

# 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<sub>adjustment</sub>**, = amount of emissions to be subtracted from National Totals \* **AD<sub>current</sub>**, = AD from latest TREMOD version as used for current submission \* **EF<sub>current</sub>**, = EF from latest TREMOD version as used for current submission \* **EF<sub>original</sub>**, = EF from TREMOD version used at the time NEC ceilings were set (here: TREMOD 3.1) \* **EM<sub>current</sub>**, = EM estimated from AD and EF from latest TREMOD version = EM reported for NFR 1.A.3.b with latest submission \* **EM<sub>current-artificial</sub>**, = 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 (2020).

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 6.02 (Knörr et al., 2019a) <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.

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cf. Also related columns in the Excel table "Annex\_VII\_Adjustments\_summary\_template\_extended2\_V2\_Aprill15.xlsx" for road transport).

Table: Aggregated impact of adjustments on NO<sub>x</sub> emissions from NFR 1.A.3.b

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Table 1: Resulting adjustment proposal 2020

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

```

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

#### Activity Data

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

#### Implied Emission Factor

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

#### NO<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%	77.644.842	67.690.906	9.953.935	-13%
1.A.3.b.i	diesel oil		629.380	629.380	0%	429.45	160.51	-63%	227.341.096	84.970.461	142.370.635	-63%
1.A.3.b.ii	gasoline		6.325	6.325	0%	255.87	214.75	-16%	1.618.432	1.358.328	260.104	-16%
1.A.3.b.ii	diesel oil		113.450	113.450	0%	476.34	134.96	-72%	54.040.533	15.311.584	38.728.949	-72%
1.A.3.b.iii	diesel oil		48.844	48.844	0%	823.00	482.55	-23%	29.931.266	23.183.732	6.747.534	-23%
1.A.3.b.iii	diesel oil		566.741	566.741	0%	446.67	271.83	-39%	253.148.243	154.056.160	99.092.083	-39%
1.A.3.b.iv	gasoline		19.712	19.712	0%	113.68	168.43	48%	2.240.749	3.320.034	-1.079.285	48%
1.A.3.b TOTAL	2010		2.079.608	2.079.608	0%			0%	645.965.162	349.851.206	296.113.956	-46%
1.A.3.b.i	gasoline		794.688	794.688	0%	92.09	81.61	-11%	73.185.851	64.851.951	8.333.900	-11%
1.A.3.b.i	diesel oil		553.564	553.564	0%	434.12	159.22	-63%	240.313.791	88.138.959	152.174.832	-63%
1.A.3.b.ii	gasoline		6.118	6.118	0%	229.35	198.57	-13%	1.403.081	1.214.776	188.305	-13%
1.A.3.b.ii	diesel oil		115.967	115.967	0%	481.55	126.92	-74%	55.844.518	14.718.142	41.126.376	-74%
1.A.3.b.iii	diesel oil		47.355	47.355	0%	592.65	448.99	-24%	28.071.221	21.268.323	6.804.898	-24%
1.A.3.b.iii	diesel oil		563.891	563.891	0%	410.38	244.97	-40%	231.410.271	138.135.342	93.273.929	-40%
1.A.3.b.iv	gasoline		19.289	19.289	0%	110.79	171.60	54%	2.137.002	3.299.162	-1.162.160	54%
1.A.3.b TOTAL	2011		2.106.883	2.106.883	0%			0%	632.365.736	331.625.655	300.740.081	-48%
1.A.3.b.i	gasoline		750.957	750.957	0%	85.73	78.00	-9%	64.379.994	58.677.229	5.802.765	-9%
1.A.3.b.i	diesel oil		555.245	555.245	0%	435.96	158.66	-64%	242.062.902	88.096.699	153.966.203	-64%
1.A.3.b.ii	gasoline		5.657	5.657	0%	218.93	193.15	-12%	1.238.520	1.092.662	145.859	-12%
1.A.3.b.ii	diesel oil		114.350	114.350	0%	481.91	128.17	-75%	55.106.362	13.741.354	41.365.008	-75%
1.A.3.b.iii	diesel oil		50.902	50.902	0%	533.22	384.33	-28%	27.141.913	19.563.200	7.578.704	-28%
1.A.3.b.iii	diesel oil		589.585	589.585	0%	381.33	224.00	-41%	234.829.180	132.064.753	92.764.428	-41%
1.A.3.b.iv	gasoline		18.268	18.268	0%	107.43	173.28	61%	1.962.546	3.165.439	-1.202.893	61%
1.A.3.b TOTAL	2012		2.084.964	2.084.964	0%			0%	616.721.438	316.391.343	300.420.094	-49%
1.A.3.b.i	gasoline		749.114	749.114	0%	89.35	74.85	-7%	60.190.007	56.071.797	4.118.211	-7%
1.A.3.b.i	diesel oil		589.131	589.131	0%	437.14	158.71	-64%	257.633.728	93.499.010	164.134.718	-64%
1.A.3.b.ii	gasoline		5.578	5.578	0%	202.80	184.07	-9%	1.131.209	1.026.727	104.482	-9%
1.A.3.b.ii	diesel oil		118.777	118.777	0%	480.60	114.93	-76%	57.083.533	13.690.488	43.433.045	-76%
1.A.3.b.iii	diesel oil		51.716	51.716	0%	509.64	260.06	-29%	26.350.969	18.620.843	7.730.126	-29%
1.A.3.b.iii	diesel oil		600.139	600.139	0%	353.06	287.93	-41%	211.887.531	124.788.469	87.099.062	-41%
1.A.3.b.iv	gasoline		18.229	18.229	0%	104.34	175.38	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	diesel oil		49.143	49.143	0%	468.37	339.99	-27%	23.017.115	16.708.234	6.308.881	-27%
1.A.3.b.iii	diesel oil		572.754	572.754	0%	314.05	196.05	-38%	179.874.133	112.285.582	67.588.551	-38%
1.A.3.b.iv	gasoline		18.673	18.673	0%	100.59	179.24	78%	1.878.294	3.346.794	-1.468.499	78%
1.A.3.b TOTAL	2014		2.153.563	2.153.563	0%			0%	597.120.297	302.252.271	294.868.025	-49%
1.A.3.b.i	gasoline		715.156	715.156	0%	74.38	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	diesel oil		52.287	52.287	0%	458.96	327.99	-29%	23.997.817	17.149.448	6.848.370	-29%
1.A.3.b.iii	diesel oil		589.411	589.411	0%	266.69	187.51	-30%	157.189.675	110.620.703	46.568.973	-30%
1.A.3.b.iv	gasoline		18.459	18.459	0%	99.32	180.65	82%	1.833.362	3.334.472	-1.501.090	82%
1.A.3.b TOTAL	2015		2.161.976	2.161.976	0%			0%	575.931.265	301.877.596	274.053.670	-48%
1.A.3.b.i	gasoline		715.272	715.272	0%	79.93	76.65	-4%	50.736.367	50.535.049	201.318	0%
1.A.3.b.i	diesel oil		675.119	675.119	0%	410.36	160.76	-61%	277.041.660	108.535.230	168.506.430	-61%
1.A.3.b.ii	gasoline		5.926	5.926	0%	180.27	171.05	-5%	1.068.292	1.013.678	54.614	-5%
1.A.3.b.ii	diesel oil		144.068	144.068	0%	456.12	185.62	-77%	65.712.732	15.216.007	50.496.725	-77%
1.A.3.b.iii	diesel oil		54.157	54.157	0%	424.73	388.24	-27%	23.002.109	16.683.117	6.308.992	-27%
1.A.3.b.iii	diesel oil		594.013	594.013	0%	226.31	180.97	-20%	134.431.699	107.496.262	26.935.437	-20%
1.A.3.b.iv	gasoline		18.785	18.785	0%	95.14	181.66	89%	1.805.897	3.412.476	-1.606.579	89%
1.A.3.b TOTAL	2016		2.207.339	2.207.339	0%			0%	553.790.558	302.901.820	250.897.738	-45%
1.A.3.b.i	gasoline		724.571	724.571	0%	67.66	69.88	3%	49.026.074	50.634.714	-1.607.640	3%
1.A.3.b.i	diesel oil		696.592	696.592	0%	390.65	161.95	-59%	272.126.091	112.810.721	159.315.370	-59%
1.A.3.b.ii	gasoline		6.186	6.186	0%	171.15	167.18	-2%	1.058.799	1.034.211	24.588	-2%
1.A.3.b.ii	diesel oil		153.284	153.284	0%	424.66	183.89	-76%	65.093.930	15.925.216	49.168.714	-76%
1.A.3.b.iii	diesel oil		53.382	53.382	0%	379.80	286.71	-23%	19.793.901	15.304.828	4.489.073	-23%
1.A.3.b.iii	diesel oil		596.263	596.263	0%	195.02	175.92	-10%	116.671.141	106.246.508	11.424.633	-10%
1.A.3.b.iv	gasoline		19.160	19.160	0%	92.83	183.39	98%	1.778.674	3.513.787	-1.735.114	98%
1.A.3.b TOTAL	2017		2.251.437	2.251.437	0%			0%	525.549.410	304.469.986	221.079.424	-42%
1.A.3.b.i	gasoline		699.027	699.027	0%	64.42	68.36	6%	45.032.996	47.786.817	-2.753.820	6%
1.A.3.b.i	diesel oil		666.074	666.074	0%	371.66	163.30	-56%	247.556.063	108.768.604	138.787.459	-56%
1.A.3.b.ii	gasoline		6.315	6.315	0%	158.22	160.11	1%	999.199	1.011.138	-11.939	1%
1.A.3.b.ii	diesel oil		154.259	154.259	0%	384.71	182.69	-73%	59.344.525	15.840.310	43.504.215	-73%
1.A.3.b.iii	diesel oil		51.634	51.634	0%	309.75	263.53	-15%	15.993.526	13.607.106	2.386.420	-15%
1.A.3.b.iii	diesel oil		585.186	585.186	0%	171.18	172.10	1%	180.173.337	180.710.869	-537.532	1%
1.A.3.b.iv	gasoline		18.497	18.497	0%	89.66	184.61	106%	1.658.568	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	diesel oil		52.939	52.939	0%	274.41	247.81	-10%	14.527.012	13.118.578	1.408.434	-10%
1.A.3.b.iii	diesel oil		595.913	595.913	0%	153.35	169.17	10%	91.380.760	106.809.376	-9.428.616	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		2.202.888	2.202.888	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 [%]	
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	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	444.991	444.991	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	795.057	795.057	0%	592.25	514.25	-13%	77.644.042	67.650.586	-9.993.456	-13%
	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	10.974.210	-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%	107.299.180	39.243.811	-68.055.349	-53%
		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	46.553	-38.491	-45%
		Diesel oil total	529.380	529.380	0%	429.45	140.55	-67%	227.347.096	84.970.461	-142.376.635	-67%
		Pkx Total	1.325.337	1.325.337	0%	238.12	155.14	-36%	364.985.938	152.621.367	-152.364.570	-36%
	Gasoline	pre-Cars	1.249	1.249	0%	627.99	645.95	3%	783.320	886.871	233.551	3%
		Car 1	367	367	0%	961.95	297.39	-69%	386.969	186.620	-208.358	-69%
		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	20.772	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	1.358.128	-248.934	-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	-29%
		Car 1	9.989	9.989	0%	399.18	276.24	-40%	2.389.080	1.289.636	-1.099.409	-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%	17.655.883	5.085.760	-12.649.123	-72%
		Car 4	54.581	54.581	0%	491.42	80.69	-84%	26.021.036	4.040.722	-21.981.114	-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	-62%	7	4	-3	-43%
		Gasoline total	113.450	113.450	0%	416.34	134.94	-72%	54.043.533	15.351.584	-38.728.949	-72%
	Diesel Oil	pre-Cars	119.175	119.175	0%	464.70	139.18	-70%	55.658.966	36.685.913	-18.985.853	-70%
		Car 1	3.382	3.382	0%	1098.25	1828.78	6%	3.674.087	3.432.644	-221.423	-6%
		Car 2	2.826	2.826	0%	749.41	732.14	0%	2.117.871	2.125.595	7.723	0%
		Car 3	10.152	10.152	0%	801.96	643.47	-20%	8.140.119	6.532.213	-1.607.906	-20%
		Car 4	15.890	15.890	0%	633.22	437.25	-30%	13.065.776	7.289.299	-2.797.567	-30%
		Car 5	5.461	5.461	0%	448.63	351.65	-22%	2.650.016	1.921.527	-628.499	-23%
		Car 6	10.326	10.326	0%	337.28	182.33	-46%	3.882.417	1.882.644	-1.999.873	-46%
		Car 6	0	0	0%	0%	0%	0	0	0	0%	
		Buses Total	48.044	48.044	0%	623.80	482.55	-23%	29.931.286	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	-993.702	-23%
		Car 2	38.558	38.558	0%	817.62	524.79	-35%	31.525.526	20.234.619	-11.290.907	-36%
		Car 3	169.023	169.023	0%	636.28	274.48	-41%	161.136.182	59.617.271	-101.608.921	-61%
		Car 4	69.636	69.636	0%	368.34	280.62	-24%	27.183.867	20.146.636	-7.037.233	-26%
		Car 5	283.934	283.934	0%	276.42	151.65	-45%	78.643.643	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	-99.892.883	-39%
1.A.3.b.ii. Motorised Two-Wheelers (MOWs)	Gasoline	pre-Cars	7.973	7.973	0%	122.80	149.18	22%	972.721	1.189.393	216.672	22%
		Car 1	5.231	5.231	0%	123.77	165.74	34%	647.479	887.039	239.560	34%
		Car 2	3.587	3.587	0%	141.16	184.21	30%	585.362	696.681	116.309	20%
		Car 3	2.950	2.950	0%	38.11	184.21	387%	116.180	567.032	450.834	387%
		Car 4	0	0	0%	0%	0%	0	0	0	0%	
		Car 5	0	0	0%	0%	0%	0	0	0	0%	
		MOWs Total	19.172	19.172	0%	113.68	148.43	48%	2.243.149	3.326.034	1.079.285	48%
	1.A.3.b. Road Transport	Total	2.879.688	2.879.688	0%	218.62	168.23	-46%	645.965.162	349.851.296	-296.113.956	-46%

Adjustment details for 2021												
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	13.063	13.063	0%	592.96	534.68	-9%	7.728.235	6.979.435	-748.801	-9%
		Car 1	61.979	61.979	0%	347.86	240.16	-31%	21.540.430	14.884.961	-6.655.479	-31%
		Car 2	87.083	87.083	0%	178.38	136.58	-24%	15.620.983	11.883.782	-3.727.191	-24%
		Car 3	124.330	124.330	0%	61.94	71.52	16%	7.683.891	8.891.671	1.227.780	16%
		Car 4	442.185	442.185	0%	43.94	43.68	0%	19.384.914	19.736.439	351.525	0%
		Car 5	66.057	66.057	0%	18.58	43.68	135%	1.227.381	2.085.636	1.658.255	135%
	Car 6	1	1	0%	25.00	43.68	60%	17	20	3	11%	
	Gasoline total	794.688	794.688	0%	52.69	51.65	-2%	73.185.851	64.851.551	-8.333.900	-11%	
	Diesel Oil	pre-Cars	1.711	1.711	0%	319.90	264.95	-16%	311.683	453.187	141.504	45%
		Car 1	8.426	8.426	0%	297.32	245.85	-18%	2.585.115	2.239.987	-345.119	-11%
		Car 2	42.514	42.514	0%	407.93	279.27	-40%	17.384.549	9.321.916	-7.962.634	-40%
		Car 3	121.429	121.429	0%	555.36	170.55	-69%	67.437.053	21.681.386	-45.755.667	-69%
		Car 4	264.943	264.943	0%	388.88	143.48	-63%	162.817.881	30.089.755	-132.808.144	-63%
		Car 5	113.047	113.047	0%	435.12	143.48	-67%	49.536.960	16.332.974	-33.203.984	-67%
	Diesel oil total	695	695	0%	259.59	143.48	-45%	180.582	99.754	-80.848	-45%	
PKx Total	553.564	553.564	0%	434.12	159.92	-63%	249.313.791	88.138.959	-152.174.832	-63%		
1.A.3.a.ii. Heavy Duty Vehicles (LDV)	Gasoline	pre-Cars	1.348.252	1.348.252	0%	232.52	153.47	-51%	313.499.642	152.990.510	-160.509.132	-51%
		Car 1	1.084	1.084	0%	626.75	645.95	3%	682.014	760.373	78.359	11%
		Car 2	283	283	0%	818.74	184.47	-46%	243.289	86.158	-157.132	-65%
		Car 3	1.184	1.184	0%	268.66	191.68	-29%	310.529	223.189	-87.340	-28%
		Car 4	783	783	0%	85.97	95.39	11%	67.320	74.782	7.361	11%
		Car 5	2.562	2.562	0%	37.38	46.51	24%	95.786	119.162	23.376	24%
	Car 6	241	241	0%	16.13	46.51	189%	3.882	11.190	7.308	189%	
	Car 7	0	0	0%	15.33	46.51	283%	1	2	2	283%	
	Gasoline total	6.198	6.198	0%	229.35	186.57	-23%	1.483.081	1.254.776	-228.305	-15%	
	Diesel Oil	pre-Cars	3.995	3.995	0%	425.99	386.79	-9%	1.988.280	1.225.682	-762.598	-29%
		Car 1	4.787	4.787	0%	399.71	276.24	-40%	1.984.260	1.030.426	-953.825	-48%
		Car 2	10.816	10.816	0%	336.90	153.29	-43%	3.644.582	2.091.063	-1.553.519	-43%
		Car 3	28.876	28.876	0%	541.53	150.54	-72%	15.037.249	4.346.870	-11.290.379	-72%
		Car 4	60.032	60.032	0%	80.02	89.26	11%	30.079.914	34.020.811	2.940.897	10%
		Car 5	6.609	6.609	0%	448.01	89.26	-80%	2.930.190	584.364	-2.335.826	-80%
Car 6	0	0	0%	161.21	89.26	-43%	14	6	-6	-43%		
Diesel oil total	115.961	115.961	0%	485.58	126.92	-74%	55.844.598	15.718.142	-40.126.376	-74%		
LDVx Total	122.085	122.085	0%	488.92	130.55	-74%	127.447.999	19,932.898	-103.445.101	-74%		
1.A.3.a.iii. Heavy Duty Vehicles (MDV)	Gasoline	pre-Cars	2.620	2.620	0%	100.63	101.18	1%	2.636.189	2.671.331	35.142	1%
		Car 1	2.258	2.258	0%	752.91	711.45	-5%	1.699.781	1.696.297	-3.484	0%
		Car 2	3.024	3.024	0%	804.17	663.36	-18%	2.281.125	1.537.559	-743.566	-33%
		Car 3	16.887	16.887	0%	633.16	457.38	-28%	9.425.880	6.889.054	-2.536.827	-28%
		Car 4	5.131	5.131	0%	448.88	351.81	-21%	2.303.338	1.881.274	-418.064	-20%
		Car 5	13.396	13.396	0%	336.60	182.62	-46%	4.589.052	2.486.399	-2.092.653	-46%
	Car 6	0	0	0%	0	0	0%	0	0	0	0%	
	Diesel Oil	47.365	47.365	0%	902.65	448.99	-50%	28.071.221	21.286.323	-6.884.898	-25%	
	Car 7	8.044	8.044	0%	107.67	173.88	60%	3.365.423	6.144.933	2.779.510	80%	
	Car 8	4.384	4.384	0%	758.16	574.04	-24%	3.288.422	2.535.237	-772.844	-23%	
	Car 9	29.277	29.277	0%	817.37	550.31	-33%	23.947.723	15.226.327	-8.721.499	-36%	
	Car 10	121.581	121.581	0%	636.16	436.56	-31%	77.271.520	45,310.423	-31,961.097	-41%	
	Car 11	68.430	68.430	0%	290.35	289.43	0%	32.177.784	15,969.685	-16,208.109	-51%	
	Car 12	342.175	342.175	0%	378.29	152.63	-60%	96.589.479	52,019.687	-44,569.792	-46%	
	MDVx Total	563.891	563.891	0%	418.38	244.97	-40%	215,470.271	138,136.342	-77,333.929	-36%	
1.A.3.b.iii. Motorised Two-Wheelers (MDVW)	Gasoline	pre-Cars	7.389	7.389	0%	322.96	150.24	-53%	969.588	1.110.170	21.588	22%
		Car 1	4.885	4.885	0%	124.72	108.26	-13%	599.299	888.547	289.248	35%
		Car 2	3.544	3.544	0%	137.85	114.58	-17%	488.552	688.683	201.851	41%
		Car 3	3.560	3.560	0%	39.59	114.58	289%	160.553	688.683	528.130	329%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
	MDVWx Total	19.289	19.289	0%	119.79	177.04	54%	2,137.082	3,299.162	1,162.180	54%	
	1.A.3.b. Road Transport	Total	2.180.883	2.180.883	0%	305.90	157.85	-49%	632.363.736	321,625.655	-308,748.081	-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-Cars	11,581	11,581	0%	607.72	635.38	-52%	7,035,041	6,189,785	-836,256	-52%
		Car 1	47,487	47,487	0%	348.56	341.62	-31%	16,571,746	11,426,129	-5,145,617	-31%
		Car 2	72,781	72,781	0%	194.27	137.92	-29%	13,487,749	10,035,380	-3,372,369	-29%
		Car 3	189,443	189,443	0%	63.89	72.62	14%	6,927,963	7,875,172	947,209	14%
		Car 4	489,541	489,541	0%	45.39	45.13	-1%	18,541,881	18,436,736	-105,145	-1%
		Car 5	181,961	181,961	0%	18.61	45.13	142%	1,897,355	4,681,311	2,783,956	142%
		Car 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-Cars	1,447	1,447	0%	311.98	284.56	-9%	463,963	383,872	-80,091	-9%
		Car 1	6,660	6,660	0%	267.79	246.44	-11%	1,980,364	1,771,787	-208,577	-11%
		Car 2	33,967	33,967	0%	406.82	279.27	-40%	13,987,432	7,445,646	-6,541,787	-40%
		Car 3	183,539	183,539	0%	564.82	176.63	-69%	58,389,037	18,434,837	-39,954,200	-69%
		Car 4	234,943	234,943	0%	398.41	146.46	-62%	91,724,190	34,488,997	-57,235,193	-62%
		Car 5	173,112	173,112	0%	434.89	146.46	-66%	75,284,364	25,353,375	-49,930,989	-66%
		Car 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-Cars	962	962	0%	632.36	645.95	2%	607,179	621,160	13,981	2%
		Car 1	232	232	0%	803.24	193.22	-86%	199,985	70,295	-129,691	-86%
		Car 2	989	989	0%	271.16	195.74	-28%	269,134	133,538	-135,596	-28%
		Car 3	835	835	0%	89.38	98.33	10%	14,623	82,092	7,469	10%
		Car 4	2,030	2,030	0%	38.49	47.58	24%	78,155	96,691	18,536	24%
		Car 5	610	610	0%	16.36	47.58	182%	9,941	29,011	19,069	182%
		Car 6	0	0	0%	15.37	47.58	210%	2	6	4	210%
		Gasoline total	5,657	5,657	0%	218.93	193.15	-12%	1,238,520	1,092,662	-145,858	-12%
1.A.3.b.i. Heavy Duty Vehicles (LDVs)	Gasoline	pre-Cars	3,281	3,281	0%	424.46	386.79	-9%	1,368,754	1,022,093	-346,661	-9%
		Car 1	3,666	3,666	0%	398.34	276.24	-30%	1,445,980	1,017,634	-428,346	-30%
		Car 2	8,479	8,479	0%	336.40	133.39	-49%	2,852,325	1,639,772	-1,212,553	-49%
		Car 3	23,785	23,785	0%	558.53	150.44	-73%	13,050,281	3,546,082	-9,504,199	-73%
		Car 4	59,485	59,485	0%	494.22	89.85	-82%	29,369,070	5,337,395	-24,031,675	-82%
		Car 5	15,964	15,964	0%	442.70	89.85	-80%	7,040,461	1,420,906	-5,619,555	-80%
		Car 6	1	1	0%	15.14	89.85	-81%	122	72	-50	-81%
		Diesel oil total	114,350	114,350	0%	485.91	120.17	-75%	55,186,382	13,741,354	-41,445,028	-75%
		LDVs Total	120,008	120,008	0%	489.51	123.61	-74%	56,344,963	14,834,656	-41,510,307	-74%
	Diesel Oil	pre-Cars	1,326	1,326	0%	1091.46	1119.45	4%	1,410,640	1,352,283	-58,357	-4%
		Car 1	1,245	1,245	0%	727.34	731.15	1%	1,017,476	1,017,184	-292	0%
		Car 2	7,789	7,789	0%	703.46	643.34	-9%	5,085,091	4,597,478	-487,613	-9%
		Car 3	14,483	14,483	0%	629.94	457.61	-27%	9,073,137	6,689,744	-2,383,393	-27%
		Car 4	5,331	5,331	0%	468.10	361.85	-23%	2,642,179	1,675,777	-966,402	-23%
		Car 5	20,752	20,752	0%	347.84	182.99	-47%	7,219,563	3,787,467	-3,432,096	-47%
		Car 6	73	73	0%	64.52	182.99	236%	3,961	13,295	9,334	236%
		Diesel Total	50,962	50,962	0%	533.22	384.33	-28%	27,141,913	19,945,288	-7,196,625	-28%
		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-Cars	6,780	6,780	0%	122.76	151.03	23%	822,539	1,011,520	188,981	23%
		Car 1	4,386	4,386	0%	124.61	171.39	39%	536,615	738,050	201,435	39%
		Car 2	3,267	3,267	0%	136.22	184.56	45%	445,087	636,853	191,766	43%
		Car 3	3,984	3,984	0%	38.66	184.56	382%	18,386	778,616	760,230	382%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
		MDVs Total	18,268	18,268	0%	107.43	173.28	61%	1,982,546	3,165,439	1,182,893	61%
		1.A.3.b. Road Transport	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-Cars	11,680	11,680	0%	618.27	649.35	-5%	7,011,541	6,967,452	-4,444,808	-95%
		Car 1	37,743	37,743	0%	353.78	341.68	-32%	13,362,966	9,129,495	-4,233,471	-31%
		Car 2	62,680	62,680	0%	188.93	139.33	-27%	11,889,922	8,722,244	-3,167,678	-27%
		Car 3	97,792	97,792	0%	66.38	73.19	10%	6,481,618	7,156,920	675,303	10%
		Car 4	397,911	397,911	0%	47.22	46.52	-1%	18,790,345	18,589,937	-200,407	-1%
		Car 5	138,063	138,063	0%	18.60	46.52	150%	2,583,150	6,439,691	3,856,541	150%
	Car 6	2,714	2,714	0%	25.99	46.52	79%	70,526	126,237	55,711	79%	
	Gasoline total	748,114	748,114	0%	88.35	74.85	-16%	68,190,687	56,671,737	-11,518,950	-16%	
	Diesel Oil	pre-Cars	1,389	1,389	0%	312.74	284.56	-9%	463,963	386,139	-77,824	-16%
		Car 1	6,625	6,625	0%	268.42	266.79	-11%	1,679,472	1,580,688	-98,784	-11%
		Car 2	29,437	29,437	0%	406.84	279.91	-40%	11,963,522	6,253,531	-5,709,991	-40%
		Car 3	182,795	182,795	0%	574.33	176.67	-69%	53,284,956	16,579,373	-36,705,583	-69%
		Car 4	222,583	222,583	0%	393.55	149.27	-62%	87,598,471	33,225,566	-54,372,905	-62%
		Car 5	233,786	233,786	0%	435.42	149.27	-66%	101,787,275	34,894,768	-66,892,507	-66%
	Car 6	4,536	4,536	0%	259.53	149.27	-42%	1,177,151	677,045	-500,106	-42%	
	Diesel oil total	589,131	589,131	0%	437.14	158.71	-64%	257,533,128	83,899,619	-173,633,509	-64%	
	FCs Total	1,338,245	1,338,245	0%	237.49	111.77	-53%	317,723,135	146,571,356	-171,151,779	-53%	
	Gasoline	pre-Cars	981	981	0%	633.81	645.95	2%	608,320	621,160	12,840	2%
		Car 1	194	194	0%	803.50	389.27	-85%	167,261	59,326	-107,935	-85%
		Car 2	836	836	0%	274.42	211.18	-23%	229,520	189,265	-40,255	-23%
Car 3		784	784	0%	52.66	111.73	30%	72,691	79,780	7,089	10%	
Car 4		1,889	1,889	0%	43.70	48.89	20%	77,284	82,833	5,549	20%	
Car 5		965	965	0%	16.67	48.89	183%	15,187	47,268	32,081	183%	
Car 6	1	1	0%	17.66	48.89	170%	26	72	46	170%		
Gasoline total	5,578	5,578	0%	262.86	244.67	-6%	1,131,299	1,096,727	-34,572	-6%		
1.A.3.a.ii. Heavy Duty Vehicles (LDVs)	Diesel Oil	pre-Cars	2,744	2,744	0%	424.37	386.79	-9%	1,168,757	944,928	-223,829	-20%
		Car 1	2,945	2,945	0%	398.75	276.25	-30%	1,166,782	834,566	-332,216	-30%
		Car 2	6,982	6,982	0%	338.92	153.35	-42%	2,340,147	1,350,674	-989,473	-42%
		Car 3	20,421	20,421	0%	568.12	150.38	-73%	11,437,995	3,070,913	-8,367,082	-73%
		Car 4	55,887	55,887	0%	497.72	90.45	-82%	27,775,440	5,040,416	-22,735,024	-82%
		Car 5	29,024	29,024	0%	441.97	90.45	-80%	13,181,325	2,687,964	-10,493,361	-80%
	Car 6	41	41	0%	15.126	90.45	-80%	6,160	2,688	-3,472	-80%	
	Diesel oil total	118,777	118,777	0%	488.66	124.93	-74%	57,083,513	13,656,488	-43,427,025	-74%	
	LDVs Total	124,354	124,354	0%	488.14	126.03	-74%	58,214,142	14,677,215	-43,536,927	-74%	
	Diesel Oil	pre-Cars	1,172	1,172	0%	1096.68	1119.23	4%	1,249,029	1,194,143	-54,886	-4%
Car 1		1,054	1,054	0%	727.68	750.39	3%	766,620	791,181	24,561	3%	
Car 2		6,984	6,984	0%	764.97	643.48	-16%	3,324,968	4,379,371	1,054,403	32%	
Car 3		11,187	11,187	0%	638.43	473.65	-25%	6,262,880	5,998,226	-2,654,757	-27%	
Car 4		4,946	4,946	0%	460.55	351.71	-24%	2,278,051	1,739,736	-543,354	-24%	
Car 5		26,096	26,096	0%	368.98	183.48	-40%	8,435,583	4,240,743	-4,194,761	-40%	
Car 6	537	537	0%	44.76	183.48	310%	24,047	86,672	62,625	260%		
Diesel total	31,716	31,716	0%	505.94	340.06	-29%	25,369,989	16,620,843	-7,748,126	-29%		
1.A.3.a.iii. Heavy Duty Vehicle: Trucks & Lorries	Diesel Oil	pre-Cars	5,983	5,983	0%	1030.72	737.35	-29%	6,072,170	4,322,888	-1,749,303	-29%
		Car 1	2,944	2,944	0%	748.27	583.47	-24%	2,176,946	1,650,960	-525,977	-24%
		Car 2	16,885	16,885	0%	818.17	510.25	-37%	10,080,881	6,949,975	-3,130,906	-31%
		Car 3	45,517	45,517	0%	633.52	387.73	-39%	47,587,448	27,081,147	-20,506,288	-39%
		Car 4	42,781	42,781	0%	356.90	287.27	-27%	16,936,867	12,289,770	-4,647,097	-27%
		Car 5	436,980	436,980	0%	261.70	152.65	-40%	123,181,324	66,796,436	-56,384,897	-40%
Car 6	18,020	18,020	0%	91.87	152.65	261%	913,082	2,750,630	1,837,548	261%		
Trucks Total	680,139	680,139	0%	353.96	287.33	-21%	218,587,531	124,188,469	-97,899,062	-47%		
1.A.3.b.iv. Motorized Two-Wheelers (MOWs)	Gasoline	pre-Cars	6,352	6,352	0%	123.97	151.79	23%	781,736	964,170	182,433	23%
		Car 1	4,013	4,013	0%	125.91	173.15	39%	582,073	634,880	52,807	39%
		Car 2	3,362	3,362	0%	132.24	158.58	40%	436,688	648,894	209,136	40%
		Car 3	4,562	4,562	0%	39.81	158.58	261%	181,610	882,175	716,565	261%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
MOWs Total	18,229	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	187.53	-56%	616,073,963	310,854,371	-305,224,592	-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	18.536.009	-523.557	-3%
		Car 5	171.270	171.270	0%	18.59	47.80	151%	3.183.282	0.187.581	-5.004.209	151%
		Car 6	10.315	10.315	0%	25.97	47.80	84%	267.855	433.096	225.248	84%
		Gasoline total	752.426	752.426	0%	76.40	73.89	-3%	57.215.533	54.598.501	-2,216,412	-3%
	Diesel Oil	pre-Cars	1.341	1.341	0%	311.73	284.66	-9%	417.947	364.246	-42,722	-9%
		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	-40%	9.734.484	5,276,480	-4,458,004	-40%
		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	-42%	83.917.680	32,059,973	-51,857,706	-42%
		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%
		Flx Total	1,338,571	1,338,571	0%	298.44	152.15	-53%	138,091,584	154,652,853	-175,478,269	-53%
	Gasoline	pre-Cars	986	986	0%	632.44	645.95	2%	193,683	278.724	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	-31%	212.888	154.839	-58,029	-27%
		Car 3	771	771	0%	98.62	185.21	-7%	75.982	81.070	5,078	7%
		Car 4	1.087	1.087	0%	43.47	50.15	15%	81.139	83.618	12,479	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%	1,985,879	1,776,259	-207,559	-21%
		Car 1	2.588	2.588	0%	393.82	276.25	-40%	987.136	639,898	-347,328	-40%
		Car 2	6.087	6.087	0%	338.91	133.25	-42%	1,385,995	1,180,889	-428,128	-42%
		Car 3	18.220	18.220	0%	571.75	150.58	-74%	10,417,076	2,742,056	-7,675,020	-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%	20,496,234	4,258,026	-16,237,709	-79%
	Diesel Oil	pre-Cars	187	187	0%	151.18	91.69	-40%	29,829	17,974	-11,855	-40%
		Diesel oil total	128,528	128,528	0%	415.56	170.94	-77%	61,146,525	14,267,237	-46,879,318	-77%
		LDVs Total	134,423	134,423	0%	463.56	153.81	-75%	62,259,160	15,298,849	-46,968,311	-75%
	Heavy Duty Vehicles (HDVs)	pre-Cars	984	984	0%	1099.48	1919.23	-5%	1,062,384	1,062,921	-48,443	-5%
		Car I	837	837	0%	728.12	130.99	-3%	659,232	628,359	18,127	-3%
		Car II	5.586	5.586	0%	704.95	643.67	-9%	4,384,320	3,683,441	-798,887	-9%
		Car III	11.221	11.221	0%	621.20	458.38	-27%	7,082,740	5,143,628	-1,939,228	-27%
		Car IV	4.278	4.278	0%	461.10	361.79	-24%	1,972,610	1,584,978	-467,632	-24%
		Car V	22.042	22.042	0%	368.55	183.99	-40%	7,726,921	4,065,632	-3,671,389	-40%
		Car VI	4.182	4.182	0%	42.78	183.99	330%	178,913	789,476	610,563	330%
		HDVs Total	49,143	49,143	0%	468.37	339.99	-27%	23,017,115	16,788,234	-6,308,881	-27%
1.A.3.b.ii. - Heavy Duty Vehicle-Trucks & Lorries	Gasoline	pre-Cars	4.782	4.782	0%	1034.34	737.35	-29%	4,945,942	3,525,898	-1,428,134	-29%
		Car I	2.285	2.285	0%	748.66	581.41	-22%	1,800,089	1,237,759	-562,348	-22%
		Car II	13.623	13.623	0%	817.90	510.38	-30%	11,446,862	6,565,738	-4,891,151	-30%
		Car III	54.685	54.685	0%	632.52	384.41	-42%	36,589,677	19,927,835	-16,661,841	-42%
		Car IV	34.037	34.037	0%	396.37	285.34	-30%	13,481,158	9,711,896	-3,779,262	-30%
		Car V	389,263	389,263	0%	282.92	153.65	-46%	110,112,782	59,688,643	-50,424,748	-46%
	Diesel Oil	pre-Cars	34.214	34.214	0%	63.96	153.65	189%	3,937,089	11,368,682	7,421,413	189%
		Trucks Total	572,754	572,754	0%	314.85	196.65	-38%	179,874,133	112,285,562	-67,588,551	-38%
		LDVs Total	572,754	572,754	0%	314.85	196.65	-38%	179,874,133	112,285,562	-67,588,551	-38%
	Motorised Two-Wheelers (MOWs)	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%	134.71	174.84	40%	478.514	670.859	192.346	40%
		Car 2	3.365	3.365	0%	128.94	186.25	52%	433.874	680.378	226.504	52%
		Car 3	5.385	5.385	0%	38.53	186.25	386%	299.722	1,041.189	821.467	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%
		MOWs Total	18,673	18,673	0%	108.59	179.24	78%	1,878,294	3,581,794	1,408,499	78%
		1.A.3.b. - Road Transport	2,153,563	2,153,563	0%	277.27	140.35	-49%	597,120,287	362,252,271	-234,868,625	-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 [g]	in [g]	in [g]	in [%]		
1.A.3.a.i. - Passenger Cars	Gasoline	pre-Cars	11.380	11.380	0%	823.37	844.11	-4%	7,266,112	6,191,942	-1,014,168	-14%	
		Car 1	34.112	34.112	0%	371.34	345.71	-34%	8,963,081	5,924,574	-3,028,298	-34%	
		Car 2	42,925	42,925	0%	207.78	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	64,897	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	151%	3,454,481	0,861,456	-5,406,375	151%	
		Car 6	29,612	29,612	0%	26.70	49.62	84%	790,781	1,451,433	652,752	84%	
		Gasoline total	715,156	715,156	0%	76.38	71.73	-6%	53,196,187	51,380,983	-1,889,895	-4%	
	Diesel Oil	pre-Cars	1,282	1,282	0%	313.30	284.66	-9%	267,917	239,733	-28,184	-9%	
		Car 1	4,279	4,279	0%	298.14	267.84	-9%	1,261,930	1,129,989	-132,821	-9%	
		Car 2	19,689	19,689	0%	407.80	220.38	-46%	8,913,687	4,339,719	-3,674,788	-46%	
		Car 3	71,044	71,044	0%	595.91	179.64	-70%	42,271,648	12,719,982	-29,551,685	-70%	
		Car 4	182,410	182,410	0%	401.42	154.67	-62%	77,237,655	29,644,450	-47,593,206	-62%	
		Car 5	364,346	364,346	0%	434.67	154.67	-65%	132,290,433	46,090,424	-86,408,969	-65%	
		Car 6	62,576	62,576	0%	259.76	154.67	-41%	13,657,082	0,180,384	-6,556,778	-41%	
		Diesel oil total	645,565	645,565	0%	426.19	159.88	-63%	275,138,233	183,163,591	-91,964,732	-63%	
		Flx Total	1,360,721	1,360,721	0%	245.16	153.52	-33%	128,331,020	154,444,484	-173,856,536	-33%	
1.A.3.b.i. - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	879	879	0%	664.37	645.95	1%	575,361	581,977	3,624	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	781	781	0%	105.50	186.62	3%	73,969	76,155	2,186	3%	
		Car 4	1,720	1,720	0%	47.06	51.30	9%	80,950	80,240	-710	-9%	
		Car 5	1,620	1,620	0%	18.41	51.30	179%	29,812	83,086	53,274	179%	
		Car 6	94	94	0%	18.71	51.30	174%	1,752	4,884	3,182	174%	
		Gasoline total	5,793	5,793	0%	597.52	172.88	-8%	1,083,507	1,080,999	-25,928	-8%	
	Diesel Oil	pre-Cars	2,323	2,323	0%	418.91	386.79	-26%	986,186	712,531	-253,854	-26%	
		Car 1	2,186	2,186	0%	391.47	276.00	-29%	824,270	453,227	-371,043	-29%	
1.A.3.b.ii. - Heavy Duty Vehicles (HDVs)	Gasoline	pre-Cars	5,025	5,025	0%	324.91	153.29	-49%	1,632,296	971,298	-660,928	-49%	
		Car 1	15,718	15,718	0%	324.91	150.67	-54%	5,112,414	2,365,703	-2,746,711	-54%	
		Car 2	47,480	47,480	0%	91.73	71.74	-22%	23,782,396	5,340,298	-18,442,098	-22%	
		Car 3	62,146	62,146	0%	436.13	91.74	-79%	27,090,214	5,680,295	-21,392,809	-79%	
		Car 4	6,235	6,235	0%	154.91	91.74	-40%	87,768	60,230	-26,528	-40%	
		LDVs total	135,356	135,356	0%	888.35	187.96	-77%	63,565,843	16,681,496	-46,884,353	-77%	
		Diesel Oil	141,098	141,098	0%	437.76	190.62	-56%	64,589,520	55,686,430	-8,903,081	-16%	
		Flx Total	979	979	0%	1070.34	191.23	-5%	1,048,372	995,256	-56,858	-5%	
	Diesel Oil	Car 1	747	747	0%	738.26	315.91	-3%	542,471	581,636	18,955	3%	
		Car 2	5,211	5,211	0%	707.43	464.46	-35%	4,163,687	3,369,084	-794,603	-19%	
		Car 3	13,862	13,862	0%	632.86	488.67	-24%	11,641,732	5,174,988	-6,466,722	-24%	
		Car 4	6,586	6,586	0%	869.70	351.99	-59%	2,154,006	1,514,177	-639,829	-26%	
		Car 5	36,267	36,267	0%	368.77	184.59	-49%	8,737,088	4,477,641	-4,259,427	-49%	
		Car 6	5,224	5,224	0%	63.13	184.59	247%	277,542	964,226	686,684	247%	
	1.A.3.b.iii. - Heavy Duty Vehicles (HDVs) - Trucks & Lorries	Diesel Oil	pre-Cars	12,887	12,887	0%	438.96	327.99	-26%	23,997,817	17,149,448	-6,848,378	-29%
			Car 1	4,379	4,379	0%	1034.69	737.35	-29%	4,483,571	3,184,428	-1,294,143	-29%
			Car 2	11,883	11,883	0%	748.71	553.48	-26%	1,387,291	1,025,551	-361,740	-26%
Car 3			1,082	1,082	0%	817.98	588.97	-30%	3,072,940	2,653,440	-419,501	-30%	
Car 4			47,382	47,382	0%	521.55	381.64	-27%	18,848,779	12,744,748	-6,104,031	-27%	
Car 5			39,233	39,233	0%	356.88	287.72	-20%	11,572,860	9,294,190	-2,278,759	-20%	
Car 6			308,736	308,736	0%	264.17	153.49	-46%	83,413,973	60,546,496	-22,867,477	-46%	
Car 7			193,787	193,787	0%	67.49	153.49	167%	8,913,364	26,292,037	16,388,684	167%	
Trucks Total		589,431	589,431	0%	268.69	189.33	-30%	197,189,675	150,920,393	-46,269,282	-23%		
Flx Total		pre-Cars	5,744	5,744	0%	125.41	157.28	25%	720,441	963,470	183,828	25%	
		Car 1	1,517	1,517	0%	107.40	176.22	39%	444,086	619,819	171,733	39%	
		Car 2	3,382	3,382	0%	107.35	196.53	55%	430,680	664,965	236,306	55%	
		Car 3	5,011	5,011	0%	48.29	196.53	309%	234,136	1,144,416	910,289	390%	
		Car 4	0	0	0%	16.96	196.53	1080%	89	884	795	1080%	
MWVs total		18,859	18,859	0%	98.32	189.65	80%	1,833,382	5,334,472	1,501,098	80%		
1.A.3.b. Road Transport		Total	2,161,056	2,161,056	0%	265.86	196.25	-48%	575,935,265	381,697,596	-94,853,678	-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 [%]	
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	15 782	15 782	0%	634.75	644.11	-14%	7 470 914	6 410 967	-1 059 947	-14%
		Car 1	20 270	20 270	0%	372.25	268.68	-35%	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	-7%	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%
	Diesel Oil	Car 6	65 332	65 332	0%	25.67	50.17	89%	1 768 917	3 327 855	1 558 938	88%
		Gasoline total	715 272	715 272	0%	70.93	70.65	-0%	58 736 267	50 535 049	-8 201 218	-14%
		pre-Cars	1 280	1 280	0%	365.76	264.56	-14%	365 262	239 173	-126 089	-34%
		Car 1	3 749	3 749	0%	298.36	269.64	-10%	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%	36 981 999	11 085 409	-25 896 590	-70%
	Diesel Oil	Car 4	175 040	175 040	0%	405.76	156.24	-61%	71 362 220	27 474 086	-43 888 134	-61%
		Car 5	299 054	299 054	0%	433.34	156.24	-64%	130 032 044	46 019 229	-83 912 815	-64%
		Car 6	116 034	116 034	0%	268.75	156.24	-42%	30 427 555	10 232 785	-19 194 770	-63%
		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	1 384 391	1 384 391	0%	235.75	154.41	-35%	327 778 627	199 070 280	-128 708 347	-39%
1.A.3.b.i - Light Duty Vehicles (LDVs)	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	-28%
		Car 3	650	650	0%	108.43	111.57	3%	70 432	72 731	2 299	3%
		Car 4	1 684	1 684	0%	43.06	52.36	21%	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%
	Diesel Oil	Car 6	363	363	0%	19.85	52.36	181%	6 764	19 992	13 228	181%
		Gasoline total	5 506	5 506	0%	588.27	171.66	-5%	1 068 292	1 013 678	-54 614	-5%
		pre-Cars	2 189	2 189	0%	414.87	385.79	-7%	899 549	845 433	-54 116	-6%
		Car 1	1 780	1 780	0%	391.89	276.25	-25%	780 189	385 371	-394 818	-50%
		Car 2	4 223	4 223	0%	323.43	153.31	-53%	1 365 594	676 452	-689 142	-50%
		Car 3	13 582	13 582	0%	588.91	150.77	-74%	8 064 323	2 040 233	-6 024 090	-74%
	Diesel Oil	Car 4	43 141	43 141	0%	504.48	32.40	-93%	21 783 989	3 985 141	-17 798 848	-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	144 068	144 068	0%	454.12	185.62	-77%	65 712 732	15 256 007	-50 456 725	-77%
		LDVs Total	149 594	149 594	0%	445.23	188.29	-58%	66 781 025	16 229 684	-50 551 341	-76%
1.A.3.b.ii - Heavy Duty Vehicles (HDVs)	Gasoline	pre-Cars	891	891	0%	1076.81	1919.23	-5%	964 197	988 234	24 037	2%
		Car 1	583	583	0%	731.36	732.67	0%	433 675	446 236	12 561	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	-28%	6 530 364	4 741 827	-1 788 537	-27%
		Car 4	4 449	4 449	0%	475.90	382.29	-20%	2 117 219	1 586 881	-530 338	-25%
		Car 5	34 380	34 380	0%	364.36	185.22	-49%	8 935 974	4 517 517	-4 418 457	-49%
	Diesel Oil	Car 6	9 126	9 126	0%	62.79	185.22	196%	573 066	1 680 431	1 107 365	196%
		HDVs Total	54 157	54 157	0%	404.73	388.24	-2%	23 082 189	16 885 117	-6 197 072	-27%
		pre-Cars	3 933	3 933	0%	1034.81	737.35	-29%	4 087 249	2 980 379	-1 106 870	-29%
		Car 1	1 555	1 555	0%	748.16	587.92	-22%	1 163 482	789 813	-373 669	-33%
		Car 2	8 876	8 876	0%	817.75	585.42	-29%	7 258 046	4 486 626	-2 771 421	-38%
		Car 3	34 167	34 167	0%	638.91	588.64	-9%	21 553 280	12 251 155	-9 302 125	-43%
	Diesel Oil	Car 4	34 287	34 287	0%	394.94	281.86	-29%	9 640 384	6 885 621	-2 754 763	-29%
		Car 5	269 735	269 735	0%	267.22	153.60	-43%	74 680 233	39 976 610	-34 703 623	-47%
		Car 6	261 480	261 480	0%	61.77	153.60	149%	16 149 289	40 244 036	24 094 748	149%
		Trucks Total	594 013	594 013	0%	226.31	180.97	-26%	134 431 899	101 496 262	-32 935 637	-24%
		pre-Cars	5 543	5 543	0%	125.59	155.78	24%	696 072	883 289	187 218	24%
Gasoline	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	50%	
	Car 3	6 443	6 443	0%	48.36	187.68	381%	209 627	1 273 571	1 063 944	508%	
	Car 4	66	66	0%	17.47	187.68	1031%	1 134	12 632	11 498	1031%	
	Car 5	0	0	0%	0	0	0%	0	0	0	0%	
	HDVs Total	16 185	16 185	0%	96.14	181.68	89%	1 885 897	3 452 476	1 566 579	83%	
1.A.3.b - Road Transport	Total	2 267 339	2 267 339	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	-14%	7 014 267	6 680 187	-1 126 108	-16%
		Car 1	17 449	17 449	0%	372.96	281.68	-36%	6 588 211	4 217 044	-2 371 167	-36%
		Car 2	30 435	30 435	0%	217.43	141.75	-35%	6 617 570	4 314 140	-2 303 430	-35%
		Car 3	54 271	54 271	0%	78.48	76.21	-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%
	Diesel Oil	Car 6	114 791	114 791	0%	25.65	51.26	82%	3 063 235	5 884 372	2 821 137	82%
		Gasoline total	724 571	724 571	0%	67.66	60.88	-3%	49 046 874	50 634 314	1 607 440	3%
		pre-Cars	1 710	1 710	0%	364.96	264.56	-13%	680 963	347 620	-333 343	-49%
		Car 1	3 360	3 360	0%	298.17	222.43	-25%	1 082 288	910 182	-172 106	-16%
		Car 2	13 780	13 780	0%	407.17	271.67	-49%	5 614 130	3 066 393	-2 547 736	-46%
		Car 3	52 128	52 128	0%	808.95	179.65	-78%	31 696 478	9 364 788	-22 331 690	-70%
	Diesel Oil	Car 4	187 047	187 047	0%	418.16	158.34	-61%	64 733 485	24 983 323	-39 750 162	-61%
		Car 5	283 480	283 480	0%	423.99	158.34	-63%	120 187 695	44 073 190	-76 114 505	-63%
		Car 6	184 768	184 768	0%	262.61	158.34	-40%	48 521 183	29 255 985	-19 265 198	-40%
		Diesel oil total	696 582	696 582	0%	294.65	161.95	-59%	272 126 081	112 890 717	-159 235 364	-59%
		Pk's Total	1 421 162	1 421 162	0%	225.98	155.61	-31%	321 152 965	163 445 435	-157 707 530	-49%
1.A.3.b.i - Light Duty Vehicles (LDV)	Gasoline	pre-Cars	940	940	0%	611.41	645.35	-1%	612 247	606 978	-5 269	-1%
		Car 1	124	124	0%	908.23	312.78	-66%	112 083	39 682	-72 401	-65%
		Car 2	485	485	0%	302.12	221.62	-27%	140 344	102 950	-37 394	-27%
		Car 3	596	596	0%	118.57	115.36	4%	65 955	68 812	2 857	4%
		Car 4	1 476	1 476	0%	50.72	53.38	5%	74 877	78 816	3 938	5%
		Car 5	1 680	1 680	0%	21.73	53.38	146%	35 240	89 034	53 794	146%
	Diesel Oil	Car 6	910	910	0%	19.18	53.38	180%	17 052	49 080	31 928	180%
		Gasoline total	6 186	6 186	0%	171.55	167.18	-2%	1 058 799	1 034 211	-24 588	-2%
		pre-Cars	2 067	2 067	0%	413.41	385.79	-7%	860 499	811 183	-49 316	-6%
		Car 1	1 538	1 538	0%	398.47	276.25	-30%	680 795	331 158	-349 636	-50%
		Car 2	3 580	3 580	0%	325.28	195.44	-40%	1 453 793	887 233	-566 560	-40%
Diesel Oil	Car 3	11 654	11 654	0%	500.65	150.73	-70%	5 840 935	1 758 525	-4 082 410	-70%	
	Car 4	39 000	39 000	0%	56.76	83.03	42%	19 789 647	3 620 025	-16 169 622	-82%	
	Car 5	75 789	75 789	0%	432.66	83.03	-80%	32 790 966	7 054 565	-25 736 401	-79%	
	Car 6	19 625	19 625	0%	161.71	83.03	-39%	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	15 920 276	-49 163 654	-74%	
1.A.3.b.ii - Heavy Duty Vehicles (HDV)	Diesel Oil	LDV's Total	199 470	199 470	0%	418.83	186.35	-54%	66 152 129	16 959 427	-49 192 702	-74%
		pre-Cars	738	738	0%	1673.33	1512.23	-5%	790 259	750 425	-39 834	-5%
		Car 1	411	411	0%	723.97	575.27	-21%	380 684	309 082	-8 602	-3%
		Car 2	3 325	3 325	0%	723.91	645.73	-10%	3 263 061	2 147 480	-1 115 581	-34%
		Car 3	8 678	8 678	0%	673.23	459.12	-31%	5 478 480	3 984 085	-1 494 395	-27%
		Car 4	3 023	3 023	0%	474.07	352.49	-26%	1 912 380	1 347 680	-564 700	-30%
	Diesel Oil	Car 5	21 913	21 913	0%	363.92	186.84	-49%	7 937 975	4 053 686	-3 884 289	-49%
		Car 6	14 586	14 586	0%	68.52	186.84	270%	854 215	2 712 680	1 858 465	218%
		Diesel total	53 582	53 582	0%	338.80	286.17	-21%	19 193 961	15 984 628	-3 209 333	-17%
		pre-Cars	3 686	3 686	0%	1034.40	971.25	-7%	3 730 272	2 659 076	-1 071 196	-29%
		Car 1	1 781	1 781	0%	738.07	583.45	-21%	902 942	614 151	-288 790	-31%
Diesel Oil	Car 2	7 037	7 037	0%	817.66	460.58	-37%	3 794 626	3 580 026	-2 226 851	-37%	
	Car 3	26 866	26 866	0%	648.17	460.58	-29%	12 622 061	9 653 219	-2 968 842	-24%	
	Car 4	39 082	39 082	0%	397.77	279.34	-30%	7 964 414	5 687 456	-2 286 958	-30%	
	Car 5	264 365	264 365	0%	298.16	154.36	-47%	69 280 789	31 635 367	-37 645 342	-47%	
	Car 6	195 965	195 965	0%	65.82	154.36	135%	21 985 366	31 738 641	9 753 275	136%	
1.A.3.b.iii - Heavy Duty Vehicle: Trucks & Lorries	Diesel Oil	Trucks Total	598 263	598 263	0%	595.92	175.92	-80%	116 671 141	185 268 508	11 424 633	10%
		pre-Cars	5 336	5 336	0%	125.91	157.13	25%	671 088	838 780	166 891	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	196.32	62%	416 290	673 548	257 248	62%
		Car 3	6 714	6 714	0%	44.22	186.32	363%	275 181	1 336 565	1 065 384	393%
		Car 4	430	430	0%	18.26	196.32	108%	7 782	86 275	77 493	963%
	MGN's Total	pre-Cars	19 180	19 180	0%	82.83	163.39	96%	1 686 834	3 551 787	1 755 114	96%
		Car 1	2 291 437	2 291 437	0%	233.43	135.23	-42%	525 540 490	384 465 586	-141 074 904	-42%
		Car 2	2 291 437	2 291 437	0%	233.43	135.23	-42%	525 540 490	384 465 586	-141 074 904	-42%
		Car 3	2 291 437	2 291 437	0%	233.43	135.23	-42%	525 540 490	384 465 586	-141 074 904	-42%
		Car 4	2 291 437	2 291 437	0%	233.43	135.23	-42%	525 540 490	384 465 586	-141 074 904	-42%

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
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	12,219	12,219	0%	637.58	644.11	-10%	7,780,965	6,648,721	-1,132,234	-15%	
		Car 1	14,362	14,362	0%	374.34	341.68	-9%	5,371,161	3,448,643	-1,922,518	-36%	
		Car 2	34,285	34,285	0%	221.97	111.68	-50%	5,360,977	2,688,163	-2,672,814	-50%	
		Car 3	43,642	43,642	0%	88.16	76.96	-13%	3,487,781	3,388,617	-99,164	-3%	
		Car 4	278,738	278,738	0%	55.98	52.30	-7%	15,683,488	14,576,755	-1,106,733	-7%	
		Car 5	186,830	186,830	0%	19.35	52.30	170%	3,228,282	8,725,688	5,497,406	170%	
	Diesel Oil	pre-Cars	159,041	159,041	0%	6.00	52.30	-89%	4,190,422	8,718,250	4,527,828	89%	
		Car 1	2,949	2,949	0%	303.16	264.96	-13%	171,670	246,173	74,503	43%	
		Car 2	10,784	10,784	0%	407.20	222.67	-45%	4,981,983	2,483,536	-2,498,447	-50%	
		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	pre-Cars	220,685	220,685	0%	254.87	180.40	-30%	58,284,140	35,680,446	-22,603,694	-39%	
		Car 1	666,076	666,076	0%	375.66	163.38	-56%	247,596,063	188,748,684	-158,847,459	-56%	
	100% Total		1,365,181	1,365,181	0%	214.34	154.68	-28%	262,589,060	196,555,421	-136,033,639	-48%	
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	911	911	0%	604.51	645.95	-7%	596,851	582,652	-14,199	-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	574,432	-196,905	-26%	
		Car 3	1,285	1,285	0%	389.94	276.28	-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	pre-Cars	33,232	33,232	0%	508.42	93.81	-82%	15,929,185	3,117,457	-12,811,728	-80%	
		Car 1	66,283	66,283	0%	432.92	93.81	-78%	28,684,080	6,217,860	-22,466,220	-78%	
	100% Total		154,259	154,259	0%	384.71	182.69	-53%	59,344,525	15,880,316	-43,464,210	-73%	
	LDVs total		160,574	160,574	0%	375.86	184.94	-51%	69,343,125	16,851,449	-52,491,676	-76%	
	1.A.3.b.ii - Heavy Duty Vehicles (HDVs)	Gasoline	pre-Cars	547	547	0%	1078.16	1919.23	-42%	589,267	557,147	-32,120	-5%
Car 1			237	237	0%	732.78	732.57	0%	173,678	178,368	4,690	3%	
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%	628.89	459.32	-27%	4,262,734	3,183,482	-1,079,252	-25%	
Car 4			3,043	3,043	0%	473.16	382.73	-19%	1,439,790	1,073,333	-366,457	-26%	
Car 5			18,189	18,189	0%	362.42	186.37	-49%	6,463,265	3,376,016	-3,087,249	-48%	
Diesel Oil		pre-Cars	20,670	20,670	0%	64.89	186.37	288%	1,176,026	3,682,314	2,506,288	288%	
		Car 1	91,634	91,634	0%	309.75	283.53	-9%	15,993,546	13,687,186	-2,306,360	-15%	
		Car 2	3,262	3,262	0%	1034.82	737.35	-29%	3,375,359	2,485,071	-890,288	-26%	
		Car 3	1,094	1,094	0%	747.82	488.39	-35%	918,052	512,378	-405,674	-44%	
		Car 4	5,544	5,544	0%	817.44	581.68	-29%	4,532,180	2,781,510	-1,750,670	-39%	
		Car 5	20,583	20,583	0%	629.54	563.68	-10%	12,967,751	7,277,279	-5,690,472	-44%	
Diesel oil total		pre-Cars	15,912	15,912	0%	358.89	276.23	-23%	6,334,421	4,386,424	-1,947,997	-31%	
		Car 1	154,983	154,983	0%	250.40	154.68	-38%	45,964,153	24,283,389	-21,680,764	-47%	
100% Total		381,799	381,799	0%	68.78	154.68	125%	28,251,482	69,665,886	41,414,404	146%		
1.A.3.b.iii - Motorised Two-Wheelers (MTWs)		Gasoline	pre-Cars	4,940	4,940	0%	128.95	188.61	46%	622,656	783,451	160,795	26%
	Car 1		2,966	2,966	0%	128.14	177.79	41%	374,114	527,294	153,180	41%	
	Car 2		3,221	3,221	0%	128.33	188.64	46%	387,596	639,833	252,237	65%	
	Car 3		6,241	6,241	0%	48.24	188.64	384%	251,126	1,239,688	988,562	384%	
	Car 4		1,130	1,130	0%	58.41	188.64	323%	23,966	224,682	200,716	837%	
	Car 5		0	0	0%	0.00	188.64	0%	0	0	0	0%	
	Diesel Oil	pre-Cars	18,487	18,487	0%	85.66	188.61	198%	1,658,568	3,434,767	1,776,199	198%	
		Car 1	2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-38%	
		Car 2	1,658,568	1,658,568	0%	85.66	188.61	198%	1,658,568	3,434,767	1,776,199	198%	
		Car 3	6,241	6,241	0%	48.24	188.64	384%	251,126	1,239,688	988,562	384%	
		Car 4	1,130	1,130	0%	58.41	188.64	323%	23,966	224,682	200,716	837%	
		Car 5	0	0	0%	0.00	188.64	0%	0	0	0	0%	
	100% Total		18,487	18,487	0%	85.66	188.61	198%	1,658,568	3,434,767	1,776,199	198%	
	100% Total		2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-38%	

	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>										
Change against Adjustment 2020										

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