

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

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

TREMODO, 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 2002⁶⁾, 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.

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

NER 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	94.99	-13%	77.644.842	67.959.906	9.683.935	-13%
1.A.3.b.i	diesel oil		529.390	529.390	0%	429.45	160.51	-63%	227.341.056	84.370.461	142.970.635	-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		46.844	46.844	0%	623.00	482.55	-23%	29.931.266	23.183.732	6.747.534	-23%
1.A.3.b.iv	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	64.351.951	8.833.900	-11%
1.A.3.b.i	diesel oil		553.564	553.564	0%	434.12	159.22	-63%	248.313.791	88.138.959	160.174.832	-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		47.365	47.365	0%	592.65	448.99	-24%	28.071.221	21.286.323	6.884.898	-24%
1.A.3.b.iii	diesel oil		563.891	563.891	0%	419.38	244.97	-40%	231.410.271	138.136.342	93.273.929	-40%
1.A.3.b.iv	gasoline		19.289	19.289	0%	119.79	171.60	54%	2.137.662	3.299.162	-1.162.160	54%
1.A.3.b TOTAL		2011	2.100.883	2.100.883	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	58.577.229	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%	55.106.382	13.741.354	41.365.028	-75%
1.A.3.b.iii	diesel oil		50.902	50.902	0%	533.22	384.33	-28%	27.141.913	19.563.208	7.578.704	-28%
1.A.3.b.iii	diesel oil		589.585	589.585	0%	381.33	224.00	-41%	224.829.180	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%	80.35	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%	257.533.728	93.499.010	164.034.718	-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%	489.60	114.93	-76%	57.003.533	13.690.488	43.333.045	-76%
1.A.3.b.iii	diesel oil		81.716	81.716	0%	509.54	369.96	-29%	26.350.969	18.420.843	7.930.126	-29%
1.A.3.b.iii	diesel oil		600.139	600.139	0%	353.06	287.93	-19%	211.887.531	124.788.459	87.099.072	-41%
1.A.3.b.iv	gasoline		18.229	18.229	0%	194.34	175.38	-9%	1.902.668	3.197.038	-1.294.371	68%
1.A.3.b TOTAL		2013	2.132.683	2.132.683	0%			0%	616.078.663	316.854.371	300.224.292	-50%
1.A.3.b.i	gasoline		752.526	752.526	0%	75.03	73.09	-3%	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%	61.146.575	14.267.237	46.879.338	-77%
1.A.3.b.iii	diesel oil		45.143	45.143	0%	468.37	339.99	-27%	23.017.116	16.708.234	6.308.881	-27%
1.A.3.b.iii	diesel oil		672.754	672.754	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%	74.38	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		135.396	135.396	0%	469.35	187.96	-77%	63.505.443	14.607.490	48.897.953	-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	116.529.703	40.659.973	-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	2.161.576	2.161.576	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%	50.736.567	50.535.049	201.518	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%	189.27	171.06	-9%	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	50.496.726	-77%
1.A.3.b.iii	diesel oil		54.157	54.157	0%	424.73	388.24	-7%	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%	134.431.899	107.496.262	26.935.637	-20%
1.A.3.b.iv	gasoline		18.785	18.785	0%	96.14	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%	553.799.556	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	-1.608.640	3%
1.A.3.b.i	diesel oil		696.592	696.592	0%	399.65	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		153.294	153.294	0%	424.66	183.89	-76%	66.093.930	15.925.216	50.168.714	-76%
1.A.3.b.iii	diesel oil		53.382	53.382	0%	378.80	286.71	-23%	19.793.501	15.304.828	4.488.673	-23%
1.A.3.b.iii	diesel oil		598.263	598.263	0%	195.02	175.92	-9%	116.671.141	105.248.508	11.422.633	-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	304.469.906	221.079.424	-42%
1.A.3.b.i	gasoline		699.027	699.027	0%	64.42	68.36	6%	45.032.556	47.786.817	-2.753.261	6%
1.A.3.b.i	diesel oil		666.074	666.074	0%	371.66	163.30	-56%	247.656.062	108.768.604	138.887.459	-56%
1.A.3.b.ii	gasoline		6.315	6.315	0%	158.22	168.11	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%	69.344.525	15.840.310	53.504.215	-73%
1.A.3.b.iii	diesel oil		51.634	51.634	0%	399.75	263.53	-35%	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%	188.173.337	188.710.869	-537.532	1%
1.A.3.b.iv	gasoline		18.457	18.457	0%	89.66	184.61	106%	1.658.568	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		683.841	683.841	0%	345.81	165.07	-52%	229.566.068	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	1.024.160	-47.931	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	-9%	14.527.012	13.118.578	1.408.434	-9%
1.A.3.b.iii	diesel oil		595.913	595.913	0%	153.35	169.17	10%	91.380.700	100.809.376	-9.428.676	10%
1.A.3.b.iv	gasoline		18.750	18.750	0%	86.05	186.83	117%	1.613.450	3.502.941	-1.889.491	117%
1.A.3.b TOTAL		2019	2.202.000	2.202.000	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 [kg]	in [kg]	in [kg]	in [kg]	
1.A.3.a.i. Passenger Cars	Gasoline	pre-Cars	13.686	13.686	0%	584.75	514.25	-12%	7.955.060	6.986.917	-958.143	-12%
		Car 1	36.541	36.541	0%	338.50	297.71	-13%	25.915.925	10.189.262	-7.716.663	-30%
		Car 2	96.425	96.425	0%	172.95	135.63	-22%	16.580.020	13.020.026	-3.588.995	-22%
		Car 3	133.139	133.139	0%	58.51	70.18	20%	7.790.384	9.343.433	1.553.129	20%
		Car 4	444.981	444.981	0%	42.27	42.19	0%	18.911.389	18.773.529	-37.859	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	67%	2	3	1	67%	
	Gasoline total	795.957	795.957	0%	92.55	84.99	-10%	37.644.842	47.650.986	8.903.875	13%	
	Diesel Oil	pre-Cars	1.915	1.915	0%	318.13	264.95	-15%	583.760	527.256	-56.504	-10%
		Car 1	10.338	10.338	0%	296.82	246.17	-11%	3.066.428	2.741.387	-325.121	-11%
		Car 2	50.088	50.088	0%	406.90	278.19	-40%	29.372.795	10.974.230	-9.398.584	-40%
		Car 3	134.025	134.025	0%	542.94	178.54	-67%	72.645.173	23.929.276	-48.716.957	-67%
		Car 4	279.154	279.154	0%	304.37	140.58	-53%	187.299.180	39.243.811	-88.655.349	-47%
		Car 5	53.547	53.547	0%	434.70	140.58	-68%	23.276.735	7.527.796	-15.749.829	-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	-42%		
Gasoline	pre-Cars	1,249	1,249	0%	627.99	645.95	1%	783.320	886.871	21.551	3%	
	Car 1	367	367	0%	961.95	297.39	-69%	386.969	186.620	-208.358	-54%	
	Car 2	1,393	1,393	0%	264.75	184.41	-30%	368.840	256.917	-111.931	-30%	
	Car 3	856	856	0%	82.47	90.83	10%	70.631	77.625	6.994	10%	
	Car 4	2,420	2,420	0%	36.32	44.90	24%	87.987	188.679	28.772	24%	
	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	-1%	1,478.832	1,596.328	246.934	16%	
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	-691.239	-33%
		Car 1	9,989	9,989	0%	398.59	276.24	-30%	2,389.080	1,289.636	-1,099.408	-46%
		Car 2	13,126	13,126	0%	336.76	153.18	-54%	4,420.380	2,534.731	-1,885.629	-43%
		Car 3	33,249	33,249	0%	531.91	150.58	-72%	17,665.883	5,085.760	-12,640.123	-72%
		Car 4	54,581	54,581	0%	491.42	80.69	-84%	26,021.036	4,940.722	-21,081.114	-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%	
	Gasoline total	113,450	113,450	0%	476.34	134.96	-72%	54,040.533	15,351.584	-38,728.949	-72%	
	Diesel Oil	LDVs total	119,175	119,175	0%	464.70	139.18	-70%	55,658.966	36,688.913	-18,989.853	-34%
		pre-Cars	3,382	3,382	0%	1096.25	1028.78	-6%	3,674.087	3,452.644	-221.423	-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%	
1.A.3.b.ii. Heavy Duty Vehicles (HDVs)	Diesel Oil	Car 3	15,890	15,890	0%	633.22	437.25	-30%	13,065.776	7,289.299	-2,797.567	-20%
		Car 4	5,461	5,461	0%	448.63	351.65	-22%	2,650.016	1,501.527	-1,148.489	-43%
		Car 5	10,326	10,326	0%	337.28	182.33	-46%	3,882.417	1,882.544	-1,999.873	-51%
		Car 6	0	0	0%	0%	0%	0	0	0	0%	
		Diesel total	48,044	48,044	0%	623.80	482.55	-23%	29,931.266	23,183.732	-6,747.534	-23%
		pre-Cars	10,185	10,185	0%	1040.16	787.37	-25%	10,510.623	7,754.138	-2,756.485	-26%
	Car 1	5,677	5,677	0%	758.59	575.55	-24%	4,261.383	3,287.681	-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%	
Trucks & Lorries	Car 3	169,923	169,923	0%	636.28	274.48	-57%	161,136.182	59,617.271	-101,508.921	-63%	
	Car 4	69,636	69,636	0%	368.34	280.62	-24%	27,183.867	20,146.636	-7,037.231	-26%	
	Car 5	283,934	283,934	0%	276.42	151.65	-45%	78,640.643	43,115.897	-35,524.746	-45%	
	Car 6	0	0	0%	0%	0%	0	0	0	0%		
	Trucks Total	566,141	566,141	0%	446.67	271.83	-39%	293,148.243	154,696.160	-138,452.083	-47%	
	pre-Cars	7,973	7,973	0%	122.80	149.18	22%	972.721	1,189.393	216.672	22%	
1.A.3.b.iii. Heavy Duty Vehicles (HDVs)	Gasoline	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	31%	585.362	696.661	116.309	20%
		Car 3	2,950	2,950	0%	38.11	184.21	387%	116.180	647.032	432.834	387%
		Car 4	0	0	0%	0%	0%	0	0	0	0%	
		Car 5	0	0	0%	0%	0%	0	0	0	0%	
		Gasoline total	19,112	19,112	0%	113.68	168.43	48%	2,243.149	3,326.034	1,079.285	48%
		Diesel Oil	pre-Cars	2,879,688	2,879,688	0%	219.62	168.23	-23%	645,965.162	349,851.296	-296,113.956
	Car 1		1,044	1,044	0%	629.25	645.95	4%	1,044	1,044	0	0%
	Car 2		1,184	1,184	0%	629.25	645.95	4%	1,184	1,184	0	0%
	Car 3		1,184	1,184	0%	629.25	645.95	4%	1,184	1,184	0	0%
	Car 4		1,184	1,184	0%	629.25	645.95	4%	1,184	1,184	0	0%
	Car 5		1,184	1,184	0%	629.25	645.95	4%	1,184	1,184	0	0%
	Diesel Oil total		115,967	115,967	0%	485.55	126.92	-74%	55,844.518	14,718.142	-41,126.376	-74%
	Pkx Total		122,085	122,085	0%	464.92	130.91	-72%	57,247.399	15,932.898	-41,314.501	-72%

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	-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%	1,897,355	4,681,311	2,783,956	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	1,487	1,487	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%	1,980,364	1,771,787	-208,577	-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%
		FCs 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%	607,179	621,160	13,981	2%
		Euro 1	232	232	0%	803.24	393.22	-65%	199,985	70,295	-129,691	-61%
		Euro 2	989	989	0%	271.16	195.74	-28%	269,134	133,538	-135,596	-29%
		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%
		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	1,692,662	454,142	12%
	Diesel Oil	pre-Euro	3,281	3,281	0%	424.46	386.79	-9%	1,368,754	982,093	-376,661	-9%
		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	-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	-61%	122	72	-50	-61%
		Diesel oil total	114,550	114,550	0%	485.91	126.17	-79%	55,186,382	13,741,354	-41,445,028	-79%
		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	437.61	-31%	9,073,137	6,089,744	-2,983,393	-31%
		Euro 4	5,331	5,331	0%	468.10	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	19,965,288	-7,176,625	-28%
	Diesel Oil	pre-Euro	6,922	6,922	0%	1036.95	758.82	-21%	7,107,543	5,252,345	-1,855,198	-21%
		Euro 1	3,630	3,630	0%	743.70	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	370.21	-42%	61,387,137	35,888,665	-25,498,472	-42%
		Euro 4	69,550	69,550	0%	366.50	288.44	-21%	19,982,680	14,680,877	-5,301,723	-21%
		Euro 5	485,981	485,981	0%	261.24	152.32	-42%	116,149,955	61,626,577	-54,523,378	-42%
		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%	134.61	171.39	28%	536,615	738,050	201,435	38%
		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%	19,386	778,616	759,230	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	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%	619.27	649.35	-5%	7,011,541	6,967,452	-4,444,808	-93%
		Euro 1	37,743	37,743	0%	353.78	281.68	-32%	13,362,966	9,129,495	-4,233,471	-32%
		Euro 2	62,680	62,680	0%	188.93	139.33	-21%	11,889,922	8,722,244	-3,167,678	-21%
		Euro 3	97,792	97,792	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	749,154	749,154	0%	88.35	74.85	-16%	69,090,067	56,671,737	-12,418,330	-18%
	Diesel Oil	pre-Euro	1,389	1,389	0%	312.32	284.56	-9%	433,081	368,136	-64,945	-9%
		Euro 1	5,426	5,426	0%	298.42	246.79	-11%	1,678,472	1,640,688	-37,784	-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%
		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	34,894,768	-66,892,507	-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%
		FCs Total	1,338,285	1,338,285	0%	237.49	111.77	-53%	317,723,735	146,571,356	-171,152,379	-53%
	Gasoline	pre-Euro	981	981	0%	633.81	645.95	2%	568,320	575,293	6,973	2%
		Euro 1	194	194	0%	803.50	393.22	-65%	167,261	59,328	-107,933	-61%
		Euro 2	836	836	0%	274.42	291.18	21%	229,520	188,265	-41,255	-21%
		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	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%	1,137,299	1,696,727	559,428	3%
	Diesel Oil	pre-Euro	2,744	2,744	0%	424.37	386.79	-9%	1,168,757	944,928	-223,829	-20%
		Euro 1	1,054	1,054	0%	727.68	731.15	1%	1,166,762	1,166,596	-166	-1%
		Euro 2	6,982	6,982	0%	336.92	133.39	-42%	2,340,147	1,260,674	-1,079,473	-42%
		Euro 3	20,421	20,421	0%	568.12	150.38	-73%	11,437,995	3,670,821	-7,767,174	-73%
Gasoline	Euro 4	55,087	55,087	0%	67.72	90.45	40%	27,776,440	5,040,456	-22,735,984	-40%	
	Euro 5	29,024	29,024	0%	441.97	90.45	-40%	13,181,325	2,687,954	-10,493,371	-40%	
	Euro 6	41	41	0%	161.28	90.45	-40%	6,168	2,688	-3,479	-56%	
	Diesel oil total	118,777	118,777	0%	488.86	154.83	-76%	57,083,513	9,956,488	-47,127,025	-76%	
	LDWs Total	124,354	124,354	0%	488.84	156.03	-69%	58,214,142	9,677,219	-48,537,923	-71%	
	Diesel Oil	pre-Euro	1,172	1,172	0%	1098.69	1193.23	4%	1,249,028	1,194,143	-54,885	-4%
		Euro 1	1,054	1,054	0%	727.68	730.39	2%	786,020	791,181	24,561	3%
		Euro 2	6,984	6,984	0%	764.97	643.48	-40%	3,334,968	4,379,371	844,403	25%
Euro 3		11,187	11,187	0%	638.43	473.65	-21%	6,262,880	5,998,226	-2,654,575	-21%	
Euro 4		4,946	4,946	0%	460.55	351.71	-24%	2,278,051	1,739,796	-548,354	-24%	
Euro 5		26,096	26,096	0%	368.98	183.48	-40%	8,435,583	4,240,743	-4,194,761	-40%	
Euro 6		537	537	0%	44.76	183.48	310%	24,047	86,672	74,625	310%	
Buses Total		11,716	11,716	0%	508.94	360.06	-29%	26,390,969	16,620,843	-9,770,126	-29%	
Diesel Oil	pre-Euro	5,983	5,983	0%	1030.72	737.35	-29%	6,072,170	4,322,888	-1,749,303	-29%	
	Euro 1	2,985	2,985	0%	748.27	583.27	-24%	2,176,946	1,650,960	-526,987	-24%	
	Euro 2	14,444	14,444	0%	818.17	510.45	-31%	10,080,881	6,494,975	-3,585,906	-31%	
	Euro 3	15,133	15,133	0%	633.52	457.13	-28%	47,587,448	27,881,147	-19,706,301	-28%	
	Euro 4	42,781	42,781	0%	356.96	287.27	-21%	16,936,867	12,289,770	-4,647,097	-21%	
	Euro 5	436,980	436,980	0%	261.70	152.65	-40%	123,181,324	66,796,436	-56,384,888	-40%	
	Euro 6	18,020	18,020	0%	913.87	183.53	-281%	913,082	2,750,630	1,837,548	281%	
	Trucks Total	680,139	680,139	0%	353.96	287.33	-21%	218,587,511	124,188,469	-94,399,042	-41%	
Gasoline	pre-Euro	6,352	6,352	0%	123.97	151.79	23%	781,736	964,170	182,433	23%	
	Euro 1	4,013	4,013	0%	152.07	173.15	10%	582,073	634,880	52,807	30%	
	Euro 2	3,362	3,362	0%	132.24	158.58	40%	436,688	648,894	209,136	40%	
	Euro 3	4,562	4,562	0%	39.81	158.58	281%	181,610	882,175	716,565	281%	
	Euro 4	0	0	0%	0	0	0%	0	0	0	0%	
	Euro 5	0	0	0%	0	0	0%	0	0	0	0%	
	Euro 6	0	0	0%	0	0	0%	0	0	0	0%	
	MOWs Total	18,229	18,229	0%	104.34	175.38	68%	1,962,088	3,197,038	1,234,951	68%	
1.A.3.b. Road Transport	Total	2,132,683	2,132,683	0%	268.88	182.57	-50%	616,073,963	310,854,371	-305,219,592	-50%	

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 [g]	in [g]	in [g]	in [g]	
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	15 782	15 782	0%	636.75	648.11	-16%	7 670 916	6 410 967	-1 657 867	-16%
		Car 1	20 270	20 270	0%	372.25	268.68	-36%	7 545 483	4 886 888	-2 648 596	-36%
		Car 2	36 062	36 062	0%	212.73	143.11	-33%	7 671 581	5 180 897	-2 516 693	-33%
		Car 3	83 039	83 039	0%	76.17	75.50	-1%	4 881 482	4 759 259	-42 233	-1%
		Car 4	334 413	334 413	0%	53.74	50.17	-7%	17 363 364	16 777 445	-1 192 489	-7%
		Car 5	183 374	183 374	0%	19.09	50.17	163%	3 580 745	9 189 834	5 609 089	163%
	Car 6	65 332	65 332	0%	25.67	50.17	89%	1 768 917	3 327 855	1 558 938	89%	
	Gasoline total	715 272	715 272	0%	79.93	70.65	-9%	58 736 267	50 535 049	-8 201 218	-9%	
	Diesel Oil	pre-Cars	1 280	1 280	0%	368.76	264.56	-28%	386 262	339 173	-46 089	-14%
		Car 1	3 749	3 749	0%	298.36	269.66	-9%	1 122 449	1 011 626	-111 425	-10%
Car 2		16 584	16 584	0%	407.19	221.43	-46%	6 720 132	3 663 964	-3 056 168	-46%	
Car 3		81 398	81 398	0%	802.50	179.24	-78%	36 991 999	11 085 409	-25 906 590	-70%	
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	4 921	4 921	0%	113.49	111.97	-1%	755 285	741 676	-13 609	-2%
		Car 1	136	136	0%	908.31	312.78	-65%	122 126	42 425	-79 708	-65%
		Car 2	540	540	0%	308.39	217.84	-29%	162 311	117 797	-44 514	-27%
		Car 3	650	650	0%	108.43	111.97	3%	70 432	72 731	2 299	3%
		Car 4	1 684	1 684	0%	43.06	52.36	7%	78 714	84 003	5 289	7%
		Car 5	1 724	1 724	0%	19.82	52.36	164%	34 157	80 258	46 106	164%
	Car 6	363	363	0%	19.85	52.36	181%	6 764	18 992	12 228	181%	
	Gasoline total	5 506	5 506	0%	188.27	171.66	-5%	1 068 292	1 013 678	-54 614	-5%	
	Diesel Oil	pre-Cars	2 189	2 189	0%	414.81	386.79	-7%	899 549	885 433	-13 416	-2%
		Car 1	1 780	1 780	0%	391.89	276.25	-29%	780 189	385 371	-394 798	-49%
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%	
1.A.3.b.ii - Heavy Duty Vehicles (HDVs)	Diesel Oil	pre-Cars	42 141	42 141	0%	504.48	32.40	-93%	21 783 989	3 986 141	-17 777 788	-82%
		Car 1	74 231	74 231	0%	434.16	32.40	-93%	32 223 283	6 658 780	-25 564 503	-79%
		Car 2	4 921	4 921	0%	113.49	82.43	-27%	755 285	454 676	-300 609	-40%
		Car 3	148 068	148 068	0%	456.12	185.62	-77%	65 712 732	15 256 007	-50 456 726	-77%
		LDVs total	148 068	148 068	0%	456.12	185.62	-77%	65 712 732	15 256 007	-50 456 726	-77%
		Car 4	149 994	149 994	0%	445.23	188.29	-57%	66 781 625	36 229 684	-30 551 941	-46%
	Diesel Total	pre-Cars	891	891	0%	1076.81	1919.23	-5%	964 197	988 234	24 037	2%
		Car 1	583	583	0%	731.36	152.67	-79%	433 675	446 236	12 568	3%
		Car 2	4 375	4 375	0%	788.25	645.03	-18%	3 440 614	2 822 621	-617 993	-18%
		Car 3	10 333	10 333	0%	632.87	458.91	-27%	6 539 364	4 741 827	-1 797 536	-27%
1.A.3.b.iii - Heavy Duty Vehicles (HDVs)	Diesel Oil	Car 4	4 449	4 449	0%	475.90	382.29	-20%	2 117 219	1 586 881	-530 338	-26%
		Car 5	34 380	34 380	0%	366.36	185.22	-49%	8 935 974	4 517 517	-4 418 457	-49%
		Car 6	9 126	9 126	0%	62.79	185.22	196%	573 066	1 680 431	1 107 365	196%
		Diesel Total	54 157	54 157	0%	424.73	388.24	-2%	23 082 189	36 835 117	13 752 928	59%
		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	-32%
	Diesel Oil	Car 2	8 876	8 876	0%	817.75	585.52	-28%	7 258 046	4 486 628	-2 771 418	-38%
		Car 3	34 167	34 167	0%	638.91	588.04	-9%	21 553 280	12 251 155	-9 302 125	-43%
		Car 4	34 287	34 287	0%	396.94	281.86	-29%	9 640 384	6 885 621	-2 754 803	-29%
		Car 5	269 735	269 735	0%	287.22	153.50	-46%	74 680 233	39 976 610	-34 703 623	-46%
1.A.3.b.iv - Motorized Two-Wheelers (M2Ws)	Diesel Oil	Car 6	261 480	261 480	0%	61.77	153.92	149%	16 149 289	40 204 036	24 054 748	149%
		Trucks Total	594 013	594 013	0%	226.31	180.97	-20%	134 431 899	181 486 262	46 954 363	35%
	Gasoline	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	265 127	50%
		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	1031%
		Car 5	0	0	0%			0%	0	0	0	0%
		M2Ws total	18 185	18 185	0%	95.14	181.68	89%	1 885 897	3 452 476	1 566 579	89%
		1.A.3.b - Road Transport	Total	2 287 339	2 287 339	0%	258.89	137.22	-45%	553 799 598	362 981 620	-190 817 978

Adjustment details for 2018													
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO _x Emissions					
		current	adjusted	difference	current	adjusted	difference	current	adjusted	adjustment	difference		
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [kg]	in [kg]	in [kg]	in [%]		
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	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%	374.24	341.68	-8%	5,371,161	3,448,643	-1,922,518	-36%	
		Car 2	34,285	34,285	0%	221.97	111.66	-50%	5,360,977	2,688,161	-2,672,814	-50%	
		Car 3	43,642	43,642	0%	88.16	76.98	-4%	3,487,781	3,388,617	-109,164	-4%	
		Car 4	278,738	278,738	0%	55.98	52.30	-7%	15,683,488	14,576,755	-1,106,733	-7%	
		Car 5	186,830	186,830	0%	19.35	52.30	170%	3,228,282	8,725,688	5,497,406	170%	
	Diesel Oil	pre-Cars	159,041	159,041	0%	6.00	52.30	788%	4,190,422	8,318,250	4,127,828	99%	
		Car 1	3,949	3,949	0%	303.16	264.96	-13%	171,676	246,173	74,497	43%	
		Car 2	10,784	10,784	0%	407.20	222.67	-45%	4,391,383	2,483,536	-1,907,848	-45%	
		Car 3	40,786	40,786	0%	812.49	180.15	-78%	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		666,074	666,074	0%	375.66	163.38	-56%	247,596,063	188,748,684	-158,847,459	-56%	
	P/Cs Total		1,365,181	1,365,181	0%	214.34	154.68	-28%	262,589,060	156,555,421	-106,033,639	-40%	
	1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	917	917	0%	644.51	645.95	1%	594,851	582,652	-12,199	-2%
Car 1			188	188	0%	911.58	312.78	-66%	98,528	33,895	-64,633	-66%	
Car 2			377	377	0%	303.64	224.45	-26%	114,682	84,713	-29,969	-26%	
Car 3			511	511	0%	111.92	116.84	4%	57,282	60,739	3,457	6%	
Car 4			1,275	1,275	0%	52.02	54.36	4%	65,290	69,278	3,988	4%	
Car 5			1,483	1,483	0%	23.70	54.36	129%	35,160	80,626	45,466	129%	
Diesel Oil		pre-Cars	1,643	1,643	0%	19.18	54.36	182%	39,550	89,326	49,776	182%	
		Car 1	6,315	6,315	0%	154.22	160.11	4%	999,199	1,011,138	11,939	1%	
		Car 2	1,872	1,872	0%	411.51	386.79	-6%	771,337	574,742	-196,595	-26%	
		Car 3	1,285	1,285	0%	389.94	276.25	-29%	483,129	272,286	-210,843	-44%	
		Car 4	2,942	2,942	0%	318.56	193.88	-39%	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		154,259	154,259	0%	384.71	182.69	-53%	59,344,525	35,880,316	-23,464,209	-39%		
1.A.3.b.ii - Heavy Duty Vehicles (HDVs)		Gasoline	pre-Cars	180,574	180,574	0%	375.86	184.94	-51%	69,343,125	36,851,449	-32,491,676	-47%
	Car 1		547	547	0%	1078.16	1919.23	78%	589,267	587,147	-2,120	-0%	
	Car 2		727	727	0%	732.67	732.67	0%	732,670	732,670	0	0%	
	Car 3		2,270	2,270	0%	787.83	646.33	-18%	1,780,686	1,487,437	-293,249	-16%	
	Car 4		6,757	6,757	0%	638.89	459.32	-29%	4,262,724	3,183,482	-1,079,242	-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%	6,663,266	3,376,016	-3,287,250	-49%	
		Car 1	20,670	20,670	0%	64.89	186.37	288%	1,176,026	3,662,314	2,486,288	209%	
		Car 2	91,634	91,634	0%	309.75	283.53	-8%	15,993,526	13,687,186	-2,306,340	-15%	
		Car 3	3,262	3,262	0%	1034.82	737.35	-29%	3,375,359	2,485,071	-890,288	-26%	
		Car 4	1,094	1,094	0%	747.82	488.39	-35%	918,052	512,378	-405,674	-44%	
		Car 5	5,544	5,544	0%	817.44	581.68	-29%	4,532,190	2,781,516	-1,750,674	-39%	
	Diesel Oil total		18,189	18,189	0%	629.54	563.68	-11%	12,367,751	7,277,279	-5,090,472	-41%	
	HDVs total		199,763	199,763	0%	358.89	276.23	-23%	6,334,421	4,386,424	-1,947,997	-31%	
	HDVs total		154,963	154,963	0%	292.40	154.68	-47%	45,964,153	24,283,389	-21,680,764	-47%	
	1.A.3.b.iii - Motorised Two-Wheelers (M2Ws)	Gasoline	pre-Cars	585,186	585,186	0%	515.18	172.19	-67%	188,173,537	180,760,889	-7,412,648	-4%
Car 1			4,940	4,940	0%	128.95	188.61	46%	622,695	783,451	160,756	26%	
Car 2			2,966	2,966	0%	128.14	177.79	41%	374,114	527,294	153,180	41%	
Car 3			3,221	3,221	0%	128.33	186.64	45%	387,596	639,833	252,237	65%	
Car 4			6,241	6,241	0%	48.24	186.64	284%	251,126	1,239,688	988,562	394%	
Car 5			1,130	1,130	0%	58.41	186.64	321%	23,966	224,582	200,616	837%	
M2Ws total		18,487	18,487	0%	85.66	188.61	198%	1,658,568	3,434,767	1,776,199	108%		
1.A.3.b.iv - Road Transport		Gasoline	pre-Cars	1,889,983	1,889,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-38%
			Car 1	2,189,983	2,189,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-38%
			Car 2	2,189,983	2,189,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-38%
			Car 3	2,189,983	2,189,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-38%
			Car 4	2,189,983	2,189,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-38%
			Car 5	2,189,983	2,189,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-38%
	Road Transport total		18,487	18,487	0%	85.66	188.61	198%	1,658,568	3,434,767	1,776,199	108%	

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

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

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

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

Adjustment description as provided in IIRs 2014 and 2015:

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

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