

# 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

	2010	2011	2012	2013	2014	2015	2016	2017	2018
proposed adjustment	-297.8	-302.3	-301.3	-306.1	-294.5	-269.0	-244.3	-214.9	-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 [kg/TJ]	in [%]	in [kg]	in [kg]	in [kg]	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%
<b>1.A.3.b TOTAL</b>	<b>2010</b>		<b>2.079.608</b>	<b>2.079.608</b>	<b>0%</b>			<b>0%</b>	<b>645.965.162</b>	<b>349.851.206</b>	<b>296.113.956</b>	<b>-46%</b>
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%
<b>1.A.3.b TOTAL</b>	<b>2011</b>		<b>2.100.883</b>	<b>2.100.883</b>	<b>0%</b>			<b>0%</b>	<b>632.365.736</b>	<b>331.625.655</b>	<b>300.740.081</b>	<b>-48%</b>
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%
<b>1.A.3.b TOTAL</b>	<b>2012</b>		<b>2.084.964</b>	<b>2.084.964</b>	<b>0%</b>			<b>0%</b>	<b>616.721.438</b>	<b>316.391.343</b>	<b>300.420.094</b>	<b>-49%</b>
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%
<b>1.A.3.b TOTAL</b>	<b>2013</b>		<b>2.132.683</b>	<b>2.132.683</b>	<b>0%</b>			<b>0%</b>	<b>616.079.063</b>	<b>310.854.371</b>	<b>305.224.692</b>	<b>-50%</b>
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%	61.546.575	14.267.237	46.879.338	-77%
1.A.3.b.iii	diesel oil		49.143	49.143	0%	468.37	339.99	-27%	23.017.115	16.708.234	6.308.881	-27%
1.A.3.b.iii	diesel oil		572.754	572.754	0%	314.05	196.05	-38%	179.874.133	112.285.582	67.588.551	-38%
1.A.3.b.iv	gasoline		18.673	18.673	0%	100.59	179.24	78%	1.878.294	3.345.794	-1.467.499	78%
<b>1.A.3.b TOTAL</b>	<b>2014</b>		<b>2.153.563</b>	<b>2.153.563</b>	<b>0%</b>			<b>0%</b>	<b>597.120.297</b>	<b>302.252.271</b>	<b>294.868.025</b>	<b>-49%</b>
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%
<b>1.A.3.b TOTAL</b>	<b>2015</b>		<b>2.161.376</b>	<b>2.161.376</b>	<b>0%</b>			<b>0%</b>	<b>575.931.265</b>	<b>301.877.596</b>	<b>274.053.670</b>	<b>-48%</b>
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%	134.431.899	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%
<b>1.A.3.b TOTAL</b>	<b>2016</b>		<b>2.207.339</b>	<b>2.207.339</b>	<b>0%</b>			<b>0%</b>	<b>553.790.558</b>	<b>302.901.820</b>	<b>250.897.738</b>	<b>-45%</b>
1.A.3.b.i	gasoline		724.571	724.571	0%	67.66	69.88	3%	49.026.074	50.634.714	-1.607.640	3%
1.A.3.b.i	diesel oil		696.592	696.592	0%	390.65	161.95	-59%	272.126.091	112.810.721	159.315.370	-59%
1.A.3.b.ii	gasoline		6.186	6.186	0%	171.15	167.18	-2%	1.058.799	1.034.211	24.588	-2%
1.A.3.b.ii	diesel oil		153.284	153.284	0%	424.66	183.89	-76%	65.093.930	15.925.216	49.168.714	-76%
1.A.3.b.iii	diesel oil		53.382	53.382	0%	370.80	286.71	-23%	19.793.901	15.304.828	4.489.073	-23%
1.A.3.b.iii	diesel oil		598.263	598.263	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%
<b>1.A.3.b TOTAL</b>	<b>2017</b>		<b>2.251.437</b>	<b>2.251.437</b>	<b>0%</b>			<b>0%</b>	<b>525.549.410</b>	<b>304.469.986</b>	<b>221.079.424</b>	<b>-42%</b>
1.A.3.b.i	gasoline		699.027	699.027	0%	64.42	68.36	6%	45.032.996	47.786.817	-2.753.820	6%
1.A.3.b.i	diesel oil		666.074	666.074	0%	371.66	163.30	-56%	247.556.063	108.768.604	138.787.459	-56%
1.A.3.b.ii	gasoline		6.315	6.315	0%	158.22	160.11	1%	999.199	1.011.138	-11.939	1%
1.A.3.b.ii	diesel oil		154.259	154.259	0%	384.71	182.69	-73%	59.344.525	15.840.310	43.504.215	-73%
1.A.3.b.iii	diesel oil		51.634	51.634	0%	309.75	263.53	-15%	15.993.526	13.607.106	2.386.420	-15%
1.A.3.b.iii	diesel oil		585.186	585.186	0%	171.18	172.10	1%	180.173.337	180.710.869	-537.532	1%
1.A.3.b.iv	gasoline		18.497	18.497	0%	89.66	184.61	106%	1.658.588	3.414.767	-1.756.209	106%
<b>1.A.3.b TOTAL</b>	<b>2018</b>		<b>2.180.993</b>	<b>2.180.993</b>	<b>0%</b>			<b>0%</b>	<b>478.758.206</b>	<b>291.139.612</b>	<b>179.618.593</b>	<b>-38%</b>
1.A.3.b.i	gasoline		704.691	704.691	0%	62.30	68.45	10%	43.901.941	48.238.025	-4.336.084	10%
1.A.3.b.i	diesel oil		663.841	663.841	0%	345.81	165.07	-52%	229.566.088	109.582.982	119.983.106	-52%
1.A.3.b.ii	gasoline		6.683	6.683	0%	146.08	153.25	5%	976.219	1.034.150	-57.931	5%
1.A.3.b.ii	diesel oil		159.183	159.183	0%	347.42	181.90	-71%	55.303.535	16.221.445	39.082.090	-71%
1.A.3.b.iii	diesel oil		52.939	52.939	0%	274.41	247.81	-10%	14.527.012	13.118.578	1.408.434	-10%
1.A.3.b.iii	diesel oil		595.913	595.913	0%	153.35	169.17	10%	91.380.760	106.809.376	-15.428.616	10%
1.A.3.b.iv	gasoline		18.750	18.750	0%	86.05	186.83	117%	1.613.450	3.502.941	-1.889.491	117%
<b>1.A.3.b TOTAL</b>	<b>2019</b>		<b>2.202.890</b>	<b>2.202.890</b>	<b>0%</b>			<b>0%</b>	<b>437.268.744</b>	<b>292.497.497</b>	<b>144.771.248</b>	<b>-33%</b>

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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	13.685	13.685	0%	584.75	514.25	-12%	7.955.060	6.986.917	-658.143	-8%
		Car 1	36.541	36.541	0%	338.50	297.71	-10%	25.915.925	19.189.262	-7.716.663	-30%
		Car 2	96.425	96.425	0%	172.95	135.63	-22%	16.580.020	13.020.026	-3.569.995	-22%
		Car 3	133.139	133.139	0%	58.51	70.19	20%	7.790.384	9.343.433	1.553.129	20%
		Car 4	444.991	444.991	0%	42.27	42.19	0%	18.911.389	18.773.529	-137.859	0%
		Car 5	31.234	31.234	0%	18.41	42.19	127%	581.142	1.317.737	736.595	127%
		Car 6	0	0	0%	25.08	42.19	62%	2	2	0	0%
		Gasoline total	795.057	795.057	0%	99.25	83.39	-13%	77.646.042	67.650.586	-9.995.456	-13%
	Diesel Oil	pre-Cars	1.915	1.915	0%	318.13	264.95	-15%	583.760	527.256	-56.504	-10%
		Car 1	10.339	10.339	0%	266.42	245.17	-11%	3.064.428	2.741.387	-323.021	-11%
		Car 2	50.088	50.088	0%	406.90	299.19	-40%	20.372.795	10.974.210	-9.398.584	-46%
		Car 3	134.025	134.025	0%	542.54	170.54	-67%	72.648.173	23.929.276	-48.718.957	-67%
		Car 4	279.154	279.154	0%	304.37	140.58	-53%	107.299.180	39.243.811	-68.055.349	-63%
		Car 5	53.547	53.547	0%	434.70	140.58	-68%	23.276.735	7.527.796	-15.748.929	-68%
		Car 6	334	334	0%	257.62	140.58	-45%	85.044	46.953	-38.091	-45%
		Diesel oil total	529.380	529.380	0%	429.45	160.55	-63%	227.347.096	84.970.461	-142.376.635	-63%
		Pkx Total	1.325.337	1.325.337	0%	238.12	155.14	-36%	364.985.938	152.621.367	-152.364.570	-56%
	Gasoline	pre-Cars	1.249	1.249	0%	627.99	645.95	2%	783.320	986.871	203.551	26%
		Car 1	367	367	0%	361.95	297.39	-16%	361.969	186.620	-175.349	-49%
		Car 2	1.393	1.393	0%	264.75	184.41	-30%	368.840	256.917	-111.921	-30%
		Car 3	856	856	0%	82.47	30.83	-63%	70.631	77.625	6.994	10%
		Car 4	2.420	2.420	0%	36.32	44.90	24%	87.987	188.679	20.772	24%
		Car 5	49	49	0%	15.34	44.90	183%	750	2.218	1.468	183%
		Car 6	0	0	0%	0	0	0%	0	0	0	0%
		Gasoline total	6.345	6.345	0%	255.87	254.75	-1%	1.478.832	1.358.128	-120.704	-8%
	Diesel Oil	pre-Cars	4.876	4.876	0%	425.99	386.79	-9%	2.077.142	1.436.983	-640.129	-30%
		Car 1	9.989	9.989	0%	398.18	276.24	-30%	2.389.080	1.289.636	-1.099.444	-46%
		Car 2	13.126	13.126	0%	336.76	153.18	-54%	4.420.280	2.534.731	-1.885.529	-43%
		Car 3	33.249	33.249	0%	531.91	150.58	-72%	17.655.883	5.085.760	-12.569.123	-72%
		Car 4	54.581	54.581	0%	491.42	80.69	-84%	26.021.036	4.940.722	-21.080.314	-80%
		Car 5	1.629	1.629	0%	427.50	80.69	-81%	696.296	144.434	-551.772	-79%
		Car 6	0	0	0%	15.73	80.69	42%	7	4	-3	-43%
		Diesel oil total	113.450	113.450	0%	476.34	134.94	-72%	54.043.533	15.311.584	-38.728.949	-72%
		LNW Total	178.775	178.775	0%	464.70	139.18	-70%	55.658.966	16.648.913	-38.989.853	-70%
1.A.3.b.ii - Heavy Duty Vehicles - Buses	Gasoline	pre-Cars	3.382	3.382	0%	1096.25	1028.78	-6%	3.674.087	3.432.644	-221.423	-6%
		Car 1	2.826	2.826	0%	749.41	731.47	-2%	2.117.871	2.125.595	7.723	0%
		Car 2	10.152	10.152	0%	801.96	643.47	-20%	8.140.119	6.532.213	-1.607.906	-20%
		Car 3	15.890	15.890	0%	633.22	437.25	-30%	10.865.776	7.289.299	-3.576.477	-33%
		Car 4	5.461	5.461	0%	448.63	351.65	-22%	2.650.016	1.921.527	-728.489	-28%
		Car 5	10.326	10.326	0%	337.28	182.33	-46%	3.882.417	1.882.644	-1.999.773	-51%
		Car 6	0	0	0%	0	0	0%	0	0	0	0%
		Buses Total	48.044	48.044	0%	623.80	482.55	-23%	29.931.286	23.183.732	-6.747.554	-23%
	Diesel Oil	pre-Cars	10.185	10.185	0%	1040.16	787.37	-24%	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	-35%	31.525.526	20.234.619	-11.290.907	-36%
		Car 3	169.023	169.023	0%	636.28	374.48	-41%	161.136.182	99.617.271	-61.518.921	-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%
		Car 6	0	0	0%	0	0	0%	0	0	0	0%
		Trucks Total	566.741	566.741	0%	446.67	271.83	-39%	293.148.243	154.696.160	-138.452.083	-47%
	Gasoline	pre-Cars	7.973	7.973	0%	122.80	149.18	22%	372.721	1.189.393	216.502	58%
		Car 1	5.231	5.231	0%	123.77	165.74	34%	647.479	887.039	239.560	34%
		Car 2	3.587	3.587	0%	141.16	184.21	30%	585.362	686.681	101.319	17%
		Car 3	2.950	2.950	0%	38.11	184.21	387%	116.180	657.032	452.834	387%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
		LNW Total	19.172	19.172	0%	113.68	168.43	48%	2.243.149	3.326.034	1.079.285	48%
		1.A.3.b - Road Transport	2.879.688	2.879.688	0%	219.62	168.23	-26%	645.965.162	349.851.296	-296.113.866	-46%

Adjustment details for 2021												
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	13.063	13.063	0%	592.96	534.68	-9%	7.720.235	6.979.435	-740.801	-9%
		Car 1	61.979	61.979	0%	347.86	340.16	-2%	21.040.430	14.884.961	-6.155.470	-31%
		Car 2	87.083	87.083	0%	178.38	136.58	-24%	15.620.983	11.883.782	-3.737.191	-24%
		Car 3	124.330	124.330	0%	61.94	71.52	16%	7.683.891	8.891.671	1.207.780	16%
		Car 4	442.185	442.185	0%	43.94	43.68	0%	19.384.914	19.376.439	-8.475	0%
		Car 5	66.057	66.057	0%	18.58	43.68	135%	1.227.381	2.085.636	1.658.255	135%
	Car 6	1	1	0%	25.06	43.68	65%	17	20	3	15%	
	Gasoline total	794.688	794.688	0%	92.69	81.65	-11%	73.165.851	64.851.551	-8.333.800	-11%	
	Diesel Oil	pre-Cars	1.711	1.711	0%	513.80	443.197	-14%	583.760	453.187	-130.566	-15%
		Car 1	8.426	8.426	0%	297.32	246.86	-17%	2.685.115	2.239.987	-445.119	-17%
		Car 2	42.514	42.514	0%	407.93	279.27	-32%	17.384.549	9.321.916	-8.062.634	-46%
		Car 3	121.429	121.429	0%	555.36	170.55	-69%	67.437.053	21.681.386	-45.755.667	-69%
		Car 4	264.943	264.943	0%	388.88	143.48	-63%	162.817.881	30.889.755	-131.928.126	-81%
		Car 5	113.047	113.047	0%	435.12	143.48	-67%	49.536.960	16.332.974	-33.203.984	-67%
	Car 6	685	685	0%	259.59	143.48	-45%	180.582	99.754	-80.828	-45%	
Diesel oil total	553.564	553.564	0%	434.12	159.92	-63%	249.713.791	88.138.959	-161.574.832	-63%		
Pkx Total	1.348.252	1.348.252	0%	232.52	131.47	-43%	713.899.642	152.990.510	-560.909.132	-78%		
1.A.3.a.ii - Light Duty Vehicles (LDV)	Gasoline	pre-Cars	1.084	1.084	0%	626.75	645.95	3%	682.074	790.373	108.299	16%
		Car 1	283	283	0%	818.74	584.47	-29%	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	35.39	-59%	67.320	74.782	7.461	11%
		Car 4	2.562	2.562	0%	37.38	46.51	24%	95.786	119.162	23.376	24%
		Car 5	241	241	0%	16.13	46.51	189%	3.882	11.190	7.308	189%
	Car 6	0	0	0%	15.33	46.51	283%	1	2	1	203%	
	Gasoline total	6.118	6.118	0%	229.35	186.57	-18%	1.483.081	1.254.776	-228.305	-15%	
	Diesel Oil	pre-Cars	3.995	3.995	0%	425.99	386.79	-9%	1.986.280	1.225.682	-760.598	-38%
		Car 1	4.787	4.787	0%	398.71	276.24	-30%	1.984.260	1.030.426	-953.835	-48%
		Car 2	10.816	10.816	0%	336.90	153.18	-54%	3.644.582	2.091.063	-1.553.519	-43%
		Car 3	28.876	28.876	0%	541.53	150.54	-72%	15.037.249	4.346.870	-10.690.379	-72%
		Car 4	60.032	60.032	0%	440.82	89.25	-80%	39.029.914	5.429.811	-33.600.103	-86%
		Car 5	6.009	6.009	0%	440.82	89.25	-80%	2.930.190	584.354	-2.345.836	-80%
	Car 6	0	0	0%	16.21	89.25	-43%	1	0	-1	-100%	
Diesel oil total	115.967	115.967	0%	405.55	126.92	-74%	55.844.558	15.708.142	-40.136.417	-74%		
LDVs Total	122.085	122.085	0%	406.92	130.51	-72%	57.247.599	15.932.858	-41.314.741	-72%		
1.A.3.a.iii - Heavy Duty Vehicles (HDV)	Diesel Oil	pre-Cars	2.620	2.620	0%	902.89	1019.78	12%	2.836.189	2.671.331	-164.778	-6%
		Car 1	2.258	2.258	0%	752.91	713.48	-5%	1.699.781	1.636.297	-63.484	-4%
		Car 2	9.074	9.074	0%	804.17	645.36	-20%	7.127.125	5.557.659	-1.569.466	-22%
		Car 3	16.887	16.887	0%	823.96	417.28	-49%	14.681.880	6.880.054	-7.801.827	-53%
		Car 4	5.131	5.131	0%	448.86	361.81	-20%	2.393.330	1.681.274	-712.056	-30%
		Car 5	13.296	13.296	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%	
	Buses Total	47.365	47.365	0%	592.65	448.99	-24%	28.071.271	21.286.323	-6.884.948	-24%	
	Diesel Oil	pre-Cars	8.044	8.044	0%	1.030.67	783.88	-25%	8.365.423	6.144.933	-2.210.491	-26%
		Car 1	4.384	4.384	0%	758.16	574.04	-23%	3.288.422	2.536.377	-752.044	-23%
		Car 2	29.277	29.277	0%	237.947	153.223	-35%	23.947.723	15.223.223	-8.724.499	-36%
		Car 3	121.581	121.581	0%	538.56	272.69	-49%	117.771.520	45.352.437	-72.419.083	-51%
		Car 4	59.430	59.430	0%	390.26	289.43	-30%	32.977.784	15.969.685	-16.998.099	-51%
		Car 5	342.751	342.751	0%	278.30	162.05	-42%	96.589.479	52.019.687	-44.569.792	-46%
	Car 6	0	0	0%	0	0	0%	0	0	0	0%	
Trucks Total	563.891	563.891	0%	418.38	244.97	-40%	219.470.131	136.136.342	-83.333.789	-40%		
1.A.3.b.i - Motorized Two-Wheelers (M2W)	Gasoline	pre-Cars	7.389	7.389	0%	122.96	150.24	22%	969.588	1.110.170	201.580	22%
		Car 1	4.085	4.085	0%	124.72	108.26	-13%	599.299	880.547	290.248	35%
		Car 2	3.544	3.544	0%	137.85	134.58	-4%	488.552	688.693	201.851	41%
		Car 3	3.560	3.560	0%	39.59	134.58	382%	160.553	680.834	520.280	382%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
M2Ws Total	19.289	19.289	0%	119.78	171.64	54%	2.177.082	3.299.162	1.162.190	54%		
1.A.3.b. Road Transport	Total	2.160.883	2.160.883	0%	306.90	157.85	-49%	632.365.736	321.625.655	-306.740.081	-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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i. Passenger Cars	Gasoline	pre-Euro	11,581	11,581	0%	607.72	635.38	-52%	7,035,041	6,189,785	-836,256	-52%
		Euro 1	47,487	47,487	0%	348.56	341.62	-31%	16,571,746	11,426,129	-5,145,617	-31%
		Euro 2	72,781	72,781	0%	194.27	137.82	-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	1,447	1,447	0%	311.98	284.56	-9%	453,963	383,872	-70,091	-9%
		Euro 1	6,660	6,660	0%	267.79	246.44	-11%	1,980,264	1,771,787	-208,477	-11%
		Euro 2	33,967	33,967	0%	406.82	279.27	-40%	13,987,432	7,445,646	-6,541,787	-40%
		Euro 3	183,539	183,539	0%	564.82	176.63	-69%	58,389,037	18,434,837	-39,954,200	-69%
		Euro 4	234,943	234,943	0%	398.41	146.46	-62%	91,724,190	34,488,997	-57,235,193	-62%
		Euro 5	173,112	173,112	0%	434.89	146.46	-66%	75,284,364	25,353,375	-49,930,989	-66%
		Euro 6	1,557	1,557	0%	259.84	146.46	-44%	484,664	220,086	-264,578	-44%
		Diesel oil total	555,245	555,245	0%	415.96	158.66	-64%	242,962,982	88,096,639	-154,866,343	-64%
		Pkx Total	1,345,512	1,345,512	0%	234.61	115.29	-50%	386,442,896	146,673,867	-239,769,029	-50%
	Gasoline	pre-Euro	962	962	0%	632.36	645.95	2%	607,779	621,166	13,411	2%
		Euro 1	232	232	0%	803.24	183.22	-86%	189,985	70,295	-119,691	-86%
		Euro 2	989	989	0%	271.16	195.74	-28%	269,134	133,538	-135,596	-28%
		Euro 3	835	835	0%	89.38	98.33	10%	74,623	82,092	7,469	10%
		Euro 4	2,030	2,030	0%	38.49	47.58	24%	78,155	96,691	18,536	24%
		Euro 5	610	610	0%	16.36	47.58	182%	9,941	29,011	19,069	182%
		Euro 6	0	0	0%	15.37	47.58	210%	2	6	4	210%
		Gasoline total	5,657	5,657	0%	218.93	183.15	-20%	1,238,520	1,092,662	-145,858	-12%
	Diesel Oil	pre-Euro	3,281	3,281	0%	424.46	386.79	-9%	1,368,754	1,022,093	-346,661	-9%
		Euro 1	3,666	3,666	0%	399.34	276.24	-30%	1,445,980	1,017,634	-428,346	-30%
		Euro 2	8,479	8,479	0%	336.40	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%	29,369,070	5,337,395	-24,031,675	-82%
		Euro 5	15,964	15,964	0%	442.70	89.85	-80%	7,040,461	1,420,906	-5,619,555	-80%
		Euro 6	1	1	0%	15.14	89.85	-81%	122	72	-50	-41%
		Diesel oil total	114,550	114,550	0%	485.91	126.17	-75%	55,186,382	13,741,354	-41,445,028	-75%
		LNx Total	126,088	126,088	0%	489.51	123.61	-74%	56,344,963	14,834,656	-41,510,307	-74%
1.A.3.b.ii. Heavy Duty Vehicles - Buses	Gasoline	pre-Euro	1,326	1,326	0%	1091.46	1919.46	4%	1,410,640	1,352,283	-58,357	-4%
		Euro 1	1,246	1,246	0%	727.34	731.15	1%	1,017,476	1,017,184	-292	-1%
		Euro 2	7,789	7,789	0%	703.46	643.34	-9%	5,085,091	4,597,478	-487,613	-9%
		Euro 3	14,483	14,483	0%	629.94	437.61	-31%	9,073,137	6,089,744	-2,983,393	-31%
		Euro 4	5,331	5,331	0%	468.10	361.85	-23%	2,642,179	1,675,777	-966,402	-23%
		Euro 5	20,752	20,752	0%	347.84	182.99	-47%	7,219,563	3,787,467	-3,432,096	-47%
		Euro 6	73	73	0%	64.52	182.99	236%	3,961	13,295	9,334	236%
		Buses Total	50,962	50,962	0%	533.22	384.33	-28%	27,141,913	19,565,288	-7,576,624	-28%
	Diesel Oil	pre-Euro	6,922	6,922	0%	1036.95	158.82	-21%	7,107,543	5,252,345	-1,855,198	-21%
		Euro 1	3,630	3,630	0%	743.70	570.57	-24%	2,721,326	2,071,111	-650,215	-24%
		Euro 2	23,577	23,577	0%	818.27	516.43	-37%	19,262,253	12,175,855	-7,086,398	-37%
		Euro 3	96,736	96,736	0%	634.65	270.21	-42%	61,387,137	35,848,665	-25,538,472	-42%
		Euro 4	60,550	60,550	0%	366.50	280.44	-23%	19,982,680	14,680,877	-5,301,723	-27%
		Euro 5	485,981	485,981	0%	261.24	152.32	-40%	116,149,955	61,626,577	-54,523,378	-40%
		Euro 6	2,380	2,380	0%	188.487	360.323	345%	188,487	360,323	171,836	223%
		Trucks Total	589,585	589,585	0%	385.33	224.69	-41%	224,829,180	132,064,153	-92,765,027	-41%
	Gasoline	pre-Euro	6,180	6,180	0%	122.76	151.03	23%	822,539	1,011,520	188,981	23%
		Euro 1	4,386	4,386	0%	124.61	171.39	39%	536,615	738,050	201,435	39%
		Euro 2	3,267	3,267	0%	136.22	184.56	45%	445,087	636,853	191,766	43%
		Euro 3	3,984	3,984	0%	38.66	184.56	382%	18,386	778,616	760,230	382%
		Euro 4	0	0	0%	0	0	0%	0	0	0	0%
		Euro 5	0	0	0%	0	0	0%	0	0	0	0%
		LNx Total	18,268	18,268	0%	107.43	175.28	61%	1,982,546	3,165,439	1,182,893	61%
		1.A.3.b. Road Transport	2,084,964	2,084,964	0%	295.79	151.71	-49%	616,721,438	396,381,343	-220,340,094	-49%

Adjustment details for 2023												
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i. Passenger Cars	Gasoline	pre-Euro	11,680	11,680	0%	619.27	649.35	-5%	7,011,641	6,967,452	-4,444,808	-5%
		Euro 1	37,743	37,743	0%	353.78	281.98	-32%	13,362,966	9,129,436	-4,233,531	-32%
		Euro 2	62,680	62,680	0%	188.93	139.33	-27%	11,889,922	8,722,244	-3,167,678	-27%
		Euro 3	97,782	97,782	0%	66.38	73.19	10%	6,481,618	7,156,920	665,303	10%
		Euro 4	397,911	397,911	0%	47.22	46.52	-1%	18,790,345	18,589,937	-200,407	-1%
		Euro 5	138,063	138,063	0%	18.60	46.52	150%	2,583,150	6,439,691	3,856,541	150%
	Gasoline total	748,114	748,114	0%	88.35	74.85	-7%	68,190,687	56,671,737	-11,518,951	-7%	
	Diesel Oil	pre-Euro	1,389	1,389	0%	312.76	284.56	-9%	433,081	368,136	-64,945	-9%
		Euro 1	5,426	5,426	0%	298.42	246.79	-17%	1,678,472	1,340,688	-337,784	-17%
		Euro 2	28,437	28,437	0%	406.84	279.91	-40%	11,563,522	6,253,531	-5,309,991	-40%
		Euro 3	92,795	92,795	0%	574.33	176.67	-69%	53,284,956	16,579,373	-36,705,583	-69%
		Euro 4	222,583	222,583	0%	393.55	149.27	-62%	87,598,471	33,225,566	-54,372,905	-62%
		Euro 5	233,786	233,786	0%	435.42	149.27	-66%	101,787,275	34,894,788	-66,892,487	-66%
	Diesel oil total	589,131	589,131	0%	437.14	158.71	-64%	257,533,128	83,899,619	-173,633,509	-64%	
Pkx Total	1,338,245	1,338,245	0%	237.49	111.77	-53%	317,723,135	146,576,886	-171,146,249	-53%		
1.A.3.b.i. Heavy Duty Vehicles (HDV)	Gasoline	pre-Euro	981	981	0%	619.81	645.95	2%	1,048,320	1,075,293	26,973	2%
		Euro 1	184	184	0%	803.50	183.22	-86%	187,281	59,328	-127,953	-86%
		Euro 2	836	836	0%	274.42	281.18	21%	229,520	188,285	-41,235	-21%
		Euro 3	784	784	0%	52.66	191.79	10%	72,691	79,780	7,089	10%
		Euro 4	1,089	1,089	0%	40.70	48.89	20%	77,284	82,833	5,549	20%
		Euro 5	965	965	0%	16.67	48.89	183%	16,187	47,268	31,081	183%
	Gasoline total	5,578	5,578	0%	262.86	184.67	-3%	1,137,299	1,096,727	-40,572	-3%	
	Diesel Oil	pre-Euro	2,744	2,744	0%	424.37	386.79	-9%	1,168,757	944,928	-223,829	-9%
		Euro 1	2,946	2,946	0%	399.75	276.24	-30%	1,166,782	834,566	-332,216	-30%
		Euro 2	6,982	6,982	0%	336.92	133.35	-42%	2,340,147	1,350,674	-989,473	-42%
		Euro 3	20,421	20,421	0%	568.12	150.38	-73%	6,715,494	3,070,914	-3,644,580	-73%
		Euro 4	55,807	55,807	0%	497.72	36.45	-93%	27,976,440	6,549,427	-21,427,013	-93%
		Euro 5	29,024	29,024	0%	141.37	36.45	-80%	13,181,325	2,687,564	-10,493,761	-80%
	Diesel oil total	118,177	118,177	0%	408.66	114.93	-76%	57,983,533	13,656,488	-44,327,045	-76%	
LDV total	128,554	128,554	0%	404.14	118.60	-70%	58,214,142	14,617,215	-43,596,927	-70%		
1.A.3.b.ii. Heavy Duty Vehicles (HDV) Buses	Diesel Oil	pre-Euro	1,172	1,172	0%	1066.69	1019.23	-4%	1,249,028	1,154,143	-94,885	-4%
		Euro 1	1,054	1,054	0%	727.68	750.98	3%	766,620	791,181	24,561	3%
		Euro 2	6,084	6,084	0%	704.07	643.48	-9%	5,534,988	4,970,271	-564,717	-9%
		Euro 3	15,817	15,817	0%	638.43	426.80	-33%	8,262,880	5,596,265	-2,666,615	-33%
		Euro 4	4,946	4,946	0%	863.55	551.71	-34%	2,279,054	1,739,778	-539,276	-34%
		Euro 5	26,096	26,096	0%	358.88	183.45	-49%	8,835,951	4,420,743	-4,415,207	-49%
Buses total	51,776	51,776	0%	509.54	380.06	-26%	26,390,989	18,840,843	-7,550,146	-26%		
1.A.3.b.iii. Heavy Duty Vehicles (HDV) Trucks & Lorries	Diesel Oil	pre-Euro	5,083	5,083	0%	1039.72	737.35	-29%	6,072,170	4,322,888	-1,749,282	-29%
		Euro 1	2,985	2,985	0%	743.27	589.27	-24%	2,178,946	1,650,959	-527,987	-24%
		Euro 2	18,446	18,446	0%	818.17	515.45	-37%	15,089,881	9,480,975	-5,608,906	-37%
		Euro 3	75,130	75,130	0%	633.73	387.23	-39%	47,587,440	27,587,130	-20,000,310	-39%
		Euro 4	42,781	42,781	0%	565.96	317.27	-44%	18,896,867	9,286,776	-9,610,091	-44%
		Euro 5	436,960	436,960	0%	270.70	152.65	-45%	193,134,324	66,796,436	-126,337,887	-45%
Trucks total	680,139	680,139	0%	516.87	287.23	-41%	211,887,321	121,880,480	-90,006,841	-41%		
1.A.3.b.iv. Motorised Two-Wheelers (M2W)	Gasoline	pre-Euro	6,362	6,362	0%	123.07	151.79	23%	181,736	264,179	102,443	23%
		Euro 1	4,013	4,013	0%	125.11	173.15	39%	562,073	634,880	102,807	39%
		Euro 2	3,362	3,362	0%	132.24	195.58	49%	436,665	645,804	209,138	49%
		Euro 3	4,562	4,562	0%	39.81	185.58	381%	181,610	882,175	710,565	381%
		Euro 4	0	0	0%	0	0	0%	0	0	0	0%
		Euro 5	0	0	0%	0	0	0%	0	0	0	0%
M2Ws total	18,229	18,229	0%	104.34	175.38	68%	1,562,088	3,191,638	1,629,551	68%		
1.A.3.b. Road Transport	Total	2,152,683	2,152,683	0%	203.88	145.76	-58%	616,979,063	390,854,371	-226,124,692	-58%	

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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i. - Passenger Cars	Gasoline	pre-Cars	11.647	11.647	0%	612.37	644.11	-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%	196.58	140.31	-29%	10.514.477	7.584.432	-3.018.844	-29%
		Car 3	87.374	87.374	0%	65.31	73.93	7%	6.955.589	6.459.797	-494.218	7%
		Car 4	387.759	387.759	0%	45.16	47.80	-3%	19.093.585	18.536.099	-523.557	-3%
		Car 5	171.270	171.270	0%	18.59	47.80	151%	3.183.282	0.187.581	-5.004.299	151%
		Car 6	10.315	10.315	0%	25.97	47.80	84%	267.855	433.096	225.245	84%
		Gasoline total	752.526	752.526	0%	76.60	73.89	-4%	57.215.533	54.598.501	-2,216.412	-4%
	Diesel Oil	pre-Cars	1.341	1.341	0%	311.73	284.66	-9%	417.947	364.246	-42.722	-9%
		Car 1	4.992	4.992	0%	298.92	267.29	-11%	1.482.284	1.387.643	-156.951	-11%
		Car 2	23.934	23.934	0%	406.71	320.45	-20%	9.734.484	5.276.490	-4.458.094	-20%
		Car 3	82.749	82.749	0%	585.53	176.81	-49%	48.451.830	14.796.245	-33.655.585	-49%
		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%
		Pkcs 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%	1,943,683	1,978.124	18.844	2%
		Car 1	173	173	0%	968.27	989.96	64%	150.074	53.575	-96.499	-64%
		Car 2	748	748	0%	204.73	287.11	31%	212.888	154.839	-58.029	-27%
		Car 3	771	771	0%	98.62	185.21	7%	75.982	81.070	5.078	7%
		Car 4	1.087	1.087	0%	43.47	50.15	15%	81.139	83.618	2.479	15%
		Car 5	1.374	1.374	0%	17.11	50.15	183%	23.517	68.918	45.401	183%
		Car 6	17	17	0%	18.06	50.15	179%	212	670	657	179%
		Gasoline total	5.845	5.845	0%	596.34	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%	1,985.919	1,776.259	-207.559	-21%
		Car 1	2.589	2.589	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	-428.126	-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%	20,696.234	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%
		Car 1	187	187	0%	151.18	91.69	-40%	29.829	17.974	-11.855	-40%
		Car 2	187	187	0%	151.18	91.69	-40%	29.829	17.974	-11.855	-40%
		Car 3	187	187	0%	151.18	91.69	-40%	29.829	17.974	-11.855	-40%
		Car 4	187	187	0%	151.18	91.69	-40%	29.829	17.974	-11.855	-40%
		Car 5	187	187	0%	151.18	91.69	-40%	29.829	17.974	-11.855	-40%
		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 Vehicle Buses	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%	599.232	628.359	18.127	3%
		Car 2	5.586	5.586	0%	704.95	643.67	-9%	4,284.320	3,683.441	-798.887	-9%
		Car 3	11.221	11.221	0%	621.20	458.38	-21%	7,082.740	5,143.628	-1,939.228	-21%
		Car 4	4.270	4.270	0%	461.10	361.79	-24%	1,972.610	1,584.978	-467.632	-24%
		Car 5	22.042	22.042	0%	368.55	183.99	-49%	7,726.921	4,065.632	-3,671.389	-49%
	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%
		Buses Total	49,143	49,143	0%	468.37	339.99	-21%	23,017,115	16,788,234	-6,238,881	-21%
		pre-Cars	4.182	4.182	0%	1034.34	737.35	-29%	4,945.942	3,525.898	-1,420.134	-29%
		Car 1	2.285	2.285	0%	748.66	561.41	-25%	1,600.089	1,237.759	-362.340	-25%
		Car 2	13.623	13.623	0%	817.90	510.38	-38%	11,446.869	6,565.736	-4,891.133	-38%
		Car 3	54.685	54.685	0%	632.52	364.41	-42%	36,589.677	19,937.835	-16,651.841	-42%
		Car 4	34.037	34.037	0%	396.37	285.34	-30%	13,481.158	9,711.896	-3,779.262	-30%
		Car 5	389.263	389.263	0%	282.92	153.66	-46%	110,112.782	59,688.643	-50,424.149	-46%
		Car 6	34.214	34.214	0%	63.96	153.66	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	-67,588,571	-38%
1.A.3.b.iii. - Motorised Two-Wheelers (MOWs)	Gasoline	pre-Cars	6.185	6.185	0%	122.85	158.64	29%	795.185	974.388	218.182	29%
		Car 1	3.037	3.037	0%	134.71	174.84	40%	478.514	670.895	192.346	40%
		Car 2	3.365	3.365	0%	128.94	186.25	52%	433.874	680.370	226.504	52%
		Car 3	5.385	5.385	0%	38.53	186.25	380%	29.722	1,041.189	831.467	380%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
		MOWs Total	18,673	18,673	0%	108.59	179.24	78%	1,878,294	3,581,794	1,703,499	78%
		1.A.3.b. - Road Transport	2,153,563	2,153,563	0%	277.27	140.35	-49%	597,120,297	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 [t]	in [t]	in [t]	in [%]	
1.A.3.a.i. - Passenger Cars	Gasoline	pre-Cars	11.380	11.380	0%	623.33	644.11	-14%	7.266.152	6.191.942	-1.014.168	-14%
		Car 1	34.112	34.112	0%	371.34	345.71	-34%	8.963.681	5.924.574	-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	5.446.237	64.876	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	652.793	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%	318.32	264.56	-16%	367.917	339.733	-28.184	-9%
		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	320.36	-20%	8.913.687	4.338.719	-3.674.968	-20%
		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	-47,593.206	-62%
		Car 5	364.346	364.346	0%	434.67	154.07	-65%	132,290.433	46,090.424	-86,400.959	-65%
		Car 6	62.576	62.576	0%	259.76	154.07	-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%
		Pkcs Total	1,360,721	1,360,721	0%	245.26	153.52	-33%	128,331,020	154,444,484	-173,856,536	-33%
Gasoline	pre-Cars	979	979	0%	654.37	646.56	-1%	575.380	567.97	-7.404	-1%	
	Car 1	150	150	0%	896.83	311.83	-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%	72.968	79.155	2.188	3%	
	Car 4	1.720	1.720	0%	46.96	51.30	9%	80.565	85.246	7.299	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	3.826	174%	
	Gasoline total	5.793	5.793	0%	387.52	372.88	-4%	5,083,597	4,880,999	-38,628	-1%	
Diesel Oil	pre-Cars	2.323	2.323	0%	418.91	386.79	-26%	968.185	712.531	-253.854	-26%	
	Car 1	2.186	2.186	0%	391.47	212.25	-45%	824.270	453.227	-371.843	-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	-24%	3,112.414	2,365.763	-746.651	-24%	
	Car 4	47.480	47.480	0%	501.73	91.76	-82%	23,762.396	3,548.298	-19,434.098	-82%	
	Car 5	62.146	62.146	0%	436.13	91.76	-79%	27,090.214	5,638.295	-21,342.009	-79%	
	Car 6	635	635	0%	154.91	91.76	-40%	87.768	62.236	-26.628	-40%	
	Diesel oil total	135.366	135.366	0%	368.35	187.96	-27%	63,565,843	54,681.426	-8,887,953	-17%	
LDVs total	144,088	144,088	0%	416.76	370.62	-10%	64,809,535	59,688,498	-5,188,881	-8%		
1.A.3.b.i. - Heavy Duty Vehicle Buses	Diesel Oil	pre-Cars	979	979	0%	1076.34	1019.23	-5%	1,048.372	995.256	-56.856	-5%
		Car 1	747	747	0%	730.26	751.91	3%	542.471	581.636	18.955	3%
		Car 2	5.211	5.211	0%	707.43	644.46	-10%	4,103.087	3,599.644	-503.853	-10%
		Car 3	15.782	15.782	0%	633.86	488.67	-24%	7,541.732	6,174.989	-1,366.822	-24%
		Car 4	4.686	4.686	0%	868.70	361.59	-30%	2,154.086	1,674.177	-3,628.829	-30%
		Car 5	36.267	36.267	0%	368.77	184.59	-49%	8,737.608	4,477.641	-4,265.427	-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	327.59	-29%	23,997,817	17,149,448	-6,848,319	-29%
1.A.3.b.ii. - Heavy Duty Vehicle Trucks & Lorries	Diesel Oil	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	11.082	11.082	0%	817.38	587.79	-30%	9,072.940	6,532.450	-2,540.391	-30%
		Car 3	47.282	47.282	0%	629.15	381.66	-39%	27,463.779	17,724.623	-9,749.156	-39%
		Car 4	39.233	39.233	0%	366.86	287.72	-20%	11,572.860	9,294.190	-2,278.769	-20%
		Car 5	308.736	308.736	0%	264.17	153.49	-40%	80,413.973	65,654.496	-14,757.477	-40%
		Car 6	179.787	179.787	0%	67.48	153.49	167%	9,813.364	26,282.637	16,468.684	167%
		Trucks total	589,431	589,431	0%	268.69	188.33	-30%	157,189,675	130,926,393	-26,868,947	-17%
1.A.3.b.iii. - Motorized Two-Wheelers (MOWs)	Gasoline	pre-Cars	5.744	5.744	0%	125.41	157.28	25%	720.441	963.470	193.828	25%
		Car 1	1.517	1.517	0%	127.40	176.22	39%	448.086	670.819	171.733	39%
		Car 2	3.382	3.382	0%	127.35	196.53	55%	430.680	686.565	236.206	55%
		Car 3	5.911	5.911	0%	48.29	196.53	309%	236.136	1,144.416	1,158.289	309%
		Car 4	4	0	0%	16.96		180%	89	88	-1	73%
		Car 5	0	0	0%			0%	0	0	0	0%
		MOWs total	18,499	18,499	0%	98.52	188.65	80%	1,833.382	5,334.472	1,501.898	80%
		1.A.3.b. Road Transport Total	2,161,592	2,161,592	0%	263.86	189.27	-48%	575,925,385	381,697,596	-194,853,788	-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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i - Passenger Cars	Gasoline	pre-Euro	15 782	15 782	0%	634.75	644.11	-14%	7 470 914	6 410 967	-1 059 947	-14%
		Euro 1	39 270	39 270	0%	372.25	341.68	-8%	7 545 483	4 986 888	-2 558 595	-34%
		Euro 2	36 062	36 062	0%	212.73	143.11	-33%	7 671 581	5 180 897	-2 490 684	-33%
		Euro 3	83 039	83 039	0%	76.17	75.50	-1%	4 881 482	4 759 259	-122 223	-1%
		Euro 4	334 413	334 413	0%	53.74	50.17	-7%	17 363 364	16 777 445	-585 919	-3%
		Euro 5	183 374	183 374	0%	19.09	50.17	163%	3 580 745	9 189 834	5 609 089	163%
		Euro 6	65 332	65 332	0%	25.67	50.17	94%	1 768 917	3 327 855	1 558 938	88%
		Gasoline total	715 272	715 272	0%	78.93	70.65	-9%	58 736 267	50 535 049	-8 201 218	-14%
	Diesel Oil	pre-Euro	1 380	1 380	0%	369.76	254.56	-31%	365 262	339 173	-26 089	-7%
		Euro 1	3 749	3 749	0%	298.36	269.66	-9%	1 122 449	1 011 625	-110 824	-10%
		Euro 2	16 584	16 584	0%	407.19	221.43	-46%	6 720 132	3 663 964	-3 056 168	-46%
		Euro 3	81 398	81 398	0%	802.50	179.24	-78%	36 981 999	11 085 049	-25 896 950	-70%
		Euro 4	175 040	175 040	0%	405.76	156.24	-61%	71 362 220	27 474 086	-43 888 134	-61%
		Euro 5	299 054	299 054	0%	433.34	156.24	-64%	130 032 044	46 019 229	-83 912 815	-64%
		Euro 6	116 034	116 034	0%	268.75	156.24	-41%	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%
		Pkcs Total	1 380 391	1 380 391	0%	235.75	154.41	-35%	327 778 927	199 070 280	-128 708 647	-39%
	Gasoline	pre-Euro	910	910	0%	602.79	645.95	11%	593 186	547 543	-45 643	-8%
		Euro 1	136	136	0%	908.31	312.78	-66%	122 126	42 425	-79 701	-65%
		Euro 2	540	540	0%	308.39	217.84	-29%	162 311	117 737	-44 574	-27%
		Euro 3	650	650	0%	108.43	111.57	3%	70 432	72 731	2 299	3%
		Euro 4	1 684	1 684	0%	43.06	52.36	21%	78 714	84 003	5 289	7%
		Euro 5	1 724	1 724	0%	19.82	52.36	164%	34 157	80 258	46 101	164%
		Euro 6	363	363	0%	19.85	52.36	181%	6 764	19 992	13 228	181%
		Gasoline total	5 506	5 506	0%	388.27	171.66	-56%	1 068 292	1 013 478	-54 814	-5%
	Diesel Oil	pre-Euro	2 189	2 189	0%	414.81	386.79	-7%	899 549	885 433	-14 116	-2%
		Euro 1	1 780	1 780	0%	391.89	276.25	-30%	780 189	385 371	-394 818	-50%
		Euro 2	4 223	4 223	0%	323.43	153.31	-53%	1 365 594	676 452	-689 142	-50%
		Euro 3	13 582	13 582	0%	588.91	150.77	-74%	8 064 323	2 040 233	-6 024 090	-74%
		Euro 4	43 141	43 141	0%	504.48	32.40	-93%	21 783 989	3 986 141	-17 797 848	-82%
		Euro 5	74 231	74 231	0%	434.16	32.40	-92%	32 223 283	6 688 780	-25 534 503	-79%
		Euro 6	4 921	4 921	0%	113.49	32.40	-71%	755 285	454 676	-300 609	-40%
		Diesel oil total	148 068	148 068	0%	456.12	185.62	-59%	65 712 732	15 256 007	-50 456 725	-77%
		DNVs Total	148 984	148 984	0%	445.21	188.29	-58%	66 781 025	16 229 684	-50 551 341	-76%
1.A.3.b.i - Heavy Duty Vehicles - Buses	Gasoline	pre-Euro	881	881	0%	1076.81	1919.23	78%	954 197	988 234	34 037	4%
		Euro 1	583	583	0%	731.36	732.67	0%	433 675	446 236	12 561	3%
		Euro 2	4 375	4 375	0%	788.25	645.03	-18%	3 440 614	2 822 621	-617 993	-18%
		Euro 3	10 333	10 333	0%	632.87	458.91	-28%	6 539 364	4 741 827	-1 797 537	-27%
		Euro 4	4 449	4 449	0%	475.90	382.28	-20%	2 117 219	1 586 881	-530 338	-25%
		Euro 5	34 380	34 380	0%	366.36	185.22	-49%	8 935 974	4 517 517	-4 418 457	-49%
		Euro 6	9 126	9 126	0%	62.79	185.22	196%	573 066	1 680 431	1 107 365	196%
		Buses Total	54 157	54 157	0%	404.73	388.24	-4%	23 082 189	16 885 117	-6 197 072	-27%
	Diesel Oil	pre-Euro	3 933	3 933	0%	1034.81	737.35	-29%	4 087 249	2 980 379	-1 106 870	-29%
		Euro 1	1 555	1 555	0%	748.16	587.92	-22%	1 163 482	789 813	-373 669	-32%
		Euro 2	8 856	8 856	0%	817.75	585.42	-28%	7 258 047	4 486 626	-2 771 421	-38%
		Euro 3	34 167	34 167	0%	638.91	588.64	-9%	21 553 280	12 251 155	-9 302 125	-43%
		Euro 4	34 287	34 287	0%	396.94	281.86	-29%	9 640 384	6 885 621	-2 754 763	-29%
		Euro 5	269 735	269 735	0%	287.22	153.60	-46%	74 680 233	39 676 610	-34 913 623	-46%
		Euro 6	261 480	261 480	0%	61.77	153.60	149%	16 149 289	40 284 036	24 134 748	149%
		Trucks Total	584 013	584 013	0%	226.31	180.97	-20%	134 431 899	101 486 262	-32 945 637	-24%
	Gasoline	pre-Euro	5 543	5 543	0%	125.59	155.78	24%	696 072	883 289	187 217	24%
		Euro 1	3 360	3 360	0%	127.11	177.29	39%	427 113	585 796	158 683	39%
		Euro 2	3 375	3 375	0%	125.94	187.68	50%	421 961	687 078	265 117	63%
		Euro 3	6 443	6 443	0%	48.36	187.68	281%	209 627	1 273 671	1 064 044	508%
		Euro 4	65	65	0%	17.47	187.68	1031%	1 134	12 632	11 498	1015%
		GNVs Total	16 185	16 185	0%	96.14	181.68	88%	1 885 897	3 452 476	1 566 579	83%
		1.A.3.b - Road Transport	2 287 339	2 287 339	0%	258.89	137.22	-46%	553 799 598	362 981 620	-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 [t]	in [t]	in [t]	in [t]		
1.A.3.a.i - Passenger Cars	Gasoline	pre-Euro	12 282	12 282	0%	636.73	644.11	-11%	7 814 287	6 680 187	-1 126 100	-14%	
		Euro 1	17 449	17 449	0%	372.96	341.68	-8%	6 588 311	4 217 644	-2 370 667	-36%	
		Euro 2	30 435	30 435	0%	217.43	141.75	-35%	6 617 570	4 314 140	-2 303 430	-35%	
		Euro 3	54 271	54 271	0%	78.48	76.27	-3%	4 254 938	4 139 376	-115 562	-3%	
		Euro 4	315 086	315 086	0%	54.96	51.26	-7%	17 316 320	16 511 881	-804 439	-5%	
		Euro 5	180 240	180 240	0%	19.17	51.26	167%	3 485 382	9 239 815	5 754 433	167%	
	Gasoline total	724 571	724 571	0%	67.66	60.88	-10%	49 046 874	38 634 374	-10 412 500	-21%		
	Diesel Oil	pre-Euro	1 780	1 780	0%	364.96	254.56	-30%	489 963	347 626	-142 337	-29%	
		Euro 1	3 360	3 360	0%	298.17	271.67	-9%	1 082 288	910 182	-172 106	-16%	
		Euro 2	13 788	13 788	0%	407.17	222.43	-45%	5 614 130	3 066 393	-2 547 736	-45%	
Euro 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 - Light Duty Vehicles (LDV)	Gasoline	Euro 4	187 947	187 947	0%	418.16	158.34	-61%	64 733 485	24 983 323	-39 750 162	-61%	
		Euro 5	283 480	283 480	0%	423.99	158.34	-63%	120 187 695	44 873 190	-75 314 505	-63%	
		Euro 6	184 768	184 768	0%	262.61	158.34	-40%	48 521 183	29 255 985	-19 265 198	-40%	
		Diesel oil total	686 582	686 582	0%	394.65	161.95	-59%	272 126 081	112 890 717	-159 235 364	-59%	
		Pkcs Total	1 421 152	1 421 152	0%	225.98	155.61	-31%	521 152 965	163 445 091	-357 707 874	-68%	
		Gasoline	pre-Euro	940	940	0%	611.41	645.95	11%	612 247	606 978	-5 269	-1%
	Euro 1		124	124	0%	908.23	312.78	-66%	112 083	39 682	-72 401	-65%	
	Euro 2		485	485	0%	302.12	221.62	-27%	140 344	102 950	-37 394	-27%	
	Euro 3		596	596	0%	118.57	115.36	-3%	65 955	68 812	2 857	4%	
	1.A.3.a.iii - Heavy Duty Vehicles (HDV)	Gasoline	Euro 4	1 476	1 476	0%	50.72	53.38	5%	74 877	78 816	3 938	5%
Euro 5			1 680	1 680	0%	21.73	53.38	146%	35 240	89 034	53 794	146%	
Euro 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%	1 058 199	1 034 211	-23 988	-2%	
Diesel Oil			pre-Euro	2 087	2 087	0%	413.41	386.79	-6%	860 499	631 183	-229 316	-28%
			Euro 1	1 538	1 538	0%	398.47	276.25	-30%	680 795	331 158	-349 636	-50%
		Euro 2	3 580	3 580	0%	321.26	153.04	-53%	1 143 793	687 293	-456 500	-40%	
		Euro 3	11 684			595.30	150.79	-74%	5 240 325	1 789 515	-3 450 810	-75%	
1.A.3.a.iv - Heavy Duty Vehicles (HDV) - Buses		Diesel Oil	Euro 4	39 680	39 680	0%	866.78	30.00	-96%	19 789 647	3 626 025	-16 163 622	-82%
			Euro 5	75 789	75 789	0%	432.95	30.00	-93%	32 790 565	7 054 565	-25 736 011	-79%
	Euro 6		19 625	19 625	0%	161.71	30.00	-81%	2 977 239	1 626 875	-1 350 364	-45%	
	Diesel oil total		153 284	153 284	0%	424.66	183.89	-57%	65 893 593	15 925 274	-49 968 319	-76%	
	LDVs total		199 470	199 470	0%	414.83	186.35	-54%	66 152 129	16 959 427	-49 192 702	-74%	
	Buses Total		pre-Euro	736	736	0%	1073.33	1019.23	-5%	190 259	150 425	-39 834	-21%
		Euro 1	411	411	0%	731.97	732.57	0%	300 684	389 062	8 839	3%	
		Euro 2	3 325	3 325	0%	707.91	645.19	-9%	2 620 087	2 147 480	-472 606	-18%	
		Euro 3	8 678	8 678	0%	624.33	419.12	-34%	6 457 480	3 984 085	-2 473 395	-38%	
	1.A.3.a.v - Heavy Duty Vehicle: Trucks & Lorries	Diesel Oil	Euro 4	3 923	3 923	0%	474.07	362.49	-24%	8 192 380	1 347 600	-6 844 780	-84%
Euro 5			21 613	21 613	0%	363.92	186.49	-49%	7 937 975	4 050 686	-3 884 291	-49%	
Euro 6			14 586	14 586	0%	68.52	186.49	270%	864 215	2 712 580	1 848 375	214%	
Buses Total			53 382	53 382	0%	318.80	286.71	-23%	19 193 981	15 384 682	-3 809 299	-20%	
Trucks Total			pre-Euro	3 686	3 686	0%	1034.43	1 731.25	-29%	3 730 272	2 659 076	-1 071 256	-29%
			Euro 1	1 311	1 311	0%	802.48	408.38	-49%	900 942	614 151	-286 790	-31%
		Euro 2	7 087	7 087	0%	817.66	543.45	-33%	5 794 876	3 588 026	-2 206 850	-38%	
		Euro 3	20 062	20 062	0%	538.17	315.88	-41%	16 581 722	9 852 452	-6 729 270	-41%	
1.A.3.a.vi - Motorized Two-Wheelers (M2W)		Gasoline	Euro 4	30 062	30 062	0%	307.77	279.34	-9%	7 965 414	6 587 045	-1 368 369	-17%
			Euro 5	264 365	264 365	0%	266.16	154.36	-41%	49 280 789	31 635 347	-17 645 342	-36%
	Euro 6		335 065	335 065	0%	65.82	154.36	135%	21 985 365	51 718 641	29 733 276	136%	
	Trucks Total		588 263	588 263	0%	195.92	175.92	-10%	116 617 141	105 248 508	-11 368 633	-10%	
	M2Ws Total		pre-Euro	5 336	5 336	0%	125.91	157.19	25%	671 980	830 789	168 809	25%
			Euro 1	3 257	3 257	0%	126.39	177.86	41%	411 617	579 244	167 627	41%
		Euro 2	3 396	3 396	0%	122.55	180.33	62%	416 290	673 540	257 249	62%	
		Euro 3	6 711	6 711	0%	41.22	180.33	263%	271 187	1 396 566	1 065 849	283%	
	1.A.3.b - Road Transport	Gasoline	Euro 4	430	430	0%	18.26	19.33	6%	7 982	8 275	277	3%
			Euro 5	0	0	0%	0.00	0	0%	0	0	0	0%
M2Ws Total			19 160	19 160	0%	92.81	183.39	98%	1 178 624	5 551 381	1 735 114	98%	
Total			2 251 471	2 251 471	0%	213.43	155.22	-42%	525 569 450	384 485 986	-141 073 464	-42%	

Adjustment details for 2018												
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 [t]	in [t]	in [t]	in [t]	
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	12,219	12,219	0%	637.58	644.11	-6%	7,780,965	6,668,721	-1,112,234	-15%
		Car 1	14,362	14,362	0%	374.34	341.68	-9%	5,371,161	3,448,643	-1,922,518	-36%
		Car 2	34,285	34,285	0%	221.97	111.68	-50%	5,360,977	2,688,163	-2,672,814	-50%
		Car 3	43,642	43,642	0%	88.16	76.96	-13%	3,487,781	3,358,617	-129,164	-4%
		Car 4	278,738	278,738	0%	55.98	52.30	-7%	15,683,488	14,576,755	-1,106,733	-7%
		Car 5	186,830	186,830	0%	19.35	52.30	170%	3,228,282	8,725,668	5,497,386	170%
	Car 6	159,041	159,041	0%	6.00	52.30	788%	4,190,422	8,316,250	4,125,828	98%	
	Gasoline total	699,027	699,027	0%	64.42	68.36	-6%	45,032,296	47,786,817	2,754,521	6%	
	pre-Cars	1,363	1,363	0%	303.16	264.96	-13%	396,486	345,173	-51,313	-13%	
	Car 1	2,849	2,849	0%	298.17	272.65	-9%	862,432	775,166	-87,266	-10%	
	Car 2	10,784	10,784	0%	407.20	222.67	-45%	4,391,383	2,483,536	-1,907,848	-45%	
	Car 3	40,786	40,786	0%	812.49	180.15	-78%	24,932,029	7,333,241	-17,598,788	-71%	
	Car 4	130,534	130,534	0%	414.71	180.40	-56%	54,133,837	20,937,329	-33,196,508	-61%	
	Car 5	251,212	251,212	0%	416.25	180.40	-56%	104,585,786	40,253,731	-64,332,055	-61%	
	Car 6	238,085	238,085	0%	254.87	180.40	-29%	58,284,140	35,680,440	-22,603,700	-39%	
Diesel oil total	686,078	686,078	0%	375.66	163.30	-56%	247,556,063	188,768,646	-138,787,458	-56%		
FCs total	1,365,181	1,365,181	0%	214.34	114.68	-46%	292,589,060	156,555,421	-136,033,639	-46%		
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	917	917	0%	648.53	645.95	-1%	596,859	582,652	-14,207	-2%
		Car 1	189	189	0%	911.58	312.78	-66%	99,529	33,895	-65,634	-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	69,270	3,980	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%	
	Gasoline total	6,315	6,315	0%	154.22	160.11	4%	999,199	1,011,136	11,937	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	276.25	-29%	483,129	272,296	-210,833	-44%	
	Car 2	2,942	2,942	0%	318.56	153.88	-52%	965,389	550,789	-414,600	-43%	
	Car 3	3,363	3,363	0%	598.16	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%	15,929,185	3,117,457	-12,811,728	-80%	
	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	-41%	5,941,615	3,686,228	-2,255,387	-38%	
Diesel oil 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%	375.80	184.94	-51%	69,343,125	16,851,449	-52,491,676	-77%		
1.A.3.b.ii - Heavy Duty Vehicles (HDVs)	Diesel Oil	pre-Cars	547	547	0%	1078.15	1919.23	78%	589,267	557,147	-32,120	-5%
		Car 1	237	237	0%	732.78	732.57	0%	173,676	176,388	2,712	2%
		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%
	Car 6	20,670	20,670	0%	64.89	186.37	289%	1,176,026	3,682,314	2,506,288	289%	
	Diesel total	51,634	51,634	0%	309.75	283.53	-9%	15,993,546	13,687,186	-2,306,360	-15%	
	pre-Cars	3,262	3,262	0%	1034.82	737.35	-29%	3,375,359	2,485,071	-890,288	-26%	
	Car 1	1,094	1,094	0%	747.82	488.39	-35%	918,052	512,378	-405,674	-44%	
	Car 2	5,544	5,544	0%	817.44	581.68	-29%	4,532,180	2,781,510	-1,750,670	-39%	
	Car 3	20,583	20,583	0%	629.54	353.68	-44%	12,367,751	7,277,279	-5,090,472	-41%	
	Car 4	15,912	15,912	0%	358.89	276.23	-23%	6,334,421	4,386,424	-1,947,997	-31%	
	Car 5	155,983	155,983	0%	268.09	154.68	-42%	45,964,153	24,283,389	-21,680,764	-47%	
	Car 6	381,799	381,799	0%	68.78	154.68	125%	26,251,482	69,665,886	43,414,404	165%	
Trucks total	585,186	585,186	0%	515.18	172.19	-67%	188,173,537	180,760,889	-7,412,648	-4%		
1.A.3.b.iii - Motorised Two-Wheelers (MTWs)	Gasoline	pre-Cars	4,940	4,940	0%	128.95	150.61	21%	622,656	783,451	160,795	26%
		Car 1	2,966	2,966	0%	126.14	177.79	41%	374,114	527,294	153,180	41%
		Car 2	3,221	3,221	0%	129.33	188.64	46%	387,596	639,833	252,237	65%
		Car 3	6,241	6,241	0%	48.24	188.64	288%	20,126	1,239,686	1,219,560	598%
		Car 4	1,130	1,130	0%	58.41	188.64	224%	23,966	224,682	200,716	837%
		Car 5	0	0	0%	0.00	188.64	0%	0	0	0	0%
	MTWs total	18,487	18,487	0%	85.66	188.64	198%	1,658,558	3,454,767	1,796,209	108%	
	1.A.3.b.iv - Road Transport	Total	2,180,983	2,180,983	0%	215.85	133.49	-38%	478,758,286	291,129,652	-187,628,634	-39%

## REVISION OF ADJUSTMENT PROPOSAL COMPARED TO SUBMISSIONS 2014 to 2019

Table 2: annual NO<sub>x</sub>, adjustment proposals, in kilotonnes

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Adjustment 2014 (accepted)	-105.6	-101.3	-95.7	-91.7						
Adjustment 2015 (accepted)	-100.3	-95.5	-89.9	-85.1						
Adjustment 2016 (accepted)	-151.3	-146.9	-145.1	-142.5	-128.1					
Adjustment 2017 (accepted)	-151.3	-146.8	-145.0	-142.4	-127.2	-100.9				
Adjustment 2018 (accepted)	-172.3	-174.5	-177.4	-180.4	-171.5	-148.9	-123.2			
Adjustment 2019 (accepted)	-172.3	-174.5	-177.4	-180.3	-171.4	-148.8	-123.3	93.7		
Adjustment 2020 (accepted)	-297.8	-302.3	-301.3	-306.1	-294.5	-269.0	-244.3	-214.9	-174.6	
<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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