

ANNEX 1 Key Category Analysis

The United States has identified national key categories based on the estimates presented in this report. The *2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories* (IPCC 2006) describes a key category as a “[category] that is prioritized within the national inventory system because its estimate has a significant influence on a country’s total inventory of greenhouse gases in terms of the absolute level, the trend, or the uncertainty in emissions and removals.” By definition, key categories are sources or sinks that have the greatest contribution to the absolute overall level of national emissions in any of the years covered by the time series. In addition, when an entire time series of emission estimates is prepared, a determination of key categories must also account for the influence of the trends of individual categories. Therefore, a trend assessment is conducted to identify source and sink categories for which significant uncertainty in the estimate would have considerable effects on overall emission trends. Finally, a qualitative evaluation of key categories should be performed, in order to capture any key categories that were not identified in either of the quantitative analyses, but can be considered key because of the unique country-specific estimation methods. A qualitative review of key categories, along with non-key categories has not identified additional categories to consider as key.

The methodology for conducting a key category analysis, as defined by Volume 1, Chapter 4 of the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC 2006), includes:

- Approach 1 (including both level and trend assessments);
- Approach 2 (including both level and trend assessments, and incorporating uncertainty analysis); and
- Qualitative approach.

This Annex presents an analysis of key categories, both for sources only and also for sources and sinks (i.e., including Land Use, Land-Use Change and Forestry LULUCF); discusses Approach 1, Approach 2, and qualitative approaches to identifying key categories; provides level and trend assessment equations; and provides a brief statistical evaluation of IPCC’s quantitative methodologies for defining key categories. The United States key category analysis generally follows the IPCC suggested aggregation level of analysis, but in some cases does differ by avoiding disaggregating into many smaller categories (i.e., separating pools and subcategories within LULUCF source categories). The UNFCCC common reporting format reporting software generates Table A-7, which also identifies key categories using an Approach 1 analysis based on the default disaggregation approach provided in Volume 1, Chapter 4 of the *2006 IPCC Guidelines*.

Table A-1 presents the key categories for the United States (including and excluding LULUCF categories) using emissions and uncertainty data in this report, and ranked according to their sector and global warming potential (GWP)-weighted emissions in 2018. The table also indicates the criteria used in identifying these categories (i.e., level, trend, Approach 1, Approach 2, and/or qualitative assessments).

Table A-1: Key Source Categories for the United States (1990 and 2018)

CRF Source/Sink Categories	Greenhouse Gas	Approach 1				Approach 2				2018 Emissions (MMT CO ₂ Eq.)
		Level Without LULUCF	Trend Without LULUCF	Level With LULUCF	Trend With LULUCF	Level Without LULUCF	Trend Without LULUCF	Level With LULUCF	Trend With LULUCF	
Energy										
1.A.3.b CO ₂ Emissions from Mobile Combustion: Road	CO ₂	•	•	•	•	•	•	•	•	1,521.9
1.A.1 CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	•	•	•	•	•	•	•	•	1,152.9
1.A.1 CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	•	•	•	•	•	•	•	•	577.4
1.A.2 CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	•	•	•	•	•	•	•	•	514.8
1.A.4.b CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	•	•	•	•	•	•	•	•	273.7
1.A.2 CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	•	•	•	•	•	•	•	•	268.6
1.A.4.a CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	•	•	•	•	•	•	•	•	192.6
1.A.3.a CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	•	•	•	•	•		•		173.9
1.A.5 CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	•	•	•	•	•	•	•	•	134.6
1.A.4.b CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	•	•	•	•	•	•		•	63.5
1.A.4.a CO ₂ Emissions from Stationary	CO ₂	•	•	•	•					52.1

Combustion - Oil - Commercial										
1.A.2 CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	•	•	•	•	•	•	•	•	49.8
1.A.3.e CO ₂ Emissions from Mobile Combustion: Other	CO ₂	•	•	•	•					49.2
1.A.3.c CO ₂ Emissions from Mobile Combustion: Railways	CO ₂	•		•						38.9
1.B.2 CO ₂ Emissions from Petroleum Systems	CO ₂	•	•	•	•	•	•	•	•	36.8
1.A.3.d CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	•	•	•	•					36.8
1.B.2 CO ₂ Emissions from Natural Gas Systems	CO ₂	•		•						35.0
1.A.5 CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	•		•						34.3
1.A.1 CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	•	•	•	•	•	•		•	22.2
1.A.5 CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂						•			3.0
1.A.4.a CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂		•		•					1.8
1.A.4.b CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂						•		•	0.0
1.B.2 CH ₄ Emissions from Natural Gas Systems	CH ₄	•	•	•	•	•	•	•	•	140.0
1.B.1 Fugitive Emissions from Coal Mining	CH ₄	•	•	•	•	•	•	•	•	52.7
1.B.2 CH ₄ Emissions from Petroleum Systems	CH ₄	•	•	•	•	•	•	•	•	36.2

1.B.2 CH ₄ Emissions from Abandoned Oil and Gas Wells	CH ₄					•		•		7.0
1.A.4.b CH ₄ Emissions from Stationary Combustion - Residential	CH ₄					•	•	•	•	4.5
1.A.3.e CH ₄ Emissions from Mobile Combustion: Other	CH ₄						•		•	1.7
1.A.1 N ₂ O Emissions from Stationary Combustion - Coal - Electricity Generation	N ₂ O					•				20.3
1.A.3.b N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	•	•	•	•	•	•		•	10.4
1.A.1 N ₂ O Emissions from Stationary Combustion - Gas - Electricity Generation	N ₂ O							•		4.1
1.A.2 N ₂ O Emissions from Stationary Combustion - Industrial	N ₂ O					•				2.6
Industrial Processes and Product Use										
2.C.1 CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	•	•	•	•	•	•	•	•	42.6
2.A.1 CO ₂ Emissions from Cement Production	CO ₂	•		•						40.3
2.B.8 CO ₂ Emissions from Petrochemical Production	CO ₂	•	•	•	•					29.4
2.G SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	•	•	•	•			•	•	4.1
2.B.9 HFC-23 Emissions from HCFC-22 Production	HFCs	•	•	•	•			•	•	3.3
2.C.3 PFC Emissions from Aluminum Production	PFCs	•	•	•	•					1.6
2.F.1 Emissions from Substitutes for Ozone Depleting Substances:	HFCs, PFCs	•	•	•	•	•	•	•	•	128.9

Refrigeration and Air Conditioning								
2.F.4 Emissions from Substitutes for Ozone Depleting Substances: Aerosols	HFCs, PFCs		•	•		•	•	19.2
2.F.2 Emissions from Substitutes for Ozone Depleting Substances: Foam Blowing Agents	HFCs, PFCs		•	•				15.1
2.F.3 Emissions from Substitutes for Ozone Depleting Substances: Fire Protection	HFCs, PFCs					•		2.6
2.F.5 Emissions from Substitutes for Ozone Depleting Substances: Solvents	HFCs, PFCs					•		2.0
Agriculture								
3.G CO ₂ Emissions from Liming	CO ₂					•		3.1
3.A.1 CH ₄ Emissions from Enteric Fermentation: Cattle	CH ₄		•	•	•	•	•	171.7
3.B.1 CH ₄ Emissions from Manure Management: Cattle	CH ₄		•	•	•	•	•	35.7
3.D.1 Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O		•		•	•	•	285.7
3.D.2 Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O		•	•	•	•	•	52.5
3.B.4 CH ₄ Emissions from Manure Management: Other Livestock	CH ₄		•		•			26.0
3.C CH ₄ Emissions from Rice Cultivation	CH ₄					•	•	13.3
Waste								

5.A CH ₄ Emissions from Landfills	CH ₄	•	•	•	•	•	•	•	•	110.6	
5.D N ₂ O Emissions from Wastewater Treatment	N ₂ O									5.0	
Land Use, Land Use Change, and Forestry											
4.E.2 Net CO ₂ Emissions from Land Converted to Settlements	CO ₂				•	•			•	•	79.3
4.B.2 Net CO ₂ Emissions from Land Converted to Cropland	CO ₂				•				•		55.3
4.C.1 Net CO ₂ Emissions from Grassland Remaining Grassland	CO ₂								•	•	11.2
4.B.1 Net CO ₂ Emissions from Cropland Remaining Cropland	CO ₂				•	•			•	•	(16.6)
4.C.2 Net CO ₂ Emissions from Land Converted to Grassland	CO ₂				•	•			•	•	(24.6)
4.A.2 Net CO ₂ Emissions from Land Converted to Forest Land	CO ₂				•				•		(110.6)
4.E.1 Net CO ₂ Emissions from Settlements Remaining Settlements	CO ₂				•	•			•	•	(125.9)
4.A.1 Net CO ₂ Emissions from Forest Land Remaining Forest Land	CO ₂				•	•			•	•	(663.2)
4.A.1 CH ₄ Emissions from Forest Fires	CH ₄					•					11.3
4.A.1 N ₂ O Emissions from Forest Fires	N ₂ O					•					7.5
Subtotal Without LULUCF										6,506.0	
Total Emissions Without LULUCF										6,676.6	
Percent of Total Without LULUCF										97%	
Subtotal With LULUCF										5,673.6	
Total Emissions With LULUCF										5,903.2	
Percent of Total With LULUCF										96%	

Note: Parentheses indicate negative values (or sequestration).

Table A-2 provides a complete listing of source categories by IPCC sector, along with notations on the criteria used in identifying key categories, without LULUCF sources and sinks. Similarly, Table A-3 provides a complete listing of source and sink categories by IPCC sector, along with notations on the criteria used in identifying key categories, including LULUCF sources and sinks. The notations refer specifically to the year(s) in the Inventory time series (i.e., 1990 to 2018) in which each source or sink category reached the threshold for being a key category based on either a Tier 1 or Tier 2 level assessment.

In addition to conducting Approach 1 and 2 level and trend assessments, a qualitative assessment of the source categories, as described in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC 2006), was conducted to capture any key categories that were not identified by either quantitative method. For this Inventory, no additional categories were identified using criteria recommend by IPCC, but EPA continues to update its qualitative assessment on an annual basis.

Table A-2: U.S. Greenhouse Gas Inventory Source Categories without LULUCF

CRF Source/Sink Categories	Direct Greenhouse Gas	2018 Emissions (MMT CO ₂ Eq.)	Key Category?	ID Criteria ^a	Level in which year(s) ^b
Energy					
1.A.3.b CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,521.9	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.1 CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,152.9	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.1 CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	577.4	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.2 CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	514.8	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.4.b CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	273.7	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.2 CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	268.6	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.4.a CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	192.6	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.3.a CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	173.9	•	L ₁ T ₁ L ₂	1990, 2018
1.A.5 CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	134.6	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.4.b CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	63.5	•	L ₁ T ₁ L ₂ T ₂	1990, 2018 ₁
1.A.4.a CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	52.1	•	L ₁ T ₁	1990 ₁ , 2018 ₁
1.A.2 CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	49.8	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.3.e CO ₂ Emissions from Mobile Combustion: Other	CO ₂	49.2	•	L ₁ T ₁	1990 ₁ , 2018 ₁
1.A.3.c CO ₂ Emissions from Mobile Combustion: Railways	CO ₂	38.9	•	L ₁	1990 ₁ , 2018 ₁
1.B.2 CO ₂ Emissions from Petroleum Systems	CO ₂	36.8	•	L ₁ T ₁ L ₂ T ₂	2018
1.A.3.d CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	36.8	•	L ₁ T ₁	1990 ₁ , 2018 ₁

1.B.2 CO ₂ Emissions from Natural Gas Systems	CO ₂	35.0	•	L ₁	1990 ₁ , 2018 ₁
1.A.5 CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	34.3	•	L ₁	1990 ₁ , 2018 ₁
1.A.1 CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	22.2	•	L ₁ T ₁ L ₂ T ₂	1990
5.C.1 CO ₂ Emissions from Incineration of Waste	CO ₂	11.1			
1.A.5 CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	4.0			
1.A.5 CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	3.0	•	T ₂	
1.A.4.a CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	1.8	•	T ₁	
1.A.1 CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.4			
1.B.2 CO ₂ Emissions from Abandoned Oil and Gas Wells	CO ₂	+			
1.A.4.b CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	0.0	•	T ₂	
1.B.2 CH ₄ Emissions from Natural Gas Systems	CH ₄	140.0	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.B.1 Fugitive Emissions from Coal Mining	CH ₄	52.7	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.B.2 CH ₄ Emissions from Petroleum Systems	CH ₄	36.2	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.B.2 CH ₄ Emissions from Abandoned Oil and Gas Wells	CH ₄	7.0	•	L ₂	1990 ₂ , 2018 ₂
1.B.1 Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	6.2			
1.A.4.b CH ₄ Emissions from Stationary Combustion - Residential	CH ₄	4.5	•	L ₂ T ₂	1990 ₂ , 2018 ₂
1.A.3.e CH ₄ Emissions from Mobile Combustion: Other	CH ₄	1.7	•	T ₂	
1.A.2 CH ₄ Emissions from Stationary Combustion - Industrial	CH ₄	1.6			
1.A.4.a CH ₄ Emissions from Stationary Combustion - Commercial	CH ₄	1.2			
1.A.3.b CH ₄ Emissions from Mobile Combustion: Road	CH ₄	1.0			
1.A.1 CH ₄ Emissions from Stationary Combustion - Gas - Electricity Generation	CH ₄	1.0			
1.A.3.d CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	0.3			

1.A.1 CH ₄ Emissions from Stationary Combustion - Coal - Electricity Generation	CH ₄	0.2			
1.A.3.c CH ₄ Emissions from Mobile Combustion: Railways	CH ₄	0.1			
1.A.5 CH ₄ Emissions from Stationary Combustion - U.S. Territories	CH ₄	0.1			
1.A.3.a CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	+			
1.A.1 CH ₄ Emissions from Stationary Combustion - Oil - Electricity Generation	CH ₄	+			
1.A.1 CH ₄ Emissions from Stationary Combustion - Wood - Electricity Generation	CH ₄	+			
5.C.1 CH ₄ Emissions from Incineration of Waste	CH ₄	+			
1.A.1 N ₂ O Emissions from Stationary Combustion - Coal - Electricity Generation	N ₂ O	20.3	•	L ₂	1990 ₂ , 2018 ₂
1.A.3.b N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	10.4	•	L ₁ T ₁ L ₂ T ₂	1990
1.A.1 N ₂ O Emissions from Stationary Combustion - Gas - Electricity Generation	N ₂ O	4.1	•	T ₂	
1.A.2 N ₂ O Emissions from Stationary Combustion - Industrial	N ₂ O	2.6	•	L ₂	1990 ₂
1.A.3.e N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	2.5			
1.A.3.a N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.6			
1.A.4.b N ₂ O Emissions from Stationary Combustion - Residential	N ₂ O	0.9			
1.A.3.d N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.5			
1.A.4.a N ₂ O Emissions from Stationary Combustion - Commercial	N ₂ O	0.3			
5.C.1 N ₂ O Emissions from Incineration of Waste	N ₂ O	0.3			
1.A.3.c N ₂ O Emissions from Mobile Combustion: Railways	N ₂ O	0.3			
1.A.5 N ₂ O Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1			
1.B.2 N ₂ O Emissions from Petroleum Systems	N ₂ O	0.1			
1.A.1 N ₂ O Emissions from Stationary Combustion - Wood - Electricity Generation	N ₂ O	+			
1.B.2 N ₂ O Emissions from Natural Gas Systems	N ₂ O	+			
1.A.1 N ₂ O Emissions from Stationary Combustion - Oil - Electricity Generation	N ₂ O	+			

Industrial Processes and Product Use						
2.C.1 CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	42.6	•	L ₁ T ₁ L ₂ T ₂	1990, 2018	
2.A.1 CO ₂ Emissions from Cement Production	CO ₂	40.3	•	L ₁	1990 ₁ , 2018 ₁	
2.B.8 CO ₂ Emissions from Petrochemical Production	CO ₂	29.4	•	L ₁ T ₁	1990 ₁ , 2018 ₁	
2.B.1 CO ₂ Emissions from Ammonia Production	CO ₂	13.5				
2.A.2 CO ₂ Emissions from Lime Production	CO ₂	13.2				
2.A.4 CO ₂ Emissions from Other Process Uses of Carbonates	CO ₂	10.0				
2.B.10 CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	4.5				
2.B.10 CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.6				
2.C.2 CO ₂ Emissions from Ferroalloy Production	CO ₂	2.1				
2.B.7 CO ₂ Emissions from Soda Ash Production	CO ₂	1.7				
2.B.6 CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.5				
2.C.3 CO ₂ Emissions from Aluminum Production	CO ₂	1.5				
2.A.3 CO ₂ Emissions from Glass Production	CO ₂	1.3				
2.C.6 CO ₂ Emissions from Zinc Production	CO ₂	1.0				
2.B.10 CO ₂ Emissions from Phosphoric Acid Production	CO ₂	0.9				
2.C.5 CO ₂ Emissions from Lead Production	CO ₂	0.5				
2.B.5 CO ₂ Emissions from Carbide Production and Consumption	CO ₂	0.2				
2.C.4 CO ₂ Emissions from Magnesium Production and Processing	CO ₂	+				
2.B.8 CH ₄ Emissions from Petrochemical Production	CH ₄	0.3				
2.C.2 CH ₄ Emissions from Ferroalloy Production	CH ₄	+				
2.B.5 CH ₄ Emissions from Carbide Production and Consumption	CH ₄	+				
2.C.1 CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH ₄	+				
2.B.3 N ₂ O Emissions from Adipic Acid Production	N ₂ O	10.3				
2.B.2 N ₂ O Emissions from Nitric Acid Production	N ₂ O	9.3				
2.G N ₂ O Emissions from Product Uses	N ₂ O	4.2				
2.B.4 N ₂ O Emissions from Caprolactam, Glyoxal, and Glyoxylic Acid Production	N ₂ O	1.4				

2.E N ₂ O Emissions from Electronics Industry	N ₂ O	0.3			
2.F.1 Emissions from Substitutes for Ozone Depleting Substances: Refrigeration and Air Conditioning	HFCs, PFCs	128.9	•	L ₁ T ₁ L ₂ T ₂	2018
2.F.4 Emissions from Substitutes for Ozone Depleting Substances: Aerosols	HFCs, PFCs	19.2	•	T ₁ T ₂	
2.F.2 Emissions from Substitutes for Ozone Depleting Substances: Foam Blowing Agents	HFCs, PFCs	15.1	•	T ₁	
2.F.3 Emissions from Substitutes for Ozone Depleting Substances: Fire Protection	HFCs, PFCs	2.6	•	T ₂	
2.F.5 Emissions from Substitutes for Ozone Depleting Substances: Solvents	HFCs, PFCs	2.0	•	T ₂	
2.E PFC, HFC, SF ₆ , and NF ₃ Emissions from Electronics Industry	HiGWP	4.8			
2.G SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	4.1	•	L ₁ T ₁ T ₂	1990 ₁
2.B.9 HFC-23 Emissions from HCFC-22 Production	HFCs	3.3	•	L ₁ T ₁ T ₂	1990 ₁
2.C.3 PFC Emissions from Aluminum Production	PFCs	1.6	•	L ₁ T ₁	1990 ₁
2.C.4 SF ₆ Emissions from Magnesium Production and Processing	SF ₆	1.1			
2.C.4 HFC-134a Emissions from Magnesium Production and Processing	HFCs	0.1			
Agriculture					
3.H CO ₂ Emissions from Urea Fertilization	CO ₂	4.6			
3.G CO ₂ Emissions from Liming	CO ₂	3.1	•	T ₂	
3.A.1 CH ₄ Emissions from Enteric Fermentation: Cattle	CH ₄	171.7	•	L ₁ T ₁ L ₂	1990, 2018
3.B.1 CH ₄ Emissions from Manure Management: Cattle	CH ₄	35.7	•	L ₁ T ₁ L ₂ T ₂	2018
3.B.4 CH ₄ Emissions from Manure Management: Other Livestock	CH ₄	26.0	•	L ₁	2018 ₁
3.C CH ₄ Emissions from Rice Cultivation	CH ₄	13.3	•	L ₂ T ₂	1990 ₂ , 2018 ₂
3.A.4 CH ₄ Emissions from Enteric Fermentation: Other Livestock	CH ₄	5.8			
3.F CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.4			
3.D.1 Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	285.7	•	L ₁ L ₂	1990, 2018
3.D.2 Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	52.5	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
3.B.1 N ₂ O Emissions from Manure Management: Cattle	N ₂ O	15.4			

3.B.4 N ₂ O Emissions from Manure Management: Other Livestock	N ₂ O	4.1			
3.F N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.2			

Waste					
5.A CH ₄ Emissions from Landfills	CH ₄	110.6	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
5.D CH ₄ Emissions from Wastewater Treatment	CH ₄	14.2			
5.B CH ₄ Emissions from Composting	CH ₄	2.5			
5.D N ₂ O Emissions from Wastewater Treatment	N ₂ O	5.0	•	L ₂	2018 ₂
5.B N ₂ O Emissions from Composting	N ₂ O	2.2			

Note: LULUCF sources and sinks are not included in this analysis.

+ Does not exceed 0.05 MMT CO₂ Eq.

^a If the source is a key category for both L₁ and L₂ (as designated in the ID criteria column), it is a key category for both assessments in the years provided unless noted by a subscript, in which case it is a key category for that assessment in that year only (e.g., 1990₂ designates a source is a key category for the Approach 2 assessment only in 1990).

^b Emissions from these sources not included in emission totals.

Table A-3: U.S. Greenhouse Gas Inventory Source Categories with LULUCF

CRF Source/Sink Categories	Direct		Key Category?	ID Criteria ^a	Level in which year(s)? ^b
	Greenhouse Gas	2018 Emissions (MMT CO ₂ Eq.)			
Energy					
1.A.3.b CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,521.9	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.1 CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,152.9	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.1 CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	577.4	•	L ₁ T ₁ L ₂ T ₂	1990 ₁ , 2018
1.A.2 CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	514.8	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.4.b CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	273.7	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.2 CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	268.6	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.4.a CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	192.6	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.3.a CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	173.9	•	L ₁ T ₁ L ₂	1990, 2018
1.A.5 CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	134.6	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.A.4.b CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	63.5	•	L ₁ T ₁ T ₂	1990 ₁ , 2018 ₁
1.A.4.a CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	52.1	•	L ₁ T ₁	1990 ₁ , 2018 ₁
1.A.2 CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	49.8	•	L ₁ T ₁ L ₂ T ₂	1990, 2018 ₁
1.A.3.e CO ₂ Emissions from Mobile Combustion: Other	CO ₂	49.2	•	L ₁ T ₁	1990 ₁ , 2018 ₁
1.A.3.c CO ₂ Emissions from Mobile Combustion: Railways	CO ₂	38.9	•	L ₁	1990 ₁ , 2018 ₁

1.B.2 CO ₂ Emissions from Petroleum Systems	CO ₂	36.8	•	L ₁ T ₁ L ₂ T ₂	2018
1.A.3.d CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	36.8	•	L ₁ T ₁	1990 ₁ , 2018 ₁
1.B.2 CO ₂ Emissions from Natural Gas Systems	CO ₂	35.0	•	L ₁	1990 ₁ , 2018 ₁
1.A.5 CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	34.3	•	L ₁	1990 ₁ , 2018 ₁
1.A.1 CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	22.2	•	L ₁ T ₁ T ₂	1990 ₁ , 2018 ₁
5.C.1 CO ₂ Emissions from Incineration of Waste	CO ₂	11.1			
1.A.5 CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	4.0			
1.A.5 CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	3.0			
1.A.4.a CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	1.8	•	T ₁	
1.A.1 CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.4			
1.B.2 CO ₂ Emissions from Abandoned Oil and Gas Wells	CO ₂	+			
1.A.4.b CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	0.0	•	T ₂	
1.B.2 CH ₄ Emissions from Natural Gas Systems	CH ₄	140.0	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.B.1 Fugitive Emissions from Coal Mining	CH ₄	52.7	•	L ₁ T ₁ L ₂ T ₂	1990, 2018 ₁
1.B.2 CH ₄ Emissions from Petroleum Systems	CH ₄	36.2	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
1.B.2 CH ₄ Emissions from Abandoned Oil and Gas Wells	CH ₄	7.0	•	L ₂	1990 ₂ , 2018 ₂
1.B.1 Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	6.2			
1.A.4.b CH ₄ Emissions from Stationary Combustion - Residential	CH ₄	4.5	•	L ₂ T ₂	1990 ₂ , 2018 ₂
1.A.3.e CH ₄ Emissions from Mobile Combustion: Other	CH ₄	1.7	•	T ₂	
1.A.2 CH ₄ Emissions from Stationary Combustion - Industrial	CH ₄	1.6			
1.A.4.a CH ₄ Emissions from Stationary Combustion - Commercial	CH ₄	1.2			
1.A.3.b CH ₄ Emissions from Mobile Combustion: Road	CH ₄	1.0			
1.A.1 CH ₄ Emissions from Stationary Combustion - Gas - Electricity Generation	CH ₄	1.0			
1.A.3.d CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	0.3			
1.A.1 CH ₄ Emissions from Stationary Combustion - Coal - Electricity Generation	CH ₄	0.2			
1.A.3.c CH ₄ Emissions from Mobile Combustion: Railways	CH ₄	0.1			
1.A.5 CH ₄ Emissions from Stationary Combustion - U.S. Territories	CH ₄	0.1			
1.A.3.a CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	+			
1.A.1 CH ₄ Emissions from Stationary Combustion - Oil - Electricity Generation	CH ₄	+			

1.A.1 CH ₄ Emissions from Stationary Combustion - Wood - Electricity Generation	CH ₄	+			
5.C.1 CH ₄ Emissions from Incineration of Waste	CH ₄	+			
1.A.1 N ₂ O Emissions from Stationary Combustion - Coal - Electricity Generation	N ₂ O	20.3			
1.A.3.b N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	10.4	•	L ₁ T ₁ T ₂	1990 ₁
1.A.1 N ₂ O Emissions from Stationary Combustion - Gas - Electricity Generation	N ₂ O	4.1			
1.A.2 N ₂ O Emissions from Stationary Combustion - Industrial	N ₂ O	2.6			
1.A.3.e N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	2.5			
1.A.3.a N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.6			
1.A.4.b N ₂ O Emissions from Stationary Combustion - Residential	N ₂ O	0.9			
1.A.3.d N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.5			
1.A.4.a N ₂ O Emissions from Stationary Combustion - Commercial	N ₂ O	0.3			
5.C.1 N ₂ O Emissions from Incineration of Waste	N ₂ O	0.3			
1.A.3.c N ₂ O Emissions from Mobile Combustion: Railways	N ₂ O	0.3			
1.A.5 N ₂ O Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1			
1.B.2 N ₂ O Emissions from Petroleum Systems	N ₂ O	0.1			
1.A.1 N ₂ O Emissions from Stationary Combustion - Wood - Electricity Generation	N ₂ O	+			
1.B.2 N ₂ O Emissions from Natural Gas Systems	N ₂ O	+			
1.A.1 N ₂ O Emissions from Stationary Combustion - Oil - Electricity Generation	N ₂ O	+			
Industrial Processes and Product Use					
2.C.1 CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	42.6	•	L ₁ T ₁ L ₂ T ₂	1990, 2018 ₁
2.A.1 CO ₂ Emissions from Cement Production	CO ₂	40.3	•	L ₁	1990 ₁ , 2018 ₁
2.B.8 CO ₂ Emissions from Petrochemical Production	CO ₂	29.4	•	L ₁ T ₁	1990 ₁ , 2018 ₁
2.B.1 CO ₂ Emissions from Ammonia Production	CO ₂	13.5			
2.A.2 CO ₂ Emissions from Lime Production	CO ₂	13.2			
2.A.4 CO ₂ Emissions from Other Process Uses of Carbonates	CO ₂	10.0			
2.B.10 CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	4.5			
2.B.10 CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.6			
2.C.2 CO ₂ Emissions from Ferroalloy Production	CO ₂	2.1			

2.B.7 CO ₂ Emissions from Soda Ash Production	CO ₂	1.7			
2.B.6 CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.5			
2.C.3 CO ₂ Emissions from Aluminum Production	CO ₂	1.5			
2.A.3 CO ₂ Emissions from Glass Production	CO ₂	1.3			
2.C.6 CO ₂ Emissions from Zinc Production	CO ₂	1.0			
2.B.10 CO ₂ Emissions from Phosphoric Acid Production	CO ₂	0.9			
2.C.5 CO ₂ Emissions from Lead Production	CO ₂	0.5			
2.B.5 CO ₂ Emissions from Carbide Production and Consumption	CO ₂	0.2			
2.C.4 CO ₂ Emissions from Magnesium Production and Processing	CO ₂	+			
2.B.8 CH ₄ Emissions from Petrochemical Production	CH ₄	0.3			
2.C.2 CH ₄ Emissions from Ferroalloy Production	CH ₄	+			
2.B.5 CH ₄ Emissions from Carbide Production and Consumption	CH ₄	+			
2.C.1 CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH ₄	+			
2.B.3 N ₂ O Emissions from Adipic Acid Production	N ₂ O	10.3			
2.B.2 N ₂ O Emissions from Nitric Acid Production	N ₂ O	9.3			
2.G N ₂ O Emissions from Product Uses	N ₂ O	4.2			
2.B.4 N ₂ O Emissions from Caprolactam, Glyoxal, and Glyoxylic Acid Production	N ₂ O	1.4			
2.E N ₂ O Emissions from Electronics Industry	N ₂ O	0.3			
2.F.1 Emissions from Substitutes for Ozone Depleting Substances: Refrigeration and Air Conditioning	HFCs, PFCs	128.9	•	L ₁ T ₁ L ₂ T ₂	2018
2.F.4 Emissions from Substitutes for Ozone Depleting Substances: Aerosols	HFCs, PFCs	19.2	•	T ₁ T ₂	
2.F.2 Emissions from Substitutes for Ozone Depleting Substances: Foam Blowing Agents	HFCs, PFCs	15.1	•	T ₁	
2.F.3 Emissions from Substitutes for Ozone Depleting Substances: Fire Protection	HFCs, PFCs	2.6			
2.F.5 Emissions from Substitutes for Ozone Depleting Substances: Solvents	HFCs, PFCs	2.0			
2.E PFC, HFC, SF ₆ , and NF ₃ Emissions from Electronics Industry	HiGWP	4.8			
2.G SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	4.1	•	L ₁ T ₁ T ₂	1990 ₁
2.B.9 HFC-23 Emissions from HCFC-22 Production	HFCs	3.3	•	L ₁ T ₁ T ₂	1990 ₁
2.C.3 PFC Emissions from Aluminum Production	PFC	1.6	•	T ₁	
2.C.4 SF ₆ Emissions from Magnesium Production and Processing	SF ₆	1.1			
2.C.4 HFC-134a Emissions from Magnesium Production and Processing	HFCs	0.1			

Agriculture					
3.H CO ₂ Emissions from Urea Fertilization	CO ₂	4.6			
3.G CO ₂ Emissions from Liming	CO ₂	3.1			
3.A.1 CH ₄ Emissions from Enteric Fermentation: Cattle	CH ₄	171.7	•	L ₁ T ₁ L ₂	1990, 2018
3.B.1 CH ₄ Emissions from Manure Management: Cattle	CH ₄	35.7	•	L ₁ T ₁ T ₂	2018 ₁
3.B.4 CH ₄ Emissions from Manure Management: Other Livestock	CH ₄	26.0	•	L ₁	2018 ₁
3.C CH ₄ Emissions from Rice Cultivation	CH ₄	13.3			
3.A.4 CH ₄ Emissions from Enteric Fermentation: Other Livestock	CH ₄	5.8			
3.F CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.4			
3.D.1 Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	285.7	•	L ₁ L ₂	1990, 2018
3.D.2 Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	52.5	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
3.B.1 N ₂ O Emissions from Manure Management: Cattle	N ₂ O	15.4			
3.B.4 N ₂ O Emissions from Manure Management: Other Livestock	N ₂ O	4.1			
3.F N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.2			
Waste					
5.A CH ₄ Emissions from Landfills	CH ₄	110.6	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
5.D CH ₄ Emissions from Wastewater Treatment	CH ₄	14.2			
5.B CH ₄ Emissions from Composting	CH ₄	2.5			
5.D N ₂ O Emissions from Wastewater Treatment	N ₂ O	5.0			
5.B N ₂ O Emissions from Composting	N ₂ O	2.2			
Land Use, Land Use Change, and Forestry					
4.E.2 Net CO ₂ Emissions from Land Converted to Settlements	CO ₂	79.3	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
4.B.2 Net CO ₂ Emissions from Land Converted to Cropland	CO ₂	55.3	•	L ₁ L ₂	1990, 2018
4.C.1 Net CO ₂ Emissions from Grassland Remaining Grassland	CO ₂	11.2	•	L ₂ T ₂	1990 ₂ , 2018 ₂
4.D.2 Net CO ₂ Emissions from Land Converted to Wetlands	CO ₂	(+)			
4.D.1 Net CO ₂ Emissions from Coastal Wetlands Remaining Coastal Wetlands	CO ₂	(+)			
4.B.1 Net CO ₂ Emissions from Cropland Remaining Cropland	CO ₂	(+)	•	L ₁ T ₁ L ₂ T ₂	1990, 2018 ₂
4.C.2 Net CO ₂ Emissions from Land Converted to Grassland	CO ₂	(+)	•	L ₁ T ₁ L ₂ T ₂	2018
4.A.2 Net CO ₂ Emissions from Land Converted to Forest Land	CO ₂	(+)	•	L ₁ L ₂	1990, 2018
4.E.1 Net CO ₂ Emissions from Settlements Remaining Settlements	CO ₂	(+)	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
4.A.1 Net CO ₂ Emissions from Forest Land Remaining Forest Land	CO ₂	(+)	•	L ₁ T ₁ L ₂ T ₂	1990, 2018
4.A.1 CH ₄ Emissions from Forest Fires	CH ₄	11.3	•	T ₁	
4.D.1 CH ₄ Emissions from Coastal Wetlands Remaining Coastal Wetlands	CH ₄	3.6			
4.C.1 CH ₄ Emissions from Grass Fires	CH ₄	0.3			

4.D.2 CH ₄ Emissions from Land Converted to Coastal Wetlands	CH ₄	+		
4.A.4 CH ₄ Emissions from Drained Organic Soils	CH ₄	+		
4.D.1 CH ₄ Emissions from Peatlands Remaining Peatlands	CH ₄	+		
4.A.1 N ₂ O Emissions from Forest Fires	N ₂ O	7.5	•	T ₁
4.E.1 N ₂ O Emissions from Settlement Soils	N ₂ O	2.4		
4.A.1 N ₂ O Emissions from Forest Soils	N ₂ O	0.5		
4.C.1 N ₂ O Emissions from Grass Fires	N ₂ O	0.3		
4.D.1 N ₂ O Emissions from Coastal Wetlands Remaining Coastal Wetlands	N ₂ O	0.1		
4.A.4 N ₂ O Emissions from Drained Organic Soils	N ₂ O	0.1		
4.D.1 N ₂ O Emissions from Peatlands Remaining Peatlands	N ₂ O	+		

Note: Parentheses indicate negative values (or sequestration).

+ Does not exceed 0.05 MMT CO₂ Eq.

^a If the source is a key category for both L₁ and L₂ (as designated in the ID criteria column), it is a key category for both assessments in the years provided unless noted by a subscript, in which case it is a key category only for that assessment in only that year (e.g., 1990₂ designates a source is a key category for the Approach 2 assessment only in 1990).

^b Emissions from these sources not included in emission totals.

Evaluation of Key Categories

Level Assessment

When using an Approach 1 for the level assessment, a predetermined cumulative emissions threshold is used to identify key categories. When source and sink categories are sorted in order of decreasing absolute emissions, those that fall at the top of the list and cumulatively account for 95 percent of emissions are considered key categories. The 95 percent threshold in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC 2006) was designed to establish a general level where the key category analysis covers approximately 90 percent of inventory uncertainty.

Including the Approach 2 provides additional insight into why certain source categories are considered key, and how to prioritize inventory improvements. In the Approach 2, the level assessment for each category from the Approach 1 is multiplied by its percent relative uncertainty. If the uncertainty reported is asymmetrical, the absolute value of the larger uncertainty is used. While CO₂ emissions from geothermal energy are included in the overall emissions estimate, they are not an official IPCC source category. As a result, there are no guidelines to associate uncertainty with the emissions estimate; therefore, an uncertainty analysis was not conducted. The uncertainty associated with CO₂ from mobile combustion is applied to each mode's emission estimate. No uncertainty was associated with CH₄ emissions from waste incineration nor certain F-GHGs, photovoltaics (PV), micro-electro-mechanical systems (MEMS) devices (MEMS), and Heat Transfer Fluids (HTFs) from the Electronics Industry because an uncertainty analysis was not conducted. When source and sink categories are sorted in decreasing order of this calculation, those that fall at the top of the list and cumulatively account for 90 percent of emissions are considered key categories. The key categories identified by the Approach 2 level assessment may differ from those identified by the Approach 1 assessment. The final set of key categories includes all source and sink categories identified as key by either the Approach 1 or the Approach 2 assessment, keeping in mind that the two assessments are not mutually exclusive.

It is important to note that a key category analysis can be sensitive to the definitions of the source and sink categories. If a large source or sink category is split into many subcategories, then the subcategories may have contributions to the total inventory that are too small for those source categories to be considered key. Similarly, a collection of small, non-key source categories adding up to less than 5 percent of total emissions could become key source categories if those source categories were aggregated into a single source or sink category. The United States has attempted to define source and sink categories by the conventions that would allow comparison with other international key categories, while still maintaining the category definitions that constitute how the emissions estimates were calculated for this report. As such, some of the category names used in the key category analysis may differ from the names used in the main body of the report. Additionally, the United States accounts for some source categories, including fossil fuel feedstocks, international bunkers, and emissions from U.S. Territories, that are derived from unique data sources using country-specific methodologies.

Table A-4 through Table A-7 contain the 1990 and 2018 level assessments for both with and without LULUCF sources and sinks, and contain further detail on where each source falls within the analysis. Approach 1 key categories are shaded dark gray. Additional key categories identified by the Approach 2 assessment are shaded light gray.

Trend Assessment

Approach 1 for trend assessment is defined as the product of the source or sink category level assessment and the absolute difference between the source or sink category trend and the total trend. In turn, the source or sink category trend is defined as the change in emissions from the base year to the current year, as a percentage of current year emissions from that source or sink category. The total trend is the percentage change in total inventory emissions from the base year to the current year.

Thus, the source or sink category trend assessment will be large if the source or sink category represents a large percentage of emissions and/or has a trend that is quite different from the overall inventory trend. To determine key categories, the trend assessments are sorted in decreasing order, so that the source or sink categories with the highest trend assessments appear first. The trend assessments are summed until the threshold of 95 percent is reached; all categories that fall within that cumulative 95 percent are considered key categories.

For Approach 2, the trend assessment for each category from Approach 1 is multiplied by its percent relative uncertainty. If the uncertainty reported is asymmetrical, the larger uncertainty is used. When source and sink categories are sorted in decreasing order of this calculation, those that fall at the top of the list and cumulatively account for 90 percent of emissions are considered key categories. The key categories identified by the Approach 2 trend assessment may differ from those identified by the Approach 1 assessment. The final set of key categories includes all source and sink categories identified as key by either the Approach 1 or the Approach 2 assessment, keeping in mind that the two assessments are not mutually exclusive.

Table A-8 and Table A-9 contain the 1990 through 2018 trend assessment for both with and without LULUCF sources and sinks, and contain further detail on where each source falls within the analysis. Approach 1 key categories are shaded dark gray. Additional key categories identified by the Approach 2 assessment are shaded light gray.

Table A-4: 1990 Key Source Category Approach 1 and Approach 2 Analysis—Level Assessment, without LULUCF

CRF Source/Sink Categories	Direct	1990 Estimate (MMT CO ₂ Eq.)	Approach 1			Approach 2
	Greenhouse Gas		Level Assessment	Cumulative Total	Uncertainty ^a	Level Assessment
1.A.1 CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,546.5	0.24	0.24	10%	0.023
1.A.3.b CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,163.9	0.18	0.42	6%	0.011
1.A.2 CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	408.5	0.06	0.48	7%	0.005
1.A.2 CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	293.3	0.05	0.53	22%	0.010
3.D.1 Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	272.5	0.04	0.57	31%	0.013
1.A.4.b CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	237.8	0.04	0.61	7%	0.003
1.A.3.a CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	187.4	0.03	0.64	6%	0.002
1.B.2 CH ₄ Emissions from Natural Gas Systems	CH ₄	183.3	0.03	0.67	15%	0.004
5.A CH ₄ Emissions from Landfills	CH ₄	179.6	0.03	0.69	23%	0.006
1.A.1 CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	175.4	0.03	0.72	5%	0.001
3.A.1 CH ₄ Emissions from Enteric Fermentation: Cattle	CH ₄	158.4	0.02	0.75	18%	0.004

1.A.2 CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	155.2	0.02	0.77	16%	0.004
1.A.4.a CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	142.0	0.02	0.79	7%	0.002
1.A.5 CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	119.5	0.02	0.81	40%	0.007
2.C.1 CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	104.7	0.02	0.83	18%	0.003
1.A.1 CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	97.5	0.02	0.84	8%	0.001
1.A.4.b CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	97.4	0.02	0.86	6%	0.001
1.B.1 Fugitive Emissions from Coal Mining	CH ₄	96.5	0.01	0.87	17%	0.002
1.A.4.a CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	74.2	0.01	0.88	5%	0.001
1.A.3.d CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	46.3	0.01	0.89	6%	<0.001
1.B.2 CH ₄ Emissions from Petroleum Systems	CH ₄	46.1	0.01	0.90	34%	0.002
2.B.9 HFC-23 Emissions from HCFC-22 Production	HFCs	46.1	0.01	0.91	10%	0.001
3.D.2 Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	43.4	0.01	0.91	151%	0.010
1.A.3.b N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	37.7	0.01	0.92	14%	0.001
1.A.3.e CO ₂ Emissions from Mobile Combustion: Other	CO ₂	36.0	0.01	0.92	6%	<0.001
1.A.3.c CO ₂ Emissions from Mobile Combustion: Railways	CO ₂	35.5	0.01	0.93	6%	<0.001
2.A.1 CO ₂ Emissions from Cement Production	CO ₂	33.5	0.01	0.93	6%	<0.001
1.B.2 CO ₂ Emissions from Natural Gas Systems	CO ₂	32.2	<0.01	0.94	15%	0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	26.9	<0.01	0.94	11%	<0.001
2.G SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	23.2	<0.01	0.95	15%	0.001
2.B.8 CO ₂ Emissions from Petrochemical Production	CO ₂	21.6	<0.01	0.95	6%	<0.001
2.C.3 PFC Emissions from Aluminum Production	PFCs	21.5	<0.01	0.95	7%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Coal - Electricity Generation	N ₂ O	20.1	<0.01	0.96	48%	0.001
3.B.4 CH ₄ Emissions from Manure Management: Other Livestock	CH ₄	19.3	<0.01	0.96	20%	0.001
3.B.1 CH ₄ Emissions from Manure Management: Cattle	CH ₄	17.9	<0.01	0.96	20%	0.001
3.C CH ₄ Emissions from Rice Cultivation	CH ₄	16.0	<0.01	0.97	62%	0.002
5.D CH ₄ Emissions from Wastewater Treatment	CH ₄	15.3	<0.01	0.97	28%	0.001
2.B.3 N ₂ O Emissions from Adipic Acid Production	N ₂ O	15.2	<0.01	0.97	5%	<0.001
2.B.1 CO ₂ Emissions from Ammonia Production	CO ₂	13.0	<0.01	0.97	5%	<0.001

2.B.2 N ₂ O Emissions from Nitric Acid Production	N ₂ O	12.1	<0.01	0.97	5%	<0.001
1.A.4.a CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	12.0	<0.01	0.98	15%	<0.001
2.A.2 CO ₂ Emissions from Lime Production	CO ₂	11.7	<0.01	0.98	2%	<0.001
3.B.1 N ₂ O Emissions from Manure Management: Cattle	N ₂ O	11.2	<0.01	0.98	24%	<0.001
1.B.2 CO ₂ Emissions from Petroleum Systems	CO ₂	9.6	<0.01	0.98	34%	0.001
5.C.1 CO ₂ Emissions from Incineration of Waste	CO ₂	8.0	<0.01	0.98	29%	<0.001
1.B.1 Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	7.2	<0.01	0.98	20%	<0.001
1.A.3.e CH ₄ Emissions from Mobile Combustion: Other	CH ₄	7.0	<0.01	0.98	52%	0.001
2.C.3 CO ₂ Emissions from Aluminum Production	CO ₂	6.8	<0.01	0.99	2%	<0.001
1.B.2 CH ₄ Emissions from Abandoned Oil and Gas Wells	CH ₄	6.6	<0.01	0.99	219%	0.002
2.A.4 CO ₂ Emissions from Other Process Uses of Carbonates	CO ₂	6.3	<0.01	0.99	14%	<0.001
3.A.4 CH ₄ Emissions from Enteric Fermentation: Other Livestock	CH ₄	5.7	<0.01	0.99	18%	<0.001
1.A.4.b CH ₄ Emissions from Stationary Combustion - Residential	CH ₄	5.2	<0.01	0.99	232%	0.002
1.A.3.b CH ₄ Emissions from Mobile Combustion: Road	CH ₄	5.2	<0.01	0.99	26%	<0.001
2.C.4 SF ₆ Emissions from Magnesium Production and Processing	SF ₆	5.2	<0.01	0.99	7%	<0.001
3.G CO ₂ Emissions from Liming	CO ₂	4.7	<0.01	0.99	111%	0.001
2.G N ₂ O Emissions from Product Uses	N ₂ O	4.2	<0.01	0.99	24%	<0.001
2.B.10 CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.8	<0.01	0.99	16%	<0.001
2.E PFC, HFC, SF ₆ , and NF ₃ Emissions from Electronics Industry	HiGWP	3.6	<0.01	0.99	6%	<0.001
5.D N ₂ O Emissions from Wastewater Treatment	N ₂ O	3.4	<0.01	0.99	109%	0.001
1.A.2 N ₂ O Emissions from Stationary Combustion - Industrial	N ₂ O	3.1	<0.01	0.99	200%	0.001
1.A.4.b CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	3.0	<0.01	1.00	NE	<0.001
3.B.4 N ₂ O Emissions from Manure Management: Other Livestock	N ₂ O	2.8	<0.01	1.00	24%	<0.001
2.C.2 CO ₂ Emissions from Ferroalloy Production	CO ₂	2.2	<0.01	1.00	12%	<0.001
3.H CO ₂ Emissions from Urea Fertilization	CO ₂	2.0	<0.01	1.00	35%	<0.001
1.A.2 CH ₄ Emissions from Stationary Combustion - Industrial	CH ₄	1.8	<0.01	1.00	48%	<0.001
1.A.3.e N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	1.8	<0.01	1.00	61%	<0.001
1.A.3.a N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.7	<0.01	1.00	67%	<0.001
2.B.4 N ₂ O Emissions from Caprolactam, Glyoxal, and Glyoxylic Acid Production	N ₂ O	1.7	<0.01	1.00	32%	<0.001
2.A.3 CO ₂ Emissions from Glass Production	CO ₂	1.5	<0.01	1.00	5%	<0.001

2.B.10 CO ₂ Emissions from Phosphoric Acid Production	CO ₂	1.5	<0.01	1.00	20%	<0.001
2.B.10 CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	1.5	<0.01	1.00	5%	<0.001
2.B.7 CO ₂ Emissions from Soda Ash Production	CO ₂	1.4	<0.01	1.00	9%	<0.001
2.B.6 CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.2	<0.01	1.00	13%	<0.001
1.A.4.a CH ₄ Emissions from Stationary Combustion - Commercial	CH ₄	1.1	<0.01	1.00	144%	<0.001
1.A.4.b N ₂ O Emissions from Stationary Combustion - Residential	N ₂ O	1.0	<0.01	1.00	218%	<0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	0.6	<0.01	1.00	19%	<0.001
2.C.6 CO ₂ Emissions from Zinc Production	CO ₂	0.6	<0.01	1.00	16%	<0.001
1.A.3.d N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.6	<0.01	1.00	44%	<0.001
1.A.3.d CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	0.6	<0.01	1.00	86%	<0.001
1.A.1 CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.5	<0.01	1.00	NA	<0.001
2.C.5 CO ₂ Emissions from Lead Production	CO ₂	0.5	<0.01	1.00	15%	<0.001
5.C.1 N ₂ O Emissions from Incineration of Waste	N ₂ O	0.5	<0.01	1.00	328%	<0.001
1.A.4.a N ₂ O Emissions from Stationary Combustion - Commercial	N ₂ O	0.4	<0.01	1.00	176%	<0.001
5.B CH ₄ Emissions from Composting	CH ₄	0.4	<0.01	1.00	50%	<0.001
2.B.5 CO ₂ Emissions from Carbide Production and Consumption	CO ₂	0.4	<0.01	1.00	10%	<0.001
3.F CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.3	<0.01	1.00	16%	<0.001
5.B N ₂ O Emissions from Composting	N ₂ O	0.3	<0.01	1.00	50%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Gas - Electricity Generation	N ₂ O	0.3	<0.01	1.00	48%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Coal - Electricity Generation	CH ₄	0.3	<0.01	1.00	10%	<0.001
1.A.3.c N ₂ O Emissions from Mobile Combustion: Railways	N ₂ O	0.3	<0.01	1.00	69%	<0.001
2.B.8 CH ₄ Emissions from Petrochemical Production	CH ₄	0.2	<0.01	1.00	57%	<0.001
2.F.4 Emissions from Substitutes for Ozone Depleting Substances: Aerosols	HFCs, PFCs	0.2	<0.01	1.00	14%	<0.001
3.F N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.2	<0.01	1.00	19%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Gas - Electricity Generation	CH ₄	0.1	<0.01	1.00	2%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Oil - Electricity Generation	N ₂ O	0.1	<0.01	1.00	10%	<0.001
1.A.5 N ₂ O Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	<0.01	1.00	199%	<0.001
1.A.3.c CH ₄ Emissions from Mobile Combustion: Railways	CH ₄	0.1	<0.01	1.00	26%	<0.001

1.A.3.a CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	0.1	<0.01	1.00	87%	<0.001
1.A.5 CH ₄ Emissions from Stationary Combustion - U.S. Territories	CH ₄	+	<0.01	1.00	55%	<0.001
2.E N ₂ O Emissions from Electronics Industry	N ₂ O	+	<0.01	1.00	0%	<0.001
2.B.5 CH ₄ Emissions from Carbide Production and Consumption	CH ₄	+	<0.01	1.00	9%	<0.001
2.C.1 CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH ₄	+	<0.01	1.00	20%	<0.001
2.C.2 CH ₄ Emissions from Ferroalloy Production	CH ₄	+	<0.01	1.00	12%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Oil - Electricity Generation	CH ₄	+	<0.01	1.00	10%	<0.001
1.B.2 N ₂ O Emissions from Petroleum Systems	N ₂ O	+	<0.01	1.00	34%	<0.001
2.F.1 Emissions from Substitutes for Ozone Depleting Substances: Refrigeration and Air Conditioning	HFCs, PFCs	+	<0.01	1.00	13%	<0.001
1.B.2 CO ₂ Emissions from Abandoned Oil and Gas Wells	CO ₂	+	<0.01	1.00	219%	<0.001
2.F.2 Emissions from Substitutes for Ozone Depleting Substances: Foam Blowing Agents	HFCs, PFCs	+	<0.01	1.00	10%	<0.001
1.B.2 N ₂ O Emissions from Natural Gas Systems	N ₂ O	+	<0.01	1.00	15%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Wood - Electricity Generation	N ₂ O	+	<0.01	1.00	2%	<0.001
2.C.4 CO ₂ Emissions from Magnesium Production and Processing	CO ₂	+	<0.01	1.00	3%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Wood - Electricity Generation	CH ₄	+	<0.01	1.00	2%	<0.001
5.C.1 CH ₄ Emissions from Incineration of Waste	CH ₄	+	<0.01	1.00	NE	<0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	0.0	<0.01	1.00	17%	<0.001
2.F.3 Emissions from Substitutes for Ozone Depleting Substances: Fire Protection	HFCs, PFCs	0.0	<0.01	1.00	18%	<0.001
2.F.5 Emissions from Substitutes for Ozone Depleting Substances: Solvents	HFCs, PFCs	0.0	<0.01	1.00	23%	<0.001
2.C.4 HFC-134a Emissions from Magnesium Production and Processing	HFCs	0.0	<0.01	1.00	21%	<0.001

Note: LULUCF sources and sinks are not included in this analysis.

+ Does not exceed 0.05 MMT CO₂ Eq.

NE (Not Estimated)

NA (Not Available)

^a Percent relative uncertainty. If the corresponding uncertainty is asymmetrical, the uncertainty given here is the larger and always positive.

Table A-5: 1990 Key Source Category Approach 1 and Approach 2 Analysis—Level Assessment, with LULUCF

CRF Source/Sink Categories	Direct	1990	Approach 1	Cumulative	Approach 2
	Greenhouse Gas		Estimate		
				Total	Uncertainty ^a

**(MMT CO₂
Eq.)**

1.A.1 CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,546.5	0.20	0.20	10%	0.020
1.A.3.b CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,163.9	0.15	0.36	6%	0.010
4.A.1 Net CO ₂ Emissions from Forest Land Remaining Forest Land	CO ₂	733.9	0.10	0.46	28%	0.027
1.A.2 CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	408.5	0.05	0.51	7%	0.004
1.A.2 CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	293.3	0.04	0.55	22%	0.008
3.D.1 Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	272.5	0.04	0.58	31%	0.011
1.A.4.b CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	237.8	0.03	0.62	7%	0.002
1.A.3.a CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	187.4	0.02	0.64	6%	0.002
1.B.2 CH ₄ Emissions from Natural Gas Systems	CH ₄	183.3	0.02	0.67	15%	0.004
5.A CH ₄ Emissions from Landfills	CH ₄	179.6	0.02	0.69	23%	0.005
1.A.1 CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	175.4	0.02	0.71	5%	0.001
3.A.1 CH ₄ Emissions from Enteric Fermentation: Cattle	CH ₄	158.4	0.02	0.73	18%	0.004
1.A.2 CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	155.2	0.02	0.75	16%	0.003
1.A.4.a CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	142.0	0.02	0.77	7%	0.001
1.A.5 CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	119.5	0.02	0.79	40%	0.006
4.E.1 Net CO ₂ Emissions from Settlements Remaining Settlements	CO ₂	109.6	0.01	0.80	94%	0.014
4.A.2 Net CO ₂ Emissions from Land Converted to Forest Land	CO ₂	109.4	0.01	0.82	10%	0.001
2.C.1 CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	104.7	0.01	0.83	18%	0.003
1.A.1 CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	97.5	0.01	0.84	8%	0.001
1.A.4.b CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	97.4	0.01	0.86	6%	0.001
1.B.1 Fugitive Emissions from Coal Mining	CH ₄	96.5	0.01	0.87	17%	0.002
1.A.4.a CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	74.2	0.01	0.88	5%	0.001
4.E.2 Net CO ₂ Emissions from Land Converted to Settlements	CO ₂	62.9	0.01	0.89	33%	0.003
4.B.2 Net CO ₂ Emissions from Land Converted to Cropland	CO ₂	54.1	0.01	0.89	98%	0.007
1.A.3.d CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	46.3	0.01	0.90	6%	<0.001
1.B.2 CH ₄ Emissions from Petroleum Systems	CH ₄	46.1	0.01	0.91	34%	0.002

2.B.9 HFC-23 Emissions from HCFC-22 Production	HFCs	46.1	0.01	0.91	10%	0.001
3.D.2 Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	43.4	0.01	0.92	151%	0.009
1.A.3.b N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	37.7	<0.01	0.92	14%	0.001
1.A.3.e CO ₂ Emissions from Mobile Combustion: Other	CO ₂	36.0	<0.01	0.93	6%	<0.001
1.A.3.c CO ₂ Emissions from Mobile Combustion: Railways	CO ₂	35.5	<0.01	0.93	6%	<0.001
2.A.1 CO ₂ Emissions from Cement Production	CO ₂	33.5	<0.01	0.94	6%	<0.001
1.B.2 CO ₂ Emissions from Natural Gas Systems	CO ₂	32.2	<0.01	0.94	15%	0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	26.9	<0.01	0.95	11%	<0.001
4.B.1 Net CO ₂ Emissions from Cropland Remaining Cropland	CO ₂	23.2	<0.01	0.95	497%	0.015
2.G SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	23.2	<0.01	0.95	15%	<0.001
2.B.8 CO ₂ Emissions from Petrochemical Production	CO ₂	21.6	<0.01	0.95	6%	<0.001
2.C.3 PFC Emissions from Aluminum Production	PFCs	21.5	<0.01	0.96	7%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Coal - Electricity Generation	N ₂ O	20.1	<0.01	0.96	48%	0.001
3.B.4 CH ₄ Emissions from Manure Management: Other Livestock	CH ₄	19.3	<0.01	0.96	20%	0.001
3.B.1 CH ₄ Emissions from Manure Management: Cattle	CH ₄	17.9	<0.01	0.97	20%	<0.001
3.C CH ₄ Emissions from Rice Cultivation	CH ₄	16.0	<0.01	0.97	62%	0.001
5.D CH ₄ Emissions from Wastewater Treatment	CH ₄	15.3	<0.01	0.97	28%	0.001
2.B.3 N ₂ O Emissions from Adipic Acid Production	N ₂ O	15.2	<0.01	0.97	5%	<0.001
2.B.1 CO ₂ Emissions from Ammonia Production	CO ₂	13.0	<0.01	0.97	5%	<0.001
2.B.2 N ₂ O Emissions from Nitric Acid Production	N ₂ O	12.1	<0.01	0.97	5%	<0.001
1.A.4.a CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	12.0	<0.01	0.98	15%	<0.001
2.A.2 CO ₂ Emissions from Lime Production	CO ₂	11.7	<0.01	0.98	2%	<0.001
3.B.1 N ₂ O Emissions from Manure Management: Cattle	N ₂ O	11.2	<0.01	0.98	24%	<0.001
1.B.2 CO ₂ Emissions from Petroleum Systems	CO ₂	9.6	<0.01	0.98	34%	<0.001
4.C.1 Net CO ₂ Emissions from Grassland Remaining Grassland	CO ₂	9.1	<0.01	0.98	1296%	0.016
5.C.1 CO ₂ Emissions from Incineration of Waste	CO ₂	8.0	<0.01	0.98	29%	<0.001
1.B.1 Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	7.2	<0.01	0.98	20%	<0.001
1.A.3.e CH ₄ Emissions from Mobile Combustion: Other	CH ₄	7.0	<0.01	0.98	52%	<0.001
2.C.3 CO ₂ Emissions from Aluminum Production	CO ₂	6.8	<0.01	0.99	2%	<0.001

4.C.2 Net CO ₂ Emissions from Land Converted to Grassland	CO ₂	6.7	<0.01	0.99	138%	0.001
1.B.2 CH ₄ Emissions from Abandoned Oil and Gas Wells	CH ₄	6.6	<0.01	0.99	219%	0.002
2.A.4 CO ₂ Emissions from Other Process Uses of Carbonates	CO ₂	6.3	<0.01	0.99	14%	<0.001
3.A.4 CH ₄ Emissions from Enteric Fermentation: Other Livestock	CH ₄	5.7	<0.01	0.99	18%	<0.001
1.A.4.b CH ₄ Emissions from Stationary Combustion - Residential	CH ₄	5.2	<0.01	0.99	232%	0.002
1.A.3.b CH ₄ Emissions from Mobile Combustion: Road	CH ₄	5.2	<0.01	0.99	26%	<0.001
2.C.4 SF ₆ Emissions from Magnesium Production and Processing	SF ₆	5.2	<0.01	0.99	7%	<0.001
3.G CO ₂ Emissions from Liming	CO ₂	4.7	<0.01	0.99	111%	0.001
2.G N ₂ O Emissions from Product Uses	N ₂ O	4.2	<0.01	0.99	24%	<0.001
4.D.1 Net CO ₂ Emissions from Coastal Wetlands Remaining Coastal Wetlands	CO ₂	4.0	<0.01	0.99	77%	<0.001
2.B.10 CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.8	<0.01	0.99	16%	<0.001
2.E PFC, HFC, SF ₆ , and NF ₃ Emissions from Electronics Industry	HiGWP	3.6	<0.01	0.99	6%	<0.001
4.D.1 CH ₄ Emissions from Coastal Wetlands Remaining Coastal Wetlands	CH ₄	3.4	<0.01	0.99	30%	<0.001
5.D N ₂ O Emissions from Wastewater Treatment	N ₂ O	3.4	<0.01	0.99	109%	<0.001
1.A.2 N ₂ O Emissions from Stationary Combustion - Industrial	N ₂ O	3.1	<0.01	0.99	200%	0.001
1.A.4.b CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	3.0	<0.01	1.00	NE	<0.001
3.B.4 N ₂ O Emissions from Manure Management: Other Livestock	N ₂ O	2.8	<0.01	1.00	24%	<0.001
2.C.2 CO ₂ Emissions from Ferroalloy Production	CO ₂	2.2	<0.01	1.00	12%	<0.001
3.H CO ₂ Emissions from Urea Fertilization	CO ₂	2.0	<0.01	1.00	35%	<0.001
4.E.1 N ₂ O Emissions from Settlement Soils	N ₂ O	2.0	<0.01	1.00	54%	<0.001
1.A.2 CH ₄ Emissions from Stationary Combustion - Industrial	CH ₄	1.8	<0.01	1.00	48%	<0.001
1.A.3.e N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	1.8	<0.01	1.00	61%	<0.001
1.A.3.a N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.7	<0.01	1.00	67%	<0.001
2.B.4 N ₂ O Emissions from Caprolactam, Glyoxal, and Glyoxylic Acid Production	N ₂ O	1.7	<0.01	1.00	32%	<0.001
2.A.3 CO ₂ Emissions from Glass Production	CO ₂	1.5	<0.01	1.00	5%	<0.001
2.B.10 CO ₂ Emissions from Phosphoric Acid Production	CO ₂	1.5	<0.01	1.00	20%	<0.001
2.B.10 CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	1.5	<0.01	1.00	5%	<0.001
2.B.7 CO ₂ Emissions from Soda Ash Production	CO ₂	1.4	<0.01	1.00	9%	<0.001
2.B.6 CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.2	<0.01	1.00	13%	<0.001
1.A.4.a CH ₄ Emissions from Stationary Combustion - Commercial	CH ₄	1.1	<0.01	1.00	144%	<0.001

1.A.4.b N ₂ O Emissions from Stationary Combustion - Residential	N ₂ O	1.0	<0.01	1.00	218%	<0.001
4.A.1 CH ₄ Emissions from Forest Fires	CH ₄	0.9	<0.01	1.00	15%	<0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	0.6	<0.01	1.00	19%	<0.001
2.C.6 CO ₂ Emissions from Zinc Production	CO ₂	0.6	<0.01	1.00	16%	<0.001
4.A.1 N ₂ O Emissions from Forest Fires	N ₂ O	0.6	<0.01	1.00	12%	<0.001
1.A.3.d N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.6	<0.01	1.00	44%	<0.001
1.A.3.d CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	0.6	<0.01	1.00	86%	<0.001
1.A.1 CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.5	<0.01	1.00	NA	<0.001
2.C.5 CO ₂ Emissions from Lead Production	CO ₂	0.5	<0.01	1.00	15%	<0.001
5.C.1 N ₂ O Emissions from Incineration of Waste	N ₂ O	0.5	<0.01	1.00	328%	<0.001
1.A.4.a N ₂ O Emissions from Stationary Combustion - Commercial	N ₂ O	0.4	<0.01	1.00	176%	<0.001
5.B CH ₄ Emissions from Composting	CH ₄	0.4	<0.01	1.00	50%	<0.001
2.B.5 CO ₂ Emissions from Carbide Production and Consumption	CO ₂	0.4	<0.01	1.00	10%	<0.001
3.F CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.3	<0.01	1.00	16%	<0.001
5.B N ₂ O Emissions from Composting	N ₂ O	0.3	<0.01	1.00	50%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Gas - Electricity Generation	N ₂ O	0.3	<0.01	1.00	48%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Coal - Electricity Generation	CH ₄	0.3	<0.01	1.00	10%	<0.001
1.A.3.c N ₂ O Emissions from Mobile Combustion: Railways	N ₂ O	0.3	<0.01	1.00	69%	<0.001
2.B.8 CH ₄ Emissions from Petrochemical Production	CH ₄	0.2	<0.01	1.00	57%	<0.001
2.F.4 Emissions from Substitutes for Ozone Depleting Substances: Aerosols	HFCs, PFCs	0.2	<0.01	1.00	14%	<0.001
3.F N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.2	<0.01	1.00	19%	<0.001
4.D.1 N ₂ O Emissions from Coastal Wetlands Remaining Coastal Wetlands	N ₂ O	0.1	<0.01	1.00	116%	<0.001
4.A.4 N ₂ O Emissions from Drained Organic Soils	N ₂ O	0.1	<0.01	1.00	128%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Gas - Electricity Generation	CH ₄	0.1	<0.01	1.00	2%	<0.001
4.A.1 N ₂ O Emissions from Forest Soils	N ₂ O	0.1	<0.01	1.00	318%	<0.001
4.C.1 N ₂ O Emissions from Grass Fires	N ₂ O	0.1	<0.01	1.00	146%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Oil - Electricity Generation	N ₂ O	0.1	<0.01	1.00	10%	<0.001
4.C.1 CH ₄ Emissions from Grass Fires	CH ₄	0.1	<0.01	1.00	146%	<0.001
1.A.5 N ₂ O Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	<0.01	1.00	199%	<0.001
1.A.3.c CH ₄ Emissions from Mobile Combustion: Railways	CH ₄	0.1	<0.01	1.00	26%	<0.001

1.A.3.a CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	0.1	<0.01	1.00	87%	<0.001
1.A.5 CH ₄ Emissions from Stationary Combustion - U.S. Territories	CH ₄	+	<0.01	1.00	55%	<0.001
4.D.2 Net CO ₂ Emissions from Land Converted to Wetlands	CO ₂	+	<0.01	1.00	34%	<0.001
2.E N ₂ O Emissions from Electronics Industry	N ₂ O	+	<0.01	1.00	0%	<0.001
2.B.5 CH ₄ Emissions from Carbide Production and Consumption	CH ₄	+	<0.01	1.00	9%	<0.001
2.C.1 CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH ₄	+	<0.01	1.00	20%	<0.001
2.C.2 CH ₄ Emissions from Ferroalloy Production	CH ₄	+	<0.01	1.00	12%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Oil - Electricity Generation	CH ₄	+	<0.01	1.00	10%	<0.001
1.B.2 N ₂ O Emissions from Petroleum Systems	N ₂ O	+	<0.01	1.00	34%	<0.001
4.D.2 CH ₄ Emissions from Land Converted to Coastal Wetlands	CH ₄	+	<0.01	1.00	30%	<0.001
2.F.1 Emissions from Substitutes for Ozone Depleting Substances: Refrigeration and Air Conditioning	HFCs, PFCs	+	<0.01	1.00	13%	<0.001
4.A.4 CH ₄ Emissions from Drained Organic Soils	CH ₄	+	<0.01	1.00	80%	<0.001
1.B.2 CO ₂ Emissions from Abandoned Oil and Gas Wells	CO ₂	+	<0.01	1.00	219%	<0.001
4.D.1 CH ₄ Emissions from Peatlands Remaining Peatlands	CH ₄	+	<0.01	1.00	88%	<0.001
2.F.2 Emissions from Substitutes for Ozone Depleting Substances: Foam Blowing Agents	HFCs, PFCs	+	<0.01	1.00	10%	<0.001
1.B.2 N ₂ O Emissions from Natural Gas Systems	N ₂ O	+	<0.01	1.00	15%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Wood - Electricity Generation	N ₂ O	+	<0.01	1.00	2%	<0.001
2.C.4 CO ₂ Emissions from Magnesium Production and Processing	CO ₂	+	<0.01	1.00	3%	<0.001
4.D.1 N ₂ O Emissions from Peatlands Remaining Peatlands	N ₂ O	+	<0.01	1.00	62%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Wood - Electricity Generation	CH ₄	+	<0.01	1.00	2%	<0.001
5.C.1 CH ₄ Emissions from Incineration of Waste	CH ₄	+	<0.01	1.00	NE	<0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	0.0	<0.01	1.00	17%	<0.001
2.F.3 Emissions from Substitutes for Ozone Depleting Substances: Fire Protection	HFCs, PFCs	0.0	<0.01	1.00	18%	<0.001
2.F.5 Emissions from Substitutes for Ozone Depleting Substances: Solvents	HFCs, PFCs	0.0	<0.01	1.00	23%	<0.001
2.C.4 HFC-134a Emissions from Magnesium Production and Processing	HFCs	0.0	<0.01	1.00	21%	<0.001

+ Does not exceed 0.05 MMT CO₂ Eq.

NE (Not Estimated)

NA (Not Available)

^a Percent relative uncertainty. If the corresponding uncertainty is asymmetrical, the uncertainty given here is the larger and always positive.

Table A-6: 2018 Key Source Category Approach 1 and Approach 2 Analysis—Level Assessment, without LULUCF

CRF Source/Sink Categories	Direct	2018 Estimate (MMT CO ₂ Eq.)	Approach 1		Approach 2 Level Assessment	
	Greenhouse Gas		Level Assessment	Cumulative Total Uncertainty ^a		
1.A.3.b CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,521.9	0.23	0.23	6%	0.014
1.A.1 CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,152.9	0.17	0.40	10%	0.017
1.A.1 CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	577.4	0.09	0.49	5%	0.004
1.A.2 CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	514.8	0.08	0.56	7%	0.006
3.D.1 Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	285.7	0.04	0.61	31%	0.013
1.A.4.b CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	273.7	0.04	0.65	7%	0.003
1.A.2 CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	268.6	0.04	0.69	22%	0.009
1.A.4.a CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	192.6	0.03	0.72	7%	0.002
1.A.3.a CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	173.9	0.03	0.74	6%	0.002
3.A.1 CH ₄ Emissions from Enteric Fermentation: Cattle	CH ₄	171.7	0.03	0.77	18%	0.005
1.B.2 CH ₄ Emissions from Natural Gas Systems	CH ₄	140.0	0.02	0.79	15%	0.003
1.A.5 CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	134.6	0.02	0.81	40%	0.008
2.F.1 Emissions from Substitutes for Ozone Depleting Substances: Refrigeration and Air Conditioning	HFCs, PFCs	128.9	0.02	0.83	13%	0.003
5.A CH ₄ Emissions from Landfills	CH ₄	110.6	0.02	0.85	23%	0.004
1.A.4.b CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	63.5	0.01	0.86	6%	0.001
1.B.1 Fugitive Emissions from Coal Mining	CH ₄	52.7	0.01	0.86	17%	0.001
3.D.2 Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	52.5	0.01	0.87	151%	0.012
1.A.4.a CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	52.1	0.01	0.88	5%	<0.001
1.A.2 CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	49.8	0.01	0.89	16%	0.001
1.A.3.e CO ₂ Emissions from Mobile Combustion: Other	CO ₂	49.2	0.01	0.89	6%	<0.001
2.C.1 CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	42.6	0.01	0.90	18%	0.001

2.A.1 CO ₂ Emissions from Cement Production	CO ₂	40.3	0.01	0.91	6%	<0.001
1.A.3.c CO ₂ Emissions from Mobile Combustion: Railways	CO ₂	38.9	0.01	0.91	6%	<0.001
1.B.2 CO ₂ Emissions from Petroleum Systems	CO ₂	36.8	0.01	0.92	34%	0.002
1.A.3.d CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	36.8	0.01	0.92	6%	<0.001
1.B.2 CH ₄ Emissions from Petroleum Systems	CH ₄	36.2	0.01	0.93	34%	0.002
3.B.1 CH ₄ Emissions from Manure Management: Cattle	CH ₄	35.7	0.01	0.93	20%	0.001
1.B.2 CO ₂ Emissions from Natural Gas Systems	CO ₂	35.0	0.01	0.94	15%	0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	34.3	0.01	0.94	11%	0.001
2.B.8 CO ₂ Emissions from Petrochemical Production	CO ₂	29.4	<0.01	0.95	6%	<0.001
3.B.4 CH ₄ Emissions from Manure Management: Other Livestock	CH ₄	26.0	<0.01	0.95	20%	0.001
1.A.1 CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	22.2	<0.01	0.96	8%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Coal - Electricity Generation	N ₂ O	20.3	<0.01	0.96	48%	0.001
2.F.4 Emissions from Substitutes for Ozone Depleting Substances: Aerosols	HFCs, PFCs	19.2	<0.01	0.96	14%	<0.001
3.B.1 N ₂ O Emissions from Manure Management: Cattle	N ₂ O	15.4	<0.01	0.96	24%	0.001
2.F.2 Emissions from Substitutes for Ozone Depleting Substances: Foam Blowing Agents	HFCs, PFCs	15.1	<0.01	0.97	10%	<0.001
5.D CH ₄ Emissions from Wastewater Treatment	CH ₄	14.2	<0.01	0.97	28%	0.001
2.B.1 CO ₂ Emissions from Ammonia Production	CO ₂	13.5	<0.01	0.97	5%	<0.001
3.C CH ₄ Emissions from Rice Cultivation	CH ₄	13.3	<0.01	0.97	62%	0.001
2.A.2 CO ₂ Emissions from Lime Production	CO ₂	13.2	<0.01	0.97	2%	<0.001
5.C.1 CO ₂ Emissions from Incineration of Waste	CO ₂	11.1	<0.01	0.98	29%	<0.001
1.A.3.b N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	10.4	<0.01	0.98	14%	<0.001
2.B.3 N ₂ O Emissions from Adipic Acid Production	N ₂ O	10.3	<0.01	0.98	5%	<0.001
2.A.4 CO ₂ Emissions from Other Process Uses of Carbonates	CO ₂	10.0	<0.01	0.98	14%	<0.001
2.B.2 N ₂ O Emissions from Nitric Acid Production	N ₂ O	9.3	<0.01	0.98	5%	<0.001
1.B.2 CH ₄ Emissions from Abandoned Oil and Gas Wells	CH ₄	7.0	<0.01	0.98	219%	0.002
1.B.1 Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	6.2	<0.01	0.98	20%	<0.001

3.A.4 CH ₄ Emissions from Enteric Fermentation: Other Livestock	CH ₄	5.8	<0.01	0.98	18%	<0.001
5.D N ₂ O Emissions from Wastewater Treatment	N ₂ O	5.0	<0.01	0.99	109%	0.001
2.E PFC, HFC, SF ₆ , and NF ₃ Emissions from Electronics Industry	HiGWP	4.8	<0.01	0.99	6%	<0.001
3.H CO ₂ Emissions from Urea Fertilization	CO ₂	4.6	<0.01	0.99	35%	<0.001
1.A.4.b CH ₄ Emissions from Stationary Combustion - Residential	CH ₄	4.5	<0.01	0.99	232%	0.002
2.B.10 CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	4.5	<0.01	0.99	5%	<0.001
2.G N ₂ O Emissions from Product Uses	N ₂ O	4.2	<0.01	0.99	24%	<0.001
3.B.4 N ₂ O Emissions from Manure Management: Other Livestock	N ₂ O	4.1	<0.01	0.99	24%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Gas - Electricity Generation	N ₂ O	4.1	<0.01	0.99	48%	<0.001
2.G SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	4.1	<0.01	0.99	15%	<0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	4.0	<0.01	0.99	19%	<0.001
2.B.10 CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.6	<0.01	0.99	16%	<0.001
2.B.9 HFC-23 Emissions from HCFC-22 Production	HFCs	3.3	<0.01	0.99	10%	<0.001
3.G CO ₂ Emissions from Liming	CO ₂	3.1	<0.01	0.99	111%	0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	3.0	<0.01	0.99	17%	<0.001
2.F.3 Emissions from Substitutes for Ozone Depleting Substances: Fire Protection	HFCs, PFCs	2.6	<0.01	0.99	18%	<0.001
1.A.2 N ₂ O Emissions from Stationary Combustion - Industrial	N ₂ O	2.6	<0.01	0.99	200%	0.001
1.A.3.e N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	2.5	<0.01	0.99	61%	<0.001
5.B CH ₄ Emissions from Composting	CH ₄	2.5	<0.01	0.99	50%	<0.001
5.B N ₂ O Emissions from Composting	N ₂ O	2.2	<0.01	1.00	50%	<0.001
2.C.2 CO ₂ Emissions from Ferroalloy Production	CO ₂	2.1	<0.01	1.00	12%	<0.001
2.F.5 Emissions from Substitutes for Ozone Depleting Substances: Solvents	HFCs, PFCs	2.0	<0.01	1.00	23%	<0.001
1.A.4.a CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	1.8	<0.01	1.00	15%	<0.001
1.A.3.e CH ₄ Emissions from Mobile Combustion: Other	CH ₄	1.7	<0.01	1.00	52%	<0.001
2.B.7 CO ₂ Emissions from Soda Ash Production	CO ₂	1.7	<0.01	1.00	9%	<0.001
1.A.2 CH ₄ Emissions from Stationary Combustion - Industrial	CH ₄	1.6	<0.01	1.00	48%	<0.001
1.A.3.a N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.6	<0.01	1.00	67%	<0.001
2.C.3 PFC Emissions from Aluminum Production	PFCs	1.6	<0.01	1.00	7%	<0.001

2.B.6 CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.5	<0.01	1.00	13%	<0.001
2.C.3 CO ₂ Emissions from Aluminum Production	CO ₂	1.5	<0.01	1.00	2%	<0.001
2.B.4 N ₂ O Emissions from Caprolactam, Glyoxal, and Glyoxylic Acid Production	N ₂ O	1.4	<0.01	1.00	32%	<0.001
2.A.3 CO ₂ Emissions from Glass Production	CO ₂	1.3	<0.01	1.00	5%	<0.001
1.A.4.a CH ₄ Emissions from Stationary Combustion - Commercial	CH ₄	1.2	<0.01	1.00	144%	<0.001
2.C.4 SF ₆ Emissions from Magnesium Production and Processing	SF ₆	1.1	<0.01	1.00	7%	<0.001
2.C.6 CO ₂ Emissions from Zinc Production	CO ₂	1.0	<0.01	1.00	16%	<0.001
1.A.3.b CH ₄ Emissions from Mobile Combustion: Road	CH ₄	1.0	<0.01	1.00	26%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Gas - Electricity Generation	CH ₄	1.0	<0.01	1.00	2%	<0.001
2.B.10 CO ₂ Emissions from Phosphoric Acid Production	CO ₂	0.9	<0.01	1.00	20%	<0.001
1.A.4.b N ₂ O Emissions from Stationary Combustion - Residential	N ₂ O	0.9	<0.01	1.00	218%	<0.001
2.C.5 CO ₂ Emissions from Lead Production	CO ₂	0.5	<0.01	1.00	15%	<0.001
1.A.3.d N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.5	<0.01	1.00	44%	<0.001
1.A.1 CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.4	<0.01	1.00	NA	<0.001
3.F CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.4	<0.01	1.00	16%	<0.001
1.A.4.a N ₂ O Emissions from Stationary Combustion - Commercial	N ₂ O	0.3	<0.01	1.00	176%	<0.001
5.C.1 N ₂ O Emissions from Incineration of Waste	N ₂ O	0.3	<0.01	1.00	328%	<0.001
1.A.3.d CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	0.3	<0.01	1.00	86%	<0.001
2.B.8 CH ₄ Emissions from Petrochemical Production	CH ₄	0.3	<0.01	1.00	57%	<0.001
1.A.3.c N ₂ O Emissions from Mobile Combustion: Railways	N ₂ O	0.3	<0.01	1.00	69%	<0.001
2.E N ₂ O Emissions from Electronics Industry	N ₂ O	0.3	<0.01	1.00	0%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Coal - Electricity Generation	CH ₄	0.2	<0.01	1.00	10%	<0.001
2.B.5 CO ₂ Emissions from Carbide Production and Consumption	CO ₂	0.2	<0.01	1.00	10%	<0.001
3.F N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.2	<0.01	1.00	19%	<0.001
1.A.5 N ₂ O Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	<0.01	1.00	199%	<0.001

2.C.4 HFC-134a Emissions from Magnesium Production and Processing	HFCs	0.1	<0.01	1.00	21%	<0.001
1.A.3.c CH ₄ Emissions from Mobile Combustion: Railways	CH ₄	0.1	<0.01	1.00	26%	<0.001
1.B.2 N ₂ O Emissions from Petroleum Systems	N ₂ O	0.1	<0.01	1.00	34%	<0.001
1.A.5 CH ₄ Emissions from Stationary Combustion - U.S. Territories	CH ₄	0.1	<0.01	1.00	55%	<0.001
1.A.3.a CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	+	<0.01	1.00	87%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Wood - Electricity Generation	N ₂ O	+	<0.01	1.00	2%	<0.001
2.C.2 CH ₄ Emissions from Ferroalloy Production	CH ₄	+	<0.01	1.00	12%	<0.001
1.B.2 N ₂ O Emissions from Natural Gas Systems	N ₂ O	+	<0.01	1.00	15%	<0.001
2.B.5 CH ₄ Emissions from Carbide Production and Consumption	CH ₄	+	<0.01	1.00	9%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Oil - Electricity Generation	N ₂ O	+	<0.01	1.00	10%	<0.001
2.C.1 CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH ₄	+	<0.01	1.00	20%	<0.001
1.B.2 CO ₂ Emissions from Abandoned Oil and Gas Wells	CO ₂	+	<0.01	1.00	219%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Oil - Electricity Generation	CH ₄	+	<0.01	1.00	10%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Wood - Electricity Generation	CH ₄	+	<0.01	1.00	2%	<0.001
2.C.4 CO ₂ Emissions from Magnesium Production and Processing	CO ₂	+	<0.01	1.00	3%	<0.001
5.C.1 CH ₄ Emissions from Incineration of Waste	CH ₄	+	<0.01	1.00	NE	<0.001
1.A.4.b CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	0.0	<0.01	1.00	NE	<0.001

Note: LULUCF sources and sinks are not included in this analysis.

+ Does not exceed 0.05 MMT CO₂ Eq.

NE (Not Estimated)

NA (Not Available)

^a Percent relative uncertainty. If the corresponding uncertainty is asymmetrical, the uncertainty given here is the larger and always positive.

Table A-7: 2018 Key Source Category Approach 1 and Approach 2 Analysis—Level Assessment with LULUCF

CRF Source/Sink Categories	2018		Approach 1 Level Assessment	Cumulative Total	Uncertainty ^a	Approach 2 Level Assessment
	Direct Greenhouse Gas	Estimate (MMT CO ₂ Eq.)				

1.A.3.b CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,521.9	0.20	0.20	6%	0.012
1.A.1 CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,152.9	0.15	0.34	10%	0.014
4.A.1 Net CO ₂ Emissions from Forest Land Remaining Forest Land	CO ₂	663.2	0.09	0.43	28%	0.023
1.A.1 CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	577.4	0.07	0.50	5%	0.004
1.A.2 CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	514.8	0.07	0.57	7%	0.005
3.D.1 Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	285.7	0.04	0.61	31%	0.011
1.A.4.b CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	273.7	0.04	0.64	7%	0.002
1.A.2 CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	268.6	0.03	0.67	22%	0.008
1.A.4.a CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	192.6	0.02	0.70	7%	0.002
1.A.3.a CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	173.9	0.02	0.72	6%	0.001
3.A.1 CH ₄ Emissions from Enteric Fermentation: Cattle	CH ₄	171.7	0.02	0.74	18%	0.004
1.B.2 CH ₄ Emissions from Natural Gas Systems	CH ₄	140.0	0.02	0.76	15%	0.003
1.A.5 CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	134.6	0.02	0.78	40%	0.007
2.F.1 Emissions from Substitutes for Ozone Depleting Substances: Refrigeration and Air Conditioning	HFCs, PFCs	128.9	0.02	0.80	13%	0.002
4.E.1 Net CO ₂ Emissions from Settlements Remaining Settlements	CO ₂	125.9	0.02	0.81	94%	0.015
4.A.2 Net CO ₂ Emissions from Land Converted to Forest Land	CO ₂	110.6	0.01	0.83	10%	0.001
5.A CH ₄ Emissions from Landfills	CH ₄	110.6	0.01	0.84	23%	0.003
4.E.2 Net CO ₂ Emissions from Land Converted to Settlements	CO ₂	79.3	0.01	0.85	33%	0.003
1.A.4.b CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	63.5	0.01	0.86	6%	<0.001
4.B.2 Net CO ₂ Emissions from Land Converted to Cropland	CO ₂	55.3	0.01	0.87	98%	0.007
1.B.1 Fugitive Emissions from Coal Mining	CH ₄	52.7	0.01	0.87	17%	0.001
3.D.2 Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	52.5	0.01	0.88	151%	0.010
1.A.4.a CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	52.1	0.01	0.89	5%	<0.001
1.A.2 CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	49.8	0.01	0.89	16%	0.001
1.A.3.e CO ₂ Emissions from Mobile Combustion: Other	CO ₂	49.2	0.01	0.90	6%	<0.001

2.C.1 CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	42.6	0.01	0.90	18%	0.001
2.A.1 CO ₂ Emissions from Cement Production	CO ₂	40.3	0.01	0.91	6%	<0.001
1.A.3.c CO ₂ Emissions from Mobile Combustion: Railways	CO ₂	38.9	<0.01	0.91	6%	<0.001
1.B.2 CO ₂ Emissions from Petroleum Systems	CO ₂	36.8	<0.01	0.92	34%	0.002
1.A.3.d CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	36.8	<0.01	0.92	6%	<0.001
1.B.2 CH ₄ Emissions from Petroleum Systems	CH ₄	36.2	<0.01	0.93	34%	0.002
3.B.1 CH ₄ Emissions from Manure Management: Cattle	CH ₄	35.7	<0.01	0.93	20%	0.001
1.B.2 CO ₂ Emissions from Natural Gas Systems	CO ₂	35.0	<0.01	0.94	15%	0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	34.3	<0.01	0.94	11%	<0.001
2.B.8 CO ₂ Emissions from Petrochemical Production	CO ₂	29.4	<0.01	0.95	6%	<0.001
3.B.4 CH ₄ Emissions from Manure Management: Other Livestock	CH ₄	26.0	<0.01	0.95	20%	0.001
4.C.2 Net CO ₂ Emissions from Land Converted to Grassland	CO ₂	24.6	<0.01	0.95	138%	0.004
1.A.1 CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	22.2	<0.01	0.95	8%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Coal - Electricity Generation	N ₂ O	20.3	<0.01	0.96	48%	0.001
2.F.4 Emissions from Substitutes for Ozone Depleting Substances: Aerosols	HFCs, PFCs	19.2	<0.01	0.96	14%	<0.001
4.B.1 Net CO ₂ Emissions from Cropland Remaining Cropland	CO ₂	16.6	<0.01	0.96	497%	0.011
3.B.1 N ₂ O Emissions from Manure Management: Cattle	N ₂ O	15.4	<0.01	0.96	24%	<0.001
2.F.2 Emissions from Substitutes for Ozone Depleting Substances: Foam Blowing Agents	HFCs, PFCs	15.1	<0.01	0.97	10%	<0.001
5.D CH ₄ Emissions from Wastewater Treatment	CH ₄	14.2	<0.01	0.97	28%	0.001
2.B.1 CO ₂ Emissions from Ammonia Production	CO ₂	13.5	<0.01	0.97	5%	<0.001
3.C CH ₄ Emissions from Rice Cultivation	CH ₄	13.3	<0.01	0.97	62%	0.001
2.A.2 CO ₂ Emissions from Lime Production	CO ₂	13.2	<0.01	0.97	2%	<0.001
4.A.1 CH ₄ Emissions from Forest Fires	CH ₄	11.3	<0.01	0.97	15%	<0.001
4.C.1 Net CO ₂ Emissions from Grassland Remaining Grassland	CO ₂	11.2	<0.01	0.98	1296%	0.019
5.C.1 CO ₂ Emissions from Incineration of Waste	CO ₂	11.1	<0.01	0.98	29%	<0.001
1.A.3.b N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	10.4	<0.01	0.98	14%	<0.001

2.B.3 N ₂ O Emissions from Adipic Acid Production	N ₂ O	10.3	<0.01	0.98	5%	<0.001
2.A.4 CO ₂ Emissions from Other Process Uses of Carbonates	CO ₂	10.0	<0.01	0.98	14%	<0.001
2.B.2 N ₂ O Emissions from Nitric Acid Production	N ₂ O	9.3	<0.01	0.98	5%	<0.001
4.A.1 N ₂ O Emissions from Forest Fires	N ₂ O	7.5	<0.01	0.98	12%	<0.001
1.B.2 CH ₄ Emissions from Abandoned Oil and Gas Wells	CH ₄	7.0	<0.01	0.98	219%	0.002
1.B.1 Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	6.2	<0.01	0.98	20%	<0.001
3.A.4 CH ₄ Emissions from Enteric Fermentation: Other Livestock	CH ₄	5.8	<0.01	0.99	18%	<0.001
5.D N ₂ O Emissions from Wastewater Treatment	N ₂ O	5.0	<0.01	0.99	109%	0.001
2.E PFC, HFC, SF ₆ , and NF ₃ Emissions from Electronics Industry	HiGWP	4.8	<0.01	0.99	6%	<0.001
3.H CO ₂ Emissions from Urea Fertilization	CO ₂	4.6	<0.01	0.99	35%	<0.001
1.A.4.b CH ₄ Emissions from Stationary Combustion - Residential	CH ₄	4.5	<0.01	0.99	232%	0.001
2.B.10 CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	4.5	<0.01	0.99	5%	<0.001
4.D.1 Net CO ₂ Emissions from Coastal Wetlands Remaining Coastal Wetlands	CO ₂	4.4	<0.01	0.99	77%	<0.001
2.G N ₂ O Emissions from Product Uses	N ₂ O	4.2	<0.01	0.99	24%	<0.001
3.B.4 N ₂ O Emissions from Manure Management: Other Livestock	N ₂ O	4.1	<0.01	0.99	24%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Gas - Electricity Generation	N ₂ O	4.1	<0.01	0.99	48%	<0.001
2.G SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	4.1	<0.01	0.99	15%	<0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	4.0	<0.01	0.99	19%	<0.001
2.B.10 CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.6	<0.01	0.99	16%	<0.001
4.D.1 CH ₄ Emissions from Coastal Wetlands Remaining Coastal Wetlands	CH ₄	3.6	<0.01	0.99	30%	<0.001
2.B.9 HFC-23 Emissions from HCFC-22 Production	HFCs	3.3	<0.01	0.99	10%	<0.001
3.G CO ₂ Emissions from Liming	CO ₂	3.1	<0.01	0.99	111%	<0.001
1.A.5 CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	3.0	<0.01	0.99	17%	<0.001
2.F.3 Emissions from Substitutes for Ozone Depleting Substances: Fire Protection	HFCs, PFCs	2.6	<0.01	0.99	18%	<0.001
1.A.2 N ₂ O Emissions from Stationary Combustion - Industrial	N ₂ O	2.6	<0.01	0.99	200%	0.001
1.A.3.e N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	2.5	<0.01	0.99	61%	<0.001
5.B CH ₄ Emissions from Composting	CH ₄	2.5	<0.01	1.00	50%	<0.001

4.E.1 N ₂ O Emissions from Settlement Soils	N ₂ O	2.4	<0.01	1.00	54%	<0.001
5.B N ₂ O Emissions from Composting	N ₂ O	2.2	<0.01	1.00	50%	<0.001
2.C.2 CO ₂ Emissions from Ferroalloy Production	CO ₂	2.1	<0.01	1.00	12%	<0.001
2.F.5 Emissions from Substitutes for Ozone Depleting Substances: Solvents	HFCs, PFCs	2.0	<0.01	1.00	23%	<0.001
1.A.4.a CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	1.8	<0.01	1.00	15%	<0.001
1.A.3.e CH ₄ Emissions from Mobile Combustion: Other	CH ₄	1.7	<0.01	1.00	52%	<0.001
2.B.7 CO ₂ Emissions from Soda Ash Production	CO ₂	1.7	<0.01	1.00	9%	<0.001
1.A.2 CH ₄ Emissions from Stationary Combustion - Industrial	CH ₄	1.6	<0.01	1.00	48%	<0.001
1.A.3.a N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.6	<0.01	1.00	67%	<0.001
2.C.3 PFC Emissions from Aluminum Production	PFCs	1.6	<0.01	1.00	7%	<0.001
2.B.6 CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.5	<0.01	1.00	13%	<0.001
2.C.3 CO ₂ Emissions from Aluminum Production	CO ₂	1.5	<0.01	1.00	2%	<0.001
2.B.4 N ₂ O Emissions from Caprolactam, Glyoxal, and Glyoxylic Acid Production	N ₂ O	1.4	<0.01	1.00	32%	<0.001
2.A.3 CO ₂ Emissions from Glass Production	CO ₂	1.3	<0.01	1.00	5%	<0.001
1.A.4.a CH ₄ Emissions from Stationary Combustion - Commercial	CH ₄	1.2	<0.01	1.00	144%	<0.001
2.C.4 SF ₆ Emissions from Magnesium Production and Processing	SF ₆	1.1	<0.01	1.00	7%	<0.001
2.C.6 CO ₂ Emissions from Zinc Production	CO ₂	1.0	<0.01	1.00	16%	<0.001
1.A.3.b CH ₄ Emissions from Mobile Combustion: Road	CH ₄	1.0	<0.01	1.00	26%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Gas - Electricity Generation	CH ₄	1.0	<0.01	1.00	2%	<0.001
2.B.10 CO ₂ Emissions from Phosphoric Acid Production	CO ₂	0.9	<0.01	1.00	20%	<0.001
1.A.4.b N ₂ O Emissions from Stationary Combustion - Residential	N ₂ O	0.9	<0.01	1.00	218%	<0.001
2.C.5 CO ₂ Emissions from Lead Production	CO ₂	0.5	<0.01	1.00	15%	<0.001
1.A.3.d N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.5	<0.01	1.00	44%	<0.001
4.A.1 N ₂ O Emissions from Forest Soils	N ₂ O	0.5	<0.01	1.00	318%	<0.001
1.A.1 CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.4	<0.01	1.00	NA	<0.001
3.F CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.4	<0.01	1.00	16%	<0.001

1.A.4.a N ₂ O Emissions from Stationary Combustion - Commercial	N ₂ O	0.3	<0.01	1.00	176%	<0.001
4.C.1 N ₂ O Emissions from Grass Fires	N ₂ O	0.3	<0.01	1.00	146%	<0.001
5.C.1 N ₂ O Emissions from Incineration of Waste	N ₂ O	0.3	<0.01	1.00	328%	<0.001
1.A.3.d CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	0.3	<0.01	1.00	86%	<0.001
2.B.8 CH ₄ Emissions from Petrochemical Production	CH ₄	0.3	<0.01	1.00	57%	<0.001
1.A.3.c N ₂ O Emissions from Mobile Combustion: Railways	N ₂ O	0.3	<0.01	1.00	69%	<0.001
4.C.1 CH ₄ Emissions from Grass Fires	CH ₄	0.3	<0.01	1.00	146%	<0.001
2.E N ₂ O Emissions from Electronics Industry	N ₂ O	0.3	<0.01	1.00	0%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Coal - Electricity Generation	CH ₄	0.2	<0.01	1.00	10%	<0.001
2.B.5 CO ₂ Emissions from Carbide Production and Consumption	CO ₂	0.2	<0.01	1.00	10%	<0.001
3.F N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.2	<0.01	1.00	19%	<0.001
4.D.1 N ₂ O Emissions from Coastal Wetlands Remaining Coastal Wetlands	N ₂ O	0.1	<0.01	1.00	116%	<0.001
1.A.5 N ₂ O Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	<0.01	1.00	199%	<0.001
4.A.4 N ₂ O Emissions from Drained Organic Soils	N ₂ O	0.1	<0.01	1.00	128%	<0.001
2.C.4 HFC-134a Emissions from Magnesium Production and Processing	HFCs	0.1	<0.01	1.00	21%	<0.001
1.A.3.c CH ₄ Emissions from Mobile Combustion: Railways	CH ₄	0.1	<0.01	1.00	26%	<0.001
1.B.2 N ₂ O Emissions from Petroleum Systems	N ₂ O	0.1	<0.01	1.00	34%	<0.001
1.A.5 CH ₄ Emissions from Stationary Combustion - U.S. Territories	CH ₄	0.1	<0.01	1.00	55%	<0.001
4.D.2 Net CO ₂ Emissions from Land Converted to Wetlands	CO ₂	+	<0.01	1.00	34%	<0.001
1.A.3.a CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	+	<0.01	1.00	87%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Wood - Electricity Generation	N ₂ O	+	<0.01	1.00	2%	<0.001
2.C.2 CH ₄ Emissions from Ferroalloy Production	CH ₄	+	<0.01	1.00	12%	<0.001
4.D.2 CH ₄ Emissions from Land Converted to Coastal Wetlands	CH ₄	+	<0.01	1.00	30%	<0.001
4.A.4 CH ₄ Emissions from Drained Organic Soils	CH ₄	+	<0.01	1.00	80%	<0.001
1.B.2 N ₂ O Emissions from Natural Gas Systems	N ₂ O	+	<0.01	1.00	15%	<0.001
2.B.5 CH ₄ Emissions from Carbide Production and Consumption	CH ₄	+	<0.01	1.00	9%	<0.001
1.A.1 N ₂ O Emissions from Stationary Combustion - Oil - Electricity Generation	N ₂ O	+	<0.01	1.00	10%	<0.001

2.C.1 CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH ₄	+	<0.01	1.00	20%	<0.001
1.B.2 CO ₂ Emissions from Abandoned Oil and Gas Wells	CO ₂	+	<0.01	1.00	219%	<0.001
4.D.1 CH ₄ Emissions from Peatlands Remaining Peatlands	CH ₄	+	<0.01	1.00	88%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Oil - Electricity Generation	CH ₄	+	<0.01	1.00	10%	<0.001
1.A.1 CH ₄ Emissions from Stationary Combustion - Wood - Electricity Generation	CH ₄	+	<0.01	1.00	2%	<0.001
2.C.4 CO ₂ Emissions from Magnesium Production and Processing	CO ₂	+	<0.01	1.00	3%	<0.001
4.D.1 N ₂ O Emissions from Peatlands Remaining Peatlands	N ₂ O	+	<0.01	1.00	62%	<0.001
5.C.1 CH ₄ Emissions from Incineration of Waste	CH ₄	+	<0.01	1.00	NE	<0.001
1.A.4.b CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	0.0	<0.01	1.00	NE	<0.001

+ Does not exceed 0.05 MMT CO₂ Eq.

NE (Not Estimated)

NA (Not Available)

^a Percent relative uncertainty. If the corresponding uncertainty is asymmetrical, the uncertainty given here is the larger and always positive.

Table A-8: 1990-2018 Key Source Category Approach 1 and 2 Analysis—Trend Assessment, without LULUCF

CRF Source/Sink Categories	Direct	1990 Estimate (MMT CO ₂ Eq.)	2018 Estimate (MMT CO ₂ Eq.)	Approach 1	Approach 2	%	Cumulative Total
	Greenhouse Gas			Trend Assessment	Trend Assessment	Contribution to Trend	
1.A.1 CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,546.5	1,152.9	0.07	0.006	18.9	19
1.A.1 CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	175.4	577.4	0.06	0.003	16.6	36
1.A.3.b CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,163.9	1,521.9	0.05	0.003	13.2	49
2.F.1 Emissions from Substitutes for Ozone Depleting Substances: Refrigeration and Air Conditioning	HFCs, PFCs	+	128.9	0.02	0.003	5.4	54
1.A.2 CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	155.2	49.8	0.02	0.003	4.7	59
1.A.2 CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	408.5	514.8	0.01	0.001	3.8	63
1.A.1 CO ₂ Emissions from Stationary Combustion -	CO ₂	97.5	22.2	0.01	0.001	3.3	66

Oil - Electricity Generation							
5.A CH ₄ Emissions from Landfills	CH ₄	179.6	110.6	0.01	0.003	3.2	69
2.C.1 CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	104.7	42.6	0.01	0.002	2.8	72
1.B.2 CH ₄ Emissions from Natural Gas Systems	CH ₄	183.3	140.0	0.01	0.001	2.1	74
1.B.1 Fugitive Emissions from Coal Mining	CH ₄	96.5	52.7	0.01	0.001	2.0	76
1.A.4.a CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	142.0	192.6	0.01	<0.001	1.9	78
2.B.9 HFC-23 Emissions from HCFC-22 Production	HFCs	46.1	3.3	0.01	0.001	1.9	80
1.A.4.b CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	97.4	63.5	0.01	<0.001	1.6	81
1.A.2 CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	293.3	268.6	0.01	0.001	1.5	83
1.A.3.b N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	37.7	10.4	<0.01	0.001	1.2	84
1.A.4.b CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	237.8	273.7	<0.01	<0.001	1.1	85
1.B.2 CO ₂ Emissions from Petroleum Systems	CO ₂	9.6	36.8	<0.01	0.001	1.1	86
1.A.4.a CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	74.2	52.1	<0.01	<0.001	1.0	87
2.C.3 PFC Emissions from Aluminum Production	PFCs	21.5	1.6	<0.01	<0.001	0.9	88
1.A.3.a CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	187.4	173.9	<0.01	<0.001	0.9	89
2.G SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	23.2	4.1	<0.01	<0.001	0.8	90
2.F.4 Emissions from Substitutes for Ozone Depleting Substances: Aerosols	HFCs, PFCs	0.2	19.2	<0.01	<0.001	0.8	91
3.B.1 CH ₄ Emissions from Manure Management: Cattle	CH ₄	17.9	35.7	<0.01	0.001	0.7	91
2.F.2 Emissions from Substitutes for Ozone	HFCs, PFCs	+	15.1	<0.01	<0.001	0.6	92

Depleting Substances: Foam Blowing Agents							
1.A.3.e CO ₂ Emissions from Mobile Combustion: Other	CO ₂	36.0	49.2	<0.01	<0.001	0.5	93
1.B.2 CH ₄ Emissions from Petroleum Systems	CH ₄	46.1	36.2	<0.01	0.001	0.5	93
1.A.3.d CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	46.3	36.8	<0.01	<0.001	0.5	93
1.A.4.a CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	12.0	1.8	<0.01	<0.001	0.4	94
1.A.5 CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	119.5	134.6	<0.01	0.001	0.4	94
3.D.2 Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	43.4	52.5	<0.01	0.002	0.3	95
3.A.1 CH ₄ Emissions from Enteric Fermentation: Cattle	CH ₄	158.4	171.7	<0.01	<0.001	0.3	95
2.B.8 CO ₂ Emissions from Petrochemical Production	CO ₂	21.6	29.4	<0.01	<0.001	0.3	95
1.A.5 CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	26.9	34.3	<0.01	<0.001	0.3	96
3.B.4 CH ₄ Emissions from Manure Management: Other Livestock	CH ₄	19.3	26.0	<0.01	<0.001	0.3	96
2.C.3 CO ₂ Emissions from Aluminum Production	CO ₂	6.8	1.5	<0.01	<0.001	0.2	96
2.A.1 CO ₂ Emissions from Cement Production	CO ₂	33.5	40.3	<0.01	<0.001	0.2	96
1.A.3.e CH ₄ Emissions from Mobile Combustion: Other	CH ₄	7.0	1.7	<0.01	<0.001	0.2	97
2.B.3 N ₂ O Emissions from Adipic Acid Production	N ₂ O	15.2	10.3	<0.01	<0.001	0.2	97
1.A.3.b CH ₄ Emissions from Mobile Combustion: Road	CH ₄	5.2	1.0	<0.01	<0.001	0.2	97
2.C.4 SF ₆ Emissions from Magnesium Production and Processing	SF ₆	5.2	1.1	<0.01	<0.001	0.2	97
3.B.1 N ₂ O Emissions from Manure Management: Cattle	N ₂ O	11.2	15.4	<0.01	<0.001	0.2	97
1.A.1 N ₂ O Emissions from Stationary Combustion - Gas - Electricity Generation	N ₂ O	0.3	4.1	<0.01	<0.001	0.2	97
2.A.4 CO ₂ Emissions from Other Process Uses of Carbonates	CO ₂	6.3	10.0	<0.01	<0.001	0.1	98

1.A.5 CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	0.6	4.0	<0.01	<0.001	0.1	98
3.C CH ₄ Emissions from Rice Cultivation	CH ₄	16.0	13.3	<0.01	<0.001	0.1	98
2.B.2 N ₂ O Emissions from Nitric Acid Production	N ₂ O	12.1	9.3	<0.01	<0.001	0.1	98
1.A.4.b CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	3.0	0.0	<0.01	<0.001	0.1	98
1.A.5 CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	0.0	3.0	<0.01	<0.001	0.1	98
3.D.1 Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	272.5	285.7	<0.01	<0.001	0.1	98
2.B.10 CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	1.5	4.5	<0.01	<0.001	0.1	98
5.C.1 CO ₂ Emissions from Incineration of Waste	CO ₂	8.0	11.1	<0.01	<0.001	0.1	99
2.F.3 Emissions from Substitutes for Ozone Depleting Substances: Fire Protection	HFCs, PFCs	0.0	2.6	<0.01	<0.001	0.1	99
3.H CO ₂ Emissions from Urea Fertilization	CO ₂	2.0	4.6	<0.01	<0.001	0.1	99
1.A.3.c CO ₂ Emissions from Mobile Combustion: Railways	CO ₂	35.5	38.9	<0.01	<0.001	0.1	99
5.B CH ₄ Emissions from Composting	CH ₄	0.4	2.5	<0.01	<0.001	0.1	99
2.F.5 Emissions from Substitutes for Ozone Depleting Substances: Solvents	HFCs, PFCs	0.0	2.0	<0.01	<0.001	0.1	99
5.B N ₂ O Emissions from Composting	N ₂ O	0.3	2.2	<0.01	<0.001	0.1	99
5.D CH ₄ Emissions from Wastewater Treatment	CH ₄	15.3	14.2	<0.01	<0.001	0.1	99
3.G CO ₂ Emissions from Liming	CO ₂	4.7	3.1	<0.01	<0.001	0.1	99
1.B.2 CO ₂ Emissions from Natural Gas Systems	CO ₂	32.2	35.0	<0.01	<0.001	0.1	99
5.D N ₂ O Emissions from Wastewater Treatment	N ₂ O	3.4	5.0	<0.01	<0.001	0.1	99
1.B.1 Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	7.2	6.2	<0.01	<0.001	0.1	99
3.B.4 N ₂ O Emissions from Manure Management: Other Livestock	N ₂ O	2.8	4.1	<0.01	<0.001	<0.1	100
2.E PFC, HFC, SF ₆ , and NF ₃ Emissions from Electronics Industry	HiGWP	3.6	4.8	<0.01	<0.001	<0.1	100

2.A.2 CO ₂ Emissions from Lime Production	CO ₂	11.7	13.2	<0.01	<0.001	<0.1	100
1.A.4.b CH ₄ Emissions from Stationary Combustion - Residential	CH ₄	5.2	4.5	<0.01	<0.001	<0.1	100
1.A.1 CH ₄ Emissions from Stationary Combustion - Gas - Electricity Generation	CH ₄	0.1	1.0	<0.01	<0.001	<0.1	100
2.B.10 CO ₂ Emissions from Phosphoric Acid Production	CO ₂	1.5	0.9	<0.01	<0.001	<0.1	100
1.A.3.e N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	1.8	2.5	<0.01	<0.001	<0.1	100
1.A.1 N ₂ O Emissions from Stationary Combustion - Coal - Electricity Generation	N ₂ O	20.1	20.3	<0.01	<0.001	<0.1	100
1.A.2 N ₂ O Emissions from Stationary Combustion - Industrial	N ₂ O	3.1	2.6	<0.01	<0.001	<0.1	100
2.C.6 CO ₂ Emissions from Zinc Production	CO ₂	0.6	1.0	<0.01	<0.001	<0.1	100
2.A.3 CO ₂ Emissions from Glass Production	CO ₂	1.5	1.3	<0.01	<0.001	<0.1	100
2.B.4 N ₂ O Emissions from Caprolactam, Glyoxal, and Glyoxylic Acid Production	N ₂ O	1.7	1.4	<0.01	<0.001	<0.1	100
2.B.6 CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.2	1.5	<0.01	<0.001	<0.1	100
2.B.10 CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.8	3.6	<0.01	<0.001	<0.1	100
1.A.2 CH ₄ Emissions from Stationary Combustion - Industrial	CH ₄	1.8	1.6	<0.01	<0.001	<0.1	100
1.A.3.d CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	0.6	0.3	<0.01	<0.001	<0.1	100
2.B.7 CO ₂ Emissions from Soda Ash Production	CO ₂	1.4	1.7	<0.01	<0.001	<0.1	100
2.E N ₂ O Emissions from Electronics Industry	N ₂ O	+	0.3	<0.01	<0.001	<0.1	100
1.A.3.a N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.7	1.6	<0.01	<0.001	<0.1	100
1.B.2 CH ₄ Emissions from Abandoned Oil and Gas Wells	CH ₄	6.6	7.0	<0.01	<0.001	<0.1	100
2.B.5 CO ₂ Emissions from Carbide Production and Consumption	CO ₂	0.4	0.2	<0.01	<0.001	<0.1	100
1.A.4.b N ₂ O Emissions from Stationary	N ₂ O	1.0	0.9	<0.01	<0.001	<0.1	100

Combustion - Residential							
2.G N ₂ O Emissions from Product Uses	N ₂ O	4.2	4.2	<0.01	<0.001	<0.1	100
2.C.2 CO ₂ Emissions from Ferroalloy Production	CO ₂	2.2	2.1	<0.01	<0.001	<0.1	100
5.C.1 N ₂ O Emissions from Incineration of Waste	N ₂ O	0.5	0.3	<0.01	<0.001	<0.1	100
1.A.1 CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.5	0.4	<0.01	<0.001	<0.1	100
1.A.4.a CH ₄ Emissions from Stationary Combustion - Commercial	CH ₄	1.1	1.2	<0.01	<0.001	<0.1	100
1.A.1 CH ₄ Emissions from Stationary Combustion - Coal - Electricity Generation	CH ₄	0.3	0.2	<0.01	<0.001	<0.1	100
3.A.4 CH ₄ Emissions from Enteric Fermentation: Other Livestock	CH ₄	5.7	5.8	<0.01	<0.001	<0.1	100
2.C.4 HFC-134a Emissions from Magnesium Production and Processing	HFCs	0.0	0.1	<0.01	<0.001	<0.1	100
1.A.3.d N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.6	0.5	<0.01	<0.001	<0.1	100
2.B.8 CH ₄ Emissions from Petrochemical Production	CH ₄	0.2	0.3	<0.01	<0.001	<0.1	100
1.A.1 N ₂ O Emissions from Stationary Combustion - Oil - Electricity Generation	N ₂ O	0.1	+	<0.01	<0.001	<0.1	100
1.A.4.a N ₂ O Emissions from Stationary Combustion - Commercial	N ₂ O	0.4	0.3	<0.01	<0.001	<0.1	100
1.B.2 N ₂ O Emissions from Petroleum Systems	N ₂ O	+	0.1	<0.01	<0.001	<0.1	100
3.F CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.3	0.4	<0.01	<0.001	<0.1	100
1.A.3.a CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	0.1	+	<0.01	<0.001	<0.1	100
1.A.5 N ₂ O Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	0.1	<0.01	<0.001	<0.1	100
1.A.3.c N ₂ O Emissions from Mobile Combustion: Railways	N ₂ O	0.3	0.3	<0.01	<0.001	<0.1	100
2.C.5 CO ₂ Emissions from Lead Production	CO ₂	0.5	0.5	<0.01	<0.001	<0.1	100

2.B.5 CH ₄ Emissions from Carbide Production and Consumption	CH ₄	+	+	<0.01	<0.001	<0.1	100
1.A.1 N ₂ O Emissions from Stationary Combustion - Wood - Electricity Generation	N ₂ O	+	+	<0.01	<0.001	<0.1	100
3.F N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.2	0.2	<0.01	<0.001	<0.1	100
1.A.1 CH ₄ Emissions from Stationary Combustion - Oil - Electricity Generation	CH ₄	+	+	<0.01	<0.001	<0.1	100
2.C.1 CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH ₄	+	+	<0.01	<0.001	<0.1	100
1.A.5 CH ₄ Emissions from Stationary Combustion - U.S. Territories	CH ₄	+	0.1	<0.01	<0.001	<0.1	100
1.A.3.c CH ₄ Emissions from Mobile Combustion: Railways	CH ₄	0.1	0.1	<0.01	<0.001	<0.1	100
1.B.2 N ₂ O Emissions from Natural Gas Systems	N ₂ O	+	+	<0.01	<0.001	<0.1	100
2.C.2 CH ₄ Emissions from Ferroalloy Production	CH ₄	+	+	<0.01	<0.001	<0.1	100
1.A.1 CH ₄ Emissions from Stationary Combustion - Wood - Electricity Generation	CH ₄	+	+	<0.01	<0.001	<0.1	100
2.B.1 CO ₂ Emissions from Ammonia Production	CO ₂	13.0	13.5	<0.01	<0.001	<0.1	100
1.B.2 CO ₂ Emissions from Abandoned Oil and Gas Wells	CO ₂	+	+	<0.01	<0.001	<0.1	100
5.C.1 CH ₄ Emissions from Incineration of Waste	CH ₄	+	+	<0.01	<0.001	<0.1	100
2.C.4 CO ₂ Emissions from Magnesium Production and Processing	CO ₂	+	+	<0.01	<0.001	<0.1	100

Note: LULUCF sources and sinks are not included in this analysis.
+ Does not exceed 0.05 MMT CO₂ Eq.

Table A-9: 1990-2018 Key Source Category Approach 1 and 2 Analysis—Trend Assessment, with LULUCF

CRF Source/Sink Categories	Direct	Approach 1		Approach 2	%	Cumulative Total	
	Greenhouse Gas	1990 Estimate (MMT CO ₂ Eq.)	2018 Estimate (MMT CO ₂ Eq.)	Trend Assessment	Trend Assessment		Contribution to Trend
1.A.1 CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,546.5	1,152.9	0.06	0.006	17.3	17
1.A.1 CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	175.4	577.4	0.05	0.003	15.5	33

1.A.3.b CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,163.9	1,521.9	0.04	0.003	12.6	45
2.F.1 Emissions from Substitutes for Ozone Depleting Substances: Refrigeration and Air Conditioning	HFCs, PFCs	+	128.9	0.02	0.002	5.1	51
1.A.2 CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	155.2	49.8	0.01	0.002	4.3	55
4.A.1 Net CO ₂ Emissions from Forest Land Remaining Forest Land	CO ₂	733.9	663.2	0.01	0.003	3.7	59
1.A.2 CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	408.5	514.8	0.01	0.001	3.7	62
1.A.1 CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	97.5	22.2	0.01	0.001	3.1	65
5.A CH ₄ Emissions from Landfills	CH ₄	179.6	110.6	0.01	0.002	2.9	68
2.C.1 CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	104.7	42.6	0.01	0.002	2.6	71
1.B.2 CH ₄ Emissions from Natural Gas Systems	CH ₄	183.3	140.0	0.01	0.001	1.9	73
1.B.1 Fugitive Emissions from Coal Mining	CH ₄	96.5	52.7	0.01	0.001	1.8	75
1.A.4.a CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	142.0	192.6	0.01	<0.001	1.8	76
2.B.9 HFC-23 Emissions from HCFC-22 Production	HFCs	46.1	3.3	0.01	0.001	1.7	78
1.A.4.b CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	97.4	63.5	<0.01	<0.001	1.4	80
1.A.2 CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	293.3	268.6	<0.01	0.001	1.3	81
1.A.4.b CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	237.8	273.7	<0.01	<0.001	1.1	82
1.A.3.b N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	37.7	10.4	<0.01	0.001	1.1	83
1.B.2 CO ₂ Emissions from Petroleum Systems	CO ₂	9.6	36.8	<0.01	0.001	1.1	84
1.A.4.a CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	74.2	52.1	<0.01	<0.001	1.0	85
2.C.3 PFC Emissions from Aluminum Production	PFCs	21.5	1.6	<0.01	<0.001	0.8	86
2.G SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	23.2	4.1	<0.01	<0.001	0.8	87
1.A.3.a CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	187.4	173.9	<0.01	<0.001	0.8	87

2.F.4 Emissions from Substitutes for Ozone Depleting Substances: Aerosols	HFCs, PFCs	0.2	19.2	<0.01	<0.001	0.7	88
4.C.2 Net CO ₂ Emissions from Land Converted to Grassland	CO ₂	6.7	24.6	<0.01	0.003	0.7	89
3.B.1 CH ₄ Emissions from Manure Management: Cattle	CH ₄	17.9	35.7	<0.01	<0.001	0.7	90
2.F.2 Emissions from Substitutes for Ozone Depleting Substances: Foam Blowing Agents	HFCs, PFCs	+	15.1	<0.01	<0.001	0.6	90
4.E.2 Net CO ₂ Emissions from Land Converted to Settlements	CO ₂	62.9	79.3	<0.01	0.001	0.6	91
4.E.1 Net CO ₂ Emissions from Settlements Remaining Settlements	CO ₂	109.6	125.9	<0.01	0.002	0.5	91
1.A.3.e CO ₂ Emissions from Mobile Combustion: Other	CO ₂	36.0	49.2	<0.01	<0.001	0.5	92
1.B.2 CH ₄ Emissions from Petroleum Systems	CH ₄	46.1	36.2	<0.01	0.001	0.4	92
1.A.5 CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	119.5	134.6	<0.01	0.001	0.4	93
1.A.3.d CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	46.3	36.8	<0.01	<0.001	0.4	93
1.A.4.a CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	12.0	1.8	<0.01	<0.001	0.4	93
4.A.1 CH ₄ Emissions from Forest Fires	CH ₄	0.9	11.3	<0.01	<0.001	0.4	94
3.A.1 CH ₄ Emissions from Enteric Fermentation: Cattle	CH ₄	158.4	171.7	<0.01	<0.001	0.3	94
3.D.2 Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	43.4	52.5	<0.01	0.002	0.3	94
4.B.1 Net CO ₂ Emissions from Cropland Remaining Cropland	CO ₂	23.2	16.6	<0.01	0.005	0.3	95
2.B.8 CO ₂ Emissions from Petrochemical Production	CO ₂	21.6	29.4	<0.01	<0.001	0.3	95
4.A.1 N ₂ O Emissions from Forest Fires	N ₂ O	0.6	7.5	<0.01	<0.001	0.3	95
1.A.5 CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	26.9	34.3	<0.01	<0.001	0.3	96
3.B.4 CH ₄ Emissions from Manure Management: Other Livestock	CH ₄	19.3	26.0	<0.01	<0.001	0.2	96
2.A.1 CO ₂ Emissions from Cement Production	CO ₂	33.5	40.3	<0.01	<0.001	0.2	96
2.C.3 CO ₂ Emissions from Aluminum Production	CO ₂	6.8	1.5	<0.01	<0.001	0.2	96
1.A.3.e CH ₄ Emissions from Mobile Combustion: Other	CH ₄	7.0	1.7	<0.01	<0.001	0.2	96
2.B.3 N ₂ O Emissions from Adipic Acid Production	N ₂ O	15.2	10.3	<0.01	<0.001	0.2	97

3.D.1 Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	272.5	285.7	<0.01	<0.001	0.2	97
1.A.3.b CH ₄ Emissions from Mobile Combustion: Road	CH ₄	5.2	1.0	<0.01	<0.001	0.2	97
2.C.4 SF ₆ Emissions from Magnesium Production and Processing	SF ₆	5.2	1.1	<0.01	<0.001	0.2	97
3.B.1 N ₂ O Emissions from Manure Management: Cattle	N ₂ O	11.2	15.4	<0.01	<0.001	0.2	97
1.A.1 N ₂ O Emissions from Stationary Combustion - Gas - Electricity Generation	N ₂ O	0.3	4.1	<0.01	<0.001	0.1	97
2.A.4 CO ₂ Emissions from Other Process Uses of Carbonates	CO ₂	6.3	10.0	<0.01	<0.001	0.1	98
1.A.5 CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	0.6	4.0	<0.01	<0.001	0.1	98
2.B.2 N ₂ O Emissions from Nitric Acid Production	N ₂ O	12.1	9.3	<0.01	<0.001	0.1	98
3.C CH ₄ Emissions from Rice Cultivation	CH ₄	16.0	13.3	<0.01	<0.001	0.1	98
1.A.4.b CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	3.0	0.0	<0.01	<0.001	0.1	98
1.A.5 CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	0.0	3.0	<0.01	<0.001	0.1	98
2.B.10 CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	1.5	4.5	<0.01	<0.001	0.1	98
5.C.1 CO ₂ Emissions from Incineration of Waste	CO ₂	8.0	11.1	<0.01	<0.001	0.1	98
2.F.3 Emissions from Substitutes for Ozone Depleting Substances: Fire Protection	HFCs, PFCs	0.0	2.6	<0.01	<0.001	0.1	99
3.H CO ₂ Emissions from Urea Fertilization	CO ₂	2.0	4.6	<0.01	<0.001	0.1	99
1.A.3.c CO ₂ Emissions from Mobile Combustion: Railways	CO ₂	35.5	38.9	<0.01	<0.001	0.1	99
4.A.2 Net CO ₂ Emissions from Land Converted to Forest Land	CO ₂	109.4	110.6	<0.01	<0.001	0.1	99
5.B CH ₄ Emissions from Composting	CH ₄	0.4	2.5	<0.01	<0.001	0.1	99
2.F.5 Emissions from Substitutes for Ozone Depleting Substances: Solvents	HFCs, PFCs	0.0	2.0	<0.01	<0.001	0.1	99
5.B N ₂ O Emissions from Composting	N ₂ O	0.3	2.2	<0.01	<0.001	0.1	99
4.C.1 Net CO ₂ Emissions from Grassland Remaining Grassland	CO ₂	9.1	11.2	<0.01	0.003	0.1	99
1.B.2 CO ₂ Emissions from Natural Gas Systems	CO ₂	32.2	35.0	<0.01	<0.001	0.1	99

3.G CO ₂ Emissions from Liming	CO ₂	4.7	3.1	<0.01	<0.001	0.1	99
5.D CH ₄ Emissions from Wastewater Treatment	CH ₄	15.3	14.2	<0.01	<0.001	0.1	99
5.D N ₂ O Emissions from Wastewater Treatment	N ₂ O	3.4	5.0	<0.01	<0.001	0.1	99
1.B.1 Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	7.2	6.2	<0.01	<0.001	<0.1	99
3.B.4 N ₂ O Emissions from Manure Management: Other Livestock	N ₂ O	2.8	4.1	<0.01	<0.001	<0.1	99
2.A.2 CO ₂ Emissions from Lime Production	CO ₂	11.7	13.2	<0.01	<0.001	<0.1	100
2.E PFC, HFC, SF ₆ , and NF ₃ Emissions from Electronics Industry	HiGWP	3.6	4.8	<0.01	<0.001	<0.1	100
1.A.1 CH ₄ Emissions from Stationary Combustion - Gas - Electricity Generation	CH ₄	0.1	1.0	<0.01	<0.001	<0.1	100
1.A.4.b CH ₄ Emissions from Stationary Combustion - Residential	CH ₄	5.2	4.5	<0.01	<0.001	<0.1	100
2.B.10 CO ₂ Emissions from Phosphoric Acid Production	CO ₂	1.5	0.9	<0.01	<0.001	<0.1	100
1.A.3.e N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	1.8	2.5	<0.01	<0.001	<0.1	100
1.A.2 N ₂ O Emissions from Stationary Combustion - Industrial	N ₂ O	3.1	2.6	<0.01	<0.001	<0.1	100
4.B.2 Net CO ₂ Emissions from Land Converted to Cropland	CO ₂	54.1	55.3	<0.01	<0.001	<0.1	100
1.A.1 N ₂ O Emissions from Stationary Combustion - Coal - Electricity Generation	N ₂ O	20.1	20.3	<0.01	<0.001	<0.1	100
4.A.1 N ₂ O Emissions from Forest Soils	N ₂ O	0.1	0.5	<0.01	<0.001	<0.1	100
2.C.6 CO ₂ Emissions from Zinc Production	CO ₂	0.6	1.0	<0.01	<0.001	<0.1	100
4.E.1 N ₂ O Emissions from Settlement Soils	N ₂ O	2.0	2.4	<0.01	<0.001	<0.1	100
2.A.3 CO ₂ Emissions from Glass Production	CO ₂	1.5	1.3	<0.01	<0.001	<0.1	100
2.B.4 N ₂ O Emissions from Caprolactam, Glyoxal, and Glyoxylic Acid Production	N ₂ O	1.7	1.4	<0.01	<0.001	<0.1	100
2.B.6 CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.2	1.5	<0.01	<0.001	<0.1	100
2.B.10 CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.8	3.6	<0.01	<0.001	<0.1	100
4.D.1 Net CO ₂ Emissions from Coastal Wetlands Remaining Coastal Wetlands	CO ₂	4.0	4.4	<0.01	<0.001	<0.1	100
1.A.3.d CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	0.6	0.3	<0.01	<0.001	<0.1	100
1.A.2 CH ₄ Emissions from Stationary Combustion - Industrial	CH ₄	1.8	1.6	<0.01	<0.001	<0.1	100

1.B.2 CH ₄ Emissions from Abandoned Oil and Gas Wells	CH ₄	6.6	7.0	<0.01	<0.001	<0.1	100
2.B.7 CO ₂ Emissions from Soda Ash Production	CO ₂	1.4	1.7	<0.01	<0.001	<0.1	100
4.C.1 N ₂ O Emissions from Grass Fires	N ₂ O	0.1	0.3	<0.01	<0.001	<0.1	100
2.E N ₂ O Emissions from Electronics Industry	N ₂ O	+	0.3	<0.01	<0.001	<0.1	100
4.C.1 CH ₄ Emissions from Grass Fires	CH ₄	0.1	0.3	<0.01	<0.001	<0.1	100
1.A.3.a N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.7	1.6	<0.01	<0.001	<0.1	100
2.B.5 CO ₂ Emissions from Carbide Production and Consumption	CO ₂	0.4	0.2	<0.01	<0.001	<0.1	100
1.A.4.b N ₂ O Emissions from Stationary Combustion - Residential	N ₂ O	1.0	0.9	<0.01	<0.001	<0.1	100
5.C.1 N ₂ O Emissions from Incineration of Waste	N ₂ O	0.5	0.3	<0.01	<0.001	<0.1	100
2.C.2 CO ₂ Emissions from Ferroalloy Production	CO ₂	2.2	2.1	<0.01	<0.001	<0.1	100
1.A.1 CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.5	0.4	<0.01	<0.001	<0.1	100
2.G N ₂ O Emissions from Product Uses	N ₂ O	4.2	4.2	<0.01	<0.001	<0.1	100
1.A.4.a CH ₄ Emissions from Stationary Combustion - Commercial	CH ₄	1.1	1.2	<0.01	<0.001	<0.1	100
1.A.1 CH ₄ Emissions from Stationary Combustion - Coal - Electricity Generation	CH ₄	0.3	0.2	<0.01	<0.001	<0.1	100
2.C.4 HFC-134a Emissions from Magnesium Production and Processing	HFCs	0.0	0.1	<0.01	<0.001	<0.1	100
4.D.1 CH ₄ Emissions from Coastal Wetlands Remaining Coastal Wetlands	CH ₄	3.4	3.6	<0.01	<0.001	<0.1	100
1.A.3.d N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.6	0.5	<0.01	<0.001	<0.1	100
2.B.8 CH ₄ Emissions from Petrochemical Production	CH ₄	0.2	0.3	<0.01	<0.001	<0.1	100
2.B.1 CO ₂ Emissions from Ammonia Production	CO ₂	13.0	13.5	<0.01	<0.001	<0.1	100
1.A.1 N ₂ O Emissions from Stationary Combustion - Oil - Electricity Generation	N ₂ O	0.1	+	<0.01	<0.001	<0.1	100
1.A.4.a N ₂ O Emissions from Stationary Combustion - Commercial	N ₂ O	0.4	0.3	<0.01	<0.001	<0.1	100
3.A.4 CH ₄ Emissions from Enteric Fermentation: Other Livestock	CH ₄	5.7	5.8	<0.01	<0.001	<0.1	100
1.B.2 N ₂ O Emissions from Petroleum Systems	N ₂ O	+	0.1	<0.01	<0.001	<0.1	100

3.F CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.3	0.4	<0.01	<0.001	<0.1	100
1.A.3.a CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	0.1	+	<0.01	<0.001	<0.1	100
1.A.5 N ₂ O Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	0.1	<0.01	<0.001	<0.1	100
1.A.3.c N ₂ O Emissions from Mobile Combustion: Railways	N ₂ O	0.3	0.3	<0.01	<0.001	<0.1	100
2.B.5 CH ₄ Emissions from Carbide Production and Consumption	CH ₄	+	+	<0.01	<0.001	<0.1	100
2.C.5 CO ₂ Emissions from Lead Production	CO ₂	0.5	0.5	<0.01	<0.001	<0.1	100
1.A.1 N ₂ O Emissions from Stationary Combustion - Wood - Electricity Generation	N ₂ O	+	+	<0.01	<0.001	<0.1	100
3.F N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.2	0.2	<0.01	<0.001	<0.1	100
1.A.1 CH ₄ Emissions from Stationary Combustion - Oil - Electricity Generation	CH ₄	+	+	<0.01	<0.001	<0.1	100
2.C.1 CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH ₄	+	+	<0.01	<0.001	<0.1	100
1.A.5 CH ₄ Emissions from Stationary Combustion - U.S. Territories	CH ₄	+	0.1	<0.01	<0.001	<0.1	100
1.A.3.c CH ₄ Emissions from Mobile Combustion: Railways	CH ₄	0.1	0.1	<0.01	<0.001	<0.1	100
1.B.2 N ₂ O Emissions from Natural Gas Systems	N ₂ O	+	+	<0.01	<0.001	<0.1	100
2.C.2 CH ₄ Emissions from Ferroalloy Production	CH ₄	+	+	<0.01	<0.001	<0.1	100
4.A.4 N ₂ O Emissions from Drained Organic Soils	N ₂ O	0.1	0.1	<0.01	<0.001	<0.1	100
4.D.1 CH ₄ Emissions from Peatlands Remaining Peatlands	CH ₄	+	+	<0.01	<0.001	<0.1	100
1.A.1 CH ₄ Emissions from Stationary Combustion - Wood - Electricity Generation	CH ₄	+	+	<0.01	<0.001	<0.1	100
4.D.2 Net CO ₂ Emissions from Land Converted to Wetlands	CO ₂	+	+	<0.01	<0.001	<0.1	100
4.D.1 N ₂ O Emissions from Coastal Wetlands Remaining Coastal Wetlands	N ₂ O	0.1	0.1	<0.01	<0.001	<0.1	100
1.B.2 CO ₂ Emissions from Abandoned Oil and Gas Wells	CO ₂	+	+	<0.01	<0.001	<0.1	100

4.D.2 CH ₄ Emissions from Land Converted to Coastal Wetlands	CH ₄	+	+	<0.01	<0.001	<0.1	100
4.A.4 CH ₄ Emissions from Drained Organic Soils	CH ₄	+	+	<0.01	<0.001	<0.1	100
4.D.1 N ₂ O Emissions from Peatlands Remaining Peatlands	N ₂ O	+	+	<0.01	<0.001	<0.1	100
5.C.1 CH ₄ Emissions from Incineration of Waste	CH ₄	+	+	<0.01	<0.001	<0.1	100
2.C.4 CO ₂ Emissions from Magnesium Production and Processing	CO ₂	+	+	<0.01	<0.001	<0.1	100

+ Does not exceed 0.05 MMT CO₂ Eq.

References

IPCC (2006) Volume 1, Chapter 4: Methodological Choice and Identification of Key Categories, *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. The National Greenhouse Gas Inventories Programme, The Intergovernmental Panel on Climate Change, H.S. Eggleston, L. Buendia, K. Miwa, T. Negara, and K. Tanabe (eds.). Hayman, Kanagawa, Japan.