ANNEXES

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Annex 1 Key Categories

A1.1. Description of methodology used for identifying key sources

The IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (IPCC, 2000) recommend as good practice the identification of key source categories of emissions. As a result of the adoption (Decision 13/CP.9) of the LULUCF Good Practice Guidance (IPCC, 2003) the concept of key sources has been expanded in order to cover LULUCF emissions by sources and removals by sinks. Therefore the term key category is used in order to include both sources and sinks.

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 prioritised 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).

This annex describes the key category analysis conducted for the 2007 Hungarian inventory. Good practice first requires that inventories be disaggregated into categories from which key sources and sinks may be identified. Adopting the categorization of sources/sinks that is presented in table 5.4.1 of the IPCC Good Practice Guidance for LULUCF (IPCC, 2003) analysis of key categories was conducted according to the Tier1 methodology described in the IPCC Good Practice Guidance. This approach identifies key categories from two perspectives. The first analyzes the emission contribution that each category makes to the national total (with and without 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 and without 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 is a reasonable approximation of 90% uncertainty for the Tier 1 method of determining key categories (IPCC, 2000). 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 contribute to 95% of the cumulative total are considered quantitatively to be key. Results for these analysis are shown in *Table A1-2*, *Table A1-3*, *Table A1-4*, *Table A1-5*.

Since uncertainty estimates are not available for the LULUCF sector Tier 2 method was applied to find key categories only for source categories (without LULUCF). The required uncertainty values for source categories are listed in *Table A7-1*. The calculation was performed using the spreadsheet 6.1 described in the IPCC Good Practice Guidance (IPCC, 2000). 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 and the key source categories are identified by accounting for those that add up to 90 % of the cumulative total. Results from Tier 2 approach can be seen in *Table A1-6*, *Table A1-7.*

A1.2. Reference to the key source tables in the CRF

Table A1-1. *IPCC source/sink categories*

CRF code	IPCC Source/Sink Categories	Direct Greenhouse Gas
1. A	Stationary Combustion - Gas	CO_2
1. A	Stationary Combustion - Coal	CO_2
1. A	Stationary Combustion - Oil	CO_2
1. A	Non-CO_2 Emission from Stationary Fuel Combustion	N_2O
1. A	Non-CO_2 Emission from Stationary Fuel Combustion	CH_4
1. A	Stationary Combustion - Other Fuel	CO_2
1. A. 3	Mobile Combustion	N_2O
1. A. 3	Mobile Combustion - Other	CO_2
1. A. 3	Mobile Combustion	CH_4
1. A. 3. B	Mobile Combustion - Road Vehicles	CO_2
1. B. 1	Fugitive Emissions from Coal Mining and Handling	CH_4
1. B. 1	Fugitive Emissions from Coal Mining and Handling	CO_2
1. B. 2	Fugitive Emissions from Oil and Gas Operations (Main Source: Gas Distribution)	CH_4
1. B. 2	Fugitive Emissions from Oil and Gas Operations	CO_2
1. B. 2	Fugitive Emissions from Oil and Gas Operations	N_2O
2.	N_2O Emission from Industry	N_2O
2.	CH_4 Emission from Industry	CH_4
2. A. 1	CO_2 Emissions from Cement Production	CO_2
2. A. 2	CO_2 Emissions from Lime Production	CO_2
2. A. 3	CO_2 Emission from Limestone and Dolomit Use	CO_2
2. A. 7	CO_2 Emission from Other Mineral Products	CO_2
2. B. 1	CO_2 Emissions from Ammonia Processes	CO_2
2. B. 2	CO_2 Emissions from Nitric Acid Production	CO_2
2. C	CO_2 Emissions from Metal Production	CO_2
2. C. 3	PFCs Emissions from Industry	PFCs
2. F	Emissions from HFCs consumption	HFCs
2. F. 7	SF_6 Emissions from Electrical Equipment	SF_6
3.	N_2O Emission from Solvent and Other Product Use	N_2O
3.	CO_2 Emission from Solvent and Other Product Use	CO_2
4. A	CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4
4. B	CH_4 Emissions from Manure Management	CH_4
4. B	N_2O Emissions from Manure Management	N_2O
4. C	CH_4 Emission from Rice Cultivation	CH_4
4. D. 1	Direct N_2O Emissions from Agricultural Soils	N_2O
4. D. 2	Pasture, Range and Paddock Manure	N_2O

Table A1-1. *IPCC source/sink categories*

CRF code	IPCC Source/Sink Categories	Direct Greenhouse Gas
4. D. 3	Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O
4. F	Field Burning of Agricultural Residues	N_2O
4. F	Field Burning of Agricultural Residues	CH_4
5. A. 1	Forest Land Remaining Forest Land	CO_2
5. A. 1	Forest Land Remaining Forest Land	CH_4
5. A. 1	Forest Land Remaining Forest Land	N_2O
5. A. 2	Conversion to Forest Land	CO_2
5. B. 1	Croplands Remaining Croplands	CO_2
6. A	CH_4 Emissions from Solid Waste Disposal Sites	CH_4
6. B	Emissions from Wastewater Handling	CH_4
6. B	Emissions from Wastewater Handling	N_2O
6. C	Non-biogenic CO_2 from Waste	CO_2
6. C	Emissions from Waste Incineration	N_2O

A1.3. Results of the key category analysis

Table A1-2. *Key Categories without LULUCF, Tier 1 Level Assessment*

IPCC Categories	Direct Greenhouse Gas	Emission (Gg)	Emission (Gg CO_2 eq.)	Level Assessment	Cumulative Total
Stationary Combustion - Gas	**CO_2**	**23 953.47**	**23 953.47**	**0.315**	**0.315**
Stationary Combustion - Coal	**CO_2**	**12 575.90**	**12 575.90**	**0.166**	**0.481**
Mobile Combustion - Road Vehicles	**CO_2**	**12 233.23**	**12 233.23**	**0.161**	**0.642**
Stationary Combustion - Oil	**CO_2**	**4 677.07**	**4 677.07**	**0.062**	**0.704**
Direct N_2O Emissions from Agricultural Soils	**N_2O**	**10.49**	**3 250.86**	**0.043**	**0.746**
CH_4 Emissions from Solid Waste Disposal Sites	**CH_4**	**140.74**	**2 955.58**	**0.039**	**0.785**
Indirect N_2O Emissions from Nitrogen Used in Agriculture	**N_2O**	**7.26**	**2 249.25**	**0.030**	**0.815**
Fugitive Emissions from Oil and Gas Operations (Main Source: Gas Distribution)	**CH_4**	**98.35**	**2 065.42**	**0.027**	**0.842**
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	**CH_4**	**74.45**	**1 563.54**	**0.021**	**0.863**
CO_2 Emissions from Cement Production	**CO_2**	**1 328.10**	**1 328.10**	**0.017**	**0.880**
N_2O Emissions from Manure Management	**N_2O**	**3.61**	**1 118.64**	**0.015**	**0.895**
CH_4 Emissions from Manure Management	**CH_4**	**52.23**	**1 096.90**	**0.014**	**0.909**
N_2O Emission from Industry	**N_2O**	**2.92**	**905.67**	**0.012**	**0.921**
CO_2 Emissions from Ammonia Processes	**CO_2**	**844.50**	**844.50**	**0.011**	**0.933**
Emissions from HFCs consumption	**HFCs**	**----**	**614.50**	**0.008**	**0.941**
Emissions from Wastewater Handling	**CH_4**	**26.48**	**556.07**	**0.007**	**0.948**
Non-CO_2 Emission from Stationary Fuel Combustion	**N_2O**	**1.41**	**438.59**	**0.006**	**0.954**
CO_2 Emission from Other Mineral Products	CO_2	433.71	433.71	0.006	0.959
Non-biogenic CO_2 from Waste	CO_2	388.12	388.12	0.005	0.965
Mobile Combustion	N_2O	1.24	385.07	0.005	0.970
CO_2 Emission from Limestone and Dolomit Use	CO_2	328.61	328.61	0.004	0.974

Table A1-2. *Key Categories without LULUCF, Tier 1 Level Assessment*

IPCC Categories	Direct Greenhouse Gas	Emission (Gg)	Emission (Gg CO_2 eq.)	Level Assessment	Cumulative Total
CO_2 Emissions from Lime Production	CO_2	300.75	300.75	0.004	0.978
CO_2 Emissions from Metal Production	CO_2	290.10	290.10	0.004	0.982
Non-CO_2 Emission from Stationary Fuel Combustion	CH_4	10.97	230.41	0.003	0.985
Emissions from Wastewater Handling	N_2O	0.66	205.94	0.003	0.987
Mobile Combustion - Other	CO_2	188.60	188.60	0.002	0.990
Pasture, Range and Paddock Manure	N_2O	0.60	186.93	0.002	0.992
SF_6 Emissions from Electrical Equipment	SF_6	----	171.65	0.002	0.995
N_2O Emission from Solvent and Other Product Use	N_2O	0.28	86.52	0.001	0.996
Fugitive Emissions from Oil and Gas Operations	CO_2	76.97	76.97	0.001	0.997
CO_2 Emission from Solvent and Other Product Use	CO_2	71.57	71.57	0.001	0.998
Stationary Combustion - Other Fuel	CO_2	61.10	61.10	0.001	0.999
Emissions from Waste Incineration	N_2O	0.097	30.18	0.000	0.999
Mobile Combustion	CH_4	1.30	27.25	0.000	0.999
Fugitive Emissions from Coal Mining and Handling	CH_4	1.08	22.69	0.000	1.000
CH_4 Emission from Industry	CH_4	0.78	16.46	0.000	1.000
CH_4 Emission from Rice Cultivation	CH_4	0.52	10.99	0.000	1.000
PFCs Emissions from Industry	PFCs	----	2.38	0.000	1.000
Fugitive Emissions from Oil and Gas Operations	N_2O	0.00	0.24	0.000	1.000
Fugitive Emissions from Coal Mining and Handling	CO_2	NO		0.000	1.000
CO_2 Emissions from Nitric Acid Production	CO_2	NO		0.000	1.000
Field Burning of Agricultural Residues	CH_4	NA,NO		0.000	1.000
Field Burning of Agricultural Residues	N_2O	NA,NO		0.000	1.000

Table A1-3. *Key Categories with LULUCF, Tier 1 Level Assessment*

IPCC Categories	Direct Greenhouse Gas	Net Emission (Gg)	Net Emission (Gg CO_2 eq.)	Net Emission – Absolute Value (Gg CO_2 eq.)	Level Assessment	Cumulative Total
Stationary Combustion - Gas	**CO_2**	**23 953.47**	**23 953.47**	**23 953.47**	**0.299**	**0.299**
Stationary Combustion - Coal	**CO_2**	**12 575.90**	**12 575.90**	**12 575.90**	**0.157**	**0.455**
Mobile Combustion - Road Vehicles	**CO_2**	**12 233.23**	**12 233.23**	**12 233.23**	**0.152**	**0.608**
Stationary Combustion - Oil	**CO_2**	**4 677.07**	**4 677.07**	**4 677.07**	**0.058**	**0.666**
Forest Land Remaining Forest Land	**CO_2**	**-4 094.32**	**-4 094.32**	**4 094.32**	**0.051**	**0.717**
Direct N_2O Emissions from Agricultural Soils	**N_2O**	**10.49**	**3 250.86**	**3 250.86**	**0.041**	**0.758**
CH_4 Emissions from Solid Waste Disposal Sites	**CH_4**	**140.74**	**2 955.58**	**2 955.58**	**0.037**	**0.794**
Indirect N_2O Emissions from Nitrogen Used in Agriculture	**N_2O**	**7.26**	**2 249.25**	**2 249.25**	**0.028**	**0.822**
Fugitive Emissions from Oil and Gas Operations (Main Source: Gas Distribution)	**CH_4**	**98.35**	**2 065.42**	**2 065.42**	**0.026**	**0.848**
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	**CH_4**	**74.45**	**1 563.54**	**1 563.54**	**0.019**	**0.868**
CO_2 Emissions from Cement Production	**CO_2**	**1 328.10**	**1 328.10**	**1 328.10**	**0.017**	**0.884**
N_2O Emissions from Manure Management	**N_2O**	**3.61**	**1 118.64**	**1 118.64**	**0.014**	**0.898**
CH_4 Emissions from Manure Management	**CH_4**	**52.23**	**1 096.90**	**1 096.90**	**0.014**	**0.912**
N_2O Emission from Industry	**N_2O**	**2.92**	**905.67**	**905.67**	**0.011**	**0.923**
CO_2 Emissions from Ammonia Processes	**CO_2**	**844.50**	**844.50**	**844.50**	**0.011**	**0.934**
Emissions from HFCs consumption	**HFCs**	**----**	**614.50**	**614.50**	**0.008**	**0.941**
Emissions from Wastewater Handling	**CH_4**	**26.48**	**556.07**	**556.07**	**0.007**	**0.948**
Non-CO_2 Emission from Stationary Fuel Combustion	**N_2O**	**1.41**	**438.59**	**438.59**	**0.005**	**0.954**
CO_2 Emission from Other Mineral Products	CO_2	433.71	433.71	433.71	0.005	0.959
Non-biogenic CO_2 from Waste	CO_2	388.12	388.12	388.12	0.005	0.964
Mobile Combustion	N_2O	1.24	385.07	385.07	0.005	0.969

Table A1-3. *Key Categories with LULUCF, Tier 1 Level Assessment*

IPCC Categories	Direct Greenhouse Gas	Net Emission (Gg)	Net Emission (Gg CO_2 eq.)	Net Emission – Absolute Value (Gg CO_2 eq.)	Level Assessment	Cumulative Total
CO_2 Emission from Limestone and Dolomit Use	CO_2	328.61	328.61	328.61	0.004	0.973
CO_2 Emissions from Lime Production	CO_2	300.75	300.75	300.75	0.004	0.977
CO_2 Emissions from Metal Production	CO_2	290.10	290.10	290.10	0.004	0.980
Non-CO_2 Emission from Stationary Fuel Combustion	CH_4	10.97	230.41	230.41	0.003	0.983
Emissions from Wastewater Handling	N_2O	0.66	205.94	205.94	0.003	0.986
Mobile Combustion - Other	CO_2	188.60	188.60	188.60	0.002	0.988
Pasture, Range and Paddock Manure	N_2O	0.60	186.93	186.93	0.002	0.990
SF_6 Emissions from Electrical Equipment	SF_6	----	171.65	171.65	0.002	0.992
Land converted Forest Land	CO_2	-120.89	-120.89	120.89	0.002	0.994
N_2O Emission from Solvent and Other Product Use	N_2O	0.28	86.52	86.52	0.001	0.995
Fugitive Emissions from Oil and Gas Operations	CO_2	76.97	76.97	76.97	0.001	0.996
CO_2 Emission from Solvent and Other Product Use	CO_2	71.57	71.57	71.57	0.001	0.997
Stationary Combustion - Other Fuel	CO_2	61.10	61.10	61.10	0.001	0.998
Cropland Remaining Cropland	CO_2	50.61	50.61	50.61	0.001	0.998
Emissions from Waste Incineration	N_2O	0.097	30.18	30.18	0.000	0.999
Mobile Combustion	CH_4	1.30	27.25	27.25	0.000	0.999
Forest Land Remaining Forest Land	CH_4	1.17	24.56	24.56	0.000	0.999
Fugitive Emissions from Coal Mining and Handling	CH_4	1.08	22.69	22.69	0.000	1.000
CH_4 Emission from Industry	CH_4	0.78	16.46	16.46	0.000	1.000
CH_4 Emission from Rice Cultivation	CH_4	0.52	10.99	10.99	0.000	1.000
Forest Land Remaining Forest Land	N_2O	0.01	2.49	2.49	0.000	1.000
PFCs Emissions from Industry	PFCs	----	2.38	2.38	0.000	1.000

Table A1-3. *Key Categories with LULUCF, Tier 1 Level Assessment*

IPCC Categories	Direct Greenhouse Gas	Net Emission (Gg)	Net Emission (Gg CO_2 eq.)	Net Emission – Absolute Value (Gg CO_2 eq.)	Level Assessment	Cumulative Total
Fugitive Emissions from Oil and Gas Operations	N_2O	0.00	0.24	0.24	0.000	1.000
Fugitive Emissions from Coal Mining and Handling	CO_2	NO		0.00	0.000	1.000
CO_2 Emissions from Nitric Acid Production	CO_2	NO		0.00	0.000	1.000
Field Burning of Agricultural Residues	CH_4	NA,NO		0.00	0.000	1.000
Field Burning of Agricultural Residues	N_2O	NA,NO		0.00	0.000	1.000

Table A1-4. *Key Categories without LULUCF, Tier 1 Trend Assessment*

IPCC Categories	Direct Greenhouse Gas	Base Years (1985-87) Emission (Gg CO_2 eq.)	Current Year (2007) Emission (Gg CO_2 eq.)	Trend Assessment	% Contribution to Trend	Cumulative Total
Stationary Combustion - Gas	**CO_2**	**19 517.56**	**23 953.47**	**0.2262**	**23.7859**	**0.238**
Stationary Combustion - Coal	**CO_2**	**34 678.65**	**12 575.90**	**0.2030**	**21.3420**	**0.451**
Mobile Combustion - Road	**CO_2**	**6 807.45**	**12 233.23**	**0.1571**	**16.5237**	**0.617**
Stationary Combustion - Oil	**CO_2**	**16 628.08**	**4 677.07**	**0.1246**	**13.1032**	**0.748**
N_2O Emission from Industry	**N_2O**	**4 541.51**	**905.67**	**0.0415**	**4.3674**	**0.791**
CH_4 Emissions from Solid Waste Disposal Sites	**CH_4**	**1 917.30**	**2 955.58**	**0.0344**	**3.6147**	**0.827**
Fugitive Emissions from Oil and Gas Operations (Main Source: Gas Distribution)	**CH_4**	**1 613.47**	**2 065.42**	**0.0204**	**2.1472**	**0.849**
Direct N_2O Emissions from Agricultural Soils	**N_2O**	**6 086.13**	**3 250.86**	**0.0146**	**1.5314**	**0.864**
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	**CH_4**	**3 464.86**	**1 563.54**	**0.0141**	**1.4810**	**0.879**
Indirect N_2O Emissions from Nitrogen Used in Agriculture	**N_2O**	**4 466.05**	**2 249.25**	**0.0134**	**1.4128**	**0.893**
Emissions from HFCs consumption	**HFCs**	**1.74**	**614.50**	**0.0124**	**1.3011**	**0.906**
Fugitive Emissions from Coal Mining and Handling	**CH_4**	**923.01**	**22.69**	**0.0117**	**1.2299**	**0.918**
N_2O Emissions from Manure Management	**N_2O**	**2 482.76**	**1 118.64**	**0.0101**	**1.0649**	**0.929**
CH_4 Emissions from Manure Management	**CH_4**	**2 399.03**	**1 096.90**	**0.0095**	**0.9951**	**0.939**
CO_2 Emissions from Ammonia Processes	**CO_2**	**1 995.97**	**844.50**	**0.0092**	**0.9724**	**0.949**
Mobile Combustion - Other	**CO_2**	**814.36**	**188.60**	**0.0069**	**0.7276**	**0.956**
Non-biogenic CO_2 from Waste	CO_2	97.62	388.12	0.0065	0.6881	0.963
Mobile Combustion	N_2O	112.10	385.07	0.0063	0.6616	0.970
CO_2 Emissions from Cement Production	CO_2	1 765.31	1 328.10	0.0035	0.3728	0.973
CO_2 Emission from Limestone and Dolomit Use	CO_2	248.68	328.61	0.0034	0.3527	0.977
Non-CO_2 Emissions from Stationary Fuel Combustion	CH_4	577.01	230.41	0.0030	0.3102	0.980

Table A1-4. *Key Categories without LULUCF, Tier 1 Trend Assessment*

IPCC Categories	Direct Greenhouse Gas	Base Years (1985-87) Emission (Gg CO_2 eq.)	Current Year (2007) Emission (Gg CO_2 eq.)	Trend Assessment	% Contribution to Trend	Cumulative Total
CO_2 Emissions from Metal Processes	CO_2	641.57	290.10	0.0026	0.2730	0.983
SF_6 Emissions from Electrical Equipment	SF_6	70.15	171.65	0.0025	0.2670	0.985
CO_2 Emissions from Lime Production	CO_2	645.03	300.75	0.0024	0.2552	0.988
PFCs Emissions	PFCs	166.82	2.38	0.0021	0.2259	0.990
N_2O Emission from Solvent and Other Product Use	N_2O	253.77	86.52	0.0016	0.1679	0.992
Non-CO_2 Emissions from Stationary Fuel Combustion	N_2O	790.15	438.59	0.0016	0.1637	0.993
Emissions from Wastewater Handling	N_2O	207.70	205.94	0.0014	0.1493	0.995
Pasture, Range and Paddock Manure	N_2O	390.92	186.93	0.0014	0.1448	0.996
Fugitive Emissions from Oil and Gas Operations	CO_2	195.68	76.97	0.0010	0.1077	0.997
N_2O Emissions from Waste Incineration	N_2O	3.65	30.18	0.0006	0.0590	0.998
Stationary Combustion - Other Fuel	CO_2	51.32	61.10	0.0006	0.0585	0.999
CH_4 Emission from Rice Cultivation	CH_4	50.54	10.99	0.0004	0.0467	0.999
CO_2 Emission from Other Mineral Products	CO_2	642.13	433.71	0.0003	0.0309	0.999
CO_2 Emission from Solvent and Other Product Use	CO_2	130.36	71.57	0.0003	0.0287	1.000
CH_4 Emission from Industry	CH_4	7.84	16.46	0.0002	0.0241	1.000
Emissions from Wastewater Handling	CH_4	847.03	556.07	0.0001	0.0067	1.000
Mobile Combustion	CH_4	45.35	27.25	0.0000	0.0050	1.000
Fugitive Emissions from Oil and Gas Operations	N_2O	0.60	0.24	0.0000	0.0003	1.000
Fugitive Emissions from Coal Mining and Handling	CO_2	3.60			0.0000	1.000
CO_2 Emissions from Nitric Acid Production	CO_2	0.08			0.0000	1.000
Field Burning of Agricultural Residues	CH_4	45.51			0.0000	1.000
Field Burning of Agricultural Residues	N_2O	13.34			0.0000	1.000

Table A1-5. *Key Categories with LULUCF, Tier 1 Trend Assessment*

IPCC Categories	Direct Greenhouse Gas	Base Years (1985-87) Emission (Gg CO_2 eq.)	Base Years (1985-87) Emission – Abs. Value (Gg CO_2 eq.)	Current Year (2007) Emission (Gg CO_2 eq.)	Current Year (2007) Emission – Abs. Value (Gg CO_2 eq.)	Trend Assess-ment	Contribu-tion to Trend %	Cumula-tive Total
Stationary Combustion - Gas	**CO_2**	**19 517.56**	**19 517.56**	**23 953.47**	**23 953.47**	**0.2032**	**21.8952**	**0.219**
Stationary Combustion - Coal	**CO_2**	**34 678.65**	**34 678.65**	**12 575.90**	**12 575.90**	**0.1978**	**21.3069**	**0.432**
Mobile Combustion - Road	**CO_2**	**6 807.45**	**6 807.45**	**12 233.23**	**12 233.23**	**0.1432**	**15.4251**	**0.586**
Stationary Combustion - Oil	**CO_2**	**16 628.08**	**16 628.08**	**4 677.07**	**4 677.07**	**0.1201**	**12.9332**	**0.716**
N_2O Emission from Industry	**N_2O**	**4 541.51**	**4 541.51**	**905.67**	**905.67**	**0.0397**	**4.2789**	**0.758**
Forest Land Remaining Forest Land	**CO_2**	**-3 393.03**	**3 393.03**	**-4 094.32**	**4 094.32**	**0.0340**	**3.6661**	**0.795**
CH_4 Emissions from Solid Waste Disposal Sites	**CH_4**	**1 917.30**	**1 917.30**	**2 955.58**	**2 955.58**	**0.0312**	**3.3608**	**0.829**
Fugitive Emissions from Oil and Gas Operations (Main Source: Gas Distribution)	**CH_4**	**1 613.47**	**1 613.47**	**2 065.42**	**2 065.42**	**0.0184**	**1.9812**	**0.848**
Direct N_2O Emissions from Agricultural Soils	**N_2O**	**6 086.13**	**6 086.13**	**3 250.86**	**3 250.86**	**0.0153**	**1.6434**	**0.865**
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	**CH_4**	**3 464.86**	**3 464.86**	**1 563.54**	**1 563.54**	**0.0140**	**1.5123**	**0.880**
Indirect N_2O Emissions from Nitrogen Used in Agriculture	**N_2O**	**4 466.05**	**4 466.05**	**2 249.25**	**2 249.25**	**0.0137**	**1.4796**	**0.895**
Emissions from HFCs consumption	**HFCs**	**1.74**	**1.74**	**614.50**	**614.50**	**0.0114**	**1.2316**	**0.907**
Fugitive Emissions from Coal Mining and Handling	**CH_4**	**923.01**	**923.01**	**22.69**	**22.69**	**0.0111**	**1.1937**	**0.919**
N_2O Emissions from Manure Management	**N_2O**	**2 482.76**	**2 482.76**	**1 118.64**	**1 118.64**	**0.0101**	**1.0871**	**0.930**
CH_4 Emissions from Manure Management	**CH_4**	**2 399.03**	**2 399.03**	**1 096.90**	**1 096.90**	**0.0095**	**1.0183**	**0.940**
CO_2 Emissions from Ammonia Processes	**CO_2**	**1 995.97**	**1 995.97**	**844.50**	**844.50**	**0.0091**	**0.9840**	**0.950**
Mobile Combustion - Other	**CO_2**	**814.36**	**814.36**	**188.60**	**188.60**	**0.0066**	**0.7147**	**0.957**
Non-biogenic CO_2 from Waste	CO_2	97.62	97.62	388.12	388.12	0.0060	0.6483	0.964
Mobile Combustion	N_2O	112.10	112.10	385.07	385.07	0.0058	0.6227	0.970
CO_2 Emission from Limestone and Dolomit Use	CO_2	248.68	248.68	328.61	328.61	0.0030	0.3260	0.973

Table A1-5. *Key Categories with LULUCF, Tier 1 Trend Assessment*

IPCC Categories	Direct Greenhouse Gas	Base Years (1985-87) Emission (Gg CO_2 eq.)	Base Years (1985-87) Emission – Abs. Value (Gg CO_2 eq.)	Current Year (2007) Emission (Gg CO_2 eq.)	Current Year (2007) Emission – Abs. Value (Gg CO_2 eq.)	Trend Assess-ment	Contribu-tion to Trend %	Cumula-tive Total
Non-CO_2 Emissions from Stationary Fuel Combustion	CH_4	577.01	577.01	230.41	230.41	0.0029	0.3120	0.976
CO_2 Emissions from Cement Production	CO_2	1 765.31	1 765.31	1 328.10	1 328.10	0.0028	0.2968	0.979
CO_2 Emissions from Metal Processes	CO_2	641.57	641.57	290.10	290.10	0.0026	0.2788	0.982
CO_2 Emissions from Lime Production	CO_2	645.03	645.03	300.75	300.75	0.0024	0.2621	0.985
SF_6 Emissions from Electrical Equipment	SF_6	70.15	70.15	171.65	171.65	0.0023	0.2505	0.987
PFCs Emissions	PFCs	166.82	166.82	2.38	2.38	0.0020	0.2192	0.989
Non-CO_2 Emissions from Stationary Fuel Combustion	N_2O	790.15	790.15	438.59	438.59	0.0017	0.1801	0.991
N_2O Emission from Solvent and Other Product Use	N_2O	253.77	253.77	86.52	86.52	0.0016	0.1670	0.993
Pasture, Range and Paddock Manure	N_2O	390.92	390.92	186.93	186.93	0.0014	0.1495	0.994
Emissions from Wastewater Handling	N_2O	207.70	207.70	205.94	205.94	0.0013	0.1347	0.996
Fugitive Emissions from Oil and Gas Operations	CO_2	195.68	195.68	76.97	76.97	0.0010	0.1082	0.997
N_2O Emissions from Waste Incineration	N_2O	3.65	3.65	30.18	30.18	0.0005	0.0557	0.997
Stationary Combustion - Other Fuel	CO_2	51.32	51.32	61.10	61.10	0.0005	0.0538	0.998
Land converted Forest Land	CO_2	-141.79	141.79	-120.89	120.89	0.0005	0.0524	0.998
CH_4 Emission from Rice Cultivation	CH_4	50.54	50.54	10.99	10.99	0.0004	0.0458	0.999
CO_2 Emission from Solvent and Other Product Use	CO_2	130.36	130.36	71.57	71.57	0.0003	0.0313	0.999
Cropland Remaining Cropland	CO_2	-94.16	94.16	50.61	50.61	0.0002	0.0248	0.999
CH_4 Emission from Industry	CH_4	7.84	7.84	16.46	16.46	0.0002	0.0225	1.000
Emissions from Wastewater Handling	CH_4	847.03	847.03	556.07	556.07	0.0002	0.0206	1.000
Forest Land Remaining Forest Land	CH_4	30.03	30.03	24.56	24.56	0.0001	0.0090	1.000
CO_2 Emission from Other Mineral Products	CO_2	642.13	642.13	433.71	433.71	0.0001	0.0088	1.000

Table A1-5. *Key Categories with LULUCF, Tier 1 Trend Assessment*

IPCC Categories	Direct Greenhouse Gas	Base Years (1985-87) Emission (Gg CO_2 eq.)	Base Years (1985-87) Emission – Abs. Value (Gg CO_2 eq.)	Current Year (2007) Emission (Gg CO_2 eq.)	Current Year (2007) Emission – Abs. Value (Gg CO_2 eq.)	Trend Assess-ment	Contribu-tion to Trend %	Cumula-tive Total
Mobile Combustion	CH_4	45.35	45.35	27.25	27.25	0.0001	0.0062	1.000
Forest Land Remaining Forest Land	N_2O	3.06	3.06	2.49	2.49	0.0000	0.0009	1.000
Fugitive Emissions from Oil and Gas Operations	N_2O	0.60	0.60	0.24	0.24	0.0000	0.0003	1.000
Fugitive Emissions from Coal Mining and Handling	CO_2	3.60	3.60				0.0000	1.000
CO_2 Emissions from Nitric Acid Production	CO_2	0.08	0.08				0.0000	1.000
Field Burning of Agricultural Residues	CH_4	45.51	45.51				0.0000	1.000
Field Burning of Agricultural Residues	N_2O	13.34	13.34				0.0000	1.000

Table A1-6. *Key Categories without LULUCF, Tier 2 Level Assessment*

IPCC Categories	Direct Greenhouse Gas	Base Years (1985-87) Emission (Gg CO_2 eq.)	Current Year (2007) Emission (Gg CO_2 eq.)	Activity Data Uncer-tainty	Emission Factor Uncer-tainty	Level Assess-ment with Uncertainty	Contribution to Total Uncertainty (%)	Cumulative Total (%)
Direct N_2O Emissions from Agricultural Soils	**N_2O**	**6 086.13**	**3 250.86**	**0***	**160**	**6.83**	**32.61**	**32.61**
Stationary Combustion - Gas	**CO_2**	**19 517.56**	**23 953.47**	**5**	**5**	**2.23**	**10.64**	**43.25**
Indirect N_2O Emissions from Nitrogen Used in Agriculture	**N_2O**	**4 466.05**	**2 249.25**	**0***	**69**	**2.03**	**9.69**	**52.95**
Fugitive Emissions from Oil and Gas Operations (Main Source: Gas Distribution)	**CH_4**	**1 613.47**	**2 065.42**	**2**	**50**	**1.36**	**6.49**	**59.44**
CH_4 Emissions from Solid Waste Disposal Sites	**CH_4**	**1 917.30**	**2 955.58**	**10**	**30**	**1.23**	**5.87**	**65.32**
Mobile Combustion - Road	**CO_2**	**6 807.45**	**12 233.23**	**5**	**5**	**1.14**	**5.44**	**70.75**
N_2O Emissions from Manure Management	**N_2O**	**2 482.76**	**1 118.64**	**0***	**68**	**1.00**	**4.76**	**75.51**
Stationary Combustion - Coal	**CO_2**	**34 678.65**	**12 575.90**	**2**	**5**	**0.89**	**4.26**	**79.77**
CH_4 Emissions from Manure Management	**CH_4**	**2 399.03**	**1 096.90**	**0**	**43**	**0.62**	**2.98**	**82.74**
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	**CH_4**	**3 464.86**	**1 563.54**	**0**	**28**	**0.58**	**2.76**	**85.50**
Mobile Combustion	**N_2O**	**112.10**	**385.07**	**5**	**100**	**0.51**	**2.42**	**87.92**
Pasture, Range and Paddock Manure	**N_2O**	**390.92**	**186.93**	**0***	**155**	**0.38**	**1.83**	**89.75**
Stationary Combustion - Oil	**CO_2**	**16628.08**	**4677.07**	**2**	**5**	**0.33**	**1.58**	**91.33**
Non-CO_2 Emission from Stationary Fuel Combustion	N_2O	790.15	438.59	3	50	0.29	1.38	92.71
Emissions from Wastewater Handling	CH_4	847.03	556.07	20	30	0.26	1.26	93.97
SF_6 Emissions from Electrical Equipment	SF_6	70.15	171.65	80	20	0.19	0.89	94.86
Emissions from HFCs consumption	HFCs	1.74	614.50	10	20	0.18	0.86	95.73
CO_2 Emission from Other Mineral Products	CO_2	642.13	433.71	10	30	0.18	0.86	96.59
Emissions from Wastewater Handling	N_2O	207.70	205.94	10	50	0.14	0.66	97.25
Fugitive Emissions from Oil and Gas Operations	CO_2	195.68	76.97	100	80	0.13	0.62	97.87
Non-biogenic CO_2 from Waste	CO_2	97.62	388.12	10	20	0.11	0.55	98.41
CO_2 Emissions from Cement Production	CO_2	1 765.31	1 328.10	2	2	0.05	0.24	98.65

Table A1-6. *Key Categories without LULUCF, Tier 2 Level Assessment*

IPCC Categories	Direct Greenhouse Gas	Base Years (1985-87) Emission (Gg CO_2 eq.)	Current Year (2007) Emission (Gg CO_2 eq.)	Activity Data Uncer-tainty	Emission Factor Uncer-tainty	Level Assess-ment with Uncertainty	Contribution to Total Uncertainty (%)	Cumulative Total (%)
N_2O Emissions from Waste Incineration	N_2O	3.65	30.18	5	100	0.04	0.19	98.84
CO_2 Emissions from Ammonia Processes	CO_2	1 995.97	844.50	2	2	0.03	0.15	98.99
CH_4 Emission from Rice Cultivation	CH_4	50.54	10.99	0*	217	0.03	0.15	99.14
N_2O Emission from Industry	N_2O	4 541.51	905.67	2	1	0.03	0.13	99.27
Non-CO_2 Emission from Stationary Fuel Combustion	CH_4	577.01	230.41	3	8	0.03	0.12	99.39
CO_2 Emissions from Lime Production	CO_2	645.03	300.75	5	2	0.02	0.10	99.49
CO_2 Emission from Solvent and Other Product Use	CO_2	130.36	71.57	10	20	0.02	0.10	99.59
CO_2 Emissions from Metal Production	CO_2	641.57	290.10	2	5	0.02	0.10	99.69
Mobile Combustion	CH_4	45.35	27.25	5	50	0.02	0.09	99.78
Mobile Combustion - Other	CO_2	814.36	188.60	5	5	0.02	0.08	99.86
CO_2 Emission from Limestone and Dolomit Use	CO_2	248.68	328.61	2	1	0.01	0.05	99.91
Stationary Combustion - Other Fuel	CO_2	51.32	61.10	5	10	0.01	0.04	99.95
CH_4 Emission from Industry	CH_4	7.84	16.46	1	20	0.00	0.02	99.97
Fugitive Emissions from Coal Mining and Handling	CH_4	923.01	22.69	3	10	0.00	0.01	99.99
N_2O Emission from Solvent and Other Product Use	N_2O	253.77	86.52	2	1	0.00	0.01	100.00
Fugitive Emissions from Oil and Gas Operations	N_2O	0.60	0.24	2	100	0.00	0.00	100.00
PFCs Emissions	PFCs	166.82	2.38	1	2	0.00	0.00	100.00
Fugitive Emissions from Coal Mining and Handling	CO_2	3.60		3	10	0.00	0.00	100.00
CO_2 Emissions from Nitric Acid Production	CO_2	0.08		0	0	0.00	0.00	100.00
Field Burning of Agricultural Residues	CH_4	45.51		10	100	0.00	0.00	100.00
Field Burning of Agricultural Residues	N_2O	13.34		10	200	0.00	0.00	100.00

* Only total uncertainty is known for this category and uncertainty is correlated across years, therefore uncertainty is entered into column F.

Table A1-7. *Key Categories without LULUCF, Tier 2 Trend Assessment*

IPCC Categories	Direct Greenhouse Gas	Base Years (1985-87) Emission (Gg CO_2 eq.)	Current Year (2007) Emission (Gg CO_2 eq.)	Activity Data Uncer-tainty	Emission Factor Uncer-tainty	Trend Assessment with Uncertainty	Contribution to Total Uncertainty (%)	Cumulative Total (%)
Direct N_2O Emissions from Agricultural Soils	**N_2O**	**6086.13**	**3250.86**	**0***	**160**	**2.32**	**17.06**	**17.06**
Stationary Combustion - Gas	**CO_2**	**19517.56**	**23953.47**	**5**	**5**	**1.60**	**11.74**	**28.79**
Mobile Combustion - Road	**CO_2**	**6807.45**	**12233.23**	**5**	**5**	**1.11**	**8.15**	**36.95**
Stationary Combustion - Coal	**CO_2**	**34678.65**	**12575.90**	**2**	**5**	**1.09**	**8.02**	**44.97**
CH_4 Emissions from Solid Waste Disposal Sites	**CH_4**	**1917.30**	**2955.58**	**10**	**30**	**1.09**	**7.98**	**52.94**
Fugitive Emissions from Oil and Gas Operations (Main Source: Gas Distribution)	**CH_4**	**1613.47**	**2065.42**	**2**	**50**	**1.02**	**7.50**	**60.44**
Indirect N_2O Emissions from Nitrogen Used in Agriculture	**N_2O**	**4466.05**	**2249.25**	**0***	**69**	**0.92**	**6.76**	**67.20**
N_2O Emissions from Manure Management	**N_2O**	**2482.76**	**1118.64**	**0***	**68**	**0.69**	**5.03**	**72.23**
Stationary Combustion - Oil	**CO_2**	**16628.08**	**4677.07**	**2**	**5**	**0.67**	**4.92**	**77.15**
Mobile Combustion	**N_2O**	**112.10**	**385.07**	**5**	**100**	**0.63**	**4.62**	**81.78**
CH_4 Emissions from Manure Management	**CH_4**	**2399.03**	**1096.90**	**0***	**43**	**0.41**	**3.00**	**84.77**
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	**CH_4**	**3464.86**	**1563.54**	**0***	**28**	**0.40**	**2.90**	**87.68**
Emissions from HFCs consumption	**HFCs**	**1.74**	**614.50**	**10**	**20**	**0.28**	**2.03**	**89.71**
Pasture, Range and Paddock Manure	**N_2O**	**390.92**	**186.93**	**0***	**155**	**0.21**	**1.57**	**91.28**
SF_6 Emissions from Electrical Equipment	SF_6	70.15	171.65	80	20	0.21	1.54	92.81
Non-biogenic CO_2 from Waste	CO_2	97.62	388.12	10	20	0.15	1.07	93.89
Fugitive Emissions from Oil and Gas Operations	CO_2	195.68	76.97	100	80	0.13	0.96	94.85
Fugitive Emissions from Coal Mining and Handling	CH_4	923.01	22.69	3	10	0.12	0.90	95.74
CH_4 Emission from Rice Cultivation	CH_4	50.54	10.99	0*	217	0.10	0.71	96.45
N_2O Emission from Industry	N_2O	4541.51	905.67	2	1	0.09	0.68	97.13
Non-CO_2 Emission from Stationary Fuel Combustion	N_2O	790.15	438.59	3	50	0.08	0.57	97.70

Table A1-7. *Key Categories without LULUCF, Tier 2 Trend Assessment*

IPCC Categories	Direct Greenhouse Gas	Base Years (1985-87) Emission (Gg CO_2 eq.)	Current Year (2007) Emission (Gg CO_2 eq.)	Activity Data Uncer-tainty	Emission Factor Uncer-tainty	Trend Assessment with Uncertainty	Contribution to Total Uncertainty (%)	Cumulative Total (%)
Emissions from Wastewater Handling	N_2O	207.70	205.94	10	50	0.07	0.53	98.23
N_2O Emissions from Waste Incineration	N_2O	3.65	30.18	5	100	0.06	0.41	98.65
Mobile Combustion - Other	CO_2	814.36	188.60	5	5	0.05	0.36	99.01
CO_2 Emissions from Ammonia Processes	CO_2	1995.97	844.50	2	2	0.03	0.19	99.20
Non-CO_2 Emission from Stationary Fuel Combustion	CH_4	577.01	230.41	3	8	0.03	0.18	99.38
CO_2 Emissions from Metal Production	CO_2	641.57	290.10	2	5	0.01	0.10	99.49
CO_2 Emissions from Lime Production	CO_2	645.03	300.75	5	2	0.01	0.10	99.58
CO_2 Emissions from Cement Production	CO_2	1765.31	1328.10	2	2	0.01	0.07	99.65
CO_2 Emission from Other Mineral Products	CO_2	642.13	433.71	10	30	0.01	0.07	99.72
CO_2 Emission from Limestone and Dolomit Use	CO_2	248.68	328.61	2	1	0.01	0.06	99.78
Stationary Combustion - Other Fuel	CO_2	51.32	61.10	5	10	0.01	0.05	99.82
CO_2 Emission from Solvent and Other Product Use	CO_2	130.36	71.57	10	20	0.01	0.04	99.87
PFCs Emissions	PFCs	166.82	2.38	1	2	0.00	0.04	99.90
CH_4 Emission from Industry	CH_4	7.84	16.46	1	20	0.00	0.03	99.94
N_2O Emission from Solvent and Other Product Use	N_2O	253.77	86.52	2	1	0.00	0.03	99.96
Mobile Combustion	CH_4	45.35	27.25	5	50	0.00	0.02	99.98
Emissions from Wastewater Handling	CH_4	847.03	556.07	20	30	0.00	0.02	100.00
Fugitive Emissions from Oil and Gas Operations	N_2O	0.60	0.24	2	100	0.00	0.00	100.00
Fugitive Emissions from Coal Mining and Handling	CO_2	3.60		3	10	0.00	0.00	100.00
CO_2 Emissions from Nitric Acid Production	CO_2	0.08		0	0	0.00	0.00	100.00
Field Burning of Agricultural Residues	CH_4	45.51		10	100	0.00	0.00	100.00
Field Burning of Agricultural Residues	N_2O	13.34		10	200	0.00	0.00	100.00

* Only total uncertainty is known for this category and uncertainty is correlated across years, therefore uncertainty is entered into column F.

A1.4. Summary assessment

Table A1-8. *Key category analysis summary – without LULUCF*

KEY CATEGORY ANALYSIS SUMMARY – WITHOUT LULUCF				
Quantitative Method Used: [X] **Tier 1** [X] **Tier 2**				
A	**B**	**C**	**D**	**E**
IPCC Source Categories	**Direct Greenhouse Gas**	**Key Source Category Flag (Yes or No)**	**If C Yes. Criteria for Identification**	**Comments**
1. Energy				
Stationary Combustion - Gas	CO_2	Yes	Level 1, Trend 1 Level 2, Trend 2	
Stationary Combustion - Coal	CO_2	Yes	Level 1, Trend 1 Level 2, Trend2	
Stationary Combustion - Oil	CO_2	Yes	Level 1, Trend 1 Level 2, Trend 2	
Non-CO_2 Emissions from Stationary Fuel Combustion	N_2O	Yes	Level 1 Level 2	
Non-CO_2 Emissions from Fuel Combustion	CH_4	No		
Stationary Combustion - Other Fuel	CO_2	No		
Mobile Combustion	N_2O	Yes	Level 2, Trend 2	
Mobile Combustion - Other	CO_2	Yes	Trend 1	
Mobile Combustion	CH_4	No		
Mobile Combustion - Road	CO_2	Yes	Level 1, Trend 1 Level 2, Trend 2	
Fugitive Emissions from Coal Mining and Handling	CO_2	No		
Fugitive Emissions from Coal Mining and Handling	CH_4	Yes	Trend 1	
Fugitive Emissions from Oil and Gas Operations	CO_2	No		
Fugitive Emissions from Oil and Gas Operations	CH_4	Yes	Level 1, Trend 1 Level 2, Trend 2	Main Source: Gas Distribution
Fugitive Emissions from Oil and Gas Operations	N_2O			
2. Industrial Processes				
N_2O Emission from Industry	N_2O	Yes	Level 1, Trend 1	
CH_4 Emission from Industry	CH_4	No		
CO_2 Emissions from Cement Production	CO_2	Yes	Level 1	
CO_2 Emissions from Lime Production	CO_2	No		
CO_2 Emission from Limestone and Dolomit Use	CO_2	No		
CO_2 Emission from Other Mineral Products	CO_2	No		

Table A1-8. *Key category analysis summary – without LULUCF*

KEY CATEGORY ANALYSIS SUMMARY – WITHOUT LULUCF				
Quantitative Method Used: [X] **Tier 1** [X] **Tier 2**				
A	**B**	**C**	**D**	**E**
IPCC Source Categories	**Direct Greenhouse Gas**	**Key Source Category Flag (Yes or No)**	**If C Yes. Criteria for Identification**	**Comments**
2. Industrial Processes				
CO_2 Emissions from Ammonia Processes	CO_2	Yes	Level 1, Trend 1	
CO_2 Emissions from Metal Production	CO_2	No		
PFCs Emissions	PFCs	No		
Emissions from HFCs consumption	HFCs	Yes	Level 1, Trend 1 Trend 2	
SF_6 Emissions from Electrical Equipment	SF_6	No		
3. Solvent and Other Product Use				
CO_2 Emission from Solvent and Other Product Use	CO_2	No		
N_2O Emission from Solvent and Other Product Use	N_2O	No		
4. Agriculture				
CH_4 Emissions from Enteric Fermentation in Domestic	CH_4	Yes	Level 1, Trend 1 Level 2, Trend 2	
CH_4 Emissions from Manure Management	CH_4	Yes	Level 1, Trend 1 Level 2, Trend2	
N_2O Emissions from Manure Management	N_2O	Yes	Level 1, Trend 1 Level 2, Trend 2	
CH_4 Emission from Rice Cultivation	CH_4	No		
Direct N_2O Emissions from Agricultural Soils	N_2O	Yes	Level 1, Trend 1 Level 2, Trend 2	
Pasture, Range and Paddock Manure	N_2O	Yes	Level 2, Trend 2	
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	Yes	Level 1, Trend 1 Level 2, Trend 2	
Field Burning of Agricultural Residues	CH_4	No		
Field Burning of Agricultural Residues	N_2O	No		
6. Waste				
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	Yes	Level 1, Trend 1 Level 2, Trend 2	
Emissions from Wastewater Handling	CH_4	Yes	Level 1	
Emissions from Wastewater Handling	N_2O	No		
Non-biogenic CO_2 from Waste	CO_2	No		
N_2O Emissions from Waste Incineration	N_2O	No		

Table A1-9. *Key category analysis summary – with LULUCF*

SOURCE CATEGORY ANALYSIS SUMMARY – WITH LULUCF				
Quantitative Method Used: ☒ **Tier 1** ☐ **Tier 2**				
A	**B**	**C**	**D**	**E**
IPCC Source Categories	**Direct Greenhouse Gas**	**Key Source Category Flag (Yes or No)**	**If C Yes. Criteria for Identification**	**Comments**
1. Energy				
Stationary Combustion - Gas	CO_2	Yes	Level 1, Trend 1	
Stationary Combustion - Coal	CO_2	Yes	Level 1, Trend 1	
Stationary Combustion - Oil	CO_2	Yes	Level 1, Trend 1	
Non-CO_2 Emissions from Stationary Fuel Combustion	N_2O	Yes	Level 1	
Non-CO_2 Emissions from Fuel Combustion	CH_4	No		
Stationary Combustion - Other Fuel	CO_2	No		
Mobile Combustion	N_2O	No		
Mobile Combustion - Other	CO_2	Yes	Trend 1	
Mobile Combustion	CH_4	No		
Mobile Combustion - Road	CO_2	Yes	Level 1, Trend 1	
Fugitive Emissions from Coal Mining and Handling	CO_2	No		
Fugitive Emissions from Coal Mining and Handling	CH_4	Yes	Trend 1	
Fugitive Emissions from Oil and Gas Operations	CO_2	No		
Fugitive Emissions from Oil and Gas Operations	CH_4	Yes	Level 1, Trend 1	Main Source: Gas Distribution
Fugitive Emissions from Oil and Gas Operations	N_2O	No		
2. Industrial Processes				
N_2O Emission from Industry	N_2O	Yes	Level 1, Trend 1	
CH_4 Emission from Industry	CH_4	No		
CO_2 Emissions from Cement Production	CO_2	Yes	Level 1	
CO_2 Emissions from Lime Production	CO_2	No		
CO_2 Emission from Limestone and Dolomit Use	CO_2	No		
CO_2 Emission from Other Mineral Products	CO_2	No		
CO_2 Emissions from Ammonia Processes	CO_2	Yes	Level 1, Trend 1	
CO_2 Emissions from Metal Production	CO_2	No		

Table A1-9. *Key category analysis summary – with LULUCF*

SOURCE CATEGORY ANALYSIS SUMMARY – WITH LULUCF				
Quantitative Method Used: ☒ **Tier 1** ☐ **Tier 2**				
A	**B**	**C**	**D**	**E**
IPCC Source Categories	**Direct Greenhouse Gas**	**Key Source Category Flag (Yes or No)**	**If C Yes. Criteria for Identification**	**Comments**
2. Industrial Processes				
PFCs Emissions	PFCs	No		
Emissions from Substitutes for Ozone Depleting Substances	HFCs	Yes	Level 1, Trend 1	
SF_6 Emissions from Electrical Equipment	SF_6	No		
3. Solvent and Other Product Use				
CO_2 Emission from Solvent and Other Product Use	CO_2	No		
N_2O Emission from Solvent and Other Product Use	N_2O	No		
4. Agriculture				
CH_4 Emissions from Enteric Fermentation in Domestic	CH_4	Yes	Level 1, Trend 1	
CH_4 Emissions from Manure Management	CH_4	Yes	Level 1, Trend 1	
N_2O Emissions from Manure Management	N_2O	Yes	Level 1, Trend 1	
CH_4 Emission from Rice Cultivation	CH_4	No		
Direct N_2O Emissions from Agricultural Soils	N_2O	Yes	Level 1, Trend 1	
Pasture, Range and Paddock Manure	N_2O	No		
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	Yes	Level 1, Trend 1	
Field Burning of Agricultural Residues	CH_4	No		
N_2O Emissions from Agricultural Residue Buming	N_2O	No		
5. Land Use. Land-Use Change and Forestry				
Forest Land Remaining Forest Land	CO_2	Yes	Level 1, Trend 1	
Forest Land Remaining Forest Land	CH_4	No		
Forest Land Remaining Forest Land	N_2O	No		
Conversion to Forest Land	CO_2	No		
Croplands Remaining Croplands	CO_2	No		
6. Waste				
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	Yes	Level 1, Trend 1	
Emissions from Wastewater Handling	CH_4	Yes	Level 1	

Table A1-9. *Key category analysis summary – with LULUCF*

SOURCE CATEGORY ANALYSIS SUMMARY – WITH LULUCF				
Quantitative Method Used: ☒ **Tier 1** ☐ **Tier 2**				
A	**B**	**C**	**D**	**E**
IPCC Source Categories	**Direct Greenhouse Gas**	**Key Source Category Flag (Yes or No)**	**If C Yes. Criteria for Identification**	**Comments**
6. Waste				
Emissions from Wastewater Handling	N_2O	No		
Non-biogenic CO_2 from Waste	CO_2	No		
N_2O Emissions from Waste Incineration	N_2O	No		

A1.5. References

Intergovernmental Panel on Climate Change (IPCC), 2000: Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories. *Intergovernmental Panel on Climate Change National Greenhouse Gas Inventories Programme*. Institute for Global Environmental Strategies, Japan.
Available online at: http://www.ipcc-nggip.iges.or.jp/public/gp/english/

Intergovernmental Panel on Climate Change (IPCC), 2003: Good practice guidance for Land Use, Land Use Change and Forestry. *Intergovernmental Panel on Climate Change National Greenhouse Gas Inventories Programme*. Institute for Global Environmental Strategies, Japan.
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Annex 2 Detailed discussion of methodology and data for estimating CO_2 emissions from fossil fuel combustion

A2.1. Fuel Consumption Data

The GHG emission calculations of fossil fuel combustion are based on the Hungarian energy balance prepared by Energia Központ Kht. The summary table of the energy balance for 2007 can be seen in *Table A2-4***.**
Energia Központ Kht. collects fuel consumption data from users and prepares the energy balance and other statistics. Independent experts check the raw data of the energy balance and they compare them with energy consumption data from other sources (e.g. data from MVM Rt.). After the quality check the Energy Statistics is published.
The energy statistics has a chapter about the energy carries balances by branches. Nowadays, division into branches (*Table A2-1*) follows mainly the structure of ISIC 3.1. Detailed EU-conform statistics from industrial and energy industrial activities help to compile the *sectoral approach*.

Branches	ISIC 3.1 code	IPCC code as treated in the Hungarian inventory
Manufacture of food, beverage and tobacco products	DA	1.AA.2.E
Man. of textiles and textile products	DB	1.AA.2.F
Man. of leather and leather products	DC	1.AA.2.F
Man. of wood and wood products	DD	1.AA.2.F
Man. of pulp, paper and paper products	DE	1.AA.2.D
Man of coke, refined petroleum products	DF	1.AA.1.B and 1.AA.1.C
Man. of chemicals, chemical products	DG	1.AA.2.C
Man. of rubber and plastic products	DH	1.AA.2.C
Man. of other non-metallic mineral products	DI	1.AA.2.B
Man. of basic metals and fabricated metal products	DJ	1.AA.2.A
Man. of machinery and equipment n.e.c.	DK	1.AA.2.F
Man. of electrtical and optical equipment	DL	1.AA.2.F
Manufacture of transport equipment	DM	1.AA.2.F
Manufacturing n.e.c.	DN	1.AA.2.F
Total of manufacture industries	*D*	
Mining and Quarrying	C	1.AA.2.F
Electr., Gas, Steam and Hot Water Supply	E40	1.AA.1.A and 1.AA.4.A
Water Management	E41	1.AA.4.A
Total Industry		
Construction	F	1.AA.2.F
Agriculture	A 01	1.AA.4.C
Forestry and Logging	A 02	1.AA.4.C
Agriculture, Forestry and Logging	*A*	
Transport and Storage	I 60–63	1.AA.4.A
Communications	I 64	1.AA.4.A
Transport, Storage and Communication	*I*	
Residential	P	1.AA.4.B
Public Services and Commerce *	G, H, J–O	1.AA.4.A
Total Inland Consumption		

Table A2-1. *Categories in the energy carries balances of the Energy Statistics*
* included Real estate activities, Public administration and Sewage and refuse disposal sections

A2.2. EU-ETS Data

In January 2005 the European Union Greenhouse Gas Emission Trading Scheme (EU-ETS) commenced operation as the largest multi-country, multi-sector Greenhouse Gas emission trading scheme world-wide. The scheme is based on Directive 2003/87/EC, which entered into force on 25 October 2003 in the EU. This law came into force in the Hungarian legal system in 2005 (2005/XV.).

A2.3. Comparison of energy statistics and EU-ETS Data

For the sake of transparency and comparability with EU-ETS data, last year the ERT recomended to report NCVs of both data sources. All of the coal based power plants are under the regulation of emission trading, so the comparision can be performed. The results are in the table (*Table A2-2*) below.

Consumption of public electricity and heat plants	EU-ETS		Energy statistics	
	kt	TJ	kt	TJ
Other bituminous or sub-bituminous coal (NCV: 17-33 MJ/kg)	284.0	6,983	284	7,208
Lignite (NCV: 10-17 MJ/kg)	1,786.7	22,595	1,787	22,318
Lignite (NCV: 3.5-10 MJ/kg)	7,999.4	54,643	8,000	54,560

Table A2-2. *Power plants' coal consumption from EU-ETS and energy statistics*

A2.4. Source of the Country Specific Emission Factors

The law 2005/XV. appoints which installation have to join in the EU-ETS. It is required, for establishments that emit more than 500 kt CO_2/year, to measure the calorific value, the carbon content and oxidation factor of used coal in accredited laboratory. These installations can calculate their emission according to the measurement data. Evaluating the measurements it is possible to define new emission factors that suit better to the Hungarian conditions. Instead of IPCC default emission factors we can calculate the national emissions using more appropriate values.
The Hungarian coal terminology differs slightly from that of IPCC. The partitioning is created according to the age of coal; *Table A2-3*. shows the classification according to the Hungarian and IPCC (2006) categories.

Hungarian Terminology	Net Calorific Values	IPCC Category (Gross calorific value)
Hard Coal	17-33 MJ/kg	Other Bituminous Coal (>23.865 MJ/kg)
Hard Coal	17-33 MJ/kg	Sub-Bituminous Coal (17.435 MJ/kg -23.865 MJ/kg)
Brown Coal	10-17 MJ/kg	Lignite (<17.435 MJ/kg)
Lignite (young brown coal)	3.5-10 MJ/kg	Lignite (<17.435 MJ/kg)

Table A2-3. *Comparison of Hungarian and IPCC terminology for coal (Sources: Bihari, 1998; IPCC, 2006)*

A2.3.1. Lignite

Fott (1999) published his research about the emission factors for the European coal (especially for Czech coal). It was found that carbon emission factor of coals and lignite are dependent especially on the net calorific value. For brown coal-lignite with the lowest net calorific values (lower than 12 MJ/kg) the default (IPCC, 1997) value 27.6 t C/TJ (101.2 t CO_2/TJ) seems to be too small.

According to measurements of the leading Hungarian lignite user, the mean net calorific value was 6.83 MJ/kg and the CO_2 emission factor was 112.48 t CO_2/TJ (30.68 t C/TJ) in 2007, based on the carbon content of the lignite. NCV of lignite in the energy statistics was less then the measured value from EU-ETS, therefore emission factor was corrected to achieve consistency in the energy balance and verified emissions, too. Measured oxidation factor (0.97122) was also applied in the calculation for the above mentioned reason.

A2.3.2. Liquid fuels

For the first time the measured NCVs from EU-ETS was also taken into account in the calculation of CO_2 emission of main electricity plants – as recomended by the ERT. For the harmonization of the ETS and inventory the applied emission factor was determinated from the weighted average of EFs from reports of power plants. As measurment is not required for all power plants and for all fuel types, the resulted EF is a mixture of IPCC default and real measured value.

A2.5. Reference approach

Energia Központ Kht. publishes Energy Statistics Yearbooks, which contain the used activity data (production, imports, exports, stock change, non-energy use) for each fuel type in summary tables (see *Table A2-4*), individual tables for time-series of each fuel type from 1985 until the previous year of publishing date (whole time-series can be seen only in the electronic format). Conversion factor was taken as 1.0 in all categories, because Energy Statistics Yearbook represents fuels in energy units (TJ), as well. Default emission factors were used in most cases. There are only two exceptions, namely, the category of lignite and other bituminous coal (see explanation above in *section A2.3*). Calculation and fraction of carbon oxidized are in accordance with Revised Guidelines (IPCC, 1997).

A2.6. References

Bihari, P., 1998: Energetics II. – university manuscript (In Hungarian: Energetika II., kézirat), *Budapesti Műszaki Egyetem*, Budapest.

Fott, P., 1999: Carbon emission factors of coal and lignite: analysis of Czech coal data and comparison to European values. *Environmental Science & Policy,* 2, 347-354.

Intergovernmental Panel on Climate Change (IPCC), 1997: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, *Intergovernmental Panel on Climate Change, Organisation for Economic Cooperation and Development, and International Energy Agency*. *(IPCC/OECD/IEA),* UK Meteorological Office, Bracknell.
Available online at: http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm

Intergovernmental Panel on Climate Change, 2006: 2006 IPCC Guidelines for National Greenhouse Gas Inventories. *Prepared by the National Greenhouse Gas Inventories Programme*, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). ISBN 4-88788-032-4, published: IGES, Japan.
Available online at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.htm

Hungarian Energy Balance for 2007

Unit: TJ	Primary Energy Production	Import	From Stock Decreasing	From Transformation	Waste Energy	Total Source and Distribution	Domestic Consumption	Direct Consumption	Direct: Non-energy use	For Transformation	Exports	For Stock Increasing	Statistical Differences	Transformation Losses
PRIMARY ENERGY	**427 024**	**726 776**	**5 985**			1 159 785	**951 870**	**333 739**	**16 409**	618 131	**36 988**	**2 431**		
Coal	74 176	71 168	0			145 344	140 747	10 220		130 527	3 837	760		
Crude OIL	35 056	287 736	0			322 793	296 230	1 719		294 511	24 892	1 671		
Natural Gas	83 926	364 880	5 985			454 791	448 190	286 208	16 409	161 982	6 601	0		
NGL	7 364					7 364	*see LPG*							
Hydro Power	756					756	*see Electricity*							
Nuclear Power	159 979					159 979	*see Electricity*							
Prod.of Wind Power Plant	396					396	*see Electricity*							
Firewood	23 030	1 853				24 882	23 224	12 095		11 129	1 658			
Other Primary Energy	8 375					8 375	8 375	0		8 375				
Estimated Renewables Energy [1)]	30 576					30 576	30 576	23 497		7 079				
Municipal Solid Waste	3 389	1 139				4 528	4 528	0		4 528				
SECONDARY ENERGY	**0**	**124 079**	**1 561**	486 159	7 135	618 934	**559 731**	**540 543**	**75 672**	19 188	**116 608**	**3 949**		
Briquette		269	0	218		487	480	460		20		7		
Ahydrated Lignite						0	0	0						
Coke		785	0	30 004		30 789	22 842	22 789		53	7 935	12		
Other Product from Coal Proc.				2 501		2 501	2 501	2 501	2 501					
LPG		8 789	217	3 913		12 919	14 966	14 966	6 274		5 317	0		
Gasoline		29 526	1 050	101 388		131 964	112 602	112 602	44 702		18 186	1 176		
Petroleum		42	294	11 466		11 802	10 164	10 164	0		1 638	0		
Gas / Diesel Oil		59 767	0	123 644		183 411	126 974	126 710	8 404	263	54 786	1 651		
Heavy Fuel Oil		1 068	0	16 988		18 055	16 181	12 345		3 836	1 792	82		
Bitumen		3 212	0	17 953		21 165	9 193	9 162	9 162	31	11 969	3		
Other Refinery Product		6 271	0	12 665		18 936	5 881	819	4 629	5 061	12 095	960		
Coke Oven Gas				8 239		8 239	8 239	3 239		5 000				
Blast Furnace Gas					7 135	7 135	7 135	2 675		4 460				
Heat energy				57 022		57 022	57 022	57 022						
Electricity				89 863		89 863	158 203	158 203						
Import Electricity		14 350				14 350	*see Electricity*							
Petroleum Coke		0	0	10 296		10 296	7 349	6 885		464	2 888	58		
TOTAL ENERGY	**427 024**	**850 855**	**7 546**	486 159	7 135	1 778 719	**1 511 601**	**874 282**	**92 081**	637 319	**153 595**	**6 380**	107 142	151 160
Unaccumulated Consumption	427 024	850 855	7 546			1 285 425	1 125 449							

1) incl. the estemated firewood, biomass and waste, geothermal, biogas, wind, solar, etc. energy

Source: Energia Központ Kht., 2008: Energy Statistics Yearbook, 2007 (In Hungarian: Energia Statisztika Évkönyv, 2007), Table 19/a and 19/b

Table A2-4. *Hungarian energy balance for 2007*

Annex 3 Other detailed methodological descriptions for individual source or sink categories

A3.1. Energy

CH_4 and N_2O emission calculation for road transport

The used method for emission estimation of road transport consist of the following steps:

1. Quantification of stock of each road vehicle type is based on data obtained from KSH and KTI. The categories are the following:
   - Gasoline:
     a. Passenger car, uncontrolled
     b. Passenger car, early oxidation catalyst
     c. Passenger car, 2-stroke engine
     d. Passenger car, three-way catalyst
     e. Motorcycles
     f. Light duty vehicle
     g. Light duty vehicle, catalyst
     h. Heavy duty vehicle
     i. Heavy duty vehicle, catalyst
     j. Bus
   - LPG
   - Natural Gas
   - Other fuel
   - Diesel
     a. Passenger car
     b. Light duty vehicle
     c. Heavy duty vehicle
     d. Bus
2. Identification of fuel consumption for 100 km of each category is based on dafault values from Revised Guidelines, 2006 IPCC Guidelines and official fuel consumption database.
3. Correction of fuel consumption of each vehicle type with real sharing in traffic is based on KTI reports.
4. Calculation of proportion in total annual fuel consumption for each category and fuel type. Total annual fuel consumption for each fuel type is given in the Energy Statistics Yearbook.
5. Calculation of total annual fuel consumption for each category and fuel type.
6. Calculation of total annual emission from category specific emission factors (see *Table 3.9 in Chapter 3.4*) and total annual fuel consumption for each category and fuel type .
7. Addition of emissions in each fuel type.

A3.2. Industry

Specific emission factors for aluminium production

According to the recommendations of the Revised Guidelines (IPCC, 1997) and the Good Practice Guidance (IPCC, 2000), the value of the specific emission factor was determined using a Tabereaux approximation as follows:

$$EF = Slope \cdot AEF \cdot AED \,. \qquad \textit{Equation A3-1.}$$

where *EF* means the emission factor (kg/t). Slope is derived from

$$Slope = \begin{cases} 1.698 \cdot \dfrac{p}{CE} & \text{for } CF_4 \\ 0.1698 \cdot \dfrac{p}{CE} & \text{for } C_2F_6 \end{cases} \qquad \textit{Equation A3-2.}$$

According to the Revised Guidelines for the given technology *p=0.04* and *CE=0.91* were used as constants. In *Equation A3-1*. *AEF* means the effect number, *AED* is the effect time. On the basis of factory data, the value of AEF is between 0.8 to 2.8 pcs/pot-day and the value of AED is 4 minutes. Information on the pot types, effect number and effect time were supplied by the factories. Currently, only vertical-stud pots are used in Hungary, although horizontal-stud pots were also present in the beginning of the period. *Table A3-1* shows the calculated specific emission factors.

emission factor (kg/t)	BY	1989	1990	1991	1992	1993	1994	1995	1996	1997
CF_4	0.4907	0.5110	0.4856	0.5010	0.6775	0.7045	0.7225	0.7046	0.6419	0.6359
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
CF_4	0.6837	0.7015	0.8390	0.7732	0.7703	0.7242	0.7849	0.8813	0.0000	0.0000

Table A3-1. *Specific emission factors for aluminium production*

A3.3. Solvent and Other Product Use

Carbon and NMVOC ratio of solvents

The Revised Guidelines (IPCC, 1997) provide little help for calculation of specific emission factor for solvents. Compositions and solvent contents were previously coordinated with the Paint Industry. Due to these discussions, paints, lacquers, kits etc. were classified into several groups according to the mean solvent content and NMVOC emissions were taken to be equal to the amount of solvent.

On the basis of solvent composition, the mean carbon content of each category was determined using the method described in the following exemplary calculation.

“Usual” solvent composition of solvent based paints: 48 % white spirit, 40% xylene, 12 % esters. In accordance with the empirical formula of chemical substance, the carbon content can be calculated. E.g., the empirical formula of xylene is C_8H_{10}. From this, the carbon content is 90.5 % w/w. Similarly, carbon contents were obtained by calculating the other components and their carbon contents, and weighting it according to the solvent composition. These are shown in the second column of *Table A3-2*.

	Carbon content (%)	Solvent content (%)
Solvent based paints	81.4	50
Water based paints	57.0	6-8
Other paints, lacquers etc.	80.0	25
Glues etc.	57.0	8
Solvents	81.6	100

Table A3-2. *Solvent and carbon contents of paints, lacquers, glues etc.*

By this, the amount of carbon (C) from NMVOC (for each type of paint) and, upon multiplying it by 44/12, the amount of CO_2 may be calculated. In *Table A3-3* the mean carbon and NMVOC ratios are shown for the last 7 years. The decreasing numbers indicate the increasing proportion of water based paints. However, the proportion of water based paints has continued to increase in 2005, this C/NMVOC ratio has increased due to decreasing amount of the group of glues and thinners, which has changed the previous ratio of solvents' composition.

	2001	2002	2003	2004	2005	2006	2007
C/NMVOC	0.7750	0.7682	0.7593	0.7415	0.7650	0.7682	0.7705

Table A3-3. *Mean carbon and NMVOC ratio of solvents for the last 7 years*

A3.4. LULUCF

Activity data for estimation of carbon stock change in Cropland living biomass

Year	Vineyard Total Area	Vineyard Area of Agricultural Enterprises	Vineyard Area of Private Farms	Vineyard Removal of Agricultural Enterprises	Estimated Vineyard Removal of Private Farms	Total Vineyard Removal
1985	153,564	69,553	84,011	7,706	no	7,706
BY	148,623	64,535	84,088	6,706	no	6,706
1986	147,444	63,501	83,943	6,267	no	6,267
1987	144,861	60,551	84,310	6,144	no	6,144
1988	142,168	55,231	86,937	3,485	no	3,485
1989	140,345	50,771	89,574	2,101	no	2,101
1990	138,404	47,050	91,350	2,152	3,042	5,194
1991	136,432	41,800	94,600	1,873	3,728	5,601
1992	135,011	43,500	91,500	1,384	3,705	5,089
1993	131,673	34,300	97,400	543	3,681	4,224
1994	131,916	20,500	111,400	404	3,657	4,061
1995	131,334	13,900	117,400	49	3,634	3,683
1996	130,934	14,600	116,300	58	3,610	3,668
1997	130,900	9,140	121,740	567	3,586	4,153
1998	129,700	8,100	121,600	127	3,563	3,690
1999	127,000	8,350	118,650	97	3,539	3,636
2000	105,900	8,740	97,140	139	3,516	3,655
2001	92,900	9,340	83,540	198	3,492	3,690
2002	92,800	10,000	82,800	202	3,872	4,074
2003	93,300	10,500	82,800	230*	3,812	4,042
2004	94,500	11,300	83,200	258	3,752	4,010
2005	86,000	12,840	73,140	68	3,692	3,760
2006	86,000	13,250	72,750	500	3,632	4,132
2007	86,000	13,250	72,750	230	3,574	3,804

Table A3-4. *Vineyard activity data for calculation of carbon stock change in living biomass on Cropland (ha) (note: * interpolated value)*

Year	Orchard Total Area	Orchard Area of Agricultural Enterprises	Orchard Area of Private Farms	Orchard Removal of Agricultural Enterprises	Estimated Orchard Removal of Private Farms	Total Orchard Removal
1985	103,484	71,210	32,274	5,628	no	5,628
BY	99,674	65,908	33,766	3,777	no	3,777
1986	99,013	65,013	34,000	2,998	no	2,998
1987	96,524	61,500	35,024	2,705	no	2,705
1988	94,944	59,347	35,597	2,015	no	2,015
1989	94,305	56,178	38,127	1,208	no	1,208
1990	95,075	61,100	34,000	2,142	*1,132*	3,274
1991	94,137	53,100	41,000	1,955	*1,264*	3,219
1992	94,465	52,100	42,400	973	*1,396*	2,369
1993	92,954	43,700	49,300	596	*1,528*	2,124
1994	92,669	37,400	55,300	469	*1,660*	2,129
1995	93,941	26,200	67,700	680	*1,792*	2,472
1996	94,332	27,700	66,600	526	*1,924*	2,450
1997	95,578	20,700	74,900	198	*2,056*	2,254
1998	96,319	19,800	76,600	538	*2,188*	2,726
1999	96,375	22,000	74,400	523	*2,320*	2,843
2000	95,400	21,200	74,200	350	*2,452*	2,802
2001	97,500	19,900	77,600	518	*2,584*	3,102
2002	97,400	21,200	76,200	803	*2,574*	3,377
2003	98,300	23,650	74,650	492*	*2,564*	3,056
2004	102,600	24,700	77,900	181	*2,554*	2,735
2005	102,800	27,100	75,700	778	*2,544*	3,322
2006	102,800	26,600	76,200	100	*2,534*	2,634
2007	101,900	26,100	75,800	200	*2,524*	2,724

Table A3-5. *Orchard Activity data for calculation of carbon stock change in living biomass on Cropland (ha) (note: * interpolated value)*

Determination of activity data (A_G, A_L) from HCSO statistics for calculation of carbon stock change of cropland living biomass

The method recommended by the GPG for LULUCF (IPCC, 2003) requires agricultural statistics on land areas of growing stock and harvested land in perennial woody crops (orchard and vineyards in Hungary) and land conversion data from and to perennial woody Cropland.

The following statistics concerned are published by the HCSO, annually:

- Vineyard total area and areas by legal forms
- Orchard total area and areas by legal forms
- Vineyard removal in the area of agricultural enterprises
- Orchard removal in the area of agricultural enterprises

It can be seen that the HCSO statistics cannot provide information on land conversion by previous and following land-use. Only the total vineyard and orchard areas and removals are known. In addition to that removal statistics are published for the agricultural enterprises only, and this statistic is not available for the private farms that have increasing importance since 1990. (Areas reported as 'area unidentifiable with holdings' in the HCSO statistics was considered as area of private farms.) Thus an estimation procedure was developed for the estimation of removal of private farms as described below.

The following assumptions were made in the course of the estimation procedure:

1. Until 1989 the data on removal in the areas of agricultural enterprises comprises the removed areas by private farms as well. Before the economic change in 1989-90 the land areas of private farms were negligible, and the few private farms used mostly the land of agricultural enterprises thus the agricultural statistics on enterprises contains the activity of mostly private farms as well.

2. According to the Tier 1 methodology of GPG for LULUCF (IPCC, 2003), a 30 year harvest cycle is assumed for perennial woody crops as orchards and vineyards in temperate climate region on the area of private farms. It means, that 3.33% of these cultures are removed and replanted in every year.

3. The change of the extent of orchard and vineyard area on private farms derives partially from legal acts (landowner change) instead of plantation and removal. It is evident from *Figure A3-1*. After the economic change the land area of agricultural enterprises decreased continuously while the area of private farms increased. According to the farm structure survey in 2007 the private farms held possession of 74 percent of the total orchard area and 85 percent of the vineyard area. A significant restructuring (landowner changes) took place in the nineties, thus the growing of land areas of private farms derived from the landowner change instead of plantation and on the contrary, the decrease of land areas of agricultural enterprises is not primarily the result of removals.

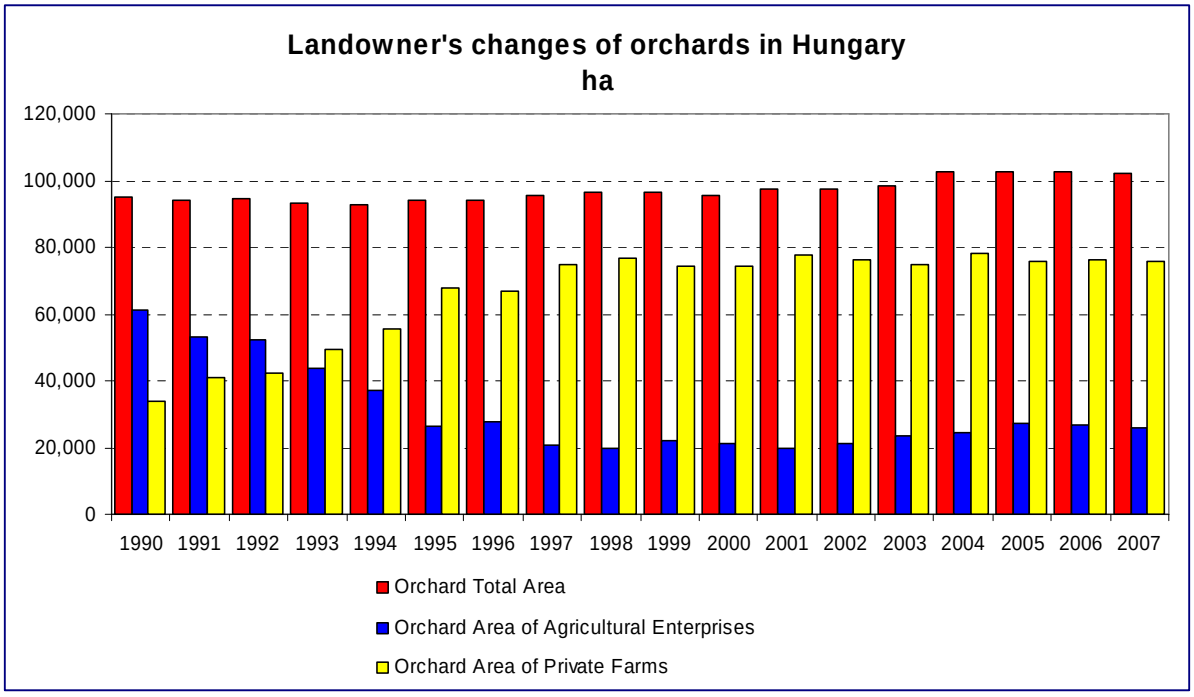

Figure A3-1. *Orchard areas by legal forms in Hungary*

To separate the area decrease resulting from the landowner change from real removals, the area decrease of private farms was considered as removal in a certain year if the total vineyard/ orchard area decreased as well. If the deacrease of the area of private farms exceeds the decrease of the total area, the area decrease is considered as removal in private farms to such an extent that the total area decreased. (Eq. A3-7, A3-8, A3-9)
(To estimate the removal from land area decrease, the total vineyard area was adjusted similarly to the area of private farms, as described below.)

The HCSO collects statistics on vineyard and orchard areas by questionnaire, annually, but in the year of the agricultural censuses, these data derives from a more detailed and more widespread data collection. (There were General Agricultural Censuses in 1990 and 2000. There was a Census on Orchards and Vineyard in 2001, which is the most detailed data collection on Hungarian vineyard and orchard. There was a Census on the most significant fruit plantation in 2007 as well). As a result of the more widespread data collection in the years of censuses, the differences between the values given for the year of census and the values given for the previous and subsequent years are sometimes significant, especially in the time series of the vineyard area of private farms. Big differences in the time series are the result of the uncertainty of annual data collection among the private farms, as revealed on the course of the General Agricultural Census in 2000. The private farms often reported abandoned vineyards as managed vineyards in the nineties (HCSO, 2000). To insure the consistency of the time series of the area of private farms, this data set was adjusted by linear interpolation between the values given for 1990 and 2001, and between 2001 and 2007, only the most detailed and reliable data collection were taken into account. Results of annual data collection were ignored.

Determination of A_G

Following the assumptions described above, A_G was obtained from the subtracting vineyard and orchard total area (agricultural enterprises and private farms areas summed) the areas of orchard and vineyard plantation in the inventory year (Equation A3-3).

$A_G = A_{VAE} + A_{VPF} + A_{OAE} + A_{OPF}$

Equation A3-3.

Where:
A_G land areas of growing stock
A_{VAE} vineyard areas of agricultural enterprises
A_{VPF} vineyard areas of private farms
A_{OAE} orchard areas of agricultural enterprises
A_{OPF} orchard areas of private farms

These time series are available from the HCSO statistics (*Activity data* **for estimation of carbon stock change in Cropland living biomass**

Year	Vineyard Total Area	Vineyard Area of Agricultural Enterprises	Vineyard Area of Private Farms	Vineyard Removal of Agricultural Enterprises	Estimated Vineyard Removal of Private Farms	Total Vineyard Removal
1985	153,564	69,553	84,011	7,706	no	7,706
BY	148,623	64,535	84,088	6,706	no	6,706
1986	147,444	63,501	83,943	6,267	no	6,267
1987	144,861	60,551	84,310	6,144	no	6,144
1988	142,168	55,231	86,937	3,485	no	3,485
1989	140,345	50,771	89,574	2,101	no	2,101
1990	138,404	47,050	91,350	2,152	3,042	5,194
1991	136,432	41,800	94,600	1,873	3,728	5,601
1992	135,011	43,500	91,500	1,384	3,705	5,089
1993	131,673	34,300	97,400	543	3,681	4,224
1994	131,916	20,500	111,400	404	3,657	4,061
1995	131,334	13,900	117,400	49	3,634	3,683
1996	130,934	14,600	116,300	58	3,610	3,668
1997	130,900	9,140	121,740	567	3,586	4,153
1998	129,700	8,100	121,600	127	3,563	3,690
1999	127,000	8,350	118,650	97	3,539	3,636
2000	105,900	8,740	97,140	139	3,516	3,655
2001	92,900	9,340	83,540	198	3,492	3,690
2002	92,800	10,000	82,800	202	3,872	4,074
2003	93,300	10,500	82,800	230*	3,812	4,042
2004	94,500	11,300	83,200	258	3,752	4,010
2005	86,000	12,840	73,140	68	3,692	3,760
2006	86,000	13,250	72,750	500	3,632	4,132
2007	86,000	13,250	72,750	230	3,574	3,804

Table A3-4 and

Year	Orchard Total Area	Orchard Area of Agricultural Enterprises	Orchard Area of Private Farms	Orchard Removal of Agricultural Enterprises	Estimated Orchard Removal of Private Farms	Total Orchard Removal
1985	103,484	71,210	32,274	5,628	no	5,628
BY	99,674	65,908	33,766	3,777	no	3,777

1986	99,013	65,013	34,000	2,998	no	2,998
1987	96,524	61,500	35,024	2,705	no	2,705
1988	94,944	59,347	35,597	2,015	no	2,015
1989	94,305	56,178	38,127	1,208	no	1,208
1990	95,075	61,100	34,000	2,142	*1,132*	3,274
1991	94,137	53,100	41,000	1,955	*1,264*	3,219
1992	94,465	52,100	42,400	973	*1,396*	2,369
1993	92,954	43,700	49,300	596	*1,528*	2,124
1994	92,669	37,400	55,300	469	*1,660*	2,129
1995	93,941	26,200	67,700	680	*1,792*	2,472
1996	94,332	27,700	66,600	526	*1,924*	2,450
1997	95,578	20,700	74,900	198	*2,056*	2,254
1998	96,319	19,800	76,600	538	*2,188*	2,726
1999	96,375	22,000	74,400	523	*2,320*	2,843
2000	95,400	21,200	74,200	350	*2,452*	2,802
2001	97,500	19,900	77,600	518	*2,584*	3,102
2002	97,400	21,200	76,200	803	*2,574*	3,377
2003	98,300	23,650	74,650	492*	*2,564*	3,056
2004	102,600	24,700	77,900	181	*2,554*	2,735
2005	102,800	27,100	75,700	778	*2,544*	3,322
2006	102,800	26,600	76,200	100	*2,534*	2,634
2007	101,900	26,100	75,800	200	*2,524*	2,724

Table A3-5. ***Orchard Activity data for calculation of carbon stock change in living biomass on Cropland (ha) (note: * interpolated value)***), although there is a data gap in the year of 2003, which was eliminated by interpolation from the values of the previous and the next years data.

Determination of A_L

The removal of perennial woody crops derives from the vineyard and orchard removal on the area of the agricultural enterprises and on the areas of private farms. The removal arises from rotation (replantation) and the area decrease (abandonment of vineyards and orchards)

$$A_L = A_{VRAE} + A_{VRPF} + A_{ORAE} + A_{ORPF}$$

Equation A3-4.

Where:
A_{VRAE} vineyard removal on the areas agricultural enterprises
A_{VRPF} vineyard removal on the areas private farms
A_{ORAE} orchard removal on the areas of agricultural enterprises
A_{ORPF} orchard removal on the areas of private farms

The time series of vineyard and orchard removal on the areas of agricultural enterprises are available from the HCSO statistics (*Activity data* **for estimation of carbon stock change in Cropland living biomass**

Year	Vineyard Total Area	Vineyard Area of Agricultural Enterprises	Vineyard Area of Private Farms	Vineyard Removal of Agricultural Enterprises	Estimated Vineyard Removal of Private Farms	Total Vineyard Removal
1985	153,564	69,553	84,011	7,706	no	7,706
BY	148,623	64,535	84,088	6,706	no	6,706

1986	147,444	63,501	83,943	6,267	no	6,267
1987	144,861	60,551	84,310	6,144	no	6,144
1988	142,168	55,231	86,937	3,485	no	3,485
1989	140,345	50,771	89,574	2,101	no	2,101
1990	138,404	47,050	91,350	2,152	3,042	5,194
1991	136,432	41,800	94,600	1,873	3,728	5,601
1992	135,011	43,500	91,500	1,384	3,705	5,089
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1986	99,013	65,013	34,000	2,998	no	2,998
1987	96,524	61,500	35,024	2,705	no	2,705
1988	94,944	59,347	35,597	2,015	no	2,015
1989	94,305	56,178	38,127	1,208	no	1,208
1990	95,075	61,100	34,000	2,142	*1,132*	3,274
1991	94,137	53,100	41,000	1,955	*1,264*	3,219
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1994	92,669	37,400	55,300	469	*1,660*	2,129
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1996	94,332	27,700	66,600	526	*1,924*	2,450
1997	95,578	20,700	74,900	198	*2,056*	2,254
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2002	97,400	21,200	76,200	803	*2,574*	3,377
2003	98,300	23,650	74,650	492*	*2,564*	3,056
2004	102,600	24,700	77,900	181	*2,554*	2,735

2005	102,800	27,100	75,700	778	*2,544*	3,322
2006	102,800	26,600	76,200	100	*2,534*	2,634
2007	101,900	26,100	75,800	200	*2,524*	2,724

Table A3-5. ***Orchard Activity data for calculation of carbon stock change in living biomass on Cropland (ha) (note: * interpolated value)***), although there is a data gap in the year of 2003, which was eliminated by linear interpolation.

Estimation of removal of private farms as fallows:

A_{VRPF} ={0 until 1989 and $A_{VPF} \cdot 0.333$+min(f(A_{VT}), f(A_{VPF})) since 1990}

Equation A3-5.

A_{ORPF} ={0 until 1989 and $A_{VPF} \cdot 0.333$+min(f(A_{OT}), f(A_{OPF})) since 1990}

Equation A3-6.

Where:
A_{VT} vineyard total area
A_{OT} orchard total area
f(x) area decrease function

f(x)={x_{iy-1}- x_{iy} if x_{iy-1}- x_{iy} >0 else 0}

Equation A3-7.

Where:
x_{iy} area in the inventory year
x_{iy-1} area one year before the inventory year

Method and activity data for the estimation of carbon stock change of mineral soils of Cropland and Grassland categories

Method

The estimation used is based on the Tier 1 methodology of GPG for LULUCF (IPCC, 2003), Equation 3.3.4 (B) for the whole LULUCF system (Cropland, Grassland and afforested croplands and grasslands), simultaneously.

$$\Delta C_{LUMineral} = [\Sigma_{LU}\Sigma_c\Sigma_s\Sigma_i (SOC_0 \cdot A)_{LU,c,s,i} - \Sigma_{LU}\Sigma_c\Sigma_s\Sigma_i (SOC_{(0-T)} \cdot A)_{LU,c,s,i}] / T$$

Equation A3-8.

Where:
$\Delta C_{LUMineral}$ = aggregated carbon stock change in mineral soils for the whole LULUCF system (Cropland, Grassland and afforested Cropland and Grassland aggregeted)
SOC_0 = soil organic carbon stock in the inventory year, tonnes C ha^{-1}
SOC_{0-T} = soil organic carbon stock T years prior to the inventory, tonnes C ha^{-1}
T= inventory time period, 20 yrs (GPG for LULUCF (IPCC, 2003) default was used)
A = land area of each parcel, ha
c represents climate zones, s the soil type, i the different management systems on Cropland and Grassland.

Hungary has aggregate land-use statistics thus the carbon stock change of all managed land is calculated combined. The estimation procedure is performed following the example that provides the Box 2.2 of the Guidelines (IPCC, 2006) for the Approach 1 area representation method. The basis of our estimation in accordance with the Guidelines (IPCC, 2006) and GPG for LULUCF (IPCC, 2003) as follows:

Land-use categories	Inventory year-20	Inventory year
Forest Land	$A_{FLCS(0-20)}$	A_{FLCS0}
Cropland	$A_{CLCSI(0-20)}$	A_{CLCSI0}
Set-aside	$A_{SACS(0-20)}$	A_{SACS0}
Managed Grassland	$A_{GLCS(0-20)}$	A_{GLCSI0}
Unmanaged Grassland	$A_{UGCS(0-20)}$	A_{UGCS0}
SOC_t (Mt C)	$\Sigma_{LU}\Sigma_c\Sigma_s\Sigma_i (SOC_{(0-20)} \cdot A)_{LU,c,s,i}$	$\Sigma_{LU}\Sigma_c\Sigma_s\Sigma_i (SOC_0 \cdot A)_{LU,c,s,i}$
$\Delta C_{LUMineral}$		$[\Sigma_{LU}\Sigma_c\Sigma_s\Sigma_i (SOC_t \cdot A)_{LU,c,s,i} - \Sigma_{LU}\Sigma_c\Sigma_s\Sigma_i (SOC_{(0-20)} \cdot A)_{LU,c,s,i}] / 20$

Table A3-6. *Estimation method on mineral soils*

Where:
$A_{FLCS0-20}$ = Forest Land areas stratified by climate zones and soil types, 20 years prior to the inventory year
A_{FLCS0} = Forest Land areas stratified by climate zones and soil types, in the inventory year
$A_{CLCSI0-20}$= Cropland areas stratified by climate zones, soil types, and management practices, 20 years prior to the inventory year

A_{CLCSI0}= Cropland areas stratified by climate zones, soil types, and management practices, in the inventory year
$A_{SACS0-20}$ = Set-aside areas (abandoned croplands), stratified by climate zones and soil types, 20 years prior to the inventory year
A_{SACS0} = set-aside areas (abandoned croplands), stratified by climate zones and soil types in the inventory year
$A_{GLCSI0-20}$= Grassland areas stratified by climate zones, soil types, and management practices, 20 years prior to the inventory year
A_{GLCSI0}= Grassland areas stratified by climate zones, soil types, and management practices, in the inventory year
$A_{UGCS0-20}$ = Unmanaged Grassland (abandoned pastures) areas stratified by climate zones and soil types, 20 years prior to the inventory year
A_{UGCS0}= Unmanaged Grassland (abandoned pastures) areas stratified by climate zones and soil types, in the inventory year

$$\Sigma_{LU}\Sigma_c\Sigma_s\Sigma_i A_{0\text{-}T} = \Sigma_{LU}\Sigma_c\Sigma_s\Sigma_i A_T = 8{,}353{,}600 \text{ ha} \qquad \textit{Equation A3-9.}$$

In Hungary, the sum of the areas of Forest Land, Cropland and managed Grassland in 1965 is the maximum area of land in the time-series 1965-2007 (8,353,600 ha), thus this area is used as the basis for emission and removal estimation throughout the inventory. In accordance with the Guidelines (IPCC, 2006) the sum of the land areas over the time series is constant in throughout the inventory, while the sums of the whole managed areas are changeable (decreasing in Hungary). Croplands changing unmanaged status from managed status are taken into account in our estimation as set-aside areas while abandoned grasslands (pastures) are taken into account as Unmanaged Grassland. The carbon stock change of this unmanaged land is taken into account 0 after 20 years the land-use conversion. In accordance with the Tier 1 methodology of GPG for LULUCF (IPCC, 2003) for mineral soils, the stock change factors for Unmanaged Grassland, Forest Land all have the value 1 throughout the calculation; and for the set-aside areas the F_{LU} has the value 0.93 and the other stock change factors (F_{MG}, F_I) are 1.

Activity data

The HCSO's land-use statistics provide the necessary activity data for Cropland and (managed) Grassland categories for the time series 1965-2007. The Forest Land area data are available for only the time series 1981-2007. The activity data before 1981 was determined by linear interpolation from the estimated area for 1965 and the data available for 1981. The area and the distribution of set-aside and Unmanaged Grassland area were determined as fallows.
To maintain the consistency with the soil type and climate zone distribution in the time-series, the soil type and climate zone distribution of set-aside / Unmanaged Grassland is determined from the soil type and climate zone distribution of Cropland / managed Grassland. (There is evidence that soil type and climate zone cannot be influenced by the land-use conversions.) Similarly, the soil type and climate zone distribution of Forest Land is determined from an assumed afforestation ratio of Cropland and Grassland in Hungary. It is assumed that the former land use of the 75 percent of afforested areas is Cropland and the former land use of the 25 percent of afforested areas is Grassland over the time-series. This assumption gives conservative estimate of carbon stock change in mineral soils in afforested areas, because the preliminary results of the ongoing project on investigation of historical land-use data indicate lower ratio of afforested Grassland. As described above the estimation of set-aside area and Unmanaged Grassland area are as fallows:

A_{SACSt}= {$A_{CLCS1965}$- A_{CLCSt}- 0.75 · (A_{FL1965}- A_{FLCSt}) if ($A_{GLCS1965}$- A_{GLCSt}- 0.25 · (A_{FL1965}- A_{FLCSt}))>0 else ($A_{CLCS1965}$- A_{CLCSt}- (A_{FL1965}- A_{FLCSt})- $A_{GLCS1965}$- A_{GLCSt})}

Equation A3-10.

A_{UGCSt}= {$A_{GLCS1965}$- A_{GLCSt}- 0.25 · (A_{FL1965}- A_{FLCSt}) if ($A_{GLCS1965}$- A_{GLCSt}- 0.25 · (A_{FL1965}- A_{FLCSt}))>0 else 0}

Equation A3-11.

Where:
A_{SACSt} = Set-aside area, stratified by climate zones and soil type at the t point in the time-series (t=1965,…., 2007)
A_{CLCSt} = Cropland area, stratified by climate zones, soil type and management practices at the t point in the time-series (t=1965,…., 2007)
A_{UGCSt} = Unmanaged Grassland area, stratified by climate zones and soil type at the t point in the time-series (t=1965,…., 2007)
A_{GLCSt} = Grassland area, stratified by climate zones and soil type and management practices at the t point in the time-series (t=1965,…., 2007)
In the course of the estimation of set-aside and Unmanaged Grassland areas the condition check of the ($A_{GLCS1965}$- A_{GLCSt}- 0.25 · (A_{FL1965}- A_{FLCSt})) difference is indispensable because the maximum area of Grassland was in 1978, while the maximum of the whole managed area was in 1965. It is assumed that the area expansion of Grassland in 1977 and 1978 is happened by the set-aside area conversion to Grassland and only croplands were afforested during the period 1977-1980.
The results of the estimation and stratification of required activity data are presented in the following tables (*Table A3-7 – Table A3-18*).

sub-categories	Climate	cold dry	cold dry	cold dry	cold dry	warm dry	warm dry	warm dry	warm dry	cold dry	cold dry	cold dry	warm dry	warm dry	warm dry	Subtotal
	Soil	HAC	HAC	HAC	HAC	HAC	HAC	HAC	HAC	LAC	LAC	LAC	LAC	LAC	LAC	
	Management	full till	full till	full till	reduced till	full till	full till	full till	reduced till	full till	full till	full till	full till	full till	full till	
	Input	low	medium	high with no manure	medium	low	medium	high with no manure	medium	low	medium	high with no manure	low	medium	high with no manure	
1965	A	968.1	704.1	88.0	no	1431.4	1041.0	130.1	no	37.2	27.1	3.4	29.6	21.5	2.7	4484.2
1966	A	966.8	703.1	87.9	no	1429.5	1039.6	130.0	no	37.2	27.0	3.4	29.6	21.5	2.7	4478.2
1967	A	964.0	701.1	87.6	no	1425.3	1036.6	129.6	no	37.0	26.9	3.4	29.5	21.4	2.7	4465.0
1968	A	961.7	699.4	87.4	no	1422.0	1034.2	129.3	no	37.0	26.9	3.4	29.4	21.4	2.7	4454.8
1969	A	960.3	698.4	87.3	no	1420.0	1032.7	129.1	no	36.9	26.8	3.4	29.4	21.4	2.7	4448.3
1970	A	958.5	697.1	87.1	no	1417.2	1030.7	128.8	no	36.8	26.8	3.3	29.3	21.3	2.7	4439.8
1971	A	955.8	695.2	86.9	no	1413.3	1027.9	128.5	no	36.7	26.7	3.3	29.2	21.3	2.7	4427.5
1972	A	953.6	693.5	86.7	no	1410.0	1025.5	128.2	no	36.6	26.7	3.3	29.2	21.2	2.7	4417.2
1973	A	951.8	692.2	86.5	no	1407.4	1023.6	127.9	no	36.6	26.6	3.3	29.1	21.2	2.6	4408.9
1974	A	943.0	685.8	85.7	no	1394.4	1014.1	126.8	no	36.2	26.4	3.3	28.8	21.0	2.6	4368.1
1975	A	941.6	684.8	85.6	no	1392.2	1012.5	126.6	no	36.2	26.3	3.3	28.8	20.9	2.6	4361.5
1976	A	937.4	681.8	85.2	no	1386.1	1008.0	126.0	no	36.0	26.2	3.3	28.7	20.8	2.6	4342.1
1977	A	929.2	675.8	84.5	no	1373.9	999.2	124.9	no	35.7	26.0	3.2	28.4	20.7	2.6	4304.0
1978	A	923.3	671.5	83.9	no	1365.3	992.9	124.1	no	35.5	25.8	3.2	28.2	20.5	2.6	4276.9
1979	A	905.7	658.7	82.3	no	1339.1	973.9	121.7	no	34.8	25.3	3.2	27.7	20.1	2.5	4195.1
1980	A	892.5	649.1	81.1	no	1319.6	959.7	120.0	no	34.3	24.9	3.1	27.3	19.8	2.5	4133.9
1981	A	880.1	640.1	80.0	no	1301.4	946.4	118.3	no	33.8	24.6	3.1	26.9	19.6	2.4	4076.8
1982	A	876.8	637.7	79.7	no	1296.4	942.8	117.9	no	33.7	24.5	3.1	26.8	19.5	2.4	4061.3
1983	A	874.7	636.2	79.5	no	1293.4	940.6	117.6	no	33.6	24.4	3.1	26.7	19.5	2.4	4051.7
1984	A	873.4	635.2	79.4	no	1291.5	939.3	117.4	no	33.6	24.4	3.1	26.7	19.4	2.4	4045.8

Table A3-7. *Stratification of Cropland areas by climate zones, soil type and management practices I. (1000 ha)(note: no means not occurring)*

sub-categories	Climate	cold dry	cold dry	cold dry	warm dry	warm dry	warm dry	cold dry	cold dry	cold dry	warm dry	warm dry	warm dry	Subtotal
	Soil	sandy	sandy	sandy	sandy	sandy	sandy	aquic	aquic	aquic	aquic	aquic	aquic	
	Management	full till	full till	full till	full till	full till	full till	full till	full till	full till	full till	full till	full till	
	Input	low	medium	high with no manure	low	medium	high with no manure	low	medium	high with no manure	low	medium	high with no manure	
1965	A	74.2	54.0	6.7	89.2	64.9	8.1	188.9	137.4	17.2	288.7	210.0	26.2	1165.5
1966	A	74.1	53.9	6.7	89.1	64.8	8.1	188.7	137.2	17.2	288.3	209.7	26.2	1164.0
1967	A	73.9	53.7	6.7	88.8	64.6	8.1	188.1	136.8	17.1	287.5	209.1	26.1	1160.6
1968	A	73.7	53.6	6.7	88.6	64.5	8.1	187.7	136.5	17.1	286.8	208.6	26.1	1157.9
1969	A	73.6	53.5	6.7	88.5	64.4	8.0	187.4	136.3	17.0	286.4	208.3	26.0	1156.2
1970	A	73.5	53.4	6.7	88.3	64.3	8.0	187.0	136.0	17.0	285.8	207.9	26.0	1154.0
1971	A	73.3	53.3	6.7	88.1	64.1	8.0	186.5	135.7	17.0	285.0	207.3	25.9	1150.8
1972	A	73.1	53.2	6.6	87.9	63.9	8.0	186.1	135.3	16.9	284.4	206.8	25.9	1148.1
1973	A	73.0	53.1	6.6	87.7	63.8	8.0	185.7	135.1	16.9	283.8	206.4	25.8	1146.0
1974	A	72.3	52.6	6.6	86.9	63.2	7.9	184.0	133.8	16.7	281.2	204.5	25.6	1135.4
1975	A	72.2	52.5	6.6	86.8	63.1	7.9	183.7	133.6	16.7	280.8	204.2	25.5	1133.6
1976	A	71.9	52.3	6.5	86.4	62.8	7.9	182.9	133.0	16.6	279.5	203.3	25.4	1128.6
1977	A	71.2	51.8	6.5	85.6	62.3	7.8	181.3	131.9	16.5	277.1	201.5	25.2	1118.7
1978	A	70.8	51.5	6.4	85.1	61.9	7.7	180.2	131.0	16.4	275.3	200.3	25.0	1111.7
1979	A	69.4	50.5	6.3	83.5	60.7	7.6	176.7	128.5	16.1	270.1	196.4	24.6	1090.4
1980	A	68.4	49.8	6.2	82.3	59.8	7.5	174.2	126.7	15.8	266.1	193.6	24.2	1074.5
1981	A	67.5	49.1	6.1	81.1	59.0	7.4	171.7	124.9	15.6	262.5	190.9	23.9	1059.6
1982	A	67.2	48.9	6.1	80.8	58.8	7.3	171.1	124.4	15.6	261.5	190.2	23.8	1055.6
1983	A	67.1	48.8	6.1	80.6	58.6	7.3	170.7	124.1	15.5	260.8	189.7	23.7	1053.1
1984	A	67.0	48.7	6.1	80.5	58.5	7.3	170.4	124.0	15.5	260.5	189.4	23.7	1051.6

Table A3-8. *Stratification of Cropland areas by climate zones, soil type and management practices II. (1000 ha)*

sub-categories	Climate	cold dry	cold dry	cold dry	cold dry	warm dry	warm dry	warm dry	warm dry	cold dry	cold dry	cold dry	warm dry	warm dry	warm dry	Subtotal
	Soil	HAC	HAC	HAC	HAC	HAC	HAC	HAC	HAC	LAC	LAC	LAC	LAC	LAC	LAC	
	Management	full till	full till	full till	reduced till	full till	full till	full till	reduced till	full till	full till	full till	full till	full till	full till	
	Input	low	medium	high with no manure	medium	low	medium	high with no manure	medium	low	medium	high with no manure	low	medium	high with no manure	
1985	A	873.3	635.1	79.4	no	1291.2	939.1	117.4	no	33.6	24.4	3.1	26.7	19.4	2.4	4044.9
1986	A	871.8	634.0	79.3	no	1289.1	937.5	117.2	no	33.5	24.4	3.0	26.7	19.4	2.4	4038.3
1987	A	870.8	633.3	79.2	no	1287.6	936.4	117.1	no	33.5	24.3	3.0	26.6	19.4	2.4	4033.7
1988	A	869.7	632.5	79.1	no	1285.9	935.2	116.9	no	33.4	24.3	3.0	26.6	19.3	2.4	4028.3
1989	A	868.5	631.6	79.0	no	1284.1	933.9	116.7	no	33.4	24.3	3.0	26.6	19.3	2.4	4022.8
1990	A	867.4	630.9	78.9	no	1282.6	932.8	116.6	no	33.3	24.2	3.0	26.5	19.3	2.4	4018.0
1991	A	862.4	627.2	78.4	no	1275.1	927.4	115.9	no	33.1	24.1	3.0	26.4	19.2	2.4	3994.5
1992	A	857.7	623.8	78.0	no	1268.2	922.3	115.3	no	33.0	24.0	3.0	26.2	19.1	2.4	3972.8
1993	A	852.3	619.9	77.5	no	1260.2	916.5	114.6	no	32.8	23.8	3.0	26.1	19.0	2.4	3947.9
1994	A	847.8	616.6	77.1	no	1253.5	911.7	114.0	no	32.6	23.7	3.0	25.9	18.9	2.4	3926.9
1995	A	843.3	613.3	76.7	no	1247.0	906.9	113.4	no	32.4	23.6	2.9	25.8	18.8	2.3	3906.4
1996	A	841.1	611.7	76.5	no	1243.6	904.4	113.1	no	32.3	23.5	2.9	25.7	18.7	2.3	3895.8
1997	A	839.5	610.6	76.3	no	1241.3	902.8	112.8	no	32.3	23.5	2.9	25.7	18.7	2.3	3888.7
1998	A	835.8	594.7	76.0	13.2	1235.8	879.0	112.3	19.8	32.1	23.4	2.9	25.6	18.6	2.3	3871.5
1999	A	831.4	583.7	75.6	21.0	1229.4	862.6	111.8	31.5	32.0	23.2	2.9	25.4	18.5	2.3	3851.2
2000	A	822.9	569.9	74.8	28.6	1216.8	842.1	110.6	42.8	31.8	23.1	2.9	25.3	18.4	2.3	3812.4
2001	A	823.2	562.3	74.8	36.4	1217.2	830.7	110.7	54.5	31.8	23.1	2.9	25.3	18.4	2.3	3813.6
2002	A	823.2	554.5	74.8	44.1	1217.2	819.0	110.7	66.2	31.8	23.1	2.9	25.3	18.4	2.3	3813.6
2003	A	823.0	546.6	74.8	51.9	1216.9	807.1	110.6	77.9	31.8	23.1	2.9	25.3	18.4	2.3	3812.7
2004	A	823.2	539.0	74.8	59.7	1217.2	795.6	110.7	89.6	31.8	23.1	2.9	25.3	18.4	2.3	3813.6
2005	A	822.1	530.5	74.7	67.4	1215.6	782.9	110.5	101.1	31.7	23.1	2.9	25.3	18.4	2.3	3808.5
2006	A	821.5	522.3	74.7	75.2	1214.7	770.7	110.4	112.7	31.7	23.1	2.9	25.2	18.4	2.3	3805.8
2007	A	820.8	514.1	74.6	82.9	1213.6	758.3	110.3	124.3	31.7	23.0	2.9	25.2	18.3	2.3	3802.4

Table A3-9. *Stratification of Cropland areas by climate zones, soil type and management practices III. (1000 ha)*

sub-categories	Climate	cold dry	cold dry	cold dry	warm dry	warm dry	warm dry	cold dry	cold dry	cold dry	warm dry	warm dry	warm dry	Subtotal
	Soil	sandy	sandy	sandy	sandy	sandy	sandy	aquic	aquic	aquic	aquic	aquic	aquic	
	Management	full till	full till	full till	full till	full till	full till	full till	full till	full till	full till	full till	full till	
	Input	low	medium	high with no manure	low	medium	high with no manure	low	medium	high with no manure	low	medium	high with no manure	
1985	A	66.9	48.7	6.1	80.5	58.5	7.3	170.4	123.9	15.5	260.4	189.4	23.7	1051.4
1986	A	66.8	48.6	6.1	80.4	58.4	7.3	170.1	123.7	15.5	260.0	189.1	23.6	1049.6
1987	A	66.8	48.6	6.1	80.3	58.4	7.3	169.9	123.6	15.4	259.7	188.9	23.6	1048.4
1988	A	66.7	48.5	6.1	80.2	58.3	7.3	169.7	123.4	15.4	259.3	188.6	23.6	1047.1
1989	A	66.6	48.4	6.1	80.0	58.2	7.3	169.5	123.3	15.4	259.0	188.4	23.5	1045.6
1990	A	66.5	48.4	6.0	80.0	58.1	7.3	169.3	123.1	15.4	258.7	188.1	23.5	1044.4
1991	A	66.1	48.1	6.0	79.5	57.8	7.2	168.3	122.4	15.3	257.2	187.0	23.4	1038.3
1992	A	65.8	47.8	6.0	79.1	57.5	7.2	167.4	121.7	15.2	255.8	186.0	23.3	1032.6
1993	A	65.3	47.5	5.9	78.6	57.1	7.1	166.3	121.0	15.1	254.2	184.8	23.1	1026.2
1994	A	65.0	47.3	5.9	78.1	56.8	7.1	165.4	120.3	15.0	252.8	183.9	23.0	1020.7
1995	A	64.7	47.0	5.9	77.7	56.5	7.1	164.6	119.7	15.0	251.5	182.9	22.9	1015.3
1996	A	64.5	46.9	5.9	77.5	56.4	7.0	164.1	119.4	14.9	250.8	182.4	22.8	1012.6
1997	A	64.4	46.8	5.9	77.4	56.3	7.0	163.8	119.1	14.9	250.3	182.1	22.8	1010.7
1998	A	64.1	46.6	5.8	77.0	56.0	7.0	163.1	118.6	14.8	249.2	181.3	22.7	1006.3
1999	A	63.7	46.4	5.8	76.6	55.7	7.0	162.2	118.0	14.7	247.9	180.3	22.5	1001.0
2000	A	62.0	45.1	5.6	74.6	54.2	6.8	161.4	117.4	14.7	246.7	179.4	22.4	990.3
2001	A	62.0	45.1	5.6	74.6	54.2	6.8	161.5	117.4	14.7	246.8	179.5	22.4	990.6
2002	A	62.0	45.1	5.6	74.6	54.2	6.8	161.5	117.4	14.7	246.8	179.5	22.4	990.6
2003	A	62.0	45.1	5.6	74.6	54.2	6.8	161.4	117.4	14.7	246.7	179.4	22.4	990.4
2004	A	62.0	45.1	5.6	74.6	54.2	6.8	161.5	117.4	14.7	246.8	179.5	22.4	990.6
2005	A	61.9	45.1	5.6	74.5	54.2	6.8	161.3	117.3	14.7	246.4	179.2	22.4	989.3
2006	A	61.9	45.0	5.6	74.4	54.1	6.8	161.1	117.2	14.6	246.3	179.1	22.4	988.6
2007	A	61.8	45.0	5.6	74.4	54.1	6.8	161.0	117.1	14.6	246.0	178.9	22.4	987.7

Table A3-10. *Stratification of Cropland areas by climate zones, soil type and management practices IV. (1000 ha)*

sub-categories		1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Climate	Soil	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
cold dry	HAC	0.0	1.3	5.5	8.5	10.0	12.4	16.2	19.2	21.4	36.4	38.1	44.6	49.0	57.5	89.8	112.5	143.7	136.3	135.5	150.0
warm dry	HAC	0.0	2.0	8.1	12.6	14.8	18.3	23.9	28.4	31.7	53.9	56.3	66.0	72.4	85.0	132.8	166.4	212.5	201.5	200.4	221.8
cold dry	LAC	0.0	0.0	0.2	0.3	0.3	0.4	0.6	0.7	0.7	1.3	1.4	1.6	6.1	6.4	7.7	8.6	5.4	9.5	9.5	5.5
warm dry	LAC	0.0	0.0	0.2	0.2	0.3	0.3	0.4	0.5	0.6	1.0	1.1	1.3	4.9	5.1	6.1	6.8	4.3	7.6	7.5	4.4
cold dry	sandy	0.0	0.1	0.4	0.7	0.8	1.0	1.3	1.5	1.7	2.8	3.0	3.5	2.3	2.9	5.4	7.1	11.1	9.0	8.9	11.6
warm dry	sandy	0.0	0.1	0.5	0.8	0.9	1.2	1.5	1.8	2.0	3.4	3.5	4.2	2.7	3.5	6.5	8.6	13.3	10.8	10.7	13.9
cold dry	aquic	0.0	0.2	1.1	1.6	1.9	2.4	3.1	3.7	4.1	7.0	7.3	8.6	13.5	15.2	21.6	26.0	27.9	30.6	30.5	29.1
warm dry	aquic	0.0	0.4	1.6	2.5	2.9	3.6	4.7	5.6	6.3	10.7	11.2	13.2	20.7	23.2	32.9	39.7	42.6	46.8	46.6	44.4
Total		0.0	4.2	17.5	27.2	32.1	39.5	51.7	61.4	68.6	116.7	121.8	142.9	171.6	198.8	302.9	375.7	460.8	452.1	449.6	480.8
Sub-categories		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Climate	Soil	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
cold dry	HAC	139.7	141.0	141.1	143.2	145.8	142.7	149.6	156.4	163.8	169.7	174.7	176.1	175.6	179.5	183.8	200.8	193.3	190.7	185.1	177.8
warm dry	HAC	206.6	208.5	208.6	211.7	215.6	211.1	221.3	231.3	242.1	250.9	258.4	260.3	259.7	265.4	271.7	296.9	285.8	281.9	273.7	262.9
cold dry	LAC	5.0	5.1	5.1	5.1	5.3	5.1	5.3	5.6	5.8	6.0	6.2	6.2	6.2	6.3	6.4	6.8	6.4	6.3	6.0	5.7
warm dry	LAC	4.0	4.0	4.0	4.1	4.2	4.0	4.2	4.4	4.6	4.8	4.9	5.0	4.9	5.0	5.1	5.4	5.1	5.0	4.8	4.5
cold dry	sandy	10.8	10.9	10.9	11.1	11.3	11.1	11.6	12.1	12.7	13.2	13.6	13.7	13.7	14.0	14.3	18.0	17.4	17.2	16.8	16.3
warm dry	sandy	13.0	13.1	13.2	13.3	13.6	13.3	14.0	14.6	15.3	15.8	16.3	16.5	16.4	16.8	17.2	21.6	20.9	20.7	20.2	19.6
cold dry	aquic	27.0	27.2	27.2	27.6	28.1	27.5	28.8	30.1	31.5	32.7	33.6	33.8	33.7	34.5	35.3	36.8	35.2	34.7	33.6	32.1
warm dry	aquic	41.2	41.6	41.6	42.2	43.0	42.0	44.0	46.0	48.2	49.9	51.4	51.7	51.5	52.7	53.9	56.2	53.9	53.0	51.3	49.0
Total		447.3	451.4	451.6	458.3	466.9	456.8	478.9	500.5	524.0	543.0	559.1	563.2	561.8	574.1	587.7	642.5	618.1	609.5	591.4	567.8

Table A3-11. *Stratification of Set-aside areas by climate zones and soil type I. (1000 ha)*

sub-categories		2005	2006	2007
Climate	Soil	A	A	A
cold dry	HAC	175.3	172.6	169.3
warm dry	HAC	259.2	255.3	250.3
cold dry	LAC	5.5	5.4	5.2
warm dry	LAC	4.4	4.3	4.1
cold dry	sandy	16.1	15.9	15.7
warm dry	sandy	19.4	19.2	18.9
cold dry	aquic	31.5	31.0	30.3
warm dry	aquic	48.2	47.3	46.3
Total		559.7	551.0	540.1

Table A3-12. *Stratification of Set-aside areas by climate zones and soil type II. (1000 ha)*

sub-categories				1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Climate	Soil	Management	Input	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
cold dry	HAC	non-degraded	-	233.6	230.3	230.7	231.1	230.0	229.6	228.7	229.5	229.3	229.2	228.4	230.5	234.1	234.6	232.3
cold dry	HAC	improved	medium	155.7	153.5	153.8	154.1	153.3	153.0	152.5	153.0	152.9	152.8	152.3	153.7	156.1	156.4	154.9
warm dry	HAC	non-degraded	-	345.4	340.5	341.1	341.7	340.0	339.4	338.2	339.4	339.1	338.9	337.7	340.8	346.2	346.8	343.5
warm dry	HAC	improved	medium	230.3	227.0	227.4	227.8	226.7	226.3	225.5	226.3	226.1	225.9	225.1	227.2	230.8	231.2	229.0
cold dry	LAC	non-degraded	-	21.6	21.3	21.3	21.4	21.3	21.2	21.2	21.2	21.2	21.2	21.1	21.3	21.6	21.7	21.5
cold dry	LAC	improved	medium	9.3	9.1	9.1	9.2	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.3	9.3	9.2
warm dry	LAC	non-degraded	-	12.3	12.1	12.1	12.1	12.1	12.1	12.0	12.1	12.1	12.0	12.0	12.1	12.3	12.3	12.2
warm dry	LAC	improved	medium	12.3	12.1	12.1	12.1	12.1	12.1	12.0	12.1	12.1	12.0	12.0	12.1	12.3	12.3	12.2
cold dry	sandy	non-degraded	-	14.6	14.4	14.4	14.4	14.3	14.3	14.3	14.3	14.3	14.3	14.2	14.4	14.6	14.6	14.5
cold dry	sandy	improved	medium	9.7	9.6	9.6	9.6	9.6	9.5	9.5	9.5	9.5	9.5	9.5	9.6	9.7	9.8	9.7
warm dry	sandy	non-degraded	-	20.4	20.1	20.2	20.2	20.1	20.1	20.0	20.1	20.1	20.0	20.0	20.2	20.5	20.5	20.3
warm dry	sandy	improved	medium	8.8	8.6	8.6	8.7	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.8	8.8	8.7
cold dry	aquic	non-degraded	-	77.3	76.2	76.4	76.5	76.1	76.0	75.7	76.0	75.9	75.9	75.6	76.3	77.5	77.7	76.9
cold dry	aquic	improved	medium	13.6	13.5	13.5	13.5	13.4	13.4	13.4	13.4	13.4	13.4	13.3	13.5	13.7	13.7	13.6
warm dry	aquic	non-degraded	-	111.2	109.6	109.9	110.0	109.5	109.3	108.9	109.3	109.2	109.1	108.7	109.7	111.5	111.7	110.6
warm dry	aquic	improved	medium	27.8	27.4	27.5	27.5	27.4	27.3	27.2	27.3	27.3	27.3	27.2	27.4	27.9	27.9	27.7
Total				1303.9	1285.3	1287.8	1289.9	1283.6	1281.3	1276.8	1281.2	1280.1	1279.2	1274.8	1286.5	1306.8	1309.3	1296.6

Table A3-13. *Stratification of Grassland areas by climate zones, soil type and management practices I. (1000 ha)*

sub-categories				1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Climate	Soil	Management	Input	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
cold dry	HAC	non-degraded	-	231.9	230.0	229.9	229.2	226.6	223.3	221.0	219.0	216.8	214.5	212.4	213.7	225.9	248.7	262.2
cold dry	HAC	improved	medium	154.6	153.4	153.3	152.8	151.1	148.9	147.4	146.0	144.5	143.0	141.6	136.6	121.6	96.7	80.6
warm dry	HAC	non-degraded	-	342.8	340.1	339.9	338.9	335.1	330.2	326.8	296.8	293.8	296.0	314.1	310.8	318.6	352.3	410.5
warm dry	HAC	improved	medium	228.6	226.8	226.6	225.9	223.4	220.1	217.9	242.8	240.4	232.6	209.4	207.2	195.3	158.3	96.3
cold dry	LAC	non-degraded	-	21.4	21.3	21.3	21.2	21.0	20.6	19.9	18.8	18.6	18.4	18.2	18.0	18.2	19.4	21.5
cold dry	LAC	improved	medium	9.2	9.1	9.1	9.1	9.0	8.8	9.3	10.1	10.0	9.9	9.8	9.7	9.4	7.9	5.7
warm dry	LAC	non-degraded	-	12.2	12.1	12.1	12.0	11.9	11.7	11.6	11.5	11.4	11.3	12.5	12.4	12.9	14.4	16.0
warm dry	LAC	improved	medium	12.2	12.1	12.1	12.0	11.9	11.7	11.6	11.5	11.4	11.3	9.8	9.7	9.0	7.4	5.6
cold dry	sandy	non-degraded	-	14.5	14.3	14.3	14.3	14.1	13.9	13.8	12.5	12.4	12.3	13.2	13.1	13.2	14.4	16.2
cold dry	sandy	improved	medium	9.6	9.6	9.6	9.5	9.4	9.3	9.2	10.2	10.1	10.0	8.8	8.7	8.5	7.1	5.1
warm dry	sandy	non-degraded	-	20.3	20.1	20.1	20.0	19.8	19.5	17.9	17.8	17.6	17.4	16.7	16.5	16.7	17.6	19.3
warm dry	sandy	improved	medium	8.7	8.6	8.6	8.6	8.5	8.4	9.7	9.6	9.5	9.4	9.8	9.7	9.4	8.3	6.4
cold dry	aquic	non-degraded	-	76.8	76.2	76.1	75.9	75.0	73.9	74.9	72.5	73.4	72.7	74.5	73.7	75.5	76.7	78.5
cold dry	aquic	improved	medium	13.5	13.4	13.4	13.4	13.2	13.0	11.2	12.8	11.0	10.9	8.3	8.2	5.7	4.0	1.6
warm dry	aquic	non-degraded	-	110.4	109.5	109.5	109.1	107.9	106.3	102.6	117.3	113.5	112.3	113.8	112.6	111.7	113.5	113.8
warm dry	aquic	improved	medium	27.6	27.4	27.4	27.3	27.0	26.6	28.9	13.0	15.5	15.3	12.6	12.5	12.4	9.9	8.6
Total				1294.2	1284.0	1283.3	1279.2	1264.9	1246.4	1233.7	1222.3	1209.9	1197.3	1185.6	1173.1	1164.0	1156.6	1148.0

Table A3-14. *Stratification of Grassland areas by climate zones, soil type and management practices II. (1000 ha)*

sub-categories				1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Climate	Soil	Management	Input	A	A	A	A	A	A	A	A	A	A	A	A	A
cold dry	HAC	non-degraded	-	277.7	288.0	308.5	315.3	318.5	293.5	307.4	312.7	313.8	314.8	312.4	301.4	302.1
cold dry	HAC	improved	medium	65.1	54.9	34.3	27.4	24.0	20.4	9.5	4.8	3.2	1.6	3.2	1.5	1.5
warm dry	HAC	non-degraded	-	435.9	451.2	466.3	476.4	486.2	447.9	456.8	462.3	466.4	465.5	464.3	445.7	446.7
warm dry	HAC	improved	medium	71.0	55.8	40.6	30.4	20.3	16.2	11.7	7.0	2.3	2.3	2.3	2.2	2.2
cold dry	LAC	non-degraded	-	22.8	23.4	24.5	25.0	25.2	23.4	23.9	24.4	24.9	24.8	24.8	23.9	23.9
cold dry	LAC	improved	medium	4.3	3.8	2.7	2.2	1.9	1.5	1.3	0.8	0.3	0.3	0.3	0.1	0.1
warm dry	LAC	non-degraded	-	17.5	17.9	18.6	19.5	19.9	18.3	18.8	19.2	19.8	19.8	19.7	19.0	19.1
warm dry	LAC	improved	medium	4.1	3.7	3.0	2.2	1.7	1.5	1.2	0.8	0.2	0.2	0.2	0.1	0.1
cold dry	sandy	non-degraded	-	17.3	18.2	18.8	19.4	19.6	18.0	19.2	19.4	19.4	19.7	19.7	18.9	18.9
cold dry	sandy	improved	medium	4.1	3.2	2.6	1.9	1.7	1.6	0.6	0.4	0.4	0.0	0.0	0.0	0.0
warm dry	sandy	non-degraded	-	20.8	22.1	23.1	23.9	24.1	22.4	23.0	23.3	23.3	23.7	23.7	22.7	22.8
warm dry	sandy	improved	medium	4.9	3.6	2.6	1.8	1.5	1.2	0.7	0.5	0.5	0.0	0.0	0.0	0.0
cold dry	aquic	non-degraded	-	78.5	78.5	78.5	79.3	79.2	72.6	73.3	73.4	74.1	73.9	73.7	70.8	71.0
cold dry	aquic	improved	medium	1.6	1.6	1.6	0.8	0.8	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0
warm dry	aquic	non-degraded	-	115.1	117.5	117.5	118.7	118.6	109.8	112.0	112.2	113.2	113.0	112.7	108.2	108.4
warm dry	aquic	improved	medium	7.3	4.9	4.9	3.7	3.7	2.2	1.1	1.1	0.0	0.0	0.0	0.0	0.0
Total				1148.0	1148.3	1148.1	1147.8	1147.1	1051.2	1061.2	1063.1	1061.6	1059.6	1056.9	1014.5	1016.9

Table A3-15. *Stratification of Grassland areas by climate zones, soil type and management practices III. (1000 ha)*

sub-categories		1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Climate	Soil	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
cold dry	HAC	0.0	5.2	4.1	3.2	4.7	5.1	6.1	4.4	4.4	4.3	5.3	1.5	0.0	0.0	2.2	2.9	0.5	6.2	7.4	4.3	6.3	9.6
warm dry	HAC	0.0	7.7	6.1	4.7	7.0	7.5	9.0	6.5	6.5	6.4	7.9	2.2	0.0	0.0	3.2	4.3	0.8	9.1	10.9	6.4	9.3	14.2
cold dry	LAC	0.0	0.4	0.3	0.3	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.2	0.0	0.0	0.2	0.2	0.2	0.5	0.6	0.6	0.8	1.1
warm dry	LAC	0.0	0.3	0.3	0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.4	0.2	0.0	0.0	0.1	0.2	0.2	0.4	0.5	0.5	0.7	0.9
cold dry	sandy	0.0	0.3	0.3	0.2	0.3	0.3	0.4	0.2	0.2	0.2	0.3	0.1	0.0	0.0	0.1	0.2	0.0	0.4	0.5	0.2	0.3	0.5
warm dry	sandy	0.0	0.4	0.3	0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.4	0.1	0.0	0.0	0.2	0.2	0.0	0.5	0.6	0.2	0.3	0.6
cold dry	aquic	0.0	1.2	1.0	0.8	1.1	1.2	1.5	1.1	1.1	1.1	1.3	0.5	0.0	0.0	0.5	0.7	0.3	1.4	1.7	1.2	1.8	2.6
warm dry	aquic	0.0	1.9	1.5	1.2	1.7	1.9	2.3	1.7	1.7	1.7	2.0	0.7	0.0	0.0	0.8	1.0	0.4	2.2	2.6	1.9	2.7	3.9
Total		0.0	17.5	13.9	10.7	15.9	17.1	20.5	15.0	15.1	14.9	18.2	5.4	0.0	0.0	7.3	9.7	2.4	20.6	24.7	15.2	22.1	33.4

sub-categories		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Climate	Soil	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
cold dry	HAC	12.4	16.1	20.1	21.9	24.9	27.0	28.4	30.2	29.2	28.2	27.1	26.3	25.3	54.4	49.1	47.7	46.1	44.4	43.7	55.1	52.9
warm dry	HAC	18.4	23.9	29.7	32.4	36.8	39.9	42.0	44.7	43.2	41.6	40.1	38.9	37.4	80.5	72.6	70.5	68.2	65.7	64.6	81.5	78.2
cold dry	LAC	1.4	1.6	2.0	2.2	2.4	2.6	2.7	2.9	2.9	2.8	2.8	2.7	2.7	4.9	4.6	4.5	4.4	4.4	4.4	5.3	5.2
warm dry	LAC	1.1	1.3	1.6	1.7	1.9	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.1	3.9	3.7	3.6	3.5	3.5	3.5	4.2	4.1
cold dry	sandy	0.6	0.9	1.1	1.2	1.4	1.5	1.6	1.7	1.6	1.6	1.5	1.4	1.3	3.3	2.9	2.8	2.7	2.6	2.5	3.2	3.1
warm dry	sandy	0.8	1.1	1.4	1.5	1.7	1.8	1.9	2.1	2.0	1.9	1.8	1.7	1.6	4.0	3.5	3.4	3.3	3.1	3.1	3.9	3.7
cold dry	aquic	3.3	4.1	5.0	5.5	6.2	6.7	7.1	7.5	7.3	7.1	6.9	6.7	6.5	13.2	12.1	11.7	11.4	11.1	11.0	13.7	13.2
warm dry	aquic	5.0	6.3	7.7	8.4	9.5	10.3	10.8	11.5	11.2	10.9	10.6	10.3	10.0	20.2	18.4	17.9	17.5	17.0	16.8	20.9	20.2
Total		42.9	55.3	68.5	74.8	84.8	92.0	96.8	102.9	99.6	96.2	93.0	90.2	86.9	184.5	166.9	162.1	157.2	151.7	149.6	188.0	180.5

Table A3-16. *Stratification of Unmanaged Grassland areas by climate zones and soil type (1000 ha)*

sub-categories		1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Climate	Soil	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
cold dry	HAC	431.6	433.0	434.3	435.7	437.0	438.4	439.7	441.1	442.4	443.8	445.1	446.5	452.5	453.9	455.2	456.6	453.2	461.3	465.9
warm dry	HAC	638.2	640.2	642.2	644.2	646.2	648.2	650.2	652.2	654.2	656.2	658.2	660.1	669.1	671.1	673.1	675.1	670.1	682.1	688.8
cold dry	LAC	20.9	20.9	21.0	21.1	21.1	21.2	21.2	21.3	21.4	21.4	21.5	21.6	17.4	17.4	17.5	17.5	21.9	17.7	17.9
warm dry	LAC	16.6	16.6	16.7	16.8	16.8	16.9	16.9	17.0	17.0	17.1	17.1	17.2	13.8	13.9	13.9	14.0	17.4	14.1	14.2
cold dry	sandy	31.6	31.7	31.8	31.9	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	34.7	34.8	34.9	35.0	33.2	35.4	35.7
warm dry	sandy	38.0	38.1	38.2	38.3	38.5	38.6	38.7	38.8	38.9	39.1	39.2	39.3	41.7	41.8	42.0	42.1	39.9	42.5	42.9
cold dry	aquic	88.3	88.5	88.8	89.1	89.4	89.6	89.9	90.2	90.5	90.7	91.0	91.3	88.3	88.6	88.8	89.1	92.7	90.0	90.9
warm dry	aquic	134.9	135.3	135.7	136.1	136.6	137.0	137.4	137.8	138.2	138.7	139.1	139.5	134.9	135.3	135.8	136.2	141.6	137.6	138.9
Total		1400.0	1404.4	1408.7	1413.1	1417.5	1421.9	1426.2	1430.6	1435.0	1439.4	1443.7	1448.1	1452.5	1456.9	1461.2	1465.6	1470.0	1480.7	1495.3
sub-categories		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Climate	Soil	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
cold dry	HAC	461.0	475.3	477.0	479.3	479.3	478.7	485.3	488.4	490.7	493.9	497.0	501.1	504.8	509.1	512.9	517.9	515.7	525.1	528.6
warm dry	HAC	681.7	702.7	705.3	708.7	708.7	707.8	717.5	722.1	725.6	730.3	734.9	740.9	746.4	752.8	758.4	765.7	762.5	776.5	781.6
cold dry	LAC	22.3	23.0	23.0	23.2	23.2	23.1	23.4	23.6	23.7	23.9	24.0	24.2	24.4	24.6	24.8	25.0	25.0	25.4	25.6
warm dry	LAC	17.7	18.3	18.3	18.4	18.4	18.4	18.7	18.8	18.9	19.0	19.1	19.3	19.4	19.6	19.7	19.9	19.9	20.2	20.4
cold dry	sandy	33.7	34.8	34.9	35.1	35.1	35.0	35.5	35.7	35.9	36.2	36.4	36.7	37.0	37.3	37.5	37.9	37.2	37.9	38.2
warm dry	sandy	40.6	41.8	42.0	42.2	42.2	42.1	42.7	43.0	43.2	43.5	43.7	44.1	44.4	44.8	45.1	45.6	44.8	45.6	45.9
cold dry	aquic	94.3	97.2	97.5	98.0	98.0	97.9	99.2	99.9	100.3	101.0	101.6	102.5	103.2	104.1	104.9	105.9	105.8	107.8	108.5
warm dry	aquic	144.1	148.5	149.1	149.8	149.8	149.6	151.6	152.6	153.3	154.3	155.3	156.6	157.7	159.1	160.3	161.8	161.7	164.7	165.8
Total		1495.3	1541.5	1547.2	1554.6	1554.7	1552.6	1574.0	1584.0	1591.7	1602.1	1612.1	1625.2	1637.4	1651.3	1663.7	1679.7	1672.7	1703.3	1714.6

Table A3-17. *Stratification of Forest Land areas by climate zones and soil type I. (1000 ha)*

sub-categories		2003	2004	2005	2006	2007
Climate	Soil	A	A	A	A	A
cold dry	HAC	536.5	545.8	551.8	556.7	563.0
warm dry	HAC	793.3	807.0	815.8	823.2	832.4
cold dry	LAC	26.0	26.4	26.7	27.0	27.3
warm dry	LAC	20.7	21.0	21.3	21.5	21.7
cold dry	sandy	38.7	39.4	39.8	40.2	40.6
warm dry	sandy	46.6	47.4	47.9	48.3	48.9
cold dry	aquic	110.1	112.0	113.2	114.3	115.5
warm dry	aquic	168.3	171.2	173.1	174.6	176.6
Total		1740.3	1770.3	1789.6	1805.8	1826.0

Table A3-18. *Stratification of Forest Land by climate zones and soil type II. (1000 ha)*

Quality Assurance Report

Prepared by Dr. Zoltan Somogyi, Hungarian Forest Research Institute (ERTI)
for the National Agricultural Institutes (MGSZH)
on its 2007 greenhouse gas inventory report on the forestry sector

1. QA of the 2007 GHG inventory report has been only made for the data for 2007, as previous data was regarded as having been reviewed and accepted.

2. The first version of the report was sent to ERTI 17 December 2008 via e-mail. The report included calculations for 2007 in a new calculation scheme. The calculations were reviewed and corrected several times. Communication between MGSZH and ERTI happened via e-mail and over phone. The final calculations were submitted to the Hungarian Meteorological Service (OMSZ) 12 January 2009.

3. The calculations were submitted in MS Excel format, and most suggestions and comments were inserted in respective cells and blocks in subsequent versions of the same file.

4. A new calculation scheme was developed by MGSZH in preparation for the supplementary information under the Kyoto Protocol due next year. The previous scheme was simplified and streamlined for better transparency. A number of suggestions was made by ERTI to further increase consistency.

5. It was discussed whether the Tier and the approach of the calculations should remain the same as in previous years, or should not. It was concluded that the current assessment methodology is the best considering the availability and the accuracy of the data, and fully comply with the IPCC guidelines.

6. There were a few inconsistencies concerning the right interpretation of the forest area, and the correct use of biomass conversion factors. The decision was made that a full recalculation of the UNFCCC biomass related data set will take place at the end of this year in order to ensure accurate and consistent UNFCCC, as well as KP inventory data sets.

7. ERTI suggested to correct a few other minor errors. MGSZH considered all suggestions of ERTI and made all requested changes that ensure that the calculations for 2007 are correct.

8. It is further noted that no uncertainty analysis has been made in addition to what was done in the previous years. Thus, the uncertainty has remained about the same with the exception that this QA has verified the correctness of the calculations of the previous years. It is suggested that MGSZH uses all new information (e.g. concerning the accuracy of the “new” wood density factors, the accuracy of its forest area and volume assessment etc.) to develop the uncertainty analysis.

9. ERTI also has some additional suggestions for further improvements. One is to include several graphs in the system of Excel sheets that could help identify inconsistencies and errors in the dataset. Another is to include forest fire statistics in the next round of the inventory to obtain estimates on emissions from forest fires. Hopefully, there will be some fire estimates in the monitoring system run by ERTI this year, but the use of other databases should also be considered. Yet another suggestion is to compile as much information on deadwood and litter from previous assessments as possible.

10. Finally, it is suggested that the necessary changes in the text of the NIR following the availability of the data for the new inventory year be made accordingly.

Budapest, 12 January 2009.

Dr. Zoltan Somogyi
QA manager for NIR/forestry, ERTI

A3.5. References

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Annex 4 Comparison of Sectoral and Reference Approaches

Analysis in case of total fuel consumption and total CO_2 emissions

The UNFCCC reference approach was compared with the sectoral approach as a check of combustion-related emissions. The check was performed for all years from 1985 to 2007 and is an integral part of reporting to the UNFCCC. The analysis includes also the comparison from the base year (1985-87).
The reference approach, in theory, includes all CO_2 emissions from all fossil fuel uses in a country and should be compared with a set of emissions from the sectoral approach that includes all CO_2 emissions from energy and non-energy (including feedstock) use of fossil fuels. In the CRF reporting software, the reference approach is directly compared with the sectoral fuel combustion total.
This direct comparison of the energy outputs from the reference approach and the sectoral approach used in the Common Reporting Format (CRF) shows a reference approach total that is consistently larger than the sectoral approach total (*Figure A4-2.*).

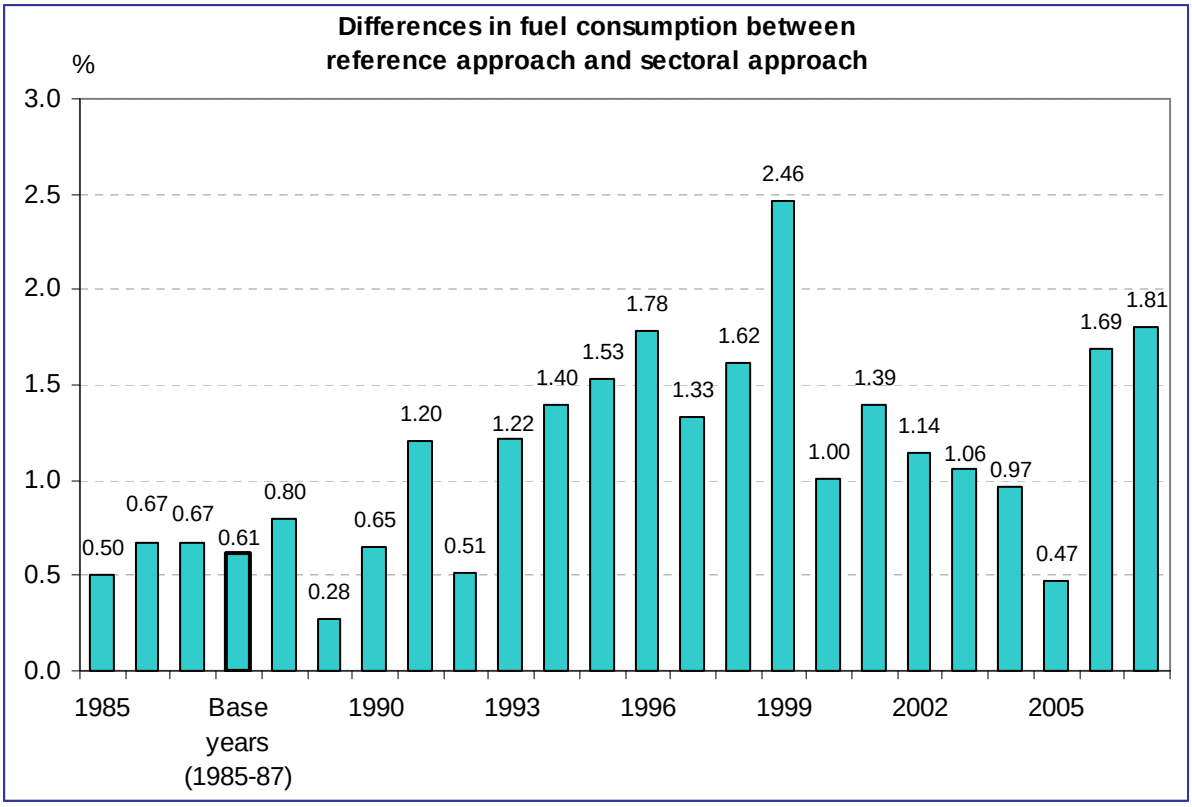


Figure A4-2. *Comparison of sectoral and reference approach – fuel consumption*

The figures of this submission are spectacularly different compared to the previous ones, especially the figure of CO_2 emission. Recalculation of CO_2 emission of natural gas used as feedstock (see Chapter 3.1) induced this change.

In 2007, comparing the two approaches the difference was 1.81% in energy consumption (*Figure A4-2.*) and 3.18% as regards CO_2 emission (*Figure A4-3.*). Increased differences are due to the following reasons:

- statistical differences between available energy and final energy consumption increased by 9% compared to 2006 in the energy statistics

- transformation losses increased by 12% compared to 2006 according to the energy statistics
- differences in *liquid* and *other fuels*, fuel consumption:

Fuel consumption in PJ	Reference approach	Sectoral approach
Liquid fuels	299.457	281.482
Other fuels*	0	13.401
Transformation losses (not included in CRF)	0	7.963
Blending of other refinery product (not included in CRF)	3.389	0
Total	**302.846**	**302.846**

* It should be noted, that in case of liqiud fuels certain oil derivatives are calculated under the "other" category in sectoral approach. Therefore, to ensure the correctness of the calculations, these values should be added to the liquid item.

- differences in *gaseous fuel* (natural gas), fuel consumption and CO_2 emission:

Fuel consumption in PJ	Reference approach	Sectoral approach
Fuel consumption – energy sector	448.190	429.212
Fuel consumption – feedstock	-16.409	0
Network losses – fugitive emission	0	2.569
Total	**431.781**	**431.781**
CO2 emission in Gg	Reference approach	Sectoral approach
Fuel consumption – energy sector	24,715.492	23,958.382
Fuel consumption – feedstock	-613.681	0
Network losses– fugitive emission	0	143.417
Total	**24,101.811**	**24,101.799**

- differences in *solid fuel*, fuel consumption:

Fuel consumption in PJ	Reference approach	Sectoral approach
Solid fuels	133.847	117.266
Derived gases		8.216
Feedstock in industrial processes	-0.171	
Other coal product used as feedstock (not included in CRF)		2.501
Liquid fuels used as feedstock in solid fuel transformation		-0.495
Transformation and network losses (not included in CRF)		6.188**
Total	**133.676**	**133.676**

** 23 TJ network loss of coke oven gas was included

The range of differences are between 0.28% (1988) and 2.46% (1999) with a 1.12% mean value as regards the fuel consumptions, and 0.57% (1995) and 3.17 (2007) with a 1.85% mean value as regards the CO_2 emissions.

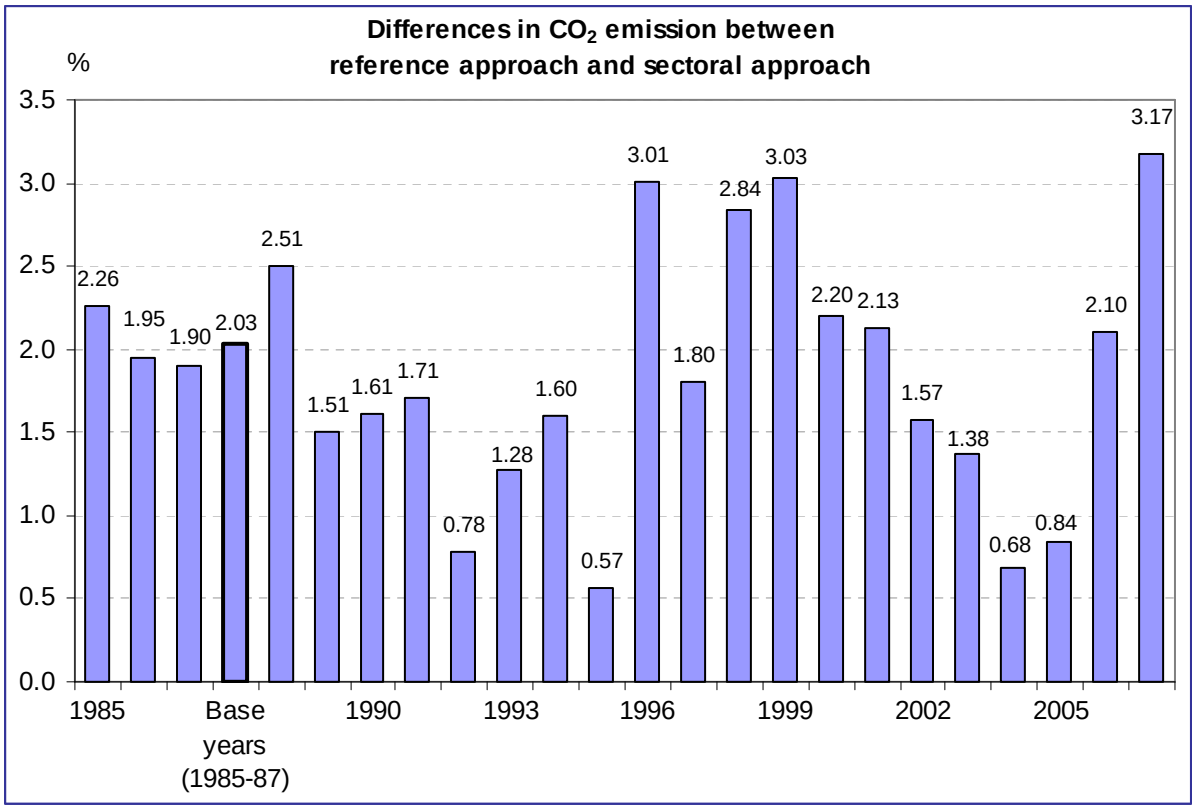


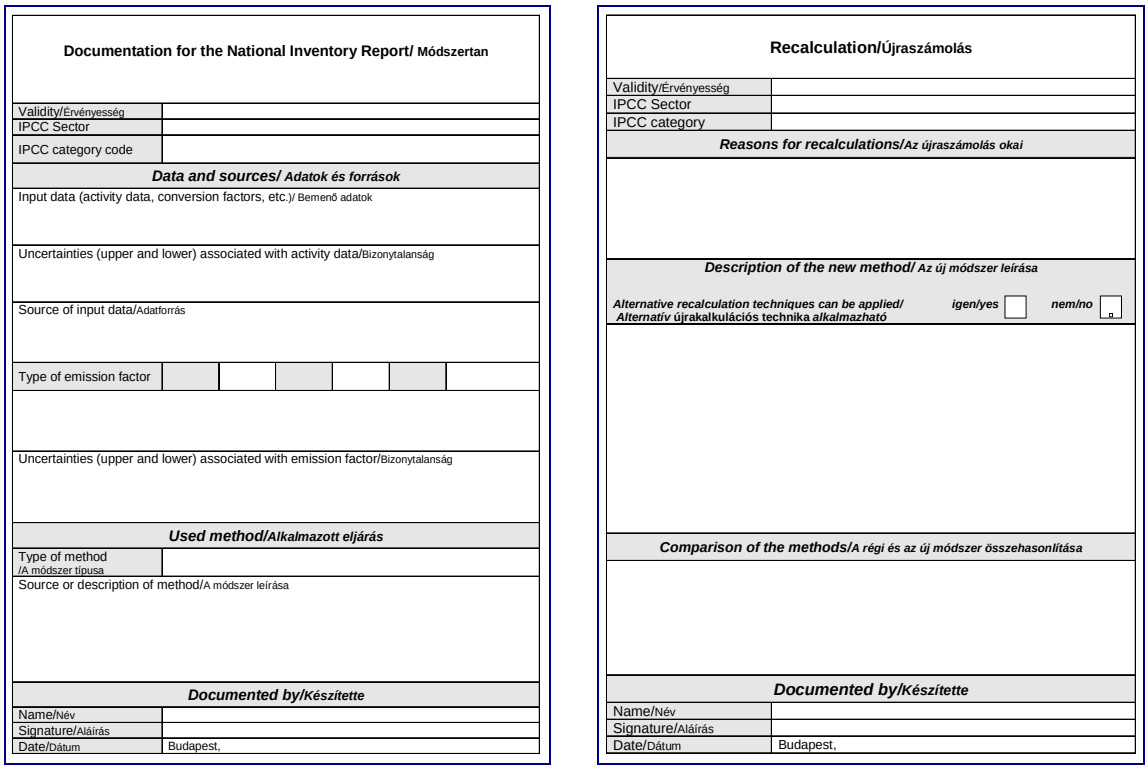
Figure A4-3. *Comparison of sectoral and reference approach – CO_2 emission*

Annex 5 Assessment of completeness

To date, no detailed information is available on assessment of completeness and of potentially excluded sources and sinks of greenhouse gas emissions.

Annex 6 Quality Assurance and Quality Control

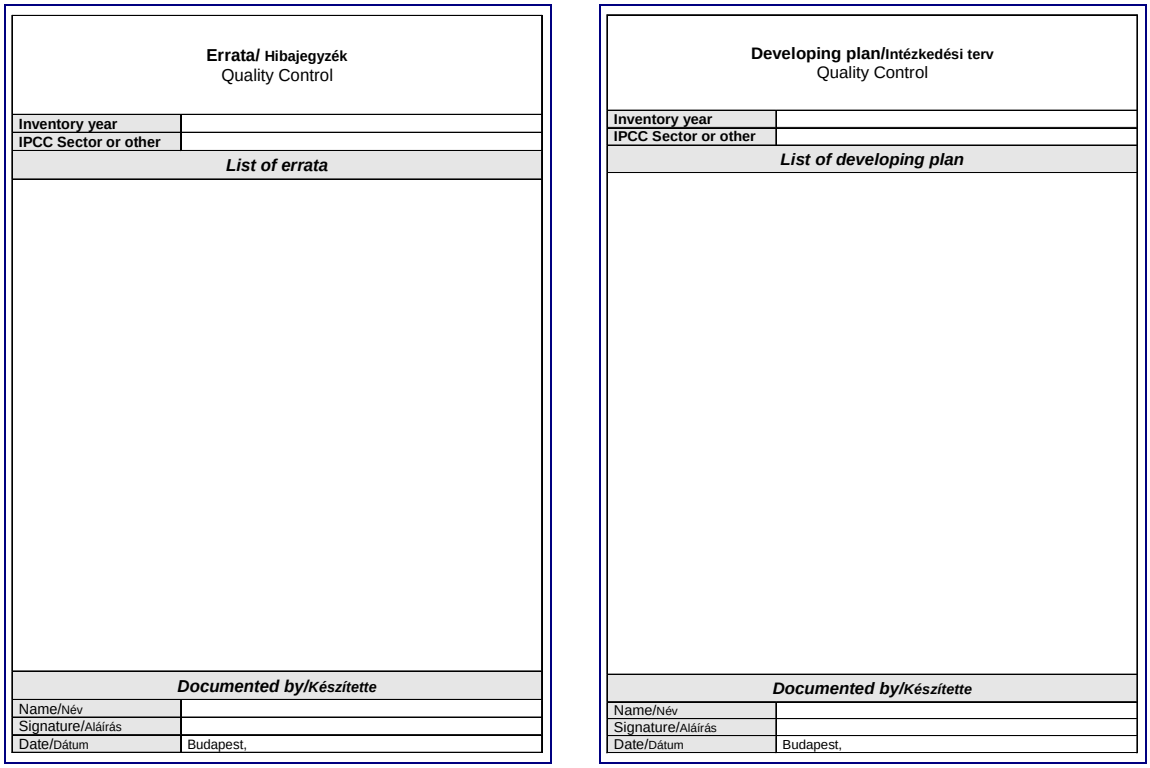
QA/QC activities are explained in Chapter 1.6. The following registers are used for documenting data sources, calculation methods, reason and effect of recalculations etc.



Documentation for the National Inventory Report/ Módszertan	
Validity/Érvényesség	
IPCC Sector	
IPCC category code	
Data and sources/ Adatok és források	
Input data (activity data, conversion factors, etc.)/ Bemenő adatok	
Uncertainties (upper and lower) associated with activity data/Bizonytalanság	
Source of input data/Adatforrás	
Type of emission factor	
Uncertainties (upper and lower) associated with emission factor/Bizonytalanság	
Used method/Alkalmazott eljárás	
Type of method /A módszer típusa	
Source or description of method/A módszer leírása	
Documented by/Készítette	
Name/Név	
Signature/Aláírás	
Date/Dátum	Budapest,

Recalculation/Újraszámolás	
Validity/Érvényesség	
IPCC Sector	
IPCC category	
Reasons for recalculations/Az újraszámolás okai	
Description of the new method/ Az új módszer leírása	
Alternative recalculation techniques can be applied/ Alternatív újrakalkulációs technika alkalmazható — ***igen/yes*** ☐ ***nem/no*** ☐	
Comparison of the methods/A régi és az új módszer összehasonlítása	
Documented by/Készítette	
Name/Név	
Signature/Aláírás	
Date/Dátum	Budapest,

Figure A6-1. *Register of used data, data sources and calculation methods and register of recalculations*



Errata/ Hibajegyzék Quality Control	
Inventory year	
IPCC Sector or other	
List of errata	
Documented by/Készítette	
Name/Név	
Signature/Aláírás	
Date/Dátum	Budapest,

Developing plan/Intézkedési terv Quality Control	
Inventory year	
IPCC Sector or other	
List of developing plan	
Documented by/Készítette	
Name/Név	
Signature/Aláírás	
Date/Dátum	Budapest,

Figure A6-2. *Register for errata and developing plan*

Quality Control of the National Inventory Report/
Adatminőség ellenőrzés

A./ General QC activity/
Általános QC tevékenység

IPCC code of the audited sector/ Vizsgált szektor és IPCC kódja:	
Inventory year/Vizsgált év:	
Controller/Ellenőrző neve:	

Summary of general findings/
Általános megállapítások összefoglalása

Date/
Dátum: …….. …… ……
auditor / ellenőr — sectoral expert / szektorfelelős

Measures suggested by the sectoral expert/
A szektorfelelős javaslata alapján teendő intézkedések

Date/
Dátum: …….. …… ……
head of division / osztályvezető — sectoral expert / szektorfelelős

Verification, after the implemented measures still exsisting problems/
Utóellenőrzés, a javító intézkedések után is fennálló problémák

Date/
Dátum: …….. …… ……
auditor / ellenőr — sectoral expert / szektorfelelős

Launch of new procedure/Új eljárás indítása:	End of the audit/A vizsgálat lezárása:
Date/ Dátum: …….. …… head of division / osztályvezető	Date/ Dátum: …….. …… head of division / osztályvezető

Figure A6-3. *Registers for quality control*

B./ CHECKLIST

QC activity/ ***QC tevékenység***	***Procedure of audit/*** ***Az ellenőrzés folyamata***	***Result of audit/*** ***Az ellenőrzés eredménye***
1. Check that assumptions and criteria for the selection of activity data and emission factors are documented. (Ellenőrizze, hogy az alkalmazott tevékenységi adatok, emissziós faktorok, módszertanok dokumentálásra kerültek.)		
2. Confirm that bibliographical data references are properly cited in the internal documentation. (Ellenőrizze, hogy a könyvtári adatokra történő hivatkozásokat pontosan idézték a belső dokumentációban.)		
3. Check that activity data could be reproduced. (Ellenőrizze, hogy a tevékenységi adatok reprodukálhatóak.)		
4. Check that emission factors could be reproduced. (Ellenőrizze, hogy az emissziós faktorok reprodukálhatóak.)		
5. Check that emissions/removals are calculated correctly. (Ellenőrizze, hogy az emissziókat/nyeléseket helyesen számolták ki.)		
6. Compare estimates to previous estimates. (Hasonlítsa össze a becsléseket a korábbi becslésekkel.)		
7. Undertake completeness checks. (Check completeness elvégzése.)		
8. Check methodological and data changes resulting in recalculations. (Ellenőrizze az újraszámításokból eredő módszertani és adatváltozásokat.)		

Annex 7 Uncertainty

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. “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 prioritise 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 IPCC Good Practice Guidance (2000), a basic method (Tier 1) which is mandatory and an analytic one (Tier 2). The uncertainty analysis for the Hungarian inventory was carried out on the basis of Tier 1 method without the LULUCF sector since uncertainty estimates for activity data are not available for this sector.

The uncertainty calculation was performed using Table 6.1 of the IPCC Good Practice Guidance (2000). The disaggregation of the inventory into categories was the same as used for key category analysis (*Table A1-1*).

The calculations of the emissions estimates uncertainty are presented, without the sector of LULUCF, in *Table A7-1*.

Input data and results of uncertainty calculations differ from previous submissions according to the new methods in agriculture. More details can be found in the NIR, Chapter 6.1.5.

Table A7-1. *Uncertainty calculation without LULUCF, Tier 1 method*

CRF code	IPCC source category	Direct green-house gas	Base year emission (Gg CO_2 eq.)	Current year (2007) emission (Gg CO_2 eq.)	Activity data uncer-tainty (%)	Emission factor uncer-tainty (%)	Combined uncertainty (%)	Combined uncertainty as % of total emissions in 2007
	A	B	C	D	E	F	G	H
			Input data	Input data	Input data	Input data	$\sqrt{E^2+F^2}$	$\frac{G \cdot D}{\sum D}$
1. A	Stationary Combustion - Gas	CO_2	19 517.56	23 953.47	5	5	7.071	2.230
1. A	Stationary Combustion - Coal	CO_2	34 678.65	12 575.90	2	5	5.385	0.892
1. A	Stationary Combustion - Oil	CO_2	16 628.08	4 677.07	2	5	5.385	0.332
1. A	Non-CO_2 Emission from Stationary Fuel Combustion	N_2O	790.15	438.59	3	50	50.090	0.289
1. A	Non-CO_2 Emission from Stationary Fuel Combustion	CH_4	577.01	230.41	3	8	8.544	0.026
1. A	Stationary Combustion - Other Fuel	CO_2	51.32	61.10	5	10	11.180	0.009
1. A. 3	Mobile Combustion - Other	CO_2	814.36	188.60	5	5	7.071	0.018
1. A. 3	Mobile Combustion	N_2O	112.10	385.07	5	100	100.125	0.508
1. A. 3	Mobile Combustion	CH_4	45.35	27.25	5	50	50.249	0.018
1. A. 3. B	Mobile Combustion - Road	CO_2	6 807.45	12 233.23	5	5	7.071	1.139
1. B. 1	Fugitive Emissions from Coal Mining and Handling	CH_4	923.01	22.69	3	10	10.440	0.003
1. B. 1	Fugitive Emissions from Coal Mining and Handling	CO_2	3.60		3	10	10.440	0.000
1. B. 2	Fugitive Emissions from Oil and Gas Operations (Main Source: Gas Distribution)	CH_4	1 613.47	2 065.42	2	50	50.040	1.361
1. B. 2	Fugitive Emissions from Oil and Gas Operations	N_2O	0.60	0.24	2	100	100.020	0.000
1. B. 2	Fugitive Emissions from Oil and Gas Operations	CO_2	195.68	76.97	100	80	128.062	0.130
2.	N_2O Emission from Industry	N_2O	4 541.51	905.67	2	1	2.236	0.027
2.	CH_4 Emission from Industry	CH_4	7.84	16.46	1	20	20.025	0.004

Table A7-1. *Uncertainty calculation without LULUCF, Tier 1 method*

CRF code	IPCC source category	Direct green-house gas	Base year emission (Gg CO_2 eq.)	Current year (2007) emission (Gg CO_2 eq.)	Activity data uncer-tainty (%)	Emission factor uncer-tainty (%)	Combined uncertainty (%)	Combined uncertainty as % of total emissions in 2007
	A	B	C	D	E	F	G	H
			Input data	Input data	Input data	Input data	$\sqrt{E^2+F^2}$	$\frac{G \cdot D}{\sum D}$
2. A. 1	CO_2 Emissions from Cement Production	CO_2	1 765.31	1 328.10	2	2	2.828	0.049
2. A. 2	CO_2 Emissions from Lime Production	CO_2	645.03	300.75	5	2	5.385	0.021
2. A. 3	CO_2 Emission from Limestone and Dolomit Use	CO_2	248.68	328.61	2	1	2.236	0.010
2. A. 7	CO_2 Emission from Other Mineral Products	CO_2	642.13	433.71	10	30	31.623	0.181
2. B. 1	CO_2 Emissions from Ammonia Processes	CO_2	1 995.97	844.50	2	2	2.828	0.031
2. B. 2	CO_2 Emissions from Nitric Acid Production	CO_2	0.082		0	0	0.000	0.000
2. C	CO_2 Emissions from Metal Production	CO_2	641.57	290.10	2	5	5.385	0.021
2. C. 3	PFCs Emissions	PFCs	166.82	2.38	1	2	2.236	0.000
2. F	Emissions from HFCs consumption	HFCs	1.74	614.50	10	20	22.361	0.181
2. F. 7	SF_6 Emissions from Electrical Equipment	SF_6	70.15	171.65	80	20	82.462	0.186
3.	N_2O Emission from Solvent and Other Product Use	N_2O	253.77	86.52	2	1	2.236	0.003
3.	CO_2 Emission from Solvent and Other Product Use	CO_2	130.36	71.57	10	20	22.361	0.021
4. A	CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	3 464.86	1 563.54	0*	28.070	28.070	0.578
4. B	CH_4 Emissions from Manure Management	CH_4	2 399.03	1 096.90	0*	43.191	43.191	0.624
4. B	N_2O Emissions from Manure Management	N_2O	2 482.76	1 118.64	0*	67.703	67.703	0.997
4. C	CH_4 Emission from Rice Cultivation	CH_4	50.54	10.99	0*	216.910	216.910	0.031
4. D. 1	Direct N_2O Emissions from Agricultural Soils	N_2O	6 086.13	3 250.86	0*	159.625	159.625	6.833
4. D. 2	Pasture, Range and Paddock Manure	N_2O	390.92	186.93	0*	155.484	155.484	0.383

Table A7-1. *Uncertainty calculation without LULUCF, Tier 1 method*

CRF code	IPCC source category	Direct green-house gas	Base year emission (Gg CO_2 eq.)	Current year (2007) emission (Gg CO_2 eq.)	Activity data uncer-tainty (%)	Emission factor uncer-tainty (%)	Combined uncertainty (%)	Combined uncertainty as % of total emissions in 2007
	A	B	C	D	E	F	G	H
			Input data	Input data	Input data	Input data	$\sqrt{E^2+F^2}$	$\frac{G \cdot D}{\sum D}$
4. D. 3	Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	4 466.05	2 249.25	0*	68.582	68.582	2.031
4. F	Field Burning of Agricultural Residues	CH_4	45.51		10	100	100.499	0.000
4. F	Field Burning of Agricultural Residues	N_2O	13.34		10	200	200.250	0.000
6. A	CH_4 Emissions from Solid Waste Disposal Sites	CH_4	1 917.30	2 955.58	10	30	31.623	1.231
6. B	Emissions from Wastewater Handling	CH_4	847.03	556.07	20	30	36.056	0.264
6. B	Emissions from Wastewater Handling	N_2O	207.70	205.94	10	50	50.990	0.138
6. C	Non-biogenic CO_2 from Waste	CO_2	97.62	388.12	10	20	22.361	0.114
6. C	N_2O Emissions from Waste Incineration	N_2O	3.65	30.18	5	100	100.125	0.040

* Only total uncertainty is known for this category and uncertainty is correlated across years, therefore uncertainty is entered into column F.

Note A

$$\frac{0.01 \cdot D_x + \sum D_i - (0.01 \cdot C_x + \sum C_i)}{(0.01 \cdot C_x + \sum C_i)} \cdot 100 - \frac{\sum D_i - \sum C_i}{\sum C_i} \cdot 100$$

Table A7-2. *Uncertainty calculation without LULUCF, Tier 1 method*

CRF code	IPCC source category	Direct green-house gas	Type A sensitivity (%)	Type B sensitivity (%)	Uncertainty in trend in emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in emissions introduced by activity data uncertainty (%)	Uncertainty introduced into the trend in total emissions (%)
	A	B	I	J	K	L	M
			Note A	$\frac{D}{\sum C}$	$I \cdot F$	$J \cdot E \cdot \sqrt{2}$	$\sqrt{K^2 + L^2}$
1. A	Stationary Combustion - Gas	CO_2	0.096	0.206	0.481	1.456	1.533
1. A	Stationary Combustion - Coal	CO_2	-0.086	0.108	-0.431	0.306	0.529
1. A	Stationary Combustion - Oil	CO_2	-0.053	0.040	-0.265	0.114	0.288
1. A	Non-CO_2 Emission from Stationary Fuel Combustion	N_2O	-0.001	0.004	-0.033	0.016	0.037
1. A	Non-CO_2 Emission from Stationary Fuel Combustion	CH_4	-0.001	0.002	-0.010	0.008	0.013
1. A	Stationary Combustion - Other Fuel	CO_2	0.000	0.001	0.002	0.004	0.004
1. A. 3	Mobile Combustion - Other	CO_2	-0.003	0.002	-0.015	0.011	0.019
1. A. 3	Mobile Combustion	N_2O	0.003	0.003	0.268	0.023	0.269
1. A. 3	Mobile Combustion	CH_4	0.000	0.000	-0.001	0.002	0.002
1. A. 3. B	Mobile Combustion - Road	CO_2	0.067	0.105	0.335	0.744	0.815
1. B. 1	Fugitive Emissions from Coal Mining and Handling	CH_4	-0.005	0.000	-0.050	0.001	0.050
1. B. 1	Fugitive Emissions from Coal Mining and Handling	CO_2	0.000	0.000	0.000	0.000	0.000
1. B. 2	Fugitive Emissions from Oil and Gas Operations (Main Source: Gas Distribution)	CH_4	0.009	0.018	0.435	0.050	0.438
1. B. 2	Fugitive Emissions from Oil and Gas Operations	N_2O	0.000	0.000	0.000	0.000	0.000
1. B. 2	Fugitive Emissions from Oil and Gas Operations	CO_2	0.000	0.001	-0.035	0.094	0.100
2.	N_2O Emission from Industry	N_2O	-0.018	0.008	-0.018	0.022	0.028
2.	CH_4 Emission from Industry	CH_4	0.000	0.000	0.002	0.000	0.002

Table A7-2. *Uncertainty calculation without LULUCF, Tier 1 method*

CRF code	IPCC source category	Direct green-house gas	Type A sensitivity (%)	Type B sensitivity (%)	Uncertainty in trend in emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in emissions introduced by activity data uncertainty (%)	Uncertainty introduced into the trend in total emissions (%)
	A	B	I	J	K	L	M
			Note A	$\frac{D}{\sum C}$	I·F	$J \cdot E \cdot \sqrt{2}$	$\sqrt{K^2 + L^2}$
2. A. 1	CO_2 Emissions from Cement Production	CO_2	0.002	0.011	0.003	0.032	0.032
2. A. 2	CO_2 Emissions from Lime Production	CO_2	-0.001	0.003	-0.002	0.018	0.018
2. A. 3	CO_2 Emission from Limestone and Dolomit Use	CO_2	0.001	0.003	0.001	0.008	0.008
2. A. 7	CO_2 Emission from Other Mineral Products	CO_2	0.000	0.004	0.004	0.053	0.053
2. B. 1	CO_2 Emissions from Ammonia Processes	CO_2	-0.004	0.007	-0.008	0.021	0.022
2. B. 2	CO_2 Emissions from Nitric Acid Production	CO_2	0.000	0.000	0.000	0.000	0.000
2. C	CO_2 Emissions from Metal Production	CO_2	-0.001	0.002	-0.006	0.007	0.009
2. C. 3	PFCs Emissions	PFCs	-0.001	0.000	-0.002	0.000	0.002
2. F	Emissions from HFCs consumption	HFCs	0.005	0.005	0.105	0.075	0.129
2. F. 7	SF_6 Emissions from Electrical Equipment	SF_6	0.001	0.001	0.022	0.167	0.168
3.	N_2O Emission from Solvent and Other Product Use	N_2O	-0.001	0.001	-0.001	0.002	0.002
3.	CO_2 Emission from Solvent and Other Product Use	CO_2	0.000	0.001	-0.002	0.009	0.009
4. A	CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	-0.006	0.013	-0.168	0.000	0.168
4. B	CH_4 Emissions from Manure Management	CH_4	-0.004	0.009	-0.174	0.000	0.174
4. B	N_2O Emissions from Manure Management	N_2O	-0.004	0.010	-0.292	0.000	0.292
4. C	CH_4 Emission from Rice Cultivation	CH_4	0.000	0.000	-0.041	0.000	0.041
4. D. 1	Direct N_2O Emissions from Agricultural Soils	N_2O	-0.006	0.028	-0.990	0.000	0.990
4. D. 2	Pasture, Range and Paddock Manure	N_2O	-0.001	0.002	-0.091	0.000	0.091

Table A7-2. *Uncertainty calculation without LULUCF, Tier 1 method*

CRF code	IPCC source category	Direct green-house gas	Type A sensitivity (%)	Type B sensitivity (%)	Uncertainty in trend in emissions introduced by emission factor uncertainty (%)	Uncertainty in trend in emissions introduced by activity data uncertainty (%)	Uncertainty introduced into the trend in total emissions (%)
	A	B	I	J	K	L	M
			Note A	$\frac{D}{\sum C}$	I·F	$J \cdot E \cdot \sqrt{2}$	$\sqrt{K^2 + L^2}$
4. D. 3	Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	-0.006	0.019	-0.392	0.000	0.392
4. F	Field Burning of Agricultural Residues	CH_4	0.000	0.000	-0.026	0.000	0.026
4. F	Field Burning of Agricultural Residues	N_2O	0.000	0.000	-0.015	0.000	0.015
6. A	CH_4 Emissions from Solid Waste Disposal Sites	CH_4	0.015	0.025	0.439	0.359	0.568
6. B	Emissions from Wastewater Handling	CH_4	0.000	0.005	0.001	0.135	0.135
6. B	Emissions from Wastewater Handling	N_2O	0.001	0.002	0.030	0.025	0.039
6. C	Non-biogenic CO_2 from Waste	CO_2	0.003	0.003	0.056	0.047	0.073
6. C	N_2O Emissions from Waste Incineration	N_2O	0.000	0.000	0.024	0.002	0.024

Table A7-3. *Uncertainty calculation for different gases (without LULUCF, Tier 1 method)*

IPCC source category	Direct green-house gas	Base year emission (Gg CO_2 eq.)	Current year (2007) emission (Gg CO_2 eq.)	Activity data uncer-tainty (%)	Emission factor uncer-tainty (%)	Combined uncertainty (%)	Combined uncertainty as % of total emissions in each gas type
Stationary Combustion - Gas	CO_2	19 517.56	23 953.47	5	5	7.071	2.933
Stationary Combustion - Coal	CO_2	34 678.65	12 575.90	2	5	5.385	1.173
Stationary Combustion - Oil	CO_2	16 628.08	4 677.07	2	5	5.385	0.436
Stationary Combustion - Other Fuel	CO_2	51.32	61.10	5	10	11.180	0.012
Mobile Combustion - Other	CO_2	814.36	188.60	5	5	7.071	0.023
Mobile Combustion - Road	CO_2	6 807.45	12 233.23	5	5	7.071	1.498
Fugitive Emissions from Coal Mining and Handling	CO_2	3.60	-	3	10	10.440	0.000
Fugitive Emissions from Oil and Gas Operations	CO_2	195.68	76.97	100	80	128.062	0.171
CO_2 Emissions from Cement Production	CO_2	1 765.31	1 328.10	2	2	2.828	0.065
CO_2 Emissions from Lime Production	CO_2	645.03	300.75	5	2	5.385	0.028
CO_2 Emission from Limestone and Dolomit Use	CO_2	248.68	328.61	2	1	2.236	0.013
CO_2 Emission from Other Mineral Products	CO_2	642.13	433.71	10	30	31.623	0.237
CO_2 Emissions from Ammonia Processes	CO_2	1 995.97	844.50	2	2	2.828	0.041
CO_2 Emissions from Nitric Acid Production	CO_2	0.08	-	0	0	0.000	0.000
CO_2 Emissions from Metal Production	CO_2	641.57	290.10	2	5	5.385	0.027
CO_2 Emission from Solvent and Other Product Use	CO_2	130.36	71.57	10	20	22.361	0.028
Non-biogenic CO_2 from Waste	CO_2	97.622	388.121	10	20	22.361	0.150
Total CO_2 uncertainty	**CO_2**	**84 863.46**	**57 751.80**				**3.539**
Non-CO_2 Emission from Stationary Fuel Combustion	CH_4	577.01	230.41	3	8	8.544	0.230
Mobile Combustion	CH_4	45.35	27.25	5	50	50.249	0.160

Table A7-3. *Uncertainty calculation for different gases (without LULUCF, Tier 1 method)*

IPCC source category	Direct green-house gas	Base year emission (Gg CO_2 eq.)	Current year (2007) emission (Gg CO_2 eq.)	Activity data uncer-tainty (%)	Emission factor uncer-tainty (%)	Combined uncertainty (%)	Combined uncertainty as % of total emissions in each gas type
Fugitive Emissions from Coal Mining and Handling	CH_4	923.01	22.69	3	10	10.440	0.028
Fugitive Emissions from Oil and Gas Operations (Main Source: Gas Distribution)	CH_4	1 613.47	2 065.42	2	50	50.040	12.095
CH_4 Emission from Industry	CH_4	7.84	16.46	1	20	20.025	0.039
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	CH_4	3 464.86	1 563.54	0*	28	28.070	5.136
CH_4 Emissions from Manure Management	CH_4	2 399.03	1 096.90	0*	43	43.191	5.544
CH_4 Emission from Rice Cultivation	CH_4	50.54	10.99	0*	217	216.910	0.279
Field Burning of Agricultural Residues	CH_4	45.51		10	100	100.499	0.000
CH_4 Emissions from Solid Waste Disposal Sites	CH_4	1 917.30	2 955.58	10	30	31.623	10.937
Total CH_4 uncertainty	**CH_4**	**11 890.96**	**8 545.31**				**18.130**
N_2O Emissions from Waste Incineration	N_2O	3.65	30.18	5	100	100.125	0.341
Non-CO_2 Emission from Stationary Fuel Combustion	N_2O	790.15	438.59	3	50	50.090	2.480
Mobile Combustion	N_2O	112.10	385.07	5	100	100.125	4.353
Fugitive Emissions from Oil and Gas Operations	N_2O	0.60	0.24	2	100	100.020	0.003
N_2O Emission from Industry	N_2O	4 541.51	905.67	2	1	2.236	0.229
N_2O Emission from Solvent and Other Product Use	N_2O	253.773	86.520	2	1	2.236	0.022
N_2O Emissions from Manure Management	N_2O	2 482.76	1 118.64	0	68	67.703	8.550
Direct N_2O Emissions from Agricultural Soils	N_2O	6 086.13	3 250.86	0	160	159.625	58.583
Pasture, Range and Paddock Manure	N_2O	390.92	186.93	0	155	155.484	3.281
Indirect N_2O Emissions from Nitrogen Used in Agriculture	N_2O	4 466.05	2 249.25	0	69	68.582	17.415

Table A7-3. *Uncertainty calculation for different gases (without LULUCF, Tier 1 method)*

IPCC source category	Direct green-house gas	Base year emission (Gg CO_2 eq.)	Current year (2007) emission (Gg CO_2 eq.)	Activity data uncer-tainty (%)	Emission factor uncer-tainty (%)	Combined uncertainty (%)	Combined uncertainty as % of total emissions in each gas type
Field Burning of Agricultural Residues	N_2O	13.34		10	200	200.250	0.000
Emissions from Wastewater Handling	N_2O	207.70	205.94	10	50	50.990	1.185
Total N_2O uncertainty	**N_2O**	**19 348.67**	**8 857.87**				**62.014**
PFCs Emissions	PFCs	166.82	2.38	1	2	2.236	0.007
SF_6 Emissions from Electrical Equipment	SF_6	70.15	171.65	80	20	82.462	17.950
Emissions from HFCs consumption	HFCs	1.74	614.50	10	20	22.361	17.426

* Only total uncertainty is known for this category and uncertainty is correlated across years, therefore uncertainty is entered into column F.

Annex 8 Other registry relevant information

Accounting of the Kyoto Protocol Units

Annual Submission Item	Reference / Information
15/CMP.1 annex I.E paragraph 11: Standard electronic format (SEF)	The SEF Report is submitted as a separate file created by the UNFCCC SEF Application v1.2. The filename is: [SEF_HU_2009_1_10-42-12 9-4-2009.xls]. (Report R-1)
15/CMP.1 annex I.E paragraph 12: List of discrepant transactions	No discrepant transaction for the reporting period, pursuant of 15/CMP.1 annex I.E paragraph 12. No transaction initiated in the reporting period resulted in a response code listed under the "Applicable DES response code" section of "SIAR Reporting Requirements for Registries v2.7" The above statement can also be found in the Excel file named [SIAR Reports 2009-HU v1.0.xls] on sheet "R-2". (Report R-2)
15/CMP.1 annex I.E paragraph 13 & 14: List of CDM notifications	No CDM notifications were received by the Registry during the reporting period. The above statement can also be found in the Excel file named [SIAR Reports 2009-HU v1.0.xls] on sheet "R-3". (Report R-3)
15/CMP.1 annex I.E paragraph 15: List of non-replacements	No non-replacements occurred during the reporting period. The above statement can also be found in the Excel file named [SIAR Reports 2009-HU v1.0.xls] on sheet "R-4". (Report R-4)
15/CMP.1 annex I.E paragraph 16: List of invalid units	No invalid units to list for the reporting period. The above statement can also be found in the Excel file named [SIAR Reports 2009-HU v1.0.xls] on sheet "R-5". (Report R-5)
15/CMP.1 annex I.E paragraph 17 Actions and changes to address discrepancies	No discrepancies have occurred since the live operation of the National Registry of Hungary.
15/CMP.1 annex I.E paragraph 18 CPR Calculation	The commitment period reserve, calculated in accordance with the annex to decision 18/CP.7, based on the inventory of 2007 (NIR submission 2009) is: 379,717,586 Mg CO_2eq. For details of the calculation, please see Ch. 11.1 of the NIR.

Changes to National Registry

Reporting Item	Reference / Information
15/CMP.1 annex II.E paragraph 32.(a) Change of name or contact	The registry administrator designated by Hungary to maintain the national registry - National Inspectorate for Environment, Nature and Water - has not changed, however there are some changes in the contact information. For details please see section 4 of this document.
15/CMP.1 annex II.E paragraph 32.(b) Change of cooperation arrangement	There is no change in this subject. Hungary's national registry is operated as a standalone registry.
15/CMP.1 annex II.E paragraph 32.(c) Change to database or the capacity of National Registry	No change in the database or the capacity of National Registry in the reporting period.
15/CMP.1 annex II.E paragraph 32.(d) Change of conformance to technical standards	No change in the conformance to technical standards in the reporting period.
15/CMP.1 annex II.E paragraph 32.(e) Change of discrepancies procedures	No change in the discrepancies procedures in the reporting period.
15/CMP.1 annex II.E paragraph 32.(f) Change of Security	No change in the security in the reporting period.
15/CMP.1 annex II.E paragraph 32.(g) Change of list of publicly available information	13/CMP.1 Annex II §45 Account information is available through the public webpage of the Hungarian national registry at [http://www.hunetr.hu/Default.aspx?Module=/PublicReports] or at www.hunetr.hu by clicking on the "Nyilvános Jelentések" link. The associated reports are: - "Változatlan számlák" - "Módosított számlák" - "Változatlan üzemeltetői számlák" - "Módosított üzemeltetői számlák" The published information is updated by the registry administrator on a weekly basis.

	Account information is also available through the public website of the CITL at [http://ec.europa.eu/environment/ets/account.do] 13/CMP.1 Annex II §46 Article 6 project information will be available on the public webpage of the Hungarian national registry (www.hunetr.hu) No ERU issuance took place yet, so information referred to in 13/CMP.1 Annex II paragraph 46 is not published. 13/CMP.1 Annex II §47 Publication of information according 13/CMP.1 Annex II paragraph 47 is regulated by EU regulation 2216/2004/EC modified by 916/2007/EC Annex XVI point 7. The information made publicly available according to 13/CMP.1 Annex II paragraph 47 can be found at [http://www.hunetr.hu/Default.aspx?Module=/PublicReports] or at www.hunetr.hu by clicking on the "Nyilvános Jelentések" link. Unpublished information is either declared confidential until its publication date set in the EU legislation or the information is not available at the date of publication for a calendar year. After publication transaction information will also be available through the public website of the CITL at [http://ec.europa.eu/environment/ets/transaction.do] 13/CMP.1 Annex II §48 According to HU legislation (governmental decree 323/2007 §17 and §18), person holding account (type 121) owners need to obtain a permit from the Ministry of Environment and Water to hold CER and ERU type Kyoto Units on their accounts. Operator holding account (type 120) owners are authorized to hold CER and ERU type Kyoto units on their accounts. Natural persons can not hold any of the mentioned units. No legal entity is authorized to hold AAU, RMU type Kyoto units on their accounts. Permission on holding of unit types per each account type can be found at www.hunetr.hu by clicking in the "Az egyes számlaípusokon tartható kibocsátási egységek" link.
32.(h) Change of Internet address	Hungary's National Registry's Internet address is unchanged. The address is: www.hunetr.hu

15/CMP.1 annex II.E paragraph 32.(i) Change of data integrity measure	No change in the data integrity measure in the reporting period.
15/CMP.1 annex II.E paragraph 32.(j) Change of test results	No change in the test results in the reporting period.
The previous Annual Review recommendations	The ERT had 2 recommendations in the Report of the review of the initial report of Hungary [FCCC/IRR/2007/HUN]: 133.(e) " Rectify minor issues identified in the IAR concerning documentation before the national registry is fully operational with the ITL, and not later than the end of 2007." Details of the issues: 120. " The IAR identified some minor limitations in the state of readiness of the registry, including the following: the test plan has not yet been completed in full; and there is insufficient evidence for the existence of a formal incident management process. These minor limitations are to be rectified before the registry is fully operational with the ITL, and not later than the end of 2007." As a solution, the updated test report - provided by the registry developer - proving that the test plan has been completed in full, and a copy of the incident log has been submitted to the operator of the ITL (Logica CMG) in May 2008. After assessment of the submitted documentation, the ITL operator has confirmed the eligibility of Hungary to connect to the ITL.

Annex 9 List of abbrevations and units

Abbrevations

AED	anode effect duration in minutes
AEF	number of anode effects per cellday
BOF	basic oxygen furnace
CE	current efficiency
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
HKVSZ	Association of Cooling and Air Conditioning Businesses (Hűtő- és Klímatechnikai Vállalkozások Szövetsége)
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
KSH	Hungarian Central Statistical Office (Központi Statisztikai Hivatal)
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
OHF	open hearth furnace
QA	quality assurance
QC	quality control
UNFCCC	United Nations Framework Convention on Climate Change

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

Units

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