

Interim Guidance for Calculating Federal Compliance with Executive Order 13693 Waste Diversion Goals

Pursuant to Executive Order 13693,
Planning for Federal Sustainability in the Next Decade

Council on Environmental Quality

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1.0 Introduction

The Council on Environmental Quality (CEQ) is issuing this interim guidance document pursuant to Executive Order (E.O.) 13693, *Planning for Federal Sustainability in the Next Decade*. This interim guidance will be reviewed and updated by CEQ as appropriate.

E.O. 13693 calls for the Federal government to reduce greenhouse gas (GHG) emissions by at least 40 percent by 2025 relative to a 2008 baseline. Diversion is an important waste management practice and in addition, reduces GHG emissions from landfill waste. Landfills are a significant source of methane, a potent GHG with a global warming potential 25 times greater than carbon dioxide.¹ Methane accounts for approximately 10 percent of all U.S. GHG emissions, and landfills are one of the largest sources of anthropogenic methane in the United States, at around 20 percent of all anthropogenic methane releases.²

Section 3(j)(ii) and (iii) of E.O. 13693 and the associated *Implementing Instructions for Executive Order 13693: Planning for Federal Sustainability in the Next Decade*³ direct agencies, where life-cycle cost effective, beginning in fiscal year 2016, to annually divert:

- 1) At least 50 percent of non-hazardous solid waste, including food and compostable material but not construction and demolition (C&D) materials and debris, and
- 2) At least 50 percent of non-hazardous C&D materials and debris, defined as waste material and debris generated during construction, renovation, demolition, or dismantling of all structures and buildings and associated infrastructure.

This document provides agencies with guidance for calculating achievement of the waste diversion goals in E.O. 13693 Section 3(j)(ii) and (iii), in support of the E.O.'s overarching goal of reducing GHG emissions.

The waste diversion goals, and therefore the calculation methodologies in this guidance, apply only to non-hazardous waste. Agencies should consult applicable Resource Conservation and Recovery Act (RCRA) provisions and regulations to ensure determination and proper management of hazardous and non-hazardous waste.

¹ U.S. EPA Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2014, February 22, 2016: www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Main-Text.pdf.

² Ibid.

³ www.whitehouse.gov/sites/default/files/docs/eo_13693_implementing_instructions_june_10_2015.pdf

2.0 Waste Management Hierarchy

The Waste Management Hierarchy established by the U.S. Environmental Protection Agency (EPA), below, categorizes waste management activities from the most to least environmentally preferred options for waste management.⁴



As source reduction and reuse are the most environmentally preferred in the Waste Management Hierarchy, agencies are encouraged to first pursue these activities to minimize waste, including food waste.⁵

To meet E.O. 13693 goals for diversion of non-hazardous solid waste and C&D waste, agencies should pursue two primary waste management practices: recycling and composting. Material salvaged for reuse may also be credited toward diversion for C&D waste. Instructions for calculating rates of waste diversion are outlined in **Section 5.0**.

Agencies may also obtain limited credit toward E.O. 13693 waste goals for energy recovery, as these practices prevent releasing methane into the atmosphere.⁶ For the purposes of this guidance, energy recovery or “waste to energy” activities will be credited as “waste conversion.” Calculation for determining maximum credit for waste conversion is detailed in **Section 6.0**.

Waste diversion plus credit for waste conversion will be used to determine a **waste goal rate** for compliance with E.O. goals. Calculation for determining the waste goal rate is detailed in **Section 4.0**.

⁴ www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy.

⁵ On September 16, 2015, U.S. Department of Agriculture (USDA) Secretary Vilsack and Environmental Protection Agency (EPA) Deputy Administrator Meiburg announced the Nation’s first food waste reduction goal, which calls for a 50% reduction by 2030. Further information on the national goal and on ways to reduce food waste and loss can be found on the USDA (www.usda.gov/oce/foodwaste/) and EPA website (www.epa.gov/sustainable-management-food).

⁶ See *Is It Better To Burn or Bury Waste for Clean Electricity Generation?*, Kaplan et al, Environ. Sci. Technol., 2009, 43 (6), pp 1711–1717, pubs.acs.org/doi/pdf/10.1021/es802395e.

3.0 Applicability and Reporting Requirements

Agencies will calculate and report waste goal rates annually for both solid waste and C&D waste. While reporting is at the agency level, agencies may internally collect and track waste management data at the building, facility, or campus level, depending on what is most efficient and effective, as long as the same level of rigor is used to calculate or estimate across the agency.

For solid (non C&D) waste, agencies should account *at minimum* for waste from buildings of 5,000 gross square feet or more, as defined by the Federal Real Property Council Guidance for Real Property Inventory Reporting (www.gsa.gov/portal/content/103101). Agencies are encouraged, but not required, to include buildings smaller than 5,000 gross square feet, leased facilities, and/or non-building waste if useful to agency waste management efforts. If these additional categories are included, agencies should aim to expand waste tracking and reporting to the maximum extent practicable, and should not limit reporting to only those facilities where waste diversion is already occurring.

For solid waste, agencies should report wherever the agency is directly responsible for waste management or for payment of contractor waste management services. This aligns with reporting requirements for other building and facility-related goals.

Reporting for C&D waste should include all C&D services, including wherever the contractor manages and pays for waste management services.

TABLE 3.0 A – Party Responsible for Reporting on Non C&D Waste

	Building Owner	Party Responsible for Payment of Waste Management	Party Responsible for Reporting
1	GSA	GSA	GSA
2	GSA	Agency	Agency
3	Agency	Agency	Agency

Agencies should track the actual amounts of materials that fall into the categories and subcategories listed in **Table 3.0 B**. Agencies may also use estimated values in some instances, as detailed in **Section 7.0**. These values will be used for calculating and reporting the waste goal rate.

TABLE 3.0 B – Categories for Waste Reporting

Waste Management Hierarchy Category	Subcategory	Waste Goal Rate (WGR) Reporting Categories
1. Source Reduction & Reuse	1a. Source Reduction	N/A: no credit toward waste goal
	1b. Reuse	Total Waste Diverted (TWD) and Total Waste Stream (TWS) – <i>C&D calculation only</i>
2. Recycling/Composting	2a. Recycling ⁷	Total Waste Diverted (TWD) and Total Waste Stream (TWS)
	2b. Composting ⁸	Total Waste Diverted (TWD) and Total Waste Stream (TWS)
3. Energy Recovery ⁹	3a. Waste to Energy	Total Waste Converted (TWC), Credit for Waste Converted to Energy Recovery (CWC), and Total Waste Stream (TWS)
	3b. Anaerobic Digester	
	3c. Other ¹⁰	
4. Treatment & Disposal	4a. Landfilled or Incinerated ¹¹	Total Waste Stream (TWS)

Agencies should use actual, measured weights of materials to the greatest extent possible. Where waste management is subcontracted to a janitorial or other building services contract, agencies may seek to modify these contracts to obtain weight information or use volume-to-weight conversion factors. Agencies can obtain these weights through a variety of sources and methods, including:

- Certified weight tickets that report compactor or truck weight before and after unloading materials.
- Actual weights for recycled or composted materials, or application of standard weight to grades and classes of materials.
- Documented weights of items diverted to reuse or based on estimates from identical items that were previously weighed.¹²

When actual weight measurements of recycled, composted, waste converted to energy recovery, landfilled, or incinerated waste are not available for a particular building, agencies may use estimates for

⁷ Including materials that are sold for recycling.

⁸ Including both on-site and off-site composting.

⁹ Does not include incineration without energy recovery.

¹⁰ Agencies should consult CEQ prior to including other processes under energy recovery.

¹¹ Incineration does not count as waste converted to energy recovery.

¹² Documented weights for reused materials may come from actual measurements or product specification sheets.

reporting purposes (see **Section 7.0** for estimation techniques). Agencies should record whether they are using actual weight measurements, estimates, or a combination of these approaches.

4.0 Calculating the Waste Goal Rate (WGR)

As described in **Section 2.0**, the waste goal rate (WGR) is the total waste diverted (TWD) plus credit for waste converted to energy recovery (CWC) divided by the total waste stream (TWS). This applies to both non-hazardous solid waste and C&D reporting.

Waste Goal Rate (WGR) Equation:

$$WGR = \frac{TWD + CWC}{TWS} \times 100$$

$$WGR = \frac{1,000 \text{ tons} + 490 \text{ tons}}{3,000 \text{ tons}} \times 100 = 50\%$$

5.0 Calculating Total Waste Diverted (TWD)

Total Waste Diverted (TWD) is the total weight of all materials that are recycled and composted. For *C&D waste only*, material salvaged for reuse may also be counted in the diversion calculation. **Table 5.0** shows an illustrative example for Agency A. The weights for recycling and composting for each building/campus are added together to yield the total waste diverted. Agencies may choose to track total waste diverted on a multi-building basis if multiple buildings share common collection containers or a common processing center.

TABLE 5.0 – Total Waste Diverted (TWD) (Agency A)

Waste Stream Category	Building X (Tons)	Campus Y (Tons)	Building Z (Tons)	TWD (Tons)
Materials Recycled	400	300	200	900
Organics Composted	50	50	0	100
Total Waste Diverted (TWD)				1000

TWD Equation:

TWD = materials recycled + organics composted

TWD = 900 tons + 100 tons = 1000 tons

6.0 Credit for Waste Converted to Energy Recovery (CWC)

Credit for waste converted to energy recovery (CWC) is based on the amount of total waste converted to energy recovery (TWC), but is *limited* and cannot exceed 50% of total waste diverted.

The limit is applied agency-wide, not on individual facilities. CWC should be calculated separately for solid waste and C&D waste.

TABLE 6.0 – Credit for Waste Converted to Energy Recovery (CWC) (Agency A)

Waste Stream Category	Building X (Tons)	Building Y (Tons)	Building Z (Tons)	TWD (Tons)	TWC (Tons)	Limited CWC (Tons)
Materials Recycled	400	300	200	900	-	-
Organics Composted	50	50	0	100	-	-
Waste Converted to Energy Recovery	50	150	400	-	600	500

Credit for Waste Converted to Energy Recovery (CWC) Equation:

$$\text{TWC} = 600$$

CWC = the smaller of 1) TWC or 2) 50% (half) of TWD

$$50\% \text{ of TWD} = (900 + 100) / 2 = 500$$

CWC limited to 500 tons

7.0 Calculating Total Waste Stream (TWS)

TWS (total waste stream) is the total weight of all solid waste materials that are recycled and composted (diverted); waste converted to energy recovery (converted); and landfilled or incinerated.

TABLE 7.0 – Total Waste Stream (TWS) (Agency A)

Waste Stream Category	Building X (Tons)	Building Y (Tons)	Building Z (Tons)	TWS (Tons)
Materials Recycled	400	300	200	900
Organics Composted	50	50	0	100
Waste Converted to Energy Recovery	50	150	400	600
Waste Landfilled or Incinerated	500	500	500	1,500
TWS	1,000	1,000	1,100	3,100

TWS Equation:

TWS = materials recycled + organics composted + waste converted + waste landfilled or incinerated

$$\text{TWS} = 900\text{tons} + 100\text{ tons} + 600\text{ tons} + 1500\text{ tons} = 3,100\text{ tons}$$

8.0 Estimating Waste Diversion Weights

Although agencies should strive to require weight measurement in all waste handling contracts, some buildings may lack accurate measurements of waste, making it difficult to calculate diversion. In the absence of certified weight tickets, agencies may estimate the waste streams using the following methods.

Weight Estimates Using Containers

Waste deposited in containers may be loose or compacted. Agencies should use EPA's most current Volume-to-Weight Conversion Factors to estimate weights for a given material. The document, currently found at <https://www.epa.gov/smm/volume-weight-conversion-factors-solid-waste>, indicates standard weights and volumes that can be used to develop estimates for a wide range of materials, including municipal solid waste and commingled recyclables, as well as more specific types of metals, paper, plastics, yard trimmings, equipment and C&D materials. Where the Volume-to-Weight Conversion Factors give a range of numbers, agencies should use the lower end of the range for consistency.

Front-Load Containers

An agency may be unable to obtain certified weight tickets for waste or recyclables deposited into a front-load container, where the hauler merely "tips" the front-load container into the compactor truck and proceeds to other locations until the truck is full. In this case, the agency may use the weight estimates above for non-hazardous solid waste and C&D.

Front-Load Container Annual Tonnage Calculation:

The example below assumes three pickups per week, 52 weeks per year; an 8 cubic yard capacity container, uncompacted and three-quarters full at each pickup; and uses the lower end of EPA's Volume-to-Weight Conversion Factor for uncompacted mixed municipal solid waste, 250 pounds per cubic yard.

$$\text{Equation: } \frac{\{\text{number of pickups per year} \times \text{cubic yards per pickup} \times \text{pounds per cubic yard}\}}{\text{pounds per ton}} = \text{tons per year}$$

$$\text{Example: } \frac{\{(3 \times 52) \text{ pickups per year} \times (8 \times 0.75) \text{ cubic yards per pickup} \times 250 \text{ pounds per cubic yard}\}}{2,000 \text{ pounds per ton}} \approx 117 \text{ tons per year}$$

This calculation also applies to waste deposited in open-top containers, which are generally 30 cubic yards in capacity but may measure as little as 20, or as much as 40, cubic yards. For specifications on the container at the building, contact the waste service and trash collection equipment provider.

Compactors

A waste hauling contract may be written so that the agency pays on a "per pull" charge, where the hauling and tipping fees are rolled into a single charge, and the agency does not receive a weight slip. In such a case, an agency may calculate the tonnage based on the number of removals, or "pulls."

The calculation for compactors is not as straightforward as for front-load or open-top containers, since the agency may be paying for removals of partially full compactors. Compactors generally compact trash at a 3:1 ratio, or 750 pounds per cubic yard.

Other Containers

For any other containers, agencies should use EPA's Volume-to-Weight Conversion Factors, currently found at <https://www.epa.gov/smm/volume-weight-conversion-factors-solid-waste>, to estimate weights by multiplying the number of containers by the volume of the container by the volume-to-weight conversion factor for that material.

Equation: Number of containers \times volume of container \times weight per cubic yard = total weight

For example, Building W recycled 120 containers of uncompacted office paper during the year, with a container volume of 0.75 cubic yards. To estimate the total weight of office paper recycled, an agency should use the lower end of EPA's Volume-to-Weight Conversion Factor for uncompacted office paper, 375 pounds per cubic yard:

Example:

120 containers of uncompacted office paper \times 0.75 cubic yards per container \times 375 lbs. per cubic yard = 33,750 lbs.

(Divide result by 2,000 to convert pounds to tons $\left[\frac{33,750 \text{ pounds}}{2,000 \text{ pounds per ton}} \approx 17 \text{ tons} \right]$)

Using Other Methods of Estimation

Agencies should consult with CEQ prior to using alternative methods to estimate waste streams.

9.0 Definitions

Composting: The biological decomposition of organic materials such as leaves, grass clippings, brush, paperboard, cardboard, and food services waste (e.g., waste food, food soiled paper, napkins, paper towels, compostable tableware) into a soil amendment or mulch. This includes both on-site and off-site composting.

Construction and demolition (C&D) materials and debris: Waste materials and debris generated during any construction, renovation, demolition, and dismantling of all structures and buildings and associated infrastructure. C&D materials often contain bulky, heavy materials that may include concrete, wood, asphalt, gypsum, metals, bricks, glass, plastics, salvaged building components, and trees, stumps, earth, and rock from clearing sites.

Credit for waste converted to energy recovery (CWC): The smaller number between: total waste converted to energy recovery and 50% of total materials recycled plus organics composted.

Energy Recovery: The conversion of waste materials into usable heat, electricity, or fuel through a variety of processes, including combustion, gasification, pyrolyzation, anaerobic digestion, and landfill gas (LFG) recovery. This process is often called waste-to-energy (WTE).

Incineration: A waste treatment process involving the combustion of organic substances contained in waste materials without energy recovery. Incineration does not count as waste converted to energy recovery.

Landfill: A discrete area of land or excavation that receives waste.

Landfilling: Disposing of waste materials in a landfill.

Recycling: The series of activities—including collection, separation, and processing—by which products or other materials are recovered from the solid waste stream for use in the form of raw materials for the manufacture of new products, other than fuel for producing heat or power by combustion.

Reuse: Preventing or delaying an existing product or material's entry into the waste collection and disposal system.

Source reduction: Any change in the design, manufacture, purchase, or use of materials or products, including packaging, to reduce their amount or toxicity before they become municipal solid waste.

Total waste converted (TWC): The total weight of all materials converted to energy recovery.

Total waste diverted (TWD): The total weight of non-hazardous solid and/or C&D waste material diverted to recycling and composting.

Total waste stream (TWS): The total weight of non-hazardous and/or C&D waste material either 1) diverted to recycling and composting, 2) used by energy recovery facilities, or 3) disposed in landfills.

Waste converted to energy recovery: The conversion of waste material into usable heat, electricity, or fuel through processes such as waste-to-energy and anaerobic digestion. This does not include incineration.

Waste diversion rate: The fraction of the total waste diverted (TWD) from landfills, calculated by dividing TWD by TWS.

Waste goal rate (WGR): The percentage of the total waste stream (by weight) that counts towards the 50% diversion goal for E.O. 13693. The WGR is the total waste diverted (TWD) plus credit for waste converted to energy recovery (CWC), divided by the total waste stream (TWS), multiplied by 100 to yield a percentage.