

# ANNEX 1 Key Category Analysis

The United States has identified national key categories based on the estimates presented in this report. The IPCC's *Good Practice Guidance* (IPCC 2000) describes a key category as a “[category] that is prioritized within the national inventory system because its estimate has a significant influence on a country’s total inventory of direct greenhouse gases in terms of the absolute level of emissions, the trend in emissions, or both.”<sup>1</sup> By definition, key categories are sources or sinks that have the greatest contribution to the absolute overall level of national emissions in any of the years covered by the time series. In addition, when an entire time series of emission estimates is prepared, a determination of key categories must also account for the influence of the trends of individual categories. Therefore, a trend assessment is conducted to identify source and sink categories for which significant uncertainty in the estimate would have considerable effects on overall emission trends. Finally, a qualitative evaluation of key categories should be performed, in order to capture any key categories that were not identified in either of the quantitative analyses, but can be considered key because of the unique country-specific estimation methods.

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
- 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 potential-weighted emissions in 2011. 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 (1990-2011)**

| IPCC Source Categories   | Gas              | Tier 1               |                      |                   |                   | Tier 2               |                      |                   |                   | Qual | 2011 Emissions (Tg CO <sub>2</sub> Eq.) |
|--|------------------|----------------------|----------------------|-------------------|-------------------|----------------------|----------------------|-------------------|-------------------|------|---|
|  |                  | Level Without LULUCF | Trend Without LULUCF | Level With LULUCF | Trend With LULUCF | Level Without LULUCF | Trend Without LULUCF | Level With LULUCF | Trend With LULUCF |      |   |
| <b>Energy</b>  |                  |                      |                      |                   |                   |                      |                      |                   |                   |      |   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Electricity Generation | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 1,722.7                                 |
| CO <sub>2</sub> Emissions from Mobile Combustion: Road                               | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 1,466.8                                 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Industrial              | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 416.3                                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Electricity Generation  | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 408.8                                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Industrial              | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 266.8                                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Residential             | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 254.6                                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Commercial              | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 170.4                                   |
| CO <sub>2</sub> Emissions from Mobile Combustion: Aviation                           | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 148.4                                   |
| CO <sub>2</sub> Emissions from Non-Energy Use of Fuels                               | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 130.6                                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Industrial             | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 90.1                                    |
| CO <sub>2</sub> Emissions from Mobile Combustion: Other                              | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 82.4                                    |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Residential             | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 73.6                                    |
| CO <sub>2</sub> Emissions from Mobile Combustion: Marine                             | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 47.4                                    |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Commercial              | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 46.7                                    |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - U.S. Territories        | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 44.7                                    |
| CO <sub>2</sub> Emissions from Natural Gas Systems                                   | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 32.3                                    |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Electricity Generation  | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 26.6                                    |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Commercial             | CO <sub>2</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 5.1                                     |
| Fugitive Emissions from Natural Gas Systems  | CH <sub>4</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 144.7                                   |
| Fugitive Emissions from Coal Mining  | CH <sub>4</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 63.2                                    |
| Fugitive Emissions from Petroleum Systems  | CH <sub>4</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 31.5                                    |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential               | CH <sub>4</sub>  | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 3.5                                     |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation    | N <sub>2</sub> O | •                    | •                    | •                 | •                 | •                    | •                    | •                 | •                 |      | 17.9                                    |

|  |                  |   |   |   |   |   |   |   |   |                |
|--|------------------|---|---|---|---|---|---|---|---|----------------|
| N <sub>2</sub> O Emissions from Mobile Combustion: Road                                  | N <sub>2</sub> O | • | • | • | • | • | • | • | • | 14.4           |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial                    | N <sub>2</sub> O |   |   |   |   |   | • |   |   | 2.7            |
| International Bunker Fuels <sup>a,b</sup>  | Several          |   |   |   |   |   |   |   | • | 112.4          |
| <b>Industrial Processes</b>  |                  |   |   |   |   |   |   |   |   |                |
| CO <sub>2</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CO <sub>2</sub>  | • | • | • | • | • | • | • | • | 64.3           |
| CO <sub>2</sub> Emissions from Cement Production   | CO <sub>2</sub>  | • | • | • | • |   |   |   |   | 31.6           |
| CO <sub>2</sub> Emissions from Ammonia Production  | CO <sub>2</sub>  |   | • |   | • |   |   |   |   | 8.8            |
| N <sub>2</sub> O Emissions from Adipic Acid Production                                   | N <sub>2</sub> O |   | • |   | • |   |   |   |   | 10.6           |
| Emissions from Substitutes for Ozone Depleting Substances                                | HiGWP            | • | • | • | • | • | • | • | • | 121.7          |
| SF <sub>6</sub> Emissions from Electrical Transmission and Distribution                  | HiGWP            |   | • |   | • |   | • |   |   | 7.0            |
| HFC-23 Emissions from HCFC-22 Production   | HiGWP            | • | • | • | • |   | • |   |   | 6.9            |
| PFC Emissions from Aluminum Production   | HiGWP            |   | • |   | • |   |   |   |   | 2.9            |
| SF <sub>6</sub> Emissions from Magnesium Production and Processing                       | HiGWP            |   | • |   |   |   |   |   |   | 1.4            |
| <b>Agriculture</b>   |                  |   |   |   |   |   |   |   |   |                |
| CH <sub>4</sub> Emissions from Enteric Fermentation                                      | CH <sub>4</sub>  | • | • | • | • | • | • | • |   | 137.4          |
| CH <sub>4</sub> Emissions from Manure Management   | CH <sub>4</sub>  | • | • | • | • | • | • | • |   | 52.0           |
| CH <sub>4</sub> Emissions from Rice Cultivation  | CH <sub>4</sub>  |   |   |   |   | • | • |   |   | 6.6            |
| Direct N <sub>2</sub> O Emissions from Agricultural Soil Management                      | N <sub>2</sub> O | • |   | • |   | • | • |   |   | 195.2          |
| Indirect N <sub>2</sub> O Emissions from Applied Nitrogen                                | N <sub>2</sub> O | • |   | • |   | • | • | • |   | 51.9           |
| <b>Waste</b>   |                  |   |   |   |   |   |   |   |   |                |
| CH <sub>4</sub> Emissions from Landfills   | CH <sub>4</sub>  | • | • | • | • | • | • | • | • | 103.0          |
| <b>Land Use, Land Use Change, and Forestry</b>   |                  |   |   |   |   |   |   |   |   |                |
| CO <sub>2</sub> Emissions from Land Converted to Cropland                                | CO <sub>2</sub>  |   |   |   | • |   | • | • |   | 14.5           |
| CO <sub>2</sub> Emissions from Grassland Remaining Grassland                             | CO <sub>2</sub>  |   |   |   |   |   | • | • |   | 7.4            |
| CO <sub>2</sub> Emissions from Cropland Remaining Cropland                               | CO <sub>2</sub>  |   |   | • | • |   | • | • |   | (2.9)          |
| CO <sub>2</sub> Emissions from Landfilled Yard Trimmings and Food Scraps                 | CO <sub>2</sub>  |   |   |   | • |   | • | • |   | (13.0)         |
| CO <sub>2</sub> Emissions from Urban Trees   | CO <sub>2</sub>  |   |   | • | • |   | • |   |   | (68.8)         |
| CO <sub>2</sub> Emissions from Changes in Forest Carbon Stocks                           | CO <sub>2</sub>  |   |   | • | • |   | • | • |   | (833.5)        |
| CH <sub>4</sub> Emissions from Forest Fires  | CH <sub>4</sub>  |   |   |   | • |   | • | • |   | 14.2           |
| N <sub>2</sub> O Emissions from Forest Fires   | N <sub>2</sub> O |   |   |   | • |   | • | • |   | 11.6           |
| <b>Subtotal Without LULUCF</b>   |                  |   |   |   |   |   |   |   |   | <b>6,513.9</b> |
| <b>Total Emissions Without LULUCF</b>  |                  |   |   |   |   |   |   |   |   | <b>6,665.7</b> |
| <b>Percent of Total Without LULUCF</b>   |                  |   |   |   |   |   |   |   |   | <b>98%</b>     |
| <b>Subtotal With LULUCF</b>  |                  |   |   |   |   |   |   |   |   | <b>5,643.4</b> |
| <b>Total Emissions With LULUCF</b>   |                  |   |   |   |   |   |   |   |   | <b>5,797.3</b> |

<sup>a</sup>Qualitative criteria.

<sup>b</sup>Emissions 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.

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

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

| IPCC Source Categories   | 2011            |                                    | Key Category? | ID Criteria <sup>a</sup>                                    | Level in which year(s)? <sup>b</sup>  |
|--|-----------------|------------------------------------|---------------|---|---------------------------------------|
|  | Direct GHG      | Emissions (Tg CO <sub>2</sub> Eq.) |               |   |                                       |
| <b>Energy</b>  |                 |                                    |               |   |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Electricity Generation | CO <sub>2</sub> | 1,722.7                            | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Mobile Combustion: Road                               | CO <sub>2</sub> | 1,466.8                            | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Industrial              | CO <sub>2</sub> | 416.3                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Electricity Generation  | CO <sub>2</sub> | 408.8                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990 <sub>1</sub> , 2011              |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Industrial              | CO <sub>2</sub> | 266.8                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Residential             | CO <sub>2</sub> | 254.6                              | •             | L <sub>1</sub> L <sub>2</sub>                               | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Commercial              | CO <sub>2</sub> | 170.4                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Mobile Combustion: Aviation                           | CO <sub>2</sub> | 148.4                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Non-Energy Use of Fuels                               | CO <sub>2</sub> | 130.6                              | •             | L <sub>1</sub> L <sub>2</sub>                               | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Industrial             | CO <sub>2</sub> | 90.1                               | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Mobile Combustion: Other                              | CO <sub>2</sub> | 82.4                               | •             | L <sub>1</sub>  | 1990 <sub>1</sub> , 2011 <sub>1</sub> |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Residential             | CO <sub>2</sub> | 73.6                               | •             | L <sub>1</sub> T <sub>1</sub> T <sub>2</sub>                | 1990 <sub>1</sub> , 2011 <sub>1</sub> |
| CO <sub>2</sub> Emissions from Mobile Combustion: Marine                             | CO <sub>2</sub> | 47.4                               | •             | L <sub>1</sub>  | 1990 <sub>1</sub> , 2011 <sub>1</sub> |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Commercial              | CO <sub>2</sub> | 46.7                               | •             | L <sub>1</sub> T <sub>1</sub>                               | 1990 <sub>1</sub> , 2011 <sub>1</sub> |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - U.S. Territories        | CO <sub>2</sub> | 44.7                               | •             | L <sub>1</sub> T <sub>1</sub> T <sub>2</sub>                | 2011 <sub>1</sub>                     |
| CO <sub>2</sub> Emissions from Natural Gas Systems                                   | CO <sub>2</sub> | 32.3                               | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011 <sub>1</sub>               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Electricity Generation  | CO <sub>2</sub> | 26.6                               | •             | L <sub>1</sub> T <sub>1</sub> T <sub>2</sub>                | 1990 <sub>1</sub>                     |
| CO <sub>2</sub> Emissions from Incineration of Waste                                 | CO <sub>2</sub> | 12.0                               |               |   |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Commercial             | CO <sub>2</sub> | 5.1                                | •             | T <sub>1</sub>  |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - U.S. Territories       | CO <sub>2</sub> | 3.5                                |               |   |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - U.S. Territories        | CO <sub>2</sub> | 1.5                                |               |   |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Residential            | CO <sub>2</sub> | 0.5                                |               |   |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy             | CO <sub>2</sub> | 0.4                                |               |   |                                       |
| CO <sub>2</sub> Emissions from Petroleum Systems                                     | CO <sub>2</sub> | 0.3                                |               |   |                                       |
| Fugitive Emissions from Natural Gas Systems  | CH <sub>4</sub> | 144.7                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| Fugitive Emissions from Coal Mining  | CH <sub>4</sub> | 63.2                               | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| Fugitive Emissions from Petroleum Systems  | CH <sub>4</sub> | 31.5                               | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011 <sub>2</sub>               |

|  |                  |       |   |   |                                       |
|--|------------------|-------|---|---|---------------------------------------|
| Fugitive Emissions from Abandoned Underground Coal Mines                                 | CH <sub>4</sub>  | 4.8   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential                   | CH <sub>4</sub>  | 3.5   | • | L <sub>2</sub> T <sub>2</sub>                               | 1990 <sub>2</sub>                     |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial                    | CH <sub>4</sub>  | 1.3   |   |   |                                       |
| CH <sub>4</sub> Emissions from Mobile Combustion: Road                                   | CH <sub>4</sub>  | 1.2   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial                    | CH <sub>4</sub>  | 0.9   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation        | CH <sub>4</sub>  | 0.4   |   |   |                                       |
| CH <sub>4</sub> Emissions from Mobile Combustion: Other                                  | CH <sub>4</sub>  | 0.4   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories              | CH <sub>4</sub>  | 0.1   |   |   |                                       |
| CH <sub>4</sub> Emissions from Mobile Combustion: Aviation                               | CH <sub>4</sub>  | +     |   |   |                                       |
| CH <sub>4</sub> Emissions from Mobile Combustion: Marine                                 | CH <sub>4</sub>  | +     |   |   |                                       |
| CH <sub>4</sub> Emissions from Incineration of Waste                                     | CH <sub>4</sub>  | +     |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation        | N <sub>2</sub> O | 17.9  | • | T <sub>1</sub> L <sub>2</sub> T <sub>2</sub>                | 1990 <sub>2</sub> , 2011 <sub>2</sub> |
| N <sub>2</sub> O Emissions from Mobile Combustion: Road                                  | N <sub>2</sub> O | 14.4  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990                                  |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial                    | N <sub>2</sub> O | 2.7   | • | T <sub>2</sub>  |                                       |
| N <sub>2</sub> O Emissions from Mobile Combustion: Other                                 | N <sub>2</sub> O | 1.9   |   |   |                                       |
| N <sub>2</sub> O Emissions from Mobile Combustion: Aviation                              | N <sub>2</sub> O | 1.4   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential                   | N <sub>2</sub> O | 0.9   |   |   |                                       |
| N <sub>2</sub> O Emissions from Mobile Combustion: Marine                                | N <sub>2</sub> O | 0.7   |   |   |                                       |
| N <sub>2</sub> O Emissions from Incineration of Waste                                    | N <sub>2</sub> O | 0.4   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial                    | N <sub>2</sub> O | 0.3   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories              | N <sub>2</sub> O | 0.1   |   |   |                                       |
| International Bunker Fuels <sup>c</sup>  | Several          | 112.4 | • | Q   |                                       |
| <b>Industrial Processes</b>  |                  |       |   |   |                                       |
| CO <sub>2</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CO <sub>2</sub>  | 64.3  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Cement Production   | CO <sub>2</sub>  | 31.6  | • | L <sub>1</sub> T <sub>1</sub>                               | 1990 <sub>1</sub>                     |
| CO <sub>2</sub> Emissions from Lime Production   | CO <sub>2</sub>  | 13.8  |   |   |                                       |
| CO <sub>2</sub> Emissions from Other Process Uses of Carbonates                          | CO <sub>2</sub>  | 9.2   |   |   |                                       |
| CO <sub>2</sub> Emissions from Ammonia Production  | CO <sub>2</sub>  | 8.8   | • | T <sub>1</sub>  |                                       |
| CO <sub>2</sub> Emissions from Urea Consumption for Non-Ag Purposes                      | CO <sub>2</sub>  | 4.3   |   |   |                                       |
| CO <sub>2</sub> Emissions from Petrochemical Production                                  | CO <sub>2</sub>  | 3.5   |   |   |                                       |
| CO <sub>2</sub> Emissions from Aluminum Production                                       | CO <sub>2</sub>  | 3.3   |   |   |                                       |
| CO <sub>2</sub> Emissions from Soda Ash Production and Consumption                       | CO <sub>2</sub>  | 2.7   |   |   |                                       |
| CO <sub>2</sub> Emissions from Titanium Dioxide Production                               | CO <sub>2</sub>  | 1.9   |   |   |                                       |
| CO <sub>2</sub> Emissions from Carbon Dioxide Consumption                                | CO <sub>2</sub>  | 1.8   |   |   |                                       |
| CO <sub>2</sub> Emissions from Ferroalloy Production                                     | CO <sub>2</sub>  | 1.7   |   |   |                                       |
| CO <sub>2</sub> Emissions from Glass Production  | CO <sub>2</sub>  | 1.3   |   |   |                                       |
| CO <sub>2</sub> Emissions from Zinc Production   | CO <sub>2</sub>  | 1.3   |   |   |                                       |
| CO <sub>2</sub> Emissions from Phosphoric Acid Production                                | CO <sub>2</sub>  | 1.2   |   |   |                                       |
| CO <sub>2</sub> Emissions from Lead Production   | CO <sub>2</sub>  | 0.5   |   |   |                                       |
| CO <sub>2</sub> Emissions from Silicon Carbide Production and Consumption                | CO <sub>2</sub>  | 0.2   |   |   |                                       |
| CH <sub>4</sub> Emissions from Petrochemical Production                                  | CH <sub>4</sub>  | 3.1   |   |   |                                       |
| CH <sub>4</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CH <sub>4</sub>  | 0.6   |   |   |                                       |
| CH <sub>4</sub> Emissions from Ferroalloy Production                                     | CH <sub>4</sub>  | +     |   |   |                                       |

|   |                  |       |   |   |                   |
|---|------------------|-------|---|---|-------------------|
| CH <sub>4</sub> Emissions from Silicon Carbide Production and Consumption | CH <sub>4</sub>  | +     |   |   |                   |
| N <sub>2</sub> O Emissions from Nitric Acid Production                    | N <sub>2</sub> O | 15.5  |   |   |                   |
| N <sub>2</sub> O Emissions from Adipic Acid Production                    | N <sub>2</sub> O | 10.6  | • | T <sub>1</sub>  |                   |
| N <sub>2</sub> O Emissions from Product Uses                              | N <sub>2</sub> O | 4.4   |   |   |                   |
| Emissions from Substitutes for Ozone Depleting Substances                 | HiGWP            | 121.7 | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 2011              |
| SF <sub>6</sub> Emissions from Electrical Transmission and Distribution   | HiGWP            | 7.0   | • | T <sub>1</sub> T <sub>2</sub>                               |                   |
| HFC-23 Emissions from HCFC-22 Production                                  | HiGWP            | 6.9   | • | L <sub>1</sub> T <sub>1</sub> T <sub>2</sub>                | 1990 <sub>1</sub> |
| PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture    | HiGWP            | 5.3   |   |   |                   |
| PFC Emissions from Aluminum Production                                    | HiGWP            | 2.9   | • | T <sub>1</sub>  |                   |
| SF <sub>6</sub> Emissions from Magnesium Production and Processing        | HiGWP            | 1.4   | • | T <sub>1</sub>  |                   |

#### Agriculture

|  |                  |       |   |   |                          |
|--|------------------|-------|---|---|--------------------------|
| CH <sub>4</sub> Emissions from Enteric Fermentation                    | CH <sub>4</sub>  | 137.4 | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990, 2011               |
| CH <sub>4</sub> Emissions from Manure Management                       | CH <sub>4</sub>  | 52.0  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990 <sub>1</sub> , 2011 |
| CH <sub>4</sub> Emissions from Rice Cultivation                        | CH <sub>4</sub>  | 6.6   | • | L <sub>2</sub>  | 1990 <sub>2</sub>        |
| CH <sub>4</sub> Emissions from Field Burning of Agricultural Residues  | CH <sub>4</sub>  | 0.2   |   |   |                          |
| Direct N <sub>2</sub> O Emissions from Agricultural Soil Management    | N <sub>2</sub> O | 195.2 | • | L <sub>1</sub> L <sub>2</sub>                               | 1990, 2011               |
| Indirect N <sub>2</sub> O Emissions from Applied Nitrogen              | N <sub>2</sub> O | 51.9  | • | L <sub>1</sub> L <sub>2</sub> T <sub>2</sub>                | 1990, 2011               |
| N <sub>2</sub> O Emissions from Manure Management                      | N <sub>2</sub> O | 18.0  |   |   |                          |
| N <sub>2</sub> O Emissions from Field Burning of Agricultural Residues | N <sub>2</sub> O | 0.1   |   |   |                          |

#### Waste

|  |                  |       |   |   |            |
|--|------------------|-------|---|---|------------|
| CH <sub>4</sub> Emissions from Landfills             | CH <sub>4</sub>  | 103.0 | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011 |
| CH <sub>4</sub> Emissions from Wastewater Treatment  | CH <sub>4</sub>  | 16.2  |   |   |            |
| CH <sub>4</sub> Emissions from Composting            | CH <sub>4</sub>  | 1.5   |   |   |            |
| N <sub>2</sub> O Emissions from Wastewater Treatment | N <sub>2</sub> O | 5.2   |   |   |            |
| N <sub>2</sub> O Emissions from Composting           | N <sub>2</sub> O | 1.7   |   |   |            |

<sup>a</sup> 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 subscripted number refers to either a Tier 1 or Tier 2 assessment (e.g., L<sub>2</sub> designates a source is a key category for a Tier 2 level assessment).

<sup>b</sup> If the source is a key category for both L<sub>1</sub> and L<sub>2</sub> (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<sub>2</sub> designates a source is a key category for the Tier 2 assessment only in 1990).

<sup>c</sup> Emissions from these sources not included in totals.

+ Does not exceed 0.05 Tg CO<sub>2</sub> Eq.

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

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

| IPCC Source Categories   | Gas             | 2011                               |               | Key ID Criteria <sup>a</sup>                                | Level in which year(s) <sup>b</sup> |
|--|-----------------|------------------------------------|---------------|---|-------------------------------------|
|  |                 | Emissions (Tg CO <sub>2</sub> Eq.) | Key Category? |   |                                     |
| <b>Energy</b>  |                 |                                    |               |   |                                     |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Electricity Generation | CO <sub>2</sub> | 1,722.7                            | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990, 2011                          |
| CO <sub>2</sub> Emissions from Mobile Combustion: Road                               | CO <sub>2</sub> | 1,466.8                            | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                          |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Industrial              | CO <sub>2</sub> | 416.3                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990, 2011                          |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Electricity Generation  | CO <sub>2</sub> | 408.8                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990 <sub>1</sub> , 2011            |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Industrial              | CO <sub>2</sub> | 266.8                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                          |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Residential             | CO <sub>2</sub> | 254.6                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990, 2011                          |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Commercial              | CO <sub>2</sub> | 170.4                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990 <sub>1</sub> , 2011            |
| CO <sub>2</sub> Emissions from Mobile Combustion: Aviation                           | CO <sub>2</sub> | 148.4                              | •             | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990, 2011                          |
| CO <sub>2</sub> Emissions from Non-Energy Use of Fuels                               | CO <sub>2</sub> | 130.6                              | •             | L <sub>1</sub> L <sub>2</sub>                               | 1990, 2011                          |

#### A-8 Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011

|   |                  |       |   |   |                                       |
|---|------------------|-------|---|---|---------------------------------------|
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Industrial            | CO <sub>2</sub>  | 90.1  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Mobile Combustion: Other                             | CO <sub>2</sub>  | 82.4  | • | L <sub>1</sub>  | 1990 <sub>1</sub> , 2011 <sub>1</sub> |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Residential            | CO <sub>2</sub>  | 73.6  | • | L <sub>1</sub> T <sub>1</sub>                               | 1990 <sub>1</sub> , 2011 <sub>1</sub> |
| CO <sub>2</sub> Emissions from Mobile Combustion: Marine                            | CO <sub>2</sub>  | 47.4  | • | L <sub>1</sub>  | 1990 <sub>1</sub> , 2011 <sub>1</sub> |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Commercial             | CO <sub>2</sub>  | 46.7  | • | L <sub>1</sub> T <sub>1</sub>                               | 1990 <sub>1</sub> , 2011 <sub>1</sub> |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - U.S. Territories       | CO <sub>2</sub>  | 44.7  | • | L <sub>1</sub> T <sub>1</sub>                               | 1990 <sub>1</sub> , 2011 <sub>1</sub> |
| CO <sub>2</sub> Emissions from Natural Gas Systems                                  | CO <sub>2</sub>  | 32.3  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990, 2011 <sub>1</sub>               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Electricity Generation | CO <sub>2</sub>  | 26.6  | • | L <sub>1</sub> T <sub>1</sub> T <sub>2</sub>                | 1990 <sub>1</sub>                     |
| CO <sub>2</sub> Emissions from Incineration of Waste                                | CO <sub>2</sub>  | 12.0  |   |   |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Commercial            | CO <sub>2</sub>  | 5.1   | • | T <sub>1</sub>  |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - U.S. Territories      | CO <sub>2</sub>  | 3.5   |   |   |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - U.S. Territories       | CO <sub>2</sub>  | 1.5   |   |   |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Residential           | CO <sub>2</sub>  | 0.5   |   |   |                                       |
| CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy            | CO <sub>2</sub>  | 0.4   |   |   |                                       |
| CO <sub>2</sub> Emissions from Petroleum Systems                                    | CO <sub>2</sub>  | 0.3   |   |   |                                       |
| Fugitive Emissions from Natural Gas Systems   | CH <sub>4</sub>  | 144.7 | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| Fugitive Emissions from Coal Mining   | CH <sub>4</sub>  | 63.2  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990, 2011                            |
| Fugitive Emissions from Petroleum Systems   | CH <sub>4</sub>  | 31.5  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| Fugitive Emissions from Abandoned Underground Coal Mines                            | CH <sub>4</sub>  | 4.8   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential              | CH <sub>4</sub>  | 3.5   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial               | CH <sub>4</sub>  | 1.3   |   |   |                                       |
| CH <sub>4</sub> Emissions from Mobile Combustion: Road                              | CH <sub>4</sub>  | 1.2   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial               | CH <sub>4</sub>  | 0.9   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation   | CH <sub>4</sub>  | 0.4   |   |   |                                       |
| CH <sub>4</sub> Emissions from Mobile Combustion: Other                             | CH <sub>4</sub>  | 0.4   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories         | CH <sub>4</sub>  | 0.1   |   |   |                                       |
| CH <sub>4</sub> Emissions from Mobile Combustion: Aviation                          | CH <sub>4</sub>  | +     |   |   |                                       |
| CH <sub>4</sub> Emissions from Mobile Combustion: Marine                            | CH <sub>4</sub>  | +     |   |   |                                       |
| CH <sub>4</sub> Emissions from Incineration of Waste                                | CH <sub>4</sub>  | +     |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation   | N <sub>2</sub> O | 17.9  | • | T <sub>1</sub> L <sub>2</sub> T <sub>2</sub>                | 1990 <sub>2</sub> , 2011 <sub>2</sub> |
| N <sub>2</sub> O Emissions from Mobile Combustion: Road                             | N <sub>2</sub> O | 14.4  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990                                  |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial               | N <sub>2</sub> O | 2.7   |   |   |                                       |
| N <sub>2</sub> O Emissions from Mobile Combustion: Other                            | N <sub>2</sub> O | 1.9   |   |   |                                       |
| N <sub>2</sub> O Emissions from Mobile Combustion: Aviation                         | N <sub>2</sub> O | 1.4   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential              | N <sub>2</sub> O | 0.9   |   |   |                                       |
| N <sub>2</sub> O Emissions from Mobile Combustion: Marine                           | N <sub>2</sub> O | 0.7   |   |   |                                       |
| N <sub>2</sub> O Emissions from Incineration of Waste                               | N <sub>2</sub> O | 0.4   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial               | N <sub>2</sub> O | 0.3   |   |   |                                       |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories         | N <sub>2</sub> O | 0.1   |   |   |                                       |

|   |                  |       |   |   |                                       |
|---|------------------|-------|---|---|---------------------------------------|
| International Bunker Fuels <sup>e</sup>                                   | Several          | 112.4 | • | Q   |                                       |
| <b>Industrial Processes</b>   |                  |       |   |   |                                       |
| CO <sub>2</sub> Emissions from Iron and Steel Production & Metallurgical  |                  |       |   |   |                                       |
| Coke Production   | CO <sub>2</sub>  | 64.3  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CO <sub>2</sub> Emissions from Cement Production                          | CO <sub>2</sub>  | 31.6  | • | L <sub>1</sub> T <sub>1</sub>                               | 1990 <sub>1</sub> , 2011 <sub>1</sub> |
| CO <sub>2</sub> Emissions from Lime Production                            | CO <sub>2</sub>  | 13.8  |   |   |                                       |
| CO <sub>2</sub> Emissions from Other Process Uses of Carbonates           | CO <sub>2</sub>  | 9.2   |   |   |                                       |
| CO <sub>2</sub> Emissions from Ammonia Production                         | CO <sub>2</sub>  | 8.8   | • | T <sub>1</sub>  |                                       |
| CO <sub>2</sub> Emissions from Urea Consumption for Non-Ag Purposes       | CO <sub>2</sub>  | 4.3   |   |   |                                       |
| CO <sub>2</sub> Emissions from Petrochemical Production                   | CO <sub>2</sub>  | 3.5   |   |   |                                       |
| CO <sub>2</sub> Emissions from Aluminum Production                        | CO <sub>2</sub>  | 3.3   |   |   |                                       |
| CO <sub>2</sub> Emissions from Soda Ash Production and Consumption        | CO <sub>2</sub>  | 2.7   |   |   |                                       |
| CO <sub>2</sub> Emissions from Titanium Dioxide Production                | CO <sub>2</sub>  | 1.9   |   |   |                                       |
| CO <sub>2</sub> Emissions from Carbon Dioxide Consumption                 | CO <sub>2</sub>  | 1.8   |   |   |                                       |
| CO <sub>2</sub> Emissions from Ferroalloy Production                      | CO <sub>2</sub>  | 1.7   |   |   |                                       |
| CO <sub>2</sub> Emissions from Glass Production                           | CO <sub>2</sub>  | 1.3   |   |   |                                       |
| CO <sub>2</sub> Emissions from Zinc Production                            | CO <sub>2</sub>  | 1.3   |   |   |                                       |
| CO <sub>2</sub> Emissions from Phosphoric Acid Production                 | CO <sub>2</sub>  | 1.2   |   |   |                                       |
| CO <sub>2</sub> Emissions from Lead Production                            | CO <sub>2</sub>  | 0.5   |   |   |                                       |
| CO <sub>2</sub> Emissions from Silicon Carbide Production and Consumption | CO <sub>2</sub>  | 0.2   |   |   |                                       |
| CH <sub>4</sub> Emissions from Petrochemical Production                   | CH <sub>4</sub>  | 3.1   |   |   |                                       |
| CH <sub>4</sub> Emissions from Iron and Steel Production & Metallurgical  |                  |       |   |   |                                       |
| Coke Production   | CH <sub>4</sub>  | 0.6   |   |   |                                       |
| CH <sub>4</sub> Emissions from Ferroalloy Production                      | CH <sub>4</sub>  | +     |   |   |                                       |
| CH <sub>4</sub> Emissions from Silicon Carbide Production and Consumption | CH <sub>4</sub>  | +     |   |   |                                       |
| N <sub>2</sub> O Emissions from Nitric Acid Production                    | N <sub>2</sub> O | 15.5  |   |   |                                       |
| N <sub>2</sub> O Emissions from Adipic Acid Production                    | N <sub>2</sub> O | 10.6  | • | T <sub>1</sub>  |                                       |
| N <sub>2</sub> O Emissions from Product Uses                              | N <sub>2</sub> O | 4.4   |   |   |                                       |
| Emissions from Substitutes for Ozone Depleting Substances                 | HiGWP            | 121.7 | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 2011                                  |
| SF <sub>6</sub> Emissions from Electrical Transmission and Distribution   | HiGWP            | 7.0   | • | T <sub>1</sub>  |                                       |
| HFC-23 Emissions from HCFC-22 Production                                  | HiGWP            | 6.9   | • | L <sub>1</sub> T <sub>1</sub>                               | 1990 <sub>1</sub>                     |
| PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture    | HiGWP            | 5.3   |   |   |                                       |
| PFC Emissions from Aluminum Production                                    | HiGWP            | 2.9   | • | T <sub>1</sub>  |                                       |
| SF <sub>6</sub> Emissions from Magnesium Production and Processing        | HiGWP            | 1.4   |   |   |                                       |
| <b>Agriculture</b>  |                  |       |   |   |                                       |
| CH <sub>4</sub> Emissions from Enteric Fermentation                       |                  |       |   |   |                                       |
| CH <sub>4</sub> Emissions from Manure Management                          | CH <sub>4</sub>  | 137.4 | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990, 2011                            |
| CH <sub>4</sub> Emissions from Rice Cultivation                           | CH <sub>4</sub>  | 52.0  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990 <sub>1</sub> , 2011              |
| CH <sub>4</sub> Emissions from Field Burning of Agricultural Residues     | CH <sub>4</sub>  | 6.6   | • | L <sub>2</sub>  | 1990 <sub>2</sub>                     |
| CH <sub>4</sub> Emissions from Field Burning of Agricultural Residues     | CH <sub>4</sub>  | 0.2   |   |   |                                       |
| Direct N <sub>2</sub> O Emissions from Agricultural Soil Management       | N <sub>2</sub> O | 195.2 | • | L <sub>1</sub> L <sub>2</sub>                               | 1990, 2011                            |
| Indirect N <sub>2</sub> O Emissions from Applied Nitrogen                 | N <sub>2</sub> O | 51.9  | • | L <sub>1</sub> L <sub>2</sub>                               | 1990, 2011                            |
| N <sub>2</sub> O Emissions from Manure Management                         | N <sub>2</sub> O | 18.0  |   |   |                                       |
| N <sub>2</sub> O Emissions from Field Burning of Agricultural Residues    | N <sub>2</sub> O | 0.1   |   |   |                                       |
| <b>Waste</b>  |                  |       |   |   |                                       |
| CH <sub>4</sub> Emissions from Landfills                                  |                  |       |   |   |                                       |
| CH <sub>4</sub> Emissions from Wastewater Treatment                       | CH <sub>4</sub>  | 103.0 | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CH <sub>4</sub> Emissions from Wastewater Treatment                       | CH <sub>4</sub>  | 16.2  |   |   |                                       |
| CH <sub>4</sub> Emissions from Composting                                 | CH <sub>4</sub>  | 1.5   |   |   |                                       |
| N <sub>2</sub> O Emissions from Wastewater Treatment                      | N <sub>2</sub> O | 5.2   |   |   |                                       |
| N <sub>2</sub> O Emissions from Composting                                | N <sub>2</sub> O | 1.7   |   |   |                                       |
| <b>Land Use, Land Use Change, and Forestry</b>                            |                  |       |   |   |                                       |

|  |                  |         |   |   |                                       |
|--|------------------|---------|---|---|---------------------------------------|
| CO <sub>2</sub> Emissions from Land Converted to Cropland                | CO <sub>2</sub>  | 14.5    | • | T <sub>1</sub> L <sub>2</sub> T <sub>2</sub>                | 1990 <sub>2</sub> , 2011 <sub>2</sub> |
| CO <sub>2</sub> Emissions from Grassland Remaining Grassland             | CO <sub>2</sub>  | 7.4     | • | L <sub>2</sub> T <sub>2</sub>                               | 1990 <sub>2</sub> , 2011 <sub>2</sub> |
| CO <sub>2</sub> Emissions from Liming of Agricultural Soils              | CO <sub>2</sub>  | 4.5     |   |   |                                       |
| CO <sub>2</sub> Emissions from Urea Fertilization                        | CO <sub>2</sub>  | 3.7     |   |   |                                       |
| CO <sub>2</sub> Emissions from Wetlands Remaining Wetlands               | CO <sub>2</sub>  | 0.9     |   |   |                                       |
| CO <sub>2</sub> Emissions from Cropland Remaining Cropland               | CO <sub>2</sub>  | (2.9)   | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011 <sub>2</sub>               |
| CO <sub>2</sub> Emissions from Land Converted to Grassland               | CO <sub>2</sub>  | (8.8)   |   |   |                                       |
| CO <sub>2</sub> Emissions from Landfilled Yard Trimmings and Food Scraps | CO <sub>2</sub>  | (13.0)  | • | T <sub>1</sub> L <sub>2</sub> T <sub>2</sub>                | 1990 <sub>2</sub>                     |
| CO <sub>2</sub> Emissions from Urban Trees                               | CO <sub>2</sub>  | (68.8)  | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub>                | 1990 <sub>1</sub> , 2011              |
| CO <sub>2</sub> Emissions from Changes in Forest Carbon Stocks           | CO <sub>2</sub>  | (833.5) | • | L <sub>1</sub> T <sub>1</sub> L <sub>2</sub> T <sub>2</sub> | 1990, 2011                            |
| CH <sub>4</sub> Emissions from Forest Fires                              | CH <sub>4</sub>  | 14.2    | • | T <sub>1</sub> L <sub>2</sub> T <sub>2</sub>                | 2011 <sub>2</sub>                     |
| N <sub>2</sub> O Emissions from Forest Fires                             | N <sub>2</sub> O | 11.6    | • | T <sub>1</sub> L <sub>2</sub> T <sub>2</sub>                | 2011 <sub>2</sub>                     |
| N <sub>2</sub> O Emissions from Settlement Soils                         | N <sub>2</sub> O | 1.5     |   |   |                                       |
| N <sub>2</sub> O Emissions from Forest Soils                             | N <sub>2</sub> O | 0.4     |   |   |                                       |
| N <sub>2</sub> O Emissions from Wetlands Remaining Wetlands              | N <sub>2</sub> O | 0.0     |   |   |                                       |

<sup>a</sup> 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 subscripted number refers to either a Tier 1 or Tier 2 assessment (e.g., L<sub>2</sub> designates a source is a key category for a Tier 2 level assessment).

<sup>b</sup> If the source is a key category for both L<sub>1</sub> and L<sub>2</sub> (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., 1990<sub>2</sub> designates a source is a key category for the Tier 2 assessment only in 1990).

<sup>c</sup> Emissions from these sources not included in totals.

+ Does not exceed 0.05 Tg CO<sub>2</sub> Eq.

Note: Parentheses indicate negative values (or sequestration).

## 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.

Including the Tier 2 approach provides additional insight into why certain source categories are considered key, and how to prioritize inventory improvements. In the Tier 2 approach, the level assessment for each category from the Tier 1 approach is multiplied by its percent relative uncertainty. If the uncertainty reported is asymmetrical, the absolute value of the larger uncertainty is used. Uncertainty is not estimated for the following sources: CO<sub>2</sub> emissions from stationary combustion – geothermal energy; CO<sub>2</sub> emissions from mobile combustion by mode of transportation; CH<sub>4</sub> and N<sub>2</sub>O emissions from mobile combustion by mode of off-road transportation; and CH<sub>4</sub> from the incineration of waste. While CO<sub>2</sub> emissions from geothermal energy are included in the overall emissions estimate, they are not an official IPCC source category. As a result, there are no guidelines to associate uncertainty with the emissions estimate; therefore, an uncertainty analysis was not conducted. The uncertainty associated with CO<sub>2</sub> from mobile combustion is applied to each mode's emissions estimate, and the uncertainty associated with off-road vehicle CH<sub>4</sub> and N<sub>2</sub>O emissions are applied to both CH<sub>4</sub> and N<sub>2</sub>O emissions from aviation, marine, and other sources. No uncertainty was associated with CH<sub>4</sub> emissions from waste incineration because emissions are less than 0.05 Gg CH<sub>4</sub> and an uncertainty analysis was not conducted. When source and sink categories are sorted in decreasing order of this calculation, those that fall at the top of the list and cumulatively account for 90 percent of emissions are considered key categories. The key categories identified by the Tier 2 level 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.

It is important to note that a key category analysis can be sensitive to the definitions of the source and sink categories. If a large source category is split into many subcategories, then the subcategories may have contributions to the total inventory that are too small for those source categories to be considered key. Similarly, a collection of small, non-key source categories adding up to less than 5 percent of total emissions could become key source categories if those source categories were aggregated into a single source category. The United States has attempted to define source and

sink categories by the conventions which would allow comparison with other international key categories, while still maintaining the category definitions that constitute how the emissions estimates were calculated for this report. As such, some of the category names used in the key category analysis may differ from the names used in the main body of the report. Additionally, the United States accounts for some source categories, including fossil fuel feedstocks, international bunkers, and emissions from U.S. territories, that are derived from unique data sources using country-specific methodologies.

Table A- 4 through Table A- 7 contain the 1990 and 2011 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

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 2011 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.

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

| IPCC Source Categories   | 1990             |                                   | Tier 1 Level Assessment | Cumulative Total | Uncertainty | Tier 2 Level Assessment |
|--|------------------|-----------------------------------|-------------------------|------------------|-------------|-------------------------|
|  | Direct GHG       | Estimate (Tg CO <sub>2</sub> Eq.) |                         |                  |             |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Electricity Generation | CO <sub>2</sub>  | 1,547.6                           | 0.25                    | 0.25             | 10%         | 0.024                   |
| CO <sub>2</sub> Emissions from Mobile Combustion: Road                               | CO <sub>2</sub>  | 1,188.9                           | 0.19                    | 0.44             | 8%          | 0.016                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Industrial              | CO <sub>2</sub>  | 408.9                             | 0.07                    | 0.51             | 10%         | 0.007                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Industrial              | CO <sub>2</sub>  | 284.4                             | 0.05                    | 0.56             | 20%         | 0.009                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Residential             | CO <sub>2</sub>  | 238.0                             | 0.04                    | 0.59             | 7%          | 0.003                   |
| CO <sub>2</sub> Emissions from Mobile Combustion: Aviation                           | CO <sub>2</sub>  | 187.4                             | 0.03                    | 0.62             | 8%          | 0.002                   |
| Direct N <sub>2</sub> O Emissions from Agricultural Soil Management                  | N <sub>2</sub> O | 181.8                             | 0.03                    | 0.65             | 40%         | 0.012                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Electricity Generation  | CO <sub>2</sub>  | 175.3                             | 0.03                    | 0.68             | 5%          | 0.001                   |
| Fugitive Emissions from Natural Gas Systems  | CH <sub>4</sub>  | 161.2                             | 0.03                    | 0.71             | 30%         | 0.008                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Industrial             | CO <sub>2</sub>  | 155.3                             | 0.03                    | 0.73             | 17%         | 0.004                   |
| CH <sub>4</sub> Emissions from Landfills   | CH <sub>4</sub>  | 147.8                             | 0.02                    | 0.76             | 54%         | 0.013                   |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Commercial              | CO <sub>2</sub>  | 142.1                             | 0.02                    | 0.78             | 7%          | 0.002                   |
| CH <sub>4</sub> Emissions from Enteric Fermentation                                  | CH <sub>4</sub>  | 132.7                             | 0.02                    | 0.80             | 18%         | 0.004                   |
| CO <sub>2</sub> Emissions from Non-Energy Use of Fuels                               | CO <sub>2</sub>  | 117.4                             | 0.02                    | 0.82             | 25%         | 0.005                   |
| CO <sub>2</sub> Emissions from Iron and Steel Production & Metallurgical             | CO <sub>2</sub>  | 99.8                              | 0.02                    | 0.84             | 17%         | 0.003                   |

|   |                  |      |       |      |      |        |
|---|------------------|------|-------|------|------|--------|
| <b>Coke Production</b>  |                  |      |       |      |      |        |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Electricity Generation     | CO <sub>2</sub>  | 97.5 | 0.02  | 0.85 | 9%   | 0.001  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Residential                | CO <sub>2</sub>  | 97.4 | 0.02  | 0.87 | 6%   | 0.001  |
| Fugitive Emissions from Coal Mining   | CH <sub>4</sub>  | 84.1 | 0.01  | 0.88 | 18%  | 0.002  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Other                                 | CO <sub>2</sub>  | 73.3 | 0.01  | 0.89 | 8%   | 0.001  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Commercial                 | CO <sub>2</sub>  | 64.9 | 0.01  | 0.91 | 5%   | 0.001  |
| Indirect N <sub>2</sub> O Emissions from Applied Nitrogen                               | N <sub>2</sub> O | 46.0 | 0.01  | 0.91 | 151% | 0.011  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Marine                                | CO <sub>2</sub>  | 44.5 | 0.01  | 0.92 | 8%   | 0.001  |
| N <sub>2</sub> O Emissions from Mobile Combustion: Road                                 | N <sub>2</sub> O | 40.3 | 0.01  | 0.93 | 27%  | 0.002  |
| CO <sub>2</sub> Emissions from Natural Gas Systems                                      | CO <sub>2</sub>  | 37.7 | 0.01  | 0.93 | 30%  | 0.002  |
| HFC-23 Emissions from HCFC-22 Production  | HFCs             | 36.4 | 0.01  | 0.94 | 10%  | 0.001  |
| Fugitive Emissions from Petroleum Systems   | CH <sub>4</sub>  | 35.2 | 0.01  | 0.94 | 149% | 0.009  |
| CO <sub>2</sub> Emissions from Cement Production  | CO <sub>2</sub>  | 33.3 | 0.01  | 0.95 | 7%   | <0.001 |
| CH <sub>4</sub> Emissions from Manure Management  | CH <sub>4</sub>  | 31.5 | 0.01  | 0.95 | 20%  | 0.001  |
| <b>CO<sub>2</sub> Emissions from Stationary Combustion - Oil - U.S. Territories</b>     |                  |      |       |      |      |        |
| SF <sub>6</sub> Emissions from Electrical Transmission and Distribution                 | SF <sub>6</sub>  | 26.7 | <0.01 | 0.96 | 21%  | 0.001  |
| PFC Emissions from Aluminum Production  | PFCs             | 18.4 | <0.01 | 0.97 | 6%   | <0.001 |
| N <sub>2</sub> O Emissions from Nitric Acid Production                                  | N <sub>2</sub> O | 18.2 | <0.01 | 0.97 | 40%  | 0.001  |
| CH <sub>4</sub> Emissions from Wastewater Treatment                                     | CH <sub>4</sub>  | 15.9 | <0.01 | 0.97 | 29%  | 0.001  |
| N <sub>2</sub> O Emissions from Adipic Acid Production                                  | N <sub>2</sub> O | 15.8 | <0.01 | 0.97 | 9%   | <0.001 |
| N <sub>2</sub> O Emissions from Manure Management                                       | N <sub>2</sub> O | 14.4 | <0.01 | 0.98 | 24%  | 0.001  |
| CO <sub>2</sub> Emissions from Ammonia Production                                       | CO <sub>2</sub>  | 13.0 | <0.01 | 0.98 | 8%   | <0.001 |
| <b>CO<sub>2</sub> Emissions from Stationary Combustion - Coal - Commercial</b>          |                  |      |       |      |      |        |
| CO <sub>2</sub> Emissions from Lime Production  | CO <sub>2</sub>  | 11.5 | <0.01 | 0.98 | 3%   | <0.001 |
| CO <sub>2</sub> Emissions from Incineration of Waste                                    | CO <sub>2</sub>  | 8.0  | <0.01 | 0.98 | 24%  | <0.001 |
| <b>Non-CO<sub>2</sub> Emissions from Stationary Combustion - Electricity Generation</b> |                  |      |       |      |      |        |
| CH <sub>4</sub> Emissions from Rice Cultivation   | CH <sub>4</sub>  | 7.1  | <0.01 | 0.99 | 146% | 0.002  |
| CO <sub>2</sub> Emissions from Aluminum Production                                      | CO <sub>2</sub>  | 6.8  | <0.01 | 0.99 | 2%   | <0.001 |
| Fugitive Emissions from Abandoned Underground Coal Mines                                | CH <sub>4</sub>  | 6.0  | <0.01 | 0.99 | 27%  | <0.001 |
| SF <sub>6</sub> Emissions from Magnesium Production and Processing                      | SF <sub>6</sub>  | 5.4  | <0.01 | 0.99 | 13%  | <0.001 |
| CO <sub>2</sub> Emissions from Other Process Uses of Carbonates                         | CO <sub>2</sub>  | 4.9  | <0.01 | 0.99 | 15%  | <0.001 |
| <b>Non-CO<sub>2</sub> Emissions from Stationary Combustion - Residential</b>            |                  |      |       |      |      |        |
| N <sub>2</sub> O Emissions from Product Uses  | N <sub>2</sub> O | 4.4  | <0.01 | 0.99 | 8%   | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Road                                  | CH <sub>4</sub>  | 4.2  | <0.01 | 0.99 | 15%  | <0.001 |
| CO <sub>2</sub> Emissions from Urea Consumption for Non-Ag Purposes                     | CO <sub>2</sub>  | 3.8  | <0.01 | 0.99 | 7%   | <0.001 |
| N <sub>2</sub> O Emissions from Wastewater Treatment                                    | N <sub>2</sub> O | 3.5  | <0.01 | 0.99 | 97%  | 0.001  |
| CO <sub>2</sub> Emissions from Petrochemical Production                                 | CO <sub>2</sub>  | 3.4  | <0.01 | 0.99 | 29%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial                   | N <sub>2</sub> O | 3.3  | <0.01 | 0.99 | 211% | 0.001  |
| <b>CO<sub>2</sub> Emissions from Stationary Combustion - Coal - Residential</b>         |                  |      |       |      |      |        |
| <b>PFC, HFC, and SF<sub>6</sub> Emissions from Semiconductor Manufacture</b>            |                  |      |       |      |      |        |
| CO <sub>2</sub> Emissions from Soda Ash Production and Consumption                      | CO <sub>2</sub>  | 2.8  | <0.01 | 1.00 | 5%   | <0.001 |
| CH <sub>4</sub> Emissions from Petrochemical Production                                 | CH <sub>4</sub>  | 2.3  | <0.01 | 1.00 | 30%  | <0.001 |
| CO <sub>2</sub> Emissions from Ferroalloy Production                                    | CO <sub>2</sub>  | 2.2  | <0.01 | 1.00 | 12%  | <0.001 |
| N <sub>2</sub> O Emissions from Mobile Combustion: Aviation                             | N <sub>2</sub> O | 1.8  | <0.01 | 1.00 | 0%   | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial                   | CH <sub>4</sub>  | 1.6  | <0.01 | 1.00 | 50%  | <0.001 |
| CO <sub>2</sub> Emissions from Glass Production   | CO <sub>2</sub>  | 1.5  | <0.01 | 1.00 | 5%   | <0.001 |
| CO <sub>2</sub> Emissions from Phosphoric Acid Production                               | CO <sub>2</sub>  | 1.5  | <0.01 | 1.00 | 18%  | <0.001 |

|  |                  |     |       |      |      |        |
|--|------------------|-----|-------|------|------|--------|
| CO <sub>2</sub> Emissions from Carbon Dioxide Consumption                                | CO <sub>2</sub>  | 1.4 | <0.01 | 1.00 | 30%  | <0.001 |
| N <sub>2</sub> O Emissions from Mobile Combustion: Other                                 | N <sub>2</sub> O | 1.3 | <0.01 | 1.00 | 0%   | <0.001 |
| CO <sub>2</sub> Emissions from Titanium Dioxide Production                               | CO <sub>2</sub>  | 1.2 | <0.01 | 1.00 | 15%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential                   | N <sub>2</sub> O | 1.1 | <0.01 | 1.00 | 201% | <0.001 |
| CH <sub>4</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CH <sub>4</sub>  | 1.0 | <0.01 | 1.00 | 22%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial                    | CH <sub>4</sub>  | 0.9 | <0.01 | 1.00 | 143% | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - U.S. Territories           | CO <sub>2</sub>  | 0.6 | <0.01 | 1.00 | 19%  | <0.001 |
| CO <sub>2</sub> Emissions from Zinc Production   | CO <sub>2</sub>  | 0.6 | <0.01 | 1.00 | 17%  | <0.001 |
| N <sub>2</sub> O Emissions from Mobile Combustion: Marine                                | N <sub>2</sub> O | 0.6 | <0.01 | 1.00 | 23%  | <0.001 |
| CO <sub>2</sub> Emissions from Lead Production   | CO <sub>2</sub>  | 0.5 | <0.01 | 1.00 | 15%  | <0.001 |
| N <sub>2</sub> O Emissions from Incineration of Waste                                    | N <sub>2</sub> O | 0.5 | <0.01 | 1.00 | 320% | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy                 | CO <sub>2</sub>  | 0.4 | <0.01 | 1.00 | NA   | <0.001 |
| CO <sub>2</sub> Emissions from Petroleum Systems   | CO <sub>2</sub>  | 0.4 | <0.01 | 1.00 | 149% | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial                    | N <sub>2</sub> O | 0.4 | <0.01 | 1.00 | 80%  | <0.001 |
| CO <sub>2</sub> Emissions from Silicon Carbide Production and Consumption                | CO <sub>2</sub>  | 0.4 | <0.01 | 1.00 | 10%  | <0.001 |
| N <sub>2</sub> O Emissions from Composting   | N <sub>2</sub> O | 0.4 | <0.01 | 1.00 | 50%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation        | CH <sub>4</sub>  | 0.3 | <0.01 | 1.00 | 42%  | <0.001 |
| Emissions from Substitutes for Ozone Depleting Substances                                | Several          | 0.3 | <0.01 | 1.00 | 13%  | <0.001 |
| CH <sub>4</sub> Emissions from Composting  | CH <sub>4</sub>  | 0.3 | <0.01 | 1.00 | 50%  | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Other                                  | CH <sub>4</sub>  | 0.3 | <0.01 | 1.00 | 0%   | <0.001 |
| CH <sub>4</sub> Emissions from Field Burning of Agricultural Residues                    | CH <sub>4</sub>  | 0.2 | <0.01 | 1.00 | 42%  | <0.001 |
| N <sub>2</sub> O Emissions from Field Burning of Agricultural Residues                   | N <sub>2</sub> O | 0.1 | <0.01 | 1.00 | 31%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories              | N <sub>2</sub> O | 0.1 | <0.01 | 1.00 | 204% | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Aviation                               | CH <sub>4</sub>  | 0.1 | <0.01 | 1.00 | 0%   | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories              | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 57%  | <0.001 |
| CH <sub>4</sub> Emissions from Silicon Carbide Production and Consumption                | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 9%   | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Marine                                 | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 4%   | <0.001 |
| CH <sub>4</sub> Emissions from Ferroalloy Production                                     | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 23%  | <0.001 |
| CH <sub>4</sub> Emissions from Incineration of Waste                                     | CH <sub>4</sub>  | +   | <0.01 | 1.00 | NE   | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - U.S. Territories            | CO <sub>2</sub>  | +   | <0.01 | 1.00 | 17%  | <0.001 |

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

<sup>a</sup> 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 CO<sub>2</sub> Eq.

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

| IPCC Source Categories   | Direct GHG      | 1990                              |                         | Cumulative Total | Uncertainty | Tier 2 Level Assessment |
|--|-----------------|-----------------------------------|-------------------------|------------------|-------------|-------------------------|
|  |                 | Estimate (Tg CO <sub>2</sub> Eq.) | Tier 1 Level Assessment |                  |             |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Electricity Generation | CO <sub>2</sub> | 1,547.6                           | 0.22                    | 0.22             | 10%         | 0.021                   |
| CO <sub>2</sub> Emissions from Mobile Combustion: Road                               | CO <sub>2</sub> | 1,188.9                           | 0.17                    | 0.39             | 8%          | 0.014                   |

|  |                  |       |       |      |       |        |
|--|------------------|-------|-------|------|-------|--------|
| CO <sub>2</sub> Emissions from Changes in Forest Carbon Stocks                           | CO <sub>2</sub>  | 696.8 | 0.10  | 0.49 | 15%   | 0.015  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Industrial                  | CO <sub>2</sub>  | 408.9 | 0.06  | 0.55 | 10%   | 0.006  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Industrial                  | CO <sub>2</sub>  | 284.4 | 0.04  | 0.59 | 20%   | 0.008  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Residential                 | CO <sub>2</sub>  | 238.0 | 0.03  | 0.62 | 7%    | 0.002  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Aviation                               | CO <sub>2</sub>  | 187.4 | 0.03  | 0.65 | 8%    | 0.002  |
| Direct N <sub>2</sub> O Emissions from Agricultural Soil Management                      | N <sub>2</sub> O | 181.8 | 0.03  | 0.67 | 40%   | 0.010  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Electricity Generation      | CO <sub>2</sub>  | 175.3 | 0.02  | 0.70 | 5%    | 0.001  |
| Fugitive Emissions from Natural Gas Systems  | CH <sub>4</sub>  | 161.2 | 0.02  | 0.72 | 30%   | 0.007  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Industrial                 | CO <sub>2</sub>  | 155.3 | 0.02  | 0.74 | 17%   | 0.004  |
| CH <sub>4</sub> Emissions from Landfills   | CH <sub>4</sub>  | 147.8 | 0.02  | 0.77 | 54%   | 0.011  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Commercial                  | CO <sub>2</sub>  | 142.1 | 0.02  | 0.79 | 7%    | 0.001  |
| CH <sub>4</sub> Emissions from Enteric Fermentation                                      | CH <sub>4</sub>  | 132.7 | 0.02  | 0.80 | 18%   | 0.003  |
| CO <sub>2</sub> Emissions from Non-Energy Use of Fuels                                   | CO <sub>2</sub>  | 117.4 | 0.02  | 0.82 | 25%   | 0.004  |
| CO <sub>2</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CO <sub>2</sub>  | 99.8  | 0.01  | 0.84 | 17%   | 0.002  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Electricity Generation      | CO <sub>2</sub>  | 97.5  | 0.01  | 0.85 | 9%    | 0.001  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Residential                 | CO <sub>2</sub>  | 97.4  | 0.01  | 0.86 | 6%    | 0.001  |
| Fugitive Emissions from Coal Mining  | CH <sub>4</sub>  | 84.1  | 0.01  | 0.88 | 18%   | 0.002  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Other                                  | CO <sub>2</sub>  | 73.3  | 0.01  | 0.89 | 8%    | 0.001  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Commercial                  | CO <sub>2</sub>  | 64.9  | 0.01  | 0.89 | 5%    | <0.001 |
| CO <sub>2</sub> Emissions from Urban Trees   | CO <sub>2</sub>  | 47.5  | 0.01  | 0.90 | 19%   | 0.001  |
| Indirect N <sub>2</sub> O Emissions from Applied Nitrogen                                | N <sub>2</sub> O | 46.0  | 0.01  | 0.91 | 151%  | 0.010  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Marine                                 | CO <sub>2</sub>  | 44.5  | 0.01  | 0.91 | 8%    | 0.001  |
| N <sub>2</sub> O Emissions from Mobile Combustion: Road                                  | N <sub>2</sub> O | 40.3  | 0.01  | 0.92 | 27%   | 0.002  |
| CO <sub>2</sub> Emissions from Natural Gas Systems                                       | CO <sub>2</sub>  | 37.7  | 0.01  | 0.93 | 30%   | 0.002  |
| HFC-23 Emissions from HCFC-22 Production   | HFCs             | 36.4  | 0.01  | 0.93 | 10%   | 0.001  |
| Fugitive Emissions from Petroleum Systems  | CH <sub>4</sub>  | 35.2  | 0.01  | 0.94 | 149%  | 0.007  |
| CO <sub>2</sub> Emissions from Cropland Remaining Cropland                               | CO <sub>2</sub>  | 34.1  | <0.01 | 0.94 | 1160% | 0.056  |
| CO <sub>2</sub> Emissions from Cement Production   | CO <sub>2</sub>  | 33.3  | <0.01 | 0.95 | 7%    | <0.001 |
| CH <sub>4</sub> Emissions from Manure Management   | CH <sub>4</sub>  | 31.5  | <0.01 | 0.95 | 20%   | 0.001  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - U.S. Territories            | CO <sub>2</sub>  | 27.2  | <0.01 | 0.95 | 11%   | <0.001 |
| SF <sub>6</sub> Emissions from Electrical Transmission and Distribution                  | SF <sub>6</sub>  | 26.7  | <0.01 | 0.96 | 21%   | 0.001  |
| CO <sub>2</sub> Emissions from Landfilled Yard Trimmings and Food Scraps                 | CO <sub>2</sub>  | 24.2  | <0.01 | 0.96 | 59%   | 0.002  |
| CO <sub>2</sub> Emissions from Land Converted to Cropland                                | CO <sub>2</sub>  | 21.0  | <0.01 | 0.96 | 70%   | 0.002  |
| PFC Emissions from Aluminum Production   | PFCs             | 18.4  | <0.01 | 0.97 | 6%    | <0.001 |
| N <sub>2</sub> O Emissions from Nitric Acid Production                                   | N <sub>2</sub> O | 18.2  | <0.01 | 0.97 | 40%   | 0.001  |
| CH <sub>4</sub> Emissions from Wastewater Treatment                                      | CH <sub>4</sub>  | 15.9  | <0.01 | 0.97 | 29%   | 0.001  |
| N <sub>2</sub> O Emissions from Adipic Acid Production                                   | N <sub>2</sub> O | 15.8  | <0.01 | 0.97 | 9%    | <0.001 |
| N <sub>2</sub> O Emissions from Manure Management  | N <sub>2</sub> O | 14.4  | <0.01 | 0.98 | 24%   | <0.001 |
| CO <sub>2</sub> Emissions from Ammonia Production  | CO <sub>2</sub>  | 13.0  | <0.01 | 0.98 | 8%    | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Commercial                 | CO <sub>2</sub>  | 12.0  | <0.01 | 0.98 | 15%   | <0.001 |
| CO <sub>2</sub> Emissions from Lime Production   | CO <sub>2</sub>  | 11.5  | <0.01 | 0.98 | 3%    | <0.001 |

|  |                       |            |                 |             |             |                  |
|--|-----------------------|------------|-----------------|-------------|-------------|------------------|
| CO <sub>2</sub> Emissions from Incineration of Waste                                     | CO <sub>2</sub>       | 8.0        | <0.01           | 0.98        | 24%         | <0.001           |
| CO <sub>2</sub> Emissions from Land Converted to Grassland                               | CO <sub>2</sub>       | 7.7        | <0.01           | 0.98        | 105%        | 0.001            |
| <b>Non-CO<sub>2</sub> Emissions from Stationary Combustion - Electricity Generation</b>  | <b>N<sub>2</sub>O</b> | <b>7.4</b> | <b>&lt;0.01</b> | <b>0.98</b> | <b>173%</b> | <b>0.002</b>     |
| CH <sub>4</sub> Emissions from Rice Cultivation  | CH <sub>4</sub>       | 7.1        | <0.01           | 0.99        | 146%        | 0.001            |
| CO <sub>2</sub> Emissions from Aluminum Production                                       | CO <sub>2</sub>       | 6.8        | <0.01           | 0.99        | 2%          | <0.001           |
| Fugitive Emissions from Abandoned Underground Coal Mines                                 | CH <sub>4</sub>       | 6.0        | <0.01           | 0.99        | 27%         | <0.001           |
| SF <sub>6</sub> Emissions from Magnesium Production and Processing                       | SF <sub>6</sub>       | 5.4        | <0.01           | 0.99        | 13%         | <0.001           |
| <b>CO<sub>2</sub> Emissions from Grassland Remaining Grassland</b>                       | <b>CO<sub>2</sub></b> | <b>5.3</b> | <b>&lt;0.01</b> | <b>0.99</b> | <b>497%</b> | <b>0.004</b>     |
| CO <sub>2</sub> Emissions from Other Process Uses of Carbonates                          | CO <sub>2</sub>       | 4.9        | <0.01           | 0.99        | 15%         | <0.001           |
| CO <sub>2</sub> Emissions from Liming of Agricultural Soils                              | CO <sub>2</sub>       | 4.7        | <0.01           | 0.99        | 112%        | 0.001            |
| <b>Non-CO<sub>2</sub> Emissions from Stationary Combustion - Residential</b>             | <b>CH<sub>4</sub></b> | <b>4.6</b> | <b>&lt;0.01</b> | <b>0.99</b> | <b>225%</b> | <b>0.001</b>     |
| N <sub>2</sub> O Emissions from Product Uses   | N <sub>2</sub> O      | 4.4        | <0.01           | 0.99        | 8%          | <0.001           |
| CH <sub>4</sub> Emissions from Mobile Combustion: Road                                   | CH <sub>4</sub>       | 4.2        | <0.01           | 0.99        | 15%         | <0.001           |
| CO <sub>2</sub> Emissions from Urea Consumption for Non-Ag Purposes                      | CO <sub>2</sub>       | 3.8        | <0.01           | 0.99        | 7%          | <0.001           |
| N <sub>2</sub> O Emissions from Wastewater Treatment                                     | N <sub>2</sub> O      | 3.5        | <0.01           | 0.99        | 97%         | <0.001           |
| CO <sub>2</sub> Emissions from Petrochemical Production                                  | CO <sub>2</sub>       | 3.4        | <0.01           | 0.99        | 29%         | <0.001           |
| <b>Non-CO<sub>2</sub> Emissions from Stationary Combustion - Industrial</b>              | <b>N<sub>2</sub>O</b> | <b>3.3</b> | <b>&lt;0.01</b> | <b>0.99</b> | <b>211%</b> | <b>0.001</b>     |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Residential                | CO <sub>2</sub>       | 3.0        | <0.01           | 0.99        | 15%         | <0.001           |
| PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture                   | Several               | 2.9        | <0.01           | 0.99        | 9%          | <0.001           |
| CO <sub>2</sub> Emissions from Soda Ash Production and Consumption                       | CO <sub>2</sub>       | 2.8        | <0.01           | 1.00        | 5%          | <0.001           |
| CH <sub>4</sub> Emissions from Forest Fires  | CH <sub>4</sub>       | 2.5        | <0.01           | 1.00        | 165%        | 0.001            |
| CO <sub>2</sub> Emissions from Urea Fertilization  | CO <sub>2</sub>       | 2.4        | <0.01           | 1.00        | 42%         | <0.001           |
| CH <sub>4</sub> Emissions from Petrochemical Production                                  | CH <sub>4</sub>       | 2.3        | <0.01           | 1.00        | 30%         | <0.001           |
| CO <sub>2</sub> Emissions from Ferroalloy Production                                     | CO <sub>2</sub>       | 2.2        | <0.01           | 1.00        | 12%         | <0.001           |
| N <sub>2</sub> O Emissions from Forest Fires   | N <sub>2</sub> O      | 2.0        | <0.01           | 1.00        | 168%        | <0.001           |
| N <sub>2</sub> O Emissions from Mobile Combustion: Aviation                              | N <sub>2</sub> O      | 1.8        | <0.01           | 1.00        | 0%          | <0.001           |
| <b>Non-CO<sub>2</sub> Emissions from Stationary Combustion - Industrial</b>              | <b>CH<sub>4</sub></b> | <b>1.6</b> | <b>&lt;0.01</b> | <b>1.00</b> | <b>50%</b>  | <b>&lt;0.001</b> |
| CO <sub>2</sub> Emissions from Glass Production  | CO <sub>2</sub>       | 1.5        | <0.01           | 1.00        | 5%          | <0.001           |
| CO <sub>2</sub> Emissions from Phosphoric Acid Production                                | CO <sub>2</sub>       | 1.5        | <0.01           | 1.00        | 18%         | <0.001           |
| CO <sub>2</sub> Emissions from Carbon Dioxide Consumption                                | CO <sub>2</sub>       | 1.4        | <0.01           | 1.00        | 30%         | <0.001           |
| N <sub>2</sub> O Emissions from Mobile Combustion: Other                                 | N <sub>2</sub> O      | 1.3        | <0.01           | 1.00        | 0%          | <0.001           |
| CO <sub>2</sub> Emissions from Titanium Dioxide Production                               | CO <sub>2</sub>       | 1.2        | <0.01           | 1.00        | 15%         | <0.001           |
| <b>Non-CO<sub>2</sub> Emissions from Stationary Combustion - Residential</b>             | <b>N<sub>2</sub>O</b> | <b>1.1</b> | <b>&lt;0.01</b> | <b>1.00</b> | <b>201%</b> | <b>&lt;0.001</b> |
| CO <sub>2</sub> Emissions from Wetlands Remaining Wetlands                               | CO <sub>2</sub>       | 1.0        | <0.01           | 1.00        | 35%         | <0.001           |
| N <sub>2</sub> O Emissions from Settlement Soils   | N <sub>2</sub> O      | 1.0        | <0.01           | 1.00        | 163%        | <0.001           |
| CH <sub>4</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CH <sub>4</sub>       | 1.0        | <0.01           | 1.00        | 22%         | <0.001           |
| <b>Non-CO<sub>2</sub> Emissions from Stationary Combustion - Commercial</b>              | <b>CH<sub>4</sub></b> | <b>0.9</b> | <b>&lt;0.01</b> | <b>1.00</b> | <b>143%</b> | <b>&lt;0.001</b> |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - U.S. Territories           | CO <sub>2</sub>       | 0.6        | <0.01           | 1.00        | 19%         | <0.001           |
| CO <sub>2</sub> Emissions from Zinc Production   | CO <sub>2</sub>       | 0.6        | <0.01           | 1.00        | 17%         | <0.001           |
| N <sub>2</sub> O Emissions from Mobile Combustion: Marine                                | N <sub>2</sub> O      | 0.6        | <0.01           | 1.00        | 23%         | <0.001           |
| CO <sub>2</sub> Emissions from Lead Production   | CO <sub>2</sub>       | 0.5        | <0.01           | 1.00        | 15%         | <0.001           |

|   |                  |     |       |      |      |        |
|---|------------------|-----|-------|------|------|--------|
| N <sub>2</sub> O Emissions from Incineration of Waste                             | N <sub>2</sub> O | 0.5 | <0.01 | 1.00 | 320% | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy          | CO <sub>2</sub>  | 0.4 | <0.01 | 1.00 | NA   | <0.001 |
| CO <sub>2</sub> Emissions from Petroleum Systems                                  | CO <sub>2</sub>  | 0.4 | <0.01 | 1.00 | 149% | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial             | N <sub>2</sub> O | 0.4 | <0.01 | 1.00 | 80%  | <0.001 |
| CO <sub>2</sub> Emissions from Silicon Carbide Production and Consumption         | CO <sub>2</sub>  | 0.4 | <0.01 | 1.00 | 10%  | <0.001 |
| N <sub>2</sub> O Emissions from Composting  | N <sub>2</sub> O | 0.4 | <0.01 | 1.00 | 50%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation | CH <sub>4</sub>  | 0.3 | <0.01 | 1.00 | 42%  | <0.001 |
| Emissions from Substitutes for Ozone Depleting Substances                         | Several          | 0.3 | <0.01 | 1.00 | 13%  | <0.001 |
| CH <sub>4</sub> Emissions from Composting   | CH <sub>4</sub>  | 0.3 | <0.01 | 1.00 | 50%  | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Other                           | CH <sub>4</sub>  | 0.3 | <0.01 | 1.00 | 0%   | <0.001 |
| CH <sub>4</sub> Emissions from Field Burning of Agricultural Residues             | CH <sub>4</sub>  | 0.2 | <0.01 | 1.00 | 42%  | <0.001 |
| N <sub>2</sub> O Emissions from Field Burning of Agricultural Residues            | N <sub>2</sub> O | 0.1 | <0.01 | 1.00 | 31%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories       | N <sub>2</sub> O | 0.1 | <0.01 | 1.00 | 204% | <0.001 |
| N <sub>2</sub> O Emissions from Forest Soils                                      | N <sub>2</sub> O | 0.1 | <0.01 | 1.00 | 211% | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Aviation                        | CH <sub>4</sub>  | 0.1 | <0.01 | 1.00 | 0%   | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories       | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 57%  | <0.001 |
| CH <sub>4</sub> Emissions from Silicon Carbide Production and Consumption         | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 9%   | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Marine                          | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 4%   | <0.001 |
| CH <sub>4</sub> Emissions from Ferroalloy Production                              | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 23%  | <0.001 |
| N <sub>2</sub> O Emissions from Wetlands Remaining Wetlands                       | N <sub>2</sub> O | +   | <0.01 | 1.00 | 74%  | <0.001 |
| CH <sub>4</sub> Emissions from Incineration of Waste                              | CH <sub>4</sub>  | +   | <0.01 | 1.00 | NE   | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - U.S. Territories     | CO <sub>2</sub>  | +   | <0.01 | 1.00 | 17%  | <0.001 |

<sup>a</sup> 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 CO<sub>2</sub> Eq.

**Table A-6: 2011 Key Source Category Tier 1 and Tier 2 Analysis—Level Assessment, without LULUCF**

| IPCC Source Categories   | Direct GHG       | Current Year Estimate    |      | Tier 1 Level Assessment | Cumulative Total | Uncertainty | Tier 2 Level Assessment |
|--|------------------|--------------------------|------|-------------------------|------------------|-------------|-------------------------|
|  |                  | (Tg CO <sub>2</sub> Eq.) |      |                         |                  |             |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Electricity Generation | CO <sub>2</sub>  | 1,722.7                  | 0.26 | 0.26                    | 10%              | 0.025       |                         |
| CO <sub>2</sub> Emissions from Mobile Combustion: Road                               | CO <sub>2</sub>  | 1,466.8                  | 0.22 | 0.48                    | 8%               | 0.018       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Industrial              | CO <sub>2</sub>  | 416.3                    | 0.06 | 0.54                    | 10%              | 0.006       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Electricity Generation  | CO <sub>2</sub>  | 408.8                    | 0.06 | 0.60                    | 5%               | 0.003       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Industrial              | CO <sub>2</sub>  | 266.8                    | 0.04 | 0.64                    | 20%              | 0.008       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Residential             | CO <sub>2</sub>  | 254.6                    | 0.04 | 0.68                    | 7%               | 0.003       |                         |
| Direct N <sub>2</sub> O Emissions from Agricultural Soil Management                  | N <sub>2</sub> O | 195.2                    | 0.03 | 0.71                    | 40%              | 0.012       |                         |

|  |                  |       |       |      |      |        |
|--|------------------|-------|-------|------|------|--------|
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Commercial                  | CO <sub>2</sub>  | 170.4 | 0.03  | 0.74 | 7%   | 0.002  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Aviation                               | CO <sub>2</sub>  | 148.4 | 0.02  | 0.76 | 8%   | 0.002  |
| Fugitive Emissions from Natural Gas Systems  | CH <sub>4</sub>  | 144.7 | 0.02  | 0.78 | 30%  | 0.007  |
| CH <sub>4</sub> Emissions from Enteric Fermentation                                      | CH <sub>4</sub>  | 137.4 | 0.02  | 0.80 | 18%  | 0.004  |
| CO <sub>2</sub> Emissions from Non-Energy Use of Fuels                                   | CO <sub>2</sub>  | 130.6 | 0.02  | 0.82 | 25%  | 0.005  |
| Emissions from Substitutes for Ozone Depleting Substances                                | Several          | 121.7 | 0.02  | 0.84 | 13%  | 0.002  |
| CH <sub>4</sub> Emissions from Landfills   | CH <sub>4</sub>  | 103.0 | 0.02  | 0.85 | 54%  | 0.008  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Industrial                 | CO <sub>2</sub>  | 90.1  | 0.01  | 0.87 | 17%  | 0.002  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Other                                  | CO <sub>2</sub>  | 82.4  | 0.01  | 0.88 | 8%   | 0.001  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Residential                 | CO <sub>2</sub>  | 73.6  | 0.01  | 0.89 | 6%   | 0.001  |
| CO <sub>2</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CO <sub>2</sub>  | 64.3  | 0.01  | 0.90 | 17%  | 0.002  |
| Fugitive Emissions from Coal Mining  | CH <sub>4</sub>  | 63.2  | 0.01  | 0.91 | 18%  | 0.002  |
| CH <sub>4</sub> Emissions from Manure Management   | CH <sub>4</sub>  | 52.0  | 0.01  | 0.92 | 20%  | 0.002  |
| Indirect N <sub>2</sub> O Emissions from Applied Nitrogen                                | N <sub>2</sub> O | 51.9  | 0.01  | 0.92 | 151% | 0.012  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Marine                                 | CO <sub>2</sub>  | 47.4  | 0.01  | 0.93 | 8%   | 0.001  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Commercial                  | CO <sub>2</sub>  | 46.7  | 0.01  | 0.94 | 5%   | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - U.S. Territories            | CO <sub>2</sub>  | 44.7  | 0.01  | 0.95 | 11%  | 0.001  |
| CO <sub>2</sub> Emissions from Natural Gas Systems                                       | CO <sub>2</sub>  | 32.3  | <0.01 | 0.95 | 30%  | 0.001  |
| CO <sub>2</sub> Emissions from Cement Production   | CO <sub>2</sub>  | 31.6  | <0.01 | 0.96 | 7%   | <0.001 |
| Fugitive Emissions from Petroleum Systems  | CH <sub>4</sub>  | 31.5  | <0.01 | 0.96 | 149% | 0.007  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Electricity Generation      | CO <sub>2</sub>  | 26.6  | <0.01 | 0.96 | 9%   | <0.001 |
| N <sub>2</sub> O Emissions from Manure Management  | N <sub>2</sub> O | 18.0  | <0.01 | 0.97 | 24%  | 0.001  |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation        | N <sub>2</sub> O | 17.9  | <0.01 | 0.97 | 173% | 0.005  |
| CH <sub>4</sub> Emissions from Wastewater Treatment                                      | CH <sub>4</sub>  | 16.2  | <0.01 | 0.97 | 29%  | 0.001  |
| N <sub>2</sub> O Emissions from Nitric Acid Production                                   | N <sub>2</sub> O | 15.5  | <0.01 | 0.97 | 40%  | 0.001  |
| N <sub>2</sub> O Emissions from Mobile Combustion: Road                                  | N <sub>2</sub> O | 14.4  | <0.01 | 0.98 | 27%  | 0.001  |
| CO <sub>2</sub> Emissions from Lime Production   | CO <sub>2</sub>  | 13.8  | <0.01 | 0.98 | 3%   | <0.001 |
| CO <sub>2</sub> Emissions from Incineration of Waste                                     | CO <sub>2</sub>  | 12.0  | <0.01 | 0.98 | 24%  | <0.001 |
| N <sub>2</sub> O Emissions from Adipic Acid Production                                   | N <sub>2</sub> O | 10.6  | <0.01 | 0.98 | 9%   | <0.001 |
| CO <sub>2</sub> Emissions from Other Process Uses of Carbonates                          | CO <sub>2</sub>  | 9.2   | <0.01 | 0.98 | 15%  | <0.001 |
| CO <sub>2</sub> Emissions from Ammonia Production  | CO <sub>2</sub>  | 8.8   | <0.01 | 0.98 | 8%   | <0.001 |
| SF <sub>6</sub> Emissions from Electrical Transmission and Distribution                  | SF <sub>6</sub>  | 7.0   | <0.01 | 0.99 | 21%  | <0.001 |
| HFC-23 Emissions from HCFC-22 Production   | HFCs             | 6.9   | <0.01 | 0.99 | 10%  | <0.001 |
| CH <sub>4</sub> Emissions from Rice Cultivation  | CH <sub>4</sub>  | 6.6   | <0.01 | 0.99 | 146% | 0.001  |
| PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture                   | Several          | 5.3   | <0.01 | 0.99 | 9%   | <0.001 |
| N <sub>2</sub> O Emissions from Wastewater Treatment                                     | N <sub>2</sub> O | 5.2   | <0.01 | 0.99 | 97%  | 0.001  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Commercial                 | CO <sub>2</sub>  | 5.1   | <0.01 | 0.99 | 15%  | <0.001 |
| Fugitive Emissions from Abandoned Underground Coal Mines                                 | CH <sub>4</sub>  | 4.8   | <0.01 | 0.99 | 27%  | <0.001 |
| N <sub>2</sub> O Emissions from Product Uses   | N <sub>2</sub> O | 4.4   | <0.01 | 0.99 | 8%   | <0.001 |
| CO <sub>2</sub> Emissions from Urea Consumption for Non-Ag Purposes                      | CO <sub>2</sub>  | 4.3   | <0.01 | 0.99 | 7%   | <0.001 |

|  |                  |     |       |      |      |        |
|--|------------------|-----|-------|------|------|--------|
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential                   | CH <sub>4</sub>  | 3.5 | <0.01 | 0.99 | 225% | 0.001  |
| CO <sub>2</sub> Emissions from Petrochemical Production                                  | CO <sub>2</sub>  | 3.5 | <0.01 | 0.99 | 29%  | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - U.S. Territories           | CO <sub>2</sub>  | 3.5 | <0.01 | 0.99 | 19%  | <0.001 |
| CO <sub>2</sub> Emissions from Aluminum Production                                       | CO <sub>2</sub>  | 3.3 | <0.01 | 0.99 | 2%   | <0.001 |
| CH <sub>4</sub> Emissions from Petrochemical Production                                  | CH <sub>4</sub>  | 3.1 | <0.01 | 0.99 | 30%  | <0.001 |
| PFC Emissions from Aluminum Production   | PFCs             | 2.9 | <0.01 | 0.99 | 6%   | <0.001 |
| CO <sub>2</sub> Emissions from Soda Ash Production and Consumption                       | CO <sub>2</sub>  | 2.7 | <0.01 | 1.00 | 5%   | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial                    | N <sub>2</sub> O | 2.7 | <0.01 | 1.00 | 211% | 0.001  |
| N <sub>2</sub> O Emissions from Mobile Combustion: Other                                 | N <sub>2</sub> O | 1.9 | <0.01 | 1.00 | 0%   | <0.001 |
| CO <sub>2</sub> Emissions from Titanium Dioxide Production                               | CO <sub>2</sub>  | 1.9 | <0.01 | 1.00 | 15%  | <0.001 |
| CO <sub>2</sub> Emissions from Carbon Dioxide Consumption                                | CO <sub>2</sub>  | 1.8 | <0.01 | 1.00 | 30%  | <0.001 |
| N <sub>2</sub> O Emissions from Composting   | N <sub>2</sub> O | 1.7 | <0.01 | 1.00 | 50%  | <0.001 |
| CO <sub>2</sub> Emissions from Ferroalloy Production                                     | CO <sub>2</sub>  | 1.7 | <0.01 | 1.00 | 12%  | <0.001 |
| CH <sub>4</sub> Emissions from Composting  | CH <sub>4</sub>  | 1.5 | <0.01 | 1.00 | 50%  | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - U.S. Territories            | CO <sub>2</sub>  | 1.5 | <0.01 | 1.00 | 17%  | <0.001 |
| N <sub>2</sub> O Emissions from Mobile Combustion: Aviation                              | N <sub>2</sub> O | 1.4 | <0.01 | 1.00 | 0%   | <0.001 |
| SF <sub>6</sub> Emissions from Magnesium Production and Processing                       | SF <sub>6</sub>  | 1.4 | <0.01 | 1.00 | 13%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial                    | CH <sub>4</sub>  | 1.3 | <0.01 | 1.00 | 50%  | <0.001 |
| CO <sub>2</sub> Emissions from Glass Production  | CO <sub>2</sub>  | 1.3 | <0.01 | 1.00 | 5%   | <0.001 |
| CO <sub>2</sub> Emissions from Zinc Production   | CO <sub>2</sub>  | 1.3 | <0.01 | 1.00 | 17%  | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Road                                   | CH <sub>4</sub>  | 1.2 | <0.01 | 1.00 | 15%  | <0.001 |
| CO <sub>2</sub> Emissions from Phosphoric Acid Production                                | CO <sub>2</sub>  | 1.2 | <0.01 | 1.00 | 18%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial                    | CH <sub>4</sub>  | 0.9 | <0.01 | 1.00 | 143% | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential                   | N <sub>2</sub> O | 0.9 | <0.01 | 1.00 | 201% | <0.001 |
| N <sub>2</sub> O Emissions from Mobile Combustion: Marine                                | N <sub>2</sub> O | 0.7 | <0.01 | 1.00 | 23%  | <0.001 |
| CH <sub>4</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CH <sub>4</sub>  | 0.6 | <0.01 | 1.00 | 22%  | <0.001 |
| CO <sub>2</sub> Emissions from Lead Production   | CO <sub>2</sub>  | 0.5 | <0.01 | 1.00 | 15%  | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Residential                | CO <sub>2</sub>  | 0.5 | <0.01 | 1.00 | 15%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation        | CH <sub>4</sub>  | 0.4 | <0.01 | 1.00 | 42%  | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy                 | CO <sub>2</sub>  | 0.4 | <0.01 | 1.00 | NA   | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Other                                  | CH <sub>4</sub>  | 0.4 | <0.01 | 1.00 | 0%   | <0.001 |
| N <sub>2</sub> O Emissions from Incineration of Waste                                    | N <sub>2</sub> O | 0.4 | <0.01 | 1.00 | 320% | <0.001 |
| CO <sub>2</sub> Emissions from Petroleum Systems   | CO <sub>2</sub>  | 0.3 | <0.01 | 1.00 | 149% | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial                    | N <sub>2</sub> O | 0.3 | <0.01 | 1.00 | 80%  | <0.001 |
| CH <sub>4</sub> Emissions from Field Burning of Agricultural Residues                    | CH <sub>4</sub>  | 0.2 | <0.01 | 1.00 | 42%  | <0.001 |
| CO <sub>2</sub> Emissions from Silicon Carbide Production and Consumption                | CO <sub>2</sub>  | 0.2 | <0.01 | 1.00 | 10%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories              | N <sub>2</sub> O | 0.1 | <0.01 | 1.00 | 204% | <0.001 |
| N <sub>2</sub> O Emissions from Field Burning of Agricultural Residues                   | N <sub>2</sub> O | 0.1 | <0.01 | 1.00 | 31%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S.                          | CH <sub>4</sub>  | 0.1 | <0.01 | 1.00 | 57%  | <0.001 |

| Territories   |                 |   |       |      |     |        |  |
|---|-----------------|---|-------|------|-----|--------|--|
| CH <sub>4</sub> Emissions from Mobile Combustion: Aviation                | CH <sub>4</sub> | + | <0.01 | 1.00 | 0%  | <0.001 |  |
| CH <sub>4</sub> Emissions from Mobile Combustion: Marine                  | CH <sub>4</sub> | + | <0.01 | 1.00 | 4%  | <0.001 |  |
| CH <sub>4</sub> Emissions from Ferroalloy Production                      | CH <sub>4</sub> | + | <0.01 | 1.00 | 23% | <0.001 |  |
| CH <sub>4</sub> Emissions from Silicon Carbide Production and Consumption | CH <sub>4</sub> | + | <0.01 | 1.00 | 9%  | <0.001 |  |
| CH <sub>4</sub> Emissions from Incineration of Waste                      | CH <sub>4</sub> | + | <0.01 | 1.00 | NE  | <0.001 |  |

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

<sup>a</sup> 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 CO<sub>2</sub> Eq.

**Table A-7: 2011 Key Source Category Tier 1 and Tier 2 Analysis—Level Assessment with LULUCF**

| IPCC Source Categories   | Direct GHG       | 2011                              |       | Tier 1 Level Assessment | Cumulative |             | Tier 2 Level Assessment |
|--|------------------|-----------------------------------|-------|-------------------------|------------|-------------|-------------------------|
|  |                  | Estimate (Tg CO <sub>2</sub> Eq.) |       |                         | Total      | Uncertainty |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Electricity Generation     | CO <sub>2</sub>  | 1,722.7                           | 0.23  | 0.23                    | 10%        | 0.022       |                         |
| CO <sub>2</sub> Emissions from Mobile Combustion: Road                                   | CO <sub>2</sub>  | 1,466.8                           | 0.19  | 0.42                    | 8%         | 0.016       |                         |
| CO <sub>2</sub> Emissions from Changes in Forest Carbon Stocks                           | CO <sub>2</sub>  | 833.5                             | 0.11  | 0.53                    | 15%        | 0.016       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Industrial                  | CO <sub>2</sub>  | 416.3                             | 0.05  | 0.58                    | 10%        | 0.006       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Electricity Generation      | CO <sub>2</sub>  | 408.8                             | 0.05  | 0.63                    | 5%         | 0.003       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Industrial                  | CO <sub>2</sub>  | 266.8                             | 0.03  | 0.67                    | 20%        | 0.007       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Residential                 | CO <sub>2</sub>  | 254.6                             | 0.03  | 0.70                    | 7%         | 0.002       |                         |
| Direct N <sub>2</sub> O Emissions from Agricultural Soil Management                      | N <sub>2</sub> O | 195.2                             | 0.03  | 0.73                    | 40%        | 0.010       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Commercial                  | CO <sub>2</sub>  | 170.4                             | 0.02  | 0.75                    | 7%         | 0.002       |                         |
| CO <sub>2</sub> Emissions from Mobile Combustion: Aviation                               | CO <sub>2</sub>  | 148.4                             | 0.02  | 0.77                    | 8%         | 0.002       |                         |
| Fugitive Emissions from Natural Gas Systems  | CH <sub>4</sub>  | 144.7                             | 0.02  | 0.79                    | 30%        | 0.006       |                         |
| CH <sub>4</sub> Emissions from Enteric Fermentation                                      | CH <sub>4</sub>  | 137.4                             | 0.02  | 0.81                    | 18%        | 0.003       |                         |
| CO <sub>2</sub> Emissions from Non-Energy Use of Fuels                                   | CO <sub>2</sub>  | 130.6                             | 0.02  | 0.82                    | 25%        | 0.004       |                         |
| Emissions from Substitutes for Ozone Depleting Substances                                | Several          | 121.7                             | 0.02  | 0.84                    | 13%        | 0.002       |                         |
| CH <sub>4</sub> Emissions from Landfills   | CH <sub>4</sub>  | 103.0                             | 0.01  | 0.85                    | 54%        | 0.007       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Industrial                 | CO <sub>2</sub>  | 90.1                              | 0.01  | 0.86                    | 17%        | 0.002       |                         |
| CO <sub>2</sub> Emissions from Mobile Combustion: Other                                  | CO <sub>2</sub>  | 82.4                              | 0.01  | 0.87                    | 8%         | 0.001       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Residential                 | CO <sub>2</sub>  | 73.6                              | 0.01  | 0.88                    | 6%         | 0.001       |                         |
| CO <sub>2</sub> Emissions from Urban Trees   | CO <sub>2</sub>  | 68.8                              | 0.01  | 0.89                    | 19%        | 0.002       |                         |
| CO <sub>2</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CO <sub>2</sub>  | 64.3                              | 0.01  | 0.90                    | 17%        | 0.001       |                         |
| Fugitive Emissions from Coal Mining  | CH <sub>4</sub>  | 63.2                              | 0.01  | 0.91                    | 18%        | 0.001       |                         |
| CH <sub>4</sub> Emissions from Manure Management   | CH <sub>4</sub>  | 52.0                              | 0.01  | 0.92                    | 20%        | 0.001       |                         |
| Indirect N <sub>2</sub> O Emissions from Applied Nitrogen                                | N <sub>2</sub> O | 51.9                              | 0.01  | 0.92                    | 151%       | 0.010       |                         |
| CO <sub>2</sub> Emissions from Mobile Combustion: Marine                                 | CO <sub>2</sub>  | 47.4                              | 0.01  | 0.93                    | 8%         | 0.001       |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Commercial                  | CO <sub>2</sub>  | 46.7                              | 0.01  | 0.94                    | 5%         | <0.001      |                         |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - U.S. Territories            | CO <sub>2</sub>  | 44.7                              | 0.01  | 0.94                    | 11%        | 0.001       |                         |
| CO <sub>2</sub> Emissions from Natural Gas Systems                                       | CO <sub>2</sub>  | 32.3                              | <0.01 | 0.95                    | 30%        | 0.001       |                         |

|   |                  |      |       |      |       |        |
|---|------------------|------|-------|------|-------|--------|
| CO <sub>2</sub> Emissions from Cement Production                                    | CO <sub>2</sub>  | 31.6 | <0.01 | 0.95 | 7%    | <0.001 |
| Fugitive Emissions from Petroleum Systems   | CH <sub>4</sub>  | 31.5 | <0.01 | 0.95 | 149%  | 0.006  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Electricity Generation | CO <sub>2</sub>  | 26.6 | <0.01 | 0.96 | 9%    | <0.001 |
| N <sub>2</sub> O Emissions from Manure Management                                   | N <sub>2</sub> O | 18.0 | <0.01 | 0.96 | 24%   | 0.001  |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation   | N <sub>2</sub> O | 17.9 | <0.01 | 0.96 | 173%  | 0.004  |
| CH <sub>4</sub> Emissions from Wastewater Treatment                                 | CH <sub>4</sub>  | 16.2 | <0.01 | 0.96 | 29%   | 0.001  |
| N <sub>2</sub> O Emissions from Nitric Acid Production                              | N <sub>2</sub> O | 15.5 | <0.01 | 0.97 | 40%   | 0.001  |
| CO <sub>2</sub> Emissions from Land Converted to Cropland                           | CO <sub>2</sub>  | 14.5 | <0.01 | 0.97 | 70%   | 0.001  |
| N <sub>2</sub> O Emissions from Mobile Combustion: Road                             | N <sub>2</sub> O | 14.4 | <0.01 | 0.97 | 27%   | 0.001  |
| CH <sub>4</sub> Emissions from Forest Fires   | CH <sub>4</sub>  | 14.2 | <0.01 | 0.97 | 165%  | 0.003  |
| CO <sub>2</sub> Emissions from Lime Production                                      | CO <sub>2</sub>  | 13.8 | <0.01 | 0.97 | 3%    | <0.001 |
| CO <sub>2</sub> Emissions from Landfilled Yard Trimmings and Food Scraps            | CO <sub>2</sub>  | 13.0 | <0.01 | 0.98 | 59%   | 0.001  |
| CO <sub>2</sub> Emissions from Incineration of Waste                                | CO <sub>2</sub>  | 12.0 | <0.01 | 0.98 | 24%   | <0.001 |
| N <sub>2</sub> O Emissions from Forest Fires  | N <sub>2</sub> O | 11.6 | <0.01 | 0.98 | 168%  | 0.003  |
| N <sub>2</sub> O Emissions from Adipic Acid Production                              | N <sub>2</sub> O | 10.6 | <0.01 | 0.98 | 9%    | <0.001 |
| CO <sub>2</sub> Emissions from Other Process Uses of Carbonates                     | CO <sub>2</sub>  | 9.2  | <0.01 | 0.98 | 15%   | <0.001 |
| CO <sub>2</sub> Emissions from Ammonia Production                                   | CO <sub>2</sub>  | 8.8  | <0.01 | 0.98 | 8%    | <0.001 |
| CO <sub>2</sub> Emissions from Land Converted to Grassland                          | CO <sub>2</sub>  | 8.8  | <0.01 | 0.98 | 105%  | 0.001  |
| CO <sub>2</sub> Emissions from Grassland Remaining Grassland                        | CO <sub>2</sub>  | 7.4  | <0.01 | 0.98 | 497%  | 0.005  |
| SF <sub>6</sub> Emissions from Electrical Transmission and Distribution             | SF <sub>6</sub>  | 7.0  | <0.01 | 0.99 | 21%   | <0.001 |
| HFC-23 Emissions from HCFC-22 Production  | HFCs             | 6.9  | <0.01 | 0.99 | 10%   | <0.001 |
| CH <sub>4</sub> Emissions from Rice Cultivation                                     | CH <sub>4</sub>  | 6.6  | <0.01 | 0.99 | 146%  | 0.001  |
| PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture              | Several          | 5.3  | <0.01 | 0.99 | 9%    | <0.001 |
| N <sub>2</sub> O Emissions from Wastewater Treatment                                | N <sub>2</sub> O | 5.2  | <0.01 | 0.99 | 97%   | 0.001  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Commercial            | CO <sub>2</sub>  | 5.1  | <0.01 | 0.99 | 15%   | <0.001 |
| Fugitive Emissions from Abandoned Underground Coal Mines                            | CH <sub>4</sub>  | 4.8  | <0.01 | 0.99 | 27%   | <0.001 |
| CO <sub>2</sub> Emissions from Liming of Agricultural Soils                         | CO <sub>2</sub>  | 4.5  | <0.01 | 0.99 | 112%  | 0.001  |
| N <sub>2</sub> O Emissions from Product Uses  | N <sub>2</sub> O | 4.4  | <0.01 | 0.99 | 8%    | <0.001 |
| CO <sub>2</sub> Emissions from Urea Consumption for Non-Ag Purposes                 | CO <sub>2</sub>  | 4.3  | <0.01 | 0.99 | 7%    | <0.001 |
| CO <sub>2</sub> Emissions from Urea Fertilization                                   | CO <sub>2</sub>  | 3.7  | <0.01 | 0.99 | 42%   | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential              | CH <sub>4</sub>  | 3.5  | <0.01 | 0.99 | 225%  | 0.001  |
| CO <sub>2</sub> Emissions from Petrochemical Production                             | CO <sub>2</sub>  | 3.5  | <0.01 | 0.99 | 29%   | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - U.S. Territories      | CO <sub>2</sub>  | 3.5  | <0.01 | 0.99 | 19%   | <0.001 |
| CO <sub>2</sub> Emissions from Aluminum Production                                  | CO <sub>2</sub>  | 3.3  | <0.01 | 0.99 | 2%    | <0.001 |
| CH <sub>4</sub> Emissions from Petrochemical Production                             | CH <sub>4</sub>  | 3.1  | <0.01 | 0.99 | 30%   | <0.001 |
| PFC Emissions from Aluminum Production  | PFCs             | 2.9  | <0.01 | 0.99 | 6%    | <0.001 |
| CO <sub>2</sub> Emissions from Cropland Remaining Cropland                          | CO <sub>2</sub>  | 2.9  | <0.01 | 1.00 | 1160% | 0.004  |
| CO <sub>2</sub> Emissions from Soda Ash Production and Consumption                  | CO <sub>2</sub>  | 2.7  | <0.01 | 1.00 | 5%    | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial               | N <sub>2</sub> O | 2.7  | <0.01 | 1.00 | 211%  | 0.001  |
| N <sub>2</sub> O Emissions from Mobile Combustion: Other                            | N <sub>2</sub> O | 1.9  | <0.01 | 1.00 | 0%    | <0.001 |
| CO <sub>2</sub> Emissions from Titanium Dioxide Production                          | CO <sub>2</sub>  | 1.9  | <0.01 | 1.00 | 15%   | <0.001 |
| CO <sub>2</sub> Emissions from Carbon Dioxide Consumption                           | CO <sub>2</sub>  | 1.8  | <0.01 | 1.00 | 30%   | <0.001 |

|  |                  |     |       |      |      |        |
|--|------------------|-----|-------|------|------|--------|
| N <sub>2</sub> O Emissions from Composting   | N <sub>2</sub> O | 1.7 | <0.01 | 1.00 | 50%  | <0.001 |
| CO <sub>2</sub> Emissions from Ferroalloy Production                                     | CO <sub>2</sub>  | 1.7 | <0.01 | 1.00 | 12%  | <0.001 |
| CH <sub>4</sub> Emissions from Composting  | CH <sub>4</sub>  | 1.5 | <0.01 | 1.00 | 50%  | <0.001 |
| N <sub>2</sub> O Emissions from Settlement Soils   | N <sub>2</sub> O | 1.5 | <0.01 | 1.00 | 163% | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - U.S. Territories            | CO <sub>2</sub>  | 1.5 | <0.01 | 1.00 | 17%  | <0.001 |
| N <sub>2</sub> O Emissions from Mobile Combustion: Aviation                              | N <sub>2</sub> O | 1.4 | <0.01 | 1.00 | 0%   | <0.001 |
| SF <sub>6</sub> Emissions from Magnesium Production and Processing                       | SF <sub>6</sub>  | 1.4 | <0.01 | 1.00 | 13%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial                    | CH <sub>4</sub>  | 1.3 | <0.01 | 1.00 | 50%  | <0.001 |
| CO <sub>2</sub> Emissions from Glass Production  | CO <sub>2</sub>  | 1.3 | <0.01 | 1.00 | 5%   | <0.001 |
| CO <sub>2</sub> Emissions from Zinc Production   | CO <sub>2</sub>  | 1.3 | <0.01 | 1.00 | 17%  | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Road                                   | CH <sub>4</sub>  | 1.2 | <0.01 | 1.00 | 15%  | <0.001 |
| CO <sub>2</sub> Emissions from Phosphoric Acid Production                                | CO <sub>2</sub>  | 1.2 | <0.01 | 1.00 | 18%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial                    | CH <sub>4</sub>  | 0.9 | <0.01 | 1.00 | 143% | <0.001 |
| CO <sub>2</sub> Emissions from Wetlands Remaining Wetlands                               | CO <sub>2</sub>  | 0.9 | <0.01 | 1.00 | 35%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential                   | N <sub>2</sub> O | 0.9 | <0.01 | 1.00 | 201% | <0.001 |
| N <sub>2</sub> O Emissions from Mobile Combustion: Marine                                | N <sub>2</sub> O | 0.7 | <0.01 | 1.00 | 23%  | <0.001 |
| CH <sub>4</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CH <sub>4</sub>  | 0.6 | <0.01 | 1.00 | 22%  | <0.001 |
| CO <sub>2</sub> Emissions from Lead Production   | CO <sub>2</sub>  | 0.5 | <0.01 | 1.00 | 15%  | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Residential                | CO <sub>2</sub>  | 0.5 | <0.01 | 1.00 | 15%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation        | CH <sub>4</sub>  | 0.4 | <0.01 | 1.00 | 42%  | <0.001 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy                 | CO <sub>2</sub>  | 0.4 | <0.01 | 1.00 | NA   | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Other                                  | CH <sub>4</sub>  | 0.4 | <0.01 | 1.00 | 0%   | <0.001 |
| N <sub>2</sub> O Emissions from Incineration of Waste                                    | N <sub>2</sub> O | 0.4 | <0.01 | 1.00 | 320% | <0.001 |
| N <sub>2</sub> O Emissions from Forest Soils   | N <sub>2</sub> O | 0.4 | <0.01 | 1.00 | 211% | <0.001 |
| CO <sub>2</sub> Emissions from Petroleum Systems   | CO <sub>2</sub>  | 0.3 | <0.01 | 1.00 | 149% | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial                    | N <sub>2</sub> O | 0.3 | <0.01 | 1.00 | 80%  | <0.001 |
| CH <sub>4</sub> Emissions from Field Burning of Agricultural Residues                    | CH <sub>4</sub>  | 0.2 | <0.01 | 1.00 | 42%  | <0.001 |
| CO <sub>2</sub> Emissions from Silicon Carbide Production and Consumption                | CO <sub>2</sub>  | 0.2 | <0.01 | 1.00 | 10%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories              | N <sub>2</sub> O | 0.1 | <0.01 | 1.00 | 204% | <0.001 |
| N <sub>2</sub> O Emissions from Field Burning of Agricultural Residues                   | N <sub>2</sub> O | 0.1 | <0.01 | 1.00 | 31%  | <0.001 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories              | CH <sub>4</sub>  | 0.1 | <0.01 | 1.00 | 57%  | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Aviation                               | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 0%   | <0.001 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Marine                                 | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 4%   | <0.001 |
| CH <sub>4</sub> Emissions from Ferroalloy Production                                     | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 23%  | <0.001 |
| CH <sub>4</sub> Emissions from Silicon Carbide Production and Consumption                | CH <sub>4</sub>  | +   | <0.01 | 1.00 | 9%   | <0.001 |
| N <sub>2</sub> O Emissions from Wetlands Remaining Wetlands                              | N <sub>2</sub> O | +   | <0.01 | 1.00 | 74%  | <0.001 |
| CH <sub>4</sub> Emissions from Incineration of Waste                                     | CH <sub>4</sub>  | +   | <0.01 | 1.00 | NE   | <0.001 |

<sup>a</sup> 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 CO<sub>2</sub> Eq.

**Table A- 8: 1990-2011 Key Source Category Tier 1 and 2 Analysis—Trend Assessment, without LULUCF**

| IPCC Source Categories   | Direct GHG       | 1990                              | 2011                              | Tier 1 Trend Assessment | Tier 2 Trend Assessment | % Contribution to Trend | Cumulative Total |
|--|------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|-------------------------|------------------|
|  |                  | Estimate (Tg CO <sub>2</sub> Eq.) | Estimate (Tg CO <sub>2</sub> Eq.) |                         |                         |                         |                  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas                               |                  |                                   |                                   |                         |                         |                         |                  |
| - Electricity Generation   | CO <sub>2</sub>  | 175.3                             | 408.8                             | 0.03                    | 0.002                   | 16.4                    | 16               |
| CO <sub>2</sub> Emissions from Mobile Combustion: Road                                   | CO <sub>2</sub>  | 1,188.9                           | 1,466.8                           | 0.03                    | 0.002                   | 13.6                    | 30               |
| Emissions from Substitutes for Ozone Depleting Substances                                | Several          | 0.3                               | 121.7                             | 0.02                    | 0.002                   | 9.1                     | 39               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Electricity Generation      | CO <sub>2</sub>  | 97.5                              | 26.6                              | 0.01                    | 0.001                   | 5.9                     | 45               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Industrial                 | CO <sub>2</sub>  | 155.3                             | 90.1                              | 0.01                    | 0.002                   | 5.8                     | 51               |
| CH <sub>4</sub> Emissions from Landfills   | CH <sub>4</sub>  | 147.8                             | 103.0                             | 0.01                    | 0.004                   | 4.2                     | 55               |
| CO <sub>2</sub> Emissions from Mobile Combustion: Aviation                               | CO <sub>2</sub>  | 187.4                             | 148.4                             | 0.01                    | 0.001                   | 4.0                     | 59               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Electricity Generation     | CO <sub>2</sub>  | 1,547.6                           | 1,722.7                           | 0.01                    | 0.001                   | 3.8                     | 63               |
| CO <sub>2</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CO <sub>2</sub>  | 99.8                              | 64.3                              | 0.01                    | 0.001                   | 3.3                     | 66               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Industrial                  | CO <sub>2</sub>  | 284.4                             | 266.8                             | 0.01                    | 0.001                   | 3.0                     | 69               |
| HFC-23 Emissions from HCFC-22 Production   | HFCs             | 36.4                              | 6.9                               | <0.01                   | <0.001                  | 2.4                     | 72               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Residential                 | CO <sub>2</sub>  | 97.4                              | 73.6                              | <0.01                   | <0.001                  | 2.4                     | 74               |
| Fugitive Emissions from Natural Gas Systems  | CH <sub>4</sub>  | 161.2                             | 144.7                             | <0.01                   | 0.001                   | 2.2                     | 76               |
| N <sub>2</sub> O Emissions from Mobile Combustion: Road                                  | N <sub>2</sub> O | 40.3                              | 14.4                              | <0.01                   | 0.001                   | 2.2                     | 78               |
| Fugitive Emissions from Coal Mining  | CH <sub>4</sub>  | 84.1                              | 63.2                              | <0.01                   | 0.001                   | 2.1                     | 80               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Industrial                  | CO <sub>2</sub>  | 408.9                             | 416.3                             | <0.01                   | <0.001                  | 1.9                     | 82               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Commercial                  | CO <sub>2</sub>  | 64.9                              | 46.7                              | <0.01                   | <0.001                  | 1.8                     | 84               |
| SF <sub>6</sub> Emissions from Electrical Transmission and Distribution                  | SF <sub>6</sub>  | 26.7                              | 7.0                               | <0.01                   | 0.001                   | 1.6                     | 86               |
| CH <sub>4</sub> Emissions from Manure Management   | CH <sub>4</sub>  | 31.5                              | 52.0                              | <0.01                   | 0.001                   | 1.4                     | 87               |
| PFC Emissions from Aluminum Production   | PFCs             | 18.4                              | 2.9                               | <0.01                   | <0.001                  | 1.3                     | 88               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Commercial                  | CO <sub>2</sub>  | 142.1                             | 170.4                             | <0.01                   | <0.001                  | 1.3                     | 90               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - U.S. Territories            | CO <sub>2</sub>  | 27.2                              | 44.7                              | <0.01                   | <0.001                  | 1.1                     | 91               |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation        | N <sub>2</sub> O | 7.4                               | 17.9                              | <0.01                   | 0.002                   | 0.7                     | 92               |
| CO <sub>2</sub> Emissions from Natural Gas Systems                                       | CO <sub>2</sub>  | 37.7                              | 32.3                              | <0.01                   | <0.001                  | 0.6                     | 92               |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Commercial                 | CO <sub>2</sub>  | 12.0                              | 5.1                               | <0.01                   | <0.001                  | 0.6                     | 93               |
| Fugitive Emissions from Petroleum Systems  | CH <sub>4</sub>  | 35.2                              | 31.5                              | <0.01                   | 0.001                   | 0.5                     | 93               |
| N <sub>2</sub> O Emissions from Adipic Acid Production                                   | N <sub>2</sub> O | 15.8                              | 10.6                              | <0.01                   | <0.001                  | 0.5                     | 94               |
| CH <sub>4</sub> Emissions from Enteric Fermentation                                      | CH <sub>4</sub>  | 132.7                             | 137.4                             | <0.01                   | <0.001                  | 0.5                     | 94               |
| CO <sub>2</sub> Emissions from Ammonia Production  | CO <sub>2</sub>  | 13.0                              | 8.8                               | <0.01                   | <0.001                  | 0.4                     | 95               |
| SF <sub>6</sub> Emissions from Magnesium Production and Processing                       | SF <sub>6</sub>  | 5.4                               | 1.4                               | <0.01                   | <0.001                  | 0.3                     | 95               |

|  |                  |       |       |       |        |      |     |
|--|------------------|-------|-------|-------|--------|------|-----|
| CO <sub>2</sub> Emissions from Cement Production   | CO <sub>2</sub>  | 33.3  | 31.6  | <0.01 | <0.001 | 0.3  | 95  |
| N <sub>2</sub> O Emissions from Nitric Acid Production                                   | N <sub>2</sub> O | 18.2  | 15.5  | <0.01 | <0.001 | 0.3  | 96  |
| CO <sub>2</sub> Emissions from Aluminum Production                                       | CO <sub>2</sub>  | 6.8   | 3.3   | <0.01 | <0.001 | 0.3  | 96  |
| CO <sub>2</sub> Emissions from Other Process Uses of Carbonates                          | CO <sub>2</sub>  | 4.9   | 9.2   | <0.01 | <0.001 | 0.3  | 96  |
| CO <sub>2</sub> Emissions from Non-Energy Use of Fuels                                   | CO <sub>2</sub>  | 117.4 | 130.6 | <0.01 | <0.001 | 0.3  | 96  |
| CO <sub>2</sub> Emissions from Incineration of Waste                                     | CO <sub>2</sub>  | 8.0   | 12.0  | <0.01 | <0.001 | 0.3  | 96  |
| CH <sub>4</sub> Emissions from Mobile Combustion: Road                                   | CH <sub>4</sub>  | 4.2   | 1.2   | <0.01 | <0.001 | 0.2  | 97  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Other                                  | CO <sub>2</sub>  | 73.3  | 82.4  | <0.01 | <0.001 | 0.2  | 97  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - U.S. Territories           | CO <sub>2</sub>  | 0.6   | 3.5   | <0.01 | <0.001 | 0.2  | 97  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Residential                | CO <sub>2</sub>  | 3.0   | 0.5   | <0.01 | <0.001 | 0.2  | 97  |
| N <sub>2</sub> O Emissions from Manure Management  | N <sub>2</sub> O | 14.4  | 18.0  | <0.01 | <0.001 | 0.2  | 97  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Residential                 | CO <sub>2</sub>  | 238.0 | 254.6 | <0.01 | <0.001 | 0.2  | 98  |
| PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture                   | Several          | 2.9   | 5.3   | <0.01 | <0.001 | 0.2  | 98  |
| Indirect N <sub>2</sub> O Emissions from Applied Nitrogen                                | N <sub>2</sub> O | 46.0  | 51.9  | <0.01 | <0.001 | 0.2  | 98  |
| Fugitive Emissions from Abandoned Underground Coal Mines                                 | CH <sub>4</sub>  | 6.0   | 4.8   | <0.01 | <0.001 | 0.1  | 98  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - U.S. Territories            | CO <sub>2</sub>  | +     | 1.5   | <0.01 | <0.001 | 0.1  | 98  |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential                   | CH <sub>4</sub>  | 4.6   | 3.5   | <0.01 | <0.001 | 0.1  | 98  |
| N <sub>2</sub> O Emissions from Wastewater Treatment                                     | N <sub>2</sub> O | 3.5   | 5.2   | <0.01 | <0.001 | 0.1  | 98  |
| CO <sub>2</sub> Emissions from Lime Production   | CO <sub>2</sub>  | 11.5  | 13.8  | <0.01 | <0.001 | 0.1  | 99  |
| N <sub>2</sub> O Emissions from Composting   | N <sub>2</sub> O | 0.4   | 1.7   | <0.01 | <0.001 | 0.1  | 99  |
| Direct N <sub>2</sub> O Emissions from Agricultural Soil Management                      | N <sub>2</sub> O | 181.8 | 195.2 | <0.01 | <0.001 | 0.1  | 99  |
| CH <sub>4</sub> Emissions from Composting  | CH <sub>4</sub>  | 0.3   | 1.5   | <0.01 | <0.001 | 0.1  | 99  |
| CH <sub>4</sub> Emissions from Rice Cultivation  | CH <sub>4</sub>  | 7.1   | 6.6   | <0.01 | <0.001 | 0.1  | 99  |
| CH <sub>4</sub> Emissions from Wastewater Treatment                                      | CH <sub>4</sub>  | 15.9  | 16.2  | <0.01 | <0.001 | 0.1  | 99  |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial                    | N <sub>2</sub> O | 3.3   | 2.7   | <0.01 | <0.001 | 0.1  | 99  |
| CH <sub>4</sub> Emissions from Petrochemical Production                                  | CH <sub>4</sub>  | 2.3   | 3.1   | <0.01 | <0.001 | <0.1 | 99  |
| CO <sub>2</sub> Emissions from Ferroalloy Production                                     | CO <sub>2</sub>  | 2.2   | 1.7   | <0.01 | <0.001 | <0.1 | 99  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Marine                                 | CO <sub>2</sub>  | 44.5  | 47.4  | <0.01 | <0.001 | <0.1 | 99  |
| CO <sub>2</sub> Emissions from Titanium Dioxide Production                               | CO <sub>2</sub>  | 1.2   | 1.9   | <0.01 | <0.001 | <0.1 | 99  |
| CO <sub>2</sub> Emissions from Zinc Production   | CO <sub>2</sub>  | 0.6   | 1.3   | <0.01 | <0.001 | <0.1 | 99  |
| N <sub>2</sub> O Emissions from Mobile Combustion: Other                                 | N <sub>2</sub> O | 1.3   | 1.9   | <0.01 | <0.001 | <0.1 | 99  |
| N <sub>2</sub> O Emissions from Mobile Combustion: Aviation                              | N <sub>2</sub> O | 1.8   | 1.4   | <0.01 | <0.001 | <0.1 | 99  |
| CO <sub>2</sub> Emissions from Phosphoric Acid Production                                | CO <sub>2</sub>  | 1.5   | 1.2   | <0.01 | <0.001 | <0.1 | 99  |
| CH <sub>4</sub> Emissions from Iron and Steel Production & Metallurgical Coke Production | CH <sub>4</sub>  | 1.0   | 0.6   | <0.01 | <0.001 | <0.1 | 99  |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial                    | CH <sub>4</sub>  | 1.6   | 1.3   | <0.01 | <0.001 | <0.1 | 99  |
| N <sub>2</sub> O Emissions from Product Uses   | N <sub>2</sub> O | 4.4   | 4.4   | <0.01 | <0.001 | <0.1 | 99  |
| CO <sub>2</sub> Emissions from Glass Production  | CO <sub>2</sub>  | 1.5   | 1.3   | <0.01 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Soda Ash Production and Consumption                       | CO <sub>2</sub>  | 2.8   | 2.7   | <0.01 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential                   | N <sub>2</sub> O | 1.1   | 0.9   | <0.01 | <0.001 | <0.1 | 100 |

|   |                  |     |     |       |        |      |     |
|---|------------------|-----|-----|-------|--------|------|-----|
| CO <sub>2</sub> Emissions from Carbon Dioxide Consumption                         | CO <sub>2</sub>  | 1.4 | 1.8 | <0.01 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Urea Consumption for Non-Ag Purposes               | CO <sub>2</sub>  | 3.8 | 4.3 | <0.01 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Silicon Carbide Production and Consumption         | CO <sub>2</sub>  | 0.4 | 0.2 | <0.01 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Petrochemical Production                           | CO <sub>2</sub>  | 3.4 | 3.5 | <0.01 | <0.001 | <0.1 | 100 |
| N <sub>2</sub> O Emissions from Incineration of Waste                             | N <sub>2</sub> O | 0.5 | 0.4 | <0.01 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Other                           | CH <sub>4</sub>  | 0.3 | 0.4 | <0.01 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Electricity Generation | CH <sub>4</sub>  | 0.3 | 0.4 | <0.01 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial             | N <sub>2</sub> O | 0.4 | 0.3 | <0.01 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Petroleum Systems                                  | CO <sub>2</sub>  | 0.4 | 0.3 | <0.01 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories       | N <sub>2</sub> O | 0.1 | 0.1 | <0.01 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Commercial             | CH <sub>4</sub>  | 0.9 | 0.9 | <0.01 | <0.001 | <0.1 | 100 |
| N <sub>2</sub> O Emissions from Mobile Combustion: Marine                         | N <sub>2</sub> O | 0.6 | 0.7 | <0.01 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Aviation                        | CH <sub>4</sub>  | 0.1 | +   | <0.01 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - U.S. Territories       | CH <sub>4</sub>  | +   | 0.1 | <0.01 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Lead Production                                    | CO <sub>2</sub>  | 0.5 | 0.5 | <0.01 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Silicon Carbide Production and Consumption         | CH <sub>4</sub>  | +   | +   | <0.01 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Field Burning of Agricultural Residues             | CH <sub>4</sub>  | 0.2 | 0.2 | <0.01 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Ferroalloy Production                              | CH <sub>4</sub>  | +   | +   | <0.01 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Mobile Combustion: Marine                          | CH <sub>4</sub>  | +   | +   | <0.01 | <0.001 | <0.1 | 100 |
| N <sub>2</sub> O Emissions from Field Burning of Agricultural Residues            | N <sub>2</sub> O | 0.1 | 0.1 | <0.01 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Stationary Combustion - Geothermal Energy          | CO <sub>2</sub>  | 0.4 | 0.4 | <0.01 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Incineration of Waste                              | CH <sub>4</sub>  | +   | +   | <0.01 | <0.001 | <0.1 | 100 |

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

+ Does not exceed 0.05 Tg CO<sub>2</sub> Eq.

**Table A-9: 1990-2011 Key Source Category Tier 1 and 2 Analysis—Trend Assessment, with LULUCF**

| IPCC Source Categories  | Direct GHG      | 1990 Estimate (Tg CO <sub>2</sub> Eq.) | 2011                              |       | Tier 1 Trend Assessment | Tier 2 Trend Assessment | Percent Contribution to Trend (%) | Cumulative Contribution to Trend (%) |
|---|-----------------|--|-----------------------------------|-------|-------------------------|-------------------------|-----------------------------------|--------------------------------------|
|   |                 |  | Estimate (Tg CO <sub>2</sub> Eq.) | Trend |                         |                         |                                   |                                      |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - Electricity Generation | CO <sub>2</sub> | 175.3                                  | 408.8                             | 0.026 | 0.001                   | 14.5                    | 14                                |                                      |
| CO <sub>2</sub> Emissions from Mobile Combustion: Road                              | CO <sub>2</sub> | 1,188.9                                | 1,466.8                           | 0.021 | 0.002                   | 11.4                    | 26                                |                                      |
| Emissions from Substitutes for Ozone Depleting Substances                           | Several         | 0.3                                    | 121.7                             | 0.015 | 0.002                   | 8.1                     | 34                                |                                      |
| CO <sub>2</sub> Emissions from Stationary Combustion - Oil - Electricity Generation | CO <sub>2</sub> | 97.5                                   | 26.6                              | 0.010 | 0.001                   | 5.3                     | 39                                |                                      |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Industrial            | CO <sub>2</sub> | 155.3                                  | 90.1                              | 0.009 | 0.002                   | 5.3                     | 45                                |                                      |
| CO <sub>2</sub> Emissions from Changes in Forest                                    | CO <sub>2</sub> | 696.8                                  | 833.5                             | 0.009 | 0.001                   | 4.9                     | 49                                |                                      |

|  |                  |         |         |       |        |     |    |
|--|------------------|---------|---------|-------|--------|-----|----|
| Carbon Stocks  |                  |         |         |       |        |     |    |
| CH <sub>4</sub> Emissions from Landfills               | CH <sub>4</sub>  | 147.8   | 103.0   | 0.007 | 0.004  | 3.9 | 53 |
| CO <sub>2</sub> Emissions from Mobile Combustion:      |                  |         |         |       |        |     |    |
| Aviation   | CO <sub>2</sub>  | 187.4   | 148.4   | 0.007 | 0.001  | 3.7 | 57 |
| CO <sub>2</sub> Emissions from Iron and Steel          |                  |         |         |       |        |     |    |
| Production & Metallurgical Coke                        |                  |         |         |       |        |     |    |
| Production   | CO <sub>2</sub>  | 99.8    | 64.3    | 0.005 | 0.001  | 3.0 | 60 |
| CO <sub>2</sub> Emissions from Stationary Combustion   |                  |         |         |       |        |     |    |
| - Oil - Industrial                                     | CO <sub>2</sub>  | 284.4   | 266.8   | 0.005 | 0.001  | 2.9 | 63 |
| CO <sub>2</sub> Emissions from Stationary Combustion   |                  |         |         |       |        |     |    |
| - Coal - Electricity Generation                        | CO <sub>2</sub>  | 1,547.6 | 1,722.7 | 0.004 | <0.001 | 2.4 | 65 |
| CO <sub>2</sub> Emissions from Cropland Remaining      |                  |         |         |       |        |     |    |
| Cropland   | CO <sub>2</sub>  | 34.1    | 2.9     | 0.004 | 0.048  | 2.3 | 68 |
| HFC-23 Emissions from HCFC-22                          |                  |         |         |       |        |     |    |
| Production   | HFCs             | 36.4    | 6.9     | 0.004 | <0.001 | 2.2 | 70 |
| CO <sub>2</sub> Emissions from Stationary Combustion   |                  |         |         |       |        |     |    |
| - Oil - Residential                                    | CO <sub>2</sub>  | 97.4    | 73.6    | 0.004 | <0.001 | 2.2 | 72 |
| Fugitive Emissions from Natural Gas                    |                  |         |         |       |        |     |    |
| Systems  | CH <sub>4</sub>  | 161.2   | 144.7   | 0.004 | 0.001  | 2.1 | 74 |
| N <sub>2</sub> O Emissions from Mobile Combustion:     |                  |         |         |       |        |     |    |
| Road   | N <sub>2</sub> O | 40.3    | 14.4    | 0.004 | 0.001  | 2.0 | 76 |
| CO <sub>2</sub> Emissions from Stationary Combustion   |                  |         |         |       |        |     |    |
| - Gas - Industrial                                     | CO <sub>2</sub>  | 408.9   | 416.3   | 0.004 | <0.001 | 2.0 | 78 |
| Fugitive Emissions from Coal Mining                    | CH <sub>4</sub>  | 84.1    | 63.2    | 0.003 | 0.001  | 1.9 | 80 |
| CO <sub>2</sub> Emissions from Stationary Combustion   |                  |         |         |       |        |     |    |
| - Oil - Commercial                                     | CO <sub>2</sub>  | 64.9    | 46.7    | 0.003 | <0.001 | 1.6 | 81 |
| SF <sub>6</sub> Emissions from Electrical Transmission |                  |         |         |       |        |     |    |
| and Distribution                                       | SF <sub>6</sub>  | 26.7    | 7.0     | 0.003 | 0.001  | 1.5 | 83 |
| CH <sub>4</sub> Emissions from Manure Management       | CH <sub>4</sub>  | 31.5    | 52.0    | 0.002 | <0.001 | 1.2 | 84 |
| PFC Emissions from Aluminum Production                 | PFCs             | 18.4    | 2.9     | 0.002 | <0.001 | 1.1 | 85 |
| CO <sub>2</sub> Emissions from Urban Trees             | CO <sub>2</sub>  | 47.5    | 68.8    | 0.002 | <0.001 | 1.1 | 86 |
| CO <sub>2</sub> Emissions from Stationary Combustion   |                  |         |         |       |        |     |    |
| - Gas - Commercial                                     | CO <sub>2</sub>  | 142.1   | 170.4   | 0.002 | <0.001 | 1.0 | 87 |
| CO <sub>2</sub> Emissions from Stationary Combustion   |                  |         |         |       |        |     |    |
| - Oil - U.S. Territories                               | CO <sub>2</sub>  | 27.2    | 44.7    | 0.002 | <0.001 | 1.0 | 88 |
| CO <sub>2</sub> Emissions from Landfilled Yard         |                  |         |         |       |        |     |    |
| Trimmings and Food Scraps                              | CO <sub>2</sub>  | 24.2    | 13.0    | 0.002 | 0.001  | 0.9 | 89 |
| CH <sub>4</sub> Emissions from Forest Fires            | CH <sub>4</sub>  | 2.5     | 14.2    | 0.001 | 0.002  | 0.8 | 90 |
| Non-CO <sub>2</sub> Emissions from Stationary          |                  |         |         |       |        |     |    |
| Combustion - Electricity Generation                    | N <sub>2</sub> O | 7.4     | 17.9    | 0.001 | 0.002  | 0.7 | 91 |
| N <sub>2</sub> O Emissions from Forest Fires           | N <sub>2</sub> O | 2.0     | 11.6    | 0.001 | 0.002  | 0.6 | 91 |
| CO <sub>2</sub> Emissions from Natural Gas Systems     | CO <sub>2</sub>  | 37.7    | 32.3    | 0.001 | <0.001 | 0.6 | 92 |
| CO <sub>2</sub> Emissions from Land Converted to       |                  |         |         |       |        |     |    |
| Cropland   | CO <sub>2</sub>  | 21.0    | 14.5    | 0.001 | 0.001  | 0.6 | 92 |
| CO <sub>2</sub> Emissions from Stationary Combustion   |                  |         |         |       |        |     |    |
| - Coal - Commercial                                    | CO <sub>2</sub>  | 12.0    | 5.1     | 0.001 | <0.001 | 0.5 | 93 |
| CH <sub>4</sub> Emissions from Enteric Fermentation    | CH <sub>4</sub>  | 132.7   | 137.4   | 0.001 | <0.001 | 0.5 | 93 |
| Fugitive Emissions from Petroleum Systems              | CH <sub>4</sub>  | 35.2    | 31.5    | 0.001 | 0.001  | 0.5 | 94 |
| N <sub>2</sub> O Emissions from Adipic Acid Production | N <sub>2</sub> O | 15.8    | 10.6    | 0.001 | <0.001 | 0.4 | 94 |
| CO <sub>2</sub> Emissions from Ammonia Production      | CO <sub>2</sub>  | 13.0    | 8.8     | 0.001 | <0.001 | 0.4 | 95 |
| CO <sub>2</sub> Emissions from Stationary Combustion   |                  |         |         |       |        |     |    |
| - Gas - Residential                                    | CO <sub>2</sub>  | 238.0   | 254.6   | 0.001 | <0.001 | 0.3 | 95 |
| CO <sub>2</sub> Emissions from Cement Production       | CO <sub>2</sub>  | 33.3    | 31.6    | 0.001 | <0.001 | 0.3 | 95 |

|  |                  |       |       |       |        |      |     |
|--|------------------|-------|-------|-------|--------|------|-----|
| SF <sub>6</sub> Emissions from Magnesium Production and Processing             | SF <sub>6</sub>  | 5.4   | 1.4   | 0.001 | <0.001 | 0.3  | 96  |
| N <sub>2</sub> O Emissions from Nitric Acid Production                         | N <sub>2</sub> O | 18.2  | 15.5  | 0.001 | <0.001 | 0.3  | 96  |
| CO <sub>2</sub> Emissions from Aluminum Production                             | CO <sub>2</sub>  | 6.8   | 3.3   | 0.000 | <0.001 | 0.3  | 96  |
| CO <sub>2</sub> Emissions from Other Process Uses of Carbonates                | CO <sub>2</sub>  | 4.9   | 9.2   | 0.000 | <0.001 | 0.3  | 96  |
| CH <sub>4</sub> Emissions from Mobile Combustion: Road                         | CH <sub>4</sub>  | 4.2   | 1.2   | 0.000 | <0.001 | 0.2  | 97  |
| CO <sub>2</sub> Emissions from Incineration of Waste                           | CO <sub>2</sub>  | 8.0   | 12.0  | 0.000 | <0.001 | 0.2  | 97  |
| Direct N <sub>2</sub> O Emissions from Agricultural Soil Management            | N <sub>2</sub> O | 181.8 | 195.2 | 0.000 | <0.001 | 0.2  | 97  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - U.S. Territories | CO <sub>2</sub>  | 0.6   | 3.5   | 0.000 | <0.001 | 0.2  | 97  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Coal - Residential      | CO <sub>2</sub>  | 3.0   | 0.5   | 0.000 | <0.001 | 0.2  | 97  |
| CO <sub>2</sub> Emissions from Non-Energy Use of Fuels                         | CO <sub>2</sub>  | 117.4 | 130.6 | 0.000 | <0.001 | 0.2  | 98  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Other                        | CO <sub>2</sub>  | 73.3  | 82.4  | 0.000 | <0.001 | 0.2  | 98  |
| N <sub>2</sub> O Emissions from Manure Management                              | N <sub>2</sub> O | 14.4  | 18.0  | 0.000 | <0.001 | 0.2  | 98  |
| PFC, HFC, and SF <sub>6</sub> Emissions from Semiconductor Manufacture         | Several          | 2.9   | 5.3   | 0.000 | <0.001 | 0.1  | 98  |
| Indirect N <sub>2</sub> O Emissions from Applied Nitrogen                      | N <sub>2</sub> O | 46.0  | 51.9  | 0.000 | <0.001 | 0.1  | 98  |
| Fugitive Emissions from Abandoned Underground Coal Mines                       | CH <sub>4</sub>  | 6.0   | 4.8   | 0.000 | <0.001 | 0.1  | 98  |
| CO <sub>2</sub> Emissions from Grassland Remaining Grassland                   | CO <sub>2</sub>  | 5.3   | 7.4   | 0.000 | 0.001  | 0.1  | 98  |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Residential         | CH <sub>4</sub>  | 4.6   | 3.5   | 0.000 | <0.001 | 0.1  | 99  |
| CO <sub>2</sub> Emissions from Stationary Combustion - Gas - U.S. Territories  | CO <sub>2</sub>  | +     | 1.5   | 0.000 | <0.001 | 0.1  | 99  |
| N <sub>2</sub> O Emissions from Wastewater Treatment                           | N <sub>2</sub> O | 3.5   | 5.2   | 0.000 | <0.001 | 0.1  | 99  |
| N <sub>2</sub> O Emissions from Composting                                     | N <sub>2</sub> O | 0.4   | 1.7   | 0.000 | <0.001 | 0.1  | 99  |
| CO <sub>2</sub> Emissions from Lime Production                                 | CO <sub>2</sub>  | 11.5  | 13.8  | 0.000 | <0.001 | 0.1  | 99  |
| CH <sub>4</sub> Emissions from Composting                                      | CH <sub>4</sub>  | 0.3   | 1.5   | 0.000 | <0.001 | 0.1  | 99  |
| CH <sub>4</sub> Emissions from Wastewater Treatment                            | CH <sub>4</sub>  | 15.9  | 16.2  | 0.000 | <0.001 | 0.1  | 99  |
| CH <sub>4</sub> Emissions from Rice Cultivation                                | CH <sub>4</sub>  | 7.1   | 6.6   | 0.000 | <0.001 | 0.1  | 99  |
| CO <sub>2</sub> Emissions from Mobile Combustion: Marine                       | CO <sub>2</sub>  | 44.5  | 47.4  | 0.000 | <0.001 | 0.1  | 99  |
| CO <sub>2</sub> Emissions from Urea Fertilization                              | CO <sub>2</sub>  | 2.4   | 3.7   | 0.000 | <0.001 | 0.1  | 99  |
| Non-CO <sub>2</sub> Emissions from Stationary Combustion - Industrial          | N <sub>2</sub> O | 3.3   | 2.7   | 0.000 | <0.001 | 0.1  | 99  |
| CO <sub>2</sub> Emissions from Ferroalloy Production                           | CO <sub>2</sub>  | 2.2   | 1.7   | 0.000 | <0.001 | <0.1 | 99  |
| CH <sub>4</sub> Emissions from Petrochemical Production                        | CH <sub>4</sub>  | 2.3   | 3.1   | 0.000 | <0.001 | <0.1 | 99  |
| CO <sub>2</sub> Emissions from Liming of Agricultural Soils                    | CO <sub>2</sub>  | 4.7   | 4.5   | 0.000 | <0.001 | <0.1 | 99  |
| CO <sub>2</sub> Emissions from Titanium Dioxide Production                     | CO <sub>2</sub>  | 1.2   | 1.9   | 0.000 | <0.001 | <0.1 | 99  |
| CO <sub>2</sub> Emissions from Zinc Production                                 | CO <sub>2</sub>  | 0.6   | 1.3   | 0.000 | <0.001 | <0.1 | 100 |
| N <sub>2</sub> O Emissions from Mobile Combustion: Aviation                    | N <sub>2</sub> O | 1.8   | 1.4   | 0.000 | <0.001 | <0.1 | 100 |

|  |                  |     |     |       |        |      |     |
|--|------------------|-----|-----|-------|--------|------|-----|
| N <sub>2</sub> O Emissions from Mobile Combustion:<br>Other                                    | N <sub>2</sub> O | 1.3 | 1.9 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Phosphoric Acid<br>Production                                   | CO <sub>2</sub>  | 1.5 | 1.2 | 0.000 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Iron and Steel<br>Production & Metallurgical Coke<br>Production | CH <sub>4</sub>  | 1.0 | 0.6 | 0.000 | <0.001 | <0.1 | 100 |
| N <sub>2</sub> O Emissions from Settlement Soils   | N <sub>2</sub> O | 1.0 | 1.5 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Land Converted to<br>Grassland                                  | CO <sub>2</sub>  | 7.7 | 8.8 | 0.000 | <0.001 | <0.1 | 100 |
| N <sub>2</sub> O Emissions from Product Uses   | N <sub>2</sub> O | 4.4 | 4.4 | 0.000 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary<br>Combustion - Industrial                       | CH <sub>4</sub>  | 1.6 | 1.3 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Glass Production  | CO <sub>2</sub>  | 1.5 | 1.3 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Soda Ash Production<br>and Consumption                          | CO <sub>2</sub>  | 2.8 | 2.7 | 0.000 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary<br>Combustion - Residential                      | N <sub>2</sub> O | 1.1 | 0.9 | 0.000 | <0.001 | <0.1 | 100 |
| N <sub>2</sub> O Emissions from Forest Soils   | N <sub>2</sub> O | 0.1 | 0.4 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Carbon Dioxide<br>Consumption                                   | CO <sub>2</sub>  | 1.4 | 1.8 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Silicon Carbide<br>Production and Consumption                   | CO <sub>2</sub>  | 0.4 | 0.2 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Petrochemical<br>Production                                     | CO <sub>2</sub>  | 3.4 | 3.5 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Wetlands Remaining<br>Wetlands                                  | CO <sub>2</sub>  | 1.0 | 0.9 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Urea Consumption for<br>Non-Ag Purposes                         | CO <sub>2</sub>  | 3.8 | 4.3 | 0.000 | <0.001 | <0.1 | 100 |
| N <sub>2</sub> O Emissions from Incineration of Waste  | N <sub>2</sub> O | 0.5 | 0.4 | 0.000 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Mobile Combustion:<br>Other                                     | CH <sub>4</sub>  | 0.3 | 0.4 | 0.000 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary<br>Combustion - Commercial                       | N <sub>2</sub> O | 0.4 | 0.3 | 0.000 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary<br>Combustion - Electricity Generation           | CH <sub>4</sub>  | 0.3 | 0.4 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Petroleum Systems   | CO <sub>2</sub>  | 0.4 | 0.3 | 0.000 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary<br>Combustion - U.S. Territories                 | N <sub>2</sub> O | 0.1 | 0.1 | 0.000 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary<br>Combustion - Commercial                       | CH <sub>4</sub>  | 0.9 | 0.9 | 0.000 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Mobile Combustion:<br>Aviation                                  | CH <sub>4</sub>  | 0.1 | +   | 0.000 | <0.001 | <0.1 | 100 |
| N <sub>2</sub> O Emissions from Mobile Combustion:<br>Marine                                   | N <sub>2</sub> O | 0.6 | 0.7 | 0.000 | <0.001 | <0.1 | 100 |
| CO <sub>2</sub> Emissions from Lead Production   | CO <sub>2</sub>  | 0.5 | 0.5 | 0.000 | <0.001 | <0.1 | 100 |
| Non-CO <sub>2</sub> Emissions from Stationary<br>Combustion - U.S. Territories                 | CH <sub>4</sub>  | +   | 0.1 | 0.000 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Field Burning of<br>Agricultural Residues                       | CH <sub>4</sub>  | 0.2 | 0.2 | 0.000 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Silicon Carbide<br>Production and Consumption                   | CH <sub>4</sub>  | +   | +   | 0.000 | <0.001 | <0.1 | 100 |
| CH <sub>4</sub> Emissions from Ferroalloy Production   | CH <sub>4</sub>  | +   | +   | 0.000 | <0.001 | <0.1 | 100 |

|  |                  |     |     |       |        |      |     |  |
|--|------------------|-----|-----|-------|--------|------|-----|--|
| CO <sub>2</sub> Emissions from Stationary Combustion                   |                  |     |     |       |        |      |     |  |
| - Geothermal Energy  | CO <sub>2</sub>  | 0.4 | 0.4 | 0.000 | <0.001 | <0.1 | 100 |  |
| N <sub>2</sub> O Emissions from Field Burning of Agricultural Residues | N <sub>2</sub> O | 0.1 | 0.1 | 0.000 | <0.001 | <0.1 | 100 |  |
| N <sub>2</sub> O Emissions from Wetlands Remaining Wetlands            | N <sub>2</sub> O | +   | +   | 0.000 | <0.001 | <0.1 | 100 |  |
| CH <sub>4</sub> Emissions from Mobile Combustion: Marine               | CH <sub>4</sub>  | +   | +   | 0.000 | <0.001 | <0.1 | 100 |  |
| CH <sub>4</sub> Emissions from Incineration of Waste                   | CH <sub>4</sub>  | +   | +   | 0.000 | <0.001 | <0.1 | 100 |  |

+ Does not exceed 0.05 Tg CO<sub>2</sub> Eq.

## References

- IPCC (2006) *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. The National Greenhouse Gas Inventories Programme, The Intergovernmental Panel on Climate Change, H.S. Eggleston, L. Buendia, K. Miwa, T. Negara, and K. Tanabe (eds.). Hayman, Kanagawa, Japan.
- IPCC (2003) *Good Practice Guidance for Land Use, Land-Use Change, and Forestry*. National Greenhouse Gas Inventories Programme, The Intergovernmental Panel on Climate Change, J. Penman, et al. (eds.). Available online at <<http://www.ipcc-nggip.iges.or.jp/public/gpplulucf/gpplulucf.htm>>. August 13, 2004.
- IPCC (2000) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, Intergovernmental Panel on Climate Change, National Greenhouse Gas Inventories Programme.