



SLOVAK REPUBLIC

ANNUAL REPORT 2023

Submission according to the Article 26(3)
of the Regulation (EU) 2018/1999¹ and relevant
articles of the Commission Implementing
Regulation (EU) 2020/1208²



Slovak Hydrometeorological Institute



Department of Emissions and Biofuels



Ministry of Environment of the Slovak Republic

Bratislava, January 15, 2023

1. INTRODUCTION

The Slovak Republic is submitting to the European Commission the SVK Annual Report 2023 according to Article 26 (3) of the Regulation (EU) 2018/1999 and the Chapter III and Articles 8-24 of the Commission Implementing Regulation (EU) 2020/1208.

The whole package of the Annual Report 2023 of the Slovak Republic comprises:

1. *SVK_Annual_Report_2023.pdf* – Annual Report of the Slovak Republic in written form according to the Regulation (EU) 2020/1208;
2. *SVK_CRF_1990-2021_15-01-2023* – CRF tables generated using the CRF Reporter software, version 6.0.10 accompanied by the xml file;
3. RREG1 Tables for the year 2022;
4. Tabular format specified in Articles 10-15, 17, 19-23 to the 2020/1208 Regulation;
5. Sectoral Chapters of the SVK NIR 2023.

Submission is uploaded via the EIONET Central Data Repository tool of the EEA.

2. DETAILS OF PREPARING THIS SUBMISSION

COUNTRY:	SLOVAK REPUBLIC
Date of completion:	January 15, 2023
Legal guarantor of report :	Ministry of the Environment of the Slovak Republic
	Directorate for Climate Change and Air Protection (National Focal Point)
Address:	Námestie Ľ. Štúra 1
	812 35 Bratislava 1, Slovak Republic
Contact person:	Ing. Jozef Škultéty, CSc.
Telephone No.:	00421-2-59562246
E-mail:	jozef.skultety@enviro.gov.sk
Expert guarantor of report:	Slovak Hydrometeorological Institute
	Department of Emissions and Biofuels (National inventory coordinator, SNE)
Address:	Jeséniova 17
	833 15 Bratislava, Slovak Republic
Contact person:	Ing. Janka Szemesova, PhD.
Telephone No.:	00421-905-693623
E-mail:	janka.szemesova@shmu.sk

3. INFORMATION TO ASSESS ACTUAL PROGRESS

Article 8(1): report the information referred to in Article 26(3) of Regulation (EU) 2018/1999 by completing, in accordance with the greenhouse gas inventory guidelines and with the rules provided for in this Regulation:

- (a) the common reporting tables by providing a complete set of spread sheets or Extensible Markup Language (XML) files, depending on the availability of the appropriate software, and covering Member State's geographical scope under Regulation (EU) 2018/1999;**
- (b) the information as specified in Articles 9 to 23 of this Regulation:**

The Slovak Republic is providing information on the anthropogenic GHG emissions and sinks as required in the Article 8(1). This information is included in the CRF tables 1990 – 2021 generated by the CRF Reporter software version 6.0.10 by the xml file as a part of annual GHG inventory submitted on January 15, 2023. Summary emissions data in GWP according to the IPCC Fifth Assessment Report (AR5)¹ are presented in the **Tables 1 – 3**.

The total national emissions of GHGs in the inventory year 2021 were estimated to be **41 301.42 Gg of CO₂ eq. excluding LULUCF** excluding indirect emissions and the net GHG emissions were 33 643.59 Gg of CO₂ eq. including LULUCF sector. The aggregated emissions of GHGs increase significantly in year 2021 excluding LULUCF, compared to the year 2020. It can be considered, that overall trend of the GHG emissions in Slovakia is stable with the decrease in the years marked with pandemic and decrease compared to the base year 1990 with more than 48% (44% excluding LULUCF). When the LULUCF sector is included to the net aggregated emissions in 2021, emissions increased by more than 4.1 Tg of CO₂ eq. compared to previous year 2020.

The major changes in the national inventory in the 2023 submission are caused by recalculations in agricultural (3.D) and waste sectors for whole time series in 5.B and 5.C.

Several general improvements in transparency of reporting, allocation of emissions and accuracy were made in this submission reflecting the ERT recommendations since the previous review. Major recalculations were made in agriculture and waste sectors and categories as recommended by the ERT or TERT during previous reviews. Further information on recalculations can be found in the **Table 4** of this Report.

The emissions without LULUCF in 2021 are higher than in 2020 and reached the level of the year 2016. GHG emissions increased mostly in energy and IPPU sectors, both in EU ETS and ESD parts across all categories, mostly in manufacturing industry, mineral production, chemical industry and metal industry.

The latest available GHG emission projections proposed emissions stabilisation as an evidence of the successful implementation of the policies and measures and their effect on the improvement in energy intensity and industrial production efficiency. During the whole period 1991 – 2021, the total greenhouse gas emissions in the Slovak Republic did not exceed the level of 1990.

The major share of the aggregated emissions excluding LULUCF in 2021 goes to the CO₂ emissions comprising about 85% of the total. The share of CH₄ emissions is about 9%, N₂O emissions about 4%, and F-gases emissions about 2% of the total, respectively. The share of gases is almost comparable with the 1990 base year structure.

Total CO₂ emissions excluding LULUCF in 2021 were estimated at 35 166.81 Gg with 43% reduction against base year. Emissions of CO₂ have increased in comparison with the previous inventory year

¹ https://archive.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf

2020 by 13% due to their increase in energy – manufactured industry; and IPPU sectors – metal industry.

Total CH₄ emissions excluding LULUCF in 2021 were estimated at 3 700.76 Gg of CO₂ eq. (132.17 Gg CH₄) with decrease by 55% in comparison with the base year. Emissions of CH₄ have remain the same compared to the previous inventory year 2020.

Total N₂O emissions excluding LULUCF in 2021 were estimated at 1 738.66 Gg of CO₂ eq. (6.56 Gg N₂O) with the reduction by 54% compared to the base year. Emissions of N₂O have slightly increased compared to the previous inventory year 2020 due to increase of emissions in transport sectors.

Total emissions of F-gases in 2021 were estimated at 695.18 Gg with the increase (HFCs) by more than 1.6 times if compared to the base year 1990. Increasing trend is visible in comparison with the previous year and the fluctuation in HFCs emissions is occurring in current inventory submission since the year 2014. The emissions of HFCs recorded increase in comparison with the previous year (2020) by 4%. The emissions of F-gases were approximately constant since 2010 because of the almost complete replacement of HFCs gases. Another reason of the change in trend is the use of HFC-32 and HFC-134a in mobile air conditioners (ACs). Coolant R134a showed continuing increasing trend mainly because of rising uses of cars with ACs. This trend stopped in 2010. It was caused by smaller purchases of cars in Slovakia since 2010, which resulted in a smaller bank of HFC-134a in Slovakia.

Total actual HFCs emissions reported in the category 2.F Product uses as substitutes for ODS were 672.37 Gg of CO₂ eq. in 2021 and they increased by 4% compared to the previous year. The increase is due the higher disposal emissions. This increasing trend is visible since the base year and is caused by supplying HCFCs gases by the HFCs.

The actual emissions of PFCs in the category 2.F did not occur in 2021². No NF₃ emissions are occurring in Slovakia. Emissions of HFCs, PFCs and SF₆ in Slovakia are only from consumption of the F-gases in industry (mostly aluminium production, construction, building and services sectors). Slovakia does not produce any of the F-gases.

The energy sector represents the major share of aggregated emissions in 2021 and covers about 27 417.42 Gg of CO₂ eq. (56% from total), the industrial processes sector covers 9 493.81 Gg of CO₂ eq. (19%), the agriculture sector about 2 504.96 Gg of CO₂ eq. (5%) and the waste sector 1 885.23 Gg of CO₂ eq. (4%). The sinks from LULUCF sector were estimated at the level of -7 657.83 Gg of CO₂ eq. in 2021, which means that removals are almost the same compared to the previous year.

The GHG emissions from energy sector based on sectoral approach data in 2021 were estimated to be 27 417.42 Gg of CO₂ eq., including the transport emissions (7 522.68 Gg of CO₂ eq.). This mean decrease by about 51% when compared to the base year and increase by 11% in comparison with the previous year 2020.

Emissions in the road transportation have increased by 7% compared to the year 2020 and increased by 10% in comparison with the base year.

The total emissions from industrial processes sector in 2021 were estimated to be 9 493.81 Gg of CO₂ eq. with the larger 17% increase compared to the previous year and decrease by 0.5% compared to 1990. Increase mostly occurred in the Metal industry.

The emissions from agriculture sector were estimated to be 2 504.96 Gg of CO₂ eq. It is decrease by 58% in comparison with the base year and slight decrease in comparison to the previous year level. The agriculture sector shows the highest (comparable with the energy sector) decrease in emissions since the base year 1990, namely due to significant decrease in cattle numbers and synthetic

² C-C₄F₈ occurred in the 2021 inventory, however the QA/QC processes still pending for confirmation of this consumption

fertilizers use. Recalculations were made in this submission reflecting the further implementation of the IPCC 2006 Guidelines and new national data.

The emissions from waste sector were estimated to be 1 885.23 Gg of CO₂ eq. Emissions are almost at the same level as in previous years (decrease by 1%) and the time series do not show significant fluctuations in trend. Compared to the base year, the emissions increased by almost 22%, due to increasing methane emissions from solid waste disposal sites. The emissions from incineration with energy use in municipal and industrial waste were included into energy sector, in several categories depending on the industry source (municipal waste in 1.A.1a – Energy Industries, other fuels). The revaluation of oxidation factor in the SWDS, methodological changes in waste incineration connected with the activity data (removing double counting) and small changes in wastewater treatment emissions were the driving force for the trend changes in the last submissions.

Indirect emissions from IPPU sector (solvents) were estimated in this submission. Time series was reconstructed with the base year on the level 88 Gg of CO₂ and the latest inventory year on the level 43.67 Gg of the CO₂. Total GHG emissions without LULUCF and with indirect CO₂ emissions were 41 345.08 Gg of CO₂ eq. and with LULUCF and with indirect CO₂ were 33 643.59 Gg of CO₂ eq.

Table 1: Summary of the GHG emissions in 2020 and 2021 according to the gases and sectors¹

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2020					
	CO ₂ equivalent (Gg)					
	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
1. Energy	23 737.03	751.57	178.25	NO	NO	NO
2. Industrial Processes	7 284.87	1.63	126.11	646.65	5.04	17.73
3. Agriculture	72.12	1 179.61	1 278.81	NO	NO	NO
4. LULUCF	-7 760.13	27.33	37.47	NO	NO	NO
5. Waste	2.61	1 767.13	137.97	NO	NO	NO
<i>Memo Items - International Transport</i>	<i>69.51</i>	<i>0.06</i>	<i>0.50</i>	<i>NO</i>	<i>NO</i>	<i>NO</i>
Total (excluding LULUCF)	31 096.63	3 699.94	1 721.14	646.65	5.04	17.73
Total (including LULUCF)	23 336.49	3 727.27	1 758.61	646.65	5.04	17.73

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2021					
	CO ₂ equivalent (Gg)					
	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆
1. Energy	26 413.46	801.42	202.53	NO	NO	NO
2. Industrial Processes	8 682.07	1.85	114.70	672.37	5.37	17.44
3. Agriculture	69.57	1 147.93	1 287.46	NO	NO	NO
4. LULUCF	-7 709.68	19.80	32.06	NO	NO	NO
5. Waste	1.70	1 749.57	133.96	NO	NO	NO
<i>Memo Items - International Transport</i>	<i>82.28</i>	<i>0.06</i>	<i>0.59</i>	<i>NO</i>	<i>NO</i>	<i>NO</i>
Total (excluding LULUCF)	35 166.81	3 700.76	1 738.66	672.37	5.37	17.44
Total (including LULUCF)	27 457.13	3 720.56	1 770.72	672.37	5.37	17.44

Table 2: Summary of the GHG emissions in 1990 – 2021 according to the gases¹

GREENHOUSE GAS EMISSIONS	Base year 1990	1991	1992	1993	1994	1995	1996	1997
	CO ₂ equivalent (Gg)							
CO ₂ emissions excluding net CO ₂ from LULUCF	61 472.83	53 286.44	48 886.84	46 351.17	43 756.98	44 144.95	44 026.13	44 098.21
CO ₂ emissions including net CO ₂ from LULUCF	52 009.32	43 004.13	37 967.02	35 623.89	33 621.94	34 567.71	34 534.85	34 826.05
CH ₄ emissions excluding CH ₄ from LULUCF	8 176.90	7 784.16	7 022.55	6 687.56	6 333.42	6 321.99	6 168.31	5 911.50
CH ₄ emissions including CH ₄ from LULUCF	8 189.34	7 794.45	7 036.86	6 714.36	6 340.64	6 330.64	6 180.35	5 920.86
N ₂ O emissions excluding N ₂ O from LULUCF	3 805.83	2 994.35	2 456.25	2 041.96	2 440.15	2 570.95	2 729.09	2 723.68
N ₂ O emissions including N ₂ O from LULUCF	3 924.09	3 099.38	2 560.93	2 150.42	2 534.00	2 652.59	2 807.16	2 793.36
HFCs	NO	NO	NO	NO	0.20	12.38	26.31	38.33
PFCs	283.05	278.43	259.11	162.10	137.74	119.24	36.62	36.11
SF ₆	0.06	0.04	0.04	0.09	18.16	10.47	11.51	11.83
Total (excluding LULUCF)	73 738.67	64 343.41	58 624.79	55 242.88	52 686.66	53 179.97	52 997.96	52 819.66
Total (including LULUCF)	64 405.87	54 176.43	47 823.96	44 650.87	42 652.70	43 693.03	43 596.79	43 626.53

GREENHOUSE GAS EMISSIONS	1998	1999	2000	2001	2002	2003	2004	2005
	CO ₂ equivalent (Gg)							
CO ₂ emissions excluding net CO ₂ from LULUCF	43 827.25	43 038.09	41 138.78	43 224.20	41 978.13	42 302.73	42 792.36	42 798.51
CO ₂ emissions including net CO ₂ from LULUCF	33 490.88	33 466.66	31 650.90	34 448.63	32 713.11	33 576.98	34 094.14	37 973.34
CH ₄ emissions excluding CH ₄ from LULUCF	5 756.43	5 652.92	5 414.10	5 259.54	5 140.12	4 914.14	4 893.13	4 865.34
CH ₄ emissions including CH ₄ from LULUCF	5 765.61	5 713.27	5 444.45	5 273.63	5 163.68	4 960.08	4 909.06	4 894.79
N ₂ O emissions excluding N ₂ O from LULUCF	2 444.70	2 063.80	2 308.28	2 614.47	2 553.27	2 516.16	2 717.05	2 686.76
N ₂ O emissions including N ₂ O from LULUCF	2 508.79	2 151.49	2 370.45	2 663.25	2 602.77	2 573.85	2 758.78	2 732.46
HFCs	50.73	71.82	98.20	130.29	167.96	201.17	240.28	277.09
PFCs	26.17	14.62	13.40	14.40	15.44	23.78	21.24	21.72
SF ₆	13.04	13.03	13.44	13.74	15.23	15.52	15.91	16.89
Total (excluding LULUCF)	52 118.31	50 854.29	48 986.21	51 256.63	49 870.15	49 973.50	50 679.97	50 666.31
Total (including LULUCF)	41 855.22	41 430.89	39 590.85	42 543.94	40 678.20	41 351.38	42 039.41	45 916.29

GREENHOUSE GAS EMISSIONS	2006	2007	2008	2009	2010	2011	2012	2013
	<i>CO₂ equivalent (Gg)</i>							
CO ₂ emissions excluding net CO ₂ from LULUCF	42 563.85	40 971.50	41 364.30	37 625.67	38 408.62	37 988.62	35 913.26	35 569.51
CO ₂ emissions including net CO ₂ from LULUCF	34 645.76	33 503.95	35 012.42	31 487.15	33 140.74	32 363.01	29 151.89	28 090.19
CH ₄ emissions excluding CH ₄ from LULUCF	4 699.70	4 578.24	4 566.17	4 394.71	4 379.66	4 335.43	4 198.18	4 181.46
CH ₄ emissions including CH ₄ from LULUCF	4 718.31	4 608.87	4 585.38	4 423.06	4 402.09	4 362.38	4 249.73	4 198.54
N ₂ O emissions excluding N ₂ O from LULUCF	2 802.07	2 737.08	2 794.31	2 403.84	2 366.42	1 899.89	1 692.89	1 727.44
N ₂ O emissions including N ₂ O from LULUCF	2 839.70	2 779.01	2 827.66	2 440.96	2 399.11	1 934.90	1 741.44	1 758.60
HFCs	323.94	368.16	431.50	492.20	569.22	576.43	602.07	620.99
PFCs	38.19	26.46	38.45	18.89	22.49	18.08	23.08	8.82
SF ₆	17.22	17.93	19.43	20.11	20.23	21.44	21.90	22.99
Total (excluding LULUCF)	50 444.97	48 699.38	49 214.16	44 955.41	45 766.63	44 839.90	42 451.37	42 131.22
Total (including LULUCF)	42 583.12	41 304.39	42 914.84	38 882.37	40 553.89	39 276.25	35 790.11	34 700.13

GREENHOUSE GAS EMISSIONS	2014	2015	2016	2017	2018	2019	2020	2021
	<i>CO₂ equivalent (Gg)</i>							
CO ₂ emissions excluding net CO ₂ from LULUCF	33 658.64	34 471.94	34 914.41	36 114.09	36 105.53	33 778.55	31 096.63	35 166.81
CO ₂ emissions including net CO ₂ from LULUCF	28 364.52	28 647.46	29 024.08	30 324.38	31 289.82	28 193.25	23 336.49	27 457.13
CH ₄ emissions excluding CH ₄ from LULUCF	3 974.12	3 980.85	3 927.50	3 897.02	3 783.44	3 756.24	3 699.94	3 700.76
CH ₄ emissions including CH ₄ from LULUCF	3 999.46	4 009.31	3 951.02	3 923.15	3 809.23	3 786.46	3 727.27	3 720.56
N ₂ O emissions excluding N ₂ O from LULUCF	1 856.68	1 689.55	1 816.97	1 682.92	1 695.16	1 718.44	1 721.14	1 738.66
N ₂ O emissions including N ₂ O from LULUCF	1 893.01	1 729.75	1 854.72	1 721.82	1 733.65	1 758.72	1 758.61	1 770.72
HFCs	626.14	704.84	647.95	710.19	675.62	688.69	646.65	672.37
PFCs	10.02	7.65	5.84	7.75	7.00	4.67	5.04	5.37
SF ₆	14.60	14.75	6.00	7.30	9.68	9.14	17.73	17.44
Total (excluding LULUCF)	40 140.20	40 869.58	41 318.67	42 419.28	42 276.43	39 955.73	37 187.12	41 301.42
Total (including LULUCF)	34 907.75	35 113.75	35 489.60	36 694.59	37 525.00	34 440.93	29 491.79	33 643.59

Table 3: Summary of the GHG emissions in 1990 – 2021 according to the sectors (determined as of 15. 01. 2023)¹

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year (1990)	1991	1992	1993	1994	1995	1996	1997
	CO ₂ equivalent (Gg)							
1. Energy	56 591.92	50 157.05	45 916.11	41 932.21	39 465.42	38 999.39	38 623.88	38 438.65
2. Industrial Processes	9 541.61	7 388.32	7 037.04	8 089.71	8 260.88	9 166.38	9 473.47	9 529.07
4. Agriculture	6 068.30	5 251.43	4 135.10	3 684.89	3 532.14	3 585.50	3 470.78	3 402.27
5. Land Use, Land-Use Change and Forestry	-9 332.80	-10 166.98	-10 800.83	-10 592.01	-10 033.96	-9 486.95	-9 401.17	-9 193.13
6. Waste	1 536.84	1 546.60	1 536.54	1 536.07	1 428.23	1 428.70	1 429.83	1 449.67
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1998	1999	2000	2001	2002	2003	2004	2005
CO ₂ equivalent (Gg)								
1. Energy	37 896.06	37 144.05	36 212.48	38 153.20	35 685.28	36 458.99	35 909.74	36 401.81
2. Industrial Processes	9 689.67	9 338.17	8 407.12	8 562.69	9 609.29	9 198.75	10 454.99	9 925.57
4. Agriculture	3 058.55	2 882.89	2 855.30	3 009.15	3 013.02	2 737.95	2 714.41	2 720.88
5. Land Use, Land-Use Change and Forestry	-10 263.09	-9 423.40	-9 395.36	-8 712.69	-9 191.95	-8 622.11	-8 640.56	-4 750.02
6. Waste	1 474.02	1 489.19	1 511.30	1 531.60	1 562.55	1 577.81	1 600.82	1 618.06
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2006	2007	2008	2009	2010	2011	2012	2013
CO ₂ equivalent (Gg)								
1. Energy	35 494.19	33 834.93	34 325.53	31 812.61	32 152.97	31 591.63	29 310.50	29 126.56
2. Industrial Processes	10 742.63	10 618.57	10 503.70	8 964.47	9 288.85	8 941.52	8 885.02	8 613.85
4. Agriculture	2 530.99	2 601.65	2 719.48	2 467.94	2 581.75	2 514.02	2 429.13	2 565.20
5. Land Use, Land-Use Change and Forestry	-7 861.85	-7 394.99	-6 299.32	-6 073.04	-5 212.74	-5 563.65	-6 661.26	-7 431.08
6. Waste	1 677.16	1 644.23	1 665.45	1 710.39	1 743.07	1 792.73	1 826.72	1 825.62
GREENHOUSE GAS SOURCE AND SINK CATEGORIES	2014	2015	2016	2017	2018	2019	2020	2021
CO ₂ equivalent (Gg)								
1. Energy	26 776.81	27 420.46	27 584.34	28 515.88	28 353.47	26 910.32	24 666.84	27 417.42
2. Industrial Processes	8 829.68	9 029.86	9 244.45	9 524.85	9 506.64	8 638.80	8 082.04	9 493.81
4. Agriculture	2 698.26	2 516.87	2 636.22	2 492.06	2 512.48	2 529.01	2 530.54	2 504.96
5. Land Use, Land-Use Change and Forestry	-5 232.46	-5 755.83	-5 829.07	-5 724.69	-4 751.43	-5 514.80	-7 695.33	-7 657.83
6. Waste	1 835.45	1 902.38	1 853.66	1 886.50	1 903.84	1 877.59	1 907.70	1 885.23

Article 8(2): draft the national inventory report referred to in Article 26(3) of Regulation (EU) 2018/1999 ('national inventory report', 'NIR') based on the outline for greenhouse gas inventory documents, and following the rules provided for in this Regulation. Member States shall include the information reported pursuant to Articles 9, 10, 12 and 14 to 18 of this Regulation in the national inventory report or in a separate Annex to the national inventory report and indicate clearly in accordance with Annex VII where the information is provided:

The Slovak Republic is enclosing as a part of the January 15, 2023 submission also preliminary sectoral Chapters of the SVK NIR 2023.

Key categories were assessed by Approach 1 by the level of emissions in years 1990 and 2021 and the trend in emissions for the year 2021 with and without LULUCF categories and those key categories have been chosen, whose cumulative contribution is less than 95%. The identification includes all reported greenhouse gases CO₂, CH₄, N₂O, HFCs, PFCs and SF₆ and all IPCC source categories with LULUCF categories (in absolute values) performed with the detailed categorization. The detailed key categories will be included in the March 15, 2023 submission.

In 2021, the Slovak Republic determined using the Approach 1 by the level assessment, 30 key categories with LULUCF and 27 key categories without LULUCF.

In 2021, the Slovak Republic determined using the Approach 1 by the trend assessment, 34 key categories with LULUCF and 29 key categories without LULUCF.

List of key categories is almost identical for the base year 1990 and for the latest inventory year.

The most important key categories are fuel combustion in energy sector for CO₂, road transport, forest land, direct N₂O emissions from agricultural soil or methane emissions from SWDS.

Article 9: report the reasons for recalculations of greenhouse gas emissions and removals referred to in point (d) of Part 1 of Annex V to Regulation (EU) 2018/1999 in the years 1990, 2005 and 2020; how the time series consistency for all reported years is maintained in writing in the form of a draft of the dedicated summary chapter on recalculations of the national inventory report:

The Slovak Republic is providing information on the changes and recalculations of the anthropogenic GHGs emissions and removals as required in the Article 9. This information is included in the CRF tables 8s1 – 8s4 for the years 1990 – 2020 generated by the CRF Reporter software version 6.0.10 as a part of annual GHG inventory submitted on January 15, 2023. The reason for recalculations of the base year or period and of year 2018 referred to in Article 9 of Implementing Regulation (EU) No 2020/1208 are shown in the sectoral NIR reports 2023 accompanied this submission.

Description and explanation of recommendations connected with the recalculations are included in the **Table 4** of this Report and the table "SVK_Art10_AnnexVIII_Recommendations_15-01-2023". Reporting on major changes to methodological descriptions for the year 2020 is shown in the sectoral tables of used methodologies for the EU key categories and emission factors accompanied this submission.

Table 4: List of recalculations in January 15, 2023 submission (version 1) against April 15, 2022 submission (version 4) with short explanation

RECALCULATED CATEGORY (SUBMISSION 2022 v4 VERSUS SUBMISSION 2023 v1)		YEARS	GHG AFFECTED	EXPLANATION
1. ENERGY SECTOR				
2. INDUSTRIAL PROCESSES SECTOR				
3. AGRICULTURE				
3.B.2.4	Manure Management – Other Livestock – Poultry	2020	N ₂ O	Revision of AWMS due to calculation error in 2020.
3.B.2.5	Manure Management – Indirect N ₂ O Emissions	2020	N ₂ O	Recalculation in the category 3.B.2.5 as an impact of changes in 3.B.2.4.
3.D.1.2.a	Animal Manure Applied to Soils	2020	N ₂ O	Recalculation in the category 3.D.1.2.a as an impact of changes in 3.B.2.4.
3.D.1.4	Crop Residues	1990-2020	N ₂ O	The recalculation of crop residues was done due to the implementation of FracRemove for meadows and revised FracRemove parameter in cereals.
3.D.2	Indirect N ₂ O Emissions From Managed Soils	1990-2020	N ₂ O	Revision of emissions due to recalculations in 3.D.1.4 and 3.B.2.4
4. LULUCF				
4.G	Harvested Wood Products	2020	CO ₂	The recalculation was realised only in HWP category in the year 2020. The main reason was correction of input activity data – wood base panel and paper and paper board. Recalculated values for the whole sector differ from the submission in 2023 of 1.32% in year 2020, the net CO ₂ eq. removals increased by 0.04% in average. Recalculated values for the HWP differ from the submission in 2023 of 68.38% in year 2020, the net CO ₂ eq. removals increased by 2.21% in average.
5. WASTE				
5.B.1.a	Biological Treatment of Solid Waste – MSW and Other Waste Composting	2020	CH ₄ , N ₂ O	This recalculation is connected with the correction of activity data of composting of municipal waste in 2020. The revision of new data is connected with data refinement provided by Statistical Office of the Slovak Republic.
5.B.2.b	Anaerobic Digestion at Biogas Facilities – Other Waste	2001-2020	CH ₄	According to the Improvement Plan 2022, the methane emissions for category 5.B.2.b - Anaerobic Digestion at Biogas Facilities – Other (non-municipal) was estimated since the year 2001.
5.C.1	5.C.1.1 Waste Incineration Biogenic 5.C.1.2 Non-Biogenic	1990-2020	CO ₂ , CH ₄ , N ₂ O	Emissions of CO ₂ , CH ₄ and N ₂ O and for the category Waste Incineration – industrial waste and MSW (biogenic and anon-biogenic share) were recalculated since the base year in this submission since the base year due to the improvements in activity data.
5.D.1	Wastewater Treatment - Protein Consumption	2020	N ₂ O	Protein consumption for the year 2020 was updated based on the statistics reported by the ŠÚ SR.

Article 10(1): report the information on the steps taken to improve inventory estimates referred to in point (g) of Part 1 of Annex V to Regulation (EU) 2018/1999 in accordance with the formats set out in Annex VIII to this Regulation.

Information on implemented improvements are listed in the sectoral chapters of the NIR 2023 accompanied this submission.

Article 10(2): referred to in paragraph 1, Member States shall cover both issues raised for the first time in the most recent respective review reports and issues repeated from previous review reports.

In some cases recommendations raised during the UNFCCC centralized review 2022 and ESD review in the year 2022 were already implemented in 2023 submission.

2022 annual review of national greenhouse gas inventory data pursuant to Article 19(2) of Regulation (EU) No 525/2013

The requirements for the Union review of the national inventory data submitted by Member States are set out in Article 19 of the MMR. The details concerning the review process, such as the timing and steps of conducting of the annual and comprehensive reviews are set out in Chapter III and Annex XVI of the Commission Implementing regulations (EU) No 749/2014. The centralized review 2022 concerning Member States' inventories for the compliance year 2020 was carry out as planned during the spring 2020. Second step of the review of Slovakia was not necessary in the review cycle 2022. Therefore, Final Review Report 2022 annual review of national greenhouse gas inventory data pursuant to Article 19(2) of Regulation (EU) No 525/2013 with no recommendation was provided by the April 20, 2022. During the first step of the review, the EU team raised 10 issues (2 in energy, 1 in IPPU, 3 in agriculture, 3 in LULUCF and 1 in waste). These were satisfactory resolved and no unresolved issues have been forwarded to step 2.

UNFCCC centralised review 2022:

Slovakia received the provisional main findings on October 22, 2022.

Slovakia was reviewed in the UNFCCC centralised review during the week from 17th – 22th October 2022. As a result of the 2022 submission' review of Slovakia, Provisional main and additional findings were received in the end of review week. There was no *Saturday paper* but the resubmission in LULUCF and KP LULUCF sectors was required. Re-submission has impact on GHG total: in the base year 1990 – 1.3% and in 2020 – 4.1%, but only with LULUCF).

List of the provisional main findings includes several recommendations (no general recommendation) which have mostly transparency character and can be resolved by including some additional rationalisation into NIR. Slovakia provided comments to this report without answer yet.

Recommendations from *List of the provisional main findings* with the comments are listed in the tabular format in the "SVK_Art10_AnnexVIII_Recommendations_15-03-2023" included in this submission.

Article 11.1: reporting on inventory methods, emission factors and on related methodological descriptions for Union key categories:

(a) summary information on the methods and emission factors used for the Union's key categories within the relevant XML files of the common reporting tables;

Information is provided in the SVK CRF Tables 1990 – 2021 and accompanied xml file in the 2023 submission of GHG inventory of Slovakia.

(b) for those Union key categories, where information on methods and emission factors is not contained in the common reporting tables, information in accordance with Part 3 of Annex IX of this Regulation;

Part of the SVK GHG inventory submission 2023 (15 January) is a Table “SVK_Art11_AnnexIX_Methods, Emissions Factors and Methodological Descriptions_15-01-2023” with the detail key category description of methodological approaches and emission factors.

(c) updated summary methodological descriptions for the Union’s key categories in accordance with the format set out in Part 4 of Annex IX.

Part of the SVK GHG inventory submission 2023 (15 January) is a Table “SVK_Art11_AnnexIX_Methods, Emissions Factors and Methodological Descriptions_15-01-2023” with the detail key category description of methodological approaches and emission factors.

Article 12.1: report at least approach 1 uncertainty estimates referred to in point (m) of Part 1 of Annex V to Regulation (EU) 2018/1999 in accordance with the format set out in Annex X to this Regulation:

The uncertainty assessment by Approach 1 will be updated in March 15, 2023 submission. Quantification of emissions uncertainty by level and trend assessment is calculated by using Approach 1 method published in the IPCC 2006 GL. The Approach 1 without LULUCF estimated the 2.23% level uncertainty and the 1.38% for the trend uncertainty in 2020 (11.60% and 4.88% with LULUCF).

The uncertainty assessment was prepared by using the more sophisticated Approach 2 Monte Carlo method. The Approach 2 uncertainty analyses for fuel combustion in energy sector (including transport) according to the fuels classification was estimated in the range of confidence interval (-2.38%; +3.12%) in 2015. The new calculation of Monte Carlo uncertainty (approach 2) in the Energy sector and categories (including transport) will be performed in the 2024 submission. The Approach 2 uncertainty analyses for industrial processes and product use sector including solvent and other product use sector according to the technological emissions was estimated in the range of confidence interval (-5.57%; +5.68%) in 2021. Results of the Monte Carlo method to estimate uncertainty were published in following papers^{3,4}

More information and calculations are included in the table “SVK Art12_AnnexX_Uncertainty and completeness_15-01-2023”.

Article 12.2: report the information on the general assessment of completeness referred to in point (m) of Part 1 of Annex V to Regulation (EU) 2018/1999 in the national inventory report, specifying:

(a) the categories, which were reported as not estimated (NE), as defined in the transparency MPGs, and detailed explanations for the use of this notation key especially where the greenhouse gas inventory guidelines provide methods for estimation of greenhouse gases:

Assessment of completeness is one of the elements of quality control procedure in the inventory preparation on general and sectoral level. The completeness of the emission inventory is improving from year to year and the updates are regularly reported in the national inventory reports. The completeness checks for ensuring time series consistency is performed regularly.

The list of categories reported by the notation keys is provided in the CRF Table 9. Whole overview of notation keys with detailed explanation will be published in the SVK NIR 2023 and submit on March 15, 2023. Information is divided to sectors and categories.

Several categories are reported as not occurring (NO) due to the not existence of the emission source or the source is out of threshold and measurement range.

³ J. Szemesova, M. Gera: Contributions to Geophysics & Geodesy, 37/3, 2007

⁴ Szemesová J., Gera M. Uncertainty analysis for estimation of landfill emissions and data sensitivity for the input variation, Climatic Change DOI 10.1007/s10584-010-9919-1, 2010

If the methodology does not exist in the IPCC Guidelines, the notation key not applicable (NA) was used. Several NE key categories have been reported in 2023 submission for 1990 – 2021.

Three reasons for not estimated (NE) categories are:

- no methodology is available;
- potential emissions/removals will under the threshold level of emissions in comparison to GHG emissions total;
- insufficient activity data (mostly for indirect GHG emissions like CO, SO₂ or NMVOC).

Table 5: List of NEs in the 2023 submission

GAS	SECTOR	CATEGORY	DESCRIPTION
CO ₂	Agriculture	General	Indirect CO ₂ emissions are not estimated in agriculture due to a lack of available methodology on atmospheric oxidation.
CO ₂	Energy	1.B Fugitive Emissions from Fuels/1.B.2 Oil and Natural Gas and Other Emissions from Energy Production/1.B.2.a Oil/1.B.2.a.4 Refining / Storage	Change of notation according to FCCC/ARR 2019 recommendation E.38; emissions are not estimated because the 2006 IPCC guidelines do not include methodologies to estimate these emissions.
CH ₄	IPPU	2.C Metal Industry/2.C.1 Iron and Steel Production/2.C.1.b Pig Iron	Used methodology does not allow to distinguish the emissions
CH ₄	IPPU	2.C Metal Industry/2.C.1 Iron and Steel Production/2.C.1.d Sinter	Used methodology does not allow to distinguish the emissions
CH ₄	IPPU	2.C Metal Industry/2.C.1 Iron and Steel Production/2.C.1.e Pellet	Used methodology does not allow to distinguish the emissions
CH ₄	IPPU	2.D Non-energy Products from Fuels and Solvent Use/2.D.1 Lubricant Use	No methodology is provided in the 2006 IPCC GL.
CH ₄	IPPU	2.D Non-energy Products from Fuels and Solvent Use/2.D.2 Paraffin Wax Use	No methodology is provided in the 2006 IPCC GL.
CH ₄	Waste	5.B Biological Treatment of Solid Waste/5.B.2 Anaerobic Digestion at Biogas Facilities/5.B.2.b Other (please specify)	The emissions from this category is energy recovered in the category 1.A.5
N ₂ O	Agriculture	General	Part of the indirect emissions of N ₂ O are included in the sectoral tables for manure management and agricultural soils indirect emissions from other than agricultural sources are not estimated.
N ₂ O	Agriculture	3.D Agricultural Soils/3.D.1 Direct N ₂ O Emissions From Managed Soils/3.D.1.6 Cultivation of Organic Soils	The emissions are under the threshold of significance. See NIR Chapter Agriculture.
N ₂ O	Energy	1.B Fugitive Emissions from Fuels/1.B.2 Oil and Natural Gas and Other Emissions from Energy Production/1.B.2.a Oil/1.B.2.a.4 Refining / Storage	Change of notation according to FCCC/ARR 2019 recommendation E.38; emissions are not estimated because the 2006 IPCC guidelines do not include methodologies to estimate these emissions.
N ₂ O	IPPU	2.D Non-energy Products from Fuels and Solvent Use/2.D.1 Lubricant Use	No methodology is provided in the 2006 IPCC GL.
N ₂ O	IPPU	2.D Non-energy Products from Fuels and Solvent Use/2.D.2 Paraffin Wax Use	No methodology is provided in the 2006 IPCC GL.

Categories included elsewhere (IE) are listed also in the CRF Table 9 with the explanations of reallocation.

(b) the geographical coverage of the greenhouse gas inventory, and any differences between the geographical coverage under the UNFCCC and the Paris Agreement and under Regulation (EU) 2018/1999:

Both direct and indirect GHGs as well as precursor gases are covered by the inventory of the Slovak Republic. The geographic coverage is complete; the whole territory of the Slovak Republic is covered by the inventory.

Article 13: report information on indicators referred to in point (e) of Part 1 of Annex V to Regulation (EU) 2018/1999 in accordance with the format set out in Annex XI:

The Slovak Republic is providing information on the annual indicators in the table “SVK_Art13_AnnexXI_Indicators_15-01-2023” for the year 2021 as a part of annual GHG inventory submitted on January 15, 2023. Information on economic indicators is available based on data provided by the Statistical Office of the Slovak Republic.

Information on indicators is available in the template (tables of priority, additional priority and supplementary indicators data). Statistical information is based on the information directly provided by the Statistical Office of the Slovak Republic, Departments of National Accounts, Cross-cutting Statistics and Production Statistics. The additional information was completed from the online statistical database SLOVSTAT and PRODSLOV (www.statistics.sk). The time series are not yet complete due to the changes in statistical methodology in the previous years. Statistical information was revised with NACE rev2 classification since 2015. Within the revision of annual national accounts finalised on September 2022, methodology for National Accounts was updated.

Article 14.1: Member States shall report the information referred to in point (h) of Part 1 of Annex V to Regulation (EU) 2018/1999 in accordance with the format set out in Annex XII to this Regulation:

The Slovak Republic is providing information on the actual or estimated allocation of the verified emissions included in the EU ETS to the national GHG inventory as required in the Article 14.1. This information is included in the tabular format “SVK_Art14_AnnexXII_Consistency with ETS_15-01-2023” as a part of annual GHG inventory submitted on January 15, 2023. Further details can be found in the **Table 6** below and will be included in the SVK NIR 2023 published on March 15, 2023.

Table 6: Actual allocation of the verified emissions reported by installations and operators under Directive 2003/87/EC for the year 2021¹

CATEGORY	GAS	GHG INVENTORY EMISSIONS	VERIFIED EMISSIONS UNDER DIRECTIVE 2003/87/EC	VERIFIED EMISSIONS/ INVENTORY EMISSIONS
		Gg of CO ₂ or CO ₂ eq.		Ratio in %
Greenhouse gas emissions (total emissions without LULUCF for GHG inventory and without emissions from 1A3a Civil aviation, total emissions from installations under Article 3h of Directive 2003/87/EC)	Total GHG	41 345.08	20 898.87	50.55%
CO ₂ emissions (total CO ₂ emissions without LULUCF for GHG inventory and without emissions from 1A3a Civil aviation, total emissions from installations under Article 3h of Directive 2003/87/EC)	CO ₂	35 166.81	20 836.89	59.25%
1.A Fuel combustion activities, stationary combustion	CO ₂	18 876.50	12 264.76	64.97%
1.A.1 Energy industries	CO ₂	6 947.88	6 232.11	89.70%
1.A.2 Manufacturing industries and construction	CO ₂	6 983.44	6 028.94	86.33%
1.A.3 Transport	CO ₂	7 436.38	120.90	1.63%
1.A.4 Other sectors	CO ₂	4 968.27	3.70	0.07%

CATEGORY	GAS	GHG INVENTORY EMISSIONS	VERIFIED EMISSIONS UNDER DIRECTIVE 2003/87/EC	VERIFIED EMISSIONS/ INVENTORY EMISSIONS
		Gg of CO ₂ or CO ₂ eq.		Ratio in %
1.B Fugitive emissions from fuels	CO ₂	14.30	NO	0.00%
2.A Mineral products	CO ₂	2 335.45	2 300.06	98.48%
2.B Chemical industry	CO ₂	1 212.59	1 368.84	112.89%
2.C Metal production	CO ₂	4 786.72	4 782.33	99.91%
2.B Chemical industry (Nitric acid production)	N ₂ O	56.64	56.64	100.00%
3.C Metal production (Aluminium production)	PFCs	5.34	5.34	100.00%

Article 14.2: report the information on results of the checks referred to in point (i) of Part 1 of Annex V of Regulation (EU) 2018/1999 in a textual format:

The Slovak Republic is providing information on the results of the checks performed on the consistency reported GHG emissions with the verified emissions included in the EU ETS as required in the Article 14.2. This information is included in the “SVK_Art14_AnnexXII_Consistency with ETS_15-01-2023” as a part of annual GHG inventory submitted on January 15, 2023.

Based on preliminary analyses, total GHG emissions verified under the EU ETS represent 50.55% on the total GHG emissions (without LULUCF and domestic aviation) based on January 15, 2023 inventory submission. The share of the EU ETS emissions is comparable with the share of the EU ESR emissions in the Slovak Republic. This progress was analysed and the resulting outcomes refer to increasing of energy effectivity and decreasing of emissions in large point sources included in the EU ETS scheme. The number of installations fell under the threshold to be included into the scheme and therefore, the EU ESR emissions increased inter-annually.

Total CO₂ emissions verified under the EU ETS represent 59.25% on the total CO₂ emissions (without LULUCF and domestic aviation) based on January 15, 2023 inventory submission.

Total N₂O emissions verified under the EU ETS represent 3.26% on the total N₂O emissions (without LULUCF and domestic aviation) based on January 15, 2023 inventory submission.

Total PFCs emissions verified under the EU ETS represent 100% on the total PFCs emissions based on January 15, 2023 inventory submission.

Article 15.1: report information on the results of the checks referred to in point (j)(i) of Part 1 of Annex V to Regulation (EU) 2018/1999 and on the consistency of the data pursuant to point (b) of Part 1 of Annex V to Regulation (EU) 2018/1999 in a textual format, specifying:

(a) whether the emissions estimates of carbon monoxide (CO), sulphur dioxide (SO₂), nitrogen oxides (NO_x) and volatile organic compounds, in inventories submitted by the Member State under Directive (EU) 2016/2284⁵ are consistent with the corresponding emission estimates in greenhouse gas inventories under Regulation (EU) 2018/1999;

(b) the submission dates of the reports under Directive (EU) 2016/2284 that were compared with the inventory submission under Regulation (EU) 2018/1999.

According to the new rules for the reporting of the air pollutants recalling the Article 8(1) and the Annex I of the NECD, annual emission reporting requirements as referred to in the first subparagraph of Article 8(1) for the year 2021 was set on 15 February 2023. Therefore, it is not possible to report

⁵ Directive was amended as follow: Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC

preliminary emissions these pollutants for the year 2021 in this report. Emissions of the CO, NO_x, SO₂ and NMVOC for the year 2021 will be reported in the March 15, 2023 resubmission of the annual GHGs inventory submission 2023.

The Slovak Republic is providing here the final estimate of emissions of CO, NO_x, SO₂ and NMVOC for the year 2020 resubmitted under the NECD on March 15, 2022, as required in the Article 15.1 in this report. This information is included in the CRF tables 1990 – 2020 generated by the CRF Reporter software as a part of annual GHG inventory submitted on January 15, 2023.

The overview of the final NO_x, CO, NMVOC and SO₂ emissions for the year 2020 and reporting on consistency of the reported data on air pollutants in the table “*SVK_Art15_AnnexXIII_Consistency with air pollution data_15-01-2023*” is accompanied January 15, 2023 submission.

Article 15.2: where the checks referred to in paragraph 1 result in differences of more than +/-5 % between the total emissions excluding the Land Use, Land Use Change and Forestry (LULUCF) for a particular air pollutant reported under Regulation (EU) 2018/1999 and under Directive (EU) 2016/2284, the Member State concerned shall, in addition to the textual information referred to in paragraph 1, report information for that air pollutant in accordance with the format set out in Annex XIII to this Regulation:

No differences occurred in this matter.

Article 15.3: report only the information referred to in paragraph 1 if the difference of more than +/- 5 % referred to in paragraph 2 derives from correction of data errors or from differences in geographical coverage or scope of application between the respective legal instruments:

The explanation of differences for the NECD and GHG inventories on air pollutants for the year 2018 is provided in the table “*SVK_Art15_AnnexXIII_Consistency with air pollution data_15-01-2023*” is accompanied January 15, 2023 submission.

The overview of NO_x, CO, NMVOC and SO₂ emissions for the year 2020 and reporting on consistency of the reported data on air pollutants in the Tabular format specified in Annexes II to the Implementing Regulation (EU) No 749/2014 (Article 7) of the European Commission accompanied March 15, 2022 submission. Several changes and recalculations were introduced into 2022 NECD submission. Among others for example:

- In the IPPU sector, emissions from the category 2.C.4 were reallocated to the category 2.C.7.c.
- In the transport, a new methodology for the non-road transport categories was implemented for the whole time-series.
- Emissions from road transport were redistributed, as the updated version of COPERT was used (switch from version 5.3 to 5.5).
- In the Agriculture sector, emissions in the category 3.B were recalculated due to implementation of mitigation measures based on long-term plants and new methodology provided and recommended by the TFEIP.
- The recalculation of emissions from the application of inorganic fertilizers was performed in 2022 submission. This revision was based on new consumption of fertilizers in the soil for the years 2000 – 2011. The revision was prepared in a cooperation with the Central Control and Testing Institute in Agriculture (ÚKSÚP). The Statistical Office of the Slovak Republic assumed the revised data and prepared resubmission to the EUROSTAT.
- The recalculation of emissions from the application of sludge from wastewater treatment plants was performed, because of the implementation of a new database of industrial sludge

consumption for agricultural purposes. The source of data comes from the Statistical Office of the Slovak Republic. Simultaneously, the data set used in the emissions estimation is consistent with the data used and presented in the Waste sector.

- In addition, the recalculated data on pollutants (indirect GHG emissions) is provided in the 5.C categories. In the category 5.C.b.i, emissions from industrial sludge were calculated for the first time as well as sewage sludge incineration in the category 5.C.b.iv..

Final data on NO_x, CO, NMVOC and SO₂ emissions for the years 1990 – 2021 (and improved time series based on recalculations) will be included in the GHG inventory submitted on March 15, 2023 after NECD and CLRTAP submissions (February 15, 2023).

Article 16: report the information on the results of the checks referred to in point (j)(ii) of Part 1 of Annex V to Regulation (EU) 2018/1999 in a textual format, specifying:

The Slovak Republic is providing information on the results of the checks performed on the consistency of the fluorinated greenhouse gases used to estimate emissions in preparation of the GHG inventories as required in the Article 16.

(a) the checks performed by the Member State concerning the level of detail, the data sets and the submissions compared:

Checks are carried out according to the data from:

- Operators (data sent to Ministry of Environment on the basis of EU Regulations No. 842/2006 and 517/2014).
- Manufacturers, importers, exporters and service, assembling organizations reported over www.szchkt.org by refrigerant.
- According to data from users of SW Leaklog on www.szchkt.org.

The data based on the first two bullets allows to calculation of total consumption of individual F-gases in Slovakia. The data from the SW Leaklog allows calculating the usage of individual F-gases in different categories on the basis of refrigerants leaks. Results of these two approaches were compared.

(b) the main results of the checks and explanations for the main inconsistencies:

Due to the method of obtaining information through www.szchkt.org the most significant data are data on the import, sale refrigerants (F gases are not produced in Slovakia), which are compared with data reported by installation and service organization about their use.

The total difference between the data calculated according to the article (a) was less than 2.0% in 2021. The main difference was in the use of R134a at mobile AC. In this area there are very many small service organizations, which are difficult to monitor. Therefore, the data in this area are corrected by using top-down approach.

(c) whether the data collected by operators under Article 6(1) of Regulation (EU) No 517/2014 of the European Parliament and of the Council (10) were made use of and how:

Data collected by operators under Article 6(1) of Regulation (EU) No 517/2014 were used as it was described in part (a).

(d) the reasons why the checks were not considered to be relevant, where those checks were not performed:

The checks were done, see part (a), above.

Article 17.1: report information on the results of the checks referred to in point (j)(iii) of Part 1 of Annex V to Regulation (EU) 2018/1999 in a textual format, specifying the differences between the reference approach calculated on the basis of the data included in the greenhouse gas inventory and the reference approach calculated on the basis of the energy statistics reported pursuant to Article 4 and Annex B to Regulation (EC) No 1099/2008 of the European Parliament and of the Council (11):

The Slovak Republic is providing information on the results of the checks performed on the consistency reported GHG emissions with the energy data reported pursuant to Article 4 of and Annex B to the Regulation (EC) No 1099/2008 as required in the Article 17. This information is included in the table "SVK_Art17_AnnexXIV_Consistency with energy statistics_15-01-2023" submitted on January 15, 2023.

The Statistical Office of the Slovak Republic published energy statistics ENERGY 2021 on their website and the EUROSTAT database published energy statistics online. The correct comparison of the national GHG inventory energy data and the energy statistics as it is written in the Article 17 of the Commission Implementing Regulation (EU) No 2020/1208 was prepared by the deadline of this submission.

Table of the Annex VI contains information from the national GHG inventory submission 2023 and the background data provided by the Statistical Office of the Slovak Republic to the NIS SR based on contract (not published). This information contains also information on average NCV, which are not consistent with the NCV data used by EUROSTAT. Therefore, inconsistencies can be higher as usual.

Article 17.2: report the quantitative information and explanations for differences of more than +/- 2 % in the total national apparent fossil fuel consumption at aggregate level for all fossil fuel categories for the year X-2 referred to in paragraph 1 in accordance with Annex XIV to this Regulation:

Based on analyses provided, the consistency of national data reported in the reference approach is in good agreement with the data reported for the EUROSTAT. Differences recognised are mostly caused by rounding and by using national (country specific) NCVs.

Therefore, in fossil solid fuels difference is -0.10% (lower in national inventory), in fossil liquid fuels difference is -0.00014% (lower in national inventory), and gaseous fossil fuels with difference 0.37%, (only natural gas is reported here). Major inconsistencies occurred in waste – non-biomass fraction: -53.89% (lower in national inventory), According to the IPCC 2006 Guidelines, only non-biomass fraction of waste is reported is RA. Country specific NCV is used in RA (NCV used by the Statistical Office of the Slovak Republic is more than 40% higher than NCV used in inventory due to different methodology used by the statistics).

Article 18: clearly state in the relevant chapters of the national inventory report if there were no changes in the description of their national inventory systems or, if applicable, of their national registries referred to in points (k) and (l) of Part 1 of Annex V to Regulation (EU) 2018/1999 since the previous submission of the national inventory report:

There were no significant changes in the arrangement of the National Inventory System during inventory year 2022. National Inventory System description is provided in the Chapter 1.2 of the latest SVK National Inventory Report 2020 published in April 2022. However, several changes of the experts occurred during the year 2022. SVK NIS is continuing in the process of strengthen capacity among the national system in line with the improvement and prioritisation plans. The uncertainties calculations were previously based on external cooperation, now (since the year 2021), an internal expert is responsible for all sectors across inventory. In addition, a new expert was involved in the cropland category to strengthen new calculations on land-based matrix and new expert was involved into agricultural team. During previous years, the several new institutions were involved in the inventory,

among others in transport (Control and Testing Body for road vehicles), Ministry of Transport of the Slovak Republic – Section of Buildings (for buildings energy balance mostly focusing of residential heating and cooling), State Nature Protection Body (for wetlands identification), new internal (SHMÚ) expert on emission projections and continuing of harmonization process between the air pollutants and GHG inventories.

Figure and tables below indicate structure and responsibilities of the SVK NIS. On the **Figure 1** a structure of the NIS is depicted, where the Committee on CCP is intergovernmental body responsible for climate change policy implementation on cross-ministerial level. In the **Table 7** is updated list of internal experts within SHMÚ and in the **Table 8** is a list of external experts and institutions within the NIS SR.

Figure 1: Structure and responsibilities of the National Inventory System of the Slovak Republic

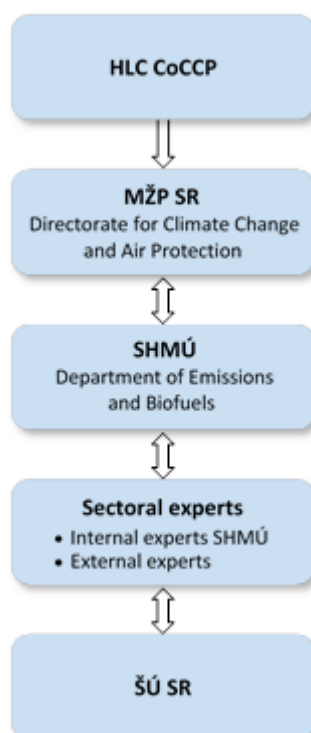


Table 7: List of internal experts in the National Inventory system of Slovak Republic

INTERNAL EXPERTS - SHMÚ		
INSTITUTION	NAME	RESPONSIBILITY
Dept. of Emissions and Biofuels	Ms. Janka Szemesová	NIS coordinator
Dept. of Emissions and Biofuels	Ms. Lenka Zetochová	Deputy of NIS coordinator and data manager
Dept. of Emissions and Biofuels	Mr. Ján Horváth	Energy expert
Dept. of Emissions and Biofuels	Mr. Marcel Zemko Mr. Jozef Orečný	Emission projections experts
Dept. of Emissions and Biofuels	Ms. Michaela Câmpian Ms. Zuzana Jonáček	Other pollutant experts
Dept. of Emissions and Biofuels	Ms. Kristina Tonhauzer	Agricultural expert
Dept. of Emissions and Biofuels	Ms. Monika Jalšovská	NEIS expert
Dept. of Water Quality	Ms. Lea Mrafková	GHG inventory in wastewater sector
Dept. of Numerical Forecasting Models and Method	Mr. Martin Petraš	Uncertainty analyses, QA activity

Table 8: List of main external experts, institutions and data provider in the NIS SR

EXTERNAL INSTITUTIONS/EXPERTS		
INSTITUTION	NAME	RESPONSIBILITY
Profing – company for environmental services in GHG	Mr. Ján Judák	Reference approach and fugitive emission preparations
Ecosys Slovakia – company for environmental services in energy	Mr. Jiří Balajka	Consultations in energy and emission projections
National Forest Centre Zvolen	Mr. Ivan Barka Mr. Tibor Priwitzer Mr. Pavel Pavlenda	GHG inventory in Forest Land and KP LULUCF
Animal Production Research Centre	Ms. Zuzana Palkovičová Mr. Ondrej Pastierik Mr. Miroslav Záhradník	GHG inventory in agriculture – animal production
Research Institute on Soil Protection Bratislava National Agricultural and Food Institute	Mr. Michal Sviček Mr. Pavol Bezák Ms. Kristína Buchová	Data provider in agriculture sector – soils, LULUCF Cropland and fertilisers
Faculty of Chemical Technology of the Slovak Technical University Bratislava	Mr. Vladimír Danielik Mr. Juraj Labovský	GHG inventory in industrial processes and solvent use sectors and energy – sectoral approach Consultation in fuel balance
Central Control and Testing Institute in Agriculture	Mr. Štefan Gáborík Ms. Maggioni-Brázová Ildikó	Data provider in the Agricultural sector – soil nutrition
Faculty of Chemical Technology of the Slovak Technical University Bratislava	Mr. Igor Bodík	GHG inventory in waste – wastewater
Independent Expert	Mr. Marek Hrabčák	GHG inventory in waste – SWDS
Statistical Office of the Slovak Republic – Department of Cross-sectoral Statistics	Ms. Maria Lexová	Statistical data provider
Slovak Association for Cooling and Air Conditioning Technology		F-gases data provider
SPIRIT Information Systems – IT services, NEIS databases provider	Mr. Jozef Skákala	NEIS provider, consultation on the NACE classification of sources
ICZ Slovakia a.s.	Ms. Eva Vicenová	National Registry focal point
Ministry of Economy	Mr. Juraj Novák	Data provider for renewables
Grassland and Mountain Agriculture Research Institute	Mr. Štefan Pollák	GHG inventory in Grassland

The following changes to the national registry of Slovakia have occurred in 2022.

Table 9: Changes to the national registry of Slovakia which occurred in 2022

REPORTING ITEM	DESCRIPTION
15/CMP.1 annex II.E paragraph 32.(a) Change of name or contact	Institutionally, there were no changes to the registry administrator set up in Slovakia. The main contact for the national registry system administrator did change and can be found in the list of main external experts.
15/CMP.1 annex II.E paragraph 32.(b) Change regarding cooperation arrangement	No changes regarding cooperation arrangement occurred during reporting period.
15/CMP.1 annex II.E paragraph 32.(c) Change to database structure or the capacity of national registry	There has been 3 new EUCR releases (versions 13.6.1, 13.7.1 and 13.8.2) after version 13.5.2 (the production version at the time of the last Chapter 14 submission). No changes were applied to the database, whose model is provided in Annex A. No change was required to the application backup plan or to the disaster recovery plan. No change to the capacity of the national registry occurred during the reported period.

REPORTING ITEM	DESCRIPTION
15/CMP.1 annex II.E paragraph 32.(d) Change regarding conformance to technical standards	The changes that have been introduced with versions 13.6.1, 13.7.1 and 13.8.2 compared with version 13.5.2 of the national registry are presented in Annex B. It is to be noted that each release of the registry is subject to both regression testing and tests related to new functionality. These tests also include thorough testing against the DES and are carried out prior to the relevant major release of the version to Production (see Annex B). No other change in the registry's conformance to the technical standards occurred for the reported period.
15/CMP.1 annex II.E paragraph 32.(e) Change to discrepancies procedures	No change to discrepancies procedures occurred during the reported period.
15/CMP.1 annex II.E paragraph 32.(f) Change regarding security	No changes regarding security were introduced.
15/CMP.1 annex II.E paragraph 32.(g) Change to list of publicly available information	No change to the list of publicly available information occurred during the reporting period.
15/CMP.1 annex II.E paragraph 32.(h) Change of Internet address	No change of the registry internet address occurred during the reported period.
15/CMP.1 annex II.E paragraph 32.(i) Change regarding data integrity measures	No change of data integrity measures occurred during the reporting period.
15/CMP.1 annex II.E paragraph 32.(j) Change regarding test results	No change regarding test results occurred during reported period.

The Standard Electronic Format (SEF) tables are providing information on AAUs, ERUs, RMUs, CERs, ICERs and tCERs in the Slovak National Emission Registry. The tables include all required information on Kyoto Protocol units in the Slovak National Emission Registry during the reported period as well as information on transfers of the units during the reported period to and from other Parties of the Kyoto Protocol.

The Standard Electronic Format report containing further information for the reported period is included in the submission (*RREG1_SK_2022_2_1.xlsx*) as well as, for completeness, the Standard Electronic Format report containing further information (*RREG1_SK_2022_1_2.xlsx*).

During the calendar year 2022 as well as previous years of the second commitment period no issuance, acquisition, cancellation or any transfer of CP2 Kyoto Protocol units were recorded in the Slovak National Emission Registry.

All operators of installations included in the EU ETS, individual account holders in the Slovak part of the Union Registry, as well as the Ministry of Environment of the Slovak Republic are allowed according to the provisions of Act no. 414/2012 Coll. as amended to participate in the KP flexible mechanisms. Installations in the EU ETS can use ERUs or CERs up to the limits set up by the Commission Regulation (EU) No. 1123/2013.

Article 19: report anthropogenic emissions of greenhouse gases listed in Part 2 of Annex V to Regulation 2018/1999 in the scope specified in Article 2(1) of Regulation (EU) 2018/842, as referred to in point (a) of Part 1 of Annex V to Regulation (EU) 2018/1999, and updates of such information referred to in point (d) of Part 1 of Annex V to Regulation (EU) 2018/1999 in accordance with the format set out in Annex XV to this Regulation:

The Slovak Republic is providing information on the anthropogenic GHGs emissions covered by Regulation (EU) 2018/842 as required in the Article 19 in the table "*SVK_Art19_AnnexXV_Emissions*

covered by the ESR_15-01-2023” for the year 2021. In the **Table 10** below, the time series for the period 2017 – 2021 is provided.

Table 10: Information on the anthropogenic GHGs emissions covered by Regulation (EU) 2018/842

YEAR	2021	2020	2019	2018	2017
	Gg of CO ₂ eq. ¹				
Total greenhouse gas emissions without LULUCF	41 345.080	37 233.000	40 001.030	42 329.550	42 466.760
Total verified emissions from stationary installations under Directive 2003/87/EC	20 898.870	18 170.000	19 903.840	22 193.400	22 063.230
CO ₂ emissions from 1.A.3.A civil aviation	1.290	0.880	1.830	2.850	3.420
Total ESR emissions (= C-D-E)	20 444.920	19 062.120	20 095.360	20 133.300	20 400.110
Annual Emission Allocation for year X-2 as defined in the Implementing Act pursuant to Art. 4(3) of Regulation (EU) 2018/842	23 410.477	25 948.871	25 646.446	25 344.020	25 041.595
Difference between AEA allocation and reported total ESR emissions (= G-F)	2 965.557	6 886.751	5 551.086	5 210.720	4 641.485

Article 20: report the summary information on concluded transfers pursuant to Articles 12 and 13 of Regulation (EU) 2018/841, referred to in point (f) of Part 1 of Annex V to Regulation (EU) 2018/1999, in accordance with the format set out in Annex XVI to this Regulation. After compilation by the Commission, a summary of the information provided pursuant to this paragraph shall be made available within three months from receiving the reports by Member States, in electronic form. In this summary, the range of prices paid per land mitigation units transaction shall be provided:

Slovakia did not arrange or conclude any transfer of AEAs pursuant to Articles 12 and 13 of Regulation (EU) 2018/841 in the year 2022. Reporting on summary information on concluded transfers in accordance with Regulation 2018/841 is provided in the table “SVK_Art20_AnnexXVI_Concluded transfers for LULUCF_15-01-2023” accompanied this Report.

Article 21.1: report the summary information on concluded transfers pursuant to Article 5 of Regulation (EU) 2018/842 as referred to in point (f) of Part 1 of Annex V to Regulation (EU) 2018/1999 in accordance with the format set out in Table 1 of Annex XVII to this Regulation. After compilation by the Commission, a summary of the information provided pursuant to this paragraph shall be made available within three months from receiving the reports by Member States, in electronic form. In this summary, the range of prices paid per annual emission allocations transaction shall be provided:

Slovakia did not arrange or conclude any transfer of AEAs pursuant to Article 5 of Regulation (EU) 2018/841 in the year 2022. Reporting on summary information on concluded transfers in accordance with Regulation 2018/841 is provided in the table “SVK_Art21_AnnexXVII_Concluded transfers for ESR_15-01-2023” accompanied this Report.

Article 21.2: within the two periods between the publication of the implementing acts referred to in Article 38(4) and the start of the compliance check procedure set out in Article 38(6) of Regulation (EU) 2018/1999 pursuant to Article 9 of Regulation (EU) 2018/842, the Member States may report to the Commission on the 15th of each month on concluded transfers pursuant to Article 5 of Regulation (EU) 2018/842 in accordance with the format set out in Table 2 of Annex XVII to this Regulation. After compilation by the Commission, a summary of the information received pursuant to this paragraph shall be made available, in a timely manner and in electronic form:

Reporting on summary information on concluded transfers in accordance with Regulation 2018/841 is provided in the table “*SVK_Art21_AnnexXVII_Concluded transfers for ESR_15-01-2023 – Table 2*” accompanied this Report.

Article 22.1: report the information on intended use of the flexibilities referred to in paragraphs 4 and 5 of Article 5 and Article 7(1) of Regulation (EU) 2018/842 as referred to in point (n) of Part 1 of Annex V to Regulation (EU) 2018/1999 in accordance with the format set out in Annex XVIII to this Regulation:

Slovakia provided information on intended use of flexibilities referred to in Paragraphs 4 and 5 pursuant to Article 5 and Article 7(1) in the table “*SVK_Art22_AnnexXVIII_Intended use of flexibilities_15-01-2023*”.

Article 22.2: within the two periods between the publication of the implementing acts referred to in Article 38(4) and the start of the compliance check procedure set out in Article 38(6) of Regulation (EU) 2018/1999 pursuant to Article 9 of Regulation (EU) 2018/842, the Member States may report to the Commission on the 15th of each month on intended use of the flexibilities in paragraphs 4 and 5 of Article 5 of Regulation (EU) 2018/842 in accordance with the format set out in Table 1 of Annex XVIII to this Regulation. After compilation by the Commission, the information received pursuant to this paragraph shall be made available, in electronic form and no later than at the end of the month referred to above:

Article 22.3: The information reported pursuant to paragraphs 1 and 2 of this Article shall not include any concluded transfers reported pursuant to Article 21:

Slovakia is not intend use of the flexibility referred to in Article 7(1) of Regulation (EU) 2018/842.

Article 23: report the information on the use of revenues in accordance with Article 5(6) of Regulation (EU) 2018/842 referred to in point (n) of Part 1 of Annex V to Regulation (EU) 2018/1999 in accordance with the format set out in Annex XIX to this Regulation.

Slovakia provided information on the use of revenues in accordance with Article 5(6) in the table “*SVK_Art23_AnnexXIX_Use of revenues_15-01-2023*”.

Article 24: report accounted greenhouse gas emissions and removals pursuant to Article 26(5) of Regulation (EU) 2018/1999 in accordance with the format set out in Annex XX:

The Slovak Republic is providing information on the anthropogenic GHGs emissions and sinks in the LULUCF sector as required in the Article 24. This information is included in the CRF tables 1990 – 2021 generated by the CRF Reporter software version 6.0.10 as a part of annual GHG inventory submitted on January 15, 2023.

The total sinks from LULUCF sector were estimated to be -7 657.83 Gg of CO₂ eq. which is at almost the same level as previous year. The estimation of emissions and sinks in the LULUCF sector are fluctuating within time series.

The recalculation was realised in HWP category in the year 2020 in this submission. The main reason was correction of input activity data – wood base panel and paper and paper board

In the preparation is the revision of methodology and national parameters research for the Wetlands category (see draft LULUCF NIR Chapter). This revision is planned to be implemented in future, while major difficulties occurred in data collection back to the base year and preparation of sustainable methodological approach during, therefore work needs to be continue also in the next years. Implementation of first results into inventory is included in the SVK NIR LULUCF Chapter.