

# **1 ANNEX 1**

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## **2 MAPPING TABLES**

## Contents

1	Relating the 2019 Refinement to the 2006 IPCC Guidelines .....	A1.3
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## Tables

Table 1	Road map for relating sections in the 2019 Refinement to the 2006 IPCC Guidelines .....	A1.3
Table 2	Road map for relating equations in the 2019 Refinement to the 2006 IPCC Guidelines .....	A1.5
Table 3	Road map for relating tables in the 2019 Refinement to the 2006 IPCC Guidelines .....	A1.7
Table 4	Road map for relating figures in the 2019 Refinement to the 2006 IPCC Guidelines .....	A1.10
Table 5	Road map for relating boxes in the 2019 Refinement to the 2006 IPCC Guidelines .....	A1.10

# 1 RELATING THE 2019 REFINEMENT TO THE 2006 IPCC GUIDELINES

This annex provides a road map for relating sections, equations, tables, figures and boxes in the *2019 Refinement* to the *2006 IPCC Guidelines* (Type of Refinement: E – Elaboration, U – Update, NG – New Guidance).

TABLE 1 ROAD MAP FOR RELATING SECTIONS IN THE 2019 REFINEMENT TO THE 2006 IPCC GUIDELINES			
Section Title	Type of Refinement	2006 IPCC Guidelines Section Number	2019 Refinement Section Number

## Second-order Draft

Treatment of biomass	E	2.3.3.4	2.3.3.4
Fugitive emissions from mining, processing, storage and transportation of coal	E	4.1	4.1
Overview and description of sources	E	4.1.1	4.1.1
Methodological issues	E	4.1.2	4.1.2
Underground coal mines	E	4.1.3	4.1.3
Choice of method	E	4.1.3.1	4.1.3.1
Choice of emission factors for underground mines	E	4.1.3.2	4.1.3.2
Uncertainty Assessment	E	4.1.3.6	4.1.3.6
Surface coal mining	E	4.1.4	4.1.4
Emission factors for surface mining	E	4.1.4.2	4.1.4.2
Uncertainty Assessment	E	4.1.4.6	4.1.4.6
Coal exploration	E	-	4.1.6
Completeness for coal mining	E	4.1.6	4.1.7
Fugitive emissions from oil and natural gas systems	U	4.2	4.2
Overview, description of sources	U	4.2.1	4.2.1
Methodological issues	U	4.2.2	4.2.2
Choice of method, decision trees, tiers	U	4.2.2.1	4.2.2.1
Choice of method	U	4.2.2.2	4.2.2.2
Choice of emission factor	U	4.2.2.3	4.2.2.3
Choice of activity data	U	4.2.2.4	4.2.2.4
Completeness	U	4.2.2.5	4.2.2.5
Developing consistent time series	U	4.2.2.6	4.2.2.6
Uncertainty Assessment	U	4.2.2.7	4.2.2.7
Inventory Quality Assurance/Quality Control (QA/QC)	U	4.2.3	4.2.3
Reporting and Documentation	U	4.2.4	4.2.4
Fugitive emissions from fuel transformation	NG	-	4.3
Standard Conditions	NG	-	Annex 4A.1
Disaggregation of Tier 1 factors presented in Section 4.2.2.3	NG	-	Annex 4A.2
Definition of terminologies used in Section 4.2	NG	-	Annex 4A.3
Fugitive emissions from mining, processing, storage and transportation of coal	NG	-	Appendix 4a.1
Abandoned Surface Mines	NG	-	Appendix 4a.1.1
Fugitive Greenhouse Gas Emissions from Wood Pellet production	NG	-	Appendix 4a.2
Fugitive Emissions from Biomass to Liquid and Biomass to Gas:	NG	-	Appendix 4a.3

<b>TABLE 2</b> <b>ROAD MAP FOR RELATING EQUATIONS IN THE 2019 REFINEMENT TO THE 2006 IPCC GUIDELINES</b>			
<b>Equation Title</b>	<b>Type of Refinement</b>	<b>2006 IPCC Guidelines Equation Number</b>	<b>2019 Refinement Equation Number</b>

## Second-order Draft

Estimating emissions from underground coal mines	E	4.1.2	4.1.2
Tier 1: global average method – underground mining – carbon dioxide	E	-	4.1.3.a
General equation for estimating fugitive emissions from surface coal mining	E	4.1.6	4.1.6
Tier 1: global average method – surface mines– carbon dioxide	E	-	4.1.7.a
Coal exploration Tier 1: global average method	E	-	4.1.14
Coal exploration Tier 2: depth-wise method	E	-	4.1.15
General equation for estimating fugitive emissions from Exploration	U	-	4.2.9
General equation for estimating fugitive emissions from Oil Production and Upgrading	U	-	4.2.10
General equation for estimating fugitive emissions from Oil Transportation	U	-	4.2.11
General equation for estimating fugitive emissions from Distribution of Oil Products	U	-	4.2.12
General equation for estimating fugitive emissions from Exploration	U	-	4.2.13
General equation for estimating fugitive emissions from Gas Production and Gathering	U	-	4.2.14
General equation for estimating fugitive emissions from Gas Processing	U	-	4.2.15
General equation for estimating fugitive emissions from Gas Transmission and Storage	U	-	4.2.16
Equation 4.2.17 General equation for estimating fugitive emissions from Gas Distribution and Post-meter Leakage	U	-	4.2.17
Fugitive GHG emissions from charcoal production	NG	-	4.3.1
Fugitive GHG emission from coke production	NG	-	4.3.2
Fugitive GHG emission from coke production	NG	-	4.3.3
Fugitive GHG emission from Flaring of Coke Oven Gas	NG	-	4.3.4
CO <sub>2</sub> Fugitive emissions from [gasification processes]	NG	-	4.3.5
Fugitive GHG emissions from [gasification processes]	NG	-	4.3.6
Conversion of oil density at 15°C	U	-	4A.1.1
Conversion of relative oil density at 15.556°C (60°F)	U	-	4A.1.2
Conversion of °API density	U	-	4A.1.3
Conversion of oil volume	U	-	4A.1.4
Conversion of gas volume	U	-	4A.1.5
CO <sub>2</sub> Fugitive emissions from [gasification processes]	NG	-	4a.3.1
CH <sub>4</sub> Fugitive emissions from [gasification processes]	NG	-	4a.3.2
CO <sub>2</sub> Fugitive emissions estimate based on	NG	-	4a.3.3

Second-order Draft

waste composition			
Fugitive GHG emissions estimate based on waste composition	NG	-	4a.3.4

<b>TABLE 3</b> <b>ROAD MAP FOR RELATING TABLES IN THE 2019 REFINEMENT TO THE 2006 IPCC GUIDELINES</b>			
<b>Table Title</b>	<b>Type of Refinement</b>	<b>2006 IPCC Guidelines Table Number</b>	<b>2019 Refinement Table Number</b>

## Second-order Draft

Detailed sector split for emissions from mining, processing, storage and transport of coal	E	4.1.1	4.1.1
Estimates of uncertainty for underground mining for tier 1 and tier 2 approaches	E	4.1.2	4.1.2
Estimates of uncertainty for surface mining for tier 1 and tier 2 approaches	E	4.1.4	4.1.4
Major categories and subcategories in the oil and gas industry	U	4.2.2	4.2.1
Tier 1 Emission Factors for Oil Exploration, 1.B.2.a.i	U	4.2.4 and 4.2.5	4.2.3
Tier 1 Emission Factors for Oil Production, 1.B.2.a.ii	U	4.2.4 and 4.2.5	4.2.4
Tier 1 Emission Factors for Oil Transport, 1.B.2.a.iii	U	4.2.4 and 4.2.5	4.2.5
Tier 1 Emission Factors for Oil Refining, 1.B.2.a.iv	U	4.2.4 and 4.2.5	4.2.6
Tier 1 Emission Factors for Distribution of Oil Products, 1.B.2.a.v	U	4.2.4 and 4.2.5	4.2.7
Tier 1 Emission Factors for Abandoned Oil Wells, 1.B.2.a.vii	U	-	4.2.8
Tier 1 Emission factors for Natural Gas Exploration Segment, 1.B.2.b.i	U	4.2.4 and 4.2.5	4.2.9
Tier 1 Emission factors for Natural Gas Production Segment, 1.B.2.b.ii	U	4.2.4 and 4.2.5	4.2.10
Tier 1 Emission factors for Gas Processing Segment, 1.B.2.b.iii	U	4.2.4 and 4.2.5	4.2.11
Tier 1 Emission factors for Gas Transmission and Storage Segment, 1.B.2.b.iv	U	4.2.4 and 4.2.5	4.2.12
Tier 1 Emission factors for Distribution Segment, 1.B.2.b.v	U	4.2.4 and 4.2.5	4.2.13
Typical activity data requirements for each assessment approach for fugitive emissions from oil and gas systems by type of primary source	E	4.2.6	4.2.14
Guidance on Obtaining the Activity Data Values Required for Use in the Tier 1 Approach to Estimate Fugitive Emissions from Oil and Gas Systems	E	4.2.7	-4.2.15
Format for summarizing the applied methodology and basis for estimated emissions from oil and natural gas systems showing sample entries	E	4.2.8	4.2.16
Estimation and reporting of fugitive emissions from fuel transformation	NG	-	4.3.1
Default Emission factors for charcoal production according to kiln technology (g GHG / kg of charcoal produced)	NG	-	4.3.2
Default uncertainty assessment for emission factors from charcoal production	NG	-	4.3.3
Commentary on fugitive greenhouse gas emissions from coke production according to processing stage	NG	-	4.3.4
Default Emission factors for coke production	NG	-	4.3.5



## Second-order Draft

Default uncertainty assessment for emission factors from Coke Production	NG	-	4.3.6
Summary of GHG emissions from gasification transformation processes	NG	-	4.3.7
Emission factors for gasification processes of CtL	NG	-	4.3.8
Emission factor for gasification processes of GtL	NG	-	4.3.9
Recalculation of gas volumes to the required temperature conversion factors (CFt)	U	-	4A.1.1
Disaggregation of Tier 1 Emission factors for Oil Production Segment, 1.B.2.a.ii	U	-	4A.2.1
Disaggregation of Tier 1 Emission factors for Oil Refining, 1.B.2.a.iv	U	-	4A.2.2
Disaggregation of Tier 1 Emission factors for Gas Production, 1.B.2.b.ii	U	-	4A.2.3
Disaggregation of Tier 1 Emission factors for Gas Processing Segment, 1.B.2.b.iii	U	-	4A.2.4
Disaggregation of Tier 1 Emission factors for Gas Transmission Segment, 1.B.2.b.iv	U	-	4A.2.5

22

23

## Second-order Draft

24

<b>TABLE 4</b> <b>ROAD MAP FOR RELATING FIGURES IN THE 2019 REFINEMENT TO THE 2006 IPCC GUIDELINES</b>			
<b>Figure Title</b>	<b>Type of Refinement</b>	<b>2006 IPCC Guidelines Figure Number</b>	<b>2019 Refinement Figure Number</b>
Decision tree for carbon dioxide from underground coal mines	E	-	4.1.1.a
Decision tree for coal exploration	E	-	4.1.4
Key segments included in natural gas and petroleum systems.	U	-	4.2.1.
Decision tree for abandoned wells	U	-	4.2.5
Decision tree for charcoal production	NG	-	4.3.1
Typical flow diagram of a coke oven plant showing emissions sources	NG	-	4.3.2
Decision tree for estimating fugitive emissions from coke production process	NG	-	4.3.3
Gasification transformation process of biomass, coal and gas	NG	-	4.3.4
Decision tree for estimating emissions from gasification transformation processes	NG	-	4.3.5
Flow diagram of wood pellet production process	NG	-	4a.2.1
Emissions Diagram for a Typical Pellet Plant (Two Dryers)	NG	-	4a.2.2
Proposed decision tree for estimating fugitive emissions from solid biomass fuel transformation	NG	-	4a.2.3

25

26

27

<b>TABLE 5</b> <b>ROAD MAP FOR RELATING BOXES IN THE 2019 REFINEMENT TO THE 2006 IPCC GUIDELINES</b>			
<b>Box Title</b>	<b>Type of Refinement</b>	<b>2006 IPCC Guidelines Box Number</b>	<b>2019 Refinement Box Number</b>
Hydrogen Production, Fugitive Emissions and Refineries	U	-	4.2.1
Example of Calculation of Disaggregated Emission Estimates for Oil Production	U	-	4A.2.1

28

29