

# Adjustment DE-A regarding NO<sub>x</sub> 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<sub>x</sub>, (IIASA, 1999) <sup>1)</sup>. The over-all 2010 national emission ceiling (NEC) for NO<sub>x</sub>, was set to 1,081 kt. When negotiating the EU NEC Directive two years later, Germany agreed to reduce its NO<sub>x</sub>, emissions further, resulting in a NEC of 1,051 kt.

In its 2016 NEC emissions reporting, Germany provided a national total for NO<sub>x</sub>, 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) <sup>2), 3)</sup> was agreed. This procedure is applicable also for existing NECs (EB, 2012b) <sup>4)</sup>.

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<sub>x</sub>, 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) <sup>5)</sup>. 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<sub>x</sub>, emissions for four selected countries (Germany, France, Netherlands and Belgium) and found higher NO<sub>x</sub>, 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<sub>x</sub>, 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<sub>x</sub>. However, as changes in AD are no valid adjustment reason, the latter value is for information only.

This was mainly due to: \* NO<sub>x</sub>, 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<sub>x</sub>, 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<sub>x</sub> 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 EM<sup>1</sup>**

<sup>1</sup> "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<sub>x</sub> 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 <sup>6)</sup>, including the following set of NO<sub>x</sub> 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<sub>x</sub> 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<sub>x</sub> 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) <sup>7)</sup>.

### 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<sub>x</sub> 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
<b>proposed adjustment</b>	<b>-296.1</b>	<b>-300.7</b>	<b>-300.4</b>	<b>-305.2</b>	<b>-294.9</b>	<b>-274.9</b>	<b>-250.9</b>	<b>-221.1</b>	<b>-179.6</b>	<b>-144.8</b>

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<sub>x</sub> 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 <sub>x</sub> Emissions			
			current	adjusted	difference	current	adjusted	difference	current	adjusted	adjustment	difference
			in [TJ]	in [TJ]	in [%]	in [kg/TJ]	in [%]	in [%]	in [kg]	in [kg]	in [%]	in [%]
1.A.3.b.i	gasoline		795.957	795.957	0%	97.55	84.99	-13%	77.64.842	67.690.906	9.993.935	-13%
1.A.3.b.i	diesel oil		629.380	629.380	0%	429.45	160.51	-63%	227.341.096	84.970.461	142.376.635	-63%
1.A.3.b.ii	gasoline		6.325	6.325	0%	255.87	214.75	-16%	1.618.432	1.358.328	266.104	-16%
1.A.3.b.ii	diesel oil		113.450	113.450	0%	476.34	134.96	-72%	54.040.533	15.311.584	38.728.949	-72%
1.A.3.b.iii	gasoline		48.844	48.844	0%	823.00	482.55	-42%	29.931.266	23.183.732	6.747.534	-23%
1.A.3.b.iii	diesel oil		566.741	566.741	0%	446.67	271.83	-39%	253.148.243	154.056.160	99.092.083	-39%
1.A.3.b.iv	gasoline		19.712	19.712	0%	113.68	168.43	48%	2.240.749	3.320.034	-1.079.285	48%
1.A.3.b TOTAL		2010	2.079.608	2.079.608	0%			0%	645.965.162	349.851.206	296.113.956	-46%
1.A.3.b.i	gasoline		794.688	794.688	0%	92.09	81.61	-11%	73.185.851	64.851.951	8.333.900	-11%
1.A.3.b.i	diesel oil		553.564	553.564	0%	434.12	159.22	-63%	240.313.791	88.138.959	152.174.832	-63%
1.A.3.b.ii	gasoline		6.118	6.118	0%	229.35	198.57	-13%	1.403.081	1.214.776	188.305	-13%
1.A.3.b.ii	diesel oil		115.967	115.967	0%	481.55	126.92	-74%	55.844.518	14.718.142	41.126.376	-74%
1.A.3.b.iii	gasoline		47.355	47.355	0%	592.65	448.99	-24%	28.071.221	21.268.323	6.804.898	-24%
1.A.3.b.iii	diesel oil		563.891	563.891	0%	410.38	244.97	-40%	231.410.271	138.135.342	93.273.929	-40%
1.A.3.b.iv	gasoline		19.289	19.289	0%	110.79	171.60	54%	2.137.002	3.299.162	-1.162.160	54%
1.A.3.b TOTAL		2011	2.106.883	2.106.883	0%			0%	632.365.736	331.625.655	300.740.081	-48%
1.A.3.b.i	gasoline		750.957	750.957	0%	85.73	78.00	-9%	64.379.994	58.677.229	5.802.765	-9%
1.A.3.b.i	diesel oil		555.245	555.245	0%	435.96	158.66	-64%	242.062.902	88.096.699	153.966.203	-64%
1.A.3.b.ii	gasoline		5.657	5.657	0%	218.93	193.15	-12%	1.238.520	1.092.662	145.859	-12%
1.A.3.b.ii	diesel oil		114.350	114.350	0%	481.91	128.17	-75%	55.106.362	13.741.354	41.365.008	-75%
1.A.3.b.iii	gasoline		50.902	50.902	0%	533.22	384.33	-28%	27.141.913	19.563.200	7.578.704	-28%
1.A.3.b.iii	diesel oil		589.585	589.585	0%	381.33	224.00	-41%	234.829.180	132.064.753	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	gasoline		51.716	51.716	0%	509.64	368.06	-29%	26.350.969	18.620.843	7.730.126	-29%
1.A.3.b.iii	diesel oil		600.139	600.139	0%	353.06	287.93	-19%	211.887.531	124.788.469	87.099.062	-41%
1.A.3.b.iv	gasoline		18.229	18.229	0%	104.34	175.38	68%	1.902.688	3.197.038	-1.294.351	68%
1.A.3.b TOTAL		2013	2.132.683	2.132.683	0%			0%	616.079.063	316.854.371	300.224.692	-50%
1.A.3.b.i	gasoline		752.526	752.526	0%	76.03	73.09	-4%	57.215.533	54.988.921	2.216.612	-4%
1.A.3.b.i	diesel oil		626.845	626.845	0%	435.87	159.12	-63%	272.876.061	95.613.892	173.262.169	-63%
1.A.3.b.ii	gasoline		5.845	5.845	0%	190.34	176.49	-7%	1.112.584	1.031.612	80.972	-7%
1.A.3.b.ii	diesel oil		128.578	128.578	0%	475.56	110.96	-77%	61.146.575	14.267.237	46.879.338	-77%
1.A.3.b.iii	gasoline		49.143	49.143	0%	468.37	339.99	-27%	23.017.115	16.708.234	6.308.881	-27%
1.A.3.b.iii	diesel oil		572.754	572.754	0%	314.05	196.05	-38%	179.874.133	112.285.582	67.588.551	-38%
1.A.3.b.iv	gasoline		18.673	18.673	0%	100.59	179.24	78%	1.878.294	3.345.794	-1.467.499	78%
1.A.3.b TOTAL		2014	2.153.563	2.153.563	0%			0%	597.120.297	302.252.271	294.868.025	-49%
1.A.3.b.i	gasoline		715.156	715.156	0%	74.38	71.73	-4%	53.190.787	51.300.983	1.889.805	-4%
1.A.3.b.i	diesel oil		645.555	645.555	0%	426.19	159.80	-63%	275.130.233	103.163.501	171.966.732	-63%
1.A.3.b.ii	gasoline		5.793	5.793	0%	187.12	172.80	-8%	1.083.927	1.000.999	82.928	-8%
1.A.3.b.ii	diesel oil		135.386	135.386	0%	489.35	187.96	-77%	63.605.443	14.607.490	48.997.953	-77%
1.A.3.b.iii	gasoline		52.287	52.287	0%	458.96	327.99	-29%	23.997.817	17.149.448	6.848.370	-29%
1.A.3.b.iii	diesel oil		589.411	589.411	0%	266.69	187.51	-30%	157.189.675	110.620.703	46.568.973	-30%
1.A.3.b.iv	gasoline		18.459	18.459	0%	99.32	180.65	82%	1.833.362	3.334.472	-1.501.090	82%
1.A.3.b TOTAL		2015	2.161.976	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	gasoline		54.157	54.157	0%	424.73	388.24	-7%	23.002.109	16.833.117	6.168.992	-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%	95.14	181.66	89%	1.805.897	3.412.476	-1.606.579	89%
1.A.3.b TOTAL		2016	2.207.339	2.207.339	0%			0%	553.790.558	302.901.820	250.897.738	-45%
1.A.3.b.i	gasoline		724.571	724.571	0%	67.66	69.88	3%	49.026.074	50.634.714	-1.607.640	3%
1.A.3.b.i	diesel oil		696.592	696.592	0%	390.65	161.95	-59%	272.126.091	112.810.721	159.315.370	-59%
1.A.3.b.ii	gasoline		6.186	6.186	0%	171.15	167.18	-2%	1.058.799	1.034.211	24.588	-2%
1.A.3.b.ii	diesel oil		153.284	153.284	0%	424.66	183.89	-76%	65.093.930	15.925.216	49.168.714	-76%
1.A.3.b.iii	gasoline		53.382	53.382	0%	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	gasoline		51.634	51.634	0%	309.75	263.53	-15%	15.993.526	13.607.106	2.386.420	-15%
1.A.3.b.iii	diesel oil		585.186	585.186	0%	171.18	172.10	1%	180.173.337	180.710.869	-537.532	1%
1.A.3.b.iv	gasoline		18.497	18.497	0%	89.66	184.61	106%	1.658.568	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		663.841	663.841	0%	345.81	165.07	-52%	229.566.088	109.582.982	119.983.106	-52%
1.A.3.b.ii	gasoline		6.683	6.683	0%	146.08	153.25	5%	976.219	1.034.150	-57.931	5%
1.A.3.b.ii	diesel oil		159.183	159.183	0%	347.42	181.90	-71%	55.303.535	16.221.445	39.082.090	-71%
1.A.3.b.iii	gasoline		52.939	52.939	0%	274.41	247.81	-10%	14.527.012	13.118.578	1.408.434	-10%
1.A.3.b.iii	diesel oil		595.913	595.913	0%	153.35	169.17	10%	91.380.760	106.809.376	-15.428.616	10%
1.A.3.b.iv	gasoline		18.750	18.750	0%	86.05	186.83	117%	1.613.450	3.502.941	-1.889.491	117%
1.A.3.b TOTAL		2019	2.202.890	2.202.890	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 <sub>x</sub> Emissions				
		current	adjusted	difference	current	adjusted	difference	current	adjusted	adjustment	difference	
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [kg]	in [kg]	in [kg]	in [kg]	
1.A.3.a.i. Passenger Cars	Gasoline	pre-Cars	13.685	13.685	0%	584.75	514.25	-12%	7.955.060	6.986.917	-958.143	-12%
		Car 1	36.541	36.541	0%	338.50	297.71	-10%	25.915.925	19.189.262	-7.716.663	-30%
		Car 2	96.425	96.425	0%	172.95	135.63	-22%	16.580.020	13.020.026	-3.568.995	-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	-137.859	0%
		Car 5	31.234	31.234	0%	18.61	42.19	127%	581.142	1.317.737	736.595	127%
	Gasoline total	795.057	795.057	0%	59.25	84.99	43%	37.644.842	47.650.986	9.993.355	43%	
	Diesel Oil	pre-Cars	1.915	1.915	0%	318.13	264.95	-15%	383.760	327.256	-56.504	-15%
		Car 1	10.338	10.338	0%	296.82	266.17	-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	19.974.230	-9.398.564	-40%
		Car 3	134.025	134.025	0%	542.94	176.54	-47%	72.645.173	23.929.276	-48.716.957	-47%
		Car 4	279.154	279.154	0%	384.37	140.58	-43%	187.299.180	39.243.811	-148.055.349	-43%
		Car 5	53.547	53.547	0%	434.70	140.58	-68%	23.276.735	7.527.796	-15.748.929	-68%
	Diesel oil total	334	334	0%	257.62	140.58	-45%	85.044	46.553	-38.491	-45%	
	Pkx Total	529.380	529.380	0%	429.45	160.55	-63%	227.347.096	84.970.461	-142.376.635	-63%	
1.A.3.b.i. Light Duty Vehicles (LDVs)	Gasoline	Pkx Total	1.325.337	1.325.337	0%	238.12	155.14	-56%	364.985.938	152.621.367	-152.364.570	-56%
		pre-Cars	1.249	1.249	0%	627.99	645.95	3%	783.320	886.871	103.551	3%
		Car 1	367	367	0%	961.95	297.39	-69%	386.969	186.620	-198.348	-69%
		Car 2	1.393	1.393	0%	264.75	184.41	-30%	368.840	256.917	-111.933	-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%
	Gasoline total	49	49	0%	15.34	44.90	183%	750	2.218	1.468	183%	
	Diesel Oil	pre-Cars	0	0	0%	0%	0%	0	0	0	0%	
	Diesel Oil	Gasoline total	6.345	6.345	0%	255.87	254.75	-1%	1.478.832	1.556.128	266.296	18%
		pre-Cars	4.876	4.876	0%	425.99	386.79	-9%	2.077.142	1.436.983	-640.239	-29%
		Car 1	9.989	9.989	0%	399.59	276.24	-40%	2.389.088	1.289.630	-1.099.458	-46%
		Car 2	13.126	13.126	0%	336.76	153.18	-43%	4.420.380	2.534.731	-1.885.629	-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	-21.081.114	-84%
		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	-42%	7	4	-3	-42%	
Diesel oil total		113.450	113.450	0%	416.34	134.96	-72%	54.043.533	15.351.584	-38.691.949	-72%	
1.A.3.b.ii. Heavy Duty Vehicles (HDVs)	Diesel Oil	LDVs Total	119.175	119.175	0%	464.70	139.18	-70%	55.658.966	36.685.913	-18.973.053	-70%
		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	0%	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	7.289.299	-5.776.477	-44%
		Car 4	54.581	54.581	0%	491.42	80.69	-84%	26.021.036	4.940.722	-21.081.114	-84%
		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	-42%	7	4	-3	-42%
		Buses Total	48.044	48.044	0%	623.80	482.55	-23%	29.931.266	23.183.732	-6.747.534	-23%
	Heavy Duty Vehicles (HDVs)	pre-Cars	10.185	10.185	0%	1040.16	787.37	-26%	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	-973.702	-23%
		Car 2	38.558	38.558	0%	817.62	524.79	-36%	31.525.526	20.234.619	-11.290.907	-36%
		Car 3	159.023	159.023	0%	636.28	274.48	-41%	161.136.182	59.617.271	-101.518.911	-41%
		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%	78.643.643	43.115.897	-35.527.746	-45%
Trucks Total	566.141	566.141	0%	446.67	271.83	-39%	293.148.243	154.696.160	-138.452.083	-39%		
1.A.3.b.iii. Motorised Two-Wheelers (MTWs)	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	185.74	34%	647.479	887.029	239.550	34%
		Car 2	3.587	3.587	0%	141.16	184.21	30%	585.362	696.681	116.309	30%
		Car 3	2.950	2.950	0%	38.11	184.21	387%	116.180	657.032	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%	
	Road Transport	pre-Cars	1.184	1.184	0%	629.75	645.95	2%	182.214	190.373	8.159	5%
		Car 1	283	283	0%	818.74	184.47	-46%	243.289	86.158	-157.132	-65%
		Car 2	1.184	1.184	0%	268.66	191.68	-29%	310.529	223.189	-87.340	-28%
		Car 3	783	783	0%	85.97	95.39	11%	67.320	74.782	7.361	11%
		Car 4	2.562	2.562	0%	37.38	46.51	24%	95.786	119.162	23.376	24%
		Car 5	241	241	0%	15.13	46.51	180%	3.882	11.190	7.308	180%
		Car 6	0	0	0%	15.13	46.51	203%	1	2	2	203%
		Gasoline total	6.118	6.118	0%	229.35	186.57	-23%	1.483.081	1.254.176	-228.905	-15%
Diesel Oil		pre-Cars	3.995	3.995	0%	425.99	386.79	-9%	1.988.280	1.225.652	-762.628	-39%



Adjustment details for 2023												
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <sub>x</sub> 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	137.82	-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	1,487	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	383.22	-56%	189,985	70,295	-119,690	-60%
		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%
1.A.3.b.i. Heavy Duty Vehicles (LON)	Gasoline	pre-Euro	3,281	3,281	0%	424.46	386.79	-9%	1,368,754	1,262,093	-106,661	-9%
		Euro 1	3,666	3,666	0%	398.34	276.24	-30%	1,445,960	1,071,634	-374,326	-26%
		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	3,546,082	-9,504,199	-73%
		Euro 4	59,485	59,485	0%	494.22	89.85	-82%	29,369,670	5,337,395	-24,032,275	-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%	151.94	89.85	-41%	122	72	-50	-41%
		Diesel oil total	114,350	114,350	0%	485.91	120.17	-75%	55,186,382	13,741,354	-41,445,028	-75%
		LONs Total	129,008	129,008	0%	489.51	123.61	-74%	56,344,963	14,834,656	-41,510,307	-74%
	Diesel Oil	pre-Euro	1,326	1,326	0%	1093.46	1919.46	4%	1,410,640	1,352,283	-58,357	-4%
		Euro 1	1,245	1,245	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	-33%
		Euro 4	5,331	5,331	0%	468.10	361.86	-23%	2,642,179	1,675,777	-966,402	-37%
		Euro 5	20,752	20,752	0%	347.84	182.99	-47%	7,219,563	2,787,467	-4,432,096	-62%
		Euro 6	73	73	0%	64.52	182.99	286%	3,961	13,296	9,334	236%
		Diesel Total	50,962	50,962	0%	533.22	384.33	-28%	27,141,913	19,965,288	-7,176,625	-27%
		Trucks Total	589,585	589,585	0%	385.33	224.69	-41%	224,829,180	132,064,153	-92,765,027	-41%
	Diesel Oil	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	39%
		Euro 2	3,267	3,267	0%	136.22	184.56	35%	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%
		NO <sub>x</sub> Total	18,268	18,268	0%	167.43	173.28	3%	1,982,546	3,163,439	1,180,893	6%
		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 <sub>x</sub> Emissions					
		current	adjusted	difference	current	adjusted	difference	current	adjusted	adjustment	difference		
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [kg]	in [kg]	in [kg]	in [%]		
1.A.3.a.i. Passenger Cars	Gasoline	pre-Euro	11,680	11,680	0%	618.27	649.35	-52%	7,011,641	5,967,452	-1,044,189	-52%	
		Euro 1	37,743	37,743	0%	353.78	341.68	-32%	13,362,966	9,129,495	-4,233,471	-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	97,782	97,782	0%	66.38	73.19	10%	6,481,618	7,156,920	675,302	10%	
		Euro 4	397,911	397,911	0%	47.22	46.52	-1%	18,790,345	18,589,937	-200,407	-1%	
		Euro 5	138,063	138,063	0%	18.60	46.52	150%	2,583,150	6,439,691	3,856,541	150%	
		Euro 6	2,714	2,714	0%	25.99	46.52	79%	70,526	126,237	55,711	79%	
		Gasoline total	748,114	748,114	0%	88.35	74.85	-16%	68,190,687	56,671,737	-11,518,950	-17%	
	Diesel Oil	pre-Euro	1,389	1,389	0%	312.74	284.56	-9%	463,963	383,872	-80,091	-9%	
		Euro 1	6,626	6,626	0%	268.42	246.79	-11%	1,970,472	1,680,588	-289,884	-11%	
		Euro 2	28,437	28,437	0%	406.84	279.91	-40%	11,983,522	6,253,531	-5,729,991	-40%	
		Euro 3	182,795	182,795	0%	574.33	176.67	-69%	53,284,956	18,579,373	-34,705,583	-69%	
		Euro 4	222,583	222,583	0%	393.55	149.27	-62%	87,588,471	33,225,566	-54,362,905	-62%	
		Euro 5	233,786	233,786	0%	435.42	149.27	-66%	101,787,275	34,894,788	-66,892,487	-66%	
		Euro 6	4,536	4,536	0%	259.53	149.27	-42%	1,177,151	677,045	-500,106	-42%	
		Diesel oil total	589,131	589,131	0%	437.14	158.71	-64%	257,533,128	83,899,619	-173,633,509	-64%	
		FCs Total	1,338,245	1,338,245	0%	237.49	111.77	-53%	317,723,735	140,571,356	-177,152,379	-53%	
	Gasoline	pre-Euro	981	981	0%	633.81	645.95	2%	568,320	579,283	10,964	2%	
		Euro 1	194	194	0%	803.50	389.27	-56%	187,281	59,326	-127,955	-68%	
		Euro 2	836	836	0%	274.42	191.74	-29%	229,520	130,295	-99,225	-43%	
		Euro 3	784	784	0%	92.66	111.73	20%	72,691	79,788	7,097	10%	
		Euro 4	1,889	1,889	0%	40.70	40.89	0%	77,284	82,833	5,549	20%	
		Euro 5	566	566	0%	16.37	40.89	183%	9,947	47,268	37,321	183%	
		Euro 6	1	1	0%	17.60	40.89	170%	26	72	46	170%	
		Gasoline total	5,578	5,578	0%	262.86	184.67	-3%	1,131,299	1,606,721	475,422	3%	
1.A.3.b.i. Heavy Duty Vehicles (LON)	Gasoline	pre-Euro	2,754	2,754	0%	424.37	386.79	-9%	1,168,757	1,044,928	-123,829	-9%	
		Euro 1	2,545	2,545	0%	398.37	276.25	-30%	1,166,762	834,596	-332,166	-26%	
		Euro 2	6,982	6,982	0%	338.92	133.39	-49%	2,340,147	1,260,674	-1,079,473	-46%	
		Euro 3	20,421	20,421	0%	558.52	150.38	-73%	11,437,995	3,070,913	-8,367,082	-73%	
		Euro 4	55,887	55,887	0%	497.72	90.46	-82%	27,775,440	5,040,416	-22,735,024	-82%	
		Euro 5	29,024	29,024	0%	441.97	90.46	-80%	13,181,325	2,687,964	-10,493,361	-80%	
		Euro 6	41	41	0%	151.26	90.46	-40%	6,160	2,688	-3,472	-40%	
		Diesel oil total	118,777	118,777	0%	488.66	124.93	-74%	57,083,513	13,656,488	-43,427,025	-74%	
		LONs Total	124,364	124,364	0%	488.14	126.03	-74%	58,214,142	14,677,215	-43,536,927	-74%	
	Diesel Oil	pre-Euro	1,172	1,172	0%	1096.68	1919.23	4%	1,249,029	1,194,143	-54,886	-4%	
		Euro 1	1,054	1,054	0%	727.68	750.39	3%	780,620	791,181	10,561	3%	
1.A.3.b.ii. Heavy Duty Vehicles (Reses)	Diesel Oil	Euro 2	6,984	6,984	0%	764.97	643.48	-16%	3,324,968	4,379,371	1,054,403	16%	
		Euro 3	13,187	13,187	0%	638.43	473.65	-24%	8,262,880	5,998,225	-2,264,655	-27%	
		Euro 4	4,946	4,946	0%	680.55	351.71	-31%	2,278,071	1,730,796	-547,275	-24%	
		Euro 5	26,096	26,096	0%	668.98	183.44	-40%	8,435,583	4,420,743	-4,014,761	-40%	
		Euro 6	537	537	0%	44.76	183.44	370%	24,047	86,672	62,625	260%	
		Dieses Total	51,776	51,776	0%	509.54	340.06	-29%	26,390,969	18,620,843	-7,770,126	-29%	
		pre-Euro	5,983	5,983	0%	1039.72	717.35	-29%	6,072,170	4,322,880	-1,749,303	-29%	
		Euro 1	2,985	2,985	0%	748.27	583.47	-24%	2,176,944	1,650,960	-525,987	-24%	
		Euro 2	14,444	14,444	0%	719.17	510.24	-27%	15,083,081	10,949,975	-4,133,106	-27%	
	Euro 3	15,133	15,133	0%	633.43	473.65	-24%	8,262,880	5,998,225	-2,264,655	-27%		
	Euro 4	42,781	42,781	0%	356.90	183.47	-37%	16,936,867	12,289,770	-4,647,097	-37%		
Euro 5	436,980	436,980	0%	261.70	152.65	-40%	123,181,324	66,796,436	-56,384,887	-40%			
Euro 6	18,020	18,020	0%	68.87	152.65	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	124,180,469	-94,407,042	-21%			
1.A.3.b.iii. Motorised Two-Wheelers (MOWs)	Gasoline	pre-Euro	6,352	6,352	0%	123.87	151.79	23%	781,738	964,179	182,443	23%	
		Euro 1	4,013	4,013	0%	125.01	173.15	39%	582,073	634,880	52,807	39%	
		Euro 2	3,362	3,362	0%	132.24	195.58	46%	436,680	684,894	248,216	46%	
		Euro 3	4,562	4,562	0%	39.81	195.58	381%	181,690	882,175	716,585	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%	
		MOWs Total	18,229	18,229	0%	104.34	175.38	68%	1,982,088	3,197,038	1,214,951	68%	
		1.A.3.b. Road Transport	Total	2,132,083	2,132,083	0%	208.88	180.57	-56%	616,073,963	390,854,371	-225,224,592	-56%

Adjustment details for 2024												
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <sub>x</sub> 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	11.647	11.647	0%	812.37	844.11	-11%	7.132.688	6.327.484	-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	19.536.099	-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	-225.249	84%
		Gasoline total	752.426	752.426	0%	76.40	73.89	4%	57.215.533	54.598.591	2,216.812	-4%
	Diesel Oil	pre-Cars	1.341	1.341	0%	311.73	284.66	-55%	417.947	364.246	-42.722	-55%
		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	-69%	48.481.830	14.796.245	33.685.585	-69%
		Car 4	211.237	211.237	0%	297.27	151.77	-62%	83.917.680	32.059.973	51.857.706	-62%
		Car 5	285.011	285.011	0%	436.38	151.77	-65%	124.721.396	43.370.300	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%	138,891,584	154,652,853	-175,476,269	-53%
	Gasoline	pre-Cars	986	986	0%	632.44	645.95	-2%	193.683	176.124	18.844	-2%
		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	-21%	212.888	154.839	-58.829	-21%
		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%
1.A.3.b.i. - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	2.537	2.537	0%	428.16	386.79	-21%	1.985.819	1.76.259	-257.559	-21%
		Car 1	2.588	2.588	0%	393.82	276.25	-49%	987.136	639.898	-347.328	-49%
		Car 2	6.087	6.087	0%	338.91	133.25	-42%	1.385.995	1.180.889	-205.126	-42%
		Car 3	18.220	18.220	0%	571.75	150.58	-74%	18.417.076	2.742.656	-15.674.828	-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%
	Diesel Oil	pre-Cars	187	187	0%	151.18	91.69	-60%	29.829	17.974	-11.855	-60%
		Car 1	187	187	0%	151.18	91.69	-60%	29.829	17.974	-11.855	-60%
		Car 2	187	187	0%	151.18	91.69	-60%	29.829	17.974	-11.855	-60%
		Car 3	187	187	0%	151.18	91.69	-60%	29.829	17.974	-11.855	-60%
		Car 4	187	187	0%	151.18	91.69	-60%	29.829	17.974	-11.855	-60%
		Car 5	187	187	0%	151.18	91.69	-60%	29.829	17.974	-11.855	-60%
		Diesel oil total	187.528	187.528	0%	415.56	170.94	-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	46,988,311	-75%
1.A.3.b.ii. - Heavy Duty Vehicles (HDVs)	Gasoline	pre-Cars	984	984	0%	1099.48	1919.23	-5%	1.062.384	1.062.921	-48.443	-5%
		Car 1	837	837	0%	728.12	130.99	-3%	659.232	628.359	18.127	-3%
		Car 2	5.586	5.586	0%	704.95	643.67	-9%	4.284.320	3.683.441	-598.887	-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%
	Diesel Oil	pre-Cars	4.182	4.182	0%	42.78	183.99	330%	178.913	789.476	-610.563	330%
		Car 1	4.182	4.182	0%	42.78	183.99	330%	178.913	789.476	-610.563	330%
		Car 2	4.182	4.182	0%	42.78	183.99	330%	178.913	789.476	-610.563	330%
		Car 3	4.182	4.182	0%	42.78	183.99	330%	178.913	789.476	-610.563	330%
		Car 4	4.182	4.182	0%	42.78	183.99	330%	178.913	789.476	-610.563	330%
		Car 5	4.182	4.182	0%	42.78	183.99	330%	178.913	789.476	-610.563	330%
		Diesel Oil total	49.143	49.143	0%	468.37	339.99	-27%	23,017,115	16,788,234	6,238,881	-27%
		Trucks Total	572,754	572,754	0%	314.85	196.65	-38%	179,874,133	112,285,562	67,588,571	-38%
1.A.3.b.iii. - Heavy Duty Vehicles (HDVs) - Trucks & Lorries	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	680.370	-246.504	52%
		Car 3	5.385	5.385	0%	38.53	186.25	386%	29.722	1.041.189	-831.467	386%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
	Diesel Oil	pre-Cars	18.673	18.673	0%	108.59	179.24	78%	1,878,294	3,381,794	-1,488,499	78%
		Car 1	18.673	18.673	0%	108.59	179.24	78%	1,878,294	3,381,794	-1,488,499	78%
		Car 2	18.673	18.673	0%	108.59	179.24	78%	1,878,294	3,381,794	-1,488,499	78%
		Car 3	18.673	18.673	0%	108.59	179.24	78%	1,878,294	3,381,794	-1,488,499	78%
		Car 4	18.673	18.673	0%	108.59	179.24	78%	1,878,294	3,381,794	-1,488,499	78%
		Car 5	18.673	18.673	0%	108.59	179.24	78%	1,878,294	3,381,794	-1,488,499	78%
		Diesel oil total	18.673	18.673	0%	108.59	179.24	78%	1,878,294	3,381,794	-1,488,499	78%
		LDVs Total	2,153,563	2,153,563	0%	277.27	140.35	-49%	597,120,287	362,252,271	234,868,025	-49%

Adjustment details for 2025																							
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <sub>x</sub> Emissions															
		current	adjusted	difference	current	adjusted	difference	current	adjusted	adjustment	difference												
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [kg]	in [kg]	in [kg]	in [%]												
1.A.3.a.i. - Passenger Cars	Gasoline	pre-Cars	11.380	11.380	0%	823.33	644.11	-14%	7.266.152	6.191.942	-1.014.168	-14%											
		Car 1	34.112	34.112	0%	371.34	245.71	-34%	8.963.681	5.924.674	-3.029.228	-34%											
		Car 2	42.925	42.925	0%	297.78	142.69	-32%	8.918.785	6.099.659	-2.818.648	-32%											
		Car 3	72.871	72.871	0%	73.86	74.74	1%	5.381.361	5.448.237	-64.887	1%											
		Car 4	363.474	363.474	0%	52.36	49.62	-6%	18.485.637	17.326.221	-1.159.416	-6%											
		Car 5	180.783	180.783	0%	19.11	49.62	157%	3.454.481	0.881.456	5.406.375	157%											
		Car 6	29.612	29.612	0%	25.70	49.62	84%	790.781	1.451.433	-652.752	84%											
		Gasoline total	715.156	715.156	0%	76.38	71.73	-4%	53.196.187	51.380.983	1.889.895	-4%											
	Diesel Oil	pre-Cars	1.282	1.282	0%	318.32	264.56	-16%	367.917	339.733	-28.184	-16%											
		Car 1	4.279	4.279	0%	298.14	267.84	-10%	1.261.930	1.129.989	-132.821	-10%											
		Car 2	19.689	19.689	0%	407.80	220.36	-46%	8.913.687	4.338.719	4.574.968	-46%											
		Car 3	71.044	71.044	0%	595.91	179.64	-70%	42.271.648	12.719.962	29.551.686	-70%											
		Car 4	182.410	182.410	0%	401.42	154.07	-62%	77.237.655	29.644.450	47.593.205	-62%											
		Car 5	364.346	364.346	0%	434.67	154.07	-65%	132.290.433	46.090.424	86.409.959	-65%											
		Car 6	62.576	62.576	0%	259.76	154.07	-41%	13.657.082	0.180.384	-13.476.737	-41%											
		Diesel oil total	645.565	645.565	0%	426.19	159.88	-63%	275.138.233	183.163.591	91.964.732	-63%											
		Pkcs Total	1,368,721	1,368,721	0%	245.26	153.52	-53%	128,317,080	154,444,484	-173,856,536	-53%											
1.A.3.b.i. - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	979	979	0%	664.37	645.95	-1%	1,375.360	1,617.977	-242.617	-1%											
		Car 1	150	150	0%	895.63	311.93	-65%	134.523	46.851	-87.672	-65%											
		Car 2	629	629	0%	298.27	212.94	-29%	187.533	133.879	-53.654	-29%											
		Car 3	782.81	782.81	0%	95.56	188.62	3%	72.969	76.155	-2.186	3%											
		Car 4	1.720	1.720	0%	47.96	51.30	9%	80.965	85.246	-4.280	9%											
		Car 5	1.620	1.620	0%	18.41	51.30	175%	29.812	83.086	-53.274	175%											
		Car 6	84	84	0%	18.71	51.30	174%	1.762	4.884	-3.122	174%											
		Gasoline total	5,793	5,793	0%	187.52	172.88	-8%	5,083.937	5,080.999	2.938	-8%											
	Diesel Oil	pre-Cars	2.323	2.323	0%	418.91	386.79	-26%	968.185	712.631	255.554	-26%											
		Car 1	2.186	2.186	0%	391.47	212.25	-45%	824.270	453.227	371.043	-45%											
		Car 2	5.025	5.025	0%	324.81	193.29	-40%	1.632.296	971.296	660.928	-40%											
		Car 3	15.781	15.781	0%	308.92	150.67	-51%	3.112.414	2.365.703	746.711	-51%											
		Car 4	47.480	47.480	0%	501.73	91.76	-82%	23.762.396	3.548.299	19.454.098	-82%											
		Car 5	62.146	62.146	0%	436.13	91.76	-79%	27.090.214	5.638.295	21.392.009	-79%											
		Car 6	635	635	0%	154.91	91.76	-40%	87.768	62.236	25.528	-40%											
		Diesel oil total	135.366	135.366	0%	368.35	187.96	-77%	63,565,843	54,681.496	8,884,353	-77%											
		LDVs total	147,088	147,088	0%	417.76	170.62	-16%	64,989,530	55,688,496	8,888,881	-16%											
1.A.3.b.ii. - Heavy Duty Vehicle: Buses	Diesel Oil	pre-Cars	979	979	0%	1076.34	1019.23	-5%	1.048.372	995.256	-53.856	-5%											
		Car 1	747	747	0%	730.26	715.91	3%	542.471	581.636	-18.165	3%											
		Car 2	5.211	5.211	0%	707.43	644.46	-10%	4.103.087	3.599.644	503.453	-10%											
		Car 3	15.282	15.282	0%	633.86	488.67	-24%	7.541.732	6.174.989	1.366.822	-24%											
		Car 4	4.686	4.686	0%	689.70	351.99	-35%	2.154.086	1.154.177	1.039.829	-35%											
		Car 5	36.257	36.257	0%	368.77	184.59	-49%	8.737.608	4.477.641	4.269.427	-49%											
		Car 6	5.224	5.224	0%	63.13	184.59	247%	277.542	964.226	-686.684	247%											
		Buses total	12,887	12,887	0%	438.96	327.99	-29%	23,997,817	17,149,448	6,848,319	-29%											
	Heavy Duty Vehicle: Trucks & Lorries	pre-Cars	4.319	4.319	0%	1034.89	737.35	-29%	4.488.571	3.184.428	1.294.143	-29%											
		Car 1	1.883	1.883	0%	748.71	553.48	-26%	1.387.291	1.025.551	361.744	-26%											
		Car 2	11.052	11.052	0%	817.38	587.99	-30%	8,072.940	6,032.450	2.040.391	-30%											
		Car 3	41.282	41.282	0%	629.55	381.66	-39%	27.463.779	17.724.673	9.739.106	-39%											
		Car 4	39.233	39.233	0%	356.86	287.72	-20%	11,572.860	9,294.190	2.278.769	-20%											
		Car 5	309.736	309.736	0%	264.17	153.49	-40%	80,413.973	60,565.436	19,847.577	-40%											
		Car 6	179.787	179.787	0%	67.48	153.49	167%	9,813.364	26,282.637	-16,469.684	167%											
		Trucks total	589,431	589,431	0%	268.69	189.33	-30%	157,189,675	150,926.393	6,263,282	-30%											
		pre-Cars	5.544	5.544	0%	125.41	157.28	25%	720.441	983.470	-183.828	25%											
Motorized Two-Wheelers (MOWs)	Gasoline	Car 1	1.517	1.517	0%	127.40	176.22	39%	444.086	670.819	-171.733	39%											
		Car 2	3.382	3.382	0%	127.35	196.53	55%	430.680	666.565	-236.206	55%											
		Car 3	5.917	5.917	0%	48.29	196.53	309%	236.136	1.144.416	-1.168.280	309%											
		Car 4	4	0	0%	16.96		180%	89	884	-795	180%											
		MOWs total	18,499	18,499	0%	98.52	180.65	82%	1,833.382	5,334.472	1,501.898	82%											
1.A.3.b. Road Transport		Total		2,161,592		2,161,592		0%		263.86		129.26		-48%		575,935.295		381,697.996		174,853.678		-48%	



Adjustment details for 2026												
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <sub>x</sub> 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	15 782	15 782	0%	634.75	644.11	-4%	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%	17 369 364	16 777 445	-591 919	-3%
		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	88%
		Gasoline total	715 272	715 272	0%	79.93	70.65	-11%	58 736 267	50 535 049	-8 201 218	-14%
	Diesel Oil	pre-Cars	1 280	1 280	0%	364.76	254.56	-30%	365 262	239 173	-126 089	-34%
		Car 1	3 749	3 749	0%	294.36	269.64	-8%	1 122 449	1 011 625	-110 824	-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%	36 991 999	11 085 409	-25 906 590	-70%
		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	-83 912 815	-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%	527 778 627	199 070 280	-328 708 347	-62%
	Gasoline	pre-Cars	910	910	0%	602.79	645.35	-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	-29%	162 311	117 737	-44 574	-27%
		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%	78 714	84 003	5 289	7%
		Car 5	1 724	1 724	0%	19.82	52.36	164%	34 157	80 258	46 101	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%	588.27	171.66	-70%	1 068 292	1 013 678	-54 614	-5%
	Diesel Oil	pre-Cars	2 189	2 189	0%	414.81	385.73	-7%	899 549	846 433	-53 116	-6%
		Car 1	1 780	1 780	0%	391.89	276.25	-30%	780 189	585 371	-194 788	-25%
		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%	558.91	150.77	-74%	8 064 323	2 040 233	-6 024 090	-74%
		Car 4	43 141	43 141	0%	504.48	32.40	-94%	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	6 658 730	-25 564 553	-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%	454.12	185.62	-59%	65 712 732	15 256 007	-50 456 725	-77%
		LN% Total	149 994	149 994	0%	445.23	188.29	-58%	66 781 025	16 229 684	-50 551 341	-76%
1.A.3.b.ii. - Heavy Duty Vehicles - Buses	Diesel Oil	pre-Cars	891	891	0%	1076.81	1319.23	-18%	964 197	988 234	24 037	2%
		Car I	583	583	0%	731.36	732.67	0%	433 675	446 236	12 561	3%
		Car II	4 375	4 375	0%	708.25	645.03	-9%	3 440 614	2 822 621	-617 993	-18%
		Car III	10 333	10 333	0%	632.87	458.91	-28%	6 530 364	4 741 827	-1 788 537	-27%
		Car IV	4 449	4 449	0%	475.90	382.28	-20%	2 117 219	1 566 881	-550 338	-26%
		Car V	34 380	34 380	0%	364.36	185.22	-49%	8 935 974	4 517 517	-4 418 457	-49%
		Car VI	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	-4%	23 082 189	16 885 117	-6 197 072	-27%
	Trucks & Lorries	pre-Cars	3 933	3 933	0%	1034.81	737.35	-29%	4 087 249	2 980 379	-1 106 870	-29%
		Car I	1 555	1 555	0%	748.16	587.92	-21%	1 163 482	789 813	-373 669	-32%
		Car II	8 876	8 876	0%	817.75	585.42	-28%	7 258 047	4 486 626	-2 771 421	-38%
		Car III	34 167	34 167	0%	638.91	588.64	-9%	21 553 280	12 251 155	-9 302 125	-43%
		Car IV	34 287	34 287	0%	394.94	281.86	-29%	9 640 384	6 885 621	-2 754 763	-29%
		Car V	269 735	269 735	0%	287.22	153.60	-46%	74 680 233	39 976 610	-34 703 623	-46%
1.A.3.b.iv. - Motorised Two-Wheelers (MOWs)	Gasoline	pre-Cars	5 543	5 543	0%	125.59	155.78	24%	696 072	883 289	187 217	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	66	66	0%	17.47	187.68	1071%	1 134	12 632	11 498	1011%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
		MOWs Total	16 185	16 185	0%	96.14	181.68	89%	1 885 897	3 452 476	1 566 579	83%
	Road Transport	pre-Cars	2 287 339	2 287 339	0%	258.89	137.22	-46%	553 799 598	362 981 620	-190 817 978	-46%
		LN% Total	2 287 339	2 287 339	0%	258.89	137.22	-46%	553 799 598	362 981 620	-190 817 978	-46%

Adjustment details for 2027													
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <sub>x</sub> 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	12,282	12,282	0%	636.73	644.11	-1%	7,614,267	6,680,187	-1,126,100	-15%	
		Car 1	17,449	17,449	0%	372.96	341.68	-8%	6,588,311	4,217,644	-2,391,267	-36%	
		Car 2	30,435	30,435	0%	217.43	141.75	-35%	6,617,570	4,374,140	-2,303,430	-36%	
		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	92%	3,063,235	5,884,372	2,821,146	92%		
	Gasoline total	724,571	724,571	0%	67.66	60.88	-30%	49,046,874	38,634,374	-10,412,500	-21%		
	Diesel Oil	pre-Cars	1,780	1,780	0%	364.36	264.56	-27%	483,963	347,620	-131,883	-27%	
		Car 1	3,760	3,760	0%	298.37	271.67	-9%	1,082,286	910,182	-182,114	-17%	
Car 2		13,780	13,780	0%	407.17	222.43	-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%		
1.A.3.a.ii. - Heavy Duty Vehicles (LDV)	Gasoline	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%	423.39	158.34	-63%	120,187,696	44,073,190	-76,114,506	-63%	
		Car 6	184,768	184,768	0%	262.61	158.34	-40%	48,521,183	20,255,985	-28,265,198	-58%	
		Diesel oil total	686,582	686,582	0%	394.65	161.95	-59%	272,126,081	112,890,721	-159,235,360	-59%	
		Pkx Total	1,621,142	1,621,142	0%	245.98	155.61	-36%	521,152,965	163,445,435	-357,707,530	-68%	
		Diesel Oil	pre-Cars	940	940	0%	611.41	645.35	-1%	612,240	686,978	5,422	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	182,950	42,606	30%	
	Car 3		596	596	0%	118.57	115.36	-3%	65,955	68,812	2,857	4%	
	1.A.3.a.iii. - Heavy Duty Vehicles (MDV)	Gasoline	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	160%	
Car 6			910	910	0%	19.18	53.38	187%	17,052	49,080	31,928	187%	
Gasoline total			6,186	6,186	0%	171.55	167.18	-2%	1,058,799	1,034,211	-24,588	-2%	
Diesel Oil			pre-Cars	2,087	2,087	0%	413.41	385.73	-7%	899,549	811,183	-88,366	-10%
			Car 1	1,538	1,538	0%	398.47	276.25	-30%	680,795	511,158	-169,637	-25%
		Car 2	3,580	3,580	0%	321.26	153.04	-53%	1,343,793	687,293	-656,500	-50%	
		Car 3	11,684	11,684	0%	558.90	150.73	-73%	5,240,935	1,758,242	-3,482,693	-67%	
1.A.3.a.iv. - Motorcycles (MDV)		Gasoline	Car 4	39,050	39,050	0%	306.76	83.03	-73%	13,749,647	3,635,025	-10,114,622	-73%
			Car 5	75,789	75,789	0%	432.66	83.03	-79%	32,790,566	7,054,565	-25,736,001	-79%
	Car 6		19,625	19,625	0%	167.71	83.03	-50%	2,977,239	1,626,675	-1,350,564	-46%	
	Diesel oil total		153,284	153,284	0%	424.66	183.89	-57%	65,083,930	15,925,274	-49,158,674	-74%	
	LDVx Total		199,470	199,470	0%	414.83	196.35	-52%	66,152,729	16,959,427	-49,193,302	-74%	
	Diesel Oil		pre-Cars	736	736	0%	707.33	101.23	-86%	190,259	150,425	-39,834	-21%
		Car 1	411	411	0%	723.97	152.57	-79%	300,684	209,082	-91,602	-30%	
		Car 2	3,325	3,325	0%	735.91	645.73	-12%	2,523,087	2,147,480	-375,607	-15%	
		Car 3	8,678	8,678	0%	673.23	459.12	-33%	6,478,480	5,984,085	-494,395	-8%	
	1.A.3.a.v. - Heavy Duty Vehicles (MDV)	Diesel Oil	Car 4	3,923	3,923	0%	474.07	352.49	-26%	1,612,380	1,347,680	-264,700	-16%
Car 5			21,913	21,913	0%	363.92	186.64	-49%	7,937,975	4,053,686	-3,884,289	-49%	
Car 6			14,586	14,586	0%	68.52	186.64	270%	854,215	2,732,580	1,878,375	218%	
Buses total			53,382	53,382	0%	318.80	286.71	-9%	19,193,961	15,384,620	-3,809,341	-20%	
pre-Cars			3,685	3,685	0%	1034.40	719.35	-29%	3,730,272	2,659,076	-1,071,256	-29%	
Car 1			1,711	1,711	0%	748.03	483.48	-35%	902,942	614,151	-288,696	-31%	
Diesel Oil		Car 2	7,387	7,387	0%	817.96	540.55	-34%	3,794,676	3,580,026	-214,650	-6%	
		Car 3	26,886	26,886	0%	626.91	365.73	-42%	12,642,041	9,852,565	-2,789,476	-22%	
		Car 4	39,082	39,082	0%	367.77	279.34	-24%	7,965,414	6,537,487	-1,427,926	-18%	
		Car 5	264,365	264,365	0%	268.16	154.36	-42%	49,280,789	31,685,347	-17,595,442	-36%	
Car 6	335,065	335,065	0%	65.82	154.36	135%	21,985,366	15,731,641	-6,253,725	-28%			
Trucks total	598,263	598,263	0%	695.92	175.92	-75%	116,671,141	105,248,960	-11,422,181	-10%			
1.A.3.a.vi. - Motorcycles (MDV)	Gasoline	pre-Cars	5,336	5,336	0%	125.91	157.13	25%	671,080	830,180	169,851	25%	
		Car 1	3,257	3,257	0%	126.39	177.06	41%	411,617	579,244	167,627	41%	
		Car 2	3,396	3,396	0%	122.55	180.33	47%	476,293	675,548	257,348	47%	
		Car 3	6,711	6,711	0%	41.22	180.33	363%	271,187	1,336,565	1,065,348	393%	
		Car 4	830	830	0%	18.26	180.33	988%	7,882	82,275	77,408	988%	
		MDVx Total	19,160	19,160	0%	52.81	183.39	348%	1,748,424	5,551,787	3,795,114	348%	
	Diesel Oil	pre-Cars	5,336	5,336	0%	125.91	157.13	25%	671,080	830,180	169,851	25%	
		Car 1	3,257	3,257	0%	126.39	177.06	41%	411,617	579,244	167,627	41%	
		Car 2	3,396	3,396	0%	122.55	180.33	47%	476,293	675,548	257,348	47%	
		Car 3	6,711	6,711	0%	41.22	180.33	363%	271,187	1,336,565	1,065,348	393%	
MDVx Total	19,160	19,160	0%	52.81	183.39	348%	1,748,424	5,551,787	3,795,114	348%			
1.A.3.b. - Road Transport	Total	2,291,427	2,291,427	0%	273.43	175.23	-36%	525,569,430	384,685,986	-121,873,424	-23%		

Adjustment details for 2018												
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <sub>x</sub> Emissions				
		current	adjusted	difference in [%]	current	adjusted	difference in [%]	current	adjusted	adjustment	difference 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%	374.34	341.68	-36%	5 371 161	3 448 643	-1 922 518	-36%
		Car 2	34 285	34 285	0%	221.97	111.68	-60%	5 360 977	2 688 163	-2 672 814	-50%
		Car 3	43 642	43 642	0%	88.16	76.96	-4%	3 487 781	3 388 617	-138 164	-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	Car 6	159 041	159 041	0%	6.00	52.30	0%	4 190 422	8 718 250	4 527 828	89%
		Gasoline total	689 027	689 027	0%	64.42	68.36	-6%	45 032 296	47 786 817	2 753 521	6%
		pre-Cars	1 363	1 363	0%	303.16	264.96	-13%	171 670	146 173	-25 497	-15%
		Car 1	2 849	2 849	0%	298.17	272.65	-9%	962 432	775 165	-187 267	-6%
		Car 2	10 784	10 784	0%	407.20	222.87	-45%	4 391 383	2 483 536	-1 907 848	-45%
		Car 3	40 786	40 786	0%	812.49	180.15	-71%	24 932 029	7 333 241	-17 598 788	-71%
	LN% Total	Car 4	130 534	130 534	0%	414.71	180.40	-61%	54 133 837	20 937 329	-33 196 508	-61%
		Car 5	251 212	251 212	0%	416.25	180.40	-61%	104 585 786	40 293 731	-64 292 055	-61%
		Car 6	228 685	228 685	0%	254.87	180.40	-31%	58 284 140	35 680 446	-22 603 700	-31%
		Diesel oil total	646 074	646 074	0%	375.66	163.38	-56%	247 596 063	188 748 684	-158 767 459	-56%
		Pre-Cars Total	1 365 181	1 365 181	0%	214.34	154.68	-28%	262 589 060	156 555 421	-106 033 639	-40%
		LN% Total	911	911	0%	944.51	645.95	-1%	196 851	162 662	-34 189	-1%
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	Car 1	188	188	0%	911.58	312.78	-66%	98 528	33 895	-64 633	-66%
		Car 2	377	377	0%	303.84	224.45	-26%	114 682	84 713	-29 969	-26%
		Car 3	511	511	0%	111.92	118.84	6%	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%
		Car 6	1 643	1 643	0%	19.18	54.36	182%	39 550	89 326	49 776	182%
	Diesel Oil	Gasoline total	6 315	6 315	0%	154.22	160.11	-1%	998 199	1 091 138	11 939	1%
		pre-Cars	1 872	1 872	0%	411.51	386.79	-6%	771 337	574 432	-196 905	-26%
		Car 1	1 285	1 285	0%	389.94	276.28	-29%	483 128	272 296	-210 832	-45%
		Car 2	2 942	2 942	0%	318.56	193.88	-39%	965 389	558 789	-406 600	-39%
		Car 3	9 383	9 383	0%	598.10	150.74	-75%	5 689 152	1 411 299	-4 277 853	-75%
		Car 4	33 232	33 232	0%	508.42	93.81	-82%	16 929 185	3 117 457	-13 811 728	-82%
	LN% Total	Car 5	66 283	66 283	0%	432.92	93.81	-78%	28 684 080	6 217 860	-22 466 220	-78%
		Car 6	39 482	39 482	0%	158.79	93.81	-39%	5 941 615	3 686 228	-2 255 387	-39%
		Diesel oil total	154 259	154 259	0%	384.71	182.69	-71%	98 344 525	15 880 318	-82 464 215	-71%
		LN% Total	180 574	180 574	0%	375.86	184.94	-72%	68 343 125	16 851 449	-51 491 676	-72%
		pre-Cars	547	547	0%	1078.16	1919.23	-5%	589 267	557 147	-32 120	-5%
		Car 1	237	237	0%	732.78	732.67	0%	173 678	178 388	4 710	3%
	Diesel Oil	Car 2	2 270	2 270	0%	787.83	646.33	-18%	1 780 686	1 487 437	-293 249	-16%
		Car 3	6 757	6 757	0%	638.89	459.32	-21%	4 262 734	3 183 482	-1 079 252	-21%
		Car 4	3 043	3 043	0%	473.16	382.73	-20%	1 439 790	1 073 333	-366 457	-25%
		Car 5	18 189	18 189	0%	362.42	186.37	-49%	6 463 265	3 376 016	-3 087 249	-49%
		Car 6	20 670	20 670	0%	64.89	186.37	228%	1 176 026	3 682 314	2 506 288	228%
		Diesel Total	51 634	51 634	0%	309.75	283.53	-18%	15 993 546	13 687 186	-2 306 428	-15%
1.A.3.b.ii - Heavy Duty Vehicle Buses	Gasoline	pre-Cars	3 282	3 282	0%	1034.82	737.35	-29%	3 375 359	2 485 071	-890 288	-29%
		Car 1	1 094	1 094	0%	747.82	488.39	-31%	818 052	512 378	-305 674	-31%
		Car 2	5 544	5 544	0%	817.44	581.68	-29%	4 632 180	2 781 516	-1 850 664	-39%
		Car 3	20 583	20 583	0%	629.54	563.68	-11%	12 367 751	7 277 279	-5 090 472	-44%
		Car 4	15 912	15 912	0%	358.89	276.23	-21%	6 334 421	4 386 424	-1 947 997	-31%
		Car 5	154 983	154 983	0%	292.40	154.68	-47%	45 964 153	24 283 389	-21 680 764	-47%
	Diesel Oil	Car 6	381 799	381 799	0%	68.78	154.68	125%	26 251 482	69 665 886	43 414 404	125%
		Trucks Total	585 186	585 186	0%	515.18	172.19	-1%	188 173 537	180 710 889	-7 462 648	-1%
		pre-Cars	4 940	4 940	0%	128.95	188.61	20%	622 695	783 451	160 756	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	65%	387 596	639 833	252 237	65%
		Car 3	6 241	6 241	0%	48.24	188.64	384%	251 126	1 239 688	988 562	384%
	LN% Total	Car 4	1 130	1 130	0%	58.41	188.64	82%	23 066	224 682	201 616	82%
		Car 5	0	0	0%	0.00	188.64	0%	0	0	0	0%
		LN% Total	18 487	18 487	0%	85.66	188.61	108%	1 658 568	3 454 767	1 796 200	108%
		1.A.3.b - Road Transport	2 180 983	2 180 983	0%	215.85	133.49	-38%	478 758 286	291 129 652	-187 628 634	-38%

Adjustment details for 2019													
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <sub>x</sub> 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	13 588	13 588	0%	638.58	644.11	-6%	8 664 621	7 382 686	-1 281 935	-15%	
		Car 1	12 427	12 427	0%	378.32	341.68	-36%	4 781 480	3 083 383	-1 698 096	-36%	
		Car 2	20 086	20 086	0%	225.58	92.58	-60%	4 531 070	1 858 018	-2 673 052	-60%	
		Car 3	38 216	38 216	0%	82.22	76.12	-5%	2 977 840	2 829 186	-148 654	-5%	
		Car 4	295 220	295 220	0%	57.04	53.29	-7%	14 588 285	13 589 621	-998 664	-7%	
		Car 5	180 537	180 537	0%	19.77	53.29	170%	3 173 728	8 054 356	5 380 628	170%	
	Car 6	285 636	285 636	0%	25.63	53.29	180%	5 295 099	11 010 782	5 715 683	180%		
	Gasoline total	784 031	784 031	0%	62.36	68.45	-10%	43 981 941	48 238 025	4 256 084	10%		
	pre-Cars	2 736	2 736	0%	333.76	264.56	-16%	913 180	724 923	-188 257	-21%		
	Car 1	2 545	2 545	0%	298.80	272.65	-9%	766 913	687 786	-80 127	-9%		
	Car 2	8 891	8 891	0%	407.19	229.16	-44%	3 620 286	2 037 480	-1 582 806	-44%		
	Car 3	33 079	33 079	0%	615.11	180.42	-71%	20 310 125	5 957 483	-14 352 642	-71%		
	Car 4	111 335	111 335	0%	419.17	182.44	-61%	48 688 685	18 085 228	-30 603 457	-61%		
	Car 5	231 784	231 784	0%	419.37	182.44	-60%	95 117 643	37 650 997	-57 466 646	-60%		
	Car 6	273 511	273 511	0%	227.36	182.44	-20%	62 183 230	44 429 184	-17 754 046	-29%		
	Diesel oil total	663 841	663 841	0%	345.81	165.67	-52%	229 566 088	109 582 982	-119 983 106	-52%		
	Pre-Cars Total	1 368 532	1 368 532	0%	699.83	155.32	-46%	273 668 009	157 821 687	-115 846 322	-42%		
	LN% Total	926	926	0%	644.89	645.96	1%	687 449	581 962	-105 487	-1%		
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	Car 1	87	87	0%	915.28	312.78	-66%	88 953	30 396	-58 557	-66%	
		Car 2	316	316	0%	304.63	224.45	-26%	96 158	70 848	-25 310	-26%	
		Car 3	447	447	0%	112.68	121.47	8%	59 355	54 283	-5 072	-8%	
		Car 4	1 126	1 126	0%	53.08	55.26	4%	59 652	62 199	2 547	4%	
		Car 5	1 361	1 361	0%	25.34	55.26	119%	34 240	74 680	40 440	119%	
		Car 6	2 420	2 420	0%	18.75	55.26	180%	45 383	133 753	88 370	180%	
	Gasoline total	6 483	6 483	0%	146.88	153.25	5%	974 299	1 094 150	11 851	5%		
	pre-Cars	1 744	1 744	0%	418.96	386.79	-6%	725 111	541 376	-183 735	-26%		
	Car 1	1 079	1 079	0%	389.52	276.28	-29%	420 285	232 256	-188 029	-45%		
	Car 2	2 334	2 334	0%	315.90	194.79	-39%	737 682	454 630	-283 052	-39%		
	Car 3	7 649	7 649	0%	557.93	150.73	-73%	2 597 343	1 152 717	-1 444 626	-73%		
	Car 4	28 714	28 714	0%	512.28	30.77	-42%	14 788 380	2 776 154	-12 012 226	-42%		
	Car 5	58 714	58 714	0%	434.36	94.57	-79%	25 499 580	5 552 428	-19 947 152	-79%		
	Car 6	69 931	69 931	0%	146.16	94.57	-35%	6 614 586	6 572 892	-4 694 164	-35%		
	LDVs total	159 183	159 183	0%	347.42	181.88	-47%	55 383 335	36 221 445	-19 161 890	-47%		
	LN% Total	165 866	165 866	0%	338.13	183.89	-46%	56 279 554	37 248 998	-19 030 556	-46%		
	1.A.3.b.ii - Heavy Duty Vehicles (Buses)	Diesel Oil	Car 1	489	489	0%	1080.20	1015.23	-6%	585 887	476 258	-109 629	-6%
			Car 2	147	147	0%	738.37	752.67	2%	188 212	170 583	-17 629	-9%
Car 3			1 611	1 611	0%	709.47	666.77	-7%	1 577 445	1 041 621	-535 824	-34%	
Car 4			5 789	5 789	0%	824.86	410.43	-50%	5 066 381	2 623 779	-2 442 602	-48%	
Car 5			2 747	2 747	0%	473.93	352.84	-26%	1 382 061	960 413	-421 648	-30%	
Car 6			17 130	17 130	0%	362.91	186.64	-49%	6 213 175	3 180 781	-3 034 394	-49%	
Car 7		25 135	25 135	0%	60.43	186.64	299%	1 518 961	4 686 133	3 167 172	299%		
Buses Total		52 939	52 939	0%	274.41	247.85	-10%	14 547 052	13 158 578	-1 408 474	-10%		
pre-Cars		3 140	3 140	0%	1034.96	737.35	-29%	3 250 020	2 375 443	-874 577	-29%		
Car 1		989	989	0%	747.60	488.34	-35%	724 240	453 754	-270 486	-35%		
Car 2		4 580	4 580	0%	817.42	581.19	-29%	3 734 343	2 280 967	-1 445 376	-39%		
Car 3		16 377	16 377	0%	688.94	341.83	-50%	13 681 323	6 756 647	-6 924 676	-50%		
Car 4		13 137	13 137	0%	396.86	279.43	-31%	2 675 679	3 589 330	913 651	31%		
Car 5		135 233	135 233	0%	135.13	154.50	10%	36 960 598	59 481 429	22 520 831	10%		
Car 6		432 488	432 488	0%	72.98	154.50	110%	31 175 448	67 083 863	35 828 367	110%		
Trucks Total		595 913	595 913	0%	553.36	165.17	-10%	85 380 180	180 889 376	94 509 196	110%		
1.A.3.b.iii - Motorized Two-Wheelers (MOWs)		Gasoline	pre-Cars	4 813	4 813	0%	125.89	164.78	31%	664 997	732 771	167 774	31%
			Car 1	2 835	2 835	0%	125.39	177.29	41%	355 456	582 589	227 133	41%
	Car 2		3 084	3 084	0%	119.33	180.06	67%	303 224	635 757	332 533	67%	
	Car 3		6 082	6 082	0%	48.03	180.06	267%	204 284	1 151 617	947 333	267%	
	Car 4		2 085	2 085	0%	21.69	180.06	817%	23 489	386 647	363 158	817%	
	Car 5		0	0	0%	0.00	0.00	0%	0	0	0	0%	
	MOWs Total	18 750	18 750	0%	86.09	186.83	115%	1 613 850	3 562 841	1 889 491	115%		
	1.A.3.b. Road Transport	Total	2 262 080	2 262 080	0%	198.58	132.83	-33%	437 266 734	292 497 497	-144 769 238	-33%	

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Adjustment 2014 (accepted)	-105.6	-101.3	-95.7	-91.7						
Adjustment 2015 (accepted)	-100.3	-95.5	-89.9	-85.1						
Adjustment 2016 (accepted)	-151.3	-146.9	-145.1	-142.5	-128.1					
Adjustment 2017 (accepted)	-151.3	-146.8	-145.0	-142.4	-127.2	-100.9				
Adjustment 2018 (accepted)	-172.3	-174.5	-177.4	-180.4	-171.5	-148.9	-123.2			
Adjustment 2019 (accepted)	-172.3	-174.5	-177.4	-180.3	-171.4	-148.8	-123.3	93.7		
Adjustment 2020 (accepted)	-297.8	-302.3	-301.3	-306.1	-294.5	-269.0	-244.3	-214.9	-174.6	
<b>Adjustment 2021 (proposal)</b>	<b>-296.1</b>	<b>-300.7</b>	<b>-300.4</b>	<b>-305.2</b>	<b>-294.9</b>	<b>-274.9</b>	<b>-250.9</b>	<b>-221.1</b>	<b>-179.6</b>	<b>-144.8</b>
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".<sup>8)</sup>

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 ><sup>9)</sup> strongly effecting the TREMOD model underlying Germany's emission reporting for road transport and hence any adjustments of NO<sub>x</sub>, 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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