

# 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), 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   |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| proposed adjustment | -296.1 | -300.7 | -300.4 | -305.2 | -294.9 | -274.9 | -250.9 | -221.1 | -179.6 | -144.8 |

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

#### **Activity Data**

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

#### **Implied Emission Factor**

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

#### **NO<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 [%]     | in [kg/TJ]              |          | in [%]     |                           | 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   | gasoline   |      | 48.844        | 48.844    | 0%         | 823.00                  | 482.55   | -42%       | 29.931.266                | 23.183.732  | 6.747.534   | -23%       |
| 1.A.3.b.iii   | diesel oil |      | 566.741       | 566.741   | 0%         | 446.67                  | 271.83   | -39%       | 253.148.243               | 154.056.160 | 99.092.083  | -39%       |
| 1.A.3.b.iv    | gasoline   |      | 19.712        | 19.712    | 0%         | 113.68                  | 168.43   | 48%        | 2.240.749                 | 3.320.034   | -1.079.285  | 48%        |
| 1.A.3.b TOTAL | 2010       |      | 2.079.608     | 2.079.608 | 0%         |                         |          | 0%         | 645.965.162               | 349.851.206 | 296.113.956 | -46%       |
| 1.A.3.b.i     | gasoline   |      | 794.688       | 794.688   | 0%         | 92.09                   | 81.61    | -11%       | 73.185.851                | 64.851.951  | 8.333.900   | -11%       |
| 1.A.3.b.i     | diesel oil |      | 553.564       | 553.564   | 0%         | 434.12                  | 159.22   | -63%       | 240.313.791               | 88.138.959  | 152.174.832 | -63%       |
| 1.A.3.b.ii    | gasoline   |      | 6.118         | 6.118     | 0%         | 229.35                  | 198.57   | -13%       | 1.403.081                 | 1.214.776   | 188.305     | -13%       |
| 1.A.3.b.ii    | diesel oil |      | 115.967       | 115.967   | 0%         | 481.55                  | 126.92   | -74%       | 55.844.518                | 14.718.142  | 41.126.376  | -74%       |
| 1.A.3.b.iii   | gasoline   |      | 47.355        | 47.355    | 0%         | 592.65                  | 448.99   | -24%       | 28.071.221                | 21.268.323  | 6.804.898   | -24%       |
| 1.A.3.b.iii   | diesel oil |      | 563.891       | 563.891   | 0%         | 410.38                  | 244.97   | -40%       | 231.410.271               | 138.135.342 | 93.273.929  | -40%       |
| 1.A.3.b.iv    | gasoline   |      | 19.289        | 19.289    | 0%         | 110.79                  | 171.60   | 54%        | 2.137.002                 | 3.299.162   | -1.162.160  | 54%        |
| 1.A.3.b TOTAL | 2011       |      | 2.106.883     | 2.106.883 | 0%         |                         |          | 0%         | 632.365.736               | 331.625.655 | 300.740.081 | -48%       |
| 1.A.3.b.i     | gasoline   |      | 750.957       | 750.957   | 0%         | 85.73                   | 78.00    | -9%        | 64.379.994                | 58.677.229  | 5.802.765   | -9%        |
| 1.A.3.b.i     | diesel oil |      | 555.245       | 555.245   | 0%         | 435.96                  | 158.66   | -64%       | 242.062.902               | 88.096.699  | 153.966.203 | -64%       |
| 1.A.3.b.ii    | gasoline   |      | 5.657         | 5.657     | 0%         | 218.93                  | 193.15   | -12%       | 1.238.520                 | 1.092.662   | 145.859     | -12%       |
| 1.A.3.b.ii    | diesel oil |      | 114.350       | 114.350   | 0%         | 481.91                  | 128.17   | -75%       | 55.106.362                | 13.741.354  | 41.365.008  | -75%       |
| 1.A.3.b.iii   | gasoline   |      | 50.902        | 50.902    | 0%         | 533.22                  | 384.33   | -28%       | 27.141.913                | 19.563.200  | 7.578.704   | -28%       |
| 1.A.3.b.iii   | diesel oil |      | 589.585       | 589.585   | 0%         | 381.33                  | 224.00   | -41%       | 234.829.180               | 132.064.753 | 92.764.428  | -41%       |
| 1.A.3.b.iv    | gasoline   |      | 18.268        | 18.268    | 0%         | 107.43                  | 173.28   | 61%        | 1.962.546                 | 3.165.439   | -1.202.893  | 61%        |
| 1.A.3.b TOTAL | 2012       |      | 2.084.964     | 2.084.964 | 0%         |                         |          | 0%         | 616.721.438               | 316.391.343 | 300.429.094 | -49%       |
| 1.A.3.b.i     | gasoline   |      | 749.114       | 749.114   | 0%         | 89.35                   | 74.85    | -7%        | 60.190.007                | 56.071.797  | 4.118.211   | -7%        |
| 1.A.3.b.i     | diesel oil |      | 589.131       | 589.131   | 0%         | 437.14                  | 158.71   | -64%       | 257.633.728               | 93.499.010  | 164.134.718 | -64%       |
| 1.A.3.b.ii    | gasoline   |      | 5.578         | 5.578     | 0%         | 202.80                  | 184.07   | -9%        | 1.131.209                 | 1.026.727   | 104.482     | -9%        |
| 1.A.3.b.ii    | diesel oil |      | 118.777       | 118.777   | 0%         | 480.60                  | 114.93   | -76%       | 57.083.533                | 13.690.488  | 43.433.045  | -76%       |
| 1.A.3.b.iii   | gasoline   |      | 51.716        | 51.716    | 0%         | 509.64                  | 368.06   | -29%       | 26.350.969                | 18.620.843  | 7.730.126   | -29%       |
| 1.A.3.b.iii   | diesel oil |      | 600.139       | 600.139   | 0%         | 353.06                  | 287.93   | -19%       | 211.887.531               | 124.788.469 | 87.099.062  | -41%       |
| 1.A.3.b.iv    | gasoline   |      | 18.229        | 18.229    | 0%         | 104.34                  | 175.38   | 68%        | 1.902.688                 | 3.197.038   | -1.294.351  | 68%        |
| 1.A.3.b TOTAL | 2013       |      | 2.132.683     | 2.132.683 | 0%         |                         |          | 0%         | 616.079.063               | 316.854.371 | 300.224.692 | -50%       |
| 1.A.3.b.i     | gasoline   |      | 752.526       | 752.526   | 0%         | 76.03                   | 73.09    | -4%        | 57.215.533                | 54.988.921  | 2.216.612   | -4%        |
| 1.A.3.b.i     | diesel oil |      | 626.845       | 626.845   | 0%         | 435.87                  | 159.12   | -63%       | 272.876.061               | 95.613.892  | 173.262.169 | -63%       |
| 1.A.3.b.ii    | gasoline   |      | 5.845         | 5.845     | 0%         | 190.34                  | 176.49   | -7%        | 1.112.584                 | 1.031.612   | 80.972      | -7%        |
| 1.A.3.b.ii    | diesel oil |      | 128.578       | 128.578   | 0%         | 475.56                  | 110.96   | -77%       | 61.146.575                | 14.267.237  | 46.879.338  | -77%       |
| 1.A.3.b.iii   | gasoline   |      | 49.143        | 49.143    | 0%         | 468.37                  | 339.99   | -27%       | 23.017.115                | 16.708.234  | 6.308.881   | -27%       |
| 1.A.3.b.iii   | diesel oil |      | 572.754       | 572.754   | 0%         | 314.05                  | 196.05   | -38%       | 179.874.133               | 112.285.582 | 67.588.551  | -38%       |
| 1.A.3.b.iv    | gasoline   |      | 18.673        | 18.673    | 0%         | 100.59                  | 179.24   | 78%        | 1.878.294                 | 3.345.794   | -1.467.499  | 78%        |
| 1.A.3.b TOTAL | 2014       |      | 2.153.563     | 2.153.563 | 0%         |                         |          | 0%         | 597.120.297               | 302.252.271 | 294.868.025 | -49%       |
| 1.A.3.b.i     | gasoline   |      | 715.156       | 715.156   | 0%         | 74.38                   | 71.73    | -4%        | 53.190.787                | 51.300.983  | 1.889.805   | -4%        |
| 1.A.3.b.i     | diesel oil |      | 645.555       | 645.555   | 0%         | 426.19                  | 159.80   | -63%       | 275.130.233               | 103.163.501 | 171.966.732 | -63%       |
| 1.A.3.b.ii    | gasoline   |      | 5.793         | 5.793     | 0%         | 187.12                  | 172.80   | -8%        | 1.083.927                 | 1.000.999   | 82.928      | -8%        |
| 1.A.3.b.ii    | diesel oil |      | 135.386       | 135.386   | 0%         | 489.35                  | 187.96   | -77%       | 63.605.443                | 14.607.490  | 48.997.953  | -77%       |
| 1.A.3.b.iii   | gasoline   |      | 52.287        | 52.287    | 0%         | 458.96                  | 327.99   | -29%       | 23.997.817                | 17.149.448  | 6.848.370   | -29%       |
| 1.A.3.b.iii   | diesel oil |      | 589.411       | 589.411   | 0%         | 266.69                  | 187.51   | -30%       | 157.189.675               | 110.620.703 | 46.568.973  | -30%       |
| 1.A.3.b.iv    | gasoline   |      | 18.459        | 18.459    | 0%         | 99.32                   | 189.65   | 82%        | 1.833.362                 | 3.334.472   | -1.501.090  | 82%        |
| 1.A.3.b TOTAL | 2015       |      | 2.161.376     | 2.161.376 | 0%         |                         |          | 0%         | 575.931.265               | 301.877.596 | 274.053.670 | -48%       |
| 1.A.3.b.i     | gasoline   |      | 715.272       | 715.272   | 0%         | 79.93                   | 76.65    | -4%        | 50.736.367                | 50.535.049  | 201.318     | 0%         |
| 1.A.3.b.i     | diesel oil |      | 675.119       | 675.119   | 0%         | 410.36                  | 160.76   | -61%       | 277.041.660               | 108.535.230 | 168.506.430 | -61%       |
| 1.A.3.b.ii    | gasoline   |      | 5.926         | 5.926     | 0%         | 180.27                  | 171.05   | -5%        | 1.068.292                 | 1.013.678   | 54.614      | -5%        |
| 1.A.3.b.ii    | diesel oil |      | 144.068       | 144.068   | 0%         | 456.12                  | 185.62   | -77%       | 65.712.732                | 15.216.007  | 50.496.725  | -77%       |
| 1.A.3.b.iii   | gasoline   |      | 54.157        | 54.157    | 0%         | 424.73                  | 388.24   | -7%        | 23.002.109                | 16.683.117  | 6.308.992   | -27%       |
| 1.A.3.b.iii   | diesel oil |      | 594.013       | 594.013   | 0%         | 226.31                  | 180.97   | -20%       | 134.431.699               | 107.496.262 | 26.935.437  | -20%       |
| 1.A.3.b.iv    | gasoline   |      | 18.785        | 18.785    | 0%         | 95.14                   | 181.66   | 89%        | 1.805.897                 | 3.412.476   | -1.606.579  | 89%        |
| 1.A.3.b TOTAL | 2016       |      | 2.207.339     | 2.207.339 | 0%         |                         |          | 0%         | 553.790.558               | 302.901.820 | 250.897.738 | -45%       |
| 1.A.3.b.i     | gasoline   |      | 724.571       | 724.571   | 0%         | 67.66                   | 69.88    | 3%         | 49.026.874                | 50.634.714  | -1.607.840  | 3%         |
| 1.A.3.b.i     | diesel oil |      | 696.592       | 696.592   | 0%         | 390.65                  | 161.95   | -59%       | 272.126.091               | 112.810.721 | 159.315.370 | -59%       |
| 1.A.3.b.ii    | gasoline   |      | 6.186         | 6.186     | 0%         | 171.15                  | 167.18   | -2%        | 1.058.799                 | 1.034.211   | 24.588      | -2%        |
| 1.A.3.b.ii    | diesel oil |      | 153.284       | 153.284   | 0%         | 424.66                  | 183.89   | -76%       | 65.093.930                | 15.925.216  | 49.168.714  | -76%       |
| 1.A.3.b.iii   | gasoline   |      | 53.382        | 53.382    | 0%         | 379.80                  | 286.71   | -23%       | 19.793.901                | 15.304.828  | 4.489.073   | -23%       |
| 1.A.3.b.iii   | diesel oil |      | 596.263       | 596.263   | 0%         | 195.02                  | 175.92   | -10%       | 116.671.141               | 106.246.508 | 11.424.633  | -10%       |
| 1.A.3.b.iv    | gasoline   |      | 19.160        | 19.160    | 0%         | 92.83                   | 183.39   | 98%        | 1.778.674                 | 3.513.787   | -1.735.114  | 98%        |
| 1.A.3.b TOTAL | 2017       |      | 2.251.437     | 2.251.437 | 0%         |                         |          | 0%         | 525.549.410               | 304.469.986 | 221.079.424 | -42%       |
| 1.A.3.b.i     | gasoline   |      | 699.027       | 699.027   | 0%         | 64.42                   | 68.36    | 6%         | 45.032.996                | 47.786.817  | -2.753.820  | 6%         |
| 1.A.3.b.i     | diesel oil |      | 666.074       | 666.074   | 0%         | 371.66                  | 163.30   | -56%       | 247.556.063               | 108.768.604 | 138.787.459 | -56%       |
| 1.A.3.b.ii    | gasoline   |      | 6.315         | 6.315     | 0%         | 158.22                  | 160.11   | 1%         | 999.199                   | 1.011.138   | -11.939     | 1%         |
| 1.A.3.b.ii    | diesel oil |      | 154.259       | 154.259   | 0%         | 384.71                  | 182.69   | -73%       | 59.344.525                | 15.840.310  | 43.504.215  | -73%       |
| 1.A.3.b.iii   | gasoline   |      | 51.634        | 51.634    | 0%         | 309.75                  | 263.53   | -15%       | 15.993.526                | 13.607.106  | 2.386.420   | -15%       |
| 1.A.3.b.iii   | diesel oil |      | 585.186       | 585.186   | 0%         | 171.18                  | 172.10   | 1%         | 180.173.337               | 180.710.869 | -537.532    | 1%         |
| 1.A.3.b.iv    | gasoline   |      | 18.497        | 18.497    | 0%         | 89.66                   | 184.61   | 106%       | 1.658.588                 | 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   | gasoline   |      | 52.939        | 52.939    | 0%         | 274.41                  | 247.81   | -10%       | 14.527.012                | 13.118.578  | 1.408.434   | -10%       |
| 1.A.3.b.iii   | diesel oil |      | 595.913       | 595.913   | 0%         | 153.35                  | 169.17   | 10%        | 91.380.700                | 106.809.376 | -15.428.676 | 10%        |
| 1.A.3.b.iv    | gasoline   |      | 18.750        | 18.750    | 0%         | 86.05                   | 186.83   | 117%       | 1.613.450                 | 3.502.941   | -1.889.491  | 117%       |
| 1.A.3.b TOTAL | 2019       |      | 2.202.899     | 2.202.899 | 0%         |                         |          | 0%         | 437.268.744               | 292.497.697 | 144.771.048 | -33%       |

Adjustment details for 2020

| NFR Code                               | Fuel           | Activity Data |           |            | Implied Emission Factor |          |             | NO <sub>x</sub> Emissions |              |              |            |      |
|----------------------------------------|----------------|---------------|-----------|------------|-------------------------|----------|-------------|---------------------------|--------------|--------------|------------|------|
|                                        |                | current       | adjusted  | difference | current                 | adjusted | difference  | current                   | adjusted     | adjustment   | difference |      |
|                                        |                | in [t]        | in [t]    | in [%]     | in [g/t]                | in [g/t] | in [%]      | in [kg]                   | in [kg]      | in [kg]      | in [kg]    |      |
| 1.A.3.a.i. Passenger Cars              | Gasoline       | pre-Cars      | 13,685    | 13,685     | 0%                      | 584.75   | 514.25      | -12%                      | 7,955,060    | 6,986,917    | -958,143   | -12% |
|                                        |                | Car 1         | 36,541    | 36,541     | 0%                      | 338.50   | 297.71      | -10%                      | 25,915,925   | 19,189,262   | -7,716,663 | -30% |
|                                        |                | Car 2         | 96,425    | 96,425     | 0%                      | 172.95   | 135.63      | -22%                      | 16,580,020   | 13,020,026   | -3,559,995 | -22% |
|                                        |                | Car 3         | 133,139   | 133,139    | 0%                      | 58.51    | 70.18       | 20%                       | 7,790,384    | 9,343,433    | 1,553,029  | 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    | 62%         | 2                         | 3            | 1            | 62%        |      |
|                                        | Gasoline total | 795,957       | 795,957   | 0%         | 92.55                   | 84.39    | -9%         | 77,646,642                | 67,656,586   | -9,990,056   | -13%       |      |
|                                        | 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   | 265.17      | -1%                       | 3,064,428    | 2,741,387    | -323,021   | -11% |
| Car 2                                  |                | 50,088        | 50,088    | 0%         | 406.90                  | 299.19   | -26%        | 29,372,795                | 10,974,210   | -18,398,584  | -63%       |      |
| Car 3                                  |                | 134,025       | 134,025   | 0%         | 542.54                  | 170.54   | -69%        | 72,648,173                | 23,929,276   | -48,718,897  | -67%       |      |
| Car 4                                  |                | 279,154       | 279,154   | 0%         | 304.37                  | 140.58   | -53%        | 187,299,180               | 39,243,811   | -148,055,349 | -80%       |      |
| 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%         |            |      |
| PHE total                              | 1,325,337      | 1,325,337     | 0%        | 238.12     | 155.14                  | -36%     | 364,985,938 | 152,621,367               | -212,364,570 | -58%         |            |      |
| 1.A.3.b.i. Light Duty Vehicles (LDVs)  | Gasoline       | pre-Cars      | 1,249     | 1,249      | 0%                      | 627.99   | 640.95      | 1%                        | 783,320      | 906,871      | 123,551    | 16%  |
|                                        |                | Car 1         | 367       | 367        | 0%                      | 361.95   | 297.39      | -18%                      | 368,969      | 186,620      | -182,349   | -50% |
|                                        |                | 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      | 20,672     | 24%  |
|                                        |                | Car 5         | 49        | 49         | 0%                      | 15.34    | 44.90       | 193%                      | 750          | 2,218        | 1,468      | 193% |
|                                        | Car 6          | 0             | 0         | 0%         | 0                       | 0        | 0%          | 0                         | 0            | 0            | 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   | -31% |
|                                        |                | Car 1         | 9,989     | 9,989      | 0%                      | 398.59   | 276.24      | -30%                      | 2,389,095    | 1,289,636    | -1,099,459 | -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                | 5,086,760    | -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    | -79%        | 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  | 15,351,584                | -38,691,949  | -72%         |            |      |
| LDVs Total                             | 119,775        | 119,775       | 0%        | 464.70     | 139.18                  | -70%     | 55,658,966  | 16,683,913                | -38,975,053  | -70%         |            |      |
| 1.A.3.b.ii. Heavy Duty Vehicles (HDVs) | 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   | 732.14      | -2%                       | 2,117,871    | 2,125,595    | 7,723      | 0%   |
|                                        |                | Car 2         | 10,122    | 10,122     | 0%                      | 801.96   | 643.47      | -20%                      | 8,140,119    | 6,532,213    | -1,607,906 | -20% |
|                                        |                | Car 3         | 15,090    | 15,090     | 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   | -27% |
|                                        |                | 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%   |
|                                        | Diesel Oil     | pre-Cars      | 48,044    | 48,044     | 0%                      | 623.80   | 482.55      | -23%                      | 29,931,266   | 23,183,732   | -6,747,534 | -23% |
|                                        |                | Car 1         | 10,185    | 10,185     | 0%                      | 1040.16  | 787.37      | -24%                      | 10,510,623   | 7,754,136    | -2,756,487 | -26% |
|                                        |                | Car 2         | 5,677     | 5,677      | 0%                      | 758.59   | 575.55      | -24%                      | 4,261,383    | 3,287,681    | -973,702   | -23% |
| Car 3                                  | 38,558         | 38,558        | 0%        | 817.62     | 524.79                  | -35%     | 31,525,526  | 20,234,619                | -11,290,907  | -36%         |            |      |
| Car 4                                  | 169,023        | 169,023       | 0%        | 636.28     | 274.48                  | -57%     | 161,136,182 | 59,617,271                | -101,518,911 | -63%         |            |      |
| Car 5                                  | 69,636         | 69,636        | 0%        | 368.34     | 280.62                  | -24%     | 27,183,867  | 20,166,636                | -7,017,230   | -26%         |            |      |
| Car 6                                  | 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                           | 565,741        | 565,741       | 0%        | 446.67     | 271.83                  | -39%     | 293,148,243 | 154,696,160               | -138,452,083 | -48%         |            |      |
| 1.A.3.b.iii. Two-Wheelers (MOWs)       | Gasoline       | pre-Cars      | 7,973     | 7,973      | 0%                      | 122.80   | 149.18      | 22%                       | 972,721      | 1,189,393    | 216,672    | 22%  |
|                                        |                | Car 1         | 5,231     | 5,231      | 0%                      | 123.77   | 165.74      | 34%                       | 647,479      | 887,039      | 239,560    | 34%  |
|                                        |                | Car 2         | 3,587     | 3,587      | 0%                      | 141.16   | 184.21      | 31%                       | 585,362      | 696,661      | 111,299    | 19%  |
|                                        |                | Car 3         | 2,950     | 2,950      | 0%                      | 38.11    | 184.21      | 387%                      | 116,188      | 647,032      | 432,844    | 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%   |
|                                        |                | MOWs Total    | 19,712    | 19,712     | 0%                      | 113.68   | 168.43      | 48%                       | 2,483,149    | 3,320,034    | 836,885    | 48%  |
| 1.A.3.b. Road Transport                | Total          | 2,879,688     | 2,879,688 | 0%         | 218.62                  | 168.23   | -23%        | 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 [kg]                   | in [kg]     | in [kg]      | in [%]       |      |
| 1.A.3.a.i. Passenger Cars             | Gasoline         | pre-Cars      | 13,063    | 13,063     | 0%                      | 592.96   | 534.68     | -9%                       | 7,720,235   | 6,979,435    | -740,801     | -10% |
|                                       |                  | Car 1         | 61,979    | 61,979     | 0%                      | 347.96   | 340.16     | -31%                      | 21,640,430  | 18,884,961   | -2,755,469   | -13% |
|                                       |                  | 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%                      | 61.64    | 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  | -8,314,300   | -11%         |      |
|                                       | Diesel Oil       | pre-Cars      | 1,711     | 1,711      | 0%                      | 318.13   | 264.95     | -17%                      | 511,863     | 453,197      | -58,666      | -11% |
|                                       |                  | Car 1         | 8,426     | 8,426      | 0%                      | 297.32   | 265.65     | -11%                      | 2,585,115   | 2,299,987    | -285,118     | -11% |
|                                       |                  | Car 2         | 42,514    | 42,514     | 0%                      | 407.93   | 279.27     | -32%                      | 17,384,549  | 9,321,916    | -8,062,633   | -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%                      | 182,917,881 | 30,889,755   | -152,028,126 | -83% |
|                                       |                  | 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%         |      |
|                                       | PHEV total       | 1,348,252     | 1,348,252 | 0%         | 232.52                  | 153.47   | -34%       | 313,499,642               | 152,990,590 | -160,509,052 | -51%         |      |
|                                       | Gasoline         | pre-Cars      | 1,084     | 1,084      | 0%                      | 626.75   | 640.95     | 1%                        | 682,014     | 790,373      | 108,359      | 16%  |
|                                       |                  | Car 1         | 283       | 283        | 0%                      | 818.74   | 584.47     | -29%                      | 243,289     | 86,158       | -157,130     | -65% |
|                                       |                  | Car 2         | 1,184     | 1,184      | 0%                      | 268.66   | 191.66     | -29%                      | 310,529     | 223,189      | -87,340      | -28% |
|                                       |                  | Car 3         | 783       | 783        | 0%                      | 85.97    | 35.39      | -59%                      | 67,320      | 74,782       | 7,462        | 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                   | 203%     | 1          | 2                         | 2           | 203%         |              |      |
| Gasoline total                        | 6,118            | 6,118         | 0%        | 229.35     | 186.57                  | -23%     | 1,483,081  | 1,254,776                 | -228,305    | -15%         |              |      |
| Diesel Oil                            | pre-Cars         | 3,995         | 3,995     | 0%         | 425.99                  | 386.79   | -9%        | 1,988,280                 | 1,225,682   | -762,598     | -38%         |      |
|                                       | Car 1            | 4,787         | 4,787     | 0%         | 398.71                  | 276.24   | -30%       | 1,984,260                 | 1,030,426   | -953,834     | -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%         | 493.82                  | 89.26    | -82%       | 30,029,914                | 2,081,081   | -28,048,833  | -93%         |      |
|                                       | Car 5            | 6,609         | 6,609     | 0%         | 168.10                  | 89.26    | -80%       | 2,930,190                 | 634,364     | -2,295,826   | -78%         |      |
| Car 6                                 | 0                | 0             | 0%        | 154.21     | 89.26                   | -42%     | 16         | 6                         | -6          | -62%         |              |      |
| Diesel oil total                      | 115,967          | 115,967       | 0%        | 485.55     | 126.92                  | -74%     | 55,848,558 | 15,780,142                | -40,168,416 | -74%         |              |      |
| LDVs total                            | 122,085          | 122,085       | 0%        | 464.92     | 130.51                  | -72%     | 97,247,599 | 9,932,958                 | -87,314,641 | -72%         |              |      |
| 1.A.3.b.i. Heavy Duty Vehicles (HDVs) | Diesel Oil       | pre-Cars      | 2,620     | 2,620      | 0%                      | 1062.69  | 1118.76    | 6%                        | 2,699,129   | 2,671,331    | -19,798      | -1%  |
|                                       |                  | Car 1         | 2,250     | 2,250      | 0%                      | 752.91   | 151.48     | -80%                      | 1,830,187   | 1,696,237    | -133,950     | -7%  |
|                                       |                  | Car 2         | 9,074     | 9,074      | 0%                      | 804.17   | 645.36     | -20%                      | 7,297,125   | 5,672,569    | -1,624,556   | -22% |
|                                       |                  | Car 3         | 14,687    | 14,687     | 0%                      | 633.95   | 345.89     | -45%                      | 9,425,890   | 6,880,837    | -2,545,053   | -27% |
|                                       |                  | Car 4         | 5,918     | 5,918      | 0%                      | 448.80   | 180.74     | -59%                      | 2,367,138   | 1,686,274    | -680,864     | -29% |
|                                       |                  | Car 5         | 13,266    | 13,266     | 0%                      | 336.40   | 182.62     | -46%                      | 4,589,052   | 2,446,399    | -2,142,653   | -47% |
|                                       | Car 6            | 0             | 0         | 0%         | 154.21                  | 89.26    | -42%       | 16                        | 6           | -6           | -62%         |      |
|                                       | Diesel total     | 47,365        | 47,365    | 0%         | 592.65                  | 448.99   | -24%       | 28,011,221                | 21,296,321  | -6,804,899   | -24%         |      |
|                                       | Buses total      | 8,044         | 8,044     | 0%         | 1020.67                 | 783.98   | -23%       | 8,395,423                 | 6,144,933   | -2,250,491   | -27%         |      |
|                                       | Car 6            | 4,384         | 4,384     | 0%         | 758.16                  | 574.04   | -23%       | 3,280,422                 | 2,516,377   | -772,844     | -23%         |      |
| Car 7                                 | 29,277           | 29,277        | 0%        | 817.97     | 520.51                  | -36%     | 23,947,723 | 15,233,223                | -8,714,500  | -36%         |              |      |
| Diesel Oil                            | pre-Cars         | 121,581       | 121,581   | 0%         | 636.56                  | 370.68   | -41%       | 77,215,020                | 46,312,437  | -31,898,884  | -41%         |      |
|                                       | Car 6            | 58,430        | 58,430    | 0%         | 393.25                  | 269.43   | -31%       | 22,977,714                | 15,969,865  | -6,988,849   | -31%         |      |
|                                       | Car 7            | 342,155       | 342,155   | 0%         | 278.30                  | 152.63   | -45%       | 16,549,479                | 8,079,619   | -8,469,860   | -45%         |      |
|                                       | Car 8            | 0             | 0         | 0%         | 0                       | 0        | 0%         | 0                         | 0           | 0            | 0%           |      |
|                                       | Trucks total     | 563,891       | 563,891   | 0%         | 418.38                  | 244.97   | -40%       | 231,493,271               | 126,136,342 | -105,277,929 | -40%         |      |
|                                       | pre-Cars         | 7,389         | 7,389     | 0%         | 668.98                  | 150.24   | -22%       | 668,588                   | 1,170,176   | 201,588      | 22%          |      |
| Car 6                                 | 4,985            | 4,985         | 0%        | 124.72     | 168.26                  | 35%      | 599,299    | 885,547                   | 286,248     | 35%          |              |      |
| Car 7                                 | 3,544            | 3,544         | 0%        | 137.95     | 194.58                  | 41%      | 485,552    | 689,633                   | 201,851     | 41%          |              |      |
| Car 8                                 | 3,050            | 3,050         | 0%        | 39.59      | 194.58                  | 382%     | 140,563    | 680,834                   | 540,270     | 382%         |              |      |
| Car 9                                 | 0                | 0             | 0%        | 0          | 0                       | 0%       | 0          | 0                         | 0           | 0%           |              |      |
| Car 10                                | 0                | 0             | 0%        | 0          | 0                       | 0%       | 0          | 0                         | 0           | 0%           |              |      |
| Gasoline total                        | 19,289           | 19,289        | 0%        | 119.79     | 171.64                  | 54%      | 2,137,087  | 3,295,152                 | 1,158,065   | 54%          |              |      |
| 1.A.3.b. Road Transport Total         |                  | 2,160,083     | 2,160,083 | 0%         | 306.80                  | 157.85   | -49%       | 632,365,136               | 312,625,435 | -300,740,801 | -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    | difference  |              |          |      |
|                                                     |                                        | in [t]           | in [t]    | in [%]     | in [g/t]                | in [g/t] | in [%]     | in [kg]                   | in [kg]     | in [%]      |              |          |      |
| 1.A.3.a.i. Passenger Cars                           | Gasoline                               | pre-Cars         | 11,581    | 11,581     | 0%                      | 607.72   | 635.38     | -52%                      | 7,035,041   | 6,189,785   | -845,256     | -52%     |      |
|                                                     |                                        | Car 1            | 47,487    | 47,487     | 0%                      | 348.56   | 341.62     | -31%                      | 16,571,746  | 11,426,129  | -5,145,617   | -31%     |      |
|                                                     |                                        | Car 2            | 72,781    | 72,781     | 0%                      | 194.27   | 137.82     | -25%                      | 13,487,749  | 10,035,380  | -3,452,369   | -25%     |      |
|                                                     |                                        | Car 3            | 189,443   | 189,443    | 0%                      | 63.89    | 72.62      | 14%                       | 6,927,963   | 7,875,172   | 947,209      | 14%      |      |
|                                                     |                                        | Car 4            | 489,541   | 489,541    | 0%                      | 45.39    | 45.13      | -1%                       | 18,541,881  | 18,436,736  | -105,145     | -1%      |      |
|                                                     |                                        | Car 5            | 181,961   | 181,961    | 0%                      | 18.61    | 45.13      | 142%                      | 1,897,355   | 4,681,311   | 2,783,956    | 142%     |      |
|                                                     | Car 6                                  | 282              | 282       | 0%         | 25.05                   | 45.13    | 74%        | 7,339                     | 12,736      | 5,397       | 74%          |          |      |
|                                                     | Gasoline total                         | 750,267          | 750,267   | 0%         | 85.73                   | 78.88    | -8%        | 64,379,964                | 58,577,229  | -5,802,735  | -9%          |          |      |
|                                                     | Diesel Oil                             | pre-Cars         | 1,487     | 1,487      | 0%                      | 311.98   | 284.56     | -9%                       | 463,963     | 383,872     | -80,091      | -9%      |      |
|                                                     |                                        | Car 1            | 6,660     | 6,660      | 0%                      | 297.79   | 286.44     | -4%                       | 1,980,364   | 1,771,787   | -208,577     | -11%     |      |
| Car 2                                               |                                        | 33,967           | 33,967    | 0%         | 408.82                  | 279.27   | -40%       | 13,887,432                | 7,445,646   | -6,441,787  | -40%         |          |      |
| Car 3                                               |                                        | 183,539          | 183,539   | 0%         | 564.82                  | 176.63   | -69%       | 58,389,037                | 18,434,837  | -39,954,200 | -69%         |          |      |
| 1.A.3.b.i. Heavy Duty Vehicles (LDVs)               | Gasoline                               | Car 4            | 234,943   | 234,943    | 0%                      | 398.41   | 146.46     | -62%                      | 91,724,190  | 34,488,997  | -57,235,193  | -62%     |      |
|                                                     |                                        | Car 5            | 173,112   | 173,112    | 0%                      | 434.89   | 146.46     | -66%                      | 75,284,364  | 25,353,375  | -49,930,989  | -66%     |      |
|                                                     |                                        | Car 6            | 1,557     | 1,557      | 0%                      | 259.84   | 146.46     | -44%                      | 484,664     | 220,086     | -264,578     | -44%     |      |
|                                                     |                                        | Diesel oil total | 555,245   | 555,245    | 0%                      | 455.96   | 158.66     | -64%                      | 242,962,982 | 88,096,639  | -154,866,343 | -64%     |      |
|                                                     |                                        | FCs Total        | 1,305,267 | 1,305,267  | 0%                      | 234.67   | 152.29     | -35%                      | 386,442,896 | 146,673,867 | -239,769,029 | -35%     |      |
|                                                     |                                        | Diesel Oil       | pre-Cars  | 962        | 962                     | 0%       | 632.38     | 645.95                    | 2%          | 607,779     | 621,146      | 13,417   | 2%   |
|                                                     | Car 1                                  |                  | 232       | 232        | 0%                      | 803.24   | 183.22     | -65%                      | 189,985     | 70,295      | -119,690     | -65%     |      |
|                                                     | Car 2                                  |                  | 989       | 989        | 0%                      | 271.16   | 195.74     | -28%                      | 268,134     | 133,538     | -134,596     | -28%     |      |
|                                                     | Car 3                                  |                  | 835       | 835        | 0%                      | 89.38    | 98.33      | 10%                       | 74,623      | 82,082      | 7,459        | 10%      |      |
|                                                     | 1.A.3.b.ii. Heavy Duty Vehicles (MDVs) | Gasoline         | Car 4     | 2,030      | 2,030                   | 0%       | 38.49      | 47.58                     | 24%         | 78,155      | 96,691       | 18,536   | 24%  |
| Car 5                                               |                                        |                  | 610       | 610        | 0%                      | 16.36    | 47.58      | 182%                      | 9,941       | 29,011      | 19,069       | 182%     |      |
| Car 6                                               |                                        |                  | 0         | 0          | 0%                      | 15.37    | 47.58      | 210%                      | 2           | 6           | 4            | 210%     |      |
| Gasoline total                                      |                                        |                  | 5,657     | 5,657      | 0%                      | 218.93   | 183.15     | -16%                      | 1,238,520   | 1,092,662   | -145,858     | -12%     |      |
| Diesel Oil                                          |                                        |                  | pre-Cars  | 3,281      | 3,281                   | 0%       | 424.46     | 386.79                    | -9%         | 1,368,754   | 1,262,093    | -106,661 | -8%  |
|                                                     |                                        |                  | Car 1     | 3,666      | 3,666                   | 0%       | 398.34     | 276.24                    | -30%        | 1,445,980   | 1,017,634    | -428,346 | -30% |
|                                                     |                                        | Car 2            | 8,479     | 8,479      | 0%                      | 336.40   | 133.39     | -40%                      | 2,852,325   | 1,639,772   | -1,212,553   | -43%     |      |
|                                                     |                                        | Car 3            | 23,785    | 23,785     | 0%                      | 558.53   | 150.44     | -73%                      | 13,050,281  | 3,565,082   | -9,485,199   | -73%     |      |
| Diesel Oil                                          |                                        | Car 4            | 59,485    | 59,485     | 0%                      | 494.22   | 89.85      | -82%                      | 29,369,870  | 5,337,395   | -24,032,475  | -82%     |      |
|                                                     |                                        | Car 5            | 15,964    | 15,964     | 0%                      | 442.70   | 89.85      | -80%                      | 7,040,461   | 1,420,906   | -5,619,555   | -80%     |      |
|                                                     | Car 6                                  | 1                | 1         | 0%         | 15.14                   | 89.85    | -61%       | 122                       | 72          | -50         | -41%         |          |      |
|                                                     | Diesel oil total                       | 114,350          | 114,350   | 0%         | 485.91                  | 120.17   | -75%       | 55,186,382                | 13,741,354  | -41,445,028 | -75%         |          |      |
| 1.A.3.b.iii. Heavy Duty Vehicles (Trucks & Lorries) | Gasoline                               | LDVs Total       | 128,008   | 128,008    | 0%                      | 485.91   | 120.17     | -75%                      | 56,344,963  | 14,834,656  | -41,510,307  | -74%     |      |
|                                                     |                                        | pre-Cars         | 1,326     | 1,326      | 0%                      | 1093.46  | 1119.45    | 4%                        | 1,410,640   | 1,352,283   | -58,357      | -4%      |      |
|                                                     |                                        | Car 1            | 1,245     | 1,245      | 0%                      | 727.34   | 731.15     | 1%                        | 1,017,476   | 1,017,184   | -292         | -0%      |      |
|                                                     |                                        | Car 2            | 7,780     | 7,780      | 0%                      | 703.46   | 643.34     | -9%                       | 5,085,091   | 4,597,478   | -487,613     | -9%      |      |
|                                                     |                                        | Car 3            | 14,483    | 14,483     | 0%                      | 629.94   | 457.61     | -27%                      | 9,073,137   | 6,689,744   | -2,383,393   | -27%     |      |
|                                                     |                                        | Car 4            | 5,331     | 5,331      | 0%                      | 468.10   | 361.85     | -23%                      | 2,642,179   | 1,675,777   | -966,402     | -23%     |      |
|                                                     | Diesel Oil                             | Car 5            | 20,752    | 20,752     | 0%                      | 347.84   | 182.99     | -47%                      | 7,219,563   | 3,787,467   | -3,432,096   | -47%     |      |
|                                                     |                                        | Car 6            | 73        | 73         | 0%                      | 64.52    | 182.99     | 236%                      | 3,961       | 13,295      | 9,334        | 236%     |      |
|                                                     |                                        | Diesel Total     | 50,962    | 50,962     | 0%                      | 533.22   | 384.33     | -28%                      | 27,141,913  | 19,965,288  | -7,176,625   | -28%     |      |
|                                                     |                                        | Trucks Total     | 589,585   | 589,585    | 0%                      | 385.33   | 224.69     | -41%                      | 224,829,180 | 132,064,753 | -92,764,427  | -41%     |      |
| 1.A.3.b.iv. Two-Wheelers (Motorbikes)               | Gasoline                               | pre-Cars         | 6,780     | 6,780      | 0%                      | 122.76   | 151.03     | 23%                       | 822,530     | 1,011,520   | 188,991      | 23%      |      |
|                                                     |                                        | Car 1            | 4,386     | 4,386      | 0%                      | 124.61   | 171.39     | 38%                       | 536,615     | 738,050     | 201,435      | 38%      |      |
|                                                     |                                        | Car 2            | 3,287     | 3,287      | 0%                      | 136.22   | 184.55     | 45%                       | 445,087     | 636,853     | 191,766      | 43%      |      |
|                                                     |                                        | Car 3            | 3,984     | 3,984      | 0%                      | 38.66    | 184.55     | 382%                      | 18,386      | 778,616     | 760,230      | 382%     |      |
|                                                     |                                        | Car 4            | 0         | 0          | 0%                      | 0        | 0          | 0%                        | 0           | 0           | 0            | 0%       |      |
|                                                     |                                        | Car 5            | 0         | 0          | 0%                      | 0        | 0          | 0%                        | 0           | 0           | 0            | 0%       |      |
|                                                     | MDVs Total                             | 18,268           | 18,268    | 0%         | 107.43                  | 175.28   | 61%        | 1,982,548                 | 3,165,438   | 1,182,891   | 61%          |          |      |
|                                                     | 1.A.3.b. Road Transport                | Total            | 2,084,964 | 2,084,964  | 0%                      | 295.79   | 151.71     | -48%                      | 616,721,438 | 396,381,343 | -220,340,094 | -48%     |      |

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     | difference   |             |      |
|                                            |                | in [t]        | in [t]    | in [%]     | in [g/t]                | in [g/t] | in [%]      | in [kg]                   | in [kg]      | in [%]       |             |      |
| 1.A.3.a.i. Passenger Cars                  | Gasoline       | pre-Cars      | 115,880   | 115,880    | 0%                      | 618.27   | 649.35      | -52%                      | 7,011,641    | 5,967,452    | -1,044,189  | -52% |
|                                            |                | Car 1         | 37,743    | 37,743     | 0%                      | 353.78   | 341.68      | -32%                      | 13,362,966   | 9,129,436    | -4,233,530  | -32% |
|                                            |                | Car 2         | 62,680    | 62,680     | 0%                      | 188.93   | 139.33      | -27%                      | 11,889,922   | 8,722,244    | -3,167,678  | -27% |
|                                            |                | Car 3         | 97,782    | 97,782     | 0%                      | 66.38    | 73.19       | 10%                       | 6,481,618    | 7,156,920    | 675,302     | 10%  |
|                                            |                | Car 4         | 397,911   | 397,911    | 0%                      | 47.22    | 46.52       | -1%                       | 18,790,345   | 18,589,937   | -200,407    | -1%  |
|                                            |                | Car 5         | 138,063   | 138,063    | 0%                      | 18.60    | 46.52       | 150%                      | 2,583,150    | 6,439,691    | 3,856,541   | 150% |
|                                            | Car 6          | 2,714         | 2,714     | 0%         | 25.99                   | 46.52    | 79%         | 70,526                    | 126,237      | 55,711       | 79%         |      |
|                                            | Gasoline total | 1,613,116     | 1,613,116 | 0%         | 88.35                   | 74.85    | -16%        | 68,190,687                | 56,671,737   | -11,518,950  | -17%        |      |
|                                            | Diesel Oil     | pre-Cars      | 1,389     | 1,389      | 0%                      | 312.74   | 284.56      | -9%                       | 463,963      | 383,872      | -80,091     | -9%  |
|                                            |                | Car 1         | 6,605     | 6,605      | 0%                      | 298.42   | 286.79      | -4%                       | 1,970,472    | 1,640,688    | -329,784    | -17% |
|                                            |                | Car 2         | 28,437    | 28,437     | 0%                      | 408.84   | 279.91      | -40%                      | 11,563,522   | 6,253,531    | -5,309,991  | -40% |
|                                            |                | Car 3         | 182,795   | 182,795    | 0%                      | 574.33   | 176.67      | -69%                      | 53,284,956   | 16,579,373   | -36,705,583 | -69% |
|                                            |                | Car 4         | 222,583   | 222,583    | 0%                      | 393.55   | 149.27      | -62%                      | 87,588,471   | 33,225,566   | -54,362,905 | -62% |
|                                            |                | Car 5         | 233,786   | 233,786    | 0%                      | 435.42   | 149.27      | -66%                      | 101,787,275  | 34,884,788   | -66,902,487 | -66% |
|                                            | Car 6          | 4,536         | 4,536     | 0%         | 259.53                  | 149.27   | -42%        | 1,177,151                 | 677,045      | -500,106     | -42%        |      |
| Diesel oil total                           | 589,131        | 589,131       | 0%        | 437.14     | 158.71                  | -64%     | 257,533,128 | 83,899,619                | -173,633,509 | -64%         |             |      |
| FCs Total                                  | 1,338,247      | 1,338,247     | 0%        | 237.49     | 151.77                  | -35%     | 317,723,735 | 140,571,356               | -177,152,379 | -35%         |             |      |
| 1.A.3.b.i. Light Duty Vehicles (LDVs)      | Gasoline       | pre-Cars      | 981       | 981        | 0%                      | 633.81   | 645.95      | 2%                        | 608,320      | 621,146      | 12,826      | 2%   |
|                                            |                | Car 1         | 194       | 194        | 0%                      | 803.50   | 183.22      | -65%                      | 187,281      | 70,295       | -116,986    | -65% |
|                                            |                | Car 2         | 836       | 836        | 0%                      | 274.42   | 191.18      | -21%                      | 229,520      | 168,295      | -61,225     | -21% |
|                                            |                | Car 3         | 784       | 784        | 0%                      | 92.66    | 111.73      | 19%                       | 72,691       | 79,780       | 7,089       | 10%  |
|                                            |                | Car 4         | 1,889     | 1,889      | 0%                      | 40.70    | 48.89       | 20%                       | 77,284       | 92,833       | 15,549      | 20%  |
|                                            |                | Car 5         | 566       | 566        | 0%                      | 16.67    | 48.89       | 193%                      | 16,187       | 47,248       | 31,061      | 193% |
|                                            | Car 6          | 1             | 1         | 0%         | 17.66                   | 48.89    | 170%        | 26                        | 72           | 46           | 170%        |      |
|                                            | Gasoline total | 5,578         | 5,578     | 0%         | 260.80                  | 184.67   | -30%        | 1,137,299                 | 1,026,727    | -110,572     | -10%        |      |
|                                            | Diesel Oil     | pre-Cars      | 2,154     | 2,154      | 0%                      | 424.37   | 376.79      | -10%                      | 1,168,757    | 944,928      | -223,829    | -20% |
|                                            |                | Car 1         | 2,545     | 2,545      | 0%                      | 398.35   | 285.25      | -28%                      | 1,166,782    | 834,596      | -332,186    | -29% |
|                                            |                | Car 2         | 6,982     | 6,982      | 0%                      | 497.72   | 133.39      | -42%                      | 2,340,147    | 1,339,074    | -999,073    | -42% |
|                                            |                | Car 3         | 20,421    | 20,421     | 0%                      | 558.52   | 150.38      | -73%                      | 11,437,995   | 3,070,913    | -8,367,082  | -73% |
| Car 4                                      |                | 55,887        | 55,887    | 0%         | 497.72                  | 90.45    | -82%        | 27,775,440                | 5,040,416    | -22,735,024  | -82%        |      |
| Car 5                                      |                | 29,024        | 29,024    | 0%         | 441.97                  | 90.45    | -80%        | 13,181,325                | 2,687,964    | -10,493,361  | -80%        |      |
| Car 6                                      | 41             | 41            | 0%        | 15.126     | 90.45                   | -80%     | 6,160       | 2,688                     | -3,478       | -60%         |             |      |
| Diesel oil total                           | 118,777        | 118,777       | 0%        | 488.66     | 124.67                  | -75%     | 57,083,513  | 13,650,488                | -43,433,025  | -76%         |             |      |
| LDVs Total                                 | 124,554        | 124,554       | 0%        | 488.14     | 124.67                  | -75%     | 58,214,142  | 14,677,215                | -43,536,927  | -75%         |             |      |
| 1.A.3.b.ii. Heavy Duty Vehicles (HDVs)     | Diesel Oil     | pre-Cars      | 1,172     | 1,172      | 0%                      | 1096.68  | 1119.45     | 4%                        | 1,249,029    | 1,194,143    | -54,886     | -4%  |
|                                            |                | Car 1         | 1,054     | 1,054      | 0%                      | 727.68   | 730.99      | 3%                        | 766,620      | 731,181      | -35,439     | -3%  |
|                                            |                | Car 2         | 6,884     | 6,884      | 0%                      | 704.91   | 643.48      | -9%                       | 5,234,981    | 4,770,721    | -464,260    | -9%  |
|                                            |                | Car 3         | 19,117    | 19,117     | 0%                      | 626.43   | 580.86      | -7%                       | 14,582,580   | 13,400,980   | -1,181,599  | -8%  |
|                                            |                | Car 4         | 6,946     | 6,946      | 0%                      | 868.55   | 812.70      | -6%                       | 2,279,061    | 2,092,374    | -186,686    | -8%  |
|                                            |                | Car 5         | 24,096    | 24,096     | 0%                      | 358.80   | 183.44      | -49%                      | 8,435,643    | 4,420,134    | -4,015,509  | -49% |
|                                            | Car 6          | 537           | 537       | 0%         | 44.76                   | 183.44   | 310%        | 26,047                    | 96,672       | 70,625       | 310%        |      |
|                                            | Diesel total   | 51,776        | 51,776    | 0%         | 509.54                  | 360.06   | -29%        | 26,590,969                | 19,620,843   | -7,970,126   | -29%        |      |
|                                            | Gasoline       | pre-Cars      | 5,083     | 5,083      | 0%                      | 120.52   | 737.35      | -29%                      | 6,972,190    | 4,322,888    | -2,649,302  | -29% |
|                                            |                | Car 1         | 2,985     | 2,985      | 0%                      | 743.27   | 587.27      | -21%                      | 2,170,945    | 1,650,969    | -519,976    | -24% |
|                                            |                | Car 2         | 18,444    | 18,444     | 0%                      | 818.17   | 533.47      | -34%                      | 15,089,981   | 9,489,975    | -5,600,006  | -34% |
|                                            |                | Car 3         | 75,130    | 75,130     | 0%                      | 633.53   | 367.33      | -42%                      | 47,581,440   | 27,787,590   | -19,793,850 | -42% |
| Car 4                                      |                | 42,781        | 42,781    | 0%         | 366.90                  | 287.37   | -22%        | 16,936,887                | 12,280,770   | -4,656,117   | -22%        |      |
| Car 5                                      |                | 236,998       | 236,998   | 0%         | 361.70                  | 121.65   | -66%        | 123,145,324               | 46,776,746   | -76,368,578  | -66%        |      |
| Car 6                                      | 19,020         | 19,020        | 0%        | 63.87      | 152.65                  | 239%     | 913,082     | 2,750,630                 | 1,837,548    | 239%         |             |      |
| Gasoline total                             | 680,739        | 680,739       | 0%        | 93.96      | 287.93                  | -68%     | 211,887,331 | 124,180,489               | -87,696,842  | -68%         |             |      |
| FCs Total                                  | 6,362          | 6,362         | 0%        | 123.57     | 151.79                  | 23%      | 181,736     | 964,179                   | 152,443      | 23%          |             |      |
| 1.A.3.b.iii. Motorized Two-Wheelers (M2Ws) | Gasoline       | Car 1         | 4,013     | 4,013      | 0%                      | 125.11   | 175.15      | 40%                       | 582,073      | 694,880      | 112,807     | 39%  |
|                                            |                | Car 2         | 3,382     | 3,382      | 0%                      | 132.24   | 195.68      | 48%                       | 435,668      | 645,804      | 209,136     | 48%  |
|                                            |                | Car 3         | 4,682     | 4,682      | 0%                      | 39.81    | 195.68      | 381%                      | 181,610      | 882,175      | 710,565     | 381% |
|                                            |                | Car 4         | 0         | 0          | 0%                      | 0        | 0           | 0%                        | 0            | 0            | 0           | 0%   |
| M2Ws Total                                 | 18,229         | 18,229        | 0%        | 164.34     | 175.38                  | 6%       | 1,962,685   | 2,581,678                 | 1,294,951    | 6%           |             |      |
| 1.A.3.b. Road Transport Total              |                | 2,132,083     | 2,132,083 | 0%         | 208.88                  | 145.35   | -30%        | 616,079,063               | 390,854,331  | -225,224,732 | -37%        |      |

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 [kg]                   | in [kg]     | in [kg]      | in [kg]      |        |
| 1.A.3.a.i. - Passenger Cars                                 | Gasoline                                 | pre-Cars         | 11,647    | 11,647     | 0%                      | 812.37   | 844.11     | -11%                      | 7,132,688   | 6,327,484    | -795,844     | -11%   |
|                                                             |                                          | Car 1            | 30,667    | 30,667     | 0%                      | 368.77   | 343.93     | -32%                      | 11,082,246  | 7,480,541    | -3,621,706   | -32%   |
|                                                             |                                          | Car 2            | 53,486    | 53,486     | 0%                      | 198.58   | 140.31     | -29%                      | 10,514,477  | 7,584,432    | -3,018,844   | -29%   |
|                                                             |                                          | Car 3            | 87,374    | 87,374     | 0%                      | 65.31    | 73.93      | 7%                        | 6,955,585   | 6,459,757    | -494,218     | 7%     |
|                                                             |                                          | Car 4            | 387,759   | 387,759    | 0%                      | 45.16    | 47.80      | 3%                        | 19,093,585  | 19,536,099   | 523,557      | 3%     |
|                                                             |                                          | Car 5            | 171,270   | 171,270    | 0%                      | 18.59    | 47.80      | 151%                      | 3,183,252   | 8,187,581    | 5,004,299    | 151%   |
|                                                             | Car 6                                    | 10,315           | 10,315    | 0%         | 25.97                   | 47.80    | 84%        | 267,855                   | 433,096     | 225,248      | 84%          |        |
|                                                             | Gasoline total                           | 752,526          | 752,526   | 0%         | 36.80                   | 73.89    | 4%         | 37,215,533                | 34,598,921  | -2,616,612   | -4%          |        |
|                                                             | Diesel Oil                               | pre-Cars         | 1,341     | 1,341      | 0%                      | 311.73   | 284.66     | -5%                       | 417,967     | 364,246      | -53,722      | -5%    |
|                                                             |                                          | Car 1            | 4,892     | 4,892      | 0%                      | 298.92   | 267.28     | -11%                      | 1,482,264   | 1,387,643    | -94,621      | -11%   |
| Car 2                                                       |                                          | 23,934           | 23,934    | 0%         | 408.71                  | 320.45   | -40%       | 9,734,484                 | 5,276,480   | -4,458,004   | -40%         |        |
| Car 3                                                       |                                          | 82,749           | 82,749    | 0%         | 585.53                  | 176.81   | -49%       | 48,451,830                | 14,796,245  | -33,655,585  | -49%         |        |
| 1.A.3.b.i. - Light Duty Vehicles (LDVs)                     | Gasoline                                 | 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   | -81,343,096  | -65%   |
|                                                             |                                          | Car 6            | 16,081    | 16,081     | 0%                      | 259.34   | 151.77     | -41%                      | 4,170,580   | 2,440,686    | -1,729,814   | -41%   |
|                                                             |                                          | Diesel oil total | 626,045   | 626,045    | 0%                      | 415.87   | 159.12     | -62%                      | 272,876,061 | 99,613,892   | -173,262,169 | -62%   |
|                                                             |                                          | Flx Total        | 1,338,571 | 1,338,571  | 0%                      | 298.44   | 152.15     | -53%                      | 338,091,594 | 154,612,813  | -175,478,781 | -53%   |
|                                                             |                                          | Diesel Oil       | pre-Cars  | 986        | 986                     | 0%       | 632.14     | 645.95                    | 2%          | 160,583      | 176,124      | 15,541 |
|                                                             | Car 1                                    |                  | 173       | 173        | 0%                      | 968.27   | 989.98     | 64%                       | 150,074     | 53,575       | -96,499      | -64%   |
|                                                             | Car 2                                    |                  | 748       | 748        | 0%                      | 204.73   | 287.11     | 21%                       | 212,888     | 154,839      | -58,029      | -27%   |
|                                                             | Car 3                                    |                  | 771       | 771        | 0%                      | 58.62    | 185.21     | 7%                        | 75,982      | 81,070       | 5,078        | 7%     |
|                                                             | 1.A.3.b.ii. - Heavy Duty Vehicles (HDVs) | Diesel Oil       | Car 4     | 1,087      | 1,087                   | 0%       | 43.47      | 50.15                     | 15%         | 81,139       | 83,618       | 2,479  |
| Car 5                                                       |                                          |                  | 1,374     | 1,374      | 0%                      | 17.11    | 50.15      | 193%                      | 23,517      | 68,918       | 45,401       | 193%   |
| Car 6                                                       |                                          |                  | 17        | 17         | 0%                      | 18.06    | 50.15      | 179%                      | 212         | 870          | 657          | 179%   |
| Gasoline total                                              |                                          |                  | 5,845     | 5,845      | 0%                      | 198.34   | 176.49     | -2%                       | 1,112,584   | 1,031,852    | -80,732      | -2%    |
| pre-Cars                                                    |                                          |                  | 2,537     | 2,537      | 0%                      | 428.16   | 386.79     | -21%                      | 1,985,919   | 776,259      | -1,209,659   | -21%   |
| Car 1                                                       |                                          |                  | 2,589     | 2,589      | 0%                      | 393.82   | 276.25     | -40%                      | 987,136     | 539,898      | -447,328     | -40%   |
| Diesel Oil                                                  |                                          | Car 2            | 6,087     | 6,087      | 0%                      | 338.91   | 133.25     | -42%                      | 1,385,995   | 1,180,889    | -205,126     | -42%   |
|                                                             |                                          | Car 3            | 18,220    | 18,220     | 0%                      | 571.75   | 150.58     | -24%                      | 10,417,076  | 2,742,056    | -7,675,020   | -24%   |
|                                                             |                                          | Car 4            | 52,361    | 52,361     | 0%                      | 498.70   | 91.69      | -42%                      | 26,164,486  | 4,703,746    | -21,460,740  | -42%   |
|                                                             |                                          | Car 5            | 46,749    | 46,749     | 0%                      | 438.64   | 91.69      | -79%                      | 20,696,234  | 4,258,626    | -16,437,608  | -79%   |
| Car 6                                                       | 187                                      | 187              | 0%        | 151.18     | 91.69                   | -40%     | 29,829     | 17,974                    | -11,855     | -40%         |              |        |
| Diesel oil total                                            | 128,528                                  | 128,528          | 0%        | 415.56     | 170.94                  | -77%     | 61,146,525 | 14,267,237                | -46,879,318 | -77%         |              |        |
| LDVs total                                                  | 134,423                                  | 134,423          | 0%        | 463.16     | 153.81                  | -75%     | 62,259,160 | 15,298,849                | -46,960,311 | -75%         |              |        |
| 1.A.3.b.iii. - Heavy Duty Vehicles (HDVs) - Buses           | Diesel Oil                               | 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   | 170.99     | 2%                        | 599,232     | 628,359      | 18,127       | 2%     |
|                                                             |                                          | Car 2            | 5,586     | 5,586      | 0%                      | 704.30   | 643.67     | -50%                      | 4,284,320   | 3,683,441    | -598,807     | -50%   |
|                                                             |                                          | Car 3            | 11,221    | 11,221     | 0%                      | 621.20   | 458.38     | -27%                      | 7,082,740   | 5,143,628    | -1,939,228   | -27%   |
|                                                             |                                          | Car 4            | 4,270     | 4,270      | 0%                      | 461.10   | 361.79     | -24%                      | 1,972,610   | 1,584,978    | -387,632     | -24%   |
|                                                             |                                          | Car 5            | 22,042    | 22,042     | 0%                      | 368.55   | 183.99     | -40%                      | 7,726,921   | 4,065,632    | -3,661,309   | -40%   |
|                                                             |                                          | Car 6            | 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     | -27%                      | 23,017,115  | 16,788,234   | -6,208,881   | -27%   |
|                                                             | Gasoline                                 | 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   | 581.41     | -22%                      | 1,800,085   | 1,237,759    | -562,326     | -22%   |
| Car 2                                                       |                                          | 13,623           | 13,623    | 0%         | 817.90                  | 510.38   | -30%       | 11,445,865                | 6,565,738   | -4,880,127   | -30%         |        |
| Car 3                                                       |                                          | 54,685           | 54,685    | 0%         | 632.52                  | 384.41   | -42%       | 36,589,677                | 19,927,835  | -16,661,841  | -42%         |        |
| 1.A.3.b.iv. - Heavy Duty Vehicles (HDVs) - Trucks & Lorries | Diesel Oil                               | 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   | 153.65     | -46%                      | 110,112,782 | 59,688,643   | -50,424,149  | -46%   |
|                                                             |                                          | Car 6            | 34,214    | 34,214     | 0%                      | 63.96    | 153.65     | 189%                      | 3,937,089   | 11,368,582   | 7,421,413    | 189%   |
|                                                             |                                          | Trucks Total     | 572,154   | 572,154    | 0%                      | 314.85   | 196.65     | -38%                      | 179,874,133 | 112,285,562  | -67,588,571  | -38%   |
|                                                             |                                          | pre-Cars         | 6,185     | 6,185      | 0%                      | 122.85   | 158.64     | 29%                       | 795,185     | 974,388      | 218,182      | 29%    |
|                                                             |                                          | Car 1            | 3,037     | 3,037      | 0%                      | 134.71   | 174.84     | 40%                       | 478,514     | 670,859      | 192,346      | 40%    |
|                                                             | Gasoline                                 | Car 2            | 3,365     | 3,365      | 0%                      | 128.94   | 186.25     | 52%                       | 433,874     | 680,370      | 246,504      | 52%    |
|                                                             |                                          | Car 3            | 5,385     | 5,385      | 0%                      | 38.53    | 186.25     | 380%                      | 299,722     | 1,041,189    | 821,467      | 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%     |
| MWVs total                                                  | 18,673                                   | 18,673           | 0%        | 108.59     | 179.24                  | 78%      | 1,878,294  | 3,386,734                 | 1,488,489   | 78%          |              |        |
| 1.A.3.b. - Road Transport                                   | Total                                    | 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 [kg]                   | in [kg]     | in [kg]      | in [%]       |          |      |
| 1.A.3.a.i. - Passenger Cars                         | Gasoline                                 | pre-Cars         | 11,380    | 11,380     | 0%                      | 823.37   | 844.11     | -14%                      | 7,264,112   | 6,191,942    | -1,072,169   | -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    | -2,819,648   | -32%     |      |
|                                                     |                                          | Car 3            | 72,871    | 72,871     | 0%                      | 73.86    | 74.74      | 1%                        | 5,381,351   | 5,448,237    | 64,887       | 1%       |      |
|                                                     |                                          | Car 4            | 363,474   | 363,474    | 0%                      | 52.36    | 49.62      | -5%                       | 18,485,637  | 17,326,221   | -1,159,416   | -6%      |      |
|                                                     |                                          | Car 5            | 180,783   | 180,783    | 0%                      | 19.11    | 49.62      | 151%                      | 3,454,481   | 8,081,456    | 4,626,975    | 151%     |      |
|                                                     | Car 6                                    | 29,612           | 29,612    | 0%         | 25.70                   | 49.62    | 84%        | 790,781                   | 1,451,433   | 659,752      | 84%          |          |      |
|                                                     | Gasoline total                           | 715,156          | 715,156   | 0%         | 74.38                   | 71.73    | -4%        | 53,196,187                | 51,380,983  | -1,809,895   | -4%          |          |      |
|                                                     | Diesel Oil                               | pre-Cars         | 1,382     | 1,382      | 0%                      | 319.30   | 284.66     | -5%                       | 367,913     | 339,733      | -28,180      | -5%      |      |
|                                                     |                                          | Car 1            | 4,279     | 4,279      | 0%                      | 298.14   | 267.84     | -50%                      | 1,261,930   | 1,129,989    | -132,021     | -10%     |      |
| Car 2                                               |                                          | 19,689           | 19,689    | 0%         | 407.80                  | 320.38   | -40%       | 8,913,587                 | 4,338,719   | -4,574,868   | -40%         |          |      |
| Car 3                                               |                                          | 71,044           | 71,044    | 0%         | 595.91                  | 179.64   | -70%       | 42,271,648                | 12,719,962  | -29,551,685  | -70%         |          |      |
| 1.A.3.b.i. - Heavy Duty Vehicles (LDVs)             | Gasoline                                 | Car 4            | 182,410   | 182,410    | 0%                      | 401.42   | 154.67     | -62%                      | 77,237,655  | 29,644,450   | -47,593,206  | -62%     |      |
|                                                     |                                          | Car 5            | 364,346   | 364,346    | 0%                      | 434.67   | 154.67     | -65%                      | 132,290,433 | 46,090,424   | -86,400,009  | -65%     |      |
|                                                     |                                          | Car 6            | 62,576    | 62,576     | 0%                      | 259.76   | 154.67     | -41%                      | 13,657,082  | 6,180,384    | -7,476,698   | -41%     |      |
|                                                     |                                          | Diesel oil total | 645,565   | 645,565    | 0%                      | 426.19   | 159.88     | -63%                      | 275,138,233 | 183,163,591  | -91,974,732  | -63%     |      |
|                                                     |                                          | Flx Total        | 1,360,721 | 1,360,721  | 0%                      | 245.48   | 113.52     | -53%                      | 538,334,420 | 154,444,484  | -383,889,936 | -53%     |      |
|                                                     |                                          | Diesel Oil       | pre-Cars  | 679        | 679                     | 0%       | 664.37     | 645.95                    | 1%          | 575,361      | 581,977      | 6,616    | 1%   |
|                                                     | Car 1                                    |                  | 150       | 150        | 0%                      | 895.63   | 311.93     | -65%                      | 134,523     | 46,851       | -87,672      | -65%     |      |
|                                                     | Car 2                                    |                  | 629       | 629        | 0%                      | 298.27   | 212.94     | -29%                      | 187,533     | 133,879      | -53,654      | -29%     |      |
|                                                     | Car 3                                    |                  | 781       | 781        | 0%                      | 105.50   | 186.62     | 3%                        | 73,969      | 76,155       | 2,186        | 3%       |      |
|                                                     | 1.A.3.b.ii. - Heavy Duty Vehicles (LDVs) | Gasoline         | Car 4     | 1,720      | 1,720                   | 0%       | 47.06      | 51.30                     | 9%          | 80,950       | 80,240       | -710     | 9%   |
| Car 5                                               |                                          |                  | 1,620     | 1,620      | 0%                      | 18.41    | 51.30      | 179%                      | 29,912      | 83,086       | 53,174       | 179%     |      |
| Car 6                                               |                                          |                  | 94        | 94         | 0%                      | 18.71    | 51.30      | 174%                      | 1,752       | 4,884        | 3,132        | 174%     |      |
| Gasoline total                                      |                                          |                  | 5,793     | 5,793      | 0%                      | 187.52   | 172.88     | -8%                       | 1,083,507   | 1,080,999    | -2,508       | -8%      |      |
| Diesel Oil                                          |                                          |                  | pre-Cars  | 2,323      | 2,323                   | 0%       | 418.91     | 386.79                    | -26%        | 986,185      | 712,531      | -273,654 | -26% |
|                                                     |                                          |                  | Car 1     | 2,186      | 2,186                   | 0%       | 391.47     | 276.25                    | -40%        | 924,270      | 453,227      | -471,043 | -40% |
|                                                     |                                          | Car 2            | 5,025     | 5,025      | 0%                      | 324.91   | 133.25     | -40%                      | 1,632,296   | 971,296      | -660,928     | -40%     |      |
|                                                     |                                          | Car 3            | 15,781    | 15,781     | 0%                      | 588.35   | 150.67     | -24%                      | 9,112,414   | 2,385,713    | -6,726,701   | -24%     |      |
| Diesel Oil                                          |                                          | Car 4            | 47,480    | 47,480     | 0%                      | 501.73   | 31.74      | -92%                      | 23,732,396  | 3,486,298    | -19,246,098  | -92%     |      |
|                                                     |                                          | Car 5            | 62,116    | 62,116     | 0%                      | 436.13   | 31.74      | -79%                      | 27,090,216  | 5,680,295    | -21,409,920  | -79%     |      |
|                                                     | Car 6                                    | 635              | 635       | 0%         | 154.91                  | 31.74    | -40%       | 87,758                    | 18,230      | -69,528      | -40%         |          |      |
|                                                     | Diesel oil total                         | 135,586          | 135,586   | 0%         | 406.35                  | 187.96   | -77%       | 63,565,843                | 16,681,490  | -46,884,353  | -77%         |          |      |
| LDVs Total                                          | 147,098                                  | 147,098          | 0%        | 476.70     | 170.62                  | -76%     | 64,989,320 | 15,688,490                | -49,300,830 | -76%         |              |          |      |
| 1.A.3.b.iii. - Heavy Duty Vehicle Fleets            | Diesel Oil                               | pre-Cars         | 979       | 979        | 0%                      | 1070.34  | 1019.23    | -29%                      | 1,048,312   | 990,256      | -58,056      | -29%     |      |
|                                                     |                                          | Car 1            | 747       | 747        | 0%                      | 728.26   | 151.91     | -3%                       | 545,471     | 981,636      | 436,165      | 3%       |      |
|                                                     |                                          | Car 2            | 5,211     | 5,211      | 0%                      | 767.43   | 644.46     | -40%                      | 4,163,687   | 3,359,634    | -804,053     | -40%     |      |
|                                                     |                                          | Car 3            | 11,282    | 11,282     | 0%                      | 633.90   | 458.07     | -28%                      | 7,141,732   | 5,174,989    | -1,966,822   | -28%     |      |
|                                                     |                                          | Car 4            | 4,586     | 4,586      | 0%                      | 468.70   | 351.99     | -25%                      | 2,154,066   | 1,614,177    | -539,829     | -25%     |      |
|                                                     |                                          | Car 5            | 34,267    | 34,267     | 0%                      | 368.77   | 184.59     | -49%                      | 8,727,060   | 4,277,641    | -4,449,427   | -49%     |      |
|                                                     | Car 6                                    | 5,294            | 5,294     | 0%         | 63.13                   | 184.59   | 291%       | 277,542                   | 964,225     | 686,684      | 291%         |          |      |
|                                                     | Diesel total                             | 52,887           | 52,887    | 0%         | 436.96                  | 327.99   | -29%       | 23,987,817                | 17,149,448  | -6,838,370   | -29%         |          |      |
|                                                     | Diesel Oil                               | pre-Cars         | 4,379     | 4,379      | 0%                      | 1034.89  | 737.35     | -29%                      | 4,468,571   | 3,184,428    | -1,284,143   | -29%     |      |
|                                                     |                                          | Car 1            | 1,083     | 1,083      | 0%                      | 748.71   | 553.48     | -26%                      | 1,387,281   | 1,025,551    | -361,740     | -26%     |      |
| Car 2                                               |                                          | 11,082           | 11,082    | 0%         | 817.38                  | 585.99   | -30%       | 3,072,940                 | 5,623,440   | 2,550,500    | 30%          |          |      |
| Car 3                                               |                                          | 43,481           | 43,481    | 0%         | 765.45                  | 361.64   | -43%       | 27,460,779                | 9,123,426   | -18,337,377  | -43%         |          |      |
| 1.A.3.b.iv. - Heavy Duty Vehicle Fleets and Lorries | Diesel Oil                               | Car 4            | 29,223    | 29,223     | 0%                      | 966.36   | 285.72     | -40%                      | 11,572,868  | 8,284,180    | -3,278,708   | -40%     |      |
|                                                     |                                          | Car 5            | 309,726   | 309,726    | 0%                      | 264.17   | 153.49     | -46%                      | 93,413,973  | 60,456,496   | -32,957,477  | -46%     |      |
|                                                     |                                          | Car 6            | 570,787   | 570,787    | 0%                      | 67.48    | 183.49     | 161%                      | 8,913,364   | 26,282,637   | 18,369,684   | 161%     |      |
|                                                     |                                          | Trucks Total     | 589,811   | 589,811    | 0%                      | 264.68   | 153.49     | -30%                      | 197,189,625 | 170,520,391  | -26,669,235  | -30%     |      |
|                                                     |                                          | pre-Cars         | 5,744     | 5,744      | 0%                      | 125.41   | 157.28     | 25%                       | 720,441     | 903,470      | 183,028      | 25%      |      |
|                                                     |                                          | Car 1            | 3,517     | 3,517      | 0%                      | 127.40   | 170.22     | 33%                       | 444,086     | 619,819      | 171,733      | 33%      |      |
|                                                     | Gasoline                                 | Car 2            | 3,382     | 3,382      | 0%                      | 127.35   | 186.53     | 50%                       | 430,660     | 665,965      | 236,305      | 50%      |      |
|                                                     |                                          | Car 3            | 1,011     | 1,011      | 0%                      | 49.29    | 186.53     | 389%                      | 234,126     | 1,144,416    | 910,289      | 389%     |      |
|                                                     |                                          | Car 4            | 6         | 6          | 0%                      | 16.96    |            | -180%                     | 69          | 884          | 736          | 1061%    |      |
|                                                     |                                          | Car 5            | 0         | 0          | 0%                      |          |            | 0%                        | 0           | 0            | 0            | 0%       |      |
| MGNs Total                                          | 18,459                                   | 18,459           | 0%        | 99.52      | 180.65                  | 82%      | 1,833,382  | 5,334,472                 | 3,501,090   | 82%          |              |          |      |
| 1.A.3.b. - Road Transport                           | Total                                    | 2,161,930        | 2,161,930 | 0%         | 266.39                  | 129.26   | -48%       | 575,937,265               | 381,697,596 | -194,853,678 | -48%         |          |      |

Adjustment details for 2026

| 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       | 11,782    | 11,782            | 0%                      | 636.75   | 644.11            | -14%                      | 7,470,914    | 6,410,967         | -1,059,947   |
|                                            |                          | Car 1          | 20,270    | 20,270            | 0%                      | 372.25   | 341.68            | -35%                      | 7,545,483    | 4,986,888         | -2,558,595   |
|                                            |                          | Car 2          | 36,062    | 36,062            | 0%                      | 212.73   | 143.11            | -33%                      | 7,671,581    | 5,180,897         | -2,490,684   |
|                                            |                          | Car 3          | 83,039    | 83,039            | 0%                      | 76.17    | 75.50             | -1%                       | 4,881,482    | 4,759,259         | -122,223     |
|                                            |                          | Car 4          | 334,413   | 334,413           | 0%                      | 53.74    | 50.17             | -1%                       | 17,363,364   | 16,777,445        | -585,919     |
|                                            |                          | Car 5          | 183,374   | 183,374           | 0%                      | 19.09    | 50.17             | 163%                      | 3,580,745    | 9,189,834         | 5,609,089    |
|                                            | Car 6                    | 65,332         | 65,332    | 0%                | 25.67                   | 50.17    | 89%               | 1,768,917                 | 3,327,855    | 1,558,938         |              |
|                                            | Gasoline total           | 715,272        | 715,272   | 0%                | 78.93                   | 70.65    | -9%               | 58,736,267                | 50,535,049   | -8,201,218        |              |
|                                            | Diesel Oil               | pre-Cars       | 1,380     | 1,380             | 0%                      | 364.76   | 254.56            | -30%                      | 386,262      | 339,172           | -47,090      |
|                                            |                          | Car 1          | 3,749     | 3,749             | 0%                      | 294.36   | 269.64            | -9%                       | 1,122,449    | 1,011,625         | -110,824     |
|                                            |                          | Car 2          | 16,584    | 16,584            | 0%                      | 407.19   | 221.43            | -46%                      | 6,720,132    | 3,653,964         | -3,066,168   |
|                                            |                          | Car 3          | 81,398    | 81,398            | 0%                      | 802.50   | 179.24            | -78%                      | 35,991,999   | 11,085,409        | -24,906,590  |
|                                            |                          | Car 4          | 175,940   | 175,940           | 0%                      | 405.76   | 156.24            | -61%                      | 71,362,220   | 27,474,086        | -43,888,134  |
|                                            |                          | Car 5          | 299,654   | 299,654           | 0%                      | 433.34   | 156.24            | -64%                      | 130,032,044  | 46,019,229        | -83,912,815  |
| Car 6                                      | 116,084                  | 116,084        | 0%        | 268.75            | 156.24                  | -42%     | 30,427,555        | 10,232,785                | -20,194,770  |                   |              |
| Diesel oil total                           | 625,119                  | 625,119        | 0%        | 418.36            | 160.76                  | -61%     | 277,947,660       | 188,535,230               | -89,412,430  |                   |              |
| Flx Total                                  | 1,360,391                | 1,360,391      | 0%        | 235.75            | 154.41                  | -35%     | 327,778,627       | 199,070,280               | -128,708,347 |                   |              |
| 1.A.3.b.i - Light Duty Vehicles (LDV)      | Gasoline                 | pre-Cars       | 910       | 910               | 0%                      | 602.79   | 645.95            | -1%                       | 593,186      | 547,543           | -45,643      |
|                                            |                          | Car 1          | 136       | 136               | 0%                      | 308.31   | 312.78            | -6%                       | 122,126      | 42,425            | -79,701      |
|                                            |                          | Car 2          | 540       | 540               | 0%                      | 308.39   | 217.84            | -29%                      | 162,311      | 117,737           | -44,574      |
|                                            |                          | Car 3          | 650       | 650               | 0%                      | 108.43   | 111.57            | -3%                       | 70,432       | 72,731            | 2,299        |
|                                            |                          | Car 4          | 1,684     | 1,684             | 0%                      | 49.06    | 52.36             | 7%                        | 73,714       | 84,003            | 10,289       |
|                                            |                          | Car 5          | 1,724     | 1,724             | 0%                      | 19.82    | 52.36             | 164%                      | 34,157       | 80,258            | 46,101       |
|                                            | Car 6                    | 363            | 363       | 0%                | 19.85                   | 52.36    | 181%              | 6,764                     | 19,992       | 13,228            |              |
|                                            | Gasoline total           | 5,506          | 5,506     | 0%                | 388.27                  | 371.66   | -4%               | 1,068,292                 | 1,013,478    | -54,814           |              |
|                                            | Diesel Oil               | pre-Cars       | 2,189     | 2,189             | 0%                      | 414.81   | 385.73            | -7%                       | 899,549      | 845,433           | -54,116      |
|                                            |                          | Car 1          | 1,780     | 1,780             | 0%                      | 391.89   | 276.25            | -30%                      | 780,189      | 385,371           | -394,818     |
|                                            |                          | Car 2          | 4,223     | 4,223             | 0%                      | 323.43   | 153.31            | -53%                      | 1,365,994    | 676,452           | -689,542     |
|                                            |                          | Car 3          | 13,582    | 13,582            | 0%                      | 588.91   | 150.77            | -74%                      | 8,064,323    | 2,940,233         | -5,124,090   |
|                                            |                          | Car 4          | 43,141    | 43,141            | 0%                      | 504.48   | 32.40             | -93%                      | 21,783,989   | 3,985,141         | -17,798,848  |
|                                            |                          | Car 5          | 74,231    | 74,231            | 0%                      | 434.16   | 32.40             | -93%                      | 32,223,283   | 6,658,780         | -25,564,503  |
| Car 6                                      | 4,921                    | 4,921          | 0%        | 113.49            | 32.40                   | -71%     | 755,285           | 454,676                   | -300,609     |                   |              |
| Diesel oil total                           | 148,068                  | 148,068        | 0%        | 454.12            | 185.62                  | -59%     | 65,712,732        | 15,256,007                | -50,456,725  |                   |              |
| LDVs total                                 | 148,068                  | 148,068        | 0%        | 454.12            | 185.62                  | -59%     | 65,712,732        | 15,256,007                | -50,456,725  |                   |              |
| 1.A.3.b.ii - Heavy Duty Vehicles (HDV)     | Gasoline                 | pre-Cars       | 881       | 881               | 0%                      | 1076.81  | 1119.23           | -4%                       | 954,197      | 988,234           | 34,037       |
|                                            |                          | Car 1          | 583       | 583               | 0%                      | 731.36   | 732.67            | -2%                       | 433,675      | 446,236           | 12,561       |
|                                            |                          | Car 2          | 4,375     | 4,375             | 0%                      | 708.25   | 645.03            | -9%                       | 3,440,614    | 2,822,621         | -617,993     |
|                                            |                          | Car 3          | 10,333    | 10,333            | 0%                      | 632.87   | 458.91            | -28%                      | 6,539,364    | 4,741,827         | -1,797,537   |
|                                            |                          | Car 4          | 4,449     | 4,449             | 0%                      | 475.90   | 382.29            | -20%                      | 2,117,219    | 1,666,881         | -450,338     |
|                                            |                          | Car 5          | 34,380    | 34,380            | 0%                      | 364.36   | 185.22            | -49%                      | 8,935,974    | 4,517,517         | -4,418,457   |
|                                            |                          | Car 6          | 9,126     | 9,126             | 0%                      | 62.79    | 185.22            | 196%                      | 573,066      | 1,680,431         | 1,107,365    |
|                                            |                          | Gasoline total | 54,157    | 54,157            | 0%                      | 404.73   | 388.24            | -4%                       | 23,082,189   | 16,835,117        | -6,247,072   |
|                                            | Diesel Oil               | pre-Cars       | 3,933     | 3,933             | 0%                      | 1034.81  | 737.35            | -29%                      | 4,087,249    | 2,980,379         | -1,106,870   |
|                                            |                          | Car 1          | 1,555     | 1,555             | 0%                      | 748.16   | 587.92            | -22%                      | 1,163,482    | 789,813           | -373,669     |
|                                            |                          | Car 2          | 8,875     | 8,875             | 0%                      | 817.75   | 585.42            | -29%                      | 7,258,047    | 4,486,626         | -2,771,421   |
|                                            |                          | Car 3          | 34,167    | 34,167            | 0%                      | 638.91   | 568.04            | -11%                      | 21,553,280   | 12,251,155        | -9,302,125   |
|                                            |                          | Car 4          | 34,287    | 34,287            | 0%                      | 394.94   | 281.86            | -29%                      | 9,640,364    | 6,885,621         | -2,754,743   |
|                                            |                          | Car 5          | 269,735   | 269,735           | 0%                      | 267.22   | 153.60            | -43%                      | 74,680,233   | 39,976,610        | -34,703,623  |
| Car 6                                      | 261,480                  | 261,480        | 0%        | 61.77             | 153.60                  | 149%     | 16,149,280        | 40,244,036                | 24,094,756   |                   |              |
| Trucks Total                               | 594,013                  | 594,013        | 0%        | 226.31            | 180.97                  | -20%     | 134,431,899       | 101,486,262               | -32,945,637  |                   |              |
| 1.A.3.b.iii - Motorized Two-Wheelers (M2W) | Gasoline                 | pre-Cars       | 5,543     | 5,543             | 0%                      | 125.59   | 155.78            | 24%                       | 696,072      | 883,289           | 187,217      |
|                                            |                          | Car 1          | 3,360     | 3,360             | 0%                      | 127.11   | 177.29            | 39%                       | 427,113      | 585,796           | 158,683      |
|                                            |                          | Car 2          | 3,375     | 3,375             | 0%                      | 125.94   | 187.68            | 50%                       | 421,961      | 687,078           | 265,117      |
|                                            |                          | Car 3          | 6,443     | 6,443             | 0%                      | 48.36    | 187.68            | 381%                      | 209,627      | 1,273,671         | 1,064,044    |
|                                            |                          | Car 4          | 85        | 85                | 0%                      | 17.47    | 187.68            | 1031%                     | 1,134        | 12,632            | 11,498       |
|                                            |                          | Car 5          | 0         | 0                 | 0%                      | 0        | 0                 | 0%                        | 0            | 0                 | 0%           |
|                                            | M2Ws total               | 16,185         | 16,185    | 0%                | 95.14                   | 181.68   | 89%               | 1,885,897                 | 3,452,476    | 1,566,579         |              |
|                                            | 1.A.3.b - Road Transport | Total          | 2,267,339 | 2,267,339         | 0%                      | 258.89   | 137.22            | -46%                      | 553,799,598  | 362,981,620       | -190,817,978 |

Adjustment details for 2027

| 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                                  | 12,282    | 12,282     | 0%        | 636.73                  | 644.11   | -14%       | 7,914,267   | 6,480,187                 | -1,434,080   | -18%         |           |      |
|                                          |              | Car 1                                     | 17,449    | 17,449     | 0%        | 372.96                  | 341.68   | -35%       | 6,588,311   | 4,217,644                 | -2,370,667   | -36%         |           |      |
|                                          |              | Car 2                                     | 30,435    | 30,435     | 0%        | 217.43                  | 141.75   | -35%       | 6,617,570   | 4,374,140                 | -2,243,430   | -34%         |           |      |
|                                          |              | Car 3                                     | 54,271    | 54,271     | 0%        | 78.48                   | 76.27    | -3%        | 4,254,938   | 4,139,376                 | -115,562     | -3%          |           |      |
|                                          |              | Car 4                                     | 315,086   | 315,086    | 0%        | 54.96                   | 51.26    | -7%        | 17,316,320  | 16,511,881                | -804,439     | -5%          |           |      |
|                                          |              | Car 5                                     | 180,240   | 180,240    | 0%        | 19.17                   | 51.26    | 163%       | 3,485,382   | 9,239,815                 | 5,754,433    | 163%         |           |      |
|                                          |              | Car 6                                     | 114,791   | 114,791    | 0%        | 25.65                   | 51.26    | 102%       | 3,060,235   | 5,884,372                 | 2,824,136    | 92%          |           |      |
|                                          |              | Gasoline total                            | 724,571   | 724,571    | 0%        | 67.66                   | 60.88    | -10%       | 49,046,874  | 38,534,734                | -10,512,140  | -21%         |           |      |
|                                          | Diesel Oil   | pre-Cars                                  | 1,370     | 1,370      | 0%        | 364.96                  | 254.56   | -30%       | 386,963     | 347,626                   | -39,337      | -10%         |           |      |
|                                          |              | Car 1                                     | 3,360     | 3,360      | 0%        | 294.17                  | 271.67   | -8%        | 1,082,288   | 910,182                   | -172,106     | -16%         |           |      |
|                                          |              | Car 2                                     | 13,788    | 13,788     | 0%        | 407.17                  | 222.43   | -46%       | 5,914,130   | 3,066,393                 | -2,847,737   | -48%         |           |      |
|                                          |              | Car 3                                     | 52,128    | 52,128     | 0%        | 808.95                  | 179.65   | -78%       | 31,696,478  | 9,364,788                 | -22,331,690  | -71%         |           |      |
|                                          |              | Car 4                                     | 187,947   | 187,947    | 0%        | 418.16                  | 158.34   | -61%       | 64,733,485  | 24,983,323                | -39,750,162  | -61%         |           |      |
|                                          |              | Car 5                                     | 283,480   | 283,480    | 0%        | 423.99                  | 158.34   | -63%       | 120,187,655 | 44,873,190                | -75,314,465  | -63%         |           |      |
|                                          |              | Car 6                                     | 184,768   | 184,768    | 0%        | 262.61                  | 158.34   | -40%       | 48,521,163  | 29,255,985                | -19,265,178  | -40%         |           |      |
|                                          |              | Diesel oil total                          | 686,562   | 686,562    | 0%        | 394.65                  | 161.95   | -59%       | 272,126,081 | 112,890,721               | -159,235,359 | -58%         |           |      |
| 1.A.3.a.ii. Heavy Duty Vehicles (LDVs)   | Gasoline     | Flx Total                                 | 1,411,133 | 1,411,133  | 0%        | 235.98                  | 155.61   | -34%       | 518,172,955 | 398,425,451               | -119,747,504 | -23%         |           |      |
|                                          |              | pre-Cars                                  | 940       | 940        | 0%        | 611.41                  | 645.95   | -1%        | 612,247     | 596,878                   | -15,369      | -3%          |           |      |
|                                          |              | Car 1                                     | 124       | 124        | 0%        | 308.23                  | 312.78   | -6%        | 112,083     | 39,682                    | -72,401      | -65%         |           |      |
|                                          |              | Car 2                                     | 485       | 485        | 0%        | 302.12                  | 221.62   | -27%       | 140,344     | 182,950                   | 42,606       | 30%          |           |      |
|                                          |              | Car 3                                     | 596       | 596        | 0%        | 118.57                  | 115.36   | -3%        | 65,955      | 68,812                    | 2,857        | 4%           |           |      |
|                                          |              | Car 4                                     | 1,476     | 1,476      | 0%        | 50.72                   | 53.38    | 5%         | 74,877      | 78,816                    | 3,939        | 5%           |           |      |
|                                          |              | Car 5                                     | 1,680     | 1,680      | 0%        | 21.73                   | 53.38    | 146%       | 35,240      | 89,034                    | 53,794       | 150%         |           |      |
|                                          |              | Car 6                                     | 910       | 910        | 0%        | 19.18                   | 53.38    | 180%       | 17,052      | 49,080                    | 32,028       | 187%         |           |      |
|                                          | Diesel Oil   | Gasoline total                            | 6,186     | 6,186      | 0%        | 171.55                  | 167.18   | -2%        | 1,058,799   | 1,034,211                 | -24,588      | -2%          |           |      |
|                                          |              | pre-Cars                                  | 2,087     | 2,087      | 0%        | 413.41                  | 385.73   | -7%        | 860,499     | 811,163                   | -49,336      | -6%          |           |      |
|                                          |              | Car 1                                     | 1,538     | 1,538      | 0%        | 398.47                  | 276.25   | -30%       | 680,795     | 331,158                   | -349,637     | -51%         |           |      |
|                                          |              | Car 2                                     | 3,580     | 3,580      | 0%        | 321.26                  | 153.04   | -53%       | 1,143,793   | 687,293                   | -456,500     | -40%         |           |      |
|                                          |              | Car 3                                     | 11,684    | 11,684     | 0%        | 595.30                  | 150.73   | -75%       | 6,940,879   | 1,758,747                 | -5,182,132   | -75%         |           |      |
|                                          |              | Car 4                                     | 39,050    | 39,050     | 0%        | 506.70                  | 32.69    | -93%       | 19,789,647  | 3,635,035                 | -16,154,612  | -82%         |           |      |
|                                          |              | Car 5                                     | 75,789    | 75,789     | 0%        | 432.66                  | 32.69    | -93%       | 32,790,955  | 7,054,945                 | -25,736,010  | -78%         |           |      |
|                                          |              | Car 6                                     | 19,625    | 19,625     | 0%        | 151.71                  | 32.69    | -79%       | 2,977,439   | 1,826,875                 | -1,150,564   | -39%         |           |      |
| 1.A.3.a.iii. Heavy Duty Vehicles (HDVs)  | Diesel Oil   | Diesel oil total                          | 153,284   | 153,284    | 0%        | 424.66                  | 183.89   | -57%       | 65,083,930  | 55,925,276                | -9,158,654   | -14%         |           |      |
|                                          |              | LDVs total                                | 199,670   | 199,670    | 0%        | 414.83                  | 186.35   | -54%       | 68,752,729  | 56,999,427                | -11,753,302  | -17%         |           |      |
|                                          |              | pre-Cars                                  | 730       | 730        | 0%        | 1073.33                 | 1191.23  | -9%        | 790,239     | 750,425                   | -39,814      | -5%          |           |      |
|                                          |              | Car 1                                     | 411       | 411        | 0%        | 731.37                  | 752.57   | -3%        | 380,684     | 389,062                   | 8,378        | 2%           |           |      |
|                                          |              | Car 2                                     | 3,325     | 3,325      | 0%        | 787.31                  | 645.49   | -18%       | 2,920,280   | 2,147,440                 | -772,840     | -27%         |           |      |
|                                          |              | Car 3                                     | 8,670     | 8,670      | 0%        | 612.41                  | 543.40   | -11%       | 5,473,440   | 3,991,685                 | -1,481,755   | -27%         |           |      |
|                                          |              | Car 4                                     | 3,823     | 3,823      | 0%        | 474.87                  | 562.19   | 19%        | 1,812,061   | 1,947,607                 | 135,546      | 8%           |           |      |
|                                          |              | Car 5                                     | 21,913    | 21,913     | 0%        | 363.82                  | 185.64   | -49%       | 7,937,567   | 4,653,698                 | -3,283,869   | -41%         |           |      |
|                                          | Diesel Total | Car 6                                     | 14,586    | 14,586     | 0%        | 58.52                   | 185.64   | 216%       | 86,215      | 272,630                   | 186,415      | 216%         |           |      |
|                                          |              | Diesel total                              | 53,382    | 53,382     | 0%        | 378.80                  | 286.71   | -23%       | 19,793,981  | 15,384,828                | -4,409,153   | -22%         |           |      |
|                                          |              | pre-Cars                                  | 3,680     | 3,680      | 0%        | 120.43                  | 171.35   | -29%       | 3,730,272   | 2,659,676                 | -1,070,596   | -29%         |           |      |
|                                          |              | Car 1                                     | 1,311     | 1,311      | 0%        | 748.03                  | 408.38   | -45%       | 980,842     | 614,151                   | -366,690     | -37%         |           |      |
|                                          |              | Car 2                                     | 7,087     | 7,087      | 0%        | 817.96                  | 583.45   | -29%       | 5,794,870   | 3,580,026                 | -2,214,844   | -38%         |           |      |
|                                          |              | Car 3                                     | 26,886    | 26,886     | 0%        | 638.17                  | 365.72   | -42%       | 19,642,611  | 9,583,881                 | -10,058,730  | -51%         |           |      |
|                                          |              | Car 4                                     | 29,082    | 29,082     | 0%        | 397.77                  | 279.34   | -30%       | 7,968,416   | 6,187,646                 | -1,780,770   | -22%         |           |      |
|                                          |              | Car 5                                     | 264,365   | 264,365    | 0%        | 244.36                  | 188,789  | -22%       | 59,988,789  | 35,365,342                | -24,623,447  | -41%         |           |      |
| 1.A.3.b.i. Motorized Two-Wheelers (M2Ws) | Gasoline     | Car 6                                     | 335,065   | 335,065    | 0%        | 65.92                   | 114.35   | 74%        | 21,985,366  | 11,798,641                | -10,186,725  | -46%         |           |      |
|                                          |              | Trucks total                              | 988,263   | 988,263    | 0%        | 999.82                  | 179.92   | -82%       | 116,611,141 | 185,268,508               | 68,657,367   | 59%          |           |      |
|                                          |              | pre-Cars                                  | 5,330     | 5,330      | 0%        | 125.51                  | 157.19   | -20%       | 671,088     | 830,789                   | 159,701      | 24%          |           |      |
|                                          |              | Car 1                                     | 3,257     | 3,257      | 0%        | 126.39                  | 177.86   | 41%        | 411,617     | 579,244                   | 167,627      | 41%          |           |      |
|                                          |              | Car 2                                     | 3,396     | 3,396      | 0%        | 122.55                  | 180.33   | 47%        | 415,280     | 673,540                   | 258,260      | 62%          |           |      |
|                                          |              | Car 3                                     | 6,741     | 6,741      | 0%        | 49.22                   | 180.33   | 363%       | 271,187     | 1,336,556                 | 1,065,369    | 393%         |           |      |
|                                          |              | Car 4                                     | 430       | 430        | 0%        | 19.28                   | 180.33   | 983%       | 7,862       | 85,270                    | 77,408       | 983%         |           |      |
|                                          |              | Car 5                                     | 0         | 0          | 0%        | 0.00                    | 180.33   | 0%         | 0           | 0                         | 0            | 0%           |           |      |
|                                          | M2Ws total   | pre-Cars                                  | 19,160    | 19,160     | 0%        | 92.83                   | 183.39   | 98%        | 1,786,674   | 5,933,787                 | 4,147,114    | 98%          |           |      |
|                                          |              | Trucks total                              | 2,291,407 | 2,291,407  | 0%        | 233.43                  | 135.23   | -42%       | 525,549,974 | 384,840,596               | -140,709,378 | -27%         |           |      |
|                                          |              | 1.A.3.b.ii. Motorized Two-Wheelers (M2Ws) | Gasoline  | pre-Cars   | 5,330     | 5,330                   | 0%       | 125.51     | 157.19      | -20%                      | 671,088      | 830,789      | 159,701   | 24%  |
|                                          |              |                                           |           | Car 1      | 3,257     | 3,257                   | 0%       | 126.39     | 177.86      | 41%                       | 411,617      | 579,244      | 167,627   | 41%  |
|                                          |              |                                           |           | Car 2      | 3,396     | 3,396                   | 0%       | 122.55     | 180.33      | 47%                       | 415,280      | 673,540      | 258,260   | 62%  |
|                                          |              |                                           |           | Car 3      | 6,741     | 6,741                   | 0%       | 49.22      | 180.33      | 363%                      | 271,187      | 1,336,556    | 1,065,369 | 393% |
|                                          |              |                                           |           | Car 4      | 430       | 430                     | 0%       | 19.28      | 180.33      | 983%                      | 7,862        | 85,270       | 77,408    | 983% |
|                                          |              |                                           |           | Car 5      | 0         | 0                       | 0%       | 0.00       | 180.33      | 0%                        | 0            | 0            | 0         | 0%   |
| 1.A.3.b. Road Transport Total            | pre-Cars     |                                           |           | 19,160     | 19,160    | 0%                      | 92.83    | 183.39     | 98%         | 1,786,674                 | 5,933,787    | 4,147,114    | 98%       |      |
|                                          | Trucks total |                                           |           | 2,291,407  | 2,291,407 | 0%                      | 233.43   | 135.23     | -42%        | 525,549,974               | 384,840,596  | -140,709,378 | -27%      |      |

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    | 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      | 12,219    | 12,219     | 0%                      | 637.58   | 644.11     | -65%                      | 7,780,965   | 6,668,721   | -1,112,234   | -55% |
|                                             |                       | Car 1         | 14,362    | 14,362     | 0%                      | 374.34   | 341.68     | -36%                      | 5,371,161   | 3,448,643   | -1,922,518   | -36% |
|                                             |                       | Car 2         | 34,285    | 34,285     | 0%                      | 221.97   | 111.68     | -60%                      | 5,360,977   | 2,688,163   | -2,672,814   | -50% |
|                                             |                       | Car 3         | 43,642    | 43,642     | 0%                      | 88.16    | 76.96      | -4%                       | 3,487,781   | 3,358,617   | -139,164     | -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         | 186,030   | 186,030    | 0%                      | 19.35    | 52.30      | 170%                      | 3,228,282   | 8,725,668   | 5,497,386    | 170% |
|                                             | Diesel Oil            | pre-Cars      | 159,041   | 159,041    | 0%                      | 6.00     | 52.30      | 0%                        | 4,190,422   | 8,716,250   | 4,525,828    | 89%  |
|                                             |                       | Car 1         | 689,007   | 689,007    | 0%                      | 64.42    | 62.36      | -3%                       | 45,032,966  | 47,786,817  | 2,753,851    | 6%   |
|                                             |                       | Car 2         | 1,363     | 1,363      | 0%                      | 303.16   | 272.65     | -10%                      | 286,430     | 245,173     | -41,257      | -14% |
|                                             |                       | Car 3         | 2,849     | 2,849      | 0%                      | 407.20   | 222.87     | -45%                      | 4,982,432   | 2,775,167   | -2,207,265   | -44% |
|                                             |                       | Car 4         | 10,784    | 10,784     | 0%                      | 499.20   | 222.87     | -55%                      | 4,391,793   | 2,483,536   | -1,908,258   | -44% |
|                                             |                       | Car 5         | 40,786    | 40,786     | 0%                      | 812.49   | 180.15     | -78%                      | 24,932,029  | 7,333,241   | -17,598,788  | -71% |
|                                             | LN <sub>2</sub> Total | pre-Cars      | 130,534   | 130,534    | 0%                      | 414.71   | 180.40     | -56%                      | 54,133,837  | 20,937,329  | -33,196,508  | -56% |
|                                             |                       | Car 1         | 251,212   | 251,212    | 0%                      | 415.25   | 180.40     | -56%                      | 104,585,786 | 40,253,731  | -64,332,055  | -56% |
|                                             |                       | Car 2         | 220,685   | 220,685    | 0%                      | 254.87   | 180.40     | -31%                      | 58,284,140  | 35,680,446  | -22,603,694  | -37% |
|                                             |                       | Car 3         | 666,076   | 666,076    | 0%                      | 375.66   | 163.38     | -56%                      | 247,556,063 | 188,768,684 | -158,787,459 | -56% |
|                                             |                       | Car 4         | 1,365,181 | 1,365,181  | 0%                      | 214.34   | 154.68     | -28%                      | 262,589,060 | 156,555,421 | -106,033,639 | -40% |
|                                             |                       | Car 5         | 911       | 911        | 0%                      | 664.51   | 645.95     | -3%                       | 596,859     | 582,662     | -14,197      | -2%  |
| 1.A.3.b.i - Light Duty Vehicles (LDVs)      | Gasoline              | pre-Cars      | 189       | 189        | 0%                      | 911.58   | 312.78     | -66%                      | 98,528      | 33,895      | -64,633      | -66% |
|                                             |                       | Car 1         | 377       | 377        | 0%                      | 303.84   | 224.45     | -26%                      | 114,682     | 84,713      | -29,969      | -26% |
|                                             |                       | Car 2         | 511       | 511        | 0%                      | 111.92   | 116.84     | 4%                        | 57,282      | 60,739      | 3,457        | 6%   |
|                                             |                       | Car 3         | 1,275     | 1,275      | 0%                      | 52.02    | 54.36      | 4%                        | 65,290      | 69,270      | 3,980        | 4%   |
|                                             |                       | Car 4         | 1,483     | 1,483      | 0%                      | 23.70    | 54.36      | 129%                      | 35,160      | 80,626      | 45,466       | 129% |
|                                             |                       | Car 5         | 1,643     | 1,643      | 0%                      | 19.18    | 54.36      | 182%                      | 39,550      | 89,326      | 49,776       | 182% |
|                                             | Diesel Oil            | pre-Cars      | 6,315     | 6,315      | 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         | 9,383     | 9,383      | 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%                      | 15,929,185  | 3,117,457   | -12,811,728  | -80% |
|                                             | LN <sub>2</sub> Total | 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% |
|                                             |                       | Car 2         | 154,259   | 154,259    | 0%                      | 384.71   | 182.69     | -53%                      | 59,344,525  | 35,880,316  | -23,464,209  | -48% |
|                                             |                       | Car 3         | 180,574   | 180,574    | 0%                      | 375.86   | 184.94     | -51%                      | 69,343,125  | 36,851,449  | -32,491,676  | -51% |
|                                             |                       | Car 4         | 547       | 547        | 0%                      | 1078.15  | 1919.23    | 78%                       | 589,267     | 557,147     | -32,120      | -5%  |
|                                             |                       | Car 5         | 237       | 237        | 0%                      | 732.78   | 732.57     | 0%                        | 173,676     | 176,368     | 2,692        | 2%   |
| 1.A.3.b.ii - Heavy Duty Vehicle Buses       | Diesel Oil            | pre-Cars      | 2,270     | 2,270      | 0%                      | 787.83   | 646.33     | -18%                      | 1,780,686   | 1,447,437   | -333,249     | -19% |
|                                             |                       | Car 1         | 6,757     | 6,757      | 0%                      | 638.89   | 459.32     | -28%                      | 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%                      | 6,463,265   | 3,376,016   | -3,087,249   | -48% |
|                                             |                       | Car 4         | 20,670    | 20,670     | 0%                      | 64.89    | 186.37     | 289%                      | 1,176,026   | 3,682,314   | 2,506,288    | 214% |
|                                             |                       | Car 5         | 15,912    | 15,912     | 0%                      | 358.89   | 276.23     | -23%                      | 6,334,421   | 4,386,424   | -1,947,997   | -31% |
|                                             | LN <sub>2</sub> Total | pre-Cars      | 51,634    | 51,634     | 0%                      | 309.75   | 283.53     | -9%                       | 15,993,546  | 13,687,186  | -2,306,360   | -15% |
|                                             |                       | Car 1         | 3,262     | 3,262      | 0%                      | 1034.82  | 737.35     | -29%                      | 3,375,359   | 2,485,071   | -890,288     | -26% |
|                                             |                       | Car 2         | 1,094     | 1,094      | 0%                      | 747.82   | 488.39     | -35%                      | 918,052     | 512,378     | -405,674     | -44% |
|                                             |                       | Car 3         | 5,544     | 5,544      | 0%                      | 817.44   | 581.68     | -29%                      | 4,532,190   | 2,781,516   | -1,750,674   | -39% |
|                                             |                       | Car 4         | 20,583    | 20,583     | 0%                      | 629.54   | 563.68     | -10%                      | 12,967,751  | 7,277,279   | -5,690,472   | -44% |
|                                             |                       | Car 5         | 15,912    | 15,912     | 0%                      | 358.89   | 276.23     | -23%                      | 6,334,421   | 4,386,424   | -1,947,997   | -31% |
|                                             | LN <sub>2</sub> Total | pre-Cars      | 154,983   | 154,983    | 0%                      | 250.40   | 154.68     | -38%                      | 45,964,153  | 24,283,389  | -21,680,764  | -47% |
|                                             |                       | Car 1         | 381,799   | 381,799    | 0%                      | 68.78    | 154.68     | 125%                      | 28,251,482  | 69,665,886  | 41,414,404   | 146% |
|                                             |                       | Car 2         | 585,186   | 585,186    | 0%                      | 515.18   | 172.19     | -67%                      | 188,173,537 | 180,760,889 | -7,412,648   | -4%  |
|                                             |                       | Car 3         | 4,940     | 4,940      | 0%                      | 128.95   | 186.61     | 45%                       | 622,656     | 783,451     | 160,795      | 26%  |
|                                             |                       | Car 4         | 2,966     | 2,966      | 0%                      | 128.14   | 177.73     | 41%                       | 374,114     | 527,294     | 153,180      | 41%  |
|                                             |                       | Car 5         | 3,221     | 3,221      | 0%                      | 129.33   | 186.64     | 45%                       | 387,596     | 639,833     | 252,237      | 65%  |
| 1.A.3.b.iii - Motorised Two-Wheelers (MOWs) | Gasoline              | pre-Cars      | 6,241     | 6,241      | 0%                      | 48.24    | 186.64     | 284%                      | 20,126      | 1,239,686   | 1,219,560    | 598% |
|                                             |                       | Car 1         | 1,130     | 1,130      | 0%                      | 58.41    | 186.64     | 221%                      | 23,066      | 224,682     | 201,616      | 874% |
|                                             |                       | Car 2         | 0         | 0          | 0%                      | 0.00     | 0.00       | 0%                        | 0           | 0           | 0            | 0%   |
|                                             |                       | Car 3         | 18,487    | 18,487     | 0%                      | 85.66    | 186.64     | 118%                      | 1,658,558   | 3,454,767   | 1,796,209    | 108% |
|                                             |                       | Car 4         | 2,180,983 | 2,180,983  | 0%                      | 215.85   | 133.49     | -38%                      | 478,758,286 | 291,129,652 | -187,628,634 | -38% |
|                                             |                       | Car 5         | 18,487    | 18,487     | 0%                      | 85.66    | 186.64     | 118%                      | 1,658,558   | 3,454,767   | 1,796,209    | 108% |
|                                             | Diesel Oil            | pre-Cars      | 4,940     | 4,940      | 0%                      | 128.95   | 186.61     | 45%                       | 622,656     | 783,451     | 160,795      | 26%  |
|                                             |                       | Car 1         | 2,966     | 2,966      | 0%                      | 128.14   | 177.73     | 41%                       | 374,114     | 527,294     | 153,180      | 41%  |
|                                             |                       | Car 2         | 3,221     | 3,221      | 0%                      | 129.33   | 186.64     | 45%                       | 387,596     | 639,833     | 252,237      | 65%  |
|                                             |                       | Car 3         | 6,241     | 6,241      | 0%                      | 48.24    | 186.64     | 284%                      | 20,126      | 1,239,686   | 1,219,560    | 598% |
|                                             |                       | Car 4         | 1,130     | 1,130      | 0%                      | 58.41    | 186.64     | 221%                      | 23,066      | 224,682     | 201,616      | 874% |
|                                             |                       | Car 5         | 0         | 0          | 0%                      | 0.00     | 0.00       | 0%                        | 0           | 0           | 0            | 0%   |
|                                             | LN <sub>2</sub> Total | pre-Cars      | 18,487    | 18,487     | 0%                      | 85.66    | 186.64     | 118%                      | 1,658,558   | 3,454,767   | 1,796,209    | 108% |
|                                             |                       | Car 1         | 2,180,983 | 2,180,983  | 0%                      | 215.85   | 133.49     | -38%                      | 478,758,286 | 291,129,652 | -187,628,634 | -38% |
|                                             |                       | Car 2         | 18,487    | 18,487     | 0%                      | 85.66    | 186.64     | 118%                      | 1,658,558   | 3,454,767   | 1,796,209    | 108% |
|                                             |                       | Car 3         | 4,940     | 4,940      | 0%                      | 128.95   | 186.61     | 45%                       | 622,656     | 783,451     | 160,795      | 26%  |
|                                             |                       | Car 4         | 2,966     | 2,966      | 0%                      | 128.14   | 177.73     | 41%                       | 374,114     | 527,294     | 153,180      | 41%  |
|                                             |                       | Car 5         | 3,221     | 3,221      | 0%                      | 129.33   | 186.64     | 45%                       | 387,596     | 639,833     | 252,237      | 65%  |

Adjustment details for 2019

| Detailed Data for 2022                     |                       |               |           |            |                         |          |            |                           |             |             |              |      |
|--------------------------------------------|-----------------------|---------------|-----------|------------|-------------------------|----------|------------|---------------------------|-------------|-------------|--------------|------|
| 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      | 13,648    | 13,648     | 0%                      | 638.58   | 644.11     | -5%                       | 8,664,621   | 7,382,686   | -1,281,935   | -55% |
|                                            |                       | Car 1         | 12,427    | 12,427     | 0%                      | 378.32   | 341.68     | -36%                      | 4,781,480   | 3,083,383   | -1,698,096   | -36% |
|                                            |                       | Car 2         | 20,086    | 20,086     | 0%                      | 225.58   | 92.59      | -60%                      | 4,531,070   | 1,858,018   | -2,672,852   | -60% |
|                                            |                       | 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   | 8,554,356   | 5,380,628    | 170% |
|                                            | Diesel Oil            | pre-Cars      | 285,636   | 285,636    | 0%                      | 25.63    | 53.29      | 180%                      | 5,285,099   | 11,010,782  | 5,725,683    | 180% |
|                                            |                       | Car 1         | 174,681   | 174,681    | 0%                      | 62.36    | 68.45      | 10%                       | 43,961,941  | 48,238,025  | 4,276,084    | 10%  |
|                                            |                       | Car 2         | 2,736     | 2,736      | 0%                      | 313.70   | 284.61     | -9%                       | 313,180     | 274,621     | -38,559      | -12% |
|                                            |                       | 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   | 229.16     | -44%                      | 3,620,286   | 2,037,480   | -1,582,806   | -44% |
|                                            |                       | Car 5         | 33,079    | 33,079     | 0%                      | 815.11   | 180.42     | -78%                      | 20,310,125  | 5,967,483   | -14,342,642  | -71% |
|                                            | LN <sub>2</sub> Total | 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% |
|                                            |                       | Car 3         | 663,841   | 663,841    | 0%                      | 345.81   | 165.67     | -52%                      | 229,568,088 | 189,582,982 | -139,985,106 | -59% |
| 1.A.3.b.i - Light Duty Vehicles (LDV)      | Gasoline              | P/Cs Total    | 1,368,532 | 1,368,532  | 0%                      | 199.83   | 153.39     | -24%                      | 273,688,059 | 151,821,807 | -121,866,252 | -45% |
|                                            |                       | Car 1         | 526       | 526        | 0%                      | 843.69   | 645.95     | -24%                      | 841,459     | 587,992     | -253,467     | -30% |
|                                            |                       | Car 2         | 97        | 97         | 0%                      | 315.58   | 272.78     | -14%                      | 89,353      | 30,396      | -58,957      | -66% |
|                                            |                       | Car 3         | 336       | 336        | 0%                      | 368.43   | 212.45     | -42%                      | 36,158      | 70,848      | 34,690       | 96%  |
|                                            |                       | Car 4         | 447       | 447        | 0%                      | 112.68   | 121.47     | 8%                        | 50,355      | 54,283      | 3,928        | 8%   |
|                                            |                       | Car 5         | 1,136     | 1,136      | 0%                      | 53.08    | 55.36      | 4%                        | 49,692      | 62,199      | 12,507       | 25%  |
|                                            | Diesel Oil            | Car 1         | 1,361     | 1,361      | 0%                      | 25.34    | 55.36      | 110%                      | 34,240      | 74,680      | 40,440       | 119% |
|                                            |                       | Car 2         | 2,420     | 2,420      | 0%                      | 18.76    | 55.36      | 180%                      | 45,389      | 133,733     | 88,345       | 190% |
|                                            |                       | Car 3         | 6,483     | 6,483      | 0%                      | 148.86   | 153.35     | 5%                        | 94,299      | 1,004,156   | 910,857      | 95%  |
|                                            |                       | Car 4         | 1,164     | 1,164      | 0%                      | 418.96   | 389.79     | -7%                       | 725,111     | 541,376     | -183,735     | -25% |
|                                            |                       | Car 5         | 1,079     | 1,079      | 0%                      | 389.52   | 275.25     | -30%                      | 420,285     | 232,255     | -188,030     | -45% |
|                                            |                       | Car 6         | 2,334     | 2,334      | 0%                      | 315.99   | 154.79     | -50%                      | 377,682     | 454,490     | 76,808       | 20%  |
|                                            | LN <sub>2</sub> Total | pre-Cars      | 7,540     | 7,540      | 0%                      | 805.11   | 593.13     | -26%                      | 4,587,943   | 3,742,462   | -845,481     | -23% |
|                                            |                       | Car 1         | 20,711    | 20,711     | 0%                      | 512.38   | 94.57      | -82%                      | 14,788,380  | 2,716,154   | -12,072,226  | -82% |
|                                            |                       | Car 2         | 58,794    | 58,794     | 0%                      | 436.30   | 94.57      | -79%                      | 25,499,080  | 5,552,420   | -19,946,660  | -78% |
|                                            |                       | Car 3         | 69,031    | 69,031     | 0%                      | 146.18   | 81.57      | -45%                      | 8,616,586   | 5,722,892   | -2,893,694   | -33% |
| Car 4                                      |                       | 159,183       | 159,183   | 0%         | 347.42                  | 191.98   | -44%       | 55,383,325                | 36,221,485  | -19,161,840 | -35%         |      |
| Car 5                                      |                       | 165,866       | 165,866   | 0%         | 339.31                  | 183.97   | -46%       | 56,279,594                | 31,245,956  | -25,033,638 | -45%         |      |
| 1.A.3.b.ii - Heavy Duty Vehicles (HDV)     | Diesel Oil            | P/Cs Total    | 489       | 489        | 0%                      | 1086.23  | 1193.23    | -6%                       | 588,087     | 478,258     | -109,829     | -19% |
|                                            |                       | Car 1         | 147       | 147        | 0%                      | 738.37   | 752.57     | 2%                        | 188,232     | 110,933     | -77,299      | -41% |
|                                            |                       | Car 2         | 1,611     | 1,611      | 0%                      | 629.67   | 645.57     | -3%                       | 1,271,445   | 1,041,621   | -229,824     | -18% |
|                                            |                       | Car 3         | 5,709     | 5,709      | 0%                      | 733.67   | 466.75     | -36%                      | 3,885,261   | 2,623,779   | -1,261,482   | -33% |
|                                            |                       | Car 4         | 2,147     | 2,147      | 0%                      | 473.92   | 242.84     | -49%                      | 1,382,041   | 969,434     | -412,607     | -30% |
|                                            |                       | Car 5         | 17,130    | 17,130     | 0%                      | 362.91   | 186.64     | -49%                      | 6,219,175   | 3,180,791   | -3,038,384   | -49% |
|                                            | LN <sub>2</sub> Total | pre-Cars      | 52,939    | 52,939     | 0%                      | 274.81   | 247.83     | -10%                      | 14,547,072  | 15,138,878  | 1,488,806    | 10%  |
|                                            |                       | Car 1         | 3,140     | 3,140      | 0%                      | 1034.98  | 737.35     | -29%                      | 3,250,020   | 2,370,443   | -879,577     | -27% |
|                                            |                       | Car 2         | 969       | 969        | 0%                      | 747.90   | 584.04     | -22%                      | 724,240     | 453,754     | -270,486     | -37% |
|                                            |                       | Car 3         | 4,580     | 4,580      | 0%                      | 817.42   | 581.04     | -29%                      | 3,734,343   | 2,288,967   | -1,445,376   | -39% |
|                                            |                       | Car 4         | 16,377    | 16,377     | 0%                      | 628.94   | 371.48     | -41%                      | 13,903,323  | 6,758,540   | -7,144,783   | -51% |
|                                            |                       | Car 5         | 19,137    | 19,137     | 0%                      | 396.86   | 269.63     | -33%                      | 1,226,679   | 3,689,320   | 2,462,641    | 201% |
|                                            | Trucks Total          | pre-Cars      | 185,203   | 185,203    | 0%                      | 965.15   | 742.90     | -23%                      | 36,969,499  | 49,411,818  | 12,442,319   | 34%  |
|                                            |                       | Car 1         | 432,496   | 432,496    | 0%                      | 72.98    | 154.92     | 110%                      | 11,175,486  | 67,683,853  | 56,508,367   | 155% |
|                                            |                       | Car 2         | 965,913   | 965,913    | 0%                      | 133.35   | 169.17     | 26%                       | 95,380,780  | 180,893,376 | 85,512,596   | 90%  |
|                                            |                       | Car 3         | 4,913     | 4,913      | 0%                      | 125.89   | 164.79     | 31%                       | 664,997     | 792,791     | 127,794      | 19%  |
| Car 4                                      |                       | 2,835         | 2,835     | 0%         | 129.39                  | 177.29   | 36%        | 355,496                   | 582,589     | 227,093     | 64%          |      |
| Car 5                                      |                       | 3,094         | 3,094     | 0%         | 119.33                  | 180.86   | 51%        | 389,224                   | 615,317     | 226,093     | 58%          |      |
| 1.A.3.b.iii - Motorized Two-Wheelers (MWV) | Gasoline              | Car 1         | 6,082     | 6,082      | 0%                      | 43.03    | 180.86     | 381%                      | 284,284     | 1,193,617   | 909,333      | 319% |
|                                            |                       | Car 2         | 2,085     | 2,085      | 0%                      | 21.68    | 180.86     | 817%                      | 43,489      | 386,647     | 343,158      | 791% |
|                                            |                       | Car 3         | 0         | 0          | 0%                      | 0.00     | 180.86     | 0%                        | 0           | 0           | 0            | 0%   |
|                                            |                       | Car 4         | 18,150    | 18,150     | 0%                      | 86.95    | 180.83     | 107%                      | 1,615,450   | 5,562,941   | 3,947,491    | 245% |
|                                            |                       | Car 5         | 2,262,080 | 2,262,080  | 0%                      | 99.58    | 132.83     | 33%                       | 67,268,146  | 292,497,437 | 164,771,248  | 245% |
|                                            |                       | Car 6         | 18,150    | 18,150     | 0%                      | 86.95    | 180.83     | 107%                      | 1,615,450   | 5,562,941   | 3,947,491    | 245% |
|                                            | Diesel Oil            | pre-Cars      | 4,913     | 4,913      | 0%                      | 125.89   | 164.79     | 31%                       | 664,997     | 792,791     | 127,794      | 19%  |
|                                            |                       | Car 1         | 2,835     | 2,835      | 0%                      | 129.39   | 177.29     | 36%                       | 355,496     | 582,589     | 227,093      | 64%  |
|                                            |                       | Car 2         | 3,094     | 3,094      | 0%                      | 119.33   | 180.86     | 51%                       | 389,224     | 615,317     | 226,093      | 58%  |
|                                            |                       | Car 3         | 6,082     | 6,082      | 0%                      | 43.03    | 180.86     | 381%                      | 284,284     | 1,193,617   | 909,333      | 319% |
|                                            |                       | Car 4         | 2,085     | 2,085      | 0%                      | 21.68    | 180.86     | 817%                      | 43,489      | 386,647     | 343,158      | 791% |
|                                            |                       | Car 5         | 0         | 0          | 0%                      | 0.00     | 180.86     | 0%                        | 0           | 0           | 0            | 0%   |
|                                            | MWV Total             | pre-Cars      | 18,150    | 18,150     | 0%                      | 86.95    | 180.83     | 107%                      | 1,615,450   | 5,562,941   | 3,947,491    | 245% |
|                                            |                       | Car 1         | 2,262,080 | 2,262,080  | 0%                      | 99.58    | 132.83     | 33%                       | 67,268,146  | 292,497,437 | 164,771,248  | 245% |

|                                                | 2010          | 2011          | 2012          | 2013          | 2014          | 2015          | 2016          | 2017          | 2018          | 2019          |
|------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Adjustment 2014 (accepted) <sup>8), 9)</sup>   | -105.6        | -101.3        | -95.7         | -91.7         |               |               |               |               |               |               |
| Adjustment 2015 (accepted) <sup>10), 11)</sup> | -100.3        | -95.5         | -89.9         | -85.1         |               |               |               |               |               |               |
| Adjustment 2016 (accepted) <sup>12), 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.; Gyarfas, 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> (bibcite 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> (bibcite 18)
- <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/e/documents/HBEFA41\\_Development\\_Report.pdf](https://www.hbefa.net/e/documents/HBEFA41_Development_Report.pdf), Bern, Heidelberg, 21. August 2019.