

1 ANNEX 1

2 MAPPING TABLES

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Annex 1: Mapping table for 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

This annex provides a road map for relating sections, equations, tables, figures and boxes in the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Sections, equations, tables, figures and boxes with “No refinement” are not included in the mapping table.

U = Update

NG = New Guidance

E = Elaboration

NA = Not available

SECTIONS

Section Title	Type of Refinement	2006 Guidelines Section Number	2019 Refinement Section Number
Chapter 1			
National GHG Inventory Arrangements	NG	NA	1.5
Chapter 2			
Introduction	NG	2.1	2.1
Collecting data	NG	2.2	2.2
Use of Facility Data in Inventories	NG	2.3	2.3
General guidance on performing surveys	E	Annex 2A2	Annex 2A2
Chapter 3			
Overview of uncertainty analysis	E	3.1.1	3.1.1
Uncertainty assessment as part of inventory management	NG	NA	3.1.2
Overall structure of uncertainty analysis	E	3.1.2	3.1.3
Causes of uncertainty	E	3.1.5	3.1.6
Reducing uncertainty	E	3.1.6	3.1.6
Quantifying uncertainties	E	3.2	3.2
Methods to combine uncertainties	U	3.2.3	3.2.3
Examples	E	3.6	3.6
Chapter 4			
Introduction	E	4.1	4.1
Definition	U	4.1.1	4.1.1
Purpose of the key category analysis	E	4.1.2	4.1.2
General approach to identify key categories	E	4.1.3	4.1.3
General rules for identification of key categories	U	4.2	4.2
Approach 1 to identify key categories	U/E	4.3.1	4.3.1
Qualitative criteria to identify key categories	U	4.3.3	4.3.3

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Reporting and Documentation	E	4.4	4.4
Examples of key category analysis	E	4.5	4.5
Chapter 5			
Recalculations due to methodological changes and refinements	E	5.2.1	5.2.1
Adding new categories	E	5.2.2	5.2.2
Tracking increases and decreases due to technological change and other factors	E	5.2.3	5.2.3
Issues with data availability	E	5.3.1	5.3.1
Splicing techniques	E	5.3.3	5.3.3
Non-linear trend analysis	NG	NA (previously called (Other techniques))	5.3.3.5
Reporting and documentation of trend information	E	5.4	5.4
Chapter 6			
Introduction	E	6.1	6.1
National level activity data	U	6.7.2.1	6.7.2.1
Comparisons of national estimates	U	6.10.1	6.10.1
Comparisons with atmospheric measurements	U/E	6.10.2	6.10.2
Use and reporting of models	NG	NA	6.11
Chapter 7			
Introduction	E	7.1	7.1
Inventory of precursors	E	7.2.1	7.2.1
CO ₂ inputs to the atmosphere from emissions of carbon-containing compounds	E	7.2.1.5	7.2.1.5
Indirect N ₂ O emissions from the atmospheric deposition of nitrogen in NO _x and NH ₃	E	7.3	7.3
Chapter 8			
Gases Included	E	8.2.2	8.2.2
Introduction to reporting tables	U	8.3	8.3
Classification and definition of categories	U, E, NG	8.5	8.5

Discussion: The authors of chapter 7 concluded that there is no coherent treatment of indirect emissions across sectors. However, the conclusion was that it would have been beyond the scope of the refinement of the 2006 Guidelines to introduce a rigorous framework across all sectors with respect to treatment of indirect emissions.

EQUATIONS

Equation Title	Type of Refinement	2006 Guidelines Equation Number	2019 Refinement Equation Number
Chapter 2			
Total facility emissions from all sources	NG	NA	2.1
Emissions calculated by Facility-Specific emission factors	NG	NA	2.2

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Facility data integration by emission source	NG	NA	2.3
Total facility emissions by industrial classification	NG	NA	2.4
Chapter 3			
Variance calculation for simple random sample design	NG	NA	3.0
Variance Calculation for Systematic Sample Design	NG	NA	3.0a
Variance Calculation for Random Stratified Design	NG	NA	3.0b
Variance Calculation for Two-Stage Design	NG	NA	3.0c
Combining uncertainties – approach 1 – AD x EF	E	3.2	3.2a
Combining uncertainties – approach 1 – EF = a x b x c	E	3.2	3.2b
Combining uncertainties – approach 1 - Trend uncertainty	E	3.2	3.2c
Calculation of Type A Sensitivity	NG	NA	3.2d
Calculation of Type B Sensitivity	NG	NA	3.2e
Trend uncertainty due to emission factor	NG	NA	3.2f
Trend uncertainty due to activity data	NG	NA	3.2g
Chapter 4			
Level Assessment (Approach 1)	U	4.1	4.1
Trend Assessment (Approach 1)	U	4.2	4.2

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27 TABLES

Table Title	Type of Refinement	2006 Guidelines Table Number	2019 Refinement Table Number
Chapter 1			
A suggested table for capturing and sharing information on the commitments supported by the national GHG inventory	NG	NA	1.1
Illustrative commitments table constructed around UK reporting and MRV commitments	NG	NA	1.2
List of stakeholder types with their general roles and capabilities needed to function	NG	NA	1.3
Suggested metadata for tracking GHG inventory stakeholders	NG	NA	1.4
Suggested table for listing datasets used in the GHG inventory	NG	NA	1.5
Illustrative workplan for the preparation of GHG inventory including an indicative timeline for a work programme of 52 weeks (1 year)	NG	NA	1.6

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Suggested information in a standardised data structure for collating time-series data	NG	NA	1.7
Suggested description of potential, planned and implemented improvements in inventory improvement plan	NG	NA	1.8
Chapter 2			
Main parameters that effect emissions and removals	NG	NA	2.2
Potential sources of literature data	U	2.3	2.3
Quality Goals of Facility Data	NG	NA	2.5
Potential Facility Greenhouse Gas Reporting Requirements	NG	NA	2.6
Chapter 3			
Approach 1 uncertainty calculation	U	3.2	3.2
Chapter 4			
Suggested aggregation level of analysis for Approach 1	E	4.1	4.1
Spreadsheet for the Approach 1 analysis – Level Assessment	E	4.2	4.2
Spreadsheet for the Approach 1 analysis – Trend Assessment	E	4.3	4.3
Key categories ranks	NG	NA	4.4a
Chapter 5			
Examples of surrogate data by sector	E	NA	5.1
Summary of splicing techniques	U/NG	5.1	5.2
Category-specific documentation of recalculations	U	5.2	5.3
Chapter 6			
Overview of the strengths and weaknesses of using atmospheric measurements for verification of GHG emissions	NG	NA	6.1
Summary of the key steps implemented in national examples	NG	NA	6.2
General outline of national inventory comparison to global/regional inverse modelling products	NG	NA	6.3
General Guidance related to models in Volumes 1 & 4 of the 2006 IPCC Guidelines	NG	NA	6.4
Chapter 7			
Non-Biogenic sources of CO ₂ from the atmospheric oxidation of CH ₄ , CO, and NMVOCs	NG	NA	A7.1
Examples of NMVOCs from the different source categories	NG	NA	A7.2

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Carbon content of various materials (percent carbon by mass, PC) and percent of total solvent NMVOC emissions (by mass, PU)	NG	NA	A7.3
Chapter 8			
Classification and definition of categories	U	8.2	8.2
Summary Table	U	Table A (1 of 6)	Table A (1 of 6)
Summary Table	U	Table A (2 of 6)	Table A (2 of 6)
Summary Table	U	Table A (3 of 6)	Table A (3 of 6)
Summary Table	U	Table A (4 of 6)	Table A (4 of 6)
Short summary Table	U	Table B (1 of 2)	Table B (1 of 2)
Energy Sectoral Table	U	Table 1 (2 of 3)	Table 1 (2 of 3)
Energy background	U	Table 1.3 (1B)	Table 1.3 (1B)
IPPU Sectoral Table	U	Table 2 (1 of 2)	Table 2 (1 of 2)
IPPU Sectoral Table	U	Table 2 (2 of 2)	Table 2 (2 of 2)
IPPU background table: 2A Mineral Industry, Chemical Industry	U	Table 2.1	Table 2.1
IPPU background table: Chemical Industry	U	Table 2.2	Table 2.2
IPPU background table: Metal Industry	U	Table 2.3	Table 2.3
IPPU background table: Metal Industry and other halogenated gases	U	Table 2.4	Table 2.4
IPPU background table: Electronics Industry	U	Table 2.6	Table 2.6
IPPU Background Table: Product Uses as Substitutes for Ozone Depleting Substances, HFCs, PFCs and other halogenated gases	U	Table 2.7	Table 2.8
IPPU Background Table: 2G (2G1, 2G2, 2G4) Other Product Manufacture and Use – PFCs, SF6 and other halogenated gases	U	Table 2.8	Table 2.8
Waste Background Table: CO ₂ , CH ₄ , N ₂ O emissions	U	Table 4.1	Table 4.1
Trends of CO ₂	U	Table 6A (1 of 3)	Table 6A (1 of 3)
Trends of CH ₄	U	Table 6B (1 of 3)	Table 6B (1 of 3)
Trends of N ₂ O	U	Table 6B (1 of 3)	Table 6B (1 of 3)
Trends of HFCs	U	Table 6D	Table 6D
Trends of PFCs	U	Table 6E	Table 6E
Trends of SF ₆	U	Table 6F	Table 6F
Trends of other gases	U	Table 6G	Table 6G

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29 **FIGURES**

Figure Title	Type of Refinement	2006 Guidelines Figure Number	2019 Refinement Figure Number
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Chapter 1			
Illustrative GHG inventory organizational structure	NG	NA	1.1
Chapter 2			
Process diagram for data collection	NG	NA	2.1
Outline of Data Collection steps and decisions	NG	NA	2.2
Process for including data in the EFDB	U	2.1	2.3
Example of decision tree for selecting facility-level data	NG	NA	2.4
Chapter 3			
Overall structure of a generic uncertainty analysis	U	3.1	3.1
Uncertainty analysis steps description and decision tree	NG	NA	3.2
Chapter 6			
A decision tree for checking the necessary criteria for using the inverse model estimates in the National Inventory verification	NG	NA	6.1
Schematic of typical model development/selection process	NG	NA	6.2

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31 **BOXES**

Box Title	Type of Refinement	2006 Guidelines Box Number	2019 Refinement Box Number
Chapter 1			
Broader benefits/applications and linkages of GHG inventory activities with other related data collection and reporting needs	NG	NA	1.1
Illustrative data flow overview diagram example for South Africa	NG	NA	1.2
Chapter 2			
Facility Data Consideration and Use	NG	NA	2.3
Chapter 3			
Example of reducing uncertainty in a source category by adopting higher tier methods	NG	NA	3.1
Difference between standard deviation and standard error	NG	NA	3.2
Example of uncertainty calculation: CH ₄ emissions from manure management	NG	NA	3.3
Chapter 5			
Recalculation in the Agriculture Forestry and Other Land Use (AFOLU) Sector	U	5.1	5.1
Time series consistency when using facility level data from new legislation (e.g. data from	NG	NA	5.2

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emissions trading scheme, other national data reporting programmes)			
Case study of overlap method methane emissions from charcoal production in Godonia	NG	NA	5.3
Case study of interpolating data carbon dioxide emissions from fossil liquid incineration in Godonia	NG	NA	5.4
Case study of non-linear interpolation of data direct soil N ₂ O emissions from manure on non-federal grasslands	NG	NA	5.5
Chapter 6			
Definitions of QA/QC and verification	E	6.1	6.1
Evaluation of data quality on external data in the transportation sector	U	6.2	6.2
UK methane (CH ₄) and nitrous oxide (N ₂ O) inverse modelling	NG	NA	6.3