

ANNEX 5 Assessment of the Sources and Sinks of Greenhouse Gas Emissions Not Included

Although this report is intended to be a comprehensive assessment of anthropogenic¹²⁰ sources and sinks of greenhouse gas emissions for the United States, certain sources have been identified but not included in the estimates presented for various reasons. Before discussing these sources, however, it is important to note that processes or activities that are not *anthropogenic in origin* or do not result in a *net source or sink* of greenhouse gas emissions are intentionally excluded from a national inventory of anthropogenic greenhouse gas emissions, in line with guidance from the IPCC in their guidelines for national inventories.

Given a source category that is both anthropogenic and results in net greenhouse gas emissions, reasons for not including a source related to an anthropogenic activity include one or more of the following:

- Emissions are not likely to occur within the United States.
- A methodology for estimating emissions from a source does not currently exist.
- Though an estimating method has been developed, data were not adequately available to calculate emissions.
- Emissions are determined to be not significant in terms of overall national emissions, as defined per UNFCCC reporting guidelines, based on available data or a preliminary assessment of significance.

It is also important to note that the United States believes that the sources discussed below are very low in comparison with the overall estimate of total U.S. greenhouse gas emissions, and not including them introduces a very minor bias. In general, the emission sources described in this annex are for source categories with methodologies introduced in the *2006 IPCC Guidelines* for which data collection has not been sufficient to pursue an initial estimation of greenhouse gases. Reporting of inventories to the UNFCCC under Decision 24/CP.19 requests “Where methodological or data gaps in inventories exist, information on these gaps should be presented in a transparent manner.” Furthermore, these revised reporting guidelines allow a country to indicate that a disproportionate amount of effort would be required to collect data for a gas from a specific category that would be insignificant in terms of the overall level and trend in national emissions.¹²¹ Specifically, where the notation key “NE” is used in the Common Reporting Format tables that accompany this Inventory report submission to the UNFCCC, countries are required to describe why such emissions or removals have not been estimated (UNFCCC 2013).

With this guidance, the United States will consider the next steps in providing transparent information on these categories in future Inventory reports. The United States is continually working to improve upon the understanding of such sources and seeking to find the data required to estimate related emissions. As such improvements are implemented, new emission sources are quantified and included in the Inventory.

The full list of sources not estimated, along with explanations for their exclusion, are provided in Table 9 of the Common Reporting Format (CRF)¹²² submission. Additional information for some specific source categories is provided below. Note the numerical references shown for categories below (e.g., 1.A.3) are consistent with CRF category numbers and may vary slightly from the references in the *2006 IPCC Guidelines*.

Source Categories Not Estimated

The following section is arranged by sector and source provides additional information to describe the reason the source was not estimated.

¹²⁰ The term “anthropogenic,” in this context, refers to greenhouse gas emissions and removals that are a direct result of human activities or are the result of natural processes that have been affected by human activities (*2006 IPCC Guidelines for National Greenhouse Gas Inventories*).

¹²¹ Paragraph 37(b) of Decision 24/CP.19 “Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention.” See <<http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf>>.

¹²² http://unfccc.int/national_reports/annex_i_ghg_inventories/reporting_requirements/items/2759.php

Energy

IPCC Category 1.A.3: CH₄ and N₂O Emissions from Transport Fuel Combustion—Biomass

Emissions from biomass fuel use in domestic aviation (1.A.3.a), motorcycles (1.A.3.b), railways (1.A.3.c), and domestic navigation (1.A.3.d) are not currently estimated. EPA has determined that the use of biodiesel in rail and navigation was likely insignificant, and there are not readily available data sources to estimate biodiesel consumption from these sources.

Emissions from ethanol mixed with gasoline in low blends are included in the on-road gasoline emissions for motorcycles. If there is any use of high blend ethanol fuel in motorcycles, it is likely insignificant.

Prior to 2011, no biobased jet fuel was assumed to be used for domestic aviation. Between 2011 and 2015, 22 airlines have performed over 2,500 commercial passenger flights with blends of up to 50 percent biojet fuel; however, CH₄ and N₂O emissions from the volume of fuel used falls below 500 kt CO₂ Eq. per year, and would be considered insignificant¹²³.

IPCC Category 1.A.3.e.i: CO₂ Emissions from Liquid Fuels in Other Transportation—Pipeline Transport

Use of liquid fuels to power pipeline pumps is uncommon, but does occur. Data are currently unavailable to characterize this activity.

IPCC Category 1.A.3.e.ii: CH₄ and N₂O Emissions from Biomass and Gaseous Fuels in Other Transportation—Non-Transportation Mobile

Biomass based fuels used in non-transportation mobile applications are currently not estimated. The use of biofuels in non-transportation mobile applications is insignificant and there are not readily available data sources to estimate it. LPG/CNG non-road equipment represent a relatively small emission source category, for which the EPA is currently compiling emission factor data sources for inclusion in a future Inventory.

IPCC Category 1.A.5.a: CO₂ Emissions from Non-Hazardous Industrial Waste Incineration and Medical Waste Incineration

Waste incineration of the municipal waste stream and hazardous waste incineration of fossil fuel-derived materials are reported two sections of the Energy chapter of the Inventory in the section on CO₂ emissions from waste incineration, and in the calculation of emissions and storage from non-energy uses of fossil fuels.

Two additional categories of waste incineration that are not directly included in our calculus are industrial non-hazardous waste and medical waste incineration. Data are not readily available for these sources.

In the calculation of emissions and storage from non-energy uses of fossil fuels there is an energy recovery component that includes emissions from waste gas; waste oils, tars, and related materials from the industrial sector. While this is not a comprehensive inclusion of non-hazardous industrial waste it does capture a subset.

Furthermore, an analysis was conducted based on a study of hospital/ medical/ infectious waste incinerator (HMIWI) facilities in the United States showing that medical waste incineration emissions could be considered insignificant. Based on that study's information of waste throughput and an analyses of fossil-based composition of the waste, it was determined that annual greenhouse gas emissions for medical waste incineration would be below 500 kt CO₂ Eq. per year and considered insignificant for the purposes of inventory reporting under the UNFCCC.¹²⁴

IPCC Category 1.A.5.a: CH₄ and N₂O Emissions from Stationary Fuel Combustion—Biomass in U.S. Territories

Data are not available to estimate emissions from biomass in U.S. Territories. However, biomass consumption is likely small in comparison with other fuel types, and therefore CH₄ and N₂O emissions are considered insignificant.

¹²³ See : https://www.iata.org/pressroom/facts_figures/fact_sheets/Documents/fact-sheet-alternative-fuels.pdf

¹²⁴ Paragraph 37(b) of Decision 24/CP.19 "Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention." See <<http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf>>.

IPCC Category 1.B.1.a.1.i: CO₂ and CH₄ from Fugitive Emissions from Underground Coal Mining Activities

Carbon dioxide emissions are currently not estimated for active coal mining activities, as emission quantities are deemed insignificant, below 0.05 percent of national emissions based on expert judgment of the coal mine inventory compilation team. Future Inventories may quantify these emissions, if it is deemed it will not require a disproportionate amount of effort. While CH₄ recovery projects were operating at surface mines from 2006 to 2010, the avoided emissions were so small that they were not included in the Inventory estimates.

IPCC Category 1.B.1.a.1.iii: CO₂ from Fugitive Emissions from Abandoned Underground Coal Mines

Carbon dioxide emissions are currently not estimated for abandoned coal mines, as emission quantities are deemed insignificant, below 0.05 percent of national emissions based on expert judgment of the coal mine inventory compilation team. Future inventories may quantify these emissions, if it is deemed it will not require a disproportionate amount of effort.

IPCC Category 1.B.1.a.2.i: CO₂ and CH₄ from Fugitive Emissions from Surface Coal Mining Activities

Carbon dioxide emissions are currently not estimated for active coal mining activities, as emission quantities are deemed insignificant, below 0.05 percent of national emissions based on expert judgment of the coal mine inventory compilation team. Future Inventories may quantify these emissions, if it is deemed it will not require a disproportionate amount of effort.

IPCC Category 1.B.2.a.3: CO₂ from Fugitive Emissions from the Transport of Oil

Based on a preliminary analysis, EPA determined that CO₂ emissions from the transport of oil are negligible. Assuming the same CO₂ content as gas from post-separator whole crude and applying this to the CH₄ estimates from transport of oil results in a national emission estimate of 1.2 kt, or less than 0.02 percent of national emissions.

IPCC Category 1.B.2.c.2: N₂O Emissions from Fugitive Emissions from Venting and Flaring

Data are currently not available to estimate N₂O emissions from venting and flaring from oil production, natural gas production, and combined oil and natural gas production.

Industrial Processes and Product Use

IPCC Category 2.A.4.a: CO₂ Emissions from Process Uses of Carbonates–Ceramics

Data are not currently available to estimate emissions from this source.

IPCC Category 2.A.4.c: CO₂ Emissions from Process Uses of Carbonates–Non-metallurgical Magnesium Production

Data are not currently available to estimate emissions from this source.

IPCC Category 2.B.4.a: CO₂ and N₂O Emissions from Caprolactam Production

Caprolactam is a widely used chemical intermediate, primarily to produce nylon-6. All processes for producing caprolactam involve the catalytic oxidation of ammonia, with N₂O being produced as a byproduct. EPA has identified national production data for 2004 through 2015 in the American Chemistry Council's (ACC) Business of Chemistry to estimate annual emissions. EPA plans to integrate estimates for Caprolactam Production in the next Inventory.

IPCC Category 2.B.4.b: CO₂ and N₂O Emissions from Glyoxal Production

Data are currently not available to estimate emissions from this source.

IPCC Category 2.B.4.c: CO₂ and N₂O Emissions from Glyoxylic Acid Production

Data are currently not available to estimate emissions from this source.

IPCC Category 2.B.5.b: CO₂ and CH₄ Emissions from Calcium Carbide Production

Carbon dioxide is formed by the oxidation of petroleum coke in the production of calcium carbide. These CO₂ emissions are implicitly accounted for in the storage factor calculation for the non-energy use of petroleum coke in the Energy chapter. CH₄ may also be emitted from the production of calcium carbide because the petroleum coke used in the process contains volatile organic compounds, which form CH₄ during thermal decomposition. EPA had identified literature

indicating that one facility is operating at over 100,000 tons of calcium carbide production capacity in the United States. Pending review of this information, research on historical production and resources, EPA plans to integrate emission estimates to improve completeness in the next Inventory report.

IPCC Category 2.C.1.c: CH₄ Emissions from Direct Reduced Iron (DRI) Production

Data are not readily available to apply the IPCC default Tier 1 methane (CH₄) emission factor. The emissions are assumed to be insignificant but this analysis will be updated in future Inventory submissions to quantitatively justify emissions reporting as “not estimated”.

IPCC Category 2.E.2, 2.E.3, and 2.E.4: Fluorinated Gas Emissions from Electronics Industry—TFT Flat Panel Displays, Photovoltaics, and Heat Transfer Fluid

Along with more emissions information for semiconductor manufacturing, EPA’s GHGRP requires the reporting of emissions from other types of electronics manufacturing, including micro-electro-mechanical systems (MEMs), flat panel displays, and photovoltaic cells. There currently are no flat panel display and photovoltaic cell manufacturing facilities that are reporting to EPA’s GHGRP, and five reporting MEMs manufacturers. The MEMs manufacturers also report emissions from semiconductor manufacturing and do not distinguish between these two types of manufacturing in their report; thus, emissions from MEMs manufacturers are included in emissions from semiconductor manufacturing. Emissions from manufacturing of flat panel displays and photovoltaic cells may not occur; EPA is not aware of such sources within the United States. To the extent that they do occur, they be included in future Inventory reports; however, estimation methodologies would need to be developed.

Agriculture

IPCC Category 3.A.4: CH₄ Emissions from Enteric Fermentation—Camels and Llamas

Enteric fermentation emissions from camels and llamas are not estimated because there is no significant population of camels and llamas in the United States. Additional analyses will be conducted to quantitatively justify emissions reporting as “not estimated” and considered insignificant.

IPCC Category 3.A.4: CH₄ Emissions from Enteric Fermentation—Poultry

No IPCC method has been developed for determining enteric fermentation emissions from poultry.

IPCC Category 3.A.4: CH₄ and N₂O Emissions from Manure Management—Camels and Llamas

Manure management emissions from camels and llamas are not estimated because there is no significant population of camels and llamas in the United States. Additional analyses will be conducted to quantitatively justify emissions reporting as “not estimated” and considered insignificant.¹²⁵

IPCC Category 3.F.1.2: CH₄ and N₂O Emissions from Field Burning of Agricultural Residues—Barley, Oats, Rye, Potatoes

There was is no significant burning of barley, oats, rye, and potatoes in the United States, and therefore emissions from field burning of agricultural residues from these crops are not currently estimated. Additional analyses will be conducted to quantitatively justify emissions reporting as “not estimated” and considered insignificant.

Land Use, Land-Use Change, and Forestry

IPCC Category 4.A.1: Emissions from Rewetted Organic Soils in *Forest Land Remaining Forest Land*

Emissions from this source will be estimated in future Inventories when data become available.

IPCC Category 4.A.1: Direct N₂O Emissions from N mineralization/immobilization in *Forest Land Remaining Forest Land*

Direct N₂O emissions from N mineralization/immobilization are not estimated because data are currently not available.

¹²⁵ Paragraph 37(b) of Decision 24/CP.19 “Revision of the UNFCCC reporting guidelines on annual inventories for Parties included in Annex I to the Convention.” See <<http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf>>.

IPCC Category 4.A.2: Carbon Stock Change in Organic Soils in *Land Converted to Forest Land*

Carbon stock change in organic soils are not currently estimated. Emissions from this source will be estimated in future Inventories when data become available.

IPCC Category 4.B.1: Carbon Stock Change in Living Biomass in *Cropland Remaining Cropland*

Carbon stock change in living biomass is not estimated because data are currently not available.

IPCC Category 4.B.2: Carbon Stock Change in Living Biomass in *Grassland Converted to Cropland*

Carbon stock change in living biomass is not estimated because data are currently not available.

IPCC Category 4.C.1: Carbon Stock Change in Living Biomass in *Grassland Remaining Grassland*

Carbon stock change in living biomass is not estimated because data are currently not available.

Waste

IPCC Category 5.D.2: N₂O Emissions from Wastewater Treatment and Discharge—Industrial Wastewater

Nitrous oxide emissions from stand-alone industrial wastewater treatment are not currently estimated due to a lack of emission factor data.