Summary Report for the Second Stakeholder Webinar on the Waste Sector Data and Methodology in the U.S. Greenhouse Gas Inventory (January 12, 2017)

EPA develops an annual report called the *Inventory of U.S. Greenhouse Gas Emissions and Sinks* (Inventory).[1] This report tracks total annual U.S. emissions and removals by source, economic sector, and greenhouse gas (GHG) going back to 1990. One sector in the annual report is the waste sector, which includes municipal solid waste (MSW) landfills, industrial landfills, composting, and wastewater. With each Inventory report, EPA strives to improve the data inputs and calculations used. The national greenhouse gas inventory is submitted to the United Nations in accordance with the United Nations Framework Convention on Climate Change (UNFCCC). Additional information about GHG inventory reporting requirements can be found on the UNFCCC GHG Inventories Reporting Requirements page (http://unfccc.int/national_reports/annex_i_ghg_inventories/reporting_requirements/items/2759.php).

On January 12, 2017, EPA held a second stakeholder webinar on the Inventory data and methodology for the waste sector, with a focus on MSW landfills and discussing comments and information that have been shared with EPA since the previous webinar.

1. Purpose of the Targeted Waste Sector Stakeholder Outreach

The purpose of this targeted waste sector stakeholder outreach series is to engage with stakeholders on the data submitted by facilities under the Greenhouse Gas Reporting Program (GHGRP) Subpart HH for MSW Landfills and the application of this information as inputs to the MSW landfill methane emissions estimates in the 1990-2015 U.S. GHG Inventory. EPA's decision to informally engage with stakeholders came about through comments on the 1990-2014 U.S. GHG Inventory Public Review Draft, where annual waste disposal data from Subpart HH was incorporated into the Inventory.

On January 12, 2017, Rachel Schmeltz from the EPA led the webinar to provide an overview of, and reaction to, the comments and reports received since the preliminary stakeholder webinar on December 8, 2016 where EPA had asked stakeholders for additional information and opinion on the following issues:

a. Use of the GHGRP annual waste disposal data in methane generation equation
b. Use of the methane generation equation with respect to the DOC value
c. Proper way to account for annual waste disposal data for facilities not reporting to the GHGRP.

Input includes, but is not limited to, data on:

- Quantities of waste types disposed at individual or groups of landfills
- How the waste composition has changed over time in a landfill or group of landfills
- Tipping receipts documenting the fraction of inerts in a landfill or group of landfills
- Statistics on the changing waste composition.

The slides from the webinars are posted on the EPA Website at: https://www.epa.gov/ghgemissions/stakeholder-webinar-waste-sector-data-and-methodology-us-

[1] The latest GHG Inventory report is available at https://www.epa.gov/ghgemissions/us-greenhouse-gas-inventory-report-1990-2014.

greenhouse-gas-inventory. The remainder of this report summarizes the January 12, 2017 webinar content and stakeholder questions and answers.

2. Summary of the Webinar

The January 12, 2017 webinar consisted of four sections discussed further below.

In the first section, EPA opened with a brief review of the purpose of the stakeholder engagement opportunities/comment schedule and purpose of the webinar.

Stakeholders provided one set of comments and two reports after the first webinar. Those stakeholders summarized their input for the webinar. First, Kelly Kerry of Waste Management presented on behalf of industry stakeholders, including Waste Management, Republic Services, SCS Engineers, the National Waste and Recycling Association, and the Solid Waste Association of North America. Their preferred approach is to directly use the Greenhouse Gas Reporting Program's (GHGRP) Subpart HH (MSW landfills) reported emissions and back-cast emissions for the Inventory time series prior to the start of the GHGRP (1990 to 2009). Ms. Kelly noted that the emissions reported through the GHGRP are considered Tier 3 data under the 2006 IPCC Guidelines and have been verified by EPA. Because the EPA has stated that the GHGRP represents 85-95% of MSW landfill emissions, this group of stakeholders suggested applying a 10% correction factor to account for landfills not reporting under the GHGRP.

Next, Bryan Staley from the Environmental Research and Education Foundation (EREF), a 501(c)3 charity, that funds and directs scientific research and education initiatives for waste management practices, presented findings from two recently published reports as the findings apply to the Solid Waste Inventory methodology. These reports are entitled:

- Municipal Solid Waste Management in the U.S.: 2010 and 2013 (EREF, 2016), and
- Estimating Degradable Organic Carbon in MSW Landfills and the Impact of Non-MSW (EREF, 2016)

In the Municipal Solid Waste Management in the U.S.: 2010 and 2013 report, EREF applied a bottom-up approach to quantifying the tonnage of MSW managed in the United States. An estimated 347 million tons of MSW were managed in 2013, the majority of which (64%) is landfilled with an additional 27% going to recycling or composting facilities. Of this 347 million tons of MSW, 48.8% was found to be organic waste of which 79% goes directly to MSW landfills. EREF also found that 45 states allow non-MSW waste to be disposed into MSW landfills. When looking at the non-MSW entering MSW landfills, EREF found that the waste disposed in landfills in 14 states with compositional information was two-thirds MSW and one-third non-MSW (construction and demolition waste, sludge, ash, industrial waste).

In the Estimating Degradable Organic Carbon in MSW Landfills and the Impact of Non-MSW report, EREF calculated DOC values from statewide waste characterization studies, and compared the calculated DOC values to the default values that subpart HH reporters have the option to use. Findings shows that both the range and average DOC value of the studies are lower than the DOC values included in the GHGRP for subpart HH facilities.

EREF also presented on an ongoing analysis of the beneficial use of landfill gas. Data from 1,577 landfills across the GHGRP, the Landfill Methane Outreach Program's database, and EREF's own database of smaller landfills were investigated. Findings from this investigation are as follows:

- 80 million more tons of waste are handled by private landfills than public landfills
- Approximately 75 percent of landfill gas collected is beneficially used (while the rest of the collected landfill gas is flared)
- About 55 percent of landfills reporting to the GHGRP are beneficially using or flaring their gas, while 52 percent of non-reporting landfills have no gas collection at all, although 34 percent of this data has yet to be analyzed, and
- 93 percent of the waste collected in the U.S. is reported under the GHGRP.

EREF ended their presentation with a brief glance at their future research work related to waste management.

In the final section of the webinar, the EPA proposed three different options for utilizing the GHGRP information into the solid waste inventory:

a. Option 1: Using the current methodology where the State of Garbage and EREF study data on MSW generation can be used in conjunction with a disposal factor to estimate nationwide MSW landfilled. This option requires minimal changes and allows for facility-specific methane recovery values to be used; however, it does not reduce uncertainty, EPA is unsure when updated MSW generation data will be available, and facility-specific oxidation factors cannot be used.

b. Option 2: Using methane generation values reported to the GHGRP along with methane recovery data reported to the GHGRP, supplemented with data from the LMOP, EIA, and flare database (as described in the first webinar). For non-reporting landfills, the GHGRP methane generation values could be augmented with waste disposal data from alternative data sources, and a modified DOC value could be applied. This option would allow for more landfill-specific data, but still does not allow for the use of facility-specific oxidation values. This option would also require a different method for non-reporting facilities and inventory years prior to 2010, the first year for which GHGRP is available.

c. Option 3: Using directly-reported methane emissions by facility from the GHGRP for years 2010 and forward for reporting landfills. This option allows for the use of facility-specific data including waste disposal, methane oxidation, gas collection efficiency, and methane recovery. However, this option would require the EPA to use a different method for non-reporting facilities and inventory years prior to 2010, like Option 2. It is also important to note that the GHGRP is a fluctuating dataset as some facilities will off-ramp from the program, and technical modifications may impact cross-year net emissions.

EPA then opened the webinar to questions, asking webinar participants for input on industry comments, EREF's study data, and the three options presented by the EPA for integrating GHGRP Subpart HH data into the inventory.

3. Summary of the Discussion and Questions and Answers

A summary of the discussion and question and answer portion of the webinar is provided below.

Fugitive losses need to be discussed and accounted for in the methodology, not just in methane flux and oxidation values present in the GHGRP.

The EPA agreed that fugitive losses are important to account for when using this methodology, but points out that fugitive emissions may already be encompassed in calculations within the GHGRP Subpart HH equations with respect to the collection efficiency. Fugitive losses will be considered in this manner in whatever methodology the EPA ultimately decides to move forward with for the Inventory.

Can EPA discuss the proposed back-casting process? Does there necessarily need to be a clean join from one set of information to another if there is a change in source, or can EPA simply indicate that the methodology changed at year X and move forward?

The EPA relies on IPCC guidelines for recommendations on how to accurately and effectively analyze data, and notes that these guidelines should be reviewed to see if they contain information on how to smooth out data in an instance such as methodological changes in the Inventory from 2010 onward. The EPA, however, also recognizes that these are guidelines and therefore should be flexible and allow for change. Internal EPA discussions will need to occur to determine how to handle this back-casting procedure and the process will be documented in the Inventory text.

What is the purpose of having prior years of data in the inventory?

Inventories developed using the IPCC Guidelines include the time series of 1990 to date. The year 1990 is typically considered the baseline with which progress towards mitigation measures are tracked. The prior year data are also used for trends analysis.

Why did EREF use a bottom-up methodology as opposed to a top-down methodology used by the EPA?

EREF representatives explained that they used a bottom-up methodology because they felt that going to facilities and directly measuring tonnage would provide a more accurate depiction of the actual tonnage at these facilities rather than a materials flow methodology that encompasses a top-down approach.

EREF representatives also noted that they expect for the Municipal Solid Waste Management in the U.S. report to be updated every three years.

4. Next Steps

The EPA will consider the stakeholder input and proposed options for moving forward with the Inventory in developing the next draft which will be available for public review. Stakeholders are welcome to provide comment on the draft Inventory methodology and emissions estimates during the public review comment period from approximately February 17, 2017 through March 19, 2017.