

Final Review Report

2020 Comprehensive Review of National Greenhouse Gas Inventory Data

pursuant to Article 4(3) of Regulation (EU) No 2018/842 and to
Article 3 of Decision No 406/2009/EC

Slovakia

30 August 2020



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Conclusions from the 2020 comprehensive review

This Final Review Report presents the findings from the 2020 review of the greenhouse gas (GHG) emission inventory of Slovakia, pursuant to:

- Article 4(3) of Regulation (EU) No 2018/842 (the 'Effort Sharing Regulation', ESR), for the purpose of setting out Slovakia's annual emission allocations (AEAs) for the years from 2021 to 2030 in terms of tonnes of CO₂ equivalent, and
- Article 3 of Decision No 406/2009/EC (the 'Effort Sharing Decision', ESD), for the purpose of verifying Slovakia's GHG emissions and achievement of its GHG emission limitation target in the year 2018

The review was carried out as a comprehensive review in line with Article 19(1) of Regulation (EU) No 525/2013 (the 'Monitoring Mechanism Regulation', MMR). The global warming potentials applied are those from the IPCC Assessment Report 4.

The reviewers carried out checks to verify the transparency, accuracy, consistency, comparability and completeness of the national GHG inventory for the years 2005, 2016, 2017 and 2018 submitted in 2020 by Slovakia pursuant to Article 7 of the MMR.

The review consisted of two steps. The initial checks in step 1 were performed by the EU inventory team (European Environment Agency (EEA), European Topic Centre on Climate Change Mitigation and Energy (ETC/CME), Joint Research Centre (JRC) and Eurostat). Step 2 was performed by a Technical Expert Review Team (TERT).

More information on the Effort Sharing legislation and the procedures for the 2020 comprehensive review is presented in the annexes of this review report.

Slovakia did not provide a resubmission to the Commission.

Step 1 and 2 conclusions

1. The reviewers raised 34 issues with Slovakia during the first and the second step of the 2020 comprehensive ESD review (see Table 1). The TERT provided recommendations for 2 of these issues. Other issues raised during the comprehensive review were clarified and are considered non-issues for the ESD review 2020.
2. The TERT identified cases where inventory data were prepared in a manner which is inconsistent with UNFCCC guidance documentation or Union rules. In particular, the TERT identified an under- or over-estimate exceeding the threshold of significance pursuant to Article 31 of Commission Implementing Regulation (EU) No 749/2014.
3. Slovakia provided 1 revised estimate that was accepted by the TERT. Table 2 and Table 3 below summarise the revised estimate and further information is provided in the respective chapter of this report.
4. The TERT did not deem necessary any technical corrections in the meaning of Article 19(3)(c) of Regulation (EU) No 525/2013.
5. The TERT identified non-binding recommendations in order to improve the national inventory data of Slovakia (see Table 6).
6. The TERT considers that it received a response from Slovakia that was sufficient in order to undertake the comprehensive review appropriately.

Table 1: Overview of issues raised with Slovakia during the first and the second step

	Issues raised step 1 ¹	Issues raised step 2	Recommendations	Revised estimates ²	Technical corrections ³
Total	19	15	2	1	-
Energy	5	2	1	-	-
IPPU	6	-	-	-	-
Agriculture	4	6	-	-	-
Waste	4	7	1	1	-
Cross-cutting	-	-	-	-	-

¹ Excluding findings related to Land Use, Land Use Change and Forestry (LULUCF) and Kyoto Protocol (KP) LULUCF.

² Revised estimates: changes in inventory estimates triggered by the review, which were provided by the country and accepted by the TERT.

³ Technical corrections: changes in inventory estimates triggered by the review and provided by the TERT.

National totals for the purpose of Article 3 of Decision No 406/2009/EC (ESD)

Table 2: National totals for the purpose of Article 3 of Decision No 406/2009/EC

Emission source category	Reference	Emission estimates (kt CO ₂ equivalent) ¹ 2018
Total greenhouse gas emissions, including indirect CO ₂ , without Land Use, Land Use Change and Forestry, without international aviation, as reported by Slovakia pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	SVK_2020_3_09032020	43 348.350
Difference between original estimates and revised estimates provided by Slovakia and accepted by the TERT²		
5A Solid Waste Disposal, CH ₄	SK-5A-2020-0003	-87.034
Total greenhouse gas emissions including revised estimates		43 261.316
CO ₂ emissions from 1A3a Domestic Aviation ³	SVK_2020_3_09032020	2.854
NF ₃ emissions ³	SVK_2020_3_09032020	-

¹ The tables presented in this report show numbers rounded to three decimal places, although most numbers are available with greater precision. For all calculations (in particular of total GHG emissions and total ESD emissions), all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals are taken into account.

² A positive difference indicates an increase compared to reported emissions. A negative difference indicates a decrease compared to reported emissions.

³ Included in the totals. NF₃ was included in the comprehensive review (see Table A-1) for the purpose of the ESR, but has to be deducted for the purpose of ESD.

National totals for the purpose of Article 4(3) of Regulation (EU) No 2018/842 (ESR)

Table 3: National totals for the purpose of Article 4(3) of Regulation (EU) No 2018/842

Emission source category	Reference	Emission estimates (kt CO ₂ equivalent) ¹			
		2005	2016	2017	2018
Total greenhouse gas emissions, including indirect CO ₂ , without Land Use, Land Use Change and Forestry, without international aviation, as reported by Slovakia pursuant to Article 7(4) of Regulation (EU) No 525/2013, taking into account any resubmission to the Commission	SVK_2020_3_09032020	51 271.662	42 316.788	43 475.291	43 348.350
Difference between original estimates and revised estimates provided by Slovakia and accepted by the TERT²					
5A Solid Waste Disposal, CH ₄	SK-5A-2020-0003	-35.803	-85.161	-87.132	-87.034
Total greenhouse gas emissions including revised estimates		51 235.860	42 231.628	43 388.158	43 261.316
CO ₂ emissions from 1A3a Domestic Aviation ³	SVK_2020_3_09032020	7.793	3.559	3.420	2.854

¹ The tables presented in this report show numbers rounded to three decimal places, although most numbers are available with greater precision. For all calculations (in particular of total GHG emissions and total ESR emissions), all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals are taken into account.

² A positive difference indicates an increase compared to reported emissions. A negative difference indicates a decrease compared to reported emissions.

³ Included in the totals

Statement from Slovakia on the conclusions presented by the TERT

Slovakia agrees with the aggregated GHG emission inventory estimates presented in Table 2 and Table 3.

Greenhouse gas emissions covered by Decision 406/2009/EC (ESD)

Table 4: Greenhouse gas emissions for the purpose of Article 3 of Decision No 406/2009/EC

Emission source category	Reference	Emission estimates (kt CO ₂ equivalent) ¹ 2018
Total greenhouse gas emissions including any accepted revised estimates provided by Slovakia and any technical corrections deemed necessary by the TERT	See Table 2 above	43 261.316
Total verified emissions from stationary installations under Directive 2003/87/EC	Extracted by the European Commission from EUTL on 9 March 2020 (as agreed at the Working Group I of the Climate Change Committee on 18 May 2015) ²	22 193.396
CO ₂ emissions from 1A3a Domestic Aviation	See Table 2 above	2.854
NF ₃ emissions	See Table 2 above	-
Total ESD emissions		21 065.066

¹ The tables presented in this report show numbers rounded to three decimal places, although most numbers are available with greater precision. For all calculations (in particular of total GHG emissions and total ESD emissions), all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals are taken into account.

² The emissions of ETS stationary installations were independently verified and recorded in the EU Transaction Log (EUTL). These emissions do not derive from the national greenhouse gas emission inventory data and therefore the TERT was not tasked to review them.

Greenhouse gas emissions covered by Regulation (EU) No 2018/842 (ESR)

Table 5: Greenhouse gas emissions for the purpose of Article 4(3) of Regulation (EU) No 2018/842 (ESR)

Emission source category	Reference	Emission estimates (kt CO ₂ equivalent) ¹			
		2005 ³	2016	2017	2018
Total greenhouse gas emissions including any accepted revised estimates provided by Slovakia and any technical corrections deemed necessary by the TERT	See Table 3 above	51 235.860	42 231.628	43 388.158	43 261.316
Total verified emissions from stationary installations under Directive 2003/87/EC	Extracted by the European Commission from EUTL on 9 March 2020 (as agreed at the Working Group I of the Climate Change Committee on 18 May 2015) ²	25 231.769	21 264.045	22 063.225	22 193.396
CO ₂ emissions from 1A3a Domestic Aviation	See Table 3 above	7.793	3.559	3.420	2.854
Total ESR emissions		-	20 964.023	21 321.513	21 065.066

¹ The tables presented in this report show numbers rounded to three decimal places, although most numbers are available with greater precision. For all calculations (in particular of total GHG emissions and total ESR emissions), all available decimal places were used. Therefore, the totals shown may slightly differ from calculation results where only three decimals are taken into account.

² The emissions of ETS stationary installations were independently verified and recorded in the EU Transaction Log (EUTL). These emissions do not derive from the national greenhouse gas emission inventory data and therefore the TERT was not tasked to review them.

³ Due to changes in ETS scope and country coverage between 2005 and 2013, 'Total ESR emissions' cannot be calculated for 2005 by deducting 'Total verified emissions from stationary installations under Directive 2003/87/EC' and 'CO₂ emissions from 1A3a Domestic Aviation' from 'Total GHG emissions including any revised estimates and any technical corrections'.

Recommendations from the TERT, considering revised estimates and technical corrections deemed necessary by the TERT

Table 6: Recommendations from TERT (RE = Revised estimate; TC = Technical correction)

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
SK-5A-2020-0003	Yes	5A Solid Waste Disposal, CH ₄ , 1990-2018	For 5A Solid Waste Disposal on Land, CH ₄ and years 1990-2018, the TERT noted that an oxidation factor of 0 has been used, whereas the default value is 0.1 if the landfill is covered with aerated material, which is the case in most of the European countries. In response to a question raised during the review, Slovakia doubted this practise, but also explained that the landfill directive has been transposed by Slovakia in 2001. The TERT agreed with Slovakia that an oxidation factor of 0.1 will be applied to managed waste disposal from 2001 onwards. Slovakia agreed to the revised estimate calculated by the TERT for years 2005, 2016, 2017 and 2018 and stated that it will be included in the next submission. The TERT recommends that Slovakia include the revised estimate in its next submission.	RE

EMRT-ID	Key category	Category, gas, year	Recommendation	Revised estimate or technical correction in 2020
SK-1B2b-2020-0001	Yes	1B2b Fugitive Emissions from Natural Gas, CH ₄ , 1990-2018	For fugitive CH ₄ emissions from category 1B2b Fugitive Emissions from Natural Gas, the TERT noted that with reference to CRF Table 1B2, Slovakia's NIR p 127ff and Annex MMR-IR Article 9 there is a lack of transparency. The TERT noted that Slovakia describes in its NIR (p127ff), that CH ₄ emissions from category 1B2b are calculated by using a Tier 1 methodology, applying the higher end of the range of default emission factors from the 2006 IPCC Guidelines (Table 4.2.4 - developed countries) and that also a methodology by the Slovak Gas Industry, Ltd. is available. Referring to Slovakia's UNFCCC ARR 2019, the ERT recommends in paragraphs E.21 and E.27 to move to a higher-tier approach in accordance with the decision tree in the 2006 IPCC Guidelines (E.21). Slovakia clarified in its response to a question during the review, that the country specific higher tier method (described as 'SPP' in Slovakia's NIR) covers only fugitive emissions from pipeline distribution system of the natural gas and only for the property of the SPP company (not 100% of the pipeline in Slovakia) and is therefore not in line with the 2006 IPCC Guidelines. Slovakia furthermore justifies the appliance of the upper limit of default CH ₄ emission factors for the subcategories of 1B2b as the pipeline network in Slovakia is obsolete and investments into modernisation are not appropriated to ensure low fugitive emissions. The TERT notes that this issue does not relate to an over- or under-estimate of emissions. The TERT recommends that Slovakia includes clear explanation and justification on the appliance of the upper limit of default CH ₄ emission factors for category 1B2b and why the country specific method is not applicable to the country. The TERT also recommends Slovakia to make efforts to shift to a higher tier method for calculating CH ₄ emissions from key category 1B2b.	No

Revised estimates provided by Slovakia and accepted by the TERT

1

ESD Review Tool ID:	SK-5A-2020-0003
ESD Review Tool URL:	https://emrt-esd.eionet.europa.eu/2020/SK-5A-2020-0003
Country:	Slovakia
Sector:	5A Solid Waste Disposal
Gases:	CH ₄
Fuel	N/A
Completed by Sector Expert:	Elisabeth Kampel
Reviewed by Counterpart:	Hans Oonk
Reviewed by Lead Reviewer:	Ole-Kenneth Nielsen
Reviewed by Quality Controller:	Bernd Guegle

1

The underlying problem:	Slovakia has been applying an oxidation factor of 0 for the whole time series, which means that landfills are not covered by soil or similar covering. The TERT assumes this to be very unlikely, as covering is also requested by the landfill directive, which has been transposed in Slovakia in 2001. For this reason, the TERT proposed that an oxidation factor of 0.1 for managed solid waste disposal sites should be used from 2001 onwards. In a response to a question raised, Slovakia agreed to the calculation from the TERT and accepted it as a revised estimate.
Summarise the methodology used:	As the oxidation factor of 0.1 is only applied to managed solid waste disposal sites (5A1), the information provided in NIR, table 7.5 has been used, which provides the CH ₄ emitted in managed (5A1) and unmanaged (5A2) solid waste disposal sites for all relevant years except 2018. For this reason, the share of 2017 was applied to the year 2018. Then the CH ₄ emitted from managed Solid Waste Disposal (5A1) as reported by Slovakia has been multiplied with 0.9 (taking into account the oxidation factor of 10%) and summed with CH ₄ emitted from 5A2, which results in total CH ₄ emissions from 5A.

2

	Original estimate (Gg CO ₂ e)								Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
2005		908.475							
2016		1 137.392							
2017		1 141.348							
2018		1 140.053							

	Revised Estimate received from country (Gg CO ₂ e)								Notes
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG	
2005		872.673							
2016		1 052.232							
2017		1 054.215							
2018		1 053.019							

	Difference between RE and OE (Gg CO ₂ e)							
Year	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	NF ₃	Mixed GHG
2005		-35.803						
2016		-85.161						
2017		-87.132						
2018		-87.034						

Annex I: Legal background and procedures of the 2020 comprehensive review

The Effort Sharing Decision No 406/2009/EC (ESD) sets national emission limits for greenhouse gas (GHG) emissions in the sectors outside the EU's Emission Trading System (ETS) for the period 2013-2020. The ESD and the Monitoring Mechanism Regulation (EU) 525/2013 (MMR) lay down annual reporting obligations, compliance checks and a Union review process to ensure that the compliance with annual GHG emission limits is assessed in a credible, consistent, transparent and timely manner.

The requirements for the Union review of the national inventory data submitted by countries are set out in Article 19 of the MMR. The details concerning the review process, such as the timing and steps of conducting the annual and comprehensive reviews are set out in Chapter III and Annex XVI of the Commission Implementing Regulation (EU) No 749/2014.

The Effort Sharing Regulation (EU) 2018/842 (ESR) sets national emission limits for greenhouse gas emissions in the sectors outside the EU's ETS for the period 2021-2030. In Article 4(3) of the ESR, the Commission is required to adopt implementing acts setting out annual emission allocations (AEAs) for the period 2021-2030 in terms of CO₂ equivalents, for which it shall carry out a comprehensive review.

The 2020 Union review was thus held as a comprehensive review in line with MMR Article 19 (1) in concert with the Union review required by the ESR.

Objectives

The objectives of the comprehensive review of countries' GHG emission inventories in 2020 are:

- a) to support the European Commission by ensuring it has accurate, reliable and verified information on annual GHG emissions for
 - determining compliance with ESD targets for the years 2018 in a credible, consistent, transparent and timely manner, and for
 - setting out countries' annual emission allocations (AEAs) for the years from 2021 to 2030 in terms of tonnes of CO₂ equivalent, according to Article 4(3) of the ESR.
- b) to assist countries in improving the quality of their GHG inventories.

Procedures

The scope of the 2020 comprehensive review is presented in Table A-1. The checks carried out during the 2020 comprehensive review are presented in Annex II. The review consisted of two steps.

The Step 1 was combined with the 'EU QA/QC procedures' (i.e. initial checks) and was carried out by the EU inventory team (ETC/CME, JRC, Eurostat). All findings from the initial checks that were partly resolved or not resolved within the initial check phase were followed up in the second step of the review.

The EU inventory team consisted of the following experts:

- ETC/CME task manager: Nicole Mandl, Marion Pinterits (ETC/CME)
- Energy: Julien Vincent, Coralie Jeannot, Eva Krtková, Marion Pinterits, Matina Kastori, Giorgos Mellios, Markéta Müllerová, Bernd Gugele (ETC/CME), Michael Goll (Eurostat)
- IPPU: Barbara Gschrey, Lorenz Moosmann, Kristina Kaar, Lukas Emele, Maria Purzner, Ils Moorkens (ETC/CME)
- Agriculture: Adrian Leip, Janka Szemesová, Alexander De-Meij (JRC)

- Waste: Céline Gueguen (ETC/CME)
- LULUCF: Raúl Abad-Viñas (JRC)
- Quality coordinators: Adrian Leip, Giacomo Grassi (JRC), Bernd Gugele, Nicole Mandl, Marion Pinterits, Maria Purzner, Julien Vincent, Giorgos Mellios, Ils Moorkens, Kaat Jespers (ETC/CME)
- Cross-cutting: Nicole Mandl (ETC/CME)

Step 2 of the comprehensive review 2020 was performed by a Technical Expert Review Team (TERT) under service contract **340201/2019/814628/SER/CLIMA.C.2** of the Directorate General for Climate Action of the European Commission. The lead reviewers and sector review experts did not review emission inventories of countries where these individuals have themselves contributed to the compilation of that inventory, or presently are or have been any part of the decision-making process related to the compilation of that inventory. Reviewers who are nationals of the country whose inventory is concerned, did not take part in the review of that inventory.

The TERT consisted of the following experts:

- CRF categories 1A1, 1A2, 1A4, 1A5 (Stationary Combustion) + Reference Approach: Katrina Young, Julien Vincent and Stephan Poupa;
- CRF categories 1A3 Transport + 1D International Bunkers: Melanie Hobson, Jean-Marc André and Matina Kastori;
- CRF categories 1B Fugitive + 1C CO₂ Transport and Storage: Ioannis Sempos, Marlene Plejdrup and Marion Pinterits;
- CRF categories IPPU Fluorinated Gases: Barbara Gschrey, Jacek Skoskiewicz and Stephanie Barrault;
- CRF categories IPPU Other Gases than Fluorinated Gases: Emma Salisbury, Kristina Kaar and Wolfram Jörß;
- CRF categories 3A Enteric Fermentation and 3B Manure Management: Chris Dore, Steen Gyldenkerne and Bernard Hyde;
- CRF categories 3C-3J: Katalin Lovas, Etienne Mathias and Michael Anderl;
- CRF sector 5 Waste: Céline Gueguen, Elisabeth Kampel and Hans Oonk;
- Lead reviewers: Karin Kindbom, Suvi Monni, Ole-Kenneth Nielsen and Ralph Harthan.
- The following experts supported the team on request of the TERT: Tomas Gustafson (IPPU), Maria Purzner (F-gases), Beatriz Sanchez (Agriculture), Katja Pazdernik (Waste).

The second step of the review was coordinated by Bernd Gugele and Justin Goodwin.

The EEA review secretariat consisting of Melanie Sporer, Claire Qoul, Kirsten May, Justine Raoult and Henry Irvine prepared and coordinated the Union comprehensive review as foreseen in Article 28 of Commission Implementing regulations (EU) No 749/2014 and Article 42 of the Governance Regulation (EU) 2018/1999.

The step 2 of the review was performed on the basis of the 15 April submissions of GHG emission data and the national inventory report (NIR) under the Monitoring Mechanism. Resubmissions reported by countries were taken into account until 8 May 2020.

Where relevant, the TERT calculated technical corrections for over- or under-estimates identified in a mandatory category in the countries' GHG inventories that exceed the threshold of significance. Technical corrections have been calculated only for the years 2005 and 2016-2018. If the technical correction exceeds the threshold of significance for at least one year of the inventory under review (2005, and 2016-2018) but not for all the years the technical correction was calculated for all years under review in order to ensure time series consistency.

Table A-1: Scope of the comprehensive review 2020

Element	Scope	Further information
Countries	EU geographical coverage of the Member States, the United Kingdom, Norway and Iceland	
Years	2005, 2016, 2017, 2018	According to MMR Article 27(2); According to MMR Article 19(1); According to ESR Article 4(3)
Gases	CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , NF ₃	
Sectors	All emission source sectors excluding LULUCF	National totals exclude emissions from LULUCF and emissions reported under memo items
Indirect CO ₂ emissions	Included in national total	

Annex II: Checks carried out during the 2020 comprehensive review in line with Art. 29, 32 and 33 of the Commission Implementing Regulation (EU) No 749/2014

First step review checks:

1. Assessment whether all emission source categories and gases required under Regulation (EU) No 525/2013 are reported;
2. Assessment whether emissions data time series are consistent;
3. Assessment whether implied emission factors across Member States are comparable taking the IPCC default emission factors for different national circumstances into account;
4. Assessment of the use of 'Not Estimated' notation keys where IPCC Tier 1 methodologies exist and where the use of the notation key is not justified in accordance with paragraph 37 of the UNFCCC reporting guidelines on annual greenhouse gas inventories as included in Annex I to Decision 24/CP.19;
5. Analysis of recalculations performed for the inventory submission, in particular if the recalculations are based on methodological changes;
6. Comparison of the verified emissions reported under the Union's Emissions Trading System with the greenhouse gas emissions reported pursuant to Article 7 of Regulation (EU) No 525/2013 with a view of identifying areas where the emission data and trends as submitted by the Member State under review deviate considerably from those of other Member States;
7. Comparison of the results of Eurostat's reference approach with the Member States' reference approach;
8. Comparison of the results of Eurostat's sectoral approach with the Member States' sectoral approach;
9. Assessment whether recommendations from earlier Union or UNFCCC reviews, not implemented by the Member State could lead to a technical correction;
10. Assessment whether there are potential over-estimations or under-estimations relating to a key category in a Member State's inventory.

Second step review checks:

1. Detailed examination of the inventory estimates including methodologies used by the Member State in the preparation of inventories;
2. Detailed analysis of the Member State's implementation of recommendations related to improving inventory estimates as listed in its most recent UNFCCC annual review report made available to that Member State before the submission under review or in the final review report pursuant to Article 35(2) of this Regulation; where recommendations have not been implemented a detailed analysis of the justification provided by the Member State for not implementing them;
3. Detailed assessment of the time series consistency of the greenhouse gas emissions estimates;
4. Detailed assessment whether the recalculations made by a Member State in the given inventory submission as compared to the previous one are transparently reported and made in accordance with the 2006 IPCC Guidelines for National Greenhouse Gas Inventories;
5. Follow-up on the results of the checks referred to in Article 29 of the Commission Implementing Regulation (EU) No 749/2014 and on any additional information submitted by the Member State under review in response to questions from the technical experts review team and other relevant checks.