

# 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, 2012 a & c) <sup>2)</sup>, <sup>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> “artificial” current emissions = virtual current emissions assuming no changes in emission factors emission factors updated in COPERT 4 that did not follow the reductions as set by the emission standards for diesel passenger cars; \* important part of diesel fuel consumption in the total fuel consumption of the road traffic.

The results of this study showed that it is the combination of different parameters which might affect the ability (to different extents) of a Party to attain the emission ceilings. In other words, the exceeding of NO<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



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

with

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

## APPLYING THE ORIGINAL METHODOLOGY

### FRAMEWORK INFORMATION

The methodology used for estimating Germany's exhaust emissions from road transport when determining emissions ceilings of the Gothenburg Protocol (1999), was the second version of the EMEP/CORINAIR guidebook corresponding to COPERT II software. This method proposed NO<sub>x</sub> emission factors for

- passenger cars (PC): up to Euro 1
- light commercial vehicles (LCV2): up to Euro 1
- heavy duty vehicles (HDV): pre-EURO I only (conventional)

Back then, without better knowledge, the emission factors for the most recent standards were derived

by directly applying the expected reductions in emission standards.

However, as Germany does not use COPERT for compiling its road transport emissions inventory but a national model called TREMOD, the following comparison has to be carried out between the oldest version of TREMOD still available and the version as applied for the current inventory submission (2021).

Unfortunately, the oldest TREMOD version available for such comparison is TREMOD 3.1 from 2002 <sup>6)</sup>, including the following set of NO<sub>x</sub> emission factors:

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

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

## THE COMPARISON

### Application of the original NO<sub>x</sub> methodology to the current road transport background activity data

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

Within this report, Germany re-estimates the NO<sub>x</sub> emission within the TREMOD 3.1 model. To isolate the requested information, the original TREMOD 3.1 activity data was combined with emission factors from both TREMOD 3.1 and the currently used TREMOD 6.12 (Knörr et al., 2020a) <sup>7)</sup>.

### Description of the updated methodology used

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

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

and

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

### Comparison of emission estimates made using the original and updated methodologies

The values of NO<sub>x</sub> emissions presented in the table below are estimated with:

- TREMOD 3.1 model equations as initial methodology

and ,

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

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

Table 1: Resulting adjustment proposal 2020

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

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

### **Activity Data**

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

### **Implied Emission Factor**

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

### **NO<sub>x</sub> Emissions**

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

Adjustment overview for years 2010 to 2019

NFR Code	Fuel	Year	Activity Data			Implied Emission Factor			NO <sub>x</sub> Emissions			
			current	adjusted	difference	current	adjusted	difference	current	adjusted	adjustment	difference
			in [TJ]	in [TJ]	in [%]	in [kg/TJ]	in [kg/TJ]	in [%]	in [kg]	in [kg]	in [kg]	in [%]
1.A.3.b.i	gasoline		756.957	756.957	0%	97.55	84.99	-13%	77.644.842	67.650.906	9.993.935	-13%
1.A.3.b.i	diesel oil		629.380	629.380	0%	429.45	160.51	-63%	227.341.096	84.970.461	142.370.635	-63%
1.A.3.b.ii	gasoline		6.325	6.325	0%	255.87	214.75	-16%	1.618.432	1.358.328	260.104	-16%
1.A.3.b.ii	diesel oil		113.450	113.450	0%	476.34	134.96	-72%	54.040.533	15.311.584	38.728.949	-72%
1.A.3.b.iii	diesel oil		48.844	48.844	0%	823.00	482.55	-23%	29.931.266	23.183.732	6.747.534	-23%
1.A.3.b.iii	diesel oil		566.741	566.741	0%	446.67	271.83	-39%	253.148.243	154.056.160	99.092.083	-39%
1.A.3.b.iv	gasoline		19.712	19.712	0%	113.68	168.43	48%	2.240.749	3.320.034	-1.079.285	48%
1.A.3.b TOTAL	2010		2.079.608	2.079.608	0%			0%	645.965.162	349.851.206	296.113.956	-46%
1.A.3.b.i	gasoline		794.688	794.688	0%	92.09	81.61	-11%	73.185.851	64.851.951	8.333.900	-11%
1.A.3.b.i	diesel oil		553.564	553.564	0%	434.12	159.22	-63%	240.313.791	88.138.959	152.174.832	-63%
1.A.3.b.ii	gasoline		6.118	6.118	0%	229.35	198.57	-13%	1.403.081	1.214.776	188.305	-13%
1.A.3.b.ii	diesel oil		115.967	115.967	0%	481.55	126.92	-74%	55.844.518	14.718.142	41.126.376	-74%
1.A.3.b.iii	diesel oil		47.355	47.355	0%	592.65	448.99	-24%	28.071.221	21.268.323	6.804.898	-24%
1.A.3.b.iii	diesel oil		563.891	563.891	0%	410.38	244.97	-40%	231.410.271	138.135.342	93.273.929	-40%
1.A.3.b.iv	gasoline		19.289	19.289	0%	110.79	171.60	54%	2.137.002	3.299.162	-1.162.160	54%
1.A.3.b TOTAL	2011		2.106.883	2.106.883	0%			0%	632.365.736	331.625.655	300.740.081	-48%
1.A.3.b.i	gasoline		750.957	750.957	0%	85.73	78.00	-9%	64.379.994	58.677.229	5.802.765	-9%
1.A.3.b.i	diesel oil		555.245	555.245	0%	435.96	158.66	-64%	242.062.902	88.096.699	153.966.203	-64%
1.A.3.b.ii	gasoline		5.657	5.657	0%	218.93	193.15	-12%	1.238.520	1.092.662	145.859	-12%
1.A.3.b.ii	diesel oil		114.350	114.350	0%	481.91	128.17	-75%	55.106.362	13.741.354	41.365.008	-75%
1.A.3.b.iii	diesel oil		50.902	50.902	0%	533.22	384.33	-28%	27.141.913	19.563.200	7.578.704	-28%
1.A.3.b.iii	diesel oil		589.585	589.585	0%	381.33	224.00	-41%	234.829.180	132.064.753	92.764.428	-41%
1.A.3.b.iv	gasoline		18.268	18.268	0%	107.43	173.28	61%	1.962.546	3.165.439	-1.202.893	61%
1.A.3.b TOTAL	2012		2.084.964	2.084.964	0%			0%	616.721.438	316.391.343	300.420.094	-49%
1.A.3.b.i	gasoline		749.114	749.114	0%	89.35	74.85	-7%	60.190.007	56.071.797	4.118.211	-7%
1.A.3.b.i	diesel oil		589.131	589.131	0%	437.14	158.71	-64%	257.633.728	93.499.010	164.134.718	-64%
1.A.3.b.ii	gasoline		5.578	5.578	0%	202.80	184.07	-9%	1.131.209	1.026.727	104.482	-9%
1.A.3.b.ii	diesel oil		118.777	118.777	0%	480.60	114.93	-76%	57.083.533	13.690.488	43.433.045	-76%
1.A.3.b.iii	diesel oil		51.716	51.716	0%	509.64	260.06	-29%	26.350.969	18.620.843	7.730.126	-29%
1.A.3.b.iii	diesel oil		600.139	600.139	0%	353.06	287.93	-41%	211.887.531	124.788.469	87.099.062	-41%
1.A.3.b.iv	gasoline		18.229	18.229	0%	104.34	175.38	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	99.613.892	173.262.169	-63%
1.A.3.b.ii	gasoline		5.845	5.845	0%	190.34	176.49	-7%	1.112.584	1.031.612	80.972	-7%
1.A.3.b.ii	diesel oil		128.578	128.578	0%	475.56	110.96	-77%	61.546.575	14.267.237	46.879.338	-77%
1.A.3.b.iii	diesel oil		49.143	49.143	0%	468.37	339.99	-27%	23.017.115	16.708.234	6.308.881	-27%
1.A.3.b.iii	diesel oil		572.754	572.754	0%	314.05	196.05	-38%	179.874.133	112.285.582	67.588.551	-38%
1.A.3.b.iv	gasoline		18.673	18.673	0%	100.59	179.24	78%	1.878.294	3.346.794	-1.468.499	78%
1.A.3.b TOTAL	2014		2.153.563	2.153.563	0%			0%	597.120.297	302.252.271	294.868.025	-49%
1.A.3.b.i	gasoline		715.156	715.156	0%	74.38	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	16.693.117	6.308.992	-27%
1.A.3.b.iii	diesel oil		594.013	594.013	0%	226.31	180.97	-20%	134.431.699	107.496.262	26.935.437	-20%
1.A.3.b.iv	gasoline		18.785	18.785	0%	95.14	181.66	89%	1.805.897	3.412.476	-1.606.579	89%
1.A.3.b TOTAL	2016		2.207.339	2.207.339	0%			0%	553.790.558	302.901.820	250.897.738	-45%
1.A.3.b.i	gasoline		724.571	724.571	0%	67.66	69.88	3%	49.026.074	50.634.714	-1.607.640	3%
1.A.3.b.i	diesel oil		696.592	696.592	0%	390.65	161.95	-59%	272.126.091	112.810.721	159.315.370	-59%
1.A.3.b.ii	gasoline		6.186	6.186	0%	171.15	167.18	-2%	1.058.799	1.034.211	24.588	-2%
1.A.3.b.ii	diesel oil		153.284	153.284	0%	424.66	183.89	-76%	65.093.930	15.925.216	49.168.714	-76%
1.A.3.b.iii	diesel oil		53.382	53.382	0%	370.80	286.71	-23%	19.793.901	15.304.828	4.489.073	-23%
1.A.3.b.iii	diesel oil		596.263	596.263	0%	195.02	175.92	-10%	116.671.141	106.246.508	11.424.633	-10%
1.A.3.b.iv	gasoline		19.160	19.160	0%	92.83	183.39	98%	1.778.674	3.513.787	-1.735.114	98%
1.A.3.b TOTAL	2017		2.251.437	2.251.437	0%			0%	525.549.410	304.469.986	221.079.424	-42%
1.A.3.b.i	gasoline		699.027	699.027	0%	64.42	68.36	6%	45.032.996	47.786.817	-2.753.820	6%
1.A.3.b.i	diesel oil		666.074	666.074	0%	371.66	163.30	-56%	247.556.063	108.768.604	138.787.459	-56%
1.A.3.b.ii	gasoline		6.315	6.315	0%	158.22	160.11	1%	999.199	1.011.138	-11.939	1%
1.A.3.b.ii	diesel oil		154.259	154.259	0%	384.71	182.69	-73%	59.344.525	15.840.310	43.504.215	-73%
1.A.3.b.iii	diesel oil		51.634	51.634	0%	309.75	263.53	-15%	15.993.526	13.607.106	2.386.420	-15%
1.A.3.b.iii	diesel oil		585.186	585.186	0%	171.18	172.10	1%	180.173.337	180.710.869	-537.532	1%
1.A.3.b.iv	gasoline		18.497	18.497	0%	89.66	184.61	106%	1.658.588	3.414.767	-1.756.209	106%
1.A.3.b TOTAL	2018		2.180.993	2.180.993	0%			0%	478.758.206	291.139.612	179.618.593	-38%
1.A.3.b.i	gasoline		704.691	704.691	0%	62.30	68.45	10%	43.901.941	48.238.025	-4.336.084	10%
1.A.3.b.i	diesel oil		663.841	663.841	0%	345.81	165.07	-52%	229.566.088	109.582.982	119.983.106	-52%
1.A.3.b.ii	gasoline		6.683	6.683	0%	146.08	153.25	5%	976.219	1.034.150	-57.931	5%
1.A.3.b.ii	diesel oil		159.183	159.183	0%	347.42	181.90	-71%	55.303.535	16.221.445	39.082.090	-71%
1.A.3.b.iii	diesel oil		52.939	52.939	0%	274.41	247.81	-10%	14.527.012	13.118.578	1.408.434	-10%
1.A.3.b.iii	diesel oil		595.913	595.913	0%	153.35	169.17	10%	91.380.760	106.809.376	-15.428.616	10%
1.A.3.b.iv	gasoline		18.750	18.750	0%	86.05	186.83	117%	1.613.450	3.502.941	-1.889.491	117%
1.A.3.b TOTAL	2019		2.202.888	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 [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	-12%	25.915.925	19.189.262	-7.716.663	-30%
		Car 2	96.425	96.425	0%	172.95	135.63	-22%	16.580.020	13.020.026	-3.569.995	-22%
		Car 3	133.139	133.139	0%	58.51	70.19	20%	7.790.384	9.343.433	1.553.129	20%
		Car 4	444.991	444.991	0%	42.27	42.19	0%	18.911.389	18.773.529	-137.859	0%
		Car 5	31.234	31.234	0%	18.61	42.19	127%	581.142	1.317.737	736.595	127%
		Car 6	0	0	0%	25.08	42.19	67%	2	2	0	0%
		Gasoline total	795.957	795.957	0%	99.25	84.39	-13%	37.644.942	31.656.986	-5.987.956	-16%
	Diesel Oil	pre-Cars	1.915	1.915	0%	318.13	264.95	-17%	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	-323.041	-11%
		Car 2	50.088	50.088	0%	406.90	299.19	-26%	20.372.795	10.974.210	-9.398.584	-46%
		Car 3	134.025	134.025	0%	542.54	176.54	-67%	72.645.173	23.929.276	-48.715.897	-67%
		Car 4	279.154	279.154	0%	384.37	140.58	-63%	107.299.180	39.243.811	-68.055.369	-63%
		Car 5	53.547	53.547	0%	434.70	140.58	-68%	23.276.735	7.527.796	-15.748.939	-68%
		Car 6	334	334	0%	257.62	140.58	-45%	85.044	46.953	-38.091	-45%
		Diesel oil total	529.380	529.380	0%	429.45	160.55	-63%	227.347.096	84.970.461	-142.376.635	-63%
		Pkx Total	1.325.337	1.325.337	0%	238.12	155.14	-36%	364.985.938	152.421.367	-212.564.570	-58%
	Gasoline	pre-Cars	1.249	1.249	0%	627.99	645.95	2%	783.320	986.871	203.551	26%
		Car 1	3617	3617	0%	361.95	297.39	-16%	361.969	186.620	-175.349	-49%
		Car 2	1.393	1.393	0%	264.75	184.41	-30%	368.840	256.917	-111.923	-30%
		Car 3	856	856	0%	82.47	30.83	-63%	70.631	77.625	6.994	10%
		Car 4	2.420	2.420	0%	36.32	44.90	24%	87.987	188.679	100.692	114%
		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	0%
		Gasoline total	6.345	6.345	0%	255.87	254.75	-0%	1.478.832	1.358.126	-120.706	-8%
	Diesel Oil	pre-Cars	4.876	4.876	0%	425.99	386.79	-9%	2.077.142	1.436.983	-640.159	-31%
		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%	4.420.260	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	-12.570.123	-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	-551.862	-80%
		Car 6	0	0	0%	15.73	80.69	412%	7	4	-3	-43%
		Diesel oil total	113.450	113.450	0%	476.34	134.94	-72%	54.043.533	15.311.584	-38.731.949	-72%
		LNx Total	178.775	178.775	0%	464.70	139.18	-70%	55.658.966	16.689.953	-38.969.013	-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	3.452.644	-221.443	-6%
		Car 1	2.826	2.826	0%	749.41	732.14	-2%	2.117.871	2.125.595	7.723	0%
		Car 2	10.152	10.152	0%	801.96	643.47	-20%	8.140.119	6.532.213	-1.607.906	-20%
		Car 3	15.890	15.890	0%	633.22	437.25	-30%	10.865.776	7.289.299	-3.576.477	-33%
		Car 4	5.461	5.461	0%	448.63	351.65	-21%	2.650.016	1.921.527	-728.489	-28%
		Car 5	10.326	10.326	0%	337.28	182.33	-46%	3.882.417	1.882.644	-1.999.773	-51%
		Car 6	0	0	0%	0	0	0%	0	0	0	0%
		Buses Total	48.044	48.044	0%	623.80	482.55	-23%	29.931.266	23.183.732	-6.747.534	-23%
	Diesel Oil	pre-Cars	10.185	10.185	0%	1040.16	787.37	-24%	10.510.623	7.754.136	-2.756.487	-26%
		Car 1	5.677	5.677	0%	758.59	575.55	-24%	4.261.383	3.287.681	-973.702	-23%
		Car 2	38.555	38.555	0%	817.62	524.79	-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	-61.518.911	-38%
		Car 4	69.635	69.635	0%	368.34	280.62	-24%	27.183.867	20.166.636	-7.017.231	-26%
		Car 5	283.934	283.934	0%	276.42	151.65	-45%	78.643.643	43.115.897	-35.527.746	-45%
		Car 6	0	0	0%	0	0	0%	0	0	0	0%
		Trucks Total	566.741	566.741	0%	446.67	271.83	-39%	293.148.243	154.696.160	-138.452.083	-48%
	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	31%	585.362	696.661	111.299	19%
		Car 3	2.950	2.950	0%	38.11	184.21	381%	116.180	657.032	540.852	465%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
		LNx Total	19.172	19.172	0%	113.68	148.43	30%	2.243.149	3.326.034	1.082.885	48%
		1.A.3.b. - Road Transport	2.879.688	2.879.688	0%	219.62	148.23	-32%	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	-10%	7.720.235	6.979.435	-740.801	-10%
		Car 1	61.979	61.979	0%	347.86	340.16	-2%	21.560.430	14.884.961	-6.675.479	-31%
		Car 2	87.083	87.083	0%	178.38	136.58	-24%	15.620.983	11.883.782	-3.737.191	-24%
		Car 3	124.330	124.330	0%	61.94	71.52	16%	7.683.891	8.891.671	1.207.780	16%
		Car 4	442.185	442.185	0%	43.94	43.68	0%	19.384.914	19.376.439	-8.475	0%
		Car 5	66.057	66.057	0%	18.58	43.68	135%	1.227.381	2.085.636	1.658.255	135%
	Gasoline total	794.688	794.688	0%	92.69	81.65	-11%	73.185.851	64.851.951	-8.333.900	-11%	
	Diesel Oil	pre-Cars	1.711	1.711	0%	318.18	264.95	-17%	531.683	453.187	-78.496	-15%
		Car 1	8.426	8.426	0%	267.32	246.66	-11%	2.585.115	2.239.987	-345.128	-11%
		Car 2	42.514	42.514	0%	407.93	299.27	-26%	17.384.549	9.921.916	-7.462.634	-43%
		Car 3	121.429	121.429	0%	555.36	176.55	-68%	67.437.053	21.681.366	-45.755.687	-68%
		Car 4	264.943	264.943	0%	388.88	143.48	-63%	162.817.881	59.089.755	-103.728.126	-63%
		Car 5	113.047	113.047	0%	435.12	143.48	-67%	49.536.960	16.332.974	-33.203.986	-67%
	Diesel oil total	695	695	0%	259.59	143.48	-45%	180.582	99.754	-80.828	-45%	
	Pkx Total	553.564	553.564	0%	434.12	159.92	-63%	249.713.791	88.138.959	-161.574.832	-63%	
1.A.3.a.ii. - Light Duty Vehicles (LDV)	Gasoline	pre-Cars	1.348.252	1.348.252	0%	232.52	133.47	-43%	371.879.642	154.990.950	-216.888.732	-58%
		Car 1	1.084	1.084	0%	626.75	645.95	3%	682.074	790.373	108.299	16%
		Car 2	283	283	0%	818.74	584.47	-29%	243.289	86.158	-157.132	-65%
		Car 3	1.184	1.184	0%	268.66	191.66	-29%	310.529	223.189	-87.340	-28%
		Car 4	783	783	0%	85.97	35.39	-59%	67.320	74.782	7.462	11%
		Car 5	2.562	2.562	0%	37.38	46.51	24%	95.786	119.162	23.376	24%
	Diesel Oil	pre-Cars	241	241	0%	16.13	46.51	189%	3.882	11.190	7.308	189%
		Car 6	0	0	0%	15.33	46.51	203%	1	2	1	203%
		Gasoline total	6.118	6.118	0%	229.35	186.52	-18%	1.483.081	1.254.776	-228.305	-15%
		pre-Cars	3.995	3.995	0%	425.99	386.79	-9%	1.989.260	1.225.682	-763.578	-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%
	Diesel Oil	pre-Cars	28.876	28.876	0%	541.53	150.54	-72%	15.037.249	4.345.870	-10.691.379	-72%
		Car 3	60.822	60.822	0%	449.82	89.29	-80%	39.029.914	5.429.816	-33.599.098	-80%
		Car 4	6.609	6.609	0%	449.82	89.29	-80%	2.930.190	584.354	-2.345.836	-80%
Car 5		0	0	0%	16.21	89.29	-43%	1	0	-1	-43%	
Diesel oil total		115.967	115.967	0%	405.55	126.92	-74%	55.844.558	15.708.142	-40.136.416	-74%	
LDVs Total		122.085	122.085	0%	406.92	130.55	-72%	57.247.599	15.932.958	-41.314.641	-72%	
1.A.3.a.iii. - Heavy Duty Vehicles (HDV)	Diesel Oil	pre-Cars	2.620	2.620	0%	902.89	1019.78	12%	2.835.189	2.671.331	-164.778	-6%
		Car 1	2.258	2.258	0%	750.61	731.48	-3%	1.699.781	1.636.297	-63.484	-4%
		Car 2	9.074	9.074	0%	804.17	645.36	-20%	7.129.125	5.557.659	-1.571.466	-22%
		Car 3	14.887	14.887	0%	823.96	417.28	-49%	14.887.880	6.889.054	-8.008.826	-49%
		Car 4	5.131	5.131	0%	448.86	361.81	-20%	2.363.330	1.681.274	-680.056	-29%
		Car 5	13.396	13.396	0%	336.60	182.62	-46%	4.589.052	2.486.399	-2.092.653	-46%
	Diesel Oil total	47.365	47.365	0%	592.65	448.99	-24%	28.071.271	21.286.323	-6.884.948	-24%	
	Beuses Total	8.044	8.044	0%	1.030.67	783.88	-26%	8.355.423	6.144.933	-2.210.491	-26%	
	Diesel Oil	pre-Cars	4.384	4.384	0%	758.16	574.04	-23%	3.288.422	2.536.377	-752.044	-23%
		Car 1	29.277	29.277	0%	817.37	550.61	-33%	23.947.723	15.233.223	-8.714.499	-36%
		Car 2	121.584	121.584	0%	538.56	272.69	-49%	117.731.520	45.352.437	-72.379.083	-49%
		Car 3	69.430	69.430	0%	365.26	289.43	-20%	32.977.784	15.969.685	-16.998.099	-49%
		Car 4	342.751	342.751	0%	278.30	162.05	-42%	96.589.479	52.019.687	-44.569.792	-42%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
	Trucks Total	563.891	563.891	0%	418.38	244.97	-40%	219.470.121	136.136.342	-83.333.779	-40%	
1.A.3.b.i. - Motorized Two-Wheelers (M2W)	Gasoline	pre-Cars	7.389	7.389	0%	122.96	150.24	22%	969.588	1.110.170	201.582	22%
		Car 1	4.085	4.085	0%	134.72	108.26	-20%	599.299	889.547	290.248	49%
		Car 2	3.544	3.544	0%	137.85	134.58	-4%	488.552	688.693	201.851	41%
		Car 3	3.550	3.550	0%	39.59	134.58	382%	160.553	688.693	528.140	382%
		Car 4	0	0	0%	0	0	0%	0	0	0	0%
		Car 5	0	0	0%	0	0	0%	0	0	0	0%
M2Ws Total	19.289	19.289	0%	119.78	171.64	54%	2.177.082	3.299.162	1.162.180	54%		
1.A.3.b. Road Transport	Total	2.160.883	2.160.883	0%	305.90	157.85	-49%	632.365.736	321.625.655	-310.740.081	-49%	

Adjustment details for 2023												
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <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	137.92	-29%	13,487,749	10,035,380	-3,372,369	-25%
		Euro 3	189,443	189,443	0%	63.89	72.62	14%	6,927,963	7,875,172	947,209	14%
		Euro 4	489,541	489,541	0%	45.39	45.13	-1%	18,541,881	18,436,736	-105,145	-1%
		Euro 5	181,961	181,961	0%	18.61	45.13	142%	1,897,355	4,681,311	2,783,956	142%
		Euro 6	282	282	0%	25.06	45.13	74%	7,339	12,736	5,399	74%
		Gasoline total	790,267	790,267	0%	85.73	78.88	-8%	64,379,964	58,577,229	-5,802,735	-9%
	Diesel Oil	pre-Euro	1,447	1,447	0%	311.98	284.56	-9%	463,963	383,872	-80,091	-9%
		Euro 1	6,660	6,660	0%	267.79	246.44	-11%	1,980,264	1,771,787	-208,477	-11%
		Euro 2	33,967	33,967	0%	406.82	279.27	-40%	13,987,432	7,445,646	-6,541,787	-40%
		Euro 3	183,539	183,539	0%	564.82	176.63	-69%	58,389,037	18,434,837	-39,954,200	-69%
		Euro 4	234,943	234,943	0%	398.41	146.46	-62%	91,724,190	34,488,997	-57,235,193	-62%
		Euro 5	173,112	173,112	0%	434.89	146.46	-66%	75,284,364	25,353,375	-49,930,989	-66%
		Euro 6	1,557	1,557	0%	259.84	146.46	-44%	484,664	220,086	-264,578	-44%
		Diesel oil total	555,245	555,245	0%	415.96	158.66	-64%	242,962,982	88,096,639	-154,866,343	-64%
		Pkcs Total	1,345,512	1,345,512	0%	234.61	115.29	-50%	386,442,896	146,673,867	-239,769,029	-50%
	Gasoline	pre-Euro	962	962	0%	632.36	645.95	2%	607,779	621,166	13,411	2%
		Euro 1	232	232	0%	803.24	383.22	-52%	189,985	70,295	-119,690	-58%
		Euro 2	989	989	0%	271.16	195.74	-28%	269,134	133,536	-135,598	-50%
		Euro 3	835	835	0%	89.38	98.33	10%	34,623	82,092	47,469	10%
		Euro 4	2,030	2,030	0%	38.49	47.58	24%	78,155	96,691	18,536	24%
		Euro 5	610	610	0%	16.36	47.58	182%	9,941	29,011	19,069	182%
		Euro 6	0	0	0%	16.37	47.58	210%	2	6	4	210%
		Gasoline total	5,657	5,657	0%	218.93	193.15	-25%	1,238,520	1,692,662	454,142	29%
	Diesel Oil	pre-Euro	3,281	3,281	0%	424.46	386.79	-9%	1,368,754	982,093	-386,661	-28%
		Euro 1	3,666	3,666	0%	399.34	276.24	-30%	1,445,960	787,634	-658,326	-46%
		Euro 2	8,479	8,479	0%	336.46	133.39	-40%	2,852,325	1,639,772	-1,212,553	-43%
		Euro 3	23,785	23,785	0%	558.53	150.44	-73%	13,050,281	3,565,082	-9,485,199	-73%
		Euro 4	59,485	59,485	0%	494.22	89.85	-82%	29,369,070	5,337,395	-24,031,675	-82%
		Euro 5	15,964	15,964	0%	442.70	89.85	-80%	7,040,461	1,420,906	-5,619,555	-80%
		Euro 6	1	1	0%	151.94	89.85	-41%	122	72	-50	-41%
		Diesel oil total	114,550	114,550	0%	485.91	126.17	-74%	55,186,382	13,741,354	-41,445,028	-74%
		LNW Total	129,088	129,088	0%	489.51	123.61	-74%	56,344,903	14,834,656	-41,510,247	-74%
1.A.3.b.ii. Heavy Duty Vehicles Buses	Gasoline	pre-Euro	1,326	1,326	0%	1093.46	1919.46	4%	1,410,640	1,352,283	-58,357	-4%
		Euro 1	1,246	1,246	0%	727.34	731.15	1%	987,476	1,017,184	29,708	3%
		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%	9,073,197	6,089,744	-2,983,453	-33%
		Euro 4	5,331	5,331	0%	468.16	361.86	-22%	2,642,179	1,675,777	-966,402	-37%
		Euro 5	20,752	20,752	0%	347.84	182.99	-47%	7,219,563	2,787,467	-4,432,096	-62%
		Euro 6	73	73	0%	64.52	182.99	236%	3,961	13,296	9,334	236%
		Buses Total	50,962	50,962	0%	533.22	384.33	-28%	27,141,913	19,565,288	-7,576,624	-28%
	Diesel Oil	pre-Euro	6,922	6,922	0%	1036.95	758.82	-27%	7,107,543	5,252,345	-1,855,198	-27%
		Euro 1	3,630	3,630	0%	749.70	570.57	-24%	2,721,326	2,071,111	-650,215	-24%
		Euro 2	23,577	23,577	0%	818.27	516.43	-37%	19,262,253	12,175,855	-7,086,398	-37%
		Euro 3	96,736	96,736	0%	634.65	370.21	-42%	61,387,137	35,888,665	-25,498,472	-42%
		Euro 4	60,550	60,550	0%	366.50	288.44	-21%	19,962,680	14,680,877	-5,281,723	-27%
		Euro 5	485,981	485,981	0%	261.24	152.32	-42%	116,149,955	61,626,577	-54,523,378	-47%
		Euro 6	2,380	2,380	0%	188.487	360.323	191%	188,487	360,323	171,836	91%
		Trucks Total	589,585	589,585	0%	385.33	224.69	-41%	224,829,180	132,064,153	-92,765,027	-41%
	Gasoline	pre-Euro	6,780	6,780	0%	122.76	151.03	23%	822,539	1,011,520	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%
		LNW 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 in [t]	adjusted in [t]	difference in [%]	current in [g/t]	adjusted in [g/t]	difference in [%]	current in [t]	adjusted in [t]	adjustment in [t]	difference in [%]	
1.A.3.a.i. Passenger Cars	Gasoline	pre-Euro	11,680	11,680	0%	619.27	649.35	-5%	7,011,641	6,967,452	-4,448	-5%
		Euro 1	37,743	37,743	0%	353.78	261.98	-32%	13,362,966	9,129,436	-4,233,530	-32%
		Euro 2	62,680	62,680	0%	188.93	139.33	-27%	11,889,922	8,722,244	-3,167,678	-27%
		Euro 3	97,792	97,792	0%	66.38	73.19	10%	6,481,618	7,156,920	675,302	10%
		Euro 4	397,911	397,911	0%	47.22	46.52	-1%	18,790,345	18,589,937	-200,407	-1%
		Euro 5	138,063	138,063	0%	18.60	46.52	150%	2,583,150	6,439,691	3,856,541	150%
	Gasoline total	748,116	748,116	0%	88.35	74.85	-7%	68,190,687	56,671,737	-11,518,950	-17%	
	Diesel Oil	pre-Euro	1,389	1,389	0%	312.76	264.56	-15%	433,081	368,136	-64,945	-15%
		Euro 1	5,426	5,426	0%	268.42	246.79	-11%	1,678,472	1,680,688	17,884	11%
		Euro 2	28,437	28,437	0%	406.84	279.91	-40%	11,563,522	6,253,531	-5,309,991	-46%
		Euro 3	92,795	92,795	0%	574.33	176.67	-69%	53,284,956	16,579,373	-36,705,583	-69%
		Euro 4	222,583	222,583	0%	393.55	149.27	-62%	87,598,471	33,225,566	-54,372,905	-62%
		Euro 5	233,766	233,766	0%	435.42	149.27	-66%	101,787,275	34,894,768	-66,892,507	-66%
	Diesel oil total	589,131	589,131	0%	437.14	158.71	-64%	257,533,128	83,695,606	-173,837,522	-64%	
Pkcs Total	1,337,247	1,337,247	0%	237.49	111.77	-53%	317,723,735	146,570,886	-171,152,849	-53%		
1.A.3.a.ii. Light Duty Vehicles (LDVs)	Gasoline	pre-Euro	981	981	0%	633.81	645.95	2%	568,320	579,293	10,973	2%
		Euro 1	194	194	0%	803.26	383.22	-52%	187,281	59,328	-127,953	-63%
		Euro 2	836	836	0%	274.42	291.18	21%	229,520	189,265	-41,255	-18%
		Euro 3	784	784	0%	52.66	191.79	10%	72,691	79,780	7,089	10%
		Euro 4	1,089	1,089	0%	43.70	48.89	10%	77,284	82,833	5,549	7%
		Euro 5	965	965	0%	16.37	48.89	183%	15,187	47,268	32,081	183%
	Gasoline total	5,578	5,578	0%	176.68	188.69	170%	26	72	46	170%	
	Diesel Oil	pre-Euro	2,744	2,744	0%	424.37	386.79	-9%	1,168,757	944,928	-223,829	-20%
		Euro 1	2,946	2,946	0%	399.35	276.24	-30%	1,166,782	634,566	-532,216	-46%
		Euro 2	6,982	6,982	0%	336.92	133.38	-40%	2,340,147	1,350,674	-989,473	-42%
		Euro 3	20,421	20,421	0%	558.53	150.44	-73%	11,437,995	3,070,913	-8,367,082	-73%
		Euro 4	55,887	55,887	0%	497.72	160.46	-68%	30,467,546	5,046,426	-25,421,120	-84%
		Euro 5	29,024	29,024	0%	141.97	160.46	40%	11,181,325	2,837,584	-8,343,741	-80%
	Diesel oil total	118,777	118,777	0%	488.66	174.90	-76%	57,883,533	13,656,488	-44,227,045	-76%	
LDVs Total	124,564	124,564	0%	488.14	180.63	-79%	58,214,142	14,677,275	-43,536,867	-79%		
1.A.3.a.iii. Heavy Duty Vehicles (HDVs)	Diesel Oil	pre-Euro	1,152	1,152	0%	1066.68	1019.23	-5%	1,249,028	1,154,143	-94,885	-4%
		Euro 1	1,064	1,064	0%	727.68	750.98	3%	786,620	791,181	24,561	3%
		Euro 2	6,984	6,984	0%	754.01	661.48	-10%	2,578,084	4,376,271	1,798,187	18%
		Euro 3	13,187	13,187	0%	826.83	477.63	-42%	8,862,880	5,986,226	-2,876,654	-33%
		Euro 4	6,946	6,946	0%	863.55	343.71	-34%	2,330,961	1,779,796	-551,165	-24%
		Euro 5	26,096	26,096	0%	358.88	183.48	-49%	8,835,653	4,420,743	-4,414,910	-50%
	Diesel Oil total	537	537	0%	44.76	183.48	310%	30,407	86,572	74,265	260%	
	Buses Total	pre-Euro	51,736	51,736	0%	509.54	360.06	-29%	26,390,989	18,620,843	-7,770,146	-29%
		Euro 1	5,083	5,083	0%	1039.72	737.35	-29%	6,072,170	4,322,880	-1,748,290	-29%
		Euro 2	2,945	2,945	0%	743.27	580.49	-21%	2,176,946	1,690,969	-485,977	-23%
		Euro 3	19,446	19,446	0%	818.17	515.47	-37%	15,089,881	9,449,975	-5,639,906	-37%
		Euro 4	76,187	76,187	0%	838.63	447.63	-46%	47,087,442	27,588,226	-19,499,216	-48%
		Euro 5	42,781	42,781	0%	396.90	287.27	-27%	16,936,867	12,280,776	-4,656,091	-27%
	Buses Total	190,229	190,229	0%	567.87	152.65	-73%	121,911,324	66,796,246	-55,115,078	-73%	
1.A.3.b.i. Motorised Two-Wheelers (MTWs)	Gasoline	pre-Euro	680,139	680,139	0%	53.86	289.50	-41%	211,887,331	128,188,909	-83,698,422	-41%
		Euro 1	6,362	6,362	0%	123.07	151.79	23%	781,736	964,179	182,443	23%
		Euro 2	4,013	4,013	0%	125.11	173.15	39%	562,073	694,880	132,807	39%
		Euro 3	3,362	3,362	0%	132.24	185.58	40%	436,668	645,894	209,226	48%
		Euro 4	4,562	4,562	0%	39.81	185.58	381%	181,610	802,175	718,565	391%
		Euro 5	0	0	0%	0	0	0%	0	0	0	0%
	MTWs Total	18,229	18,229	0%	104.34	175.38	68%	1,962,088	3,181,638	1,219,550	68%	
	1.A.3.b. Road Transport Total	2,132,683	2,132,683	0%	268.88	147.65	-50%	616,079,063	390,854,731	-225,224,332	-50%	



Emission details for 2024												
NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <sub>x</sub> Emissions				
		current [t]	adjusted [t]	difference in [%]	current [g/t]	adjusted [g/t]	difference in [%]	current [kg]	adjusted [kg]	adjustment [kg]	difference in [%]	
1.A.3.b.i - Passenger Cars	Gasoline	pre-Cars	15.647	15.647	0%	812.37	644.11	-11%	7.132.080	6.337.484	-796.484	-11%
		Eurs 1	30.667	30.667	0%	368.77	243.93	-32%	11.082.246	7.480.641	-3.621.706	-32%
		Eurs 2	53.486	53.486	0%	196.58	140.31	-29%	19.514.477	7.584.432	-3.816.844	-29%
		Eurs 3	87.374	87.374	0%	69.31	73.93	7%	6.065.589	6.450.787	404.216	7%
		Eurs 4	387.759	387.759	0%	48.49	47.89	-1%	19.093.245	19.536.899	423.557	-1%
		Eurs 5	171.270	171.270	0%	19.55	47.89	107%	3.183.292	8.187.811	5.004.289	152%
	Eurs 6	92.315	92.315	0%	25.97	47.89	84%	267.055	433.098	226.248	84%	
	Gasoline total	752.526	752.526	0%	316.03	73.89	-4%	57,295,533	54,996,591	2,216,412	-4%	
	Diesel Oil	pre-Cars	1.341	1.341	0%	311.73	264.96	-15%	417.967	366.326	-43.722	-15%
		Eurs 1	4.982	4.982	0%	1.282.284	1.387.643	8%	6.428.284	1.387.643	156.161	11%
Eurs 2		23.934	23.934	0%	406.71	220.45	-46%	9.734.484	5.276.490	-4.458.094	-46%	
Eurs 3		82.749	82.749	0%	585.53	176.81	-69%	48.417.030	14.796.245	-33.655.585	-69%	
1.A.3.b.ii - Heavy Duty Vehicles (LDV)	Gasoline	Eurs 4	211.237	211.237	0%	397.27	151.77	-62%	83.491.630	32.993.573	-51.857.708	-62%
		Eurs 5	235.811	235.811	0%	435.36	151.77	-65%	124.721.396	43,729,325	-81,000,000	-65%
		Eurs 6	15.081	15.081	0%	209.24	151.77	-41%	6.170.590	2.440.656	-3.729.814	-61%
		Diesel oil total	626.045	626.045	0%	453.67	159.12	-63%	272,853,601	90,693,892	-173,269,709	-63%
		Px total	1,338,571	1,338,571	0%	239.44	152.15	-33%	33,091,954	15,842,813	-17,475,281	-53%
		pre-Cars	996	996	0%	636.74	646.95	2%	668.683	676.724	16.848	2%
	Eurs 1	173	173	0%	868.27	389.96	-54%	150.074	53.575	-96.499	-64%	
	Eurs 2	740	740	0%	264.73	287.11	21%	212.989	154.839	-58.629	-27%	
	Diesel Oil	Eurs 3	1.781	1.781	0%	98.02	185.21	7%	75.992	81.670	5.678	7%
		Eurs 4	1.987	1.987	0%	43.47	50.15	15%	81.139	83.616	12.475	15%
Eurs 5		1.374	1.374	0%	17.11	50.15	183%	23.517	69.681	46.401	183%	
Eurs 6		17	17	0%	18.88	50.15	179%	212	870	657	179%	
Gasoline total	5.945	5.945	0%	190.34	176.49	-3%	5,112,584	1,031,842	-3,881,92	-7%		
1.A.3.b.iii - Heavy Duty Vehicles (HDV)	Diesel Oil	pre-Cars	2.537	2.537	0%	409.16	386.79	-21%	1,065.919	776.259	-287.558	-21%
		Eurs 1	2.586	2.586	0%	393.62	275.25	-45%	987.136	539.898	-447.328	-45%
		Eurs 2	6.087	6.087	0%	338.61	183.25	-42%	1,985.995	1.180.889	-825.126	-42%
		Eurs 3	19.200	19.200	0%	517.75	150.58	-70%	10,417.076	2,742.656	-7,675.826	-74%
		Eurs 4	52.361	52.361	0%	499.70	91.89	-82%	26.164.496	4.760.761	-21,394.744	-82%
		Eurs 5	48.624	48.624	0%	439.24	91.89	-79%	29.496.234	4.259.626	-25,236.608	-79%
	Eurs 6	187	187	0%	15.18	91.89	-60%	9.209.9	17.874	11.655	-60%	
	Diesel oil total	128.538	128.538	0%	415.56	106.94	-73%	51,548,575	15,269,737	-36,278,838	-73%	
	LDVs total	134.423	134.423	0%	463.16	133.81	-67%	62,299,180	22,848,468	-39,460,711	-67%	
	1.A.3.b.iv - Heavy Duty Vehicles (HDV)	Diesel Oil	pre-Cars	984	984	0%	1099.48	1919.23	5%	1,062.364	1,062.921	49.443
Eurs 1			937	937	0%	728.12	759.98	2%	699.232	629.39	-19.127	-3%
Eurs 2			5.580	5.580	0%	704.95	643.67	-9%	4.784.720	3.683.441	-1,106.287	-18%
Eurs 3			11.291	11.291	0%	671.20	458.37	-31%	7,392.340	5.143.528	-2,248.802	-30%
Eurs 4			4.270	4.270	0%	461.90	351.79	-24%	1,972.610	1.484.325	-488.285	-25%
Eurs 5			32.042	32.042	0%	369.55	183.99	-49%	7,726.901	4,055.530	-3,671.389	-49%
Eurs 6		182	182	0%	42.78	183.99	300%	579.919	79.476	-568.563	-336%	
Diesel total		49.143	49.143	0%	468.37	339.99	-27%	23,017.135	16,988,234	-6,338,891	-27%	
pre-Cars		4.782	4.782	0%	1034.34	737.35	-29%	4,945.942	3,525.808	-1,420.134	-29%	
Eurs 1		2.285	2.285	0%	748.06	581.31	-25%	1,050.680	1,237.759	412.848	25%	
Eurs 2	13.629	13.629	0%	817.30	510.48	-35%	11.146.989	6,955.738	-4,191.151	-35%		
Eurs 3	56.685	56.685	0%	632.52	364.41	-42%	34,689.617	19,937.826	-14,601.841	-42%		
Eurs 4	34.697	34.697	0%	396.37	286.34	-26%	16,891.168	9,711.896	-7,179.262	-40%		
Eurs 5	889.139	889.139	0%	459.18	251.79	-45%	19,113.782	8,919.848	-10,193.934	-45%		
Eurs 6	34.714	34.714	0%	63.16	153.65	189%	3,917.081	11,289.562	7,372.451	189%		
Trucks total	572.754	572.754	0%	314.89	186.65	-38%	53,034,133	22,565,562	-30,468,571	-38%		
1.A.3.b.v - Motorised Two-Wheelers (SDV)	Gasoline	pre-Cars	6.185	6.185	0%	122.80	158.04	29%	756.185	974.368	218.182	29%
		Eurs 1	3.037	3.037	0%	124.71	174.84	40%	478.514	670.859	192.346	40%
		Eurs 2	3.365	3.365	0%	128.94	186.25	52%	433.074	680.376	226.504	52%
		Eurs 3	5.385	5.385	0%	39.53	186.25	366%	269.772	1,061.189	81.457	366%
		Eurs 4	0	0	0%	0	0	0%	0	0	0	0%
		Eurs 5	0	0	0%	0	0	0%	0	0	0	0%
	SDVs total	18.637	18.637	0%	108.56	179.34	7%	1,838,294	3,340.794	1,468.499	7%	
	1.A.3.b. Road Transport Total	2,153,563	2,153,563	0%	277.27	146.35	-46%	597,149,297	362,252,271	-234,888,825	-46%	

Equipment details for 2015													
MFR Code	Fuel	Activity Data				Implied Emissions				NO <sub>x</sub> Emissions			
		current	adjusted	difference	in [%]	current	adjusted	difference	in [%]	current	adjusted	adjustment	difference in [%]
1.A.3.1.a.i. Passenger Cars	Gasoline	pre-Euro	11,380	11,380	0%	633.23	644.11	-14%	7,265.112	6,191.942	-1,074.168	-14%	
		Euro 1	24,112	24,112	0%	371.34	245.71	-34%	8,963.981	5,924.472	-3,039.228	-34%	
		Euro 2	42,925	42,925	0%	207.78	142.08	-32%	8,918.785	6,099.695	-2,819.488	-32%	
		Euro 3	72,871	72,871	0%	73.85	74.74	1%	5,381.381	5,446.237	64.857	1%	
		Euro 4	363,474	363,474	0%	52.30	49.02	-6%	18,485.037	17,326.221	-1,158.416	-6%	
		Euro 5	180,783	180,783	0%	13.11	-49.02	-157%	3,454.481	8,081.456	4,626.975	135%	
	Diesel Oil	Euro 6	29,612	29,612	0%	25.70	-49.02	-84%	750.791	1,517.833	767.043	102%	
		Gasoline total	715,116	715,116	0%	74.38	74.38	4%	53,150.181	51,380.585	-1,769.596	-3%	
		pre-Euro	1,282	1,282	0%	313.32	264.96	-15%	387.917	339.733	-48.184	-12%	
		Euro 1	4,219	4,219	0%	268.54	267.84	-0%	1,261.930	1,129.989	-132.821	-10%	
1.A.3.1.b.i. Light Duty Vehicles (LDVs)	Gasoline	Euro 2	19,689	19,689	0%	407.80	220.38	-46%	8,031.567	4,338.719	-3,674.788	-46%	
		Euro 3	71,044	71,044	0%	555.91	179.04	-70%	42,271.648	12,719.962	-29,551.686	-70%	
		Euro 4	182,410	182,410	0%	401.42	154.07	-62%	77,237.055	29,644.450	-47,592.206	-62%	
		Euro 5	364,345	364,345	0%	434.67	154.07	-65%	132,290.843	48,800.424	-83,490.419	-63%	
		Euro 6	52,525	52,525	0%	258.76	154.07	-41%	13,657.082	81,950.284	68,293.202	81%	
	Diesel Oil	Gasoline total	645,445	645,445	0%	405.05	154.07	-62%	143,249.323	143,249.323	0	0%	
		Pre-Euro	1,360,791	1,360,791	0%	245.26	115.59	-53%	328,391.040	154,644.884	-173,746.156	-53%	
		pre-Euro	879	879	0%	664.37	645.96	-1%	575,380	641.977	73.404	1%	
		Euro 1	150	150	0%	895.83	311.93	-65%	134,523	48.851	-87.672	-65%	
		Euro 2	629	629	0%	298.27	272.94	-9%	187,533	133.879	-53.654	-29%	
1.A.3.1.b.ii. Heavy Duty Vehicles (HDVs)	Gasoline	Euro 3	781	781	0%	105.50	180.62	7%	73,369	70,155	-2,186	-3%	
		Euro 4	1,720	1,720	0%	47.96	51.30	7%	80,969	80,240	-729	-1%	
		Euro 5	1,620	1,620	0%	18.41	51.30	175%	29,812	83,086	53,274	179%	
		Euro 6	34	34	0%	18.71	51.30	174%	1,702	3,882	2,180	128%	
	Diesel Oil	Gasoline total	5,719	5,719	0%	987.29	172.48	-82%	5,083,591	1,680,599	-3,402,992	-67%	
		pre-Euro	2,323	2,323	0%	414.31	286.79	-30%	966,185	732,517	-233,668	-24%	
		Euro 1	2,186	2,186	0%	924.207	215.25	-45%	924,200	453,227	-471,043	-50%	
		Euro 2	5,025	5,025	0%	324.81	183.29	-44%	6,132.296	971,286	668,920	74%	
1.A.3.1.b.iii. Two-Wheelers (Mopeds)	Gasoline	Euro 3	15,781	15,781	0%	588.35	150.67	-74%	1,912.414	2,385.713	474.701	24%	
		Euro 4	47,480	47,480	0%	501.73	91.74	-82%	23,782.395	4,340.298	-19,434.808	-82%	
		Euro 5	62,116	62,116	0%	436.13	91.74	-79%	27,090.214	5,630.295	-21,320.808	-79%	
		Euro 6	525	525	0%	154.91	91.74	-40%	87.759	62.235	-25.524	-29%	
		Gasoline total	135,296	135,296	0%	883.25	181.64	-79%	63,545.443	14,647.249	-48,897.953	-77%	
	Diesel Oil	LDVs total	141,098	141,098	0%	476.75	116.62	-76%	64,569.320	55,648.690	-8,910.630	-14%	
		pre-Euro	979	979	0%	1070.34	1918.23	-5%	1,048.372	990.255	-58.118	-5%	
		Euro 1	747	747	0%	738.26	751.91	2%	545.471	581.836	36.365	6%	
		Euro 2	5,211	5,211	0%	707.43	644.45	-9%	4,163.687	3,350.604	-745.803	-18%	
		Euro 3	11,282	11,282	0%	633.80	458.67	-28%	7,141.732	5,174.989	-1,966.822	-28%	
1.A.3.1.b.iv. Trucks & Lorries	Gasoline	Euro 4	4,686	4,686	0%	303.70	351.99	18%	2,156.008	1,614.177	-541.829	-25%	
		Euro 5	26,267	26,267	0%	361.77	184.59	-49%	8,727.060	4,747.641	-3,979.427	-45%	
		Euro 6	5,234	5,234	0%	61.13	184.59	281%	277.542	644.225	366.684	337%	
		Gasoline total	32,991	32,991	0%	496.58	521.99	5%	23,991.971	11,834.428	-12,157.543	-51%	
		pre-Euro	4,379	4,379	0%	1034.69	773.35	-25%	4,468.571	9,174.480	4,705.909	105%	
	Diesel Oil	Euro 1	1,853	1,853	0%	748.71	557.48	-25%	1,387.291	1,025.551	-361.748	-26%	
		Euro 2	11,082	11,082	0%	817.88	502.90	-38%	9,072.940	5,632.460	-3,439.391	-38%	
		Euro 3	43,481	43,481	0%	631.55	361.64	-43%	27,460.779	15,724.621	-11,736.147	-43%	
		Euro 4	29,233	29,233	0%	366.86	283.72	-23%	11,572.860	8,294.190	-3,278.769	-28%	
		Euro 5	326,726	326,726	0%	264.17	153.49	-42%	93,413.973	60,446.436	-32,967.477	-35%	
1.A.3.1.b.v. Two-Wheelers (Mopeds)	Gasoline	Trucks Total	50,767	50,767	0%	57.49	153.49	181%	9,913.354	26,252.637	16,339.804	165%	
		pre-Euro	5,417	5,417	0%	265.75	177.95	-33%	197,189.625	130,263.313	-66,926.313	-33%	
		Euro 1	3,544	3,544	0%	125.41	117.22	-7%	720.441	963.470	243.028	34%	
		Euro 2	5,717	5,717	0%	127.40	166.22	30%	444.085	619.819	171.733	39%	
		Euro 3	3,382	3,382	0%	127.35	196.93	55%	430.680	685.965	235.306	55%	
	Diesel Oil	Euro 4	5,011	5,011	0%	43.29	196.93	389%	236.125	1,144.415	918.289	390%	
		Euro 5	0	0	0%	16.96		-180%	69	884	735	1061%	
		Gasoline total	16,059	16,059	0%	99.32	180.65	82%	1,833.382	3,334.472	1,501.898	82%	
		LDVs total	2,161,500	2,161,500	0%	266.39	126.26	-48%	575,931.265	371,077.294	-204,853.971	-48%	
		Trucks Total	50,767	50,767	0%	57.49	153.49	181%	9,913.354	26,252.637	16,339.804	165%	

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%	17 369 364	16 777 445	-591 919	-3%
		Euro 5	183 374	183 374	0%	19.09	50.17	163%	3 580 745	9 189 834	5 609 089	162%
		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%	79.93	70.65	-11%	58 736 267	50 535 049	-8 201 218	-14%
	Diesel Oil	pre-Euro	1 380	1 380	0%	369.76	254.56	-31%	366 262	339 173	-27 089	-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	11 085 409	-25 896 590	-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%
		Pkx Total	1 384 391	1 384 391	0%	235.75	154.41	-35%	327 778 627	199 070 280	-128 708 347	-39%
	Gasoline	pre-Euro	910	910	0%	602.79	645.95	-7%	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	18 992	12 228	181%
		Gasoline total	5 506	5 506	0%	388.27	171.66	-56%	1 068 292	1 013 678	-54 614	-5%
	Diesel Oil	pre-Euro	2 189	2 189	0%	414.81	386.79	-7%	899 549	846 433	-53 116	-6%
		Euro 1	1 790	1 790	0%	391.89	276.25	-29%	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	-93%	32 223 283	6 658 780	-25 564 503	-79%
		Euro 6	4 921	4 921	0%	113.49	32.40	-71%	755 285	454 676	-300 609	-40%
		Diesel oil total	144 068	144 068	0%	454.12	185.62	-59%	65 712 132	15 256 007	-50 456 125	-77%
		LNx Total	149 994	149 994	0%	445.23	188.29	-58%	66 781 825	16 229 684	-50 552 141	-76%
1.A.3.b.i - Heavy Duty Vehicles - Buses	Diesel Oil	pre-Euro	891	891	0%	1076.81	1919.23	-43%	964 197	988 234	24 037	2%
		Euro I	583	583	0%	731.36	732.67	0%	433 675	446 236	12 561	3%
		Euro II	4 375	4 375	0%	708.25	645.03	-9%	3 440 614	2 822 621	-617 993	-18%
		Euro III	10 333	10 333	0%	632.87	458.91	-28%	6 539 364	4 741 827	-1 797 537	-27%
		Euro IV	4 449	4 449	0%	475.90	382.29	-20%	2 117 219	1 586 881	-530 338	-25%
		Euro V	34 380	34 380	0%	366.36	185.22	-49%	8 935 974	4 517 517	-4 418 457	-49%
		Euro VI	9 126	9 126	0%	62.79	185.22	196%	573 066	1 680 431	1 107 365	196%
		Buses Total	54 157	54 157	0%	404.73	388.24	-2%	23 082 189	16 885 117	-6 197 072	-27%
	Trucks & Lorries	pre-Euro	3 933	3 933	0%	1034.81	737.35	-29%	4 087 249	2 980 379	-1 106 870	-27%
		Euro I	1 555	1 555	0%	748.16	587.92	-21%	1 163 482	789 813	-373 669	-32%
		Euro II	8 856	8 856	0%	817.75	585.42	-28%	7 258 047	4 486 626	-2 771 421	-38%
		Euro III	34 167	34 167	0%	638.91	588.64	-9%	21 553 280	12 251 155	-9 302 125	-43%
		Euro IV	34 287	34 287	0%	396.94	281.86	-29%	9 640 384	6 885 621	-2 754 763	-29%
		Euro V	269 735	269 735	0%	287.22	153.60	-46%	74 680 233	39 976 610	-34 703 623	-46%
1.A.3.b.ii - Motorised Two-Wheelers (MOWs)	Gasoline	Euro VI	261 480	261 480	0%	61.77	153.60	149%	16 149 289	40 204 036	24 054 748	149%
		Trucks Total	594 013	594 013	0%	226.31	180.97	-20%	134 431 899	101 496 262	-32 935 637	-24%
		pre-Euro	5 543	5 543	0%	125.59	155.78	24%	696 072	883 289	187 218	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	986%
		Euro 5	0	0	0%	0	0	0%	0	0	0	0%
		MOWs 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	362 981 820	-190 817 778	-45%

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 [%]	
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%	87.66	80.88	-8%	49 046 874	38 634 374	-10 412 500	-21%	
	Diesel Oil	pre-Euro	1 790	1 790	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 - Heavy Duty Vehicles (LDV)	Gasoline	Euro 4	187 047	187 047	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	44 073 190	-76 114 505	-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	696 582	696 582	0%	394.65	161.95	-59%	272 126 081	112 890 717	-159 235 364	-59%
		Pkx Total	1 421 152	1 421 152	0%	225.98	155.61	-31%	521 152 965	163 445 435	-357 707 530	-68%
		Diesel Oil	pre-Euro	940	940	0%	611.41	645.95	-7%	612 247	598 878	-13 369
	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 - Light Duty Vehicles (LDV)	Gasoline	Euro 4	1 476	1 476	0%	50.72	53.38	5%	74 877	78 816	3 938
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	-24 988	-2%
pre-Euro			2 087	2 087	0%	413.41	386.79	-6%	860 499	811 183	-49 316	-6%
Euro 1			1 538	1 538	0%	398.47	276.25	-30%	680 795	331 158	-349 636	-50%
Diesel Oil		Euro 2	3 580	3 580	0%	321.26	135.04	-40%	1 543 793	887 293	-656 500	-43%
		Euro 3	11 054	11 054	0%	595.30	150.79	-75%	5 240 325	1 789 515	-3 450 810	-75%
		Euro 4	39 050	39 050	0%	866.78	30.00	-97%	19 789 647	3 626 025	-16 163 622	-82%
		Euro 5	75 789	75 789	0%	432.95	30.00	-99%	32 790 566	2 564 565	-29 235 001	-79%
Diesel oil total	153,284	153,284	0%	424.66	131.89	-76%	65,003,930	15,925,274	-49,078,674	-76%		
1.A.3.a.iv - Heavy Duty Vehicles (HGV)	Diesel Oil	LDVs total	199,470	199,470	0%	414.83	186.35	-54%	66,152,129	36,959,427	-29,192,702	-44%
		pre-Euro	736	736	0%	1073.33	1019.23	-5%	790 259	750 425	-39 834	-5%
		Euro 1	411	411	0%	731.97	732.57	0%	300 684	309 062	8 458	3%
		Euro 2	3 325	3 325	0%	707.91	664.79	-7%	2 620 087	2 147 480	-472 606	-18%
		Euro 3	8 678	8 678	0%	824.32	419.12	-49%	6 457 480	3 984 085	-2 473 395	-38%
		Euro 4	3 923	3 923	0%	474.07	362.49	-23%	2 812 380	1 347 600	-1 464 780	-50%
	Buses	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	218%
		Buses total	53,582	53,582	0%	318.80	286.71	-23%	19,793,981	15,384,682	-4,409,873	-23%
		pre-Euro	3 686	3 686	0%	1034.43	737.15	-29%	3 730 272	2 659 076	-1 071 256	-29%
1.A.3.a.v - Heavy Duty Vehicle: Trucks & Lorries	Diesel Oil	Euro 1	1 311	1 311	0%	877.86	408.38	-53%	900 942	614 151	-286 790	-31%
		Euro 2	7 087	7 087	0%	718.66	543.45	-24%	5 794 876	3 580 626	-2 214 250	-38%
		Euro 3	20 062	20 062	0%	538.17	315.81	-41%	16 571 480	9 852 455	-6 719 025	-41%
		Euro 4	30 062	30 062	0%	307.77	279.34	-9%	7 965 414	6 587 045	-1 378 369	-17%
		Euro 5	264 365	264 365	0%	266.16	154.36	-42%	49 280 789	31 635 347	-17 645 342	-36%
		Euro 6	335 065	335 065	0%	65.82	154.36	135%	21 985 366	51 718 641	29 733 275	136%
	Trucks total	598,263	598,263	0%	195.92	175.92	-10%	116,617,141	105,248,508	-11,428,633	-10%	
	pre-Euro	5 336	5 336	0%	125.91	157.19	25%	671 088	830 789	168 801	25%	
	Euro 1	3 257	3 257	0%	126.39	177.86	41%	411 617	579 244	167 627	41%	
	1.A.3.b - Motorized Two-Wheelers (M2W)	Gasoline	Euro 2	3 396	3 396	0%	122.55	130.33	62%	416 200	673 540	257 340
Euro 3			6 711	6 711	0%	41.22	130.33	263%	271 187	1 396 566	1 065 849	283%
Euro 4			430	430	0%	18.26	130.33	967%	7 682	85 275	77 593	968%
Euro 5			0	0	0%	0.00	0	0%	0	0	0	0%
M2Ws total			10 536	10 536	0%	52.81	183.39	366%	1 738 074	5 551 381	3 755 114	366%
1.A.3.b - Road Transport			Total	2 251 471	2 251 471	0%	213.43	175.23	-42%	525 540 430	384 485 986	-141 054 444

Adjustment details for 2008

NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <sub>x</sub> Emissions				
		current	adjusted	difference in [%]	current	adjusted	difference in [%]	current	adjusted	difference in [%]		
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	12 219	12 219	0%	637.58	644.11	-6%	7 790 965	6 668 721	-1 122 234	-15%
		Car 1	14 362	14 362	0%	374.34	341.68	-9%	5 371 161	3 448 643	-1 922 518	-36%
		Car 2	34 285	34 285	0%	221.97	111.68	-50%	5 360 977	2 688 163	-2 672 814	-50%
		Car 3	43 642	43 642	0%	88.16	76.96	-13%	3 897 781	3 358 617	-539 164	-14%
		Car 4	275 738	275 738	0%	55.98	52.30	-7%	15 683 498	14 576 755	-1 106 743	-7%
		Car 5	186 030	186 030	0%	19.35	52.30	-170%	3 228 282	8 725 668	5 497 386	170%
	Gasoline total	689 027	689 027	0%	64.42	64.34	0%	4 190 432	8 716 255	4 525 823	108%	
	Diesel Oil	pre-Cars	159 041	159 041	0%	303.16	264.96	-15%	338 146	345 173	7 026	2%
		Car 1	2 949	2 949	0%	294.17	272.65	-8%	862 432	776 165	-86 267	-10%
		Car 2	10 784	10 784	0%	409.20	222.67	-45%	4 391 383	2 483 536	-1 907 848	-43%
		Car 3	40 786	40 786	0%	612.49	180.15	-71%	24 932 029	7 333 241	-17 598 788	-71%
		Car 4	130 534	130 534	0%	414.71	180.40	-56%	54 133 837	20 937 329	-33 196 508	-61%
		Car 5	251 212	251 212	0%	416.25	180.40	-56%	104 585 786	40 293 731	-64 292 055	-61%
	Diesel oil total	666 076	666 076	0%	254.87	180.40	-30%	56 284 140	35 680 446	-20 603 694	-37%	
	Flx Total	1 365 181	1 365 181	0%	375.66	163.38	-56%	247 596 063	188 768 684	-158 767 459	-56%	
Gasoline	pre-Cars	911	911	0%	664.51	645.95	-3%	599 851	582 662	-17 189	-3%	
	Car 1	188	188	0%	911.58	312.78	-66%	99 528	33 895	-65 633	-66%	
	Car 2	377	377	0%	303.84	224.45	-26%	114 682	84 713	-29 969	-26%	
	Car 3	511	511	0%	111.92	116.84	4%	57 282	60 739	3 457	6%	
	Car 4	1 275	1 275	0%	52.02	54.36	4%	66 290	69 278	2 988	4%	
	Car 5	1 483	1 483	0%	23.70	54.36	129%	35 160	80 626	45 466	129%	
Gasoline total	6 315	6 315	0%	18.18	54.36	182%	30 560	89 326	58 766	182%		
Light Duty Vehicles (LDVs)	pre-Cars	1 872	1 872	0%	154.22	160.11	4%	999 199	1 011 136	11 937	1%	
	Car 1	1 872	1 872	0%	411.51	386.79	-6%	771 337	574 432	-196 905	-26%	
	Car 2	1 285	1 285	0%	389.94	276.25	-29%	483 129	272 296	-210 833	-44%	
	Car 3	2 942	2 942	0%	318.56	153.88	-52%	965 389	550 789	-414 600	-43%	
	Car 4	9 363	9 363	0%	558.10	150.74	-73%	5 689 152	1 411 299	-4 277 853	-75%	
	Car 5	33 232	33 232	0%	508.42	93.81	-82%	16 929 185	3 117 457	-13 811 728	-82%	
Diesel Oil	pre-Cars	66 283	66 283	0%	432.92	93.81	-78%	28 684 080	6 217 860	-22 466 220	-78%	
	Car 1	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	180 574	180 574	0%	375.80	184.94	-51%	69 343 125	16 851 449	-52 491 676	-76%	
	pre-Cars	547	547	0%	1076.16	1919.23	-45%	589 267	557 147	-32 120	-5%	
	Car 1	237	237	0%	732.78	732.57	0%	173 676	176 388	2 712	2%	
1.A.3.b.i - Heavy Duty Vehicles (HDVs)	Diesel Oil	pre-Cars	2 270	2 270	0%	787.83	646.33	-18%	1 780 686	1 487 437	-293 249	-16%
		Car 1	6 757	6 757	0%	628.89	459.32	-27%	4 262 734	3 183 482	-1 079 252	-25%
		Car 2	3 043	3 043	0%	473.16	382.73	-19%	1 439 790	1 073 333	-366 457	-25%
		Car 3	18 189	18 189	0%	362.42	186.37	-49%	6 663 265	3 376 016	-3 287 249	-49%
		Car 4	20 670	20 670	0%	64.89	186.37	288%	1 176 026	3 662 314	2 486 288	212%
		Car 5	91 634	91 634	0%	309.75	283.53	-8%	15 993 546	13 687 186	-2 306 360	-15%
1.A.3.b.ii - Heavy Duty Trucks & Lorries	Diesel Oil	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%	4 532 190	2 781 516	-1 750 674	-39%
		Car 3	20 583	20 583	0%	629.54	563.68	-10%	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	154 980	154 980	0%	250.40	154.68	-38%	45 964 153	24 283 389	-21 680 764	-47%
Trucks Total	381 799	381 799	0%	68.78	154.68	125%	26 251 482	69 665 896	43 414 414	165%		
1.A.3.b.iii - Motorised Two-Wheelers (MTWs)	Gasoline	pre-Cars	4 940	4 940	0%	128.95	188.61	46%	622 666	783 451	160 785	26%
		Car 1	2 966	2 966	0%	126.14	177.73	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	284%	20 126	1 239 686	1 219 560	598%
		Car 4	1 130	1 130	0%	58.41	188.64	224%	23 066	224 682	201 616	874%
		Car 5	0	0	0%	0.00	188.64	0%	0	0	0	0%
MTWs total	18 487	18 487	0%	85.66	188.65	118%	1 658 568	3 454 767	1 796 199	108%		
1.A.3.b - Road Transport	Total	2 180 980	2 180 980	0%	215.85	133.49	-38%	478 758 286	291 129 652	-187 628 634	-39%	

Adjustment details for 2009

NFR Code	Fuel	Activity Data			Implied Emission Factor			NO <sub>x</sub> Emissions				
		current	adjusted	difference	current	adjusted	difference	current	adjusted	difference		
		in [t]	in [t]	in [%]	in [g/t]	in [g/t]	in [%]	in [t]	in [t]	in [%]		
1.A.3.a.i - Passenger Cars	Gasoline	pre-Cars	13 588	13 588	0%	638.58	644.11	-9%	8 664 621	7 382 686	-1 281 935	-15%
		Car 1	12 427	12 427	0%	378.32	341.68	-9%	4 781 480	3 083 383	-1 698 097	-36%
		Car 2	20 086	20 086	0%	225.58	92.59	-59%	4 531 070	1 858 018	-2 673 052	-59%
		Car 3	38 216	38 216	0%	82.22	76.12	-7%	2 977 840	2 829 186	-148 654	-5%
		Car 4	295 220	295 220	0%	57.04	53.29	-7%	14 588 285	13 589 621	-998 664	-7%
		Car 5	180 537	180 537	0%	19.77	53.29	-170%	3 173 728	8 054 356	4 880 628	154%
	Diesel Oil	pre-Cars	285 636	285 636	0%	25.63	53.29	108%	5 295 099	11 010 782	5 715 683	108%
		Car 1	194 631	194 631	0%	62.36	68.45	10%	43 961 941	48 238 025	4 276 084	10%
		Car 2	3 735	3 735	0%	333.74	264.96	-21%	913 180	734 621	-178 559	-21%
		Car 3	2 545	2 545	0%	298.80	272.65	-9%	764 913	687 786	-77 127	-10%
		Car 4	8 891	8 891	0%	407.19	226.16	-44%	3 620 286	2 037 480	-1 582 806	-44%
		Car 5	33 079	33 079	0%	615.11	180.42	-71%	20 310 125	5 967 483	-14 342 642	-71%
	Trucks & Lorries	pre-Cars	111 335	111 335	0%	419.17	182.44	-56%	48 688 685	10 885 228	-37 803 457	-78%
		Car 1	231 784	231 784	0%	419.37	182.44	-56%	95 117 643	37 650 997	-57 466 646	-60%
		Car 2	273 511	273 511	0%	227.36	182.44	-20%	62 183 230	44 429 184	-17 754 046	-29%
Diesel oil total		663 841	663 841	0%	345.81	165.67	-52%	229 566 088	189 582 982	-139 983 106	-61%	
PUs total		9 568 532	9 568 532	0%	599.83	155.32	-74%	273 668 009	157 821 687	-115 846 322	-42%	
Gasoline	Car 1	316	316	0%	644.89	645.95	1%	687 449	581 962	-105 487	-15%	
	Car 2	909	909	0%	915.20	312.78	-66%	89 953	30 396	-59 557	-66%	
	Car 3	447	447	0%	112.68	121.47	8%	50 355	54 283	3 928	8%	
	Car 4	1 126	1 126	0%	53.08	55.26	4%	59 652	62 199	2 547	4%	
	Car 5	1 361	1 361	0%	25.34	55.26	119%	34 240	74 680	40 440	119%	
	Car 6	2 420	2 420	0%	18.75	55.26	188%	45 383	133 753	88 370	188%	
Gasoline total		6 483	6 483	0%	146.88	153.25	9%	974 299	1 044 150	69 851	7%	
1.A.3.b.i - Light Duty Vehicles (LDVs)	Gasoline	pre-Cars	1 744	1 744	0%	418.96	386.79	-7%	725 111	541 376	-183 735	-25%
		Car 1	1 079	1 079	0%	389.52	276.25	-29%	420 285	232 256	-188 029	-44%
		Car 2	2 334	2 334	0%	315.90	194.79	-39%	737 682	454 630	-283 052	-39%
		Car 3	2 549	2 549	0%	457.97	242.15	-48%	4 587 943	1 175 174	-3 412 769	-48%
		Car 4	20 711	20 711	0%	512.28	34.57	-82%	1 478 788	2 116 311	11 503 524	785%
		Car 5	58 774	58 774	0%	436.30	84.57	-79%	25 459 680	5 552 420	-19 907 262	-78%
	Diesel Oil	pre-Cars	59 921	59 921	0%	146.18	84.57	-42%	8 616 586	6 572 882	-2 043 704	-24%
		LDVs total	159 183	159 183	0%	347.42	181.99	-47%	55 383 325	36 221 485	-19 161 840	-35%
		LDVs total	165 866	165 866	0%	319.31	183.97	-43%	56 279 594	37 248 596	-19 030 998	-34%
		pre-Cars	489	489	0%	1086.20	1191.23	10%	588 087	478 258	-109 829	-19%
		Car 1	147	147	0%	736.37	752.57	2%	186 212	110 593	-75 619	-40%
		Car 2	1 611	1 611	0%	703.47	646.77	-9%	1 271 445	1 041 621	-229 824	-18%
	Diesel Oil	pre-Cars	1 709	1 709	0%	639.65	639.65	0%	2 653 381	2 653 381	0	0%
		Car 1	2 747	2 747	0%	473.92	562.64	19%	1 382 061	969 413	-412 648	-30%
		Car 2	17 130	17 130	0%	363.91	186.64	-49%	6 213 175	2 180 791	-4 032 384	-65%
Car 3		25 135	25 135	0%	68.43	186.64	269%	1 518 981	4 686 133	3 167 152	209%	
LDVs total		52 939	52 939	0%	274.81	247.81	-9%	14 527 072	15 138 878	1 408 806	10%	
pre-Cars		3 140	3 140	0%	1034.98	737.35	-29%	3 250 020	2 370 443	-879 577	-27%	
Heavy Duty Vehicles (HDVs)	pre-Cars	989	989	0%	747.00	488.39	-35%	774 240	453 754	-320 486	-41%	
	Car 1	560	560	0%	817.42	581.04	-29%	3 734 343	2 280 987	-1 445 356	-39%	
	Car 2	15 377	15 377	0%	628.94	373.43	-41%	19 380 323	5 786 580	-4 543 743	-24%	
	Car 3	19 127	19 127	0%	396.85	261.48	-34%	1 226 679	3 619 324	2 392 645	196%	
	Car 4	185 219	185 219	0%	365.13	360 499	-9%	18 966 969	18 966 969	0	0%	
	Car 5	432 493	432 493	0%	72.98	154.92	110%	11 175 486	67 063 853	56 888 367	505%	
Trucks Total		993 913	993 913	0%	551.35	169.17	-69%	55 380 190	180 899 376	1 248 676	18%	
Heavy Duty Vehicle: Trucks & Lorries	pre-Cars	4 913	4 913	0%	125.89	164.79	31%	664 997	792 771	127 774	21%	
	Car 1	2 835	2 835	0%	125.39	177.29	41%	355 496	582 589	227 093	64%	
	Car 2	3 094	3 094	0%	119.33	180.66	51%	389 224	615 317	246 093	63%	
	Car 3	6 082	6 082	0%	49.03	180.66	367%	240 284	1 193 617	953 333	397%	
	Car 4	2 085	2 085	0%	214.80	180.66	-8%	47 489	386 647	339 158	715%	
	Car 5	0	0	0%	0.00	180.63	0%	0	0	0	0%	
MGOVs total		18 150	18 150	0%	86.95	186.83	157%	1 615 450	5 562 541	3 947 091	245%	
1.A.3.b Road Transport Total		2 262 080	2 262 080	0%	198.58	132.83	-33%	637 268 146	292 497 487	-344 770 659	-46%	

## 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) <sup>8)</sup> <sup>9)</sup>	-105.6	-101.3	-95.7	-91.7						
Adjustment 2015 (accepted) <sup>10)</sup> <sup>11)</sup>	-100.3	-95.5	-89.9	-85.1						
Adjustment 2016 (accepted) <sup>12)</sup> <sup>13)</sup>	-151.3	-146.9	-145.1	-142.5	-128.1					
Adjustment 2017 (accepted) <sup>14)</sup>	-151.3	-146.8	-145.0	-142.4	-127.2	-100.9				
Adjustment 2018 (accepted) <sup>15)</sup>	-172.3	-174.5	-177.4	-180.4	-171.5	-148.9	-123.2			
Adjustment 2019 (accepted) <sup>16)</sup>	-172.3	-174.5	-177.4	-180.3	-171.4	-148.8	-123.3	93.7		
Adjustment 2020 (accepted)	-297.8	-302.3	-301.3	-306.1	-294.5	-269.0	-244.3	-214.9	-174.6	
<b>Adjustment 2021 (proposal)</b>	<b>-296.1</b>	<b>-300.7</b>	<b>-300.4</b>	<b>-305.2</b>	<b>-294.9</b>	<b>-274.9</b>	<b>-250.9</b>	<b>-221.1</b>	<b>-179.6</b>	<b>-144.8</b>
Change against Adjustment 2020	1.7	1.6	0.9	0.9	-0.4	-5.9	-6.6	-6.2	-5.0	

The noticeable differences between the 2017 and 2018 adjustment proposals resulted from an ad-hoc revision of the *Handbook Emission Factors for Road Transport* (HBEFA, version 3.3) in the aftermath of the so-called “Diesel-gate”. <sup>17)</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>18)</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 2020 adjustment proposal differed significantly from the adjustment applied for and accepted in 2019.

**In comparison to 2020, the TREMOD model applied for the 2021 submission has been revised only slightly in terms of NO<sub>x</sub> emission factors. Hence, the 2021 adjustment proposal differs only slightly from the (accepted) proposal provided with submission 2020.**

### **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](#)

<sup>1)</sup> IIASA, 1999: Amann, M.; Bertok, I.; Cofala, J.; Gyarmas, F.; Heyes, Chr.; Klimont, Zb.; Syri, S.; Schöpp, W.: Further analysis of scenario results obtained with the RAINS model - Interim Report to the



Ministère de L'Aménagement du Territoire et de l'Environnement Direction de la Prévention des Pollutions et des Risques 20, avenue de Ségur 75302 Paris 07 SP, April 1999 – URL:

<https://iiasa.ac.at/web/home/research/researchPrograms/air/policy/france3b.pdf>

<sup>2)</sup> EB, 2012a: CLRTAP EB Decision 2012/3, ECE/EB.AIR/111/Add.1: Adjustments under the Gothenburg Protocol to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them URL:

[http://www.unece.org/fileadmin/DAM/env/documents/2013/air/ECE\\_EB.AIR\\_111\\_Add.1\\_\\_ENG\\_DECISION\\_3.pdf](http://www.unece.org/fileadmin/DAM/env/documents/2013/air/ECE_EB.AIR_111_Add.1__ENG_DECISION_3.pdf)

<sup>3)</sup> EB, 2012c: CLRTAP EB Decision 2012/12: Guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them URL:

[http://www.unece.org/fileadmin/DAM/env/documents/2012/EB/Decision\\_2012\\_12.pdf](http://www.unece.org/fileadmin/DAM/env/documents/2012/EB/Decision_2012_12.pdf)

<sup>4)</sup> EB, 2012b: CLRTAP EB Decision 2012/4: Provisional Application of Amendment to the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone URL:

[http://www.unece.org/fileadmin/DAM/env/documents/2013/air/ECE\\_EB.AIR\\_111\\_Add.1\\_\\_ENG\\_DECISION\\_4.pdf](http://www.unece.org/fileadmin/DAM/env/documents/2013/air/ECE_EB.AIR_111_Add.1__ENG_DECISION_4.pdf)

<sup>5)</sup> (bibi cite 4)

<sup>6)</sup> ifeu, 2002: Final report to UFOPLAN study FKZ 201 45 112 (German version only): Aktualisierung des Daten- und Rechenmodells: Energieverbrauch und Schadstoffemissionen des motorisierten Verkehrs in Deutschland 1980-2020; Im Auftrag des Umweltbundesamtes; ifeu Institut für Energie- und Umweltforschung Heidelberg GmbH (Institute for Energy and Environmental Research), Wilckensstraße 3, D-69120 Heidelberg, Germany, phone: +49 (0) 6221 / 47 67 -0, fax: +49 (0) 6221 / 47 67 -19, Heidelberg, 31. Oktober 2002

<sup>7)</sup> Knörr et al. (2020a): Knörr, W., Heidt, C., Gores, S., & Bergk, F.: ifeu Institute for Energy and Environmental Research (Institut für Energie- und Umweltforschung Heidelberg gGmbH, ifeu): Fortschreibung des Daten- und Rechenmodells: Energieverbrauch und Schadstoffemissionen des motorisierten Verkehrs in Deutschland 1960-2035, sowie TREMOD, im Auftrag des Umweltbundesamtes, Heidelberg & Berlin, 2020.

<sup>8)</sup> CEIP, 2014a: Centre on Emission Inventories and Projections (CEIP): CEIP/Adjustment RR/2014/GERMANY: Review of the 2014 Adjustment Application by Germany, URL: [https://webdab01.umweltbundesamt.at/download/adjustments2014/Adjustment\\_Review\\_Report\\_GERMANY\\_2014.pdf?cgiproxy\\_skip=1](https://webdab01.umweltbundesamt.at/download/adjustments2014/Adjustment_Review_Report_GERMANY_2014.pdf?cgiproxy_skip=1), 5 August 2014.

<sup>10)</sup> CEIP, 2015a: Centre on Emission Inventories and Projections (CEIP): CEIP/Adjustment RR/2015/Germany: Review of the 2015 Adjustment Application by Germany, URL: [https://webdab01.umweltbundesamt.at/download/adjustments2015/Germany2015-adj.pdf?cgiproxy\\_skip=1](https://webdab01.umweltbundesamt.at/download/adjustments2015/Germany2015-adj.pdf?cgiproxy_skip=1), September 2015.

<sup>11)</sup> CEIP, 2015b: Centre on Emission Inventories and Projections (CEIP): CE/EB.AIR/GE.1/2015/10-ECE/EB.AIR/WG.1/2015/13: Review of adjustment applications 2015; URL: [http://www.ceip.at/fileadmin/inhalte/emep/Adjustments/ece.eb.air.ge.1.2015.10\\_ece.eb.air.wg.1.2015.13.AV.pdf](http://www.ceip.at/fileadmin/inhalte/emep/Adjustments/ece.eb.air.ge.1.2015.10_ece.eb.air.wg.1.2015.13.AV.pdf), 6 July 2015.

<sup>12)</sup> CEIP, 2016a: Centre on Emission Inventories and Projections (CEIP): Review of the 2016 Adjustment Application by Germany, URL: [https://webdab01.umweltbundesamt.at/download/adjustments2016/Germany2016-adj.pdf?cgiproxy\\_skip=1](https://webdab01.umweltbundesamt.at/download/adjustments2016/Germany2016-adj.pdf?cgiproxy_skip=1), 2016.

<sup>13)</sup> CEIP, 2016b: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2016/10-ECE/EB.AIR/WG.1/2016/18: Review of adjustment applications 2016; URL: [http://www.ceip.at/fileadmin/inhalte/emep/pdf/2016/ECE\\_EB.AIR\\_GE.1\\_2016\\_10\\_E.pdf](http://www.ceip.at/fileadmin/inhalte/emep/pdf/2016/ECE_EB.AIR_GE.1_2016_10_E.pdf), 2016.

<sup>14)</sup> CEIP, 2017a: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2017/10-ECE/EB.AIR/WG.1/2017/20: Review of adjustment applications 2017; URL: [http://www.ceip.at/fileadmin/inhalte/emep/pdf/2017/Advance\\_ece\\_eb\\_air\\_ge\\_1\\_2017\\_10\\_ece\\_eb\\_air\\_wg\\_1\\_2017.pdf](http://www.ceip.at/fileadmin/inhalte/emep/pdf/2017/Advance_ece_eb_air_ge_1_2017_10_ece_eb_air_wg_1_2017.pdf), 2017.

<sup>15)</sup> CEIP, 2018a: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2018/10-ECE/EB.AIR/WG.1/2018/21: Review of adjustment applications 2018; URL: [https://www.ceip.at/fileadmin/inhalte/emep/pdf/2018/ADJ\\_ece.eb.air.ge.1.2018.10-ece.eb.air.wg.1.2018.21\\_advance.pdf](https://www.ceip.at/fileadmin/inhalte/emep/pdf/2018/ADJ_ece.eb.air.ge.1.2018.10-ece.eb.air.wg.1.2018.21_advance.pdf), 2018.

<sup>16)</sup> CEIP, 2019a: Centre on Emission Inventories and Projections (CEIP): ECE/EB.AIR/GE.1/2019/10–ECE/EB.AIR/WG.1/2019/22: Review of adjustment applications 2019; URL: [https://www.ceip.at/fileadmin/inhalte/emep/pdf/2019/ECE\\_EB.AIR\\_GE.1\\_2019\\_10-1909789E.pdf](https://www.ceip.at/fileadmin/inhalte/emep/pdf/2019/ECE_EB.AIR_GE.1_2019_10-1909789E.pdf), 2019.

<sup>17)</sup> Keller et al. (2017): Keller, M., Hausberger, S., Matzer, C., Wüthrich, P., & Notter, B.: Handbook Emission Factors for Road Transport, version 3.3 (Handbuch Emissionsfaktoren des Straßenverkehrs 3.3) URL: [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwj0y67pi5foAhWB16QKHfpYDIgQFjAAegQIAhAB&url=https%3A%2F%2Fwww.hbefa.net%2Fde%2Fdocuments%2FHBEFA33\\_Hintergrundbericht.pdf&usg=AOvVaw2sOF884KtccVyWLItdt1CIZ](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwj0y67pi5foAhWB16QKHfpYDIgQFjAAegQIAhAB&url=https%3A%2F%2Fwww.hbefa.net%2Fde%2Fdocuments%2FHBEFA33_Hintergrundbericht.pdf&usg=AOvVaw2sOF884KtccVyWLItdt1CIZ) - Dokumentation, Bern, 2017.

<sup>18)</sup> Notter et al. (2019): Keller, M., Althaus, H.-J., Cox, B., Knörr, W., Heidt, Ch., Biemann, K., Räder, D.: Handbook Emission Factors for Road Transport, version 4.1 (Handbuch Emissionsfaktoren des Straßenverkehrs 4.1), HBEFA 4.1 Development Report; URL: [https://www.hbefa.net/de/documents/HBEFA41\\_Development\\_Report.pdf](https://www.hbefa.net/de/documents/HBEFA41_Development_Report.pdf), Bern, Heidelberg, 21. August 2019.