB Decision 2012/4: Provisional Application of Amendment to the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone URL:

http://www.unece.org/fileadmin/DAM/env/documents/2013/air/ECE_EB.AIR_111_Add.1__ENG_DECISION_4.pdf : 3 : EB, 2012c: CLRTAP EB Decision 2012/12: Guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them URL: http://www.unece.org/fileadmin/DAM/env/documents/2012/EB/Decision_2012_12.pdf : 4 : IIASA, 1999: Amann, M.; Bertok, I.; Cofala, J.; Gyarmas, F.; Heyes, Chr.; Klimont, Zb.; Syri, S.; Schöpp, W.: Further analysis of scenario results obtained with the RAINS model - Interim Report to the Ministère de L'Aménagement du Territoire et de l'Environnement Direction de la Prévention des Pollutions et des Risques 20, avenue de Ségur 75302 Paris 07 SP, April 1999 - URL: <https://iiasa.ac.at/web/home/research/researchPrograms/air/policy/france3b.pdf> : 5 : ifeu, 2002: Final report to UFOPLAN study FKZ 201 45 112 (German version only): Aktualisierung des Daten- und Rechenmodells: Energieverbrauch und Schadstoffemissionen des motorisierten Verkehrs in Deutschland 1980-2020; Im Auftrag des Umweltbundesamtes; ifeu Institut für Energie- und Umweltforschung Heidelberg GmbH (Institute for Energy and Environmental Research), Wilckensstraße 3, D-69120 Heidelberg, Germany, phone: +49 (0) 6221 / 47 67 -0, fax: +49 (0) 6221 / 47 67 -19, Heidelberg, 31. Oktober 2002 : 6 : Knörr et al. (2019a): Knörr, W., Heidt, C., Gores, S., & Bergk, F.: ifeu Institute for Energy and Environmental Research (Institut für Energie- und Umweltforschung Heidelberg gGmbH, ifeu): Fortschreibung des Daten- und Rechenmodells: Energieverbrauch und Schadstoffemissionen des motorisierten Verkehrs in Deutschland 1960-2035, sowie TREMOD, im Auftrag des Umweltbundesamtes, Heidelberg & Berlin, 2019. : 7 : UBA, 2018: CLRTAP submission 2018, Dessau, 2018 : 8 : ECE/EB.AIR/113/Add.1, 2012: Report of the Executive Body on its thirty-first session, Decision 2012/12 on Guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them; URL: http://www.unece.org/fileadmin/DAM/env/documents/2012/EB/ECE_EB.AIR_113_Add.1__ENG_1_.pdf : 9 : CEIP, 2014a: Centre on Emission Inventories and Projections (CEIP): CEIP/Adjustment RR/2014/GERMANY: Review of the 2014 Adjustment Application by Germany, URL: https://webdab01.umweltbundesamt.at/download/adjustments2014/Adjustment_Review_Report_GERMANY_2014.pdf?cgiproxy_skip=1, 5 August 2014 : 10 : CEIP, 2014b: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2014/10: Review of adjustment applications 2014; URL: http://www.ceip.at/fileadmin/inhalte/emep/pdf/2015/ece.eb.air.ge.1.2014.10.edited.ae_formatting_accepted.ko.pdf, 5 August 2014 : 11 : CEIP, 2015a: Centre on Emission Inventories and Projections (CEIP): CEIP/Adjustment RR/2015/Germany: Review of the 2015 Adjustment Application by Germany, URL: https://webdab01.umweltbundesamt.at/download/adjustments2015/Germany2015-adj.pdf?cgiproxy_skip=1, September 2015 : 12 : CEIP, 2015b: Centre on Emission Inventories and Projections (CEIP): CE/EB.AIR/GE.1/2015/10-ECE/EB.AIR/WG.1/2015/13: Review of adjustment applications 2015; URL: http://www.ceip.at/fileadmin/inhalte/emep/Adjustments/ece.eb.air.ge.1.2015.10_ece.eb.air.wg.1.2015.13.AV.pdf, 6 July 2015 : 13 : CEIP, 2016a: Centre on Emission Inventories and Projections (CEIP): Review of the 2016 Adjustment Application by Germany, URL: https://webdab01.umweltbundesamt.at/download/adjustments2016/Germany2016-adj.pdf?cgiproxy_skip=1, 2016 : 14 : CEIP, 2016b: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2016/10-ECE/EB.AIR/WG.1/2016/18: Review of adjustment applications 2016; URL: http://www.ceip.at/fileadmin/inhalte/emep/pdf/2016/ECE_EB.AIR_GE.1_2016_10_E.pdf, 2016 : 15 : CEIP, 2017a: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2017/10-ECE/EB.AIR/WG.1/2017/20: Review of adjustment applications 2017; URL: http://www.ceip.at/fileadmin/inhalte/emep/pdf/2017/Advance_ece_eb_air_ge_1_2017_10_ece_eb_air_wg_1_2017.pdf, 2017 : 16 : CEIP, 2018a: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2018/10-ECE/EB.AIR/WG.1/2018/21: Review of adjustment applications 2018; URL: https://www.ceip.at/fileadmin/inhalte/emep/pdf/2018/ADJ_ece.eb.air.ge.1.2018.10-ece.eb.air.wg.1.2018.21_advance.pdf, 2018 : 17 : CEIP, 2019a: Centre on Emission Inventories and Projections (CEIP):

ECE/EB.AIR/GE.1/2019/10–ECE/EB.AIR/WG.1/2019/22: Review of adjustment applications 2019; URL: https://www.ceip.at/fileadmin/inhalte/emep/pdf/2019/ECE_EB.AIR_GE.1_2019_10-1909789E.pdf, 2019 : 18 : Keller et al. (2017): Keller, M., Hausberger, S., Matzer, C., Wüthrich, P., & Notter, B.: Handbook Emission Factors for Road Transport, version 3.3 (Handbuch Emissionsfaktoren des Straßenverkehrs 3.3) URL: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwj0y67pi5foAhWB16QKHfpYDIgQFjAAegQIAhAB&url=https%3A%2F%2Fwww.hbefa.net%2Fd%2Fd ocuments%2FHBFEFA33_Hintergrundbericht.pdf&usg=AOvVaw2sOF884KtccVyWLIdt1CIZ - Dokumentation, Bern, 2017. : 19 : Notter et al. (2019): Keller, M., Althaus, H.-J., Cox, B., Knörr, W., Heidt, Ch., Biemann, K., Räder, D.: Handbook Emission Factors for Road Transport, version 4.1 (Handbuch Emissionsfaktoren des Straßenverkehrs 4.1), HBEFA 4.1 Development Report; URL: https://www.hbefa.net/e/documents/HBEFA41_Development_Report.pdf, Bern, Heidelberg, 21. August 2019. bibliography

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- ¹⁾ (bibcite 4)
 - ²⁾ (bibcite 1)
 - ³⁾ (bibcite 3)
 - ⁴⁾ (bibcite 2)
 - ⁵⁾ (bibcite 4)
 - ⁶⁾ (bibcite 5)
 - ⁷⁾ (bibcite 6)
 - ⁸⁾ (bibcite 18)
 - ⁹⁾ (bibcite 19)