ANNEXES TO THE NATIONAL INVENTORY REPORT

2023

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ANNEX 1. Key Categories

A1.1 Description of methodology used for identifying key sources and reference to the key source tables in the CRF

This annex describes the key category analysis conducted for the 2020 Hungarian inventory.

Generally, inventory uncertainty is lower when emissions are estimated using the available most rigorous methods, but due to finite resources this may not be feasible for every category. Therefore, it is good practice to identify those categories (key categories) that have the greatest contribution to overall inventory uncertainty in order to make the most efficient use of available resources. In that context, a "key category" is one that is prioritized within the national inventory system because its estimate has a significant influence on a country's total inventory of direct greenhouse gases in terms of the absolute level of emissions (level assessment) or/and to the trend of emissions (trend assessment).

The 2006 IPCC Guidelines describes two Tier level for identification of key categories. The difference is that in Tier 2 approach assessments are weighted with the uncertainty values of each source category.

Both in Tier 1 and Tier 2 approaches key categories are identified from two perspectives.

The first analyzes the emission contribution that each category makes to the national total (with LULUCF). The second perspective analyzes the trend of emission contributions from each category to identify where the greatest absolute changes (either increases or reductions) have taken place over a given time (with LULUCF categories). The percent contributions to both levels and trends in emissions are calculated and sorted from greatest to least. A cumulative total is calculated for both approaches. IPCC has determined that a cumulative contribution threshold of 95% for both level and trend assessments. The 95% cumulative contribution threshold has been used in this analysis to define an upper boundary for key category identification. Therefore, when source and/or sink contributions are sorted in decreasing order of importance, those that integrate the group of categories that accumulate the upper 95% of national GHG emissions are considered quantitatively to be key. Results for these analyses are shown in *Table A1-2* and *Table A1-3*. Key categories are highlighted with bold characters.

The Equation 4.1 from 2006 IPCC Guidelines Vol.1 was used for level assessment and equation 4.2 from 2006 IPCC Guidelines Vol.1 was used for trend assessment.

Good practice first requires that source categories should be disaggregated into categories from which key sources and sinks may be identified. Several recommendations exist for the list of categories (aggregation/disaggregation level):

- 2006 IPCC Guidelines Table 4.1;
- EU list
- country specific list

In Hungary Tier 1 level and trend assessment was conducted on a list of categories that follow Table 4.1 from 2006 IPCC Guidelines in order to be consistent with CRF Table 7 Key categories. This list of Tier 1 analysis is shown in Table A1-1 below.

Table A1-1 Category list used in Tier 1 analysis

CRF code and category name	GHG
1A1 Energy Industries - Biomass	CH_4
1A1 Energy Industries - Biomass	N_2O
1A1 Energy Industries - Gaseous fuels	CH_4
1A1 Energy Industries - Gaseous fuels	CO_2
1A1 Energy Industries - Gaseous fuels	N_2O
1A1 Energy Industries - Liquid fuels	CH_4
1A1 Energy Industries - Liquid fuels	CO_2
1A1 Energy Industries - Liquid fuels	N_2O
1A1 Energy Industries - Other fossil fuels	CH_4
1A1 Energy Industries - Other fossil fuels	CO_2
1A1 Energy Industries - Other fossil fuels	N_2O
1A1 Energy Industries - Peat	CH_4
1A1 Energy Industries - Peat	N_2O
1A1 Energy Industries - Solid fuels	CH_4
1A1 Energy Industries - Solid fuels	CO_2
1A1 Energy Industries - Solid fuels	N_2O
1A2 Manufacturing industries - Biomass	CH_4
1A2 Manufacturing industries - Biomass	N_2O
1A2 Manufacturing industries - Gaseous fuels	CH_4
1A2 Manufacturing industries - Gaseous fuels	CO_2
1A2 Manufacturing industries - Gaseous fuels	N_2O
1A2 Manufacturing industries - Liquid fuels	CH_4
1A2 Manufacturing industries - Liquid fuels	CO_2
1A2 Manufacturing industries - Liquid fuels	N_2O
1A2 Manufacturing industries - Other fossil fuels	CH_4
1A2 Manufacturing industries - Other fossil fuels	CO_2
1A2 Manufacturing industries - Other fossil fuels	N_2O
1A2 Manufacturing industries - Peat	CH_4
1A2 Manufacturing industries - Peat	N_2O
1A2 Manufacturing industries - Solid fuels	CH_4
1A2 Manufacturing industries - Solid fuels	CO_2
1A2 Manufacturing industries - Solid fuels	N_2O
1A3a Domestic aviation - All fuels	CH_4
1A3a Domestic aviation - All fuels	CO_2
1A3a Domestic aviation - All fuels	N_2O
1A3b Road trasport - All Fuels	CH_4
1A3b Road trasport - All Fuels	CO_2
1A3b Road trasport - All Fuels	N_2O
1A3c Railways - All Fuels	CH_4

CRF code and category name	GHG
1A3c Railways - All Fuels	CO_2
1A3c Railways - All Fuels	N_2O
1A3d Domestic navigation - Gaseous fuels	CH_4
1A3d Domestic navigation - Gaseous fuels	CO_2
1A3d Domestic navigation - Gaseous fuels	N_2O
1A3d Domestic navigation - All Liquid fuels	CH_4
1A3d Domestic navigation - All Liquid fuels	CO_2
1A3d Domestic navigation - All Liquid fuels	N_2O
1A3e Other Transportation (as specified in table 1A(a) sheet 3) - Pipeline, only gaseous	CH_4
1A3e Other Transportation (as specified in table 1A(a) sheet 3) - Pipeline, only gaseous	CO_2
1A3e Other Transportation (as specified in table 1A(a) sheet 3) - Pipeline, only gaseous	N_2O
1A4 Other sectors - Biomass	CH_4
1A4 Other sectors - Biomass	N_2O
1A4 Other sectors - Gaseous fuels	CH_4
1A4 Other sectors - Gaseous fuels	CO_2
1A4 Other sectors - Gaseous fuels	N_2O
1A4 Other sectors - Liquid fuels	CH_4
1A4 Other sectors - Liquid fuels	CO_2
1A4 Other sectors - Liquid fuels	N_2O
1A4 Other sectors - Other Fossil Fuels	CH_4
1A4 Other sectors - Other Fossil Fuels	CO_2
1A4 Other sectors - Other Fossil Fuels	N_2O
1A4 Other sectors - Solid fuels	CH_4
1A4 Other sectors - Solid fuels	CO_2
1A4 Other sectors - Solid fuels	N_2O
1A5a Stationary	CH_4
1A5a Stationary	CO_2
1A5a Stationary	N_2O
1A5b Mobile	CH_4
1A5b Mobile	CO_2
1A5b Mobile	N_2O
1B1 Solid fuels	CH_4
1B1 Solid fuels	CO_2
1B2a Oil	CH_4
1B2a Oil	CO_2
1B2b Natural Gas	CH_4
1B2b Natural Gas	CO_2
1B2b Natural Gas	N_2O
1B2c Venting and flaring	CH_4
1B2c Venting and flaring	CO_2

CRF code and category name	GHG
1B2c Venting and flaring	N_2O
1B2d Other (Thermal water extraction + natural gas storage)	CH_4
1B2d Other (Thermal water extraction + natural gas storage)	CO_2
1B2d Other (Thermal water extraction + natural gas storage)	N_2O
2A1 Cement Production	CO_2
2A2 Lime Production	CO_2
2A3 Glass production	CO_2
2A4 Other Process Uses of Carbonates	CO_2
2B1 Ammonia Production	CH_4
2B1 Ammonia Production	CO_2
2B1 Ammonia Production	N_2O
2B2 Nitric Acid Production	N_2O
2B8 Petrochemical and carbon black production	CH_4
2B8 Petrochemical and carbon black production	CO_2
2B8 Petrochemical and carbon black production	N_2O
2C1 Iron and Steel Production	CH_4
2C1 Iron and Steel Production	CO_2
2C1 Iron and Steel Production	N_2O
2C2 Ferroalloys Production	CH_4
2C2 Ferroalloys Production	CO_2
2C2 Ferroalloys Production	N_2O
2C3 Aluminium Production	CH_4
2C3 Aluminium Production	CO_2
2C3 Aluminium Production	N_2O
2C3 Aluminium Production	PFC
2D Non-energy products from fuels and solvent use	CH_4
2D Non-energy products from fuels and solvent use	CO_2
2E Electronics industry	SF_6
2F1 Refrigeration and Air Conditioning Equipment - HFC+PFC	Aggr. F-gases
2F2 Foam Blowing - HFC	Aggr. F-gases
2F3 Fire extinguishers - HFC	Aggr. F-gases
2F4 Aerosol + MDI - HFC	Aggr. F-gases
2F5Solvent - HFC+PFC	Aggr. F-gases
2G Other Product Manufacture and Use - SF6	Aggr. F-gases
2G Other Product Manufacture and Use	N_2O
3A Enteric Fermentation	CH_4
3B Manure Management	CH_4
3B Manure Management	N_2O
3C Rice Cultivation	CH_4
3D Agricultural Soils	CH_4

CRF code and category name	GHG
3D1 Direct N2O Emissions from Managed Soils	N_2O
3D2 Indirect N2O Emissions from Managed Soils	N_2O
3F Field Burning of Agricultural Residues	CH_4
3F Field Burning of Agricultural Residues	N_2O
3G Liming	CO_2
3H Urea application	CO_2
3I Other carboncontaining fertilizers	CO_2
3J Other	CH_4
3J Other	CO_2
3J Other	N_2O
4(I) Direct N2O emissions from N inputs to managed soils	N_2O
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	CH_4
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	CO_2
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	N_2O
4(III) Direct N2O emissions from N mineralization/immobilization	N_2O
4(IV) Indirect N2O Emissions from Managed Soils	N_2O
4(V) Biomass Burning	CH_4
4(V) Biomass Burning	CO_2
4(V) Biomass Burning	N_2O
4A1 Forest Land Remaining Forest Land	CO_2
4A2 Land Converted to Forest Land	CO_2
4B1 Cropland Remaining Cropland	CO_2
4B2 Land Converted to Cropland	CO_2
4C1 Grassland Remaining Grassland	CO_2
4C2 Land Converted to Grassland	CO_2
4D11 Peat Extraction Remaining Peat Extraction	CO_2
4D12 Flooded Land Remaining Flooded Land	CO_2
4D13 Other Wetlands Remaining Other Wetlands	CO_2
4D2 Land Converted to Wetlands	CO_2
4E1 Settlements Remaining Settlements	CO_2
4E2 Land Converted to Settlements	CO_2
4F1 Other Land Remaining Other Land	CO_2
4F2 Land Converted to Other Land	CO_2
4G Harvested Wood Products	CO_2
4H Other	CH_4
4H Other	CO_2
4H Other	N_2O
5A Solid waste disposal	CH_4
5A Solid waste disposal	CO_2

CRF code and category name	GHG
5A Solid waste disposal	N_2O
5B Biological Treatment of Soild Waste	CH_4
5B Biological Treatment of Soild Waste	CO_2
5B Biological Treatment of Soild Waste	N_2O
5C Incineration and open burning of waste	CH_4
5C Incineration and open burning of waste	CO_2
5C Incineration and open burning of waste	N_2O
5D Wastewater Treatment and Discharge	CH_4
5D Wastewater Treatment and Discharge	CO_2
5D Wastewater Treatment and Discharge	N_2O
5E Other	CH_4
5E Other	CO_2
5E Other	N_2O

A1.2 Results of the key category analysis

Table A1-2 Tier 1 level assessment including LULUCF (2021)

CRF code + note	Direct Greenhouse Gas	Latest Year Emission [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A3b Road trasport - All Fuels	CO2	13 651,63	13 651,63	18,92%	18,92%
1A4 Other sectors - Gaseous fuels	CO2	10 877,78	10 877,78	15,08%	34,00%
1A1 Energy Industries - Gaseous fuels	CO2	6 088,68	6 088,68	8,44%	42,44%
4A1 Forest Land Remaining Forest Land	CO2	-5 495,98	5 495,98	7,62%	50,05%
1A1 Energy Industries - Solid fuels	CO2	4 171,05	4 171,05	5,78%	55,83%
3.D.1 Direct N2O Emissions From Managed Soils	N2O	3 560,32	3 560,32	4,93%	60,77%
1A2 Manufacturing industries - Gaseous fuels	CO2	3 290,42	3 290,42	4,56%	65,33%
5A Solid waste disposal	CH4	2 880,58	2 880,58	3,99%	69,32%
3A Enteric Fermentation	CH4	2 110,84	2 110,84	2,93%	72,25%
2F1 Refrigeration and Air Conditioning Equipment - HFC+PFC	Aggregate F-gases	1 654,43	1 654,43	2,29%	74,54%
1A4 Other sectors - Liquid fuels	CO2	1 518,54	1 518,54	2,10%	76,64%
2B8 Petrochemical and carbon black production	CO2	1 405,13	1 405,13	1,95%	78,59%
1B2b Natural Gas	CH4	1 288,88	1 288,88	1,79%	80,38%
2B1 Ammonia Production	CO2	1 201,19	1 201,19	1,66%	82,04%
4A2 Land Converted to Forest Land	CO2	-1 177,00	1 177,00	1,63%	83,67%
1A2 Manufacturing industries - Liquid fuels	CO2	1 102,23	1 102,23	1,53%	85,20%
2A1 Cement Production	CO2	1 001,50	1 001,50	1,39%	86,59%
4G Harvested Wood Products	CO2	-933,37	933,37	1,29%	87,88%
1A1 Energy Industries - Liquid fuels	CO2	925,38	925,38	1,28%	89,17%
2C1 Iron and Steel Production	CO2	838,36	838,36	1,16%	90,33%

CRF code + note	Direct Greenhouse Gas	Latest Year Emission [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
3B Manure Management	CH4	676,36	676,36	0,94%	91,27%
1A2 Manufacturing industries - Other fossil fuels	CO2	479,57	479,57	0,66%	91,93%
3B Manure Management	N2O	432,21	432,21	0,60%	92,53%
1A4 Other sectors - Biomass	CH4	424,21	424,21	0,59%	93,12%
1A2 Manufacturing industries - Solid fuels	CO2	287,97	287,97	0,40%	93,52%
3.D.2 Indirect N2O Emissions From Managed Soils	N2O	262,37	262,37	0,36%	93,88%
2G Other Product Manufacture and Use - N2O	N2O	247,19	247,19	0,34%	94,22%
1A1 Energy Industries - Other fossil fuels	CO2	237,16	237,16	0,33%	94,55%
5D Wastewater Treatment and Discharge	CH4	229,07	229,07	0,32%	94,87%
4C2 Land Converted to Grassland	CO2	204,42	204,42	0,28%	95,15%
1A4 Other sectors - Solid fuels	CO2	201,92	201,92	0,28%	95,43%
1B2c Venting and flaring	CH4	187,10	187,10	0,26%	95,69%
2A4 Other Process Uses of Carbonates	CO2	182,85	182,85	0,25%	95,95%
2F2 Foam Blowing - HFC	Aggregate F-gases	174,62	174,62	0,24%	96,19%
1A4 Other sectors - Other Fossil Fuels	CO2	160,80	160,80	0,22%	96,41%
4B2 Land Converted to Cropland	CO2	156,01	156,01	0,22%	96,63%
4E2 Land Converted to Settlements	CO2	153,82	153,82	0,21%	96,84%
4C1 Grassland Remaining Grassland	CO2	-145,94	145,94	0,20%	97,04%
1A3b Road trasport - All Fuels	N2O	143,37	143,37	0,20%	97,24%
1B2c Venting and flaring	CO2	130,32	130,32	0,18%	97,42%
3H Urea application	CO2	126,50	126,50	0,18%	97,60%
2A2 Lime Production	CO2	111,43	111,43	0,15%	97,75%
1A3c Railways - All Fuels	CO2	104,57	104,57	0,14%	97,90%
3I Other carboncontaining fertilizers	CO2	103,49	103,49	0,14%	98,04%
2D Non-energy products from fuels and solvent use	CO2	102,75	102,75	0,14%	98,18%
5B Biological Treatment of Soild Waste	CH4	97,78	97,78	0,14%	98,32%
2G Other Product Manufacture and Use - SF6	Aggregate F-gases	94,15	94,15	0,13%	98,45%
5D Wastewater Treatment and Discharge	N2O	84,43	84,43	0,12%	98,56%
1B2d Other (Thermal water extraction + NatGas storage)	CH4	69,26	69,26	0,10%	98,66%
1A4 Other sectors - Biomass	N2O	67,43	67,43	0,09%	98,75%
1A3e Other Transportation - Pipelines	CO2	62,95	62,95	0,09%	98,84%
1A5b Mobile	CO2	56,67	56,67	0,08%	98,92%
1B2a Oil	CH4	51,77	51,77	0,07%	98,99%
1A5a Stationary	CO2	48,88	48,88	0,07%	99,06%
2B8 Petrochemical and carbon black production	CH4	47,30	47,30	0,07%	99,12%
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	CO2	46,72	46,72	0,06%	99,19%
5B Biological Treatment of Soild Waste	N2O	42,87	42,87	0,06%	99,25%
4B1 Cropland Remaining Cropland	CO2	-40,45	40,45	0,06%	99,31%
2A3 Glass production	CO2	39,67	39,67	0,05%	99,36%

CRF code + note	Direct Greenhouse Gas	Latest Year Emission [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
2F4 Aerosol + MDI - HFC	Aggregate F-gases	33,71	33,71	0,05%	99,41%
2B2 Nitric Acid Production	N2O	32,69	32,69	0,05%	99,45%
1A1 Energy Industries - Biomass	N2O	30,70	30,70	0,04%	99,49%
1B1 Solid fuels	CH4	28,48	28,48	0,04%	99,53%
5C Incineration and open burning of waste	CO2	24,70	24,70	0,03%	99,57%
1A4 Other sectors - Gaseous fuels	CH4	24,28	24,28	0,03%	99,60%
1A3b Road trasport - All Fuels	CH4	20,60	20,60	0,03%	99,63%
1A1 Energy Industries - Biomass	CH4	19,32	19,32	0,03%	99,66%
3C Rice Cultivation	CH4	18,35	18,35	0,03%	99,68%
1A4 Other sectors - Liquid fuels	N2O	15,33	15,33	0,02%	99,70%
4(III)Direct N2O emissions from N mineralization/immobilization	N2O	15,31	15,31	0,02%	99,73%
1A2 Manufacturing industries - Biomass	N2O	15,23	15,23	0,02%	99,75%
1A4 Other sectors - Solid fuels	CH4	14,63	14,63	0,02%	99,77%
1A1 Energy Industries - Solid fuels	N2O	14,29	14,29	0,02%	99,79%
2F3 Fire extinguishers - HFC	Aggregate F-gases	12,85	12,85	0,02%	99,80%
1A3c Railways - All Fuels	N2O	12,02	12,02	0,02%	99,82%
4(V) Biomass Burning	CH4	11,35	11,35	0,02%	99,84%
1A2 Manufacturing industries - Liquid fuels	N2O	10,63	10,63	0,01%	99,85%
1A3d Domestic navigation - All Liquid fuels	CO2	9,50	9,50	0,01%	99,86%
1A2 Manufacturing industries - Biomass	CH4	9,47	9,47	0,01%	99,88%
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	N2O	8,96	8,96	0,01%	99,89%
4(V) Biomass Burning	N2O	7,63	7,63	0,01%	99,90%
1A2 Manufacturing industries - Other fossil fuels	N2O	7,49	7,49	0,01%	99,91%
1B1 Solid fuels	CO2	6,80	6,80	0,01%	99,92%
1A4 Other sectors - Gaseous fuels	N2O	5,79	5,79	0,01%	99,93%
1A3a Domestic aviation - All fuels	CO2	5,55	5,55	0,01%	99,94%
1A2 Manufacturing industries - Other fossil fuels	CH4	4,71	4,71	0,01%	99,94%
3G Liming	CO2	3,94	3,94	0,01%	99,95%
1A1 Energy Industries - Gaseous fuels	N2O	3,24	3,24	0,00%	99,95%
4(IV) Indirect N2O Emissions from Managed Soils	N2O	3,15	3,15	0,00%	99,96%
1A1 Energy Industries - Other fossil fuels	N2O	3,10	3,10	0,00%	99,96%
2C1 Iron and Steel Production	CH4	3,02	3,02	0,00%	99,97%
4D2 Land Converted to Wetlands	CO2	-2,77	2,77	0,00%	99,97%
1A1 Energy Industries - Gaseous fuels	CH4	2,72	2,72	0,00%	99,97%
1A4 Other sectors - Liquid fuels	CH4	2,43	2,43	0,00%	99,98%
1A4 Other sectors - Other Fossil Fuels	N2O	2,13	2,13	0,00%	99,98%
1A1 Energy Industries - Other fossil fuels	CH4	1,76	1,76	0,00%	99,98%
1A2 Manufacturing industries - Gaseous fuels	N2O	1,75	1,75	0,00%	99,98%
1A2 Manufacturing industries - Gaseous fuels	CH4	1,47	1,47	0,00%	99,99%
1A4 Other sectors - Other Fossil Fuels	CH4	1,34	1,34	0,00%	99,99%

CRF code + note	Direct Greenhouse Gas	Latest Year Emission [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A2 Manufacturing industries - Solid fuels	N2O	1,17	1,17	0,00%	99,99%
1A1 Energy Industries - Solid fuels	CH4	0,97	0,97	0,00%	99,99%
1A4 Other sectors - Solid fuels	N2O	0,89	0,89	0,00%	99,99%
1A1 Energy Industries - Liquid fuels	N2O	0,84	0,84	0,00%	99,99%
1B2b Natural Gas	CO2	0,71	0,71	0,00%	99,99%
1B2a Oil	CO2	0,57	0,57	0,00%	100,00%
1A1 Energy Industries - Liquid fuels	CH4	0,51	0,51	0,00%	100,00%
1A5b Mobile	N2O	0,46	0,46	0,00%	100,00%
5C Incineration and open burning of waste	N2O	0,40	0,40	0,00%	100,00%
1A2 Manufacturing industries - Liquid fuels	CH4	0,36	0,36	0,00%	100,00%
1A2 Manufacturing industries - Solid fuels	CH4	0,34	0,34	0,00%	100,00%
1B2c Venting and flaring	N2O	0,33	0,33	0,00%	100,00%
3F Field Burning of Agricultural Residues	CH4	0,20	0,20	0,00%	100,00%
1A3c Railways - All Fuels	CH4	0,15	0,15	0,00%	100,00%
1A5a Stationary	CH4	0,10	0,10	0,00%	100,00%
5C Incineration and open burning of waste	CH4	0,10	0,10	0,00%	100,00%
1A3d Domestic navigation - All Liquid fuels	N2O	0,08	0,08	0,00%	100,00%
3F Field Burning of Agricultural Residues	N2O	0,06	0,06	0,00%	100,00%
1A3a Domestic aviation - All fuels	N2O	0,05	0,05	0,00%	100,00%
1A5a Stationary	N2O	0,04	0,04	0,00%	100,00%
1A3e Other Transportation - Pipelines	N2O	0,03	0,03	0,00%	100,00%
1A3e Other Transportation - Pipelines	CH4	0,03	0,03	0,00%	100,00%
1A3d Domestic navigation - All Liquid fuels	CH4	0,02	0,02	0,00%	100,00%
1B2d Other (Thermal water extraction + NatGas storage)	CO2	0,01	0,01	0,00%	100,00%
1A5b Mobile	CH4	0,01	0,01	0,00%	100,00%
1A3a Domestic aviation - All fuels	CH4	0,00	0,00	0,00%	100,00%
1B1 Solid fuels	N2O	0,00	0,00	0,00%	100,00%
4D13 Other Wetlands Remaining Other Wetlands	CO2	0,00	0,00	0,00%	100,00%
4D11 Peat Extraction Remaining Peat Extraction	CO2	0,00	0,00	0,00%	100,00%
4F2 Land Converted to Other Land	CO2	0,00	0,00	0,00%	100,00%
1A1 Energy Industries - Peat	CH4	0,00	0,00	0,00%	100,00%
1A1 Energy Industries - Peat	N2O	0,00	0,00	0,00%	100,00%
1A2 Manufacturing industries - Peat	CH4	0,00	0,00	0,00%	100,00%
1A2 Manufacturing industries - Peat	N2O	0,00	0,00	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	CH4	0,00	0,00	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	CO2	0,00	0,00	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	N2O	0,00	0,00	0,00%	100,00%
1B2b Natural Gas	N2O	0,00	0,00	0,00%	100,00%
1B2d Other (Thermal water extraction + NatGas storage)	N2O	0,00	0,00	0,00%	100,00%
2B1 Ammonia Production	CH4	0,00	0,00	0,00%	100,00%
2B1 Ammonia Production	N2O	0,00	0,00	0,00%	100,00%

CRF code + note	Direct Greenhouse Gas	Latest Year Emission [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
2B8 Petrochemical and carbon black production	N2O	0,00	0,00	0,00%	100,00%
2C1 Iron and Steel Production	N2O	0,00	0,00	0,00%	100,00%
2C2 Ferroalloys Production	CH4	0,00	0,00	0,00%	100,00%
2C2 Ferroalloys Production	CO2	0,00	0,00	0,00%	100,00%
2C2 Ferroalloys Production	N2O	0,00	0,00	0,00%	100,00%
2C3 Aluminium Production	CH4	0,00	0,00	0,00%	100,00%
2C3 Aluminium Production	CO2	0,00	0,00	0,00%	100,00%
2C3 Aluminium Production	N2O	0,00	0,00	0,00%	100,00%
2C3 Aluminium Production	PFC	0,00	0,00	0,00%	100,00%
2D Non-energy products from fuels and solvent use	CH4	0,00	0,00	0,00%	100,00%
2E Electronics industry	SF6	0,00	0,00	0,00%	100,00%
2F5 Solvent - HFC+PFC	Aggregate F-gases	0,00	0,00	0,00%	100,00%
3D Agricultural Soils	CH4	0,00	0,00	0,00%	100,00%
3J Other	CH4	0,00	0,00	0,00%	100,00%
3J Other	CO2	0,00	0,00	0,00%	100,00%
3J Other	N2O	0,00	0,00	0,00%	100,00%
4(I) Direct N2O emissions from N inputs to managed soils	N2O	0,00	0,00	0,00%	100,00%
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	CH4	0,00	0,00	0,00%	100,00%
4(V) Biomass Burning	CO2	0,00	0,00	0,00%	100,00%
4D12 Flooded Land Remaining Flooded Land	CO2	0,00	0,00	0,00%	100,00%
4E1 Settlements Remaining Settlements	CO2	0,00	0,00	0,00%	100,00%
4F1 Other Land Remaining Other Land	CO2	0,00	0,00	0,00%	100,00%
4H Other	CH4	0,00	0,00	0,00%	100,00%
4H Other	CO2	0,00	0,00	0,00%	100,00%
4H Other	N2O	0,00	0,00	0,00%	100,00%
5A Solid waste disposal	CO2	0,00	0,00	0,00%	100,00%
5A Solid waste disposal	N2O	0,00	0,00	0,00%	100,00%
5B Biological Treatment of Soild Waste	CO2	0,00	0,00	0,00%	100,00%
5D Wastewater Treatment and Discharge	CO2	0,00	0,00	0,00%	100,00%
5E Other	CH4	0,00	0,00	0,00%	100,00%
5E Other	CO2	0,00	0,00	0,00%	100,00%
5E Other	N2O	0,00	0,00	0,00%	100,00%

Table A1-3 Tier1 trend assessment including LULUCF (2021)

CRF code + note	Direct Greenhouse Gas	Base Year Emission [Gg CO2-eq]	Current Year Emission [Gg CO2-eq]	Trend Assesment	% Contribution to Trend	Cumulative Total %
1A3b Road trasport - All Fuels	CO2	7223,579	13651,63	0,086855	16,42%	16,42%
1A4 Other sectors - Gaseous fuels	CO2	4038,812	10877,78	0,077129	14,58%	31,00%
1A4 Other sectors - Solid fuels	CO2	12499,72	201,9211	0,055893	10,57%	41,57%
1A1 Energy Industries - Solid fuels	CO2	14335,74	4171,045	0,029421	5,56%	47,13%
1A1 Energy Industries - Gaseous fuels	CO2	5731,213	6088,681	0,02716	5,14%	52,27%
2B2 Nitric Acid Production	N2O	4365,708	32,68548	0,019855	3,75%	56,02%
1A1 Energy Industries - Liquid fuels	CO2	5880,181	925,3787	0,018983	3,59%	59,61%
1A4 Other sectors - Liquid fuels	CO2	6947,766	1518,539	0,018687	3,53%	63,15%
4A1 Forest Land Remaining Forest Land	CO2	-2391,79	-5495,98	0,017307	3,27%	66,42%
5A Solid waste disposal	CH4	2094,363	2880,579	0,015697	2,97%	69,39%
2F1 Refrigeration and Air Conditioning Equipment - HFC+PFC	Aggregate F-gases	0	1654,43	0,014565	2,75%	72,14%
2C1 Iron and Steel Production	CO2	4578,589	838,3599	0,013744	2,60%	74,74%
1A2 Manufacturing industries - Solid fuels	CO2	3318,741	287,974	0,012777	2,42%	77,15%
1A2 Manufacturing industries - Gaseous fuels	CO2	8774,225	3290,422	0,011515	2,18%	79,33%
1A2 Manufacturing industries - Liquid fuels	CO2	4241,621	1102,234	0,009866	1,87%	81,20%
2B8 Petrochemical and carbon black production	CO2	571,2592	1405,134	0,009735	1,84%	83,04%
3.D.1 Direct N2O Emissions From Managed Soils	N2O	4692,799	3560,323	0,009692	1,83%	84,87%
4A2 Land Converted to Forest Land	CO2	-76,2593	-1177	0,009371	1,77%	86,64%
1B1 Solid fuels	CH4	1598,878	28,48388	0,007126	1,35%	87,99%
1B2b Natural Gas	CH4	1031,883	1288,884	0,006586	1,25%	89,23%
1A2 Manufacturing industries - Other fossil fuels	CO2	0	479,5746	0,004222	0,80%	90,03%
4G Harvested Wood Products	CO2	-328,962	-933,375	0,003943	0,75%	90,78%
1A4 Other sectors - Solid fuels	CH4	870,7939	14,63081	0,003889	0,74%	91,51%
1A4 Other sectors - Biomass	CH4	153,2	424,2089	0,003028	0,57%	92,08%
2B1 Ammonia Production	CO2	1714,647	1201,187	0,002664	0,50%	92,59%
1A3c Railways - All Fuels	CO2	753,7338	104,5683	0,002557	0,48%	93,07%
2G Other Product Manufacture and Use - N2O	N2O	7,29191	247,1931	0,002143	0,41%	93,48%
5D Wastewater Treatment and Discharge	CH4	868,4734	229,0735	0,00199	0,38%	93,85%
1A1 Energy Industries - Other fossil fuels	CO2	49,45313	237,1612	0,00186	0,35%	94,20%
2A2 Lime Production	CO2	606,7867	111,4319	0,001819	0,34%	94,55%
4C2 Land Converted to Grassland	CO2	6,345916	204,4221	0,00177	0,33%	94,88%
2C3 Aluminium Production	PFC	371,08	0	0,001712	0,32%	95,21%
4B2 Land Converted to Cropland	CO2	-13,8057	156,0124	0,001553	0,29%	95,50%
2F2 Foam Blowing - HFC	Aggregate F-gases	0	174,6156	0,001537	0,29%	95,79%
1A3d Domestic navigation - All Liquid fuels	CO2	340,5658	9,5018	0,001488	0,28%	96,07%
1B2c Venting and flaring	CO2	571,0592	130,3187	0,001487	0,28%	96,35%
1A4 Other sectors - Other Fossil Fuels	CO2	0	160,7966	0,001416	0,27%	96,62%

CRF code + note	Direct Greenhouse Gas	Base Year Emission [Gg CO2-eq]	Current Year Emission [Gg CO2-eq]	Trend Assesment	% Contribution to Trend	Cumulative Total %
4E2 Land Converted to Settlements	CO2	54,22861	153,818	0,001104	0,21%	96,83%
1B2c Venting and flaring	CH4	590,6065	187,1024	0,001078	0,20%	97,03%
4B1 Cropland Remaining Cropland	CO2	152,9803	-40,4544	0,001062	0,20%	97,23%
1A3b Road trasport - All Fuels	N2O	52,85782	143,3659	0,001018	0,19%	97,43%
4C1 Grassland Remaining Grassland	CO2	-22,4542	-145,935	0,000993	0,19%	97,61%
5B Biological Treatment of Soild Waste	CH4	5	97,77555	0,000838	0,16%	97,77%
2A1 Cement Production	CO2	1744,645	1001,5	0,000767	0,15%	97,92%
3I Other carboncontaining fertilizers	CO2	48,10802	103,4921	0,000689	0,13%	98,05%
2C3 Aluminium Production	CO2	125,3716	0	0,000578	0,11%	98,16%
3A Enteric Fermentation	CH4	4151,358	2110,835	0,00057	0,11%	98,27%
3G Liming	CO2	130,209	3,936875	0,000566	0,11%	98,37%
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	CO2	201,2277	46,72171	0,000517	0,10%	98,47%
2A4 Other Process Uses of Carbonates	CO2	453,29	182,8519	0,000482	0,09%	98,56%
1A4 Other sectors - Biomass	N2O	24,34859	67,43177	0,000481	0,09%	98,65%
3B Manure Management	N2O	926,7005	432,2147	0,000471	0,09%	98,74%
1B2a Oil	CH4	194,5615	51,76597	0,000442	0,08%	98,82%
1A5b Mobile	CO2	14,50137	56,6676	0,000432	0,08%	98,91%
1A5a Stationary	CO2	0	48,88316	0,00043	0,08%	98,99%
5B Biological Treatment of Soild Waste	N2O	3,576	42,87381	0,000361	0,07%	99,06%
2B8 Petrochemical and carbon black production	CH4	20,54375	47,29794	0,000322	0,06%	99,12%
2F4 Aerosol + MDI - HFC	Aggregate F-gases	0	33,70815	0,000297	0,06%	99,17%
1A3c Railways - All Fuels	N2O	84,01983	12,02152	0,000282	0,05%	99,23%
1A1 Energy Industries - Biomass	N2O	0,936515	30,70044	0,000266	0,05%	99,28%
1A4 Other sectors - Solid fuels	N2O	57,48279	0,893599	0,000257	0,05%	99,33%
3.D.2 Indirect N2O Emissions From Managed Soils	N2O	450,8412	262,366	0,00023	0,04%	99,37%
5C Incineration and open burning of waste	CO2	96,87855	24,70147	0,00023	0,04%	99,41%
3C Rice Cultivation	CH4	81,23132	18,34691	0,000213	0,04%	99,45%
3F Field Burning of Agricultural Residues	CH4	46,39401	0,20242	0,000212	0,04%	99,49%
2C2 Ferroalloys Production	CO2	40,24	0	0,000186	0,04%	99,53%
1A4 Other sectors - Gaseous fuels	CH4	9,080063	24,28075	0,000172	0,03%	99,56%
1A1 Energy Industries - Biomass	CH4	0,58925	19,32415	0,000167	0,03%	99,59%
1A1 Energy Industries - Solid fuels	N2O	63,36294	14,2934	0,000167	0,03%	99,62%
1A3e Other Transportation - Pipelines	CO2	154,3827	62,9496	0,000158	0,03%	99,65%
1A2 Manufacturing industries - Biomass	N2O	0,901947	15,23027	0,00013	0,02%	99,68%
4(III)Direct N2O emissions from N mineralization/immobilization	N2O	1,519192	15,31027	0,000128	0,02%	99,70%
2D Non-energy products from fuels and solvent use	CO2	221,8214	102,7454	0,000119	0,02%	99,72%
2F3 Fire extinguishers - HFC	Aggregate F-gases	0	12,85493	0,000113	0,02%	99,75%

CRF code + note	Direct Greenhouse Gas	Base Year Emission [Gg CO2-eq]	Current Year Emission [Gg CO2-eq]	Trend Assesment	% Contribution to Trend	Cumulative Total %
2G Other Product Manufacture and Use - SF6	Aggregate F-gases	156,3158	94,14894	0,000108	0,02%	99,77%
1A2 Manufacturing industries - Biomass	CH4	0,5675	9,4677	8,07E-05	0,02%	99,78%
1A4 Other sectors - Liquid fuels	CH4	20,3835	2,429948	7,27E-05	0,01%	99,79%
1A3b Road trasport - All Fuels	CH4	54,05628	20,59624	6,81E-05	0,01%	99,81%
3B Manure Management	CH4	1276,134	676,3588	6,66E-05	0,01%	99,82%
1A2 Manufacturing industries - Other fossil fuels	N2O	0	7,492912	6,6E-05	0,01%	99,83%
3F Field Burning of Agricultural Residues	N2O	14,33747	0,062555	6,56E-05	0,01%	99,85%
3H Urea application	CO2	229,0349	126,4985	5,69E-05	0,01%	99,86%
2A3 Glass production	CO2	87,62508	39,66942	5,5E-05	0,01%	99,87%
1A1 Energy Industries - Liquid fuels	N2O	12,52665	0,839459	5,04E-05	0,01%	99,88%
1A2 Manufacturing industries - Solid fuels	N2O	12,70087	1,172236	4,83E-05	0,01%	99,89%
1B1 Solid fuels	CO2	3,603417	6,802	4,33E-05	0,01%	99,89%
1A2 Manufacturing industries - Other fossil fuels	CH4	0	4,7145	4,15E-05	0,01%	99,90%
1A4 Other sectors - Gaseous fuels	N2O	2,164687	5,788531	4,1E-05	0,01%	99,91%
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	N2O	8,618319	8,960273	3,91E-05	0,01%	99,92%
4D2 Land Converted to Wetlands	CO2	3,151316	-2,76889	3,89E-05	0,01%	99,92%
1A3a Domestic aviation - All fuels	CO2	3,629156	5,552765	3,21E-05	0,01%	99,93%
1A2 Manufacturing industries - Solid fuels	CH4	7,16077	0,34135	3E-05	0,01%	99,94%
1A2 Manufacturing industries - Liquid fuels	N2O	13,98148	10,63275	2,91E-05	0,01%	99,94%
5D Wastewater Treatment and Discharge	N2O	154,8721	84,43419	2,88E-05	0,01%	99,95%
4(IV) Indirect N2O Emissions from Managed Soils	N2O	0,329428	3,151454	2,62E-05	0,00%	99,95%
2C1 Iron and Steel Production	CH4	10,88608	3,023	2,36E-05	0,00%	99,96%
1A1 Energy Industries - Other fossil fuels	N2O	0,936515	3,10326	2,3E-05	0,00%	99,96%
1B2a Oil	CO2	5,568651	0,566714	2,07E-05	0,00%	99,96%
1A1 Energy Industries - Liquid fuels	CH4	5,387088	0,509383	2,04E-05	0,00%	99,97%
1A4 Other sectors - Other Fossil Fuels	N2O	0	2,134872	1,88E-05	0,00%	99,97%
1A2 Manufacturing industries - Liquid fuels	CH4	4,341091	0,358844	1,69E-05	0,00%	99,97%
1A1 Energy Industries - Gaseous fuels	N2O	3,069168	3,24206	1,44E-05	0,00%	99,98%
1B2d Other (Thermal water extraction + NatGas storage)	CH4	129,2483	69,25703	1,34E-05	0,00%	99,98%
1A1 Energy Industries - Other fossil fuels	CH4	0,58925	1,761557	1,28E-05	0,00%	99,98%
1A3d Domestic navigation - All Liquid fuels	N2O	2,866561	0,076423	1,26E-05	0,00%	99,98%
1A1 Energy Industries - Gaseous fuels	CH4	2,574805	2,719849	1,21E-05	0,00%	99,99%
1A4 Other sectors - Other Fossil Fuels	CH4	0	1,34325	1,18E-05	0,00%	99,99%
1A1 Energy Industries - Solid fuels	CH4	3,591634	0,966458	8,06E-06	0,00%	99,99%
4(V) Biomass Burning	N2O	16,23922	7,632623	7,73E-06	0,00%	99,99%

CRF code + note	Direct Greenhouse Gas	Base Year Emission [Gg CO2-eq]	Current Year Emission [Gg CO2-eq]	Trend Assesment	% Contribution to Trend	Cumulative Total %
1A2 Manufacturing industries - Gaseous fuels	N2O	4,702732	1,750975	6,28E-06	0,00%	99,99%
1A2 Manufacturing industries - Gaseous fuels	CH4	3,945245	1,468938	5,27E-06	0,00%	99,99%
1B2b Natural Gas	CO2	2,27785	0,708542	4,27E-06	0,00%	100,00%
5C Incineration and open burning of waste	N2O	1,637913	0,398266	4,05E-06	0,00%	100,00%
1A3d Domestic navigation - All Liquid fuels	CH4	0,841692	0,02244	3,69E-06	0,00%	100,00%
1A5b Mobile	N2O	0,118887	0,463889	3,54E-06	0,00%	100,00%
4(V) Biomass Burning	CH4	20,88873	11,34782	3,53E-06	0,00%	100,00%
1A3c Railways - All Fuels	CH4	1,036365	0,146363	3,49E-06	0,00%	100,00%
1B2c Venting and flaring	N2O	1,272976	0,332781	2,94E-06	0,00%	100,00%
2C2 Ferroalloys Production	CH4	0,2515	0	1,16E-06	0,00%	100,00%
5C Incineration and open burning of waste	CH4	0,396793	0,097368	9,74E-07	0,00%	100,00%
1A5a Stationary	CH4	0	0,100605	8,86E-07	0,00%	100,00%
1A5a Stationary	N2O	0	0,041301	3,64E-07	0,00%	100,00%
1A4 Other sectors - Liquid fuels	N2O	29,31408	15,33181	2,73E-07	0,00%	100,00%
1A3a Domestic aviation - All fuels	N2O	0,030582	0,046436	2,68E-07	0,00%	100,00%
1A3e Other Transportation - Pipelines	N2O	0,082745	0,033498	8,69E-08	0,00%	100,00%
1A5b Mobile	CH4	0,002493	0,009729	7,41E-08	0,00%	100,00%
1A3e Other Transportation - Pipelines	CH4	0,069417	0,028103	7,29E-08	0,00%	100,00%
1B2d Other (Thermal water extraction + NatGas storage)	CO2	0,039067	0,012628	6,91E-08	0,00%	100,00%
1A3a Domestic aviation - All fuels	CH4	0,000641	0,000974	5,61E-09	0,00%	100,00%
4D13 Other Wetlands Remaining Other Wetlands	CO2	0	0	0	0,00%	100,00%
4D11 Peat Extraction Remaining Peat Extraction	CO2	1,315967	0	0	0,00%	100,00%
5E Other	N2O	0	0	0	0,00%	100,00%
5E Other	CO2	0	0	0	0,00%	100,00%
5E Other	CH4	0	0	0	0,00%	100,00%
5D Wastewater Treatment and Discharge	CO2	0	0	0	0,00%	100,00%
5B Biological Treatment of Soild Waste	CO2	0	0	0	0,00%	100,00%
5A Solid waste disposal	N2O	0	0	0	0,00%	100,00%
5A Solid waste disposal	CO2	0	0	0	0,00%	100,00%
4H Other	N2O	0	0	0	0,00%	100,00%
4H Other	CO2	0	0	0	0,00%	100,00%
4H Other	CH4	0	0	0	0,00%	100,00%
4F2 Land Converted to Other Land	CO2	0	0	0	0,00%	100,00%
4F1 Other Land Remaining Other Land	CO2	0	0	0	0,00%	100,00%
4E1 Settlements Remaining Settlements	CO2	0	0	0	0,00%	100,00%
4D12 Flooded Land Remaining Flooded Land	CO2	0	0	0	0,00%	100,00%
4(V) Biomass Burning	CO2	0	0	0	0,00%	100,00%
4(II) Emissions and removals from drainage and rewetting and other	CH4	0	0	0	0,00%	100,00%

CRF code + note	Direct Greenhouse Gas	Base Year Emission [Gg CO2-eq]	Current Year Emission [Gg CO2-eq]	Trend Assesment	% Contribution to Trend	Cumulative Total %
management of organic and mineral soils						
4(I) Direct N2O emissions from N inputs to managed soils	N2O	0	0	0	0,00%	100,00%
3J Other	N2O	0	0	0	0,00%	100,00%
3J Other	CO2	0	0	0	0,00%	100,00%
3J Other	CH4	0	0	0	0,00%	100,00%
3D Agricultural Soils	CH4	0	0	0	0,00%	100,00%
2F5 Solvent - HFC+PFC	Aggregate F-gases	0	0	0	0,00%	100,00%
2E Electronics industry	SF6	0	0	0	0,00%	100,00%
2D Non-energy products from fuels and solvent use	CH4	0	0	0	0,00%	100,00%
2C3 Aluminium Production	N2O	0	0	0	0,00%	100,00%
2C3 Aluminium Production	CH4	0	0	0	0,00%	100,00%
2C2 Ferroalloys Production	N2O	0	0	0	0,00%	100,00%
2C1 Iron and Steel Production	N2O	0	0	0	0,00%	100,00%
2B8 Petrochemical and carbon black production	N2O	0	0	0	0,00%	100,00%
2B1 Ammonia Production	N2O	0	0	0	0,00%	100,00%
2B1 Ammonia Production	CH4	0	0	0	0,00%	100,00%
1B2d Other (Thermal water extraction + NatGas storage)	N2O	0	0	0	0,00%	100,00%
1B2b Natural Gas	N2O	0	0	0	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	N2O	0	0	0	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	CO2	0	0	0	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	CH4	0	0	0	0,00%	100,00%
1A2 Manufacturing industries - Peat	N2O	0	0	0	0,00%	100,00%
1A2 Manufacturing industries - Peat	CH4	0	0	0	0,00%	100,00%
1A1 Energy Industries - Peat	N2O	0	0	0	0,00%	100,00%
1A1 Energy Industries - Peat	CH4	0	0	0	0,00%	100,00%

Table A1-4 Tier 1 level assessment excluding LULUCF (2021)

Category	Direct Greenhouse Gas	Latest Year Emission exluding LULUCF [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A3b Road trasport - All Fuels	CO2	13 651,63	13 651,63	21,41%	21,41%
1A4 Other sectors - Gaseous fuels	CO2	10 877,78	10 877,78	17,06%	38,48%
1A1 Energy Industries - Gaseous fuels	CO2	6 088,68	6 088,68	9,55%	48,03%
1A1 Energy Industries - Solid fuels	CO2	4 171,05	4 171,05	6,54%	54,57%
3.D.1 Direct N2O Emissions From Managed Soils	N2O	3 560,32	3 560,32	5,58%	60,16%
1A2 Manufacturing industries - Gaseous fuels	CO2	3 290,42	3 290,42	5,16%	65,32%
5A Solid waste disposal	CH4	2 880,58	2 880,58	4,52%	69,84%
3A Enteric Fermentation	CH4	2 110,84	2 110,84	3,31%	73,15%
2F1 Refrigeration and Air Conditioning Equipment - HFC+PFC	Aggregate F-gases	1 654,43	1 654,43	2,60%	75,74%
1A4 Other sectors - Liquid fuels	CO2	1 518,54	1 518,54	2,38%	78,13%
2B8 Petrochemical and carbon black production	CO2	1 405,13	1 405,13	2,20%	80,33%
1B2b Natural Gas	CH4	1 288,88	1 288,88	2,02%	82,35%
2B1 Ammonia Production	CO2	1 201,19	1 201,19	1,88%	84,24%
1A2 Manufacturing industries - Liquid fuels	CO2	1 102,23	1 102,23	1,73%	85,97%
2A1 Cement Production	CO2	1 001,50	1 001,50	1,57%	87,54%
1A1 Energy Industries - Liquid fuels	CO2	925,38	925,38	1,45%	88,99%
2C1 Iron and Steel Production	CO2	838,36	838,36	1,32%	90,30%
3B Manure Management	CH4	676,36	676,36	1,06%	91,36%
1A2 Manufacturing industries - Other fossil fuels	CO2	479,57	479,57	0,75%	92,12%
3B Manure Management	N2O	432,21	432,21	0,68%	92,79%
1A4 Other sectors - Biomass	CH4	424,21	424,21	0,67%	93,46%
1A2 Manufacturing industries - Solid fuels	CO2	287,97	287,97	0,45%	93,91%
3.D.2 Indirect N2O Emissions From Managed Soils	N2O	262,37	262,37	0,41%	94,32%
2G Other Product Manufacture and Use - N2O	N2O	247,19	247,19	0,39%	94,71%
1A1 Energy Industries - Other fossil fuels	CO2	237,16	237,16	0,37%	95,08%
5D Wastewater Treatment and Discharge	CH4	229,07	229,07	0,36%	95,44%
1A4 Other sectors - Solid fuels	CO2	201,92	201,92	0,32%	95,76%
1B2c Venting and flaring	CH4	187,10	187,10	0,29%	96,05%
2A4 Other Process Uses of Carbonates	CO2	182,85	182,85	0,29%	96,34%
2F2 Foam Blowing - HFC	Aggregate F-gases	174,62	174,62	0,27%	96,61%
1A4 Other sectors - Other Fossil Fuels	CO2	160,80	160,80	0,25%	96,87%
1A3b Road trasport - All Fuels	N2O	143,37	143,37	0,22%	97,09%
1B2c Venting and flaring	CO2	130,32	130,32	0,20%	97,30%
3H Urea application	CO2	126,50	126,50	0,20%	97,49%
2A2 Lime Production	CO2	111,43	111,43	0,17%	97,67%
1A3c Railways - All Fuels	CO2	104,57	104,57	0,16%	97,83%

Category	Direct Greenhouse Gas	Latest Year Emission exluding LULUCF [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
3I Other carboncontaining fertilizers	CO2	103,49	103,49	0,16%	97,99%
2D Non-energy products from fuels and solvent use	CO2	102,75	102,75	0,16%	98,16%
5B Biological Treatment of Soild Waste	CH4	97,78	97,78	0,15%	98,31%
2G Other Product Manufacture and Use - SF6	Aggregate F-gases	94,15	94,15	0,15%	98,46%
5D Wastewater Treatment and Discharge	N2O	84,43	84,43	0,13%	98,59%
1B2d Other (Thermal water extraction + NatGas storage)	CH4	69,26	69,26	0,11%	98,70%
1A4 Other sectors - Biomass	N2O	67,43	67,43	0,11%	98,80%
1A3e Other Transportation - Pipelines	CO2	62,95	62,95	0,10%	98,90%
1A5b Mobile	CO2	56,67	56,67	0,09%	98,99%
1B2a Oil	CH4	51,77	51,77	0,08%	99,07%
1A5a Stationary	CO2	48,88	48,88	0,08%	99,15%
2B8 Petrochemical and carbon black production	CH4	47,30	47,30	0,07%	99,22%
5B Biological Treatment of Soild Waste	N2O	42,87	42,87	0,07%	99,29%
2A3 Glass production	CO2	39,67	39,67	0,06%	99,35%
2F4 Aerosol + MDI - HFC	Aggregate F-gases	33,71	33,71	0,05%	99,41%
2B2 Nitric Acid Production	N2O	32,69	32,69	0,05%	99,46%
1A1 Energy Industries - Biomass	N2O	30,70	30,70	0,05%	99,51%
1B1 Solid fuels	CH4	28,48	28,48	0,04%	99,55%
5C Incineration and open burning of waste	CO2	24,70	24,70	0,04%	99,59%
1A4 Other sectors - Gaseous fuels	CH4	24,28	24,28	0,04%	99,63%
1A3b Road trasport - All Fuels	CH4	20,60	20,60	0,03%	99,66%
1A1 Energy Industries - Biomass	CH4	19,32	19,32	0,03%	99,69%
3C Rice Cultivation	CH4	18,35	18,35	0,03%	99,72%
1A4 Other sectors - Liquid fuels	N2O	15,33	15,33	0,02%	99,74%
1A2 Manufacturing industries - Biomass	N2O	15,23	15,23	0,02%	99,77%
1A4 Other sectors - Solid fuels	CH4	14,63	14,63	0,02%	99,79%
1A1 Energy Industries - Solid fuels	N2O	14,29	14,29	0,02%	99,81%
2F3 Fire extinguishers - HFC	Aggregate F-gases	12,85	12,85	0,02%	99,83%
1A3c Railways - All Fuels	N2O	12,02	12,02	0,02%	99,85%
1A2 Manufacturing industries - Liquid fuels	N2O	10,63	10,63	0,02%	99,87%
1A3d Domestic navigation - All Liquid fuels	CO2	9,50	9,50	0,01%	99,88%
1A2 Manufacturing industries - Biomass	CH4	9,47	9,47	0,01%	99,90%
1A2 Manufacturing industries - Other fossil fuels	N2O	7,49	7,49	0,01%	99,91%
1B1 Solid fuels	CO2	6,80	6,80	0,01%	99,92%
1A4 Other sectors - Gaseous fuels	N2O	5,79	5,79	0,01%	99,93%
1A3a Domestic aviation - All fuels	CO2	5,55	5,55	0,01%	99,94%
1A2 Manufacturing industries - Other fossil fuels	CH4	4,71	4,71	0,01%	99,94%
3G Liming	CO2	3,94	3,94	0,01%	99,95%

Category	Direct Greenhouse Gas	Latest Year Emission exluding LULUCF [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A1 Energy Industries - Gaseous fuels	N2O	3,24	3,24	0,01%	99,96%
1A1 Energy Industries - Other fossil fuels	N2O	3,10	3,10	0,00%	99,96%
2C1 Iron and Steel Production	CH4	3,02	3,02	0,00%	99,97%
1A1 Energy Industries - Gaseous fuels	CH4	2,72	2,72	0,00%	99,97%
1A4 Other sectors - Liquid fuels	CH4	2,43	2,43	0,00%	99,97%
1A4 Other sectors - Other Fossil Fuels	N2O	2,13	2,13	0,00%	99,98%
1A1 Energy Industries - Other fossil fuels	CH4	1,76	1,76	0,00%	99,98%
1A2 Manufacturing industries - Gaseous fuels	N2O	1,75	1,75	0,00%	99,98%
1A2 Manufacturing industries - Gaseous fuels	CH4	1,47	1,47	0,00%	99,98%
1A4 Other sectors - Other Fossil Fuels	CH4	1,34	1,34	0,00%	99,99%
1A2 Manufacturing industries - Solid fuels	N2O	1,17	1,17	0,00%	99,99%
1A1 Energy Industries - Solid fuels	CH4	0,97	0,97	0,00%	99,99%
1A4 Other sectors - Solid fuels	N2O	0,89	0,89	0,00%	99,99%
1A1 Energy Industries - Liquid fuels	N2O	0,84	0,84	0,00%	99,99%
1B2b Natural Gas	CO2	0,71	0,71	0,00%	99,99%
1B2a Oil	CO2	0,57	0,57	0,00%	99,99%
1A1 Energy Industries - Liquid fuels	CH4	0,51	0,51	0,00%	100,00%
1A5b Mobile	N2O	0,46	0,46	0,00%	100,00%
5C Incineration and open burning of waste	N2O	0,40	0,40	0,00%	100,00%
1A2 Manufacturing industries - Liquid fuels	CH4	0,36	0,36	0,00%	100,00%
1A2 Manufacturing industries - Solid fuels	CH4	0,34	0,34	0,00%	100,00%
1B2c Venting and flaring	N2O	0,33	0,33	0,00%	100,00%
3F Field Burning of Agricultural Residues	CH4	0,20	0,20	0,00%	100,00%
1A3c Railways - All Fuels	CH4	0,15	0,15	0,00%	100,00%
1A5a Stationary	CH4	0,10	0,10	0,00%	100,00%
5C Incineration and open burning of waste	CH4	0,10	0,10	0,00%	100,00%
1A3d Domestic navigation - All Liquid fuels	N2O	0,08	0,08	0,00%	100,00%
3F Field Burning of Agricultural Residues	N2O	0,06	0,06	0,00%	100,00%
1A3a Domestic aviation - All fuels	N2O	0,05	0,05	0,00%	100,00%
1A5a Stationary	N2O	0,04	0,04	0,00%	100,00%
1A3e Other Transportation - Pipelines	N2O	0,03	0,03	0,00%	100,00%
1A3e Other Transportation - Pipelines	CH4	0,03	0,03	0,00%	100,00%
1A3d Domestic navigation - All Liquid fuels	CH4	0,02	0,02	0,00%	100,00%
1B2d Other (Thermal water extraction + NatGas storage)	CO2	0,01	0,01	0,00%	100,00%
1A5b Mobile	CH4	0,01	0,01	0,00%	100,00%
1A3a Domestic aviation - All fuels	CH4	0,00	0,00	0,00%	100,00%
1B1 Solid fuels	N2O	0,00	0,00	0,00%	100,00%
1A1 Energy Industries - Peat	CH4	0,00	0,00	0,00%	100,00%
1A1 Energy Industries - Peat	N2O	0,00	0,00	0,00%	100,00%

Category	Direct Greenhouse Gas	Latest Year Emission exluding LULUCF [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A2 Manufacturing industries - Peat	CH4	0,00	0,00	0,00%	100,00%
1A2 Manufacturing industries - Peat	N2O	0,00	0,00	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	CH4	0,00	0,00	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	CO2	0,00	0,00	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	N2O	0,00	0,00	0,00%	100,00%
1B2b Natural Gas	N2O	0,00	0,00	0,00%	100,00%
1B2d Other (Thermal water extraction + NatGas storage)	N2O	0,00	0,00	0,00%	100,00%
2B1 Ammonia Production	CH4	0,00	0,00	0,00%	100,00%
2B1 Ammonia Production	N2O	0,00	0,00	0,00%	100,00%
2B8 Petrochemical and carbon black production	N2O	0,00	0,00	0,00%	100,00%
2C1 Iron and Steel Production	N2O	0,00	0,00	0,00%	100,00%
2C2 Ferroalloys Production	CH4	0,00	0,00	0,00%	100,00%
2C2 Ferroalloys Production	CO2	0,00	0,00	0,00%	100,00%
2C2 Ferroalloys Production	N2O	0,00	0,00	0,00%	100,00%
2C3 Aluminium Production	CH4	0,00	0,00	0,00%	100,00%
2C3 Aluminium Production	CO2	0,00	0,00	0,00%	100,00%
2C3 Aluminium Production	N2O	0,00	0,00	0,00%	100,00%
2C3 Aluminium Production	PFC	0,00	0,00	0,00%	100,00%
2D Non-energy products from fuels and solvent use	CH4	0,00	0,00	0,00%	100,00%
2E Electronics industry	SF6	0,00	0,00	0,00%	100,00%
2F5 Solvent - HFC+PFC	Aggregate F-gases	0,00	0,00	0,00%	100,00%
3D Agricultural Soils	CH4	0,00	0,00	0,00%	100,00%
3J Other	CH4	0,00	0,00	0,00%	100,00%
3J Other	CO2	0,00	0,00	0,00%	100,00%
3J Other	N2O	0,00	0,00	0,00%	100,00%
5A Solid waste disposal	CO2	0,00	0,00	0,00%	100,00%
5A Solid waste disposal	N2O	0,00	0,00	0,00%	100,00%
5B Biological Treatment of Soild Waste	CO2	0,00	0,00	0,00%	100,00%
5D Wastewater Treatment and Discharge	CO2	0,00	0,00	0,00%	100,00%
5E Other	CH4	0,00	0,00	0,00%	100,00%
5E Other	CO2	0,00	0,00	0,00%	100,00%
5E Other	N2O	0,00	0,00	0,00%	100,00%

Table A1-5 Tier1 trend assessment excluding LULUCF (2021)

CRF code + note	Direct Greenhouse Gas	Base Years (1985-87) Emission	Current Year Emission	Trend Assesment	% Contribution to Trend	Cumulative Total %
1A3b Road trasport - All Fuels	CO2	7 223,58	13 651,63	0,086	16,20%	16,20%
1A4 Other sectors - Gaseous fuels	CO2	4 038,81	10 877,78	0,077	14,61%	30,81%
1A4 Other sectors - Solid fuels	CO2	12 499,72	201,92	0,064	12,01%	42,82%
1A1 Energy Industries - Solid fuels	CO2	14 335,74	4 171,05	0,037	7,04%	49,86%
1A1 Energy Industries - Gaseous fuels	CO2	5 731,21	6 088,68	0,025	4,75%	54,61%
1A4 Other sectors - Liquid fuels	CO2	6 947,77	1 518,54	0,023	4,27%	58,88%
2B2 Nitric Acid Production	N2O	4 365,71	32,69	0,023	4,26%	63,14%
1A1 Energy Industries - Liquid fuels	CO2	5 880,18	925,38	0,022	4,23%	67,36%
2C1 Iron and Steel Production	CO2	4 578,59	838,36	0,016	3,09%	70,46%
1A2 Manufacturing industries - Gaseous fuels	CO2	8 774,22	3 290,42	0,016	3,05%	73,50%
5A Solid waste disposal	CH4	2 094,36	2 880,58	0,015	2,86%	76,36%
2F1 Refrigeration and Air Conditioning Equipment - HFC+PFC	Aggregate F-gases	0,00	1 654,43	0,015	2,83%	79,19%
1A2 Manufacturing industries - Solid fuels	CO2	3 318,74	287,97	0,015	2,79%	81,97%
1A2 Manufacturing industries - Liquid fuels	CO2	4 241,62	1 102,23	0,012	2,31%	84,28%
2B8 Petrochemical and carbon black production	CO2	571,26	1 405,13	0,010	1,84%	86,12%
1B1 Solid fuels	CH4	1 598,88	28,48	0,008	1,53%	87,65%
3.D.1 Direct N2O Emissions From Managed Soils	N2O	4 692,80	3 560,32	0,008	1,45%	89,10%
1B2b Natural Gas	CH4	1 031,88	1 288,88	0,006	1,18%	90,29%
1A4 Other sectors - Solid fuels	CH4	870,79	14,63	0,004	0,84%	91,12%
1A2 Manufacturing industries - Other fossil fuels	CO2	0,00	479,57	0,004	0,82%	91,94%
1A4 Other sectors - Biomass	CH4	153,20	424,21	0,003	0,57%	92,52%
1A3c Railways - All Fuels	CO2	753,73	104,57	0,003	0,57%	93,08%
3A Enteric Fermentation	CH4	4 151,36	2 110,84	0,003	0,49%	93,58%
5D Wastewater Treatment and Discharge	CH4	868,47	229,07	0,002	0,47%	94,04%
2G Other Product Manufacture and Use - N2O	N2O	7,29	247,19	0,002	0,42%	94,46%
2A2 Lime Production	CO2	606,79	111,43	0,002	0,41%	94,87%
2C3 Aluminium Production	PFC	371,08	0,00	0,002	0,37%	95,23%
2B1 Ammonia Production	CO2	1 714,65	1 201,19	0,002	0,36%	95,59%
1A1 Energy Industries - Other fossil fuels	CO2	49,45	237,16	0,002	0,36%	95,95%
1B2c Venting and flaring	CO2	571,06	130,32	0,002	0,34%	96,29%
1A3d Domestic navigation - All Liquid fuels	CO2	340,57	9,50	0,002	0,32%	96,61%
2F2 Foam Blowing - HFC	Aggregate F-gases	0,00	174,62	0,002	0,30%	96,91%
1A4 Other sectors - Other Fossil Fuels	CO2	0,00	160,80	0,001	0,27%	97,18%
1B2c Venting and flaring	CH4	590,61	187,10	0,001	0,26%	97,45%
1A3b Road trasport - All Fuels	N2O	52,86	143,37	0,001	0,19%	97,64%
3B Manure Management	N2O	926,70	432,21	0,001	0,18%	97,82%

CRF code + note	Direct Greenhouse Gas	Base Years (1985-87) Emission	Current Year Emission	Trend Assesment	% Contribution to Trend	Cumulative Total %
5B Biological Treatment of Soild Waste	CH4	5,00	97,78	0,001	0,16%	97,98%
2A4 Other Process Uses of Carbonates	CO2	453,29	182,85	0,001	0,14%	98,12%
3I Other carboncontaining fertilizers	CO2	48,11	103,49	0,001	0,13%	98,25%
2C3 Aluminium Production	CO2	125,37	0,00	0,001	0,12%	98,37%
3G Liming	CO2	130,21	3,94	0,001	0,12%	98,49%
3B Manure Management	CH4	1 276,13	676,36	0,001	0,10%	98,60%
1B2a Oil	CH4	194,56	51,77	0,001	0,10%	98,70%
1A4 Other sectors - Biomass	N2O	24,35	67,43	0,000	0,09%	98,79%
1A5a Stationary	CO2	0,00	48,88	0,000	0,08%	98,87%
1A5b Mobile	CO2	14,50	56,67	0,000	0,08%	98,96%
5B Biological Treatment of Soild Waste	N2O	3,58	42,87	0,000	0,07%	99,03%
1A3c Railways - All Fuels	N2O	84,02	12,02	0,000	0,06%	99,09%
2B8 Petrochemical and carbon black production	CH4	20,54	47,30	0,000	0,06%	99,15%
2F4 Aerosol + MDI - HFC	Aggregate F-gases	0,00	33,71	0,000	0,06%	99,21%
1A4 Other sectors - Solid fuels	N2O	57,48	0,89	0,000	0,06%	99,26%
5C Incineration and open burning of waste	CO2	96,88	24,70	0,000	0,05%	99,32%
1A1 Energy Industries - Biomass	N2O	0,94	30,70	0,000	0,05%	99,37%
3C Rice Cultivation	CH4	81,23	18,35	0,000	0,05%	99,42%
3F Field Burning of Agricultural Residues	CH4	46,39	0,20	0,000	0,05%	99,46%
1A3e Other Transportation - Pipelines	CO2	154,38	62,95	0,000	0,04%	99,51%
2D Non-energy products from fuels and solvent use	CO2	221,82	102,75	0,000	0,04%	99,55%
2C2 Ferroalloys Production	CO2	40,24	0,00	0,000	0,04%	99,59%
1A1 Energy Industries - Solid fuels	N2O	63,36	14,29	0,000	0,04%	99,63%
1A4 Other sectors - Gaseous fuels	CH4	9,08	24,28	0,000	0,03%	99,66%
1A1 Energy Industries - Biomass	CH4	0,59	19,32	0,000	0,03%	99,69%
1A2 Manufacturing industries - Biomass	N2O	0,90	15,23	0,000	0,03%	99,72%
2F3 Fire extinguishers - HFC	Aggregate F-gases	0,00	12,85	0,000	0,02%	99,74%
2A3 Glass production	CO2	87,63	39,67	0,000	0,02%	99,76%
1A3b Road trasport - All Fuels	CH4	54,06	20,60	0,000	0,02%	99,78%
1A4 Other sectors - Liquid fuels	CH4	20,38	2,43	0,000	0,02%	99,79%
1A2 Manufacturing industries - Biomass	CH4	0,57	9,47	0,000	0,02%	99,81%
3F Field Burning of Agricultural Residues	N2O	14,34	0,06	0,000	0,01%	99,82%
1A2 Manufacturing industries - Other fossil fuels	N2O	0,00	7,49	0,000	0,01%	99,84%
2A1 Cement Production	CO2	1 744,64	1 001,50	0,000	0,01%	99,85%
1A1 Energy Industries - Liquid fuels	N2O	12,53	0,84	0,000	0,01%	99,86%
1A2 Manufacturing industries - Solid fuels	N2O	12,70	1,17	0,000	0,01%	99,87%
3H Urea application	CO2	229,03	126,50	0,000	0,01%	99,88%
1B2d Other (Thermal water extraction + NatGas storage)	CH4	129,25	69,26	0,000	0,01%	99,89%

CRF code + note	Direct Greenhouse Gas	Base Years (1985-87) Emission	Current Year Emission	Trend Assesment	% Contribution to Trend	Cumulative Total %
5D Wastewater Treatment and Discharge	N2O	154,87	84,43	0,000	0,01%	99,90%
1B1 Solid fuels	CO2	3,60	6,80	0,000	0,01%	99,91%
1A2 Manufacturing industries - Other fossil fuels	CH4	0,00	4,71	0,000	0,01%	99,91%
1A4 Other sectors - Gaseous fuels	N2O	2,16	5,79	0,000	0,01%	99,92%
1A2 Manufacturing industries - Solid fuels	CH4	7,16	0,34	0,000	0,01%	99,93%
2G Other Product Manufacture and Use - SF6	Aggregate F-gases	156,32	94,15	0,000	0,01%	99,93%
1A3a Domestic aviation - All fuels	CO2	3,63	5,55	0,000	0,01%	99,94%
2C1 Iron and Steel Production	CH4	10,89	3,02	0,000	0,01%	99,95%
1B2a Oil	CO2	5,57	0,57	0,000	0,00%	99,95%
1A1 Energy Industries - Liquid fuels	CH4	5,39	0,51	0,000	0,00%	99,96%
1A1 Energy Industries - Other fossil fuels	N2O	0,94	3,10	0,000	0,00%	99,96%
1A2 Manufacturing industries - Liquid fuels	N2O	13,98	10,63	0,000	0,00%	99,96%
1A2 Manufacturing industries - Liquid fuels	CH4	4,34	0,36	0,000	0,00%	99,97%
1A4 Other sectors - Other Fossil Fuels	N2O	0,00	2,13	0,000	0,00%	99,97%
3.D.2 Indirect N2O Emissions From Managed Soils	N2O	450,84	262,37	0,000	0,00%	99,97%
1A4 Other sectors - Liquid fuels	N2O	29,31	15,33	0,000	0,00%	99,98%
1A3d Domestic navigation - All Liquid fuels	N2O	2,87	0,08	0,000	0,00%	99,98%
1A1 Energy Industries - Gaseous fuels	N2O	3,07	3,24	0,000	0,00%	99,98%
1A1 Energy Industries - Other fossil fuels	CH4	0,59	1,76	0,000	0,00%	99,98%
1A4 Other sectors - Other Fossil Fuels	CH4	0,00	1,34	0,000	0,00%	99,99%
1A1 Energy Industries - Gaseous fuels	CH4	2,57	2,72	0,000	0,00%	99,99%
1A1 Energy Industries - Solid fuels	CH4	3,59	0,97	0,000	0,00%	99,99%
1A2 Manufacturing industries - Gaseous fuels	N2O	4,70	1,75	0,000	0,00%	99,99%
1A2 Manufacturing industries - Gaseous fuels	CH4	3,95	1,47	0,000	0,00%	99,99%
1B2b Natural Gas	CO2	2,28	0,71	0,000	0,00%	100,00%
5C Incineration and open burning of waste	N2O	1,64	0,40	0,000	0,00%	100,00%
1A3d Domestic navigation - All Liquid fuels	CH4	0,84	0,02	0,000	0,00%	100,00%
1A3c Railways - All Fuels	CH4	1,04	0,15	0,000	0,00%	100,00%
1B2c Venting and flaring	N2O	1,27	0,33	0,000	0,00%	100,00%
1A5b Mobile	N2O	0,12	0,46	0,000	0,00%	100,00%
2C2 Ferroalloys Production	CH4	0,25	0,00	0,000	0,00%	100,00%
5C Incineration and open burning of waste	CH4	0,40	0,10	0,000	0,00%	100,00%
1A5a Stationary	CH4	0,00	0,10	0,000	0,00%	100,00%
1A5a Stationary	N2O	0,00	0,04	0,000	0,00%	100,00%
1A3a Domestic aviation - All fuels	N2O	0,03	0,05	0,000	0,00%	100,00%
1A3e Other Transportation - Pipelines	N2O	0,08	0,03	0,000	0,00%	100,00%
1A3e Other Transportation - Pipelines	CH4	0,07	0,03	0,000	0,00%	100,00%

CRF code + note	Direct Greenhouse Gas	Base Years (1985-87) Emission	Current Year Emission	Trend Assesment	% Contribution to Trend	Cumulative Total %
1B2d Other (Thermal water extraction + NatGas storage)	CO2	0,04	0,01	0,000	0,00%	100,00%
1A5b Mobile	CH4	0,00	0,01	0,000	0,00%	100,00%
1A3a Domestic aviation - All fuels	CH4	0,00	0,00	0,000	0,00%	100,00%
1A1 Energy Industries - Peat	CH4	0,00	0,00	0,000	0,00%	100,00%
1A1 Energy Industries - Peat	N2O	0,00	0,00	0,000	0,00%	100,00%
1A2 Manufacturing industries - Peat	CH4	0,00	0,00	0,000	0,00%	100,00%
1A2 Manufacturing industries - Peat	N2O	0,00	0,00	0,000	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	CH4	0,00	0,00	0,000	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	CO2	0,00	0,00	0,000	0,00%	100,00%
1A3d Domestic navigation - Gaseous fuels	N2O	0,00	0,00	0,000	0,00%	100,00%
1B2b Natural Gas	N2O	0,00	0,00	0,000	0,00%	100,00%
1B2d Other (Thermal water extraction + NatGas storage)	N2O	0,00	0,00	0,000	0,00%	100,00%
2B1 Ammonia Production	CH4	0,00	0,00	0,000	0,00%	100,00%
2B1 Ammonia Production	N2O	0,00	0,00	0,000	0,00%	100,00%
2B8 Petrochemical and carbon black production	N2O	0,00	0,00	0,000	0,00%	100,00%
2C1 Iron and Steel Production	N2O	0,00	0,00	0,000	0,00%	100,00%
2C2 Ferroalloys Production	N2O	0,00	0,00	0,000	0,00%	100,00%
2C3 Aluminium Production	CH4	0,00	0,00	0,000	0,00%	100,00%
2C3 Aluminium Production	N2O	0,00	0,00	0,000	0,00%	100,00%
2D Non-energy products from fuels and solvent use	CH4	0,00	0,00	0,000	0,00%	100,00%
2E Electronics industry	SF6	0,00	0,00	0,000	0,00%	100,00%
2F5 Solvent - HFC+PFC	Aggregate F-gases	0,00	0,00	0,000	0,00%	100,00%
3D Agricultural Soils	CH4	0,00	0,00	0,000	0,00%	100,00%
3J Other	CH4	0,00	0,00	0,000	0,00%	100,00%
3J Other	CO2	0,00	0,00	0,000	0,00%	100,00%
3J Other	N2O	0,00	0,00	0,000	0,00%	100,00%
5A Solid waste disposal	CO2	0,00	0,00	0,000	0,00%	100,00%
5A Solid waste disposal	N2O	0,00	0,00	0,000	0,00%	100,00%
5B Biological Treatment of Soild Waste	CO2	0,00	0,00	0,000	0,00%	100,00%
5D Wastewater Treatment and Discharge	CO2	0,00	0,00	0,000	0,00%	100,00%
5E Other	CH4	0,00	0,00	0,000	0,00%	100,00%
5E Other	CO2	0,00	0,00	0,000	0,00%	100,00%
5E Other	N2O	0,00	0,00	0,000	0,00%	100,00%

Table A1-6 Tier 1 level assessment including LULUCF (Base year)

Category	Direct Greenhouse Gas	Base Year Emission [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A1 Energy Industries - Solid fuels	CO2	14,335.74	14,335.74	12.59%	12.59%
1A4 Other sectors - Solid fuels	CO2	12,499.72	12,499.72	10.98%	23.57%
1A2 Manufacturing industries - Gaseous fuels	CO2	8,774.22	8,774.22	7.71%	31.28%
1A3b Road trasport - All Fuels	CO2	7,153.76	7,153.76	6.28%	37.56%
1A4 Other sectors - Liquid fuels	CO2	6,947.45	6,947.45	6.10%	43.66%
1A1 Energy Industries - Liquid fuels	CO2	5,880.18	5,880.18	5.16%	48.83%
1A1 Energy Industries - Gaseous fuels	CO2	5,731.21	5,731.21	5.03%	53.86%
3.D.1 Direct N2O Emissions From Managed Soils	N2O	4,693.23	4,693.23	4.12%	57.98%
2C1 Iron and Steel Production	CO2	4,578.59	4,578.59	4.02%	62.00%
2B2 Nitric Acid Production	N2O	4,365.71	4,365.71	3.83%	65.84%
1A2 Manufacturing industries - Liquid fuels	CO2	4,241.62	4,241.62	3.73%	69.56%
3A Enteric Fermentation	CH4	4,151.36	4,151.36	3.65%	73.21%
1A4 Other sectors - Gaseous fuels	CO2	3,988.18	3,988.18	3.50%	76.71%
1A2 Manufacturing industries - Solid fuels	CO2	3,318.74	3,318.74	2.91%	79.63%
4A1 Forest Land Remaining Forest Land	CO2	-2,368.01	2,368.01	2.08%	81.71%
5A Solid waste disposal	CH4	2,094.36	2,094.36	1.84%	83.55%
2A1 Cement Production	CO2	1,744.64	1,744.64	1.53%	85.08%
2B1 Ammonia Production	CO2	1,714.65	1,714.65	1.51%	86.58%
1B1 Solid fuels	CH4	1,598.88	1,598.88	1.40%	87.99%
1B2b Natural Gas	CH4	1,400.61	1,400.61	1.23%	89.22%
3B Manure Management	CH4	1,258.92	1,258.92	1.11%	90.32%
3B Manure Management	N2O	926.70	926.70	0.81%	91.14%
1A4 Other sectors - Solid fuels	CH4	870.79	870.79	0.76%	91.90%
5D Wastewater Treatment and Discharge	CH4	868.47	868.47	0.76%	92.67%
1A3c Railways - All Fuels	CO2	753.73	753.73	0.66%	93.33%
2A2 Lime Production	CO2	606.79	606.79	0.53%	93.86%
1B2c Venting and flaring	CH4	590.61	590.61	0.52%	94.38%
2B8 Petrochemical and carbon black production	CO2	571.26	571.26	0.50%	94.88%
1B2c Venting and flaring	CO2	571.06	571.06	0.50%	95.38%
2A4 Other Process Uses of Carbonates	CO2	453.29	453.29	0.40%	95.78%
3.D.2 Indirect N2O Emissions From Managed Soils	N2O	450.85	450.85	0.40%	96.18%
4G Harvested Wood Products	CO2	-406.40	406.40	0.36%	96.53%
2C3 Aluminium Production	PFC	371.08	371.08	0.33%	96.86%
1A3d Domestic navigation - All Liquid fuels	CO2	340.57	340.57	0.30%	97.16%
3H Urea application	CO2	229.03	229.03	0.20%	97.36%
2D Non-energy products from fuels and solvent use	CO2	221.82	221.82	0.19%	97.55%
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	CO2	200.59	200.59	0.18%	97.73%
1B2a Oil	CH4	194.56	194.56	0.17%	97.90%
4B1 Cropland Remaining Cropland	CO2	157.96	157.96	0.14%	98.04%

Category	Direct Greenhouse Gas	Base Year Emission [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
2G Other Product Manufacture and Use - N2O	N2O	156.32	156.32	0.14%	98.18%
5D Wastewater Treatment and Discharge	N2O	154.87	154.87	0.14%	98.31%
1A3e Other Transportation - Pipelines	CO2	154.38	154.38	0.14%	98.45%
1A4 Other sectors - Biomass	CH4	153.20	153.20	0.13%	98.58%
3G Liming	CO2	130.21	130.21	0.11%	98.70%
1B2d Other (Thermal water extraction + NatGas storage)	CH4	129.25	129.25	0.11%	98.81%
2C3 Aluminium Production	CO2	125.37	125.37	0.11%	98.92%
5C Incineration and open burning of waste	CO2	96.88	96.88	0.09%	99.01%
2A3 Glass production	CO2	87.63	87.63	0.08%	99.08%
1A3c Railways - All Fuels	N2O	84.02	84.02	0.07%	99.16%
3C Rice Cultivation	CH4	81.23	81.23	0.07%	99.23%
1A1 Energy Industries - Solid fuels	N2O	63.36	63.36	0.06%	99.29%
4E2 Land Converted to Settlements	CO2	62.26	62.26	0.05%	99.34%
1A4 Other sectors - Solid fuels	N2O	57.48	57.48	0.05%	99.39%
1A3b Road trasport - All Fuels	CH4	54.06	54.06	0.05%	99.44%
1A3b Road trasport - All Fuels	N2O	52.86	52.86	0.05%	99.48%
1A1 Energy Industries - Other fossil fuels	CO2	49.45	49.45	0.04%	99.53%
3I Other carboncontaining fertilizers	CO2	48.11	48.11	0.04%	99.57%
3F Field Burning of Agricultural Residues	CH4	46.39	46.39	0.04%	99.61%
4A2 Land Converted to Forest Land	CO2	-41.77	41.77	0.04%	99.65%
2C2 Ferroalloys Production	CO2	40.24	40.24	0.04%	99.68%
1A4 Other sectors - Liquid fuels	N2O	29.31	29.31	0.03%	99.71%
4(V) Biomass Burning	CH4	24.72	24.72	0.02%	99.73%
1A4 Other sectors - Biomass	N2O	24.35	24.35	0.02%	99.75%
2B8 Petrochemical and carbon black production	CH4	20.40	20.40	0.02%	99.77%
1A4 Other sectors - Liquid fuels	CH4	20.38	20.38	0.02%	99.79%
4B2 Land Converted to Cropland	CO2	16.00	16.00	0.01%	99.80%
4(V) Biomass Burning	N2O	15.74	15.74	0.01%	99.82%
4C1 Grassland Remaining Grassland	CO2	-15.46	15.46	0.01%	99.83%
1A5b Mobile	CO2	14.50	14.50	0.01%	99.84%
4C2 Land Converted to Grassland	CO2	-14.39	14.39	0.01%	99.85%
3F Field Burning of Agricultural Residues	N2O	14.34	14.34	0.01%	99.87%
1A2 Manufacturing industries - Liquid fuels	N2O	13.98	13.98	0.01%	99.88%
1A2 Manufacturing industries - Solid fuels	N2O	12.70	12.70	0.01%	99.89%
1A1 Energy Industries - Liquid fuels	N2O	12.53	12.53	0.01%	99.90%
2C1 Iron and Steel Production	CH4	10.89	10.89	0.01%	99.91%
1A4 Other sectors - Gaseous fuels	CH4	8.97	8.97	0.01%	99.92%
2G Other Product Manufacture and Use - SF6	Aggregate F-gases	7.29	7.29	0.01%	99.93%
1A2 Manufacturing industries - Solid fuels	CH4	7.16	7.16	0.01%	99.93%
1B2a Oil	CO2	5.57	5.57	0.00%	99.94%
1A1 Energy Industries - Liquid fuels	CH4	5.39	5.39	0.00%	99.94%
5B Biological Treatment of Soild Waste	CH4	5.00	5.00	0.00%	99.95%

Category	Direct Greenhouse Gas	Base Year Emission [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A2 Manufacturing industries - Gaseous fuels	N2O	4.70	4.70	0.00%	99.95%
4(III)Direct N2O emissions from N mineralization/immobilization	N2O	4.52	4.52	0.00%	99.95%
1A2 Manufacturing industries - Liquid fuels	CH4	4.34	4.34	0.00%	99.96%
1A2 Manufacturing industries - Gaseous fuels	CH4	3.95	3.95	0.00%	99.96%
1A3a Domestic aviation - All fuels	CO2	3.63	3.63	0.00%	99.96%
1B1 Solid fuels	CO2	3.60	3.60	0.00%	99.97%
1A1 Energy Industries - Solid fuels	CH4	3.59	3.59	0.00%	99.97%
5B Biological Treatment of Soild Waste	N2O	3.58	3.58	0.00%	99.97%
4D2 Land Converted to Wetlands	CO2	3.09	3.09	0.00%	99.98%
1A1 Energy Industries - Gaseous fuels	N2O	3.07	3.07	0.00%	99.98%
1A3d Domestic navigation - All Liquid fuels	N2O	2.87	2.87	0.00%	99.98%
1A1 Energy Industries - Gaseous fuels	CH4	2.57	2.57	0.00%	99.98%
1B2b Natural Gas	CO2	2.28	2.28	0.00%	99.99%
1A4 Other sectors - Gaseous fuels	N2O	2.14	2.14	0.00%	99.99%
4D13 Other Wetlands Remaining Other Wetlands	CO2	-2.05	2.05	0.00%	99.99%
5C Incineration and open burning of waste	N2O	1.64	1.64	0.00%	99.99%
4D11 Peat Extraction Remaining Peat Extraction	CO2	1.32	1.32	0.00%	99.99%
1A3c Railways - All Fuels	CH4	1.04	1.04	0.00%	99.99%
1A1 Energy Industries - Biomass	N2O	0.94	0.94	0.00%	99.99%
1A1 Energy Industries - Other fossil fuels	N2O	0.94	0.94	0.00%	99.99%
4(IV) Indirect N2O Emissions from Managed Soils	N2O	0.91	0.91	0.00%	100.00%
1A2 Manufacturing industries - Biomass	N2O	0.90	0.90	0.00%	100.00%
1B2c Venting and flaring	N2O	0.89	0.89	0.00%	100.00%
1A3d Domestic navigation - All Liquid fuels	CH4	0.84	0.84	0.00%	100.00%
1A1 Energy Industries - Biomass	CH4	0.59	0.59	0.00%	100.00%
1A1 Energy Industries - Other fossil fuels	CH4	0.59	0.59	0.00%	100.00%
1A2 Manufacturing industries - Biomass	CH4	0.57	0.57	0.00%	100.00%
5C Incineration and open burning of waste	CH4	0.40	0.40	0.00%	100.00%
2C2 Ferroalloys Production	CH4	0.25	0.25	0.00%	100.00%
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	N2O	0.14	0.14	0.00%	100.00%
1A5b Mobile	N2O	0.12	0.12	0.00%	100.00%
1A3e Other Transportation - Pipelines	N2O	0.08	0.08	0.00%	100.00%
1A3e Other Transportation - Pipelines	CH4	0.07	0.07	0.00%	100.00%
1B2d Other (Thermal water extraction + NatGas storage)	CO2	0.04	0.04	0.00%	100.00%
1A3a Domestic aviation - All fuels	N2O	0.03	0.03	0.00%	100.00%
1A5b Mobile	CH4	0.00	0.00	0.00%	100.00%
1A3a Domestic aviation - All fuels	CH4	0.00	0.00	0.00%	100.00%
1A1 Energy Industries - Peat	CH4	0.00	0.00	0.00%	100.00%
1A1 Energy Industries - Peat	N2O	0.00	0.00	0.00%	100.00%

Category	Direct Greenhouse Gas	Base Year Emission [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A2 Manufacturing industries - Other fossil fuels	CH4	0.00	0.00	0.00%	100.00%
1A2 Manufacturing industries - Other fossil fuels	CO2	0.00	0.00	0.00%	100.00%
1A2 Manufacturing industries - Other fossil fuels	N2O	0.00	0.00	0.00%	100.00%
1A2 Manufacturing industries - Peat	CH4	0.00	0.00	0.00%	100.00%
1A2 Manufacturing industries - Peat	N2O	0.00	0.00	0.00%	100.00%
1A3d Domestic navigation - Gaseous fuels	CH4	0.00	0.00	0.00%	100.00%
1A3d Domestic navigation - Gaseous fuels	CO2	0.00	0.00	0.00%	100.00%
1A3d Domestic navigation - Gaseous fuels	N2O	0.00	0.00	0.00%	100.00%
1A4 Other sectors - Other Fossil Fuels	CH4	0.00	0.00	0.00%	100.00%
1A4 Other sectors - Other Fossil Fuels	CO2	0.00	0.00	0.00%	100.00%
1A4 Other sectors - Other Fossil Fuels	N2O	0.00	0.00	0.00%	100.00%
1A5a Stationary	CH4	0.00	0.00	0.00%	100.00%
1A5a Stationary	CO2	0.00	0.00	0.00%	100.00%
1A5a Stationary	N2O	0.00	0.00	0.00%	100.00%
1B2b Natural Gas	N2O	0.00	0.00	0.00%	100.00%
1B2d Other (Thermal water extraction + NatGas storage)	N2O	0.00	0.00	0.00%	100.00%
2B1 Ammonia Production	CH4	0.00	0.00	0.00%	100.00%
2B1 Ammonia Production	N2O	0.00	0.00	0.00%	100.00%
2B8 Petrochemical and carbon black production	N2O	0.00	0.00	0.00%	100.00%
2C1 Iron and Steel Production	N2O	0.00	0.00	0.00%	100.00%
2C2 Ferroalloys Production	N2O	0.00	0.00	0.00%	100.00%
2C3 Aluminium Production	CH4	0.00	0.00	0.00%	100.00%
2C3 Aluminium Production	N2O	0.00	0.00	0.00%	100.00%
2D Non-energy products from fuels and solvent use	CH4	0.00	0.00	0.00%	100.00%
2E Electronics industry	SF6	0.00	0.00	0.00%	100.00%
2F1 Refrigeration and Air Conditioning Equipment - HFC+PFC	Aggregate F-gases	0.00	0.00	0.00%	100.00%
2F2 Foam Blowing - HFC	Aggregate F-gases	0.00	0.00	0.00%	100.00%
2F3 Fire extinguishers - HFC	Aggregate F-gases	0.00	0.00	0.00%	100.00%
2F4 Aerosol + MDI - HFC	Aggregate F-gases	0.00	0.00	0.00%	100.00%
2F5 Solvent - HFC+PFC	Aggregate F-gases	0.00	0.00	0.00%	100.00%
3D Agricultural Soils	CH4	0.00	0.00	0.00%	100.00%
3J Other	CH4	0.00	0.00	0.00%	100.00%
3J Other	CO2	0.00	0.00	0.00%	100.00%
3J Other	N2O	0.00	0.00	0.00%	100.00%
4(I) Direct N2O emissions from N inputs to managed soils	N2O	0.00	0.00	0.00%	100.00%
4(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils	CH4	0.00	0.00	0.00%	100.00%
4(V) Biomass Burning	CO2	0.00	0.00	0.00%	100.00%

Category	Direct Greenhouse Gas	Base Year Emission [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
4D12 Flooded Land Remaining Flooded Land	CO2	0.00	0.00	0.00%	100.00%
4E1 Settlements Remaining Settlements	CO2	0.00	0.00	0.00%	100.00%
4F1 Other Land Remaining Other Land	CO2	0.00	0.00	0.00%	100.00%
4F2 Land Converted to Other Land	CO2	0.00	0.00	0.00%	100.00%
4H Other	CH4	0.00	0.00	0.00%	100.00%
4H Other	CO2	0.00	0.00	0.00%	100.00%
4H Other	N2O	0.00	0.00	0.00%	100.00%
5A Solid waste disposal	CO2	0.00	0.00	0.00%	100.00%
5A Solid waste disposal	N2O	0.00	0.00	0.00%	100.00%
5B Biological Treatment of Soild Waste	CO2	0.00	0.00	0.00%	100.00%
5D Wastewater Treatment and Discharge	CO2	0.00	0.00	0.00%	100.00%
5E Other	CH4	0.00	0.00	0.00%	100.00%
5E Other	CO2	0.00	0.00	0.00%	100.00%
5E Other	N2O	0.00	0.00	0.00%	100.00%

Table A1-7 Tier 1 level assessment excluding LULUCF (Base year)

Category	Direct Greenhouse Gas	Base Year Emission exluding LULUCF [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A1 Energy Industries - Solid fuels	CO2	14,335.74	14,335.74	12.97%	12.97%
1A4 Other sectors - Solid fuels	CO2	12,499.72	12,499.72	11.31%	24.28%
1A2 Manufacturing industries - Gaseous fuels	CO2	8,774.22	8,774.22	7.94%	32.22%
1A3b Road trasport - All Fuels	CO2	7,153.76	7,153.76	6.47%	38.69%
1A4 Other sectors - Liquid fuels	CO2	6,947.45	6,947.45	6.29%	44.98%
1A1 Energy Industries - Liquid fuels	CO2	5,880.18	5,880.18	5.32%	50.30%
1A1 Energy Industries - Gaseous fuels	CO2	5,731.21	5,731.21	5.19%	55.48%
3.D.1 Direct N2O Emissions From Managed Soils	N2O	4,693.23	4,693.23	4.25%	59.73%
2C1 Iron and Steel Production	CO2	4,578.59	4,578.59	4.14%	63.87%
2B2 Nitric Acid Production	N2O	4,365.71	4,365.71	3.95%	67.82%
1A2 Manufacturing industries - Liquid fuels	CO2	4,241.62	4,241.62	3.84%	71.66%
3A Enteric Fermentation	CH4	4,151.36	4,151.36	3.76%	75.42%
1A4 Other sectors - Gaseous fuels	CO2	3,988.18	3,988.18	3.61%	79.03%
1A2 Manufacturing industries - Solid fuels	CO2	3,318.74	3,318.74	3.00%	82.03%
5A Solid waste disposal	CH4	2,094.36	2,094.36	1.89%	83.92%
2A1 Cement Production	CO2	1,744.64	1,744.64	1.58%	85.50%
2B1 Ammonia Production	CO2	1,714.65	1,714.65	1.55%	87.05%
1B1 Solid fuels	CH4	1,598.88	1,598.88	1.45%	88.50%
1B2b Natural Gas	CH4	1,400.61	1,400.61	1.27%	89.77%
3B Manure Management	CH4	1,258.92	1,258.92	1.14%	90.91%
3B Manure Management	N2O	926.70	926.70	0.84%	91.75%
1A4 Other sectors - Solid fuels	CH4	870.79	870.79	0.79%	92.53%
5D Wastewater Treatment and Discharge	CH4	868.47	868.47	0.79%	93.32%
1A3c Railways - All Fuels	CO2	753.73	753.73	0.68%	94.00%
2A2 Lime Production	CO2	606.79	606.79	0.55%	94.55%
1B2c Venting and flaring	CH4	590.61	590.61	0.53%	95.09%
2B8 Petrochemical and carbon black production	CO2	571.26	571.26	0.52%	95.60%
1B2c Venting and flaring	CO2	571.06	571.06	0.52%	96.12%
2A4 Other Process Uses of Carbonates	CO2	453.29	453.29	0.41%	96.53%
3.D.2 Indirect N2O Emissions From Managed Soils	N2O	450.85	450.85	0.41%	96.94%
2C3 Aluminium Production	PFC	371.08	371.08	0.34%	97.27%
1A3d Domestic navigation - All Liquid fuels	CO2	340.57	340.57	0.31%	97.58%
3H Urea application	CO2	229.03	229.03	0.21%	97.79%
2D Non-energy products from fuels and solvent use	CO2	221.82	221.82	0.20%	97.99%
1B2a Oil	CH4	194.56	194.56	0.18%	98.16%
2G Other Product Manufacture and Use - N2O	N2O	156.32	156.32	0.14%	98.31%
5D Wastewater Treatment and Discharge	N2O	154.87	154.87	0.14%	98.45%
1A3e Other Transportation - Pipelines	CO2	154.38	154.38	0.14%	98.59%

Category	Direct Greenhouse Gas	Base Year Emission exluding LULUCF [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A4 Other sectors - Biomass	CH4	153.20	153.20	0.14%	98.72%
3G Liming	CO2	130.21	130.21	0.12%	98.84%
1B2d Other (Thermal water extraction + NatGas storage)	CH4	129.25	129.25	0.12%	98.96%
2C3 Aluminium Production	CO2	125.37	125.37	0.11%	99.07%
5C Incineration and open burning of waste	CO2	96.88	96.88	0.09%	99.16%
2A3 Glass production	CO2	87.63	87.63	0.08%	99.24%
1A3c Railways - All Fuels	N2O	84.02	84.02	0.08%	99.32%
3C Rice Cultivation	CH4	81.23	81.23	0.07%	99.39%
1A1 Energy Industries - Solid fuels	N2O	63.36	63.36	0.06%	99.45%
1A4 Other sectors - Solid fuels	N2O	57.48	57.48	0.05%	99.50%
1A3b Road trasport - All Fuels	CH4	54.06	54.06	0.05%	99.55%
1A3b Road trasport - All Fuels	N2O	52.86	52.86	0.05%	99.60%
1A1 Energy Industries - Other fossil fuels	CO2	49.45	49.45	0.04%	99.64%
3I Other carboncontaining fertilizers	CO2	48.11	48.11	0.04%	99.68%
3F Field Burning of Agricultural Residues	CH4	46.39	46.39	0.04%	99.73%
2C2 Ferroalloys Production	CO2	40.24	40.24	0.04%	99.76%
1A4 Other sectors - Liquid fuels	N2O	29.31	29.31	0.03%	99.79%
1A4 Other sectors - Biomass	N2O	24.35	24.35	0.02%	99.81%
2B8 Petrochemical and carbon black production	CH4	20.40	20.40	0.02%	99.83%
1A4 Other sectors - Liquid fuels	CH4	20.38	20.38	0.02%	99.85%
1A5b Mobile	CO2	14.50	14.50	0.01%	99.86%
3F Field Burning of Agricultural Residues	N2O	14.34	14.34	0.01%	99.87%
1A2 Manufacturing industries - Liquid fuels	N2O	13.98	13.98	0.01%	99.89%
1A2 Manufacturing industries - Solid fuels	N2O	12.70	12.70	0.01%	99.90%
1A1 Energy Industries - Liquid fuels	N2O	12.53	12.53	0.01%	99.91%
2C1 Iron and Steel Production	CH4	10.89	10.89	0.01%	99.92%
1A4 Other sectors - Gaseous fuels	CH4	8.97	8.97	0.01%	99.93%
2G Other Product Manufacture and Use - SF6	Aggregate F-gases	7.29	7.29	0.01%	99.93%
1A2 Manufacturing industries - Solid fuels	CH4	7.16	7.16	0.01%	99.94%
1B2a Oil	CO2	5.57	5.57	0.01%	99.95%
1A1 Energy Industries - Liquid fuels	CH4	5.39	5.39	0.00%	99.95%
5B Biological Treatment of Soild Waste	CH4	5.00	5.00	0.00%	99.95%
1A2 Manufacturing industries - Gaseous fuels	N2O	4.70	4.70	0.00%	99.96%
1A2 Manufacturing industries - Liquid fuels	CH4	4.34	4.34	0.00%	99.96%
1A2 Manufacturing industries - Gaseous fuels	CH4	3.95	3.95	0.00%	99.97%
1A3a Domestic aviation - All fuels	CO2	3.63	3.63	0.00%	99.97%
1B1 Solid fuels	CO2	3.60	3.60	0.00%	99.97%
1A1 Energy Industries - Solid fuels	CH4	3.59	3.59	0.00%	99.98%
5B Biological Treatment of Soild Waste	N2O	3.58	3.58	0.00%	99.98%
1A1 Energy Industries - Gaseous fuels	N2O	3.07	3.07	0.00%	99.98%

Category	Direct Greenhouse Gas	Base Year Emission exluding LULUCF [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1A3d Domestic navigation - All Liquid fuels	N2O	2.87	2.87	0.00%	99.98%
1A1 Energy Industries - Gaseous fuels	CH4	2.57	2.57	0.00%	99.99%
1B2b Natural Gas	CO2	2.28	2.28	0.00%	99.99%
1A4 Other sectors - Gaseous fuels	N2O	2.14	2.14	0.00%	99.99%
5C Incineration and open burning of waste	N2O	1.64	1.64	0.00%	99.99%
1A3c Railways - All Fuels	CH4	1.04	1.04	0.00%	99.99%
1A1 Energy Industries - Biomass	N2O	0.94	0.94	0.00%	99.99%
1A1 Energy Industries - Other fossil fuels	N2O	0.94	0.94	0.00%	100.00%
1A2 Manufacturing industries - Biomass	N2O	0.90	0.90	0.00%	100.00%
1B2c Venting and flaring	N2O	0.89	0.89	0.00%	100.00%
1A3d Domestic navigation - All Liquid fuels	CH4	0.84	0.84	0.00%	100.00%
1A1 Energy Industries - Biomass	CH4	0.59	0.59	0.00%	100.00%
1A1 Energy Industries - Other fossil fuels	CH4	0.59	0.59	0.00%	100.00%
1A2 Manufacturing industries - Biomass	CH4	0.57	0.57	0.00%	100.00%
5C Incineration and open burning of waste	CH4	0.40	0.40	0.00%	100.00%
2C2 Ferroalloys Production	CH4	0.25	0.25	0.00%	100.00%
1A5b Mobile	N2O	0.12	0.12	0.00%	100.00%
1A3e Other Transportation - Pipelines	N2O	0.08	0.08	0.00%	100.00%
1A3e Other Transportation - Pipelines	CH4	0.07	0.07	0.00%	100.00%
1B2d Other (Thermal water extraction + NatGas storage)	CO2	0.04	0.04	0.00%	100.00%
1A3a Domestic aviation - All fuels	N2O	0.03	0.03	0.00%	100.00%
1A5b Mobile	CH4	0.00	0.00	0.00%	100.00%
1A3a Domestic aviation - All fuels	CH4	0.00	0.00	0.00%	100.00%
1A1 Energy Industries - Peat	CH4	0.00	0.00	0.00%	100.00%
1A1 Energy Industries - Peat	N2O	0.00	0.00	0.00%	100.00%
1A2 Manufacturing industries - Other fossil fuels	CH4	0.00	0.00	0.00%	100.00%
1A2 Manufacturing industries - Other fossil fuels	CO2	0.00	0.00	0.00%	100.00%
1A2 Manufacturing industries - Other fossil fuels	N2O	0.00	0.00	0.00%	100.00%
1A2 Manufacturing industries - Peat	CH4	0.00	0.00	0.00%	100.00%
1A2 Manufacturing industries - Peat	N2O	0.00	0.00	0.00%	100.00%
1A3d Domestic navigation - Gaseous fuels	CH4	0.00	0.00	0.00%	100.00%
1A3d Domestic navigation - Gaseous fuels	CO2	0.00	0.00	0.00%	100.00%
1A3d Domestic navigation - Gaseous fuels	N2O	0.00	0.00	0.00%	100.00%
1A4 Other sectors - Other Fossil Fuels	CH4	0.00	0.00	0.00%	100.00%
1A4 Other sectors - Other Fossil Fuels	CO2	0.00	0.00	0.00%	100.00%
1A4 Other sectors - Other Fossil Fuels	N2O	0.00	0.00	0.00%	100.00%
1A5a Stationary	CH4	0.00	0.00	0.00%	100.00%
1A5a Stationary	CO2	0.00	0.00	0.00%	100.00%
1A5a Stationary	N2O	0.00	0.00	0.00%	100.00%
1B2b Natural Gas	N2O	0.00	0.00	0.00%	100.00%

Category	Direct Greenhouse Gas	Base Year Emission exluding LULUCF [Gg CO2-eq]	Emission in absolute value [Gg CO2-eq]	Level Assessment	Cumulative Total%
1B2d Other (Thermal water extraction + NatGas storage)	N2O	0.00	0.00	0.00%	100.00%
2B1 Ammonia Production	CH4	0.00	0.00	0.00%	100.00%
2B1 Ammonia Production	N2O	0.00	0.00	0.00%	100.00%
2B8 Petrochemical and carbon black production	N2O	0.00	0.00	0.00%	100.00%
2C1 Iron and Steel Production	N2O	0.00	0.00	0.00%	100.00%
2C2 Ferroalloys Production	N2O	0.00	0.00	0.00%	100.00%
2C3 Aluminium Production	CH4	0.00	0.00	0.00%	100.00%
2C3 Aluminium Production	N2O	0.00	0.00	0.00%	100.00%
2D Non-energy products from fuels and solvent use	CH4	0.00	0.00	0.00%	100.00%
2E Electronics industry	SF6	0.00	0.00	0.00%	100.00%
2F1 Refrigeration and Air Conditioning Equipment - HFC+PFC	Aggregate F-gases	0.00	0.00	0.00%	100.00%
2F2 Foam Blowing - HFC	Aggregate F-gases	0.00	0.00	0.00%	100.00%
2F3 Fire extinguishers - HFC	Aggregate F-gases	0.00	0.00	0.00%	100.00%
2F4 Aerosol + MDI - HFC	Aggregate F-gases	0.00	0.00	0.00%	100.00%
2F5 Solvent - HFC+PFC	Aggregate F-gases	0.00	0.00	0.00%	100.00%
3D Agricultural Soils	CH4	0.00	0.00	0.00%	100.00%
3J Other	CH4	0.00	0.00	0.00%	100.00%
3J Other	CO2	0.00	0.00	0.00%	100.00%
3J Other	N2O	0.00	0.00	0.00%	100.00%
5A Solid waste disposal	CO2	0.00	0.00	0.00%	100.00%
5A Solid waste disposal	N2O	0.00	0.00	0.00%	100.00%
5B Biological Treatment of Soild Waste	CO2	0.00	0.00	0.00%	100.00%
5D Wastewater Treatment and Discharge	CO2	0.00	0.00	0.00%	100.00%
5E Other	CH4	0.00	0.00	0.00%	100.00%
5E Other	CO2	0.00	0.00	0.00%	100.00%
5E Other	N2O	0.00	0.00	0.00%	100.00%

ANNEX 2. Assessment of uncertainty

A2.1 Description of methodology used for uncertainty calculation

The first uncertainty calculation for the Hungarian greenhouse gas inventory was reported in 2006 for the year 2004 to fulfill the IPCC requirements for a complete emission inventory. For the 2012 submission the full coverage of the emission sources and sinks has been achieved both in key category analysis and in uncertainty estimation. The disaggregation of the categories used in uncertainty analysis is the same as listed in Table A1-1 (currently without LULUCF).

“Uncertainty estimates are an essential element of a complete emissions inventory. Uncertainty information is not intended to dispute the validity of the inventory estimates but to help prioritize efforts to improve the accuracy of inventories in the future and guide decisions on methodological choice.” (IPCC, 2000) There are two methods for the uncertainty estimation suggested by the 2006 IPCC Guidelines, a basic method (Tier 1) which is mandatory and an analytic one (Tier 2). The combination of uncertainties of the sectors “in order to arrive at the overall uncertainty in the national emissions and the trend” in the Hungarian inventory is carried out on the basis of Tier 1 method (error propagation rule). The uncertainty calculation was performed using the relevant Table of the 2006 IPCC Guidelines.

The calculations of the emissions estimates uncertainty are presented without LULUCF sectors, in the Table A2-1 below. Uncertainty calculation for each GHG (without LULUCF sector) is presented in Table A2-2. Calculation of the uncertainty with LULUCF is a planned improvement.

Table A2-1 Uncertainty calculation without LULUCF, Tier 1 method

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
		Input data	Input data	Input data Note A	Input data Note A	$\sqrt{E^2 + F^2}$	$\frac{(G*D)^2}{(\sum D)^2}$	Note B	$\left\|\frac{D}{\sum C}\right\|$	$I*F$ Note C	$J*E*\sqrt{2}$ Note D	K^2+L^2
		Gg CO2 equivalent	Gg CO2 equivalent	%	%	%		%	%	%	%	%
1A1 Energy Industries - Biomass	CH4	0,65996	21,643048	5	100	100,124922	0,0011387	0,00019261	0,00019609	0,01926106	0,00138656	0,00037291
1A1 Energy Industries - Biomass	N2O	0,83280667	27,300724	5	200	200,06249	0,00723383	0,00024296	0,00024735	0,04859178	0,00174902	0,00236422
1A1 Energy Industries - Gaseous fuels	CH4	2,8837816	3,04623134	1	100	100,005	2,2504E-05	1,2398E-05	2,7599E-05	0,00123977	3,9031E-05	1,5386E-06
1A1 Energy Industries - Gaseous fuels	CO2	5731,21252	6088,68085	1	3	3,16227766	0,08989489	0,02493986	0,05516444	0,07481957	0,0780143	0,0116842
1A1 Energy Industries - Gaseous fuels	N2O	2,7292933	2,88304037	1	200	200,0025	8,0623E-05	1,1734E-05	2,6121E-05	0,00234671	3,694E-05	5,5084E-06
1A1 Energy Industries - Liquid fuels	CH4	6,033538	0,57092907	1	100	100,005	7,9049E-07	2,6633E-05	5,1727E-06	0,00266326	7,3153E-06	7,093E-06
1A1 Energy Industries - Liquid fuels	CO2	5880,1806	925,749239	1	2	2,23606798	0,00103907	0,02259743	0,00838744	0,04519486	0,01186163	0,00218327

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
1A1 Energy Industries - Liquid fuels	N2O	11,1394738	0,74729401	1	200	200,0025	5,4168E-06	5,195E-05	6,7706E-06	0,01039004	9,5751E-06	0,00010795
1A1 Energy Industries - Other fossil fuels	CH4	0,65996	1,97294344	1	100	100,005	9,4398E-06	1,4396E-05	1,7875E-05	0,00143963	2,5279E-05	2,0732E-06
1A1 Energy Industries - Other fossil fuels	CO2	49,453127	237,161193	1	5	5,09901951	0,00035461	0,00188802	0,00214872	0,00944011	0,00303875	9,835E-05
1A1 Energy Industries - Other fossil fuels	N2O	0,83280667	2,75961021	1	200	200,0025	7,3868E-05	2,0612E-05	2,5003E-05	0,00412249	3,5359E-05	1,6996E-05
1A1 Energy Industries - Solid fuels	CH4	4,02262969	1,0824324	1	100	100,005	2,8414E-06	1,1398E-05	9,807E-06	0,0011398	1,3869E-05	1,2993E-06
1A1 Energy Industries - Solid fuels	CO2	14335,7445	4171,0452	1	2	2,23606798	0,02109349	0,03773039	0,03779035	0,07546078	0,05344362	0,00855055
1A1 Energy Industries - Solid fuels	N2O	56,3462395	12,710574	1	200	200,0025	0,00156707	0,00018186	0,00011516	0,03637279	0,00016286	0,00132301
1A2 Manufacturing industries - Biomass	CH4	0,6356	10,603824	5	100	100,124922	0,00027334	9,2722E-05	9,6072E-05	0,00927219	0,00067933	8,6435E-05
1A2 Manufacturing industries - Biomass	N2O	0,80206667	13,5436995	5	200	200,06249	0,00178031	0,00011848	0,00012271	0,02369602	0,00086768	0,00056225
1A2 Manufacturing	CH4	4,4186743	1,64521108	5	100	100,124922	6,5799E-06	8,3868E-06	1,4906E-05	0,00083868	0,0001054	7,1449E-07

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
industries - Gaseous fuels												
1A2 Manufacturing industries - Gaseous fuels	CO2	8774,22467	3290,42216	5	5	7,07106781	0,1312689	0,01642781	0,02981176	0,08213907	0,21080098	0,05118388
1A2 Manufacturing industries - Gaseous fuels	N2O	4,1819596	1,55707477	5	200	200,06249	2,3531E-05	7,9375E-06	1,4107E-05	0,0015875	9,9754E-05	2,5301E-06
1A2 Manufacturing industries - Gaseous fuels	CH4	4,86202222	0,40190494	5	100	100,124922	3,9266E-07	2,1988E-05	3,6413E-06	0,00219884	2,5748E-05	4,8356E-06
1A2 Manufacturing industries - Liquid fuels	CO2	4241,62121	1102,2336	5	2	5,38516481	0,00854346	0,0123682	0,00998642	0,02473641	0,07061462	0,00559831
1A2 Manufacturing industries - Liquid fuels	N2O	12,4331916	9,45530185	5	200	200,06249	0,0008677	2,0126E-05	8,5667E-05	0,00402519	0,00060575	1,6569E-05
1A2 Manufacturing industries - Liquid fuels	CH4	0	5,28024	5	100	100,124922	6,7777E-05	4,784E-05	4,784E-05	0,00478398	0,00033828	2,3001E-05
1A2 Manufacturing industries - Other fossil fuels	CO2	0	479,574626	5	5	7,07106781	0,0027885	0,00434502	0,00434502	0,02172512	0,03072396	0,00141594
1A2 Manufacturing industries - Other fossil fuels												

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
1A2 Manufacturing industries - Other fossil fuels	N2O	0	6,66316	5	200	200,06249	0,0004309	6,0369E-05	6,0369E-05	0,01207386	0,00042688	0,00014596
1A2 Manufacturing industries - Solid fuels	CH4	8,02006251	0,38231236	5	100	100,124922	3,5531E-07	3,8813E-05	3,4638E-06	0,00388133	2,4493E-05	1,5065E-05
1A2 Manufacturing industries - Solid fuels	CO2	3318,74107	287,974045	5	5	7,07106781	0,00100546	0,01488092	0,00260909	0,07440458	0,01844906	0,00587641
1A2 Manufacturing industries - Solid fuels	N2O	11,2944019	1,0424248	5	200	200,06249	1,0547E-05	5,0093E-05	9,4445E-06	0,01001859	6,6783E-05	0,00010038
1A3a Domestic aviation - All fuels	CH4	0,00071838	0,00109078	5	100	100,124922	2,8923E-12	6,0958E-09	9,8826E-09	6,0958E-07	6,9881E-08	3,7647E-13
1A3a Domestic aviation - All fuels	CO2	3,62915646	5,55276457	5	5	7,07106781	3,7383E-07	3,1178E-05	5,0309E-05	0,00015589	0,00035574	1,5085E-07
1A3a Domestic aviation - All fuels	N2O	0,02719577	0,04129377	5	150	150,08331	9,3137E-09	2,3077E-07	3,7413E-07	3,4615E-05	2,6455E-06	1,2052E-09
1A3b Road trasport - All Fuels	CH4	60,543033	23,0677928	5	100	100,124922	0,00129356	0,00011015	0,000209	0,01101493	0,00147784	0,00012351
1A3b Road trasport - All Fuels	CO2	7223,57891	13651,6339	5	1,5	5,22015325	1,2314715	0,08555151	0,12368603	0,12832726	0,87459228	0,78137954
1A3b Road trasport - All Fuels	N2O	47,0044377	127,489814	5	200	200,06249	0,15775056	0,00090729	0,00115508	0,18145889	0,00816764	0,03299404

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
1A3c Railways - All Fuels	CH4	1,16072893	0,16392676	5	250	250,049995	4,0742E-07	4,6335E-06	1,4852E-06	0,00115837	1,0502E-05	1,3419E-06
1A3c Railways - All Fuels	CO2	753,733814	104,568336	5	1	5,09901951	6,8939E-05	0,00302564	0,00094741	0,00302564	0,00669917	5,4033E-05
1A3c Railways - All Fuels	N2O	74,7156172	10,6902742	5	300	300,041664	0,00249476	0,000297	9,6856E-05	0,08909995	0,00068487	0,00793927
1A3d Domestic navigation - All Liquid fuels	CH4	0,94269467	0,0251323	5	50	50,2493781	3,8674E-10	4,7416E-06	2,277E-07	0,00023708	1,6101E-06	5,621E-08
1A3d Domestic navigation - All Liquid fuels	CO2	340,565844	9,5018	5	1,5	5,22015325	5,9658E-07	0,00170913	8,6088E-05	0,00256369	0,00060873	6,9431E-06
1A3d Domestic navigation - All Liquid fuels	N2O	2,54912333	0,06795978	5	140	140,089257	2,1979E-08	1,2822E-05	6,1573E-07	0,00179505	4,3538E-06	3,2222E-06
1A3e Other Transportation (as specified in table 1A(a) sheet 3) - Pipeline, only gaseous	CH4	0,07774667	0,0314748	5	100	100,124922	2,4082E-09	1,2467E-07	2,8517E-07	1,2467E-05	2,0164E-06	1,5949E-10
1A3e Other Transportation (as specified in table 1A(a) sheet 3) - Pipeline, only gaseous	CO2	154,382667	62,9496	5	5	7,07106781	4,8045E-05	0,00024348	0,00057033	0,0012174	0,00403287	1,7746E-05
1A3e Other Transportation (as specified in table 1A(a) sheet	N2O	0,07358167	0,02978865	5	200	200,06249	8,6123E-09	1,1799E-07	2,6989E-07	2,3598E-05	1,9084E-06	5,6051E-10

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
3) - Pipeline, only gaseous												
1A4 Other sectors - Biomass	CH4	171,584	475,11394	20	100	101,98039	0,56926893	0,00340007	0,00430461	0,34000653	0,12175275	0,13042817
1A4 Other sectors - Biomass	N2O	21,6522667	59,9644915	20	200	200,997512	0,03522559	0,00042915	0,00054329	0,0858298	0,01536651	0,00760288
1A4 Other sectors - Gaseous fuels	CH4	10,16967	27,19444	5	100	100,124922	0,00179777	0,00019278	0,00024639	0,01927773	0,00174221	0,00037467
1A4 Other sectors - Gaseous fuels	CO2	4038,8118	10877,776	5	5	7,07106781	1,43462641	0,07723588	0,09855442	0,38617941	0,696885	0,63478324
1A4 Other sectors - Gaseous fuels	N2O	1,92497325	5,147519	5	200	200,06249	0,00025717	3,649E-05	4,6637E-05	0,007298	0,00032978	5,337E-05
1A4 Other sectors - Liquid fuels	CH4	22,8295173	2,72154205	5	100	100,124922	1,8005E-05	9,5686E-05	2,4658E-05	0,00956862	0,00017436	9,1589E-05
1A4 Other sectors - Liquid fuels	CO2	6947,76642	1518,53878	5	2	5,38516481	0,0162158	0,02285201	0,01375821	0,04570402	0,09728523	0,01155327
1A4 Other sectors - Liquid fuels	N2O	26,0678868	13,6339942	5	200	200,06249	0,00180412	1,3889E-05	0,00012353	0,00277771	0,00087346	8,4786E-06
1A4 Other sectors - Other Fossil Fuels	CH4	0	1,50444	5	100	100,124922	5,502E-06	1,363E-05	1,363E-05	0,00136305	9,6382E-05	1,8672E-06
1A4 Other sectors - Other Fossil Fuels	CO2	0	160,79664	5	7	8,60232527	0,00046395	0,00145684	0,00145684	0,01019791	0,01030144	0,00021012

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
1A4 Other sectors - Other Fossil Fuels	N2O	0	1,89846	5	200	200,06249	3,498E-05	1,72E-05	1,72E-05	0,00344007	0,00012162	1,1849E-05
1A4 Other sectors - Solid fuels	CH4	975,28916	16,3865058	5	100	100,124922	0,00065275	0,00499225	0,00014846	0,49922543	0,0010498	0,24922713
1A4 Other sectors - Solid fuels	CO2	12499,7191	201,921081	5	7	8,60232527	0,00073162	0,06398938	0,00182944	0,44792564	0,01293608	0,20080472
1A4 Other sectors - Solid fuels	N2O	51,117245	0,79464344	5	200	200,06249	6,1286E-06	0,00026226	7,1996E-06	0,05245194	5,0909E-05	0,00275121
1A5b Other	CH4	0,00279265	0,12357425	10	100	100,498756	3,74E-08	1,1049E-06	1,1196E-06	0,00011049	1,5834E-05	1,2458E-08
1A5b Other	CO2	14,5013739	105,550756	10	5	11,1803399	0,00033769	0,00087986	0,00095631	0,00439932	0,01352422	0,00020226
1A5b Other	N2O	0,10572179	0,44924695	10	200	200,249844	1,9625E-06	3,5129E-06	4,0703E-06	0,00070259	5,7562E-05	4,9695E-07
1B1 Solid fuels	CH4	1790,74353	31,9019431	5	200	200,06249	0,00987766	0,00914924	0,00028904	1,8298484	0,0020438	3,34834935
1B1 Solid fuels	CO2	3,60341667	6,802	5	200	200,06249	0,00044905	4,2632E-05	6,1627E-05	0,00852642	0,00043577	7,289E-05
1B2a Oil	CH4	217,908922	57,9778895	0	88,766437	88,766437	0,0064226	0,00062339	0,00052529	0,05533595	0	0,00306207
1B2a Oil	CO2	5,56865083	0,56671393	0	44,5571325	44,5571325	1,5461E-07	2,422E-05	5,1345E-06	0,00107918	0	1,1646E-06
1B2b Natural Gas	CH4	1155,70948	1443,55022	0	292,972387	292,972387	43,371632	0,00698584	0,0130788	2,04665741	0	4,18880654
1B2b Natural Gas	CO2	2,2778497	0,70854165	0	284,614831	284,614831	9,8613E-06	5,588E-06	6,4195E-06	0,00159043	0	2,5295E-06
1B2c Venting and flaring	CH4	408,36318	209,554699	0	64,2265365	64,2265365	0,04392506	0,00025405	0,0018986	0,01631644	0	0,00026623
1B2c Venting and flaring	CO2	571,059246	130,318687	0	434,485323	434,485323	0,77741373	0,00182949	0,00118071	0,7948868	0	0,63184503
1B2c Venting and flaring	N2O	1,13200881	0,29592927	0	584,300872	584,300872	7,25E-06	3,2861E-06	2,6812E-06	0,00192009	0	3,6867E-06
1B2d Other (Thermal water	CH4	144,758124	77,567868	5	200	200,06249	0,05839607	6,0303E-05	0,00070278	0,01206054	0,00496939	0,00017015

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
extraction + NatGas storage)												
1B2d Other (Thermal water extraction + NatGas storage)	CO2	0,0390672	0,012628	5	200	200,06249	1,5477E-09	9,1528E-08	1,1441E-07	1,8306E-05	8,0901E-07	3,3575E-10
2A1 Cement Production	CO2	1744,64476	1001,50016	2,5	2,5	3,53553391	0,00304019	0,00012298	0,00907375	0,00030746	0,03208057	0,00102926
2A2 Lime Production	CO2	606,786669	111,431862	2,5	2,5	3,53553391	3,7637E-05	0,00218892	0,00100959	0,00547229	0,00356944	4,2687E-05
2A3 Glass production	CO2	87,6250773	39,6694174	2,5	2,5	3,53553391	4,7699E-06	0,0001025	0,00035941	0,00025624	0,00127071	1,6804E-06
2A4 Other Process Uses of Carbonates	CO2	453,290019	182,851926	2,5	2,5	3,53553391	0,00010134	0,00073278	0,00165667	0,00183196	0,00585721	3,7663E-05
2B1 Ammonia Production	CO2	1714,64658	1201,18716	5	5	7,07106781	0,01749363	0,00184404	0,01088295	0,0092202	0,07695409	0,00600694
2B2 Nitric Acid Production	N2O	3882,25733	29,0659501	7,5	7,5	10,6066017	2,3047E-05	0,02019457	0,00026334	0,15145926	0,00279317	0,02294771
2B8 Petrochemical and carbon black production	CH4	23,0090037	53,3585365	3	10	10,4403065	7,5253E-05	0,00036215	0,00048344	0,00362146	0,00205105	1,7322E-05
2B8 Petrochemical and carbon black production	CO2	571,259215	1405,13376	7,5	7,5	10,6066017	0,05386125	0,00971889	0,01273074	0,07289167	0,1350299	0,02354627
2C1 Iron and Steel Production	CH4	12,1924131	3,38576047	10	10	14,1421356	5,5594E-07	3,3596E-05	3,0676E-05	0,00033596	0,00043382	3,0107E-07
2C1 Iron and Steel Production	CO2	4578,58927	838,359856	7,5	5	9,01387819	0,01384755	0,01653314	0,00759568	0,08266568	0,08056432	0,01332422

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
2C2 Ferroalloys Production	CH4	0,28168	0	5	37,5	37,8318649	0	1,4849E-06	0	5,5682E-05	0	3,1005E-09
2C2 Ferroalloys Production	CO2	40,24	0	5	37,5	37,8318649	0	0,00021212	0	0,00795455	0	6,3275E-05
2C3 Aluminium Production	CO2	125,371602	0	2	10	10,198039	0	0,00066088	0	0,00660879	0	4,3676E-05
2C3 Aluminium Production	PFC	333,355961	0	2	99	99,0202	0	0,00175721	0	0,17396345	0	0,03026328
2D Non-energy products from fuels and solvent use	CO2	221,82145	102,745379	5	50	50,2493781	0,0064636	0,00023842	0,00093089	0,01192098	0,00658239	0,00018544
2F1 Refrigeration and Air Conditioning Equipment - HFC+PFC	Aggregate F-gases	0	1656,72274	10	10	14,1421356	0,13311232	0,01501018	0,01501018	0,15010178	0,21227597	0,06759163
2F2 Foam Blowing - HFC	Aggregate F-gases	0	164,704829	50	21	54,2309875	0,01934623	0,00149225	0,00149225	0,0313373	0,10551819	0,01211612
2F3 Fire extinguishers - HFC	Aggregate F-gases	0	12,1504502	15	2	15,132746	8,198E-06	0,00011009	0,00011009	0,00022017	0,00233526	5,5019E-06
2F4 Aerosol + MDI - HFC	Aggregate F-gases	0	30,6445647	10	50	50,9901951	0,00059206	0,00027764	0,00027764	0,01388224	0,00392649	0,00020813
2G Other Product Manufacture and Use - SF6	Aggregate F-gases	7,51578489	97,0394798	3	40	40,1123422	0,00367402	0,00083957	0,00087919	0,03358296	0,0037301	0,00114173
2G Other Product Manufacture and Use	N2O	139,005697	219,819379	3	3	4,24264069	0,00021091	0,00125883	0,0019916	0,00377648	0,00844964	8,5658E-05

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
3A Enteric Fermentation	CH4	4649,52047	2364,13528	0	12,5954896	12,5954896	0,21501232	0,00308883	0,02141945	0,03890531	0	0,00151362
3B Manure Management	CH4	1429,27007	757,647517	0	14,0124941	14,0124941	0,0273309	0,00066979	0,00686441	0,0093854	0	8,8086E-05
3B Manure Management	N2O	824,079284	384,356214	0	141,915367	141,915367	0,72146499	0,00086167	0,00348233	0,12228488	0	0,01495359
3C Rice Cultivation	CH4	90,9790764	20,54854	5	75,4422793	75,6077873	0,00058531	0,00029341	0,00018617	0,02213578	0,00131644	0,00049173
3D Agricultural Soils	N2O	4592,17335	3438,77041	0	186,831249	186,831249	100,09076	0,00694565	0,03115582	1,29766458	0	1,68393335
3F Field Burning of Agricultural Residues	CH4	51,961294	0,22671063	40	50	64,0312424	5,1099E-08	0,00027185	2,054E-06	0,01359273	0,00011619	0,00018478
3F Field Burning of Agricultural Residues	N2O	12,7497619	0,05562807	40	50	64,0312424	3,0765E-09	6,6705E-05	5,04E-07	0,00333526	2,8511E-05	1,1125E-05
3G Liming	CO2	130,208979	3,93687513	10	20	22,3606798	1,8792E-06	0,00065071	3,5669E-05	0,0130142	0,00050443	0,00016962
3H Urea application	CO2	229,034875	127,980761	5	20	20,6155281	0,00168798	4,7812E-05	0,00115953	0,00095623	0,00819909	6,8139E-05
3I Other carboncontaining fertilizers	CO2	48,1080247	104,318554	5	20	20,6155281	0,0011215	0,00069154	0,00094514	0,01383085	0,00668317	0,00023596
5A Solid waste disposal	CH4	2345,68605	3226,24861	10	33	34,4818793	3,00100079	0,01686166	0,02923034	0,55643463	0,4133794	0,48050202
5B Biological Treatment of Soild Waste	CH4	5,6	111,216837	10	140	140,356688	0,05908754	0,00097812	0,00100764	0,13693711	0,01425022	0,01895484
5B Biological Treatment of Soild Waste	N2O	3,18	39,0960648	10	130	130,384048	0,00630091	0,00033745	0,00035422	0,04386895	0,00500938	0,00194958

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
5C Incineration and open burning of waste	CH4	0,44440769	0,10905264	10	100	100,498756	2,9126E-08	1,3546E-06	9,8803E-07	0,00013546	1,3973E-05	1,8545E-08
5C Incineration and open burning of waste	CO2	96,8785481	24,7014682	10	25	26,925824	0,00010727	0,00028689	0,0002238	0,00717214	0,003165	6,1457E-05
5C Incineration and open burning of waste	N2O	1,45653328	0,35416297	10	100	100,498756	3,072E-07	4,4692E-06	3,2088E-06	0,00044692	4,5379E-05	2,018E-07
5D Wastewater Treatment and Discharge	CH4	972,690154	256,562367	30	40	50	0,03990382	0,00280272	0,0023245	0,11210862	0,09862005	0,02229426
5D Wastewater Treatment and Discharge	N2O	137,721836	75,0840984	15	200	200,561711	0,0549896	4,5715E-05	0,00068027	0,00914301	0,01443079	0,00029184
Total		**110373,292**	**64217,8414**				**152,463543**					**12,7293188**
					Percentage uncertainty in total inventory:		12,3476129				Trend uncertainty:	3,56781709

Source: 2006 IPPC guidelines, Volume 1, Table 3.2 Approach 1 uncertainty calculation

Table A2-2 Uncertainty calculation for CO_2 without LULUCF, Tier 1 method

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor	Uncertainty introduced in trend in national emissions introduced by activity data	Uncertainty introduced in trend in national emissions
		Gg CO2 eq	Gg CO2 eq					%				
1A1 Energy Industries - Gaseous fuels	CO2	5 731,21	6 088,68	1	3	3,16	0,396	0,033	0,071	0,099	0,101	0,141
1A1 Energy Industries - Liquid fuels	CO2	5 880,18	925,75	1	2	2,24	0,043	-0,028	0,011	-0,056	0,015	0,058
1A1 Energy Industries - Other fossil fuels	CO2	49,45	237,16	1	5	5,10	0,025	0,002	0,003	0,012	0,004	0,013
1A1 Energy Industries - Solid fuels	CO2	14 335,74	4 171,05	1	2	2,24	0,192	-0,046	0,049	-0,093	0,069	0,115
1A2 Manufacturing industries - Gaseous fuels	CO2	8 774,22	3 290,42	5	5	7,07	0,479	-0,020	0,038	-0,099	0,272	0,289
1A2 Manufacturing industries - Liquid fuels	CO2	4 241,62	1 102,23	5	2	5,39	0,122	-0,015	0,013	-0,031	0,091	0,096
1A2 Manufacturing industries - Other fossil fuels	CO2	0,00	479,57	5	5	7,07	0,070	0,006	0,006	0,028	0,040	0,049
1A2 Manufacturing industries - Solid fuels	CO2	3 318,74	287,97	5	5	7,07	0,042	-0,019	0,003	-0,093	0,024	0,096
1A3a Domestic aviation - All fuels	CO2	3,63	5,55	5	5	7,07	0,001	0,000	0,000	0,000	0,000	0,001
1A3b Road trasport - All Fuels	CO2	7 223,58	13 651,63	5	2	5,22	1,467	0,112	0,160	0,167	1,129	1,141
1A3c Railways - All Fuels	CO2	753,73	104,57	5	1	5,10	0,011	-0,004	0,001	-0,004	0,009	0,009
1A3d Domestic navigation - All Liquid fuels	CO2	340,57	9,50	5	2	5,22	0,001	-0,002	0,000	-0,003	0,001	0,003

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor	Uncertainty introduced in trend in national emissions introduced by activity data	Uncertainty introduced in trend in national emissions
1A3e Other Transportation (as specified in table 1A(a) sheet 3) - Pipeline, only gaseous	CO2	154,38	62,95	5	5	7,07	0,009	0,000	0,001	-0,001	0,005	0,005
1A4 Other sectors - Gaseous fuels	CO2	4 038,81	10 877,78	5	5	7,07	1,584	0,100	0,127	0,502	0,899	1,030
1A4 Other sectors - Liquid fuels	CO2	6 947,77	1 518,54	5	2	5,39	0,168	-0,028	0,018	-0,057	0,126	0,138
1A4 Other sectors - Other Fossil Fuels	CO2	0,00	160,80	5	7	8,60	0,028	0,002	0,002	0,013	0,013	0,019
1A4 Other sectors - Solid fuels	CO2	12 499,72	201,92	5	7	8,60	0,036	-0,080	0,002	-0,563	0,017	0,564
1A5b Other - Mobile	CO2	14,50	105,55	10	5	11,18	0,024	0,001	0,001	0,006	0,017	0,018
1B1 Solid fuels	CO2	3,60	6,80	5	200	200,06	0,028	0,000	0,000	0,011	0,001	0,011
1B2a Oil	CO2	5,57	0,57	0	45	44,56	0,001	0,000	0,000	-0,001	0,000	0,001
1B2b Natural Gas	CO2	2,28	0,71	0	285	284,61	0,004	0,000	0,000	-0,002	0,000	0,002
1B2c Venting and flaring	CO2	571,06	130,32	0	434	434,49	1,166	-0,002	0,002	-0,985	0,000	0,985
1B2d Other (Thermal water extraction + NatGas storage)	CO2	0,04	0,01	5	200	200,06	0,000	0,000	0,000	0,000	0,000	0,000
2A1 Cement Production	CO2	1 744,64	1 001,50	3	3	3,54	0,073	0,000	0,012	0,000	0,041	0,041
2A2 Lime Production	CO2	606,79	111,43	3	3	3,54	0,008	-0,003	0,001	-0,007	0,005	0,008
2A3 Glass production	CO2	87,63	39,67	3	3	3,54	0,003	0,000	0,000	0,000	0,002	0,002
2A4 Other Process Uses of Carbonates	CO2	453,29	182,85	3	3	3,54	0,013	-0,001	0,002	-0,002	0,008	0,008
2B1 Ammonia Production	CO2	1 714,65	1 201,19	5	5	7,07	0,175	0,003	0,014	0,013	0,099	0,100

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor	Uncertainty introduced in trend in national emissions introduced by activity data	Uncertainty introduced in trend in national emissions
2B8 Petrochemical and carbon black production	CO2	571,26	1 405,13	8	8	10,61	0,307	0,013	0,016	0,095	0,174	0,198
2C1 Iron and Steel Production	CO2	4 578,59	838,36	8	5	9,01	0,156	-0,021	0,010	-0,103	0,104	0,146
2C2 Ferroalloys Production	CO2	40,24	0,00	5	38	37,83	0,000	0,000	0,000	-0,010	0,000	0,010
2C3 Aluminium Production	CO2	125,37	0,00	2	10	10,20	0,000	-0,001	0,000	-0,008	0,000	0,008
2D Non-energy products from fuels and solvent use	CO2	221,82	102,75	5	50	50,25	0,106	0,000	0,001	-0,014	0,008	0,016
3G Liming	CO2	130,21	3,94	10	20	22,36	0,002	-0,001	0,000	-0,016	0,001	0,016
3H Urea application	CO2	229,03	127,98	5	20	20,62	0,054	0,000	0,001	0,000	0,011	0,011
3I Other carboncontaining fertilizers	CO2	48,11	104,32	5	20	20,62	0,044	0,001	0,001	0,018	0,009	0,020
5C Incineration and open burning of waste	CO2	96,88	24,70	10	25	26,93	0,014	0,000	0,000	-0,009	0,004	0,010
		Σ C	**Σ D**				**$(\Sigma H^2)^{1/2}$**					**$(\Sigma M^2)^{1/2}$**
TOTAL excluding LULUCF		**85 538,92**	**48 563,86**				**2,6**					**2,0**
TOTAL excluding LULUCF CRF		**85 538,92**	**48 563,86**				**% SUM Uncertainty**					
		0,0000	**0,0000**									
contribution to SUM National Total (exLULUCF)	**CO2**	**77,5%**	**75,6%**									

Table A2-3 Uncertainty calculation for CH4 without LULUCF, Tier 1 method

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
		Gg CO2 eq	Gg CO2 eq					%				
1A1 Energy Industries - Biomass	CH4	0,66	21,64	5	100	100,12	0,235	0,001	0,001	0,146	0,011	0,146
1A1 Energy Industries - Gaseous fuels	CH4	2,88	3,05	1	100	100,00	0,033	0,000	0,000	0,008	0,000	0,008
1A1 Energy Industries - Liquid fuels	CH4	6,03	0,57	1	100	100,00	0,006	0,000	0,000	-0,022	0,000	0,022
1A1 Energy Industries - Other fossil fuels	CH4	0,66	1,97	1	100	100,00	0,021	0,000	0,000	0,011	0,000	0,011
1A1 Energy Industries - Solid fuels	CH4	4,02	1,08	1	100	100,00	0,012	0,000	0,000	-0,010	0,000	0,010
1A2 Manufacturing industries - Biomass	CH4	0,64	10,60	5	100	100,12	0,115	0,001	0,001	0,070	0,005	0,070
1A2 Manufacturing industries - Gaseous fuels	CH4	4,42	1,65	5	100	100,12	0,018	0,000	0,000	-0,008	0,001	0,008
1A2 Manufacturing industries - Liquid fuels	CH4	4,86	0,40	5	100	100,12	0,004	0,000	0,000	-0,018	0,000	0,018
1A2 Manufacturing industries - Other fossil fuels	CH4	0,00	5,28	5	100	100,12	0,057	0,000	0,000	0,036	0,003	0,036
1A2 Manufacturing industries - Solid fuels	CH4	8,02	0,38	5	100	100,12	0,004	0,000	0,000	-0,032	0,000	0,032
1A3a Domestic aviation - All fuels	CH4	0,00	0,00	5	100	100,12	0,000	0,000	0,000	0,000	0,000	0,000
1A3b Road trasport - All Fuels	CH4	60,54	23,07	5	100	100,12	0,251	-0,001	0,002	-0,104	0,011	0,105
1A3c Railways - All Fuels	CH4	1,16	0,16	5	250	250,05	0,004	0,000	0,000	-0,010	0,000	0,010
1A3d Domestic navigation - All Liquid fuels	CH4	0,94	0,03	5	50	50,25	0,000	0,000	0,000	-0,002	0,000	0,002

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
1A3e Other Transportation (as specified in table 1A(a) sheet 3) - Pipeline, only gaseous	CH4	0,078	0,031	5	100	100,12	0,000	0,000	0,000	0,000	0,000	0,000
1A4 Other sectors - Biomass	CH4	171,58	475,11	20	100	101,98	5,263	0,025	0,033	2,516	0,922	2,680
1A4 Other sectors - Gaseous fuels	CH4	10,17	27,19	5	100	100,12	0,296	0,001	0,002	0,143	0,013	0,143
1A4 Other sectors - Liquid fuels	CH4	22,83	2,72	5	100	100,12	0,030	-0,001	0,000	-0,080	0,001	0,080
1A4 Other sectors - Other Fossil Fuels	CH4	0,00	1,50	5	100	100,12	0,016	0,000	0,000	0,010	0,001	0,010
1A4 Other sectors - Solid fuels	CH4	975,29	16,39	5	100	100,12	0,178	-0,041	0,001	-4,112	0,008	4,112
1A5b Other - Mobile	CH4	0,00	0,12	10	100	100,50	0,001	0,000	0,000	0,001	0,000	0,001
1B1 Solid fuels	CH4	1 790,74	31,90	5	200	200,06	0,693	-0,075	0,002	-15,069	0,015	15,069
1B2a Oil	CH4	217,91	57,98	0	89	88,77	0,559	-0,005	0,004	-0,485	0,000	0,485
1B2b Natural Gas	CH4	1 155,71	1 443,55	0	293	292,97	45,935	0,049	0,099	14,331	0,000	14,331
1B2c Venting and flaring	CH4	408,36	209,55	0	64	64,23	1,462	-0,003	0,014	-0,213	0,000	0,213
1B2d Other (Thermal water extraction + NatGas storage)	CH4	144,76	77,57	5	200	200,06	1,686	-0,001	0,005	-0,190	0,038	0,194
2B8 Petrochemical and carbon black production	CH4	23,01	53,36	3	10	10,44	0,061	0,003	0,004	0,027	0,016	0,031
2C1 Iron and Steel Production	CH4	12,19	3,39	10	10	14,14	0,005	0,000	0,000	-0,003	0,003	0,004
2C2 Ferroalloys Production	CH4	0,28	0,00	5	38	37,83	0,000	0,000	0,000	0,000	0,000	0,000
3A Enteric Fermentation	CH4	4 649,52	2 364,14	0	13	12,60	3,234	-0,039	0,162	-0,494	0,000	0,494
3B Manure Management	CH4	1 429,27	757,65	0	14	14,01	1,153	-0,010	0,052	-0,140	0,000	0,140
3C Rice Cultivation	CH4	90,98	20,55	5	75	75,61	0,169	-0,003	0,001	-0,191	0,010	0,191
3F Field Burning of Agricultural Residues	CH4	51,96	0,23	40	50	64,03	0,002	-0,002	0,000	-0,112	0,001	0,112
5A Solid waste disposal	CH4	2 345,69	3 226,25	10	33	34,48	12,083	0,119	0,221	3,943	3,131	5,035

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
5B Biological Treatment of Soild Waste	CH4	5,60	111,22	10	140	140,36	1,695	0,007	0,008	1,034	0,108	1,040
5C Incineration and open burning of waste	CH4	0,44	0,11	10	100	100,50	0,001	0,000	0,000	-0,001	0,000	0,001
5D Wastewater Treatment and Discharge	CH4	972,69	256,56	30	40	50,00	1,393	-0,025	0,018	-0,982	0,747	1,234
		Σ C	**Σ D**				**$(\Sigma H^2)^{1/2}$**					**$(\Sigma M^2)^{1/2}$**
TOTAL excluding LULUCF		**14 573,91**	**9 206,95**				**48,0**					**22,0**
TOTAL excluding LULUCF CRF		**14 573,91**	**9 206,95**				**% SUM Uncertainty**					
		0,0000	*0,0000*									
contribution to SUM National Total (exLULUCF)	***CO2***	***13,2%***	***14,3%***									

Table A2-4 Uncertainty calculation for N_2O without LULUCF, Tier 1 method

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
		Gg CO2 eq	Gg CO2 eq					%				
1A1 Energy Industries - Biomass	N2O	0,83	27,30	5	200	200,06	1,218	0,003	0,003	0,543	0,019	0,543
1A1 Energy Industries - Gaseous fuels	N2O	2,73	2,88	1	200	200,00	0,129	0,000	0,000	0,033	0,000	0,033
1A1 Energy Industries - Liquid fuels	N2O	11,14	0,75	1	200	200,00	0,033	0,000	0,000	-0,086	0,000	0,086
1A1 Energy Industries - Other fossil fuels	N2O	0,83	2,76	1	200	200,00	0,123	0,000	0,000	0,048	0,000	0,048
1A1 Energy Industries - Solid fuels	N2O	56,35	12,71	1	200	200,00	0,567	-0,001	0,001	-0,257	0,002	0,257
1A2 Manufacturing industries - Biomass	N2O	0,80	13,54	5	200	200,06	0,604	0,001	0,001	0,266	0,010	0,266
1A2 Manufacturing industries - Gaseous fuels	N2O	4,18	1,56	5	200	200,06	0,069	0,000	0,000	-0,007	0,001	0,007
1A2 Manufacturing industries - Liquid fuels	N2O	12,43	9,46	5	200	200,06	0,422	0,000	0,001	0,077	0,007	0,078
1A2 Manufacturing industries - Other fossil fuels	N2O	0,00	6,66	5	200	200,06	0,297	0,001	0,001	0,134	0,005	0,134
1A2 Manufacturing industries - Solid fuels	N2O	11,29	1,04	5	200	200,06	0,046	0,000	0,000	-0,082	0,001	0,082
1A3a Domestic aviation - All fuels	N2O	0,03	0,04	5	150	150,08	0,001	0,000	0,000	0,000	0,000	0,000
1A3b Road trasport - All Fuels	N2O	47,00	127,49	5	200	200,06	5,686	0,011	0,013	2,142	0,091	2,144
1A3c Railways - All Fuels	N2O	74,72	10,69	5	300	300,04	0,715	-0,002	0,001	-0,698	0,008	0,699
1A3d Domestic navigation - All Liquid fuels	N2O	2,55	0,07	5	140	140,09	0,002	0,000	0,000	-0,015	0,000	0,015
1A3e Other Transportation (as specified in table 1A(a) sheet 3) - Pipeline, only gaseous	N2O	0,07	0,03	5	200	200,06	0,001	0,000	0,000	0,000	0,000	0,000
1A4 Other sectors - Biomass	N2O	21,65	59,96	20	200	201,00	2,687	0,005	0,006	1,012	0,171	1,026
1A4 Other sectors - Gaseous fuels	N2O	1,92	5,15	5	200	200,06	0,230	0,000	0,001	0,086	0,004	0,086

CRF	Pollutant	Base year emissions	Year t emissions	Activity data uncertainty	Emission factor uncertainty	Combined uncertainty	Combined uncertainty as % of total national emissions in the year t	Type A sensitivity	Type B sensitivity	Uncertainty introduced in trend in national emissions introduced by emission factor uncertainty	Uncertainty introduced in trend in national emissions introduced by activity data uncertainty	Uncertainty introduced in trend in national emissions
1A4 Other sectors - Liquid fuels	N2O	26,07	13,63	5	200	200,06	0,608	0,000	0,001	0,037	0,010	0,038
1A4 Other sectors - Other Fossil Fuels	N2O	0,00	1,90	5	200	200,06	0,085	0,000	0,000	0,038	0,001	0,038
1A4 Other sectors - Solid fuels	N2O	51,12	0,79	5	200	200,06	0,035	-0,002	0,000	-0,450	0,001	0,450
1A5b Other - Mobile	N2O	0,11	0,45	10	200	200,25	0,020	0,000	0,000	0,008	0,001	0,008
1B2c Venting and flaring	N2O	1,13	0,30	0	584	584,30	0,039	0,000	0,000	-0,013	0,000	0,013
2B2 Nitric Acid Production	N2O	3 882,26	29,07	8	8	10,61	0,069	-0,173	0,003	-1,300	0,031	1,301
2G Other Product Manufacture and Use	N2O	139,01	219,82	3	3	4,24	0,208	0,016	0,022	0,047	0,094	0,105
3B Manure Management	N2O	824,08	384,36	0	142	141,92	12,160	0,001	0,039	0,167	0,000	0,167
3D Agricultural Soils	N2O	4 592,17	3 438,77	0	187	186,83	143,224	0,137	0,347	25,537	0,000	25,537
3F Field Burning of Agricultural Residues	N2O	12,75	0,06	40	50	64,03	0,001	-0,001	0,000	-0,029	0,000	0,029
5B Biological Treatment of Soild Waste	N2O	3,18	39,10	10	130	130,38	1,136	0,004	0,004	0,494	0,056	0,497
5C Incineration and open burning of waste	N2O	1,46	0,35	10	100	100,50	0,008	0,000	0,000	-0,003	0,001	0,003
5D Wastewater Treatment and Discharge	N2O	137,72	75,08	15	200	200,56	3,357	0,001	0,008	0,258	0,161	0,304
		Σ C	**Σ D**				**$(ΣH^2)^{1/2}$**					**$(ΣM^2)^{1/2}$**
TOTAL excluding LULUCF		**9 919,59**	**4 485,77**				**143,9**					**25,7**
TOTAL excluding LULUCF CRF		**9 919,59**	**4 485,77**				**% SUM Uncertainty**					
		0,0000	***0,0000***									
contribution to SZUM National Total (exLULUCF)	***CO2***	***9,0%***	***7,0%***									

ANNEX 3. Detailed methodological descriptions for individual source or sink categories

A3.1 Fugitive emissions

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA			Source of EMISSION FACTORS		Recovery/Flaring[2]
	Description	Unit	Source	CH_4[1]	CO_2	-
1. B. 1. a. Coal mining and handling						
i.Underground mines[4]	Underground coal production	kt	IEA	-	Recovery/flaring of Mecsek basin	Data from the Hungarian Office for Mining (2007)
Mining activities	Coal production in Mecsek basin - including surfaces mines	Mt	MBFH (Hungarian Office for Mining and Geology)	CS: Regional Centre for Energy Policy Research, 2005 (http://www.rekk.eu/images/stories/letoltheto/uhg-ag-vol2.pdf)	-	-
	Coal production from all other underground Mines	Mt	MBFH (Hungarian Office for Mining and Geology)	CS: Regional Centre for Energy Policy Research, 2005 (http://www.rekk.eu/images/stories/letoltheto/uhg-ag-vol2.pdf)	-	-
Post-mining activities	Underground coal production	kt	IEA	-	-	-
	Coal production in Mecsek basin - including surfaces mines	Mt	MBFH (Hungarian Office for Mining and Geology)	CS: 10% of the mining emission factor - like IPCC 2006 GLs T1 methodology	-	-

	Coal production from all other underground Mines	Mt	MBFH (Hungarian Office for Mining and Geology)	CS: 10% of the mining emission factor - like IPCC 2006 GLs T1 methodology	-	-
Abandoned underground mines	Abandoned and still unflooded mines	number of abandoned and unflooded mines year by yearl	Mecsek Mining Resources and Extraction Nonprofit Ltd.	IPCC 2006 GLs, T1 emission factors (extended with the 2019 Refinement)	-	-
ii. Surface mines[4]	Mined Hungarian lignite is relatively young in the coalification therefore - according to the research project conducted by Regional Centre for Energy Policy Research - mining activities do not cause emissions.			-	-	-
Mining activities				-	-	-
Post-mining activities				-	-	-
1. B. 1. b. Solid fuel transformation[5]	Coke production	Mt	IEA	Refinement Table 4.3.7	ETS	ETS
1. B. 1. c. Other (*please specify*)[6]	-	-	-			-

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	**ACTIVITY DATA**			**Source of EMISSION FACTORS**		
	Description	**Unit**	**Source of data**	**CO_2**	**CH_4**	**N_2O**
1. B. 2. a. Oil						
1. Exploration		NA	IE to 1B2c			
2. Production	Conventional oil production	1000 m3	**IEA, data converted kt to thousand m^3**	**IPCC 2006 GLs, production**	**IPCC 2006 GLs, production**	
3. Transport	Oil transported by pipeline	1000 m3	**MOL Hungary**	**IPCC 2006 GLs, pipelines**	**IPCC 2006 GLs, mpipelines**	
	Oil transported by tanker trucks and rail cars	1000 m3	**MOL Hungary**	**IPCC 2006 GLs, tanker trucks and rail cars**	**IPCC 2006 GLs, tanker trucks and rail cars**	

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA			Source of EMISSION FACTORS		
	Description	Unit	Source of data	CO_2	CH_4	N_2O
	Condensate and Pentanes Plus transport	1000 m3	**MOL Hungary**	**IPCC 2006 GLs, condensates**	**IPCC 2006 GLs, condensates**	
	LPG	1000 m3	**MOL Hungary**	**IPCC 2006 GLs, LPG**		
4. Refining/storage	Oil refined	1000 m3	**IEA, data converted kt to thousand m^3**		**IPCC 2006 GLs, refining**	
5. Distribution of oil products		NA	NA			
6. Other		NO	NO			
1. B. 2. b. Natural gas						
1. Exploration		NA	IE			
2. Production	Gas production	million m3	**IEA**	**IPCC 2006 GLs, gas production**	**IPCC 2006 GLs, gas production**	
3. Processing	Sweet gas plants-raw gas feed	million m3	**MOL Hungary**	**IPCC 2006 GLs, gas processing**	**IPCC 2006 GLs, gas processing**	
	Sour Gas Plants - raw gas feed	million m3	**MOL Hungary**	**IPCC 2006 GLs, gas processing**	**IPCC 2006 GLs, gas processing**	
	Deep cut Plants - raw gas feed	million m3	**MOL Hungary**	**IPCC 2006 GLs, gas processing**	**IPCC 2006 GLs, gas processing**	
4. Transmission and storage	Inland consumption	million m3	IEA/ Hungarian Energy and Public Utility Regulatory Authority	IPCC 2006 GLs, transmission	CS + 2019 Refinement: transmission	

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA			Source of EMISSION FACTORS		
	Description	Unit	Source of data	CO_2	CH_4	N_2O
	Inland consumption	million m3	IEA/ Hungarian Energy and Public Utility Regulatory Authority	IPCC 2006 GLs, storage	CS + 2019 Refinement: storage	
5. Distribution	Pipeline length	km	Mining and Geological Survey of Hungary	IPCC 2006 GLs, gas distribution	CS + 2019 Refinement: gas distribution	
6. Other		NO	**NO**			
1. B. 2. c. Venting and flaring						
Venting						
i. Oil	Conventional oil production	1000 m3	**IEA, data converted kt to thousand m^3**	**IPCC 2006 GLs, oil production venting**	**IPCC 2006 GLs, oil production venting**	
ii. Gas	Sour gas plants-raw gas feed	million m3	**MOL Hungary**	**IPCC 2006 GLs, gas production venting (raw CO_2 venting)**		
iii. Combined		NO	IE to 1B2c1.Venting i. Oil			

Flaring						
i. Oil	Conventional oil production	1000 m3	**IEA, data converted kt to thousand m³**	**IPCC 2006 GLs, oil production flaring**	**IPCC 2006 GLs, oil production flaring**	**IPCC 2006 GLs, oil production flaring**
	Conventional oil production	1000 m3	**IEA, data converted kt to thousand m³**	**IPCC 2006 GLs, wells drilling**	**IPCC 2006 GLs, wells drilling**	
	Conventional oil production	1000 m3	**IEA, data converted kt to thousand m³**	**IPCC 2006 GLs, wells testing**	**IPCC 2006 GLs, wells testing**	**IPCC 2006 GLs, wells testing**
	Conventional oil production	1000 m3	**IEA, data converted kt to thousand m³**	**IPCC 2006 GLs, wells servicing**	**IPCC 2006 GLs, wells servicing**	**IPCC 2006 GLs, wells servicing**
	Gas flared	million m3	**EU ETS: 2006-2018, extrapolation with IEA "refinery intake": 1985-2004**	**EU ETS: 2006-2018, extrapolation with IEA "refinery intake": 1985-2005**	**IPCC 2006 GLs, oil refinery flaring**	**IPCC 2006 GLs, oil refinery flaring**
ii. Gas	Gas production	million m3	**IEA**	**IPCC 2006 GLs, gas production flaring**	**IPCC 2006 GLs, gas production flaring**	**IPCC 2006 GLs, gas production flaring**
	Sweet Gas Plants - raw gas feed	million m3	**MOL Hungary**	**IPCC 2006 GLs, gas processing - sweet gas plants flaring**	**IPCC 2006 GLs, gas processing - sweet gas plants flaring**	**IPCC 2006 GLs, gas processing - sweet gas plants flaring**
	Sour Gas Plants - raw gas feed	million m3	**MOL Hungary**	**IPCC 2006 GLs, gas processing - sour gas plants flaring**	**IPCC 2006 GLs, gas processing - sour gas plants flaring**	**IPCC 2006 GLs, gas processing - sour gas plants flaring**
	Deep cut Plants - raw gas feed	million m3	**MOL Hungary**	**IPCC 2006 GLs, gas processing -deep-cut plants flaring**	**IPCC 2006 GLs, gas processing -deep-cut plants flaring**	**IPCC 2006 GLs, gas processing - deep-cut plants flaring**
iii. Combined		NA	IE to 1B2c2. Flaring i. Oil			
1.B.2.d. Other						

Groundwater extraction and CO2 mining	Annual freshwater abstraction	million m3	**EUROSTAT, HCSO**		**MFGI (Geological and Geophysical Institute of Hungary)**	
	CO_2 mined in HU	million m3	**MBFH (Hungarian Office for Mining and Geology)**	**IPCC 2006 GLs, natural gas production CO_2 EF**		

A3.2 IPPU sector

Year: 2021				Unit	Solids							Liquids												Gas	
					Coal	Coke	Coal tars	Coal oils	BF/OF gas	(CO gas) b)	Total solids	Naphtha	Gas oil	Fuel Oil	Ethane	LPG b)	Pet.coke	Other	Chem. gas	Lubricants	Waxes	Bitumen	Total liquids	Nat Gas	Total gas
A: Declared NEU (from commodity balance)				TJ	0,0	12397,6	228,0	0,0	0,0	0,0		49980,0	0,0	0	0	15964,4	0	13489,8	0	1671,6	644,4	10483,4		25852,4	
B: Carbon Content				kg C/GJ	25,8	29,2	22,0	29,1	70,8	70,8		20,0	20,2	21,1	16,8	17,2	26,6	20,0	20,0	20,0	20,0	22,0		15,3	
C: Total supplied for feedstock/non-energy	[C = A * B / 1000]			Gg C	0,0	362,0	5,0	0,0	0,0	0,0	367,0	999,6	0,0	0,0	0,0	274,6	0,0	269,8	0,0	33,4	12,9	230,6	1820,9	395,5	395,5
D: Total supplied for feedstock/non-energy	**[D = C * 44/12]**			Gg CO_2-eq.	0,0	1327,4	18,4	0,0	0,0	0,0	1345,8	3665,2	0,0	0,0	0,0	1006,8	0,0	989,3	0,0	122,6	47,3	845,7	6676,8	1450,3	1450,3
E: Implied carbon fraction oxidised	**[E = F / D * 100]**			%		1,0	0,0				1,0	0,0				0,0		0,0		0,2	0,2	0,0	0,2	1,0	1,0
	Activity a)	CO_2 Emissions a	IEF CO_2																						
F: Total fossil IPPU CO_2 reported		4077,6		Gg CO_2	0,0	1326,0	0,0	0,0	0,0	0,0	1326,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	24,3	9,5	0,0	1351,9	1399,6	1399,6
2 INDUSTRIAL PROCESSES				Gg CO_2																					
2A: Mineral Industry		0,0		Gg CO_2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
(Please specify the subcategory.)				Gg CO_2																					
2B: Chemical Industry		2697,9		Gg CO_2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1318,2	1379,7	1379,7
2B1: Ammonia Production		1245,5		Gg CO_2																				1245,5	1245,5
2B5: Carbide Production				Gg CO_2																					
2B6: Titanium Dioxide Production				Gg CO_2																					
2B8: Petrochemical and Carbon Black Production		1452,4		Gg CO_2	0,0	0,0	0,0	0,0	0,0	0,0	0,0												1318,2	134,2	134,2
2B8a: Methanol				Gg CO_2																					
2B8b: Ethylene				Gg CO_2																					
2B8f: Carbon Black				Gg CO_2																					
2B10: Other				Gg CO_2																					
2C: Metal Industry		718,2		Gg CO_2	0,0	698,4	0,0	0,0	0,0	0,0	698,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	19,9	19,9
2C1: Iron and Steel Production		718,2		Gg CO_2		698,4					698,4													19,9	19,9
2C2: Ferroalloys Production				Gg CO_2																					
2C3: Aluminium Production				Gg CO_2																					
2C5: Lead Production				Gg CO_2																					
2C6: Zinc Production				Gg CO_2																					
2C7: Other				Gg CO_2																					
2D: Non-Energy Products from Fuels and Solvent Use		33,7		Gg CO_2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	24,3	9,5	0,0	33,7	0,0	0,0
2D1: Lubricant Use		24,3		Gg CO_2																24,3			24,3		
2D2: Paraffin Wax Use		9,5		Gg CO_2																	9,5		9,5		
2D3: Solvent Use				Gg CO_2																			0,0		
2D4: Other				Gg CO_2																			0,0		
2H: Other		0,0		Gg CO_2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
2H1: Pulp and Paper Industry				Gg CO_2																					
2H2: Food and Beverages Industry				Gg CO_2																					
2F3: Other				Gg CO_2																					
EXCEPTIONS REPORTED ELSEWHERE				Gg CO_2																					
1A FUEL COMBUSTION ACTIVITIES		627,7		Gg CO_2	0,0	627,7	0,0	0,0	0,0	0,0	627,7	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1A1a: Main Activity Electricity and Heat Production		627,7		Gg CO_2		627,7					627,7														
1A1b: Petroleum Refining				Gg CO_2																					
1A1c: Manufacture of Solid Fuels and Other Energy Industries				Gg CO_2																					
1A2: Manufacturing Industries and Construction				Gg CO_2																					

A3.3 WASTE sector

Activity data used in the IPCC Waste model and the resulting methane emissions are summarized in the table below.

Year	Food	Garden	Paper	Wood	Textile	Nappies/ Clinical	Sludge	C&D	Total	CH4 Emission
1950	366	37	270	95	61	1	25	364	NE	-
1960	429	43	307	93	78	1	25	364	NE	-
1970	532	51	355	90	102	1	42	611	NE	-
1980	951	90	611	121	196	1	69	993	NE	-
1985-87	1272	121	807	131	275	1	77	1109	19351	**83.8**
1990	1265	119	787	110	279	1	77	993	19414	**101.3**
1991	1240	100	608	94	113	15	68	843	18524	**105.1**
1992	1309	105	658	97	159	29	65	803	16935	**107.3**
1993	1124	102	591	94	233	42	65	784	17354	**110.0**
1994	1131	107	659	98	198	58	67	835	16866	**112.0**
1995	1167	104	601	97	158	71	59	711	17493	**114.4**
1996	1135	111	711	102	135	112	61	751	17944	**116.3**
1997	1043	118	764	108	237	138	69	805	17602	**118.6**
1998	1161	118	730	108	261	119	70	900	17373	**121.3**
1999	1157	121	822	110	214	122	60	953	17257	**124.2**
2000	1452	112	521	103	139	50	76	998	16940	**127.2**
2001	1429	111	601	102	101	75	83	1062	16188	**128.0**
2002	1108	115	635	105	124	89	77	1198	15436	**132.1**
2003	1104	119	629	109	128	100	88	1269	14685	**135.5**
2004	1111	116	596	106	121	86	35	1337	13933	**136.6**
2005	1157	81	575	93	126	94	67	1526	11151	**138.1**
2006	962	74	567	97	134	101	51	1842	10970	**137.5**
2007	856	63	397	93	131	90	53	1784	10898	**137.9**
2008	828	55	452	86	145	118	48	1932	9864	**136.8**
2009	814	57	419	67	150	147	39	1373	8912	**137.8**
2010	659	20	380	53	135	127	27	939	7549	**136.5**
2011	645	20	360	50	132	127	25	755	8639	**130.5**
2012	623	16	356	42	126	126	22	491	6952	**133.3**
2013	672	3	350	33	120	135	22	144	5942	**126.1**
2014	599	3	440	31	113	122	21	82	5161	**122.6**
2015	454	2	320	41	97	109	20	37	5078	**121.1**
2016	430	2	304	51	100	121	14	37	4796	**117.4**
2017	438	1	322	61	98	126	17	47	4155	**117.5**
2018	509	1	377	67	113	139	9	40	4159	**117.0**
2019	508	3	397	78	138	142	8	78	4109	**116.8**
2020	415	10	383	80	133	145	8	72	4212	**116.0**
2021	398	6	401	94	120	133	10	58	3998	**115.2**
Trend 1990-2021	**-69%**	**-95%**	**-49%**	**-14%**	**-57%**	**11199%**	**-87%**	**-94%**	**-79%**	**14%**
Trend 2005-2021	**-66%**	**-92%**	**-30%**	**0%**	**-5%**	**41%**	**-85%**	**-96%**	**-64%**	**-17%**

ANNEX 4. The national energy balance for the most recent inventory year

In the following page, the aggregated energy balance of Hungary is presented. This energy balance was produced by the energy statistics provider (i.e. Hungarian Energy and Public Utility Regulatory Authority) and was downloaded from their site:

http://mekh.hu/download/6/93/31000/7_2_annual_national_energy_balance_2014_2021.xlsx

In addition, the time series of the primary energy balance as published by the HCSO is presented in the table below.

https://www.ksh.hu/stadat_files/ene/en/ene0002.html

HUNGARIAN CENTRAL STATISTICAL OFFICE

6.1.1.2. Primary energy balance

Year	Production[a]	Imports[b]	Exports[c]	Change in stocks (–)[d]	Energy consumption, total[e]
	petajoules				
1990	614.9	665.4	72.6	3.1	1,210.9
1991	604.7	580.5	51.8	21.9	1,155.3
1992	582.6	532.8	65.2	6.0	1,056.2
1993	573.5	604.3	91.5	-4.0	1,082.3
1994	556.2	594.1	103.2	4.8	1,051.9
1995	581.6	623.7	103.5	-10.8	1,091.0
1996	571.2	666.2	93.5	-24.8	1,119.2
1997	557.9	658.4	96.0	-22.5	1,097.8
1998	521.8	684.3	92.7	-29.9	1,083.5
1999	499.0	672.5	97.8	2.6	1,076.4
2000	486.4	685.2	104.6	-10.5	1,056.5
2001	473.2	703.2	126.4	30.6	1,080.7
2002	468.9	753.3	138.9	-2.7	1,080.6
2003	435.9	816.2	131.8	-17.4	1,102.8
2004	428.6	804.0	131.8	0.5	1,101.2
2005	455.1	910.4	172.0	-7.9	1,185.6
2006	452.5	911.6	185.8	-3.0	1,175.3
2007	449.3	885.3	192.3	8.5	1,150.8
2008	456.2	897.3	186.0	-31.0	1,136.5
2009	490.3	750.0	127.9	-33.1	1,079.4
2010	496.9	789.2	156.4	-9.9	1,119.8
2011	493.2	732.5	185.1	55.2	1,095.7
2012	492.1	720.8	201.8	30.2	1,041.3
2013	480.4	721.4	220.3	25.8	1,007.3
2014	464.1	806.1	210.2	-55.0	1,005.1
2015	472.9	757.2	189.4	21.5	1,062.2
2016	480.2	771.0	175.1	-0.3	1,075.8
2017	474.7	887.9	188.6	-49.9	1,124.1
2018	462.4	854.6	204.9	12.5	1,124.6
2019	460.9	975.9	196.8	-112.4	1,127.5
2020	451.7	797.9	178.2	31.4	1,102.7
2021	454.3	796.2	175.9	80.2	1,154.8

MEKH
Hungarian Energy and Public Utility Regulatory Authority

7.2 Annual National Energy Balance, 2021

Select the Unit of Measure: terajoule

Name	Coal and coal products	Oil and petroleum products	Natural gas	Combustible renewables and waste	Nuclear	Water	Wind	Solar	Geothermal	Electricity	Heat	Total
Production	**32 367**	**45 638**	**49 337**	**128 128**	**174 824**	**763**	**2 390**	**14 316**	**6 552**	**0**	**0**	**454 316**
Import	**36 276**	412 431	**261 556**	**14 090**	**0**	**0**	**0**	**0**	**0**	**71 881**	**0**	796 234
Export	**-14 153**	-118 022	**0**	**-17 775**	**0**	**0**	**0**	**0**	**0**	**-25 967**	**0**	-175 917
International aviation	**0**	**-5 117**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-5 117**
Stocks changes	**3 054**	-1 147	**78 281**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	80 204
Domestic supply	**57 545**	333 783	**389 174**	**124 459**	**174 824**	**763**	**2 390**	**14 316**	**6 552**	**45 914**	**0**	1 149 721
Interproduct transfers	**0**	**172**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**172**
Statistical difference	**-119**	**484**	**5 649**	**0**	0	0	0	0	**0**	-1 622	-780	3 612
Transformation sector	**-46 196**	346	**-103 668**	-36 584	**-174 824**	**-763**	**-2 390**	**-13 666**	**-3 679**	129 988	52 161	-199 275
Energy sector own use	**-3 912**	**-14 567**	**-9 312**	-620	**0**	**0**	**0**	**0**	**0**	**-11 021**	**-3 017**	-42 448
Network losses	**-448**	**0**	**-4 390**	**0**	**0**	**0**	**0**	**0**	**0**	**-10 987**	**-4 240**	**-20 066**
Final consumption	**6 870**	320 218	**277 453**	87 255	**0**	**0**	**0**	**650**	**2 873**	**152 273**	**44 124**	891 715
Industry	**4 618**	**30 521**	**60 983**	**18 572**	**0**	**0**	**0**	**0**	**77**	**67 669**	**15 949**	**198 389**
Iron and steel	2 441	43	1 904	17	0	0	0	0	0	2 218	1 108	**7 730**
Chemical and petrochemical	0	16 389	9 746	112	0	0	0	0	0	13 252	11 655	**51 154**
Non-ferrous metals	0	43	2 938	0	0	0	0	0	0	1 397	3	**4 380**
Non-metallic minerals	939	2 395	8 426	7 089	0	0	0	0	0	5 605	119	**24 572**
Transport equipment	0	89	3 272	8	0	0	0	0	5	6 001	514	**9 889**
Machinery	15	446	9 449	158	0	0	0	0	13	12 154	214	**22 449**
Mining and quarrying	0	895	164	2	0	0	0	0	0	410	1	**1 472**
Food, beverages and tobacco	59	670	14 405	3 782	0	0	0	0	20	10 062	1 206	**30 204**
Paper, pulp and printing	1 002	89	2 655	3 028	0	0	0	0	0	3 442	679	**10 894**
Wood and wood products	0	482	324	3 966	0	0	0	0	0	1 840	0	**6 612**
Construction	147	8 758	2 326	180	0	0	0	0	28	2 023	147	**13 609**
Textiles and leather	0	0	782	9	0	0	0	0	0	785	11	**1 587**
Not elsewhere specified (Industry)	15	223	4 592	221	0	0	0	0	11	8 482	292	**13 836**
Transport	**0**	186 310	**1 428**	**11 932**	**0**	**0**	**0**	**0**	**0**	**4 482**	**0**	204 152
Road	0	184 733	304	11 932	0	0	0	0	0	302	0	197 271
Domestic aviation	0	44	0	0	0	0	0	0	0	0	0	**44**
Rail	0	1 406	0	0	0	0	0	0	0	4 144	0	**5 549**
Pipeline transport	0	0	1 124	0	0	0	0	0	0	36	0	**1 160**
Domestic navigation	0	128	0	0	0	0	0	0	0	0	0	**128**
Non-specified - transport	0	0	0	0	0	0	0	0	0	0	0	**0**
Other sectors	**2 024**	**21 553**	**192 628**	56 751	**0**	**0**	**0**	**650**	**2 796**	**80 122**	**28 175**	384 698
Residential	1 887	3 082	139 394	55 162	0	0	0	639	0	46 904	20 964	**268 032**
Commercial and public services	50	1 273	46 569	1 109	0	0	0	11	1 260	29 376	7 070	86 717
Agriculture/forestry/fishing	62	16 384	5 890	480	0	0	0	0	1 536	3 528	26	**27 905**
Not elsewhere specified (Other)	25	814	776	0	0	0	0	0	0	313	115	**2 043**
Non-energy use	**228**	81 834	**22 414**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	104 476

ANNEX 5. Additional information

Quality Assurance and Quality Control

QA/QC activities are explained in Chapter 1.7. The update of the QC Plan entered into force on 4th January 2013 (HMS ISO document n.: ELFO 401.01), which was updated several times due to the chages of the Guidebook and legislation. The last update entered into force in December 2022. Our most recent QA/QC Plan is: MFO_NELO_402.01). The records and their functions are the following at the moment:

- NELO03: Development Plan: to be filled in every year by the end of the inventory cycle based on the outcome of all reviews and own experience;
- NELO04: Responsibility: for the specification of the sectoral responsibilities of the core team and the QA/QC coordinator.

Please see below the English translation of the QA/QC Plan.

Q A - Q C P L A N

MFO/NELO 402

Preparation of Emission Inventories required by United Nations Framework Convention on Climate Change (UNFCCC) and Convention on Long-range, Transboundary Air Pollution (CLRTAP)

	Name	signature
Prepared (and translated) by:	Katalin Lovas	expert

Reviewed by:		Gábor Kis-Kovács	Head of Unit
Approved by:		Gyula Horváth	Head of Department
Version:	**02**		
Pages:	22		

12 December 2022

Content

OBJECTIVE

The Unit of National Emission Inventories (hereafter NEI) of Hungarian Meteorological Service (HMS) has been assigned by the Ministry for Energy Affairs as the ministry responsible for environmental protection to compile GHG inventory required by United Nations Framework Convention on Climate Change and the Air Pollutants Emission Inventory required by Convention on Long-range, Transboundary Air Pollution (CLRTAP). Several parts of the inventories, such as transport, agriculture and Land use, land-use change and forestry (LULUCF) are delegated to other institutions by law.

The NEI of the HMS is appointed as Inventory Compiler within the National System by Act LX of 2007 on the implementation of United Nations Framework Convention on Climate Change and the Govt. Decree 278/2014. (XI.14.) on the content and preparation of national reports concerning greenhouse gas emissions and climate change, on the rules of data provision, and on the penalty for violation of the reporting obligations

HMS is indicated as compiler of the inventory of air pollutants (required by the Convention on Long-range, Transboundary Air Pollution) by Govt. Decree 353/2021 (VI.24.) on the Hungarian Meteorological Service, which lists this task in addition to the task of preparation of reporting on air quality data required by any international reporting obligation.

Present ISO document (hereinafter QA-QC Plan) aims to fulfill both the requirements of quality management system ISO 9001:2008 and the QA-QC requirements of the Conventions mentioned above. Therefore, the relevant parts of the former annual QA-QC Plans and the former Documentation and Archiving Manual are integrated into this single document. The former QA-QC Plan was the ELFO_NELO 401.01 document.

TASKS AND RESPONSIBILITIES

Tasks and responsibilities connected to the implementation of activities defined within this QA-QC Plan:

- preparation of QA-QC Plan: expert appointed by the Head of the NEI
- implementation of the QA-QC Plan: expert(s) appointed by the Head of the NEI,
- supervision of the implementation of QA-QC Plan: Head of the NEI,
- internal audit of the implementation of activities definec within this QA-QC Plan: QA/QC manager of HMS.

The names of sectoral experts, QA-QC coordinator, archiving manager and inventory compiler are specified in the quality record NELO 04.

DESCRIPTION OF THE ACTIVITIES / ANNUAL INVENTORY CYCLE

Principles

All domestic and international reporting obligations in connection to the inventory of greenhouse gases and air pollutants to be submitted to any local or international organizations are meant as „Report" hereinafter. Guidelines and Guidebooks specified by the Conventions or Protocols have to be applied for the preparation of the reports

	UNFCCC	CLRTAP+ NEC
Guidelines	UNFCCC: 18/CMA.1 Decision EU Regulation No 2018/1999 and Commission Regulations No. 1208/2020 and No. 2020/1044	ECE/EB.AIR/125 + 81/2001/EC directive
updated Guidelines since 2020	2006 IPCC Guidelines (See References)	2019 EMEP/EEA Guidebook (See References)

The format and content of the reports are determined by CRF (Common Reporting Form) in the case of UNFCCC and NFR (Nomenclature For Reporting) in the case of CLRTAP. Both are detailed in the Guidelines and Guidebooks mentioned above. The reports consist of tables (hereinafter: CRF/NFR Table) and text documents (hereinafter: NIR/IIR) containing descriptions specified in the Guidelines as well. The names, content, deadlines, process of the submission, public availability of the reports are summarized in Annex 1.

Inventory principles (TCCCA) included in Annex 4 as defined by the Conventions should always be taken into account during the inventory process:

- Transparency,
- Completeness,
- Comparability,
- Consistency,
- Accuracy,
- *in addition to timeliness and improvement.*

Main steps of the annual inventory cycle

- data collection and choice of estimation method;
- calculations i.e. estimation of emissions and removal by sinks;
- uncertainty analysis;
- QA/QC activities;
- compilation of the report;
- submission of the report;
- documentation and archiving;
- reviews;

– compilation of a development plan.

The outline of the process is included in Annex 3.

Tasks and responsibilities of persons involved in the inventory preparation

Sectoral experts:

- choice of emission estimation methods;
- collection, documentation and archiving of data needed for the calculations as detailed below and in chapter 2 and in Documentation and Archiving Regulation of HMS;
- data quality check relating to the sector;
- communication with external experts;
- calculation and documentation and archiving of calculation files as detailed below and in chapter 2;
- compilation of QC checklists;
- compilation of CRF Reporter Program relating to the sector use of QA/QC functions of the CRF Reporter and the implementation of the required corrections;
- providing input into the NIR/IIR relating to the sector;
- providing input for the responses of the review questions relating to the sector;
- providing input into the Development Plan.

Sectoral experts regarding documentation and archiving:

- all the incoming documents containing data used during the preparation of the inventory should be registered in the central register of the HMS as required by the Documentation and Archiving Regulation of HMS;
- all the data used during the preparation of the inventory and information on the source of these data should be documented and archived as detailed in chapter 2;
- all the calculation files and compiled reports should be archived ensuring tracking of changes (due to checks and reviews);
- continuous update of the documentation of all subsectors assigned, archiving of data and other documentation;
- recording, organizing, archiving and removing the files relating to their sector;

Head of NEI:

- check of input provided by sectoral experts;
- compilation, finalization of reports, forwarding for approval and submission in the case of UNFCCC;
- communication and finalization of responses to be sent during the international reviews;
- finalization of Development Plan.

QA/QC coordinator:

- updating present QA/QC Plan and the quality records;
- documentation and archiving relating to QA/QC activities.

QA/QC coordinator regarding documentation and archiving:

- recording, organizing, archiving and removing files relating to QC/QC activities,
- control of QA/QC folder within directory of NEI as included in Annex 2.

Archiving coordinator:

- development of archiving processes and tasks, and making proposals on it;
- support for the sectoral experts and the head of unit relating to archiving problems,
- follow-up of the requirements relating to archiving and incorporation of new elements into the QA/QC Plan if needed

Main steps of the annual inventory cycle

Choice of estimation method

Sectoral experts are required to choose the appropriate estimation method or to coordinate it with external experts and to document it. Methods are to be improved continuously and to be amended or corrected if needed. Methods might be chosen from different tier methods (i.e. methods with different level of complexity) presented in the Guidebooks depending on the results of key source category analysis of the previous year or performed preliminary (as higher tier methods are suggested for key categories), the issues included in the Development Plan and the review results especially regarding recommended changes of methods.

The choice of the estimation method means in fact the choice of activity data set and emission factors to be applied for the calculations. Those methods are appropriate where the whole set of activity data is available and consistent or at least it is possible to apply an extrapolation technique and transparent, documented emission factors are available. Even if country specific emission factors and/or plant specific data (higher tier methods) might result in more realistic estimations, these are only applicable if consistency, comparability and transparency principles are also fulfilled.

The need for change of method might arise anytime during the preparation of the inventory (e.g. new data available, recommendations of the review, etc.), which causes the recalculation of the whole time series. Recalculations should be documented in CRF Table8 and in the appropriate chapter of the NIR/IIR.

The methods applied by subsector have to be documented transparently in the sector-specific chapters of the NIR/IIR, in the CRF and in the calculation files (at least activity data and its source + emission factor and its source).

It is necessary to consider the consistency of activity data, emission factors (and the results) among international reporting obligation (e.g. UNFCCC, CLRTAP, IEA, NAMEA) and the comparability of results with reports of other countries (and the EU).

Sectoral experts consult all general and sector specific issues including choice of method with the Head of NEI either during division meetings or individually. Head of NEI informs all the other experts eventually concerned regarding changes of methods.

In addition, NIR/IIR chapters might be amended by sectoral experts only using “track change” mode. Head of NEI accepts the changes before submission.

Data collection

Sectoral experts/institutions are required to ensure the appropriate quantity, quality, format and timeliness of the data needed for the estimation method. Data might be collected from public

databases, based on authorization by law or by data provision agreements with institutions or organizations.

The Act and Govt. Decree 278/2014. (XII.14.) authorizes HMS to collect data needed for the preparation of the inventory, even for the collection of confidential data and to expose penalty in the case of non-compliance.

Special care is needed in the case where the number of data providers is less than three as *Govt. Decree 170/1993 (XII.3.) on the implementation of Act XLVI of 1993 on statistics* (hereafter Statistical Law) requires the Hungarian Statistical Office not to publish data - not even in an aggregated way- in such cases[1].

Sectoral experts may communicate also via e-mail, phone and mail with external experts, data providers and other persons involved in the National System.

Incoming documents that contain data used by the preparation of the inventory are to be registered in the central register of the HMS as required by the HMS Regulation on documentation and archiving where special provisions are included regarding the NEI.

Any data base, reference or document relating to the preparation of the inventory either hard copies or electronically should be documented and archived as described in chapter 2.7 in order to ensure replicability and transparency of the reports. It is needed to document (e.g. in form of *„minutes of meeting/phone call/etc__IPCCcode_date_doc")* verbal information as well if it is used by the preparation of the inventory.

Information regarding the sources of data should be documented on quality record *NELO05 Data source logbook*. This record should be completed by year and by sector with information on data sources (date of enquiry and receipt, contact person, Reg. No. etc.) in the case of mails, e-mails arriving thank to Govt. Decree 278/2014. and with information on the download (e.g. url, website, date, etc.) in the case the data source is on-line.

Calculations i.e. estimation of emissions and removal by sinks

Compilation of the inventory is the task of sectoral experts or external experts contracted by the HMS. Sectoral experts work in calculation files (separate for every year) which are saved in a specific place in the directory used by the NEI and treated as it is described in 2.7. Calculation files should contain in a transparent way the estimation method, activity data together with their source, emission factors together with their source and uncertainty together with their source (in addition to NIR/IIR and CRF/NFR Tables to be compiled in a later stage). This will ensure the reproducibility of emission estimates and enables substitution or replacement of sectoral experts when necessary.

Further QA/QC recommendations regarding the content of the calculation files:

[1] With the exception of article (2) of Section 18 and Section 16 of Statistical Law

Section 18 (2) Individual data on the activities of organs, social organizations and state budget organs performing activities of public interest, may be made public also without prior written consent of the data supplier if the respective data relates to the activities of public interest of the organs above.

Section 16 (1) Collections of statistical data based on voluntary data supply may be performed without permission.
(2) The attention of those requested to supply data shall be called to the voluntary character of the supply of the data.

- it is favorable to include notes and/or to apply different coloring for the cells of the table that contain data from different sources;

- possibility automatic checks should be included in the calculation files (e.g. conditional formatting, crosschecks, references, macro, etc.) in order to minimize calculation or mistype errors;

- summary tables in the calculation files should possibly follow exactly the outline of the appropriate CRF Table in order to enable the final crosscheck with the compiled CRF

- the year to which the data relates should always be indicated clearly (e.g. above/next to the data set)

- activity data, emission factors, conversion factors, other parameters, units should be indicated separately, unit conversions should be presented step by step;

- the tables should be compiled in a way that makes possible to track the steps of the calculation based on the formulas or references (in the case the formula is on other worksheet or work file);

- data from external source should be clearly separated from elaborated data (i.e. unit conversions, after calculation steps, etc.);

- emission factors, conversion factors and other parameters should not be built in the formulas, but in a separate cell referenced by the formula;

- units of the dataset should be noted in the beginning of all the rows;

- special attention is needed for the update of conversion factors and temporary coefficients if necessary.

Beyond the above recommendations, calculations should be checked.

Recalculations

In the case estimation method has been changed (either activity data or emission factor) the whole time-series need to be recalculated. Correction of data of earlier years is regarded as recalculation as well. The reasons for recalculations have to be presented in the appropriate chapter of the NIR/IIR. While the sectoral experts are encouraged to present comparison table including the old and the new time series together with their difference in the NIR/IIR. It is recommended to clearly note (e.g. different coloring) the old and the new time series also in the calculation files. In addition, the new time series should be copied possibly from the final (before submission) state of the compiled CRF.

Uncertainty and key category analysis

Uncertainty analysis has to be performed using the sector list suggested by 2006 IPCC Guidelines. Sectoral experts either copy the uncertainties associated to the sectors into one common file and/or revise the table compiled by the expert responsible for the uncertainty analysis. The responsible expert calculates the aggregated uncertainty, the aggregated uncertainty by gas and uncertainty by main sectors. These results are to be included in the NIR. The responsible expert updates the relevant chapter of the NIR and the Annex containing the full calculation table.

Possibly any deviation from the sector list for key category analysis suggested by 2006 IPCC Guidelines should be explained. Obviously, the Tier2 key category analysis can be performed only on the sector list of uncertainty analysis.

The expert responsible for key category analysis updates the references in the common file and performs the analysis using both Tier1 and Tier2 (with uncertainty) methods. Full tables are to be included in Annex of the NIR and summary tables are to be included in CRF Table7 and appropriate

chapter of the NIR/IIR where also the comparison with results of last year should be indicated.

Compilation, approval and submission of the report

Sectoral experts export the time series developed in the calculation files into the CRF Reporter program and run the available automatic control functions, and they subsequently make the corrections needed.

In the case of NECD and CLRTAP, the sectoral experts copy the sectoral data from the calculation files into a specified common file.

In the same time the sectoral experts update the chapters of the NIR/IIR assigned to them and include also the descriptions and comparison tables of recalculations into the appropriate chapters. The treatment and archiving of NIR/IIR working files is described in chapter 2.7.4. Head of Division checks and finalizes the reports.

The process of approval and submission of the reports is determined by the Act and the implementing Govt. Decree 278/2014. In the case of UNFCCC reporting, the Head of NEI submits the reports to UNFCCC secretariat and the EU Commission. In the case of CLRTAP reporting, HMS sends the report to the Ministry of Agriculture (responsible for the environment) for submission.

Comments or opinions eventually arrived from the authorizing ministries, or other external experts, committees, institutions before submission of the reports should be documented on the quality record NELO 08 QA Activities logbook.

International reviews

During international reviews (as detailed in Annex1) all the communication is managed by the Head of NEI. Questionnaires are saved in the assigned GHG directory. After the sectoral experts prepare the concerning answers, the head of unit checks and finalizes the official response. Responses prepared by sectoral experts should be sent only after the approval of the Head of Division in the case of on-line review as well.

Documentation and archiving

All the data, information and documents arising during the processes and activities of the NEI should be collected, treated, documented and archived in a way that the reports remain transparent and reproducible.

HMS Regulations regarding documentation and archiving

Documents and data of the NEI are registered, processed, treated, stored and archived within the central register and IT network of the HSM. Therefore, central regulations are valid for the NEI as well. The HMS Regulation on documentation and archiving in force includes special provisions regarding the data collected by the NEI for the compilation of the inventory. Present QA/QC Plan includes only provisions not included in the general HMS Regulations mainly regarding sectoral experts and emission inventorying.

Collection, processing and storage of data and documents

Hard copies of documents and any hardware containing data are to be ordered by sector and located in the premises of the HMS. It is suggested to store an electronic version of the hard copies too (by scanning). Sectoral experts are required to store the electronic version of such documents together

with other electronic data described later.

Electronic documents should be saved in the directory of the server of the NEI as described in Annex 2. and the following chapters. Sectoral experts are responsible for the organization, archiving and cancellation of the documents within their folders.

Electronic documents are collected, stored and archived in a password protected server accessible only for sectoral experts working for the NEI. Within the directory of the server of the NEI every expert and the Head of Unit have the same access (both for writing and reading) in order that experts might be substituted or replaced if needed. However additional security measures might be applied by the Head of Unit for the documents archived in the OFFICIAL ARCHIVE section of the directory especially where the submitted documents are archived in order to avoid any unintentional modification.

General principles for managing files and other recommendations

Names

Consistency, unambiguity and the inclusion of CRF/NFR sector codes should be aimed by naming the files and folders. Either the name of the file or the name of the folder should contain the CRF/NFR code. (In the case of incoming data files, it is suggested to name the folder rather than change the original name of the file while in the case of calculation files CRF/NFR codes should be included in the filename.) Abbreviations of CRF/NFR codes and names should be consistent and homogenous. Different versions of the file might be distinguished by adding „v" and/or month of the submission within the filename (obviously in addition to the year within the name of the file or folder). Older versions of the calculation files should be stored temporarily at least within the annual inventory cycle. The storage of different versions and the names including the version number and/or month of submission allows tracking changes within the year. In the case the calculation file contains more sub-sectors, it is suggested to use the name/code of the lowest obvious level of sector. Calculation files should be distinguished from original data files by using „Calc_xxx" within the filename.

Capital letters might be used for name of a folder, while the rules of English grammar for writing titles might be followed for filenames. Separation of words might be noted with the character „_". Based on the above, it is suggested to name the folders and (calculation files*):

Topic_CRF/NFRcode_year_(version/submission month*)

It is suggested to include into the name of a draft NIR/IIR together with name of the report, date of planned submission and version number (or month of planned submission).

Allocation of files within the directory of the server of the NEI

Files relating data collection

However, data provision is a legally binding obligation, HMS is usually sending reminder letters. The documents regarding mailing should be stored in the GHG directory.

Incoming documents containing data and databases directly used in the inventory should be stored in folder A. OFFICIAL ARCHIVE\ DATABASE\1-7. SECTORS.

Calculation files and text files

Sectoral experts work within the folders D. WORKING FOLDER\1-7. SECTORs folders. Files for uncertainty analysis and key category analysis are to be located within the folder D. WORKING\0.

GENERAL folder as well as draft text files of NIR/IIR.

QA//QC documents

QA/QC documents including blank versions of quality records and documents relating to internal and external audits, etc. are stored within the folder E. QA-QC\A. GHG QA/QC PLAN. folder. Compiled quality records are to be located in a place clearly noted in the file *Quality_records_logbook.xls* within this folder.

Archiving of data and background documents and submissions at the end of the annual inventory cycle

Data and documents to be archived should be provided by the sectoral experts, while the appropriate execution is monitored by the archiving coordinator. It should be possible to reproduce the reports fully from the archived files. Towards reproducibility worksheets and interim calculation used in the production of the inventory have to be archived by the sectoral experts in their own working folders or in the folders used for storage of background documents (U:\GHG\A. OFFICIAL ARCHIVE\B. BACKGROUND DOCUMENTS). The final, submitted CRF/NFR Tables and NIR/IIR files have to be stored within A. OFFICIAL ARCHIVE\C. SUBMISSIONS

Development Plan

Planned improvements and corrections might be collected and noted on sector specific quality records NELO03 throughout the year, especially regarding:

- recommendations, encouragements and suggestions received during the reviews,
- errors discovered during the previous year,
- results of key-category analysis,
- lessons learned during previous inventory cycle,
- new data available (e.g. new data provisions, new international obligation)
- follow-up of regulatory changes affecting the inventory,
- continuous improvement.

All the mid-term and long-term planned improvements and the necessary corrections that had not been possible to perform in a given inventory cycle (should be included into the quality record NELO 03 Development Plan by the sectoral experts and into the „Planned improvements" chapter of the NIR/IIR after the approval of the Head of NEI. Sectoral experts should update the quality record NELO 03 Development Plan with further planned improvements and corrections emerged after the submission regarding their sector.

Development Plan should reflect the review results (especially EU and UNFCCC). Planned improvements and corrections should be categorized as mid-term or long-term.

Further notes on CLRTAP reporting

Activities described above should be applied in the case of CLRTAP reporting too, evidently except for CRF Reporter program, uncertainty analysis and quality records.

For the preparation of reports to be submitted under CLRTAP and NEC, sectoral experts include the most up-to-date (eventually recalculated) time series into the worksheets of the appropriate pollutant within the Excel workbook to be found in folder D. WORKING FOLDER\0. GENERAL.

This file is referenced by the file in order to convert the time series into NFR Table format as required by Annex IV Table 1 of ECE/EB.AIR/97 and 81/2001/EC Directive too.

During compilation, sectoral experts are encouraged to include additional data sources needed for CLRTAP reporting or to note if the data is used for both purposes.

By the time being, key category and uncertainty analysis are performed without application of quality records in the case of CLRTAP reporting.

Requirements relating to external experts

Contracts with external experts providing input into the inventory should possibly include the following:

- external experts should deliver all the documentation (background documents and calculations) and transparency is to be taken into account also for external experts;
- external experts should be available during international reviews;
- inclusion of indemnity in the case of non-keeping the deadline.

Legal background:

- HMS Regulation on organizational structure and operation;
- Govt. Decree 353/2021. (VI.24.) on the Hungarian Meteorological Service;
- Act LX of 2007 on the implementation of United Nations Framework Convention on Climate Change;
- Govt. Decree 278/2014. (XI.14.) on the content and preparation of national reports concerning greenhouse gas emissions and climate change, on the rules of data provision, and on the penalty for violation of the reporting obligations;
- 2018/1999, 2020/1208 and 2020/1044 EC Regulations and implementing regulations.

Documents created as output of the activities described above:

- working files containing all the details of the calculations, Excel files generated by CRF Reporter, annually, (official inventory data);
- national inventory report (HU_NIR_MonthSubmissionYear.pdf files);
- annexes to the national inventory report (HU_NIR_ANNEXES_MonthSubmissionYear.pdf files);
- Executive summary in Hungarian);
- Reports required by the above mentioned rules and regulations;
- Approximated GHG inventory for the EU submitted until 31th of July;
- Air pollutant emission inventories (NFR files);
- Informative Inventory Reports on emissions of air pollutants (IIR_HU_InventoryYear_version.doc);
- files containing tables or text required by international reviews.

Responsible: experts working at NEI as it is specified in their contract

Deadline: As included in Annex1.

Check points, monitoring, quality control points:

Accessibility checks: only experts assigned by the Head of NEI have access

Operational checks: checks built-in the processes, self-checking, checks of the activities and data.

Hierarchical checks: Experts report on progress to the Head of NEI during meetings of the NEI. Inputs provided by sectoral experts are controlled by the Head of Division.

Financial or accounting issues: n/a

LIST OF QUALITY RECORDS

- NELO 03 Development Plan
- NELO 04 Responsibility

REFERENCES

- HMS Regulation on procedures of the departments and the presidency of HSM
- HMS Regulation on documentation and archiving
- HMS QA/QC Manual
  http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html
- Intergovernmental Panel on Climate Change (IPCC), 2006: 2006 IPCC Guidelines for National Greenhouse Gas Inventories,
  http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html
- EMEP/EEA air pollutant emission inventory guidebook -2019 (Technical report No 3/2019, European Environmental Agency)
- Elements of the union system for policies and measures and projections and the quality assurance and control (QA/QC) Programme as required under regulation (EU) No.3/2019;

ANNEXES TO THE QA/QC PLAN

Annex 1: Summary table

Documents, deadlines and QA/QC activities in connection with reporting to UNFCCC and Kyoto Protocol, CLRTAP and its Protocols and NEC directive						
Deadline	**Task**	**QC**	**Document /Report**			**QA**
			name	**route of submission**	**availability**	
May - Nov	search for new data available; data collection, documentation	Legal authorization-Govt.Decree 353/2021. (VI.24.) ; Documentation and archiving;	n.a.(data input)	n.a. (internal)	A. OFFICIAL ARCHIVE\ A. DATABASE and/or hard copies	
Sept - Dec (- April)	methodological changes (if needed) ; calculation, recalculation;	Division meetings; documentation	n.a.(calculation files)	n.a. (internal)	D. WORKING FOLDER …	possibly review by third parties, external experts
Sept - Dec (- April)	final results and calculations from external experts	HMS quality record ME-06 (Evaluation of contractors); documentation	n.a.(incoming files)	n.a. (internal)	A. OFFICIAL ARCHIVE\ A. DATABASE …	checks performed by sectoral expert
Jan-April	compilation of CRF compilation of CollectER	Completeness check Recalculation check incorporated into CRF Reporter; possibly cross-check among *CALC files and sectoral experts; checks using EU's sectoral cheking tools*				

Documents, deadlines and QA/QC activities in connection with reporting to UNFCCC and Kyoto Protocol, CLRTAP and its Protocols and NEC directive						
Deadline	**Task**	**QC**	**Document /Report**			**QA**
			name	**route of submission**	**availability**	
15.Jan.	**compilation and submission of preliminary report required by 2018/1999/EC**	Documentation and archiving Consistency checks in accordance with Article 7 (1) of Regulation 2018/1999/ and the Regulation EU No 2020/1044 (MMR Implementing Regulation) Completeness check of the LULUCF sector	**preliminary report required by 2018/1999/EC (CRF table, preliminary NIR, indicators, *SEF and MMR tables required by the MMR Implementing Regulations*)**	**Ministry of National Development → EU Commission (DG Climate Action)**	**http://cdr.eionet.europa.eu/hu/eu/ghgmm**	
15.Febr.	*compilation and submission of **CLRTAP** report*	*Documentation and archiving;* *RepDab check*	***CLRTAP NFR Table***	***Ministry of Agriculture → EMEP Centre on Emission Inventories and Projections (CEIP) + letter to UNECE Secretariat***	***http://www.ceip.at/overview-of-submissions-under-clrtap/***	*CLRTAP review process:* *1. Status + 2. Synthesis and Assessment (Reports: http://www.ceip.at/review-results/ (password protected))* *(3. Centralized review in every 5 years)*
15. Jan- 28. Febr	*EU Team QA/QC checks (STEP 1 and initial cheks)*	Checks in accordance with the Art. 29 of the MMR Implementing Regulation	***EU ESD Review Report***	***EEA→HMS using the EEA Emission Review Tool (EMRT)***	https://emrt-esd.eionet.europa.eu/ ***(password protected)***	Checks in accordance with the Art. 29 of the MMR Implementing Regulation
15. Jan- 15. March	*Providing responses to the EU Team;* *Correction actions based on the observations made by the EU team during the*	Identification and elimination of causes of problems identified by the EU team; actions to prevent their recurrence in the future.	***EU ESD Review Report***	***HMS→EEA using the EEA Emission Review Tool (EMRT)***	***https://emrt-esd.eionet.europa.eu/ (password protected)***	

Documents, deadlines and QA/QC activities in connection with reporting to UNFCCC and Kyoto Protocol, CLRTAP and its Protocols and NEC directive						
Deadline	**Task**	**QC**	**Document /Report**			**QA**
			name	**route of submission**	**availability**	
	STEP 1 and initial checks					
15.March	*compilation and submission of **CLRTAP** report*	Documentation and archiving	***CLRTAP IIR (+grid+LPS every 5 years)***	***Ministry of Agriculture → EMEP Centre on Emission Inventories and Projections (CEIP) - nek + letter to UNECE Secretariat***	***http://www.ceip.at/overview-of-submissions-under-clrtap/***	
15.March	**compilation and submission of report required by 2018/1999/EC**	Documentation and archiving Consistency checks in accordance with Article 7 (1) of Regulation 2018/1999/	**report required by 2018/1999/EC(CRF Tables, NIR, indicators, *SEF and MMR tables required by the MMR Implementing Regulations*)**	**Ministry of National Development → EU Commission DG Climate Action)**	http://cdr.eionet.europa.eu/hu/eu/mmr/art07_inventory	
15 March- 19 April	**EU Team checks**		***EU ESD Review Report***	**EEA→HMS using the EMRT**	https://emrt-esd.eionet.europa.eu/ (password protected)	EU Team identifies Potential Significan Issues (PSI); prepares estimates for data missing from the national inventory (gap filling); QA experts send follow up questions to HU.
31 March- 7 April	**Providing responses and comments to the EU Team**	Correction actions based on the observations made by the EU team; Check of the EEA/Comission estimates for missing data (Gap	***EU ESD Review Report***	**HMS→EEA using the EMRT; supervision by the Ministry of National Development**	https://emrt-esd.eionet.europa.eu/ (password protected)	

Documents, deadlines and QA/QC activities in connection with reporting to UNFCCC and Kyoto Protocol, CLRTAP and its Protocols and NEC directive						
Deadline	**Task**	**QC**	**Document /Report**			**QA**
			name	**route of submission**	**availability**	
		filling) or providing revised estimate;				
15.April	**compilation and submission of UNFCCC report**	Documentation and archiving	**UNFCCC report (CRF Tables, NIR, *SEF*)**	**Ministry of National Development →** **UNFCCC Secretariat**	**http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/492.php**	Before submission: Approval by Ministry of Agriculture, National Development and National Economy After submission: **UNFCCC review process:** 1. Status (Reports: http://unfccc.int/national_reports/annex_i_ghg_inventories/inventory_review_reports/items/8109.php 2. Synthesis and Assessment (Reports: http://unfccc.int/documentation/documents/advanced_search/items/6911.php?priref=600008003#beg

Documents, deadlines and QA/QC activities in connection with reporting to UNFCCC and Kyoto Protocol, CLRTAP and its Protocols and NEC directive						
Deadline	**Task**	**QC**	**Document /Report**			**QA**
			name	**route of submission**	**availability**	
15 April – end of April	**EU ESD step 2 review, if applicable;**	Providing responses to the EU ESD Step 2 team and calculating revised estimate or providing comments on potencial technical corrections	**EU ESD Review Report**	**Communication between the EEA and the HMS using the EMRT and supervised by the Ministry of National Development**	**https://emrt-esd.eionet.europa.eu/ (password protected)**	Step 2 team identifies and calculates technical corrections and send questions to HU
8 May	**compilation and resubmission of GHG inventory to the EU and the UNFCCC, if applicable)**	Documentation and archiving	**UNFCCC report (CRF Tables, NIR, SEF)**	**Ministry of National Development → UNFCCC Secretariat and EU Commission (DG Climate Action)**	http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/492.php **http://cdr.eionet.europa.eu/hu/eu/mmr/art07_inventory**	

Documents, deadlines and QA/QC activities in connection with reporting to UNFCCC and Kyoto Protocol, CLRTAP and its Protocols and NEC directive						
Deadline	**Task**	**QC**	**Document /Report**			**QA**
			name	**route of submission**	**availability**	
30-31 May	**Quattro-lateral QA/QC meeting on GHG-inventory**		**MINUTES FROM QUATTRO-LATERAL MEETING**	**Organizing country → Other countries**	u:\GHG\E. QA-QC\C. INTERNATIONAL REVIEWS\Quattro Lateral Meeting\	review of chapters of the GHG-inventory by members of the GHG.inventory team of Slovakia, Czech Republic and Poland
31.July	**Compilation and submission of preliminary report required by Art 8. of 2018/1999/EC**	Documentation and archiving Consistency checks in accordance with Article 7 (1) of Regulation 2018/1999/ (if it is relevant)	**preliminary report required by Art 8. of 2018/1999/EC for year x-1**	**Ministry of National Development →** **EU Commission DG Climate Action)**	http://cdr.eionet.europa.eu/hu/eu/mmr/art08_proxy	
May-August-Oct	evaluation, corrective actions and planned improvements (incorporating results of annual review processes);	Additional cheks based on the lessons learned during the UNFCCC, EU review processes and Quattro Lateral meeting;	NELO 03 Development Plan; MFO_NELO_401.02		E. QA-QC	

Documents, deadlines and QA/QC activities in connection with reporting to UNFCCC and Kyoto Protocol, CLRTAP and its Protocols and NEC directive						
Deadline	**Task**	**QC**	**Document /Report**			**QA**
			name	**route of submission**	**availability**	
	update of QA/QC documents if needed					
March-Sept.	HCSO data exchange		GHG - UNFCCC - CRF Tables; Air Pollutants - CLRTAP - NFR Tables; Climate data	Hungarian Central Statistical Office (HCSO)	HCSO Statistical Yearbook and Handbook + http://www.ksh.hu/stadat_eves_5 + NAMEA	crosscheck with NAMEA
Sept-Oct	responses to be sent during the UNFCCC review; recalculations and resubmission if needed	Division meetings; documentation	responses sent electronically	UNFCCC Secretariat	E. QA-QC\C. INTERNATIONAL REVIEWS\UNFCCC	**UNFCCC review process**: 3. Annual centralized/in-country review (Reports: http://unfccc.int/national_reports/annex_i_ghg_inventories/inventory_review_reports/items/8452.php)
before the beginning of the new inventory cycle	archiving	archiving of all documents and data not yet archived on the server of NEI				
annually	Quality objectives of NEI for the HMS level quality objectives				E. QA-QC\B. HMS ISO\QUALITY PROGRAMME http://www.met.hu/en/omsz/minosegiranyitas/	

Documents, deadlines and QA/QC activities in connection with reporting to UNFCCC and Kyoto Protocol, CLRTAP and its Protocols and NEC directive						
Deadline	**Task**	**QC**	**Document /Report**			**QA**
			name	**route of submission**	**availability**	
1-2 years	External audits within the ISO quality management system				Result of the audit http://www.met.hu/doc/minosegiranyitas/OMSZ_ISO-9001_tanusitvany_2012-15_en.pdf	external audit
1-2 years	Internal audits within ISO quality management system				n.a.	internal audit

Annex 2 : Structure of directory used by the NEI

A. OFFICIAL ARCHIVE

A DATABASE

0. GENERAL

1-7.SECTORS

B BACKGROUND DOCUMENTS

0. GENERAL

1-7.SECTORS

C SUBMISSIONS

D. WORKING FOLDER

0. GENERAL
G. NFR Total

1-7.SECTORS E. QA/QC

E. QA/QC

A. GHG QA/QC PLAN
B. HMS ISO

C. INTERNATIONAL REVIEWS

D. NATIONAL AUDITS REVIEWS

E. WORKING

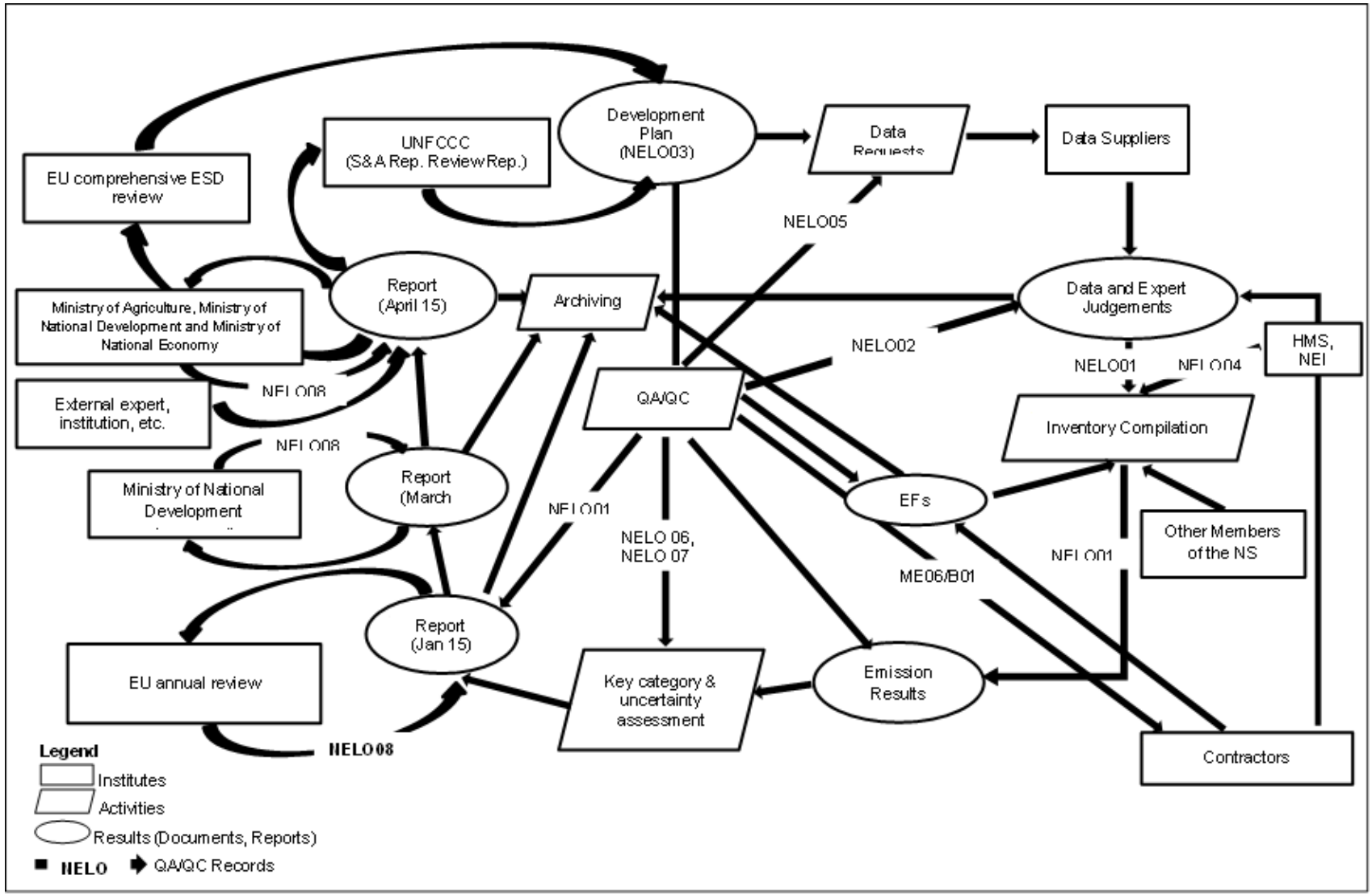
F. ARCHIVE

F. MANAGEMENT

A. DATA REQUESTS

G. OTHERS

Annex 3: Outline of the process



Annex 4: Abbreviations and inventory principles

CRF	Common reporting format = table (UNFCCC)
NIR	National Inventory Report = text (UNFCCC)
SEF	Standard electronic format = table on the Registry (UNFCCC) (it is NOT a HMS task)
NEI	Unit of National Emission Inventories
NFR	Nomenclature for reporting = table (CLRTAP)
IIR	Informative Inventory Reports = text (CLRTAP)
NEC	National Emission Ceiling Directive - 2001/81/EC of The European Parliament And Of The Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants
UNFCCC	United Nations Framework Convention on Climate Change (1992)
CLRTAP	Convention on Long-range, Transboundary Air Pollution (1979, Geneva)
GHG	greenhouse gas

CLRTAP (EMEP/EEA 2009.)	UNFCCC (18/CP.8)
Transparency means that Parties should provide clear documentation and report a level of disaggregation that sufficiently allows individuals or groups other than the designated emission expert or the compiler of the inventory to understand how the inventory was compiled and assure it meets good practice requirements. The transparency of emission reporting is fundamental to the effective use, review and continuous improvement of the inventory.	*Transparency* means that the assumptions and methodologies used for an inventory should be clearly explained to facilitate replication and assessment of the inventory by users of the reported information. The transparency of inventories is fundamental to the success of the process for the communication and consideration of information;

Consistency means that estimates for any different inventory years, pollutants (2) and source categories are made in such a way that differences in the results between years and source categories reflect real differences in emissions. Annual emissions, as far as possible, should be calculated using the same method, and data sources for all years, and resultant trends should reflect real fluctuations in emissions and not the changes resulting from methodological differences. Consistency also means that, as far as practicable and appropriate, the same data are reported under different international reporting obligations.	*Consistency* means that an inventory should be internally consistent in all its elements with inventories of other years. An inventory is consistent if the same methodologies are used for the base and all subsequent years and if consistent data sets are used to estimate emissions or removals from sources or sinks. Under certain circumstances referred to in paragraphs 15 and 16, an inventory using different methodologies for different years can be considered to be consistent if it has been recalculated in a transparent manner, in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories and Good Practice Guidance for Land Use, Land-Use Change and Forestry*;1
Comparability means that the national inventory is reported in such a way that allows it to be compared with national inventories of other Parties. This can be achieved by using accepted methodologies as elaborated in the Reporting Guidelines by using the reporting templates and through the use of the harmonized Nomenclature For Reporting (NFR), as specified in Annex IV of the Reporting Guidelines.	*Comparability* means that estimates of emissions and removals reported by Annex I Parties in inventories should be comparable among Annex I Parties. For this purpose, Annex I Parties should use the methodologies and formats agreed by the COP for estimating and reporting inventories. The allocation of different source/sink categories should follow the split of the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*,2 and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, at the level of its summary and sectoral tables;
Completeness means that estimates are reported for all pollutants, all relevant source categories and all years and for the entire territorial areas of the Parties covered by the reporting requirements set forth in the provisions of the Convention and its protocols. Where numerical information on emissions under any source category is not provided, the appropriate notation key defined in Annex I of the Reporting Guidelines should be used when filling in the reporting template and their absence should be documented.	*Completeness* means that an inventory covers all sources and sinks, as well as all gases, included in the IPCC Guidelines as well as other existing relevant source/sink categories which are specific to individual Annex I Parties and, therefore, may not be included in the IPCC Guidelines. Completeness also means full geographic coverage of sources and sinks of an Annex I Party.

Accuracy means that emissions are neither systematically overestimated nor underestimated, as far as can be judged. This implies that Parties will endeavour to remove bias from the inventory estimates and minimize uncertainty.	*Accuracy* is a relative measure of the exactness of an emission or removal estimate. Estimates should be accurate in the sense that they are systematically neither over nor under true emissions or removals, as far as can be judged, and that uncertainties are reduced as far as practicable. Appropriate methodologies should be used, in accordance with the IPCC good practice guidance, to promote *accuracy* in inventories.

NELO 03 **Development Plan (Fejlesztési terv)**

					Updated:	
SHORT TERM (WITHIN ONE INVENTORY CYCLE)						
GENERAL		Who		Deadline	Compl.	Cause of non-compliance
ENERGY	Category	Who	Key	Deadline	Compl.	Cause of non-compliance
INDUSTRIAL PROCESSES	Category	Who	Key	Deadline	Compl.	Cause of non-compliance
AGRICULTURE	Category	Who	Key	Deadline	Compl.	Cause of non-compliance
LULUCF	Category	Who	Key	Deadline	Compl.	Cause of non-compliance
WASTE	Category	Who	Key	Deadline	Compl.	Cause of non-compliance
LONG TERM						
GENERAL	Category	Who	Key	Timeline	Status	Remarks
ENERGY	Category	Who	Key	Timeline	Status	Remarks
INDUSTRIAL PROCESSES	Category	Who	Key	Timeline	Status	Remarks
AGRICULTURE	Category	Who	Key	Timeline	Status	Remarks

LULUCF	Category	Who	Key	Timeline	Status	Remarks
WASTE	Category	Who	Key	Timeline	Status	Remarks

NELO 04 **Responsibilities**

Task	Name	Date
Compiler		
QA/QC		
Archiving		
Sector experts		
Energy		
Industry, solvents		
Agriculture		
LULUCF		
Waste		
Uncertainty, key category analysis		

ANNEX 6. Summary of the results of the QA activities carried out by the EU

In the following tables, results of the quality checks and reviews of national emission inventories under the Monitoring Mechanism Regulation are summarized for the last years.

Sector	Detail	Review Year	Status
5A Solid waste disposal	HUN : for 2016 CH4 emissions from 5A decreased of 137 kt CO2eq (-4,6%) between the previous and the latest submission which is higher than the 2016 threshold of significance. An short explanation is provided ("Change in AD (revised extrapolation")in annex III for Article 8 of the MMR BUT the 2016 values in the MMR recalculation file are different than the values reported in the CRF table	2019	closed (Resolved)
1A1a Public electricity and heat production	1A1a Solid CO2 IEF	2019	closed (Resolved)
1A2c Chemicals	Identical values for 2016 and 2017 under subcategory 1.A.2.c	2019	closed (Resolved)
1AB Reference approach	Inconsistency found for carbon emission factor in the reference approach	2019	closed (Resolved)
2F1 Refrigeration and air conditioning	2.F.1 increase of emissions in 2017	2019	closed (Resolved)
1AB Reference approach	Inconsistency found for carbon emission factor in the reference approach	2019	closed (Resolved)
0 Cross cutting	Information on MMR IR Art. 8-10 (Annex III-V) is missing from your submission.	2019	closed (Resolved)
4 Land use, land-use change and forestry	Variation of total country area reported under the Convention	2019	closed (Resolved)
4E Settlements	Lack of information on activity data for the category 4.E.1	2019	closed (Resolved)
7 KP LULUCF	Lack of information in the accounting table for non-elected KP activities in the base year.	2019	closed (Resolved)
7 KP LULUCF	Carbon stock changes in HWP under Deforestation	2019	closed (Resolved)
4 Land use, land-use change and forestry	2018 Reference number: HU-4-2018-0001. For the year 2017, inconsistencies between final area of Cropland, Grassland and Settlements in CRF table 4.1 and total area in CRF table 4.B, 4.C and 4.D	2019	closed (Unresolved)
7 KP LULUCF	Harvest from remaining lands reported in the cell D24 of the CRF table 4(KP-I)C	2019	closed (Resolved)
1A3b Road transportation	Calculation of fossil fuels from biofuels	2019	open
2C1 Iron and steel production	Hungary has fluctuating IEFs for 2C1d, sinter production.	2019	closed (Resolved)
2B1 Ammonia production	2.B.1 Ammonia production – CO2. UNFCCC 2017 Review – allocation of emissions from hydrogen production used for the production of ammonia	2019	closed (Resolved)
2A3 Glass production	2.A.3 Glass production – CO2 UNFCCC 2017 Review: country-specific method is used to estimate CO2 emissions from glass production	2019	closed (Resolved)

Sector	Detail	Review Year	Status
7 KP LULUCF	Inconsistency between total areas at the end of the current inventory year in CRF table NIR-2 and this reported in tables 4(KP-I)A.1, 4(KP-I)A.2 and 4(KP-I)B.1	2018	closed (Unresolved)
4 Land use, land-use change and forestry	Inconsistency between total land use areas reported in CRF table 4.1 and those reported in tables 4A – 4F Ref: HU-4-2017-0002	2018	closed (Unresolved)
2A1 Cement production	2.A.1 Cement production – CO2 IEF for 2005 used to extrapolate for earlier years	2018	closed (Resolved)
1A2a Iron and steel	1A2a - solid fuels CO2 IEF 1998-2016 is much lower than for previous years.	2018	closed (Resolved)
3D1 Direct N2O emissions from managed soils	3.D.1.1 - N input from application of inorganic fertilizers to cropland and grassland (AD, Direct N2O Emissions From Managed Soils): Irregularities in the time series have been been identified. Years flagged: 1990	2018	closed (Resolved)
7 KP LULUCF	Blank cells for information on base year of non-elected activities in CRF table Accounting	2018	closed (Partly resolved)
7 KP LULUCF	Blank cells under the KP CRF tables 4 (KP-I) C and 4 (KP-II)4	2018	closed (Resolved)
2C1 Iron and steel production	2017 reference number: HU-2C1-2017-0003. Under 2.C.1, recovery of CO2 from pig iron production is reported.	2018	closed (Resolved)
7 KP LULUCF	Inconsistency between total areas at the end of current inventory years and total areas at the end of the previous inventory year reported in CRF table NIR-2	2018	closed (Resolved)
4 Land use, land-use change and forestry	Inconsistencies between total country area at the end of the current inventory year reported in table NIR-2 and final area reported in table 4.1	2018	closed (Resolved)
4B2 Land converted to cropland	Potential error in areas for subcategory 4B 2.1 in 1996, 1997, 1999 and 2000	2018	closed (Resolved)
5B Biological treatment of solid waste	N2O emissions from 5.B.2 anaerobic digestion are reported as NE.	2018	closed (Resolved)
1AB Reference approach	Intransparent reporting in CRF table 1A(d)	2018	closed (Resolved)
5B Biological treatment of solid waste	Activity data used to calculate CH4 and N2O emissions from 5.B biological treatment of waste lower than reported activity data under Eurostat.	2018	closed (Resolved)
2G Other product manufacture and use	Activities and N2O emissions from category "2G3a Medical Applications" are reported as IE.	2018	closed (Resolved)
2F1 Refrigeration and air conditioning	2.F.1 Completeness: Data for 2014?	2018	closed (Resolved)
2F1 Refrigeration and air conditioning	2.F.1 Decrease of emissions in 2016	2018	closed (Resolved)

Sector	Detail	Review Year	Status
3D1 Direct N2O emissions from managed soils	3.D.1.2.a (Animal Manure Applied to Soils): The amount of N applied with animal manure in 3.D.1.2.a is large as compared to N managed in MMS minus N lost as NH3+NOx or leaching (inverse ratio val:0.9). Years: all	2017	closed (Partly resolved)
3B Manure management	3.B.1.4.7 - Methane conversion factor (MCF): Irregularities in the time series have been been identified. Years flagged: 2014	2017	closed (Partly resolved)
1B1 Fugitive emissions from solid fuels	Implied Emission factor for CH4 emissions in 1.B.1.a.1.i (Underground mining - Mining activities)	2017	closed (Resolved)
1B1 Fugitive emissions from solid fuels	Implied Emission factor for CH4 emissions in 1.B.1.a.1.ii (Underground mining - post mining activities)	2017	closed (Resolved)
3H Urea application	3.G.2 - Amount applied (AD): Irregularities in the time series have been been identified. Years flagged: 2009	2017	closed (Resolved)
3D2 Indirect N2O emissions from managed soils	Recalculations in category 3.D.2.1 indirect N2O emissions from atmospheric deposition	2017	closed (Resolved)
3D1 Direct N2O emissions from managed soils	3.D.1.5 - N in mineral soils that is mineralized in association with loss of soil C (AD): Irregularities in the time series have been been identified. Years flagged: 2005 2012	2017	closed (Resolved)
3A Enteric fermentation	3.A.4.6 - Population (POP): Irregularities in the time series have been been identified. Years flagged: 2010	2017	closed (Resolved)
3A Enteric fermentation	3.A.4.1 - Population (POP): Irregularities in the time series have been been identified. Years flagged: 1995 2010	2017	closed (Resolved)
0 Cross cutting	CRF Tables have not been submitted for the 15 March submission.	2017	closed (Resolved)
4B2 Land converted to cropland	Empty cells in CRF table 4(B)	2017	closed (Partly resolved)
4 Land use, land-use change and forestry	Potential typo error in reported areas	2017	closed (Partly resolved)
4 Land use, land-use change and forestry	Blank cells under the CRF tables	2017	closed (Partly resolved)
4 Land use, land-use change and forestry	Inconsistency between total land use areas reported in CRF table 4.1 and those reported in tables 4B, 4C and 4E.	2017	closed (Partly resolved)
1A3 Transport	Consumption and emissions from lubricants used in 2-stroke engines	2017	closed (Resolved)
1A3b Road transportation	Increase in the value of CH4 IEF	2017	closed (Partly resolved)
1A3a Domestic aviation	Recalculation and recommendation from TERT on military aviation	2017	closed (Resolved)
1A3b Road transportation	Recalculation of emissions	2017	closed (Resolved)
1B1 Fugitive emissions from solid fuels	Implied Emission factor for CH4 emissions in 1.B.1.a.1.iii (Underground mining - Abandoned coal mines)	2017	closed (Resolved)

Sector	Detail	Review Year	Status
1A1a Public electricity and heat production	The IEF decreased by 18% compared to 2014	2017	closed (Resolved)
2C1 Iron and steel production	The implied emission factor for CO2 emissions from 2C1d sinter shows a substantial increase.	2017	closed (Resolved)
5D Wastewater treatment and discharge	Recalculation of N2O emissions from domestic wastewater handling (5.D.1).	2017	closed (Resolved)
2F4 Aerosols	2.F.4 Aerosols (Other): Unvalid product life factor	2017	closed (Partly resolved)
2F1 Refrigeration and air conditioning	2.F.1.a Manufacture of domestic refrigeration equipment with R134a in 2015?	2017	closed (Resolved)
5A Solid waste disposal	Recalculation of CH4 emissions from 5.A.1.	2017	closed (Resolved)
7 KP LULUCF	Inconsistency between total areas at the end of current inventory years and total areas at the end of the previous inventory year reported in CRF table NIR 2	2017	closed (Resolved)
4 Land use, land-use change and forestry	Inconsistencies between total country area at the end of the current inventory year reported in table NIR2 and final area reported in table 4.1	2017	closed (Resolved)
7 KP LULUCF	Inconsistency between total areas at the end of the current inventory year in CRF table NIR 2 and this reported in table 4(KP-I)A.1	2017	closed (Resolved)
2F1 Refrigeration and air conditioning	2.F.1 Disposal loss factor values	2017	closed (Resolved)
2C1 Iron and steel production	Under 2.C.1, recovery of CO2 from pig iron production is reported	2017	closed (Partly resolved)
2C1 Iron and steel production	The change in emissions (total of 1A2a+2C1) deviates from the change in pig iron production.	2017	closed (Resolved)
7 KP LULUCF	HWP originating from the deforestation events should be reported using instantaneous oxidation following paragraph 2 (g) (v) of the Annex II of Decision 2/CMP.8	2017	closed (Resolved)

ANNEX 7. List of abbreviations and units

A7.1 Abbreviations

AED	anode effect duration in minutes
AEF	number of anode effects per cellday
Aggr.	aggregate
BOF	basic oxygen furnace
CE	current efficiency
CLRTAP	Convention on Long-range Transboundary Air Pollution
CORINAIR	CORe INventory of AIR emissions
CKD	cement kiln dust
CRF	common reporting format
EAF	electric arc furnace
EF	emission factor
ERT	expert review team
EU	European Union
ETS	Emission Trading Scheme
GDP	gross domestic product
GHG	greenhouse gas
HCSO	Hungarian Central Statistical Office
HKVSZ	Association of Cooling and Air Conditioning Businesses (Hűtő- és Klímatechnikai Vállalkozások Szövetsége)
HMBC	Hungarian Monitoring Body for Certification
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
KTI	Institute for Transport Sciences (Közlekedéstudományi Intézet Kht.)
LULUCF	land use, land-use change and forestry
LPG	liquified petroleum gas
MVM Rt.	Hungarian Power Companies Ltd.
NCV	net calorific value
NFI	National Forest Inventory
OHF	open hearth furnace
QA	quality assurance

QC	quality control
UNFCCC	United Nations Framework Convention on Climate Change

A7.2 Chemical formulas

C	carbon
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
HFCs	hydrofluorocarbons
NMVOC	non-methane volatile organic compound
N_2O	nitrous oxide
NO_x	nitrogen oxide
PFCs	perfluorocarbons
SF_6	sulphur hexafluoride
SO_2	sulphur dioxide
$CaCO_3$	calcium carbonate, limestone
$MgCO_3$	magnesium carbonate
CaO	calcium oxide, quicklime
$Ca(OH)_2$	slack lime
NH_3	ammonia
HNO_3	nitric acid
CF_4	tetrafluoromethane
C_2F_6	hexafluoroethane

A7.3 Units

PJ	petajoule (10^{15} J)
TJ	terajoule (10^{12} J)
Gg	gigagram (10^9 g)
kt	kilotonnes (1000 t)