ANNEX 1 Key Category Analysis

2 The United States has identified national key categories based on the estimates presented in this report. The 3 IPCC's Good Practice Guidance (IPCC 2000) describes a key category as a "[category] that is prioritized within the 4 national inventory system because its estimate has a significant influence on a country's total inventory of direct 5 greenhouse gases in terms of the absolute level of emissions, the trend in emissions, or both." By definition, key categories 6 are sources or sinks that have the greatest contribution to the absolute overall level of national emissions in any of the 7 years covered by the time series. In addition, when an entire time series of emission estimates is prepared, a determination 8 of key categories must also account for the influence of the trends of individual categories. Therefore, a trend assessment 9 is conducted to identify source and sink categories for which significant uncertainty in the estimate would have 10 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 11 12 because of the unique country-specific estimation methods.

The methodology for conducting a key category analysis, as defined by IPCC's *Good Practice Guidance* (IPCC 2000), IPCC's *Good Practice Guidance for Land Use, Land-Use Change, and Forestry (IPCC 2003)*, and IPCC's 2006 *Guidelines for National Greenhouse Gas Inventories* IPCC (2006); includes:

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

18 • Qualitative approach.

This Annex presents an analysis of key categories, both for sources only and also for sources and sinks (i.e., including LULUCF); discusses Tier 1, Tier 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. 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 potentialweighted emissions in 2012. The table also indicates the criteria used in identifying these categories (i.e., level, trend, Tier 1, Tier 2, and/or qualitative assessments).

Table A-1: Key Source Categories for the United States (1990-2012)

Gas	Level Without	Trend	Level	Trend	Level	- .		- ·		1
CC Source Categories Gas	LULUCF	Without LULUCF	With LULUCF	With	Level Without LULUCF	Trend Without LULUCF	Level With LULUCF	Trend With LULUCF	Qual	2012 Emissions (Tg CO ₂ Eq.
					1				1	
CO ₂	•	•	•	•	•	•	•	•		1,512.2
CO ₂	•	•	•	•	•	•	•	•		1,469.8
CO ₂	٠	•	•	•	•	•	•	•		492.2
CO ₂	•		•		•		•			428.5
CO ₂	•	•	•	•	•	•	•	•		267.0
	•	•	•	•	•		•			225.8
CO ₂	•	•	•	•	•		•			157.0
CO ₂	•	•	•	•	•	•	•	•		145.1
	•	•	•	•	•	•	•	•		110.6
	•	•	•	•						83.9
CO ₂	•	•	•	•	•	•	•	•		74.3
CO ₂	•	•	•	•		•				63.7
CO ₂	•	•	•	•		•				44.7
	•	•	•	•						36.8
	•	•	•	•						36.6
	•		•		•		•			35.2
	•	•	•	•		•		•		18.8
CO ₂		•		•						4.1
CH ₄	•	•	•	•	•	•	•	•		127.1
CH ₄	•	•	•	•	•	•	•	•		55.8
CH4	•		•		•	•	•	•		31.7
CH ₄					•	•	•	•		3.1
		•		•		•	•	•		18.3
		-				-	-			
	•	•	•	•	•	•	•	•		12.6
						•				2.4
Several									•	112.8
	CO2 CO2 CO2 CO2 CO2 CO2 CO2 CO2 CO2 CO2	CO2 CO3 CO4 CO4 CO2 CO2 C	CO2 • • CO2 • • <td< td=""><td>CO2 • • CO2 • • <td< td=""><td>CO2 • • • CO2 • • •<td>CO2 • • • CO2 • • •<td>CO2 • • • • CO2 • • • • •</td><td>CO2 •</td><td>CO2 •</td><td>CO2 ····································</td></td></td></td<></td></td<>	CO2 • • CO2 • • <td< td=""><td>CO2 • • • CO2 • • •<td>CO2 • • • CO2 • • •<td>CO2 • • • • CO2 • • • • •</td><td>CO2 •</td><td>CO2 •</td><td>CO2 ····································</td></td></td></td<>	CO2 • • • CO2 • • • <td>CO2 • • • CO2 • • •<td>CO2 • • • • CO2 • • • • •</td><td>CO2 •</td><td>CO2 •</td><td>CO2 ····································</td></td>	CO2 • • • CO2 • • • <td>CO2 • • • • CO2 • • • • •</td> <td>CO2 •</td> <td>CO2 •</td> <td>CO2 ····································</td>	CO2 • • • • CO2 • • • • •	CO2 •	CO2 •	CO2 ····································

	-									
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	•	•	•	•	•	•	•	•	54.3
CO ₂ Emissions from Cement Production	CO ₂	•		•						35.1
N2O Emissions from Adipic Acid Production	N ₂ O		•		•					5.8
Emissions from Substitutes for Ozone Depleting Substances	HiGWP	•	•	•	•	•	•	•	•	129.4
HFC-23 Emissions from HCFC-22 Production	HiGWP	•	•	•	•		•			6.9
SF ₆ Emissions from Electrical Transmission and Distribution	HiGWP		•		•		•		•	6.0
PFC Emissions from Aluminum Production	HiGWP		•		•					2.5
Agriculture		-				-				
CH ₄ Emissions from Enteric Fermentation	CH ₄	•		•		•		•		141.0
CH ₄ Emissions from Manure Management	CH ₄	•	•	•	•	•	•	•	•	52.9
Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	•	•	•	•	•	•	•		260.9
Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	•		•		•	•	•		45.7
Waste		•				•			•	•
CH ₄ Emissions from Landfills	CH ₄	•	•	•	•	•	•	•	•	102.8
Land Use, Land Use Change, and Forestry										
CO ₂ Emissions from Land Converted to Cropland	CO ₂				•			•	•	16.8
CO ₂ Emissions from Grassland Remaining Grassland	CO ₂							•	•	6.7
CO ₂ Emissions from Landfilled Yard Trimmings and Food										(40.0)
Scraps	CO ₂				•			•	•	(13.2)
CO ₂ Emissions from Cropland Remaining Cropland	CO ₂			•	•			•	•	(26.5)
CO ₂ Emissions from Urban Trees	CO ₂			•	•			•	•	(88.4)
CO ₂ Emissions from Changes in Forest Carbon Stocks	CO ₂			•	•			•	•	(866.5)
CH ₄ Emissions from Forest Fires	CH ₄				•			•	•	15.3
N ₂ O Emissions from Forest Fires	N ₂ O				•			•	•	12.5
Subtotal Without LULUCF	-									6,300.7
Total Emissions Without LULUCF										6,463.8
Percent of Total Without LULUCF										97%
Subtotal With LULUCF										5,357.5
Total Emissions With LULUCF										5,522.1
Percent of Total With LULUCF										97%
a Qualitativa aritaria										

^a Qualitative criteria.

^bEmissions from this source not included in totals.

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 2009) in which each source category reached the threshold for being a key category based on either a Tier 1 or Tier 2 level

assessment.

5 6 7

In addition to conducting Tier 1 and 2 level and trend assessments, a qualitative assessment of the source 1 2 categories, as described in the IPCC's Good Practice Guidance (IPCC 2000), was conducted to capture any key categories 3 that were not identified by any quantitative method. One additional key category, international bunker fuels, was 4 identified using this qualitative assessment. International bunker fuels are fuels consumed for aviation or marine 5 international transport activities, and emissions from these fuels are reported separately from totals in accordance with 6 7 IPCC guidelines. If these emissions were included in the totals, bunker fuels would qualify as a key category according to the Tier 1 approach. The amount of uncertainty associated with estimation of emissions from international bunker fuels 8 also supports the qualification of this source category as key, which would qualify it as a key category according to the 9 Tier 2 approach.

10

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

		2012 Emissions (Tg CO ₂	Key	ID	Level in which
IPCC Source Categories	Direct GHG	Eq.)	Category?	Criteriaª	year(s)? ^b
Energy					
CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,512.2	•	L1 T1 L2 T2	1990, 2012
CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,469.8	•	$L_1 T_1 L_2 T_2$	1990, 2012
CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	492.2	•	$L_1 T_1 L_2 T_2$	1990, 2012
CO2 Emissions from Stationary Combustion - Gas - Industrial	CO ₂	428.5	•	$L_1 L_2$	1990, 2012
CO2 Emissions from Stationary Combustion - Oil - Industrial	CO ₂	267.0	•	$L_1 T_1 L_2 T_2$	1990, 2012
CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	225.8	•	$L_1 T_1 L_2$	1990, 2012
CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	157.0	•	$L_1 T_1 L_2$	1990, 2012
CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	145.1	•	$L_1 T_1 L_2 T_2$	1990, 2012
CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	110.6	•	$L_1 T_1 L_2 T_2$	1990, 2012
CO ₂ Emissions from Mobile Combustion: Other	CO ₂	83.9	•	$L_1 T_1$	1990 ₁ , 2012 ₁
CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	74.3	•	$L_1 T_1 L_2 T_2$	1990, 2012
CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	63.7	•	$L_1 \ T_1 \ T_2$	1990₁, 2012₁
CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	44.7	•	$L_1 \ T_1 \ T_2$	2012 ₁
CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	36.8	•	$L_1 T_1$	1990₁, 2012₁
CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	36.6	•	$L_1 T_1$	1990₁, 2012₁
CO ₂ Emissions from Natural Gas Systems	CO ₂	35.2	•	L1 L2	1990, 2012
CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	18.8	•	$L_1 \ T_1 \ T_2$	1990 1
CO ₂ Emissions from Incineration of Waste	CO ₂	12.1			
CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	4.1	•	T ₁	
CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	3.4			
CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	1.4			
CO ₂ Emissions from Petroleum Systems	CO ₂	0.4			
CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.4			
CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	+			
Fugitive Emissions from Natural Gas Systems	CH ₄	127.1	•	L1 T1 L2 T2	1990, 2012
Fugitive Emissions from Coal Mining	CH4	55.8	•	L1 T1 L2 T2	1990, 2012 ₁
Fugitive Emissions from Petroleum Systems	CH ₄	31.7	•	$L_1 L_2 T_2$	1990,

					2012 ₂
Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	4.7			
Non-CO ₂ Emissions from Stationary Combustion - Residential	CH₄	3.1	•	$L_2 T_2$	1990 ₂
CH ₄ Emissions from Mobile Combustion: Road	CH₄	1.2			
Non-CO2 Emissions from Stationary Combustion - Industrial	CH ₄	1.2			
Non-CO2 Emissions from Stationary Combustion - Commercial	CH ₄	0.8			
Non-CO2 Emissions from Stationary Combustion - Electricity Generation	CH ₄	0.5			
CH ₄ Emissions from Mobile Combustion: Other	CH ₄	0.4			
Non-CO2 Emissions from Stationary Combustion - U.S. Territories	CH ₄	0.1			
CH ₄ Emissions from Mobile Combustion: Aviation	CH4	+			
CH ₄ Emissions from Mobile Combustion: Marine	CH4	+			
CH ₄ Emissions from Incineration of Waste	CH ₄	+			
Non-CO₂ Emissions from Stationary Combustion - Electricity Generation	N ₂ O	18.3	•	$T_1 L_2 T_2$	1990 ₂ , 2012 ₂
N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	12.6	•	L1 T1 L2 T2	1990
Non-CO ₂ Emissions from Stationary Combustion - Industrial	N ₂ O	2.4	•	T ₂	
N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	2.0			
N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.4			
Non-CO ₂ Emissions from Stationary Combustion - Residential	N ₂ O	0.8			
N2O Emissions from Mobile Combustion: Marine	N ₂ O	0.5			
N2O Emissions from Incineration of Waste	N ₂ O	0.4			
Non-CO ₂ Emissions from Stationary Combustion - Commercial	N ₂ O	0.3			
Non-CO ₂ Emissions from Stationary Combustion - U.S.	N ₂ O	0.0			
Territories		112.8	•	0	
Industrial Processes	Several	112.0	•	Q	
	~~~	F1 0		. T . T	1000 001
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	54.3	•	L1 T1 L2 T2	
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production	CO ₂	35.1	•	L1 T1 L2 T2 L1	1990, 201 1990 ₁
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production CO ₂ Emissions from Lime Production	CO ₂ CO ₂	35.1 13.3	•		
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production CO ₂ Emissions from Lime Production CO ₂ Emissions from Ammonia Production	CO2 CO2 CO2	35.1 13.3 9.4	•		
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production CO ₂ Emissions from Lime Production CO ₂ Emissions from Ammonia Production CO ₂ Emissions from Limestone and Dolomite Use	$\begin{array}{c} CO_2 \\ CO_2 \\ CO_2 \\ CO_2 \\ CO_2 \end{array}$	35.1 13.3 9.4 8.0	•		
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production CO ₂ Emissions from Lime Production CO ₂ Emissions from Ammonia Production CO ₂ Emissions from Limestone and Dolomite Use CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	$\begin{array}{c} CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2	•		
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production CO ₂ Emissions from Lime Production CO ₂ Emissions from Ammonia Production CO ₂ Emissions from Limestone and Dolomite Use CO ₂ Emissions from Urea Consumption for Non-Ag Purposes CO ₂ Emissions from Petrochemical Production	$\begin{array}{c} CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2 3.5	•		
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production CO ₂ Emissions from Lime Production CO ₂ Emissions from Ammonia Production CO ₂ Emissions from Limestone and Dolomite Use CO ₂ Emissions from Urea Consumption for Non-Ag Purposes CO ₂ Emissions from Petrochemical Production	$\begin{array}{c} CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2	•		
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production CO ₂ Emissions from Lime Production CO ₂ Emissions from Ammonia Production CO ₂ Emissions from Limestone and Dolomite Use CO ₂ Emissions from Urea Consumption for Non-Ag Purposes CO ₂ Emissions from Petrochemical Production CO ₂ Emissions from Aluminum Production	$\begin{array}{c} CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2 3.5	•		
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production CO ₂ Emissions from Lime Production CO ₂ Emissions from Ammonia Production CO ₂ Emissions from Limestone and Dolomite Use CO ₂ Emissions from Urea Consumption for Non-Ag Purposes CO ₂ Emissions from Petrochemical Production CO ₂ Emissions from Aluminum Production CO ₂ Emissions from Soda Ash Production and Consumption CO ₂ Emissions from Carbon Dioxide Consumption	$\begin{array}{c} CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2 3.5 3.4	•		
<ul> <li>CO₂ Emissions from Iron and Steel Production &amp; Metallurgical</li> <li>Coke Production</li> <li>CO₂ Emissions from Cement Production</li> <li>CO₂ Emissions from Lime Production</li> <li>CO₂ Emissions from Ammonia Production</li> <li>CO₂ Emissions from Limestone and Dolomite Use</li> <li>CO₂ Emissions from Vrea Consumption for Non-Ag Purposes</li> <li>CO₂ Emissions from Aluminum Production</li> <li>CO₂ Emissions from Soda Ash Production and Consumption</li> <li>CO₂ Emissions from Carbon Dioxide Consumption</li> </ul>	$\begin{array}{c} CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7	•		
CO2 Emissions from Iron and Steel Production & Metallurgical         Coke Production         CO2 Emissions from Cement Production         CO2 Emissions from Lime Production         CO2 Emissions from Ammonia Production         CO2 Emissions from Lime Production         CO2 Emissions from Lime Production         CO2 Emissions from Lime Production         CO2 Emissions from Limestone and Dolomite Use         CO2 Emissions from Urea Consumption for Non-Ag Purposes         CO2 Emissions from Petrochemical Production         CO2 Emissions from Aluminum Production         CO2 Emissions from Soda Ash Production and Consumption         CO2 Emissions from Carbon Dioxide Consumption         CO2 Emissions from Titanium Dioxide Production	$\begin{array}{c} CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8	•		
CO2 Emissions from Iron and Steel Production & Metallurgical         Coke Production         CO2 Emissions from Cement Production         CO2 Emissions from Lime Production         CO2 Emissions from Ammonia Production         CO2 Emissions from Lime Production         CO2 Emissions from Lime Production         CO2 Emissions from Lime Production         CO2 Emissions from Urea Consumption for Non-Ag Purposes         CO2 Emissions from Petrochemical Production         CO2 Emissions from Aluminum Production         CO2 Emissions from Carbon Dioxide Consumption         CO2 Emissions from Titanium Dioxide Production         CO2 Emissions from Ferroalloy Production	$\begin{array}{c} CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8 1.7	•		
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production CO ₂ Emissions from Lime Production CO ₂ Emissions from Ammonia Production CO ₂ Emissions from Limestone and Dolomite Use CO ₂ Emissions from Urea Consumption for Non-Ag Purposes CO ₂ Emissions from Petrochemical Production CO ₂ Emissions from Aluminum Production CO ₂ Emissions from Soda Ash Production and Consumption	$\begin{array}{c} CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8 1.7 1.7	•		
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production CO ₂ Emissions from Cement Production CO ₂ Emissions from Lime Production CO ₂ Emissions from Ammonia Production CO ₂ Emissions from Limestone and Dolomite Use CO ₂ Emissions from Urea Consumption for Non-Ag Purposes CO ₂ Emissions from Petrochemical Production CO ₂ Emissions from Petrochemical Production CO ₂ Emissions from Aluminum Production CO ₂ Emissions from Soda Ash Production and Consumption CO ₂ Emissions from Carbon Dioxide Consumption CO ₂ Emissions from Titanium Dioxide Production CO ₂ Emissions from Ferroalloy Production CO ₂ Emissions from Ferroalloy Production CO ₂ Emissions from Jinc Production CO ₂ Emissions from Glass Production	$\begin{array}{c} CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8 1.7 1.7 1.7	•		
CO2 Emissions from Iron and Steel Production & Metallurgical         Coke Production         CO2 Emissions from Cement Production         CO2 Emissions from Lime Production         CO2 Emissions from Limestone and Dolomite Use         CO2 Emissions from Urea Consumption for Non-Ag Purposes         CO2 Emissions from Petrochemical Production         CO2 Emissions from Aluminum Production         CO2 Emissions from Carbon Dioxide Consumption         CO2 Emissions from Titanium Dioxide Production         CO2 Emissions from Ferroalloy Production         CO2 Emissions from Zinc Production         CO2 Emissions from Glass Production         CO2 Emissions from Phosphoric Acid Production	$\begin{array}{c} CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8 1.7 1.7 1.7 1.4 1.2 1.1	•		
CO2 Emissions from Iron and Steel Production & Metallurgical         CO4 Emissions from Cement Production         CO2 Emissions from Cement Production         CO2 Emissions from Lime Production         CO2 Emissions from Lime Production         CO2 Emissions from Lime Production         CO2 Emissions from Limestone and Dolomite Use         CO2 Emissions from Urea Consumption for Non-Ag Purposes         CO2 Emissions from Petrochemical Production         CO2 Emissions from Aluminum Production         CO2 Emissions from Carbon Dioxide Consumption         CO2 Emissions from Titanium Dioxide Production         CO2 Emissions from Zinc Production         CO2 Emissions from Glass Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Silicon Carbide Production	$\begin{array}{c} CO_2\\ CO_2\end{array}$	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8 1.7 1.7 1.4 1.2	•		
CO2 Emissions from Iron and Steel Production & Metallurgical         Coke Production         CO2 Emissions from Cement Production         CO2 Emissions from Lime Production         CO2 Emissions from Limestone and Dolomite Use         CO2 Emissions from Urea Consumption for Non-Ag Purposes         CO2 Emissions from Petrochemical Production         CO2 Emissions from Aluminum Production         CO2 Emissions from Carbon Dioxide Consumption         CO2 Emissions from Titanium Dioxide Production         CO2 Emissions from Zinc Production         CO2 Emissions from Glass Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Lead Production         CO2 Emissions from Silicon Carbide Production and	$     \begin{array}{c}       CO_2 \\       $	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8 1.7 1.8 1.7 1.7 1.4 1.2 1.1 0.5 0.2	•		
CO2 Emissions from Iron and Steel Production & Metallurgical         Coke Production         CO2 Emissions from Cement Production         CO2 Emissions from Lime Production         CO2 Emissions from Limestone and Dolomite Use         CO2 Emissions from Urea Consumption for Non-Ag Purposes         CO2 Emissions from Petrochemical Production         CO2 Emissions from Soda Ash Production         CO2 Emissions from Carbon Dioxide Consumption         CO2 Emissions from Titanium Dioxide Production         CO2 Emissions from Galass Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Silicon Carbide Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Silicon Carbide Production         CO3 Emissions from Silicon Carbide Production         CO4 Emissi	$     \begin{array}{c}       CO_2 \\       $	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8 1.7 1.8 1.7 1.7 1.4 1.2 1.1 0.5	•		
CO2 Emissions from Iron and Steel Production & Metallurgical         Coke Production         CO2 Emissions from Cement Production         CO2 Emissions from Lime Production         CO2 Emissions from Lime Production         CO2 Emissions from Lime Production         CO2 Emissions from Limestone and Dolomite Use         CO2 Emissions from Urea Consumption for Non-Ag Purposes         CO2 Emissions from Petrochemical Production         CO2 Emissions from Aluminum Production         CO2 Emissions from Soda Ash Production and Consumption         CO2 Emissions from Titanium Dioxide Consumption         CO2 Emissions from Ferroalloy Production         CO2 Emissions from Ferroalloy Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Silicon Carbide Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Silicon Carbide Production         CO2 Emissions from Silicon Carbide Production         CO2 Emissions from Silicon Carbide Production         CO2 Emissions from Petrochemical Production         CO3 Emissions from Petrochemical Production	$     \begin{array}{c}       CO_2 \\       $	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8 1.7 1.7 1.4 1.2 1.1 0.5 0.2 3.1	•		
CO2 Emissions from Iron and Steel Production & MetallurgicalCO2 Emissions from Cement ProductionCO2 Emissions from Lime ProductionCO2 Emissions from Lime ProductionCO2 Emissions from Lime ProductionCO2 Emissions from Limestone and Dolomite UseCO2 Emissions from Vera Consumption for Non-Ag PurposesCO2 Emissions from Petrochemical ProductionCO2 Emissions from Soda Ash ProductionCO2 Emissions from Carbon Dioxide ConsumptionCO2 Emissions from Titanium Dioxide ProductionCO2 Emissions from Ferroalloy ProductionCO2 Emissions from Petrochemical ProductionCO2 Emissions from Carbon Dioxide ConsumptionCO2 Emissions from Carbon Dioxide ProductionCO2 Emissions from Ferroalloy ProductionCO2 Emissions from Phosphoric Acid ProductionCO2 Emissions from Petrochemical ProductionCO2 Emissions from Petrochemical ProductionCO3 Emissions from Petrochemical ProductionCO4 Emissions from Ferroalloy ProductionCO4 Emission	$     \begin{array}{c}       CO_2 \\       $	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8 1.7 1.7 1.4 1.2 1.1 0.5 0.2 3.1 0.6	•		
CO2 Emissions from Iron and Steel Production & Metallurgical         Coke Production         CO2 Emissions from Cement Production         CO2 Emissions from Lime Production         CO2 Emissions from Limestone and Dolomite Use         CO2 Emissions from Urea Consumption for Non-Ag Purposes         CO2 Emissions from Petrochemical Production         CO2 Emissions from Soda Ash Production         CO2 Emissions from Carbon Dioxide Consumption         CO2 Emissions from Titanium Dioxide Production         CO2 Emissions from Galass Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Silicon Carbide Production         CO2 Emissions from Phosphoric Acid Production         CO2 Emissions from Silicon Carbide Production         CO3 Emissions from Silicon Carbide Production         CO4 Emissi	$     \begin{array}{c}       CO_2 \\       $	35.1 13.3 9.4 8.0 5.2 3.5 3.4 2.7 1.8 1.7 1.7 1.7 1.7 1.4 1.2 1.1 0.5 0.2 3.1 0.6 +	•		1990, 201 19901

A-6 DRAFT Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012

N ₂ O Emissions from Product Uses	N ₂ O	4.4			
Emissions from Substitutes for Ozone Depleting Substances	HiGWP	129.4	•	$L_1 T_1 L_2 T_2$	2012
HFC-23 Emissions from HCFC-22 Production	HiGWP	6.9	•	$L_1 T_1 T_2$	1990 ₁
SF ₆ Emissions from Electrical Transmission and Distribution	HiGWP	6.0	•	$T_1 T_2$	
PFC, HFC, and SF ₆ Emissions from Semiconductor Manufacture	HiGWP	3.7			
PFC Emissions from Aluminum Production	HiGWP	2.5	•	T ₁	
SF ₆ Emissions from Magnesium Production and Processing	HiGWP	1.7			
Agriculture					
CH ₄ Emissions from Enteric Fermentation	CH ₄	141.0	•	L1 L2	1990, 2012
CH ₄ Emissions from Manure Management	CH ₄	52.9	•	L1 T1 L2 T2	2012
CH ₄ Emissions from Rice Cultivation	CH ₄	7.4			
CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.3			
Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	260.9	•	L1 T1 L2 T2	1990, 2012
Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	45.7	•	L1 L2 T2	1990, 2012
N ₂ O Emissions from Manure Management	N ₂ O	18.0			
N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.1			
Waste					
CH ₄ Emissions from Landfills	CH ₄	102.8	•	L1 T1 L2 T2	1990, 2012
CH ₄ Emissions from Wastewater Treatment	CH ₄	12.8			
CH ₄ Emissions from Composting	CH ₄	1.6			
N ₂ O Emissions from Wastewater Treatment	N ₂ O	5.0			
N ₂ O Emissions from Composting	N ₂ O	1.8			

1 ^a For the ID criteria, L refers to a key category identified through a level assessment; T refers to a key category identified through a trend assessment and the

2 subscripted number refers to either a Tier 1 or Tier 2 assessment (e.g., L2 designates a source is a key category for a Tier 2 level assessment).

3 ^b 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., 1990 designates a source is a key category for the Tier 2
 assessment only in 1990).
 Emissions from these sources not included in totals.
 + Does not exceed 0.05 Tg CO₂ Eq.

, 8 9 Note: LULUCF sources and sinks are not included in this analysis.

IPCC Source Categories	Direct GHG	2012 Emissions (Tg CO ₂ Eq.)	Key Category?	ID Criteriaª	Level in which year(s)? ^ь
Energy		17			<b>J</b> ²² (2)
CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,512.2	٠	L1 T1 L2 T2	1990, 2012
CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,469.8	•	L1 T1 L2 T2	1990, 2012
CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	492.2	•	$L_1 T_1 L_2 T_2$	1990 ₁ , 2012
CO2 Emissions from Stationary Combustion - Gas - Industrial	CO ₂	428.5	•	L1 L2	1990, 2012
CO2 Emissions from Stationary Combustion - Oil - Industrial	CO ₂	267.0	•	L1 T1 L2 T2	1990, 2012
CO2 Emissions from Stationary Combustion - Gas - Residential	CO ₂	225.8	•	L1 T1 L2	1990, 2012
CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	157.0	•	L1 T1 L2	1990, 2012
CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	145.1	•	L1 T1 L2 T2	1990, 2012
CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	110.6	•	L1 T1 L2 T2	1990, 2012
CO ₂ Emissions from Mobile Combustion: Other	CO ₂	83.9	•	L1 T1	1990 ₁ , 2012 ₁
CO2 Emissions from Stationary Combustion - Coal - Industrial	CO ₂	74.3	•	L1 T1 L2 T2	1990, 2012
CO2 Emissions from Stationary Combustion - Oil - Residential	CO ₂	63.7	•	L1 T1	1990 ₁ , 2012 ₁
CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	44.7	•	$L_1 T_1$	1990 ₁ , 2012 ₁
CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	36.8	•	L1 T1	1990₁, 2012₁
CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	36.6	•	$L_1 T_1$	1990 ₁ , 2012 ₁
CO ₂ Emissions from Natural Gas Systems	CO ₂	35.2	•	$L_1 T_1 L_2$	1990, 2012
CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	18.8	•	$L_1 T_1 T_2$	<b>1990</b> 1
CO ₂ Emissions from Incineration of Waste	CO ₂	12.1			
CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	4.1	•	T ₁	
CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	3.4			
CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	1.4			
CO ₂ Emissions from Petroleum Systems	CO ₂	0.4			
CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.4			
CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	+			
Fugitive Emissions from Natural Gas Systems	CH ₄	127.1	•	L1 T1 L2 T2	1990, 201
Fugitive Emissions from Coal Mining	CH ₄	55.8	•	L1 T1 L2 T2	1990, 2012 ₁
Fugitive Emissions from Petroleum Systems	CH ₄	31.7	•	L1 L2 T2	1990, 2012
Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	4.7			
Non-CO ₂ Emissions from Stationary Combustion - Residential	CH ₄	3.1	•	L2 T2	1990 ₂
CH ₄ Emissions from Mobile Combustion: Road	CH ₄	1.2		_ • •	
Non-CO ₂ Emissions from Stationary Combustion - Industrial	CH₄	1.2			
Non-CO ₂ Emissions from Stationary Combustion - Commercial	CH₄	0.8			
Non-CO ₂ Emissions from Stationary Combustion - Electricity Generation	CH4	0.5			
CH ₄ Emissions from Mobile Combustion: Other	CH ₄	0.4			
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	CH4	0.1			
CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	+			

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

Old Fasississe from Mobile Osmehovetism Maxim	011				
CH ₄ Emissions from Mobile Combustion: Marine	CH₄ CH₄	+			
CH ₄ Emissions from Incineration of Waste Non-CO ₂ Emissions from Stationary Combustion - Electricity	N ₂ O	+ 18.3	•	$T_1 L_2 T_2$	1990 ₂ ,
Generation	N ₂ O	10.5	·	I1 L2 I2	1990 ₂ , 2012 ₂
N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	12.6	•	L1 T1 L2 T2	1990
Non-CO ₂ Emissions from Stationary Combustion - Industrial	N ₂ O	2.4			
$N_2O$ Emissions from Mobile Combustion: Other	N ₂ O	2.0			
N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.4			
Non-CO ₂ Emissions from Stationary Combustion - Residential	N ₂ O	0.8			
$N_2O$ Emissions from Mobile Combustion: Marine	N ₂ O	0.5			
N ₂ O Emissions from Incineration of Waste	N ₂ O	0.4			
Non-CO ₂ Emissions from Stationary Combustion - Commercial	N ₂ O	0.3			
Non-CO $_2$ Emissions from Stationary Combustion - U.S.	N ₂ O	0.1			
Territories	1120	0.1			
International Bunker Fuels ^c	Several	112.8	•	Q	
ndustrial Processes					
CO ₂ Emissions from Iron and Steel Production & Metallurgical	CO ₂	54.3	•	$L_1 T_1 L_2 T_2$	1990,
Coke Production					20121
CO ₂ Emissions from Cement Production	CO ₂	35.1	•	L1	1990 ₁ ,
CO ₂ Emissions from Lime Production	CO ₂	13.3			20121
CO ₂ Emissions from Ammonia Production		9.4			
CO ₂ Emissions from Limestone and Dolomite Use		8.0			
CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	5.2			
CO ₂ Emissions from Petrochemical Production	CO ₂	3.5			
CO ₂ Emissions from Aluminum Production	CO ₂	3.4			
CO ₂ Emissions from Soda Ash Production and Consumption	CO ₂	2.7			
CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	1.8			
CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.7			
CO ₂ Emissions from Ferroalloy Production	CO ₂	1.7			
CO ₂ Emissions from Zinc Production	CO ₂	1.4			
CO ₂ Emissions from Glass Production	CO ₂	1.2			
CO ₂ Emissions from Phosphoric Acid Production	CO ₂	1.1			
CO ₂ Emissions from Lead Production	CO ₂	0.5			
CO ₂ Emissions from Silicon Carbide Production and	CO ₂	0.2			
	0.1	<u>.</u>			
CH ₄ Emissions from Petrochemical Production	CH4	3.1			
CH ₄ Emissions from Iron and Steel Production & Metallurgical	CH4	0.6			
Coke Production CH4 Emissions from Ferroalloy Production	CH ₄	+			
CH4 Emissions from Silicon Carbide Production and	CH ₄	+			
Consumption	CI 14	Ŧ			
V ₂ O Emissions from Nitric Acid Production	N ₂ O	15.3			
$v_2$ O Emissions from Adipic Acid Production	N ₂ O	5.8	•	T ₁	
$V_2O$ Emissions from Product Uses	N ₂ O	4.4			
Emissions from Substitutes for Ozone Depleting Substances	HiGWP	129.4	•	L1 T1 L2 T2	2012
HFC-23 Emissions from HCFC-22 Production	HiGWP	6.9	•	L ₁ T ₁	1990 ₁
SF ₆ Emissions from Electrical Transmission and Distribution	HiGWP	6.0	•	$T_1 T_2$	10001
PFC, HFC, and SF ₆ Emissions from Semiconductor	HiGWP	3.7			
Vanufacture	1.000	0.1			
PFC Emissions from Aluminum Production	HiGWP	2.5	•	T ₁	
SF ₆ Emissions from Magnesium Production and Processing	HiGWP	1.7			
Agriculture					
CH ₄ Emissions from Enteric Fermentation	CH ₄	141.0	•	L1 L2	1990, 20 ⁻

					2012
CH ₄ Emissions from Rice Cultivation	CH ₄	7.4			
CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.3			
Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	260.9	•	$L_1 L_2$	1990, 2012
Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	45.7	•	$L_1 L_2$	1990, 2012
N ₂ O Emissions from Manure Management	N ₂ O	18.0			
N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.1			
Waste					
CH ₄ Emissions from Landfills	CH ₄	102.8	•	L1 T1 L2 T2	1990, 2012
CH ₄ Emissions from Wastewater Treatment	CH4	12.8			
CH ₄ Emissions from Composting	CH4	1.6			
N ₂ O Emissions from Wastewater Treatment	N ₂ O	5.0			
N ₂ O Emissions from Composting	N ₂ O	1.8			
Land Use, Land Use Change, and Forestry					
CO ₂ Emissions from Land Converted to Cropland	CO ₂	6.8	•	T1 L2 T2	1990, 2012
CO2 Emissions from Grassland Remaining Grassland	CO ₂	6.7	•	L2 T2	1990, 2012
CO ₂ Emissions from Liming of Agricultural Soils	CO ₂	3.9			
CO ₂ Emissions from Urea Fertilization	CO ₂	3.4			
CO2 Emissions from Wetlands Remaining Wetlands	CO ₂	0.8			
CO ₂ Emissions from Land Converted to Grassland	CO ₂	(8.5)			
CO ₂ Emissions from Landfilled Yard Trimmings and Food Scraps	CO ₂	(13.2)	•	$T_1 L_2 T_2$	1990 ₂
CO2 Emissions from Cropland Remaining Cropland	CO ₂	(26.5)	•	L1 T1 L2 T2	1990, 2012
CO ₂ Emissions from Urban Trees	CO ₂	(88.4)	•	L1 T1 L2 T2	1990, 2012
CO2 Emissions from Changes in Forest Carbon Stocks	CO ₂	(866.5)	•	L1 T1 L2 T2	1990, 2012
CH ₄ Emissions from Forest Fires	CH4	5.3	•	$T_1 L_2 T_2$	2012
N ₂ O Emissions from Forest Fires	N ₂ O	2.5	•	$T_1 L_2 T_2$	2012
N ₂ O Emissions from Settlement Soils	N ₂ O	.5			
N ₂ O Emissions from Forest Soils	N ₂ O	0.4			
N ₂ O Emissions from Wetlands Remaining Wetlands	N ₂ O	+			

1 ^a For the ID criteria, L refers to a key category identified through a level assessment; T refers to a key category identified through a trend assessment and the

2 subscripted number refers to either a Tier 1 or Tier 2 assessment (e.g., L2 designates a source is a key category for a Tier 2 level assessment).

³ ^b 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 Tier 2

5 assessment only in 1990).

6 • Emissions from these sources not included in totals.

7 + Does not exceed 0.05 Tg CO₂ Eq.

8 Note: Parentheses indicate negative values (or sequestration).

### 9

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#### 10 Evaluation of Key Categories

#### Level Assessment

When using a Tier 1 approach 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 *IPCC Good Practice Guidance* (IPCC 2000) was designed to establish a general level where the key category analysis covers approximately 75 to 92 percent of inventory uncertainty.

17 Including the Tier 2 approach provides additional insight into why certain source categories are considered key, 18 and how to prioritize inventory improvements. In the Tier 2 approach, the level assessment for each category from the Tier 19 1 approach is multiplied by its percent relative uncertainty. If the uncertainty reported is asymmetrical, the absolute value 20 of the larger uncertainty is used. Uncertainty is not estimated for the following sources: CO₂ emissions from stationary 21 combustion – geothermal energy; CO₂ emissions from mobile combustion by mode of transportation; CH₄ and N₂O 22 emissions from mobile combustion by mode of off-road transportation; and CH₄ from the incineration of waste. While 23  $CO_2$  emissions from geothermal energy are included in the overall emissions estimate, they are not an official IPCC source 24 category. As a result, there are no guidelines to associate uncertainty with the emissions estimate; therefore, an uncertainty

1 analysis was not conducted. The uncertainty associated with CO₂ from mobile combustion is applied to each mode's 2 emissions estimate, and the uncertainty associated with off-road vehicle CH₄ and N₂O emissions are applied to both CH₄ and N₂O emissions from aviation, marine, and other sources. No uncertainty was associated with CH₄ emissions from 3 waste incineration because emissions are less than 0.05 Gg CH₄ and an uncertainty analysis was not conducted. When 4 5 source and sink categories are sorted in decreasing order of this calculation, those that fall at the top of the list and 6 cumulatively account for 90 percent of emissions are considered key categories. The key categories identified by the Tier 7 2 level assessment may differ from those identified by the Tier 1 assessment. The final set of key categories includes all 8 source and sink categories identified as key by either the Tier 1 or the Tier 2 assessment, keeping in mind that the two 9 assessments are not mutually exclusive.

10 It is important to note that a key category analysis can be sensitive to the definitions of the source and sink 11 categories. If a large source category is split into many subcategories, then the subcategories may have contributions to 12 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 13 14 source categories were aggregated into a single source category. The United States has attempted to define source and 15 sink categories by the conventions which would allow comparison with other international key categories, while still 16 maintaining the category definitions that constitute how the emissions estimates were calculated for this report. As such, 17 some of the category names used in the key category analysis may differ from the names used in the main body of the 18 report. Additionally, the United States accounts for some source categories, including fossil fuel feedstocks, international 19 bunkers, and emissions from U.S. territories, that are derived from unique data sources using country-specific 20 methodologies.

Table A- 4 through Table A- 7 contain the 1990 and 2012 level assessments for both with and without LULUCF sources and sinks, and contain further detail on where each source falls within the analysis. Tier 1 key categories are shaded dark gray. Additional key categories identified by the Tier 2 assessment are shaded light gray.

#### Trend Assessment

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The Tier 1 approach 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 the Tier 2 approach, the trend assessment for each category from the Tier 1 approach 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 Tier 2 trend assessment may differ from those identified by the Tier 1 assessment. The final set of key categories includes all source and sink categories identified as key by either the Tier 1 or the Tier 2 assessment, keeping in mind that the two assessments are not mutually exclusive.

Table A- 8 and Table A- 9 contain the 1990 through 2012 trend assessment for both with and without LULUCF sources and sinks, and contain further detail on where each source falls within the analysis. Tier 1 key categories are shaded dark gray. Additional key categories identified by the Tier 2 assessment are shaded light gray.

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

		1990 Estimate	Tier 1 Level	Cumulative		Tier 2 Level
IPCC Source Categories	Direct GHG	(Tg CO ₂ Eq.)	Assessment	Total	Uncertainty	Assessment
CO ₂ Emissions from Stationary Combustion - Coal - Electricity	CO ₂	1,547.6	0.25	0.25	10%	0.024
Generation						
CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,188.9	0.19	0.44	8%	0.016
CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	408.9	0.07	0.51	10%	0.007
CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	280.9	0.05	0.55	20%	0.009
Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	240.7	0.04	0.59	28%	0.011

CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	238.0	0.04	0.63	7%	0.003
CO ₂ Emissions from Stationary Combustion - Gas - Residential CO ₂ Emissions from Mobile Combustion: Aviation		230.0 187.4	0.04	0.66	8%	0.003
CO ₂ Emissions from Mobile Combustion. Available CO ₂ Emissions from Stationary Combustion - Gas - Electricity		175.3	0.03	0.69	5%	0.002
Generation	002	170.0	0.00	0.00	070	0.001
CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	155.3	0.02	0.71	17%	0.004
Fugitive Emissions from Natural Gas Systems	CH ₄	152.9	0.02	0.74	30%	0.007
CH ₄ Emissions from Landfills	CH ₄	147.8	0.02	0.76	56%	0.013
CO2 Emissions from Stationary Combustion - Gas - Commercial	CO ₂	142.1	0.02	0.78	7%	0.002
CH ₄ Emissions from Enteric Fermentation	CH ₄	137.9	0.02	0.80	18%	0.004
CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	120.8	0.02	0.82	36%	0.007
CO2 Emissions from Iron and Steel Production & Metallurgical	CO ₂	99.8	0.02	0.84	17%	0.003
Coke Production						
CO ₂ Emissions from Stationary Combustion - Oil - Electricity	CO ₂	97.5	0.02	0.86	9%	0.001
Generation CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	97.4	0.02	0.87	6%	0.001
Fugitive Emissions from Coal Mining	CO ₂ CH ₄	81.1	0.02	0.88	16%	0.001
CO ₂ Emissions from Mobile Combustion: Other	CO ₂	73.3	0.01	0.88	8%	0.002
CO ₂ Emissions from Mobile Combustion. Other		64.9	0.01	0.90	5%	0.001
CO ₂ Emissions from Stationary Combustion - Oil - Commercial		44.5	0.01	0.91	3 % 8%	0.001
Indirect N ₂ O Emissions from Applied Nitrogen	N2O	44.5	0.01	0.91	151%	0.001
N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	40.3	0.01	0.92	27%	0.002
CO ₂ Emissions from Natural Gas Systems	CO ₂	37.7	0.01	0.93	30%	0.002
HFC-23 Emissions from HCFC-22 Production	HFCs	36.4	0.01	0.94	10%	0.002
Fugitive Emissions from Petroleum Systems	CH4	35.8	0.01	0.94	149%	0.009
CO ₂ Emissions from Cement Production	CO ₂	33.3	0.01	0.95	6%	<0.003
CH ₄ Emissions from Manure Management	CO ₂ CH ₄	31.5	0.01	0.96	20%	0.001
CO ₂ Emissions from Nationary Combustion - Oil - U.S.	CO ₂	27.2	<0.01	0.96	11%	<0.001
Territories	002	21.2	<b>SOLO I</b>	0.50	1170	\$0.001
SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	26.7	<0.01	0.96	25%	0.001
PFC Emissions from Aluminum Production	PFCs	18.4	<0.01	0.97	6%	<0.001
N ₂ O Emissions from Nitric Acid Production	N ₂ O	18.2	< 0.01	0.97	41%	0.001
N ₂ O Emissions from Adipic Acid Production	N ₂ O	15.8	< 0.01	0.97	4%	<0.001
N ₂ O Emissions from Manure Management	N ₂ O	14.4	< 0.01	0.97	24%	0.001
CH ₄ Emissions from Wastewater Treatment	CH ₄	13.2	< 0.01	0.98	27%	0.001
CO ₂ Emissions from Ammonia Production	CO ₂	13.0	< 0.01	0.98	7%	<0.001
CO ₂ Emissions from Stationary Combustion - Coal -		12.0	< 0.01	0.98	15%	< 0.001
Commercial	002	12.0	40.01	0.00	1070	-0.001
CO ₂ Emissions from Lime Production	CO ₂	11.4	<0.01	0.98	3%	<0.001
CO ₂ Emissions from Incineration of Waste	CO ₂	8.0	<0.01	0.98	14%	<0.001
CH ₄ Emissions from Rice Cultivation	CH ₄	7.7	<0.01	0.99	96%	0.001
Non-CO2 Emissions from Stationary Combustion - Electricity	N ₂ O	7.4	<0.01	0.99	173%	0.002
Generation						
CO ₂ Emissions from Aluminum Production	CO ₂	6.8	<0.01	0.99	2%	< 0.001
Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	6.0	<0.01	0.99	26%	< 0.001
SF ₆ Emissions from Magnesium Production and Processing	SF ₆	5.4	<0.01	0.99	12%	< 0.001
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	4.9	<0.01	0.99	20%	< 0.001
Non-CO ₂ Emissions from Stationary Combustion - Residential	CH ₄	4.6	< 0.01	0.99	225%	0.002
N ₂ O Emissions from Product Uses	N ₂ O	4.4	< 0.01	0.99	24%	< 0.001
CH ₄ Emissions from Mobile Combustion: Road	CH4	4.2	< 0.01	0.99	16%	< 0.001
CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.8	<0.01	0.99	10%	< 0.001
N ₂ O Emissions from Wastewater Treatment	N ₂ O	3.5	<0.01	0.99	100%	0.001
CO ₂ Emissions from Petrochemical Production	CO ₂	3.4	< 0.01	0.99	27%	< 0.001
Non-CO ₂ Emissions from Stationary Combustion - Industrial	N ₂ O	3.3	< 0.01	0.99	211%	0.001
CO2 Emissions from Stationary Combustion - Coal - Residential	CO ₂	3.0	<0.01	0.99	15%	<0.001

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PFC, HFC, and SF ₆ Emissions from Semiconductor Manufacture	Several	2.9	<0.01	0.99	5%	<0.(
CO ₂ Emissions from Soda Ash Production and Consumption	CO ₂	2.7	<0.01	1.00	6%	<0.0
CH ₄ Emissions from Petrochemical Production	CH ₄	2.3	<0.01	1.00	10%	<0.0
CO ₂ Emissions from Ferroalloy Production	CO ₂	2.2	<0.01	1.00	12%	<0.
N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.8	<0.01	1.00	2%	<0.
Non-CO2 Emissions from Stationary Combustion - Industrial	CH ₄	1.6	<0.01	1.00	50%	<0.
CO2 Emissions from Phosphoric Acid Production	CO ₂	1.6	<0.01	1.00	21%	<0.
CO ₂ Emissions from Glass Production	CO ₂	1.5	<0.01	1.00	5%	<0.
CO2 Emissions from Carbon Dioxide Consumption	CO ₂	1.4	<0.01	1.00	40%	<0.0
N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	1.3	<0.01	1.00	1%	<0.0
CO2 Emissions from Titanium Dioxide Production	CO ₂	1.2	<0.01	1.00	13%	<0.
Non-CO ₂ Emissions from Stationary Combustion - Residential	N ₂ O	1.1	<0.01	1.00	201%	<0.
CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH ₄	1.0	<0.01	1.00	22%	<0.
Non-CO ₂ Emissions from Stationary Combustion - Commercial	CH4	0.9	<0.01	1.00	143%	<0.
CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO2	0.6	<0.01	1.00	19%	<0.
CO ₂ Emissions from Zinc Production	CO ₂	0.6	<0.01	1.00	17%	<0.
N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.6	<0.01	1.00	28%	<0.
CO ₂ Emissions from Lead Production	CO ₂	0.5	<0.01	1.00	15%	<0.
N ₂ O Emissions from Incineration of Waste	N ₂ O	0.5	<0.01	1.00	317%	<0.
CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.4	<0.01	1.00	NA	<0.
CO ₂ Emissions from Petroleum Systems	CO ₂	0.4	<0.01	1.00	149%	<0.
Non-CO ₂ Emissions from Stationary Combustion - Commercial	N ₂ O	0.4	<0.01	1.00	80%	<0.
CO ₂ Emissions from Silicon Carbide Production and Consumption	CO ₂	0.4	<0.01	1.00	9%	<0.
N ₂ O Emissions from Composting	N ₂ O	0.4	<0.01	1.00	50%	<0.
Non-CO ₂ Emissions from Stationary Combustion - Electricity Generation	CH4	0.3	<0.01	1.00	42%	<0.
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	<0.01	1.00	13%	<0.
CH ₄ Emissions from Composting	CH ₄	0.3	<0.01	1.00	50%	<0.
CH ₄ Emissions from Mobile Combustion: Other	CH ₄	0.3	<0.01	1.00	1%	<0.
CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.3	< 0.01	1.00	42%	<0.
N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.1	< 0.01	1.00	32%	<0.
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	<0.01	1.00	204%	<0.
CH ₄ Emissions from Mobile Combustion: Aviation		0.1	<0.01	1.00	8%	<0.
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	CH ₄	+	<0.01	1.00	57%	<0.0
CH ₄ Emissions from Silicon Carbide Production and Consumption	CH ₄	+	<0.01	1.00	9%	<0.
CH ₄ Emissions from Mobile Combustion: Marine	CH4	+	<0.01	1.00	7%	<0.
CH ₄ Emissions from Ferroalloy Production	CH ₄	+	<0.01	1.00	11%	<0.
CH ₄ Emissions from Incineration of Waste	CH ₄	+	<0.01	1.00	NE	<0.0
CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	+	<0.01	1.00	17%	<0.

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

		1990 Estimate	Tier 1 Level	Cumulative		Tier 2 Lev
PCC Source Categories	Direct GHG	(Tg CO ₂ Eq.)	Assessment	Total	Uncertainty	Assessme
CO2 Emissions from Stationary Combustion - Coal - Electricity	CO ₂	1,547.6	0.22	0.22	10%	0.021
Generation	<u> </u>	1 100 0	0.17	0.20	00/	0.014
CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,188.9	0.17	0.38	8%	0.014
CO ₂ Emissions from Changes in Forest Carbon Stocks	CO ₂	704.6	0.10	0.48	15%	0.015
CO ₂ Emissions from Stationary Combustion - Gas - Industrial		408.9	0.06	0.54	10%	0.006
CO ₂ Emissions from Stationary Combustion - Oil - Industrial		280.9	0.04	0.58	20%	0.008
Direct N ₂ O Emissions from Agricultural Soil Management	N ₂ O	240.7	0.03	0.61	28%	0.010
CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	238.0	0.03	0.65	7%	0.002
CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	187.4	0.03	0.67	8%	0.002
CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	175.3	0.02	0.70	5%	0.001
CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	155.3	0.02	0.72	17%	0.004
Eugitive Emissions from Natural Gas Systems	CH ₄	152.9	0.02	0.74	30%	0.006
CH ₄ Emissions from Landfills	CH ₄	147.8	0.02	0.76	56%	0.012
CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	142.1	0.02	0.78	7%	0.001
CH ₄ Emissions from Enteric Fermentation	CH ₄	137.9	0.02	0.80	18%	0.003
CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	120.8	0.02	0.82	36%	0.006
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	99.8	0.01	0.83	17%	0.002
CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	97.5	0.01	0.85	9%	0.001
CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	97.4	0.01	0.86	6%	0.001
ugitive Emissions from Coal Mining	CH ₄	81.1	0.01	0.87	16%	0.002
CO ₂ Emissions from Mobile Combustion: Other	CO ₂	73.3	0.01	0.88	8%	0.001
CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	64.9	0.01	0.89	5%	<0.00
CO ₂ Emissions from Urban Trees	CO ₂	60.4	0.01	0.90	47%	0.004
CO ₂ Emissions from Cropland Remaining Cropland	CO ₂	51.9	0.01	0.91	167%	0.012
CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	44.5	0.01	0.91	8%	0.001
ndirect N2O Emissions from Applied Nitrogen	N ₂ O	41.4	0.01	0.92	151%	0.009
I2O Emissions from Mobile Combustion: Road	N ₂ O	40.3	0.01	0.93	27%	0.002
CO ₂ Emissions from Natural Gas Systems	CO ₂	37.7	0.01	0.93	30%	0.002
IFC-23 Emissions from HCFC-22 Production	HFCs	36.4	0.01	0.94	10%	0.001
ugitive Emissions from Petroleum Systems	CH ₄	35.8	0.01	0.94	149%	0.007
CO ₂ Emissions from Cement Production	CO ₂	33.3	<0.01	0.95	6%	<0.00
CH4 Emissions from Manure Management	CH4	31.5	<0.01	0.95	20%	0.001
CO ₂ Emissions from Stationary Combustion - Oil - U.S. erritories	CO ₂	27.2	<0.01	0.95	11%	<0.00
CO ₂ Emissions from Land Converted to Cropland	CO ₂	26.9	<0.01	0.96	77%	0.003
F6 Emissions from Electrical Transmission and Distribution	SF ₆	26.7	<0.01	0.96	25%	0.001
CO ₂ Emissions from Landfilled Yard Trimmings and Food Scraps	CO ₂	24.2	<0.01	0.96	60%	0.002
PFC Emissions from Aluminum Production	PFCs	18.4	<0.01	0.97	6%	<0.00
I2O Emissions from Nitric Acid Production	N ₂ O	18.2	<0.01	0.97	41%	0.001
I2O Emissions from Adipic Acid Production	N ₂ O	15.8	<0.01	0.97	4%	< 0.001
V2O Emissions from Manure Management	N ₂ O	14.4	<0.01	0.97	24%	< 0.001
CH ₄ Emissions from Wastewater Treatment	CH ₄	13.2	<0.01	0.98	27%	0.001
CO ₂ Emissions from Ammonia Production	CO ₂	13.0	<0.01	0.98	7%	<0.002
CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	12.0	<0.01	0.98	15%	<0.00
CO ₂ Emissions from Lime Production	CO ₂	11.4	<0.01	0.98	3%	<0.001
CO ₂ Emissions from Grassland Remaining Grassland	CO ₂	9.6	<0.01	0.98	529%	0.007

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CO ₂ Emissions from Incineration of Waste		8.0	< 0.01	0.98	14%	< 0.001
CH ₄ Emissions from Rice Cultivation	CH4	7.7	< 0.01	0.98	96%	0.001
Non-CO ₂ Emissions from Stationary Combustion - Electricity Generation	N ₂ O	7.4	<0.01	0.99	173%	0.002
CO ₂ Emissions from Land Converted to Grassland	$CO_2$	7.3	<0.01	0.99	108%	0.001
CO ₂ Emissions from Aluminum Production		6.8	< 0.01	0.99	2%	< 0.001
Fugitive Emissions from Abandoned Underground Coal Mines	CH4	6.0	< 0.01	0.99	26%	< 0.001
$SF_6$ Emissions from Magnesium Production and Processing	SF ₆	5.4	< 0.01	0.99	12%	< 0.001
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	4.9	< 0.01	0.99	20%	< 0.001
CO ₂ Emissions from Liming of Agricultural Soils		4.7	< 0.01	0.99	106%	0.001
Non-CO ₂ Emissions from Stationary Combustion - Residential	CH4	4.6	< 0.01	0.99	225%	0.001
N ₂ O Emissions from Product Uses	N ₂ O	4.4	< 0.01	0.99	24%	< 0.001
CH ₄ Emissions from Mobile Combustion: Road	CH ₄	4.2	< 0.01	0.99	16%	< 0.001
CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.8	< 0.01	0.99	10%	< 0.001
N ₂ O Emissions from Wastewater Treatment	N ₂ O	3.5	< 0.01	0.99	100%	< 0.001
CO ₂ Emissions from Petrochemical Production	CO ₂	3.4	< 0.01	0.99	27%	< 0.001
Non-CO ₂ Emissions from Stationary Combustion - Industrial	N2O	3.3	< 0.01	0.99	211%	0.001
CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	3.0	< 0.01	0.99	15%	< 0.001
PFC, HFC, and SF ₆ Emissions from Semiconductor	Several	2.9	< 0.01	0.99	5%	< 0.001
Manufacture				0.00	0,0	
CO2 Emissions from Soda Ash Production and Consumption	CO ₂	2.7	<0.01	1.00	6%	<0.001
CH ₄ Emissions from Forest Fires	CH ₄	2.5	<0.01	1.00	176%	0.001
CO ₂ Emissions from Urea Fertilization	CO ₂	2.4	<0.01	1.00	43%	<0.001
CH ₄ Emissions from Petrochemical Production	CH ₄	2.3	<0.01	1.00	10%	<0.001
CO ₂ Emissions from Ferroalloy Production	CO ₂	2.2	<0.01	1.00	12%	<0.001
N ₂ O Emissions from Forest Fires	N ₂ O	2.0	<0.01	1.00	144%	<0.001
N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.8	<0.01	1.00	2%	<0.001
Non-CO2 Emissions from Stationary Combustion - Industrial	CH ₄	1.6	<0.01	1.00	50%	<0.001
CO ₂ Emissions from Phosphoric Acid Production	CO ₂	1.6	<0.01	1.00	21%	<0.001
CO ₂ Emissions from Glass Production	CO ₂	1.5	<0.01	1.00	5%	<0.001
CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	1.4	<0.01	1.00	40%	<0.001
N2O Emissions from Mobile Combustion: Other	N ₂ O	1.3	<0.01	1.00	1%	<0.001
CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.2	<0.01	1.00	13%	<0.001
Non-CO2 Emissions from Stationary Combustion - Residential	N ₂ O	1.1	<0.01	1.00	201%	<0.001
CO ₂ Emissions from Wetlands Remaining Wetlands	CO ₂	1.0	<0.01	1.00	30%	<0.001
N ₂ O Emissions from Settlement Soils	N ₂ O	1.0	<0.01	1.00	163%	<0.001
CH ₄ Emissions from Iron and Steel Production & Metallurgical	CH ₄	1.0	<0.01	1.00	22%	<0.001
Coke Production Non-CO ₂ Emissions from Stationary Combustion - Commercial	CH ₄	0.9	<0.01	1.00	143%	<0.001
CO ₂ Emissions from Stationary Combustion - Coal - U.S.	CO ₂	0.9	<0.01	1.00	143 %	<0.001
Territories	002	0.0	<b>~0.01</b>	1.00	1370	<b>NU.001</b>
CO ₂ Emissions from Zinc Production	CO ₂	0.6	<0.01	1.00	17%	<0.001
N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.6	<0.01	1.00	28%	<0.001
CO ₂ Emissions from Lead Production	CO ₂	0.5	<0.01	1.00	15%	<0.001
N ₂ O Emissions from Incineration of Waste	N ₂ O	0.5	<0.01	1.00	317%	< 0.001
CO ₂ Emissions from Stationary Combustion - Geothermal	CO ₂	0.4	<0.01	1.00	NA	< 0.001
Energy	002	0.4	<b>&lt;</b> 0.01	1.00	N/A	<b>\U.UU</b>
CO ₂ Emissions from Petroleum Systems	CO ₂	0.4	<0.01	1.00	149%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - Commercial	N ₂ O	0.4	<0.01	1.00	80%	<0.001
CO ₂ Emissions from Silicon Carbide Production and	CO ₂	0.4	<0.01	1.00	9%	< 0.001
Consumption					- / •	
N ₂ O Emissions from Composting	$N_2O$	0.4	<0.01	1.00	50%	<0.001
Non-CO2 Emissions from Stationary Combustion - Electricity	CH ₄	0.3	<0.01	1.00	42%	<0.001
Generation						

Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	<0.01	1.00	13%	<0.001	
CH ₄ Emissions from Composting	CH ₄	0.3	<0.01	1.00	50%	<0.001	
CH ₄ Emissions from Mobile Combustion: Other	CH ₄	0.3	<0.01	1.00	1%	<0.001	
CH4 Emissions from Field Burning of Agricultural Residues	CH ₄	0.3	<0.01	1.00	42%	<0.001	
N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.1	<0.01	1.00	32%	<0.001	
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	<0.01	1.00	204%	<0.001	
N ₂ O Emissions from Forest Soils	N ₂ O	0.1	<0.01	1.00	211%	<0.001	
CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	0.1	<0.01	1.00	8%	<0.001	
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	CH ₄	+	<0.01	1.00	57%	<0.001	
CH ₄ Emissions from Silicon Carbide Production and Consumption	CH ₄	+	<0.01	1.00	9%	<0.001	
CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	+	<0.01	1.00	7%	<0.001	
CH ₄ Emissions from Ferroalloy Production	CH ₄	+	<0.01	1.00	11%	<0.001	
N ₂ O Emissions from Wetlands Remaining Wetlands	N ₂ O	+	<0.01	1.00	73%	<0.001	
CH ₄ Emissions from Incineration of Waste	CH ₄	+	<0.01	1.00	NE	<0.001	
CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	+	<0.01	1.00	17%	<0.001	

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

NE Uncertainty not estimated. + Does not exceed 0.05 Tg CO₂ Eq.

#### Table A- 6: 2012 Key Source Category Tier 1 and Tier 2 Analysis—Level Assessment, without LULUCF

	Direct GHG	2012 Estimate	Tier 1 Level Assessment	Cumulative Total	Uncertaintv	Tier 2 Level Assessment
PCC Source Categories		(Tg CO ₂ Eq.)	0.23	0.23	10%	
CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,512.2	0.23	0.23	10%	0.023
CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1.469.8	0.23	0.46	8%	0.018
CO ₂ Emissions from Stationary Combustion - Gas -	CO ₂	492.2	0.08	0.54	5%	0.004
Electricity Generation	0.02	102.2	0.00	0.01	0,0	0.001
CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	428.5	0.07	0.60	10%	0.007
CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	267.0	0.04	0.65	20%	0.008
Direct N2O Emissions from Agricultural Soil Management	N ₂ O	260.9	0.04	0.69	28%	0.011
CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	225.8	0.03	0.72	7%	0.002
CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	157.0	0.02	0.74	7%	0.002
CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	145.1	0.02	0.77	8%	0.002
CH ₄ Emissions from Enteric Fermentation	CH ₄	141.0	0.02	0.79	18%	0.004
Emissions from Substitutes for Ozone Depleting Substances	Several	129.4	0.02	0.81	13%	0.003
Fugitive Emissions from Natural Gas Systems	CH ₄	127.1	0.02	0.83	30%	0.006
CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	110.6	0.02	0.85	36%	0.006
CH ₄ Emissions from Landfills	CH ₄	102.8	0.02	0.86	56%	0.009
CO ₂ Emissions from Mobile Combustion: Other	CO ₂	83.9	0.01	0.87	8%	0.001
CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	74.3	0.01	0.89	17%	0.002
CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	63.7	0.01	0.90	6%	0.001
Fugitive Emissions from Coal Mining	CH ₄	55.8	0.01	0.90	16%	0.001
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	54.3	0.01	0.91	17%	0.001
CH ₄ Emissions from Manure Management	CH ₄	52.9	0.01	0.92	20%	0.002

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Indiract NLO Emissions from Applied Nitracon		15 7	0.01	0.02	1510/	0.011
Indirect N ₂ O Emissions from Applied Nitrogen CO ₂ Emissions from Stationary Combustion - Oil - U.S.	N2O CO2	45.7 44.7	0.01 0.01	0.93 0.94	151% 11%	0.011 0.001
CO ₂ Emissions from Stationary Compustion - Oil - 0.5.	002	44.7	0.01	0.94	1170	0.001
CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	36.8	0.01	0.94	5%	<0.001
CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	36.6	0.01	0.95	8%	<0.001
CO ₂ Emissions from Natural Gas Systems		35.2	0.01	0.95	30%	0.002
CO ₂ Emissions from Cement Production	CO ₂	35.1	0.01	0.96	6%	< 0.001
Fugitive Emissions from Petroleum Systems	CH4	31.7	< 0.01	0.96	149%	0.007
CO ₂ Emissions from Stationary Combustion - Oil - Electricity	CO ₂	18.8	<0.01	0.97	9%	<0.001
Generation						
Non-CO ₂ Emissions from Stationary Combustion - Electricity	N ₂ O	18.3	<0.01	0.97	173%	0.005
Generation	NaO	18.0	<0.01	0.07	24%	0.001
N ₂ O Emissions from Manure Management	N ₂ O		<0.01	0.97		
N ₂ O Emissions from Nitric Acid Production	N ₂ O	15.3	<0.01	0.97	41%	0.001
CO ₂ Emissions from Lime Production	CO ₂	13.3	< 0.01	0.98	3%	< 0.001
CH ₄ Emissions from Wastewater Treatment	CH4	12.8	<0.01	0.98	27%	0.001
N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	12.6	<0.01	0.98	27%	0.001
CO ₂ Emissions from Incineration of Waste	CO ₂	12.1	<0.01	0.98	14%	< 0.001
CO ₂ Emissions from Ammonia Production	CO ₂	9.4	<0.01	0.98	7%	<0.001
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	8.0	<0.01	0.98	20%	<0.001
CH ₄ Emissions from Rice Cultivation	CH4	7.4	<0.01	0.98	96%	0.001
HFC-23 Emissions from HCFC-22 Production	HFCs	6.9	<0.01	0.99	10%	<0.001
SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	6.0	<0.01	0.99	25%	<0.001
N ₂ O Emissions from Adipic Acid Production	N ₂ O	5.8	<0.01	0.99	4%	<0.001
CO ₂ Emissions from Urea Consumption for Non-Ag	CO ₂	5.2	<0.01	0.99	10%	<0.001
Purposes N₂O Emissions from Wastewater Treatment	N ₂ O	5.0	<0.01	0.99	100%	0.001
Fugitive Emissions from Abandoned Underground Coal	CH4	4.7	<0.01	0.99	26%	< 0.001
Mines	0114		0.01	0.00	2070	0.001
N ₂ O Emissions from Product Uses	N ₂ O	4.4	<0.01	0.99	24%	<0.001
CO2 Emissions from Stationary Combustion - Coal -	CO ₂	4.1	<0.01	0.99	15%	<0.001
Commercial		o <del>-</del>		0.00		0.004
PFC, HFC, and SF ₆ Emissions from Semiconductor Manufacture	Several	3.7	<0.01	0.99	5%	<0.001
CO ₂ Emissions from Petrochemical Production	CO ₂	3.5	<0.01	0.99	27%	<0.001
CO ₂ Emissions from Aluminum Production	CO ₂	3.4	<0.01	0.99	2%	< 0.001
CO ₂ Emissions from Stationary Combustion - Coal - U.S.	CO ₂	3.4	< 0.01	0.99	19%	<0.001
Territories	002	0.1	0.01	0.00	1070	0.001
Non-CO ₂ Emissions from Stationary Combustion -	CH ₄	3.1	<0.01	0.99	225%	0.001
Residential	0.1	<u>.</u>		0.00	100/	0.004
CH ₄ Emissions from Petrochemical Production	CH₄	3.1	< 0.01	0.99	10%	< 0.001
CO ₂ Emissions from Soda Ash Production and	CO ₂	2.7	<0.01	0.99	6%	<0.001
Consumption PFC Emissions from Aluminum Production	PFCs	2.5	<0.01	1.00	6%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - Industrial	N2O	2.3	<0.01	1.00	211%	0.001
N2O Emissions from Mobile Combustion: Other	N ₂ O	2.4	<0.01	1.00	1%	< 0.001
CO ₂ Emissions from Carbon Dioxide Consumption	CO ₂	1.8	<0.01	1.00	40%	<0.001
N ₂ O Emissions from Composting	N2O	1.8	<0.01	1.00	40 % 50%	<0.001
CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.0	<0.01 <0.01	1.00	13%	<0.001
SF ₆ Emissions from Magnesium Production and Processing	SF ₆	1.7	<0.01 <0.01	1.00	12%	<0.001
CO ₂ Emissions from Ferroalloy Production		1.7	<0.01 <0.01	1.00	12%	<0.001
CH ₂ Emissions from Composting	CO ₂ CH ₄	1.7	<0.01	1.00	50%	<0.001
CO ₂ Emissions from Stationary Combustion - Gas - U.S.		1.0	<0.01	1.00	50 <i>%</i> 17%	<0.001
Territories	002	T.T	NU.U I	1.00	1770	-0.001
CO ₂ Emissions from Zinc Production	CO ₂	1.4	<0.01	1.00	17%	<0.001
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N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.4	<0.01	1.00	2%	<0.001
CO ₂ Emissions from Glass Production	CO ₂	1.2	<0.01	1.00	5%	<0.001
CH ₄ Emissions from Mobile Combustion: Road	CH ₄	1.2	<0.01	1.00	16%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - Industrial	CH ₄	1.2	<0.01	1.00	50%	<0.001
CO ₂ Emissions from Phosphoric Acid Production	CO ₂	1.1	<0.01	1.00	21%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - Residential	N ₂ O	0.8	<0.01	1.00	201%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - Commercial	CH ₄	0.8	<0.01	1.00	143%	<0.001
CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH4	0.6	<0.01	1.00	22%	<0.001
CO ₂ Emissions from Lead Production	CO ₂	0.5	<0.01	1.00	15%	<0.001
N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.5	<0.01	1.00	28%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - Electricity Generation	CH4	0.5	<0.01	1.00	42%	<0.001
CH ₄ Emissions from Mobile Combustion: Other	CH ₄	0.4	<0.01	1.00	1%	<0.001
CO ₂ Emissions from Petroleum Systems	CO ₂	0.4	<0.01	1.00	149%	<0.001
CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.4	<0.01	1.00	NA	<0.001
N ₂ O Emissions from Incineration of Waste	N ₂ O	0.4	<0.01	1.00	317%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - Commercial	N ₂ O	0.3	<0.01	1.00	80%	<0.001
CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.3	<0.01	1.00	42%	<0.001
CO ₂ Emissions from Silicon Carbide Production and Consumption	CO ₂	0.2	<0.01	1.00	9%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	<0.01	1.00	204%	<0.001
N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.1	<0.01	1.00	32%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	CH4	0.1	<0.01	1.00	57%	<0.001
CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	+	<0.01	1.00	8%	<0.001
CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	+	<0.01	1.00	7%	<0.001
CH ₄ Emissions from Ferroalloy Production	CH ₄	+	<0.01	1.00	11%	<0.001
CH ₄ Emissions from Silicon Carbide Production and Consumption	CH ₄	+	<0.01	1.00	9%	<0.001
CH ₄ Emissions from Incineration of Waste	CH ₄	+	<0.01	1.00	NE	<0.001
CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	+	<0.01	1.00	15%	<0.001

Residential Note: LULUCF sources and sinks are not included in this analysis. ^a Percent relative uncertainty. If the corresponding uncertainty is asymmetrical, the uncertainty given here is the larger and always positive. NE Uncertainty not estimated.

# 1 Note: LULUCF sources and sinks are not included in this analysis. 2 a Percent relative uncertainty. If the corresponding uncertainty is asymmetrical, the uncertainty given here is the larger and 3 NE Uncertainty not estimated. 4 + Does not exceed 0.05 Tg CO₂ Eq. 5 6 6 Table A-7: 2012 Key Source Category Tier 1 and Tier 2 Analysis—Level Assessment with LULUCF 2012 Tier 1

		2012	Tier 1			
		Estimate (Tg	Level	Cumulative		Tier 2 Level
IPCC Source Categories	Direct GHG	CO ₂ Eq.)	Assessment	Total	Uncertainty	Assessment
CO2 Emissions from Stationary Combustion - Coal -	CO ₂	1,512.2	0.20	0.20	10%	0.019
Electricity Generation						
CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,469.8	0.20	0.40	8%	0.016
CO ₂ Emissions from Changes in Forest Carbon Stocks	CO ₂	866.5	0.12	0.51	15%	0.018
CO ₂ Emissions from Stationary Combustion - Gas -	CO ₂	492.2	0.07	0.58	5%	0.003
Electricity Generation						
CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	428.5	0.06	0.63	10%	0.006
CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	267.0	0.04	0.67	20%	0.007

Direct NoO Emissions from Agricultural Soil Management	N ₂ O	260.9	0.03	0.70	28%	0.010
Direct N ₂ O Emissions from Agricultural Soil Management CO ₂ Emissions from Stationary Combustion - Gas -		200.9	0.03	0.70	20% 7%	0.010
Residential	002	225.0	0.05	0.75	1 /0	0.002
CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	157.0	0.02	0.75	7%	0.001
CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	145.1	0.02	0.77	8%	0.002
CH ₄ Emissions from Enteric Fermentation	CH ₄	141.0	0.02	0.79	18%	0.003
Emissions from Substitutes for Ozone Depleting Substances	Several	129.4	0.02	0.81	13%	0.002
Fugitive Emissions from Natural Gas Systems	CH ₄	127.1	0.02	0.83	30%	0.005
CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	110.6	0.01	0.84	36%	0.005
CH ₄ Emissions from Landfills	CH ₄	102.8	0.01	0.85	56%	0.008
CO ₂ Emissions from Urban Trees	CO ₂	88.4	0.01	0.87	47%	0.006
CO ₂ Emissions from Mobile Combustion: Other	CO ₂	83.9	0.01	0.88	8%	0.001
CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	74.3	0.01	0.89	17%	0.002
CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	63.7	0.01	0.90	6%	<0.001
Fugitive Emissions from Coal Mining	CH ₄	55.8	0.01	0.90	16%	0.001
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	54.3	0.01	0.91	17%	0.001
CH ₄ Emissions from Manure Management	CH ₄	52.9	0.01	0.92	20%	0.001
Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	45.7	0.01	0.92	151%	0.009
CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	44.7	0.01	0.93	11%	0.001
CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	36.8	<0.01	0.93	5%	<0.001
CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	36.6	<0.01	0.94	8%	<0.001
CO ₂ Emissions from Natural Gas Systems	CO ₂	35.2	<0.01	0.94	30%	0.001
CO ₂ Emissions from Cement Production	CO ₂	35.1	<0.01	0.95	6%	<0.001
Fugitive Emissions from Petroleum Systems	CH ₄	31.7	<0.01	0.95	149%	0.006
CO ₂ Emissions from Cropland Remaining Cropland	CO ₂	26.5	<0.01	0.96	167%	0.006
CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	18.8	<0.01	0.96	9%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - Electricity Generation	N ₂ O	18.3	<0.01	0.96	173%	0.004
N ₂ O Emissions from Manure Management	N ₂ O	18.0	< 0.01	0.96	24%	0.001
CO ₂ Emissions from Land Converted to Cropland		16.8	<0.01	0.97	77% 176%	0.002
CH ₄ Emissions from Forest Fires	CH ₄	15.3	< 0.01	0.97		0.004
N ₂ O Emissions from Nitric Acid Production	N ₂ O	15.3	<0.01 <0.01	0.97	41%	0.001 <0.001
CO ₂ Emissions from Line Production	CO2	13.3 13.2	<0.01	0.97 0.97	3% 60%	0.001
CO ₂ Emissions from Landfilled Yard Trimmings and Food Scraps	CO ₂					
CH ₄ Emissions from Wastewater Treatment	CH₄	12.8	<0.01	0.98	27%	<0.001
N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	12.6	< 0.01	0.98	27%	< 0.001
N ₂ O Emissions from Forest Fires	N ₂ O	12.5	<0.01	0.98	144%	0.002
CO ₂ Emissions from Incineration of Waste	CO ₂	12.1	<0.01	0.98	14%	<0.001
CO ₂ Emissions from Ammonia Production	CO ₂	9.4	<0.01	0.98	7%	<0.001
CO ₂ Emissions from Land Converted to Grassland	CO ₂	8.5	<0.01	0.98	108%	0.001
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	8.0	<0.01	0.98	20%	<0.001
CH ₄ Emissions from Rice Cultivation	CH ₄	7.4	<0.01	0.98	96%	0.001
HFC-23 Emissions from HCFC-22 Production	HFCs	6.9	<0.01	0.99	10%	<0.001
CO ₂ Emissions from Grassland Remaining Grassland	CO ₂	6.7	<0.01	0.99	529%	0.005
$SF_6$ Emissions from Electrical Transmission and Distribution	SF ₆	6.0	< 0.01	0.99	25%	< 0.001
N ₂ O Emissions from Adipic Acid Production	N ₂ O	5.8	<0.01	0.99	4%	<0.001

CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	5.2	<0.01	0.99	10%	<0.001
N ₂ O Emissions from Wastewater Treatment	N ₂ O	5.0	<0.01	0.99	100%	0.001
Fugitive Emissions from Abandoned Underground Coal	CH ₄	4.7	<0.01	0.99	26%	< 0.001
Mines						
N ₂ O Emissions from Product Uses	N ₂ O	4.4	<0.01	0.99	24%	<0.001
CO ₂ Emissions from Stationary Combustion - Coal -	CO ₂	4.1	<0.01	0.99	15%	<0.001
Commercial	<u> </u>	2.0	<0.01	0.00	106%	0.001
CO ₂ Emissions from Liming of Agricultural Soils	CO ₂ Several	3.9 3.7	<0.01 <0.01	0.99 0.99	5%	0.001 <0.001
PFC, HFC, and SF ₆ Emissions from Semiconductor Manufacture	Several	3.7	<0.01	0.99	5%	<b>NU.UU</b>
CO ₂ Emissions from Petrochemical Production	CO ₂	3.5	<0.01	0.99	27%	< 0.001
CO ₂ Emissions from Urea Fertilization	CO ₂	3.4	<0.01	0.99	43%	< 0.001
CO2 Emissions from Aluminum Production	CO ₂	3.4	<0.01	0.99	2%	<0.001
CO2 Emissions from Stationary Combustion - Coal - U.S.	CO ₂	3.4	<0.01	0.99	19%	<0.001
Territories						
Non-CO ₂ Emissions from Stationary Combustion -	CH4	3.1	<0.01	0.99	225%	0.001
Residential CH ₄ Emissions from Petrochemical Production	CH ₄	3.1	<0.01	0.99	10%	<0.001
CO ₂ Emissions from Soda Ash Production and		2.7	<0.01	1.00	6%	<0.001
Consumption	002	2.1	<b>~0.01</b>	1.00	070	<b>NO.001</b>
PFC Emissions from Aluminum Production	PFCs	2.5	<0.01	1.00	6%	< 0.001
Non-CO ₂ Emissions from Stationary Combustion - Industrial	N ₂ O	2.4	<0.01	1.00	211%	0.001
N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	2.0	<0.01	1.00	1%	< 0.001
CO2 Emissions from Carbon Dioxide Consumption	CO ₂	1.8	<0.01	1.00	40%	< 0.001
N ₂ O Emissions from Composting	N ₂ O	1.8	<0.01	1.00	50%	< 0.001
CO2 Emissions from Titanium Dioxide Production	CO ₂	1.7	<0.01	1.00	13%	< 0.001
SF ₆ Emissions from Magnesium Production and Processing	SF ₆	1.7	<0.01	1.00	12%	< 0.001
CO ₂ Emissions from Ferroalloy Production	CO ₂	1.7	<0.01	1.00	12%	< 0.001
CH ₄ Emissions from Composting	CH ₄	1.6	<0.01	1.00	50%	<0.001
N ₂ O Emissions from Settlement Soils	N ₂ O	1.5	<0.01	1.00	163%	<0.001
CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	1.4	<0.01	1.00	17%	<0.001
CO ₂ Emissions from Zinc Production	CO ₂	1.4	<0.01	1.00	17%	<0.001
N ₂ O Emissions from Mobile Combustion: Aviation	N ₂ O	1.4	< 0.01	1.00	2%	< 0.001
CO ₂ Emissions from Glass Production	CO ₂	1.2	<0.01	1.00	5%	< 0.001
CH ₄ Emissions from Mobile Combustion: Road	CH ₄	1.2	<0.01	1.00	16%	< 0.001
Non-CO ₂ Emissions from Stationary Combustion - Industrial	CH ₄	1.2	<0.01	1.00	50%	< 0.001
CO ₂ Emissions from Phosphoric Acid Production	CO ₂	1.1	<0.01	1.00	21%	<0.001
CO ₂ Emissions from Wetlands Remaining Wetlands	CO ₂	0.8	<0.01	1.00	30%	<0.001
Non-CO ₂ Emissions from Stationary Combustion -	N ₂ O	0.8	<0.01	1.00	201%	<0.001
Residential						
Non-CO ₂ Emissions from Stationary Combustion -	CH ₄	0.8	<0.01	1.00	143%	<0.001
Commercial	011	0.0	-0.04	4.00	00%	-0.001
CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH ₄	0.6	<0.01	1.00	22%	<0.001
CO ₂ Emissions from Lead Production	CO ₂	0.5	<0.01	1.00	15%	<0.001
N ₂ O Emissions from Mobile Combustion: Marine	N2O	0.5	<0.01	1.00	28%	< 0.001
Non-CO ₂ Emissions from Stationary Combustion - Electricity	CH ₄	0.5	<0.01	1.00	42%	<0.001
Generation	CI 14	0.5	<0.01	1.00	42 /0	<b>\0.001</b>
CH ₄ Emissions from Mobile Combustion: Other	CH ₄	0.4	<0.01	1.00	1%	< 0.001
CO ₂ Emissions from Petroleum Systems	CO ₂	0.4	<0.01	1.00	149%	< 0.001
CO ₂ Emissions from Stationary Combustion - Geothermal		0.4	< 0.01	1.00	NA	< 0.001
Energy	002	т.	-0.01	1.00	1 1/ 1	-0.001
N ₂ O Emissions from Incineration of Waste	N ₂ O	0.4	<0.01	1.00	317%	<0.001

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N ₂ O Emissions from Forest Soils	N ₂ O	0.4	<0.01	1.00	211%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - Commercial	N ₂ O	0.3	<0.01	1.00	80%	<0.001
CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.3	<0.01	1.00	42%	<0.001
CO ₂ Emissions from Silicon Carbide Production and Consumption	CO ₂	0.2	<0.01	1.00	9%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	<0.01	1.00	204%	<0.001
N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.1	<0.01	1.00	32%	<0.001
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	CH ₄	0.1	<0.01	1.00	57%	<0.001
CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	+	<0.01	1.00	8%	<0.001
CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	+	<0.01	1.00	7%	<0.001
CH ₄ Emissions from Ferroalloy Production	CH ₄	+	<0.01	1.00	11%	<0.001
CH ₄ Emissions from Silicon Carbide Production and Consumption	CH ₄	+	<0.01	1.00	9%	<0.001
N ₂ O Emissions from Wetlands Remaining Wetlands	N ₂ O	+	<0.01	1.00	73%	<0.001
CH ₄ Emissions from Incineration of Waste	CH ₄	+	<0.01	1.00	NE	<0.001
CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	+	<0.01	1.00	15%	<0.001

Residential

Percent relative uncertainty. If the corresponding uncertainty is asymmetrical, the uncertainty given here is the larger and always positive.
NE Uncertainty not estimated.

# Residential a Percent relative uncertainty. If the corresponding uncertainty is asymmetrical, the uncertainty given here is the larger and always NE Uncertainty not estimated. + Does not exceed 0.05 Tg CO₂ Eq. 5 Table A- 8: 1990-2012 Key Source Category Tier 1 and 2 Analysis—Trend Assessment, without LULUCF

		1990	2012			%			
		Estimate	Estimate	Tier 1 Trend	Tier 2 Trend	Contribution	Cumulativ		
PCC Source Categories	Direct GHG	(Tg CO₂ Eq.	)(Tg CO₂ Eq.)	Assessment	Assessment	to Trend	Total		
CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	175.3	492.2	0.05	0.002	19.9	20		
CO ₂ Emissions from Mobile Combustion: Road	CO ₂	1,188.9	1,469.8	0.04	0.003	15.0	35		
Emissions from Substitutes for Ozone Depleting Substances	Several	0.3	129.4	0.02	0.003	8.3	43		
CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,547.6	1,512.2	0.02	0.001	6.2	49		
CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	155.3	74.3	0.01	0.002	5.6	55		
CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	97.5	18.8	0.01	0.001	5.3	60		
CH ₄ Emissions from Landfills	CH ₄	147.8	102.8	0.01	0.004	3.3	64		
CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	187.4	145.1	0.01	0.001	3.2	67		
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	99.8	54.3	0.01	0.001	3.2	70		
CO ₂ Emissions from Stationary Combustion - Oil -	CO ₂	97.4	63.7	0.01	<0.001	2.4	72		
Fugitive Emissions from Natural Gas Systems	CH ₄	152.9	127.1	0.01	0.001	2.1	74		
HFC-23 Emissions from HCFC-22 Production	HFCs	36.4	6.9	<0.01	<0.001	2.0	76		
CO ₂ Emissions from Stationary Combustion - Oil - Commercial	CO ₂	64.9	36.8	<0.01	<0.001	2.0	78		
N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	40.3	12.6	<0.01	0.001	1.9	80		
Fugitive Emissions from Coal Mining	CH ₄	81.1	55.8	<0.01	0.001	1.8	82		
CO ₂ Emissions from Stationary Combustion - Oil - Industrial	CO ₂	280.9	267.0	<0.01	0.001	1.6	84		
SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	26.7	6.0	<0.01	0.001	1.4	85		
CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	238.0	225.8	<0.01	<0.001	1.4	87		

CH ₄ Emissions from Manure Management	CH ₄	31.5	52.9	<0.01	0.001	1.3	88
PFC Emissions from Aluminum Production	PFCs	18.4	2.5	< 0.01	<0.001	1.3	89
CO ₂ Emissions from Stationary Combustion - Oil -	CO ₂	27.2	2.5 44.7	< 0.01	<0.001	1.1	89 90
U.S. Territories	002	21.2	44.7	<b>~0.01</b>	~0.001	1.1	30
CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	120.8	110.6	<0.01	0.001	1.0	91
N ₂ O Emissions from Adipic Acid Production	N ₂ O	15.8	5.8	<0.01	<0.001	0.7	92
Non-CO ₂ Emissions from Stationary Combustion -	N ₂ O	7.4	18.3	<0.01	0.003	0.7	92
Electricity Generation							
Direct N ₂ O Emissions from Agricultural Soil	N ₂ O	240.7	260.9	<0.01	<0.001	0.7	93
Management		44 -		0.04	0.004		<u>.</u>
CO ₂ Emissions from Mobile Combustion: Marine		44.5	36.6	< 0.01	< 0.001	0.6	94
CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	142.1	157.0	<0.01	<0.001	0.6	94
CO ₂ Emissions from Stationary Combustion - Coal	CO ₂	12.0	4.1	<0.01	<0.001	0.5	95
- Commercial	002	12.0	1.1	-0.01	0.001	0.0	00
CO ₂ Emissions from Mobile Combustion: Other	CO ₂	73.3	83.9	<0.01	<0.001	0.5	95
Fugitive Emissions from Petroleum Systems	CH ₄	35.8	31.7	<0.01	0.001	0.4	96
CO ₂ Emissions from Ammonia Production	CO ₂	13.0	9.4	<0.01	<0.001	0.3	96
SF ₆ Emissions from Magnesium Production and	SF ₆	5.4	1.7	<0.01	<0.001	0.3	96
Processing		<u> </u>	05.0	0.01	0.001		00
CO ₂ Emissions from Natural Gas Systems	CO ₂	37.7	35.2	< 0.01	< 0.001	0.3	96
CO ₂ Emissions from Incineration of Waste	CO ₂	8.0	12.1	< 0.01	< 0.001	0.2	97
CO ₂ Emissions from Aluminum Production		6.8	3.4	< 0.01	< 0.001	0.2	97
N ₂ O Emissions from Nitric Acid Production	N ₂ O	18.2	15.3	< 0.01	< 0.001	0.2	97
CO ₂ Emissions from Stationary Combustion - Gas - Industrial	CO ₂	408.9	428.5	<0.01	<0.001	0.2	97
CH ₄ Emissions from Mobile Combustion: Road	CH ₄	4.2	1.2	<0.01	<0.001	0.2	97
CO ₂ Emissions from Stationary Combustion - Coal		3.0	+	< 0.01	< 0.001	0.2	98
- Residential							
N ₂ O Emissions from Manure Management	N ₂ O	14.4	18.0	<0.01	<0.001	0.2	98
CO ₂ Emissions from Limestone and Dolomite Use	CO ₂	4.9	8.0	<0.01	<0.001	0.2	98
CO ₂ Emissions from Stationary Combustion - Coal	CO ₂	0.6	3.4	<0.01	<0.001	0.2	98
- U.S. Territories Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	41.4	45.7	<0.01	0.001	0.2	98
CH ₄ Emissions from Enteric Fermentation	CH ₄	137.9	45.7	< 0.01	< 0.001	0.2	98
Non-CO ₂ Emissions from Stationary Combustion -	CH ₄	4.6	3.1	< 0.01	0.001	0.2	98
Residential	0114	4.0	J.1	<0.01	0.001	0.1	90
Fugitive Emissions from Abandoned Underground	CH ₄	6.0	4.7	<0.01	<0.001	0.1	99
Coal Mines							
CO ₂ Emissions from Lime Production	CO ₂	11.4	13.3	<0.01	<0.001	0.1	99
CO ₂ Emissions from Stationary Combustion - Gas	CO ₂	+	1.4	<0.01	<0.001	0.1	99
- U.S. Territories N ₂ O Emissions from Wastewater Treatment	N ₂ O	3.5	5.0	<0.01	<0.001	0.1	99
$N_2O$ Emissions from Composting	N ₂ O	0.4	1.8	<0.01	<0.001	0.1	99
CO ₂ Emissions from Urea Consumption for Non-	CO ₂	3.8	5.2	<0.01	<0.001	0.1	99
Ag Purposes	002	0.0	J.Z	<b>~0.01</b>	\$0.001	0.1	55
CH ₄ Emissions from Composting	CH ₄	0.3	1.6	<0.01	<0.001	0.1	99
Non-CO ₂ Emissions from Stationary Combustion -	N ₂ O	3.3	2.4	<0.01	<0.001	0.1	99
Industrial							
CH ₄ Emissions from Wastewater Treatment	CH4	13.2	12.8	<0.01	<0.001	0.1	99
CO ₂ Emissions from Zinc Production	CO ₂	0.6	1.4	<0.01	<0.001	<0.1	99
CH ₄ Emissions from Petrochemical Production	CH ₄	2.3	3.1	<0.01	<0.001	<0.1	99
PFC, HFC, and SF ₆ Emissions from	Several	2.9	3.7	<0.01	<0.001	<0.1	99
Semiconductor Manufacture N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	1.3	2.0	<0.01	<0.001	<0.1	99
CH ₄ Emissions from Rice Cultivation	CH ₄	1.3 7.7	2.0 7.4	< 0.01	<0.001	<0.1 <0.1	99 99
CO ₂ Emissions from Ferroalloy Production		2.2	1.7	<0.01	<0.001	<0.1 <0.1	99 99
	0.02	<b>-</b> . <b></b> <i>C</i>		0.01	0.001	<b>v</b> .1	

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CO ₂ Emissions from Phosphoric Acid Production	CO ₂	1.6	1.1	<0.01	<0.001	<0.1	99
CO ₂ Emissions from Titanium Dioxide Production	CO ₂	1.2	1.7	<0.01	<0.001	<0.1	100
N ₂ O Emissions from Mobile Combustion: Aviation	$N_2O$	1.8	1.4	<0.01	<0.001	<0.1	100
Non-CO ₂ Emissions from Stationary Combustion - Industrial	CH4	1.6	1.2	<0.01	<0.001	<0.1	100
CO ₂ Emissions from Cement Production	CO ₂	33.3	35.1	<0.01	<0.001	<0.1	100
Non-CO ₂ Emissions from Stationary Combustion - Residential	N ₂ O	1.1	0.8	<0.01	<0.001	<0.1	100
CH ₄ Emissions from Iron and Steel Production & Metallurgical Coke Production	CH4	1.0	0.6	<0.01	<0.001	<0.1	100
CO ₂ Emissions from Glass Production	CO ₂	1.5	1.2	<0.01	<0.001	<0.1	100
CO2 Emissions from Carbon Dioxide Consumption	CO ₂	1.4	1.8	<0.01	<0.001	<0.1	100
CO ₂ Emissions from Silicon Carbide Production and Consumption	CO ₂	0.4	0.2	<0.01	<0.001	<0.1	100
N ₂ O Emissions from Product Uses	N ₂ O	4.4	4.4	<0.01	<0.001	<0.1	100
CO ₂ Emissions from Soda Ash Production and Consumption	CO ₂	2.7	2.7	<0.01	<0.001	<0.1	100
Non-CO ₂ Emissions from Stationary Combustion - Electricity Generation	CH4	0.3	0.5	<0.01	<0.001	<0.1	100
Non-CO ₂ Emissions from Stationary Combustion - Commercial	CH4	0.9	0.8	<0.01	<0.001	<0.1	100
CH ₄ Emissions from Mobile Combustion: Other	CH ₄	0.3	0.4	<0.01	<0.001	<0.1	100
N ₂ O Emissions from Incineration of Waste	N ₂ O	0.5	0.4	<0.01	<0.001	<0.1	100
Non-CO ₂ Emissions from Stationary Combustion - Commercial	N ₂ O	0.4	0.3	<0.01	<0.001	<0.1	100
N ₂ O Emissions from Mobile Combustion: Marine	N ₂ O	0.6	0.5	<0.01	<0.001	<0.1	100
CO ₂ Emissions from Petrochemical Production	CO ₂	3.4	3.5	<0.01	<0.001	<0.1	100
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	N ₂ O	0.1	0.1	<0.01	<0.001	<0.1	100
CH ₄ Emissions from Mobile Combustion: Aviation	CH ₄	0.1	+	<0.01	<0.001	<0.1	100
CH ₄ Emissions from Field Burning of Agricultural Residues	CH ₄	0.3	0.3	<0.01	<0.001	<0.1	100
Non-CO ₂ Emissions from Stationary Combustion - U.S. Territories	CH ₄	+	0.1	<0.01	<0.001	<0.1	100
CH ₄ Emissions from Silicon Carbide Production and Consumption	CH ₄	+	+	<0.01	<0.001	<0.1	100
CO ₂ Emissions from Stationary Combustion - Geothermal Energy	CO ₂	0.4	0.4	<0.01	<0.001	<0.1	100
CO ₂ Emissions from Lead Production	CO ₂	0.5	0.5	<0.01	<0.001	<0.1	100
CH ₄ Emissions from Ferroalloy Production	CH4	+	+	<0.01	<0.001	<0.1	100
CO ₂ Emissions from Petroleum Systems	CO ₂	0.4	0.4	<0.01	<0.001	<0.1	100
N ₂ O Emissions from Field Burning of Agricultural Residues	N ₂ O	0.1	0.1	<0.01	<0.001	<0.1	100
CH ₄ Emissions from Mobile Combustion: Marine	CH ₄	+	+	<0.01	<0.001	<0.1	100
CH ₄ Emissions from Incineration of Waste	CH ₄	+	+	<0.01	<0.001	<0.1	100
Note: I III LICE sources and sinks are not included in this anal	veie						

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

+ Does not exceed 0.05 Tg  $CO_2$  Eq.

#### Table A- 9: 1990-2012 Key Source Category Tier 1 and 2 Analysis—Trend Assessment, with LULUCF

		1990	2012				
		Estimate	Estimate			Percent	Cumulative
		(Tg CO2	(Tg CO ₂	Tier 1 Trend	Tier 2 Trend	Contribution to	Contribution to
IPCC Source Categories	Direct GHG	Eq.)	Eq.)	Assessment	Assessment	Trend (%)	Trend (%)
CO ₂ Emissions from Stationary Combustion - Gas - Electricity Generation	CO ₂	175.3	492.2	0.043	0.002	16.9	17
CO ₂ Emissions from Mobile Combustion:	CO ₂	1,188.9	1,469.8	0.030	0.002	11.6	29

Road							
Emissions from Substitutes for Ozone	Several	0.3	129.4	0.018	0.002	7.1	36
Depleting Substances CO ₂ Emissions from Stationary Combustion - Coal - Electricity Generation	CO ₂	1,547.6	1,512.2	0.018	0.002	6.9	43
CO ₂ Emissions from Changes in Forest Carbon Stocks	CO ₂	704.6	866.5	0.017	0.003	6.7	49
CO ₂ Emissions from Stationary Combustion - Coal - Industrial	CO ₂	155.3	74.3	0.013	0.002	5.0	54
CO ₂ Emissions from Stationary Combustion - Oil - Electricity Generation	CO ₂	97.5	18.8	0.012	0.001	4.6	59
CH ₄ Emissions from Landfills	CH ₄	147.8	102.8	0.008	0.004	2.9	62
CO ₂ Emissions from Mobile Combustion: Aviation	CO ₂	187.4	145.1	0.007	0.001	2.9	65
CO ₂ Emissions from Iron and Steel Production & Metallurgical Coke Production	CO ₂	99.8	54.3	0.007	0.001	2.8	67
CO ₂ Emissions from Stationary Combustion - Oil - Residential	CO ₂	97.4	63.7	0.006	<0.001	2.2	70
Fugitive Emissions from Natural Gas Systems	CH ₄	152.9	127.1	0.005	0.001	1.9	72
CO ₂ Emissions from Stationary Combustion	CO ₂	64.9	36.8	0.004	<0.001	1.8	73
HFC-23 Emissions from HCFC-22 Production	HFCs	36.4	6.9	0.004	<0.001	1.7	75
CO ₂ Emissions from Stationary Combustion	CO ₂	280.9	267.0	0.004	0.001	1.7	77
N ₂ O Emissions from Mobile Combustion: Road	N ₂ O	40.3	12.6	0.004	0.001	1.7	78
Fugitive Emissions from Coal Mining	CH ₄	81.1	55.8	0.004	0.001	1.6	80
CO ₂ Emissions from Cropland Remaining Cropland	CO ₂	51.9	26.5	0.004	0.007	1.6	82
CO ₂ Emissions from Stationary Combustion - Gas - Residential	CO ₂	238.0	225.8	0.004	<0.001	1.4	83
CO ₂ Emissions from Urban Trees	CO ₂	60.4	88.4	0.003	0.002	1.3	84
SF ₆ Emissions from Electrical Transmission and Distribution	SF ₆	26.7	6.0	0.003	0.001	1.2	86
CH ₄ Emissions from Manure Management	CH ₄	31.5	52.9	0.003	0.001	1.1	87
CO ₂ Emissions from Non-Energy Use of Fuels	CO ₂	120.8	110.6	0.002	0.001	1.0	88
PFC Emissions from Aluminum Production	PFCs	18.4	2.5	0.002	< 0.001	0.9	88
CO ₂ Emissions from Stationary Combustion - Oil - U.S. Territories	CO ₂	27.2	44.7	0.002	<0.001	0.9	89
CH ₄ Emissions from Forest Fires	CH ₄	2.5	15.3	0.002	0.003	0.7	90
CO ₂ Emissions from Landfilled Yard Trimmings and Food Scraps	CO ₂	24.2	13.2	0.002	0.001	0.7	91
CO ₂ Emissions from Land Converted to Cropland	CO ₂	26.9	16.8	0.002	0.001	0.6	91
N ₂ O Emissions from Adipic Acid Production	N ₂ O	15.8	5.8	0.002	<0.001	0.6	92
Non-CO ₂ Emissions from Stationary Combustion - Electricity Generation	N ₂ O	7.4	18.3	0.001	0.003	0.6	93
CO ₂ Emissions from Mobile Combustion: Marine	CO ₂	44.5	36.6	0.001	<0.001	0.6	93
N ₂ O Emissions from Forest Fires	N ₂ O	2.0	12.5	0.001	0.002	0.6	94
CO ₂ Emissions from Stationary Combustion - Coal - Commercial	CO ₂	12.0	4.1	0.001	<0.001	0.5	94
- Coal - Commercial CO ₂ Emissions from Stationary Combustion - Gas - Commercial	CO ₂	142.1	157.0	0.001	<0.001	0.4	95
CO ₂ Emissions from Mobile Combustion: Other	CO ₂	73.3	83.9	0.001	<0.001	0.4	95

Direct N ₂ O Emissions from Agricultural Soil Management	$N_2O$	240.7	260.9	0.001	<0.001	0.3	95
Fugitive Emissions from Petroleum Systems	CH ₄	35.8	31.7	0.001	0.001	0.3	96
CH ₄ Emissions from Enteric Fermentation	CH ₄	137.9	141.0	0.001	<0.001	0.3	96
CO ₂ Emissions from Natural Gas Systems	CO ₂	37.7	35.2	0.001	<0.001	0.3	96
CO ₂ Emissions from Ammonia Production	CO ₂	13.0	9.4	0.001	<0.001	0.2	96
$CO_2$ Emissions from Stationary Combustion		408.9	428.5	0.001	<0.001	0.2	97
- Gas - Industrial	002	100.0	120.0	0.001	0.001	0.2	01
SF ₆ Emissions from Magnesium Production and Processing	SF ₆	5.4	1.7	0.001	<0.001	0.2	97
N ₂ O Emissions from Nitric Acid Production	N ₂ O	18.2	15.3	0.001	<0.001	0.2	97
CO ₂ Emissions from Aluminum Production	CO ₂	6.8	3.4	0.001	<0.001	0.2	97
CO ₂ Emissions from Incineration of Waste	CO ₂	8.0	12.1	0.001	<0.001	0.2	97
CO ₂ Emissions from Grassland Remaining Grassland	CO ₂	9.6	6.7	0.000	0.003	0.2	98
CH ₄ Emissions from Mobile Combustion: Road	CH ₄	4.2	1.2	0.000	<0.001	0.2	98
CO ₂ Emissions from Stationary Combustion - Coal - Residential	CO ₂	3.0	+	0.000	<0.001	0.2	98
N ₂ O Emissions from Manure Management	N ₂ O	14.4	18.0	0.000	<0.001	0.2	98
CO ₂ Emissions from Limestone and	CO ₂	4.9	8.0	0.000	<0.001	0.2	98
Dolomite Use CO ₂ Emissions from Stationary Combustion - Coal - U.S. Territories	CO ₂	0.6	3.4	0.000	<0.001	0.1	98
Indirect N ₂ O Emissions from Applied Nitrogen	N ₂ O	41.4	45.7	0.000	<0.001	0.1	99
Non-CO ₂ Emissions from Stationary Combustion - Residential	CH ₄	4.6	3.1	0.000	0.001	0.1	99
Fugitive Emissions from Abandoned Underground Coal Mines	CH ₄	6.0	4.7	0.000	<0.001	0.1	99
CO ₂ Emissions from Stationary Combustion - Gas - U.S. Territories	CO ₂	+	1.4	0.000	<0.001	0.1	99
N ₂ O Emissions from Composting	N ₂ O	0.4	1.8	0.000	<0.001	0.1	99
N ₂ O Emissions from Wastewater Treatment	N ₂ O	3.5	5.0	0.000	<0.001	0.1	99
CH ₄ Emissions from Composting	CH ₄	0.3	1.6	0.000	<0.001	0.1	99
CO ₂ Emissions from Urea Consumption for Non-Ag Purposes	CO ₂	3.8	5.2	0.000	<0.001	0.1	99
CO ₂ Emissions from Lime Production	CO ₂	11.4	13.3	0.000	<0.001	0.1	99
CH ₄ Emissions from Wastewater Treatment	CH ₄	13.2	12.8	0.000	<0.001	0.1	99
Non-CO ₂ Emissions from Stationary	N ₂ O	3.3	2.4	0.000	<0.001	0.1	99
Combustion - Industrial							
CO ₂ Emissions from Liming of Agricultural Soils	CO ₂	4.7	3.9	0.000	<0.001	0.1	99
CO ₂ Emissions from Urea Fertilization	CO ₂	2.4	3.4	0.000	<0.001	<0.1	99
CH ₄ Emissions from Rice Cultivation	CH ₄	7.7	7.4	0.000	<0.001	<0.1	99
CO ₂ Emissions from Land Converted to Grassland	CO ₂	7.3	8.5	0.000	<0.001	<0.1	99
CO ₂ Emissions from Zinc Production	CO ₂	0.6	1.4	0.000	<0.001	<0.1	99
CH ₄ Emissions from Petrochemical Production	CH ₄	2.3	3.1	0.000	<0.001	<0.1	100
PFC, HFC, and SF ₆ Emissions from Semiconductor Manufacture	Several	2.9	3.7	0.000	<0.001	<0.1	100
CO ₂ Emissions from Ferroalloy Production	CO ₂	2.2	1.7	0.000	<0.001	<0.1	100
N ₂ O Emissions from Mobile Combustion: Other	N ₂ O	1.3	2.0	0.000	<0.001	<0.1	100
CO ₂ Emissions from Phosphoric Acid Production	CO ₂	1.6	1.1	0.000	<0.001	<0.1	100
N ₂ O Emissions from Mobile Combustion:	N ₂ O	1.8	1.4	0.000	<0.001	<0.1	100

CH ₄	1.6	1.2	0.000	<0.001	<0.1	100
CO ₂	1.2	1.7	0.000	<0.001	<0.1	100
N ₂ O	1.0	1.5	0.000	<0.001	<0.1	100
						100
N20	1.1	0.0	0.000	<b>NO.001</b>	50.1	100
CH ₄	1.0	0.6	0.000	<0.001	<0.1	100
CO ₂	1.5	1.2	0.000	< 0.001	<0.1	100
					<0.1	100
002		1.0	0.000	0.001	0.1	100
N ₂ O	0.1	0.4	0.000	< 0.001	<0.1	100
						100
						100
CO ₂	0.4	0.2	0.000	<0.001	<0.1	100
CO ₂	2.7	2.7	0.000	<0.001	<0.1	100
CH ₄	0.9	0.8	0.000	<0.001	<0.1	100
CO ₂	33.3	35.1	0.000	<0.001	<0.1	100
			0.000	<0.001	<0.1	100
0.14	010	0.0	0.000	0.001	•	
N ₂ O	0.5	0.4	0.000	<0.001	<0.1	100
						100
N ₂ O	0.4	0.3	0.000	<0.001	<0.1	100
$CO_2$	3.4	3.5	0.000	<0.001	<0.1	100
N ₂ O	0.6	0.5	0.000	<0.001	<0.1	100
N ₂ O	0.1	0.1	0.000	<0.001	<0.1	100
CH ₄	0.3	0.3	0.000	<0.001	<0.1	100
CH ₄	0.1	+	0.000	<0.001	<0.1	100
CH ₄	+	0.1	0.000	<0.001	<0.1	100
CO ₂	0.4	0.4	0.000	<0.001	<0.1	100
00	0.5	0.5	0.000	-0.001	-0.1	100
						100
CH ₄	+	+	0.000	<0.001	<0.1	100
00	0.4	0.4	0.000	.0.004	.0.4	400
						100
						100
N ₂ O	0.1	0.1	0.000	<0.001	<0.1	100
N ₂ O	+	+	0.000	<0.001	<0.1	100
CH ₄	+	+	0.000	<0.001	<0.1	100
CH₄	+	+	0.000	<0.001	<0.1	100
	CO2 N2O N2O CH4 CO2 CO2 CO2 CO2 CO2 CO2 CO2 CO2 CH4 N2O CH4 N2O CH4 N2O CH4 CO2 CH4 CH4 CH4 CH4 CH4 CH4 CH4 CH4 CO2 CH4 CH4 CO2 CO2 CO2 CO2 CO2 CO2 CO2 CO2 CO2 CO2	$CO_2$ 1.2 $N_2O$ 1.0 $N_2O$ 1.1 $CH_4$ 1.0 $CO_2$ 1.5 $CO_2$ 1.4 $N_2O$ 0.1 $N_2O$ 4.4 $CO_2$ 0.4 $CO_2$ 0.4 $CO_2$ 0.4 $CO_2$ 33.3 $CH_4$ 0.9 $CO_2$ 33.3 $CH_4$ 0.3 $N_2O$ 0.5 $CH_4$ 0.3 $N_2O$ 0.4 $CO_2$ 3.4 $N_2O$ 0.1 $CH_4$ 0.3 $CH_4$ 0.1 $CH_4$ + $CO_2$ 0.4 $CH_4$ + $N_2O$ + $CH_4$ +	$CO_2$ 1.21.7 $N_2O$ 1.01.5 $N_2O$ 1.10.8 $CH_4$ 1.00.6 $CO_2$ 1.51.2 $CO_2$ 1.41.8 $N_2O$ 0.10.4 $N_2O$ 4.44.4 $CO_2$ 1.00.8 $CO_2$ 0.40.2 $CO_2$ 2.72.7 $CH_4$ 0.90.8 $CO_2$ 33.335.1 $CH_4$ 0.30.4 $N_2O$ 0.50.4 $CH_4$ 0.30.3 $CO_2$ 3.43.5 $N_2O$ 0.60.5 $N_2O$ 0.10.1 $CH_4$ +0.1 $CO_2$ 0.40.4 $CO_2$ 0.50.5 $R_4$ ++ $CO_2$ 0.40.4 $CO_2$ 0.50.5 $CH_4$ ++ $CO_2$ 0.40.4 $CO_2$ 0.40.4 $CO_2$ 0.50.5 $CH_4$ ++ $R_2O$ 0.10.1 $N_2O$ ++ $CO_2$ 0.40.4 $CN_2O$ 0.10.1 $N_2O$ ++ $CO_2$ 0.40.4 $CH_4$ ++ $R_2O$ 0.10.1 $R_2O$ ++ $R_2O$ ++ $R_2O$ ++ $R_2O$ ++ $R_2O$ ++ $R_2O$ <td>$CO_2$1.21.70.000$N_2O$1.01.50.000$CH_4$1.00.60.000$CO_2$1.51.20.000$CO_2$1.41.80.000$N_2O$0.10.40.000$N_2O$4.44.40.000$CO_2$1.00.80.000$CO_2$0.40.20.000$CO_2$2.72.70.000$CO_2$33.335.10.000$CO_2$33.335.10.000$CH_4$0.30.40.000$CO_2$3.43.50.000$N_2O$0.60.50.000$N_2O$0.10.10.000$CO_2$3.43.50.000$N_2O$0.10.10.000$CO_2$3.43.50.000$N_2O$0.10.10.000$CO_2$0.40.40.000$CO_2$0.40.40.000$CO_2$0.40.40.000$CO_2$0.50.50.000$CO_2$0.40.40.000$CO_2$0.40.40.000$CO_2$0.40.40.000$CO_2$0.40.40.000$CO_2$0.50.50.000$CO_2$0.40.40.000$CO_2$0.40.40.000$CO_2$0.40.40.000$CO_2$0.40.40.</td> <td>$CO_2$1.21.70.000&lt;0.001N2O1.01.50.000&lt;0.001</td> CH41.00.60.000<0.001	$CO_2$ 1.21.70.000 $N_2O$ 1.01.50.000 $CH_4$ 1.00.60.000 $CO_2$ 1.51.20.000 $CO_2$ 1.41.80.000 $N_2O$ 0.10.40.000 $N_2O$ 4.44.40.000 $CO_2$ 1.00.80.000 $CO_2$ 0.40.20.000 $CO_2$ 2.72.70.000 $CO_2$ 33.335.10.000 $CO_2$ 33.335.10.000 $CH_4$ 0.30.40.000 $CO_2$ 3.43.50.000 $N_2O$ 0.60.50.000 $N_2O$ 0.10.10.000 $CO_2$ 3.43.50.000 $N_2O$ 0.10.10.000 $CO_2$ 3.43.50.000 $N_2O$ 0.10.10.000 $CO_2$ 0.40.40.000 $CO_2$ 0.40.40.000 $CO_2$ 0.40.40.000 $CO_2$ 0.50.50.000 $CO_2$ 0.40.40.000 $CO_2$ 0.40.40.000 $CO_2$ 0.40.40.000 $CO_2$ 0.40.40.000 $CO_2$ 0.50.50.000 $CO_2$ 0.40.40.000 $CO_2$ 0.40.40.000 $CO_2$ 0.40.40.000 $CO_2$ 0.40.40.	$CO_2$ 1.21.70.000<0.001N2O1.01.50.000<0.001	$\begin{array}{c ccccc} CO_2 & 1.2 & 1.7 & 0.000 & <0.001 & <0.1 \\ N_2O & 1.0 & 1.5 & 0.000 & <0.001 & <0.1 \\ N_2O & 1.1 & 0.8 & 0.000 & <0.001 & <0.1 \\ CH_4 & 1.0 & 0.6 & 0.000 & <0.001 & <0.1 \\ CO_2 & 1.5 & 1.2 & 0.000 & <0.001 & <0.1 \\ CO_2 & 1.4 & 1.8 & 0.000 & <0.001 & <0.1 \\ N_2O & 0.1 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 1.0 & 0.8 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.2 & 0.000 & <0.001 & <0.1 \\ CO_2 & 2.7 & 2.7 & 0.000 & <0.001 & <0.1 \\ CH_4 & 0.9 & 0.8 & 0.000 & <0.001 & <0.1 \\ CH_4 & 0.3 & 0.5 & 0.000 & <0.001 & <0.1 \\ CH_4 & 0.3 & 0.5 & 0.000 & <0.001 & <0.1 \\ CO_2 & 3.4 & 3.5 & 0.000 & <0.001 & <0.1 \\ CO_2 & 3.4 & 3.5 & 0.000 & <0.001 & <0.1 \\ CO_2 & 3.4 & 3.5 & 0.000 & <0.001 & <0.1 \\ CH_4 & 0.3 & 0.3 & 0.000 & <0.001 & <0.1 \\ CH_4 & 0.3 & 0.3 & 0.000 & <0.001 & <0.1 \\ CH_4 & 0.3 & 0.3 & 0.000 & <0.001 & <0.1 \\ CO_2 & 3.4 & 3.5 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CH_4 & 0.1 & + & 0.000 & <0.001 & <0.1 \\ CH_4 & 0.1 & + & 0.000 & <0.001 & <0.1 \\ CH_4 & + & 0.1 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CH_4 & + & + & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.000 & <0.001 & <0.1 \\ CO_2 & 0.4 & 0.4 & 0.0$

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