Appendix K

Comparative Greenhouse Gas Analysis

TECHNICAL MEMORANDUM

Date: January 2022

Prepared For: King County Solid Waste Division

Prepared By: Herrera Environmental Consultants, Inc.

Subject: **Comparative Greenhouse Gas Analysis**

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Introduction

As part of King County's CHRLF 2020 Site Development Plan and Facilities Relocation Final EIS, a comparative greenhouse gas (GHG) assessment was performed to compare implementation of any of the action alternatives, including the facility relocation options, compared to the No Action Alternative. Because King County has not yet selected the long-term disposal option that will be used once the CHRLF reaches its capacity under the alternative selected as the result of the EIS process, potential GHG emissions from the action alternatives and the No Action Alternative are compared over the same period into the future based on the Solid Waste Comp Plan direction that either waste export by rail (WEBR) to a regional landfill or a waste-to-energy (WTE) facility located somewhere in King County would be utilized once CHRLF closes.

Modeling Approach

In compliance with 40 CFR Part 98, Mandatory Greenhouse Gas Reporting, King County reports GHG emissions into US EPA's electronic greenhouse gas reporting tool (e-GGRT) using calculations defined in Subpart HH § 98.343 for municipal solid waste landfills and using calculations defined in Subpart C § 98.30 for general stationary fuel combustion sources. However, the methods used to calculate facility emissions for compliance with 40 CFR Part 98 are meant to capture one year of emissions and are not appropriate for estimating GHG emissions over the multiple years and varying scenarios inherent in the alternatives under consideration.

There is some dispute in the scientific community as to how GHG from waste management scenarios should be considered. Given the various sources of data and modeling techniques currently in use to evaluate GHG emissions from landfills and other waste management facilities and in order to conservatively estimate the potential range of emissions, King County used a combination of the most widely accepted industry models to estimate the total GHG emissions (biogenic and non-biogenic sources) from the alternatives under consideration.

Net GHG emissions in metric tons of carbon dioxide equivalents (MTCO2e) are estimated using the Waste Reduction Model (WARM) excel version 15, Municipal Solid Waste Decision Support Tool (MSW-DST) version 2, Landfill Gas Emission Model (LandGEM) version 3.03, the Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) tool 2020, and the King County SEPA GHG Emission Worksheet, all of which are the latest versions of those models and incorporate the latest improvements to their individual methodologies. Additional information about each of these models is provided below in Modeling Tools. While these models have inherent differences in default model assumptions, inputs and calculations, King County chose to model the alternatives under consideration using assumptions and inputs as similar as possible in order to accurately compare results. The modeling assumptions used are described in more detail below in Modeling Assumptions.

Sources of GHG Emissions

The primary GHG emissions considered in the analysis include carbon dioxide (CO2) and methane (CH4) from the following sources:

- Waste--decomposition of the waste after placement in a landfill or combustion in a WTE facility, including fugitive emissions
- Operation of the landfill gas control system, including combustion of collected landfill gas in flares
- Operation of diesel- and gasoline-powered landfill equipment (dozers, compactors, construction equipment, etc.) for daily operations and for construction, including offsite construction trips (materials, soils, etc.)
- Operation of diesel-powered trucks and rail for waste transport
- Combustion of BEW gas through flares and reciprocating engines
- Combustion of BEW Pipeline Gas at its end use.

The matrix shown in Table 1 indicates the model or combination of models used to estimate GHG emissions from the sources listed above, and for the corresponding development activity, if applicable. Shaded boxes indicate those sources of emissions are not applicable to the development activity.

Table 1. Applicable Modeling to GHG Sources and Development Activity

	Landfill Construction		Facilities Construction			Landfill Operation		
Sources	**CHRLF**	**Offsite**	**Landfill Support**	**WTE**	**WEBR**	**To Closure**	**Closure to 2046 (WEBR)**	**Closure to 2046 (WTE)**
Waste including fugitive emissions						WARM MSWDST LandGEM	WARM MSWDST LandGEM	WARM MSWDST LandGEM
Operation of the landfill gas control system						WARM MSWDST	WARM MSWDST	WARM MSWDST
Truck and equipment for daily operations and construction	AFLEET	AFLEET	AFLEET KC GHG Wrksht	AFLEET KC GHG Wrksht	AFLEET KC GHG Wrksht	WARM MSWDST	WARM MSWDST	WARM MSWDST
Waste transport						WARM MSWDST	WARM MSWDST	WARM MSWDST

Table 1. Applicable Modeling to GHG Sources and Development Activity								
	Landfill Construction		Facilities Construction			Landfill Operation		
Sources	CHRLF	Offsite	Landfill Support	WTE	WEBR	To Closure	Closure to 2046 (WEBR)	Closure to 2046 (WTE)
Combustion of BEW gas						WARM MSWDST	WARM MSWDST	WARM MSWDST
Combustion of BEW Pipeline Gas at its end use						WARM MSWDST	WARM MSWDST	WARM MSWDST

WARM scenario modeling for WTE and WEBR relies on the methods and assumptions presented in the King County report Waste -To-Energy and Waste Export by Rail Feasibility Study (King County 2017), which itself relies on the emission factors and emission credits in the WARM model documentation for the more refined GHG estimate based on County-specific considerations used in "Method 2" for that analysis. To be consistent with that methodology, all analyses using all models (except AFLEET) identify separately the following GHG emission "credits":

- Biogenic carbon stored in the landfill
  (The NRMRL report [NRMRL 2015] points out that biogenic carbon storage is included as an anthropogenic credit in the landfill GHG estimates for WARM and it can be either included or excluded as a credit in MSW-DST. As discussed earlier, King County configured the models similarly in order to compare results).

- CO_2 emissions avoided through landfill gas-to-energy

- Advanced Material Processing (AMP) of metals

- WTE residual ash reuse

As noted in King County's report, the uncaptured methane produced from anaerobic decomposition of waste is counted in all scenario models (WARM and MSWDST) as an anthropogenic GHG because degradation would not result in methane emissions if not for placement in the landfill. The methane that is captured by the landfill gas recovery system and converted to CO_2 through combustion is not counted because the CO_2 is of biogenic origin.

Waste Management Scenarios

All of the alternatives under consideration assume the CHRLF will continue to operate into the future, with the landfill closed to disposal in 2028 under the No Action Alternative, 2037 under

Action Alternative 1, 2038 under Action Alternative 2, and 2046 under Action Alternative 3. For each alternative at the time CHRLF stops accepting waste, waste would then be disposed at a waste-to-energy facility located somewhere in King County or exported to an out of county regional landfill. Appendix F of the Solid Waste Comp Plan describes the long term disposal options considered, including the specific out of county landfills with suitable rail access and remaining capacity. All are large modern landfills, regulatory compliant facilities and are equipped with state of the art landfill gas (LFG) recovery and energy production systems. All are accessible by truck, rail, and barge from Seattle. Three of the landfills located in eastern Washington and Oregon with an arid climate that receives less than 10 inches of annual precipitation; one landfill in eastern Washington receiving less than 15 inches of precipitation per year; and one in Idaho receiving less than 12 inches off annual precipitation (King County 2019a).

In order to evaluate GHG emissions from the CHRLF action alternatives, it was assumed that the out-of-county regional landfill would be located 320 miles by rail from an intermodal site 20 miles on average from the King County Recycling and Transfer Stations. To model the GHG emissions from the WEBR scenario, it was assumed that CHRLF receives greater than 50 inches of rainfall annually and that the out of county regional landfill receives less than 20 inches of rainfall annually. All models use the typical LFG collection rates, as defaulted by the WARM and MSW-DST models, which are shown in the following section.

Modeling Tools

In 2015 the National Risk Management Research Laboratory (NRMRL), a part of the US EPA, published A Comparative Analysis of Life-Cycle Assessment Tools for End-of-Life Materials Management Systems (NMRMRL 2015). The analysis identified 29 different lifecycle assessment software tools and chose five tools to further evaluate how they assessed environmental and economic impacts of end-of-life materials management options. The analysis compared the results from each tool for a wide variety of waste management scenarios and concluded that "although the magnitude of impact varied among tools, the tools results, in general, provided consistent qualitative interpretation of environmental benefits as expected for various materials-management options simulated."

King County has prepared this summary using two of the tools evaluated in the NRMRL study, alone and in combination, to evaluate the alternatives in combination with the two long-term disposal scenarios under consideration (WEBR and WTE). Additional models were used to refine and supplement the GHG estimates to reflect the full range of emissions possible.

The first is the Waste Reduction Model (WARM), a modeling tool developed by the US EPA that is widely used and accepted throughout the solid waste industry. WARM is a life-cycle GHG accounting tool used to compare the emissions and credits resulting from different waste management options (e.g., landfill disposal, WTE, etc.) for materials commonly found in the waste stream. Because the emission factors used by WARM represent the full life-cycle changes in GHG emissions, WARM correctly accounts for the full range of GHG emission changes resulting from alternative waste management options. WARM:

- Does not explicitly model the timing of GHG emission changes.17
- Only considers anthropogenic emissions as GHG emissions.16
- The emissions shown for each solid waste management alternative in WARM represent the estimate for net GHG emissions, which includes direct GHG emissions associated with the alternative, and any avoided fossil fuel utility emissions.
- Considers landfill carbon storage as a credit on emissions that occur for landfilled materials.18
- Accounts for the energy used by mobile equipment used at the landfill to place and compact waste, and to place daily cover materials.

The second is the Municipal Solid Waste Decision Support Tool (MSW-DST), a peer reviewed and commonly used modeling tool developed by RTI with funding from EPA. MSW-DST is also a comprehensive LCA tool used to evaluate the cost and environmental aspects of waste management strategies, including GHG emissions analysis. MSW-DST is capable of calculating the emissions associated with all stages of waste management from waste collection, transfer, materials recovery, treatment, and final disposal for each waste management option; King County modeled only transportation and final disposal stages associated with the alternatives under consideration. MSW-DST:

- Does not explicitly model the timing of GHG emission changes.
- Considers both anthropogenic and biogenic emissions as GHG emissions.16
- The emissions shown for each solid waste management alternative in MSW-DST represent the estimate for net GHG emissions, which includes direct GHG emissions associated with the alternative, and any avoided fossil fuel utility emissions.
- Can consider landfill carbon storage as a credit on emissions that occur for landfilled materials or as neutral.18
- Accounts for the energy used by mobile equipment used at the landfill to place and compact waste, and to place daily cover materials.

In general, MSW-DST allows for more customization than WARM, allowing for more inputs such as distance traveled from the WTE facility to the ash disposal site.

A third tool, the Landfill Gas Emissions Model (LandGEM), is used specifically to incorporate the emissions of existing buried refuse, which the other models exclude. LandGEM is used by King County and throughout the waste management industry to determine if a landfill is subject to the control requirements of Clean Air Act and to estimate emissions rates for total landfill gas, methane, carbon dioxide, nonmethane organic compounds, and individual air pollutants.

A fourth tool, AFLEET, is used to quantify direct emissions from construction and operations (including on-road vehicle and off-road equipment use). AFLEET uses data from Argonne's Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) fuel-cycle model to generate necessary well-to-wheels petroleum use and GHG emission co-efficients for key fuel production pathways and vehicle types. In addition, US EPA’s MOtor Vehicle Emission Simulator (MOVES) and certification data are used to estimate tailpipe air pollutant emissions.

The key assumptions are included in the Modeling Assumptions section, below and detailed results are included in the Modeling Results section, below.

Modeling Assumptions

Each of the models differs in the degree of customization allowed, and King County made changes to the models where able in order to specify conditions at CHRLF or a out-of-county regional landfill that differed from the model defaults. Table 2 shows the general assumptions used for each landfill or disposal scenario model used.

Table 2. General Assumptions Used in Waste Scenario Modeling

	WARM Standard	LANDGEM Standard	MSWDST Standard
Waste Composition	WARM model mixed MSW composition using National average waste composition.	LANDGEM model reflects U.S. waste composition including MSW, inert material, and other non-hazardous waste streams.	MSW-DST uses the lasted King County Waste Characterization from 2019
Distance for transporting waste from point of collection to the CHRLF, a rail intermodal yard, or to a WTE facility	20.7 miles	N/A	20.7 miles
Trucking distance from WTE facility to landfill (if required for ash disposal)	20 miles	N/A	20 miles
Rail distance from intermodal yard to our of county regional landfill	320 miles	N/A	320 miles
LFG collection scenario	“typical operation”: 0% in Years 0-1; 50% in Years 2-4; 75% in Years 5-14;	Used 75% in post-model calculation	0% in Years 0-2; 50% in Year 3-5; 75% in years 6-15 under intermediate

Table 2. General Assumptions Used in Waste Scenario Modeling			
	WARM Standard	**LANDGEM Standard**	**MSWDST Standard**
	82.5% in Year 15 to 1 year before final cover; 90% with final cover)		cover; 82.5% in years 16 to 1 year before final cover; under increased gas collection; 90% under final cover.
Overall LFG Capture Efficiency	75%	75%	Equates to approximately 68%
Precipitation (Wet vs dry)	The CHRLF receives greater than 50 inches of precipitation per year The out-of-county regional landfill receives less than 20 inches of precipitation per year	The CHRLF receives greater than 50 inches of precipitation per year The out-of-county regional landfill receives less than 20 inches of precipitation per year	The CHRLF receives greater than 50 inches of precipitation per year The out-of-county regional landfill receives less than 20 inches of precipitation per year
Methane Decay rate (k value)	CHRLF: "Wet" (0.06) Regional: 0.02	CHRLF: 0.057 Regional: 0.02	CHRLF: 0.06 Regional: 0.02
Methane Content	50%	50%	50%
Methane Generation Capacity (L value)	100	100	100
Methane Oxidation Rate	10% without collection; 20% with collection; 35% after final cover	1%	10% without collection; 20% with collection; 35% after final cover
Initial biogenic carbon content of MSW	42%	N/A	N/A
Flare methane destruction efficiency	99%	99%	99.9%
Timeframe	100 years	100 years	100 years
Energy Recovery	Collected landfill gas is used to generate electricity in WA	N/A	Collected landfill gas is used to generate electricity in WA
Utility Emissions Fuel mix	Pacific Region (California, Oregon, and Washington)	N/A	Western Electricity Coordinating Council (WECC) (Washington, Oregon, Colorado, California, Nevada, Montana, Idaho, Wyoming, Utah, Arizona, New Mexico

Table 2. General Assumptions Used in Waste Scenario Modeling			
	WARM Standard	**LANDGEM Standard**	**MSWDST Standard**
Utility offset credit for landfill gas electricity (MTCO2e/MTCO2e methane combusted	0.08	0.08	0.06
Global Warming Potential (GWP) factors	2007	AR5 - 2013 in post-model calculation	AR5 - 2013 in post-model calculation
Biogenic emissions	Methane Included Carbon Dioxide Excluded	Methane Included Carbon Dioxide Excluded	Methane Included Carbon Dioxide Excluded
Landfill Carbon Storage/Sequestration	NEGATIVE (-0.21 MTCO2e/ton))	N/A	NEGATIVE (-0.21 MTCO2e/ton))

WARM and MSW-DST include emissions associated with the energy used by mobile equipment used at the landfill to place and compact waste, and to place daily cover materials. This is true for CHRLF and for an out of county regional landfill. In addition, those models also account for GHG emissions associated with waste transport between the King County Recycling and Transfer Stations and the CHRLF, an intermodal facility, or a WTE facility. Those distances are assumed to be the same at approximately 20 miles.

Because a large fraction of LFG collected at CHRLF is sent to BEW for processing, emissions from BEW processes and the biogas product itself are considered in this analysis. When burned in either landfill flares, engines, or at its ultimate end use, all calculations assume methane is 99% converted to water and biogenic CO2.

In addition to the above, the following assumptions specific to WTE and WEBR are included in the results based on the King County report Waste -To-Energy and Waste Export by Rail Feasibility Study (King County 2017):

WEBR

- Adjusted yield of methane as a proportion of initial carbon is 16%.
- Methane generation of waste is 1.62 MTCO2E/ton.
- GHG estimates do not include landfill fires or potential future oxidation of buried waste.
- Utility CO2 emissions avoided from combustion of LFG are based on the WARM model emission factor for the mixed MSW category in the Pacific Region (California, Oregon, and Washington). The credit for utility offsets in the Pacific Region is 0.08 MTCO2E per MTCO2E of methane combusted.

WTE

- 0.075 tons of ash will be recycled per ton of incoming MSW.
- The emission factor for truck and rail transportation used for WEBR was multiplied by 0.075 for WTE to account for lower tonnage of ash compared to MSW.
- The emission factor used for truck transportation of ash from the WTE facility to the intermodal facility is 0.008 metric tons of CO2 equivalent per short ton of MSW (MTCO2E/ton). This is 7.5% of the emission factor for trucking all the MSW to an intermodal facility.
- The rail emission factor is 20% of the truck emission factor per ton-mile and 7.5% of the MSW in ash requires landfill disposal.
- Utility CO2 emissions avoided from WTE are based on the WARM model emission factor for the mixed MSW category in the Pacific Region (California, Oregon, and Washington). The WARM model uses "non-baseload" emission factors from USEPA's Emissions and Generation Resource Integrated Database (eGRID). The national average WARM model credit for utility offsets nationally is 0.038 MTCO2E/ton. In contrast, the credit for utility offsets in the Pacific Region is 0.026 MTCO2E per ton of MSW.
- To account for recycling of ferrous and non-ferrous metals and beneficial reuse of the ash, an additional off-set of 0.018 MTCO2E per ton of MSW was credited.

Modeling Results

Table 3 shows the results from WARM in combination with LandGEM, both with and without the credits for carbon storage, avoided emissions from metal recycling and ash reuse, and avoided utility emissions. Table 4 shows the results from MSW-DST in combination with LandGEM, both with and without the credits for carbon storage, avoided emissions from metal recycling and ash reuse, and avoided utility emissions.

Table 3. Comparison of Total GHG Emissions for WTE and Waste Export by Rail, WARM Method 2 and LandGEM

	No Action Alternative		Action Alternative 1		Action Alternative 2		Action Alternative 3	
Description	Waste to Energy (MTCO2E))	Waste Export by Rail (MTCO2E)	Waste to Energy (MTCO2E))	Waste Export by Rail (MTCO2E)	Waste to Energy (MTCO2E))	Waste Export by Rail (MTCO2E)	Waste to Energy (MTCO2E))	Waste Export by Rail (MTCO2E)
Construction Sources								
Landfill Cell Closure/Construction	11,122	29,501	44,789	56,391	45,689	57,346	65,988	65,988
Landfill Support Facilities Construction	2,758	2,758	2,758	2,758	2,758	2,758	2,758	2,758
WTE or WEBR Facilities Construction	18,268	1,530	18,268	1,530	18,268	1,530	18,268	1,530
Facility Sources								
Fugitive Emissions; Operation of LFG Recovery System	13,282,081	21,715,801	16,985,401	21,715,801	17,393,641	21,715,801	21,715,801	21,715,801
MSW combustion	8,746,080		4,905,600		4,482,240			
Operation of BEW Processing System	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above
BEW Pipeline Gas	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above
Landfill Equipment Operation	205,156	590,400	374,320	590,400	392,968	590,400	590,400	590,400
Transportation Sources								
Rail Transport of MSW to Out of County Regional landfill		624,720		350,400		320,160		
Rail Transport of Ash from Intermodal Facility to Landfill	208,240		116,800		106,720			
Truck Transport between KCRTS and CHRLF, WTE Facility, and Intermodal Facility	236,160	236,160	236,160	236,160	236,160	236,160	236,160	236,160
Total Net GHG Emissions Excluding Credits	**22,709,865**	**23,200,869**	**22,684,097**	**22,953,440**	**22,678,445**	**22,924,155**	**22,629,375**	**22,612,637**
Avoided Utilities - Pacific Region	(7,646,906)	(3,482,106)	(5,818,106)	(3,482,106)	(5,616,506)	(3,482,106)	(3,482,106)	(3,482,106)
Avoided Emissions-metal recycling, ash reuse (WTE); landfill carbon sequestration (WEBR)	(6,407,440)	(6,199,200)	(6,316,000)	(6,199,200)	(6,305,920)	(6,199,200)	(6,199,200)	(6,199,200)
Total Net GHG Emissions 2	**8,655,519**	**13,519,564**	**10,549,991**	**13,272,134**	**10,756,019**	**13,242,849**	**12,948,070**	**12,931,331**

Table 4. Comparison of Total GHG Emissions for WTE and Waste Export by Rail, MSW-DSTv2 and LandGEM

Description	No Action Alternative		Action Alternative 1		Action Alternative 2		Action Alternative 3	
	Waste to Energy (MTCO2E))	Waste Export by Rail (MTCO2E)	Waste to Energy (MTCO2E))	Waste Export by Rail (MTCO2E)	Waste to Energy (MTCO2E))	Waste Export by Rail (MTCO2E)	Waste to Energy (MTCO2E))	Waste Export by Rail (MTCO2E)
Construction Sources								
Landfill Cell Closure/Construction	11,122	29,501	44,789	56,391	45,689	57,346	65,988	65,988
Landfill Support Facilities Construction	2,758	2,758	2,758	2,758	2,758	2,758	2,758	2,758
WTE or WEBR Facilities Construction	18,268	1,530	18,268	1,530	18,268	1,530	18,268	1,530
Facility Sources								
Fugitive Emissions; Operation of LFG Recovery System	15,522,187	23,380,272	19,502,657	23,910,189	19,941,449	23,968,605	24,587,073	24,587,073
MSW combustion	7,886,668		4,423,563		4,041,804			
Operation of BEW Processing System	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above
BEW Pipeline Gas	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above
Landfill Equipment Operation	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above	Incl. above
Transportation Sources								
Rail Transport of MSW to Out of County Regional landfill		Incl. below		Incl. below		Incl. below		
Rail Transport of Ash from Intermodal Facility to Landfill	175		98		90			
Truck Transport between KCRTS and CHRLF, WTE Facility, and Intermodal Facility	847,771	2,123,301	880,215	1,617,214	880,215	1,557,849	847,771	847,771
Total Net GHG Emissions Excluding Credits	24,288,949	25,537,361	24,872,350	25,588,082	24,930,274	25,588,088	25,521,858	25,505,120
Avoided Utilities - Pacific Region	(11,032,461)	(3,208,346)	(7,594,772)	(3,206,294)	(7,215,814)	(3,206,068)	(3,203,672)	(3,203,672)
Avoided Emissions-metal recycling, ash reuse (WTE); landfill carbon sequestration (WEBR)	(5,092,269)	(10,017,293)	(7,255,051)	(10,017,448)	(7,493,469)	(10,017,466)	(10,017,681)	(10,017,681)
Total Net GHG Emissions 2	**8,164,219**	**12,311,722**	**10,022,527**	**12,364,340**	**10,220,991**	**12,364,554**	**12,300,505**	**12,283,767**

WARM Documentation

U.S. Environmental Protection Agency
Office of Resource Conservation and Recovery

Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)

Management Practices Chapters

November 2020

Prepared by ICF
For the U.S. Environmental Protection Agency
Office of Resource Conservation and Recovery

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Table of Contents

5 COMBUSTION

This document presents an overview of combustion as a waste management strategy in relation to the development of material-specific emission factors for EPA's Waste Reduction Model (WARM). Included are estimates of the net greenhouse gas (GHG) emissions from combustion of most of the materials considered in WARM and several categories of mixed waste.

5.1 A SUMMARY OF THE GHG IMPLICATIONS OF COMBUSTION

Combustion of municipal solid waste (MSW) results in emissions of CO_2 and N_2O. Note that CO_2 from combustion of biomass (such as paper products and yard trimmings) is not counted because it is biogenic (as explained in the WARM Background and Overview chapter). WARM estimates emissions from combustion of MSW in waste-to-energy (WTE) facilities. WARM does not consider any recovery of materials from the MSW stream that may occur before MSW is delivered to the combustor.

In the United States, about 80 WTE facilities process more than 30 million tons of MSW annually (ERC, 2014). WTE facilities can be divided into three categories: (1) mass burn, (2) modular, and (3) refuse-derived fuel (RDF). A mass burn facility generates electricity and/or steam from the combustion of mixed MSW. Most of the facilities (76 percent) employ mass burn technology. Modular WTE plants are generally smaller than mass burn plants, and are prefabricated off-site so that they can be assembled quickly where they are needed. Because of their similarity to mass burn facilities, modular facilities are treated as part of the mass burn category for the purposes of this analysis.

An RDF facility combusts MSW that has undergone varying degrees of processing, from simple removal of bulky and noncombustible items to more complex processes (such as shredding and material recovery) that result in a finely divided fuel. Processing MSW into RDF yields a more uniform fuel that has a higher heating value than that used by mass burn or modular WTE. MSW processing into RDF involves both manual and mechanical separation to remove materials such as glass and metals that have little or no fuel value. In the United States, approximately 14 facilities combust RDF (ERC, 2010).

This study analyzed the net GHG emissions from combustion of all individual and mixed waste streams in WARM at mass burn and RDF facilities, with the exception of asphalt concrete, drywall, and fiberglass insulation. These three materials were excluded because EPA determined that they are not typically combusted at end of life. Note that **WARM incorporates only the emission factors for mass burn facilities**, due to (1) the relatively small number of RDF facilities in the United States and (2) the fact that the RDF emission factors are based on data from only one RDF facility.

Net emissions consist of (1) emissions from the transportation of waste to a combustion facility, (2) emissions of non-biogenic CO_2, and (3) emissions of N_2O minus (4) avoided GHG emissions from the electric utility sector and (5) avoided GHG emissions due to the recovery and recycling of ferrous metals at the combustor. There is some evidence that as combustor ash ages, it absorbs CO_2 from the atmosphere. However, EPA did not count absorbed CO_2 because the quantity is estimated to be less than 0.02 $MTCO_2E$ per ton of MSW combusted.[26] The results of this analysis for the materials contained in WARM and the explanations for each of these results are discussed in section 5.3.[27]

[26] Based on data provided by Dr. Jürgen Vehlow of the Institut für Technische Chemie in Karlsruhe, Germany, EPA estimated that the ash from one ton of MSW would absorb roughly 0.004 MTCE of CO_2.

[27] Note that Exhibit 5-1, Exhibit 5-2, and Exhibit 5-6 do not show mixed paper. Mixed paper is shown in the summary exhibit. The summary values for mixed paper are based on the proportions of the four paper types (newspaper, office paper, corrugated containers, and magazines/third-class mail) that make up the different "mixed paper" definitions.

5.2 CALCULATING THE GHG IMPACTS OF COMBUSTION

This study's general approach was to estimate (1) the gross emissions of CO_2 and N_2O from MSW combustion (including emissions from transportation of waste to the combustor and ash from the combustor to a landfill) and (2) the CO_2 emissions avoided because of displaced electric utility generation and decreased energy requirements for production processes using recycled inputs. A comprehensive evaluation would also consider the fate of carbon remaining in combustor ash. Depending on its chemical form, carbon may be aerobically degraded to CO_2, anaerobically degraded to CH_4, or remain in a relatively inert form and be stored. Unless the ash carbon is converted to CH_4 (which EPA considers unlikely), the effect on the net GHG emissions will be very small. To obtain an estimate of the *net* GHG emissions from MSW combustion, the GHG emissions avoided were subtracted from the direct GHG emissions. EPA estimated the net GHG emissions from waste combustion per ton of mixed MSW and per ton of each selected material in MSW. The remainder of this section describes how EPA developed these estimates.

5.2.1 Emissions of CO_2 from WTE Facilities

The carbon in MSW has two distinct origins: some of it is derived from sustainably harvested biomass (i.e., carbon in plant matter that was converted from CO_2 in the atmosphere through photosynthesis), and the remainder is from non-biomass sources, e.g., plastic and synthetic rubber derived from petroleum.

As explained in the WARM Background and Overview chapter, WARM considers only CO_2 that derives from fossil sources and does not consider biogenic CO_2 emissions. Therefore, only CO_2 emissions from the combustion of non-biomass components of MSW—plastic, textiles and rubber—were counted. These components make up a relatively small share of total MSW, so only a small portion of the total CO_2 emissions from combustion are considered in WARM.

To estimate the non-biogenic carbon content of the plastics, textiles, rubber and leather contained in one ton of mixed MSW, EPA first established assumptions for the non-biogenic share of carbon in these materials. For plastics in products in MSW, EPA assumed that all carbon is non-biogenic carbon, because biogenic plastics likely make up a small but unknown portion of products. For rubber and leather products in MSW, EPA assumed that the non-biogenic share of carbon contained in clothing and footwear is 25 percent; this assumption is based on expert judgment. The non-biogenic share of carbon in containers, packaging, and other durables is 100 percent; and the non-biogenic share of carbon in other nondurables is 75 percent (EPA, 2010). For textile products in MSW, EPA assumed that the non-biogenic share of carbon is 55 percent (DeZan, 2000). EPA then calculated the non-biogenic carbon content of each of these material groups. For plastics in products in MSW, EPA used the molecular formula of each resin type to assume that PET is 63 percent carbon; PVC is 38 percent carbon; polystyrene is 92 percent carbon; HDPE, LDPE, and polypropylene are 86 percent carbon; and a weighted average of all other resins is 66 percent carbon (by weight). Based on the amount of each plastic discarded in 2015 (EPA, 2018), EPA calculated a weighted carbon content of 78 percent for plastics in mixed MSW. For rubber and leather products, EPA used the weighted average carbon content of rubbers consumed in 2002 to estimate a carbon content of 85 percent (by weight) for rubber and leather products in mixed MSW. For textiles, EPA used the average carbon content of the four main synthetic fiber types to estimate a carbon content of 70 percent (by weight) for textiles in mixed MSW. Next, using data from BioCycle's *The State of Garbage in America* (Van Haaren et al., 2010), EPA assumed that seven percent of discards are combusted in the United States. Data from BioCycle is used instead of EPA's *Advancing Sustainable Materials Management: Facts and Figures* report (EPA, 2018a), because it is based off of direct reporting, and provides a more accurate representation of the amount of materials discarded at WTE facilities. Additionally, these data are also used in order to maintain consistency with the data source used in EPA's annual *Inventory of U.S. Greenhouse Gas Emissions and Sinks* report. Based on these assumptions, EPA estimated that there are 0.10 tons of non-biogenic carbon in the plastic, textiles, rubber and leather contained in one ton of mixed MSW (EPA, 2018a; Van Haaren et al., 2010).

The 10 percent non-biomass carbon content of mixed MSW was then converted to units of $MTCO_2E$ per short ton of mixed MSW combusted. The resulting value for mixed MSW is shown in Exhibit 5-1. Note that if EPA had used a best-case assumption for textiles (i.e., assuming that they have no petrochemical-based fibers), the resulting value for mixed MSW would have been slightly lower. The values for CO_2 emissions are shown in column (b) of Exhibit 5-1.

Exhibit 5-1: Gross GHG Emissions from MSW Combustion ($MTCO_2E$/Short Ton of Material Combusted)

(a) Material	(b) Combustion CO_2 Emissions from Non-Biomass per Short Ton Combusted	(c) Combustion N_2O Emissions per Short Ton Combusted	(d) Transportation CO_2 Emissions per Short Ton Combusted	(e) Gross GHG Emissions per Short Ton Combusted (e = b + c + d)
Aluminum Cans	–	–	0.01	0.01
Aluminum Ingot	–	–	0.01	0.01
Steel Cans	–	–	0.01	0.01
Copper Wire	–	–	0.01	0.01
Glass	–	–	0.01	0.01
HDPE	2.79	–	0.01	2.80
LDPE	2.79	–	0.01	2.80
PET	2.04	–	0.01	2.05
LLDPE	2.79	–	0.01	2.80
PP	2.79	–	0.01	2.80
PS	3.01	–	0.01	3.02
PVC	1.25	–	0.01	1.26
PLA	–	–	0.01	0.01
Corrugated Containers	–	0.04	0.01	0.05
Magazines/Third-Class Mail	–	0.04	0.01	0.05
Newspaper	–	0.04	0.01	0.05
Office Paper	–	0.04	0.01	0.05
Phone Books[a]	–	0.04	0.01	0.05
Textbooks[a]	–	0.04	0.01	0.05
Dimensional Lumber	–	0.04	0.01	0.05
Medium-Density Fiberboard	–	0.04	0.01	0.05
Food Waste	–	0.04	0.01	0.05
Food Waste (meat only)	–	0.04	0.01	0.05
Food Waste (non-meat)	–	0.04	0.01	0.05
Beef	–	0.04	0.01	0.05
Poultry	–	0.04	0.01	0.05
Grains	–	0.04	0.01	0.05
Bread	–	0.04	0.01	0.05
Fruits and Vegetables	–	0.04	0.01	0.05
Dairy Products	–	0.04	0.01	0.05
Yard Trimmings	–	0.04	0.01	0.05
Grass	–	0.04	0.01	0.05
Leaves	–	0.04	0.01	0.05
Branches	–	0.04	0.01	0.05
Mixed Paper (general)	–	0.04	0.01	0.05
Mixed Paper (primarily residential)	–	0.04	0.01	0.05
Mixed Paper (primarily from offices)	–	0.04	0.01	0.05

(a) Material	(b) Combustion CO_2 Emissions from Non-Biomass per Short Ton Combusted	(c) Combustion N_2O Emissions per Short Ton Combusted	(d) Transportation CO_2 Emissions per Short Ton Combusted	(e) Gross GHG Emissions per Short Ton Combusted (e = b + c + d)
Mixed Metals	–	–	0.01	0.01
Mixed Plastics	2.33	–	0.01	2.34
Mixed Recyclables	0.07	0.03	0.01	0.11
Mixed Organics	–	0.04	0.01	0.05
Mixed MSW	0.38	0.04	0.01	0.43
Carpet	1.67	–	0.01	1.68
Desktop CPUs	0.40	–	0.01	0.40
Portable Electronic Devices	0.88	–	0.01	0.89
Flat-panel Displays	0.73	–	0.01	0.74
CRT Displays	0.63	–	0.01	0.64
Electronic Peripheral	2.22	–	0.01	2.23
Hard-copy Devices	1.91	–	0.01	1.92
Mixed Electronics	0.86	–	0.01	0.87
Clay Bricks	NA	NA	NA	NA
Concrete	NA	NA	NA	NA
Fly Ash	NA	NA	NA	NA
Tires	2.20	–	0.01	2.21
Asphalt Concrete	NA	NA	NA	NA
Asphalt Shingles	0.65	0.04	0.01	0.70
Drywall	NA	NA	NA	NA
Fiberglass Insulation	NA	NA	NA	NA
Vinyl Flooring	0.28	–	0.01	0.29
Wood Flooring	–	0.04	0.05	0.08

– = Zero emissions.
Note that totals may not add due to rounding, and more digits may be displayed than are significant.
[a] The values for phone books and textbooks are proxies, based on newspaper and office paper, respectively.

5.2.2 Emissions of N_2O from WTE Facilities

Studies compiled by the Intergovernmental Panel on Climate Change (IPCC) show that MSW combustion results in measurable emissions of N_2O, a GHG with a global warming potential (GWP) 298 times that of CO_2 (EPA, 2018a; IPCC, 2007; IPCC, 2006). The IPCC compiled reported ranges of N_2O emissions, per metric ton of waste combusted, from six classifications of MSW combustors. This study averaged the midpoints of each range and converted the units to $MTCO_2E$ of N_2O per ton of MSW. The resulting estimate is 0.04 $MTCO_2E$ of N_2O emissions per ton of mixed MSW combusted. Because the IPCC did not report N_2O values for combustion of individual components of MSW, EPA used the 0.04 value not only for mixed MSW, but also as a proxy for all components of MSW, except for aluminum cans, steel cans, glass, HDPE, LDPE, and PET. This exception was made because at the relatively low combustion temperatures found in MSW combustors, most of the nitrogen in N_2O emissions is derived from the waste, not from the combustion air. Because aluminum and steel cans, glass, and plastics do not contain nitrogen, EPA concluded that running these materials through an MSW combustor would not result in N_2O emissions.

5.2.3 Emissions of CO_2 from Transportation of Waste and Ash

WARM includes emissions associated with transporting of waste and the subsequent transportation of the residual waste ash to the landfill. Transportation energy emissions occur when fossil fuels are combusted to collect and transport material to the combustion facility and then to operate on-site equipment. Transportation of any individual material in MSW is assumed to use the same amount of energy as transportation of mixed MSW. To calculate the emissions, WARM relies on assumptions from FAL (1994) for the equipment emissions and NREL's US Life Cycle Inventory Database (USLCI) (NREL, 2015). The NREL emission factor assumes a diesel, short-haul truck.

5.2.4 Estimating Utility CO_2 Emissions Avoided

Most WTE plants in the United States produce electricity. Only a few cogenerate electricity and steam. In this analysis, EPA assumed that the energy recovered with MSW combustion would be in the form of electricity, with the exception of two materials that are not assumed to be combusted at WTE plants. For tires, the avoided utility CO_2 emissions per ton of tires combusted is based on the weighted average of three tire combustion pathways: combustion at cement kilns, power plants, and pulp and paper mills. For asphalt shingles, the avoided utility CO_2 emissions per ton of shingles combusted is equal to the amount of avoided refinery gas combusted at cement kilns where asphalt shingles are combusted. The avoided utility CO_2 emissions analysis is shown in Exhibit 5-2. EPA used three data elements to estimate the avoided electric utility CO_2 emissions associated with combustion of waste in a WTE plant: (1) the energy content of mixed MSW and of each separate waste material considered, (2) the combustion system efficiency in converting energy in MSW to delivered electricity, and (3) the electric utility CO_2 emissions avoided per kilowatt-hour (kWh) of electricity delivered by WTE plants.

Exhibit 5-2: Avoided Utility GHG Emissions from Combustion at WTE Facilities

(a) Material Combusted	(b) Energy Content (Million Btu Per Ton)	(c) Mass Burn Combustion System Efficiency (%)	(d) RDF Combus-tion System Efficiency (%)	(e) Emission Factor for Utility-Generated Electricity[a] ($MTCO_2E$/ Million Btu of Electricity Delivered)	(f) Avoided Utility GHG Emissions per Ton Combusted at Mass Burn Facilities[a] ($MTCO_2E$) (f = b × c × e)	(g) Avoided Utility CO_2 per Ton Combusted at RDF Facilities ($MTCO_2E$) (g = b × d × e)
Aluminum Cans	(0.67)[b]	17.8%	16.3%	0.21	(0.03)	(0.02)
Aluminum Ingot	(0.67)	17.8%	16.3%	0.21	(0.03)	(0.02)
Steel Cans	(0.42)[b]	17.8%	16.3%	0.21	(0.02)	(0.01)
Copper Wire	(0.55)[c]	17.8%	16.3%	0.21	(0.02)	(0.02)
Glass	(0.47)[b]	17.8%	16.3%	0.21	(0.02)	(0.02)
HDPE	39.97[d]	17.8%	16.3%	0.21	1.52	1.38
LDPE	39.75[d]	17.8%	16.3%	0.21	1.51	1.38
PET	21.20	17.8%	16.3%	0.21	0.80	0.73
LLDPE	39.89	17.8%	16.3%	0.21	1.51	1.38
PP	39.90	17.8%	16.3%	0.21	1.51	1.38
PS	36.00	17.8%	16.3%	0.21	1.37	1.25
PVC	15.75	17.8%	16.3%	0.21	0.60	0.55
PLA	16.74	17.8%	16.3%	0.21	0.64	0.58
Corrugated Containers	14.09[d]	17.8%	16.3%	0.21	0.53	0.49
Magazines/Third-Class Mail	10.52[d]	17.8%	16.3%	0.21	0.40	0.36
Newspaper	15.90[d]	17.8%	16.3%	0.21	0.60	0.55
Office Paper	13.60[d]	17.8%	16.3%	0.21	0.52	0.47
Phone Books	15.90[d]	17.8%	16.3%	0.21	0.60	0.55
Textbooks	13.60[d]	17.8%	16.3%	0.21	0.52	0.47
Dimensional Lumber	16.60[f]	17.8%	16.3%	0.21	0.63	0.58
Medium-Density Fiberboard	16.60[f]	17.8%	16.3%	0.21	0.63	0.58

(a) Material Combusted	(b) Energy Content (Million Btu Per Ton)	(c) Mass Burn Combustion System Efficiency (%)	(d) RDF Combus-tion System Efficiency (%)	(e) Emission Factor for Utility-Generated Electricity[a] ($MTCO_2E$/ Million Btu of Electricity Delivered)	(f) Avoided Utility GHG Emissions per Ton Combusted at Mass Burn Facilities[a] ($MTCO_2E$) (f = b × c × e)	(g) Avoided Utility CO_2 per Ton Combusted at RDF Facilities ($MTCO_2E$) (g = b × d × e)
Food Waste	4.74[d]	17.8%	16.3%	0.21	0.18	0.16
Food Waste (meat only)	4.74[d]	17.8%	16.3%	0.21	0.18	0.16
Food Waste (non-meat)	4.74[d]	17.8%	16.3%	0.21	0.18	0.16
Beef	4.74[d]	17.8%	16.3%	0.21	0.18	0.16
Poultry	4.74[d]	17.8%	16.3%	0.21	0.18	0.16
Grains	4.74[d]	17.8%	16.3%	0.21	0.18	0.16
Bread	4.74[d]	17.8%	16.3%	0.21	0.18	0.16
Fruits and Vegetables	4.74[d]	17.8%	16.3%	0.21	0.18	0.16
Dairy Products	4.74[d]	17.8%	16.3%	0.21	0.18	0.16
Yard Trimmings	5.60[g]	17.8%	16.3%	0.21	0.21	0.19
Grass	5.60[g]	17.8%	16.3%	0.21	0.21	0.19
Leaves	5.60[g]	17.8%	16.3%	0.21	0.21	0.19
Branches	5.60[g]	17.8%	16.3%	0.21	0.21	0.19
Mixed Paper (general)	NA	17.8%	16.3%	0.21	0.54	NA
Mixed Paper (primarily residential)	NA	17.8%	16.3%	0.21	0.53	NA
Mixed Paper (primarily from offices)	NA	17.8%	16.3%	0.21	0.49	NA
Mixed Metals	NA	17.8%	16.3%	0.21	-0.02	NA
Mixed Plastics	NA	17.8%	16.3%	0.21	1.09	NA
Mixed Recyclables	NA	17.8%	16.3%	0.21	0.50	NA
Mixed Organics	NA	17.8%	16.3%	0.21	0.20	NA
Mixed MSW	10.00[h]	17.8%	16.3%	0.21	0.38	0.35
Carpet	15.20[i]	17.8%	16.3%	0.21	0.58	0.53
Desktop CPUs	3.07	17.8%	16.3%	0.21	0.12	0.11
Portable Electronic Devices	3.07	17.8%	16.3%	0.21	0.12	0.11
Flat-panel Displays	3.07	17.8%	16.3%	0.21	0.12	0.11
CRT Displays	3.07	17.8%	16.3%	0.21	0.12	0.11
Electronic Peripherals	3.07	17.8%	16.3%	0.21	0.12	0.11
Hard-copy Devices	3.07	17.8%	16.3%	0.21	0.12	0.11
Mixed Electronics	3.07	17.8%	16.3%	0.21	0.12	0.11
Clay Bricks	NA	NA	NA	NA	NA	NA
Concrete	NA	NA	NA	NA	NA	NA
Fly Ash	NA	NA	NA	NA	NA	NA
Tires	27.78[j]	NA	NA	NA	1.57	1.57
Asphalt Concrete	NA	NA	NA	NA	NA	NA
Asphalt Shingles	8.80	NA[k]	NA[k]	NA[k]	1.05[l]	1.05[l]
Drywall	NA	NA	NA	NA	NA	NA

(a) Material Combusted	(b) Energy Content (Million Btu Per Ton)	(c) Mass Burn Combustion System Efficiency (%)	(d) RDF Combus-tion System Efficiency (%)	(e) Emission Factor for Utility-Generated Electricity[a] ($MTCO_2E$/ Million Btu of Electricity Delivered)	(f) Avoided Utility GHG Emissions per Ton Combusted at Mass Burn Facilities[a] ($MTCO_2E$) (f = b × c × e)	(g) Avoided Utility CO_2 per Ton Combusted at RDF Facilities ($MTCO_2E$) (g = b × d × e)
Fiberglass Insulation	NA	NA	NA	NA	NA	NA
Vinyl Flooring	15.75	17.8%	16.3%	0.21	0.60	0.55
Wood Flooring	17.99[m]	21.5%[n]	16.3%	0.21	0.82	0.62

NA = Not applicable.

Note that totals may not add due to rounding, and more digits may be displayed than are significant.

[a] The values in this column are based on national average emissions from utility-generated electricity. The Excel version of WARM also allows users to choose region-specific utility-generated factors, which are contained in Exhibit 5-4.

[b] EPA developed these estimates based on data on the specific heat of aluminum, steel, and glass and calculated the energy required to raise the temperature of aluminum, steel, and glass from ambient temperature to the temperature found in a combustor (about 750° Celsius), based on Incropera and DeWitt (1990).

[c] Average of aluminum and steel.

[d] Source: EPA (1995). "Magazines" used as proxy for magazines/third-class mail; "mixed paper" used as a proxy for the value for office paper and textbooks; "newspapers" used as a proxy for phone books.

[e] Source: Gaines and Stodolsky (1993).

[f] EPA used the higher end of the MMBtu factor for basswood from the USDA-FS. Basswood is a relatively soft wood, so its high-end MMBtu content should be similar to an average factor for all wood types (Fons et al., 1962).

[g] Proctor and Redfern, Ltd. and ORTECH International (1993).

[h] Source: IWSA and American Ref-Fuel (personal communication, October 28, 1997). Mixed MSW represents the entire waste stream as disposed of.

[i] Source: Realff, M. (2010).

[j] Tires used as tire-derived fuel substitute for coal in cement kilns and electric utilities; used as a substitute for natural gas in pulp and paper facilities. Therefore, columns (d) through (h) are a weighted average of multiple tire combustion pathways, and are not calculated in the same manner as the other materials and products in the table.

[k] The avoided utility GHG emissions are assumed to equal avoided cement kiln refinery gas combustion, so this factor is not used.

[l] Assumes avoided cement kiln refinery gas combustion.

[m] Bergman and Bowe (2008), Table 3, p. 454. Note that this is in agreement with values already in WARM for lumber and medium-density fiberboard.

[n] Based on average heat rate of U.S. dedicated biomass electricity plants.

5.2.4.1 Energy Content

The energy content of each of the combustible materials in WARM is contained in column (b) of Exhibit 5-2. For the energy content of mixed MSW, EPA used a value of 10.0 million Btu (MMBtu) per short ton of mixed MSW combusted, which is a value commonly used in the WTE industry (IWSA and American Ref-Fuel, 1997). This estimate is within the range of values (9.0 to 13.0 MMBtu per ton) reported by FAL (1994) and is slightly higher than the 9.6 MMBtu per ton value reported in EPA's *MSW Fact Book* (EPA, 1995). For the energy content of RDF, a value of 11.4 MMBtu per ton of RDF combusted was used (Harrington, 1997). This estimate is within the range of values (9.6 to 12.8 MMBtu per ton) reported by the DOE's National Renewable Energy Laboratory (NREL, 1992). For the energy content of specific materials in MSW, EPA consulted three sources: (1) EPA's *MSW Fact Book* (1995), a compilation of data from primary sources, (2) a report by Environment Canada (Procter and Redfern, Ltd. and ORTECH International, 1993), and (3) a report by Argonne National Laboratories (Gaines and Stodolsky, 1993). EPA assumed that the energy contents reported in the first two of these sources were for materials with moisture contents typically found for the materials in MSW (the sources imply this but do not explicitly state it). The Argonne study reports energy content on a dry weight basis.

5.2.4.2 Combustion System Efficiency

To estimate the combustion system efficiency of mass burn plants, EPA used a net value of 550 kWh generated by mass burn plants per ton of mixed MSW combusted (Zannes, 1997).

To estimate the combustion system efficiency of RDF plants, EPA evaluated three sources: (1) data supplied by an RDF processing facility located in Newport, MN (Harrington, 1997); (2) the Integrated Waste Services Association report, *The 2000 Waste-to-Energy Directory: Year 2000* (IWSA, 2000); and (3) the National Renewable Energy Laboratory (NREL, 1992). EPA used the Newport Processing Facility's reported net value of 572 kWh generated per ton of RDF for two reasons. First, this value is within the range of values reported by the other sources. Second, the Newport Processing Facility provides a complete set of data for evaluating the overall system efficiency of an RDF plant. The net energy value reported accounts for the estimated energy required to process MSW into RDF and the estimated energy consumed by the RDF combustion facility. The dataset includes estimates on the composition and amount of MSW delivered to the processing facility, as well as estimates for the heat value of RDF, the amount of energy required to process MSW into RDF, and the amount of energy used to operate the RDF facility.

Next, EPA considered losses in transmission and distribution of electricity specific to WTE combustion facilities. The U.S. average transmission and distribution ("line") loss rate is about nine percent, although for some facilities or cities, this rate may be lower. According to IWSA and American Ref-Fuel (1997), this rate could be as low as four percent. IWSA supports a five percent line loss rate, and for purposes of this analysis, we assume this value. Using the five percent loss rate, EPA estimated that 523 kWh are delivered per ton of waste combusted at mass burn facilities, and 544 kWh are delivered per ton of waste input at RDF facilities.

EPA then used the value for the delivered kWh per ton of waste combusted to derive the implicit combustion system efficiency (i.e., the percentage of energy in the waste that is ultimately delivered in the form of electricity). To determine this efficiency, we estimate the MMBtu of MSW needed to deliver one kWh of electricity. EPA divided the MMBtu per ton of waste by the delivered kWh per ton of waste to obtain the MMBtu of waste per delivered kWh. The result is 0.0191 MMBtu per kWh for mass burn and 0.0210 MMBtu per kWh for RDF. The physical constant for the energy in one kWh (0.0034 MMBtu) is then divided by the MMBtu of MSW and RDF needed to deliver one kWh, to estimate the total system efficiency at 17.8 percent for mass burn and 16.3 percent for RDF (see Exhibit 5-2, columns (d) and (e)). Note that the total system efficiency is the efficiency of translating the energy content of the fuel into the energy content of delivered electricity. The estimated system efficiencies of 17.8 and 16.3 percent reflect losses in (1) converting energy in the fuel into steam, (2) converting energy in steam into electricity, and (3) delivering electricity.

5.2.4.3 Electric Utility Carbon Emissions Avoided

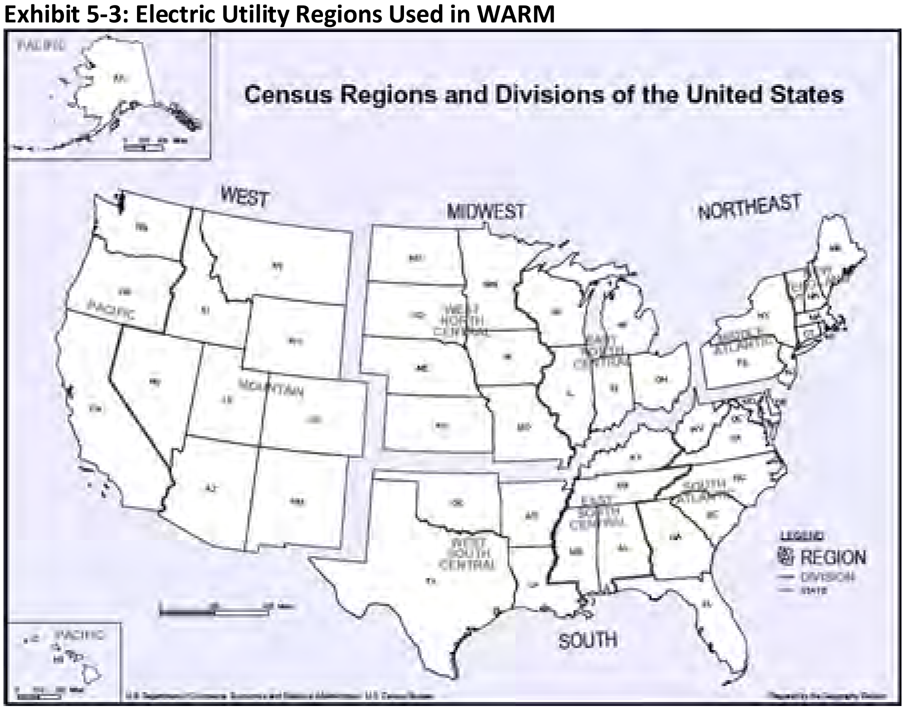
To estimate the avoided utility GHG emissions from waste combustion, EPA used "non-baseload" emission factors from EPA's Emissions and Generation Resource Integrated Database (eGRID). EPA made the decision to use non-baseload factors rather than a national average of only fossil-fuel plants[28] because the non-baseload emission rates provide a more accurate estimate of the marginal emissions rate. The non-baseload rates scale emissions from generating units based on their capacity

[28] While coal accounts for 33 percent of U.S. primary energy consumption—and 56 percent of fossil-fuel consumption—in the electricity sector, these plants may serve as baseload power with marginal changes in electricity supply met by natural gas plants in some areas (EIA, 2018). Natural gas plants have a much lower emissions rate than the coal-dominated national average of fossil-fuel plants.

factor. Plants that run at more than 80 percent capacity are considered “baseload” generation and not included in the “non-baseload” emission factor; a share of generation from plants that run between 80 percent and 20 percent capacity is included in the emission factor based on a “linear relationship,” and all plants with capacity factors below 20 percent are included (E.H. Pechan & Associates, 2006).

In order to capture the regional differences in the emissions rate due to the variation in sources of electricity generation, WARM first uses state-level eGRID non-baseload emission factors and aggregates them into weighted average regional emission factors based on fossil-fuel-only state electricity generation. The geographic regions are based on U.S. Census Bureau-designated areas. Exhibit 5-3 contains a map, prepared by the U.S. Census Bureau, of the nine regions. Exhibit 5-4 shows the national average eGRID emission factor and the factors for each of the nine geographic regions. In addition to the calculated regional non-baseload emission factors, EPA also utilized eGRID’s national non-baseload emission factor to represent the national average non-baseload avoided utility emission factor. The resulting non-baseload regional and national average estimates for utility carbon emissions avoided for each material at mass burn facilities are shown in Exhibit 5-5. Columns (g) and (h), respectively, of Exhibit 5-2 show the national average estimates for mass burn and RDF facilities.

Exhibit 5-3: Electric Utility Regions Used in WARM



Source: U.S. Census Bureau (2009).

Exhibit 5-4: Avoided Utility Emission Factors by Region

Region	Emission Factors for Utility-Generated Electricity[a] ($MTCO_2E$/Million Btu of Electricity Delivered)
National Average	0.221
Pacific	0.151
Mountain	0.230
West-North Central	0.294
West-South Central	0.193
East-North Central	0.265
East-South Central	0.237
New England	0.156
Middle Atlantic	0.203
South Atlantic	0.231

[a] Includes transmission and distributions losses, which are assumed to be 5.8% (EIA, 2018).

Exhibit 5-5: Avoided Utility GHG Emissions at Mass Burn Facilities by Region ($MTCO_2E$/Short Ton of Material Combusted)

Material Combusted	National Average	Pacific	Moun tain	West-North Central	West-South Central	East-North Central	East-South Central	New England	Middle Atlantic	South Atlantic
Aluminum Cans	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
Aluminum Ingot	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
Steel Cans	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)
Copper Wire	(0.02)	(0.01)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.01)	(0.02)	(0.02)
Glass	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)
HDPE	1.52	1.02	1.66	21.94	1.42	1.94	1.57	1.01	1.38	1.47
LDPE	1.51	1.02	1.65	1.93	1.41	1.93	1.56	1.00	1.38	1.46
PET	0.80	0.54	0.88	1.03	0.75	1.03	0.83	0.53	0.73	0.78
LLDPE	1.51	1.02	1.66	1.93	1.41	1.94	1.57	1.00	1.38	1.47
PP	1.51	1.02	1.66	1.93	1.41	1.94	1.57	1.00	1.38	1.47
PS	1.37	0.92	1.50	1.74	1.27	1.75	1.41	0.91	1.25	1.432
PVC	0.60	0.40	0.66	0.76	0.56	0.77	0.62	0.40	0.54	0.58
PLA	0.64	0.43	0.70	0.81	0.59	0.81	0.66	0.42	0.58	0.61
Corrugated Containers	0.53	0.36	0.59	0.68	0.50	0.68	0.55	0.35	0.49	0.52
Magazines/Third-Class Mail	0.40	0.27	0.44	0.51	0.37	0.51	0.41	0.26	0.36	0.39
Newspaper	0.60	0.41	0.66	0.77	0.56	0.77	0.62	0.40	0.55	0.58
Office Paper	0.52	0.35	0.57	0.66	0.48	0.66	0.53	0.34	0.47	0.50
Phone Books	0.60	0.41	0.66	0.77	0.56	0.77	0.62	0.40	0.55	0.58
Textbooks	0.52	0.35	0.57	0.66	0.48	0.66	0.53	0.34	0.47	0.50
Dimensional Lumber	0.63	0.42	0.69	0.80	0.59	0.81	0.65	0.42	0.57	0.61
Medium-Density Fiberboard	0.63	0.42	0.69	0.80	0.59	0.81	0.65	0.42	0.57	0.61
Food Waste	0.18	0.12	0.20	0.23	0.17	0.23	0.19	0.12	0.16	0.17
Food Waste (meat only)	0.18	0.12	0.20	0.23	0.17	0.23	0.19	0.12	0.16	0.17
Food Waste (non-meat)	0.18	0.12	0.20	0.23	0.17	0.23	0.19	0.12	0.16	0.17
Beef	0.18	0.12	0.20	0.23	0.17	0.23	0.19	0.12	0.16	0.17
Poultry	0.18	0.12	0.20	0.23	0.17	0.23	0.19	0.12	0.16	0.17
Grains	0.18	0.12	0.20	0.23	0.17	0.23	0.19	0.12	0.16	0.17
Bread	0.18	0.12	0.20	0.23	0.17	0.23	0.19	0.12	0.16	0.217
Fruits and Vegetables	0.18	0.12	0.20	0.23	0.17	0.23	0.19	0.12	0.16	0.17
Dairy Products	0.18	0.12	0.20	0.23	0.17	0.23	0.19	0.12	0.16	0.17
Yard Trimmings	0.21	0.14	0.23	0.27	0.20	0.27	0.22	0.14	0.19	0.21

Material Combusted	National Average	Pacific	Moun tain	West-North Central	West-South Central	East-North Central	East-South Central	New England	Middle Atlantic	South Atlantic
Mixed MSW	0.38	0.26	0.42	0.48	0.35	0.49	0.39	0.25	0.35	0.37
Carpet	0.58	0.39	0.63	0.74	0.54	0.74	0.60	0.38	0.53	0.56
Desktop CPUs	0.12	0.08	0.13	0.15	0.11	0.15	0.12	0.08	0.11	0.11
Portable Electronic Devices	0.12	0.08	0.13	0.15	0.11	0.15	0.12	0.08	0.11	0.11
Flat-panel Displays	0.12	0.08	0.13	0.15	0.11	0.15	0.12	0.08	0.11	0.11
CRT Displays	0.12	0.08	0.13	0.15	0.11	0.15	0.12	0.08	0.11	0.11
Electronic Peripherals	0.12	0.08	0.13	0.15	0.11	0.15	0.12	0.08	0.11	0.11
Hard-copy Devices	0.12	0.08	0.13	0.15	0.11	0.15	0.12	0.08	0.11	0.11
Mixed Electronics	0.12	0.08	0.13	0.15	0.11	0.15	0.12	0.08	0.11	0.11
Tires[a]	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
Asphalt Shingles[b]	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
Vinyl Flooring	0.60	0.40	0.66	0.76	0.56	0.77	0.62	0.40	0.54	0.58
Wood Flooring	0.82	0.56	0.90	1.05	0.77	1.06	0.85	0.55	0.75	0.80

Note that the "National Average" column is also represented in column (g) of Exhibit 5-2.
[a] Assumes weighted average avoided utility GHG emissions for multiple tire combustion pathways.
[b] Assumes avoided cement kiln refinery gas combustion.

5.2.5 Avoided CO_2 Emissions Due to Steel Recycling

WARM estimates the avoided CO_2 emissions from increased steel recycling made possible by steel recovery from WTE plants for steel cans, mixed MSW, electronics, and tires. Most MSW combusted with energy recovery in the United States is combusted at WTE plants that recover ferrous metals (e.g., iron and steel).[29] Note that EPA does not credit increased recycling of nonferrous materials due to a lack of data on the proportions of those materials being recovered. Therefore, the result tends to overestimate net GHG emissions from combustion.

For mixed MSW, EPA estimated the amount of steel recovered per ton of mixed MSW combusted, based on (1) the amount of MSW combusted in the United States, and (2) the amount of steel recovered, post-combustion. Ferrous metals are recovered at approximately 98 percent of WTE facilities in the United States (Bahor, 2010) and at five RDF processing facilities that do not generate power on-site. These facilities recovered a total of nearly 706,000 short tons per year of ferrous metals in 2004 (IWSA, 2004). By dividing 706,000 short tons (total U.S. steel recovery at combustors) by total U.S. combustion of MSW, which is 28.5 million tons (Van Haaren al., 2010), EPA estimated that 0.02 short tons of steel are recovered per short ton of mixed MSW combusted (as a national average).

For steel cans, EPA first estimated the national average proportion of steel cans entering WTE plants that would be recovered. As noted above, approximately 98 percent of MSW destined for combustion goes to facilities with a ferrous recovery system. At these plants, approximately 90 percent of steel is recovered (Bahor, 2010). EPA multiplied these percentages to estimate the weight of steel cans recovered per ton of MSW combusted—about 0.88 tons recovered per ton combusted.

Finally, to estimate the avoided CO_2 emissions due to increased recycling of steel, EPA multiplied (1) the weight of steel recovered by (2) the avoided CO_2 emissions per ton of steel recovered. The estimated avoided CO_2 emissions results are in column (d) of Exhibit 5-6. For more information on the GHG benefits of recycling, see the Recycling and Metals chapters.

[29] EPA did not consider any recovery of materials from the MSW stream that might occur before MSW is delivered to the combustor. EPA considered such prior recovery to be unrelated to the combustion operation—unlike the recovery of steel from combustor ash, an activity that is an integral part of the operation of many combustors.

Exhibit 5-6: Avoided GHG Emissions Due to Increased Steel Recovery from MSW at WTE Facilities

(a) Material Combusted	(b) Short Tons of Steel Recovered per Short Ton of Waste Combusted (Short Tons)	(c) Avoided CO_2 Emissions per Short Ton of Steel Recovered ($MTCO_2E$/Short Ton)	(d) Avoided CO_2 Emissions per Short Ton of Waste Combusted ($MTCO_2E$/Short Ton)[a]
Aluminum Cans	–	–	–
Aluminum Ingot	–	–	–
Steel Cans	0.88	1.83	-1.62
Copper Wire	–	–	–
Glass	–	–	–
HDPE	–	–	–
LDPE	–	–	–
PET	–	–	–
LLDPE	–	–	–
PP	–	–	–
PS	–	–	–
PVC	–	–	–
PLA	–	–	–
Corrugated Containers	–	–	–
Magazines/Third-Class Mail	–	–	–
Newspaper	–	–	–
Office Paper	–	–	–
Phone Books	–	–	–
Textbooks	–	–	–
Dimensional Lumber	–	–	–
Medium-Density Fiberboard	–	–	–
Food Waste	–	–	–
Food Waste (meat only)	–	–	–
Food Waste (non-meat)	–	–	–
Beef	–	–	–
Poultry	–	–	–
Grains	–	–	–
Bread	–	–	–
Fruits and Vegetables	–	–	–
Dairy Products	–	–	–
Yard Trimmings	–	–	–
Mixed Paper (general)	–	–	–
Mixed Paper (primarily residential)	–	–	–
Mixed Paper (primarily from offices)	–	–	–
Mixed Metals	–	–	-1.04
Mixed Plastics	–	–	–
Mixed Recyclables	–	–	-0.04
Mixed Organics	–	–	–
Mixed MSW	0.02	1.83	-0.04
Carpet	–	–	–
Desktop CPUs	0.52	1.83	0.95
Portable Electronic Devices	0.06	1.83	0.12
Flat-panel Displays	0.33	1.83	0.60
CRT Displays	0.04	1.83	0.08
Electronic Peripherals	0.02	1.83	0.03
Hard-copy Devices	0.33	1.83	0.60
Mixed Electronics	0.20	1.83	0.37
Clay Bricks	–	–	–
Concrete	–	–	–
Fly Ash	–	–	–

(a) Material Combusted	(b) Short Tons of Steel Recovered per Short Ton of Waste Combusted (Short Tons)	(c) Avoided CO_2 Emissions per Short Ton of Steel Recovered ($MTCO_2E$/Short Ton)	(d) Avoided CO_2 Emissions per Short Ton of Waste Combusted ($MTCO_2E$/Short Ton)[a]
Tires	0.06	1.80	-0.10
Asphalt Concrete	–	–	–
Asphalt Shingles	–	–	–
Drywall	–	–	–
Fiberglass Insulation	–	–	–
Vinyl Flooring	–	–	–
Wood Flooring	–	–	–

– = Zero emissions.
Note that totals may not sum due to independent rounding, and more digits may be displayed than are significant.
[a] The value in column (d) is a national average and is weighted to reflect 90 percent recovery at the 98 percent of facilities that recover ferrous metals.
[b] Assumes that only 68 percent of facilities that use TDF recover ferrous metals.

5.3 RESULTS

The national average results of this analysis are shown in Exhibit 5-7. The results from the last column of Exhibit 5-1, the last two columns of Exhibit 5-2, and the last column of Exhibit 5-6 are shown in columns (b) through (e) in Exhibit 5-7. The net GHG emissions from combustion of each material at mass burn and RDF facilities are shown in columns (f) and (g), respectively. These net values represent the gross GHG emissions (column (b)), minus the avoided GHG emissions (columns (c), (d), and (e)). As stated earlier, these estimates of net GHG emissions are expressed for combustion in absolute terms, and are not values relative to another waste management option, although they must be used comparatively, as all WARM emission factors must be. They are expressed in terms of short tons of waste input (i.e., tons of waste prior to processing).

Exhibit 5-7: Net National Average GHG Emissions from Combustion at WTE Facilities

(a) Material Combusted	(b) Gross GHG Emissions per Ton Combusted ($MTCO_2E$/ Short Ton)	(c) Avoided Utility GHG Emissions per Ton Combusted at Mass Burn Facilities ($MTCO_2E$ / Short Ton)[a]	(d) Avoided CO_2 Emissions per Ton Combusted Due to Steel Recovery ($MTCO_2E$ / Short Ton)	(e = b – c – d) Net GHG Emissions from Combustion at Mass Burn Facilities ($MTCO_2E$ / Short Ton)
Aluminum Cans	0.01	(0.03)	–	0.03
Aluminum Ingot	0.01	(0.03)	–	0.03
Steel Cans	0.01	(0.02)	1.62	(1.59)
Copper Wire	0.01	(0.02)	–	0.03
Glass	0.01	(0.02)	–	0.03
HDPE	2.80	1.58	–	1.29
LDPE	2.80	1.57	–	1.29
PET	2.05	0.84	–	1.24
LLDPE	2.80	1.51	–	1.29
PP	2.80	1.51	–	1.29
PS	3.02	1.37	–	1.66
PVC	1.26	0.60	–	0.66
PLA	0.01	0.64	–	(0.63)
Corrugated Containers	0.05	0.53	–	(0.49)
Magazines/Third-Class Mail	0.05	0.40	–	(0.35)
Newspaper	0.05	0.60	–	(0.56)
Office Paper	0.05	0.52	–	(0.47)
Phone Books	0.05	0.60	–	(0.56)
Textbooks	0.05	0.52	–	(0.47)

Dimensional Lumber	0.05	0.63	–	(0.58)
Medium-Density Fiberboard	0.05	0.63	–	(0.58)
Food Waste	0.05	0.18	–	(0.13)
Food Waste (meat only)	0.05	0.18	–	(0.13)
Food Waste (non-meat)	0.05	0.18	–	(0.13)
Beef	0.05	0.18	–	(0.13)
Poultry	0.05	0.18	–	(0.13)
Grains	0.05	0.18	–	(0.13)
Bread	0.05	0.18	–	(0.13)
Fruits and Vegetables	0.05	0.18	–	(0.13)
Dairy Products	0.05	0.18	–	(0.13)
Yard Trimmings	0.05	0.21	–	(0.17)
Grass	0.05	0.21	–	(0.17)
Leaves	0.05	0.21	–	(0.17)
Branches	0.05	0.21	–	(0.17)
Mixed Paper (general)[b]	0.05	0.54	–	(0.49)
Mixed Paper (primarily residential)[b]	0.05	0.53	–	(0.49)
Mixed Paper (primarily from offices)[b]	0.05	0.29	–	(0.45)
Mixed Metals	0.01	-0.02	1.05	(1.02)
Mixed Plastics	2.34	1.09	–	1.26
Mixed Recyclables	0.11	0.50	0.04	(0.42)
Mixed Organics	0.05	0.20	–	(0.15)
Mixed MSW	0.43	0.38	0.04	0.01
Carpet	1.68	0.58	–	1.10
Desktop CPUs	0.40	-0.12	0.95	(0.66)
Portable Electronic Device	0.88	-0.12	0.12	0.65
Flat-panel Displays	0.73	-0.12	0.60	0.03
CRT Displays	0.63	-0.12	0.08	0.45
Electronic Peripherals	2.22	-0.12	0.03	2.08
Hard-copy Devices	1.91	-0.12	0.60	1.20
Mixed Electronics	0.86	-0.12	0.37	0.39
Clay Bricks	NA	NA	NA	NA
Concrete	NA	NA	NA	NA
Fly Ash	NA	NA	NA	NA
Tires[c]	2.21	1.57	0.13	0.50
Asphalt Concrete	NA	NA	NA	NA
Asphalt Shingles	0.70	1.05[m]	–	(0.35)
Drywall	NA	NA	–	NA
Fiberglass Insulation	NA	NA	–	NA
Vinyl Flooring	0.29	0.60	–	(0.31)
Wood Flooring	0.09	0.82	–	(0.74)

Note that totals may not sum due to independent rounding, and more digits may be displayed than are significant.
[a] The values in this column represent the national average avoided utility GHG emissions. WARM also allows users to use region-specific avoided utility emissions, which are contained in Exhibit 5-5.
[b] The summary values for mixed paper are based on the proportions of the four paper types (corrugated containers, magazines/third-class mail, newspaper, and office paper) that constitute the different "mixed paper" definitions.
[c] Tires used as TDF substitute for coal in cement kilns and utility boilers and as a substitute for natural gas, coal, and biomass in pulp and paper facilities.

In the Excel version of WARM, the user can select the state where the waste is being disposed of to determine the combustion emissions based on regional avoided utility emission factors. This functionality is not available in the online version of WARM, which only allows for national average emissions calculations.

Net GHG emissions are estimated to be negative for all biogenic sources of carbon (paper and wood products, organics) because CO_2 emissions from these sources are not counted, as discussed earlier.

As shown in Exhibit 5-7

Exhibit 5-7, combustion of plastics results in substantial net GHG emissions. This result is primarily because of the high content of non-biomass carbon in plastics. Also, when combustion of plastics results in electricity generation, the utility carbon emissions avoided (due to displaced utility fossil fuel combustion) are much lower than the carbon emissions from the combustion of plastics. This result is largely due to the lower system efficiency of WTE plants compared with electric utility plants. Recovery of ferrous metals at combustors results in negative net GHG emissions for steel cans, due to the increased steel recycling made possible by ferrous metal recovery at WTE plants. Combustion of mixed MSW results in slightly negative GHG emissions because of the high proportion of biogenic carbon and steel.

5.4 LIMITATIONS

The certainty of the analysis presented in this chapter is limited by the reliability of the various data elements used. The most significant limitations are as follows:

- Combustion system efficiency of WTE plants may be improving. If efficiency improves, more utility CO_2 will be displaced per ton of waste combusted (assuming no change in utility emissions per kWh), and the net GHG emissions from combustion of MSW will decrease.
- Data for the RDF analysis were provided by the Minnesota Office of Environmental Assistance and were obtained from a single RDF processing facility and a separate RDF combustion facility. Research indicates that each RDF processing and combustion facility is different. For example, some RDF combustion facilities may generate steam for sale off-site, which can affect overall system efficiency. In addition, the amount of energy required to process MSW into RDF and the amount of energy used to operate RDF combustion facilities can be difficult to quantify and can vary among facilities on daily, seasonal and annual bases. This is one of the reasons that RDF factors are not included in WARM.
- The reported ranges for N_2O emissions were broad. In some cases, the high end of the range was 10 times the low end of the range. Research has indicated that N_2O emissions vary with the type of waste burned. Thus, the average value used for mixed MSW and for all MSW components should be interpreted as approximate values.
- For mixed MSW, the study assumed that all carbon in textiles is from synthetic fibers derived from petrochemicals (whereas, in fact, some textiles are made from cotton, wool and other natural fibers). Because EPA assumed that all carbon in textiles is non-biogenic, all of the CO_2 emissions from combustion of textiles as GHG emissions were counted. This assumption will slightly overstate the net GHG emissions from combustion of mixed MSW, but the magnitude of the error is small because textiles represent only a small fraction of the MSW stream. Similarly, the MSW category of “rubber and leather” contains some biogenic carbon from leather and natural rubber. By not considering this small amount of biogenic carbon, the analysis slightly overstates the GHG emissions from MSW combustion.
- Because the makeup of a given community’s mixed MSW may vary from the national average, the energy content also may vary from the national average energy content used in this analysis. For example, MSW from communities with a higher- or lower-than-average recycling rate may

have a different energy content, and MSW with more than the average proportion of dry leaves and branches will have a higher energy content.

- In this analysis, EPA used the national average recovery rate for steel. Where waste is sent to a WTE plant with steel recovery, the net GHG emissions for steel cans will be slightly lower (i.e., more negative). Where waste is sent to a WTE plant without steel recovery, the net GHG emissions for steel cans will be the same as for aluminum cans (i.e., close to zero). EPA did not credit increased recycling of nonferrous materials, because of a lack of information on the proportions of those materials. This assumption tends to result in overstated net GHG emissions from combustion.
- This analysis uses the "non-baseload" emission factors for electricity as the proxy for fuel displaced at the margin when WTE plants displace utility electricity. These non-baseload emission factors vary depending on the state where the waste is assumed to be combusted. If some other fuel or mix of fuels is displaced at the margin (e.g., a more coal-heavy fuel mix), the avoided utility CO_2 would be different.

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6 LANDFILLING

This chapter presents an overview of landfilling as a waste management strategy in relation to the development of material-specific emission factors for EPA's Waste Reduction Model (WARM). Estimates of the net greenhouse gas (GHG) emissions from landfilling most of the materials considered in WARM and several categories of mixed waste streams (e.g., mixed paper, mixed recyclables, and mixed municipal solid waste (MSW)) are included in the chapter.

6.1 A SUMMARY OF THE GHG IMPLICATIONS OF LANDFILLING

When food waste, yard trimmings, paper, and wood are landfilled, anaerobic bacteria degrade the materials, producing methane (CH_4) and carbon dioxide (CO_2). CH_4 is counted as an anthropogenic GHG because, even if it is derived from sustainably harvested biogenic sources, degradation would not result in CH_4 emissions if not for deposition in landfills. The CO_2 produced after landfilling is not counted as a GHG because it is considered part of the natural carbon cycle of growth and decomposition; for more information, see the text box on biogenic carbon in the WARM Background and Overview chapter. The other materials in WARM either do not contain carbon or do not biodegrade measurably in anaerobic conditions, and therefore do not generate any CH_4.

In addition to carbon emissions, some of the carbon in these materials (i.e., food waste, yard trimmings, paper, and wood) is stored in the landfill because these materials are not completely decomposed by anaerobic bacteria. Because this carbon storage would not normally occur under natural conditions (virtually all of the biodegradable material would degrade to CO_2, completing the photosynthesis/respiration cycle), this is counted as an anthropogenic sink. However, carbon in plastics and rubber that remains in the landfill is not counted as stored carbon because it is of fossil origin. Fossil carbon (e.g., petroleum, coal) is already considered "stored" in its natural state; converting it to plastic or rubber and putting it in a landfill only moves the carbon from one storage site to another.

EPA developed separate estimates of emissions from (1) landfills without gas recovery systems, (2) those that flare CH_4, (3) those that combust CH_4 for energy recovery, and (4) the national average mix of these three categories. The national average emission estimate accounts for the extent to which CH_4 will not be managed at some landfills, flared at some landfills, and combusted onsite for energy recovery at others.[30] The assumed mix of the three landfill categories that make up the national average for construction and demolition (C&D) materials and all other material types in WARM are presented in Exhibit 6-1. These estimates are based on the amount of CH_4 generated by U.S. landfills, as reported in Subpart HH and TT from EPA's Greenhouse Gas Reporting Program (EPA, 2018a), and the type of collection system from EPA's Landfill Methane Outreach Program (LMOP) (EPA, 2018b), as summarized in Exhibit 6-2. For C&D materials, EPA assumes that roughly 3% of waste is landfilled in a municipal landfill, while the remaining 97% waste is landfilled in a C&D landfill, which recovers landfill gas (LFG) at a rate that is consistent with industrial landfills (EPA, 2019; EPA, 2017). For all other materials, EPA assumes LFG recovery rates that are consistent with municipal landfills.

[30] Although gas from some landfills is piped to an offsite power plant and combusted there, for the purposes of WARM, the simplifying assumption was that all gas for energy recovery was combusted onsite. This assumption was made due to the lack of information about the frequency of offsite power generation, piping distances, and losses from pipelines.

Exhibit 6-1: Percentage of CH_4 Generated under the National Average

Material Type	Percentage of CH_4 from Landfills without LFG Recovery	Percentage of CH_4 from Landfills with LFG Recovery and Flaring only	CH_4 from Landfills with LFG Recovery and Electricity Generation (%)
C&D Material	96%	2%	2%
MSW Materials	8%	26%	66%

Exhibit 6-2: Percentage of CH_4 Generated from Each Type of Landfill

Landfill Type	Percentage of CH_4 from Landfills without LFG Recovery	Percentage of CH_4 from Landfills with LFG Recovery and Flaring only	CH_4 from Landfills with LFG Recovery and Electricity Generation (%)[a]
Industrial Landfill	98%	2%	–
Municipal Landfill	8%	26%	66%

[a] The LMOP database indicates landfills that have active landfill-gas-to-energy (LFGTE) systems. However, it does not report the percentage of LFG recovered at these facilities for energy generation versus the percentage of LFG recovered for flaring. In WARM, all LFG generation at landfills with LFGTE systems is assumed to be recovered for energy. Therefore, this approach likely underestimates the total percentage of LFG generation that is flared in the U.S. by not accounting for LFG flaring at landfills with LFGTE systems.

6.2 CALCULATING THE GHG IMPACTS OF LANDFILLING

The landfilling emission factors are made up of the following components:

1. CH_4 emissions from anaerobic decomposition of biogenic carbon compounds;
2. Transportation CO_2 emissions from landfilling equipment;
3. Biogenic carbon stored in the landfill; and
4. CO_2 emissions avoided through landfill gas-to-energy projects.

As mentioned above, WARM does not calculate CH_4 emissions, stored carbon, or CO_2 avoided for materials containing only fossil carbon (e.g., plastics, rubber). These materials have net landfilling emissions that are very low because they include only the transportation-related emissions from landfilling equipment. Some materials (e.g., newspaper, dimensional lumber) result in net storage (i.e., carbon storage exceeds CH_4 plus transportation energy emissions) at all landfills, regardless of whether gas recovery is present, while others (e.g., food waste) result in net emissions regardless of landfill gas collection and recovery practices. Whether the remaining materials result in net storage or net emissions depends on the landfill gas recovery scenario.

6.2.1 Carbon Stocks and Flows in Landfills

Exhibit 6-3 shows the carbon flows within a landfill system. Carbon entering the landfill can have one of several fates: exit as CH_4, exit as CO_2, exit as volatile organic compounds (VOCs), exit dissolved in leachate, or remain stored in the landfill.[31]

After entering landfills, a portion of the biodegradable material decomposes and eventually is transformed into landfill gas and/or leachate. Aerobic bacteria initially decompose the waste until the available oxygen is consumed. This stage usually lasts less than a week and is followed by the anaerobic acid state, in which carboxylic acids accumulate, the pH decreases, and some cellulose and hemicellulose decomposition occurs. Finally, during the methanogenic state, bacteria further decompose the biodegradable material into CH_4 and CO_2.

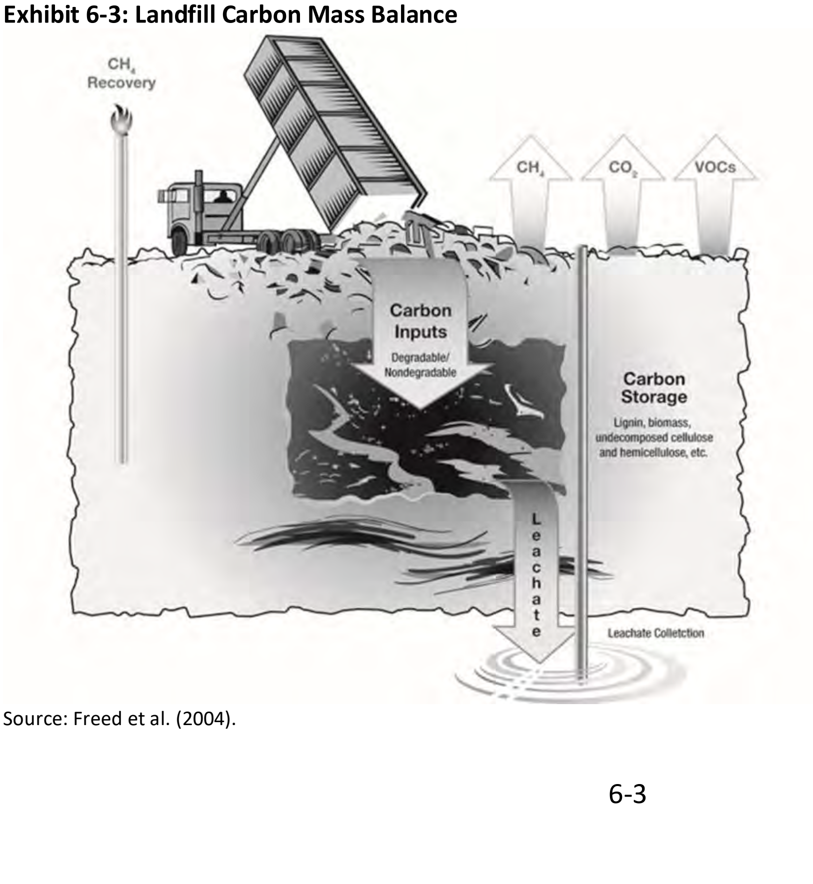
[31] The exhibit and much of the ensuing discussion are taken directly from Freed et al. (2004).

The rate of decomposition in landfills is affected by a number of factors, including: (1) waste composition; (2) factors influencing microbial growth (moisture, available nutrients, pH, temperature); and (3) whether the operation of the landfill retards or enhances waste decomposition. Most studies have shown that the amount of moisture in the waste, which can vary widely within a single landfill, is a critical factor in the rate of decomposition (Barlaz et al., 1990). Due to this fact, the emission factors presented in WARM are per wet ton of waste.

Among the research conducted on the various components of the landfill carbon system, much to date has focused on the transformation of landfill carbon into CH_4. This interest has been spurred by a number of factors, including EPA's 1996 rule requiring large landfills to control landfill gas emissions (40 Code of Federal Regulations Part 60, Subparts Cc and WWW), the importance of CH_4 emissions in GHG inventories, and the market for CH_4 as an energy source. CH_4 production occurs in the methanogenic stage of decomposition, as methanogenic bacteria break down the fermentation products from earlier decomposition processes. Since CH_4 emissions result from waste decomposition, the quantity and duration of the emissions is dependent on the same factors that influence waste degradability (e.g., waste composition, moisture). The CH_4 portion of each material type's emission factor is discussed further in section 6.2.2.

Carbon dioxide is produced in the initial aerobic stage and in the anaerobic acid stage of decomposition. However, relatively little research has been conducted to quantify CO_2 emissions during these stages. Emissions during the aerobic stage are generally assumed to be a small proportion of total organic carbon inputs, and a screening-level analysis indicates that less than one percent of carbon is likely to be emitted through this pathway (Freed et al., 2004). Once the methanogenic stage of decomposition begins, landfill gas *as generated* is composed of approximately 50 percent CH_4 and 50 percent CO_2 (Bingemer and Crutzen, 1987). However, landfill gas *as collected* generally has a higher CH_4 concentration than CO_2 concentration (sometimes as much as a 60 percent: 40 percent ratio), because some of the CO_2 is dissolved in the leachate as part of the carbonate system ($CO_2 \leftrightarrow H_2CO_3 \leftrightarrow HCO_3^- \leftrightarrow CO_3^{2-}$).

Exhibit 6-3: Landfill Carbon Mass Balance



Source: Freed et al. (2004).

To date, very little research has been conducted on the role of VOC emissions in the landfill carbon mass balance. Given the thousands of compounds entering the landfill environment, tracking the biochemistry by which these compounds ultimately are converted to VOC is a complex undertaking. Existing research indicates that ethane, limonene, *n*-decane, *p*-dichlorobenzene, and toluene may be among the most abundant landfill VOCs (Eklund et al., 1998). Hartog (2003) reported non-CH_4 volatile organic compound concentrations in landfill gas at a bioreactor site in Iowa, averaging 1,700 parts per million (ppm) carbon by volume in 2001 and 925 ppm carbon by volume in 2002. If the VOC concentrations in landfill gas are generally of the order of magnitude of 1,000 ppm, VOCs would have a small role in the overall carbon balance, as concentrations of CH_4 and CO_2 will both be hundreds of times larger.

Leachate is produced as water percolates through landfills. Factors affecting leachate formation include the quantity of water entering the landfill, waste composition, and the degree of decomposition. Because it may contain materials capable of contaminating groundwater, leachate (and the carbon it contains) is typically collected and treated before being released to the environment, where it eventually degrades into CO_2. However, leachate is increasingly being recycled into the landfill as a means of inexpensive disposal and to promote decomposition, increasing the mass of biodegradable materials collected by the system and consequently enhancing aqueous degradation (Chan et al., 2002; Warith et al., 1999). Although a significant body of literature exists on landfill leachate formation, little research is available on the carbon implications of this process. Based on a screening analysis, Freed et al. (2004) found that loss as leachate may occur for less than one percent of total carbon inputs to landfills.

In mass balance terms, carbon storage can be characterized as the carbon that remains after accounting for the carbon exiting the system as landfill gas or dissolved in leachate. On a dry weight basis, municipal refuse contains 30–50 percent cellulose, 7–12 percent hemicellulose and 15–28 percent lignin (Hilger and Barlaz, 2001). Although the degradation of cellulose and hemicellulose in landfills is well documented, lignin does not degrade to a significant extent under anaerobic conditions (Colberg, 1988). Landfills in effect store some of carbon from the cellulose and hemicellulose and all of the carbon from the lignin that is buried initially. The amount of storage will vary with environmental conditions in the landfill; pH and moisture content have been identified as the two most important variables controlling decomposition (Barlaz et al., 1990). These variables and their effects on each material type's emission factor are discussed further below.

6.2.2 Estimating Emissions from Landfills

As discussed in section 6.2.1, when biodegradable materials such as wood products, food wastes, and yard trimmings are placed into a landfill, a fraction of the carbon within these materials degrades into CH_4 emissions. The quantity and timing of CH_4 emissions released from the landfill depends upon three factors: (1) how much of the original material decays into CH_4, (2) how readily the material decays under different landfill moisture conditions, and (3) landfill gas collection practices. This section describes how these three factors are addressed in WARM.

6.2.2.1 Methane Generation and Landfill Carbon Storage

The first step is to determine the amount of carbon contained in degradable materials that is emitted from the landfill as CH_4, and the amount that remains in long-term storage within the landfill. Although a large body of research exists on CH_4 generation from mixed solid wastes, only a few investigators—most notably Dr. Morton Barlaz and colleagues at North Carolina State University—have measured the behavior of specific waste wood, paper, food waste, and yard trimming components. The results of their experiments yield data on the inputs—specifically the initial carbon contents, CH_4 generation, and carbon stored—that are required for calculating material-specific emission factors for WARM.

Barlaz (1998) developed a series of laboratory experiments designed to measure biodegradation of these materials in a simulated landfill environment, in conditions designed to promote decomposition (i.e., by providing ample moisture and nutrients). Each waste component (e.g., grass, branches, leaves, paper) was dried; analyzed for cellulose, hemicellulose, and lignin content; weighed; placed in two-liter plastic containers (i.e., reactors); and allowed to decompose anaerobically under moist conditions (Eleazer et al., 1997). At the end of the experiment, the contents of the reactors were dried, weighed, and analyzed for cellulose, hemicellulose, lignin, and (in the case of food waste only) protein content. The carbon in these residual components is assumed to represent carbon that would remain undegraded over the long term in landfills: that is, it would be stored.

Based on these components, Dr. Barlaz estimated the initial biogenic carbon content of each waste material as a percent of dry matter. For some materials, the carbon content estimates have been updated to reflect more recent studies or to better reflect changes in material composition in recent years. Exhibit 6-4 shows the initial carbon contents of the wastes analyzed by Barlaz (1998) and Wang et al. (2011).

Exhibit 6-4: Initial Biogenic Carbon Content of Materials Tested in Barlaz (1998) and Wang et al. (2011)

Material	Initial Biogenic Carbon Content, % of Dry Matter	Source
Corrugated Containers	47%	Barlaz (1998)
Newspaper	49%	Barlaz (1998)
Office Paper	32%	Barlaz (1998)[a]
Coated Paper	34%	Barlaz (1998)
Food Waste	50%	Barlaz (1998)
Grass	45%	Barlaz (1998)
Leaves	46%	Barlaz (1998)
Branches	49%	Barlaz (1998)
Mixed MSW	42%	Barlaz (1998)
Gypsum Board	5%	Barlaz (1998)
Dimensional Lumber	49%	Wang et al. (2011)
Medium-density Fiberboard	44%	Wang et al. (2011)
Wood Flooring[b]	46%	Wang et al. (2011)

[a] Based on 2014 discussions with Dr. Morton Barlaz, the carbon content of office paper has been updated to account for an average calcium carbonate ($CaCO_3$) content of 20 percent in office paper in recent years.
[b] Based on an average of carbon content values for red oak and plywood in Wang et al. (2011).

The principal stocks and flows in the landfill carbon balance are:

- Initial carbon content (Initial C);
- Carbon output as CH_4 (CH_4^C);
- Carbon output as CO_2 (CO_2^C); and
- Residual carbon (i.e., landfill carbon storage, LF^C).

The initial carbon content, along with the other results from the Barlaz (1998), Wang et al. (2013), Wang et al. (2011), and Levis et al. (2013) experiments are used to estimate each material type's emission factor in WARM. The Barlaz (1998), Wang et al. (2013), Wang et al. (2011), and Levis et al. (2013) experiments did not capture CO_2 emissions in the carbon balance; however, in a simple system where the only carbon fates are CH_4, CO_2 and carbon storage, the carbon balance can be described as

$$CH_4^C + CO_2^C + LF^C = \text{Initial C}$$

If the only decomposition is anaerobic, then $CH_4^C = CO_2^C$.[32] Thus, the carbon balance can be expressed as

$$= \text{Initial C} 2 \times CH_4^C + LF^C = \text{Initial C}$$

Exhibit 6-5 shows the measured experimental values, in terms of the percentage of initial carbon for each of the materials analyzed, the implied landfill gas yield, and the sum of outputs as a percentage of initial carbon (Barlaz, 1998; Wang et al., 2013; Wang et al., 2011; Levis et al., 2013). As the sum of the outputs shows, the balance between carbon outputs and carbon inputs generally was not perfect. This imbalance is attributable to measurement uncertainty in the analytic techniques.

Exhibit 6-5: Experimental Values for CH_4 Yield and Carbon Storage[a]

(a) Material	(b) Measured CH_4 Yield as a % of Initial Carbon	(c) Implied Yield of Landfill Gas (CH_4+CO_2) as a Proportion of Initial Carbon (c = 2 × b)	(d) Measured Proportion of Initial Carbon Stored	(e) Output as % of Initial Carbon (e = c + d)
Corrugated Containers	17%	35%	55%	90%
Newspaper	8%	16%	85%	100%
Office Paper	29%	58%	12%	70%
Coated Paper	13%	26%	79%	100%
Food Waste	32%	63%	16%	79%
Grass	23%	46%	53%	99%
Leaves	8%	15%	85%	100%
Branches	12%	23%	77%	100%
Mixed MSW	16%	32%	19%	50%
Gypsum Board	0%	0%	55%	55%
Dimensional Lumber	1%	3%	88%	91%
Medium-density Fiberboard	1%	1%	84%	85%
Wood Flooring	2%	5%	99%	100%

[a] The CH_4, CO_2, and carbon stored from these experiments represents only the biogenic carbon in each material type.

To calculate the WARM emission factors, adjustments were made to the measured values so that exactly 100 percent of the initial carbon would be accounted for. After consultation with Dr. Barlaz, the following approach was adopted to account for exactly 100 percent of the initial carbon:

- For most materials where the total carbon output is less than the total carbon input (e.g., corrugated containers, office paper, food waste, grass, leaves), the "missing" carbon was assumed to be emitted as equal quantities of CH_4^C and CO_2^C. In these cases (corrugated

[32] The emissions ratio of CH_4 to CO_2 is 1:1 for carbohydrates (e.g., cellulose, hemicellulose). For proteins, the ratio is 1.65 CH_4 per 1.55 CO_2; for protein, it is $C_{3.2}H_5ON_{0.86}$ (Barlaz et al., 1989). Given the predominance of carbohydrates, for all practical purposes, the overall ratio is 1:1.

containers, office paper, food waste, grass, leaves), the CH_4^C was increased with respect to the measured values as follows:

$$\frac{\text{Initial C-LF}^C}{2} = CH_4^C$$

This calculation assumes that $CO_2^C = CH_4^C$. In essence, the adjustment approach was to increase landfill gas production, as suggested by Dr. Barlaz.

- For coated paper, newspaper, and wood flooring, where carbon outputs were greater than initial carbon, the measurements of initial carbon content and CH_4 mass were assumed to be accurate. Here, the adjustment approach was to decrease carbon storage. Thus, landfill carbon storage was calculated as the residual of initial carbon content minus ($2 \times CH_4^C$).

  The resulting adjusted CH_4 yields and carbon storage are presented in Exhibit 6-6.

- For branches, dimensional lumber, medium-density fiberboard, and mixed MSW, the measured CH_4 yield as a percentage of initial carbon was considered to be the most realistic estimate for methane yield, based on consultation with Dr. Barlaz. Therefore, no adjustment was made for these materials.

- For gypsum board, the sulfate in wallboard is estimated to reduce methane generation, as bacteria use sulfate preferentially to the pathway that results in methane, as suggested by Dr. Barlaz. As such, methane yield from gypsum board is likely to be negligible and is therefore adjusted to 0% in WARM.

Exhibit 6-6: Adjusted CH_4 Yield and Carbon Storage by Material Type

Material	Adjusted Yield of CH_4 as Proportion of Initial Carbon	Adjusted Carbon Storage as Proportion of Initial Carbon
Corrugated Containers[a]	22%	55%
Newspaper[b]	8%	84%
Office Paper[a]	44%	12%
Coated Paper[b]	13%	74%
Food Waste[a]	42%	16%
Grass[a]	23%	53%
Leaves[a]	8%	85%
Branches[c]	12%	77%
Mixed MSW[c]	16%	19%
Gypsum Board[d]	0%	55%
Dimensional Lumber[c]	1%	88%
Medium-density Fiberboard[c]	1%	84%
Wood Flooring[b]	2%	95%

[a] CH_4 yield is adjusted to account for measurement uncertainty in the analytic techniques to measure these quantities. For corrugated containers, office paper, food waste, grass, and leaves, the yield of CH_4 was increased such that the proportion of initial carbon emitted as landfill gas (i.e., $2 \times CH_4$) plus the proportion that remains stored in the landfill is equal to 100% of the initial carbon.

[b] For coated paper, newspaper, and wood flooring, the proportion of initial carbon that is stored in the landfill is decreased such that the proportion of initial carbon emitted as landfill gas (i.e., $2 \times CH_4$) plus the proportion that remains stored in the landfill is equal to 100% of the initial carbon.

[c] For branches, dimensional lumber, medium-density fiberboard, and mixed MSW, the measured CH_4 yield as a percentage of initial carbon and measured proportion of initial carbon stored shown in columns b and d, respectively of Exhibit 6-5 was considered to be the most realistic estimate for methane yield. Therefore, these values were not adjusted.

[d] For gypsum board, the sulfate in wallboard is estimated to reduce methane generation; thus, the methane yield from gypsum board is likely to be negligible and is therefore adjusted to 0%.

Dr. Barlaz's experiment did not test all of the biodegradable material types in WARM. EPA identified proxies for the remaining material types for which there were no experimental data. Magazines and third-class mail placed in a landfill were assumed to contain a mix of coated paper and office paper and were therefore assumed to behave like an average of those two materials. Similarly, phone books and textbooks were assumed to behave in the same way as newspaper and office paper, respectively. Results from two studies by Wang et al. were used for dimensional lumber, medium-density fiberboard, and wood flooring (2011; 2013). For wood flooring, the ratio of dry-to-wet weight was adjusted to more accurately represent the moisture content of wood lumber (Staley and Barlaz, 2009). Drywall was assumed to have characteristics similar to gypsum board. Exhibit 6-7 shows the landfill CH_4 emission factors and the final carbon storage factors for all applicable material types.

Exhibit 6-7: CH_4 Yield for Solid Waste Components

Material	Initial Biogenic Carbon Content	Adjusted Yield of CH_4 as Proportion Of Initial Carbon	Final (Adjusted) CH_4 Generation, $MTCO_2E$/Dry Metric Ton[a]	Final (Adjusted) CH_4 Generation ($MTCO_2E$ /Wet Short Ton)[b]
Corrugated Containers	47%	22%	3.48	2.62
Magazines/Third-Class Mail	36%	12%	1.43	1.19
Newspaper	49%	8%	1.33	1.05
Office Paper	32%	44%	4.71	3.89
Phonebooks	49%	8%	1.33	1.05
Textbooks	32%	44%	4.71	3.89
Dimensional Lumber	49%	1%	0.24	0.17
Medium-Density Fiberboard	44%	1%	0.08	0.06
Food Waste	49%	40%	6.63	1.62
Yard Trimmings				
Grass	45%	23%	3.48	0.57
Leaves	46%	8%	1.17	0.65
Branches	49%	12%	1.90	1.45
Mixed MSW	42%	16%	2.23	1.62
Drywall	5%	0%	0	0
Wood Flooring	43%	2%	0.27	0.18

[a] Final adjusted CH_4 generation per dry metric ton is the product of the initial carbon content and the final percent carbon emitted as CH_4 multiplied by the molecular ratio of carbon to CH_4 (12/16).

[b] CH_4 generation is converted from per dry metric ton to per wet short ton by multiplying the CH_4 generation on a dry metric ton basis by (1 – the material's moisture content) and by converting from metric tons to short tons of material.

6.2.2.2 Component-Specific Decay Rates

The second factor in estimating material-specific landfill emissions is the rate at which a material decays under anaerobic conditions in the landfill. The decay rate is an important factor that influences the landfill collection efficiency described further in the next section. Although the final adjusted CH_4 yield shown in Exhibit 6-7 will eventually occur no matter what the decay rate, the rate at which the material decays influences how much of the CH_4 yield will eventually be captured for landfills with collection systems.

Recent studies by De la Cruz and Barlaz (2010) found that different materials degrade at different rates relative to bulk MSW rates of decay. For example, one short ton of a relatively inert wood material—such as lumber—will degrade slowly and produce a smaller amount of methane than food waste, which readily decays over a much shorter timeframe. Materials will also degrade faster under wetter landfill conditions. Consequently, the rate at which CH_4 emissions are generated from decaying material in a landfill depends upon: (1) the type of material placed in the landfill, and (2) the moisture conditions of the landfill.

De la Cruz and Barlaz (2010) measured component-specific decay rates in laboratory experiments that were then scaled to field-level, component-specific decay rates based on mixed MSW field-scale decay rates published in EPA (1998) guidance.

To scale the laboratory-scale, component-specific decay rate measurements to field-scale values, De la Cruz and Barlaz (2010) assumed that the weighted average decay rate for a waste mixture of the same composition as MSW would be equal to the bulk MSW decay rate. They also related a lab-scale decay rate for mixed MSW to the field-scale decay rate using a scaling factor. Using these two relationships, the authors were able to estimate field-scale decay rates for different materials based on the laboratory data. The following equations were used to estimate the component-specific decay rates:

Equation 1

$$f \times \sum_{i=1}^{n} k_{lab,i} \times (wt.fraction)_i = decay\ rate$$

Equation 2

$$k_{field,i} = f \times k_{lab,i}$$

where,

f = a correction factor to force the left side of the equation to equal the overall MSW decay rate

$k_{lab,i}$ = the component-specific decay rate calculated from lab experiments

$k_{field,i}$ = the component-specific decay rate determined for the field

i = the i^{th} waste component

Based on the results from De la Cruz and Barlaz (2010), the Excel version of WARM allows users to select different component-specific decay rates based on different assumed moisture contents of the landfill to estimate the rate at which CH_4 is emitted for each material type (or "component"). The five MSW decay rates used are:

1. k = 0.02/year ("Dry"), corresponding to landfills receiving fewer than 20 inches of annual precipitation: based values reported in EPA (2010)
2. k = 0.04/year ("Moderate"), corresponding to landfills receiving between 20 and 40 inches of annual precipitation: based values reported in EPA (2010)
3. k = 0.06/year ("Wet"), corresponding to landfills receiving greater than 40 inches of annual precipitation: based values reported in EPA (2010)
4. k = 0.12/year ("Bioreactor"), corresponding to landfills operating as bioreactors where water is added until the moisture content reaches 40 percent moisture on a wet-weight basis: based on expert judgment using values reported in Barlaz et al. (2010) and Tolaymat et al. (2010)
5. k = 0.052/year ("National Average"), corresponding to a weighted average based on the share of waste received at each landfill type: based on expert judgment using values reported in EPA (2010)

The final waste component-specific decay rates as a function of landfill moisture conditions are provided in Exhibit 6-8.

Exhibit 6-8: Component-Specific Decay Rates (yr^{-1}) by Landfill Moisture Scenario

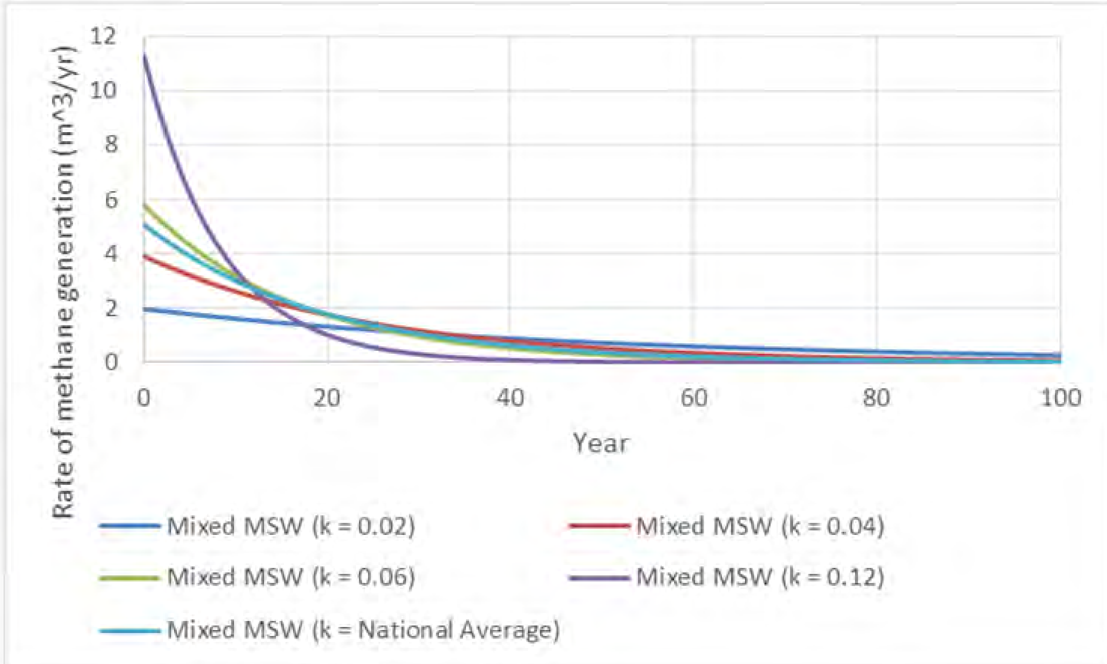
Material	Landfill Moisture Conditions				
	Dry	Moderate	Wet	Bioreactor	National Average
Corrugated Containers	0.01	0.02	0.03	0.06	0.03
Magazines/Third-Class Mail	0.06	0.12	0.18	0.37	0.16
Newspaper	0.02	0.03	0.05	0.10	0.04
Office Paper	0.01	0.03	0.04	0.09	0.04
Phone Books	0.02	0.03	0.05	0.10	0.04
Textbooks	0.01	0.03	0.04	0.09	0.04
Dimensional Lumber	0.04	0.08	0.12	0.25	0.11
Medium-Density Fiberboard	0.03	0.06	0.10	0.19	0.08
Food Waste	0.07	0.14	0.22	0.43	0.19
Yard Trimmings	0.10	0.20	0.29	0.59	0.26
Grass	0.15	0.30	0.45	0.89	0.39
Leaves	0.09	0.17	0.26	0.51	0.22
Branches	0.01	0.02	0.02	0.05	0.02
Mixed MSW	0.02	0.04	0.06	0.12	0.05
Drywall[a]	–	–	–	–	–
Wood Flooring[a]	–	–	–	–	–

– = Zero Emissions.

[a]Decay rates were not estimated since WARM assumes that the construction and demolition landfills where these materials are disposed of do not collect landfill gas.

The profile of methane emissions as materials decay in landfills over time is commonly approximated using a first-order decay methodology summarized in De la Cruz and Barlaz (2010). The CH_4 generation potential of landfilled waste decreases gradually throughout time and can be estimated using first order decomposition mathematics. The profile of methane emissions from landfills over time for mixed MSW is shown in Exhibit 6-9 as a graphic representation of the methane emissions approximated using a first-order decay equation. As Exhibit 6-9 shows, materials will degrade faster under wetter conditions in landfills (i.e., landfills whose conditions imply higher decay rates for materials).

Exhibit 6-9. Rate of Methane Generation for Mixed MSW as a Function of Decay Rate



Although in each landfill moisture scenario, the total final CH_4 yield for solid waste components (Exhibit 6-7) will eventually be emitted over time, the rate at which methane is emitted greatly depends on the decay rate. Finally, since different materials have very different methane emission profiles in landfills, the effectiveness and timing of the installation of landfill gas collection systems can greatly influence methane emissions, as discussed in the next section.

6.2.2.3 Landfill Gas Collection

WARM estimates the amount of methane that is collected by landfill gas collection equipment. In practice, the landfill gas collection system efficiency does not remain constant over the duration of gas production. Rather, the gas collection system at any particular landfill is typically expanded over time. Usually, only a small percentage (or none) of the gas produced soon after waste burial is collected, while almost all of the gas produced is collected once a final cover is installed. To provide a better estimate of gas collection system efficiency, EPA used a Monte Carlo analysis to estimate the fraction of produced gas that is vented directly, flared and utilized for energy recovery while considering annual waste disposal and landfill operating life (Levis and Barlaz, 2014).[33]

The gas collection efficiencies that WARM uses are evaluated from the perspective of a short ton of a specific material placed in the landfill at year zero. The efficiencies are calculated based on one of five moisture conditions (dry, moderate, wet, bioreactor, and national average conditions, described in section 6.2.2.2) and one of four landfill gas collection practices over a 100-year time period, which is approximately the amount of time required for 95 percent of the potential landfill gas to be produced under the “Dry” (k = 0.02/yr) landfill scenario. The final average efficiency is equal to the total CH_4 collected over 100 years divided by the total CH_4 produced over 100 years.

The combination of four different landfill gas collection scenarios and five different landfill moisture conditions means there are 20 possible landfill gas collection efficiencies possible for each

[33] This improved analysis of landfill gas collection was incorporated in June 2014 into WARM Version 13.

material in WARM. The landfill collection efficiency scenarios are described below and the assumptions for each are shown in Exhibit 6-10:

1. Typical collection – phased-in collection with an improved cover; judged to represent the average U.S. landfill, although every landfill is unique and a typical landfill is an approximation of reality.
2. Worst-case collection – the minimum collection requirements under EPA's New Source Performance Standards.
3. Aggressive collection – landfills where the operator is aggressive in gas collection relative to a typical landfill; bioreactor landfills are assumed to collect gas aggressively.
4. California regulatory scenario[34] – equivalent to landfill management practices based on California regulatory requirements.

Exhibit 6-10: WARM Gas Collection Scenario Assumptions and Efficiencies Compared to EPA AP-42 (1998) with Landfill Gas Recovery for Energy

Scenario	Gas Collection Scenario Description	Gas Collection Scenario	Landfill Gas Collection Efficiency (%) for Mixed MSW[a]				
			MSW Decay Rate (yr^{-1})				
			0.02	0.04	0.06	0.12	National Average
AP-42	EPA default gas collection assumption (EPA 1998 AP-42) (not modeled in WARM)	All years: 75%	75.0	75.0	75.0	75.0	75.0
1	"Typical collection", judged to represent the average U.S. landfill	Years 0–1: 0% Years 2-4: 50% Years 5–14: 75% Years 15 to 1 year before final cover: 82.5% Final cover: 90%	68.2	65.0	64.1	60.6	64.8
2	"Worst-case collection" under EPA New Source Performance Standards (NSPS)	Years 0-4: 0% Years 5-9: 50% Years 10–14: 75% Years 15 to 1 year before final cover: 82.5% Final cover: 90%	66.2	61.3	59.2	50.6	60.3
3	"Aggressive gas collection," typical bioreactor operation	Year 0: 0% Years 0.5-2: 50% Years 3–14: 75% Years 15 to 1 year before final cover: 82.5% Final Cover: 90%	68.6	65.8	66.3	63.9	66.4
4	"California regulatory scenario", landfill management based on California regulatory requirements	Year 0: 0% Year 1: 50% Years 2-7: 80% Years 8 to 1 year before final cover: 85% Final cover: 90%	83.6	79.5	77.4	72.9	78.8

[a] The values in this table are for landfills that recover gas for energy. In reality, a small share of gas recovered is eventually flared. The values provided in this table include both the gas recovered for energy and the small portion recovered for flaring.

[34] This additional landfill gas collection scenario was incorporated in June 2014 into WARM Version 13 to allow WARM users to estimate and view landfill management results based on California regulatory requirements.

The landfill gas collection efficiencies by material type for each of the four landfill collection efficiency scenarios and each of the five moisture conditions are provided in Exhibit 6-11. In addition to the gas collected, EPA also took into account the percentage of gas that is flared, oxidized, and emitted for landfills that recover gas for energy, as described in Levis and Barlaz (2014). Some of the uncollected methane is oxidized to CO_2 as it passes through the landfill cover; Levis and Barlaz (2014) adapted EPA recommendations for methane oxidation (71 FR 230, 2013) to develop the following oxidation rates at various stages of landfill gas collection:

- Without gas collection or final cover: 10 percent
- With gas collection before final cover: 20 percent
- After final cover installation: 35 percent

In the EPA recommendations, the fraction of uncollected methane that is oxidized varies with the methane flux (mass per area per time) and ranges from 10 percent to 35 percent (71 FR 230, 2013). Measurement or estimation of the methane flux is possible on a site-specific basis but requires assumptions on landfill geometry and waste density to estimate flux for a generic landfill as is represented by WARM. As such, the methane oxidation values published by EPA were used as guidance for the values listed above. Landfills with a final cover and a gas collection system in place will have a relatively low flux through the cover, which justifies the upper end of the range (35 percent) given by EPA. Similarly, landfills without a gas collection system in place will have a relatively high flux, suggesting that an oxidation rate of 10 percent is most appropriate. Landfills with a gas collection system in place but prior to final cover placement were assigned an oxidation rate of 20 percent. Based on preliminary calculations for a variety of landfill geometries and waste densities, Levis and Barlaz (2014) determined that the methane flux would justify an oxidation rate of 25 percent most but not all of the time. As such, an oxidation rate of 20 percent was adopted in WARM for landfills with gas collection before final cover (Levis and Barlaz, 2014).

For landfill gas that is not collected for energy use, EPA took into account the percentage of landfill CH_4 that is flared (when recovery for flaring is assumed), oxidized near the surface of the landfill, and emitted. Based on analysis by Levis and Barlaz, EPA estimated the percentage of the landfill CH_4 generated that are either flared, chemically oxidized or converted by bacteria to CO_2, and emitted for each material type for each of the four landfill collection efficiency scenarios and each of the five moisture conditions (Levis and Barlaz, 2014).

Exhibit 6-11: Waste Component-Specific Collection Efficiencies by Landfill Moisture Condition with Landfill Gas Recovery for Energy

Material	Typical Landfill Scenario					Worst-Case Landfill Scenario					Aggressive Collection Landfill Scenario					California Regulations Collection Scenario				
	Dry	Moderate	Wet	Bioreactor	National Avg.	Dry	Moderate	Wet	Bioreactor	National Avg.	Dry	Moderate	Wet	Bioreactor	National Avg.	Dry	Moderate	Wet	Bioreactor	National Avg.
Corrugated Containers	61%	55%	54%	55%	56%	60%	54%	53%	50%	54%	61%	56%	56%	58%	57%	66%	59%	60%	62%	61%
Magazines/ Third-Class Mail	59%	55%	52%	45%	54%	55%	46%	40%	26%	43%	61%	58%	57%	51%	57%	67%	63%	61%	54%	62%
Newspaper	62%	59%	59%	57%	59%	61%	56%	55%	49%	56%	62%	59%	61%	60%	61%	67%	64%	65%	65%	65%
Office Paper	62%	58%	58%	57%	59%	61%	56%	55%	50%	56%	62%	59%	60%	60%	60%	67%	63%	64%	65%	64%
Phone Books	62%	59%	59%	57%	59%	61%	56%	55%	49%	56%	62%	59%	61%	60%	61%	67%	64%	65%	65%	65%
Textbooks	62%	58%	58%	57%	59%	61%	56%	55%	50%	56%	62%	59%	60%	60%	60%	67%	63%	64%	65%	64%
Dimensional Lumber	62%	59%	57%	50%	58%	59%	52%	48%	35%	50%	63%	61%	60%	55%	60%	68%	66%	65%	60%	65%
Medium-Density Fiberboard	62%	60%	59%	53%	59%	60%	55%	51%	40%	53%	63%	62%	62%	58%	62%	68%	66%	67%	62%	67%
Food Waste	58%	53%	50%	42%	52%	53%	43%	36%	22%	40%	59%	56%	55%	49%	55%	65%	61%	59%	51%	60%
Food Waste (meat only)	58%	53%	50%	42%	52%	53%	43%	36%	22%	40%	59%	56%	55%	49%	55%	65%	61%	59%	51%	60%
Food Waste (non-meat)	58%	53%	50%	42%	52%	53%	43%	36%	22%	40%	59%	56%	55%	49%	55%	65%	61%	59%	51%	60%
Beef	58%	53%	50%	42%	52%	53%	43%	36%	22%	40%	59%	56%	55%	49%	55%	65%	61%	59%	51%	60%
Poultry	58%	53%	50%	42%	52%	53%	43%	36%	22%	40%	59%	56%	55%	49%	55%	65%	61%	59%	51%	60%
Grains	58%	53%	50%	42%	52%	53%	43%	36%	22%	40%	59%	56%	55%	49%	55%	65%	61%	59%	51%	60%
Bread	58%	53%	50%	42%	52%	53%	43%	36%	22%	40%	59%	56%	55%	49%	55%	65%	61%	59%	51%	60%
Fruits and Vegetables	58%	53%	50%	42%	52%	53%	43%	36%	22%	40%	59%	56%	55%	49%	55%	65%	61%	59%	51%	60%
Dairy Products	58%	53%	50%	42%	52%	53%	43%	36%	22%	40%	59%	56%	55%	49%	55%	65%	61%	59%	51%	60%
Yard Trimmings	54%	47%	44%	39%	47%	47%	37%	31%	21%	35%	55%	51%	49%	44%	50%	61%	55%	52%	45%	54%
Grass	49%	43%	39%	33%	41%	39%	27%	20%	9%	25%	51%	47%	45%	39%	46%	57%	51%	48%	38%	50%
Leaves	56%	51%	47%	40%	49%	50%	40%	33%	19%	37%	58%	54%	52%	46%	53%	64%	59%	57%	48%	58%
Branches	61%	53%	51%	52%	54%	60%	52%	51%	49%	53%	61%	54%	53%	54%	55%	65%	57%	57%	58%	59%
Mixed MSW	62%	60%	60%	57%	60%	61%	56%	55%	47%	56%	63%	61%	62%	60%	62%	67%	65%	67%	65%	66%
Gypsum[a]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Wood Flooring[a]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

– = Zero Emissions.

[a]WARM assumes that construction and demolition landfills do not collect landfill gas.

6.2.3 Emissions from Transportation to Landfills and Landfill Operation

WARM includes emissions associated with transportation and landfilling the material. Transportation energy emissions occur when fossil fuels are combusted to collect and transport material to the landfill facility and then to operate landfill operational equipment. To calculate the emissions, WARM relies on assumptions from FAL (1994) for the equipment emissions and NREL's US Life Cycle Inventory Database (USLCI) (NREL, 2015). The NREL emission factor assumes a diesel, short-haul truck. Exhibit 6-12 provides the transportation emission factor calculation.

Exhibit 6-12: Transportation CO_2 Emissions Assumptions and Calculation

Equipment	Total ($MTCO_2E$/Short Ton)
Collection Vehicles	0.00
Landfill Equipment	0.02
Total	**0.02**

6.2.4 Estimating Landfill Carbon Storage

The other anthropogenic fate of carbon in landfills is storage. As described in section 6.2.1, a portion of the carbon in biodegradable materials (i.e., food waste, yard trimmings, paper, and wood) that is not completely decomposed by anaerobic bacteria remains stored in the landfill. This carbon storage would not normally occur under natural conditions, so it is counted as an anthropogenic sink (IPCC, 2006; Bogner et al., 2007).

The discussion in section 6.2.2 on initial carbon contents and CH_4 generation includes the measured carbon stored from the Barlaz (1998), Wang et al. (2013), Wang et al. (2011), and Levis et al. (2013) experiments. For the most part, the amount of stored carbon measured as the output during these experiments is considered the final ratio of carbon stored to total initial dry weight of each material type. For newspaper, wood flooring, and coated paper—which is used to estimate landfill characteristics for magazines and third-class mail—the amount of carbon stored is reduced because carbon outputs were *greater than* initial carbon.

To estimate the final carbon storage factor, the proportion of initial carbon stored found in Exhibit 6-6 is multiplied by the initial carbon contents in Exhibit 6-4 to obtain the ratio of carbon storage to dry weight for each material type found in Exhibit 6-13. These estimates are then converted from dry weight to wet weight and from grams to metric tons of CO_2 per wet short ton of material. The last column of Exhibit 6-13 provides the final carbon storage factors for the biodegradable solid waste components modeled in WARM.

Exhibit 6-13: Carbon Storage for Solid Waste Components

Material	Ratio of Carbon Storage to Dry Weight (gram C/dry gram)	Ratio of Dry Weight to Wet Weight	Ratio of Carbon Storage to Wet Weight (gram C/wet gram)	Amount of Carbon Stored ($MTCO_2E$ per Wet Short Ton)
Corrugated Containers	0.26	0.83	0.22	0.72
Magazines/Third-Class Mail	0.28	0.92	0.25	0.85
Newspaper	0.41	0.87	0.36	1.19
Office Paper	0.04	0.91	0.04	0.12
Phonebooks	0.41	0.87	0.36	1.19
Textbooks	0.04	0.91	0.04	0.12
Dimensional Lumber	0.44	0.75	0.33	1.09
Medium-Density Fiberboard	0.37	0.75	0.28	0.92
Food Waste	0.10	0.27	0.03	0.09
Yard Trimmings	0.31	0.45	0.16	0.54
Grass	0.24	0.18	0.04	0.14
Leaves	0.39	0.62	0.24	0.79
Branches	0.38	0.84	0.32	1.06
Mixed MSW	0.08	0.80	0.06	0.21
Drywall	0.03	0.94	0.02	0.08
Wood Flooring	0.42	0.75	0.31	1.04

6.2.5 Electric Utility GHG Emissions Avoided

The CH_4 component of landfill gas that is collected from landfills can be combusted to produce heat and electricity, and recovery of heat and electricity from landfill gas offsets the combustion of other fossil fuel inputs. WARM models the recovery of landfill gas for electricity generation and assumes that this electricity offsets non-baseload electricity generation in the power sector.

WARM applies non-baseload electricity emission rates to calculate the emissions offset from landfill gas energy recovery because the model assumes that incremental increases in landfill energy recovery will affect non-baseload power plants (i.e., power plants that are "demand-following" and adjust to marginal changes in the supply and demand of electricity). EPA calculated non-baseload emission rates as the average emissions rate from power plants that combust fuel and have capacity factors less than 0.8 (EPA, 2015a).

EPA estimated the avoided GHG emissions per $MTCO_2E$ of CH_4 combusted using several physical constants and data from EPA's Landfill Methane Outreach Program and eGRID (EPA, 2013; EPA, 2018c). The mix of fuels used to produce electricity varies regionally in the United States; consequently, EPA applied a different CO_2-intensity for electricity generation depending upon where the electricity is offset. The Excel version of WARM includes CO_2-intensity emission factors for non-baseload electricity generated in nine different U.S. regions as well as a U.S.-average CO_2-intensity (EPA, 2015a). The formula used to calculate the quantity of electricity generation emissions avoided per $MTCO_2E$ of CH_4 combusted is as follows:

$$\frac{BTU_{CH4}}{H_{LFGTE}} \times a \times E_{Grid} = R$$

Where:

Btu_{CH4} = Energy content of CH_4 per $MTCO_2E$ CH_4 combusted; assumed to be 1,012 Btu per cubic foot of CH_4 (EPA, 2013), converted into Btu per $MTCO_2E$ CH_4 assuming 20 grams per cubic foot of CH_4 at standard temperature and pressure and a global warming potential of CH_4 of 21

H_{LFGTE} = Heat rate of landfill gas to energy conversion; assumed to be 11,700 Btu per kWh generated (EPA, 2013)

a = Net capacity factor of electricity generation; assumed to be 85 percent (EPA, 2013)

E_{grid} = Non-baseload CO_2-equivalent GHG emissions intensity of electricity produced at the regional or national electricity grid; values assumed for each region and U.S. average are shown in Exhibit 6-15

R = Ratio of GHG emissions avoided from electricity generation per $MTCO_2E$ of CH_4 combusted for landfill gas to energy recovery

Exhibit 6-14 shows variables in the GHG emissions offset for the national average fuel mix. The final ratio is the product of columns (a) through (h). Exhibit 6-15 shows the amount of carbon avoided per kilowatt-hour of generated electricity and the final ratio of $MTCO_2E$ avoided of utility carbon per $MTCO_2E$ of CH_4 combusted (column (g) and resulting column (i)).

Exhibit 6-14: Calculation to Estimate Utility GHGs Avoided Through Combustion of Landfill CH_4 for Electricity Based on National Average Electricity Grid Mix

(a) Metric Tons CH_4/$MTCO_2E$ CH_4 Combusted	(b) Grams CH_4/Metric Ton CH_4	(c) Cubic Ft. CH_4/ Gram CH_4	(d) Btu/Cubic Ft. CH_4	(e) kWh Electricity Generated/ Btu	(f) Electricity Generation Efficiency	(g) Kg Utility CO_2 Avoided/ kWh Generated Electricity	(h) Metric Tons Avoided Utility CO_2/Kg Utility CO_2	(i) Ratio of $MTCO_2E$ Avoided Utility CO_2 per $MTCO_2E$ CH_4 Combusted
0.04	1,000,000	0.05	1,012	0.00009	0.85	0.73	0.001	0.11

Exhibit 6-15: Ratio of $MTCO_2E$ Avoided Utility Carbon per $MTCO_2E$ CH_4 Combusted by Region

Region	Kg Utility CO_2 Avoided/kWh Generated Electricity	Ratio of $MTCO_2E$ Avoided Utility C per $MTCO_2E$ CH_4
Pacific	0.52	0.08
Mountain	0.78	0.12
West-North Central	1.00	0.15
West-South Central	0.66	0.10
East-North Central	0.90	0.13
East-South Central	0.81	0.12
New England	0.53	0.08
Mid Atlantic	0.69	0.10
South Atlantic	0.79	0.12
National Average	0.75	0.11

If regional avoided utility emission factors are not employed, WARM calculates U.S.-average avoided utility emission factors based on the percent of CH_4 generated at landfills in the nation with landfill gas recovery and electricity production found in Exhibit 6-2, and assuming U.S.-average, non-baseload electricity GHG emission intensity. Exhibit 6-16 shows this calculation for each material type for the national average fuel mix.

Exhibit 6-16: Overall Avoided Utility CO_2 Emissions per Short Ton of Waste Material (National Average Grid Mix)

		Methane from Landfills With LFG Recovery and Electricity Generation					
(a) Material	(b) CH_4 Generation ($MTCO_2E$/ Wet Short Ton) (Exhibit 6-7)	(c) Percentage of CH_4 Recovered (Exhibit 6-11)	(d) Utility GHG Emissions Avoided per $MTCO_2E$ CH_4 Combusted ($MTCO_2E$) (Exhibit 6-15)	(e) Percentage of CH_4 Recovered for Electricity Generation Not Utilized Due to LFG System "Down Time"	(f) Utility GHG Emissions Avoided ($MTCO_2E$/Wet Short Ton) (f = b × c × d × (1-e))	(g) Percentage of CH_4 From Landfills With LFG Recovery and Electricity Generation (Exhibit 6-2)	(h) Net Avoided CO_2 Emissions from Energy Recovery ($MTCO_2E$/ Wet Short Ton) (h = f × g)
Corrugated Containers	2.62	56%	-0.11	3%	(0.15)	63%	(0.10)
Magazines/ Third-Class Mail	1.19	54%	-0.11	3%	(0.07)	63%	(0.04)
Newspaper	1.05	59%	-0.11	3%	(0.06)	63%	(0.04)
Office Paper	3.89	59%	-0.11	3%	(0.24)	63%	(0.15)
Phonebooks	1.05	59%	-0.11	3%	(0.06)	63%	(0.04)
Textbooks	3.89	59%	-0.11	3%	(0.24)	63%	(0.15)
Dimensional Lumber	0.17	58%	-0.11	3%	(0.05)	63%	(0.01)
Medium-Density Fiberboard	0.06	59%	-0.11	3%	0.00	63%	0.00
Food Waste	1.62	52%	-0.11	3%	(0.09)	63%	(0.05)
Yard Trimmings	0.81	47%	-0.11	3%	(0.04)	63%	(0.02)
Grass	0.57	41%	-0.11	3%	(0.02)	63%	(0.02)
Leaves	0.65	49%	-0.11	3%	(0.03)	63%	(0.02)
Branches	1.45	54%	-0.11	3%	(0.08)	63%	(0.05)
Mixed MSW	1.62	60%	-0.11	3%	(0.10)	63%	(0.06)
Drywall[a]	0.00	–	-0.11	3%	–	–	–
Wood Flooring[a]	0.18	–	-0.11	3%	–	–	–

– = Zero Emissions.

[a] WARM assumes that construction and demolition landfills do not collect landfill gas.

6.2.6 Net GHG Emissions from Landfilling

CH_4 emissions, transportation CO_2 emissions, carbon storage, and avoided utility GHG emissions are then summed to estimate the net GHG emissions from landfilling each material type. Exhibit 6-17 shows the net emission factors for landfilling each material based on typical landfill gas collection practices, average landfill moisture conditions (i.e., for landfills receiving between 20 and 40 inches of precipitation annually), and U.S.-average non-baseload electricity grid mix.

Exhibit 6-17: Net GHG Emissions from Landfilling ($MTCO_2E$/Short Ton)

Material	Raw Material Acquisition and Manufacturing (Current Mix of Inputs)	Transportation to Landfill	Landfill CH_4	Avoided CO_2 Emissions from Energy Recovery	Landfill Carbon Sequestration	Net Emissions (Post-Consumer)
Aluminum Cans	–	0.02	–	–	–	0.02
Aluminum Ingot	–	0.02	–	–	–	0.02
Steel Cans	–	0.02	–	–	–	0.02
Copper Wire	–	0.02	–	–	–	0.02
Glass	–	0.02	–	–	–	0.02
HDPE	–	0.02	–	–	–	0.02
LDPE	–	0.02	–	–	–	0.02
PET	–	0.02	–	–	–	0.02
LLDPE	–	0.02	–	–	–	0.02
PP	–	0.02	–	–	–	0.02
PS	–	0.02	–	–	–	0.02
PVC	–	0.02	–	–	–	0.02
PLA	–	0.02	–	–	(1.66)	(1.64)
Corrugated Containers	–	0.02	0.88	(0.10)	(0.72)	0.18
Magazines/Third-Class Mail	–	0.02	0.40	(0.04)	(0.85)	(0.43)
Newspaper	–	0.02	0.33	(0.04)	(1.19)	(0.85)
Office Paper	–	0.02	1.23	(0.16)	(0.12)	1.13
Phonebooks	–	0.02	0.33	(0.04)	(1.19)	(0.85)
Textbooks	–	0.02	1.23	(0.16)	(0.12)	1.13
Dimensional Lumber	–	0.02	0.15	0.00	(1.09)	(0.92)
Medium-density Fiberboard	–	0.02	0.05	0.00	(0.92)	(0.85)
Food Waste	–	0.02	0.56	(0.06)	(0.09)	0.50
Food Waste (meat only)	–	0.02	0.56	(0.06)	(0.09)	0.50
Food Waste (non-meat)	–	0.02	0.56	(0.06)	(0.09)	0.50
Beef	–	0.02	0.56	(0.06)	(0.09)	0.50
Poultry	–	0.02	0.56	(0.06)	(0.09)	0.50
Grains	–	0.02	0.56	(0.06)	(0.09)	0.50
Bread	–	0.02	0.56	(0.06)	(0.09)	0.50
Fruits and Vegetables	–	0.02	0.56	(0.06)	(0.09)	0.50
Dairy Products	–	0.02	0.56	(0.06)	(0.09)	0.50
Yard Trimmings	–	0.02	0.31	(0.03)	(0.54)	(0.20)
Grass	–	0.02	0.24	(0.03)	(0.14)	0.12
Leaves	–	0.02	0.24	(0.03)	(0.79)	(0.53)
Branches	–	0.02	0.51	(0.05)	(1.06)	(0.54)
Mixed Paper (general)	–	0.02	0.78	(0.09)	(0.72)	0.07
Mixed Paper (primarily residential)	–	0.02	0.75	(0.09)	(0.76)	0.02
Mixed Paper (primarily from offices)	–	0.02	0.73	(0.09)	(0.64)	0.11
Mixed Metals	–	0.02	–	–	–	0.02
Mixed Plastics	–	0.02	–	–	–	0.02
Mixed Recyclables	–	0.02	0.66	(0.07)	(0.65)	0.03
Mixed Organics	–	0.02	0.46	(0.04)	(0.30)	0.18
Mixed MSW	–	0.02	0.50	(0.07)	(0.21)	0.31
Carpet	–	0.02	–	–	–	0.02
Desktop CPUs	–	0.02	–	–	–	0.02
Portable Electronic Devices	–	0.02	–	–	–	0.02
Flat-panel Displays	–	0.02	–	–	–	0.02
CRT Displays	–	0.02	–	–	–	0.02
Electronic Peripherals	–	0.02	–	–	–	0.02

Material	Raw Material Acquisition and Manufacturing (Current Mix of Inputs)	Transportation to Landfill	Landfill CH_4	Avoided CO_2 Emissions from Energy Recovery	Landfill Carbon Sequestration	Net Emissions (Post-Consumer)
Hard-copy Devices	–	0.02	–	–	–	0.02
Mixed Electronics	–	0.02	–	–	–	0.02
Clay Bricks	–	0.02	–	–	–	0.02
Concrete	–	0.02	–	–	–	0.02
Fly Ash	–	0.02	–	–	–	0.02
Tires	–	0.02	–	–	–	0.02
Asphalt Concrete	–	0.02	–	–	–	0.02
Asphalt Shingles	–	0.02	–	–	–	0.02
Drywall	–	0.02	–	–	(0.08)	(0.06)
Fiberglass Insulation	–	0.02	–	–	–	0.02
Structural Steel	–	0.02	–	–	–	0.02
Vinyl Flooring	–	0.02	–	–	–	0.02
Wood Flooring[a]	–	0.02	0.16	0.00	(1.04)	(0.86)

– = Zero Emissions.

[a] WARM assumes that construction and demolition landfills do not collect landfill gas

In WARM, emissions from landfills are dependent on the user selection of one of four different landfill scenarios (i.e., "Landfills: National Average," "Landfills Without LFG Recovery," "Landfills With LFG Recovery and Flaring," and "Landfills With LFG Recovery and Electric Generation") as described in section 1. The net landfilling emission factors for landfilling each material based on the default options in WARM (i.e., typical landfill gas collection practices, average landfill moisture conditions, and U.S.-average non-baseload electricity grid mix) are shown in Exhibit 6-18.

Exhibit 6-18: Landfilling Net Emission Factors in WARM Using Default Options ($MTCO_2E$/Ton)

Material	Landfills: National Average (Exhibit 6-17)	Landfills without LFG Recovery	Landfills with LFG Recovery and Flaring	Landfills with LFG Recovery and Electricity Generation
Aluminum Cans	0.02	0.02	0.02	0.02
Aluminum Ingot	0.02	0.02	0.02	0.02
Steel Cans	0.02	0.02	0.02	0.02
Copper Wire	0.02	0.02	0.02	0.02
Glass	0.02	0.02	0.02	0.02
HDPE	0.02	0.02	0.02	0.02
LDPE	0.02	0.02	0.02	0.02
PET	0.02	0.02	0.02	0.02
LLDPE	0.02	0.02	0.02	0.02
PP	0.02	0.02	0.02	0.02
PS	0.02	0.02	0.02	0.02
PVC	0.02	0.02	0.02	0.02
PLA	(1.64)	(1.64)	(1.64)	(1.64)
Corrugated Containers	0.18	1.66	0.45	(0.10)
Magazines/Third-Class Mail	(0.43)	0.25	(0.37)	(0.53)
Newspaper	(0.85)	(0.23)	(0.75)	(0.96)
Office Paper	1.13	3.40	1.51	0.72
Phonebooks	(0.85)	(0.23)	(0.75)	(0.96)
Textbooks	1.13	3.40	1.51	0.72
Dimensional Lumber	(0.92)	(0.92)	(1.01)	(1.03)
Medium-density Fiberboard	(0.85)	(0.85)	(0.88)	(0.89)
Food Waste	0.50	1.39	0.56	0.36

Material	Landfills: National Average (Exhibit 6-17)	Landfills without LFG Recovery	Landfills with LFG Recovery and Flaring	Landfills with LFG Recovery and Electricity Generation
Food Waste (meat only)	0.50	1.39	0.56	0.36
Food Waste (non-meat)	0.50	1.39	0.56	0.36
Beef	0.50	1.39	0.56	0.36
Poultry	0.50	1.39	0.56	0.36
Grains	0.50	1.39	0.56	0.36
Bread	0.50	1.39	0.56	0.36
Fruits and Vegetables	0.50	1.39	0.56	0.36
Dairy Products	0.50	1.39	0.56	0.36
Yard Trimmings	(0.20)	0.21	(0.17)	(0.26)
Grass	0.12	0.39	0.12	0.08
Leaves	(0.53)	(0.18)	(0.51)	(0.58)
Branches	(0.54)	0.26	(0.39)	(0.69)
Mixed Paper (general)	0.07	1.44	0.30	(0.18)
Mixed Paper (primarily residential)	0.02	1.33	0.23	(0.23)
Mixed Paper (primarily from offices)	0.11	1.42	0.29	(0.11)
Mixed Metals	0.02	0.02	0.02	0.02
Mixed Plastics	0.02	0.02	0.02	0.02
Mixed Recyclables	0.03	1.18	0.37	(0.23)
Mixed Organics	0.18	0.84	0.23	0.08
Mixed MSW	0.31	1.27	0.46	0.14
Carpet	0.02	0.02	0.02	0.02
Desktop CPUs	0.02	0.02	0.02	0.02
Portable Electronic Devices	0.02	0.02	0.02	0.02
Flat-panel Displays	0.02	0.02	0.02	0.02
CRT Displays	0.02	0.02	0.02	0.02
Electronic Peripherals	0.02	0.02	0.02	0.02
Hard-copy Devices	0.02	0.02	0.02	0.02
Mixed Electronics	0.02	0.02	0.02	0.02
Clay Bricks	0.02	0.02	0.02	0.02
Concrete	0.02	0.02	0.02	0.02
Fly Ash	0.02	0.02	0.02	0.02
Tires	0.02	0.02	0.02	0.02
Asphalt Concrete	0.02	0.02	0.02	0.02
Asphalt Shingles	0.02	0.02	0.02	0.02
Drywall	(0.06)	(0.06)	(0.06)	(0.06)
Fiberglass Insulation	0.02	0.02	0.02	0.02
Structural Steel	0.02	0.02	0.02	0.02
Vinyl Flooring	0.02	0.02	0.02	0.02
Wood Flooring	(0.86)	(0.86)	(0.86)	(0.86)

6.3 LIMITATIONS

The landfilling analysis has several limitations, outlined below.

- The net GHG emissions from landfilling each material are quite sensitive to the LFG recovery rate. Because of the high global warming potential of CH_4, small changes in the LFG recovery rate (for the national average landfill) could have a large effect on the net GHG impacts of landfilling each material and the ranking of landfilling relative to other MSW management options.

- The distribution of waste in place is not a perfect proxy for the distribution of ongoing waste generation destined for landfill.
- Ongoing shifts in the use of landfill cover and liner systems are likely to influence the rate of CH_4 generation and collection. As more landfills install effective covers and implement controls to keep water and other liquids out, conditions will be less favorable for degradation of biodegradable wastes. Over the long term, these improvements may result in a decrease in CH_4 generation and an increase in carbon storage. Moreover, Dr. Barlaz believes that the CH_4 yields from his laboratory experiments are likely to be higher than CH_4 yields in a landfill, because the laboratory experiments were designed to generate the maximum amount of CH_4 possible. If the CH_4 yields from the laboratory experiments were higher than yields in a landfill, the net GHG emissions from landfilling biodegradable materials would be lower than estimated here.
- EPA assumed that once wastes are disposed in a landfill, they are never removed. In other words, it was assumed that landfills are never "mined." A number of communities have mined their landfills—removing and combusting the waste—in order to create more space for continued disposal of waste in the landfill. To the extent that landfills are mined in the future, it is incorrect to assume that carbon stored in a landfill will remain stored. For example, if landfilled wastes are later combusted, the carbon that was stored in the landfill will be oxidized to CO_2 in the combustor.
- The estimate of avoided utility GHG emissions per unit of CH_4 combusted assumes that all landfill gas-to-energy projects produce electricity. In reality, some projects are "direct gas" projects, in which CH_4 is piped directly to the end user for use as fuel. In these cases, the CH_4 typically replaces natural gas as a fuel source. Because natural gas use is less GHG-intensive than average electricity production, direct gas projects will tend to offset fewer GHG emissions than electricity projects will—a fact not reflected in the analysis.
- For landfilling of yard trimmings (and other organic materials), EPA assumed that all carbon storage in a landfill environment is incremental to the storage that occurs in a non-landfill environment. In other words, it was assumed that in a baseline where yard trimmings are returned to the soil (i.e., in a non-landfill environment), all of the carbon is decomposed relatively rapidly (i.e., within several years) to CO_2, and there is no long-term carbon storage. To the extent that long-term carbon storage occurs in the baseline, the estimates of carbon storage reported here are overstated, and the net postconsumer GHG emissions are understated.
- Another limitation is the assumptions used in developing "corrected" CH_4 yields for biodegradable materials in MSW. Because of the high GWP of CH_4, a small difference between estimated and actual CH_4 generation values would have a large effect on the GHG impacts of landfilling and the ranking of landfilling relative to other MSW management options.

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MSW-DST Data Tables

Mass Flows

	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
Yard Trimmings, Leaves	97664	0	0	0	0	0	97664	0	97,664	97,664
Yard Trimmings, Grass	97649	0	0	0	0	0	97649	0	97,649	97,649
Yard Trimmings, Branches	46888	0	0	0	0	0	46888	0	46,888	46,888
Food Waste - Vegetable	820443	0	0	0	0	0	820443	0	820,443	820,443
Food Waste - Non-Vegetable	410222	0	0	0	0	0	410222	0	410,222	410,222
Wood	757332	0	0	0	0	0	757332	0	757,332	757,332
Wood Other	157778	0	0	0	0	0	157778	0	157,778	157,778
Textiles	331333	0	0	0	0	0	331333	0	331,333	331,333
Rubber/Leather	78889	0	0	0	0	0	78889	0	78,889	78,889
Newsprint	23454	0	0	0	0	0	23454	0	23,454	23,454
Corr. Cardboard	305683	0	0	0	0	0	305683	0	305,683	305,683
Office Paper	39444	0	0	0	0	0	39444	0	39,444	39,444
Magazines	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0
Folding Containers	78889	0	0	0	0	0	78889	0	78,889	78,889
Paper Bags	355000	0	0	0	0	0	355000	0	355,000	355,000
Mixed Paper	465444	0	0	0	0	0	465444	0	465,444	465,444
Paper - Non-recyclable	118333	0	0	0	0	0	118333	0	118,333	118,333
HDPE - Translucent Containers	31361	0	0	0	0	0	31361	0	31,361	31,361
HDPE - Pigmented Containers	15681	0	0	0	0	0	15681	0	15,681	15,681
PET - Containers	54995	0	0	0	0	0	54995	0	54,995	54,995
Plastic - Other # 1, Polypropylene	31556	0	0	0	0	0	31556	0	31,556	31,556
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	134111	0	0	0	0	0	134111	0	134,111	134,111
Plastic Film	528555	0	0	0	0	0	528555	0	528,555	528,555
Plastic - Non-Recyclable	299777	0	0	0	0	0	299777	0	299,777	299,777
Ferrous Cans	23580	0	0	0	0	0	23580	0	23,580	23,580
Ferrous Metal - Other	181444	0	0	0	0	0	181444	0	181,444	181,444
Aluminum Cans	23561	0	0	0	0	0	23561	0	23,561	23,561
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	23667	0	0	0	0	0	23667	0	23,667	23,667
Ferrous - Non-recyclable	197222	0	0	0	0	0	197222	0	197,222	197,222
Al - Non-recyclable	7889	0	0	0	0	0	7889	0	7,889	7,889
Glass - Brown	23537	0	0	0	0	0	23537	0	23,537	23,537
Glass - Green	15657	0	0	0	0	0	15657	0	15,657	15,657
Glass - Clear	62790	0	0	0	0	0	62790	0	62,790	62,790
Mixed Glass	46865	0	0	0	0	0	46865	0	46,865	46,865
Glass - Non-recyclable	23667	0	0	0	0	0	23667	0	23,667	23,667
Misc. Organic	339222	0	0	0	0	0	339222	0	339,222	339,222
Misc. Inorganic	1159665	0	0	0	0	0	1159665	0	1,159,665	1,159,665
E-waste	55222	0	0	0	0	0	55222	0	55,222	55,222
Aerobic Residual	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	418111	0	0	0	0	0	418111	0	418,111	418,111
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0
Total	7882576	0	0	0	0	0	7882576	0		

CHRLF_DST_CHA8 V3 WET.xlsx

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative	1,240,021,892	263,141,971	0	0	0	0	0	976,879,921	0	263,141,971	976,879,921
cumulative energy demand fossil non-rer	17,592,075,848	4,534,710,563	0	0	0	0	0	13,057,365,285	0	4,534,710,563	13,057,365,285
TRACI environmental impact acidification	206,508,880	31,214,329	0	0	0	0	0	175,294,551	0	31,214,329	175,294,551
TRACI environmental impact eutrophicati	516,929	30,944	0	0	0	0	0	485,985	0	30,944	485,985
TRACI environmental impact photochemi	4,704,465	358,241	0	0	0	0	0	4,346,225	0	358,241	4,346,225
USEtox ecotoxicity total (CTUe)	1,716,806,527	691,749,776	0	0	0	0	0	1,025,056,751	0	691,749,776	1,025,056,751
USEtox human toxicity total (CTUh)	148	51	0	0	0	0	0	97	0	51	97
CO2-Fossil (kg)	502,510,350	246,898,093	0	0	0	0	0	255,612,257	0	246,898,093	255,612,257
CO2-Biogenic (kg)	1,675,155,420	1,612,434	0	0	0	0	0	1,673,542,986	0	1,612,434	1,673,542,986
CO2-Stored (kg)	-2,951,003,934	76,173	0	0	0	0	0	-2,951,080,108	0	76,173	-2,951,080,108
CH4-Fossil (kg)	2,771,447	403,817	0	0	0	0	0	2,367,630	0	403,817	2,367,630
CH4-Biogenic (kg)	106,765,737	2,193	0	0	0	0	0	106,763,545	0	2,193	106,763,545
N2O (kg)	1,165	2,464	0	0	0	0	0	-1,299	0	2,464	-1,299
CO (kg)	3,345,230	455,596	0	0	0	0	0	2,889,634	0	455,596	2,889,634
NOx (kg)	4,248,514	340,026	0	0	0	0	0	3,908,489	0	340,026	3,908,489
SOx (kg)	722,143	333,415	0	0	0	0	0	388,728	0	333,415	388,728
PM>10 (kg)	134,134	243,174	0	0	0	0	0	-109,040	0	243,174	-109,040
PM10 (kg)	203,220	82,207	0	0	0	0	0	121,013	0	82,207	121,013
PM2.5 (kg)	260,166	47,311	0	0	0	0	0	212,855	0	47,311	212,855
NMVOC (kg)	2,726,131	325,289	0	0	0	0	0	2,400,842	0	325,289	2,400,842
Lead (kg)	852	131	0	0	0	0	0	721	0	131	721
Cost ($)	240,543,384	115,084,636	0	0	0	0	0	125,458,748	0	115,084,636	125,458,748

Collection MT	Collection GWP	Collection MTCO2e		Landfill MT	Landfill GWP	Landfill MTCO2e	
263,142				976,880		1,416,619	
						-439,739	
246,898	1	246,898		255,612	1	255,612	
1,612	1	1,612		1,673,543	1	1,673,543	
76	1	76		(2,951,080)	1	(2,951,080)	
404	28	11,307		2,368	28	66,294	
2	28	61		106,764	28	2,989,379	
2	298	734		(1)	298	(387)	
		-				-	
340	10	3,400		3,908	10	39,085	
	0.03	**263,066**	**Total emissions excluding credits**		0.50	**4,367,699**	**Total emissions excluding credits**
	0.03	**263,142**	**Total emissions including credits**		0.11	**976,880**	**Total emissions including credits**
		262,477					
					0.53	**4,630,765**	**Total emissions excluding credits**
					0.14	**1,240,022**	**Total emissions including credits**

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	1,679,760,977	263,141,971	0	0	0	0	0	1,416,619,006	0	263,141,971	1,416,619,006
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.	23,836,434,131	4,534,710,563	0	0	0	0	0	19,301,723,569	0	4,534,710,563	19,301,723,569
TRACI environmental impact acidification (moles of H+-Eq)	238,480,050	31,214,329	0	0	0	0	0	207,265,721	0	31,214,329	207,265,721
TRACI environmental impact eutrophication (kg N-Eq.)	465,888	30,944	0	0	0	0	0	434,945	0	30,944	434,945
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	3,269,258	358,241	0	0	0	0	0	2,911,018	0	358,241	2,911,018
USEtox ecotoxicity total (CTUe)	2,825,057,320	691,749,776	0	0	0	0	0	2,133,307,544	0	691,749,776	2,133,307,544
USEtox human toxicity total (CTUh)	240	51	0	0	0	0	0	188	0	51	188
CO2-Fossil (kg)	925,717,310	246,898,093	0	0	0	0	0	678,819,216	0	246,898,093	678,819,216
CO2-Biogenic (kg)	1,635,218,760	1,612,434	0	0	0	0	0	1,633,606,326	0	1,612,434	1,633,606,326
CO2-Stored (kg)	-2,950,962,709	76,173	0	0	0	0	0	-2,951,038,883	0	76,173	-2,951,038,883
CH4-Fossil (kg)	3,923,846	403,817	0	0	0	0	0	3,520,029	0	403,817	3,520,029
CH4-Biogenic (kg)	105,862,003	2,193	0	0	0	0	0	105,859,810	0	2,193	105,859,810
N2O (kg)	14,899	2,464	0	0	0	0	0	12,435	0	2,464	12,435
CO (kg)	3,534,083	455,596	0	0	0	0	0	3,078,487	0	455,596	3,078,487
NOx (kg)	2,797,472	340,026	0	0	0	0	0	2,457,447	0	340,026	2,457,447
SOx (kg)	2,356,466	333,415	0	0	0	0	0	2,023,051	0	333,415	2,023,051
PM>10 (kg)	512,286	243,174	0	0	0	0	0	269,112	0	243,174	269,112
PM10 (kg)	229,811	82,207	0	0	0	0	0	147,604	0	82,207	147,604
PM2.5 (kg)	295,518	47,311	0	0	0	0	0	248,207	0	47,311	248,207
NMVOC (kg)	2,846,155	325,289	0	0	0	0	0	2,520,866	0	325,289	2,520,866
Lead (kg)	939	131	0	0	0	0	0	807	0	131	807
Cost ($)	278,164,952	115,084,636	0	0	0	0	0	163,080,315	0	115,084,636	163,080,315

CHRLF_DST_NoAction WTE V3.xlsx

Mass Flows

	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-WTE1	Collection SF1_RWC-LF1	WTE WTE1	Landfill LF1
Yard Trimmings, Leaves	233872	32478	0	0	0	233872	32478	0	233,872	0	233,872	32,478
Yard Trimmings, Grass	233836	36660	0	0	0	233836	36660	0	233,836	0	233,836	36,660
Yard Trimmings, Branches	112280	8395	0	0	0	112280	8395	0	112,280	0	112,280	8,395
Food Waste - Vegetable	1964686	118050	0	0	0	1964686	118050	0	1,964,686	0	1,964,686	118,050
Food Waste - Non-Vegetable	982343	89595	0	0	0	982343	89595	0	982,343	0	982,343	89,595
Wood	1813557	263175	0	0	0	1813557	263175	0	1,813,557	0	1,813,557	263,175
Wood Other	377824	54828	0	0	0	377824	54828	0	377,824	0	377,824	54,828
Textiles	793431	73315	0	0	0	793431	73315	0	793,431	0	793,431	73,315
Rubber/Leather	188912	30495	0	0	0	188912	30495	0	188,912	0	188,912	30,495
Newsprint	56164	7096	0	0	0	56164	7096	0	56,164	0	56,164	7,096
Corr. Cardboard	732009	117231	0	0	0	732009	117231	0	732,009	0	732,009	117,231
Office Paper	94456	16535	0	0	0	94456	16535	0	94,456	0	94,456	16,535
Magazines	0	0	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0	0	0
Folding Containers	188912	30135	0	0	0	188912	30135	0	188,912	0	188,912	30,135
Paper Bags	850105	135606	0	0	0	850105	135606	0	850,105	0	850,105	135,606
Mixed Paper	1114582	188088	0	0	0	1114582	188088	0	1,114,582	0	1,114,582	188,088
Paper - Non-recyclable	283368	37378	0	0	0	283368	37378	0	283,368	0	283,368	37,378
HDPE - Translucent Containers	75100	8786	0	0	0	75100	8786	0	75,100	0	75,100	8,786
HDPE - Pigmented Containers	37550	4393	0	0	0	37550	4393	0	37,550	0	37,550	4,393
PET - Containers	131694	15407	0	0	0	131694	15407	0	131,694	0	131,694	15,407
Plastic - Other # 1, Polypropylene	75565	6004	0	0	0	75565	6004	0	75,565	0	75,565	6,004
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	321151	32514	0	0	0	321151	32514	0	321,151	0	321,151	32,514
Plastic Film	1265711	121693	0	0	0	1265711	121693	0	1,265,711	0	1,265,711	121,693
Plastic - Non-Recyclable	717866	77578	0	0	0	717866	77578	0	717,866	0	717,866	77,578
Ferrous Cans	56465	57199	0	0	0	56465	19972	37227	56,465	0	56,465	19,972
Ferrous Metal - Other	434498	440146	0	0	0	434498	186270	253877	434,498	0	434,498	186,270
Aluminum Cans	56422	57155	0	0	0	56422	25221	31935	56,422	0	56,422	25,221
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	56674	45557	0	0	0	56674	25241	20316	56,674	0	56,674	25,241
Ferrous - Non-recyclable	472280	478420	0	0	0	472280	167046	311374	472,280	0	472,280	167,046
Al - Non-recyclable	18891	19137	0	0	0	18891	18789	348	18,891	0	18,891	18,789
Glass - Brown	56364	57097	0	0	0	56364	57097	0	56,364	0	56,364	57,097
Glass - Green	37493	37981	0	0	0	37493	37981	0	37,493	0	37,493	37,981
Glass - Clear	150360	152315	0	0	0	150360	152315	0	150,360	0	150,360	152,315
Mixed Glass	112226	113685	0	0	0	112226	113685	0	112,226	0	112,226	113,685
Glass - Non-recyclable	56674	57410	0	0	0	56674	57410	0	56,674	0	56,674	57,410
Misc. Organic	812322	106351	0	0	0	812322	106351	0	812,322	0	812,322	106,351
Misc. Inorganic	2777008	2721683	0	0	0	2777008	2721683	0	2,777,008	0	2,777,008	2,721,683
E-waste	132238	133958	0	0	0	132238	133874	84	132,238	0	132,238	133,874
Aerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	1001234	96789	0	0	0	1001234	96789	0	1,001,234	0	1,001,234	96,789
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0	0	0
Total	18876124	6080320	0	0	0	18876124	5425159	655160				

	Reprocessing REPROC_ASH1-OCC	Reprocessing REPROC_ASH1-MxPap	Reprocessing REPROC_ASH1-ONP	Reprocessing REPROC_ASH1-OFF	Reprocessing REPROC_ASH1-OtPap	Reprocessing REPROC_ASH1-PET	Reprocessing REPROC_ASH1-HDPEu	Reprocessing REPROC_ASH1-HDPEp	Reprocessing REPROC_ASH1-HDPEt	Reprocessing REPROC_ASH1-PVC	Reprocessing REPROC_ASH1-LDPE	Reprocessing REPROC_ASH1-PP	Reprocessing REPROC_ASH1-PS	Reprocessing REPROC_ASH1-OtPlas	Reprocessing REPROC_ASH1-MxPlas
Yard Trimmings, Leaves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yard Trimmings, Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yard Trimmings, Branches	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food Waste - Vegetable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food Waste - Non-Vegetable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Textiles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubber/Leather	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Newsprint	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corr. Cardboard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Office Paper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magazines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Folding Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paper Bags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Paper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paper - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HDPE - Translucent Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HDPE - Pigmented Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PET - Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic - Other # 1, Polypropylene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic Film	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic - Non-Recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferrous Cans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferrous Metal - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum Cans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferrous - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Al - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Brown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Glass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Misc. Organic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Misc. Inorganic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E-waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total															

	Reprocessing REPROC_ASH1-Al	Reprocessing REPROC_ASH1-Fe	Reprocessing REPROC_ASH1-Cu	Reprocessing REPROC_ASH1-Bglas	Reprocessing REPROC_ASH1-Cglas	Reprocessing REPROC_ASH1-Gglas	Reprocessing REPROC_ASH1-MxGlas	Transportation Trans_WTE1-LF1	Transportation Trans_Al_WTE1-REPROC_ASH1	Transportation Trans_Fe_WTE1-REPROC_ASH1	Transportation Trans_Cu_WTE1-REPROC_ASH1
Yard Trimmings, Leaves	0	0	0	0	0	0	0	32,478	0	0	0
Yard Trimmings, Grass	0	0	0	0	0	0	0	36,660	0	0	0
Yard Trimmings, Branches	0	0	0	0	0	0	0	8,395	0	0	0
Food Waste - Vegetable	0	0	0	0	0	0	0	118,050	0	0	0
Food Waste - Non-Vegetable	0	0	0	0	0	0	0	89,595	0	0	0
Wood	0	0	0	0	0	0	0	263,175	0	0	0
Wood Other	0	0	0	0	0	0	0	54,828	0	0	0
Textiles	0	0	0	0	0	0	0	73,315	0	0	0
Rubber/Leather	0	0	0	0	0	0	0	30,495	0	0	0
Newsprint	0	0	0	0	0	0	0	7,096	0	0	0
Corr. Cardboard	0	0	0	0	0	0	0	117,231	0	0	0
Office Paper	0	0	0	0	0	0	0	16,535	0	0	0
Magazines	0	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0	0
Folding Containers	0	0	0	0	0	0	0	30,135	0	0	0
Paper Bags	0	0	0	0	0	0	0	135,606	0	0	0
Mixed Paper	0	0	0	0	0	0	0	188,088	0	0	0
Paper - Non-recyclable	0	0	0	0	0	0	0	37,378	0	0	0
HDPE - Translucent Containers	0	0	0	0	0	0	0	8,786	0	0	0
HDPE - Pigmented Containers	0	0	0	0	0	0	0	4,393	0	0	0
PET - Containers	0	0	0	0	0	0	0	15,407	0	0	0
Plastic - Other # 1, Polypropylene	0	0	0	0	0	0	0	6,004	0	0	0
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	0	0	0	0	0	0	0	32,514	0	0	0
Plastic Film	0	0	0	0	0	0	0	121,693	0	0	0
Plastic - Non-Recyclable	0	0	0	0	0	0	0	77,578	0	0	0
Ferrous Cans	5,138	32,076	13	0	0	0	0	19,972	5,138	32,076	13
Ferrous Metal - Other	6,951	246,822	103	0	0	0	0	186,270	6,951	246,822	103
Aluminum Cans	15,840	16,065	30	0	0	0	0	25,221	15,840	16,065	30
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	19,306	989	20	0	0	0	0	25,241	19,306	989	20
Ferrous - Non-recyclable	42,977	268,285	112	0	0	0	0	167,046	42,977	268,285	112
Al - Non-recyclable	11	330	7	0	0	0	0	18,789	11	330	7
Glass - Brown	0	0	0	0	0	0	0	57,097	0	0	0
Glass - Green	0	0	0	0	0	0	0	37,981	0	0	0
Glass - Clear	0	0	0	0	0	0	0	152,315	0	0	0
Mixed Glass	0	0	0	0	0	0	0	113,685	0	0	0
Glass - Non-recyclable	0	0	0	0	0	0	0	57,410	0	0	0
Misc. Organic	0	0	0	0	0	0	0	106,351	0	0	0
Misc. Inorganic	0	0	0	0	0	0	0	2,721,683	0	0	0
E-waste	84	0	0	0	0	0	0	133,874	84	0	0
Aerobic Residual	0	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	0	0	0	0	0	0	0	96,789	0	0	0
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0	0
Total											

CHRLF_DST_NoAction WTE V3.xlsx

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-WTE1	Collection SF1_RWC-LF1	WTE WTE1	Landfill LF1
C Emissions Neutral; C Storage Neg	-1,156,440,843	584,874,534	175,481	0	0	0	-995,148,357	373,062,438	-1,119,404,938	584,874,534	0	-995,148,357	373,062,438
cumulative energy demand fossil n	-97,593,194,610	10,079,213,792	2,454,491	0	0	0	-109,202,065,053	11,456,621,854	-9,929,419,695	10,079,213,792	0	-109,202,065,053	11,456,621,854
TRACI environmental impact acidifi	-1,848,859,826	69,374,959	79,527	0	0	0	-1,843,621,444	127,245,313	-201,938,180	69,374,959	0	-1,843,621,444	127,245,313
TRACI environmental impact eutrop	-390,597	68,778	79	0	0	0	-553,313	186,970	-93,111	68,778	0	-553,313	186,970
TRACI environmental impact photo	-6,609,707	796,235	1,621	0	0	0	-7,941,753	2,139,023	-1,604,833	796,235	0	-7,941,753	2,139,023
USEtox ecotoxicity total (CTUe)	-20,816,120,808	1,537,530,071	391,059	0	0	0	-19,514,620,225	1,143,842,663	-3,983,264,377	1,537,530,071	0	-19,514,620,225	1,143,842,663
USEtox human toxicity total (CTUh)	-1,539	114	0	0	0	0	-1,592	102	-164	114	0	-1,592	102
CO2-Fossil (kg)	-351,846,239	548,770,916	163,423	0	0	0	-255,301,535	343,322,099	-988,801,143	548,770,916	0	-255,301,535	343,322,099
CO2-Biogenic (kg)	11,530,975,624	3,583,468	1,229	0	0	0	11,110,757,964	428,745,776	-12,112,814	3,583,468	0	11,110,757,964	428,745,776
CO2-Stored (kg)	-1,021,860,307	169,313	77	0	0	0	-686,318	-1,021,223,794	-119,585	169,313	0	-686,318	-1,021,223,794
CH4-Fossil (kg)	-19,254,785	897,522	255	0	0	0	-20,305,970	2,085,341	-1,931,934	897,522	0	-20,305,970	2,085,341
CH4-Biogenic (kg)	28,773,003	4,874	2	0	0	0	-140,492	28,919,816	-11,197	4,874	0	-140,492	28,919,816
N2O (kg)	-18,255	5,476	5	0	0	0	-9,594	4,538	-18,681	5,476	0	-9,594	4,538
CO (kg)	-4,072,959	1,012,670	610	0	0	0	-105,646	2,058,708	-7,039,301	1,012,670	0	-105,646	2,058,708
NOx (kg)	-6,428,389	755,749	1,606	0	0	0	-7,693,338	1,989,280	-1,481,686	755,749	0	-7,693,338	1,989,280
SOx (kg)	-30,874,829	741,007	287	0	0	0	-28,743,208	908,070	-3,780,985	741,007	0	-28,743,208	908,070
PM>10 (kg)	-12,991,546	540,496	139	0	0	0	-6,406,957	62,953	-7,188,178	540,496	0	-6,406,957	62,953
PM10 (kg)	199	182,726	56	0	0	0	-198,517	81,335	-65,401	182,726	0	-198,517	81,335
PM2.5 (kg)	-156,427	105,159	69	0	0	0	-312,730	152,635	-101,559	105,159	0	-312,730	152,635
NMVOC (kg)	216,360	723,034	247	0	0	0	-1,413,845	1,195,379	-288,454	723,034	0	-1,413,845	1,195,379
Lead (kg)	-817	292	0	0	0	0	-1,488	530	-151	292	0	-1,488	530
Cost ($)	1,150,282,247	211,653,401	60,159,312	0	0	0	852,265,817	82,523,601	-56,319,884	211,653,401	0	852,265,817	82,523,601

Impacts	Reprocessing REPROC_ASH1-OCC	Reprocessing REPROC_ASH1-MxPap	Reprocessing REPROC_ASH1-ONP	Reprocessing REPROC_ASH1-OFF	Reprocessing REPROC_ASH1-OtPap	Reprocessing REPROC_ASH1-PET	Reprocessing REPROC_ASH1-HDPEu	Reprocessing REPROC_ASH1-HDPEp	Reprocessing REPROC_ASH1-HDPEt	Reprocessing REPROC_ASH1-PVC	Reprocessing REPROC_ASH1-LDPE	Reprocessing REPROC_ASH1-PP	Reprocessing REPROC_ASH1-PS	Reprocessing REPROC_ASH1-OtPlas	Reprocessing REPROC_ASH1-MxPlas	Reprocessing REPROC_ASH1-Al	Reprocessing REPROC_ASH1-Fe	Reprocessing REPROC_ASH1-Cu	Reprocessing REPROC_ASH1-Bglas	Reprocessing REPROC_ASH1-Cglas	Reprocessing REPROC_ASH1-Gglas	Reprocessing REPROC_ASH1-MxGlas	Transportation Trans_WTE1-LF1	Transportation Trans_Al_WTE1-REPROC_ASH1	Transportation Trans_Fe_WTE1-REPROC_ASH1	Transportation Trans_Cu_WTE1-REPROC_ASH1
C Emissions Neutral; C Storage Neg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-539,709,557	-579,695,382	0	0	0	0	0	121,193	7,483	46,781	24
cumulative energy demand fossil n	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-5,988,763,900	-3,940,655,795	0	0	0	0	0	1,639,387	112,354	702,395	355
TRACI environmental impact acidifi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-121,612,871	-80,325,309	0	0	0	0	0	60,105	2,677	16,736	8
TRACI environmental impact eutrop	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-50,098	-43,012	0	0	0	0	0	60	3	17	0
TRACI environmental impact photo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-807,211	-797,622	0	0	0	0	0	1,245	52	324	0
USEtox ecotoxicity total (CTUe)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1,899,458,162	-2,083,806,215	0	0	0	0	0	256,768	18,511	115,722	58
USEtox human toxicity total (CTUh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-94	-70	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-452,137,456	-536,663,687	0	0	0	0	0	112,750	6,985	43,667	22
CO2-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-7,900,406	-4,212,408	0	0	0	0	0	908	44	277	0
CO2-Stored (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-60,050	-59,535	0	0	0	0	0	56	3	18	0
CH4-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-1,040,644	-891,290	0	0	0	0	0	180	10	65	0
CH4-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-6,857	-4,340	0	0	0	0	0	2	0	0	0
N2O (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-11,555	-7,126	0	0	0	0	0	3	0	2	0
CO (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,409,773	-4,629,528	0	0	0	0	0	499	15	96	0
NOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-759,113	-722,573	0	0	0	0	0	1,233	51	321	0
SOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,321,625	-1,459,360	0	0	0	0	0	202	12	73	0
PM>10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2,845,384	-4,342,794	0	0	0	0	0	93	6	40	0
PM10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-30,324	-35,078	0	0	0	0	0	39	2	15	0
PM2.5 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-52,700	-48,860	0	0	0	0	0	53	2	14	0
NMVOC (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-145,826	-142,628	0	0	0	0	0	180	9	57	0
Lead (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-170	20	0	0	0	0	0	0	0	0	0
Cost ($)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-40,980,487	-15,339,397	0	0	0	0	0	60,159,312	0	0	0

Transportation MT	Transportation GWP	Transportation MTCO2e	WTE MT	WTE GWP	WTE MTCO2e	Landfill MT	Landfill GWP	Landfill MTCO2e	Reprocessing MT	Reprocessing GWP	Reprocessing MTCO2e	Collection MT	Collection GWP	Collection MTCO2e
175	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] Total anthropogenic without credits

[illegible] Total anthropogenic with credits

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-WTE1	Collection SF1_RWC-LF1	WTE WTE1	Landfill LF1
C Emissions Neutral; C Storage Nega	7,750,878,909	584,874,534	175,481	0	0	0	7,886,668,193	398,565,640	-1,119,404,938	584,874,534	0	7,886,668,193	398,565,640
cumulative energy demand fossil no	20,502,857,717	10,079,213,792	2,454,491	0	0	0	9,019,757,740	11,330,851,388	-9,929,419,695	10,079,213,792	0	9,019,757,740	11,330,851,388
TRACI environmental impact acidific	477,195,371	69,374,959	79,527	0	0	0	482,760,225	126,918,841	-201,938,180	69,374,959	0	482,760,225	126,918,841
TRACI environmental impact eutrop	546,638	68,778	79	0	0	0	382,619	188,272	-93,111	68,778	0	382,619	188,272
TRACI environmental impact photoc	9,222,308	796,235	1,621	0	0	0	7,851,910	2,177,375	-1,604,833	796,235	0	7,851,910	2,177,375
USEtox ecotoxicity total (CTUe)	143,604,541	1,537,530,071	391,059	0	0	0	1,467,426,608	1,121,521,179	-3,983,264,377	1,537,530,071	0	1,467,426,608	1,121,521,179
USEtox human toxicity total (CTUh)	190	114	0	0	0	0	138	101	-164	114	0	138	101
CO2-Fossil (kg)	7,652,030,058	548,770,916	163,423	0	0	0	7,757,098,767	334,798,095	-988,801,143	548,770,916	0	7,757,098,767	334,798,095
CO2-Biogenic (kg)	11,763,162,606	3,583,468	1,229	0	0	0	11,305,736,251	465,954,472	-12,112,814	3,583,468	0	11,305,736,251	465,954,472
CO2-Stored (kg)	-1,021,080,643	169,313	77	0	0	0	94,177	-1,021,224,624	-119,585	169,313	0	94,177	-1,021,224,624
CH4-Fossil (kg)	2,539,884	897,522	255	0	0	0	1,511,910	2,062,130	-1,931,934	897,522	0	1,511,910	2,062,130
CH4-Biogenic (kg)	29,973,433	4,874	2	0	0	0	11,166	29,968,588	-11,197	4,874	0	11,166	29,968,588
N2O (kg)	241,494	5,476	5	0	0	0	250,432	4,262	-18,681	5,476	0	250,432	4,262
CO (kg)	-507,547	1,012,670	610	0	0	0	3,463,536	2,054,938	-7,039,301	1,012,670	0	3,463,536	2,054,938
NOx (kg)	9,085,027	755,749	1,606	0	0	0	7,784,649	2,024,708	-1,481,686	755,749	0	7,784,649	2,024,708
SOx (kg)	541,869	741,007	287	0	0	0	2,706,018	875,541	-3,780,985	741,007	0	2,706,018	875,541
PM>10 (kg)	-6,076,492	540,496	139	0	0	0	514,872	56,178	-7,188,178	540,496	0	514,872	56,178
PM10 (kg)	248,107	182,726	56	0	0	0	49,020	81,706	-65,401	182,726	0	49,020	81,706
PM2.5 (kg)	351,745	105,159	69	0	0	0	195,584	152,493	-101,559	105,159	0	195,584	152,493
NMVOC (kg)	1,825,493	723,034	247	0	0	0	194,152	1,196,515	-288,454	723,034	0	194,152	1,196,515
Lead (kg)	816	292	0	0	0	0	146	529	-151	292	0	146	529
Cost ($)	1,861,913,738	211,653,401	60,159,312	0	0	0	1,564,652,230	81,768,679	-56,319,884	211,653,401	0	1,564,652,230	81,768,679

Impacts	Reprocessing REPROC_ASH1-OCC	Reprocessing REPROC_ASH1-MxPap	Reprocessing REPROC_ASH1-ONP	Reprocessing REPROC_ASH1-OFF	Reprocessing REPROC_ASH1-OtPap	Reprocessing REPROC_ASH1-PET	Reprocessing REPROC_ASH1-HDPEu	Reprocessing REPROC_ASH1-HDPEp	Reprocessing REPROC_ASH1-HDPEt	Reprocessing REPROC_ASH1-PVC	Reprocessing REPROC_ASH1-LDPE	Reprocessing REPROC_ASH1-PP	Reprocessing REPROC_ASH1-PS	Reprocessing REPROC_ASH1-OtPlas	Reprocessing REPROC_ASH1-MxPlas
C Emissions Neutral; C Storage Nega	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cumulative energy demand fossil no	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact acidific	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact eutrop	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact photoc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USEtox ecotoxicity total (CTUe)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USEtox human toxicity total (CTUh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Stored (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CH4-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CH4-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N2O (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM>10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM2.5 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NMVOC (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lead (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost ($)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Impacts	Reprocessing REPROC_ASH1-Al	Reprocessing REPROC_ASH1-Fe	Reprocessing REPROC_ASH1-Cu	Reprocessing REPROC_ASH1-Bglas	Reprocessing REPROC_ASH1-Cglas	Reprocessing REPROC_ASH1-Gglas	Reprocessing REPROC_ASH1-MxGlas	Transportation Trans_WTE1-LF1	Transportation Trans_Al_WTE1-REPROC_ASH1	Transportation Trans_Fe_WTE1-REPROC_ASH1	Transportation Trans_Cu_WTE1-REPROC_ASH1
C Emissions Neutral; C Storage Nega	-539,709,557	-579,695,382	0	0	0	0	0	121,193	7,483	46,781	24
cumulative energy demand fossil no	-5,988,763,900	-3,940,655,795	0	0	0	0	0	1,639,387	112,354	702,395	355
TRACI environmental impact acidific	-121,612,871	-80,325,309	0	0	0	0	0	60,105	2,677	16,736	8
TRACI environmental impact eutrop	-50,098	-43,012	0	0	0	0	0	60	3	17	0
TRACI environmental impact photoc	-807,211	-797,622	0	0	0	0	0	1,245	52	324	0
USEtox ecotoxicity total (CTUe)	-1,899,458,162	-2,083,806,215	0	0	0	0	0	256,768	18,511	115,722	58
USEtox human toxicity total (CTUh)	-94	-70	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	-452,137,456	-536,663,687	0	0	0	0	0	112,750	6,985	43,667	22
CO2-Biogenic (kg)	-7,900,406	-4,212,408	0	0	0	0	0	908	44	277	0
CO2-Stored (kg)	-60,050	-59,535	0	0	0	0	0	56	3	18	0
CH4-Fossil (kg)	-1,040,644	-891,290	0	0	0	0	0	180	10	65	0
CH4-Biogenic (kg)	-6,857	-4,340	0	0	0	0	0	2	0	0	0
N2O (kg)	-11,555	-7,126	0	0	0	0	0	3	0	2	0
CO (kg)	-2,409,773	-4,629,528	0	0	0	0	0	499	15	96	0
NOx (kg)	-759,113	-722,573	0	0	0	0	0	1,233	51	321	0
SOx (kg)	-2,321,625	-1,459,360	0	0	0	0	0	202	12	73	0
PM>10 (kg)	-2,845,384	-4,342,794	0	0	0	0	0	93	6	40	0
PM10 (kg)	-30,324	-35,078	0	0	0	0	0	39	2	15	0
PM2.5 (kg)	-52,700	-48,860	0	0	0	0	0	53	2	14	0
NMVOC (kg)	-145,826	-142,628	0	0	0	0	0	180	9	57	0
Lead (kg)	-170	20	0	0	0	0	0	0	0	0	0
Cost ($)	-40,980,487	-15,339,397	0	0	0	0	0	60,159,312	0	0	0

CHRLF_DST_NoAction WEBR V3 DRY.xlsx

Mass Flows

	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
Yard Trimmings, Leaves	233872	0	0	0	0	0	233872	0	233,872	233,872
Yard Trimmings, Grass	233836	0	0	0	0	0	233836	0	233,836	233,836
Yard Trimmings, Branches	112280	0	0	0	0	0	112280	0	112,280	112,280
Food Waste - Vegetable	1964686	0	0	0	0	0	1964686	0	1,964,686	1,964,686
Food Waste - Non-Vegetable	982343	0	0	0	0	0	982343	0	982,343	982,343
Wood	1813557	0	0	0	0	0	1813557	0	1,813,557	1,813,557
Wood Other	377824	0	0	0	0	0	377824	0	377,824	377,824
Textiles	793431	0	0	0	0	0	793431	0	793,431	793,431
Rubber/Leather	188912	0	0	0	0	0	188912	0	188,912	188,912
Newsprint	56164	0	0	0	0	0	56164	0	56,164	56,164
Corr. Cardboard	732009	0	0	0	0	0	732009	0	732,009	732,009
Office Paper	94456	0	0	0	0	0	94456	0	94,456	94,456
Magazines	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0
Folding Containers	188912	0	0	0	0	0	188912	0	188,912	188,912
Paper Bags	850105	0	0	0	0	0	850105	0	850,105	850,105
Mixed Paper	1114582	0	0	0	0	0	1114582	0	1,114,582	1,114,582
Paper - Non-recyclable	283368	0	0	0	0	0	283368	0	283,368	283,368
HDPE - Translucent Containers	75100	0	0	0	0	0	75100	0	75,100	75,100
HDPE - Pigmented Containers	37550	0	0	0	0	0	37550	0	37,550	37,550
PET - Containers	131694	0	0	0	0	0	131694	0	131,694	131,694
Plastic - Other # 1, Polypropylene	75565	0	0	0	0	0	75565	0	75,565	75,565
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	321151	0	0	0	0	0	321151	0	321,151	321,151
Plastic Film	1265711	0	0	0	0	0	1265711	0	1,265,711	1,265,711
Plastic - Non-Recyclable	717866	0	0	0	0	0	717866	0	717,866	717,866
Ferrous Cans	56465	0	0	0	0	0	56465	0	56,465	56,465
Ferrous Metal - Other	434498	0	0	0	0	0	434498	0	434,498	434,498
Aluminum Cans	56422	0	0	0	0	0	56422	0	56,422	56,422
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	56674	0	0	0	0	0	56674	0	56,674	56,674
Ferrous - Non-recyclable	472280	0	0	0	0	0	472280	0	472,280	472,280
Al - Non-recyclable	18891	0	0	0	0	0	18891	0	18,891	18,891
Glass - Brown	56364	0	0	0	0	0	56364	0	56,364	56,364
Glass - Green	37493	0	0	0	0	0	37493	0	37,493	37,493
Glass - Clear	150360	0	0	0	0	0	150360	0	150,360	150,360
Mixed Glass	112226	0	0	0	0	0	112226	0	112,226	112,226
Glass - Non-recyclable	56674	0	0	0	0	0	56674	0	56,674	56,674
Misc. Organic	812322	0	0	0	0	0	812322	0	812,322	812,322
Misc. Inorganic	2777008	0	0	0	0	0	2777008	0	2,777,008	2,777,008
E-waste	132238	0	0	0	0	0	132238	0	132,238	132,238
Aerobic Residual	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	1001234	0	0	0	0	0	1001234	0	1,001,234	1,001,234
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0
Total	18876124	0	0	0	0	0	18876124	0		

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	2,988,616,442	1,860,773,620	0	0	0	0	0	1,127,842,821	0	1,860,773,620	1,127,842,821
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq	66,053,526,624	32,067,653,364	0	0	0	0	0	33,985,873,261	0	32,067,653,364	33,985,873,261
TRACI environmental impact acidification (moles of H+-Eq)	646,235,932	220,689,719	0	0	0	0	0	425,546,213	0	220,689,719	425,546,213
TRACI environmental impact eutrophication (kg N-Eq.)	1,353,329	218,818	0	0	0	0	0	1,134,511	0	218,818	1,134,511
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	12,018,444	2,533,140	0	0	0	0	0	9,485,304	0	2,533,140	9,485,304
USEtox ecotoxicity total (CTUe)	7,828,713,191	4,891,688,167	0	0	0	0	0	2,937,025,024	0	4,891,688,167	2,937,025,024
USEtox human toxicity total (CTUh)	635	364	0	0	0	0	0	271	0	364	271
CO2-Fossil (kg)	2,542,223,931	1,745,916,850	0	0	0	0	0	796,307,081	0	1,745,916,850	796,307,081
CO2-Biogenic (kg)	3,001,989,949	11,397,886	0	0	0	0	0	2,990,592,063	0	11,397,886	2,990,592,063
CO2-Stored (kg)	-7,066,289,341	538,703	0	0	0	0	0	-7,066,828,044	0	538,703	-7,066,828,044
CH4-Fossil (kg)	9,026,554	2,855,292	0	0	0	0	0	6,171,262	0	2,855,292	6,171,262
CH4-Biogenic (kg)	213,307,834	15,504	0	0	0	0	0	213,292,330	0	15,504	213,292,330
N2O (kg)	20,286	17,419	0	0	0	0	0	2,867	0	17,419	2,867
CO (kg)	10,221,395	3,222,044	0	0	0	0	0	6,999,351	0	3,222,044	6,999,351
NOx (kg)	10,973,230	2,404,327	0	0	0	0	0	8,568,904	0	2,404,327	8,568,904
SOx (kg)	3,989,342	2,357,093	0	0	0	0	0	1,632,249	0	2,357,093	1,632,249
PM>10 (kg)	1,601,517	1,719,611	0	0	0	0	0	-118,094	0	1,719,611	-118,094
PM10 (kg)	859,518	581,393	0	0	0	0	0	278,125	0	581,393	278,125
PM2.5 (kg)	845,069	334,584	0	0	0	0	0	510,486	0	334,584	510,486
NMVOC (kg)	7,832,392	2,300,518	0	0	0	0	0	5,531,874	0	2,300,518	5,531,874
Lead (kg)	2,692	927	0	0	0	0	0	1,764	0	927	1,764
Cost ($)	692,800,664	376,066,836	0	0	0	0	0	316,733,829	0	376,066,836	316,733,829

Impacts	Collection MT	Collection GWP	Collection MTCO2e		Landfill MT	Landfill GWP	Landfill MTCO2e	
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	1,860,774				1,127,843		2,185,544	
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq							-1,057,701	
CO2-Fossil (kg)	1,745,917	1	1,745,917		796,307	1	796,307	
CO2-Biogenic (kg)	11,398	1	11,398		2,990,592	1	2,990,592	
CO2-Stored (kg)	539	1	539		(7,066,828)	1	(7,066,828)	
CH4-Fossil (kg)	2,855	28	79,948		6,171	28	172,795	
CH4-Biogenic (kg)	16	28	434		213,292	28	5,972,185	
N2O (kg)	17	298	5,191		3	298	854	
CO (kg)			-				-	
NOx (kg)	2,404	10	24,043		8,569	10	85,689	
Cost ($)		0.21	**1,860,235**	**Total emissions excluding credits**		1.06	**9,252,372**	**Total emissions excluding credits**
		0.21	**1,860,774**	**Total emissions including credits**		0.13	**1,127,843**	**Total emissions including credits**
						1.28	**11,112,607**	**Total emissions excluding credits**
						0.34	**2,988,616**	**Total emissions including credits**

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	4,046,317,767	1,860,773,620	0	0	0	0	0	2,185,544,147	0	1,860,773,620	2,185,544,147
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.	78,277,985,773	32,067,653,364	0	0	0	0	0	46,210,332,410	0	32,067,653,364	46,210,332,410
TRACI environmental impact acidification (moles of H+-Eq)	709,657,420	220,689,719	0	0	0	0	0	488,967,701	0	220,689,719	488,967,701
TRACI environmental impact eutrophication (kg N-Eq.)	1,254,129	218,818	0	0	0	0	0	1,035,311	0	218,818	1,035,311
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	9,243,075	2,533,140	0	0	0	0	0	6,709,936	0	2,533,140	6,709,936
USEtox ecotoxicity total (CTUe)	9,998,315,077	4,891,688,167	0	0	0	0	0	5,106,626,910	0	4,891,688,167	5,106,626,910
USEtox human toxicity total (CTUh)	814	364	0	0	0	0	0	450	0	364	450
CO2-Fossil (kg)	3,370,727,991	1,745,916,850	0	0	0	0	0	1,624,811,141	0	1,745,916,850	1,624,811,141
CO2-Biogenic (kg)	3,010,830,228	11,397,886	0	0	0	0	0	2,999,432,341	0	11,397,886	2,999,432,341
CO2-Stored (kg)	-7,066,208,636	538,703	0	0	0	0	0	-7,066,747,339	0	538,703	-7,066,747,339
CH4-Fossil (kg)	11,282,583	2,855,292	0	0	0	0	0	8,427,291	0	2,855,292	8,427,291
CH4-Biogenic (kg)	217,450,466	15,504	0	0	0	0	0	217,434,961	0	15,504	217,434,961
N2O (kg)	47,173	17,419	0	0	0	0	0	29,754	0	17,419	29,754
CO (kg)	10,591,203	3,222,044	0	0	0	0	0	7,369,159	0	3,222,044	7,369,159
NOx (kg)	8,148,811	2,404,327	0	0	0	0	0	5,744,484	0	2,404,327	5,744,484
SOx (kg)	7,189,842	2,357,093	0	0	0	0	0	4,832,749	0	2,357,093	4,832,749
PM>10 (kg)	2,344,024	1,719,611	0	0	0	0	0	624,413	0	1,719,611	624,413
PM10 (kg)	913,950	581,393	0	0	0	0	0	332,557	0	581,393	332,557
PM2.5 (kg)	915,772	334,584	0	0	0	0	0	581,189	0	334,584	581,189
NMVOC (kg)	8,077,346	2,300,518	0	0	0	0	0	5,776,828	0	2,300,518	5,776,828
Lead (kg)	2,861	927	0	0	0	0	0	1,933	0	927	1,933
Cost ($)	766,459,098	376,066,836	0	0	0	0	0	390,392,263	0	376,066,836	390,392,263

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Mass Flows

	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
Yard Trimmings, Leaves	102695	0	0	0	0	0	102695	0	102,695	102,695
Yard Trimmings, Grass	102679	0	0	0	0	0	102679	0	102,679	102,679
Yard Trimmings, Branches	49303	0	0	0	0	0	49303	0	49,303	49,303
Food Waste - Vegetable	862711	0	0	0	0	0	862711	0	862,711	862,711
Food Waste - Non-Vegetable	431355	0	0	0	0	0	431355	0	431,355	431,355
Wood	796349	0	0	0	0	0	796349	0	796,349	796,349
Wood Other	165906	0	0	0	0	0	165906	0	165,906	165,906
Textiles	348402	0	0	0	0	0	348402	0	348,402	348,402
Rubber/Leather	82953	0	0	0	0	0	82953	0	82,953	82,953
Newsprint	24662	0	0	0	0	0	24662	0	24,662	24,662
Corr. Cardboard	321431	0	0	0	0	0	321431	0	321,431	321,431
Office Paper	41476	0	0	0	0	0	41476	0	41,476	41,476
Magazines	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0
Folding Containers	82953	0	0	0	0	0	82953	0	82,953	82,953
Paper Bags	373288	0	0	0	0	0	373288	0	373,288	373,288
Mixed Paper	489423	0	0	0	0	0	489423	0	489,423	489,423
Paper - Non-recyclable	124429	0	0	0	0	0	124429	0	124,429	124,429
HDPE - Translucent Containers	32977	0	0	0	0	0	32977	0	32,977	32,977
HDPE - Pigmented Containers	16489	0	0	0	0	0	16489	0	16,489	16,489
PET - Containers	57828	0	0	0	0	0	57828	0	57,828	57,828
Plastic - Other # 1, Polypropylene	33181	0	0	0	0	0	33181	0	33,181	33,181
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	141020	0	0	0	0	0	141020	0	141,020	141,020
Plastic Film	555785	0	0	0	0	0	555785	0	555,785	555,785
Plastic - Non-Recyclable	315221	0	0	0	0	0	315221	0	315,221	315,221
Ferrous Cans	24794	0	0	0	0	0	24794	0	24,794	24,794
Ferrous Metal - Other	190792	0	0	0	0	0	190792	0	190,792	190,792
Aluminum Cans	24775	0	0	0	0	0	24775	0	24,775	24,775
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	24886	0	0	0	0	0	24886	0	24,886	24,886
Ferrous - Non-recyclable	207382	0	0	0	0	0	207382	0	207,382	207,382
Al - Non-recyclable	8295	0	0	0	0	0	8295	0	8,295	8,295
Glass - Brown	24750	0	0	0	0	0	24750	0	24,750	24,750
Glass - Green	16464	0	0	0	0	0	16464	0	16,464	16,464
Glass - Clear	66024	0	0	0	0	0	66024	0	66,024	66,024
Mixed Glass	49279	0	0	0	0	0	49279	0	49,279	49,279
Glass - Non-recyclable	24886	0	0	0	0	0	24886	0	24,886	24,886
Misc. Organic	356698	0	0	0	0	0	356698	0	356,698	356,698
Misc. Inorganic	1219409	0	0	0	0	0	1219409	0	1,219,409	1,219,409
E-waste	58067	0	0	0	0	0	58067	0	58,067	58,067
Aerobic Residual	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	439651	0	0	0	0	0	439651	0	439,651	439,651
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0
Total	8288671	0	0	0	0	0	8288671	0		

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1	Collection MT	Collection GWP	Collection MTCO2e		Landfill MT	Landfill GWP	Landfill MTCO2e	
C Emissions Neutral; C Storage Negative 100 AR5	1,302,233,353	275,026,558	0	0	0	0	0	1,027,206,794	0	275,026,558	1,027,206,794	275,027				1,027,207		1,489,600	
cumulative energy demand fossil non-renewable	18,469,575,109	4,739,520,837	0	0	0	0	0	13,730,054,271	0	4,739,520,837	13,730,054,271							-462,394	
TRACI environmental impact acidification (moles	216,949,328	32,623,958	0	0	0	0	0	184,325,371	0	32,623,958	184,325,371								
TRACI environmental impact eutrophication (kg	543,363	32,341	0	0	0	0	0	511,022	0	32,341	511,022								
TRACI environmental impact photochemical oxid	4,944,553	374,420	0	0	0	0	0	4,570,134	0	374,420	4,570,134								
USEtox ecotoxicity total (CTUe)	1,800,857,936	722,992,340	0	0	0	0	0	1,077,865,597	0	722,992,340	1,077,865,597								
USEtox human toxicity total (CTUh)	156	54	0	0	0	0	0	102	0	54	102								
CO2-Fossil (kg)	526,829,957	258,049,075	0	0	0	0	0	268,780,882	0	258,049,075	268,780,882	258,049	1	258,049		268,781	1	268,781	
CO2-Biogenic (kg)	1,761,445,771	1,685,243	0	0	0	0	0	1,759,760,528	0	1,685,243	1,759,760,528	1,685	1	1,685		1,759,761	1	1,759,761	
CO2-Stored (kg)	-3,103,034,158	79,614	0	0	0	0	0	-3,103,113,771	0	79,614	-3,103,113,771	80	1	80		(3,103,114)	1	(3,103,114)	
CH4-Fossil (kg)	2,911,660	422,054	0	0	0	0	0	2,489,605	0	422,054	2,489,605	422	28	11,818		2,490	28	69,709	
CH4-Biogenic (kg)	112,266,078	2,292	0	0	0	0	0	112,263,786	0	2,292	112,263,786	2	28	64		112,264	28	3,143,386	
N2O (kg)	1,209	2,575	0	0	0	0	0	-1,366	0	2,575	-1,366	3	298	767		(1)	298	(407)	
CO (kg)	3,514,676	476,174	0	0	0	0	0	3,038,502	0	476,174	3,038,502			-				-	
NOx (kg)	4,465,228	355,382	0	0	0	0	0	4,109,846	0	355,382	4,109,846	355	10	3,554		4,110	10	41,098	
SOx (kg)	757,226	348,471	0	0	0	0	0	408,755	0	348,471	408,755								
PM>10 (kg)	139,499	254,157	0	0	0	0	0	-114,658	0	254,157	-114,658								
PM10 (kg)	213,167	85,920	0	0	0	0	0	127,247	0	85,920	127,247								
PM2.5 (kg)	273,268	49,448	0	0	0	0	0	223,821	0	49,448	223,821								
NMVOC (kg)	2,864,510	339,981	0	0	0	0	0	2,524,528	0	339,981	2,524,528								
Lead (kg)	895	137	0	0	0	0	0	758	0	137	758								
Cost ($)	250,573,951	118,651,823	0	0	0	0	0	131,922,128	0	118,651,823	131,922,128		0.03	**274,947**	**Total emissions excluding credits**		0.53	**4,592,714**	**Total emissions excluding credits**
													0.03	**275,027**	**Total emissions including credits**		0.12	**1,027,207**	**Total emissions including credits**
																	0.56	**4,867,661**	**Total emissions excluding credits**
																	0.15	**1,302,233**	**Total emissions including credits**

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (	1,764,626,903	275,026,558	0	0	0	0	0	1,489,600,345	0	275,026,558	1,489,600,345
cumulative energy demand fossil non-renewable energy r	25,035,630,070	4,739,520,837	0	0	0	0	0	20,296,109,233	0	4,739,520,837	20,296,109,233
TRACI environmental impact acidification (moles of H+-Eq	250,567,588	32,623,958	0	0	0	0	0	217,943,630	0	32,623,958	217,943,630
TRACI environmental impact eutrophication (kg N-Eq.)	489,693	32,341	0	0	0	0	0	457,352	0	32,341	457,352
TRACI environmental impact photochemical oxidation (kg	3,435,407	374,420	0	0	0	0	0	3,060,987	0	374,420	3,060,987
USEtox ecotoxicity total (CTUe)	2,966,203,563	722,992,340	0	0	0	0	0	2,243,211,223	0	722,992,340	2,243,211,223
USEtox human toxicity total (CTUh)	252	54	0	0	0	0	0	198	0	54	198
CO2-Fossil (kg)	971,839,682	258,049,075	0	0	0	0	0	713,790,606	0	258,049,075	713,790,606
CO2-Biogenic (kg)	1,719,451,655	1,685,243	0	0	0	0	0	1,717,766,412	0	1,685,243	1,717,766,412
CO2-Stored (kg)	-3,102,990,809	79,614	0	0	0	0	0	-3,103,070,423	0	79,614	-3,103,070,423
CH4-Fossil (kg)	4,123,427	422,054	0	0	0	0	0	3,701,373	0	422,054	3,701,373
CH4-Biogenic (kg)	111,315,785	2,292	0	0	0	0	0	111,313,493	0	2,292	111,313,493
N2O (kg)	15,651	2,575	0	0	0	0	0	13,076	0	2,575	13,076
CO (kg)	3,713,259	476,174	0	0	0	0	0	3,237,084	0	476,174	3,237,084
NOx (kg)	2,939,431	355,382	0	0	0	0	0	2,584,049	0	355,382	2,584,049
SOx (kg)	2,475,746	348,471	0	0	0	0	0	2,127,274	0	348,471	2,127,274
PM>10 (kg)	537,133	254,157	0	0	0	0	0	282,976	0	254,157	282,976
PM10 (kg)	241,128	85,920	0	0	0	0	0	155,208	0	85,920	155,208
PM2.5 (kg)	310,442	49,448	0	0	0	0	0	260,995	0	49,448	260,995
NMVOC (kg)	2,990,717	339,981	0	0	0	0	0	2,650,736	0	339,981	2,650,736
Lead (kg)	986	137	0	0	0	0	0	849	0	137	849
Cost ($)	290,133,705	118,651,823	0	0	0	0	0	171,481,882	0	118,651,823	171,481,882

Mass Flows

	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-WTE1	Collection SF1_RWC-LF1	WTE WTE1	Landfill LF1
Yard Trimmings, Leaves	131177	18217	0	0	0	131177	18217	0	131,177	0	131,177	18,217
Yard Trimmings, Grass	131156	20562	0	0	0	131156	20562	0	131,156	0	131,156	20,562
Yard Trimmings, Branches	62977	4709	0	0	0	62977	4709	0	62,977	0	62,977	4,709
Food Waste - Vegetable	1101975	66213	0	0	0	1101975	66213	0	1,101,975	0	1,101,975	66,213
Food Waste - Non-Vegetable	550988	50253	0	0	0	550988	50253	0	550,988	0	550,988	50,253
Wood	1017208	147613	0	0	0	1017208	147613	0	1,017,208	0	1,017,208	147,613
Wood Other	211918	30753	0	0	0	211918	30753	0	211,918	0	211,918	30,753
Textiles	445029	41122	0	0	0	445029	41122	0	445,029	0	445,029	41,122
Rubber/Leather	105959	17104	0	0	0	105959	17104	0	105,959	0	105,959	17,104
Newsprint	31502	3980	0	0	0	31502	3980	0	31,502	0	31,502	3,980
Corr. Cardboard	410577	65754	0	0	0	410577	65754	0	410,577	0	410,577	65,754
Office Paper	52980	9275	0	0	0	52980	9275	0	52,980	0	52,980	9,275
Magazines	0	0	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0	0	0
Folding Containers	105959	16902	0	0	0	105959	16902	0	105,959	0	105,959	16,902
Paper Bags	476816	76060	0	0	0	476816	76060	0	476,816	0	476,816	76,060
Mixed Paper	625159	105497	0	0	0	625159	105497	0	625,159	0	625,159	105,497
Paper - Non-recyclable	158939	20965	0	0	0	158939	20965	0	158,939	0	158,939	20,965
HDPE - Translucent Containers	42123	4928	0	0	0	42123	4928	0	42,123	0	42,123	4,928
HDPE - Pigmented Containers	21061	2464	0	0	0	21061	2464	0	21,061	0	21,061	2,464
PET - Containers	73866	8642	0	0	0	73866	8642	0	73,866	0	73,866	8,642
Plastic - Other # 1, Polypropylene	42384	3368	0	0	0	42384	3368	0	42,384	0	42,384	3,368
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	180131	18237	0	0	0	180131	18237	0	180,131	0	180,131	18,237
Plastic Film	709926	68257	0	0	0	709926	68257	0	709,926	0	709,926	68,257
Plastic - Non-Recyclable	402645	43513	0	0	0	402645	43513	0	402,645	0	402,645	43,513
Ferrous Cans	31671	32083	0	0	0	31671	11202	20881	31,671	0	31,671	11,202
Ferrous Metal - Other	243706	246874	0	0	0	243706	104477	142397	243,706	0	243,706	104,477
Aluminum Cans	31646	32058	0	0	0	31646	14146	17912	31,646	0	31,646	14,146
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	31788	25552	0	0	0	31788	14157	11395	31,788	0	31,788	14,157
Ferrous - Non-recyclable	264898	268342	0	0	0	264898	93695	174647	264,898	0	264,898	93,695
Al - Non-recyclable	10596	10734	0	0	0	10596	10539	195	10,596	0	10,596	10,539
Glass - Brown	31614	32025	0	0	0	31614	32025	0	31,614	0	31,614	32,025
Glass - Green	21030	21303	0	0	0	21030	21303	0	21,030	0	21,030	21,303
Glass - Clear	84336	85432	0	0	0	84336	85432	0	84,336	0	84,336	85,432
Mixed Glass	62947	63765	0	0	0	62947	63765	0	62,947	0	62,947	63,765
Glass - Non-recyclable	31788	32201	0	0	0	31788	32201	0	31,788	0	31,788	32,201
Misc. Organic	455624	59651	0	0	0	455624	59651	0	455,624	0	455,624	59,651
Misc. Inorganic	1557600	1526568	0	0	0	1557600	1526568	0	1,557,600	0	1,557,600	1,526,568
E-waste	74171	75136	0	0	0	74171	75089	47	74,171	0	74,171	75,089
Aerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	561584	54288	0	0	0	561584	54288	0	561,584	0	561,584	54,288
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0	0	0
Total	10587453	3410398	0	0	0	10587453	3042925	367474				

	Reprocessing REPROC_ASH1-OCC	Reprocessing REPROC_ASH1-MxPap	Reprocessing REPROC_ASH1-ONP	Reprocessing REPROC_ASH1-OFF	Reprocessing REPROC_ASH1-OtPap	Reprocessing REPROC_ASH1-PET	Reprocessing REPROC_ASH1-HDPEu	Reprocessing REPROC_ASH1-HDPEp	Reprocessing REPROC_ASH1-HDPEt	Reprocessing REPROC_ASH1-PVC	Reprocessing REPROC_ASH1-LDPE	Reprocessing REPROC_ASH1-PP	Reprocessing REPROC_ASH1-PS	Reprocessing REPROC_ASH1-OtPlas	Reprocessing REPROC_ASH1-MxPlas
Yard Trimmings, Leaves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yard Trimmings, Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yard Trimmings, Branches	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food Waste - Vegetable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food Waste - Non-Vegetable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Textiles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubber/Leather	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Newsprint	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corr. Cardboard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Office Paper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magazines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Folding Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paper Bags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Paper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paper - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HDPE - Translucent Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HDPE - Pigmented Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PET - Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic - Other # 1, Polypropylene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic Film	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic - Non-Recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferrous Cans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferrous Metal - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum Cans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferrous - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Al - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Brown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Glass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Misc. Organic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Misc. Inorganic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E-waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Reprocessing REPROC_ASH1-Al	Reprocessing REPROC_ASH1-Fe	Reprocessing REPROC_ASH1-Cu	Reprocessing REPROC_ASH1-Bglas	Reprocessing REPROC_ASH1-Cglas	Reprocessing REPROC_ASH1-Gglas	Reprocessing REPROC_ASH1-MxGlas	Transportation Trans_WTE1-LF1	Transportation Trans_Al_WTE1-REPROC_ASH1	Transportation Trans_Fe_WTE1-REPROC_ASH1	Transportation Trans_Cu_WTE1-REPROC_ASH1
Yard Trimmings, Leaves	0	0	0	0	0	0	0	18,217	0	0	0
Yard Trimmings, Grass	0	0	0	0	0	0	0	20,562	0	0	0
Yard Trimmings, Branches	0	0	0	0	0	0	0	4,709	0	0	0
Food Waste - Vegetable	0	0	0	0	0	0	0	66,213	0	0	0
Food Waste - Non-Vegetable	0	0	0	0	0	0	0	50,253	0	0	0
Wood	0	0	0	0	0	0	0	147,613	0	0	0
Wood Other	0	0	0	0	0	0	0	30,753	0	0	0
Textiles	0	0	0	0	0	0	0	41,122	0	0	0
Rubber/Leather	0	0	0	0	0	0	0	17,104	0	0	0
Newsprint	0	0	0	0	0	0	0	3,980	0	0	0
Corr. Cardboard	0	0	0	0	0	0	0	65,754	0	0	0
Office Paper	0	0	0	0	0	0	0	9,275	0	0	0
Magazines	0	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0	0
Folding Containers	0	0	0	0	0	0	0	16,902	0	0	0
Paper Bags	0	0	0	0	0	0	0	76,060	0	0	0
Mixed Paper	0	0	0	0	0	0	0	105,497	0	0	0
Paper - Non-recyclable	0	0	0	0	0	0	0	20,965	0	0	0
HDPE - Translucent Containers	0	0	0	0	0	0	0	4,928	0	0	0
HDPE - Pigmented Containers	0	0	0	0	0	0	0	2,464	0	0	0
PET - Containers	0	0	0	0	0	0	0	8,642	0	0	0
Plastic - Other # 1, Polypropylene	0	0	0	0	0	0	0	3,368	0	0	0
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	0	0	0	0	0	0	0	18,237	0	0	0
Plastic Film	0	0	0	0	0	0	0	68,257	0	0	0
Plastic - Non-Recyclable	0	0	0	0	0	0	0	43,513	0	0	0
Ferrous Cans	2,882	17,991	8	0	0	0	0	11,202	2,882	17,991	8
Ferrous Metal - Other	3,899	138,440	58	0	0	0	0	104,477	3,899	138,440	58
Aluminum Cans	8,884	9,011	17	0	0	0	0	14,146	8,884	9,011	17
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	10,829	555	11	0	0	0	0	14,157	10,829	555	11
Ferrous - Non-recyclable	24,105	150,479	63	0	0	0	0	93,695	24,105	150,479	63
Al - Non-recyclable	6	185	4	0	0	0	0	10,539	6	185	4
Glass - Brown	0	0	0	0	0	0	0	32,025	0	0	0
Glass - Green	0	0	0	0	0	0	0	21,303	0	0	0
Glass - Clear	0	0	0	0	0	0	0	85,432	0	0	0
Mixed Glass	0	0	0	0	0	0	0	63,765	0	0	0
Glass - Non-recyclable	0	0	0	0	0	0	0	32,201	0	0	0
Misc. Organic	0	0	0	0	0	0	0	59,651	0	0	0
Misc. Inorganic	0	0	0	0	0	0	0	1,526,568	0	0	0
E-waste	47	0	0	0	0	0	0	75,089	47	0	0
Aerobic Residual	0	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	0	0	0	0	0	0	0	54,288	0	0	0
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0	0

CHRLF_DST_A1 WTE V3.xlsx

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-WTE1	Collection SF1_RWC-LF1	WTE WTE1	Landfill LF1
C Emissions Neutral; C Storage Neg	-634,386,832	342,301,760	98,426	0	0	0	-558,170,025	209,247,464	-627,864,457	342,301,760	0	-558,170,025	209,247,464
cumulative energy demand fossil nc	-54,493,621,466	5,898,892,358	1,376,703	0	0	0	-61,250,484,885	6,425,919,174	-5,569,324,817	5,898,892,358	0	-61,250,484,885	6,425,919,174
TRACI environmental impact acidific	-1,035,317,688	40,603,455	44,606	0	0	0	-1,034,071,172	71,370,785	-113,265,362	40,603,455	0	-1,034,071,172	71,370,785
TRACI environmental impact eutrop	-217,407	40,253	45	0	0	0	-310,348	104,870	-52,225	40,253	0	-310,348	104,870
TRACI environmental impact photo	-3,687,923	466,006	909	0	0	0	-4,454,460	1,199,759	-900,137	466,006	0	-4,454,460	1,199,759
USEtox ecotoxicity total (CTUe)	-11,638,120,192	899,847,424	219,342	0	0	0	-10,945,580,109	641,571,363	-2,234,178,213	899,847,424	0	-10,945,580,109	641,571,363
USEtox human toxicity total (CTUh)	-860	67	0	0	0	0	-893	57	-92	67	0	-893	57
CO2-Fossil (kg)	-183,976,751	321,171,548	91,663	0	0	0	-143,196,402	192,566,368	-554,609,928	321,171,548	0	-143,196,402	192,566,368
CO2-Biogenic (kg)	6,467,711,010	2,097,392	689	0	0	0	6,231,927,138	240,479,763	-6,793,971	2,097,392	0	6,231,927,138	240,479,763
CO2-Stored (kg)	-573,148,401	99,089	43	0	0	0	-384,950	-572,795,510	-67,074	99,089	0	-384,950	-572,795,510
CH4-Fossil (kg)	-10,777,964	525,289	143	0	0	0	-11,389,441	1,169,649	-1,083,605	525,289	0	-11,389,441	1,169,649
CH4-Biogenic (kg)	16,138,645	2,853	1	0	0	0	-78,801	16,220,872	-6,280	2,853	0	-78,801	16,220,872
N2O (kg)	-10,106	3,205	3	0	0	0	-5,381	2,546	-10,478	3,205	0	-5,381	2,546
CO (kg)	-2,259,825	592,660	342	0	0	0	-59,256	1,154,711	-3,948,283	592,660	0	-59,256	1,154,711
NOx (kg)	-3,587,209	442,311	901	0	0	0	-4,315,126	1,115,770	-831,064	442,311	0	-4,315,126	1,115,770
SOx (kg)	-17,299,346	433,700	161	0	0	0	-16,121,815	509,329	-2,120,721	433,700	0	-16,121,815	509,329
PM>10 (kg)	-7,273,677	316,328	78	0	0	0	-3,593,606	35,310	-4,031,786	316,328	0	-3,593,606	35,310
PM10 (kg)	4,561	106,939	31	0	0	0	-111,346	45,620	-36,683	106,939	0	-111,346	45,620
PM2.5 (kg)	-85,177	61,544	39	0	0	0	-175,408	85,612	-56,964	61,544	0	-175,408	85,612
NMVOC (kg)	138,962	423,151	138	0	0	0	-793,013	670,478	-161,791	423,151	0	-793,013	670,478
Lead (kg)	-451	171	0	0	0	0	-835	298	-85	171	0	-835	298
Cost ($)	665,313,353	138,844,628	33,742,833	0	0	0	478,028,456	46,286,767	-31,589,331	138,844,628	0	478,028,456	46,286,767

Impacts	Reprocessing REPROC_ASH1-OCC	Reprocessing REPROC_ASH1-MxPap	Reprocessing REPROC_ASH1-ONP	Reprocessing REPROC_ASH1-OFF	Reprocessing REPROC_ASH1-OtPap	Reprocessing REPROC_ASH1-PET	Reprocessing REPROC_ASH1-HDPEu	Reprocessing REPROC_ASH1-HDPEp	Reprocessing REPROC_ASH1-HDPEt	Reprocessing REPROC_ASH1-PVC	Reprocessing REPROC_ASH1-LDPE	Reprocessing REPROC_ASH1-PP	Reprocessing REPROC_ASH1-PS	Reprocessing REPROC_ASH1-OtPlas	Reprocessing REPROC_ASH1-MxPlas
C Emissions Neutral; C Storage Neg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cumulative energy demand fossil nc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact acidific	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact eutrop	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact photo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USEtox ecotoxicity total (CTUe)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USEtox human toxicity total (CTUh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Stored (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CH4-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CH4-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N2O (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM>10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM2.5 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NMVOC (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lead (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost ($)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Impacts	Reprocessing REPROC_ASH1-Al	Reprocessing REPROC_ASH1-Fe	Reprocessing REPROC_ASH1-Cu	Reprocessing REPROC_ASH1-Bglas	Reprocessing REPROC_ASH1-Cglas	Reprocessing REPROC_ASH1-Gglas	Reprocessing REPROC_ASH1-MxGlas	Transportation Trans_WTE1-LF1	Transportation Trans_Al_WTE1-REPROC_ASH1	Transportation Trans_Fe_WTE1-REPROC_ASH1	Transportation Trans_Cu_WTE1-REPROC_ASH1
C Emissions Neutral; C Storage Neg	-302,718,378	-325,146,079	0	0	0	0	0	67,976	4,197	26,239	13
cumulative energy demand fossil nc	-3,359,045,386	-2,210,279,431	0	0	0	0	0	919,518	63,019	393,967	199
TRACI environmental impact acidific	-68,211,598	-45,053,765	0	0	0	0	0	33,712	1,502	9,387	5
TRACI environmental impact eutrop	-28,100	-24,125	0	0	0	0	0	34	2	9	0
TRACI environmental impact photo	-452,757	-447,379	0	0	0	0	0	698	29	182	0
USEtox ecotoxicity total (CTUe)	-1,065,389,500	-1,168,788,713	0	0	0	0	0	144,019	10,383	64,907	33
USEtox human toxicity total (CTUh)	-52	-39	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	-253,599,952	-301,009,977	0	0	0	0	0	63,240	3,918	24,492	12
CO2-Biogenic (kg)	-4,431,269	-2,362,703	0	0	0	0	0	509	25	155	0
CO2-Stored (kg)	-33,681	-33,393	0	0	0	0	0	32	2	10	0
CH4-Fossil (kg)	-583,688	-499,917	0	0	0	0	0	101	6	37	0
CH4-Biogenic (kg)	-3,846	-2,434	0	0	0	0	0	1	0	0	0
N2O (kg)	-6,481	-3,997	0	0	0	0	0	2	0	1	0
CO (kg)	-1,351,621	-2,596,662	0	0	0	0	0	280	9	54	0
NOx (kg)	-425,780	-405,285	0	0	0	0	0	692	29	180	0
SOx (kg)	-1,302,179	-818,542	0	0	0	0	0	113	7	41	0
PM>10 (kg)	-1,595,951	-2,435,835	0	0	0	0	0	52	4	22	0
PM10 (kg)	-17,008	-19,675	0	0	0	0	0	22	1	9	0
PM2.5 (kg)	-29,559	-27,405	0	0	0	0	0	30	1	8	0
NMVOC (kg)	-81,793	-79,999	0	0	0	0	0	101	5	32	0
Lead (kg)	-96	11	0	0	0	0	0	0	0	0	0
Cost ($)	-22,985,597	-8,603,734	0	0	0	0	0	33,742,833	0	0	0

Transportation MT	Transportation GWP	Transportation MTCO2e	WTE MT	WTE GWP	WTE MTCO2e	Landfill MT	Landfill GWP	Landfill MTCO2e	Reprocessing MT	Reprocessing GWP	Reprocessing MTCO2e	Collection MT	Collection GWP	Collection MTCO2e
98			(558,170)			209,247			(627,864)			342,302		
					4,423,563									
					-4,981,733									
92	1	92	(143,196)	1	(143,196)	192,566	1	192,566	(554,610)	1	(554,610)	321,172	1	321,172
1	1	1	6,231,927	1	6,231,927	240,480	1	240,480	(6,794)	1	(6,794)	2,097	1	2,097
0	1	0	(385)	1	(385)	(572,796)	1	(572,796)	(67)	1	(67)	99	1	99
0	28	4	(11,389)	28	(318,904)	1,170	28	32,750	(1,084)	28	(30,341)	525	28	14,708
0	28	0	(79)	28	(2,206)	16,221	28	454,184	(6)	28	(176)	3	28	80
0	298	1	(5)	298	(1,604)	3	298	759	(10)	298	(3,122)	3	298	955
0		-	(59)		-	1,155		-	(3,948)		-	593		-
1	10	9	(4,315)	10	(43,151)	1,116	10	11,158	(831)	10	(8,311)	442	10	4,423

98 Total anthropogenic without credits **4,423,563 Total anthropogenic without credits** **782,043 Total anthropogenic without credits** **(627,797) Total anthropogenic without credits** **342,203 Total anthropogenic without credits**

98 Total anthropogenic with credits **(558,170) Total anthropogenic with credits** **209,247 Total anthropogenic with credits** **(627,864) Total anthropogenic with credits** **342,302 Total anthropogenic with credits**

5,547,907 Total anthropogenic without credits

(634,387) Total anthropogenic with credits

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-WTE1	Collection SF1_RWC-LF1	WTE WTE1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	4,361,651,050	342,301,760	98,426	0	0	0	4,423,563,334	223,551,987	-627,864,457	342,301,760	0	4,423,563,334	223,551,987
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.)	11,745,423,231	5,898,892,358	1,376,703	0	0	0	5,059,103,368	6,355,375,618	-5,569,324,817	5,898,892,358	0	5,059,103,368	6,355,375,618
TRACI environmental impact acidification (moles of H+-Eq)	269,346,364	40,603,455	44,606	0	0	0	270,775,995	71,187,670	-113,265,362	40,603,455	0	270,775,995	71,187,670
TRACI environmental impact eutrophication (kg N-Eq.)	308,280	40,253	45	0	0	0	214,608	105,600	-52,225	40,253	0	214,608	105,600
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	5,192,117	466,006	909	0	0	0	4,404,068	1,221,271	-900,137	466,006	0	4,404,068	1,221,271
USEtox ecotoxicity total (CTUe)	118,006,764	899,847,424	219,342	0	0	0	823,066,773	629,051,438	-2,234,178,213	899,847,424	0	823,066,773	629,051,438
USEtox human toxicity total (CTUh)	109	67	0	0	0	0	78	56	-92	67	0	78	56
CO2-Fossil (kg)	4,305,327,585	321,171,548	91,663	0	0	0	4,350,888,974	187,785,328	-554,609,928	321,171,548	0	4,350,888,974	187,785,328
CO2-Biogenic (kg)	6,597,942,662	2,097,392	689	0	0	0	6,341,288,757	261,349,795	-6,793,971	2,097,392	0	6,341,288,757	261,349,795
CO2-Stored (kg)	-572,711,094	99,089	43	0	0	0	52,823	-572,795,976	-67,074	99,089	0	52,823	-572,795,976
CH4-Fossil (kg)	1,446,475	525,289	143	0	0	0	848,017	1,156,631	-1,083,605	525,289	0	848,017	1,156,631
CH4-Biogenic (kg)	16,811,956	2,853	1	0	0	0	6,263	16,809,119	-6,280	2,853	0	6,263	16,809,119
N2O (kg)	135,586	3,205	3	0	0	0	140,465	2,390	-10,478	3,205	0	140,465	2,390
CO (kg)	-260,016	592,660	342	0	0	0	1,942,667	1,152,597	-3,948,283	592,660	0	1,942,667	1,152,597
NOx (kg)	5,114,131	442,311	901	0	0	0	4,366,342	1,135,641	-831,064	442,311	0	4,366,342	1,135,641
SOx (kg)	322,005	433,700	161	0	0	0	1,517,782	491,083	-2,120,721	433,700	0	1,517,782	491,083
PM>10 (kg)	-3,395,083	316,328	78	0	0	0	288,787	31,510	-4,031,786	316,328	0	288,787	31,510
PM10 (kg)	143,610	106,939	31	0	0	0	27,495	45,828	-36,683	106,939	0	27,495	45,828
PM2.5 (kg)	199,852	61,544	39	0	0	0	109,701	85,532	-56,964	61,544	0	109,701	85,532
NMVOC (kg)	1,041,510	423,151	138	0	0	0	108,898	671,115	-161,791	423,151	0	108,898	671,115
Lead (kg)	465	171	0	0	0	0	82	297	-85	171	0	82	297
Cost ($)	1,064,461,243	138,844,628	33,742,833	0	0	0	877,599,776	45,863,338	-31,589,331	138,844,628	0	877,599,776	45,863,338

Impacts	Reprocessing REPROC_ASH1-OCC	Reprocessing REPROC_ASH1-MxPap	Reprocessing REPROC_ASH1-ONP	Reprocessing REPROC_ASH1-OFF	Reprocessing REPROC_ASH1-OtPap	Reprocessing REPROC_ASH1-PET	Reprocessing REPROC_ASH1-HDPEu	Reprocessing REPROC_ASH1-HDPEp	Reprocessing REPROC_ASH1-HDPEt	Reprocessing REPROC_ASH1-PVC	Reprocessing REPROC_ASH1-LDPE	Reprocessing REPROC_ASH1-PP	Reprocessing REPROC_ASH1-PS	Reprocessing REPROC_ASH1-OtPlas	Reprocessing REPROC_ASH1-MxPlas
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact acidification (moles of H+-Eq)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact eutrophication (kg N-Eq.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USEtox ecotoxicity total (CTUe)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USEtox human toxicity total (CTUh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Stored (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CH4-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CH4-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N2O (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM>10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM2.5 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NMVOC (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lead (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost ($)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Impacts	Reprocessing REPROC_ASH1-Al	Reprocessing REPROC_ASH1-Fe	Reprocessing REPROC_ASH1-Cu	Reprocessing REPROC_ASH1-Bglas	Reprocessing REPROC_ASH1-Cglas	Reprocessing REPROC_ASH1-Gglas	Reprocessing REPROC_ASH1-MxGlas	Transportation Trans_WTE1-LF1	Transportation Trans_Al_WTE1-REPROC_ASH1	Transportation Trans_Fe_WTE1-REPROC_ASH1	Transportation Trans_Cu_WTE1-REPROC_ASH1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	-302,718,378	-325,146,079	0	0	0	0	0	67,976	4,197	26,239	13
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.)	-3,359,045,386	-2,210,279,431	0	0	0	0	0	919,518	63,019	393,967	199
TRACI environmental impact acidification (moles of H+-Eq)	-68,211,598	-45,053,765	0	0	0	0	0	33,712	1,502	9,387	5
TRACI environmental impact eutrophication (kg N-Eq.)	-28,100	-24,125	0	0	0	0	0	34	2	9	0
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	-452,757	-447,379	0	0	0	0	0	698	29	182	0
USEtox ecotoxicity total (CTUe)	-1,065,389,500	-1,168,788,713	0	0	0	0	0	144,019	10,383	64,907	33
USEtox human toxicity total (CTUh)	-52	-39	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	-253,599,952	-301,009,977	0	0	0	0	0	63,240	3,918	24,492	12
CO2-Biogenic (kg)	-4,431,269	-2,362,703	0	0	0	0	0	509	25	155	0
CO2-Stored (kg)	-33,681	-33,393	0	0	0	0	0	32	2	10	0
CH4-Fossil (kg)	-583,688	-499,917	0	0	0	0	0	101	6	37	0
CH4-Biogenic (kg)	-3,846	-2,434	0	0	0	0	0	1	0	0	0
N2O (kg)	-6,481	-3,997	0	0	0	0	0	2	0	1	0
CO (kg)	-1,351,621	-2,596,662	0	0	0	0	0	280	9	54	0
NOx (kg)	-425,780	-405,285	0	0	0	0	0	692	29	180	0
SOx (kg)	-1,302,179	-818,542	0	0	0	0	0	113	7	41	0
PM>10 (kg)	-1,595,951	-2,435,835	0	0	0	0	0	52	4	22	0
PM10 (kg)	-17,008	-19,675	0	0	0	0	0	22	1	9	0
PM2.5 (kg)	-29,559	-27,405	0	0	0	0	0	30	1	8	0
NMVOC (kg)	-81,793	-79,999	0	0	0	0	0	101	5	32	0
Lead (kg)	-96	11	0	0	0	0	0	0	0	0	0
Cost ($)	-22,985,597	-8,603,734	0	0	0	0	0	33,742,833	0	0	0

CHRLF_DST_A1 WEBR V3 DRY.xlsx

Mass Flows

	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
Yard Trimmings, Leaves	131177	0	0	0	0	0	131177	0	131,177	131,177
Yard Trimmings, Grass	131156	0	0	0	0	0	131156	0	131,156	131,156
Yard Trimmings, Branches	62977	0	0	0	0	0	62977	0	62,977	62,977
Food Waste - Vegetable	1101975	0	0	0	0	0	1101975	0	1,101,975	1,101,975
Food Waste - Non-Vegetable	550988	0	0	0	0	0	550988	0	550,988	550,988
Wood	1017208	0	0	0	0	0	1017208	0	1,017,208	1,017,208
Wood Other	211918	0	0	0	0	0	211918	0	211,918	211,918
Textiles	445029	0	0	0	0	0	445029	0	445,029	445,029
Rubber/Leather	105959	0	0	0	0	0	105959	0	105,959	105,959
Newsprint	31502	0	0	0	0	0	31502	0	31,502	31,502
Corr. Cardboard	410577	0	0	0	0	0	410577	0	410,577	410,577
Office Paper	52980	0	0	0	0	0	52980	0	52,980	52,980
Magazines	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0
Folding Containers	105959	0	0	0	0	0	105959	0	105,959	105,959
Paper Bags	476816	0	0	0	0	0	476816	0	476,816	476,816
Mixed Paper	625159	0	0	0	0	0	625159	0	625,159	625,159
Paper - Non-recyclable	158939	0	0	0	0	0	158939	0	158,939	158,939
HDPE - Translucent Containers	42123	0	0	0	0	0	42123	0	42,123	42,123
HDPE - Pigmented Containers	21061	0	0	0	0	0	21061	0	21,061	21,061
PET - Containers	73866	0	0	0	0	0	73866	0	73,866	73,866
Plastic - Other # 1, Polypropylene	42384	0	0	0	0	0	42384	0	42,384	42,384
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	180131	0	0	0	0	0	180131	0	180,131	180,131
Plastic Film	709926	0	0	0	0	0	709926	0	709,926	709,926
Plastic - Non-Recyclable	402645	0	0	0	0	0	402645	0	402,645	402,645
Ferrous Cans	31671	0	0	0	0	0	31671	0	31,671	31,671
Ferrous Metal - Other	243706	0	0	0	0	0	243706	0	243,706	243,706
Aluminum Cans	31646	0	0	0	0	0	31646	0	31,646	31,646
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	31788	0	0	0	0	0	31788	0	31,788	31,788
Ferrous - Non-recyclable	264898	0	0	0	0	0	264898	0	264,898	264,898
Al - Non-recyclable	10596	0	0	0	0	0	10596	0	10,596	10,596
Glass - Brown	31614	0	0	0	0	0	31614	0	31,614	31,614
Glass - Green	21030	0	0	0	0	0	21030	0	21,030	21,030
Glass - Clear	84336	0	0	0	0	0	84336	0	84,336	84,336
Mixed Glass	62947	0	0	0	0	0	62947	0	62,947	62,947
Glass - Non-recyclable	31788	0	0	0	0	0	31788	0	31,788	31,788
Misc. Organic	455624	0	0	0	0	0	455624	0	455,624	455,624
Misc. Inorganic	1557600	0	0	0	0	0	1557600	0	1,557,600	1,557,600
E-waste	74171	0	0	0	0	0	74171	0	74,171	74,171
Aerobic Residual	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	561584	0	0	0	0	0	561584	0	561,584	561,584
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0
Total	10587453	0	0	0	0	0	10587453	0		

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	1,712,111,239	1,079,514,047	0	0	0	0	0	632,597,192	0	1,079,514,047	632,597,192
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq	37,666,154,351	18,603,774,758	0	0	0	0	0	19,062,379,594	0	18,603,774,758	19,062,379,594
TRACI environmental impact acidification (moles of H+-Eq)	366,718,018	128,032,862	0	0	0	0	0	238,685,156	0	128,032,862	238,685,156
TRACI environmental impact eutrophication (kg N-Eq.)	763,283	126,946	0	0	0	0	0	636,337	0	126,946	636,337
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	6,789,811	1,469,586	0	0	0	0	0	5,320,224	0	1,469,586	5,320,224
USEtox ecotoxicity total (CTUe)	4,485,225,872	2,837,874,178	0	0	0	0	0	1,647,351,694	0	2,837,874,178	1,647,351,694
USEtox human toxicity total (CTUh)	363	211	0	0	0	0	0	152	0	211	152
CO2-Fossil (kg)	1,459,522,090	1,012,880,400	0	0	0	0	0	446,641,690	0	1,012,880,400	446,641,690
CO2-Biogenic (kg)	1,684,009,527	6,612,549	0	0	0	0	0	1,677,396,978	0	6,612,549	1,677,396,978
CO2-Stored (kg)	-3,963,409,629	312,523	0	0	0	0	0	-3,963,722,152	0	312,523	-3,963,722,152
CH4-Fossil (kg)	5,117,892	1,656,485	0	0	0	0	0	3,461,407	0	1,656,485	3,461,407
CH4-Biogenic (kg)	119,642,800	8,995	0	0	0	0	0	119,633,805	0	8,995	119,633,805
N2O (kg)	11,714	10,106	0	0	0	0	0	1,608	0	10,106	1,608
CO (kg)	5,795,107	1,869,233	0	0	0	0	0	3,925,875	0	1,869,233	3,925,875
NOx (kg)	6,201,080	1,394,857	0	0	0	0	0	4,806,223	0	1,394,857	4,806,223
SOx (kg)	2,282,985	1,367,472	0	0	0	0	0	915,514	0	1,367,472	915,514
PM>10 (kg)	931,381	997,618	0	0	0	0	0	-66,238	0	997,618	-66,238
PM10 (kg)	493,286	337,288	0	0	0	0	0	155,998	0	337,288	155,998
PM2.5 (kg)	480,432	194,105	0	0	0	0	0	286,327	0	194,105	286,327
NMVOC (kg)	4,437,398	1,334,618	0	0	0	0	0	3,102,780	0	1,334,618	3,102,780
Lead (kg)	1,528	538	0	0	0	0	0	990	0	538	990
Cost ($)	411,495,666	233,842,427	0	0	0	0	0	177,653,239	0	233,842,427	177,653,239

Impacts	Collection MT	Collection GWP	Collection MTCO2e	Landfill MT	Landfill GWP	Landfill MTCO2e
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	1,079,514			632,597		1,225,853
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq						-593,255
CO2-Fossil (kg)	1,012,880	1	1,012,880	446,642	1	446,642
CO2-Biogenic (kg)	6,613	1	6,613	1,677,397	1	1,677,397
CO2-Stored (kg)	313	1	313	(3,963,722)	1	(3,963,722)
CH4-Fossil (kg)	1,656	28	46,382	3,461	28	96,919
CH4-Biogenic (kg)	9	28	252	119,634	28	3,349,747
N2O (kg)	10	298	3,012	2	298	479
CO (kg)			-			-
NOx (kg)	1,395	10	13,949	4,806	10	48,062

Collection GWP	Collection MTCO2e		Landfill GWP	Landfill MTCO2e	
0.12	**1,079,202**	**Total emissions excluding credits**	0.60	**5,189,575**	**Total emissions excluding credits**
0.12	**1,079,514**	**Total emissions including credits**	0.07	**632,597**	**Total emissions including credits**
			0.72	**6,268,776**	**Total emissions excluding credits**
			0.20	**1,712,111**	**Total emissions including credits**

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	2,305,366,678	1,079,514,047	0	0	0	0	0	1,225,852,631	0	1,079,514,047	1,225,852,631
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.	44,522,746,761	18,603,774,758	0	0	0	0	0	25,918,972,003	0	18,603,774,758	25,918,972,003
TRACI environmental impact acidification (moles of H+-Eq)	402,290,576	128,032,862	0	0	0	0	0	274,257,715	0	128,032,862	274,257,715
TRACI environmental impact eutrophication (kg N-Eq.)	707,642	126,946	0	0	0	0	0	580,697	0	126,946	580,697
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	5,233,131	1,469,586	0	0	0	0	0	3,763,544	0	1,469,586	3,763,544
USEtox ecotoxicity total (CTUe)	5,702,136,627	2,837,874,178	0	0	0	0	0	2,864,262,450	0	2,837,874,178	2,864,262,450
USEtox human toxicity total (CTUh)	464	211	0	0	0	0	0	253	0	211	253
CO2-Fossil (kg)	1,924,222,784	1,012,880,400	0	0	0	0	0	911,342,384	0	1,012,880,400	911,342,384
CO2-Biogenic (kg)	1,688,967,962	6,612,549	0	0	0	0	0	1,682,355,413	0	6,612,549	1,682,355,413
CO2-Stored (kg)	-3,963,364,363	312,523	0	0	0	0	0	-3,963,676,885	0	312,523	-3,963,676,885
CH4-Fossil (kg)	6,383,279	1,656,485	0	0	0	0	0	4,726,794	0	1,656,485	4,726,794
CH4-Biogenic (kg)	121,966,366	8,995	0	0	0	0	0	121,957,371	0	8,995	121,957,371
N2O (kg)	26,795	10,106	0	0	0	0	0	16,689	0	10,106	16,689
CO (kg)	6,002,529	1,869,233	0	0	0	0	0	4,133,297	0	1,869,233	4,133,297
NOx (kg)	4,616,888	1,394,857	0	0	0	0	0	3,222,031	0	1,394,857	3,222,031
SOx (kg)	4,078,118	1,367,472	0	0	0	0	0	2,710,647	0	1,367,472	2,710,647
PM>10 (kg)	1,347,846	997,618	0	0	0	0	0	350,228	0	997,618	350,228
PM10 (kg)	523,817	337,288	0	0	0	0	0	186,528	0	337,288	186,528
PM2.5 (kg)	520,089	194,105	0	0	0	0	0	325,984	0	194,105	325,984
NMVOC (kg)	4,574,791	1,334,618	0	0	0	0	0	3,240,172	0	1,334,618	3,240,172
Lead (kg)	1,623	538	0	0	0	0	0	1,084	0	538	1,084
Cost ($)	452,810,038	233,842,427	0	0	0	0	0	218,967,612	0	233,842,427	218,967,612

Mass Flows

	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
Yard Trimmings, Leaves	114016	0	0	0	0	0	114016	0	114,016	114,016
Yard Trimmings, Grass	113998	0	0	0	0	0	113998	0	113,998	113,998
Yard Trimmings, Branches	54738	0	0	0	0	0	54738	0	54,738	54,738
Food Waste - Vegetable	957813	0	0	0	0	0	957813	0	957,813	957,813
Food Waste - Non-Vegetable	478906	0	0	0	0	0	478906	0	478,906	478,906
Wood	884135	0	0	0	0	0	884135	0	884,135	884,135
Wood Other	184195	0	0	0	0	0	184195	0	184,195	184,195
Textiles	386809	0	0	0	0	0	386809	0	386,809	386,809
Rubber/Leather	92097	0	0	0	0	0	92097	0	92,097	92,097
Newsprint	27381	0	0	0	0	0	27381	0	27,381	27,381
Corr. Cardboard	356865	0	0	0	0	0	356865	0	356,865	356,865
Office Paper	46049	0	0	0	0	0	46049	0	46,049	46,049
Magazines	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0
Folding Containers	92097	0	0	0	0	0	92097	0	92,097	92,097
Paper Bags	414438	0	0	0	0	0	414438	0	414,438	414,438
Mixed Paper	543375	0	0	0	0	0	543375	0	543,375	543,375
Paper - Non-recyclable	138146	0	0	0	0	0	138146	0	138,146	138,146
HDPE - Translucent Containers	36612	0	0	0	0	0	36612	0	36,612	36,612
HDPE - Pigmented Containers	18306	0	0	0	0	0	18306	0	18,306	18,306
PET - Containers	64203	0	0	0	0	0	64203	0	64,203	64,203
Plastic - Other # 1, Polypropylene	36839	0	0	0	0	0	36839	0	36,839	36,839
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	156566	0	0	0	0	0	156566	0	156,566	156,566
Plastic Film	617053	0	0	0	0	0	617053	0	617,053	617,053
Plastic - Non-Recyclable	349970	0	0	0	0	0	349970	0	349,970	349,970
Ferrous Cans	27528	0	0	0	0	0	27528	0	27,528	27,528
Ferrous Metal - Other	211824	0	0	0	0	0	211824	0	211,824	211,824
Aluminum Cans	27506	0	0	0	0	0	27506	0	27,506	27,506
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	27629	0	0	0	0	0	27629	0	27,629	27,629
Ferrous - Non-recyclable	230243	0	0	0	0	0	230243	0	230,243	230,243
Al - Non-recyclable	9210	0	0	0	0	0	9210	0	9,210	9,210
Glass - Brown	27478	0	0	0	0	0	27478	0	27,478	27,478
Glass - Green	18278	0	0	0	0	0	18278	0	18,278	18,278
Glass - Clear	73303	0	0	0	0	0	73303	0	73,303	73,303
Mixed Glass	54712	0	0	0	0	0	54712	0	54,712	54,712
Glass - Non-recyclable	27629	0	0	0	0	0	27629	0	27,629	27,629
Misc. Organic	396019	0	0	0	0	0	396019	0	396,019	396,019
Misc. Inorganic	1353832	0	0	0	0	0	1353832	0	1,353,832	1,353,832
E-waste	64468	0	0	0	0	0	64468	0	64,468	64,468
Aerobic Residual	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	488116	0	0	0	0	0	488116	0	488,116	488,116
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0
Total	9202382	0	0	0	0	0	9202382	0		

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	1,442,209,024	301,766,859	0	0	0	0	0	1,140,442,166	0	301,766,859	1,140,442,166
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.)	20,443,946,825	5,200,343,577	0	0	0	0	0	15,243,603,247	0	5,200,343,577	15,243,603,247
TRACI environmental impact acidification (moles of H+-Eq)	240,440,318	35,795,619	0	0	0	0	0	204,644,699	0	35,795,619	204,644,699
TRACI environmental impact eutrophication (kg N-Eq.)	602,841	35,486	0	0	0	0	0	567,355	0	35,486	567,355
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	5,484,751	410,823	0	0	0	0	0	5,073,928	0	410,823	5,073,928
USEtox ecotoxicity total (CTUe)	1,989,973,452	793,288,050	0	0	0	0	0	1,196,685,401	0	793,288,050	1,196,685,401
USEtox human toxicity total (CTUh)	172	59	0	0	0	0	0	113	0	59	113
CO2-Fossil (kg)	581,549,029	283,138,764	0	0	0	0	0	298,410,264	0	283,138,764	298,410,264
CO2-Biogenic (kg)	1,955,598,899	1,849,062	0	0	0	0	0	1,953,749,837	0	1,849,062	1,953,749,837
CO2-Stored (kg)	-3,445,101,880	87,355	0	0	0	0	0	-3,445,189,234	0	87,355	-3,445,189,234
CH4-Fossil (kg)	3,227,138	463,088	0	0	0	0	0	2,764,050	0	463,088	2,764,050
CH4-Biogenic (kg)	124,641,834	2,515	0	0	0	0	0	124,639,319	0	2,515	124,639,319
N2O (kg)	1,309	2,826	0	0	0	0	0	-1,517	0	2,826	-1,517
CO (kg)	3,895,930	522,475	0	0	0	0	0	3,373,455	0	522,475	3,373,455
NOx (kg)	4,952,834	389,934	0	0	0	0	0	4,562,900	0	389,934	4,562,900
SOx (kg)	836,162	382,348	0	0	0	0	0	453,814	0	382,348	453,814
PM>10 (kg)	151,571	278,868	0	0	0	0	0	-127,297	0	278,868	-127,297
PM10 (kg)	235,549	94,275	0	0	0	0	0	141,274	0	94,275	141,274
PM2.5 (kg)	302,749	54,255	0	0	0	0	0	248,494	0	54,255	248,494
NMVOC (kg)	3,175,862	373,039	0	0	0	0	0	2,802,823	0	373,039	2,802,823
Lead (kg)	992	150	0	0	0	0	0	842	0	150	842
Cost ($)	273,142,707	126,677,985	0	0	0	0	0	146,464,722	0	126,677,985	146,464,722

Impacts	Collection MT	Collection GWP	Collection MTCO2e		Landfill MT	Landfill GWP	Landfill MTCO2e	
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	301,767				1,140,442		1,653,808	
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.)							-513,366	
CO2-Fossil (kg)	283,139	1	283,139		298,410	1	298,410	
CO2-Biogenic (kg)	1,849	1	1,849		1,953,750	1	1,953,750	
CO2-Stored (kg)	87	1	87		(3,445,189)	1	(3,445,189)	
CH4-Fossil (kg)	463	28	12,966		2,764	28	77,393	
CH4-Biogenic (kg)	3	28	70		124,639	28	3,489,901	
N2O (kg)	3	298	842		(2)	298	(452)	
CO (kg)			-				-	
NOx (kg)	390	10	3,899		4,563	10	45,629	
Cost ($)		0.03	**301,680**	**Total emissions excluding credits**		0.59	**5,098,997**	**Total emissions excluding credits**
		0.03	**301,767**	**Total emissions including credits**		0.13	**1,140,442**	**Total emissions including credits**
						0.62	**5,400,677**	**Total emissions excluding credits**
						0.17	**1,442,209**	**Total emissions including credits**

CHRLF_DST A2 CH V3 WET ZERO-E.xlsx

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5	1,955,575,082	301,766,859	0	0	0	0	0	1,653,808,223	0	301,766,859	1,653,808,223
cumulative energy demand fossil non-renewable ε	27,733,818,719	5,200,343,577	0	0	0	0	0	22,533,475,142	0	5,200,343,577	22,533,475,142
TRACI environmental impact acidification (moles c	277,764,526	35,795,619	0	0	0	0	0	241,968,907	0	35,795,619	241,968,907
TRACI environmental impact eutrophication (kg N	543,255	35,486	0	0	0	0	0	507,769	0	35,486	507,769
TRACI environmental impact photochemical oxida	3,809,242	410,823	0	0	0	0	0	3,398,419	0	410,823	3,398,419
USEtox ecotoxicity total (CTUe)	3,283,782,349	793,288,050	0	0	0	0	0	2,490,494,299	0	793,288,050	2,490,494,299
USEtox human toxicity total (CTUh)	279	59	0	0	0	0	0	220	0	59	220
CO2-Fossil (kg)	1,075,614,933	283,138,764	0	0	0	0	0	792,476,168	0	283,138,764	792,476,168
CO2-Biogenic (kg)	1,908,975,512	1,849,062	0	0	0	0	0	1,907,126,450	0	1,849,062	1,907,126,450
CO2-Stored (kg)	-3,445,053,752	87,355	0	0	0	0	0	-3,445,141,107	0	87,355	-3,445,141,107
CH4-Fossil (kg)	4,572,486	463,088	0	0	0	0	0	4,109,399	0	463,088	4,109,399
CH4-Biogenic (kg)	123,586,784	2,515	0	0	0	0	0	123,584,269	0	2,515	123,584,269
N2O (kg)	17,343	2,826	0	0	0	0	0	14,517	0	2,826	14,517
CO (kg)	4,116,403	522,475	0	0	0	0	0	3,593,928	0	522,475	3,593,928
NOx (kg)	3,258,839	389,934	0	0	0	0	0	2,868,905	0	389,934	2,868,905
SOx (kg)	2,744,125	382,348	0	0	0	0	0	2,361,777	0	382,348	2,361,777
PM>10 (kg)	593,039	278,868	0	0	0	0	0	314,170	0	278,868	314,170
PM10 (kg)	266,592	94,275	0	0	0	0	0	172,318	0	94,275	172,318
PM2.5 (kg)	344,021	54,255	0	0	0	0	0	289,766	0	54,255	289,766
NMVOC (kg)	3,315,982	373,039	0	0	0	0	0	2,942,943	0	373,039	2,942,943
Lead (kg)	1,093	150	0	0	0	0	0	943	0	150	943
Cost ($)	317,063,378	126,677,985	0	0	0	0	0	190,385,393	0	126,677,985	190,385,393

Mass Flows

	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-WTE1	Collection SF1_RWC-LF1	WTE WTE1	Landfill LF1
Yard Trimmings, Leaves	119856	16645	0	0	0	119856	16645	0	119,856	0	119,856	16,645
Yard Trimmings, Grass	119837	18788	0	0	0	119837	18788	0	119,837	0	119,837	18,788
Yard Trimmings, Branches	57542	4303	0	0	0	57542	4303	0	57,542	0	57,542	4,303
Food Waste - Vegetable	1006873	60499	0	0	0	1006873	60499	0	1,006,873	0	1,006,873	60,499
Food Waste - Non-Vegetable	503437	45916	0	0	0	503437	45916	0	503,437	0	503,437	45,916
Wood	929422	134873	0	0	0	929422	134873	0	929,422	0	929,422	134,873
Wood Other	193630	28099	0	0	0	193630	28099	0	193,630	0	193,630	28,099
Textiles	406622	37573	0	0	0	406622	37573	0	406,622	0	406,622	37,573
Rubber/Leather	96815	15628	0	0	0	96815	15628	0	96,815	0	96,815	15,628
Newsprint	28783	3637	0	0	0	28783	3637	0	28,783	0	28,783	3,637
Corr. Cardboard	375144	60079	0	0	0	375144	60079	0	375,144	0	375,144	60,079
Office Paper	48407	8474	0	0	0	48407	8474	0	48,407	0	48,407	8,474
Magazines	0	0	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0	0	0
Folding Containers	96815	15444	0	0	0	96815	15444	0	96,815	0	96,815	15,444
Paper Bags	435666	69496	0	0	0	435666	69496	0	435,666	0	435,666	69,496
Mixed Paper	571207	96392	0	0	0	571207	96392	0	571,207	0	571,207	96,392
Paper - Non-recyclable	145222	19156	0	0	0	145222	19156	0	145,222	0	145,222	19,156
HDPE - Translucent Containers	38488	4503	0	0	0	38488	4503	0	38,488	0	38,488	4,503
HDPE - Pigmented Containers	19244	2251	0	0	0	19244	2251	0	19,244	0	19,244	2,251
PET - Containers	67491	7896	0	0	0	67491	7896	0	67,491	0	67,491	7,896
Plastic - Other # 1, Polypropylene	38726	3077	0	0	0	38726	3077	0	38,726	0	38,726	3,077
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	164585	16663	0	0	0	164585	16663	0	164,585	0	164,585	16,663
Plastic Film	648659	62366	0	0	0	648659	62366	0	648,659	0	648,659	62,366
Plastic - Non-Recyclable	367896	39757	0	0	0	367896	39757	0	367,896	0	367,896	39,757
Ferrous Cans	28938	29314	0	0	0	28938	10235	19079	28,938	0	28,938	10,235
Ferrous Metal - Other	222674	225569	0	0	0	222674	95461	130108	222,674	0	222,674	95,461
Aluminum Cans	28915	29291	0	0	0	28915	12925	16366	28,915	0	28,915	12,925
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	29044	23347	0	0	0	29044	12936	10412	29,044	0	29,044	12,936
Ferrous - Non-recyclable	242037	245183	0	0	0	242037	85609	159575	242,037	0	242,037	85,609
Al - Non-recyclable	9681	9807	0	0	0	9681	9629	178	9,681	0	9,681	9,629
Glass - Brown	28886	29261	0	0	0	28886	29261	0	28,886	0	28,886	29,261
Glass - Green	19215	19465	0	0	0	19215	19465	0	19,215	0	19,215	19,465
Glass - Clear	77057	78059	0	0	0	77057	78059	0	77,057	0	77,057	78,059
Mixed Glass	57514	58262	0	0	0	57514	58262	0	57,514	0	57,514	58,262
Glass - Non-recyclable	29044	29422	0	0	0	29044	29422	0	29,044	0	29,044	29,422
Misc. Organic	416303	54503	0	0	0	416303	54503	0	416,303	0	416,303	54,503
Misc. Inorganic	1423177	1394824	0	0	0	1423177	1394824	0	1,423,177	0	1,423,177	1,394,824
E-waste	67770	68651	0	0	0	67770	68608	43	67,770	0	67,770	68,608
Aerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	513118	49603	0	0	0	513118	49603	0	513,118	0	513,118	49,603
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0	0	0
Total	9673742	3116076	0	0	0	9673742	2780316	335760				

	Reprocessing REPROC_ASH1-OCC	Reprocessing REPROC_ASH1-MxPap	Reprocessing REPROC_ASH1-ONP	Reprocessing REPROC_ASH1-OFF	Reprocessing REPROC_ASH1-OtPap	Reprocessing REPROC_ASH1-PET	Reprocessing REPROC_ASH1-HDPEu	Reprocessing REPROC_ASH1-HDPEp	Reprocessing REPROC_ASH1-HDPEt	Reprocessing REPROC_ASH1-PVC	Reprocessing REPROC_ASH1-LDPE	Reprocessing REPROC_ASH1-PP	Reprocessing REPROC_ASH1-PS	Reprocessing REPROC_ASH1-OtPlas	Reprocessing REPROC_ASH1-MxPlas
Yard Trimmings, Leaves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yard Trimmings, Grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yard Trimmings, Branches	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food Waste - Vegetable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food Waste - Non-Vegetable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Textiles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubber/Leather	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Newsprint	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corr. Cardboard	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Office Paper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Magazines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Folding Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paper Bags	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Paper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Paper - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HDPE - Translucent Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HDPE - Pigmented Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PET - Containers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic - Other # 1, Polypropylene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic Film	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plastic - Non-Recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferrous Cans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferrous Metal - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum Cans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferrous - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Al - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Brown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Clear	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mixed Glass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass - Non-recyclable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Misc. Organic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Misc. Inorganic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E-waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total															

	Reprocessing REPROC_ASH1-Al	Reprocessing REPROC_ASH1-Fe	Reprocessing REPROC_ASH1-Cu	Reprocessing REPROC_ASH1-Bglas	Reprocessing REPROC_ASH1-Cglas	Reprocessing REPROC_ASH1-Gglas	Reprocessing REPROC_ASH1-MxGlas	Transportation Trans_WTE1-LF1	Transportation Trans_Al_WTE1-REPROC_ASH1	Transportation Trans_Fe_WTE1-REPROC_ASH1	Transportation Trans_Cu_WTE1-REPROC_ASH1
Yard Trimmings, Leaves	0	0	0	0	0	0	0	16,645	0	0	0
Yard Trimmings, Grass	0	0	0	0	0	0	0	18,788	0	0	0
Yard Trimmings, Branches	0	0	0	0	0	0	0	4,303	0	0	0
Food Waste - Vegetable	0	0	0	0	0	0	0	60,499	0	0	0
Food Waste - Non-Vegetable	0	0	0	0	0	0	0	45,916	0	0	0
Wood	0	0	0	0	0	0	0	134,873	0	0	0
Wood Other	0	0	0	0	0	0	0	28,099	0	0	0
Textiles	0	0	0	0	0	0	0	37,573	0	0	0
Rubber/Leather	0	0	0	0	0	0	0	15,628	0	0	0
Newsprint	0	0	0	0	0	0	0	3,637	0	0	0
Corr. Cardboard	0	0	0	0	0	0	0	60,079	0	0	0
Office Paper	0	0	0	0	0	0	0	8,474	0	0	0
Magazines	0	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0	0
Folding Containers	0	0	0	0	0	0	0	15,444	0	0	0
Paper Bags	0	0	0	0	0	0	0	69,496	0	0	0
Mixed Paper	0	0	0	0	0	0	0	96,392	0	0	0
Paper - Non-recyclable	0	0	0	0	0	0	0	19,156	0	0	0
HDPE - Translucent Containers	0	0	0	0	0	0	0	4,503	0	0	0
HDPE - Pigmented Containers	0	0	0	0	0	0	0	2,251	0	0	0
PET - Containers	0	0	0	0	0	0	0	7,896	0	0	0
Plastic - Other # 1, Polypropylene	0	0	0	0	0	0	0	3,077	0	0	0
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	0	0	0	0	0	0	0	16,663	0	0	0
Plastic Film	0	0	0	0	0	0	0	62,366	0	0	0
Plastic - Non-Recyclable	0	0	0	0	0	0	0	39,757	0	0	0
Ferrous Cans	2,633	16,438	7	0	0	0	0	10,235	2,633	16,438	7
Ferrous Metal - Other	3,563	126,493	53	0	0	0	0	95,461	3,563	126,493	53
Aluminum Cans	8,118	8,233	15	0	0	0	0	12,925	8,118	8,233	15
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	9,894	507	10	0	0	0	0	12,936	9,894	507	10
Ferrous - Non-recyclable	22,025	137,492	57	0	0	0	0	85,609	22,025	137,492	57
Al - Non-recyclable	6	169	3	0	0	0	0	9,629	6	169	3
Glass - Brown	0	0	0	0	0	0	0	29,261	0	0	0
Glass - Green	0	0	0	0	0	0	0	19,465	0	0	0
Glass - Clear	0	0	0	0	0	0	0	78,059	0	0	0
Mixed Glass	0	0	0	0	0	0	0	58,262	0	0	0
Glass - Non-recyclable	0	0	0	0	0	0	0	29,422	0	0	0
Misc. Organic	0	0	0	0	0	0	0	54,503	0	0	0
Misc. Inorganic	0	0	0	0	0	0	0	1,394,824	0	0	0
E-waste	43	0	0	0	0	0	0	68,608	43	0	0
Aerobic Residual	0	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	0	0	0	0	0	0	0	49,603	0	0	0
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0	0
Total											

CHRLF_DST_A2 WTE V3.xlsx

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-WTE1	Collection SF1_RWC-LF1	WTE WTE1	Landfill LF1
C Emissions Neutral; C Storage Negati	-576,837,583	315,561,459	89,931	0	0	0	-509,999,195	191,189,125	-573,678,903	315,561,459	0	-509,999,195	191,189,125
cumulative energy demand fossil non	-49,742,488,400	5,438,069,618	1,257,891	0	0	0	-55,964,485,013	5,871,353,639	-5,088,684,536	5,438,069,618	0	-55,964,485,013	5,871,353,639
TRACI environmental impact acidifica	-945,635,897	37,431,794	40,756	0	0	0	-944,829,428	65,211,390	-103,490,408	37,431,794	0	-944,829,428	65,211,390
TRACI environmental impact eutroph	-198,315	37,108	41	0	0	0	-283,565	95,819	-47,718	37,108	0	-283,565	95,819
TRACI environmental impact photoch	-3,365,836	429,603	831	0	0	0	-4,070,034	1,096,218	-822,454	429,603	0	-4,070,034	1,096,218
USEtox ecotoxicity total (CTUe)	-10,626,372,302	829,551,714	200,412	0	0	0	-10,000,961,709	586,202,885	-2,041,365,604	829,551,714	0	-10,000,961,709	586,202,885
USEtox human toxicity total (CTUh)	-786	62	0	0	0	0	-816	52	-84	62	0	-816	52
CO2-Fossil (kg)	-165,471,457	296,081,859	83,752	0	0	0	-130,838,358	175,947,629	-506,746,340	296,081,859	0	-130,838,358	175,947,629
CO2-Biogenic (kg)	5,909,555,971	1,933,572	630	0	0	0	5,694,103,379	219,726,033	-6,207,643	1,933,572	0	5,694,103,379	219,726,033
CO2-Stored (kg)	-523,684,107	91,348	39	0	0	0	-351,728	-523,362,481	-61,286	91,348	0	-351,728	-523,362,481
CH4-Fossil (kg)	-9,843,512	484,256	131	0	0	0	-10,406,517	1,068,707	-990,088	484,256	0	-10,406,517	1,068,707
CH4-Biogenic (kg)	14,745,881	2,630	1	0	0	0	-72,000	14,820,989	-5,738	2,630	0	-72,000	14,820,989
N2O (kg)	-9,207	2,955	3	0	0	0	-4,917	2,326	-9,574	2,955	0	-4,917	2,326
CO (kg)	-2,059,952	546,360	313	0	0	0	-54,142	1,055,058	-3,607,540	546,360	0	-54,142	1,055,058
NOx (kg)	-3,274,008	407,759	823	0	0	0	-3,942,725	1,019,477	-759,342	407,759	0	-3,942,725	1,019,477
SOx (kg)	-15,802,837	399,824	147	0	0	0	-14,730,480	465,373	-1,937,700	399,824	0	-14,730,480	465,373
PM>10 (kg)	-6,643,361	291,616	71	0	0	0	-3,283,473	32,263	-3,683,838	291,616	0	-3,283,473	32,263
PM10 (kg)	5,042	98,585	29	0	0	0	-101,737	41,683	-33,517	98,585	0	-101,737	41,683
PM2.5 (kg)	-77,323	56,736	35	0	0	0	-160,270	78,223	-52,048	56,736	0	-160,270	78,223
NMVOC (kg)	130,430	390,093	126	0	0	0	-724,575	612,614	-147,828	390,093	0	-724,575	612,614
Lead (kg)	-411	157	0	0	0	0	-763	272	-77	157	0	-763	272
Cost ($)	611,852,226	130,818,466	30,830,780	0	0	0	436,773,952	42,292,156	-28,863,129	130,818,466	0	436,773,952	42,292,156

Impacts	Reprocessing REPROC_ASH1-OCC	Reprocessing REPROC_ASH1-MxPap	Reprocessing REPROC_ASH1-ONP	Reprocessing REPROC_ASH1-OFF	Reprocessing REPROC_ASH1-OtPap	Reprocessing REPROC_ASH1-PET	Reprocessing REPROC_ASH1-HDPEu	Reprocessing REPROC_ASH1-HDPEp	Reprocessing REPROC_ASH1-HDPEt	Reprocessing REPROC_ASH1-PVC	Reprocessing REPROC_ASH1-LDPE	Reprocessing REPROC_ASH1-PP	Reprocessing REPROC_ASH1-PS	Reprocessing REPROC_ASH1-OtPlas	Reprocessing REPROC_ASH1-MxPlas
C Emissions Neutral; C Storage Negati	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cumulative energy demand fossil non	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact acidifica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact eutroph	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact photoch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USEtox ecotoxicity total (CTUe)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USEtox human toxicity total (CTUh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Stored (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CH4-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CH4-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N2O (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM>10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM2.5 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NMVOC (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lead (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost ($)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Impacts	Reprocessing REPROC_ASH1-Al	Reprocessing REPROC_ASH1-Fe	Reprocessing REPROC_ASH1-Cu	Reprocessing REPROC_ASH1-Bglas	Reprocessing REPROC_ASH1-Cglas	Reprocessing REPROC_ASH1-Gglas	Reprocessing REPROC_ASH1-MxGlas	Transportation Trans_WTE1-LF1	Transportation Trans_Al_WTE1-REPROC_ASH1	Transportation Trans_Fe_WTE1-REPROC_ASH1	Transportation Trans_Cu_WTE1-REPROC_ASH1
C Emissions Neutral; C Storage Negati	-276,593,372	-297,085,531	0	0	0	0	0	62,110	3,835	23,975	12
cumulative energy demand fossil non	-3,069,155,216	-2,019,529,320	0	0	0	0	0	840,162	57,580	359,967	182
TRACI environmental impact acidifica	-62,324,844	-41,165,564	0	0	0	0	0	30,803	1,372	8,577	4
TRACI environmental impact eutroph	-25,675	-22,043	0	0	0	0	0	31	1	9	0
TRACI environmental impact photoch	-413,684	-408,770	0	0	0	0	0	638	27	166	0
USEtox ecotoxicity total (CTUe)	-973,444,942	-1,067,920,663	0	0	0	0	0	131,590	9,486	59,306	30
USEtox human toxicity total (CTUh)	-48	-36	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	-231,713,932	-275,032,408	0	0	0	0	0	57,783	3,580	22,378	11
CO2-Biogenic (kg)	-4,048,844	-2,158,798	0	0	0	0	0	465	23	142	0
CO2-Stored (kg)	-30,775	-30,511	0	0	0	0	0	29	1	9	0
CH4-Fossil (kg)	-533,315	-456,773	0	0	0	0	0	92	5	33	0
CH4-Biogenic (kg)	-3,514	-2,224	0	0	0	0	0	1	0	0	0
N2O (kg)	-5,922	-3,652	0	0	0	0	0	2	0	1	0
CO (kg)	-1,234,974	-2,372,567	0	0	0	0	0	255	8	49	0
NOx (kg)	-389,034	-370,308	0	0	0	0	0	632	26	165	0
SOx (kg)	-1,189,799	-747,901	0	0	0	0	0	104	6	38	0
PM>10 (kg)	-1,458,218	-2,225,619	0	0	0	0	0	48	3	20	0
PM10 (kg)	-15,540	-17,977	0	0	0	0	0	20	1	8	0
PM2.5 (kg)	-27,008	-25,040	0	0	0	0	0	27	1	7	0
NMVOC (kg)	-74,734	-73,095	0	0	0	0	0	92	5	29	0
Lead (kg)	-87	10	0	0	0	0	0	0	0	0	0
Cost ($)	-21,001,909	-7,861,220	0	0	0	0	0	30,830,780	0	0	0

Transportation MT	ansportati GWP	Transportation MTCO2e	WTE MT	WTE GWP	WTE MTCO2e	Landfill MT	Landfill GWP	Landfill MTCO2e	Reprocessing MT	eprocessin GWP	Reprocessing MTCO2e	Collection MT	Collection GWP	Collection MTCO2e
90			(509,999)			191,189			(573,679)			315,561		
					4,041,804									
					-4,551,803									
84	1	84	(130,838)	1	(130,838)	175,948	1	175,948	(506,746)	1	(506,746)	296,082	1	296,082
1	1	1	5,694,103	1	5,694,103	219,726	1	219,726	(6,208)	1	(6,208)	1,934	1	1,934
0	1	0	(352)	1	(352)	(523,362)	1	(523,362)	(61)	1	(61)	91	1	91
0	28	4	(10,407)	28	(291,382)	1,069	28	29,924	(990)	28	(27,722)	484	28	13,559
0	28	0	(72)	28	(2,016)	14,821	28	414,988	(6)	28	(161)	3	28	74
0	298	1	(5)	298	(1,465)	2	298	693	(10)	298	(2,853)	3	298	881
0		-	(54)		-	1,055		-	(3,608)		-	546		-
1	10	8	(3,943)	10	(39,427)	1,019	10	10,195	(759)	10	(7,593)	408	10	4,078

90	Total anthropogenic without credits	4,041,804	Total anthropogenic without credits	714,552	Total anthropogenic without credits	(573,618)	Total anthropogenic without credits	315,470	Total anthropogenic without credits
90	Total anthropogenic with credits	(509,999)	Total anthropogenic with credits	191,189	Total anthropogenic with credits	(573,679)	Total anthropogenic with credits	315,561	Total anthropogenic with credits
								5,071,915	Total anthropogenic without credits
								(576,838)	Total anthropogenic with credits

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-WTE1	Collection SF1_RWC-LF1	WTE WTE1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	3,988,035,458	315,561,459	89,931	0	0	0	4,041,803,822	204,259,148	-573,678,903	315,561,459	0	4,041,803,822	204,259,148
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.)	10,780,036,951	5,438,069,618	1,257,891	0	0	0	4,622,495,890	5,806,898,087	-5,088,684,536	5,438,069,618	0	4,622,495,890	5,806,898,087
TRACI environmental impact acidification (moles of H+-Eq)	246,433,879	37,431,794	40,756	0	0	0	247,407,660	65,044,078	-103,490,408	37,431,794	0	247,407,660	65,044,078
TRACI environmental impact eutrophication (kg N-Eq.)	282,005	37,108	41	0	0	0	196,087	96,487	-47,718	37,108	0	196,087	96,487
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	4,747,844	429,603	831	0	0	0	4,023,991	1,115,873	-822,454	429,603	0	4,023,991	1,115,873
USEtox ecotoxicity total (CTUe)	115,184,962	829,551,714	200,412	0	0	0	752,034,995	574,763,446	-2,041,365,604	829,551,714	0	752,034,995	574,763,446
USEtox human toxicity total (CTUh)	100	62	0	0	0	0	71	52	-84	62	0	71	52
CO2-Fossil (kg)	3,936,399,829	296,081,859	83,752	0	0	0	3,975,401,358	171,579,200	-506,746,340	296,081,859	0	3,975,401,358	171,579,200
CO2-Biogenic (kg)	6,028,548,455	1,933,572	630	0	0	0	5,794,026,942	238,794,953	-6,207,643	1,933,572	0	5,794,026,942	238,794,953
CO2-Stored (kg)	-523,284,540	91,348	39	0	0	0	48,264	-523,362,907	-61,286	91,348	0	48,264	-523,362,907
CH4-Fossil (kg)	1,325,942	484,256	131	0	0	0	774,832	1,056,812	-990,088	484,256	0	774,832	1,056,812
CH4-Biogenic (kg)	15,361,084	2,630	1	0	0	0	5,723	15,358,469	-5,738	2,630	0	5,723	15,358,469
N2O (kg)	123,911	2,955	3	0	0	0	128,343	2,184	-9,574	2,955	0	128,343	2,184
CO (kg)	-232,730	546,360	313	0	0	0	1,775,012	1,053,126	-3,607,540	546,360	0	1,775,012	1,053,126
NOx (kg)	4,676,394	407,759	823	0	0	0	3,989,521	1,037,634	-759,342	407,759	0	3,989,521	1,037,634
SOx (kg)	297,768	399,824	147	0	0	0	1,386,795	448,702	-1,937,700	399,824	0	1,386,795	448,702
PM>10 (kg)	-3,099,495	291,616	71	0	0	0	263,865	28,790	-3,683,838	291,616	0	263,865	28,790
PM10 (kg)	132,091	98,585	29	0	0	0	25,122	41,873	-33,517	98,585	0	25,122	41,873
PM2.5 (kg)	183,108	56,736	35	0	0	0	100,234	78,151	-52,048	56,736	0	100,234	78,151
NMVOC (kg)	955,087	390,093	126	0	0	0	99,500	613,197	-147,828	390,093	0	99,500	613,197
Lead (kg)	426	157	0	0	0	0	75	271	-77	157	0	75	271
Cost ($)	976,553,112	130,818,466	30,830,780	0	0	0	801,861,725	41,905,270	-28,863,129	130,818,466	0	801,861,725	41,905,270

Impacts	Reprocessing REPROC_ASH1-OCC	Reprocessing REPROC_ASH1-MxPap	Reprocessing REPROC_ASH1-ONP	Reprocessing REPROC_ASH1-OFF	Reprocessing REPROC_ASH1-OtPap	Reprocessing REPROC_ASH1-PET	Reprocessing REPROC_ASH1-HDPEu	Reprocessing REPROC_ASH1-HDPEp	Reprocessing REPROC_ASH1-HDPEt	Reprocessing REPROC_ASH1-PVC	Reprocessing REPROC_ASH1-LDPE	Reprocessing REPROC_ASH1-PP	Reprocessing REPROC_ASH1-PS	Reprocessing REPROC_ASH1-OtPlas	Reprocessing REPROC_ASH1-MxPlas
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact acidification (moles of H+-Eq)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact eutrophication (kg N-Eq.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USEtox ecotoxicity total (CTUe)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USEtox human toxicity total (CTUh)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO2-Stored (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CH4-Fossil (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CH4-Biogenic (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N2O (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CO (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SOx (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM>10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM10 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM2.5 (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NMVOC (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lead (kg)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost ($)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Impacts	Reprocessing REPROC_ASH1-Al	Reprocessing REPROC_ASH1-Fe	Reprocessing REPROC_ASH1-Cu	Reprocessing REPROC_ASH1-Bglas	Reprocessing REPROC_ASH1-Cglas	Reprocessing REPROC_ASH1-Gglas	Reprocessing REPROC_ASH1-MxGlas	Transportation Trans_WTE1-LF1	Transportation Trans_Al_WTE1-REPROC_ASH1	Transportation Trans_Fe_WTE1-REPROC_ASH1	Transportation Trans_Cu_WTE1-REPROC_ASH1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	-276,593,372	-297,085,531	0	0	0	0	0	62,110	3,835	23,975	12
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.)	-3,069,155,216	-2,019,529,320	0	0	0	0	0	840,162	57,580	359,967	182
TRACI environmental impact acidification (moles of H+-Eq)	-62,324,844	-41,165,564	0	0	0	0	0	30,803	1,372	8,577	4
TRACI environmental impact eutrophication (kg N-Eq.)	-25,675	-22,043	0	0	0	0	0	31	1	9	0
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	-413,684	-408,770	0	0	0	0	0	638	27	166	0
USEtox ecotoxicity total (CTUe)	-973,444,942	-1,067,920,663	0	0	0	0	0	131,590	9,486	59,306	30
USEtox human toxicity total (CTUh)	-48	-36	0	0	0	0	0	0	0	0	0
CO2-Fossil (kg)	-231,713,932	-275,032,408	0	0	0	0	0	57,783	3,580	22,378	11
CO2-Biogenic (kg)	-4,048,844	-2,158,798	0	0	0	0	0	465	23	142	0
CO2-Stored (kg)	-30,775	-30,511	0	0	0	0	0	29	1	9	0
CH4-Fossil (kg)	-533,315	-456,773	0	0	0	0	0	92	5	33	0
CH4-Biogenic (kg)	-3,514	-2,224	0	0	0	0	0	1	0	0	0
N2O (kg)	-5,922	-3,652	0	0	0	0	0	2	0	1	0
CO (kg)	-1,234,974	-2,372,567	0	0	0	0	0	255	8	49	0
NOx (kg)	-389,034	-370,308	0	0	0	0	0	632	26	165	0
SOx (kg)	-1,189,799	-747,901	0	0	0	0	0	104	6	38	0
PM>10 (kg)	-1,458,218	-2,225,619	0	0	0	0	0	48	3	20	0
PM10 (kg)	-15,540	-17,977	0	0	0	0	0	20	1	8	0
PM2.5 (kg)	-27,008	-25,040	0	0	0	0	0	27	1	7	0
NMVOC (kg)	-74,734	-73,095	0	0	0	0	0	92	5	29	0
Lead (kg)	-87	10	0	0	0	0	0	0	0	0	0
Cost ($)	-21,001,909	-7,861,220	0	0	0	0	0	30,830,780	0	0	0

Mass Flows

	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
Yard Trimmings, Leaves	119856	0	0	0	0	0	119856	0	119,856	119,856
Yard Trimmings, Grass	119837	0	0	0	0	0	119837	0	119,837	119,837
Yard Trimmings, Branches	57542	0	0	0	0	0	57542	0	57,542	57,542
Food Waste - Vegetable	1006873	0	0	0	0	0	1006873	0	1,006,873	1,006,873
Food Waste - Non-Vegetable	503437	0	0	0	0	0	503437	0	503,437	503,437
Wood	929422	0	0	0	0	0	929422	0	929,422	929,422
Wood Other	193630	0	0	0	0	0	193630	0	193,630	193,630
Textiles	406622	0	0	0	0	0	406622	0	406,622	406,622
Rubber/Leather	96815	0	0	0	0	0	96815	0	96,815	96,815
Newsprint	28783	0	0	0	0	0	28783	0	28,783	28,783
Corr. Cardboard	375144	0	0	0	0	0	375144	0	375,144	375,144
Office Paper	48407	0	0	0	0	0	48407	0	48,407	48,407
Magazines	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0
Folding Containers	96815	0	0	0	0	0	96815	0	96,815	96,815
Paper Bags	435666	0	0	0	0	0	435666	0	435,666	435,666
Mixed Paper	571207	0	0	0	0	0	571207	0	571,207	571,207
Paper - Non-recyclable	145222	0	0	0	0	0	145222	0	145,222	145,222
HDPE - Translucent Containers	38488	0	0	0	0	0	38488	0	38,488	38,488
HDPE - Pigmented Containers	19244	0	0	0	0	0	19244	0	19,244	19,244
PET - Containers	67491	0	0	0	0	0	67491	0	67,491	67,491
Plastic - Other # 1, Polypropylene	38726	0	0	0	0	0	38726	0	38,726	38,726
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	164585	0	0	0	0	0	164585	0	164,585	164,585
Plastic Film	648659	0	0	0	0	0	648659	0	648,659	648,659
Plastic - Non-Recyclable	367896	0	0	0	0	0	367896	0	367,896	367,896
Ferrous Cans	28938	0	0	0	0	0	28938	0	28,938	28,938
Ferrous Metal - Other	222674	0	0	0	0	0	222674	0	222,674	222,674
Aluminum Cans	28915	0	0	0	0	0	28915	0	28,915	28,915
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	29044	0	0	0	0	0	29044	0	29,044	29,044
Ferrous - Non-recyclable	242037	0	0	0	0	0	242037	0	242,037	242,037
Al - Non-recyclable	9681	0	0	0	0	0	9681	0	9,681	9,681
Glass - Brown	28886	0	0	0	0	0	28886	0	28,886	28,886
Glass - Green	19215	0	0	0	0	0	19215	0	19,215	19,215
Glass - Clear	77057	0	0	0	0	0	77057	0	77,057	77,057
Mixed Glass	57514	0	0	0	0	0	57514	0	57,514	57,514
Glass - Non-recyclable	29044	0	0	0	0	0	29044	0	29,044	29,044
Misc. Organic	416303	0	0	0	0	0	416303	0	416,303	416,303
Misc. Inorganic	1423177	0	0	0	0	0	1423177	0	1,423,177	1,423,177
E-waste	67770	0	0	0	0	0	67770	0	67,770	67,770
Aerobic Residual	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	513118	0	0	0	0	0	513118	0	513,118	513,118
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0
Total	9673742	0	0	0	0	0	9673742	0		

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	1,571,394,159	993,390,963	0	0	0	0	0	578,003,197	0	993,390,963	578,003,197
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq	34,536,838,369	17,119,567,973	0	0	0	0	0	17,417,270,395	0	17,119,567,973	17,417,270,395
TRACI environmental impact acidification (moles of H+-Eq)	335,905,025	117,818,722	0	0	0	0	0	218,086,303	0	117,818,722	218,086,303
TRACI environmental impact eutrophication (kg N-Eq.)	698,238	116,818	0	0	0	0	0	581,420	0	116,818	581,420
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	6,213,426	1,352,344	0	0	0	0	0	4,861,082	0	1,352,344	4,861,082
USEtox ecotoxicity total (CTUe)	4,116,652,542	2,611,469,533	0	0	0	0	0	1,505,183,010	0	2,611,469,533	1,505,183,010
USEtox human toxicity total (CTUh)	333	194	0	0	0	0	0	139	0	194	139
CO2-Fossil (kg)	1,340,169,156	932,073,249	0	0	0	0	0	408,095,906	0	932,073,249	408,095,906
CO2-Biogenic (kg)	1,538,720,377	6,085,032	0	0	0	0	0	1,532,635,345	0	6,085,032	1,532,635,345
CO2-Stored (kg)	-3,621,359,968	287,590	0	0	0	0	0	-3,621,647,558	0	287,590	-3,621,647,558
CH4-Fossil (kg)	4,687,016	1,524,333	0	0	0	0	0	3,162,683	0	1,524,333	3,162,683
CH4-Biogenic (kg)	109,317,523	8,277	0	0	0	0	0	109,309,246	0	8,277	109,309,246
N2O (kg)	10,769	9,300	0	0	0	0	0	1,469	0	9,300	1,469
CO (kg)	5,307,170	1,720,104	0	0	0	0	0	3,587,066	0	1,720,104	3,587,066
NOx (kg)	5,675,016	1,283,577	0	0	0	0	0	4,391,440	0	1,283,577	4,391,440
SOx (kg)	2,094,883	1,258,379	0	0	0	0	0	836,504	0	1,258,379	836,504
PM>10 (kg)	857,507	918,029	0	0	0	0	0	-60,521	0	918,029	-60,521
PM10 (kg)	452,914	310,379	0	0	0	0	0	142,535	0	310,379	142,535
PM2.5 (kg)	440,236	178,619	0	0	0	0	0	261,616	0	178,619	261,616
NMVOC (kg)	4,063,147	1,228,141	0	0	0	0	0	2,835,006	0	1,228,141	2,835,006
Lead (kg)	1,399	495	0	0	0	0	0	904	0	495	904
Cost ($)	380,485,672	218,164,149	0	0	0	0	0	162,321,524	0	218,164,149	162,321,524

Impacts	Collection MT	Collection GWP	Collection MTCO2e		Landfill MT	Landfill GWP	Landfill MTCO2e	
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	993,391				578,003		1,120,060	
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq							-542,057	
TRACI environmental impact acidification (moles of H+-Eq)								
TRACI environmental impact eutrophication (kg N-Eq.)								
TRACI environmental impact photochemical oxidation (kg NOx-Eq)								
USEtox ecotoxicity total (CTUe)								
USEtox human toxicity total (CTUh)								
CO2-Fossil (kg)	932,073	1	932,073		408,096	1	408,096	
CO2-Biogenic (kg)	6,085	1	6,085		1,532,635	1	1,532,635	
CO2-Stored (kg)	288	1	288		(3,621,648)	1	(3,621,648)	
CH4-Fossil (kg)	1,524	28	42,681		3,163	28	88,555	
CH4-Biogenic (kg)	8	28	232		109,309	28	3,060,659	
N2O (kg)	9	298	2,771		1	298	438	
CO (kg)			-				-	
NOx (kg)	1,284	10	12,836		4,391	10	43,914	
SOx (kg)								
PM>10 (kg)								
PM10 (kg)								
PM2.5 (kg)								
NMVOC (kg)								
Lead (kg)								
Cost ($)		0.11	**993,103**	**Total emissions excluding credits**		0.55	**4,741,707**	**Total emissions excluding credits**
		0.11	**993,391**	**Total emissions including credits**		0.07	**578,003**	**Total emissions including credits**
						0.66	**5,734,811**	**Total emissions excluding credits**
						0.18	**1,571,394**	**Total emissions including credits**

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	2,113,450,850	993,390,963	0	0	0	0	0	1,120,059,887	0	993,390,963	1,120,059,887
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.	40,801,697,559	17,119,567,973	0	0	0	0	0	23,682,129,586	0	17,119,567,973	23,682,129,586
TRACI environmental impact acidification (moles of H+-Eq)	368,407,624	117,818,722	0	0	0	0	0	250,588,902	0	117,818,722	250,588,902
TRACI environmental impact eutrophication (kg N-Eq.)	647,400	116,818	0	0	0	0	0	530,582	0	116,818	530,582
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	4,791,089	1,352,344	0	0	0	0	0	3,438,745	0	1,352,344	3,438,745
USEtox ecotoxicity total (CTUe)	5,228,542,250	2,611,469,533	0	0	0	0	0	2,617,072,718	0	2,611,469,533	2,617,072,718
USEtox human toxicity total (CTUh)	425	194	0	0	0	0	0	231	0	194	231
CO2-Fossil (kg)	1,764,765,550	932,073,249	0	0	0	0	0	832,692,301	0	932,073,249	832,692,301
CO2-Biogenic (kg)	1,543,250,892	6,085,032	0	0	0	0	0	1,537,165,861	0	6,085,032	1,537,165,861
CO2-Stored (kg)	-3,621,318,608	287,590	0	0	0	0	0	-3,621,606,197	0	287,590	-3,621,606,197
CH4-Fossil (kg)	5,843,198	1,524,333	0	0	0	0	0	4,318,865	0	1,524,333	4,318,865
CH4-Biogenic (kg)	111,440,562	8,277	0	0	0	0	0	111,432,285	0	8,277	111,432,285
N2O (kg)	24,548	9,300	0	0	0	0	0	15,249	0	9,300	15,249
CO (kg)	5,496,691	1,720,104	0	0	0	0	0	3,776,588	0	1,720,104	3,776,588
NOx (kg)	4,227,542	1,283,577	0	0	0	0	0	2,943,965	0	1,283,577	2,943,965
SOx (kg)	3,735,094	1,258,379	0	0	0	0	0	2,476,714	0	1,258,379	2,476,714
PM>10 (kg)	1,238,031	918,029	0	0	0	0	0	320,003	0	918,029	320,003
PM10 (kg)	480,810	310,379	0	0	0	0	0	170,430	0	310,379	170,430
PM2.5 (kg)	476,470	178,619	0	0	0	0	0	297,851	0	178,619	297,851
NMVOC (kg)	4,188,682	1,228,141	0	0	0	0	0	2,960,541	0	1,228,141	2,960,541
Lead (kg)	1,486	495	0	0	0	0	0	991	0	495	991
Cost ($)	418,234,559	218,164,149	0	0	0	0	0	200,070,410	0	218,164,149	200,070,410

Mass Flows

	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
Yard Trimmings, Leaves	233872	0	0	0	0	0	233872	0	233,872	233,872
Yard Trimmings, Grass	233836	0	0	0	0	0	233836	0	233,836	233,836
Yard Trimmings, Branches	112280	0	0	0	0	0	112280	0	112,280	112,280
Food Waste - Vegetable	1964686	0	0	0	0	0	1964686	0	1,964,686	1,964,686
Food Waste - Non-Vegetable	982343	0	0	0	0	0	982343	0	982,343	982,343
Wood	1813557	0	0	0	0	0	1813557	0	1,813,557	1,813,557
Wood Other	377824	0	0	0	0	0	377824	0	377,824	377,824
Textiles	793431	0	0	0	0	0	793431	0	793,431	793,431
Rubber/Leather	188912	0	0	0	0	0	188912	0	188,912	188,912
Newsprint	56164	0	0	0	0	0	56164	0	56,164	56,164
Corr. Cardboard	732009	0	0	0	0	0	732009	0	732,009	732,009
Office Paper	94456	0	0	0	0	0	94456	0	94,456	94,456
Magazines	0	0	0	0	0	0	0	0	0	0
3rd Class Mail	0	0	0	0	0	0	0	0	0	0
Folding Containers	188912	0	0	0	0	0	188912	0	188,912	188,912
Paper Bags	850105	0	0	0	0	0	850105	0	850,105	850,105
Mixed Paper	1114582	0	0	0	0	0	1114582	0	1,114,582	1,114,582
Paper - Non-recyclable	283368	0	0	0	0	0	283368	0	283,368	283,368
HDPE - Translucent Containers	75100	0	0	0	0	0	75100	0	75,100	75,100
HDPE - Pigmented Containers	37550	0	0	0	0	0	37550	0	37,550	37,550
PET - Containers	131694	0	0	0	0	0	131694	0	131,694	131,694
Plastic - Other # 1, Polypropylene	75565	0	0	0	0	0	75565	0	75,565	75,565
Plastic - Other # 2	0	0	0	0	0	0	0	0	0	0
Mixed Plastic	321151	0	0	0	0	0	321151	0	321,151	321,151
Plastic Film	1265711	0	0	0	0	0	1265711	0	1,265,711	1,265,711
Plastic - Non-Recyclable	717866	0	0	0	0	0	717866	0	717,866	717,866
Ferrous Cans	56465	0	0	0	0	0	56465	0	56,465	56,465
Ferrous Metal - Other	434498	0	0	0	0	0	434498	0	434,498	434,498
Aluminum Cans	56422	0	0	0	0	0	56422	0	56,422	56,422
Aluminum - Foil	0	0	0	0	0	0	0	0	0	0
Aluminum - Other	56674	0	0	0	0	0	56674	0	56,674	56,674
Ferrous - Non-recyclable	472280	0	0	0	0	0	472280	0	472,280	472,280
Al - Non-recyclable	18891	0	0	0	0	0	18891	0	18,891	18,891
Glass - Brown	56364	0	0	0	0	0	56364	0	56,364	56,364
Glass - Green	37493	0	0	0	0	0	37493	0	37,493	37,493
Glass - Clear	150360	0	0	0	0	0	150360	0	150,360	150,360
Mixed Glass	112226	0	0	0	0	0	112226	0	112,226	112,226
Glass - Non-recyclable	56674	0	0	0	0	0	56674	0	56,674	56,674
Misc. Organic	812322	0	0	0	0	0	812322	0	812,322	812,322
Misc. Inorganic	2777008	0	0	0	0	0	2777008	0	2,777,008	2,777,008
E-waste	132238	0	0	0	0	0	132238	0	132,238	132,238
Aerobic Residual	0	0	0	0	0	0	0	0	0	0
Anaerobic Residual	0	0	0	0	0	0	0	0	0	0
Bottom Ash	0	0	0	0	0	0	0	0	0	0
Fly Ash	0	0	0	0	0	0	0	0	0	0
Waste Fraction 46	1001234	0	0	0	0	0	1001234	0	1,001,234	1,001,234
Waste Fraction 47	0	0	0	0	0	0	0	0	0	0
Waste Fraction 48	0	0	0	0	0	0	0	0	0	0
Waste Fraction 49	0	0	0	0	0	0	0	0	0	0
Waste Fraction 50	0	0	0	0	0	0	0	0	0	0
Waste Fraction 51	0	0	0	0	0	0	0	0	0	0
Waste Fraction 52	0	0	0	0	0	0	0	0	0	0
Waste Fraction 53	0	0	0	0	0	0	0	0	0	0
Waste Fraction 54	0	0	0	0	0	0	0	0	0	0
Waste Fraction 55	0	0	0	0	0	0	0	0	0	0
Waste Fraction 56	0	0	0	0	0	0	0	0	0	0
Waste Fraction 57	0	0	0	0	0	0	0	0	0	0
Waste Fraction 58	0	0	0	0	0	0	0	0	0	0
Waste Fraction 59	0	0	0	0	0	0	0	0	0	0
Waste Fraction 60	0	0	0	0	0	0	0	0	0	0
Total	18876124	0	0	0	0	0	18876124	0		

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	2,924,173,944	584,874,534	0	0	0	0	0	2,339,299,410	0	584,874,534	2,339,299,410
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq	41,347,219,442	10,079,213,792	0	0	0	0	0	31,268,005,649	0	10,079,213,792	31,268,005,649
TRACI environmental impact acidification (moles of H+-Eq)	489,146,550	69,374,959	0	0	0	0	0	419,771,591	0	69,374,959	419,771,591
TRACI environmental impact eutrophication (kg N-Eq.)	1,232,548	68,778	0	0	0	0	0	1,163,770	0	68,778	1,163,770
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	11,203,984	796,235	0	0	0	0	0	10,407,749	0	796,235	10,407,749
USEtox ecotoxicity total (CTUe)	3,992,196,812	1,537,530,071	0	0	0	0	0	2,454,666,740	0	1,537,530,071	2,454,666,740
USEtox human toxicity total (CTUh)	346	114	0	0	0	0	0	232	0	114	232
CO2-Fossil (kg)	1,160,876,446	548,770,916	0	0	0	0	0	612,105,529	0	548,770,916	612,105,529
CO2-Biogenic (kg)	4,011,157,003	3,583,468	0	0	0	0	0	4,007,573,535	0	3,583,468	4,007,573,535
CO2-Stored (kg)	-7,066,676,675	169,313	0	0	0	0	0	-7,066,845,988	0	169,313	-7,066,845,988
CH4-Fossil (kg)	6,567,201	897,522	0	0	0	0	0	5,669,679	0	897,522	5,669,679
CH4-Biogenic (kg)	255,667,716	4,874	0	0	0	0	0	255,662,842	0	4,874	255,662,842
N2O (kg)	2,365	5,476	0	0	0	0	0	-3,111	0	5,476	-3,111
CO (kg)	7,932,374	1,012,670	0	0	0	0	0	6,919,703	0	1,012,670	6,919,703
NOx (kg)	10,115,267	755,749	0	0	0	0	0	9,359,518	0	755,749	9,359,518
SOx (kg)	1,671,880	741,007	0	0	0	0	0	930,873	0	741,007	930,873
PM>10 (kg)	279,381	540,496	0	0	0	0	0	-261,115	0	540,496	-261,115
PM10 (kg)	472,511	182,726	0	0	0	0	0	289,785	0	182,726	289,785
PM2.5 (kg)	614,875	105,159	0	0	0	0	0	509,716	0	105,159	509,716
NMVOC (kg)	6,472,244	723,034	0	0	0	0	0	5,749,210	0	723,034	5,749,210
Lead (kg)	2,018	292	0	0	0	0	0	1,727	0	292	1,727
Cost ($)	512,084,977	211,653,401	0	0	0	0	0	300,431,576	0	211,653,401	300,431,576

Impacts	Collection MT	Collection GWP	Collection MTCO2e		Landfill MT	Landfill GWP	Landfill MTCO2e	
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	584,875				2,339,299		3,392,327	
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq							-1,053,027	
CO2-Fossil (kg)	548,771	1	548,771		612,106	1	612,106	
CO2-Biogenic (kg)	3,583	1	3,583		4,007,574	1	4,007,574	
CO2-Stored (kg)	169	1	169		(7,066,846)	1	(7,066,846)	
CH4-Fossil (kg)	898	28	25,131		5,670	28	158,751	
CH4-Biogenic (kg)	5	28	136		255,663	28	7,158,560	
N2O (kg)	5	298	1,632		(3)	298	(927)	
CO (kg)			-				-	
NOx (kg)	756	10	7,557		9,360	10	93,595	
		0.07	**584,705**	**Total emissions excluding credits**		1.20	**10,459,173**	**Total emissions excluding credits**
		0.07	**584,875**	**Total emissions including credits**		0.27	**2,339,299**	**Total emissions including credits**
						1.27	**11,043,878**	**Total emissions excluding credits**
						0.34	**2,924,174**	**Total emissions including credits**

LCIA Outputs

Impacts	Total	Collection	Transportation	Separation	AD	Composting	WTE	Landfill	Reprocessing	Collection SF1_RWC-LF1	Landfill LF1
C Emissions Neutral; C Storage Negative 100 AR5 - 2013 (kg CO2-eq)	3,977,201,402	584,874,534	0	0	0	0	0	3,392,326,868	0	584,874,534	3,392,326,868
cumulative energy demand fossil non-renewable energy resources, fossil (MJ-Eq.	56,300,360,892	10,079,213,792	0	0	0	0	0	46,221,147,100	0	10,079,213,792	46,221,147,100
TRACI environmental impact acidification (moles of H+-Eq)	565,706,767	69,374,959	0	0	0	0	0	496,331,808	0	69,374,959	496,331,808
TRACI environmental impact eutrophication (kg N-Eq.)	1,110,324	68,778	0	0	0	0	0	1,041,546	0	68,778	1,041,546
TRACI environmental impact photochemical oxidation (kg NOx-Eq)	7,767,145	796,235	0	0	0	0	0	6,970,910	0	796,235	6,970,910
USEtox ecotoxicity total (CTUe)	6,646,085,349	1,537,530,071	0	0	0	0	0	5,108,555,278	0	1,537,530,071	5,108,555,278
USEtox human toxicity total (CTUh)	565	114	0	0	0	0	0	451	0	114	451
CO2-Fossil (kg)	2,174,315,016	548,770,916	0	0	0	0	0	1,625,544,099	0	548,770,916	1,625,544,099
CO2-Biogenic (kg)	3,915,522,111	3,583,468	0	0	0	0	0	3,911,938,643	0	3,583,468	3,911,938,643
CO2-Stored (kg)	-7,066,577,955	169,313	0	0	0	0	0	-7,066,747,268	0	169,313	-7,066,747,268
CH4-Fossil (kg)	9,326,809	897,522	0	0	0	0	0	8,429,286	0	897,522	8,429,286
CH4-Biogenic (kg)	253,503,576	4,874	0	0	0	0	0	253,498,702	0	4,874	253,498,702
N2O (kg)	35,254	5,476	0	0	0	0	0	29,778	0	5,476	29,778
CO (kg)	8,384,612	1,012,670	0	0	0	0	0	7,371,942	0	1,012,670	7,371,942
NOx (kg)	6,640,508	755,749	0	0	0	0	0	5,884,759	0	755,749	5,884,759
SOx (kg)	5,585,535	741,007	0	0	0	0	0	4,844,527	0	741,007	4,844,527
PM>10 (kg)	1,184,930	540,496	0	0	0	0	0	644,433	0	540,496	644,433
PM10 (kg)	536,188	182,726	0	0	0	0	0	353,462	0	182,726	353,462
PM2.5 (kg)	699,532	105,159	0	0	0	0	0	594,374	0	105,159	594,374
NMVOC (kg)	6,759,661	723,034	0	0	0	0	0	6,036,628	0	723,034	6,036,628
Lead (kg)	2,225	292	0	0	0	0	0	1,934	0	292	1,934
Cost ($)	602,175,999	211,653,401	0	0	0	0	0	390,522,598	0	211,653,401	390,522,598

LandGEM Data Tables

USER INPUTS

Landfill Name or Identifier: CHRLF - Site Development Plan No Action

Clear ALL Non-Parameter Inputs/Selections

1: PROVIDE LANDFILL CHARACTERISTICS

Landfill Open Year	1965	
Landfill Closure Year	2028	
Have Model Calculate Closure Year?	○ Yes ◉ No	
Waste Design Capacity		*megagrams*

Restore Default Model Parameters

2: DETERMINE MODEL PARAMETERS

Methane Generation Rate, k (*$year^{-1}$*)

User-specified

User-specified k value should be based on site-specific data and determined by EPA Method 2E.

User-specified value: 0.057

Potential Methane Generation Capacity, L_0 (*m^3/Mg*)

Inventory Conventional - 100

NMOC Concentration (*ppmv as hexane*)

CAA - 4,000

Methane Content (*% by volume*)

CAA - 50% by volume

3: SELECT GASES/POLLUTANTS

Default pollutant parameters are currently being used by model.

Gas / Pollutant #1

Total landfill gas

Gas / Pollutant #2

Methane

Gas / Pollutant #3

Carbon dioxide

Gas / Pollutant #4

NMOC

Edit Existing or Add New Pollutant Parameters

Restore Default Pollutant Parameters

Description/Comments:

Annual acceptance rates obtained from TonnageForecastFebraury2020.xlsx.

RESULTS

Landfill Name or Identifier: CHRLF - Site Development Plan No Action

Closure Year (with 80-year limit) = 2028
Methane = 50 *% by volume*

Please choose a third unit of measure to represent all of the emission rates below.
User-specified Unit: short tons/year

Year	Waste Accepted		Waste-In-Place		Total landfill gas			Methane			Carbon dioxide			NMOC		
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*
1965	283,858	312,244	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	283,858	312,244	283,858	312,244	3.939E+03	3.154E+06	4.333E+03	1.052E+03	1.577E+06	1.157E+03	2.887E+03	1.577E+06	3.176E+03	4.523E+01	1.262E+04	4.975E+01
1967	283,858	312,244	567,716	624,488	7.660E+03	6.134E+06	8.427E+03	2.046E+03	3.067E+06	2.251E+03	5.614E+03	3.067E+06	6.176E+03	8.795E+01	2.454E+04	9.675E+01
1968	283,858	312,244	851,574	936,731	1.118E+04	8.949E+06	1.229E+04	2.985E+03	4.474E+06	3.284E+03	8.190E+03	4.474E+06	9.009E+03	1.283E+02	3.579E+04	1.411E+02
1969	283,858	312,244	1,135,432	1,248,975	1.450E+04	1.161E+07	1.595E+04	3.872E+03	5.804E+06	4.259E+03	1.062E+04	5.804E+06	1.169E+04	1.664E+02	4.643E+04	1.831E+02
1970	283,858	312,244	1,419,290	1,561,219	1.763E+04	1.412E+07	1.939E+04	4.710E+03	7.059E+06	5.181E+03	1.292E+04	7.059E+06	1.421E+04	2.024E+02	5.647E+04	2.227E+02
1971	283,858	312,244	1,703,148	1,873,463	2.059E+04	1.649E+07	2.265E+04	5.501E+03	8.245E+06	6.051E+03	1.509E+04	8.245E+06	1.660E+04	2.364E+02	6.596E+04	2.601E+02
1972	283,858	312,244	1,987,006	2,185,707	2.339E+04	1.873E+07	2.573E+04	6.248E+03	9.366E+06	6.873E+03	1.714E+04	9.366E+06	1.886E+04	2.686E+02	7.493E+04	2.954E+02
1973	283,858	312,244	2,270,864	2,497,950	2.604E+04	2.085E+07	2.864E+04	6.954E+03	1.042E+07	7.650E+03	1.908E+04	1.042E+07	2.099E+04	2.989E+02	8.339E+04	3.288E+02
1974	283,858	312,244	2,554,722	2,810,194	2.853E+04	2.285E+07	3.139E+04	7.621E+03	1.142E+07	8.384E+03	2.091E+04	1.142E+07	2.300E+04	3.276E+02	9.139E+04	3.603E+02
1975	283,858	312,244	2,838,580	3,122,438	3.089E+04	2.474E+07	3.398E+04	8.251E+03	1.237E+07	9.076E+03	2.264E+04	1.237E+07	2.490E+04	3.547E+02	9.894E+04	3.901E+02
1976	283,858	312,244	3,122,438	3,434,682	3.312E+04	2.652E+07	3.643E+04	8.846E+03	1.326E+07	9.731E+03	2.427E+04	1.326E+07	2.670E+04	3.802E+02	1.061E+05	4.183E+02
1977	283,858	312,244	3,406,296	3,746,926	3.522E+04	2.821E+07	3.875E+04	9.409E+03	1.410E+07	1.035E+04	2.581E+04	1.410E+07	2.840E+04	4.044E+02	1.128E+05	4.448E+02
1978	327,357	360,093	3,690,154	4,059,169	3.721E+04	2.980E+07	4.093E+04	9.939E+03	1.490E+07	1.093E+04	2.727E+04	1.490E+07	3.000E+04	4.272E+02	1.192E+05	4.699E+02
1979	563,437	619,781	4,017,511	4,419,262	3.969E+04	3.178E+07	4.366E+04	1.060E+04	1.589E+07	1.166E+04	2.909E+04	1.589E+07	3.200E+04	4.557E+02	1.271E+05	5.013E+02
1980	648,540	713,394	4,580,948	5,039,043	4.531E+04	3.628E+07	4.984E+04	1.210E+04	1.814E+07	1.331E+04	3.321E+04	1.814E+07	3.653E+04	5.202E+02	1.451E+05	5.723E+02
1981	730,149	803,164	5,229,488	5,752,437	5.180E+04	4.148E+07	5.698E+04	1.384E+04	2.074E+07	1.522E+04	3.797E+04	2.074E+07	4.176E+04	5.947E+02	1.659E+05	6.542E+02
1982	688,180	756,998	5,959,637	6,555,601	5.907E+04	4.730E+07	6.497E+04	1.578E+04	2.365E+07	1.735E+04	4.329E+04	2.365E+07	4.762E+04	6.781E+02	1.892E+05	7.459E+02
1983	648,546	713,401	6,647,817	7,312,599	6.534E+04	5.232E+07	7.188E+04	1.745E+04	2.616E+07	1.920E+04	4.789E+04	2.616E+07	5.268E+04	7.502E+02	2.093E+05	8.252E+02
1984	720,752	792,827	7,296,363	8,025,999	7.072E+04	5.663E+07	7.780E+04	1.889E+04	2.832E+07	2.078E+04	5.183E+04	2.832E+07	5.702E+04	8.120E+02	2.265E+05	8.932E+02
1985	771,768	848,945	8,017,115	8,818,827	7.681E+04	6.150E+07	8.449E+04	2.052E+04	3.075E+07	2.257E+04	5.629E+04	3.075E+07	6.192E+04	8.818E+02	2.460E+05	9.700E+02
1986	833,773	917,150	8,788,883	9,667,771	8.326E+04	6.667E+07	9.159E+04	2.224E+04	3.334E+07	2.446E+04	6.102E+04	3.334E+07	6.712E+04	9.559E+02	2.667E+05	1.052E+03
1987	1,183,599	1,301,959	9,622,656	10,584,922	9.022E+04	7.224E+07	9.924E+04	2.410E+04	3.612E+07	2.651E+04	6.612E+04	3.612E+07	7.273E+04	1.036E+03	2.890E+05	1.139E+03
1988	1,146,547	1,261,202	10,806,255	11,886,881	1.016E+05	8.139E+07	1.118E+05	2.715E+04	4.070E+07	2.987E+04	7.450E+04	4.070E+07	8.195E+04	1.167E+03	3.256E+05	1.284E+03
1989	1,128,738	1,241,612	11,952,802	13,148,082	1.119E+05	8.963E+07	1.231E+05	2.990E+04	4.481E+07	3.289E+04	8.203E+04	4.481E+07	9.023E+04	1.285E+03	3.585E+05	1.414E+03
1990	1,259,605	1,385,566	13,081,540	14,389,694	1.214E+05	9.720E+07	1.335E+05	3.242E+04	4.860E+07	3.567E+04	8.897E+04	4.860E+07	9.786E+04	1.394E+03	3.888E+05	1.533E+03
1991	1,046,361	1,150,997	14,341,145	15,775,260	1.321E+05	1.058E+08	1.454E+05	3.530E+04	5.291E+07	3.883E+04	9.685E+04	5.291E+07	1.065E+05	1.517E+03	4.233E+05	1.669E+03
1992	825,388	907,927	15,387,506	16,926,257	1.393E+05	1.116E+08	1.533E+05	3.722E+04	5.579E+07	4.094E+04	1.021E+05	5.579E+07	1.123E+05	1.600E+03	4.463E+05	1.760E+03
1993	798,133	877,946	16,212,894	17,834,183	1.431E+05	1.146E+08	1.574E+05	3.822E+04	5.729E+07	4.204E+04	1.049E+05	5.729E+07	1.153E+05	1.643E+03	4.583E+05	1.807E+03
1994	729,465	802,412	17,011,027	18,712,130	1.462E+05	1.171E+08	1.609E+05	3.906E+04	5.855E+07	4.296E+04	1.072E+05	5.855E+07	1.179E+05	1.679E+03	4.684E+05	1.847E+03
1995	739,534	813,487	17,740,492	19,514,541	1.482E+05	1.187E+08	1.631E+05	3.960E+04	5.936E+07	4.356E+04	1.087E+05	5.936E+07	1.195E+05	1.702E+03	4.748E+05	1.872E+03
1996	734,672	808,139	18,480,026	20,328,029	1.503E+05	1.204E+08	1.653E+05	4.015E+04	6.018E+07	4.416E+04	1.102E+05	6.018E+07	1.212E+05	1.726E+03	4.814E+05	1.898E+03
1997	784,168	862,585	19,214,698	21,136,168	1.522E+05	1.218E+08	1.674E+05	4.065E+04	6.092E+07	4.471E+04	1.115E+05	6.092E+07	1.227E+05	1.747E+03	4.874E+05	1.922E+03
1998	794,234	873,657	19,998,866	21,998,753	1.546E+05	1.238E+08	1.701E+05	4.130E+04	6.191E+07	4.543E+04	1.133E+05	6.191E+07	1.247E+05	1.775E+03	4.952E+05	1.953E+03
1999	839,470	923,417	20,793,100	22,872,410	1.571E+05	1.258E+08	1.728E+05	4.196E+04	6.289E+07	4.615E+04	1.151E+05	6.289E+07	1.266E+05	1.803E+03	5.031E+05	1.984E+03
2000	859,262	945,188	21,632,570	23,795,827	1.600E+05	1.281E+08	1.760E+05	4.274E+04	6.407E+07	4.702E+04	1.173E+05	6.407E+07	1.290E+05	1.837E+03	5.126E+05	2.021E+03
2001	849,406	934,347	22,491,832	24,741,015	1.631E+05	1.306E+08	1.794E+05	4.356E+04	6.529E+07	4.792E+04	1.195E+05	6.529E+07	1.315E+05	1.872E+03	5.223E+05	2.060E+03
2002	852,290	937,519	23,341,238	25,675,362	1.658E+05	1.328E+08	1.824E+05	4.430E+04	6.640E+07	4.873E+04	1.215E+05	6.640E+07	1.337E+05	1.904E+03	5.312E+05	2.094E+03
2003	887,986	976,785	24,193,528	26,612,881	1.685E+05	1.349E+08	1.853E+05	4.500E+04	6.745E+07	4.950E+04	1.235E+05	6.745E+07	1.358E+05	1.934E+03	5.396E+05	2.128E+03
2004	912,776	1,004,054	25,081,514	27,589,665	1.715E+05	1.373E+08	1.886E+05	4.580E+04	6.865E+07	5.038E+04	1.257E+05	6.865E+07	1.382E+05	1.969E+03	5.492E+05	2.165E+03
2005	897,074	986,781	25,994,290	28,593,719	1.746E+05	1.398E+08	1.921E+05	4.665E+04	6.992E+07	5.131E+04	1.280E+05	6.992E+07	1.408E+05	2.005E+03	5.593E+05	2.205E+03
2006	905,558	996,114	26,891,364	29,580,500	1.774E+05	1.421E+08	1.951E+05	4.739E+04	7.103E+07	5.212E+04	1.300E+05	7.103E+07	1.430E+05	2.037E+03	5.682E+05	2.240E+03
2007	916,646	1,008,311	27,796,922	30,576,614	1.801E+05	1.442E+08	1.982E+05	4.812E+04	7.212E+07	5.293E+04	1.320E+05	7.212E+07	1.452E+05	2.068E+03	5.770E+05	2.275E+03
2008	844,241	928,665	28,713,568	31,584,925	1.829E+05	1.464E+08	2.012E+05	4.885E+04	7.322E+07	5.373E+04	1.340E+05	7.322E+07	1.474E+05	2.100E+03	5.858E+05	2.310E+03
2009	786,965	865,662	29,557,809	32,513,590	1.845E+05	1.477E+08	2.029E+05	4.927E+04	7.386E+07	5.420E+04	1.352E+05	7.386E+07	1.487E+05	2.118E+03	5.908E+05	2.330E+03
2010	753,791	829,170	30,344,774	33,379,251	1.852E+05	1.483E+08	2.037E+05	4.946E+04	7.414E+07	5.441E+04	1.357E+05	7.414E+07	1.493E+05	2.126E+03	5.931E+05	2.338E+03
2011	740,755	814,831	31,098,565	34,208,422	1.854E+05	1.484E+08	2.039E+05	4.951E+04	7.422E+07	5.447E+04	1.359E+05	7.422E+07	1.494E+05	2.128E+03	5.937E+05	2.341E+03
2012	737,319	811,051	31,839,320	35,023,252	1.854E+05	1.484E+08	2.039E+05	4.952E+04	7.422E+07	5.447E+04	1.359E+05	7.422E+07	1.494E+05	2.128E+03	5.938E+05	2.341E+03
2013	740,936	815,030	32,576,639	35,834,303	1.853E+05	1.484E+08	2.039E+05	4.951E+04	7.421E+07	5.446E+04	1.358E+05	7.421E+07	1.494E+05	2.128E+03	5.936E+05	2.341E+03
2014	765,655	842,221	33,317,575	36,649,333	1.854E+05	1.484E+08	2.039E+05	4.951E+04	7.421E+07	5.446E+04	1.358E+05	7.421E+07	1.494E+05	2.128E+03	5.937E+05	2.341E+03
2015	789,071	867,978	34,083,230	37,491,553	1.857E+05	1.487E+08	2.043E+05	4.960E+04	7.435E+07	5.457E+04	1.361E+05	7.435E+07	1.497E+05	2.132E+03	5.948E+05	2.345E+03
2016	836,424	920,066	34,872,301	38,359,531	1.864E+05	1.492E+08	2.050E+05	4.978E+04	7.462E+07	5.476E+04	1.366E+05	7.462E+07	1.502E+05	2.140E+03	5.969E+05	2.354E+03
2017	844,750	929,225	35,708,725	39,279,598	1.877E+05	1.503E+08	2.064E+05	5.012E+04	7.513E+07	5.514E+04	1.375E+05	7.513E+07	1.513E+05	2.154E+03	6.011E+05	2.370E+03
2018	806,036	886,640	36,553,475	40,208,823	1.890E+05	1.513E+08	2.079E+05	5.048E+04	7.566E+07	5.553E+04	1.385E+05	7.566E+07	1.524E+05	2.170E+03	6.053E+05	2.387E+03
2019	882,469	970,716	37,359,511	41,095,462	1.897E+05	1.519E+08	2.087E+05	5.067E+04	7.595E+07	5.574E+04	1.390E+05	7.595E+07	1.529E+05	2.178E+03	6.076E+05	2.396E+03
2020	820,523	902,575	38,241,980	42,066,178	1.914E+05	1.533E+08	2.106E+05	5.113E+04	7.664E+07	5.625E+04	1.403E+05	7.664E+07	1.543E+05	2.198E+03	6.132E+05	2.418E+03
2021	825,806	908,387	39,062,503	42,968,753	1.922E+05	1.539E+08	2.114E+05	5.134E+04	7.696E+07	5.648E+04	1.409E+05	7.696E+07	1.550E+05	2.207E+03	6.157E+05	2.427E+03
2022	839,776	923,753	39,888,308	43,877,139	1.930E+05	1.546E+08	2.123E+05	5.156E+04	7.728E+07	5.671E+04	1.415E+05	7.728E+07	1.556E+05	2.216E+03	6.183E+05	2.438E+03
2023	842,715	926,986	40,728,084	44,800,893	1.940E+05	1.553E+08	2.134E+05	5.181E+04	7.767E+07	5.700E+04	1.422E+05	7.767E+07	1.564E+05	2.227E+03	6.213E+05	2.450E+03
2024	845,654	930,220	41,570,799	45,727,879	1.949E+05	1.561E+08	2.144E+05	5.207E+04	7.805E+07	5.727E+04	1.429E+05	7.805E+07	1.571E+05	2.238E+03	6.244E+05	2.462E+03
2025	846,276	930,904	42,416,453	46,658,098	1.959E+05	1.568E+08	2.155E+05	5.232E+04	7.842E+07	5.755E+04	1.435E+05	7.842E+07	1.579E+05	2.249E+03	6.274E+05	2.474E+03
2026	846,899	931,589	43,262,730	47,589,003	1.968E+05	1.576E+08	2.164E+05	5.256E+04	7.878E+07	5.781E+04	1.442E+05	7.878E+07	1.586E+05	2.259E+03	6.302E+05	2.485E+03
2027	852,095	937,305	44,109,628	48,520,591	1.976E+05	1.582E+08	2.174E+05	5.278E+04	7.912E+07	5.806E+04	1.448E+05	7.912E+07	1.593E+05	2.269E+03	6.329E+05	2.496E+03
2028	860,554	946,609	44,961,724	49,457,896	1.985E+05	1.589E+08	2.183E+05	5.302E+04	7.947E+07	5.832E+04	1.455E+05	7.947E+07	1.600E+05	2.279E+03	6.358E+05	2.507E+03
2029	0	0	45,822,277	50,404,505	1.994E+05	1.597E+08	2.194E+05	5.327E+04	7.985E+07	5.860E+04	1.462E+05	7.985E+07	1.608E+05	2.290E+03	6.388E+05	2.519E+03
2030	0	0	45,822,277	50,404,505	1.884E+05	1.508E+08	2.072E+05	5.032E+04	7.542E+07	5.535E+04	1.381E+05	7.542E+07	1.519E+05	2.163E+03	6.034E+05	2.379E+03
2031	0	0	45,822,277	50,404,505	1.779E+05	1.425E+08	1.957E+05	4.753E+04	7.124E+07	5.228E+04	1.304E+05	7.124E+07	1.435E+05	2.043E+03	5.700E+05	2.247E+03
2032	0	0	45,822,277	50,404,505	1.681E+05	1.346E+08	1.849E+05	4.490E+04	6.730E+07	4.939E+04	1.232E+05	6.730E+07	1.355E+05	1.930E+03	5.384E+05	2.123E+03
2033	0	0	45,822,277	50,404,505	1.588E+05	1.271E+08	1.746E+05	4.241E+04	6.357E+07	4.665E+04	1.164E+05	6.357E+07	1.280E+05	1.823E+03	5.085E+05	2.005E+03
2034	0	0	45,822,277	50,404,505	1.500E+05	1.201E+08	1.650E+05	4.006E+04	6.005E+07	4.407E+04	1.099E+05	6.005E+07	1.209E+05	1.722E+03	4.804E+05	1.894E+03
2035	0	0	45,822,277	50,404,505	1.417E+05	1.134E+08	1.558E+05	3.784E+04	5.672E+07	4.162E+04	1.038E+05	5.672E+07	1.142E+05	1.626E+03	4.538E+05	1.789E+03
2036	0	0	45,822,277	50,404,505	1.338E+05	1.072E+08	1.472E+05	3.574E+04	5.358E+07	3.932E+04	9.807E+04	5.358E+07	1.079E+05	1.536E+03	4.286E+05	1.690E+03
2037	0	0	45,822,277	50,404,505	1.264E+05	1.012E+08	1.390E+05	3.376E+04	5.061E+07	3.714E+04	9.264E+04	5.061E+07	1.019E+05	1.451E+03	4.049E+05	1.596E+03
2038	0	0	45,822,277	50,404,505	1.194E+05	9.561E+07	1.313E+05	3.189E+04	4.780E+07	3.508E+04	8.751E+04	4.780E+07	9.626E+04	1.371E+03	3.824E+05	1.508E+03
2039	0	0	45,822,277	50,404,505	1.128E+05	9.031E+07	1.241E+05	3.013E+04	4.516E+07	3.314E+04	8.266E+04	4.516E+07	9.092E+04	1.295E+03	3.612E+05	1.424E+03
2040	0	0	45,822,277	50,404,505	1.065E+05	8.531E+07	1.172E+05	2.846E+04	4.265E+07	3.130E+04	7.808E+04	4.265E+07	8.589E+04	1.223E+03	3.412E+05	1.345E+03

RESULTS **Landfill Name or Identifier:** CHRLF - Site Development Plan No Action

Closure Year (with 80-year limit) = 2028
Methane = 50 *% by volume*

Please choose a third unit of measure to represent all of the emission rates below.
User-specified Unit: *short tons/year*

Year	Waste Accepted		Waste-In-Place		Total landfill gas			Methane			Carbon dioxide			NMOC		
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*	*(Mg/year)*	*(m^3/year)*	*(short tons/year)*
2041	0	0	45,822,277	50,404,505	1.006E+05	8.058E+07	1.107E+05	2.688E+04	4.029E+07	2.957E+04	7.375E+04	4.029E+07	8.113E+04	1.155E+03	3.223E+05	1.271E+03
2042	0	0	45,822,277	50,404,505	9.506E+04	7.612E+07	1.046E+05	2.539E+04	3.806E+07	2.793E+04	6.967E+04	3.806E+07	7.663E+04	1.091E+03	3.045E+05	1.200E+03
2043	0	0	45,822,277	50,404,505	8.979E+04	7.190E+07	9.877E+04	2.398E+04	3.595E+07	2.638E+04	6.581E+04	3.595E+07	7.239E+04	1.031E+03	2.876E+05	1.134E+03
2044	0	0	45,822,277	50,404,505	8.481E+04	6.792E+07	9.330E+04	2.265E+04	3.396E+07	2.492E+04	6.216E+04	3.396E+07	6.838E+04	9.738E+02	2.717E+05	1.071E+03
2045	0	0	45,822,277	50,404,505	8.012E+04	6.415E+07	8.813E+04	2.140E+04	3.208E+07	2.354E+04	5.872E+04	3.208E+07	6.459E+04	9.198E+02	2.566E+05	1.012E+03
2046	0	0	45,822,277	50,404,505	7.568E+04	6.060E+07	8.324E+04	2.021E+04	3.030E+07	2.224E+04	5.546E+04	3.030E+07	6.101E+04	8.689E+02	2.424E+05	9.557E+02
2047	0	0	45,822,277	50,404,505	7.148E+04	5.724E+07	7.863E+04	1.909E+04	2.862E+07	2.100E+04	5.239E+04	2.862E+07	5.763E+04	8.207E+02	2.290E+05	9.028E+02
2048	0	0	45,822,277	50,404,505	6.752E+04	5.407E+07	7.428E+04	1.804E+04	2.703E+07	1.984E+04	4.949E+04	2.703E+07	5.444E+04	7.752E+02	2.163E+05	8.528E+02
2049	0	0	45,822,277	50,404,505	6.378E+04	5.107E+07	7.016E+04	1.704E+04	2.554E+07	1.874E+04	4.675E+04	2.554E+07	5.142E+04	7.323E+02	2.043E+05	8.055E+02
2050	0	0	45,822,277	50,404,505	6.025E+04	4.824E+07	6.627E+04	1.609E+04	2.412E+07	1.770E+04	4.416E+04	2.412E+07	4.857E+04	6.917E+02	1.930E+05	7.609E+02
2051	0	0	45,822,277	50,404,505	5.691E+04	4.557E+07	6.260E+04	1.520E+04	2.279E+07	1.672E+04	4.171E+04	2.279E+07	4.588E+04	6.534E+02	1.823E+05	7.187E+02
2052	0	0	45,822,277	50,404,505	5.376E+04	4.305E+07	5.913E+04	1.436E+04	2.152E+07	1.579E+04	3.940E+04	2.152E+07	4.334E+04	6.172E+02	1.722E+05	6.789E+02
2053	0	0	45,822,277	50,404,505	5.078E+04	4.066E+07	5.586E+04	1.356E+04	2.033E+07	1.492E+04	3.721E+04	2.033E+07	4.094E+04	5.830E+02	1.626E+05	6.413E+02
2054	0	0	45,822,277	50,404,505	4.796E+04	3.841E+07	5.276E+04	1.281E+04	1.920E+07	1.409E+04	3.515E+04	1.920E+07	3.867E+04	5.507E+02	1.536E+05	6.058E+02
2055	0	0	45,822,277	50,404,505	4.531E+04	3.628E+07	4.984E+04	1.210E+04	1.814E+07	1.331E+04	3.321E+04	1.814E+07	3.653E+04	5.202E+02	1.451E+05	5.722E+02
2056	0	0	45,822,277	50,404,505	4.280E+04	3.427E+07	4.708E+04	1.143E+04	1.713E+07	1.257E+04	3.137E+04	1.713E+07	3.450E+04	4.914E+02	1.371E+05	5.405E+02
2057	0	0	45,822,277	50,404,505	4.043E+04	3.237E+07	4.447E+04	1.080E+04	1.619E+07	1.188E+04	2.963E+04	1.619E+07	3.259E+04	4.641E+02	1.295E+05	5.105E+02
2058	0	0	45,822,277	50,404,505	3.819E+04	3.058E+07	4.200E+04	1.020E+04	1.529E+07	1.122E+04	2.799E+04	1.529E+07	3.078E+04	4.384E+02	1.223E+05	4.823E+02
2059	0	0	45,822,277	50,404,505	3.607E+04	2.888E+07	3.968E+04	9.635E+03	1.444E+07	1.060E+04	2.644E+04	1.444E+07	2.908E+04	4.141E+02	1.155E+05	4.555E+02
2060	0	0	45,822,277	50,404,505	3.407E+04	2.728E+07	3.748E+04	9.101E+03	1.364E+07	1.001E+04	2.497E+04	1.364E+07	2.747E+04	3.912E+02	1.091E+05	4.303E+02
2061	0	0	45,822,277	50,404,505	3.218E+04	2.577E+07	3.540E+04	8.597E+03	1.289E+07	9.456E+03	2.359E+04	1.289E+07	2.595E+04	3.695E+02	1.031E+05	4.065E+02
2062	0	0	45,822,277	50,404,505	3.040E+04	2.434E+07	3.344E+04	8.120E+03	1.217E+07	8.932E+03	2.228E+04	1.217E+07	2.451E+04	3.490E+02	9.737E+04	3.839E+02
2063	0	0	45,822,277	50,404,505	2.872E+04	2.299E+07	3.159E+04	7.670E+03	1.150E+07	8.438E+03	2.105E+04	1.150E+07	2.315E+04	3.297E+02	9.198E+04	3.627E+02
2064	0	0	45,822,277	50,404,505	2.713E+04	2.172E+07	2.984E+04	7.245E+03	1.086E+07	7.970E+03	1.988E+04	1.086E+07	2.187E+04	3.114E+02	8.688E+04	3.426E+02
2065	0	0	45,822,277	50,404,505	2.562E+04	2.052E+07	2.818E+04	6.844E+03	1.026E+07	7.528E+03	1.878E+04	1.026E+07	2.066E+04	2.942E+02	8.207E+04	3.236E+02
2066	0	0	45,822,277	50,404,505	2.420E+04	1.938E+07	2.662E+04	6.465E+03	9.690E+06	7.111E+03	1.774E+04	9.690E+06	1.951E+04	2.779E+02	7.752E+04	3.057E+02
2067	0	0	45,822,277	50,404,505	2.286E+04	1.831E+07	2.515E+04	6.107E+03	9.153E+06	6.717E+03	1.676E+04	9.153E+06	1.843E+04	2.625E+02	7.323E+04	2.887E+02
2068	0	0	45,822,277	50,404,505	2.160E+04	1.729E+07	2.375E+04	5.768E+03	8.646E+06	6.345E+03	1.583E+04	8.646E+06	1.741E+04	2.479E+02	6.917E+04	2.727E+02
2069	0	0	45,822,277	50,404,505	2.040E+04	1.633E+07	2.244E+04	5.449E+03	8.167E+06	5.994E+03	1.495E+04	8.167E+06	1.644E+04	2.342E+02	6.534E+04	2.576E+02
2070	0	0	45,822,277	50,404,505	1.927E+04	1.543E+07	2.120E+04	5.147E+03	7.715E+06	5.661E+03	1.412E+04	7.715E+06	1.553E+04	2.212E+02	6.172E+04	2.433E+02
2071	0	0	45,822,277	50,404,505	1.820E+04	1.457E+07	2.002E+04	4.862E+03	7.287E+06	5.348E+03	1.334E+04	7.287E+06	1.467E+04	2.090E+02	5.830E+04	2.299E+02
2072	0	0	45,822,277	50,404,505	1.719E+04	1.377E+07	1.891E+04	4.592E+03	6.883E+06	5.052E+03	1.260E+04	6.883E+06	1.386E+04	1.974E+02	5.507E+04	2.171E+02
2073	0	0	45,822,277	50,404,505	1.624E+04	1.300E+07	1.786E+04	4.338E+03	6.502E+06	4.772E+03	1.190E+04	6.502E+06	1.309E+04	1.865E+02	5.202E+04	2.051E+02
2074	0	0	45,822,277	50,404,505	1.534E+04	1.228E+07	1.687E+04	4.097E+03	6.142E+06	4.507E+03	1.124E+04	6.142E+06	1.237E+04	1.761E+02	4.913E+04	1.937E+02
2075	0	0	45,822,277	50,404,505	1.449E+04	1.160E+07	1.594E+04	3.870E+03	5.802E+06	4.258E+03	1.062E+04	5.802E+06	1.168E+04	1.664E+02	4.641E+04	1.830E+02
2076	0	0	45,822,277	50,404,505	1.369E+04	1.096E+07	1.506E+04	3.656E+03	5.480E+06	4.022E+03	1.003E+04	5.480E+06	1.103E+04	1.571E+02	4.384E+04	1.729E+02
2077	0	0	45,822,277	50,404,505	1.293E+04	1.035E+07	1.422E+04	3.453E+03	5.176E+06	3.799E+03	9.475E+03	5.176E+06	1.042E+04	1.484E+02	4.141E+04	1.633E+02
2078	0	0	45,822,277	50,404,505	1.221E+04	9.779E+06	1.343E+04	3.262E+03	4.890E+06	3.588E+03	8.950E+03	4.890E+06	9.846E+03	1.402E+02	3.912E+04	1.542E+02
2079	0	0	45,822,277	50,404,505	1.154E+04	9.237E+06	1.269E+04	3.081E+03	4.619E+06	3.390E+03	8.455E+03	4.619E+06	9.300E+03	1.324E+02	3.695E+04	1.457E+02
2080	0	0	45,822,277	50,404,505	1.090E+04	8.726E+06	1.199E+04	2.911E+03	4.363E+06	3.202E+03	7.986E+03	4.363E+06	8.785E+03	1.251E+02	3.490E+04	1.376E+02
2081	0	0	45,822,277	50,404,505	1.029E+04	8.242E+06	1.132E+04	2.749E+03	4.121E+06	3.024E+03	7.544E+03	4.121E+06	8.298E+03	1.182E+02	3.297E+04	1.300E+02
2082	0	0	45,822,277	50,404,505	9.723E+03	7.786E+06	1.070E+04	2.597E+03	3.893E+06	2.857E+03	7.126E+03	3.893E+06	7.838E+03	1.116E+02	3.114E+04	1.228E+02
2083	0	0	45,822,277	50,404,505	9.184E+03	7.354E+06	1.010E+04	2.453E+03	3.677E+06	2.698E+03	6.731E+03	3.677E+06	7.404E+03	1.054E+02	2.942E+04	1.160E+02
2084	0	0	45,822,277	50,404,505	8.675E+03	6.947E+06	9.543E+03	2.317E+03	3.473E+06	2.549E+03	6.358E+03	3.473E+06	6.994E+03	9.960E+01	2.779E+04	1.096E+02
2085	0	0	45,822,277	50,404,505	8.195E+03	6.562E+06	9.014E+03	2.189E+03	3.281E+06	2.408E+03	6.006E+03	3.281E+06	6.606E+03	9.408E+01	2.625E+04	1.035E+02
2086	0	0	45,822,277	50,404,505	7.741E+03	6.198E+06	8.515E+03	2.068E+03	3.099E+06	2.274E+03	5.673E+03	3.099E+06	6.240E+03	8.887E+01	2.479E+04	9.776E+01
2087	0	0	45,822,277	50,404,505	7.312E+03	5.855E+06	8.043E+03	1.953E+03	2.927E+06	2.148E+03	5.359E+03	2.927E+06	5.894E+03	8.395E+01	2.342E+04	9.234E+01
2088	0	0	45,822,277	50,404,505	6.907E+03	5.530E+06	7.597E+03	1.845E+03	2.765E+06	2.029E+03	5.062E+03	2.765E+06	5.568E+03	7.929E+01	2.212E+04	8.722E+01
2089	0	0	45,822,277	50,404,505	6.524E+03	5.224E+06	7.176E+03	1.743E+03	2.612E+06	1.917E+03	4.781E+03	2.612E+06	5.259E+03	7.490E+01	2.090E+04	8.239E+01
2090	0	0	45,822,277	50,404,505	6.162E+03	4.935E+06	6.779E+03	1.646E+03	2.467E+06	1.811E+03	4.516E+03	2.467E+06	4.968E+03	7.075E+01	1.974E+04	7.783E+01
2091	0	0	45,822,277	50,404,505	5.821E+03	4.661E+06	6.403E+03	1.555E+03	2.331E+06	1.710E+03	4.266E+03	2.331E+06	4.693E+03	6.683E+01	1.864E+04	7.351E+01
2092	0	0	45,822,277	50,404,505	5.498E+03	4.403E+06	6.048E+03	1.469E+03	2.201E+06	1.616E+03	4.030E+03	2.201E+06	4.433E+03	6.313E+01	1.761E+04	6.944E+01
2093	0	0	45,822,277	50,404,505	5.194E+03	4.159E+06	5.713E+03	1.387E+03	2.079E+06	1.526E+03	3.806E+03	2.079E+06	4.187E+03	5.963E+01	1.664E+04	6.559E+01
2094	0	0	45,822,277	50,404,505	4.906E+03	3.929E+06	5.397E+03	1.310E+03	1.964E+06	1.442E+03	3.596E+03	1.964E+06	3.955E+03	5.633E+01	1.571E+04	6.196E+01
2095	0	0	45,822,277	50,404,505	4.634E+03	3.711E+06	5.098E+03	1.238E+03	1.855E+06	1.362E+03	3.396E+03	1.855E+06	3.736E+03	5.321E+01	1.484E+04	5.853E+01
2096	0	0	45,822,277	50,404,505	4.377E+03	3.505E+06	4.815E+03	1.169E+03	1.753E+06	1.286E+03	3.208E+03	1.753E+06	3.529E+03	5.026E+01	1.402E+04	5.528E+01
2097	0	0	45,822,277	50,404,505	4.135E+03	3.311E+06	4.548E+03	1.104E+03	1.656E+06	1.215E+03	3.030E+03	1.656E+06	3.333E+03	4.747E+01	1.324E+04	5.222E+01
2098	0	0	45,822,277	50,404,505	3.906E+03	3.128E+06	4.296E+03	1.043E+03	1.564E+06	1.148E+03	2.863E+03	1.564E+06	3.149E+03	4.484E+01	1.251E+04	4.933E+01
2099	0	0	45,822,277	50,404,505	3.689E+03	2.954E+06	4.058E+03	9.855E+02	1.477E+06	1.084E+03	2.704E+03	1.477E+06	2.974E+03	4.236E+01	1.182E+04	4.659E+01
2100	0	0	45,822,277	50,404,505	3.485E+03	2.791E+06	3.834E+03	9.309E+02	1.395E+06	1.024E+03	2.554E+03	1.395E+06	2.810E+03	4.001E+01	1.116E+04	4.401E+01
2101	0	0	45,822,277	50,404,505	3.292E+03	2.636E+06	3.621E+03	8.793E+02	1.318E+06	9.672E+02	2.413E+03	1.318E+06	2.654E+03	3.779E+01	1.054E+04	4.157E+01
2102	0	0	45,822,277	50,404,505	3.110E+03	2.490E+06	3.420E+03	8.306E+02	1.245E+06	9.136E+02	2.279E+03	1.245E+06	2.507E+03	3.570E+01	9.960E+03	3.927E+01
2103	0	0	45,822,277	50,404,505	2.937E+03	2.352E+06	3.231E+03	7.846E+02	1.176E+06	8.630E+02	2.153E+03	1.176E+06	2.368E+03	3.372E+01	9.408E+03	3.709E+01
2104	0	0	45,822,277	50,404,505	2.774E+03	2.222E+06	3.052E+03	7.411E+02	1.111E+06	8.152E+02	2.033E+03	1.111E+06	2.237E+03	3.185E+01	8.887E+03	3.504E+01
2105	0	0	45,822,277	50,404,505	2.621E+03	2.099E+06	2.883E+03	7.000E+02	1.049E+06	7.700E+02	1.921E+03	1.049E+06	2.113E+03	3.009E+01	8.394E+03	3.310E+01

4: ENTER WASTE ACCEPTANCE RATES

Input Units: *Mg/year*

Year	Input Units *(Mg/year)*	Calculated Units *(short tons/year)*
1965	283,858	312,244
1966	283,858	312,244
1967	283,858	312,244
1968	283,858	312,244
1969	283,858	312,244
1970	283,858	312,244
1971	283,858	312,244
1972	283,858	312,244
1973	283,858	312,244
1974	283,858	312,244
1975	283,858	312,244
1976	283,858	312,244
1977	283,858	312,244
1978	327,357	360,093
1979	563,437	619,781
1980	648,540	713,394
1981	730,149	803,164
1982	688,180	756,998
1983	648,546	713,401
1984	720,752	792,827
1985	771,768	848,945
1986	833,773	917,150
1987	1,183,599	1,301,959
1988	1,146,547	1,261,202
1989	1,128,738	1,241,612
1990	1,259,605	1,385,566
1991	1,046,361	1,150,997
1992	825,388	907,927
1993	798,133	877,946
1994	729,465	802,412
1995	739,534	813,487
1996	734,672	808,139
1997	784,168	862,585
1998	794,234	873,657
1999	839,470	923,417
2000	859,262	945,188
2001	849,406	934,347
2002	852,290	937,519
2003	887,986	976,785
2004	912,776	1,004,054

4: ENTER WASTE ACCEPTANCE RATES

Input Units: *Mg/year*

Year	Input Units *(Mg/year)*	Calculated Units *(short tons/year)*
2005	897,074	986,781
2006	905,558	996,114
2007	916,646	1,008,311
2008	844,241	928,665
2009	786,965	865,662
2010	753,791	829,170
2011	740,755	814,831
2012	737,319	811,051
2013	740,936	815,030
2014	765,655	842,221
2015	789,071	867,978
2016	836,424	920,066
2017	844,750	929,225
2018	806,036	886,640
2019	882,469	970,716
2020	820,523	902,575
2021	825,806	908,387
2022	839,776	923,753
2023	842,715	926,986
2024	845,654	930,220
2025	846,276	930,904
2026	846,899	931,589
2027	852,095	937,305
2028	860,554	946,609
2029		
2030		
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2044		

LANDGEM		ST			74.500%	28	0.008	0.02	0.21	0.06	
No Action	Year	Waste Accepted	Generated (ST)	Gen (MT)	Fugitive (MT)	Fugitive (CO2e)	Transport to LF (CO2e)	LF Operations (CO2e)	Landfill Carbon Storage Credit	Utility Avoided GHG Emissions Credit	Net Fugitive (CO2e)
Methane	1965	312,244	-	-	-	-			(65,571.20)		(65,571)
Standard	1966	312,244	1,157	1,052.25	268.32	7,513.03			(65,571.20)		(58,058)
	1967	312,244	2,251	2,046.19	521.78	14,609.80			(65,571.20)		(50,961)
	1968	312,244	3,284	2,985.06	761.19	21,313.36			(65,571.20)		(44,258)
	1969	312,244	4,259	3,871.92	987.34	27,645.50			(65,571.20)		(37,926)
	1970	312,244	5,181	4,709.64	1,200.96	33,626.81			(65,571.20)		(31,944)
	1971	312,244	6,051	5,500.94	1,402.74	39,276.72			(65,571.20)		(26,294)
	1972	312,244	6,873	6,248.40	1,593.34	44,613.58			(65,571.20)		(20,958)
	1973	312,244	7,650	6,954.45	1,773.38	49,654.76			(65,571.20)		(15,916)
	1974	312,244	8,384	7,621.38	1,943.45	54,416.62			(65,571.20)		(11,155)
	1975	312,244	9,076	8,251.35	2,104.09	58,914.65			(65,571.20)		(6,657)
	1976	312,244	9,731	8,846.42	2,255.84	63,163.46			(65,571.20)		(2,408)
	1977	312,244	10,349	9,408.52	2,399.17	67,176.86			(65,571.20)		1,606
	1978	360,093	10,933	9,939.48	2,534.57	70,967.90			(75,619.47)		(4,652)
	1979	619,781	11,662	10,602.27	2,703.58	75,700.20			(130,153.95)		(54,454)
	1980	713,394	13,314	12,103.47	3,086.38	86,418.77			(149,812.74)		(63,394)
	1981	803,164	15,221	13,836.97	3,528.43	98,795.93			(168,664.42)		(69,868)
	1982	756,998	17,355	15,776.94	4,023.12	112,647.32			(158,969.58)		(46,322)
	1983	713,401	19,199	17,453.84	4,450.73	124,620.44			(149,814.13)		(25,194)
	1984	792,827	20,780	18,890.92	4,817.18	134,881.17			(166,493.71)		(31,613)
	1985	848,945	22,568	20,516.04	5,231.59	146,484.50			(178,278.41)		(31,794)
	1986	917,150	24,464	22,240.23	5,671.26	158,795.22			(192,601.56)		(33,806)
	1987	1,301,959	26,509	24,098.73	6,145.18	172,064.96			(273,411.37)		(101,346)
	1988	1,261,202	29,866	27,151.06	6,923.52	193,858.53			(264,852.36)		(70,994)
	1989	1,241,612	32,887	29,896.91	7,623.71	213,463.93			(260,738.48)		(47,275)
	1990	1,385,566	35,667	32,424.61	8,268.28	231,511.72			(290,968.76)		(59,457)
	1991	1,150,997	38,827	35,297.38	9,000.83	252,023.28			(241,709.39)		10,314
	1992	907,927	40,943	37,220.49	9,491.23	265,754.32			(190,664.63)		75,090
	1993	877,946	42,040	38,217.92	9,745.57	272,875.97			(184,368.72)		88,507
	1994	802,412	42,965	39,059.06	9,960.06	278,881.67			(168,506.42)		110,375
	1995	813,487	43,559	39,599.04	10,097.75	282,737.13			(170,832.35)		111,905
	1996	808,139	44,161	40,146.43	10,237.34	286,645.49			(169,709.23)		116,936
	1997	862,585	44,710	40,645.46	10,364.59	290,208.61			(181,142.81)		109,066
	1998	873,657	45,430	41,300.33	10,531.58	294,884.35			(183,468.05)		111,416
	1999	923,417	46,152	41,956.23	10,698.84	299,567.45			(193,917.57)		105,650
	2000	945,188	47,018	42,743.47	10,899.58	305,188.37			(198,489.52)		106,699
	2001	934,347	47,917	43,560.46	11,107.92	311,021.70			(196,212.79)		114,809
	2002	937,519	48,725	44,295.65	11,295.39	316,270.97			(196,878.99)		119,392
	2003	976,785	49,501	45,000.80	11,475.20	321,305.72			(205,124.77)		116,181
	2004	1,004,054	50,379	45,799.20	11,678.80	327,006.31			(210,851.26)		116,155
	2005	986,781	51,310	46,645.26	11,894.54	333,047.19			(207,224.09)		125,823
	2006	996,114	52,125	47,386.24	12,083.49	338,337.76			(209,183.90)		129,154
	2007	1,008,311	52,929	48,117.61	12,269.99	343,559.76			(211,745.23)		131,815
	2008	928,665	53,735	48,849.57	12,456.64	348,785.91			(195,019.67)		153,766
	2009	865,662	54,200	49,272.56	12,564.50	351,806.11			(181,788.92)		170,017
	2010	829,170	54,406	49,459.81	12,612.25	353,143.01			(174,125.72)		179,017
	2011	814,831	54,465	49,513.70	12,625.99	353,527.81			(171,114.41)		182,413
	2012	811,051	54,468	49,516.28	12,626.65	353,546.26			(170,320.69)	(61,974.58)	121,251
	2013	815,030	54,457	49,505.99	12,624.03	353,472.74			(171,156.22)	(61,961.69)	120,355
	2014	842,221	54,461	49,509.67	12,624.97	353,499.03			(176,866.31)	(61,966.30)	114,666
	2015	867,978	54,565	49,604.78	12,649.22	354,178.11			(182,275.40)	(62,085.34)	109,817
	2016	920,066	54,760	49,781.42	12,694.26	355,439.34			(193,213.94)	(62,306.42)	99,919

LANDGEM		ST			74.500%	28	0.008	0.02	0.21	0.06	
No Action	Year	Waste Accepted	Generated (ST)	Gen (MT)	Fugitive (MT)	Fugitive (CO2e)	Transport to LF (CO2e)	LF Operations (CO2e)	Landfill Carbon Storage Credit	Utility Avoided GHG Emissions Credit	Net Fugitive (CO2e)
	2017	929,225	55,136	50,123.81	12,781.57	357,884.00			(195,137.25)	(62,734.96)	100,012
	2018	886,640	55,526	50,478.09	12,871.91	360,413.58			(186,194.32)	(63,178.38)	111,041
	2019	970,716	55,736	50,669.24	12,920.66	361,778.35			(203,850.34)	(63,417.62)	94,510
	2020	902,575	56,246	51,133.12	13,038.95	365,090.49			(189,540.71)	(63,998.22)	111,552
	2021	-	56,476	51,341.67	13,092.13	366,579.55	-	-	-	(64,259.24)	302,320
	2022	-	56,714	51,558.26	13,147.36	368,125.94	-	-	-	(64,530.31)	303,596
	2023	-	56,996	51,814.62	13,212.73	369,956.40	-	-	-	(64,851.18)	305,105
	2024	-	57,274	52,067.68	13,277.26	371,763.24	-	-	-	(65,167.91)	306,595
	2025	-	57,549	52,317.61	13,340.99	373,547.76	-	-	-	(65,480.72)	308,067
	2026	-	57,812	52,556.01	13,401.78	375,249.88	-	-	-	(65,779.10)	309,471
	2027	-	58,062	52,783.50	13,459.79	376,874.16	-	-	-	(66,063.82)	310,810
	2028	-	58,319	53,017.65	13,519.50	378,545.99	-	-	-	(66,356.88)	312,189
	2029	-	58,597	53,270.18	13,583.89	380,349.06			-	(66,672.95)	313,676
	2030	-	55,351	50,318.69	12,831.27	359,275.46			-	(62,978.88)	296,297
	2031	-	52,284	47,530.74	12,120.34	339,369.47			-	(59,489.47)	279,880
	2032	-	49,387	44,897.25	11,448.80	320,566.39			-	(56,193.40)	264,373
	2033	-	46,651	42,409.68	10,814.47	302,805.11			-	(53,079.95)	249,725
	2034	-	44,066	40,059.93	10,215.28	286,027.91			-	(50,139.01)	235,889
	2035	-	41,624	37,840.37	9,649.30	270,180.27			-	(47,361.01)	222,819
	2036	-	39,318	35,743.79	9,114.67	255,210.68			-	(44,736.93)	210,474
	2037	-	37,140	33,763.37	8,609.66	241,070.50			-	(42,258.24)	198,812
	2038	-	35,082	31,892.68	8,132.63	227,713.76			-	(39,916.88)	187,797
	2039	-	33,138	30,125.64	7,682.04	215,097.07			-	(37,705.25)	177,392
	2040	-	31,302	28,456.50	7,256.41	203,179.41			-	(35,616.16)	167,563
	2041	-	29,568	26,879.84	6,854.36	191,922.07			-	(33,642.81)	158,279
	2042	-	27,930	25,390.54	6,474.59	181,288.45			-	(31,778.80)	149,510
	2043	-	26,382	23,983.75	6,115.86	171,243.99			-	(30,018.06)	141,226
	2044	-	24,920	22,654.91	5,777.00	161,756.06			-	(28,354.89)	133,401
	2045	-	23,540	21,399.69	5,456.92	152,793.82			-	(26,783.86)	126,010
	2046	-	22,235	20,214.02	5,154.58	144,328.13			-	(25,299.87)	119,028
	2047	-	21,003	19,094.05	4,868.98	136,331.50			-	(23,898.11)	112,433
	2048	-	19,840	18,036.12	4,599.21	128,777.92			-	(22,574.01)	106,204
	2049	-	18,740	17,036.82	4,344.39	121,642.86			-	(21,323.28)	100,320
	2050	-	17,702	16,092.88	4,103.68	114,903.13			-	(20,141.84)	94,761
	2051	-	**16,721**	15,201.23	3,876.31	108,536.81			-	(19,025.86)	89,511
	2052	-	15,795	14,359.00	3,661.54	102,523.23			-	(17,971.72)	84,552
	2053	-	14,920	13,563.42	3,458.67	96,842.83			-	(16,975.98)	79,867
	2054	-	14,093	12,811.93	3,267.04	91,477.17			-	(16,035.41)	75,442
	2055	-	13,312	12,102.07	3,086.03	86,408.79			-	(15,146.95)	71,262
	2056	-	12,575	11,431.54	2,915.04	81,621.23			-	(14,307.72)	67,314
	2057	-	11,878	10,798.17	2,753.53	77,098.93			-	(13,514.99)	63,584
	2058	-	11,220	10,199.89	2,600.97	72,827.19			-	(12,766.18)	60,061
	2059	-	10,598	9,634.75	2,456.86	68,792.13			-	(12,058.86)	56,733
	2060	-	10,011	9,100.93	2,320.74	64,980.64			-	(11,390.72)	53,590
	2061	-	9,456	8,596.68	2,192.15	61,380.33			-	(10,759.61)	50,621
	2062	-	8,932	8,120.38	2,070.70	57,979.49			-	(10,163.46)	47,816
	2063	-	8,438	7,670.46	1,955.97	54,767.09			-	(9,600.35)	45,167
	2064	-	7,970	7,245.47	1,847.60	51,732.67			-	(9,068.43)	42,664
	2065	-	7,528	6,844.03	1,745.23	48,866.37			-	(8,565.99)	40,300
	2066	-	7,111	6,464.83	1,648.53	46,158.88			-	(8,091.38)	38,068
	2067	-	6,717	6,106.64	1,557.19	43,601.41			-	(7,643.07)	35,958

LANDGEM		ST			74.500%	28	0.008	0.02	0.21	0.06		
No Action	**Year**	**Waste Accepted**	**Generated (ST)**	**Gen (MT)**	**Fugitive (MT)**	**Fugitive (CO2e)**	**Transport to LF (CO2e)**	**LF Operations (CO2e)**	**Landfill Carbon Storage Credit**	**Utility Avoided GHG Emissions Credit**	**Net Fugitive (CO2e)**	
	2068	-	6,345	5,768.30	1,470.92	41,185.63			-	(7,219.60)	33,966	
	2069	-	5,994	5,448.70	1,389.42	38,903.70			-	(6,819.59)	32,084	
	2070	-	5,661	5,146.81	1,312.44	36,748.21			-	(6,441.74)	30,306	
	2071	-	5,348	4,861.64	1,239.72	34,712.14			-	(6,084.83)	28,627	
	2072	-	5,052	4,592.28	1,171.03	32,788.88			-	(5,747.70)	27,041	
	2073	-	4,772	4,337.84	1,106.15	30,972.18			-	(5,429.24)	25,543	
	2074	-	4,507	4,097.50	1,044.86	29,256.14			-	(5,128.43)	24,128	
	2075	-	4,258	3,870.47	986.97	27,635.17			-	(4,844.28)	22,791	
	2076	-	4,022	3,656.03	932.29	26,104.02			-	(4,575.88)	21,528	
	2077	-	3,799	3,453.46	880.63	24,657.70			-	(4,322.35)	20,335	
	2078	-	3,588	3,262.12	831.84	23,291.52			-	(4,082.87)	19,209	
	2079	-	3,390	3,081.38	785.75	22,001.03			-	(3,856.65)	18,144	
	2080	-	3,202	2,910.65	742.22	20,782.05			-	(3,642.97)	17,139	
	2081	-	3,024	2,749.38	701.09	19,630.60			-	(3,441.13)	16,189	
	2082	-	2,857	2,597.05	662.25	18,542.95			-	(3,250.47)	15,292	
	2083	-	2,698	2,453.16	625.56	17,515.56			-	(3,070.37)	14,445	
	2084	-	2,549	2,317.24	590.90	16,545.09			-	(2,900.26)	13,645	
	2085	-	2,408	2,188.85	558.16	15,628.39			-	(2,739.57)	12,889	
	2086	-	2,274	2,067.58	527.23	14,762.49			-	(2,587.78)	12,175	
	2087	-	2,148	1,953.02	498.02	13,944.56			-	(2,444.40)	11,500	
	2088	-	2,029	1,844.81	470.43	13,171.95			-	(2,308.96)	10,863	
	2089	-	1,917	1,742.60	444.36	12,442.14			-	(2,181.03)	10,261	
	2090	-	1,811	1,646.05	419.74	11,752.78			-	(2,060.19)	9,693	
	2091	-	1,710	1,554.85	396.49	11,101.60			-	(1,946.05)	9,156	
	2092	-	1,616	1,468.70	374.52	10,486.51			-	(1,838.22)	8,648	
	2093	-	1,526	1,387.32	353.77	9,905.49			-	(1,736.37)	8,169	
	2094	-	1,442	1,310.46	334.17	9,356.67			-	(1,640.17)	7,717	
	2095	-	1,362	1,237.85	315.65	8,838.25			-	(1,549.29)	7,289	
	2096	-	1,286	1,169.27	298.16	8,348.56			-	(1,463.45)	6,885	
	2097	-	1,215	1,104.48	281.64	7,886.00			-	(1,382.37)	6,504	
	2098	-	1,148	1,043.29	266.04	7,449.07			-	(1,305.78)	6,143	
	2099	-	1,084	985.48	251.30	7,036.35			-	(1,233.43)	5,803	
	2100	-	1,024	930.88	237.37	6,646.49			-	(1,165.09)	5,481	
	2101	-	967	879.31	224.22	6,278.24			-	(1,100.54)	5,178	
	2102	-	914	830.59	211.80	5,930.39			-	(1,039.56)	4,891	
	2103	-	863	784.57	200.06	5,601.81			-	(981.96)	4,620	
	2104	-	815	741.10	188.98	5,291.43			-	(927.56)	4,364	
	2105	-	770	700.04	178.51	4,998.26			-	(876.17)	4,122	
NA	**2021-2105**	**-**	**1,503,672**	**1,366,975**	**348,579**	**9,760,201**	-	-	**-**	**(1,710,906)**	**8,049,295**	
	Cumm						**9,760,201**	**9,760,201**			8,049,295	check

* includes cover oxidation at 1% of fugitive

74.50% 75% Capture Rate
1% oxidation rate of fugitive gas
99% destruction rate of combusted gas

AFLEET Data Tables

Key Inputs

Key Inputs	Calculator Inputs Used In
Primary Vehicle Location	*Payback, TCO, IR, Footprint*
Light-Duty Vehicle Information	*Payback, TCO*
Heavy-Duty Vehicle Information	*Payback, TCO*
Fuel and DEF Price	*Payback, TCO, IR*
Total Cost of Ownership Inputs	*TCO*
Fuel Production Assumptions	*Payback, TCO, IR, Footprint*
Petroleum Use, GHGs & Air Pollutant Options	*Payback, TCO, IR, Footprint*
Idle Reduction Inputs	*IR*
Electric Vehicle Charging Inputs	*Charging*
Off-Road Equipment Inputs	*Payback*

Key Vehicle and Fuel Inputs

Primary Vehicle Location

State	WASHINGTON
County	KING

Light-Duty Vehicle Information

Vehicle Type	Passenger Car
Vocation Type	Car

Light-Duty Fuel Type	Number of Light-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPGGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	*Default Mileage*	*Default MPGGE*	*Default AFV MPGGE Relative Ratio*	*User AFV MPGGE Relative Ratio*	*Default Purchase Price*	*Default Maintenance & Repair*	*User MPDGE*
Gasoline	0	12,400	30.9	$20,000	$0.15	*12,400*	*30.9*	*1.00*	*1.00*	*$20,000*	*$0.15*	*35.7*
Diesel	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Gasoline Hybrid Electric Vehicle (HEV)	0	12,400	46.3	$22,000	$0.14	*12,400*	*46.3*	*1.50*	*1.50*	*$22,000*	*$0.14*	*53.4*
Gasoline Plug-in Hybrid Electric Vehicle (PHEV)	0	12,400	53.2	$27,000	$0.13	*12,400*	*53.2*	*1.72*	*1.72*	*$27,000*	*$0.13*	*61.4*
Gasoline Extended Range Electric Vehicle (EREV)	0	12,400	44.4	$33,000	$0.13	*12,400*	*44.4*	*1.43*	*1.43*	*$33,000*	*$0.13*	*51.2*
All-Electric Vehicle (EV)	0	12,400	106.2	$37,000	$0.09	*12,400*	*106.2*	*3.43*	*3.43*	*$37,000*	*$0.09*	*122.6*
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	12,400	73.5	$50,000	$0.09	*12,400*	*73.5*	*2.38*	*2.38*	*$50,000*	*$0.09*	*84.8*
Biodiesel (B20)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Biodiesel (B100)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Renewable Diesel (RD20)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Renewable Diesel (RD100)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Ethanol (E85)	0	12,400	30.9	$20,000	$0.15	*12,400*	*30.9*	*1.00*	*1.00*	*$20,000*	*$0.15*	*35.7*
Propane (LPG)	0	12,400	30.9	$26,000	$0.15	*12,400*	*30.9*	*1.00*	*1.00*	*$26,000*	*$0.15*	*35.7*
Compressed Natural Gas (CNG)	0	12,400	29.4	$27,000	$0.15	*12,400*	*29.4*	*0.95*	*0.95*	*$27,000*	*$0.15*	*33.9*

Heavy-Duty Vehicle Information

Vehicle Type	School Bus
Vocation Type	School Bus

Heavy-Duty Fuel Type	Number of Heavy-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPDGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	*Default Mileage*	*Default MPDGE*	*Default AFV MPDGE Relative Ratio*	*User AFV MPDGE Relative Ratio*	*Default Purchase Price*	*Default Maintenance & Repair*	*Default MPGGE*	*User MPGGE*
Gasoline	0	0	6.8	$0	$0.61	*0*	*6.8*	*0.83*	*0.83*	*$0*	*$0.61*	*5.9*	*5.9*
Diesel	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
All-Electric Vehicle (EV)	0	15,000	24.0	$300,000	$0.56	*15,000*	*24.0*	*2.93*	*2.93*	*$300,000*	*$0.56*	*20.8*	*20.8*
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	11.3	$0	$0.56	*0*	*11.3*	*1.38*	*1.38*	*$0*	*$0.56*	*9.8*	*9.8*
Diesel Hybrid Electric Vehicle (HEV)	0	15,000	11.1	$160,000	$0.81	*15,000*	*11.1*	*1.35*	*1.35*	*$160,000*	*$0.81*	*9.6*	*9.6*
Diesel Hydraulic Hybrid (HHV)	0	0	10.6	$0	$0.81	*0*	*10.6*	*1.29*	*1.29*	*$0*	*$0.81*	*9.2*	*9.2*
Biodiesel (B20)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Biodiesel (B100)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Renewable Diesel (RD20)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Renewable Diesel (RD100)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Ethanol (E85)	0	0	6.8	$0	$0.61	*0*	*6.8*	*0.83*	*0.83*	*$0*	*$0.61*	*5.9*	*5.9*
Propane (LPG)	0	15,000	6.8	$108,000	$0.61	*15,000*	*6.8*	*0.83*	*0.83*	*$108,000*	*$0.61*	*5.9*	*5.9*
Compressed Natural Gas (CNG)	0	15,000	7.0	$130,000	$0.93	*15,000*	*7.0*	*0.85*	*0.85*	*$130,000*	*$0.93*	*6.0*	*6.0*
Liquefied Natural Gas (LNG)	0	15,000	7.0	$120,000	$0.93	*15,000*	*7.0*	*0.85*	*0.85*	*$120,000*	*$0.93*	*6.0*	*6.0*
LNG / Diesel Pilot Ignition	0	0	7.8	$0	$0.97	*0*	*7.8*	*0.95*	*0.95*	*$0*	*$0.97*	*6.7*	*6.7*

Refueling Information

Fueling Type	Private Station	Infrastructure costs (go to 'Payback')
Fuel Price Sensitivity	No	Enter fuel price range (go to 'Payback')

Fuel and DEF Price

	Fuel Unit	Public Station ($/fuel unit)	Private Station ($/fuel unit)	Public Station: *Default $/Fuel Unit*	Public Station: *Default $/GGE*	Public Station: *User $/GGE*	Public Station: *User $/DGE*	Private Station: *Default $/Fuel Unit*	Private Station: *Default $/GGE*	Private Station: *User $/GGE*	Private Station: *User $/DGE*
Gasoline	gasoline gallon	$3.13	$3.01	*$3.13*	*$3.13*	*$3.13*	*$3.61*	*$3.01*	***$3.01***	*$3.01*	*$3.47*
Diesel	diesel gallon	$3.22	$2.99	*$3.22*	*$2.79*	*$2.79*	*$3.22*	*$2.99*	***$2.59***	*$2.59*	*$2.99*
Electricity	kWh	$0.10	$0.10	*$0.10*	*$3.19*	*$3.19*	*$3.68*	*$0.10*	*$3.19*	*$3.19*	*$3.68*
G.H2	hydrogen kg										
B20	B20 gallon	$3.05	$2.61	*$3.05*	***$2.68***	*$2.68*	*$3.10*	*$2.61*	***$2.30***	*$2.30*	*$2.65*
B100	B100 gallon	$4.17	$4.36	*$4.17*	*$3.91*	*$3.91*	*$4.52*	*$4.36*	***$4.09***	*$4.09*	*$4.72*
RD20	RD20 gallon	$3.66	$2.96	*$3.66*	*$3.20*	*$3.20*	*$3.70*	*$2.96*	*$2.59*	*$2.59*	*$2.99*
RD100	RD100 gallon	$3.71	$2.95	*$3.71*	*$3.39*	*$3.39*	*$3.91*	*$2.95*	*$2.69*	*$2.69*	*$3.11*
E85	E85 gallon	$3.68	$2.37	*$3.68*	*$5.02*	*$5.02*	*$5.79*	*$2.37*	***$3.23***	*$3.23*	*$3.73*
Propane	LPG gallon	$2.06	$3.26	*$2.06*	*$2.72*	*$2.72*	*$3.14*	*$3.26*	***$4.31***	*$4.31*	*$4.97*
CNG	CNG GGE	$2.77	$1.72	*$2.77*	*$2.77*	*$2.77*	*$3.20*	*$1.72*	***$1.72***	*$1.72*	*$1.99*
LNG	LNG gallon	$1.91	$1.10	*$1.91*	*$2.87*	*$2.87*	*$3.31*	*$1.10*	*$1.65*	*$1.65*	*$1.91*
Diesel Exhaust Fluid (DEF)	DEF gallon	$2.80	$2.80	*$2.80*	*$2.80*	*$2.80*	*N/A*	*$2.80*	*$2.80*	*$2.80*	*N/A*

Total Cost of Ownership Inputs

Vehicle and Infrastructure Information

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure	*Default LDV*	*Default HDV*	*Default Infrastructure*
Years of Planned Ownership	years	15	15	15	*15*	*15*	*15*

Financial Assumptions

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure			
Loan	yes/no	No	No	No			
Loan Term	years	5	5	5	*5*	*5*	*5*
Interest Rate	%	4.20%	4.20%	4.20%	*4.20%*	*4.20%*	*4.20%*
Percent Down Payment	%	12.00%	12.00%	12.00%	*12.00%*	*12.00%*	*12.00%*
Discount Factor	%		1.24%			*1.24%*	

Fuel Production Assumptions

Biodiesel Feedstock Source	1 - Soy 2 - Canola 3 - Corn 4 - Tallow	1	
Renewable Diesel Feedstock Source	1 - Soy 2 - Canola 3 - Palm	1	
Ethanol Feedstock Source	1 - Corn 2 - Switchgrass 3 - Sugarcane 4 - Grain Sorghum	1	
CNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
LNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
North American NG Feedstock Source		Conventional 66%	Shale 34%
LPG Feedstock Source		NG 69%	Petroleum 31%
Source of Electricity for PHEVs, EVs, and FCVs (Electrolysis)	1 - Average U.S. Mix 2 to 11 - EIA Region Mix (see map) 12 - User Defined (go to 'Background Data' sheet)	11	
G.H2 Production Process	1 - Refueling Station SMR (On-site) 2 - Central Plant SMR (Off-site) 3 - Refueling Station Electrolysis (On-site)	1	

Number	Grid Mix
1	U.S.
2	ASCC
3	FRCC
4	HICC
5	MRO
6	NPCC
7	RFC
8	SERC
9	SPP
10	TRE
11	WECC
12	User Defined
11	**Default based on State and County**

Petroleum Use, GHGs & Air Pollutant Options

Petroleum Use, GHGs & Air Pollutant Calculation Type		1
1 - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants		
2 - Well-to-Wheels Petroleum Use, GHGs, and Air Pollutants		
3 - Well-to-Wheels & Vehicle Production* Petroleum Use, GHGs, Air Pollutants (*LDVs only)		
Diesel In-Use Emissions Multiplier	yes/no	No
Low NOx Engines - CNG, LNG, LPG HDVs	yes/no	Yes

Idle Reduction Inputs

Light-Duty Vehicle Information

Idle Reduction (IR) Vehicle Type	Passenger Car
IR Vocation Type	Police Car
Baseline Vehicle Model Year	2020
Annual Idling Hours (per Vehicle)	1,750

Services Required (% of hours):

	Vehicle Heating	Engine Heating	Cooling	Electrical
% of Idle Hours by Service	33%	0%	33%	34%

Default Services Required (% of hours):

Default Idle Hr	*Vehicle Heating*	*Engine Heating*	*Cooling*	*Electrical*
1750	*33%*	*0%*	*33%*	*34%*

Light-Duty Baseline & Idling Reduction Equipment	Number of Light-Duty Vehicles	Services Provided By IR Equipment: Vehicle Heating	Engine Heating	Cooling	Electrical	Idling Hour Reduction Goal	Fuel Consumption (GGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	*Default Fuel Consumption (GGE/hr)*	*Default Fuel Consumption (DGE/hr)*	*Electrical Power Demand (W)*	*Default Equipment Cost*
Gasoline	0						0.30			*0.30*	*0.26*		
Fuel Operated Air Heater	0	✓	✗	✗	✗	578	0.03	0	$900	*0.03*	*0.03*	*0*	*$900*
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0.08	0	$1,250	*0.08*	*0.07*	*0*	*$1,250*
Battery Management Start/Stop	0	✗	✗	✗	✓	595	0.00	250	$1,500	*0.00*	*0.00*	*250*	*$1,500*
APU (Battery)	0	✗	✗	✓	✓	1173	0.00	250	$4,300	*0.00*	*0.00*	*250*	*$4,300*
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	1750	0.03	250	$5,200	*0.03*	*0.03*	*250*	*$5,200*
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	1173	0.00	250	$5,800	*0.00*	*0.00*	*250*	*$5,800*

Heavy-Duty Vehicle Information

IR Vehicle Type	Combination Long-Haul Truck
IR Vocation Type	Long Haul Freight Truck
Baseline Vehicle Model Year	2020

Default Services Required (% of hours):

		Services Required (% of hours):				Default Idle Hr	Vehicle Heating	Engine Heating	Cooling	Electrical
Annual Conventional Idling Hours (per Vehicle)	150	Vehicle Heating	Engine Heating	Cooling	Electrical	150				
% of Idle Hours by Service		33%	0%	33%	34%		33%	0%	33%	34%
						Default Hotel Hr				
*Annual Hotelling Hours (per Vehicle)**	1,800	Vehicle Heating	Engine Heating	Cooling	Electrical	1800				
% of Hotelling Hours by Service		33%	0%	33%	34%		33%	0%	33%	34%

Heavy-Duty Baseline & Idling Reduction Equipment	Number of Heavy-Duty Vehicles	Services Provided By IR Equipment				Conventional Idling Hour Reduction Goal	Hotelling Hour Reduction Goal	Fuel Consumption (DGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	*Default Fuel Consumption (GGE/hr)*	*Default Fuel Consumption (DGE/hr)*	*Electrical Power Demand (W)*	*Default Equipment Cost*	*User Fuel Consumption (GGE/hr)*
Diesel	0							0.78			0.89	0.78			0.89
*Diesel (Hotelling)**								0.90			1.03	0.90			1.03
Fuel Operated Air Heater	0	✔	✘	✘	✘	50	594	0.06	0	$1,800	0.07	0.06	0	$1,800	0.07
Fuel Operated Coolant Heater	0	✘	✔	✘	✘	0	0	0.12	0	$1,700	0.14	0.12	0	$1,700	0.14
Battery Management Start/Stop	0	✘	✘	✘	✔	51	612	0.00	704	$2,500	0.00	0.00	704	$2,500	0.00
APU (Diesel)	0	✔	✔	✔	✔	150	1800	0.20	0	$10,000	0.23	0.20	0	$10,000	0.23
APU (Battery)	0	✘	✘	✔	✔	101	1206	0.00	704	$8,000	0.00	0.00	704	$8,000	0.00
APU (Battery) & Fuel Operated Air Heater	0	✔	✘	✔	✔	150	1800	0.06	704	$9,800	0.07	0.06	704	$9,800	0.07
APU (Battery) & Battery Management Start/Stop	0	✘	✘	✔	✔	101	1206	0.00	704	$10,500	0.00	0.00	704	$10,500	0.00
Truck Stop Electrification - Single System**	0	✘	✘	✔	✔	101	1206	0.00	704	$5	0.00	0.00	704	$5	0.00
Shore Power**	0	✘	✘	✔	✔	101	1206	0.00	704	$2,500	0.00	0.00	704	$2,500	0.00

Electric Vehicle Charging Inputs

Level 2 Charging Infrastructure

Predicted Weekly Utilization: Moderate

Venue	Number of Chargers	Weekly Utilization (sessions/week/station)	Average Session Power (kW)	Charge Time (minutes/session)	*Default Utilization Selected*	*Default Session Power (kW)*	*Default Charge Time (hr/session)*	*Low*	*Moderate*	*High*	*Default Charge Time (min/session)*	*User Charge Time (hr/session)*
Parking Lot	0	4.5	4	150	4.5	4	2.5	0.5	4.5	6.5	150	2.5
Retail & Leisure	0	5.5	4	90	5.5	4	1.5	1.0	5.5	7.0	90	1.5
Education	0	6.0	4	150	6.0	4	2.5	1.5	6.0	9.0	150	2.5
Healthcare	0	6.5	4	150	6.5	4	2.5	3.5	6.5	7.0	150	2.5
Workplace	0	4.5	4	150	4.5	4	2.5	1.0	4.5	7.5	150	2.5
Multi-Unit Dwelling	0	3.0	4	210	3.0	4	3.5	0.5	3.0	4.0	210	3.5
Single-Unit Dwelling	0	6.0	4	120	6.0	4	2.0	3.0	6.0	7.5	120	2.0

DC Fast Charging Infrastructure

Predicted Weekly Utilization: Moderate

Venue	Number of Chargers	Weekly Utilization (sessions/week/station)	Average Session Power (kW)	Charge Time (minutes/session)	*Default Utilization Selected*	*Default Session Power (kW)*	*Default Charge Time (hr/session)*	*Low*	*Moderate*	*High*	*Default Charge Time (min/session)*	*User Charge Time (hr/session)*
Parking Lot	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Retail & Leisure	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Education	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Healthcare	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Workplace	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Multi-Unit Dwelling	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Single-Unit Dwelling	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4

Off-Road Equipment Inputs

Small Equipment Information

						Default Rated hp				
Equipment Type	Commercial Turf Equipment									
Vocation Type	Zero-Turn Commercial Turf									
Rated Horsepower	25					25				
	Type	**Replacements per Lifetime**	**Battery Capacity (kWh)**	**Battery Cost ($/kWh)**	**Lifetime Replacement Cost**	*Default Type*	*Default Replacements per Lifetime*	*Default kWh*	*Default $/kWh: Lithium-Ion*	*User $/kWh: Lithium-Ion*
EV Battery Replacement	Lithium-Ion	0	21.6	$800	$0	Lithium-Ion	0	21.6	$800	$800

Small Equipment Fuel Type	Number of Units	Annual Hourly Usage	Fuel Consumption (GGE/hr)	Equipment Price ($/unit)	Maintenance & Repair ($/hr)	*Default Usage*	*Default GGE/hr*	*Default AFV GGE/hr Relative Ratio*	*User AFV GGE/hr Relative Ratio*	*Default Purchase Price*	*User Purchase Price + Battery Replacement*	*Default Maintenance & Repair*	*User DGE/hr*	*User Rated hp*
Gasoline	0	1,364	0.34	$12,000	$0.12	1,364	0.34	1.00	1.00	$12,000	$12,000	$0.12	0.29	25
Diesel	0	1,364	0.28	$16,000	$0.15	1,364	0.28	0.83	0.83	$16,000	$16,000	$0.15	0.25	25
Gasoline Hybrid Electric Vehicle (HEV)	0	0	0.24	$0	$0.00	0	0.24	0.71	0.71	$0	$0	$0.00	0.21	25
All-Electric Vehicle (EV)	0	1,364	0.07	$23,000	$0.05	1,364	0.07	0.20	0.20	$23,000	$23,000	$0.05	0.06	25
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	0.11	$0	$0.00	0	0.11	0.33	0.33	$0	$0	$0.00	0.10	25
Biodiesel (B20)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Biodiesel (B100)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Renewable Diesel (RD20)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Renewable Diesel (RD100)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Ethanol (E85)	0	0	0.34	$0	$0.00	0	0.34	1.00	1.00	$0	$0	$0.00	0.29	25
Propane (LPG)	0	1,364	0.34	$13,500	$0.12	1,364	0.34	1.00	1.00	$13,500	$13,500	$0.12	0.29	25
Compressed Natural Gas (CNG)	0	0	0.34	$0	$0.00	0	0.34	1.00	1.00	$0	$0	$0.00	0.29	25

Large Equipment Information

						Default Rated hp				
Equipment Type	Forklifts									
Vocation Type	Warehouse Forklift									
Rated Horsepower	50					50				
	Type	**Replacements per Lifetime**	**Battery Capacity (kWh)**	**Battery Cost ($/kWh)**	**Lifetime Replacement Cost**	*Default Type*	*Default Replacements per Lifetime*	*Default kWh*	*Default $/kWh: Lead-Acid*	*User $/kWh: Lead-Acid*
EV Battery Replacement	Lead-Acid	0	43.2	$200	$0	Lead-Acid	0	43.2	$200	$200

Large Equipment Fuel Type	Number of Units	Annual Hourly Usage	Fuel Consumption (DGE/hr)	Equipment Price ($/unit)	Maintenance & Repair ($/hr)	*Default Usage*	*Default DGE/hr*	*Default AFV MPDGE Relative Ratio*	*User AFV MPDGE Relative Ratio*	*Default Purchase Price*	*User Purchase Price + Battery Replacement*	*Default Maintenance & Repair*	*Default GGE/hr*	*User Rated hp*	*User GGE/hr*
Gasoline	0	1,700	0.70	$22,000	$0.14	1,700	0.70	1.00	1.00	$22,000	$22,000	$0.14	0.80	50	0.80
Diesel	0	1,700	0.58	$30,000	$0.19	1,700	0.58	0.83	0.83	$30,000	$30,000	$0.19	0.67	50	0.67
All-Electric Vehicle (EV)	0	1,700	0.14	$37,000	$0.08	1,700	0.14	0.20	0.20	$37,000	$37,000	$0.08	0.16	50	0.16
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	1,700	0.23	$40,000	$0.08	1,700	0.23	0.33	0.33	$40,000	$40,000	$0.08	0.27	50	0.27
Diesel Hybrid Electric Vehicle (HEV)	0	0	0.48	$0	$0.00	0	0.48	0.69	0.69	$0	$0	$0.00	0.56	50	0.56
Diesel Hydraulic Hybrid (HHV)	0	0	0.48	$0	$0.00	0	0.48	0.69	0.69	$0	$0	$0.00	0.56	50	0.56
Biodiesel (B20)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Biodiesel (B100)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Renewable Diesel (RD20)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Renewable Diesel (RD100)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Ethanol (E85)	0	0	0.70	$0	$0.00	0	0.70	1.00	1.00	$0	$0	$0.00	0.80	50	0.80
Propane (LPG)	0	1,700	0.70	$25,000	$0.14	1,700	0.70	1.00	1.00	$25,000	$25,000	$0.14	0.80	50	0.80
Compressed Natural Gas (CNG)	0	1,700	0.70	$50,000	$0.14	1,700	0.70	1.00	1.00	$50,000	$50,000	$0.14	0.80	50	0.80
Liquefied Natural Gas (LNG)	0	0	0.70	$0	$0.00	0	0.70	1.00	1.00	$0	$0	$0.00	0.80	50	0.80
LNG / Diesel Pilot Ignition	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67

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On-Road Fleet Footprint Calculator

State: WASHINGTON

Year: 2020

Vehicle Type	Model Year	Annual Vehicle Mileage	Fuel Use: Gasoline (gal)	Diesel (gal)	Gasoline HEV (gal)	Gasoline PHEV (gal)	Gasoline PHEV (kWh)	Gasoline EREV (gal)	Gasoline EREV (kWh)	Electricity (kWh)	G.H2 (kg)	Diesel HEV (gal)	Diesel HHV (gal)	B20 (gal)	B100 (gal)	RD20 (gal)	RD100 (gal)	E85 (gal)	LPG (gal)	CNG (GGE)	LNG (gal)	LNG / Diesel (LNG gal)	LNG / Diesel (diesel gal)	Remaining Lifetime (years): Default Lifetime	Calculated Lifetime	Age	Remaining Lifetime	Well-to-Wheels Petroleum Use (barrels)	Vehicle Production Petroleum Use (barrels)	Well-to-Wheels GHGs (short tons)	Vehicle Production GHGs (short tons)	CO	NOx
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	2005	4,200		212																				15	15	15	0	5.3	0.0	2.9	0.0	28.7	33.7
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	1992	4,200		627																				15	28	28	0	15.6	0.0	8.6	0.0	48.9	153.3
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	2008	336,000		50,149																				15	15	12	3	1,249.4	0.0	687.9	0.0	726.7	5,157.1
Combination Short-Haul Truck	2008	336,000		50,149																				15	15	12	3	1,249.4	0.0	687.9	0.0	726.7	5,157.1
Combination Short-Haul Truck	2001	300,000		44,776																				15	19	19	0	1,115.5	0.0	614.2	0.0	3,837.4	13,018.1
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

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Off-Road Fleet Footprint Calculator

State
WASHINGTON

Year 2021

Equipment Type	Model Year	Annual Usage (hours)	Rated Horsepower (hp)	Fuel Use: Gasoline (gal)	Diesel (gal)	Electricity (kWh)	G.H2 (kg)	B20 (gal)	B100 (gal)	RD20 (gal)	RD100 (gal)	E85 (gal)	LPG (gal)	CNG (GGE)	LNG (gal)	Default Annual Usage (hr)	Default Rated Horsepower (hp)	Default Estimated Gasoline Use (gal)	Default Estimated Electricity Use (kWh)	Load Factor %
Aerial Lifts																384	47	86	565	21%
Aerial Lifts																384	47	86	565	21%
Agricultural Tractors																475	50	318	2,090	59%
Agricultural Tractors																475	50	318	2,090	59%
Airport Support Equipment																732	150	1,469	9,662	59%
Airport Support Equipment																732	150	1,469	9,662	59%
Chain Saws																303	4	19	127	70%
Chain Saws																303	4	19	127	70%
Commercial Turf Equipment																1,364	25	464	3,051	60%
Commercial Turf Equipment																1,364	25	464	3,051	60%
Cranes																990	365	3,524	23,173	43%
Cranes																990	365	3,524	23,173	43%
Crawler Tractor/Dozers	2020	7,500	452		75,000											936	130	1,628	10,707	59%
Crawler Tractor/Dozers	2003	8,400	140		84,000											936	130	1,628	10,707	59%
Excavators	2017	600	425		6,000											1,092	25	365	2,402	59%
Excavators																1,092	25	365	2,402	59%
Forklifts																1,700	50	1,137	7,479	59%
Forklifts																1,700	50	1,137	7,479	59%
Golf Carts																1,080	9	101	667	46%
Golf Carts																1,080	9	101	667	46%
Lawn & Garden Tractors																721	26	187	1,230	44%
Lawn & Garden Tractors																721	26	187	1,230	44%
Lawn Mowers																406	20	61	400	33%
Lawn Mowers																406	20	61	400	33%
Leafblowers/Vacuums																564	14	168	1,107	94%
Leafblowers/Vacuums																564	14	168	1,107	94%
Rollers																760	95	966	6,353	59%
Rollers																760	95	966	6,353	59%
Rubber Tire Loaders	2006	7,500	269		75,000											761	599	6,099	40,110	59%
Rubber Tire Loaders																761	599	6,099	40,110	59%
Skid Steer Loaders																818	48	187	1,230	21%
Skid Steer Loaders																818	48	187	1,230	21%
Snowblowers																272	8	10	65	20%
Snowblowers																272	8	10	65	20%
Sweepers/Scrubbers																1,032	40	665	4,371	71%
Sweepers/Scrubbers																1,032	40	665	4,371	71%
Terminal Tractors																1,257	141	2,372	15,596	59%
Terminal Tractors																1,257	141	2,372	15,596	59%
Tractors/Loaders/Backhoes	2014	8,400	94		84,000											1,135	73	395	2,595	21%
Tractors/Loaders/Backhoes																1,135	73	395	2,595	21%
Trimmers/Edgers/Brush Cutter																274	2	11	74	91%
Trimmers/Edgers/Brush Cutter																274	2	11	74	91%

Equipment Type	Remaining Lifetime: Median Life Full Load (hr)	Calculated Lifetime (hr)	Cumulative Hours	Remaining Lifetime (hr)	Remaining Years	Well-to-Wheels Petroleum Use (barrels)	Well-to-Wheels GHGs (short tons)	Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aerial Lifts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0	0	7,500	0	0	1,868.5	1,028.8	79.4	489.5	13.2	13.2	39.7	0.0	11.7
Crawler Tractor/Dozers	0	0	151,200	0	0	2,092.7	1,152.3	2,239.4	6,470.4	458.9	445.1	625.6	0.0	13.1
Excavators	0	0	2,400	0	0	149.5	82.3	27.5	77.3	4.3	4.3	6.0	0.0	0.9
Excavators	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0	0	112,500	0	0	1,868.5	1,028.8	3,427.2	7,631.2	737.4	716.4	619.3	0.0	11.7
Rubber Tire Loaders	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0	0	58,800	0	0	2,092.7	1,152.3	291.4	829.5	43.5	42.0	27.8	0.0	13.1
Tractors/Loaders/Backhoes	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment Type	Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Well-to-Wheels Petroleum Use (barrels)	Remaining Lifetime Well-to-Wheels GHGs (short tons)	Remaining Lifetime Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment Type	Externality Cost - Well-to-Wheels Petroleum Use	Externality Cost - Well-to-Wheels GHGs	Externality Cost - Equipment Operation Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$31,671	$41,953	$0	$873	$0	$873	$845	$0	$64	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$35,472	$46,966	$0	$11,532	$87	$28,092	$6,188	$0	$746	$0	$0	$0	$0	$0	$0	$0
Excavators	$2,534	$3,353	$0	$134	$0	$300	$61	$0	$13	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$31,671	$41,953	$0	$13,603	$153	$47,995	$6,124	$0	$661	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$35,472	$46,966	$0	$1,478	$0	$2,774	$264	$0	$746	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Equipment Type	Remaining Lifetime Externality Cost - Well-to-Wheels Petroleum Use	Remaining Lifetime Externality Cost - Well-to-Wheels GHGs	Remaining Lifetime Externality Cost - Equipment Operation Air: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

On-Road and Off-Road Fleet Footprint Calculator Output

		pounds	39,017.2	**11,122.0**	MTCO2E	Fuel Use (Barrels)	11,707.0
On-Road Fleet Footprint Calculator Output	5,848.0	**tons**	17.69807116			Gallons	**491,695**
			5274.025204				

On-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	5.3	2.9	28.7	33.7	3.0	2.5	8.4	0.0
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	15.6	8.6	48.9	153.3	8.5	7.0	21.4	0.1
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	3,614.3	1,990.1	5,290.7	23,332.3	807.8	568.8	1,355.9	22.6
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	3,635.2	2,001.6	5,368.3	23,519.3	819.2	578.3	1,385.7	22.7

Remaining Lifetime Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	7,496.2	4,127.6	4,360.1	30,942.7	617.8	204.4	928.9	46.8
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	7,496.2	4,127.6	4,360.1	30,942.7	617.8	204.4	928.9	46.8

On-Road Fleet Footprint Calculator Output - Externality Costs

Current Year On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$90	$119	$0	$60	$3	$163	$85	$2
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$265	$350	$0	$273	$9	$460	$219	$6
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$61,263	$81,113	$0	$41,586	$1,502	$37,560	$13,846	$1,279
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$61,617	$81,582	$0	$41,919	$1,514	$38,183	$14,150	$1,286

Remaining Lifetime On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$0	$0	$0	$0	$0	$0	$0	$0
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$127,064	$168,235	$0	$55,150	$2,598	$13,500	$9,485	$2,652
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$127,064	$168,235	$0	$55,150	$2,598	$13,500	$9,485	$2,652

Off-Road Fleet Footprint Calculator Output

Off-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Equipment Type

	Petroleum Use	GHGs	CO	NOx	PM10	PM2.5	VOC	SOx

Equipment Type	(barrels)	(short tons)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	3,961.2	2,181.1	2,318.8	6,959.9	472.1	458.4	665.3	24.7
Excavators	149.5	82.3	27.5	77.3	4.3	4.3	6.0	0.9
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	1,868.5	1,028.8	3,427.2	7,631.2	737.4	716.4	619.3	11.7
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	2,092.7	1,152.3	291.4	829.5	43.5	42.0	27.8	13.1
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	8,071.9	4,444.6	6,064.9	15,497.9	1,257.3	1,221.1	1,318.4	50.4

Remaining Lifetime Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Equipment Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Off-Road Fleet Footprint Calculator Output - Externality Costs

Current Year Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$67,144	$88,899	$0	$12,405	$87	$30,266	$6,794	$1,401
Excavators	$2,534	$3,355	$0	$138	$0	$285	$61	$53
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$31,671	$41,933	$0	$13,601	$132	$47,305	$6,324	$661

Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$35,472	$46,966	$0	$1,478	$9	$2,776	$284	$740
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$136,821	$181,153	$0	$27,622	$228	$80,631	$13,463	$2,855

Remaining Lifetime Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0	$0	$0

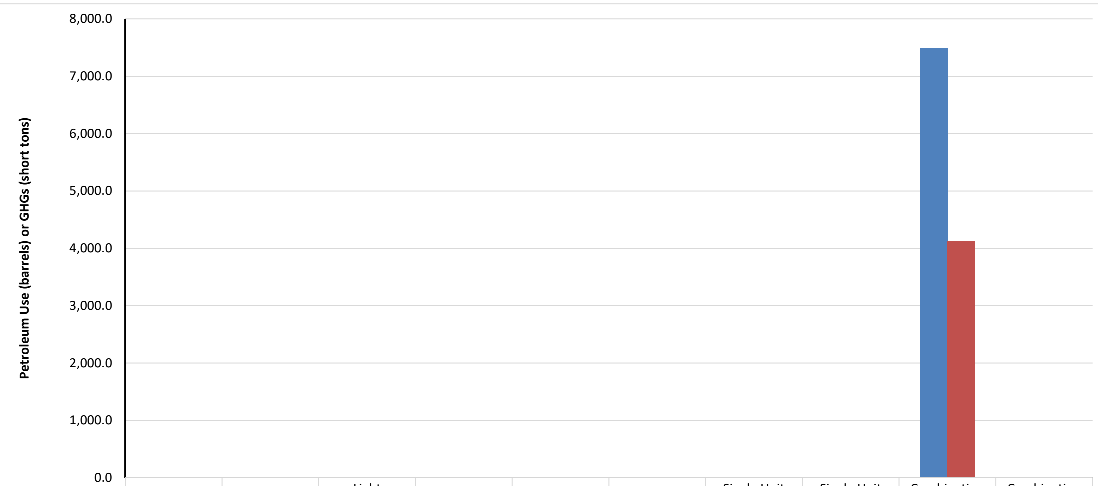
Current Year Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet

	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
Petroleum Use	0.0	0.0	5.3	0.0	0.0	0.0	15.6	0.0	3,614.3	0.0
GHGs	0.0	0.0	2.9	0.0	0.0	0.0	8.6	0.0	1,990.1	0.0

Current Year Vehicle Operation Air Pollutants - On-Road Fleet

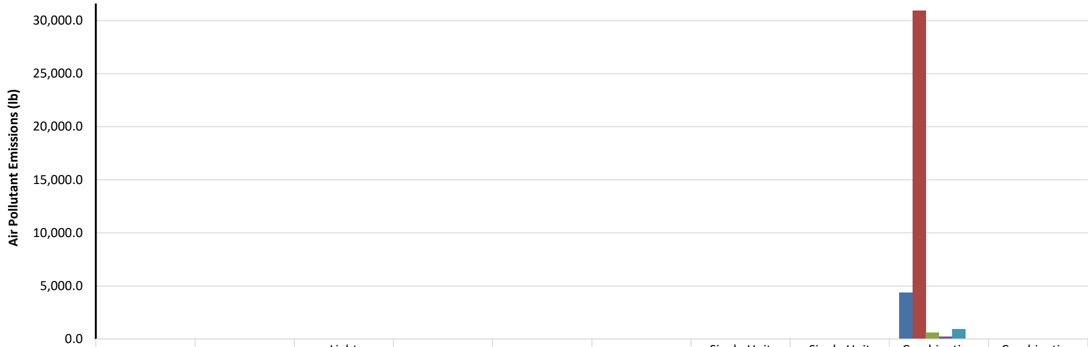
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	28.7	0.0	0.0	0.0	48.9	0.0	5,290.7	0.0
NOx	0.0	0.0	33.7	0.0	0.0	0.0	153.3	0.0	23,332.3	0.0
PM10	0.0	0.0	3.0	0.0	0.0	0.0	8.5	0.0	807.8	0.0
PM2.5	0.0	0.0	2.5	0.0	0.0	0.0	7.0	0.0	568.8	0.0
VOC	0.0	0.0	8.4	0.0	0.0	0.0	21.4	0.0	1,355.9	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	22.6	0.0

Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet



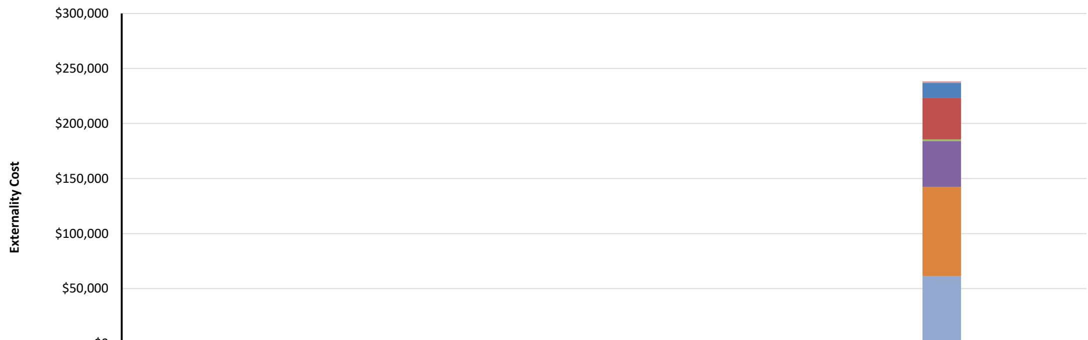
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7,496.2	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,127.6	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - On-Road Fleet



	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,360.1	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30,942.7	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	617.8	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	204.4	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	928.9	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.8	0.0

Current Year Externality Costs - On-Road Fleet

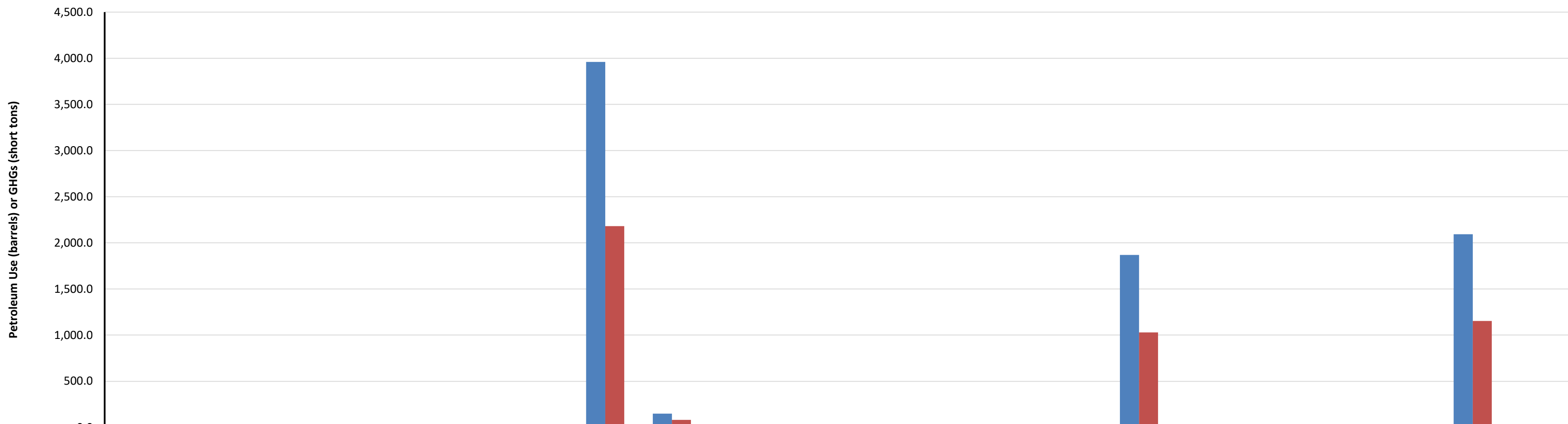


	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$2	$0	$0	$0	$6	$0	$1,279	$0
VOC	$0	$0	$85	$0	$0	$0	$219	$0	$13,846	$0
PM2.5	$0	$0	$163	$0	$0	$0	$460	$0	$37,560	$0
PM10	$0	$0	$3	$0	$0	$0	$9	$0	$1,502	$0
NOx	$0	$0	$60	$0	$0	$0	$273	$0	$41,586	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$119	$0	$0	$0	$350	$0	$81,113	$0
Petroleum Use	$0	$0	$90	$0	$0	$0	$265	$0	$61,263	$0

Remaining Lifetime Externality Costs - On-Road Fleet

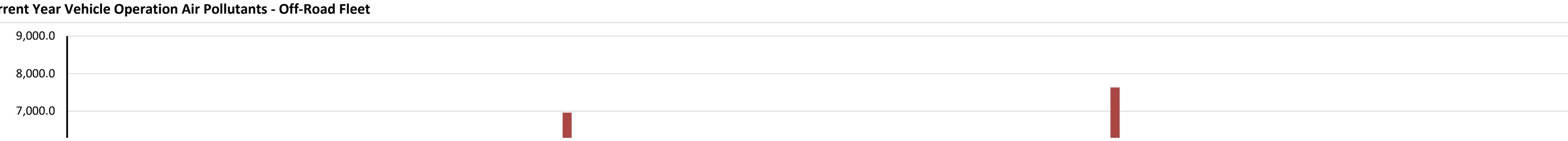
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$0	$0	$0	$0	$0	$0	$2,652	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$0	$9,485	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$0	$13,500	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$0	$2,598	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$0	$55,150	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$0	$168,235	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$0	$127,064	$0

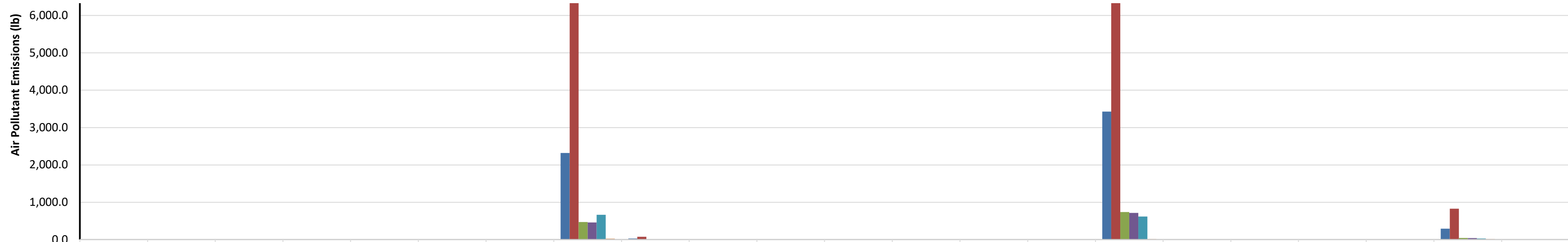
Current Year Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,961.2	149.5	0.0	0.0	0.0	0.0	0.0	0.0	1,868.5	0.0	0.0	0.0	0.0	2,092.7	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,181.1	82.3	0.0	0.0	0.0	0.0	0.0	0.0	1,028.8	0.0	0.0	0.0	0.0	1,152.3	0.0

Current Year Vehicle Operation Air Pollutants - Off-Road Fleet





	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,318.8	27.5	0.0	0.0	0.0	0.0	0.0	0.0	3,427.2	0.0	0.0	0.0	0.0	291.4	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,959.9	77.3	0.0	0.0	0.0	0.0	0.0	0.0	7,631.2	0.0	0.0	0.0	0.0	829.5	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	472.1	4.3	0.0	0.0	0.0	0.0	0.0	0.0	737.4	0.0	0.0	0.0	0.0	43.5	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	458.4	4.3	0.0	0.0	0.0	0.0	0.0	0.0	716.4	0.0	0.0	0.0	0.0	42.0	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	665.3	6.0	0.0	0.0	0.0	0.0	0.0	0.0	619.3	0.0	0.0	0.0	0.0	27.8	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.7	0.9	0.0	0.0	0.0	0.0	0.0	0.0	11.7	0.0	0.0	0.0	0.0	13.1	0.0

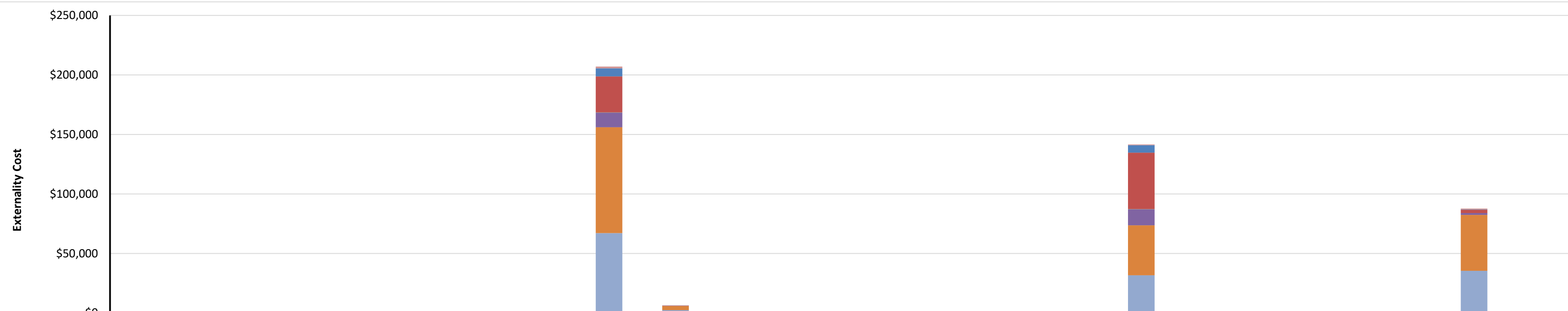
Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet

	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - Off-Road Fleet

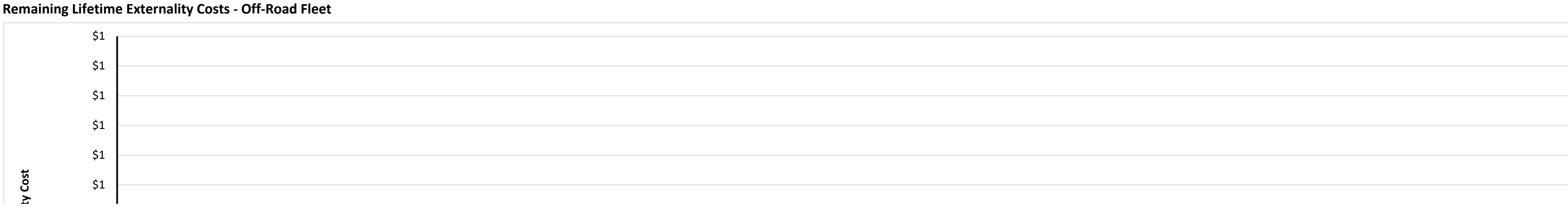
	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Current Year Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$1,401	$53	$0	$0	$0	$0	$0	$0	$661	$0	$0	$0	$0	$740	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$6,794	$61	$0	$0	$0	$0	$0	$0	$6,324	$0	$0	$0	$0	$284	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$30,266	$285	$0	$0	$0	$0	$0	$0	$47,305	$0	$0	$0	$0	$2,776	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$87	$0	$0	$0	$0	$0	$0	$0	$132	$0	$0	$0	$0	$9	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$12,405	$138	$0	$0	$0	$0	$0	$0	$13,601	$0	$0	$0	$0	$1,478	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$88,899	$3,355	$0	$0	$0	$0	$0	$0	$41,933	$0	$0	$0	$0	$46,966	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$67,144	$2,534	$0	$0	$0	$0	$0	$0	$31,671	$0	$0	$0	$0	$35,472	$0

Remaining Lifetime Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Key Inputs

Key Inputs	Calculator Inputs Used In
Primary Vehicle Location	Payback, TCO, IR, Footprint
Light-Duty Vehicle Information	Payback, TCO
Heavy-Duty Vehicle Information	Payback, TCO
Fuel and DEF Price	Payback, TCO, IR
Total Cost of Ownership Inputs	TCO
Fuel Production Assumptions	Payback, TCO, IR, Footprint
Petroleum Use, GHGs & Air Pollutant Options	Payback, TCO, IR, Footprint
Idle Reduction Inputs	IR
Electric Vehicle Charging Inputs	Charging
Off-Road Equipment Inputs	Payback

Key Vehicle and Fuel Inputs

Primary Vehicle Location

State	WASHINGTON
County	KING

Light-Duty Vehicle Information

Vehicle Type	Passenger Car
Vocation Type	Car

Light-Duty Fuel Type	Number of Light-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPGGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	Default Mileage	Default MPGGE	Default AFV MPGGE Relative Ratio	User AFV MPGGE Relative Ratio	Default Purchase Price	Default Maintenance & Repair	User MPGGE
Gasoline	0	12,400	30.9	$20,000	$0.15	12,400	30.9	1.00	1.00	$20,000	$0.15	35.7
Diesel	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Gasoline Hybrid Electric Vehicle (HEV)	0	12,400	46.3	$22,000	$0.14	12,400	46.3	1.50	1.50	$22,000	$0.14	53.4
Gasoline Plug-in Hybrid Electric Vehicle (PHEV)	0	12,400	53.2	$27,000	$0.13	12,400	53.2	1.72	1.72	$27,000	$0.13	61.4
Gasoline Extended Range Electric Vehicle (EREV)	0	12,400	44.4	$33,000	$0.13	12,400	44.4	1.43	1.43	$33,000	$0.13	51.2
All-Electric Vehicle (EV)	0	12,400	106.2	$37,000	$0.09	12,400	106.2	3.43	3.43	$37,000	$0.09	122.6
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	12,400	73.5	$50,000	$0.09	12,400	73.5	2.38	2.38	$50,000	$0.09	84.8
Biodiesel (B20)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Biodiesel (B100)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Renewable Diesel (RD20)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Renewable Diesel (RD100)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Ethanol (E85)	0	12,400	30.9	$20,000	$0.15	12,400	30.9	1.00	1.00	$20,000	$0.15	35.7
Propane (LPG)	0	12,400	30.9	$26,000	$0.15	12,400	30.9	1.00	1.00	$26,000	$0.15	35.7
Compressed Natural Gas (CNG)	0	12,400	29.4	$27,000	$0.15	12,400	29.4	0.95	0.95	$27,000	$0.15	33.9

Heavy-Duty Vehicle Information

Vehicle Type	School Bus
Vocation Type	School Bus

Heavy-Duty Fuel Type	Number of Heavy-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPDGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	Default Mileage	Default MPDGE	Default AFV MPDGE Relative Ratio	User AFV MPDGE Relative Ratio	Default Purchase Price	Default Maintenance & Repair	Default MPGGE	User MPGGE
Gasoline	0	0	6.8	$0	$0.61	0	6.8	0.83	0.83	$0	$0.61	5.9	5.9
Diesel	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
All-Electric Vehicle (EV)	0	15,000	24.0	$300,000	$0.56	15,000	24.0	2.93	2.93	$300,000	$0.56	20.8	20.8
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	11.3	$0	$0.56	0	11.3	1.38	1.38	$0	$0.56	9.8	9.8
Diesel Hybrid Electric Vehicle (HEV)	0	15,000	11.1	$160,000	$0.81	15,000	11.1	1.35	1.35	$160,000	$0.81	9.6	9.6
Diesel Hydraulic Hybrid (HHV)	0	0	10.6	$0	$0.81	0	10.6	1.29	1.29	$0	$0.81	9.2	9.2
Biodiesel (B20)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Biodiesel (B100)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Renewable Diesel (RD20)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Renewable Diesel (RD100)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Ethanol (E85)	0	0	6.8	$0	$0.61	0	6.8	0.83	0.83	$0	$0.61	5.9	5.9
Propane (LPG)	0	15,000	6.8	$108,000	$0.61	15,000	6.8	0.83	0.83	$108,000	$0.61	5.9	5.9
Compressed Natural Gas (CNG)	0	15,000	7.0	$130,000	$0.93	15,000	7.0	0.85	0.85	$130,000	$0.93	6.0	6.0
Liquefied Natural Gas (LNG)	0	15,000	7.0	$120,000	$0.93	15,000	7.0	0.85	0.85	$120,000	$0.93	6.0	6.0
LNG / Diesel Pilot Ignition	0	0	7.8	$0	$0.97	0	7.8	0.95	0.95	$0	$0.97	6.7	6.7

Refueling Information

Fueling Type	Private Station	Infrastructure costs (go to 'Payback')
Fuel Price Sensitivity	No	Enter fuel price range (go to 'Payback')

Fuel and DEF Price

	Fuel Unit	Public Station ($/fuel unit)	Private Station ($/fuel unit)	Public Station: Default $/Fuel Unit	Public Station: Default $/GGE	Public Station: User $/GGE	Public Station: User $/DGE	Private Station: Default $/Fuel Unit	Private Station: Default $/GGE	Private Station: User $/GGE	Private Station: User $/DGE
Gasoline	gasoline gallon	$3.13	$3.01	$3.13	$3.13	$3.13	$3.61	$3.01	**$3.01**	$3.01	$3.47
Diesel	diesel gallon	$3.22	$2.99	$3.22	$2.79	$2.79	$3.22	$2.99	**$2.59**	$2.59	$2.99
Electricity	kWh	$0.10	$0.10	$0.10	$3.19	$3.19	$3.68	$0.10	$3.19	$3.19	$3.68
G.H2	hydrogen kg										
B20	B20 gallon	$3.05	$2.61	$3.05	**$2.68**	$2.68	$3.10	$2.61	**$2.30**	$2.30	$2.65
B100	B100 gallon	$4.17	$4.36	$4.17	$3.91	$3.91	$4.52	$4.36	**$4.09**	$4.09	$4.72
RD20	RD20 gallon	$3.66	$2.96	$3.66	$3.20	$3.20	$3.70	$2.96	$2.59	$2.59	$2.99
RD100	RD100 gallon	$3.71	$2.95	$3.71	$3.39	$3.39	$3.91	$2.95	$2.69	$2.69	$3.11
E85	E85 gallon	$3.68	$2.37	$3.68	$5.02	$5.02	$5.79	$2.37	**$3.23**	$3.23	$3.73
Propane	LPG gallon	$2.06	$3.26	$2.06	$2.72	$2.72	$3.14	$3.26	**$4.31**	$4.31	$4.97
CNG	CNG GGE	$2.77	$1.72	$2.77	$2.77	$2.77	$3.20	$1.72	**$1.72**	$1.72	$1.99
LNG	LNG gallon	$1.91	$1.10	$1.91	$2.87	$2.87	$3.31	$1.10	$1.65	$1.65	$1.91
Diesel Exhaust Fluid (DEF)	DEF gallon	$2.80	$2.80	$2.80	$2.80	$2.80	N/A	$2.80	$2.80	$2.80	N/A

Total Cost of Ownership Inputs

Vehicle and Infrastructure Information

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure	Default LDV	Default HDV	Default Infrastructure
Years of Planned Ownership	years	15	15	15	15	15	15

Financial Assumptions

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure			
Loan	yes/no	No	No	No			
Loan Term	years	5	5	5	5	5	5
Interest Rate	%	4.20%	4.20%	4.20%	4.20%	4.20%	4.20%
Percent Down Payment	%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%
Discount Factor	%		1.24%			1.24%	

Fuel Production Assumptions

	Options	Selection	
Biodiesel Feedstock Source	1 - Soy 2 - Canola 3 - Corn 4 - Tallow	1	
Renewable Diesel Feedstock Source	1 - Soy 2 - Canola 3 - Palm	1	
Ethanol Feedstock Source	1 - Corn 2 - Switchgrass 3 - Sugarcane 4 - Grain Sorghum	1	
CNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
LNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
North American NG Feedstock Source		Conventional 66%	Shale 34%
LPG Feedstock Source		NG 69%	Petroleum 31%
Source of Electricity for PHEVs, EVs, and FCVs (Electrolysis)	1 - Average U.S. Mix 2 to 11 - EIA Region Mix (see map) 12 - User Defined (go to 'Background Data' sheet)	11	
G.H2 Production Process	1 - Refueling Station SMR (On-site) 2 - Central Plant SMR (Off-site) 3 - Refueling Station Electrolysis (On-site)	1	

Number	Grid Mix
1	U.S.
2	ASCC
3	FRCC
4	HICC
5	MRO
6	NPCC
7	RFC
8	SERC
9	SPP
10	TRE
11	WECC
12	User Defined
11	**Default based on State and County**

Petroleum Use, GHGs & Air Pollutant Options

Petroleum Use, GHGs & Air Pollutant Calculation Type		1
1 - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants		
2 - Well-to-Wheels Petroleum Use, GHGs, and Air Pollutants		
3 - Well-to-Wheels & Vehicle Production* Petroleum Use, GHGs, Air Pollutants (*LDVs only)		
Diesel In-Use Emissions Multiplier	yes/no	No
Low NOx Engines - CNG, LNG, LPG HDVs	yes/no	Yes

Idle Reduction Inputs

Light-Duty Vehicle Information

Idle Reduction (IR) Vehicle Type	Passenger Car	
IR Vocation Type	Police Car	
Baseline Vehicle Model Year	2020	
Annual Idling Hours (per Vehicle)	1,750	Default Idle Hr: 1750

Services Required (% of hours):	Vehicle Heating	Engine Heating	Cooling	Electrical
% of Idle Hours by Service	33%	0%	33%	34%
Default Services Required (% of hours):	33%	0%	33%	34%

Light-Duty Baseline & Idling Reduction Equipment	Number of Light-Duty Vehicles	Services Provided By IR Equipment: Vehicle Heating	Engine Heating	Cooling	Electrical	Idling Hour Reduction Goal	Fuel Consumption (GGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	Default Fuel Consumption (GGE/hr)	Default Fuel Consumption (DGE/hr)	Electrical Power Demand (W)	Default Equipment Cost
Gasoline	0						0.30			0.30	0.26		
Fuel Operated Air Heater	0	✓	✗	✗	✗	578	0.03	0	$900	0.03	0.03	0	$900
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0.08	0	$1,250	0.08	0.07	0	$1,250
Battery Management Start/Stop	0	✗	✗	✗	✓	595	0.00	250	$1,500	0.00	0.00	250	$1,500
APU (Battery)	0	✗	✗	✓	✓	1173	0.00	250	$4,300	0.00	0.00	250	$4,300
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	1750	0.03	250	$5,200	0.03	0.03	250	$5,200
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	1173	0.00	250	$5,800	0.00	0.00	250	$5,800

Heavy-Duty Vehicle Information

IR Vehicle Type	Combination Long-Haul Truck
IR Vocation Type	Long Haul Freight Truck
Baseline Vehicle Model Year	2020

Default Services Required (% of hours):

		Services Required (% of hours):				Default Idle Hr	Vehicle Heating	Engine Heating	Cooling	Electrical
Annual Conventional Idling Hours (per Vehicle)	150	Vehicle Heating	Engine Heating	Cooling	Electrical	150				
% of Idle Hours by Service		33%	0%	33%	34%		33%	0%	33%	34%
						Default Hotel Hr				
*Annual Hotelling Hours (per Vehicle)**	1,800	Vehicle Heating	Engine Heating	Cooling	Electrical	1800				
% of Hotelling Hours by Service		33%	0%	33%	34%		33%	0%	33%	34%

Heavy-Duty Baseline & Idling Reduction Equipment	Number of Heavy-Duty Vehicles	Services Provided By IR Equipment				Conventional Idling Hour Reduction Goal	Hotelling Hour Reduction Goal	Fuel Consumption (DGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	*Default Fuel Consumption (GGE/hr)*	*Default Fuel Consumption (DGE/hr)*	*Electrical Power Demand (W)*	*Default Equipment Cost*	*User Fuel Consumption (GGE/hr)*
Diesel	0							0.78			0.89	0.78			0.89
*Diesel (Hotelling)**								0.90			1.03	0.90			1.03
Fuel Operated Air Heater	0	✓	✗	✗	✗	50	594	0.06	0	$1,800	0.07	0.06	0	$1,800	0.07
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0	0.12	0	$1,700	0.14	0.12	0	$1,700	0.14
Battery Management Start/Stop	0	✗	✗	✗	✓	51	612	0.00	704	$2,500	0.00	0.00	704	$2,500	0.00
APU (Diesel)	0	✓	✓	✓	✓	150	1800	0.20	0	$10,000	0.23	0.20	0	$10,000	0.23
APU (Battery)	0	✗	✗	✓	✓	101	1206	0.00	704	$8,000	0.00	0.00	704	$8,000	0.00
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	150	1800	0.06	704	$9,800	0.07	0.06	704	$9,800	0.07
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	101	1206	0.00	704	$10,500	0.00	0.00	704	$10,500	0.00
Truck Stop Electrification - Single System**	0	✗	✗	✓	✓	101	1206	0.00	704	$5	0.00	0.00	704	$5	0.00
Shore Power**	0	✗	✗	✓	✓	101	1206	0.00	704	$2,500	0.00	0.00	704	$2,500	0.00

Electric Vehicle Charging Inputs

Level 2 Charging Infrastructure

Predicted Weekly Utilization: Moderate

Venue	Number of Chargers	Weekly Utilization (sessions/week/station)	Average Session Power (kW)	Charge Time (minutes/session)	*Default Utilization Selected*	*Default Session Power (kW)*	*Default Charge Time (hr/session)*	*Low*	*Moderate*	*High*	*Default Charge Time (min/session)*	*User Charge Time (hr/session)*
Parking Lot	0	4.5	4	150	4.5	4	2.5	0.5	4.5	6.5	150	2.5
Retail & Leisure	0	5.5	4	90	5.5	4	1.5	1.0	5.5	7.0	90	1.5
Education	0	6.0	4	150	6.0	4	2.5	1.5	6.0	9.0	150	2.5
Healthcare	0	6.5	4	150	6.5	4	2.5	3.5	6.5	7.0	150	2.5
Workplace	0	4.5	4	150	4.5	4	2.5	1.0	4.5	7.5	150	2.5
Multi-Unit Dwelling	0	3.0	4	210	3.0	4	3.5	0.5	3.0	4.0	210	3.5
Single-Unit Dwelling	0	6.0	4	120	6.0	4	2.0	3.0	6.0	7.5	120	2.0

DC Fast Charging Infrastructure

Predicted Weekly Utilization: Moderate

Venue	Number of Chargers	Weekly Utilization (sessions/week/station)	Average Session Power (kW)	Charge Time (minutes/session)	*Default Utilization Selected*	*Default Session Power (kW)*	*Default Charge Time (hr/session)*	*Low*	*Moderate*	*High*	*Default Charge Time (min/session)*	*User Charge Time (hr/session)*
Parking Lot	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Retail & Leisure	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Education	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Healthcare	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Workplace	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Multi-Unit Dwelling	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Single-Unit Dwelling	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4

Off-Road Equipment Inputs

Small Equipment Information

Equipment Type	Commercial Turf Equipment	*Default Rated hp*
Vocation Type	Zero-Turn Commercial Turf	
Rated Horsepower	25	*25*

	Type	Replacements per Lifetime	Battery Capacity (kWh)	Battery Cost ($/kWh)	Lifetime Replacement Cost	*Default Type*	*Default Replacements per Lifetime*	*Default kWh*	*Default $/kWh: Lithium-Ion*	*User $/kWh: Lithium-Ion*
EV Battery Replacement	Lithium-Ion	0	21.6	$800	$0	Lithium-Ion	0	21.6	$800	$800

Small Equipment Fuel Type	Number of Units	Annual Hourly Usage	Fuel Consumption (GGE/hr)	Equipment Price ($/unit)	Maintenance & Repair ($/hr)	*Default Usage*	*Default GGE/hr*	*Default AFV GGE/hr Relative Ratio*	*User AFV GGE/hr Relative Ratio*	*Default Purchase Price*	*User Purchase Price + Battery Replacement*	*Default Maintenance & Repair*	*User DGE/hr*	*User Rated hp*
Gasoline	0	1,364	0.34	$12,000	$0.12	1,364	0.34	1.00	1.00	$12,000	$12,000	$0.12	0.29	25
Diesel	0	1,364	0.28	$16,000	$0.15	1,364	0.28	0.83	0.83	$16,000	$16,000	$0.15	0.25	25
Gasoline Hybrid Electric Vehicle (HEV)	0	0	0.24	$0	$0.00	0	0.24	0.71	0.71	$0	$0	$0.00	0.21	25
All-Electric Vehicle (EV)	0	1,364	0.07	$23,000	$0.05	1,364	0.07	0.20	0.20	$23,000	$23,000	$0.05	0.06	25
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	0.11	$0	$0.00	0	0.11	0.33	0.33	$0	$0	$0.00	0.10	25
Biodiesel (B20)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Biodiesel (B100)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Renewable Diesel (RD20)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Renewable Diesel (RD100)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Ethanol (E85)	0	0	0.34	$0	$0.00	0	0.34	1.00	1.00	$0	$0	$0.00	0.29	25
Propane (LPG)	0	1,364	0.34	$13,500	$0.12	1,364	0.34	1.00	1.00	$13,500	$13,500	$0.12	0.29	25
Compressed Natural Gas (CNG)	0	0	0.34	$0	$0.00	0	0.34	1.00	1.00	$0	$0	$0.00	0.29	25

Large Equipment Information

Equipment Type	Forklifts	*Default Rated hp*
Vocation Type	Warehouse Forklift	
Rated Horsepower	50	*50*

	Type	Replacements per Lifetime	Battery Capacity (kWh)	Battery Cost ($/kWh)	Lifetime Replacement Cost	*Default Type*	*Default Replacements per Lifetime*	*Default kWh*	*Default $/kWh: Lead-Acid*	*User $/kWh: Lead-Acid*
EV Battery Replacement	Lead-Acid	0	43.2	$200	$0	Lead-Acid	0	43.2	$200	$200

Large Equipment Fuel Type	Number of Units	Annual Hourly Usage	Fuel Consumption (DGE/hr)	Equipment Price ($/unit)	Maintenance & Repair ($/hr)	*Default Usage*	*Default DGE/hr*	*Default AFV MPDGE Relative Ratio*	*User AFV MPDGE Relative Ratio*	*Default Purchase Price*	*User Purchase Price + Battery Replacement*	*Default Maintenance & Repair*	*Default GGE/hr*	*User Rated hp*	*User GGE/hr*
Gasoline	0	1,700	0.70	$22,000	$0.14	1,700	0.70	1.00	1.00	$22,000	$22,000	$0.14	0.80	50	0.80
Diesel	0	1,700	0.58	$30,000	$0.19	1,700	0.58	0.83	0.83	$30,000	$30,000	$0.19	0.67	50	0.67
All-Electric Vehicle (EV)	0	1,700	0.14	$37,000	$0.08	1,700	0.14	0.20	0.20	$37,000	$37,000	$0.08	0.16	50	0.16
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	1,700	0.23	$40,000	$0.08	1,700	0.23	0.33	0.33	$40,000	$40,000	$0.08	0.27	50	0.27
Diesel Hybrid Electric Vehicle (HEV)	0	0	0.48	$0	$0.00	0	0.48	0.69	0.69	$0	$0	$0.00	0.56	50	0.56
Diesel Hydraulic Hybrid (HHV)	0	0	0.48	$0	$0.00	0	0.48	0.69	0.69	$0	$0	$0.00	0.56	50	0.56
Biodiesel (B20)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Biodiesel (B100)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Renewable Diesel (RD20)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Renewable Diesel (RD100)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Ethanol (E85)	0	0	0.70	$0	$0.00	0	0.70	1.00	1.00	$0	$0	$0.00	0.80	50	0.80
Propane (LPG)	0	1,700	0.70	$25,000	$0.14	1,700	0.70	1.00	1.00	$25,000	$25,000	$0.14	0.80	50	0.80
Compressed Natural Gas (CNG)	0	1,700	0.70	$50,000	$0.14	1,700	0.70	1.00	1.00	$50,000	$50,000	$0.14	0.80	50	0.80
Liquefied Natural Gas (LNG)	0	0	0.70	$0	$0.00	0	0.70	1.00	1.00	$0	$0	$0.00	0.80	50	0.80
LNG / Diesel Pilot Ignition	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67

AFLEET_Tool_2020_CHRLF EIS GHG_A1Constr.xlsx

On-Road Fleet Footprint Calculator

State: WASHINGTON

Year: 2020

Vehicle Type	Model Year	Annual Vehicle Mileage	Fuel Use: Gasoline (gal)	Diesel (gal)	Gasoline HEV (gal)	Gasoline PHEV (gal)	Gasoline PHEV (kWh)	Gasoline EREV (gal)	Gasoline EREV (kWh)	Electricity (kWh)	G.H2 (kg)	Diesel HEV (gal)	Diesel HHV (gal)	B20 (gal)	B100 (gal)	RD20 (gal)	RD100 (gal)	E85 (gal)	LPG (gal)	CNG (GGE)	LNG (gal)	LNG / Diesel (LNG gal)	LNG / Diesel (diesel gal)	Remaining Lifetime (years): Default Lifetime	Calculated Lifetime	Age	Remaining Lifetime	Well-to-Wheels Petroleum Use (barrels)	Vehicle Production Petroleum Use (barrels)	Well-to-Wheels GHGs (short tons)	Vehicle Production GHGs (short tons)	CO	NOx
Passenger Car																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	2005	7,800		394																			15	15	15	0	9.8	0.0	5.4	0.0	53.2	62.6
School Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	1992	7,800		1,164																			15	28	28	0	29.0	0.0	16.0	0.0	90.8	284.7
Single Unit Short-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	2008	2,145,200		320,179																			15	15	12	3	7,976.7	0.0	4,392.2	0.0	4,639.5	32,925.8
Combination Short-Haul Truck	2008	2,097,200		313,015																			15	15	12	3	7,798.2	0.0	4,293.9	0.0	4,535.7	32,189.0
Combination Short-Haul Truck	2001	2,061,200		307,642																			15	19	19	0	7,664.3	0.0	4,220.2	0.0	26,365.3	89,442.9
Combination Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																							0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0

AFLEET_Tool_2020_CHRLF EIS GHG_A1Constr.xlsx

Off-Road Fleet Footprint Calculator

State

WASHINGTON

Year 2021

Equipment Type	Model Year	Annual Usage (hours)	Rated Horsepower (hp)	Fuel Use: Gasoline (gal)	Diesel (gal)	Electricity (kWh)	G.H2 (kg)	B20 (gal)	B100 (gal)	RD20 (gal)	RD100 (gal)	E85 (gal)	LPG (gal)	CNG (GGE)	LNG (gal)
Aerial Lifts															
Aerial Lifts															
Agricultural Tractors															
Agricultural Tractors															
Airport Support Equipment															
Airport Support Equipment															
Chain Saws															
Chain Saws															
Commercial Turf Equipment															
Commercial Turf Equipment															
Cranes															
Cranes															
Crawler Tractor/Dozers	2020	14,700	452		147,000										
Crawler Tractor/Dozers	2003	15,600	140		156,000										
Excavators	2017	3,000	425		30,000										
Excavators	2020	2,400	36		24,000										
Forklifts															
Forklifts															
Golf Carts															
Golf Carts															
Lawn & Garden Tractors															
Lawn & Garden Tractors															
Lawn Mowers															
Lawn Mowers															
Leafblowers/Vacuums															
Leafblowers/Vacuums															
Rollers															
Rollers															
Rubber Tire Loaders	2006	14,700	269		147,000										
Rubber Tire Loaders															
Skid Steer Loaders															
Skid Steer Loaders															
Snowblowers															
Snowblowers															
Sweepers/Scrubbers															
Sweepers/Scrubbers															
Terminal Tractors															
Terminal Tractors															
Tractors/Loaders/Backhoes	2014	14,400	94		144,000										
Tractors/Loaders/Backhoes															
Trimmers/Edgers/Brush Cutter															
Trimmers/Edgers/Brush Cutter															

Equipment Type	Default Annual Usage (hr)	Default Rated Horsepower (hp)	Default Estimated Gasoline Use (gal)	Default Estimated Electricity Use (kWh)	Load Factor %	Remaining Lifetime: Median Life Full Load (hr)	Calculated Lifetime (hr)	Cumulative Hours	Remaining Lifetime (hr)	Remaining Years	Well-to-Wheels Petroleum Use (barrels)	Well-to-Wheels GHGs (short tons)
Aerial Lifts	384	47	86	565	21%	0	0	0	0	0	0.0	0.0
Aerial Lifts	384	47	86	565	21%	0	0	0	0	0	0.0	0.0
Agricultural Tractors	475	50	318	2,090	59%	0	0	0	0	0	0.0	0.0
Agricultural Tractors	475	50	318	2,090	59%	0	0	0	0	0	0.0	0.0
Airport Support Equipment	732	150	1,469	9,662	59%	0	0	0	0	0	0.0	0.0
Airport Support Equipment	732	150	1,469	9,662	59%	0	0	0	0	0	0.0	0.0
Chain Saws	303	4	19	127	70%	0	0	0	0	0	0.0	0.0
Chain Saws	303	4	19	127	70%	0	0	0	0	0	0.0	0.0
Commercial Turf Equipment	1,364	25	464	3,051	60%	0	0	0	0	0	0.0	0.0
Commercial Turf Equipment	1,364	25	464	3,051	60%	0	0	0	0	0	0.0	0.0
Cranes	990	365	3,524	23,173	43%	0	0	0	0	0	0.0	0.0
Cranes	990	365	3,524	23,173	43%	0	0	0	0	0	0.0	0.0
Crawler Tractor/Dozers	936	130	1,628	10,707	59%	0	0	14,700	0	0	3,662.2	2,016.5
Crawler Tractor/Dozers	936	130	1,628	10,707	59%	0	0	280,800	0	0	3,886.4	2,140.0
Excavators	1,092	25	365	2,402	59%	0	0	12,000	0	0	747.4	411.5
Excavators	1,092	25	365	2,402	59%	0	0	2,400	0	0	597.9	329.2
Forklifts	1,700	50	1,137	7,479	59%	0	0	0	0	0	0.0	0.0
Forklifts	1,700	50	1,137	7,479	59%	0	0	0	0	0	0.0	0.0
Golf Carts	1,080	9	101	667	46%	0	0	0	0	0	0.0	0.0
Golf Carts	1,080	9	101	667	46%	0	0	0	0	0	0.0	0.0
Lawn & Garden Tractors	721	26	187	1,230	44%	0	0	0	0	0	0.0	0.0
Lawn & Garden Tractors	721	26	187	1,230	44%	0	0	0	0	0	0.0	0.0
Lawn Mowers	406	20	61	400	33%	0	0	0	0	0	0.0	0.0
Lawn Mowers	406	20	61	400	33%	0	0	0	0	0	0.0	0.0
Leafblowers/Vacuums	564	14	168	1,107	94%	0	0	0	0	0	0.0	0.0
Leafblowers/Vacuums	564	14	168	1,107	94%	0	0	0	0	0	0.0	0.0
Rollers	760	95	966	6,353	59%	0	0	0	0	0	0.0	0.0
Rollers	760	95	966	6,353	59%	0	0	0	0	0	0.0	0.0
Rubber Tire Loaders	761	599	6,099	40,110	59%	0	0	220,500	0	0	3,662.2	2,016.5
Rubber Tire Loaders	761	599	6,099	40,110	59%	0	0	0	0	0	0.0	0.0
Skid Steer Loaders	818	48	187	1,230	21%	0	0	0	0	0	0.0	0.0
Skid Steer Loaders	818	48	187	1,230	21%	0	0	0	0	0	0.0	0.0
Snowblowers	272	8	10	65	20%	0	0	0	0	0	0.0	0.0
Snowblowers	272	8	10	65	20%	0	0	0	0	0	0.0	0.0
Sweepers/Scrubbers	1,032	40	665	4,371	71%	0	0	0	0	0	0.0	0.0
Sweepers/Scrubbers	1,032	40	665	4,371	71%	0	0	0	0	0	0.0	0.0
Terminal Tractors	1,257	141	2,372	15,596	59%	0	0	0	0	0	0.0	0.0
Terminal Tractors	1,257	141	2,372	15,596	59%	0	0	0	0	0	0.0	0.0
Tractors/Loaders/Backhoes	1,135	73	395	2,595	21%	0	0	100,800	0	0	3,587.5	1,975.4
Tractors/Loaders/Backhoes	1,135	73	395	2,595	21%	0	0	0	0	0	0.0	0.0
Trimmers/Edgers/Brush Cutter	274	2	11	74	91%	0	0	0	0	0	0.0	0.0
Trimmers/Edgers/Brush Cutter	274	2	11	74	91%	0	0	0	0	0	0.0	0.0

Equipment Type	Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Well-to-Wheels Petroleum Use (barrels)	Remaining Lifetime Well-to-Wheels GHGs (short tons)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	155.6	959.3	25.9	25.9	77.8	0.0	22.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	4,158.9	12,016.5	852.2	826.7	1,161.9	0.0	24.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	137.6	386.4	21.6	21.6	29.9	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	29.7	283.3	1.7	1.7	10.3	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	6,717.4	14,957.2	1,445.3	1,404.2	1,213.9	0.0	22.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	499.5	1,421.9	74.6	72.1	47.6	0.0	22.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment Type	Remaining Lifetime Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Externality Cost - Well-to-Wheels Petroleum Use	Externality Cost - Well-to-Wheels GHGs
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$62,076	$82,190
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$65,877	$87,222
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$12,669	$16,773
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$10,135	$13,419
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$62,076	$82,190
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$60,809	$80,512
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0

Equipment Type	Externality Cost - Equipment Operation Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$1,710	$0	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$21,417	$161	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$689	$0	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$505	$0	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$26,659	$259	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$2,534	$16	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Equipment Type	Remaining Lifetime Externality Cost - Well-to-Wheels Petroleum Use	Remaining Lifetime Externality Cost - Well-to-Wheels GHGs	Remaining Lifetime Externality Cost - Equipment Operation Air: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

On-Road and Off-Road Fleet Footprint Calculator Output

		pounds	184,929.7	44,789.4	MTCO2E	Fuel Use (Barrels)	39,621.7
On-Road Fleet Footprint Calculator Output	19,792.1	tons	83.8835461			Gallons	1,664,111
			24997.29674				

On-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	9.8	5.4	53.2	62.6	5.5	4.6	15.5	0.1
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	29.0	16.0	90.8	284.7	15.7	12.9	39.8	0.2
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	23,439.2	12,906.3	35,540.4	154,557.7	5,435.2	3,870.2	9,143.6	146.3
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	23,478.0	12,927.6	35,684.5	154,904.9	5,456.5	3,887.7	9,198.9	146.5

Remaining Lifetime Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	47,324.5	26,058.2	27,525.6	195,344.5	3,900.2	1,290.7	5,864.3	295.4
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	47,324.5	26,058.2	27,525.6	195,344.5	3,900.2	1,290.7	5,864.3	295.4

On-Road Fleet Footprint Calculator Output - Externality Costs

Current Year On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$166	$220	$0	$112	$6	$303	$158	$3
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$492	$651	$0	$507	$18	$854	$407	$10
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$397,302	$526,034	$0	$275,473	$9,835	$255,550	$93,369	$8,292
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$397,960	$526,905	$0	$276,092	$9,859	$256,707	$93,934	$8,305

Remaining Lifetime On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$0	$0	$0	$0	$0	$0	$0	$0
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$802,168	$1,062,081	$0	$348,169	$16,398	$85,226	$59,882	$16,741
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$802,168	$1,062,081	$0	$348,169	$16,398	$85,226	$59,882	$16,741

Off-Road Fleet Footprint Calculator Output

Off-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Equipment Type

	Petroleum Use	GHGs	CO	NOx	PM10	PM2.5	VOC	SOx

Equipment Type	(barrels)	(short tons)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	7,548.7	4,156.5	4,314.5	12,975.9	878.2	852.6	1,239.7	47.1
Excavators	1,345.3	740.8	167.3	669.7	23.2	23.2	40.2	8.4
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	3,662.2	2,016.5	6,717.4	14,957.2	1,445.3	1,404.2	1,213.9	22.9
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	3,587.5	1,975.4	499.5	1,421.9	74.6	72.1	47.6	22.4
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	16,143.7	8,889.2	11,698.6	30,024.7	2,421.3	2,352.1	2,541.3	100.8

Remaining Lifetime Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Equipment Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Off-Road Fleet Footprint Calculator Output - Externality Costs

Current Year Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

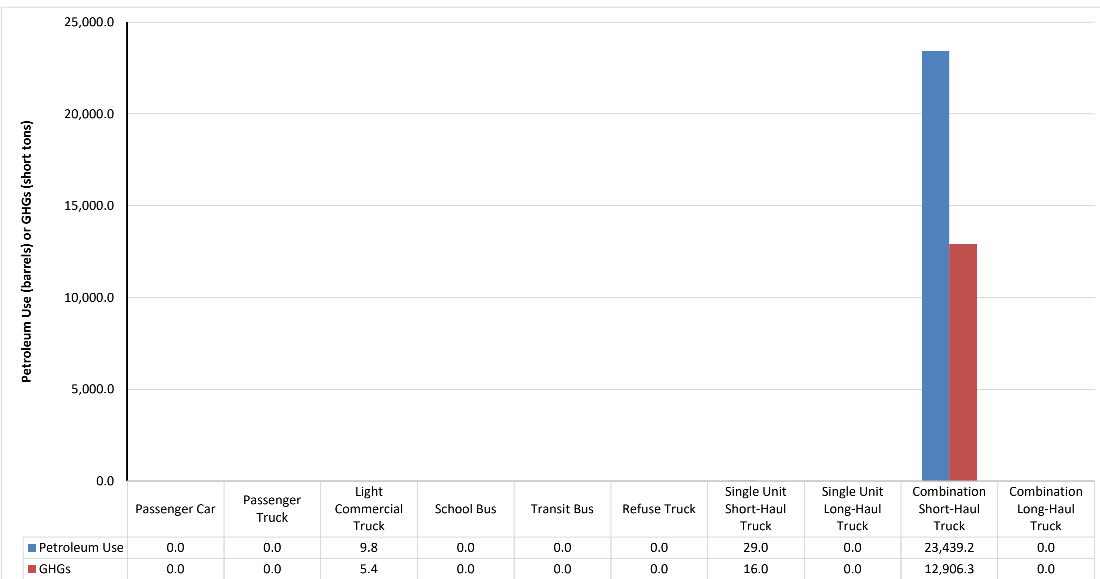
Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$127,953	$169,411	$0	$23,127	$161	$56,298	$12,659	$2,670
Excavators	$22,803	$30,192	$0	$1,194	$0	$1,535	$410	$476
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$62,076	$82,190	$0	$26,659	$259	$92,718	$12,395	$1,296

Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$60,809	$80,512	$0	$2,534	$16	$4,759	$486	$1,269
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$273,642	$362,305	$0	$53,514	$435	$155,309	$25,951	$5,711

Remaining Lifetime Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0	$0	$0

Current Year Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet



Current Year Vehicle Operation Air Pollutants - On-Road Fleet

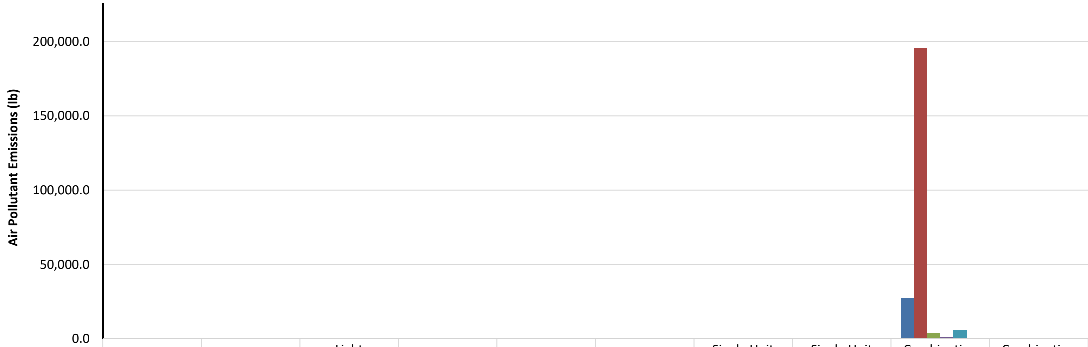
180,000.0

	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	53.2	0.0	0.0	0.0	90.8	0.0	35,540.4	0.0
NOx	0.0	0.0	62.6	0.0	0.0	0.0	284.7	0.0	154,557.7	0.0
PM10	0.0	0.0	5.5	0.0	0.0	0.0	15.7	0.0	5,435.2	0.0
PM2.5	0.0	0.0	4.6	0.0	0.0	0.0	12.9	0.0	3,870.2	0.0
VOC	0.0	0.0	15.5	0.0	0.0	0.0	39.8	0.0	9,143.6	0.0
SOx	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	146.3	0.0

Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet

	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47,324.5	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26,058.2	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - On-Road Fleet

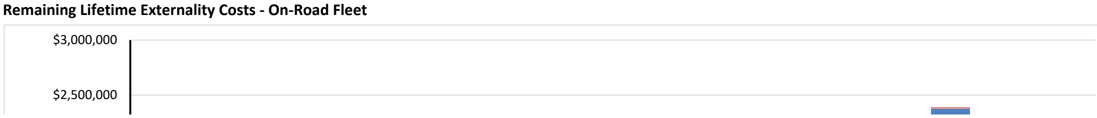


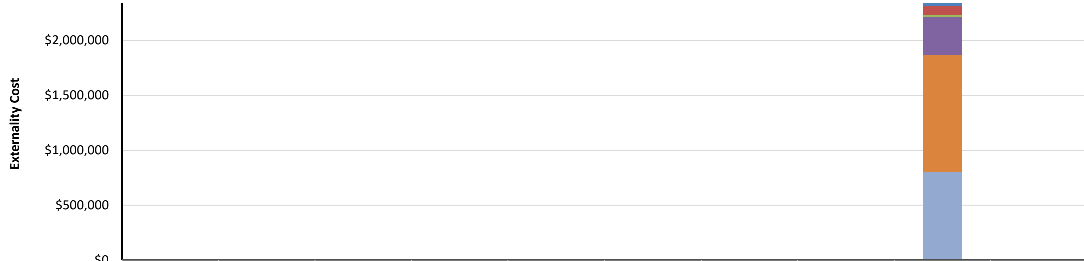
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27,525.6	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	195,344.5	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,900.2	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,290.7	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,864.3	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	295.4	0.0

Current Year Externality Costs - On-Road Fleet

	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$3	$0	$0	$0	$10	$0	$8,292	$0
VOC	$0	$0	$158	$0	$0	$0	$407	$0	$93,369	$0
PM2.5	$0	$0	$303	$0	$0	$0	$854	$0	$255,550	$0
PM10	$0	$0	$6	$0	$0	$0	$18	$0	$9,835	$0
NOx	$0	$0	$112	$0	$0	$0	$507	$0	$275,473	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$220	$0	$0	$0	$651	$0	$526,034	$0
Petroleum Use	$0	$0	$166	$0	$0	$0	$492	$0	$397,302	$0

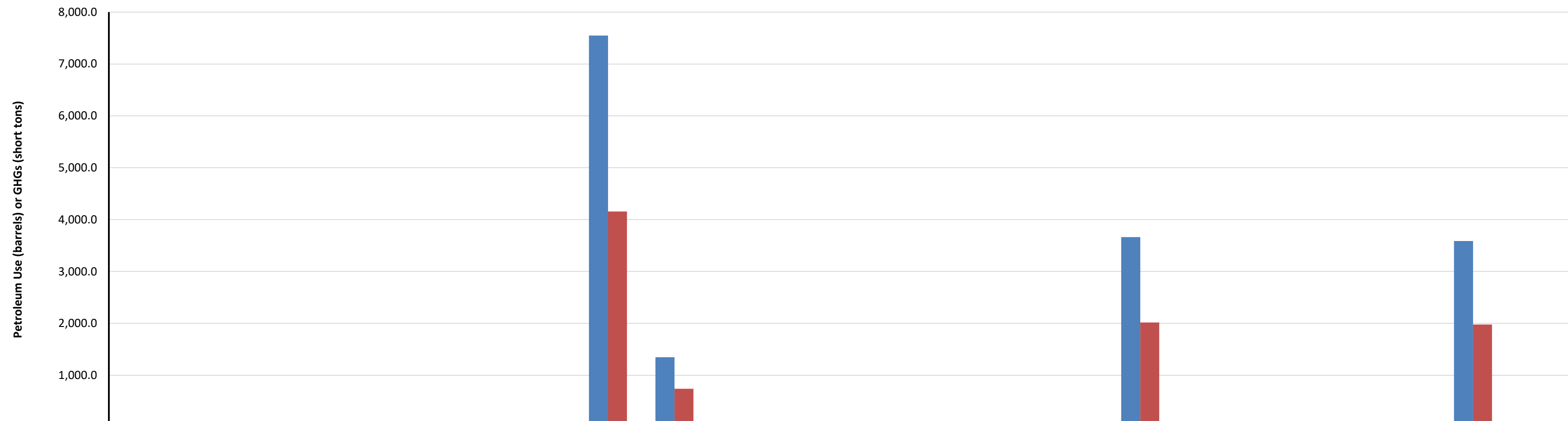
Remaining Lifetime Externality Costs - On-Road Fleet





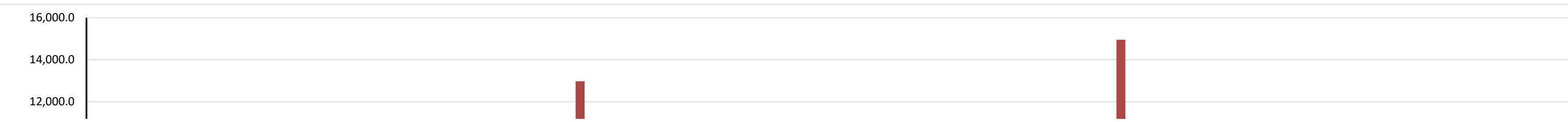
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$0	$0	$0	$0	$0	$0	$16,741	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$0	$59,882	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$0	$85,226	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$0	$16,398	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$0	$348,169	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$0	$1,062,081	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$0	$802,168	$0

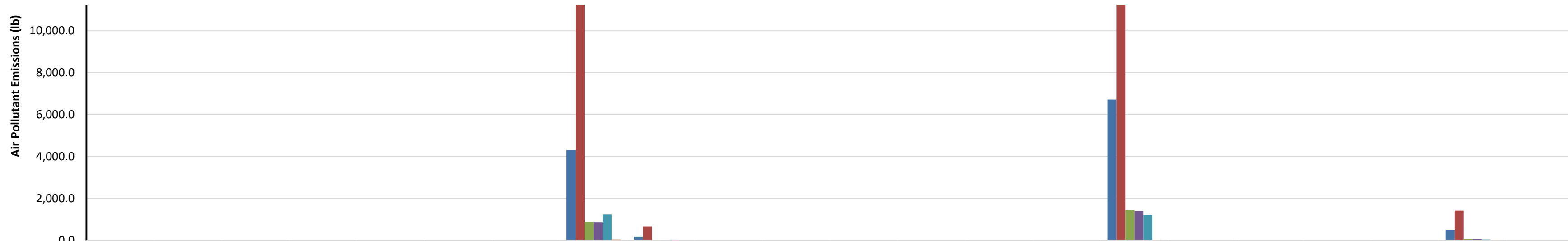
Current Year Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7,548.7	1,345.3	0.0	0.0	0.0	0.0	0.0	0.0	3,662.2	0.0	0.0	0.0	0.0	3,587.5	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,156.5	740.8	0.0	0.0	0.0	0.0	0.0	0.0	2,016.5	0.0	0.0	0.0	0.0	1,975.4	0.0

Current Year Vehicle Operation Air Pollutants - Off-Road Fleet





	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,314.5	167.3	0.0	0.0	0.0	0.0	0.0	0.0	6,717.4	0.0	0.0	0.0	0.0	499.5	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12,975.9	669.7	0.0	0.0	0.0	0.0	0.0	0.0	14,957.2	0.0	0.0	0.0	0.0	1,421.9	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	878.2	23.2	0.0	0.0	0.0	0.0	0.0	0.0	1,445.3	0.0	0.0	0.0	0.0	74.6	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	852.6	23.2	0.0	0.0	0.0	0.0	0.0	0.0	1,404.2	0.0	0.0	0.0	0.0	72.1	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,239.7	40.2	0.0	0.0	0.0	0.0	0.0	0.0	1,213.9	0.0	0.0	0.0	0.0	47.6	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	47.1	8.4	0.0	0.0	0.0	0.0	0.0	0.0	22.9	0.0	0.0	0.0	0.0	22.4	0.0

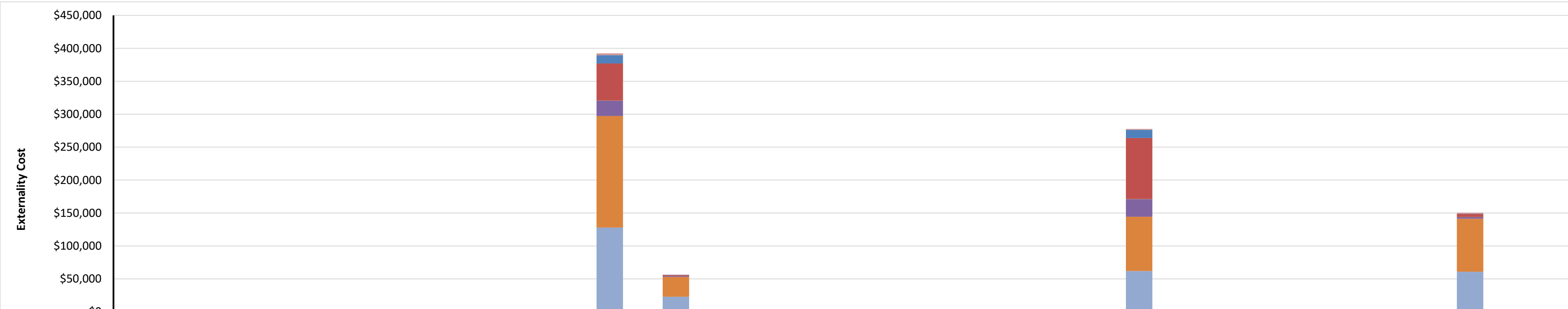
Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet

	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - Off-Road Fleet

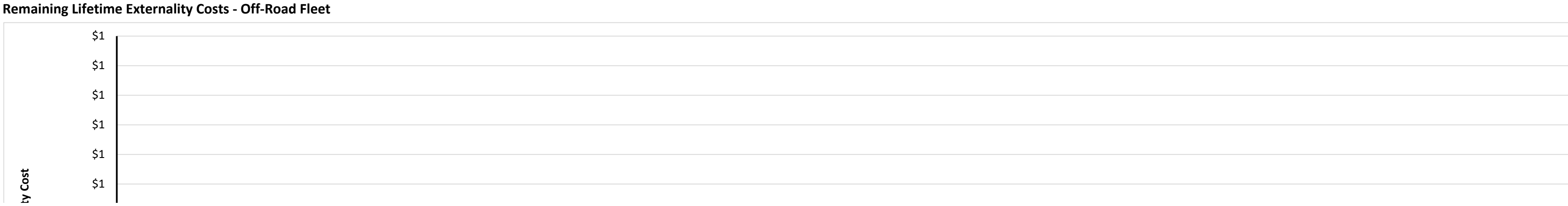
	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Current Year Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$2,670	$476	$0	$0	$0	$0	$0	$0	$1,296	$0	$0	$0	$0	$1,269	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$12,659	$410	$0	$0	$0	$0	$0	$0	$12,395	$0	$0	$0	$0	$486	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$56,298	$1,535	$0	$0	$0	$0	$0	$0	$92,718	$0	$0	$0	$0	$4,759	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$161	$0	$0	$0	$0	$0	$0	$0	$259	$0	$0	$0	$0	$16	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$23,127	$1,194	$0	$0	$0	$0	$0	$0	$26,659	$0	$0	$0	$0	$2,534	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$169,411	$30,192	$0	$0	$0	$0	$0	$0	$82,190	$0	$0	$0	$0	$80,512	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$127,953	$22,803	$0	$0	$0	$0	$0	$0	$62,076	$0	$0	$0	$0	$60,809	$0

Remaining Lifetime Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Key Inputs

Key Inputs	Calculator Inputs Used In
Primary Vehicle Location	*Payback, TCO, IR, Footprint*
Light-Duty Vehicle Information	*Payback, TCO*
Heavy-Duty Vehicle Information	*Payback, TCO*
Fuel and DEF Price	*Payback, TCO, IR*
Total Cost of Ownership Inputs	*TCO*
Fuel Production Assumptions	*Payback, TCO, IR, Footprint*
Petroleum Use, GHGs & Air Pollutant Options	*Payback, TCO, IR, Footprint*
Idle Reduction Inputs	*IR*
Electric Vehicle Charging Inputs	*Charging*
Off-Road Equipment Inputs	*Payback*

Key Vehicle and Fuel Inputs

Primary Vehicle Location

State	WASHINGTON
County	KING

Light-Duty Vehicle Information

Vehicle Type	Passenger Car
Vocation Type	Car

Light-Duty Fuel Type	Number of Light-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPGGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	*Default Mileage*	*Default MPGGE*	*Default AFV MPGGE Relative Ratio*	*User AFV MPGGE Relative Ratio*	*Default Purchase Price*	*Default Maintenance & Repair*	*User MPDGE*
Gasoline	0	12,400	30.9	$20,000	$0.15	12,400	30.9	1.00	1.00	$20,000	$0.15	35.7
Diesel	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Gasoline Hybrid Electric Vehicle (HEV)	0	12,400	46.3	$22,000	$0.14	12,400	46.3	1.50	1.50	$22,000	$0.14	53.4
Gasoline Plug-in Hybrid Electric Vehicle (PHEV)	0	12,400	53.2	$27,000	$0.13	12,400	53.2	1.72	1.72	$27,000	$0.13	61.4
Gasoline Extended Range Electric Vehicle (EREV)	0	12,400	44.4	$33,000	$0.13	12,400	44.4	1.43	1.43	$33,000	$0.13	51.2
All-Electric Vehicle (EV)	0	12,400	106.2	$37,000	$0.09	12,400	106.2	3.43	3.43	$37,000	$0.09	122.6
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	12,400	73.5	$50,000	$0.09	12,400	73.5	2.38	2.38	$50,000	$0.09	84.8
Biodiesel (B20)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Biodiesel (B100)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Renewable Diesel (RD20)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Renewable Diesel (RD100)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Ethanol (E85)	0	12,400	30.9	$20,000	$0.15	12,400	30.9	1.00	1.00	$20,000	$0.15	35.7
Propane (LPG)	0	12,400	30.9	$26,000	$0.15	12,400	30.9	1.00	1.00	$26,000	$0.15	35.7
Compressed Natural Gas (CNG)	0	12,400	29.4	$27,000	$0.15	12,400	29.4	0.95	0.95	$27,000	$0.15	33.9

Heavy-Duty Vehicle Information

Vehicle Type	School Bus
Vocation Type	School Bus

Heavy-Duty Fuel Type	Number of Heavy-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPDGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	*Default Mileage*	*Default MPDGE*	*Default AFV MPDGE Relative Ratio*	*User AFV MPDGE Relative Ratio*	*Default Purchase Price*	*Default Maintenance & Repair*	*Default MPGGE*	*User MPGGE*
Gasoline	0	0	6.8	$0	$0.61	0	6.8	0.83	0.83	$0	$0.61	5.9	5.9
Diesel	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
All-Electric Vehicle (EV)	0	15,000	24.0	$300,000	$0.56	15,000	24.0	2.93	2.93	$300,000	$0.56	20.8	20.8
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	11.3	$0	$0.56	0	11.3	1.38	1.38	$0	$0.56	9.8	9.8
Diesel Hybrid Electric Vehicle (HEV)	0	15,000	11.1	$160,000	$0.81	15,000	11.1	1.35	1.35	$160,000	$0.81	9.6	9.6
Diesel Hydraulic Hybrid (HHV)	0	0	10.6	$0	$0.81	0	10.6	1.29	1.29	$0	$0.81	9.2	9.2
Biodiesel (B20)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Biodiesel (B100)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Renewable Diesel (RD20)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Renewable Diesel (RD100)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Ethanol (E85)	0	0	6.8	$0	$0.61	0	6.8	0.83	0.83	$0	$0.61	5.9	5.9
Propane (LPG)	0	15,000	6.8	$108,000	$0.61	15,000	6.8	0.83	0.83	$108,000	$0.61	5.9	5.9
Compressed Natural Gas (CNG)	0	15,000	7.0	$130,000	$0.93	15,000	7.0	0.85	0.85	$130,000	$0.93	6.0	6.0
Liquefied Natural Gas (LNG)	0	15,000	7.0	$120,000	$0.93	15,000	7.0	0.85	0.85	$120,000	$0.93	6.0	6.0
LNG / Diesel Pilot Ignition	0	0	7.8	$0	$0.97	0	7.8	0.95	0.95	$0	$0.97	6.7	6.7

Refueling Information

Fueling Type	Private Station	Infrastructure costs (go to 'Payback')
Fuel Price Sensitivity	No	Enter fuel price range (go to 'Payback')

Fuel and DEF Price

	Fuel Unit	Public Station ($/fuel unit)	Private Station ($/fuel unit)	*Public Station: Default $/Fuel Unit*	*Public Station: Default $/GGE*	*Public Station: User $/GGE*	*Public Station: User $/DGE*	*Private Station: Default $/Fuel Unit*	*Private Station: Default $/GGE*	*Private Station: User $/GGE*	*Private Station: User $/DGE*
Gasoline	gasoline gallon	$3.13	$3.01	$3.13	$3.13	$3.13	$3.61	$3.01	**$3.01**	$3.01	$3.47
Diesel	diesel gallon	$3.22	$2.99	$3.22	$2.79	$2.79	$3.22	$2.99	**$2.59**	$2.59	$2.99
Electricity	kWh	$0.10	$0.10	$0.10	$3.19	$3.19	$3.68	$0.10	$3.19	$3.19	$3.68
G.H2	hydrogen kg										
B20	B20 gallon	$3.05	$2.61	$3.05	**$2.68**	$2.68	$3.10	$2.61	**$2.30**	$2.30	$2.65
B100	B100 gallon	$4.17	$4.36	$4.17	$3.91	$3.91	$4.52	$4.36	**$4.09**	$4.09	$4.72
RD20	RD20 gallon	$3.66	$2.96	$3.66	$3.20	$3.20	$3.70	$2.96	$2.59	$2.59	$2.99
RD100	RD100 gallon	$3.71	$2.95	$3.71	$3.39	$3.39	$3.91	$2.95	$2.69	$2.69	$3.11
E85	E85 gallon	$3.68	$2.37	$3.68	$5.02	$5.02	$5.79	$2.37	**$3.23**	$3.23	$3.73
Propane	LPG gallon	$2.06	$3.26	$2.06	$2.72	$2.72	$3.14	$3.26	**$4.31**	$4.31	$4.97
CNG	CNG GGE	$2.77	$1.72	$2.77	$2.77	$2.77	$3.20	$1.72	**$1.72**	$1.72	$1.99
LNG	LNG gallon	$1.91	$1.10	$1.91	$2.87	$2.87	$3.31	$1.10	$1.65	$1.65	$1.91
Diesel Exhaust Fluid (DEF)	DEF gallon	$2.80	$2.80	$2.80	$2.80	$2.80	N/A	$2.80	$2.80	$2.80	N/A

Total Cost of Ownership Inputs

Vehicle and Infrastructure Information

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure	*Default LDV*	*Default HDV*	*Default Infrastructure*
Years of Planned Ownership	years	15	15	15	15	15	15

Financial Assumptions

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure			
Loan	yes/no	No	No	No			
Loan Term	years	5	5	5	5	5	5
Interest Rate	%	4.20%	4.20%	4.20%	4.20%	4.20%	4.20%
Percent Down Payment	%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%
Discount Factor	%		1.24%			1.24%	

Fuel Production Assumptions

	Options	Selection	
Biodiesel Feedstock Source	1 - Soy 2 - Canola 3 - Corn 4 - Tallow	1	
Renewable Diesel Feedstock Source	1 - Soy 2 - Canola 3 - Palm	1	
Ethanol Feedstock Source	1 - Corn 2 - Switchgrass 3 - Sugarcane 4 - Grain Sorghum	1	
CNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
LNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
North American NG Feedstock Source		Conventional 66%	Shale 34%
LPG Feedstock Source		NG 69%	Petroleum 31%
Source of Electricity for PHEVs, EVs, and FCVs (Electrolysis)	1 - Average U.S. Mix 2 to 11 - EIA Region Mix (see map) 12 - User Defined (go to 'Background Data' sheet)	11	
G.H2 Production Process	1 - Refueling Station SMR (On-site) 2 - Central Plant SMR (Off-site) 3 - Refueling Station Electrolysis (On-site)	1	

Number	Grid Mix
1	U.S.
2	ASCC
3	FRCC
4	HICC
5	MRO
6	NPCC
7	RFC
8	SERC
9	SPP
10	TRE
11	WECC
12	User Defined
11	**Default based on State and County**

Petroleum Use, GHGs & Air Pollutant Options

Petroleum Use, GHGs & Air Pollutant Calculation Type		1
1 - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants		
2 - Well-to-Wheels Petroleum Use, GHGs, and Air Pollutants		
3 - Well-to-Wheels & Vehicle Production* Petroleum Use, GHGs, Air Pollutants (*LDVs only)		
Diesel In-Use Emissions Multiplier	yes/no	No
Low NOx Engines - CNG, LNG, LPG HDVs	yes/no	Yes

Idle Reduction Inputs

Light-Duty Vehicle Information

Idle Reduction (IR) Vehicle Type	Passenger Car
IR Vocation Type	Police Car
Baseline Vehicle Model Year	2020
Annual Idling Hours (per Vehicle)	1,750

Services Required (% of hours):

	Vehicle Heating	Engine Heating	Cooling	Electrical
% of Idle Hours by Service	33%	0%	33%	34%

Default Services Required (% of hours):

Default Idle Hr	*Vehicle Heating*	*Engine Heating*	*Cooling*	*Electrical*
1750	33%	0%	33%	34%

Light-Duty Baseline & Idling Reduction Equipment	Number of Light-Duty Vehicles	Services Provided By IR Equipment: Vehicle Heating	Engine Heating	Cooling	Electrical	Idling Hour Reduction Goal	Fuel Consumption (GGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	*Default Fuel Consumption (GGE/hr)*	*Default Fuel Consumption (DGE/hr)*	*Electrical Power Demand (W)*	*Default Equipment Cost*
Gasoline	0						0.30			0.30	0.26		
Fuel Operated Air Heater	0	✓	✗	✗	✗	578	0.03	0	$900	0.03	0.03	0	$900
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0.08	0	$1,250	0.08	0.07	0	$1,250
Battery Management Start/Stop	0	✗	✗	✗	✓	595	0.00	250	$1,500	0.00	0.00	250	$1,500
APU (Battery)	0	✗	✗	✓	✓	1173	0.00	250	$4,300	0.00	0.00	250	$4,300
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	1750	0.03	250	$5,200	0.03	0.03	250	$5,200
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	1173	0.00	250	$5,800	0.00	0.00	250	$5,800

Heavy-Duty Vehicle Information

IR Vehicle Type	Combination Long-Haul Truck
IR Vocation Type	Long Haul Freight Truck
Baseline Vehicle Model Year	2020

Default Services Required (% of hours):

		Services Required (% of hours):				Default Idle Hr	Vehicle Heating	Engine Heating	Cooling	Electrical
		Vehicle Heating	Engine Heating	Cooling	Electrical					
Annual Conventional Idling Hours (per Vehicle)	150					150				
% of Idle Hours by Service		33%	0%	33%	34%		33%	0%	33%	34%
		Vehicle Heating	Engine Heating	Cooling	Electrical	Default Hotel Hr				
*Annual Hotelling Hours (per Vehicle)**	1,800					1800				
% of Hotelling Hours by Service		33%	0%	33%	34%		33%	0%	33%	34%

Heavy-Duty Baseline & Idling Reduction Equipment	Number of Heavy-Duty Vehicles	Services Provided By IR Equipment				Conventional Idling Hour Reduction Goal	Hotelling Hour Reduction Goal	Fuel Consumption (DGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	Default Fuel Consumption (GGE/hr)	Default Fuel Consumption (DGE/hr)	Electrical Power Demand (W)	Default Equipment Cost	User Fuel Consumption (GGE/hr)
Diesel	0							0.78			0.89	0.78			0.89
*Diesel (Hotelling)**								0.90			1.03	0.90			1.03
Fuel Operated Air Heater	0	✓	✗	✗	✗	50	594	0.06	0	$1,800	0.07	0.06	0	$1,800	0.07
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0	0.12	0	$1,700	0.14	0.12	0	$1,700	0.14
Battery Management Start/Stop	0	✗	✗	✗	✓	51	612	0.00	704	$2,500	0.00	0.00	704	$2,500	0.00
APU (Diesel)	0	✓	✓	✓	✓	150	1800	0.20	0	$10,000	0.23	0.20	0	$10,000	0.23
APU (Battery)	0	✗	✗	✓	✓	101	1206	0.00	704	$8,000	0.00	0.00	704	$8,000	0.00
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	150	1800	0.06	704	$9,800	0.07	0.06	704	$9,800	0.07
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	101	1206	0.00	704	$10,500	0.00	0.00	704	$10,500	0.00
Truck Stop Electrification - Single System**	0	✗	✗	✓	✓	101	1206	0.00	704	$5	0.00	0.00	704	$5	0.00
Shore Power**	0	✗	✗	✓	✓	101	1206	0.00	704	$2,500	0.00	0.00	704	$2,500	0.00

Electric Vehicle Charging Inputs

Level 2 Charging Infrastructure

Predicted Weekly Utilization: Moderate

Venue	Number of Chargers	Weekly Utilization (sessions/week/ station)	Average Session Power (kW)	Charge Time (minutes/ session)	Default Utilization Selected	Default Session Power (kW)	Default Charge Time (hr/session)	Low	Moderate	High	Default Charge Time (min/session)	User Charge Time (hr/session)
Parking Lot	0	4.5	4	150	4.5	4	2.5	0.5	4.5	6.5	150	2.5
Retail & Leisure	0	5.5	4	90	5.5	4	1.5	1.0	5.5	7.0	90	1.5
Education	0	6.0	4	150	6.0	4	2.5	1.5	6.0	9.0	150	2.5
Healthcare	0	6.5	4	150	6.5	4	2.5	3.5	6.5	7.0	150	2.5
Workplace	0	4.5	4	150	4.5	4	2.5	1.0	4.5	7.5	150	2.5
Multi-Unit Dwelling	0	3.0	4	210	3.0	4	3.5	0.5	3.0	4.0	210	3.5
Single-Unit Dwelling	0	6.0	4	120	6.0	4	2.0	3.0	6.0	7.5	120	2.0

DC Fast Charging Infrastructure

Predicted Weekly Utilization: Moderate

Venue	Number of Chargers	Weekly Utilization (sessions/week/ station)	Average Session Power (kW)	Charge Time (minutes/ session)	Default Utilization Selected	Default Session Power (kW)	Default Charge Time (hr/session)	Low	Moderate	High	Default Charge Time (min/session)	User Charge Time (hr/session)
Parking Lot	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Retail & Leisure	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Education	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Healthcare	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Workplace	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Multi-Unit Dwelling	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Single-Unit Dwelling	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4

Off-Road Equipment Inputs

Small Equipment Information

Equipment Type	Commercial Turf Equipment	*Default Rated hp*
Vocation Type	Zero-Turn Commercial Turf	
Rated Horsepower	25	*25*

	Type	Replacements per Lifetime	Battery Capacity (kWh)	Battery Cost ($/kWh)	Lifetime Replacement Cost	Default Type	Default Replacements per Lifetime	Default kWh	Default $/kWh: Lithium-Ion	User $/kWh: Lithium-Ion
EV Battery Replacement	Lithium-Ion	0	21.6	$800	$0	Lithium-Ion	0	21.6	$800	$800

Small Equipment Fuel Type	Number of Units	Annual Hourly Usage	Fuel Consumption (GGE/hr)	Equipment Price ($/unit)	Maintenance & Repair ($/hr)	Default Usage	Default GGE/hr	Default AFV GGE/hr Relative Ratio	User AFV GGE/hr Relative Ratio	Default Purchase Price	User Purchase Price + Battery Replacement	Default Maintenance & Repair	User DGE/hr	User Rated hp
Gasoline	0	1,364	0.34	$12,000	$0.12	1,364	0.34	1.00	1.00	$12,000	$12,000	$0.12	0.29	25
Diesel	0	1,364	0.28	$16,000	$0.15	1,364	0.28	0.83	0.83	$16,000	$16,000	$0.15	0.25	25
Gasoline Hybrid Electric Vehicle (HEV)	0	0	0.24	$0	$0.00	0	0.24	0.71	0.71	$0	$0	$0.00	0.21	25
All-Electric Vehicle (EV)	0	1,364	0.07	$23,000	$0.05	1,364	0.07	0.20	0.20	$23,000	$23,000	$0.05	0.06	25
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	0.11	$0	$0.00	0	0.11	0.33	0.33	$0	$0	$0.00	0.10	25
Biodiesel (B20)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Biodiesel (B100)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Renewable Diesel (RD20)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Renewable Diesel (RD100)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Ethanol (E85)	0	0	0.34	$0	$0.00	0	0.34	1.00	1.00	$0	$0	$0.00	0.29	25
Propane (LPG)	0	1,364	0.34	$13,500	$0.12	1,364	0.34	1.00	1.00	$13,500	$13,500	$0.12	0.29	25
Compressed Natural Gas (CNG)	0	0	0.34	$0	$0.00	0	0.34	1.00	1.00	$0	$0	$0.00	0.29	25

Large Equipment Information

Equipment Type	Forklifts	*Default Rated hp*
Vocation Type	Warehouse Forklift	
Rated Horsepower	50	*50*

	Type	Replacements per Lifetime	Battery Capacity (kWh)	Battery Cost ($/kWh)	Lifetime Replacement Cost	Default Type	Default Replacements per Lifetime	Default kWh	Default $/kWh: Lead-Acid	User $/kWh: Lead-Acid
EV Battery Replacement	Lead-Acid	0	43.2	$200	$0	Lead-Acid	0	43.2	$200	$200

Large Equipment Fuel Type	Number of Units	Annual Hourly Usage	Fuel Consumption (DGE/hr)	Equipment Price ($/unit)	Maintenance & Repair ($/hr)	Default Usage	Default DGE/hr	Default AFV MPDGE Relative Ratio	User AFV MPDGE Relative Ratio	Default Purchase Price	User Purchase Price + Battery Replacement	Default Maintenance & Repair	Default GGE/hr	User Rated hp	User GGE/hr
Gasoline	0	1,700	0.70	$22,000	$0.14	1,700	0.70	1.00	1.00	$22,000	$22,000	$0.14	0.80	50	0.80
Diesel	0	1,700	0.58	$30,000	$0.19	1,700	0.58	0.83	0.83	$30,000	$30,000	$0.19	0.67	50	0.67
All-Electric Vehicle (EV)	0	1,700	0.14	$37,000	$0.08	1,700	0.14	0.20	0.20	$37,000	$37,000	$0.08	0.16	50	0.16
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	1,700	0.23	$40,000	$0.08	1,700	0.23	0.33	0.33	$40,000	$40,000	$0.08	0.27	50	0.27
Diesel Hybrid Electric Vehicle (HEV)	0	0	0.48	$0	$0.00	0	0.48	0.69	0.69	$0	$0	$0.00	0.56	50	0.56
Diesel Hydraulic Hybrid (HHV)	0	0	0.48	$0	$0.00	0	0.48	0.69	0.69	$0	$0	$0.00	0.56	50	0.56
Biodiesel (B20)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Biodiesel (B100)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Renewable Diesel (RD20)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Renewable Diesel (RD100)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Ethanol (E85)	0	0	0.70	$0	$0.00	0	0.70	1.00	1.00	$0	$0	$0.00	0.80	50	0.80
Propane (LPG)	0	1,700	0.70	$25,000	$0.14	1,700	0.70	1.00	1.00	$25,000	$25,000	$0.14	0.80	50	0.80
Compressed Natural Gas (CNG)	0	1,700	0.70	$50,000	$0.14	1,700	0.70	1.00	1.00	$50,000	$50,000	$0.14	0.80	50	0.80
Liquefied Natural Gas (LNG)	0	0	0.70	$0	$0.00	0	0.70	1.00	1.00	$0	$0	$0.00	0.80	50	0.80
LNG / Diesel Pilot Ignition	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67

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On-Road Fleet Footprint Calculator

State
WASHINGTON

Year 2020

Vehicle Type	Model Year	Annual Vehicle Mileage	Fuel Use: Gasoline (gal)	Diesel (gal)	Gasoline HEV (gal)	Gasoline PHEV (gal)	Gasoline PHEV (kWh)	Gasoline EREV (gal)	Gasoline EREV (kWh)	Electricity (kWh)	G.H2 (kg)	Diesel HEV (gal)	Diesel HHV (gal)	B20 (gal)	B100 (gal)	RD20 (gal)	RD100 (gal)	E85 (gal)	LPG (gal)	CNG (GGE)	LNG (gal)	LNG / Diesel (LNG gal)	LNG / Diesel (diesel gal)	Remaining Lifetime (years): Default Lifetime	Calculated Lifetime	Age	Remaining Lifetime	Well-to-Wheels Petroleum Use (barrels)	Vehicle Production Petroleum Use (barrels)
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck	2005	8,250		417																				15	15	15	0	10.4	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck	1992	8,250		1,231																				15	28	28	0	30.7	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck	2008	2,193,600		327,403																				15	15	12	3	8,156.6	0.0
Combination Short-Haul Truck	2008	2,109,600		314,866																				15	15	12	3	7,844.3	0.0
Combination Short-Haul Truck	2001	2,073,600		309,493																				15	19	19	0	7,710.6	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0

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Off-Road Fleet Footprint Calculator

State

WASHINGTON

Year 2021

Equipment Type	Model Year	Annual Usage (hours)	Rated Horsepower (hp)	Fuel Use: Gasoline (gal)	Diesel (gal)	Electricity (kWh)	G.H2 (kg)	B20 (gal)	B100 (gal)	RD20 (gal)	RD100 (gal)	E85 (gal)	LPG (gal)	CNG (GGE)	LNG (gal)	Default Annual Usage (hr)	Default Rated Horsepower (hp)	Default Estimated Gasoline Use (gal)	Default Estimated Electricity Use (kWh)	Load Factor %
Aerial Lifts																384	47	86	565	21%
Aerial Lifts																384	47	86	565	21%
Agricultural Tractors																475	50	318	2,090	59%
Agricultural Tractors																475	50	318	2,090	59%
Airport Support Equipment																732	150	1,469	9,662	59%
Airport Support Equipment																732	150	1,469	9,662	59%
Chain Saws																303	4	19	127	70%
Chain Saws																303	4	19	127	70%
Commercial Turf Equipment																1,364	25	464	3,051	60%
Commercial Turf Equipment																1,364	25	464	3,051	60%
Cranes																990	365	3,524	23,173	43%
Cranes																990	365	3,524	23,173	43%
Crawler Tractor/Dozers	2020	15,600	452		156,000											936	130	1,628	10,707	59%
Crawler Tractor/Dozers	2003	16,500	140		165,000											936	130	1,628	10,707	59%
Excavators	2017	3,000	425		30,000											1,092	25	365	2,402	59%
Excavators	2020	2,400	36		24,000											1,092	25	365	2,402	59%
Forklifts																1,700	50	1,137	7,479	59%
Forklifts																1,700	50	1,137	7,479	59%
Golf Carts																1,080	9	101	667	46%
Golf Carts																1,080	9	101	667	46%
Lawn & Garden Tractors																721	26	187	1,230	44%
Lawn & Garden Tractors																721	26	187	1,230	44%
Lawn Mowers																406	20	61	400	33%
Lawn Mowers																406	20	61	400	33%
Leafblowers/Vacuums																564	14	168	1,107	94%
Leafblowers/Vacuums																564	14	168	1,107	94%
Rollers																760	95	966	6,353	59%
Rollers																760	95	966	6,353	59%
Rubber Tire Loaders	2006	15,600	269		156,000											761	599	6,099	40,110	59%
Rubber Tire Loaders																761	599	6,099	40,110	59%
Skid Steer Loaders																818	48	187	1,230	21%
Skid Steer Loaders																818	48	187	1,230	21%
Snowblowers																272	8	10	65	20%
Snowblowers																272	8	10	65	20%
Sweepers/Scrubbers																1,032	40	665	4,371	71%
Sweepers/Scrubbers																1,032	40	665	4,371	71%
Terminal Tractors																1,257	141	2,372	15,596	59%
Terminal Tractors																1,257	141	2,372	15,596	59%
Tractors/Loaders/Backhoes	2014	14,400	94		144,000											1,135	73	395	2,595	21%
Tractors/Loaders/Backhoes																1,135	73	395	2,595	21%
Trimmers/Edgers/Brush Cutter																274	2	11	74	91%
Trimmers/Edgers/Brush Cutter																274	2	11	74	91%

Equipment Type	Remaining Lifetime: Median Life Full Load (hr)	Calculated Lifetime (hr)	Cumulative Hours	Remaining Lifetime (hr)	Remaining Years	Well-to-Wheels Petroleum Use (barrels)	Well-to-Wheels GHGs (short tons)	Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aerial Lifts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0	0	15,600	0	0	3,886.4	2,140.0	165.1	1,018.1	27.5	27.5	82.5	0.0	24.3
Crawler Tractor/Dozers	0	0	297,000	0	0	4,110.7	2,263.4	4,398.9	12,709.8	901.4	874.4	1,228.9	0.0	25.7
Excavators	0	0	12,000	0	0	747.4	411.5	137.6	386.4	21.6	21.6	29.9	0.0	4.7
Excavators	0	0	2,400	0	0	597.9	329.2	29.7	283.3	1.7	1.7	10.3	0.0	3.7
Forklifts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0	0	234,000	0	0	3,886.4	2,140.0	7,128.6	15,872.9	1,533.8	1,490.1	1,288.2	0.0	24.3
Rubber Tire Loaders	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0	0	100,800	0	0	3,587.5	1,975.4	499.5	1,421.9	74.6	72.1	47.6	0.0	22.4
Tractors/Loaders/Backhoes	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment Type	Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Well-to-Wheels Petroleum Use (barrels)	Remaining Lifetime Well-to-Wheels GHGs (short tons)	Remaining Lifetime Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment Type	Externality Cost - Well-to-Wheels Petroleum Use	Externality Cost - Well-to-Wheels GHGs	Externality Cost - Equipment Operation Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	[illegible]	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	[illegible]	$0	$0	$0	$0	$0	$0	$0
Excavators	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	[illegible]	$0	$0	$0	$0	$0	$0	$0
Excavators	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	[illegible]	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	[illegible]	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	[illegible]	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Equipment Type	Remaining Lifetime Externality Cost - Well-to-Wheels Petroleum Use	Remaining Lifetime Externality Cost - Well-to-Wheels GHGs	Remaining Lifetime Externality Cost - Equipment Operation Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

On-Road and Off-Road Fleet Footprint Calculator Output

		pounds	188,088.7	45,689.5	MTCO2E	Fuel Use (Barrels)	40,568.8
On-Road Fleet Footprint Calculator Output	20,265.2	tons	85.31648225			Gallons	1,703,888
			25424.31171				

On-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	10.4	5.7	56.3	66.2	5.9	4.9	16.4	0.1
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	30.7	16.9	96.0	301.1	16.6	13.7	42.1	0.2
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	23,711.4	13,056.1	35,830.6	156,029.0	5,478.8	3,897.0	9,214.9	148.0
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	23,752.4	13,078.7	35,982.9	156,396.3	5,501.3	3,915.6	9,273.4	148.3

Remaining Lifetime Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	48,002.8	26,431.7	27,920.0	198,144.1	3,956.1	1,309.2	5,948.3	299.6
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	48,002.8	26,431.7	27,920.0	198,144.1	3,956.1	1,309.2	5,948.3	299.6

On-Road Fleet Footprint Calculator Output - Externality Costs

Current Year On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$176	$233	$0	$118	$6	$321	$168	$4
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$520	$688	$0	$537	$19	$903	$430	$11
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$401,916	$532,142	$0	$278,095	$9,940	$257,324	$94,097	$8,388
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$402,612	$533,064	$0	$278,750	$9,965	$258,547	$94,694	$8,403

Remaining Lifetime On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$0	$0	$0	$0	$0	$0	$0	$0
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$813,664	$1,077,303	$0	$353,159	$16,633	$86,447	$60,740	$16,981
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$813,664	$1,077,303	$0	$353,159	$16,633	$86,447	$60,740	$16,981

Off-Road Fleet Footprint Calculator Output

Off-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Equipment Type

	Petroleum Use	GHGs	CO	NOx	PM10	PM2.5	VOC	SOx

Equipment Type	(barrels)	(short tons)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	7,997.1	4,403.4	4,563.9	13,727.9	928.9	901.9	1,311.5	49.9
Excavators	1,345.3	740.8	167.3	669.7	23.2	23.2	40.2	8.4
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	3,886.4	2,140.0	7,128.6	15,872.9	1,533.8	1,490.1	1,288.2	24.3
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	3,587.5	1,975.4	499.5	1,421.9	74.6	72.1	47.6	22.4
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	16,816.4	9,259.6	12,359.4	31,692.5	2,560.5	2,487.3	2,687.5	105.0

Remaining Lifetime Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Equipment Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Off-Road Fleet Footprint Calculator Output - Externality Costs

Current Year Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

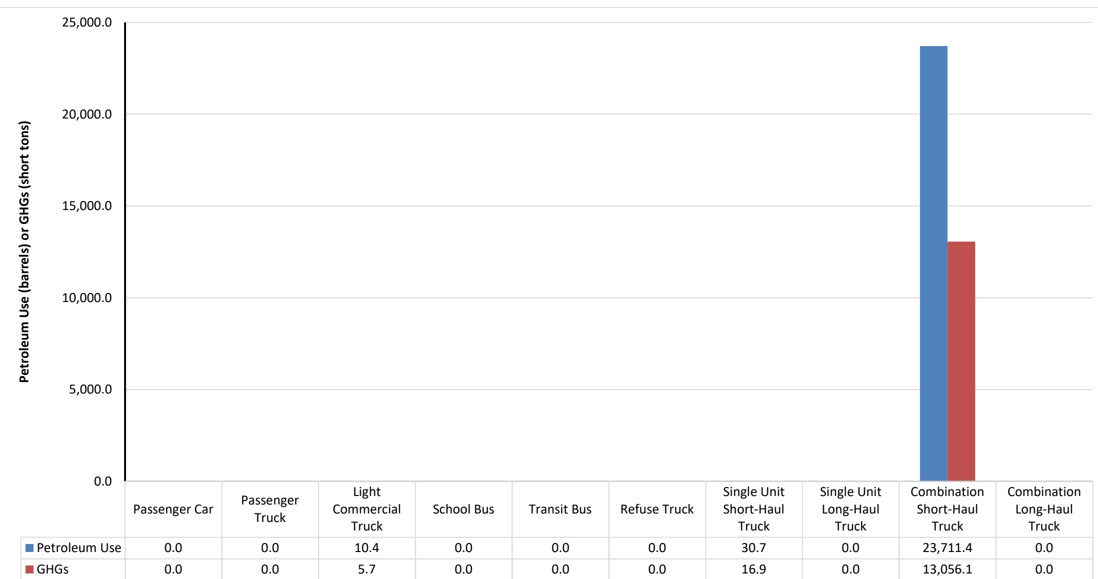
Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$135,554	$179,475	$0	$24,468	$170	$59,552	$13,392	$2,829
Excavators	$22,803	$30,192	$0	$1,194	$0	$1,535	$410	$476
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$65,877	$87,222	$0	$28,291	$274	$98,395	$13,154	$1,375

Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$60,809	$80,512	$0	$2,534	$16	$4,759	$486	$1,269
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$285,043	$377,401	$0	$56,487	$460	$164,240	$27,443	$5,949

Remaining Lifetime Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0	$0	$0

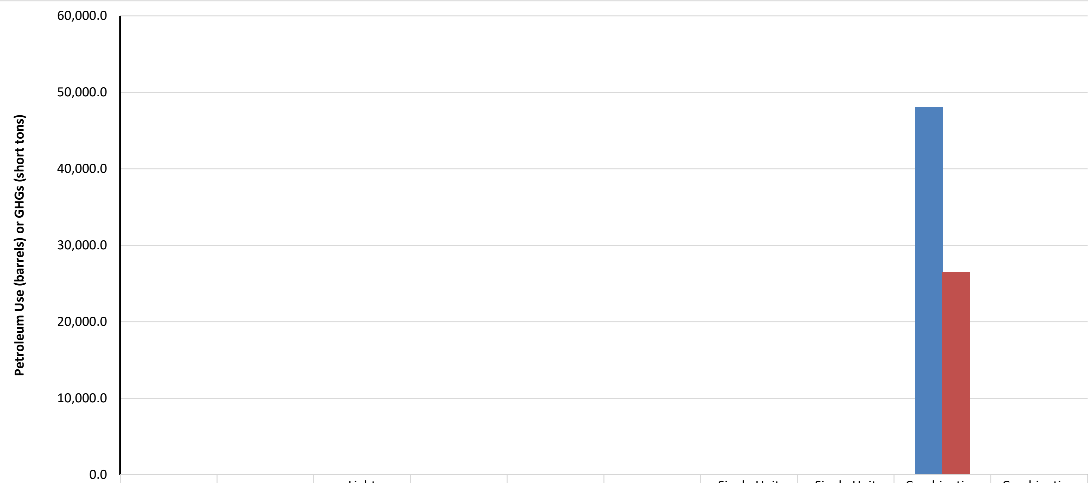
Current Year Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet



Current Year Vehicle Operation Air Pollutants - On-Road Fleet

	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	56.3	0.0	0.0	0.0	96.0	0.0	35,830.6	0.0
NOx	0.0	0.0	66.2	0.0	0.0	0.0	301.1	0.0	156,029.0	0.0
PM10	0.0	0.0	5.9	0.0	0.0	0.0	16.6	0.0	5,478.8	0.0
PM2.5	0.0	0.0	4.9	0.0	0.0	0.0	13.7	0.0	3,897.0	0.0
VOC	0.0	0.0	16.4	0.0	0.0	0.0	42.1	0.0	9,214.9	0.0
SOx	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	148.0	0.0

Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet



	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48,002.8	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26,431.7	0.0

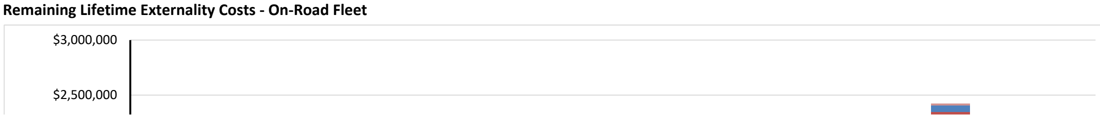
Remaining Lifetime Vehicle Operation Air Pollutants - On-Road Fleet

	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27,920.0	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	198,144.1	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3,956.1	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,309.2	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,948.3	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	299.6	0.0

Current Year Externality Costs - On-Road Fleet

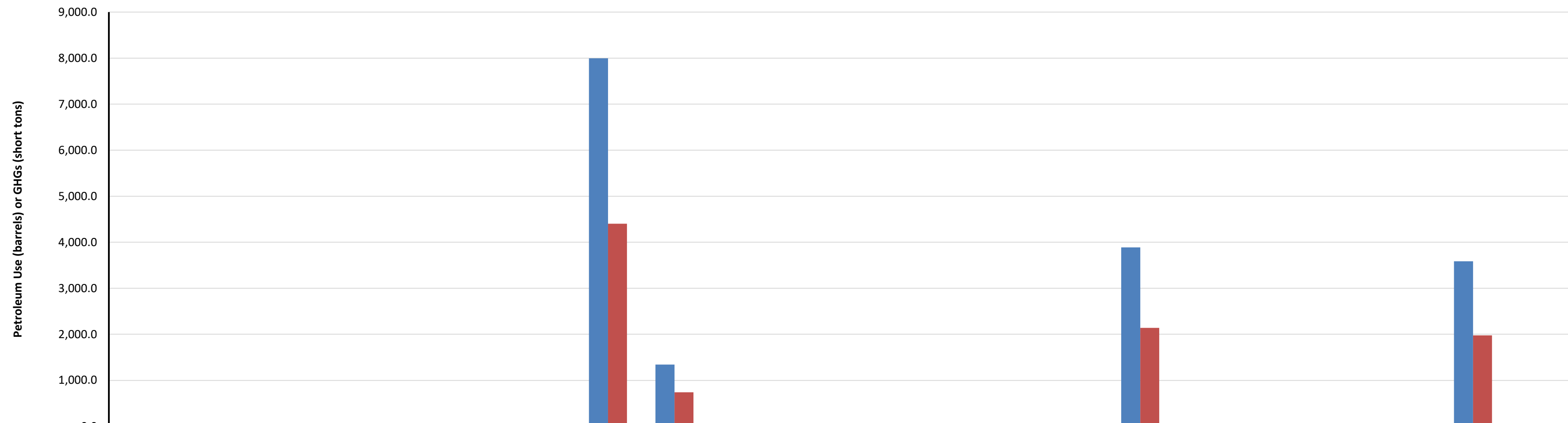
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$4	$0	$0	$0	$11	$0	$8,388	$0
VOC	$0	$0	$168	$0	$0	$0	$430	$0	$94,097	$0
PM2.5	$0	$0	$321	$0	$0	$0	$903	$0	$257,324	$0
PM10	$0	$0	$6	$0	$0	$0	$19	$0	$9,940	$0
NOx	$0	$0	$118	$0	$0	$0	$537	$0	$278,095	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$233	$0	$0	$0	$688	$0	$532,142	$0
Petroleum Use	$0	$0	$176	$0	$0	$0	$520	$0	$401,916	$0

Remaining Lifetime Externality Costs - On-Road Fleet



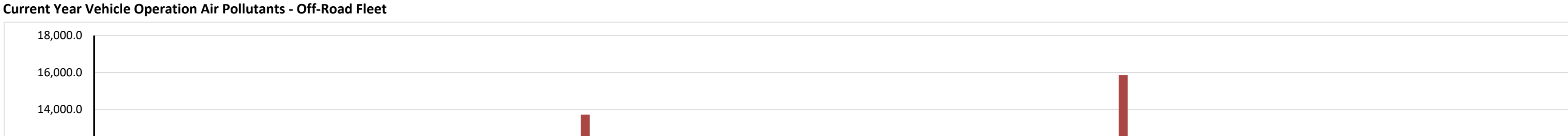
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$0	$0	$0	$0	$0	$0	$16,981	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$0	$60,740	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$0	$86,447	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$0	$16,633	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$0	$353,159	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$0	$1,077,303	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$0	$813,664	$0

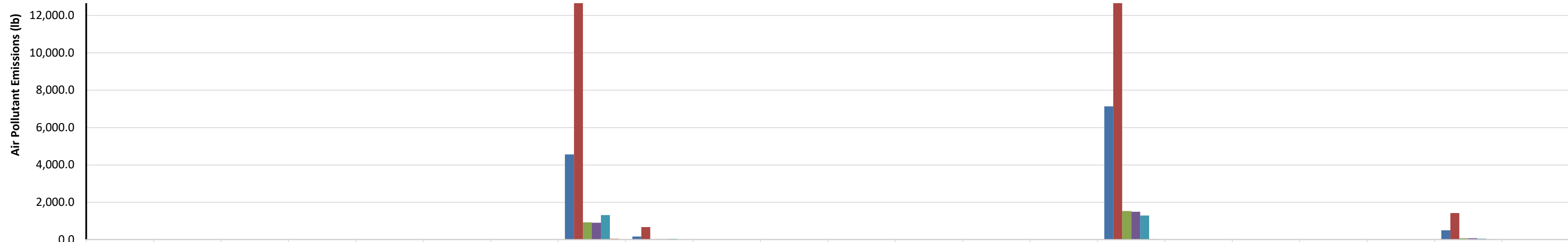
Current Year Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7,997.1	1,345.3	0.0	0.0	0.0	0.0	0.0	0.0	3,886.4	0.0	0.0	0.0	0.0	3,587.5	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,403.4	740.8	0.0	0.0	0.0	0.0	0.0	0.0	2,140.0	0.0	0.0	0.0	0.0	1,975.4	0.0

Current Year Vehicle Operation Air Pollutants - Off-Road Fleet





	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,563.9	167.3	0.0	0.0	0.0	0.0	0.0	0.0	7,128.6	0.0	0.0	0.0	0.0	499.5	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13,727.9	669.7	0.0	0.0	0.0	0.0	0.0	0.0	15,872.9	0.0	0.0	0.0	0.0	1,421.9	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	928.9	23.2	0.0	0.0	0.0	0.0	0.0	0.0	1,533.8	0.0	0.0	0.0	0.0	74.6	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	901.9	23.2	0.0	0.0	0.0	0.0	0.0	0.0	1,490.1	0.0	0.0	0.0	0.0	72.1	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,311.5	40.2	0.0	0.0	0.0	0.0	0.0	0.0	1,288.2	0.0	0.0	0.0	0.0	47.6	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.9	8.4	0.0	0.0	0.0	0.0	0.0	0.0	24.3	0.0	0.0	0.0	0.0	22.4	0.0

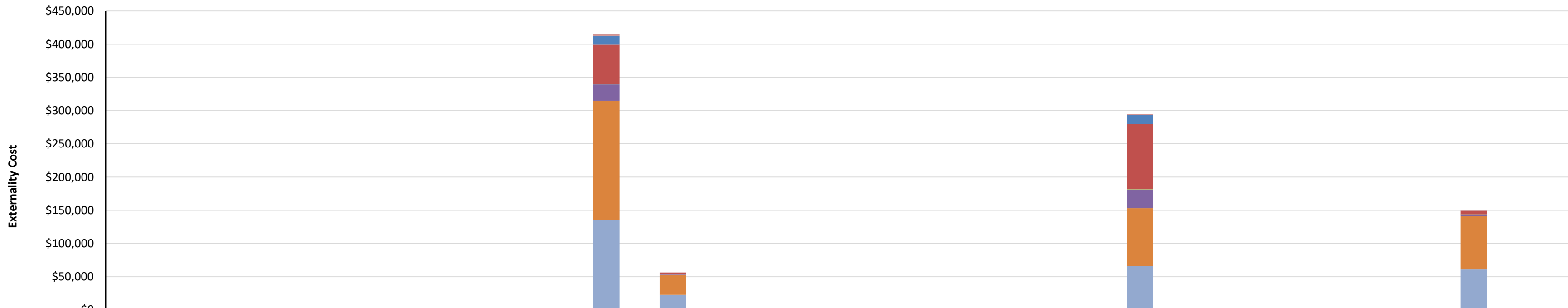
Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet

	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - Off-Road Fleet

	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Current Year Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$2,829	$476	$0	$0	$0	$0	$0	$0	$1,375	$0	$0	$0	$0	$1,269	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$13,392	$410	$0	$0	$0	$0	$0	$0	$13,154	$0	$0	$0	$0	$486	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$59,552	$1,535	$0	$0	$0	$0	$0	$0	$98,395	$0	$0	$0	$0	$4,759	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$170	$0	$0	$0	$0	$0	$0	$0	$274	$0	$0	$0	$0	$16	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$24,468	$1,194	$0	$0	$0	$0	$0	$0	$28,291	$0	$0	$0	$0	$2,534	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$179,475	$30,192	$0	$0	$0	$0	$0	$0	$87,222	$0	$0	$0	$0	$80,512	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$135,554	$22,803	$0	$0	$0	$0	$0	$0	$65,877	$0	$0	$0	$0	$60,809	$0

Remaining Lifetime Externality Costs - Off-Road Fleet

	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Key Inputs

Key Inputs	Calculator Inputs Used In
Primary Vehicle Location	*Payback, TCO, IR, Footprint*
Light-Duty Vehicle Information	*Payback, TCO*
Heavy-Duty Vehicle Information	*Payback, TCO*
Fuel and DEF Price	*Payback, TCO, IR*
Total Cost of Ownership Inputs	*TCO*
Fuel Production Assumptions	*Payback, TCO, IR, Footprint*
Petroleum Use, GHGs & Air Pollutant Options	*Payback, TCO, IR, Footprint*
Idle Reduction Inputs	*IR*
Electric Vehicle Charging Inputs	*Charging*
Off-Road Equipment Inputs	*Payback*

Key Vehicle and Fuel Inputs

Primary Vehicle Location

State	WASHINGTON
County	KING

Light-Duty Vehicle Information

Vehicle Type	Passenger Car
Vocation Type	Car

Light-Duty Fuel Type	Number of Light-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPGGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	*Default Mileage*	*Default MPGGE*	*Default AFV MPGGE Relative Ratio*	*User AFV MPGGE Relative Ratio*	*Default Purchase Price*	*Default Maintenance & Repair*	*User MPDGE*
Gasoline	0	12,400	30.9	$20,000	$0.15	12,400	30.9	1.00	1.00	$20,000	$0.15	35.7
Diesel	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Gasoline Hybrid Electric Vehicle (HEV)	0	12,400	46.3	$22,000	$0.14	12,400	46.3	1.50	1.50	$22,000	$0.14	53.4
Gasoline Plug-in Hybrid Electric Vehicle (PHEV)	0	12,400	53.2	$27,000	$0.13	12,400	53.2	1.72	1.72	$27,000	$0.13	61.4
Gasoline Extended Range Electric Vehicle (EREV)	0	12,400	44.4	$33,000	$0.13	12,400	44.4	1.43	1.43	$33,000	$0.13	51.2
All-Electric Vehicle (EV)	0	12,400	106.2	$37,000	$0.09	12,400	106.2	3.43	3.43	$37,000	$0.09	122.6
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	12,400	73.5	$50,000	$0.09	12,400	73.5	2.38	2.38	$50,000	$0.09	84.8
Biodiesel (B20)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Biodiesel (B100)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Renewable Diesel (RD20)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Renewable Diesel (RD100)	0	12,400	37.1	$27,000	$0.23	12,400	37.1	1.20	1.20	$27,000	$0.23	42.8
Ethanol (E85)	0	12,400	30.9	$20,000	$0.15	12,400	30.9	1.00	1.00	$20,000	$0.15	35.7
Propane (LPG)	0	12,400	30.9	$26,000	$0.15	12,400	30.9	1.00	1.00	$26,000	$0.15	35.7
Compressed Natural Gas (CNG)	0	12,400	29.4	$27,000	$0.15	12,400	29.4	0.95	0.95	$27,000	$0.15	33.9

Heavy-Duty Vehicle Information

Vehicle Type	School Bus
Vocation Type	School Bus

Heavy-Duty Fuel Type	Number of Heavy-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPDGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	*Default Mileage*	*Default MPDGE*	*Default AFV MPDGE Relative Ratio*	*User AFV MPDGE Relative Ratio*	*Default Purchase Price*	*Default Maintenance & Repair*	*Default MPGGE*	*User MPGGE*
Gasoline	0	0	6.8	$0	$0.61	0	6.8	0.83	0.83	$0	$0.61	5.9	5.9
Diesel	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
All-Electric Vehicle (EV)	0	15,000	24.0	$300,000	$0.56	15,000	24.0	2.93	2.93	$300,000	$0.56	20.8	20.8
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	11.3	$0	$0.56	0	11.3	1.38	1.38	$0	$0.56	9.8	9.8
Diesel Hybrid Electric Vehicle (HEV)	0	15,000	11.1	$160,000	$0.81	15,000	11.1	1.35	1.35	$160,000	$0.81	9.6	9.6
Diesel Hydraulic Hybrid (HHV)	0	0	10.6	$0	$0.81	0	10.6	1.29	1.29	$0	$0.81	9.2	9.2
Biodiesel (B20)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Biodiesel (B100)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Renewable Diesel (RD20)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Renewable Diesel (RD100)	0	15,000	8.2	$100,000	$0.93	15,000	8.2	1.00	1.00	$100,000	$0.93	7.1	7.1
Ethanol (E85)	0	0	6.8	$0	$0.61	0	6.8	0.83	0.83	$0	$0.61	5.9	5.9
Propane (LPG)	0	15,000	6.8	$108,000	$0.61	15,000	6.8	0.83	0.83	$108,000	$0.61	5.9	5.9
Compressed Natural Gas (CNG)	0	15,000	7.0	$130,000	$0.93	15,000	7.0	0.85	0.85	$130,000	$0.93	6.0	6.0
Liquefied Natural Gas (LNG)	0	15,000	7.0	$120,000	$0.93	15,000	7.0	0.85	0.85	$120,000	$0.93	6.0	6.0
LNG / Diesel Pilot Ignition	0	0	7.8	$0	$0.97	0	7.8	0.95	0.95	$0	$0.97	6.7	6.7

Refueling Information

Fueling Type	Private Station	Infrastructure costs (go to 'Payback')
Fuel Price Sensitivity	No	Enter fuel price range (go to 'Payback')

Fuel and DEF Price

	Fuel Unit	Public Station ($/fuel unit)	Private Station ($/fuel unit)	*Public Station: Default $/Fuel Unit*	*Public Station: Default $/GGE*	*Public Station: User $/GGE*	*Public Station: User $/DGE*	*Private Station: Default $/Fuel Unit*	*Private Station: Default $/GGE*	*Private Station: User $/GGE*	*Private Station: User $/DGE*
Gasoline	gasoline gallon	$3.13	$3.01	$3.13	$3.13	$3.13	$3.61	$3.01	**$3.01**	$3.01	$3.47
Diesel	diesel gallon	$3.22	$2.99	$3.22	$2.79	$2.79	$3.22	$2.99	**$2.59**	$2.59	$2.99
Electricity	kWh	$0.10	$0.10	$0.10	$3.19	$3.19	$3.68	$0.10	$3.19	$3.19	$3.68
G.H2	hydrogen kg										
B20	B20 gallon	$3.05	$2.61	$3.05	**$2.68**	$2.68	$3.10	$2.61	**$2.30**	$2.30	$2.65
B100	B100 gallon	$4.17	$4.36	$4.17	$3.91	$3.91	$4.52	$4.36	**$4.09**	$4.09	$4.72
RD20	RD20 gallon	$3.66	$2.96	$3.66	$3.20	$3.20	$3.70	$2.96	$2.59	$2.59	$2.99
RD100	RD100 gallon	$3.71	$2.95	$3.71	$3.39	$3.39	$3.91	$2.95	$2.69	$2.69	$3.11
E85	E85 gallon	$3.68	$2.37	$3.68	$5.02	$5.02	$5.79	$2.37	**$3.23**	$3.23	$3.73
Propane	LPG gallon	$2.06	$3.26	$2.06	$2.72	$2.72	$3.14	$3.26	**$4.31**	$4.31	$4.97
CNG	CNG GGE	$2.77	$1.72	$2.77	$2.77	$2.77	$3.20	$1.72	**$1.72**	$1.72	$1.99
LNG	LNG gallon	$1.91	$1.10	$1.91	$2.87	$2.87	$3.31	$1.10	$1.65	$1.65	$1.91
Diesel Exhaust Fluid (DEF)	DEF gallon	$2.80	$2.80	$2.80	$2.80	$2.80	N/A	$2.80	$2.80	$2.80	N/A

Total Cost of Ownership Inputs

Vehicle and Infrastructure Information

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure	*Default LDV*	*Default HDV*	*Default Infrastructure*
Years of Planned Ownership	years	15	15	15	15	15	15

Financial Assumptions

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure			
Loan	yes/no	No	No	No			
Loan Term	years	5	5	5	5	5	5
Interest Rate	%	4.20%	4.20%	4.20%	4.20%	4.20%	4.20%
Percent Down Payment	%	12.00%	12.00%	12.00%	12.00%	12.00%	12.00%
Discount Factor	%		1.24%			1.24%	

Fuel Production Assumptions

Biodiesel Feedstock Source	1 - Soy 2 - Canola 3 - Corn 4 - Tallow	1	
Renewable Diesel Feedstock Source	1 - Soy 2 - Canola 3 - Palm	1	
Ethanol Feedstock Source	1 - Corn 2 - Switchgrass 3 - Sugarcane 4 - Grain Sorghum	1	
CNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
LNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
North American NG Feedstock Source		Conventional 66%	Shale 34%
LPG Feedstock Source		NG 69%	Petroleum 31%
Source of Electricity for PHEVs, EVs, and FCVs (Electrolysis)	1 - Average U.S. Mix 2 to 11 - EIA Region Mix (see map) 12 - User Defined (go to 'Background Data' sheet)	11	
G.H2 Production Process	1 - Refueling Station SMR (On-site) 2 - Central Plant SMR (Off-site) 3 - Refueling Station Electrolysis (On-site)	1	

Number	Grid Mix
1	U.S.
2	ASCC
3	FRCC
4	HICC
5	MRO
6	NPCC
7	RFC
8	SERC
9	SPP
10	TRE
11	WECC
12	User Defined
11	**Default based on State and County**

Petroleum Use, GHGs & Air Pollutant Options

Petroleum Use, GHGs & Air Pollutant Calculation Type		1
1 - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants		
2 - Well-to-Wheels Petroleum Use, GHGs, and Air Pollutants		
3 - Well-to-Wheels & Vehicle Production* Petroleum Use, GHGs, Air Pollutants (*LDVs only)		
Diesel In-Use Emissions Multiplier	yes/no	No
Low NOx Engines - CNG, LNG, LPG HDVs	yes/no	Yes

Idle Reduction Inputs

Light-Duty Vehicle Information

Idle Reduction (IR) Vehicle Type	Passenger Car
IR Vocation Type	Police Car
Baseline Vehicle Model Year	2020

Services Required (% of hours):

		Vehicle Heating	Engine Heating	Cooling	Electrical	*Default Idle Hr*
Annual Idling Hours (per Vehicle)	1,750					1750
% of Idle Hours by Service		33%	0%	33%	34%	

Default Services Required (% of hours): *Vehicle Heating* 33%, *Engine Heating* 0%, *Cooling* 33%, *Electrical* 34%

Light-Duty Baseline & Idling Reduction Equipment	Number of Light-Duty Vehicles	Services Provided By IR Equipment: Vehicle Heating	Engine Heating	Cooling	Electrical	Idling Hour Reduction Goal	Fuel Consumption (GGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	*Default Fuel Consumption (GGE/hr)*	*Default Fuel Consumption (DGE/hr)*	*Electrical Power Demand (W)*	*Default Equipment Cost*
Gasoline	0						0.30			0.30	0.26		
Fuel Operated Air Heater	0	✓	✗	✗	✗	578	0.03	0	$900	0.03	0.03	0	$900
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0.08	0	$1,250	0.08	0.07	0	$1,250
Battery Management Start/Stop	0	✗	✗	✗	✓	595	0.00	250	$1,500	0.00	0.00	250	$1,500
APU (Battery)	0	✗	✗	✓	✓	1173	0.00	250	$4,300	0.00	0.00	250	$4,300
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	1750	0.03	250	$5,200	0.03	0.03	250	$5,200
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	1173	0.00	250	$5,800	0.00	0.00	250	$5,800

Heavy-Duty Vehicle Information

IR Vehicle Type	Combination Long-Haul Truck
IR Vocation Type	Long Haul Freight Truck
Baseline Vehicle Model Year	2020

Default Services Required (% of hours):

Services Required (% of hours):

		Vehicle Heating	Engine Heating	Cooling	Electrical
Annual Conventional Idling Hours (per Vehicle)	150				
% of Idle Hours by Service		33%	0%	33%	34%
*Annual Hotelling Hours (per Vehicle)**	1,800				
% of Hotelling Hours by Service		33%	0%	33%	34%

		Vehicle Heating	Engine Heating	Cooling	Electrical
Default Idle Hr	*150*				
		33%	*0%*	*33%*	*34%*
Default Hotel Hr	*1800*				
		33%	*0%*	*33%*	*34%*

Heavy-Duty Baseline & Idling Reduction Equipment	Number of Heavy-Duty Vehicles	Services Provided By IR Equipment				Conventional Idling Hour Reduction Goal	Hotelling Hour Reduction Goal	Fuel Consumption (DGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	*Default Fuel Consumption (GGE/hr)*	*Default Fuel Consumption (DGE/hr)*	*Electrical Power Demand (W)*	*Default Equipment Cost*	*User Fuel Consumption (GGE/hr)*
Diesel	0							0.78			*0.89*	*0.78*			*0.89*
*Diesel (Hotelling)**								*0.90*			*1.03*	*0.90*			*1.03*
Fuel Operated Air Heater	0	✓	✗	✗	✗	50	594	0.06	0	$1,800	*0.07*	*0.06*	*0*	*$1,800*	*0.07*
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0	0.12	0	$1,700	*0.14*	*0.12*	*0*	*$1,700*	*0.14*
Battery Management Start/Stop	0	✗	✗	✗	✓	51	612	0.00	704	$2,500	*0.00*	*0.00*	*704*	*$2,500*	*0.00*
APU (Diesel)	0	✓	✓	✓	✓	150	1800	0.20	0	$10,000	*0.23*	*0.20*	*0*	*$10,000*	*0.23*
APU (Battery)	0	✗	✗	✓	✓	101	1206	0.00	704	$8,000	*0.00*	*0.00*	*704*	*$8,000*	*0.00*
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	150	1800	0.06	704	$9,800	*0.07*	*0.06*	*704*	*$9,800*	*0.07*
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	101	1206	0.00	704	$10,500	*0.00*	*0.00*	*704*	*$10,500*	*0.00*
Truck Stop Electrification - Single System**	0	✗	✗	✓	✓	101	1206	0.00	704	$5	*0.00*	*0.00*	*704*	*$5*	*0.00*
Shore Power**	0	✗	✗	✓	✓	101	1206	0.00	704	$2,500	*0.00*	*0.00*	*704*	*$2,500*	*0.00*

Electric Vehicle Charging Inputs

Level 2 Charging Infrastructure

Predicted Weekly Utilization: Moderate

Venue	Number of Chargers	Weekly Utilization (sessions/week/ station)	Average Session Power (kW)	Charge Time (minutes/ session)	*Default Utilization Selected*	*Default Session Power (kW)*	*Default Charge Time (hr/session)*	*Low*	*Moderate*	*High*	*Default Charge Time (min/session)*	*User Charge Time (hr/session)*
Parking Lot	0	4.5	4	150	*4.5*	*4*	*2.5*	*0.5*	*4.5*	*6.5*	*150*	*2.5*
Retail & Leisure	0	5.5	4	90	*5.5*	*4*	*1.5*	*1.0*	*5.5*	*7.0*	*90*	*1.5*
Education	0	6.0	4	150	*6.0*	*4*	*2.5*	*1.5*	*6.0*	*9.0*	*150*	*2.5*
Healthcare	0	6.5	4	150	*6.5*	*4*	*2.5*	*3.5*	*6.5*	*7.0*	*150*	*2.5*
Workplace	0	4.5	4	150	*4.5*	*4*	*2.5*	*1.0*	*4.5*	*7.5*	*150*	*2.5*
Multi-Unit Dwelling	0	3.0	4	210	*3.0*	*4*	*3.5*	*0.5*	*3.0*	*4.0*	*210*	*3.5*
Single-Unit Dwelling	0	6.0	4	120	*6.0*	*4*	*2.0*	*3.0*	*6.0*	*7.5*	*120*	*2.0*

DC Fast Charging Infrastructure

Predicted Weekly Utilization: Moderate

Venue	Number of Chargers	Weekly Utilization (sessions/week/ station)	Average Session Power (kW)	Charge Time (minutes/ session)	*Default Utilization Selected*	*Default Session Power (kW)*	*Default Charge Time (hr/session)*	*Low*	*Moderate*	*High*	*Default Charge Time (min/session)*	*User Charge Time (hr/session)*
Parking Lot	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Retail & Leisure	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Education	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Healthcare	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Workplace	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Multi-Unit Dwelling	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Single-Unit Dwelling	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*

Off-Road Equipment Inputs

Small Equipment Information

Equipment Type	Commercial Turf Equipment	*Default Rated hp*
Vocation Type	Zero-Turn Commercial Turf	
Rated Horsepower	25	*25*

	Type	Replacements per Lifetime	Battery Capacity (kWh)	Battery Cost ($/kWh)	Lifetime Replacement Cost	*Default Type*	*Default Replacements per Lifetime*	*Default kWh*	*Default $/kWh: Lithium-Ion*	*User $/kWh: Lithium-Ion*
EV Battery Replacement	Lithium-Ion	0	21.6	$800	$0	*Lithium-Ion*	*0*	*21.6*	*$800*	*$800*

Small Equipment Fuel Type	Number of Units	Annual Hourly Usage	Fuel Consumption (GGE/hr)	Equipment Price ($/unit)	Maintenance & Repair ($/hr)	*Default Usage*	*Default GGE/hr*	*Default AFV GGE/hr Relative Ratio*	*User AFV GGE/hr Relative Ratio*	*Default Purchase Price*	*User Purchase Price + Battery Replacement*	*Default Maintenance & Repair*	*User DGE/hr*	*User Rated hp*
Gasoline	0	1,364	0.34	$12,000	$0.12	*1,364*	*0.34*	*1.00*	*1.00*	*$12,000*	*$12,000*	*$0.12*	*0.29*	*25*
Diesel	0	1,364	0.28	$16,000	$0.15	*1,364*	*0.28*	*0.83*	*0.83*	*$16,000*	*$16,000*	*$0.15*	*0.25*	*25*
Gasoline Hybrid Electric Vehicle (HEV)	0	0	0.24	$0	$0.00	*0*	*0.24*	*0.71*	*0.71*	*$0*	*$0*	*$0.00*	*0.21*	*25*
All-Electric Vehicle (EV)	0	1,364	0.07	$23,000	$0.05	*1,364*	*0.07*	*0.20*	*0.20*	*$23,000*	*$23,000*	*$0.05*	*0.06*	*25*
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	0.11	$0	$0.00	*0*	*0.11*	*0.33*	*0.33*	*$0*	*$0*	*$0.00*	*0.10*	*25*
Biodiesel (B20)	0	0	0.28	$0	$0.00	*0*	*0.28*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.25*	*25*
Biodiesel (B100)	0	0	0.28	$0	$0.00	*0*	*0.28*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.25*	*25*
Renewable Diesel (RD20)	0	0	0.28	$0	$0.00	*0*	*0.28*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.25*	*25*
Renewable Diesel (RD100)	0	0	0.28	$0	$0.00	*0*	*0.28*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.25*	*25*
Ethanol (E85)	0	0	0.34	$0	$0.00	*0*	*0.34*	*1.00*	*1.00*	*$0*	*$0*	*$0.00*	*0.29*	*25*
Propane (LPG)	0	1,364	0.34	$13,500	$0.12	*1,364*	*0.34*	*1.00*	*1.00*	*$13,500*	*$13,500*	*$0.12*	*0.29*	*25*
Compressed Natural Gas (CNG)	0	0	0.34	$0	$0.00	*0*	*0.34*	*1.00*	*1.00*	*$0*	*$0*	*$0.00*	*0.29*	*25*

Large Equipment Information

Equipment Type	Forklifts	*Default Rated hp*
Vocation Type	Warehouse Forklift	
Rated Horsepower	50	*50*

	Type	Replacements per Lifetime	Battery Capacity (kWh)	Battery Cost ($/kWh)	Lifetime Replacement Cost	*Default Type*	*Default Replacements per Lifetime*	*Default kWh*	*Default $/kWh: Lead-Acid*	*User $/kWh: Lead-Acid*
EV Battery Replacement	Lead-Acid	0	43.2	$200	$0	*Lead-Acid*	*0*	*43.2*	*$200*	*$200*

Large Equipment Fuel Type	Number of Units	Annual Hourly Usage	Fuel Consumption (DGE/hr)	Equipment Price ($/unit)	Maintenance & Repair ($/hr)	*Default Usage*	*Default DGE/hr*	*Default AFV MPDGE Relative Ratio*	*User AFV MPDGE Relative Ratio*	*Default Purchase Price*	*User Purchase Price + Battery Replacement*	*Default Maintenance & Repair*	*Default GGE/hr*	*User Rated hp*	*User GGE/hr*
Gasoline	0	1,700	0.70	$22,000	$0.14	*1,700*	*0.70*	*1.00*	*1.00*	*$22,000*	*$22,000*	*$0.14*	*0.80*	*50*	*0.80*
Diesel	0	1,700	0.58	$30,000	$0.19	*1,700*	*0.58*	*0.83*	*0.83*	*$30,000*	*$30,000*	*$0.19*	*0.67*	*50*	*0.67*
All-Electric Vehicle (EV)	0	1,700	0.14	$37,000	$0.08	*1,700*	*0.14*	*0.20*	*0.20*	*$37,000*	*$37,000*	*$0.08*	*0.16*	*50*	*0.16*
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	1,700	0.23	$40,000	$0.08	*1,700*	*0.23*	*0.33*	*0.33*	*$40,000*	*$40,000*	*$0.08*	*0.27*	*50*	*0.27*
Diesel Hybrid Electric Vehicle (HEV)	0	0	0.48	$0	$0.00	*0*	*0.48*	*0.69*	*0.69*	*$0*	*$0*	*$0.00*	*0.56*	*50*	*0.56*
Diesel Hydraulic Hybrid (HHV)	0	0	0.48	$0	$0.00	*0*	*0.48*	*0.69*	*0.69*	*$0*	*$0*	*$0.00*	*0.56*	*50*	*0.56*
Biodiesel (B20)	0	0	0.58	$0	$0.00	*0*	*0.58*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.67*	*50*	*0.67*
Biodiesel (B100)	0	0	0.58	$0	$0.00	*0*	*0.58*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.67*	*50*	*0.67*
Renewable Diesel (RD20)	0	0	0.58	$0	$0.00	*0*	*0.58*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.67*	*50*	*0.67*
Renewable Diesel (RD100)	0	0	0.58	$0	$0.00	*0*	*0.58*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.67*	*50*	*0.67*
Ethanol (E85)	0	0	0.70	$0	$0.00	*0*	*0.70*	*1.00*	*1.00*	*$0*	*$0*	*$0.00*	*0.80*	*50*	*0.80*
Propane (LPG)	0	1,700	0.70	$25,000	$0.14	*1,700*	*0.70*	*1.00*	*1.00*	*$25,000*	*$25,000*	*$0.14*	*0.80*	*50*	*0.80*
Compressed Natural Gas (CNG)	0	1,700	0.70	$50,000	$0.14	*1,700*	*0.70*	*1.00*	*1.00*	*$50,000*	*$50,000*	*$0.14*	*0.80*	*50*	*0.80*
Liquefied Natural Gas (LNG)	0	0	0.70	$0	$0.00	*0*	*0.70*	*1.00*	*1.00*	*$0*	*$0*	*$0.00*	*0.80*	*50*	*0.80*
LNG / Diesel Pilot Ignition	0	0	0.58	$0	$0.00	*0*	*0.58*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.67*	*50*	*0.67*

AFLEET_Tool_2020_CHRLF EIS GHG_A3Constr.xlsx

On-Road Fleet Footprint Calculator

State
WASHINGTON

Year 2020

Vehicle Type	Model Year	Annual Vehicle Mileage	Fuel Use: Gasoline (gal)	Diesel (gal)	Gasoline HEV (gal)	Gasoline PHEV (gal)	Gasoline PHEV (kWh)	Gasoline EREV (gal)	Gasoline EREV (kWh)	Electricity (kWh)	G.H2 (kg)	Diesel HEV (gal)	Diesel HHV (gal)	B20 (gal)	B100 (gal)	RD20 (gal)	RD100 (gal)	E85 (gal)	LPG (gal)	CNG (GGE)	LNG (gal)	LNG / Diesel (LNG gal)	LNG / Diesel (diesel gal)	Remaining Lifetime (years): Default Lifetime	Calculated Lifetime	Age	Remaining Lifetime	Well-to-Wheels Petroleum Use (barrels)	Vehicle Production Petroleum Use (barrels)
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck	2005	11,400		576																				15	15	15	0	16.3	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck	1992	11,400		1,701																				15	28	28	0	42.4	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck	2008	3,369,560		502,919																				15	15	12	3	12,529.3	0.0
Combination Short-Haul Truck	2008	3,181,160		474,800																				15	15	12	3	11,828.8	0.0
Combination Short-Haul Truck	2001	3,073,160		458,681																				15	19	19	0	11,427.2	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0

Off-Road Fleet Footprint Calculator

State
WASHINGTON

Year 2021

Equipment Type	Model Year	Annual Usage (hours)	Rated Horsepower (hp)	Fuel Use: Gasoline (gal)	Diesel (gal)	Electricity (kWh)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	E85 (gal)	LPG (gal)	CNG (GGE)	LNG (gal)
Aerial Lifts															
Aerial Lifts															
Agricultural Tractors															
Agricultural Tractors															
Airport Support Equipment															
Airport Support Equipment															
Chain Saws															
Chain Saws															
Commercial Turf Equipment															
Commercial Turf Equipment															
Cranes															
Cranes															
Crawler Tractor/Dozers	2020	20,100	452		201,000										
Crawler Tractor/Dozers	2003	22,800	140		228,000										
Excavators	2017	3,000	425		30,000										
Excavators	2020	2,400	36		24,000										
Forklifts															
Forklifts															
Golf Carts															
Golf Carts															
Lawn & Garden Tractors															
Lawn & Garden Tractors															
Lawn Mowers															
Lawn Mowers															
Leafblowers/Vacuums															
Leafblowers/Vacuums															
Rollers															
Rollers															
Rubber Tire Loaders	2006	20,100	269		201,000										
Rubber Tire Loaders															
Skid Steer Loaders															
Skid Steer Loaders															
Snowblowers															
Snowblowers															
Sweepers/Scrubbers															
Sweepers/Scrubbers															
Terminal Tractors															
Terminal Tractors															
Tractors/Loaders/Backhoes	2014	18,000	94		180,000										
Tractors/Loaders/Backhoes															
Trimmers/Edgers/Brush Cutter															
Trimmers/Edgers/Brush Cutter															

Equipment Type	Default Annual Usage (hr)	Default Rated Horsepower (hp)	Default Estimated Gasoline Use (gal)	Default Estimated Electricity Use (kWh)	Load Factor %	Remaining Lifetime: Median Life Full Load (hr)	Calculated Lifetime (hr)	Cumulative Hours	Remaining Lifetime (hr)	Remaining Years	Well-to-Wheels Petroleum Use (barrels)	Well-to-Wheels GHGs (short tons)
Aerial Lifts	384	47	86	565	21%	0	0	0	0	0	0.0	0.0
Aerial Lifts	384	47	86	565	21%	0	0	0	0	0	0.0	0.0
Agricultural Tractors	475	50	318	2,090	59%	0	0	0	0	0	0.0	0.0
Agricultural Tractors	475	50	318	2,090	59%	0	0	0	0	0	0.0	0.0
Airport Support Equipment	732	150	1,469	9,662	59%	0	0	0	0	0	0.0	0.0
Airport Support Equipment	732	150	1,469	9,662	59%	0	0	0	0	0	0.0	0.0
Chain Saws	303	4	19	127	70%	0	0	0	0	0	0.0	0.0
Chain Saws	303	4	19	127	70%	0	0	0	0	0	0.0	0.0
Commercial Turf Equipment	1,364	25	464	3,051	60%	0	0	0	0	0	0.0	0.0
Commercial Turf Equipment	1,364	25	464	3,051	60%	0	0	0	0	0	0.0	0.0
Cranes	990	365	3,524	23,173	43%	0	0	0	0	0	0.0	0.0
Cranes	990	365	3,524	23,173	43%	0	0	0	0	0	0.0	0.0
Crawler Tractor/Dozers	936	130	1,628	10,707	59%	0	0	20,100	0	0	5,007.5	2,757.3
Crawler Tractor/Dozers	936	130	1,628	10,707	59%	0	0	410,400	0	0	5,680.2	3,127.7
Excavators	1,092	25	365	2,402	59%	0	0	12,000	0	0	747.4	411.5
Excavators	1,092	25	365	2,402	59%	0	0	2,400	0	0	597.9	329.2
Forklifts	1,700	50	1,137	7,479	59%	0	0	0	0	0	0.0	0.0
Forklifts	1,700	50	1,137	7,479	59%	0	0	0	0	0	0.0	0.0
Golf Carts	1,080	9	101	667	46%	0	0	0	0	0	0.0	0.0
Golf Carts	1,080	9	101	667	46%	0	0	0	0	0	0.0	0.0
Lawn & Garden Tractors	721	26	187	1,230	44%	0	0	0	0	0	0.0	0.0
Lawn & Garden Tractors	721	26	187	1,230	44%	0	0	0	0	0	0.0	0.0
Lawn Mowers	406	20	61	400	33%	0	0	0	0	0	0.0	0.0
Lawn Mowers	406	20	61	400	33%	0	0	0	0	0	0.0	0.0
Leafblowers/Vacuums	564	14	168	1,107	94%	0	0	0	0	0	0.0	0.0
Leafblowers/Vacuums	564	14	168	1,107	94%	0	0	0	0	0	0.0	0.0
Rollers	760	95	966	6,353	59%	0	0	0	0	0	0.0	0.0
Rollers	760	95	966	6,353	59%	0	0	0	0	0	0.0	0.0
Rubber Tire Loaders	761	599	6,099	40,110	59%	0	0	301,500	0	0	5,007.5	2,757.3
Rubber Tire Loaders	761	599	6,099	40,110	59%	0	0	0	0	0	0.0	0.0
Skid Steer Loaders	818	48	187	1,230	21%	0	0	0	0	0	0.0	0.0
Skid Steer Loaders	818	48	187	1,230	21%	0	0	0	0	0	0.0	0.0
Snowblowers	272	8	10	65	20%	0	0	0	0	0	0.0	0.0
Snowblowers	272	8	10	65	20%	0	0	0	0	0	0.0	0.0
Sweepers/Scrubbers	1,032	40	665	4,371	71%	0	0	0	0	0	0.0	0.0
Sweepers/Scrubbers	1,032	40	665	4,371	71%	0	0	0	0	0	0.0	0.0
Terminal Tractors	1,257	141	2,372	15,596	59%	0	0	0	0	0	0.0	0.0
Terminal Tractors	1,257	141	2,372	15,596	59%	0	0	0	0	0	0.0	0.0
Tractors/Loaders/Backhoes	1,135	73	395	2,595	21%	0	0	126,000	0	0	4,484.4	2,469.2
Tractors/Loaders/Backhoes	1,135	73	395	2,595	21%	0	0	0	0	0	0.0	0.0
Trimmers/Edgers/Brush Cutter	274	2	11	74	91%	0	0	0	0	0	0.0	0.0
Trimmers/Edgers/Brush Cutter	274	2	11	74	91%	0	0	0	0	0	0.0	0.0

Equipment Type	Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Well-to-Wheels Petroleum Use (barrels)	Remaining Lifetime Well-to-Wheels GHGs (short tons)	Remaining Lifetime Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	212.7	1,311.7	35.5	35.5	106.4	0.0	31.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	6,078.4	17,562.6	1,245.6	1,208.2	1,698.1	0.0	35.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	137.6	386.4	21.6	21.6	29.9	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	29.7	283.3	1.7	1.7	10.3	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	9,185.0	20,451.7	1,976.2	1,920.0	1,659.8	0.0	31.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	624.3	1,777.4	93.2	90.1	59.5	0.0	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment Type	Externality Cost - Well-to-Wheels Petroleum Use	Externality Cost - Well-to-Wheels GHGs	Externality Cost - Equipment Operation Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Externality Cost - Well-to-Wheels Petroleum Use	Remaining Lifetime Externality Cost - Well-to-Wheels GHGs	Remaining Lifetime Externality Cost - Equipment Operation Air: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$84,880	$112,382	$0	$2,338	$0	$2,341	$1,086	$0	$1,771	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$96,281	$127,478	$0	$31,302	$235	$79,779	$17,340	$0	$2,009	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$12,669	$16,773	$0	$689	$0	$1,424	$305	$0	$264	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$10,135	$13,419	$0	$505	$0	$111	$106	$0	$212	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$84,880	$112,382	$0	$36,452	$354	$126,778	$16,948	$0	$1,771	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$76,012	$100,640	$0	$3,168	$20	$5,948	$608	$0	$1,586	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

On-Road and Off-Road Fleet Footprint Calculator Output

		pounds	276,180.4	65,988.1	MTCO2E	Fuel Use (Barrels)	57,366.9
On-Road Fleet Footprint Calculator Output	28,656.3	tons	125.2746144			Gallons	2,409,410
			37331.8351				

On-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	14.3	7.9	77.8	91.4	8.1	6.7	22.7	0.1
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	42.4	23.3	132.7	416.1	23.0	18.9	58.2	0.3
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	35,785.2	19,704.4	53,476.9	233,899.7	8,172.8	5,793.1	13,736.6	223.4
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	35,842.0	19,735.6	53,687.4	234,407.2	8,203.9	5,818.7	13,817.5	223.7

Remaining Lifetime Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	73,074.2	40,236.7	42,502.4	301,632.8	6,022.3	1,993.0	9,055.0	456.1
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	73,074.2	40,236.7	42,502.4	301,632.8	6,022.3	1,993.0	9,055.0	456.1

On-Road Fleet Footprint Calculator Output - Externality Costs

Current Year On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$243	$322	$0	$163	$9	$443	$231	$5
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$719	$951	$0	$742	$26	$1,248	$594	$15
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$606,572	$803,110	$0	$416,887	$14,954	$382,524	$140,270	$12,659
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$607,534	$804,383	$0	$417,792	$14,989	$384,215	$141,096	$12,679

Remaining Lifetime On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$0	$0	$0	$0	$0	$0	$0	$0
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$1,238,633	$1,639,967	$0	$537,610	$25,321	$131,598	$92,465	$25,850
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$1,238,633	$1,639,967	$0	$537,610	$25,321	$131,598	$92,465	$25,850

Off-Road Fleet Footprint Calculator Output

Off-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Equipment Type

	Petroleum Use	GHGs	CO	NOx	PM10	PM2.5	VOC	SOx

Equipment Type	(barrels)	(short tons)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	10,687.7	5,885.0	6,291.1	18,874.4	1,281.0	1,243.7	1,804.5	66.7
Excavators	1,345.3	740.8	167.3	669.7	23.2	23.2	40.2	8.4
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	5,007.5	2,757.3	9,185.0	20,451.7	1,976.2	1,920.0	1,659.8	31.3
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	4,484.4	2,469.2	624.3	1,777.4	93.2	90.1	59.5	28.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	21,524.9	11,852.2	16,267.7	41,773.2	3,373.7	3,277.0	3,564.0	134.3

Remaining Lifetime Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

	Petroleum Use	GHGs	CO	NOx	PM10	PM2.5	VOC	SOx
Equipment Type	(barrels)	(short tons)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Off-Road Fleet Footprint Calculator Output - Externality Costs

Current Year Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

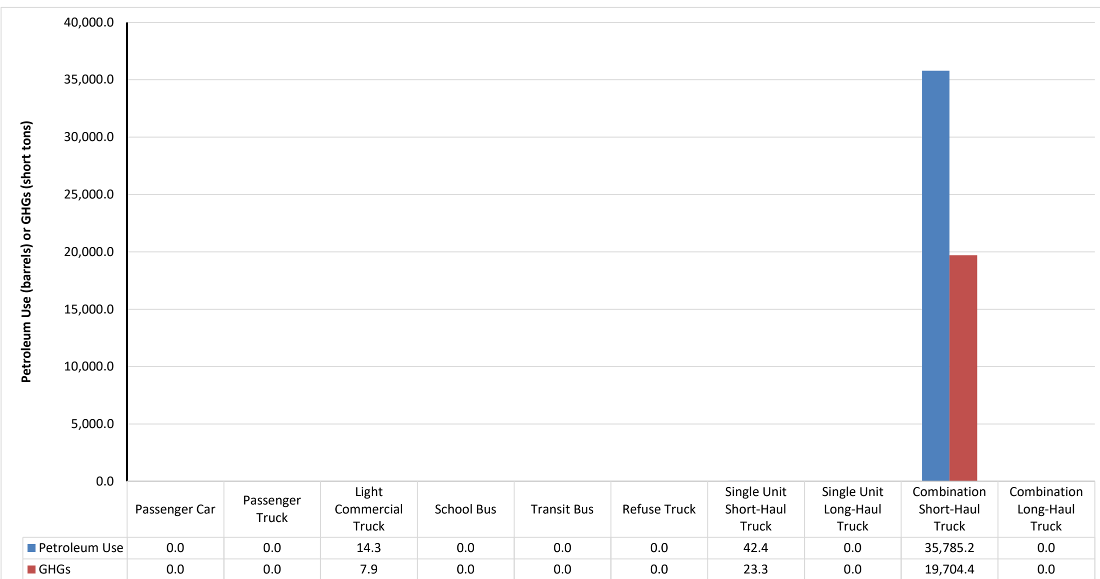
	Petroleum Use	GHGs	CO	NOx	PM10	PM2.5	VOC	SOx
Equipment Type	($)	($)	($)	($)	($)	($)	($)	($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$181,161	$239,860	$0	$33,640	$235	$82,120	$18,426	$3,781
Excavators	$22,803	$30,192	$0	$1,194	$0	$1,535	$410	$476
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$84,880	$112,382	$0	$36,452	$354	$126,778	$16,948	$1,771

Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$76,012	$100,640	$0	$3,168	$20	$5,948	$608	$1,586
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$364,856	$483,074	$0	$74,454	$608	$216,381	$36,393	$7,615

Remaining Lifetime Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0	$0	$0

Current Year Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet



Current Year Vehicle Operation Air Pollutants - On-Road Fleet

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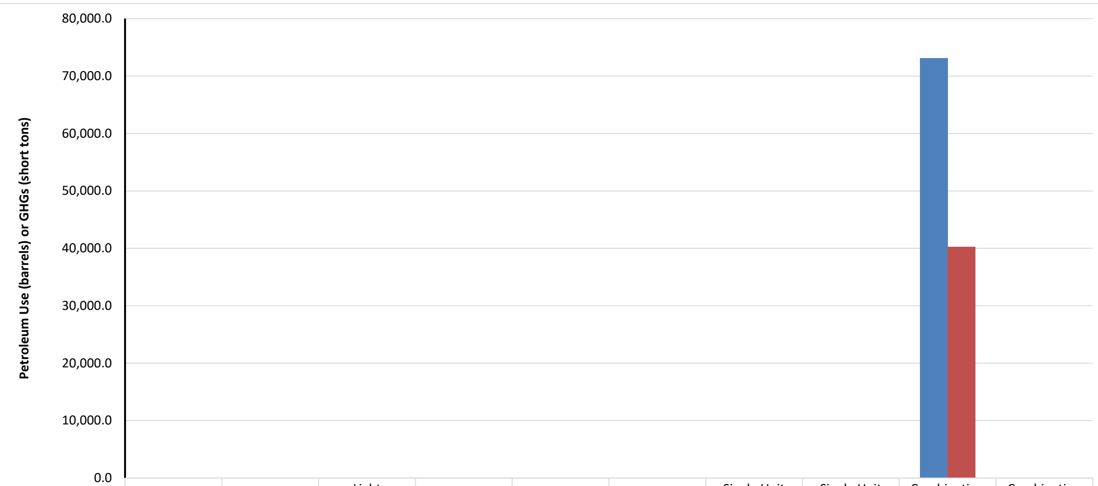
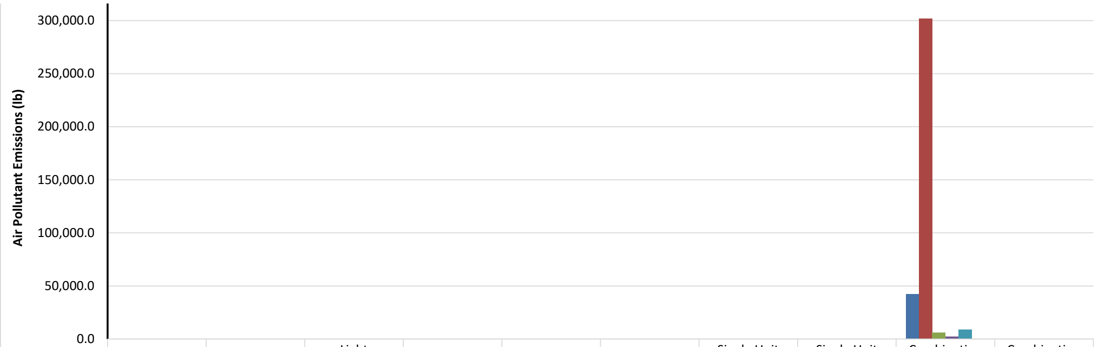
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	77.8	0.0	0.0	0.0	132.7	0.0	53,476.9	0.0
NOx	0.0	0.0	91.4	0.0	0.0	0.0	416.1	0.0	233,899.7	0.0
PM10	0.0	0.0	8.1	0.0	0.0	0.0	23.0	0.0	8,172.8	0.0
PM2.5	0.0	0.0	6.7	0.0	0.0	0.0	18.9	0.0	5,793.1	0.0
VOC	0.0	0.0	22.7	0.0	0.0	0.0	58.2	0.0	13,736.6	0.0
SOx	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	223.4	0.0

Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet



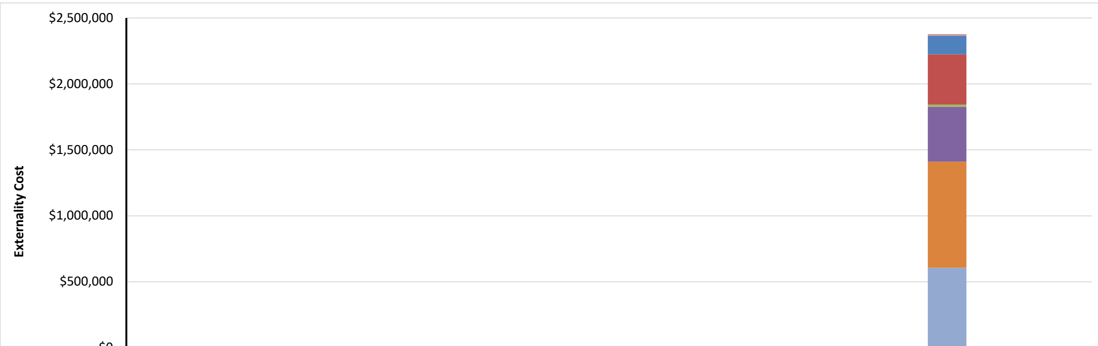
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	73,074.2	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40,236.7	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - On-Road Fleet



	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42,502.4	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	301,632.8	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,022.3	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,993.0	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9,055.0	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	456.1	0.0

Current Year Externality Costs - On-Road Fleet

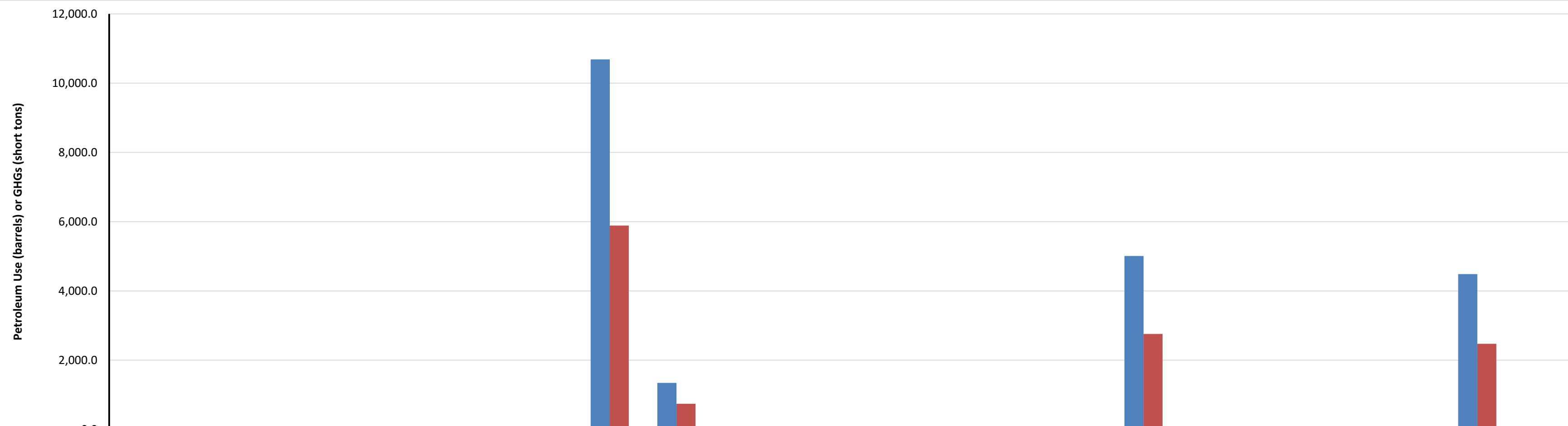


	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$5	$0	$0	$0	$15	$0	$12,659	$0
VOC	$0	$0	$231	$0	$0	$0	$594	$0	$140,270	$0
PM2.5	$0	$0	$443	$0	$0	$0	$1,248	$0	$382,524	$0
PM10	$0	$0	$9	$0	$0	$0	$26	$0	$14,954	$0
NOx	$0	$0	$163	$0	$0	$0	$742	$0	$416,887	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$322	$0	$0	$0	$951	$0	$803,110	$0
Petroleum Use	$0	$0	$243	$0	$0	$0	$719	$0	$606,572	$0

Remaining Lifetime Externality Costs - On-Road Fleet

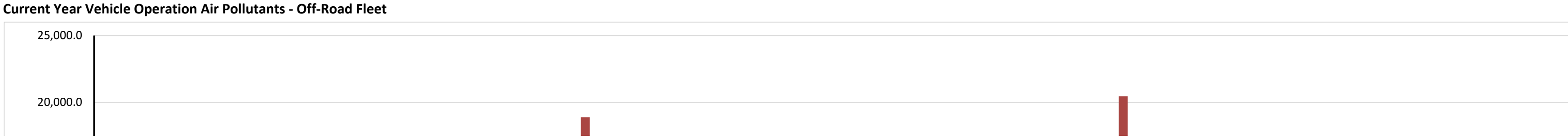
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$0	$0	$0	$0	$0	$0	$25,850	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$0	$92,465	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$0	$131,598	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$0	$25,321	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$0	$537,610	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$0	$1,639,967	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$0	$1,238,633	$0

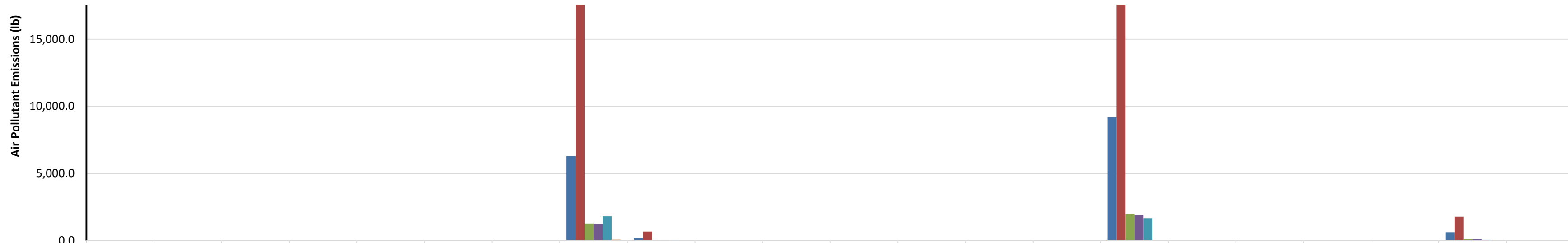
Current Year Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10,687.7	1,345.3	0.0	0.0	0.0	0.0	0.0	0.0	5,007.5	0.0	0.0	0.0	0.0	4,484.4	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5,885.0	740.8	0.0	0.0	0.0	0.0	0.0	0.0	2,757.3	0.0	0.0	0.0	0.0	2,469.2	0.0

Current Year Vehicle Operation Air Pollutants - Off-Road Fleet





	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6,291.1	167.3	0.0	0.0	0.0	0.0	0.0	0.0	9,185.0	0.0	0.0	0.0	0.0	624.3	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18,874.4	669.7	0.0	0.0	0.0	0.0	0.0	0.0	20,451.7	0.0	0.0	0.0	0.0	1,777.4	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,281.0	23.2	0.0	0.0	0.0	0.0	0.0	0.0	1,976.2	0.0	0.0	0.0	0.0	93.2	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,243.7	23.2	0.0	0.0	0.0	0.0	0.0	0.0	1,920.0	0.0	0.0	0.0	0.0	90.1	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,804.5	40.2	0.0	0.0	0.0	0.0	0.0	0.0	1,659.8	0.0	0.0	0.0	0.0	59.5	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.7	8.4	0.0	0.0	0.0	0.0	0.0	0.0	31.3	0.0	0.0	0.0	0.0	28.0	0.0

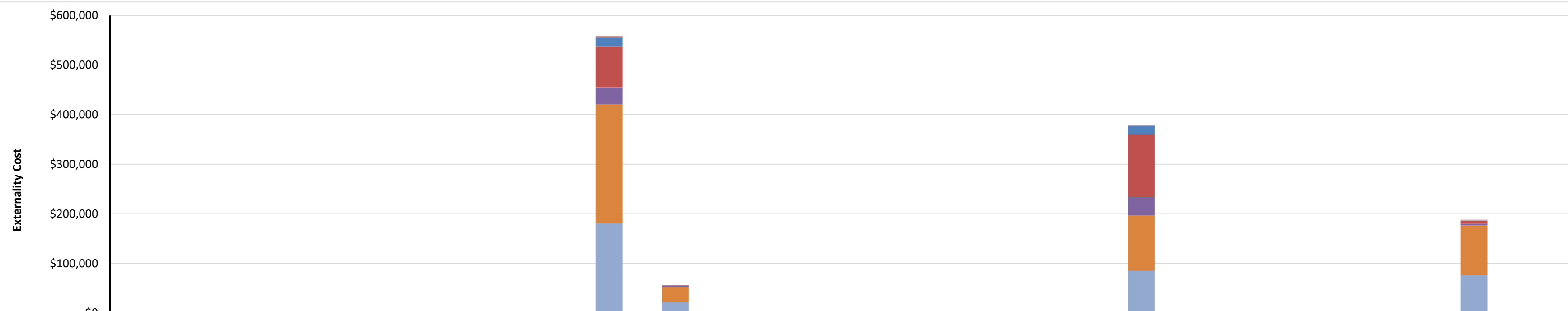
Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet

	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - Off-Road Fleet

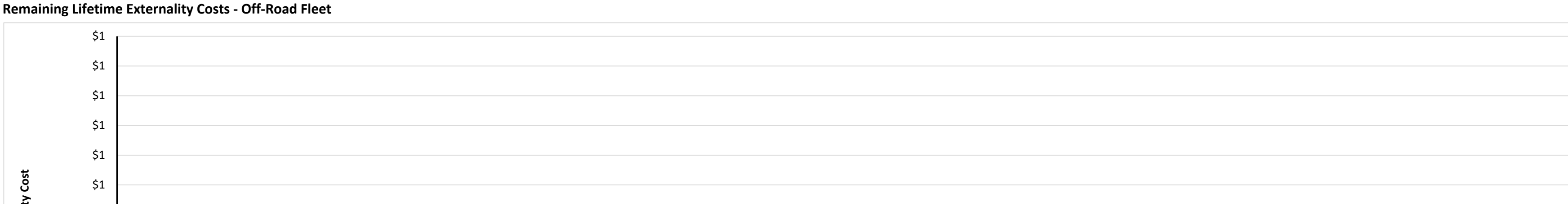
	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Current Year Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$3,781	$476	$0	$0	$0	$0	$0	$0	$1,771	$0	$0	$0	$0	$1,586	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$18,426	$410	$0	$0	$0	$0	$0	$0	$16,948	$0	$0	$0	$0	$608	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$82,120	$1,535	$0	$0	$0	$0	$0	$0	$126,778	$0	$0	$0	$0	$5,948	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$235	$0	$0	$0	$0	$0	$0	$0	$354	$0	$0	$0	$0	$20	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$33,640	$1,194	$0	$0	$0	$0	$0	$0	$36,452	$0	$0	$0	$0	$3,168	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$239,860	$30,192	$0	$0	$0	$0	$0	$0	$112,382	$0	$0	$0	$0	$100,640	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$181,161	$22,803	$0	$0	$0	$0	$0	$0	$84,880	$0	$0	$0	$0	$76,012	$0

Remaining Lifetime Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Key Inputs

Key Inputs	Calculator Inputs Used In
Primary Vehicle Location	*Payback, TCO, IR, Footprint*
Light-Duty Vehicle Information	*Payback, TCO*
Heavy-Duty Vehicle Information	*Payback, TCO*
Fuel and DEF Price	*Payback, TCO, IR*
Total Cost of Ownership Inputs	*TCO*
Fuel Production Assumptions	*Payback, TCO, IR, Footprint*
Petroleum Use, GHGs & Air Pollutant Options	*Payback, TCO, IR, Footprint*
Idle Reduction Inputs	*IR*
Electric Vehicle Charging Inputs	*Charging*
Off-Road Equipment Inputs	*Payback*

Key Vehicle and Fuel Inputs

Primary Vehicle Location

State	WASHINGTON
County	KING

Light-Duty Vehicle Information

Vehicle Type	Passenger Car
Vocation Type	Car

Light-Duty Fuel Type	Number of Light-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPGGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	*Default Mileage*	*Default MPGGE*	*Default AFV MPGGE Relative Ratio*	*User AFV MPGGE Relative Ratio*	*Default Purchase Price*	*Default Maintenance & Repair*	*User MPDGE*
Gasoline	0	12,400	30.9	$20,000	$0.15	*12,400*	*30.9*	*1.00*	*1.00*	*$20,000*	*$0.15*	*35.7*
Diesel	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Gasoline Hybrid Electric Vehicle (HEV)	0	12,400	46.3	$22,000	$0.14	*12,400*	*46.3*	*1.50*	*1.50*	*$22,000*	*$0.14*	*53.4*
Gasoline Plug-in Hybrid Electric Vehicle (PHEV)	0	12,400	53.2	$27,000	$0.13	*12,400*	*53.2*	*1.72*	*1.72*	*$27,000*	*$0.13*	*61.4*
Gasoline Extended Range Electric Vehicle (EREV)	0	12,400	44.4	$33,000	$0.13	*12,400*	*44.4*	*1.43*	*1.43*	*$33,000*	*$0.13*	*51.2*
All-Electric Vehicle (EV)	0	12,400	106.2	$37,000	$0.09	*12,400*	*106.2*	*3.43*	*3.43*	*$37,000*	*$0.09*	*122.6*
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	12,400	73.5	$50,000	$0.09	*12,400*	*73.5*	*2.38*	*2.38*	*$50,000*	*$0.09*	*84.8*
Biodiesel (B20)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Biodiesel (B100)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Renewable Diesel (RD20)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Renewable Diesel (RD100)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Ethanol (E85)	0	12,400	30.9	$20,000	$0.15	*12,400*	*30.9*	*1.00*	*1.00*	*$20,000*	*$0.15*	*35.7*
Propane (LPG)	0	12,400	30.9	$26,000	$0.15	*12,400*	*30.9*	*1.00*	*1.00*	*$26,000*	*$0.15*	*35.7*
Compressed Natural Gas (CNG)	0	12,400	29.4	$27,000	$0.15	*12,400*	*29.4*	*0.95*	*0.95*	*$27,000*	*$0.15*	*33.9*

Heavy-Duty Vehicle Information

Vehicle Type	School Bus
Vocation Type	School Bus

Heavy-Duty Fuel Type	Number of Heavy-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPDGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	*Default Mileage*	*Default MPDGE*	*Default AFV MPDGE Relative Ratio*	*User AFV MPDGE Relative Ratio*	*Default Purchase Price*	*Default Maintenance & Repair*	*Default MPGGE*	*User MPGGE*
Gasoline	0	0	6.8	$0	$0.61	*0*	*6.8*	*0.83*	*0.83*	*$0*	*$0.61*	*5.9*	*5.9*
Diesel	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
All-Electric Vehicle (EV)	0	15,000	24.0	$300,000	$0.56	*15,000*	*24.0*	*2.93*	*2.93*	*$300,000*	*$0.56*	*20.8*	*20.8*
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	11.3	$0	$0.56	*0*	*11.3*	*1.38*	*1.38*	*$0*	*$0.56*	*9.8*	*9.8*
Diesel Hybrid Electric Vehicle (HEV)	0	15,000	11.1	$160,000	$0.81	*15,000*	*11.1*	*1.35*	*1.35*	*$160,000*	*$0.81*	*9.6*	*9.6*
Diesel Hydraulic Hybrid (HHV)	0	0	10.6	$0	$0.81	*0*	*10.6*	*1.29*	*1.29*	*$0*	*$0.81*	*9.2*	*9.2*
Biodiesel (B20)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Biodiesel (B100)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Renewable Diesel (RD20)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Renewable Diesel (RD100)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Ethanol (E85)	0	0	6.8	$0	$0.61	*0*	*6.8*	*0.83*	*0.83*	*$0*	*$0.61*	*5.9*	*5.9*
Propane (LPG)	0	15,000	6.8	$108,000	$0.61	*15,000*	*6.8*	*0.83*	*0.83*	*$108,000*	*$0.61*	*5.9*	*5.9*
Compressed Natural Gas (CNG)	0	15,000	7.0	$130,000	$0.93	*15,000*	*7.0*	*0.85*	*0.85*	*$130,000*	*$0.93*	*6.0*	*6.0*
Liquefied Natural Gas (LNG)	0	15,000	7.0	$120,000	$0.93	*15,000*	*7.0*	*0.85*	*0.85*	*$120,000*	*$0.93*	*6.0*	*6.0*
LNG / Diesel Pilot Ignition	0	0	7.8	$0	$0.97	*0*	*7.8*	*0.95*	*0.95*	*$0*	*$0.97*	*6.7*	*6.7*

Refueling Information

Fueling Type	Private Station	Infrastructure costs (go to 'Payback')
Fuel Price Sensitivity	No	Enter fuel price range (go to 'Payback')

Fuel and DEF Price

	Fuel Unit	Public Station ($/fuel unit)	Private Station ($/fuel unit)	*Public Station: Default $/Fuel Unit*	*Public Station: Default $/GGE*	*Public Station: User $/GGE*	*Public Station: User $/DGE*	*Private Station: Default $/Fuel Unit*	*Private Station: Default $/GGE*	*Private Station: User $/GGE*	*Private Station: User $/DGE*
Gasoline	gasoline gallon	$3.13	$3.01	*$3.13*	*$3.13*	*$3.13*	*$3.61*	*$3.01*	***$3.01***	*$3.01*	*$3.47*
Diesel	diesel gallon	$3.22	$2.99	*$3.22*	*$2.79*	*$2.79*	*$3.22*	*$2.99*	***$2.59***	*$2.59*	*$2.99*
Electricity	kWh	$0.10	$0.10	*$0.10*	*$3.19*	*$3.19*	*$3.68*	*$0.10*	*$3.19*	*$3.19*	*$3.68*
G.H2	hydrogen kg										
B20	B20 gallon	$3.05	$2.61	*$3.05*	***$2.68***	*$2.68*	*$3.10*	*$2.61*	***$2.30***	*$2.30*	*$2.65*
B100	B100 gallon	$4.17	$4.36	*$4.17*	*$3.91*	*$3.91*	*$4.52*	*$4.36*	***$4.09***	*$4.09*	*$4.72*
RD20	RD20 gallon	$3.66	$2.96	*$3.66*	*$3.20*	*$3.20*	*$3.70*	*$2.96*	*$2.59*	*$2.59*	*$2.99*
RD100	RD100 gallon	$3.71	$2.95	*$3.71*	*$3.39*	*$3.39*	*$3.91*	*$2.95*	*$2.69*	*$2.69*	*$3.11*
E85	E85 gallon	$3.68	$2.37	*$3.68*	*$5.02*	*$5.02*	*$5.79*	*$2.37*	***$3.23***	*$3.23*	*$3.73*
Propane	LPG gallon	$2.06	$3.26	*$2.06*	*$2.72*	*$2.72*	*$3.14*	*$3.26*	***$4.31***	*$4.31*	*$4.97*
CNG	CNG GGE	$2.77	$1.72	*$2.77*	*$2.77*	*$2.77*	*$3.20*	*$1.72*	***$1.72***	*$1.72*	*$1.99*
LNG	LNG gallon	$1.91	$1.10	*$1.91*	*$2.87*	*$2.87*	*$3.31*	*$1.10*	*$1.65*	*$1.65*	*$1.91*
Diesel Exhaust Fluid (DEF)	DEF gallon	$2.80	$2.80	*$2.80*	*$2.80*	*$2.80*	*N/A*	*$2.80*	*$2.80*	*$2.80*	*N/A*

Total Cost of Ownership Inputs

Vehicle and Infrastructure Information

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure	*Default LDV*	*Default HDV*	*Default Infrastructure*
Years of Planned Ownership	years	15	15	15	*15*	*15*	*15*

Financial Assumptions

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure	*Default LDV*	*Default HDV*	*Default Infrastructure*
Loan	yes/no	No	No	No			
Loan Term	years	5	5	5	*5*	*5*	*5*
Interest Rate	%	4.20%	4.20%	4.20%	*4.20%*	*4.20%*	*4.20%*
Percent Down Payment	%	12.00%	12.00%	12.00%	*12.00%*	*12.00%*	*12.00%*
Discount Factor	%		1.24%			*1.24%*	

Fuel Production Assumptions

Biodiesel Feedstock Source	1 - Soy 2 - Canola 3 - Corn 4 - Tallow	1	
Renewable Diesel Feedstock Source	1 - Soy 2 - Canola 3 - Palm	1	
Ethanol Feedstock Source	1 - Corn 2 - Switchgrass 3 - Sugarcane 4 - Grain Sorghum	1	
CNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
LNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
North American NG Feedstock Source		Conventional 66%	Shale 34%
LPG Feedstock Source		NG 69%	Petroleum 31%
Source of Electricity for PHEVs, EVs, and FCVs (Electrolysis)	1 - Average U.S. Mix 2 to 11 - EIA Region Mix (see map) 12 - User Defined (go to 'Background Data' sheet)	11	
G.H2 Production Process	1 - Refueling Station SMR (On-site) 2 - Central Plant SMR (Off-site) 3 - Refueling Station Electrolysis (On-site)	1	

Number	Grid Mix
1	U.S.
2	ASCC
3	FRCC
4	HICC
5	MRO
6	NPCC
7	RFC
8	SERC
9	SPP
10	TRE
11	WECC
12	User Defined
11	**Default based on State and County**

Petroleum Use, GHGs & Air Pollutant Options

Petroleum Use, GHGs & Air Pollutant Calculation Type		1
1 - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants		
2 - Well-to-Wheels Petroleum Use, GHGs, and Air Pollutants		
3 - Well-to-Wheels & Vehicle Production* Petroleum Use, GHGs, Air Pollutants (*LDVs only)		
Diesel In-Use Emissions Multiplier	yes/no	No
Low NOx Engines - CNG, LNG, LPG HDVs	yes/no	Yes

Idle Reduction Inputs

Light-Duty Vehicle Information

Idle Reduction (IR) Vehicle Type	Passenger Car
IR Vocation Type	Police Car
Baseline Vehicle Model Year	2020

		Vehicle Heating	Engine Heating	Cooling	Electrical	*Default Idle Hr*
Annual Idling Hours (per Vehicle)	1,750					*1750*
% of Idle Hours by Service (Services Required (% of hours))		33%	0%	33%	34%	
Default Services Required (% of hours)		*33%*	*0%*	*33%*	*34%*	

Light-Duty Baseline & Idling Reduction Equipment	Number of Light-Duty Vehicles	Services Provided By IR Equipment: Vehicle Heating	Engine Heating	Cooling	Electrical	Idling Hour Reduction Goal	Fuel Consumption (GGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	*Default Fuel Consumption (GGE/hr)*	*Default Fuel Consumption (DGE/hr)*	*Electrical Power Demand (W)*	*Default Equipment Cost*
Gasoline	0						0.30			*0.30*	*0.26*		
Fuel Operated Air Heater	0	✓	✗	✗	✗	578	0.03	0	$900	*0.03*	*0.03*	*0*	*$900*
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0.08	0	$1,250	*0.08*	*0.07*	*0*	*$1,250*
Battery Management Start/Stop	0	✗	✗	✗	✓	595	0.00	250	$1,500	*0.00*	*0.00*	*250*	*$1,500*
APU (Battery)	0	✗	✗	✓	✓	1173	0.00	250	$4,300	*0.00*	*0.00*	*250*	*$4,300*
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	1750	0.03	250	$5,200	*0.03*	*0.03*	*250*	*$5,200*
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	1173	0.00	250	$5,800	*0.00*	*0.00*	*250*	*$5,800*

Heavy-Duty Vehicle Information

IR Vehicle Type	Combination Long-Haul Truck
IR Vocation Type	Long Haul Freight Truck
Baseline Vehicle Model Year	2020

Default Services Required (% of hours):

Services Required (% of hours):

		Vehicle Heating	Engine Heating	Cooling	Electrical
Annual Conventional Idling Hours (per Vehicle)	150				
% of Idle Hours by Service		33%	0%	33%	34%
*Annual Hotelling Hours (per Vehicle)**	1,800				
% of Hotelling Hours by Service		33%	0%	33%	34%

	Vehicle Heating	Engine Heating	Cooling	Electrical
Default Idle Hr *150*				
	33%	*0%*	*33%*	*34%*
Default Hotel Hr *1800*				
	33%	*0%*	*33%*	*34%*

Heavy-Duty Baseline & Idling Reduction Equipment	Number of Heavy-Duty Vehicles	Services Provided By IR Equipment: Vehicle Heating	Engine Heating	Cooling	Electrical	Conventional Idling Hour Reduction Goal	Hotelling Hour Reduction Goal	Fuel Consumption (DGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	*Default Fuel Consumption (GGE/hr)*	*Default Fuel Consumption (DGE/hr)*	*Electrical Power Demand (W)*	*Default Equipment Cost*	*User Fuel Consumption (GGE/hr)*
Diesel	0							0.78			*0.89*	*0.78*			*0.89*
*Diesel (Hotelling)**								*0.90*			*1.03*	*0.90*			*1.03*
Fuel Operated Air Heater	0	✓	✗	✗	✗	50	594	0.06	0	$1,800	*0.07*	*0.06*	*0*	*$1,800*	*0.07*
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0	0.12	0	$1,700	*0.14*	*0.12*	*0*	*$1,700*	*0.14*
Battery Management Start/Stop	0	✗	✗	✗	✓	51	612	0.00	704	$2,500	*0.00*	*0.00*	*704*	*$2,500*	*0.00*
APU (Diesel)	0	✓	✓	✓	✓	150	1800	0.20	0	$10,000	*0.23*	*0.20*	*0*	*$10,000*	*0.23*
APU (Battery)	0	✗	✗	✓	✓	101	1206	0.00	704	$8,000	*0.00*	*0.00*	*704*	*$8,000*	*0.00*
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	150	1800	0.06	704	$9,800	*0.07*	*0.06*	*704*	*$9,800*	*0.07*
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	101	1206	0.00	704	$10,500	*0.00*	*0.00*	*704*	*$10,500*	*0.00*
Truck Stop Electrification - Single System**	0	✗	✗	✓	✓	101	1206	0.00	704	$5	*0.00*	*0.00*	*704*	*$5*	*0.00*
Shore Power**	0	✗	✗	✓	✓	101	1206	0.00	704	$2,500	*0.00*	*0.00*	*704*	*$2,500*	*0.00*

Electric Vehicle Charging Inputs

Level 2 Charging Infrastructure

Predicted Weekly Utilization: Moderate

Venue	Number of Chargers	Weekly Utilization (sessions/week/ station)	Average Session Power (kW)	Charge Time (minutes/ session)	*Default Utilization Selected*	*Default Session Power (kW)*	*Default Charge Time (hr/session)*	*Low*	*Moderate*	*High*	*Default Charge Time (min/session)*	*User Charge Time (hr/session)*
Parking Lot	0	4.5	4	150	*4.5*	*4*	*2.5*	*0.5*	*4.5*	*6.5*	*150*	*2.5*
Retail & Leisure	0	5.5	4	90	*5.5*	*4*	*1.5*	*1.0*	*5.5*	*7.0*	*90*	*1.5*
Education	0	6.0	4	150	*6.0*	*4*	*2.5*	*1.5*	*6.0*	*9.0*	*150*	*2.5*
Healthcare	0	6.5	4	150	*6.5*	*4*	*2.5*	*3.5*	*6.5*	*7.0*	*150*	*2.5*
Workplace	0	4.5	4	150	*4.5*	*4*	*2.5*	*1.0*	*4.5*	*7.5*	*150*	*2.5*
Multi-Unit Dwelling	0	3.0	4	210	*3.0*	*4*	*3.5*	*0.5*	*3.0*	*4.0*	*210*	*3.5*
Single-Unit Dwelling	0	6.0	4	120	*6.0*	*4*	*2.0*	*3.0*	*6.0*	*7.5*	*120*	*2.0*

DC Fast Charging Infrastructure

Predicted Weekly Utilization: Moderate

Venue	Number of Chargers	Weekly Utilization (sessions/week/ station)	Average Session Power (kW)	Charge Time (minutes/ session)	*Default Utilization Selected*	*Default Session Power (kW)*	*Default Charge Time (hr/session)*	*Low*	*Moderate*	*High*	*Default Charge Time (min/session)*	*User Charge Time (hr/session)*
Parking Lot	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Retail & Leisure	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Education	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Healthcare	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Workplace	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Multi-Unit Dwelling	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*
Single-Unit Dwelling	0	15.0	24	22	*15.0*	*24*	*0.4*	*6.5*	*15.0*	*26.0*	*22*	*0.4*

Off-Road Equipment Inputs

Small Equipment Information

Equipment Type	Commercial Turf Equipment	*Default Rated hp*
Vocation Type	Zero-Turn Commercial Turf	
Rated Horsepower	25	*25*

	Type	Replacements per Lifetime	Battery Capacity (kWh)	Battery Cost ($/kWh)	Lifetime Replacement Cost	*Default Type*	*Default Replacements per Lifetime*	*Default kWh*	*Default $/kWh: Lithium-Ion*	*User $/kWh: Lithium-Ion*
EV Battery Replacement	Lithium-Ion	0	21.6	$800	$0	*Lithium-Ion*	*0*	*21.6*	*$800*	*$800*

Small Equipment Fuel Type	Number of Units	Annual Hourly Usage	Fuel Consumption (GGE/hr)	Equipment Price ($/unit)	Maintenance & Repair ($/hr)	*Default Usage*	*Default GGE/hr*	*Default AFV GGE/hr Relative Ratio*	*User AFV GGE/hr Relative Ratio*	*Default Purchase Price*	*User Purchase Price + Battery Replacement*	*Default Maintenance & Repair*	*User DGE/hr*	*User Rated hp*
Gasoline	0	1,364	0.34	$12,000	$0.12	*1,364*	*0.34*	*1.00*	*1.00*	*$12,000*	*$12,000*	*$0.12*	*0.29*	*25*
Diesel	0	1,364	0.28	$16,000	$0.15	*1,364*	*0.28*	*0.83*	*0.83*	*$16,000*	*$16,000*	*$0.15*	*0.25*	*25*
Gasoline Hybrid Electric Vehicle (HEV)	0	0	0.24	$0	$0.00	*0*	*0.24*	*0.71*	*0.71*	*$0*	*$0*	*$0.00*	*0.21*	*25*
All-Electric Vehicle (EV)	0	1,364	0.07	$23,000	$0.05	*1,364*	*0.07*	*0.20*	*0.20*	*$23,000*	*$23,000*	*$0.05*	*0.06*	*25*
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	0.11	$0	$0.00	*0*	*0.11*	*0.33*	*0.33*	*$0*	*$0*	*$0.00*	*0.10*	*25*
Biodiesel (B20)	0	0	0.28	$0	$0.00	*0*	*0.28*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.25*	*25*
Biodiesel (B100)	0	0	0.28	$0	$0.00	*0*	*0.28*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.25*	*25*
Renewable Diesel (RD20)	0	0	0.28	$0	$0.00	*0*	*0.28*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.25*	*25*
Renewable Diesel (RD100)	0	0	0.28	$0	$0.00	*0*	*0.28*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.25*	*25*
Ethanol (E85)	0	0	0.34	$0	$0.00	*0*	*0.34*	*1.00*	*1.00*	*$0*	*$0*	*$0.00*	*0.29*	*25*
Propane (LPG)	0	1,364	0.34	$13,500	$0.12	*1,364*	*0.34*	*1.00*	*1.00*	*$13,500*	*$13,500*	*$0.12*	*0.29*	*25*
Compressed Natural Gas (CNG)	0	0	0.34	$0	$0.00	*0*	*0.34*	*1.00*	*1.00*	*$0*	*$0*	*$0.00*	*0.29*	*25*

Large Equipment Information

Equipment Type	Forklifts	*Default Rated hp*
Vocation Type	Warehouse Forklift	
Rated Horsepower	50	*50*

	Type	Replacements per Lifetime	Battery Capacity (kWh)	Battery Cost ($/kWh)	Lifetime Replacement Cost	*Default Type*	*Default Replacements per Lifetime*	*Default kWh*	*Default $/kWh: Lead-Acid*	*User $/kWh: Lead-Acid*
EV Battery Replacement	Lead-Acid	0	43.2	$200	$0	*Lead-Acid*	*0*	*43.2*	*$200*	*$200*

Large Equipment Fuel Type	Number of Units	Annual Hourly Usage	Fuel Consumption (DGE/hr)	Equipment Price ($/unit)	Maintenance & Repair ($/hr)	*Default Usage*	*Default DGE/hr*	*Default AFV MPDGE Relative Ratio*	*User AFV MPDGE Relative Ratio*	*Default Purchase Price*	*User Purchase Price + Battery Replacement*	*Default Maintenance & Repair*	*Default GGE/hr*	*User Rated hp*	*User GGE/hr*
Gasoline	0	1,700	0.70	$22,000	$0.14	*1,700*	*0.70*	*1.00*	*1.00*	*$22,000*	*$22,000*	*$0.14*	*0.80*	*50*	*0.80*
Diesel	0	1,700	0.58	$30,000	$0.19	*1,700*	*0.58*	*0.83*	*0.83*	*$30,000*	*$30,000*	*$0.19*	*0.67*	*50*	*0.67*
All-Electric Vehicle (EV)	0	1,700	0.14	$37,000	$0.08	*1,700*	*0.14*	*0.20*	*0.20*	*$37,000*	*$37,000*	*$0.08*	*0.16*	*50*	*0.16*
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	1,700	0.23	$40,000	$0.08	*1,700*	*0.23*	*0.33*	*0.33*	*$40,000*	*$40,000*	*$0.08*	*0.27*	*50*	*0.27*
Diesel Hybrid Electric Vehicle (HEV)	0	0	0.48	$0	$0.00	*0*	*0.48*	*0.69*	*0.69*	*$0*	*$0*	*$0.00*	*0.56*	*50*	*0.56*
Diesel Hydraulic Hybrid (HHV)	0	0	0.48	$0	$0.00	*0*	*0.48*	*0.69*	*0.69*	*$0*	*$0*	*$0.00*	*0.56*	*50*	*0.56*
Biodiesel (B20)	0	0	0.58	$0	$0.00	*0*	*0.58*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.67*	*50*	*0.67*
Biodiesel (B100)	0	0	0.58	$0	$0.00	*0*	*0.58*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.67*	*50*	*0.67*
Renewable Diesel (RD20)	0	0	0.58	$0	$0.00	*0*	*0.58*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.67*	*50*	*0.67*
Renewable Diesel (RD100)	0	0	0.58	$0	$0.00	*0*	*0.58*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.67*	*50*	*0.67*
Ethanol (E85)	0	0	0.70	$0	$0.00	*0*	*0.70*	*1.00*	*1.00*	*$0*	*$0*	*$0.00*	*0.80*	*50*	*0.80*
Propane (LPG)	0	1,700	0.70	$25,000	$0.14	*1,700*	*0.70*	*1.00*	*1.00*	*$25,000*	*$25,000*	*$0.14*	*0.80*	*50*	*0.80*
Compressed Natural Gas (CNG)	0	1,700	0.70	$50,000	$0.14	*1,700*	*0.70*	*1.00*	*1.00*	*$50,000*	*$50,000*	*$0.14*	*0.80*	*50*	*0.80*
Liquefied Natural Gas (LNG)	0	0	0.70	$0	$0.00	*0*	*0.70*	*1.00*	*1.00*	*$0*	*$0*	*$0.00*	*0.80*	*50*	*0.80*
LNG / Diesel Pilot Ignition	0	0	0.58	$0	$0.00	*0*	*0.58*	*0.83*	*0.83*	*$0*	*$0*	*$0.00*	*0.67*	*50*	*0.67*

On-Road Fleet Footprint Calculator

Year 2020

Vehicle Type	Model Year	Annual Vehicle Mileage	(gal)	(gal)	HEV (gal)	PHEV (gal)	(kWh)	EREV (gal)	(kWh)	(kWh)	(kg)	HEV (gal)	HHV (gal)	B20 (gal)	(gal)	(gal)	RD100 (gal)	E85 (gal)	LPG (gal)	(GGE)	(gal)	LNG (gal)	(gal)	Default Lifetime	Calculated Lifetime	Age	Remaining Lifetime	Well-to-Wheels Petroleum Use (barrels)	Vehicle Production Petroleum Use (barrels)	Well-to-Wheels GHGs (short tons)	Vehicle Production GHGs (short tons)	CO	NOx	PM10	PM10 (TBW)	PM2.5	PM2.5 (TBW)	VOC	VOC (Evap)	SOx
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	2005	7,200		364																				15	15	15	0	9.1	0.0	5.0	0.0	49.1	57.7	4.5	0.6	4.2	0.1	14.1	0.2	0.1
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	2015	25,000	20,000																					15	15	5	10	415.3	0.0	235.2	0.0	252.5	5.8	0.6	3.2	0.6	0.4	3.6	17.6	2.3
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Off-Road Fleet Footprint Calculator

State

WASHINGTON

Year 2021

Equipment Type	Model Year	Annual Usage (hours)	Rated Horsepower (hp)	Fuel Use: Gasoline (gal)	Diesel (gal)	Electricity (kWh)	G.H2 (kg)	B20 (gal)	B100 (gal)	RD20 (gal)	RD100 (gal)	E85 (gal)	LPG (gal)	CNG (GGE)	LNG (gal)	Default Annual Usage (hr)	Default Rated Horsepower (hp)	Default Estimated Gasoline Use (gal)	Default Estimated Electricity Use (kWh)	Load Factor %	Remaining Lifetime: Median Life Full Load (hr)	Calculated Lifetime (hr)	Cumulative Hours	Remaining Lifetime (hr)	Remaining Years
Aerial Lifts																384	47	86	565	21%	0	0	0	0	0
Aerial Lifts																384	47	86	565	21%	0	0	0	0	0
Agricultural Tractors																475	50	318	2,090	59%	0	0	0	0	0
Agricultural Tractors																475	50	318	2,090	59%	0	0	0	0	0
Airport Support Equipment																732	150	1,469	9,662	59%	0	0	0	0	0
Airport Support Equipment																732	150	1,469	9,662	59%	0	0	0	0	0
Chain Saws																303	4	19	127	70%	0	0	0	0	0
Chain Saws																303	4	19	127	70%	0	0	0	0	0
Commercial Turf Equipment																1,364	25	464	3,051	60%	0	0	0	0	0
Commercial Turf Equipment																1,364	25	464	3,051	60%	0	0	0	0	0
Cranes																990	365	3,524	23,173	43%	0	0	0	0	0
Cranes																990	365	3,524	23,173	43%	0	0	0	0	0
Crawler Tractor/Dozers	2010	2,080	568		15,000											936	130	1,628	10,707	59%	0	0	22,880	0	0
Crawler Tractor/Dozers																936	130	1,628	10,707	59%	0	0	0	0	0
Excavators																1,092	25	365	2,402	59%	0	0	0	0	0
Excavators	2010	400	499		15,000											1,092	25	365	2,402	59%	0	0	4,400	0	0
Forklifts	2010	100	109		2,500											1,700	50	1,137	7,479	59%	0	0	1,100	0	0
Forklifts																1,700	50	1,137	7,479	59%	0	0	0	0	0
Golf Carts																1,080	9	101	667	46%	0	0	0	0	0
Golf Carts																1,080	9	101	667	46%	0	0	0	0	0
Lawn & Garden Tractors																721	26	187	1,230	44%	0	0	0	0	0
Lawn & Garden Tractors																721	26	187	1,230	44%	0	0	0	0	0
Lawn Mowers																406	20	61	400	33%	0	0	0	0	0
Lawn Mowers																406	20	61	400	33%	0	0	0	0	0
Leafblowers/Vacuums																564	14	168	1,107	94%	0	0	0	0	0
Leafblowers/Vacuums																564	14	168	1,107	94%	0	0	0	0	0
Rollers	2010	100	95		200											760	95	966	6,353	59%	0	0	1,100	0	0
Rollers																760	95	966	6,353	59%	0	0	0	0	0
Rubber Tire Loaders	2010	1,500	599		13,000											761	599	6,099	40,110	59%	0	0	16,500	0	0
Rubber Tire Loaders																761	599	6,099	40,110	59%	0	0	0	0	0
Skid Steer Loaders	2010	1,600	48		400											818	48	187	1,230	21%	0	0	17,600	0	0
Skid Steer Loaders																818	48	187	1,230	21%	0	0	0	0	0
Snowblowers																272	8	10	65	20%	0	0	0	0	0
Snowblowers																272	8	10	65	20%	0	0	0	0	0
Sweepers/Scrubbers	2010	250	90		13,000											1,032	40	665	4,371	71%	0	0	2,750	0	0
Sweepers/Scrubbers																1,032	40	665	4,371	71%	0	0	0	0	0
Terminal Tractors																1,257	141	2,372	15,596	59%	0	0	0	0	0
Terminal Tractors																1,257	141	2,372	15,596	59%	0	0	0	0	0
Tractors/Loaders/Backhoes	2010	10,000	300		14,000											1,135	73	395	2,595	21%	0	0	110,000	0	0
Tractors/Loaders/Backhoes																1,135	73	395	2,595	21%	0	0	0	0	0
Trimmers/Edgers/Brush Cutter																274	2	11	74	91%	0	0	0	0	0
Trimmers/Edgers/Brush Cutter																274	2	11	74	91%	0	0	0	0	0

Equipment Type	Well-to-Wheels Petroleum Use (barrels)	Well-to-Wheels GHGs (short tons)	Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Well-to-Wheels Petroleum Use (barrels)	Remaining Lifetime Well-to-Wheels GHGs (short tons)	Remaining Lifetime Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	373.7	205.8	2,242.1	4,038.5	396.5	384.2	302.7	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	373.7	205.8	385.5	683.1	70.4	68.3	51.4	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	62.3	34.3	3.5	28.6	0.8	0.7	0.5	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	5.0	2.7	51.5	39.0	7.9	7.6	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	323.9	178.3	1,667.7	3,067.8	281.7	272.3	230.2	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	10.0	5.5	54.4	139.7	7.2	7.0	17.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	323.9	178.3	96.1	106.5	15.1	14.6	7.4	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	348.8	192.1	2,893.1	4,227.8	547.2	530.6	672.2	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment Type	Externality Cost - Well-to-Wheels Petroleum Use	Externality Cost - Well-to-Wheels GHGs	Externality Cost - Equipment Operation Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Externality Cost - Well-to-Wheels Petroleum Use	Remaining Lifetime Externality Cost - Well-to-Wheels GHGs	Remaining Lifetime Externality Cost - Equipment Operation Air: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$6,334	$8,387	$0	$7,198	$77	$25,368	$3,091	$0	$132	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$6,334	$8,387	$0	$1,217	$13	$4,509	$525	$0	$132	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$1,056	$1,398	$0	$51	$0	$49	$5	$0	$22	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$84	$112	$0	$69	$1	$503	$28	$0	$2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$5,490	$7,268	$0	$5,468	$59	$17,981	$2,351	$0	$115	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$169	$224	$0	$249	$1	$460	$173	$0	$4	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$5,490	$7,268	$0	$190	$3	$965	$76	$0	$115	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$5,912	$7,828	$0	$7,535	$105	$35,034	$6,864	$0	$123	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

On-Road and Off-Road Fleet Footprint Calculator Output

		pounds	12,394.6	**2,803.0**	MTCO2E	Fuel Use (Barrels)	2,245.5
On-Road Fleet Footprint Calculator Output	1,127.6	**tons**	5.622174149			Gallons	**94,310**
			1675.407897				

On-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	9.1	5.0	49.1	57.7	5.1	4.2	14.3	0.1
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	415.3	235.2	252.5	5.8	3.8	1.0	21.2	2.3
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	424.3	240.2	301.6	63.6	8.9	5.2	35.5	2.3

Remaining Lifetime Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	4,152.6	2,352.3	5,040.2	67.9	38.7	10.5	258.3	22.6
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	4,152.6	2,352.3	5,040.2	67.9	38.7	10.5	258.3	22.6

On-Road Fleet Footprint Calculator Output - Externality Costs

Current Year On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$154	$203	$0	$103	$5	$280	$146	$3
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$7,039	$9,587	$0	$10	$18	$66	$217	$128
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$7,192	$9,791	$0	$113	$23	$345	$363	$131

Remaining Lifetime On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$0	$0	$0	$0	$0	$0	$0	$0
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$70,388	$95,874	$0	$121	$177	$691	$2,637	$1,279
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$70,388	$95,874	$0	$121	$177	$691	$2,637	$1,279

Off-Road Fleet Footprint Calculator Output

Off-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Equipment Type

	Petroleum Use	GHGs	CO	NOx	PM10	PM2.5	VOC	SOx

Equipment Type	(barrels)	(short tons)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	373.7	205.8	2,242.1	4,038.5	396.5	384.2	302.7	2.3
Excavators	373.7	205.8	385.5	683.1	70.4	68.3	51.4	2.3
Forklifts	62.3	34.3	3.5	28.6	0.8	0.7	0.5	0.4
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	5.0	2.7	51.5	39.0	7.9	7.6	2.7	0.0
Rubber Tire Loaders	323.9	178.3	1,667.7	3,067.8	281.7	272.3	230.2	2.0
Skid Steer Loaders	10.0	5.5	54.4	139.7	7.2	7.0	17.0	0.1
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	323.9	178.3	96.1	106.5	15.1	14.6	7.4	2.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	348.8	192.1	2,893.1	4,227.8	547.2	530.6	672.2	2.2
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1,821.1	1,002.8	7,394.0	12,331.1	1,326.6	1,285.3	1,284.2	11.4

Remaining Lifetime Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Equipment Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Off-Road Fleet Footprint Calculator Output - Externality Costs

Current Year Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

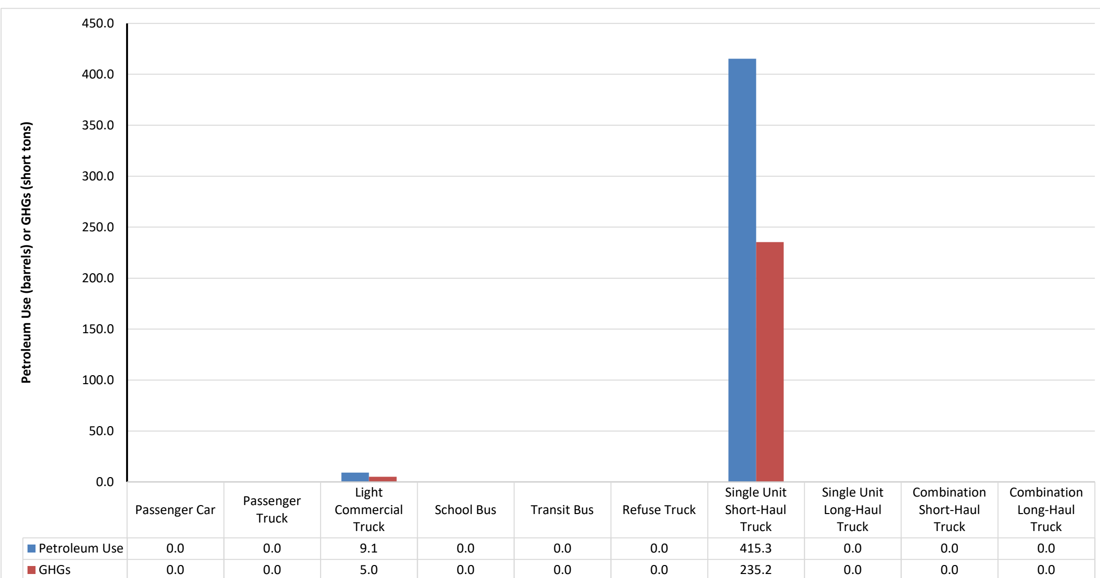
Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$6,334	$8,387	$0	$7,198	$77	$25,368	$3,091	$132
Excavators	$6,334	$8,387	$0	$1,217	$13	$4,509	$525	$132
Forklifts	$1,056	$1,398	$0	$51	$0	$49	$5	$22
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$84	$112	$0	$69	$1	$503	$28	$2
Rubber Tire Loaders	$5,490	$7,268	$0	$5,468	$59	$17,981	$2,351	$115

Skid Steer Loaders	$169	$224	$0	$249	$1	$460	$173	$4
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$5,490	$7,268	$0	$190	$3	$965	$76	$115
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$5,912	$7,828	$0	$7,535	$105	$35,034	$6,864	$123
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$30,869	$40,871	$0	$21,978	$260	$84,868	$13,113	$644

Remaining Lifetime Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0	$0	$0

Current Year Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet



Current Year Vehicle Operation Air Pollutants - On-Road Fleet

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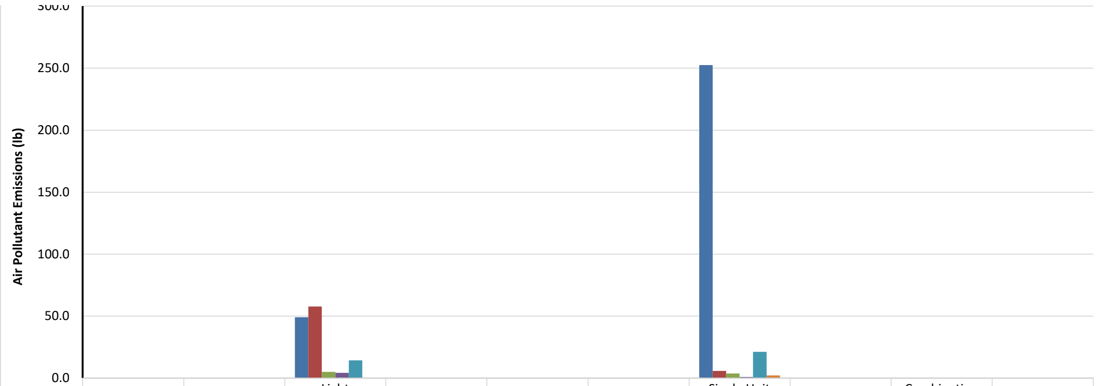
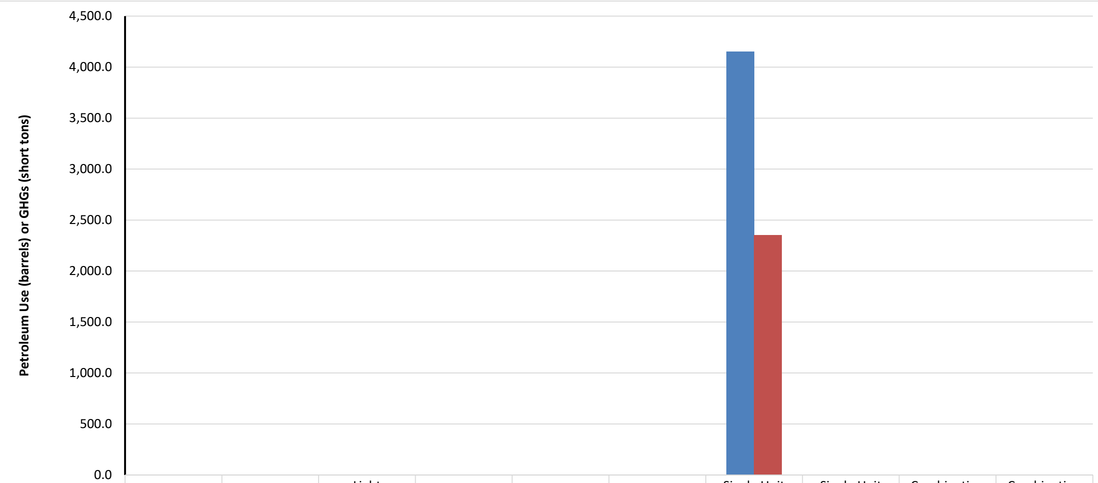


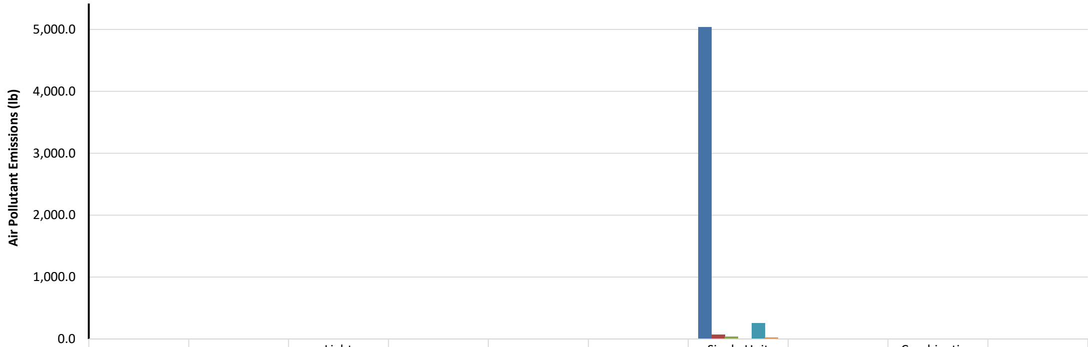
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	49.1	0.0	0.0	0.0	252.5	0.0	0.0	0.0
NOx	0.0	0.0	57.7	0.0	0.0	0.0	5.8	0.0	0.0	0.0
PM10	0.0	0.0	5.1	0.0	0.0	0.0	3.8	0.0	0.0	0.0
PM2.5	0.0	0.0	4.2	0.0	0.0	0.0	1.0	0.0	0.0	0.0
VOC	0.0	0.0	14.3	0.0	0.0	0.0	21.2	0.0	0.0	0.0
SOx	0.0	0.0	0.1	0.0	0.0	0.0	2.3	0.0	0.0	0.0

Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet



	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	4,152.6	0.0	0.0	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	2,352.3	0.0	0.0	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - On-Road Fleet

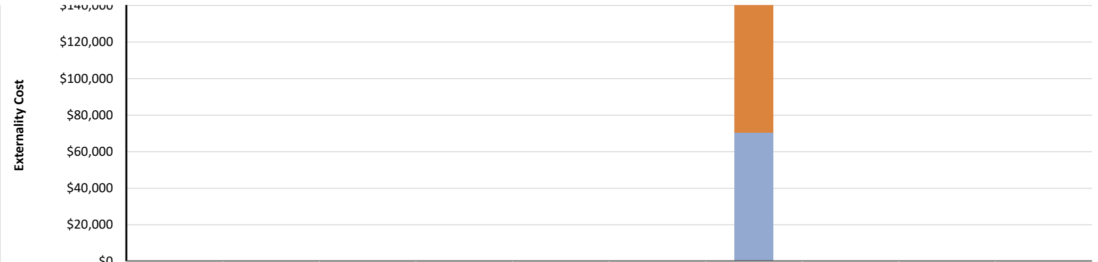


	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	0.0	0.0	0.0	0.0	5,040.2	0.0	0.0	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	67.9	0.0	0.0	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	38.7	0.0	0.0	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	10.5	0.0	0.0	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	258.3	0.0	0.0	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	22.6	0.0	0.0	0.0

Current Year Externality Costs - On-Road Fleet

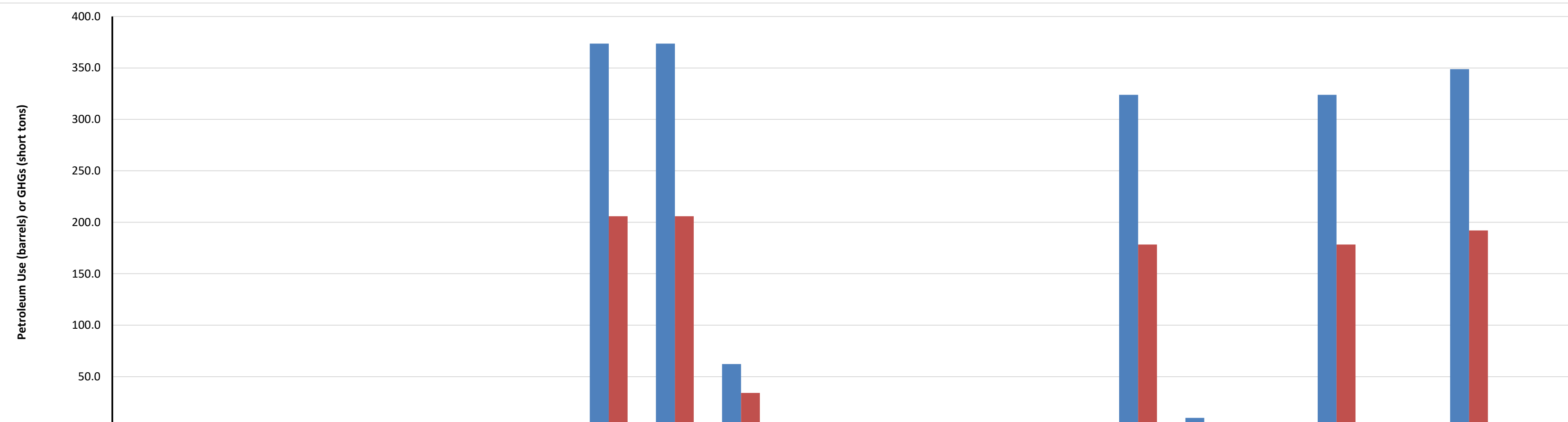
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$3	$0	$0	$0	$128	$0	$0	$0
VOC	$0	$0	$146	$0	$0	$0	$217	$0	$0	$0
PM2.5	$0	$0	$280	$0	$0	$0	$66	$0	$0	$0
PM10	$0	$0	$5	$0	$0	$0	$18	$0	$0	$0
NOx	$0	$0	$103	$0	$0	$0	$10	$0	$0	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$203	$0	$0	$0	$9,587	$0	$0	$0
Petroleum Use	$0	$0	$154	$0	$0	$0	$7,039	$0	$0	$0

Remaining Lifetime Externality Costs - On-Road Fleet



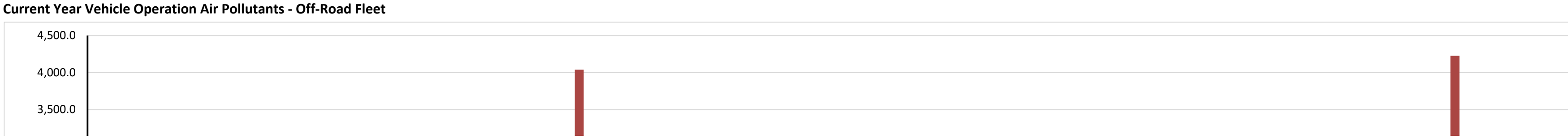
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$0	$0	$0	$0	$1,279	$0	$0	$0
VOC	$0	$0	$0	$0	$0	$0	$2,637	$0	$0	$0
PM2.5	$0	$0	$0	$0	$0	$0	$691	$0	$0	$0
PM10	$0	$0	$0	$0	$0	$0	$177	$0	$0	$0
NOx	$0	$0	$0	$0	$0	$0	$121	$0	$0	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$95,874	$0	$0	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$70,388	$0	$0	$0

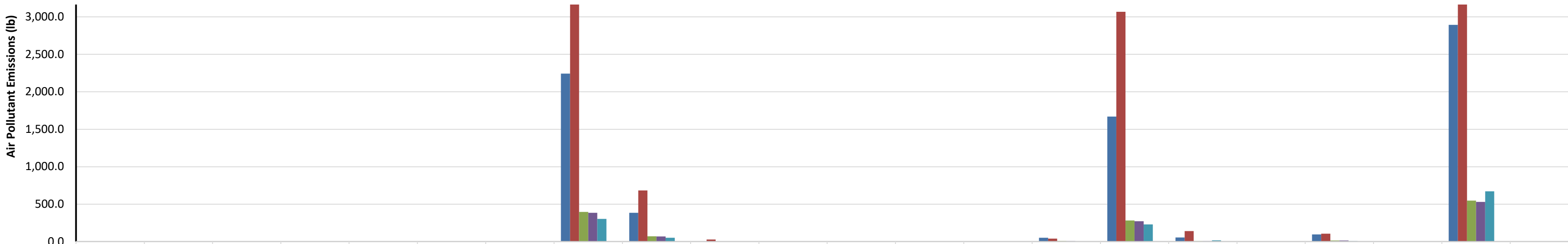
Current Year Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	373.7	373.7	62.3	0.0	0.0	0.0	0.0	5.0	323.9	10.0	0.0	323.9	0.0	348.8	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	205.8	205.8	34.3	0.0	0.0	0.0	0.0	2.7	178.3	5.5	0.0	178.3	0.0	192.1	0.0

Current Year Vehicle Operation Air Pollutants - Off-Road Fleet





	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2,242.1	385.5	3.5	0.0	0.0	0.0	0.0	51.5	1,667.7	54.4	0.0	96.1	0.0	2,893.1	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4,038.5	683.1	28.6	0.0	0.0	0.0	0.0	39.0	3,067.8	139.7	0.0	106.5	0.0	4,227.8	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	396.5	70.4	0.8	0.0	0.0	0.0	0.0	7.9	281.7	7.2	0.0	15.1	0.0	547.2	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	384.2	68.3	0.7	0.0	0.0	0.0	0.0	7.6	272.3	7.0	0.0	14.6	0.0	530.6	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	302.7	51.4	0.5	0.0	0.0	0.0	0.0	2.7	230.2	17.0	0.0	7.4	0.0	672.2	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.3	0.4	0.0	0.0	0.0	0.0	0.0	2.0	0.1	0.0	2.0	0.0	2.2	0.0

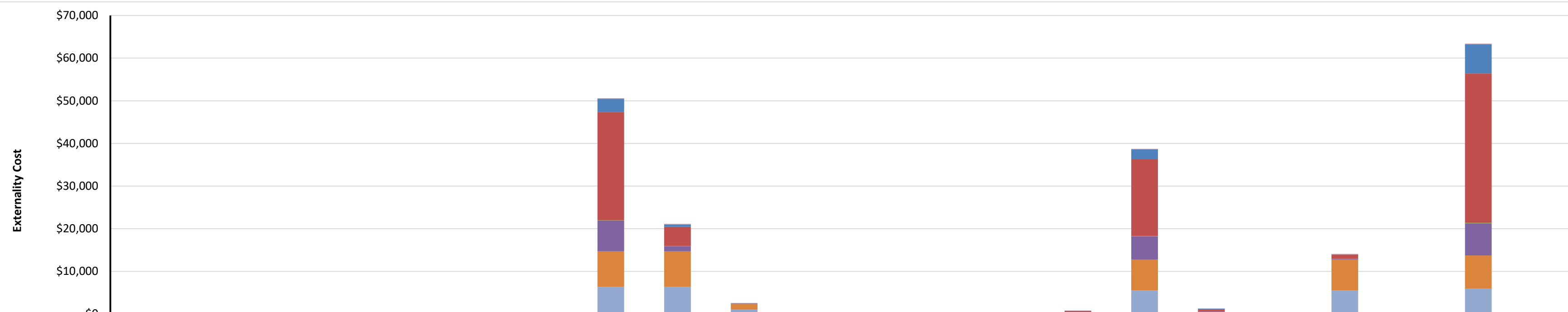
Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet

	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - Off-Road Fleet

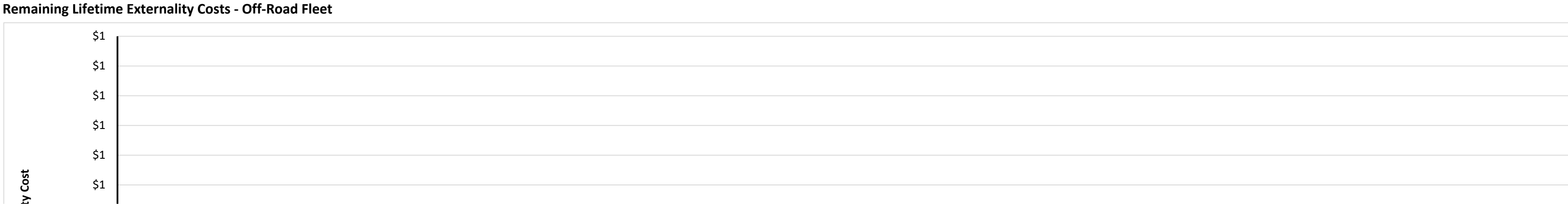
	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Current Year Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$132	$132	$22	$0	$0	$0	$0	$2	$115	$4	$0	$115	$0	$123	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$3,091	$525	$5	$0	$0	$0	$0	$28	$2,351	$173	$0	$76	$0	$6,864	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$25,368	$4,509	$49	$0	$0	$0	$0	$503	$17,981	$460	$0	$965	$0	$35,034	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$77	$13	$0	$0	$0	$0	$0	$1	$59	$1	$0	$3	$0	$105	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$7,198	$1,217	$51	$0	$0	$0	$0	$69	$5,468	$249	$0	$190	$0	$7,535	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$8,387	$8,387	$1,398	$0	$0	$0	$0	$112	$7,268	$224	$0	$7,268	$0	$7,828	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$6,334	$6,334	$1,056	$0	$0	$0	$0	$84	$5,490	$169	$0	$5,490	$0	$5,912	$0

Remaining Lifetime Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Key Inputs

Key Inputs	Calculator Inputs Used In
Primary Vehicle Location	*Payback, TCO, IR, Footprint*
Light-Duty Vehicle Information	*Payback, TCO*
Heavy-Duty Vehicle Information	*Payback, TCO*
Fuel and DEF Price	*Payback, TCO, IR*
Total Cost of Ownership Inputs	*TCO*
Fuel Production Assumptions	*Payback, TCO, IR, Footprint*
Petroleum Use, GHGs & Air Pollutant Options	*Payback, TCO, IR, Footprint*
Idle Reduction Inputs	*IR*
Electric Vehicle Charging Inputs	*Charging*
Off-Road Equipment Inputs	*Payback*

Key Vehicle and Fuel Inputs

Primary Vehicle Location

State	WASHINGTON
County	KING

Light-Duty Vehicle Information

Vehicle Type	Passenger Car
Vocation Type	Car

Light-Duty Fuel Type	Number of Light-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPGGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	*Default Mileage*	*Default MPGGE*	*Default AFV MPGGE Relative Ratio*	*User AFV MPGGE Relative Ratio*	*Default Purchase Price*	*Default Maintenance & Repair*	*User MPDGE*
Gasoline	0	12,400	30.9	$20,000	$0.15	*12,400*	*30.9*	*1.00*	*1.00*	*$20,000*	*$0.15*	*35.7*
Diesel	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Gasoline Hybrid Electric Vehicle (HEV)	0	12,400	46.3	$22,000	$0.14	*12,400*	*46.3*	*1.50*	*1.50*	*$22,000*	*$0.14*	*53.4*
Gasoline Plug-in Hybrid Electric Vehicle (PHEV)	0	12,400	53.2	$27,000	$0.13	*12,400*	*53.2*	*1.72*	*1.72*	*$27,000*	*$0.13*	*61.4*
Gasoline Extended Range Electric Vehicle (EREV)	0	12,400	44.4	$33,000	$0.13	*12,400*	*44.4*	*1.43*	*1.43*	*$33,000*	*$0.13*	*51.2*
All-Electric Vehicle (EV)	0	12,400	106.2	$37,000	$0.09	*12,400*	*106.2*	*3.43*	*3.43*	*$37,000*	*$0.09*	*122.6*
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	12,400	73.5	$50,000	$0.09	*12,400*	*73.5*	*2.38*	*2.38*	*$50,000*	*$0.09*	*84.8*
Biodiesel (B20)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Biodiesel (B100)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Renewable Diesel (RD20)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Renewable Diesel (RD100)	0	12,400	37.1	$27,000	$0.23	*12,400*	*37.1*	*1.20*	*1.20*	*$27,000*	*$0.23*	*42.8*
Ethanol (E85)	0	12,400	30.9	$20,000	$0.15	*12,400*	*30.9*	*1.00*	*1.00*	*$20,000*	*$0.15*	*35.7*
Propane (LPG)	0	12,400	30.9	$26,000	$0.15	*12,400*	*30.9*	*1.00*	*1.00*	*$26,000*	*$0.15*	*35.7*
Compressed Natural Gas (CNG)	0	12,400	29.4	$27,000	$0.15	*12,400*	*29.4*	*0.95*	*0.95*	*$27,000*	*$0.15*	*33.9*

Heavy-Duty Vehicle Information

Vehicle Type	School Bus
Vocation Type	School Bus

Heavy-Duty Fuel Type	Number of Heavy-Duty Vehicles	Annual Vehicle Mileage	Fuel Economy (MPDGE)	Purchase Price ($/vehicle)	Maintenance & Repair ($/mi)	*Default Mileage*	*Default MPDGE*	*Default AFV MPDGE Relative Ratio*	*User AFV MPDGE Relative Ratio*	*Default Purchase Price*	*Default Maintenance & Repair*	*Default MPGGE*	*User MPGGE*
Gasoline	0	0	6.8	$0	$0.61	*0*	*6.8*	*0.83*	*0.83*	*$0*	*$0.61*	*5.9*	*5.9*
Diesel	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
All-Electric Vehicle (EV)	0	15,000	24.0	$300,000	$0.56	*15,000*	*24.0*	*2.93*	*2.93*	*$300,000*	*$0.56*	*20.8*	*20.8*
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	11.3	$0	$0.56	*0*	*11.3*	*1.38*	*1.38*	*$0*	*$0.56*	*9.8*	*9.8*
Diesel Hybrid Electric Vehicle (HEV)	0	15,000	11.1	$160,000	$0.81	*15,000*	*11.1*	*1.35*	*1.35*	*$160,000*	*$0.81*	*9.6*	*9.6*
Diesel Hydraulic Hybrid (HHV)	0	0	10.6	$0	$0.81	*0*	*10.6*	*1.29*	*1.29*	*$0*	*$0.81*	*9.2*	*9.2*
Biodiesel (B20)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Biodiesel (B100)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Renewable Diesel (RD20)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Renewable Diesel (RD100)	0	15,000	8.2	$100,000	$0.93	*15,000*	*8.2*	*1.00*	*1.00*	*$100,000*	*$0.93*	*7.1*	*7.1*
Ethanol (E85)	0	0	6.8	$0	$0.61	*0*	*6.8*	*0.83*	*0.83*	*$0*	*$0.61*	*5.9*	*5.9*
Propane (LPG)	0	15,000	6.8	$108,000	$0.61	*15,000*	*6.8*	*0.83*	*0.83*	*$108,000*	*$0.61*	*5.9*	*5.9*
Compressed Natural Gas (CNG)	0	15,000	7.0	$130,000	$0.93	*15,000*	*7.0*	*0.85*	*0.85*	*$130,000*	*$0.93*	*6.0*	*6.0*
Liquefied Natural Gas (LNG)	0	15,000	7.0	$120,000	$0.93	*15,000*	*7.0*	*0.85*	*0.85*	*$120,000*	*$0.93*	*6.0*	*6.0*
LNG / Diesel Pilot Ignition	0	0	7.8	$0	$0.97	*0*	*7.8*	*0.95*	*0.95*	*$0*	*$0.97*	*6.7*	*6.7*

Refueling Information

Fueling Type	Private Station	Infrastructure costs (go to 'Payback')
Fuel Price Sensitivity	No	Enter fuel price range (go to 'Payback')

Fuel and DEF Price

	Fuel Unit	Public Station ($/fuel unit)	Private Station ($/fuel unit)	*Public Station: Default $/Fuel Unit*	*Public Station: Default $/GGE*	*Public Station: User $/GGE*	*Public Station: User $/DGE*	*Private Station: Default $/Fuel Unit*	*Private Station: Default $/GGE*	*Private Station: User $/GGE*	*Private Station: User $/DGE*
Gasoline	gasoline gallon	$3.13	$3.01	*$3.13*	*$3.13*	*$3.13*	*$3.61*	*$3.01*	***$3.01***	*$3.01*	*$3.47*
Diesel	diesel gallon	$3.22	$2.99	*$3.22*	*$2.79*	*$2.79*	*$3.22*	*$2.99*	***$2.59***	*$2.59*	*$2.99*
Electricity	kWh	$0.10	$0.10	*$0.10*	*$3.19*	*$3.19*	*$3.68*	*$0.10*	*$3.19*	*$3.19*	*$3.68*
G.H2	hydrogen kg										
B20	B20 gallon	$3.05	$2.61	*$3.05*	***$2.68***	*$2.68*	*$3.10*	*$2.61*	***$2.30***	*$2.30*	*$2.65*
B100	B100 gallon	$4.17	$4.36	*$4.17*	*$3.91*	*$3.91*	*$4.52*	*$4.36*	***$4.09***	*$4.09*	*$4.72*
RD20	RD20 gallon	$3.66	$2.96	*$3.66*	*$3.20*	*$3.20*	*$3.70*	*$2.96*	*$2.59*	*$2.59*	*$2.99*
RD100	RD100 gallon	$3.71	$2.95	*$3.71*	*$3.39*	*$3.39*	*$3.91*	*$2.95*	*$2.69*	*$2.69*	*$3.11*
E85	E85 gallon	$3.68	$2.37	*$3.68*	*$5.02*	*$5.02*	*$5.79*	*$2.37*	***$3.23***	*$3.23*	*$3.73*
Propane	LPG gallon	$2.06	$3.26	*$2.06*	*$2.72*	*$2.72*	*$3.14*	*$3.26*	***$4.31***	*$4.31*	*$4.97*
CNG	CNG GGE	$2.77	$1.72	*$2.77*	*$2.77*	*$2.77*	*$3.20*	*$1.72*	***$1.72***	*$1.72*	*$1.99*
LNG	LNG gallon	$1.91	$1.10	*$1.91*	*$2.87*	*$2.87*	*$3.31*	*$1.10*	*$1.65*	*$1.65*	*$1.91*
Diesel Exhaust Fluid (DEF)	DEF gallon	$2.80	$2.80	*$2.80*	*$2.80*	*$2.80*	*N/A*	*$2.80*	*$2.80*	*$2.80*	*N/A*

Total Cost of Ownership Inputs

Vehicle and Infrastructure Information

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure	*Default LDV*	*Default HDV*	*Default Infrastructure*
Years of Planned Ownership	years	15	15	15	*15*	*15*	*15*

Financial Assumptions

		Light-Duty Vehicle	Heavy-Duty Vehicle	Infrastructure			
Loan	yes/no	No	No	No			
Loan Term	years	5	5	5	*5*	*5*	*5*
Interest Rate	%	4.20%	4.20%	4.20%	*4.20%*	*4.20%*	*4.20%*
Percent Down Payment	%	12.00%	12.00%	12.00%	*12.00%*	*12.00%*	*12.00%*
Discount Factor	%		1.24%			*1.24%*	

Fuel Production Assumptions

Biodiesel Feedstock Source	1 - Soy 2 - Canola 3 - Corn 4 - Tallow	1	
Renewable Diesel Feedstock Source	1 - Soy 2 - Canola 3 - Palm	1	
Ethanol Feedstock Source	1 - Corn 2 - Switchgrass 3 - Sugarcane 4 - Grain Sorghum	1	
CNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
LNG Feedstock Source	1 - North American NG 2 - Landfill Gas 3 - AD Gas of Animal Waste 4 - AD Gas of Wastewater Sludge 5 - AD Gas of MSW	1	
North American NG Feedstock Source		Conventional 66%	Shale 34%
LPG Feedstock Source		NG 69%	Petroleum 31%
Source of Electricity for PHEVs, EVs, and FCVs (Electrolysis)	1 - Average U.S. Mix 2 to 11 - EIA Region Mix (see map) 12 - User Defined (go to 'Background Data' sheet)	11	
G.H2 Production Process	1 - Refueling Station SMR (On-site) 2 - Central Plant SMR (Off-site) 3 - Refueling Station Electrolysis (On-site)	1	

Number	Grid Mix
1	U.S.
2	ASCC
3	FRCC
4	HICC
5	MRO
6	NPCC
7	RFC
8	SERC
9	SPP
10	TRE
11	WECC
12	User Defined
11	**Default based on State and County**

Petroleum Use, GHGs & Air Pollutant Options

Petroleum Use, GHGs & Air Pollutant Calculation Type		1
1 - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants		
2 - Well-to-Wheels Petroleum Use, GHGs, and Air Pollutants		
3 - Well-to-Wheels & Vehicle Production* Petroleum Use, GHGs, Air Pollutants (*LDVs only)		
Diesel In-Use Emissions Multiplier	yes/no	No
Low NOx Engines - CNG, LNG, LPG HDVs	yes/no	Yes

Idle Reduction Inputs

Light-Duty Vehicle Information

Idle Reduction (IR) Vehicle Type	Passenger Car
IR Vocation Type	Police Car
Baseline Vehicle Model Year	2020

Services Required (% of hours):

		Vehicle Heating	Engine Heating	Cooling	Electrical
Annual Idling Hours (per Vehicle)	1,750				
% of Idle Hours by Service		33%	0%	33%	34%

Default Services Required (% of hours):

Default Idle Hr	*Vehicle Heating*	*Engine Heating*	*Cooling*	*Electrical*
1750	*33%*	*0%*	*33%*	*34%*

Light-Duty Baseline & Idling Reduction Equipment	Number of Light-Duty Vehicles	Services Provided By IR Equipment: Vehicle Heating	Engine Heating	Cooling	Electrical	Idling Hour Reduction Goal	Fuel Consumption (GGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	*Default Fuel Consumption (GGE/hr)*	*Default Fuel Consumption (DGE/hr)*	*Electrical Power Demand (W)*	*Default Equipment Cost*
Gasoline	0						0.30			*0.30*	*0.26*		
Fuel Operated Air Heater	0	✓	✗	✗	✗	578	0.03	0	$900	*0.03*	*0.03*	*0*	*$900*
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0.08	0	$1,250	*0.08*	*0.07*	*0*	*$1,250*
Battery Management Start/Stop	0	✗	✗	✗	✓	595	0.00	250	$1,500	*0.00*	*0.00*	*250*	*$1,500*
APU (Battery)	0	✗	✗	✓	✓	1173	0.00	250	$4,300	*0.00*	*0.00*	*250*	*$4,300*
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	1750	0.03	250	$5,200	*0.03*	*0.03*	*250*	*$5,200*
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	1173	0.00	250	$5,800	*0.00*	*0.00*	*250*	*$5,800*

Heavy-Duty Vehicle Information

IR Vehicle Type	Combination Long-Haul Truck
IR Vocation Type	Long Haul Freight Truck
Baseline Vehicle Model Year	2020

Default Services Required (% of hours):

		Services Required (% of hours):					Default Idle Hr	Vehicle Heating	Engine Heating	Cooling	Electrical
Annual Conventional Idling Hours (per Vehicle)	150	Vehicle Heating	Engine Heating	Cooling	Electrical		150				
% of Idle Hours by Service		33%	0%	33%	34%			33%	0%	33%	34%
							Default Hotel Hr				
*Annual Hotelling Hours (per Vehicle)**	1,800	Vehicle Heating	Engine Heating	Cooling	Electrical		1800				
% of Hotelling Hours by Service		33%	0%	33%	34%			33%	0%	33%	34%

Heavy-Duty Baseline & Idling Reduction Equipment	Number of Heavy-Duty Vehicles	Services Provided By IR Equipment				Conventional Idling Hour Reduction Goal	Hotelling Hour Reduction Goal	Fuel Consumption (DGE/hr)	Electrical Power Demand (W)	IR Equipment Price ($/vehicle)	*Default Fuel Consumption (GGE/hr)*	*Default Fuel Consumption (DGE/hr)*	*Electrical Power Demand (W)*	*Default Equipment Cost*	*User Fuel Consumption (GGE/hr)*
Diesel	0							0.78			0.89	0.78			0.89
*Diesel (Hotelling)**								0.90			1.03	0.90			1.03
Fuel Operated Air Heater	0	✓	✗	✗	✗	50	594	0.06	0	$1,800	0.07	0.06	0	$1,800	0.07
Fuel Operated Coolant Heater	0	✗	✓	✗	✗	0	0	0.12	0	$1,700	0.14	0.12	0	$1,700	0.14
Battery Management Start/Stop	0	✗	✗	✗	✓	51	612	0.00	704	$2,500	0.00	0.00	704	$2,500	0.00
APU (Diesel)	0	✓	✓	✓	✓	150	1800	0.20	0	$10,000	0.23	0.20	0	$10,000	0.23
APU (Battery)	0	✗	✗	✓	✓	101	1206	0.00	704	$8,000	0.00	0.00	704	$8,000	0.00
APU (Battery) & Fuel Operated Air Heater	0	✓	✗	✓	✓	150	1800	0.06	704	$9,800	0.07	0.06	704	$9,800	0.07
APU (Battery) & Battery Management Start/Stop	0	✗	✗	✓	✓	101	1206	0.00	704	$10,500	0.00	0.00	704	$10,500	0.00
Truck Stop Electrification - Single System**	0	✗	✗	✓	✓	101	1206	0.00	704	$5	0.00	0.00	704	$5	0.00
Shore Power**	0	✗	✗	✓	✓	101	1206	0.00	704	$2,500	0.00	0.00	704	$2,500	0.00

Electric Vehicle Charging Inputs

Level 2 Charging Infrastructure

Predicted Weekly Utilization	Moderate											
Venue	**Number of Chargers**	**Weekly Utilization (sessions/week/ station)**	**Average Session Power (kW)**	**Charge Time (minutes/ session)**	*Default Utilization Selected*	*Default Session Power (kW)*	*Default Charge Time (hr/session)*	*Low*	*Moderate*	*High*	*Default Charge Time (min/session)*	*User Charge Time (hr/session)*
Parking Lot	0	4.5	4	150	4.5	4	2.5	0.5	4.5	6.5	150	2.5
Retail & Leisure	0	5.5	4	90	5.5	4	1.5	1.0	5.5	7.0	90	1.5
Education	0	6.0	4	150	6.0	4	2.5	1.5	6.0	9.0	150	2.5
Healthcare	0	6.5	4	150	6.5	4	2.5	3.5	6.5	7.0	150	2.5
Workplace	0	4.5	4	150	4.5	4	2.5	1.0	4.5	7.5	150	2.5
Multi-Unit Dwelling	0	3.0	4	210	3.0	4	3.5	0.5	3.0	4.0	210	3.5
Single-Unit Dwelling	0	6.0	4	120	6.0	4	2.0	3.0	6.0	7.5	120	2.0

DC Fast Charging Infrastructure

Predicted Weekly Utilization	Moderate											
Venue	**Number of Chargers**	**Weekly Utilization (sessions/week/ station)**	**Average Session Power (kW)**	**Charge Time (minutes/ session)**	*Default Utilization Selected*	*Default Session Power (kW)*	*Default Charge Time (hr/session)*	*Low*	*Moderate*	*High*	*Default Charge Time (min/session)*	*User Charge Time (hr/session)*
Parking Lot	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Retail & Leisure	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Education	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Healthcare	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Workplace	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Multi-Unit Dwelling	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4
Single-Unit Dwelling	0	15.0	24	22	15.0	24	0.4	6.5	15.0	26.0	22	0.4

Off-Road Equipment Inputs

Small Equipment Information

						Default Rated hp				
Equipment Type	Commercial Turf Equipment									
Vocation Type	Zero-Turn Commercial Turf					25				
Rated Horsepower	25									
	Type	**Replacements per Lifetime**	**Battery Capacity (kWh)**	**Battery Cost ($/kWh)**	**Lifetime Replacement Cost**	*Default Type*	*Default Replacements per Lifetime*	*Default kWh*	*Default $/kWh: Lithium-Ion*	*User $/kWh: Lithium-Ion*
EV Battery Replacement	Lithium-Ion	0	21.6	$800	$0	Lithium-Ion	0	21.6	$800	$800

Small Equipment Fuel Type	**Number of Units**	**Annual Hourly Usage**	**Fuel Consumption (GGE/hr)**	**Equipment Price ($/unit)**	**Maintenance & Repair ($/hr)**	*Default Usage*	*Default GGE/hr*	*Default AFV GGE/hr Relative Ratio*	*User AFV GGE/hr Relative Ratio*	*Default Purchase Price*	*User Purchase Price + Battery Replacement*	*Default Maintenance & Repair*	*User DGE/hr*	*User Rated hp*
Gasoline	0	1,364	0.34	$12,000	$0.12	1,364	0.34	1.00	1.00	$12,000	$12,000	$0.12	0.29	25
Diesel	0	1,364	0.28	$16,000	$0.15	1,364	0.28	0.83	0.83	$16,000	$16,000	$0.15	0.25	25
Gasoline Hybrid Electric Vehicle (HEV)	0	0	0.24	$0	$0.00	0	0.24	0.71	0.71	$0	$0	$0.00	0.21	25
All-Electric Vehicle (EV)	0	1,364	0.07	$23,000	$0.05	1,364	0.07	0.20	0.20	$23,000	$23,000	$0.05	0.06	25
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	0	0.11	$0	$0.00	0	0.11	0.33	0.33	$0	$0	$0.00	0.10	25
Biodiesel (B20)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Biodiesel (B100)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Renewable Diesel (RD20)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Renewable Diesel (RD100)	0	0	0.28	$0	$0.00	0	0.28	0.83	0.83	$0	$0	$0.00	0.25	25
Ethanol (E85)	0	0	0.34	$0	$0.00	0	0.34	1.00	1.00	$0	$0	$0.00	0.29	25
Propane (LPG)	0	1,364	0.34	$13,500	$0.12	1,364	0.34	1.00	1.00	$13,500	$13,500	$0.12	0.29	25
Compressed Natural Gas (CNG)	0	0	0.34	$0	$0.00	0	0.34	1.00	1.00	$0	$0	$0.00	0.29	25

Large Equipment Information

						Default Rated hp				
Equipment Type	Forklifts									
Vocation Type	Warehouse Forklift					50				
Rated Horsepower	50									
	Type	**Replacements per Lifetime**	**Battery Capacity (kWh)**	**Battery Cost ($/kWh)**	**Lifetime Replacement Cost**	*Default Type*	*Default Replacements per Lifetime*	*Default kWh*	*Default $/kWh: Lead-Acid*	*User $/kWh: Lead-Acid*
EV Battery Replacement	Lead-Acid	0	43.2	$200	$0	Lead-Acid	0	43.2	$200	$200

Large Equipment Fuel Type	**Number of Units**	**Annual Hourly Usage**	**Fuel Consumption (DGE/hr)**	**Equipment Price ($/unit)**	**Maintenance & Repair ($/hr)**	*Default Usage*	*Default DGE/hr*	*Default AFV MPDGE Relative Ratio*	*User AFV MPDGE Relative Ratio*	*Default Purchase Price*	*User Purchase Price + Battery Replacement*	*Default Maintenance & Repair*	*Default GGE/hr*	*User Rated hp*	*User GGE/hr*
Gasoline	0	1,700	0.70	$22,000	$0.14	1,700	0.70	1.00	1.00	$22,000	$22,000	$0.14	0.80	50	0.80
Diesel	0	1,700	0.58	$30,000	$0.19	1,700	0.58	0.83	0.83	$30,000	$30,000	$0.19	0.67	50	0.67
All-Electric Vehicle (EV)	0	1,700	0.14	$37,000	$0.08	1,700	0.14	0.20	0.20	$37,000	$37,000	$0.08	0.16	50	0.16
Gaseous Hydrogen (G.H2) Fuel Cell Vehicle (FCV)	0	1,700	0.23	$40,000	$0.08	1,700	0.23	0.33	0.33	$40,000	$40,000	$0.08	0.27	50	0.27
Diesel Hybrid Electric Vehicle (HEV)	0	0	0.48	$0	$0.00	0	0.48	0.69	0.69	$0	$0	$0.00	0.56	50	0.56
Diesel Hydraulic Hybrid (HHV)	0	0	0.48	$0	$0.00	0	0.48	0.69	0.69	$0	$0	$0.00	0.56	50	0.56
Biodiesel (B20)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Biodiesel (B100)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Renewable Diesel (RD20)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Renewable Diesel (RD100)	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67
Ethanol (E85)	0	0	0.70	$0	$0.00	0	0.70	1.00	1.00	$0	$0	$0.00	0.80	50	0.80
Propane (LPG)	0	1,700	0.70	$25,000	$0.14	1,700	0.70	1.00	1.00	$25,000	$25,000	$0.14	0.80	50	0.80
Compressed Natural Gas (CNG)	0	1,700	0.70	$50,000	$0.14	1,700	0.70	1.00	1.00	$50,000	$50,000	$0.14	0.80	50	0.80
Liquefied Natural Gas (LNG)	0	0	0.70	$0	$0.00	0	0.70	1.00	1.00	$0	$0	$0.00	0.80	50	0.80
LNG / Diesel Pilot Ignition	0	0	0.58	$0	$0.00	0	0.58	0.83	0.83	$0	$0	$0.00	0.67	50	0.67

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On-Road Fleet Footprint Calculator

State
WASHINGTON

Year 2020

Vehicle Type	Model Year	Annual Vehicle Mileage	Fuel Use: Gasoline (gal)	Diesel (gal)	Gasoline HEV (gal)	Gasoline PHEV (gal)	Gasoline PHEV (kWh)	Gasoline EREV (gal)	Gasoline EREV (kWh)	Electricity (kWh)	G.H2 (kg)	Diesel HEV (gal)	Diesel HHV (gal)	B20 (gal)	B100 (gal)	RD20 (gal)	RD100 (gal)	E85 (gal)	LPG (gal)	CNG (GGE)	LNG (gal)	LNG / Diesel (LNG gal)	LNG / Diesel (diesel gal)	Remaining Lifetime (years): Default Lifetime	Calculated Lifetime	Age	Remaining Lifetime	Well-to-Wheels Petroleum Use (barrels)	Vehicle Production Petroleum Use (barrels)
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Car																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Passenger Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck																								0	0	0	0	0.0	0.0
Light Commercial Truck	2015	13,500		682																				15	15	5	10	17.0	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
School Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Transit Bus																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Refuse Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck	2015	46,875		6,996																				15	15	5	10	174.3	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Short-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Single Unit Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Short-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0
Combination Long-Haul Truck																								0	0	0	0	0.0	0.0

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Off-Road Fleet Footprint Calculator

State
WASHINGTON

Year 2021

Equipment Type	Model Year	Annual Usage (hours)	Rated Horsepower (hp)	Fuel Use: Gasoline (gal)	Fuel Use: Diesel (gal)	Fuel Use: Electricity (kWh)	Fuel Use: G.H2 (kg)	Fuel Use: B20 (gal)	Fuel Use: B100 (gal)	Fuel Use: RD20 (gal)	Fuel Use: RD100 (gal)	Fuel Use: E85 (gal)	Fuel Use: LPG (gal)	Fuel Use: CNG (GGE)	Fuel Use: LNG (gal)	Default Annual Usage (hr)	Default Rated Horsepower (hp)	Default Estimated Gasoline Use (gal)	Default Estimated Electricity Use (kWh)	Load Factor %	Remaining Lifetime: Median Life Full Load (hr)	Remaining Lifetime: Calculated Lifetime (hr)	Remaining Lifetime: Cumulative Hours	Remaining Lifetime: Remaining Lifetime (hr)	Remaining Lifetime: Remaining Years
Aerial Lifts																384	47	86	565	21%	0	0	0	0	0
Aerial Lifts																384	47	86	565	21%	0	0	0	0	0
Agricultural Tractors																475	50	318	2,090	59%	0	0	0	0	0
Agricultural Tractors																475	50	318	2,090	59%	0	0	0	0	0
Airport Support Equipment																732	150	1,469	9,662	59%	0	0	0	0	0
Airport Support Equipment																732	150	1,469	9,662	59%	0	0	0	0	0
Chain Saws																303	4	19	127	70%	0	0	0	0	0
Chain Saws																303	4	19	127	70%	0	0	0	0	0
Commercial Turf Equipment																1,364	25	464	3,051	60%	0	0	0	0	0
Commercial Turf Equipment																1,364	25	464	3,051	60%	0	0	0	0	0
Cranes																990	365	3,524	23,173	43%	0	0	0	0	0
Cranes																990	365	3,524	23,173	43%	0	0	0	0	0
Crawler Tractor/Dozers	2015	4,160	568		30,000											936	130	1,628	10,707	59%	0	0	24,960	0	0
Crawler Tractor/Dozers																936	130	1,628	10,707	59%	0	0	0	0	0
Excavators																1,092	25	365	2,402	59%	0	0	0	0	0
Excavators	2015	800	499		30,000											1,092	25	365	2,402	59%	0	0	4,800	0	0
Forklifts	2015	300	109		7,500											1,700	50	1,137	7,479	59%	0	0	1,800	0	0
Forklifts																1,700	50	1,137	7,479	59%	0	0	0	0	0
Golf Carts																1,080	9	101	667	46%	0	0	0	0	0
Golf Carts																1,080	9	101	667	46%	0	0	0	0	0
Lawn & Garden Tractors																721	26	187	1,230	44%	0	0	0	0	0
Lawn & Garden Tractors																721	26	187	1,230	44%	0	0	0	0	0
Lawn Mowers																406	20	61	400	33%	0	0	0	0	0
Lawn Mowers																406	20	61	400	33%	0	0	0	0	0
Leafblowers/Vacuums																564	14	168	1,107	94%	0	0	0	0	0
Leafblowers/Vacuums																564	14	168	1,107	94%	0	0	0	0	0
Rollers	2010	300	95		600											760	95	966	6,353	59%	0	0	3,300	0	0
Rollers																760	95	966	6,353	59%	0	0	0	0	0
Rubber Tire Loaders	2010	2,813	599		24,375											761	599	6,099	40,110	59%	0	0	30,938	0	0
Rubber Tire Loaders																761	599	6,099	40,110	59%	0	0	0	0	0
Skid Steer Loaders	2010	3,000	48		750											818	48	187	1,230	21%	0	0	33,000	0	0
Skid Steer Loaders																818	48	187	1,230	21%	0	0	0	0	0
Snowblowers																272	8	10	65	20%	0	0	0	0	0
Snowblowers																272	8	10	65	20%	0	0	0	0	0
Sweepers/Scrubbers	2010	750	90		39,000											1,032	40	665	4,371	71%	0	0	8,250	0	0
Sweepers/Scrubbers																1,032	40	665	4,371	71%	0	0	0	0	0
Terminal Tractors																1,257	141	2,372	15,596	59%	0	0	0	0	0
Terminal Tractors																1,257	141	2,372	15,596	59%	0	0	0	0	0
Tractors/Loaders/Backhoes	2010	18,750	300		26,250											1,135	73	395	2,595	21%	0	0	206,250	0	0
Tractors/Loaders/Backhoes																1,135	73	395	2,595	21%	0	0	0	0	0
Trimmers/Edgers/Brush Cutter																274	2	11	74	91%	0	0	0	0	0
Trimmers/Edgers/Brush Cutter																274	2	11	74	91%	0	0	0	0	0

Equipment Type	Well-to-Wheels Petroleum Use (barrels)	Well-to-Wheels GHGs (short tons)	Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	747.4	411.5	673.1	1,509.1	107.6	104.5	110.6	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	747.4	411.5	114.8	255.0	19.2	18.7	18.7	0.0	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	186.8	102.9	27.4	50.8	7.4	7.1	4.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	14.9	8.2	154.5	117.0	23.6	22.9	8.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	607.3	334.4	3,127.0	5,752.2	528.1	510.6	431.7	0.0	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	18.7	10.3	102.0	261.9	13.5	13.1	31.8	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	971.6	535.0	288.2	319.5	45.2	43.8	22.2	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	654.0	360.1	5,424.6	7,927.2	1,026.1	994.8	1,260.4	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment Type	Remaining Lifetime Well-to-Wheels Petroleum Use (barrels)	Remaining Lifetime Well-to-Wheels GHGs (short tons)	Remaining Lifetime Equipment Operation Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Upstream Air Pollutants (lb): CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Equipment Type	Externality Cost - Well-to-Wheels Petroleum Use	Externality Cost - Well-to-Wheels GHGs	Externality Cost - Equipment Operation Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Forklifts	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Equipment Type	Remaining Lifetime Externality Cost - Well-to-Wheels Petroleum Use	Remaining Lifetime Externality Cost - Well-to-Wheels GHGs	Remaining Lifetime Externality Cost - Equipment Operation Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx	Remaining Lifetime Externality Cost - Upstream Air Pollutants: CO	NOx	PM10	PM2.5	VOC	VOC (Evap)	SOx
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

On-Road and Off-Road Fleet Footprint Calculator Output

		pounds	16,352.1	**4,278.1**	MTCO2E	Fuel Use (Barrels)	4,139.4
On-Road Fleet Footprint Calculator Output	2,067.7	tons	7.417267282			Gallons	**173,855**
			2210.34565				

On-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	17.0	9.4	24.5	12.8	1.2	0.2	0.7	0.1
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	174.3	96.0	107.1	146.6	9.8	1.8	6.1	1.1
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	191.3	105.3	131.6	159.5	11.0	2.0	6.8	1.2

Remaining Lifetime Year On-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Vehicle Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Passenger Car	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passenger Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Light Commercial Truck	169.9	93.5	282.0	144.7	12.1	2.1	7.5	1.1
School Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transit Bus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refuse Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Unit Short-Haul Truck	1,743.0	959.7	1,078.9	1,507.7	99.1	17.6	60.5	10.9
Single Unit Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Short-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Combination Long-Haul Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1,912.9	1,053.3	1,360.9	1,652.4	111.2	19.7	68.0	11.9

On-Road Fleet Footprint Calculator Output - Externality Costs

Current Year On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$288	$381	$0	$23	$6	$14	$7	$6
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$2,954	$3,912	$0	$261	$51	$116	$62	$62
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$3,242	$4,293	$0	$284	$57	$130	$70	$68

Remaining Lifetime On-Road - Energy Use and Emission Externality Costs by Vehicle Type

Vehicle Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Passenger Car	$0	$0	$0	$0	$0	$0	$0	$0
Passenger Truck	$0	$0	$0	$0	$0	$0	$0	$0
Light Commercial Truck	$2,879	$3,812	$0	$258	$63	$138	$76	$60
School Bus	$0	$0	$0	$0	$0	$0	$0	$0
Transit Bus	$0	$0	$0	$0	$0	$0	$0	$0
Refuse Truck	$0	$0	$0	$0	$0	$0	$0	$0
Single Unit Short-Haul Truck	$29,544	$39,117	$0	$2,687	$512	$1,160	$618	$617
Single Unit Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Short-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Combination Long-Haul Truck	$0	$0	$0	$0	$0	$0	$0	$0
Total	$32,424	$42,929	$0	$2,945	$575	$1,298	$694	$677

Off-Road Fleet Footprint Calculator Output

Off-Road Fleet Footprint Calculator Output - Energy Use and Emissions

Current Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Equipment Type

	Petroleum Use	GHGs	CO	NOx	PM10	PM2.5	VOC	SOx

Equipment Type	(barrels)	(short tons)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	747.4	411.5	673.1	1,509.1	107.6	104.5	110.6	4.7
Excavators	747.4	411.5	114.8	255.0	19.2	18.7	18.7	4.7
Forklifts	186.8	102.9	27.4	50.8	7.4	7.1	4.0	1.2
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	14.9	8.2	154.5	117.0	23.6	22.9	8.2	0.1
Rubber Tire Loaders	607.3	334.4	3,127.0	5,752.2	528.1	510.6	431.7	3.8
Skid Steer Loaders	18.7	10.3	102.0	261.9	13.5	13.1	31.8	0.1
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	971.6	535.0	288.2	319.5	45.2	43.8	22.2	6.1
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	654.0	360.1	5,424.6	7,927.2	1,026.1	994.8	1,260.4	4.1
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	3,948.1	2,173.9	9,911.5	16,192.6	1,770.6	1,715.5	1,887.6	24.6

Remaining Lifetime Year Off-Road - Well-to-Wheels Petroleum Use and GHGs & Vehicle Operation Air Pollutants by Vehicle Type

Equipment Type	Petroleum Use (barrels)	GHGs (short tons)	CO (lb)	NOx (lb)	PM10 (lb)	PM2.5 (lb)	VOC (lb)	SOx (lb)
Aerial Lifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Agricultural Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Airport Support Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All Terrain Vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chain Saws	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial Turf Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cranes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Crawler Tractor/Dozers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Excavators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forklifts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Golf Carts	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn & Garden Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lawn Mowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafblowers/Vacuums	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rollers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubber Tire Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Skid Steer Loaders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snowblowers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sweepers/Scrubbers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Terminal Tractors	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tractors/Loaders/Backhoes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trimmers/Edgers/Brush Cutter	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Off-Road Fleet Footprint Calculator Output - Externality Costs

Current Year Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

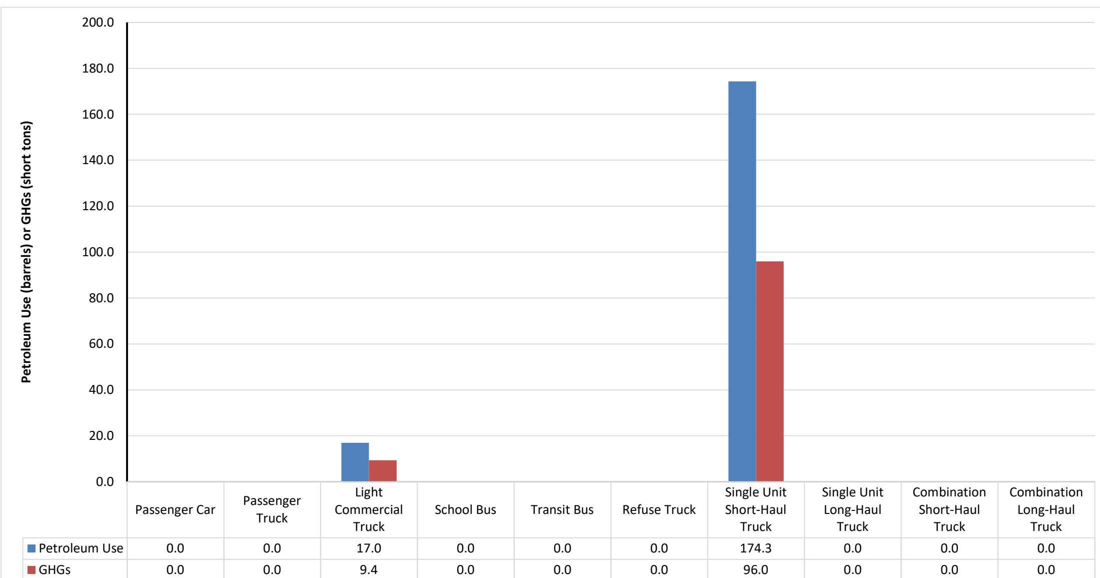
Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$12,669	$16,773	$0	$2,690	$19	$6,900	$1,130	$264
Excavators	$12,669	$16,773	$0	$454	$3	$1,234	$191	$264
Forklifts	$3,167	$4,193	$0	$91	$2	$472	$41	$66
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$253	$335	$0	$208	$4	$1,510	$84	$5
Rubber Tire Loaders	$10,293	$13,628	$0	$10,252	$110	$33,714	$4,408	$215

Skid Steer Loaders	$317	$419	$0	$467	$3	$863	$325	$7
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$16,469	$21,805	$0	$569	$9	$2,895	$227	$344
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$11,085	$14,677	$0	$14,129	$196	$65,688	$12,871	$231
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$66,922	$88,605	$0	$28,861	$346	$113,276	$19,275	$1,397

Remaining Lifetime Off-Road - Energy Use and Emission Externality Costs by Vehicle Type

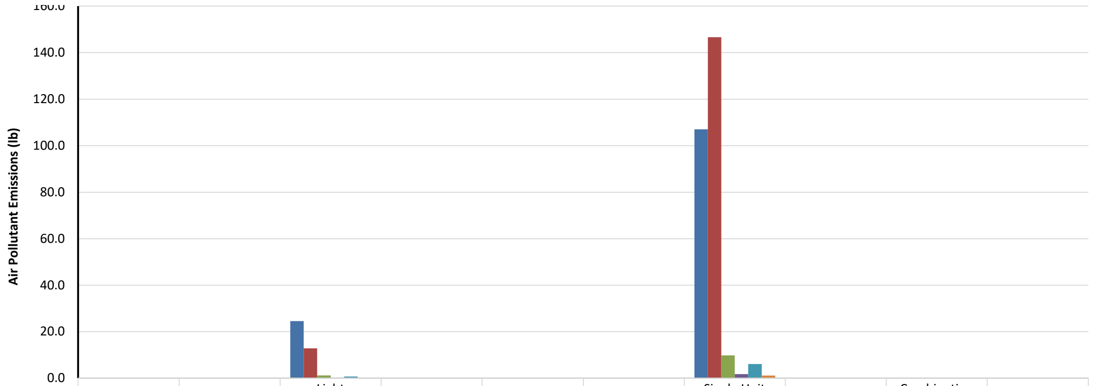
Equipment Type	Petroleum Use ($)	GHGs ($)	CO ($)	NOx ($)	PM10 ($)	PM2.5 ($)	VOC ($)	SOx ($)
Aerial Lifts	$0	$0	$0	$0	$0	$0	$0	$0
Agricultural Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Airport Support Equipment	$0	$0	$0	$0	$0	$0	$0	$0
All Terrain Vehicles	$0	$0	$0	$0	$0	$0	$0	$0
Chain Saws	$0	$0	$0	$0	$0	$0	$0	$0
Commercial Turf Equipment	$0	$0	$0	$0	$0	$0	$0	$0
Cranes	$0	$0	$0	$0	$0	$0	$0	$0
Crawler Tractor/Dozers	$0	$0	$0	$0	$0	$0	$0	$0
Excavators	$0	$0	$0	$0	$0	$0	$0	$0
Forklifts	$0	$0	$0	$0	$0	$0	$0	$0
Golf Carts	$0	$0	$0	$0	$0	$0	$0	$0
Lawn & Garden Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Lawn Mowers	$0	$0	$0	$0	$0	$0	$0	$0
Leafblowers/Vacuums	$0	$0	$0	$0	$0	$0	$0	$0
Rollers	$0	$0	$0	$0	$0	$0	$0	$0
Rubber Tire Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Skid Steer Loaders	$0	$0	$0	$0	$0	$0	$0	$0
Snowblowers	$0	$0	$0	$0	$0	$0	$0	$0
Sweepers/Scrubbers	$0	$0	$0	$0	$0	$0	$0	$0
Terminal Tractors	$0	$0	$0	$0	$0	$0	$0	$0
Tractors/Loaders/Backhoes	$0	$0	$0	$0	$0	$0	$0	$0
Trimmers/Edgers/Brush Cutter	$0	$0	$0	$0	$0	$0	$0	$0
Total	$0	$0	$0	$0	$0	$0	$0	$0

Current Year Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet



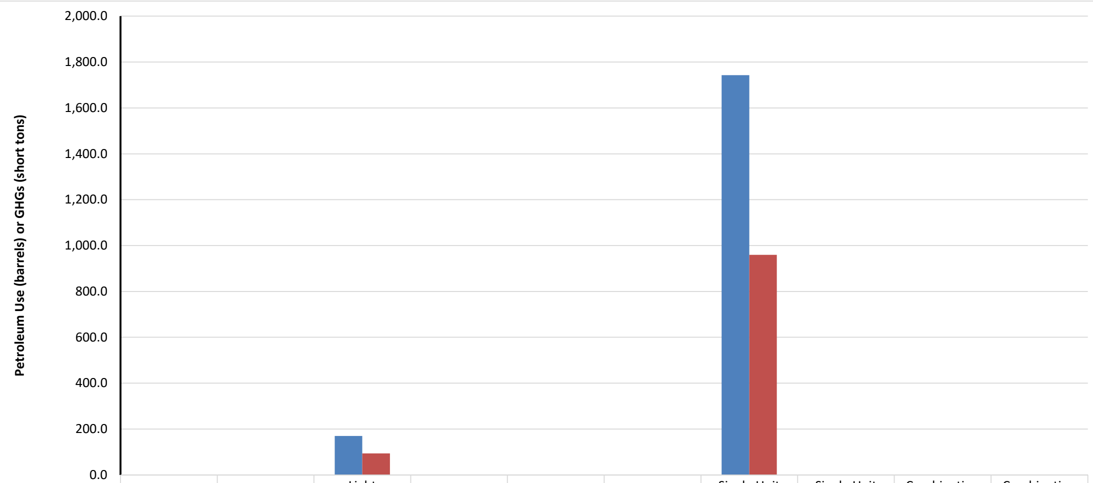
Current Year Vehicle Operation Air Pollutants - On-Road Fleet

160.0



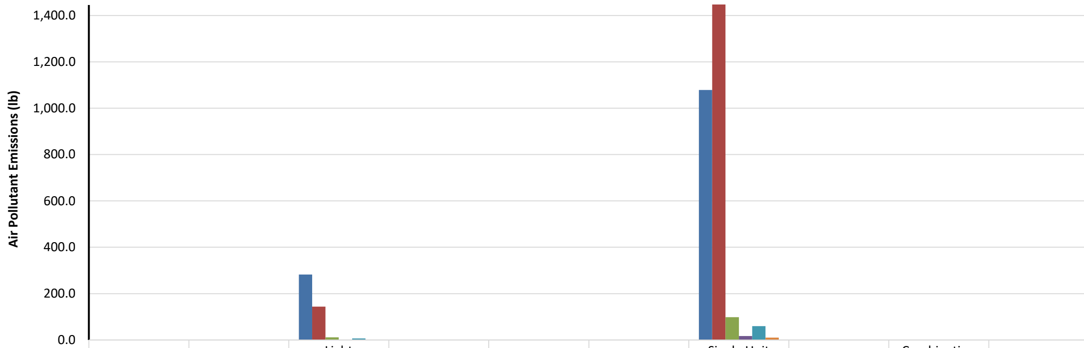
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	24.5	0.0	0.0	0.0	107.1	0.0	0.0	0.0
NOx	0.0	0.0	12.8	0.0	0.0	0.0	146.6	0.0	0.0	0.0
PM10	0.0	0.0	1.2	0.0	0.0	0.0	9.8	0.0	0.0	0.0
PM2.5	0.0	0.0	0.2	0.0	0.0	0.0	1.8	0.0	0.0	0.0
VOC	0.0	0.0	0.7	0.0	0.0	0.0	6.1	0.0	0.0	0.0
SOx	0.0	0.0	0.1	0.0	0.0	0.0	1.1	0.0	0.0	0.0

Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - On-Road Fleet



	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
Petroleum Use	0.0	0.0	169.9	0.0	0.0	0.0	1,743.0	0.0	0.0	0.0
GHGs	0.0	0.0	93.5	0.0	0.0	0.0	959.7	0.0	0.0	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - On-Road Fleet

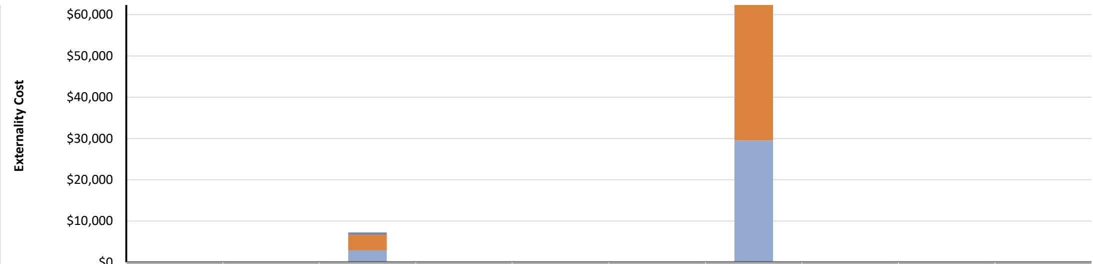


	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
CO	0.0	0.0	282.0	0.0	0.0	0.0	1,078.9	0.0	0.0	0.0
NOx	0.0	0.0	144.7	0.0	0.0	0.0	1,507.7	0.0	0.0	0.0
PM10	0.0	0.0	12.1	0.0	0.0	0.0	99.1	0.0	0.0	0.0
PM2.5	0.0	0.0	2.1	0.0	0.0	0.0	17.6	0.0	0.0	0.0
VOC	0.0	0.0	7.5	0.0	0.0	0.0	60.5	0.0	0.0	0.0
SOx	0.0	0.0	1.1	0.0	0.0	0.0	10.9	0.0	0.0	0.0

Current Year Externality Costs - On-Road Fleet

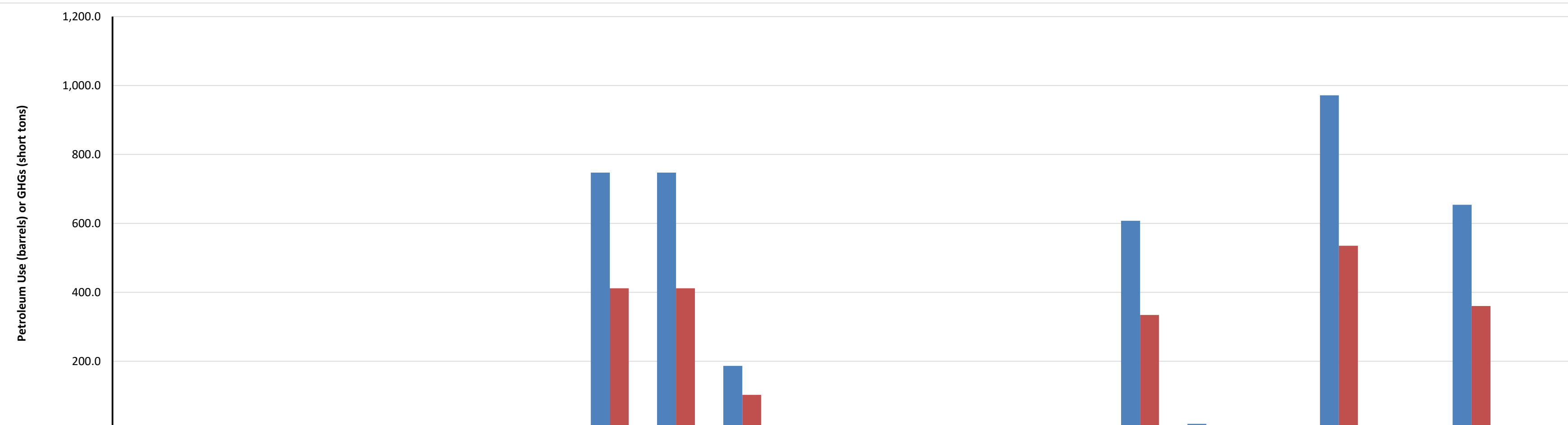
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$6	$0	$0	$0	$62	$0	$0	$0
VOC	$0	$0	$7	$0	$0	$0	$62	$0	$0	$0
PM2.5	$0	$0	$14	$0	$0	$0	$116	$0	$0	$0
PM10	$0	$0	$6	$0	$0	$0	$51	$0	$0	$0
NOx	$0	$0	$23	$0	$0	$0	$261	$0	$0	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$381	$0	$0	$0	$3,912	$0	$0	$0
Petroleum Use	$0	$0	$288	$0	$0	$0	$2,954	$0	$0	$0

Remaining Lifetime Externality Costs - On-Road Fleet



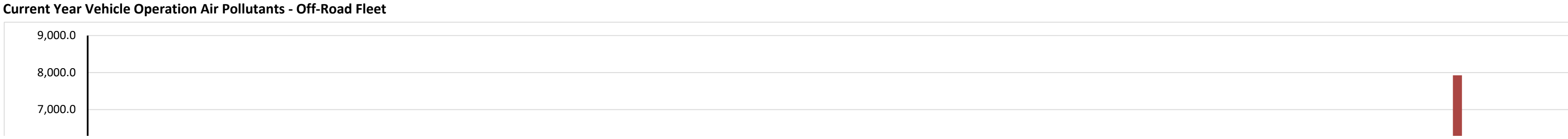
	Passenger Car	Passenger Truck	Light Commercial Truck	School Bus	Transit Bus	Refuse Truck	Single Unit Short-Haul Truck	Single Unit Long-Haul Truck	Combination Short-Haul Truck	Combination Long-Haul Truck
SOx	$0	$0	$60	$0	$0	$0	$617	$0	$0	$0
VOC	$0	$0	$76	$0	$0	$0	$618	$0	$0	$0
PM2.5	$0	$0	$138	$0	$0	$0	$1,160	$0	$0	$0
PM10	$0	$0	$63	$0	$0	$0	$512	$0	$0	$0
NOx	$0	$0	$258	$0	$0	$0	$2,687	$0	$0	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$3,812	$0	$0	$0	$39,117	$0	$0	$0
Petroleum Use	$0	$0	$2,879	$0	$0	$0	$29,544	$0	$0	$0

Current Year Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	747.4	747.4	186.8	0.0	0.0	0.0	0.0	14.9	607.3	18.7	0.0	971.6	0.0	654.0	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	411.5	411.5	102.9	0.0	0.0	0.0	0.0	8.2	334.4	10.3	0.0	535.0	0.0	360.1	0.0

Current Year Vehicle Operation Air Pollutants - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	673.1	114.8	27.4	0.0	0.0	0.0	0.0	154.5	3,127.0	102.0	0.0	288.2	0.0	5,424.6	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,509.1	255.0	50.8	0.0	0.0	0.0	0.0	117.0	5,752.2	261.9	0.0	319.5	0.0	7,927.2	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.6	19.2	7.4	0.0	0.0	0.0	0.0	23.6	528.1	13.5	0.0	45.2	0.0	1,026.1	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	104.5	18.7	7.1	0.0	0.0	0.0	0.0	22.9	510.6	13.1	0.0	43.8	0.0	994.8	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	110.6	18.7	4.0	0.0	0.0	0.0	0.0	8.2	431.7	31.8	0.0	22.2	0.0	1,260.4	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	4.7	1.2	0.0	0.0	0.0	0.0	0.1	3.8	0.1	0.0	6.1	0.0	4.1	0.0

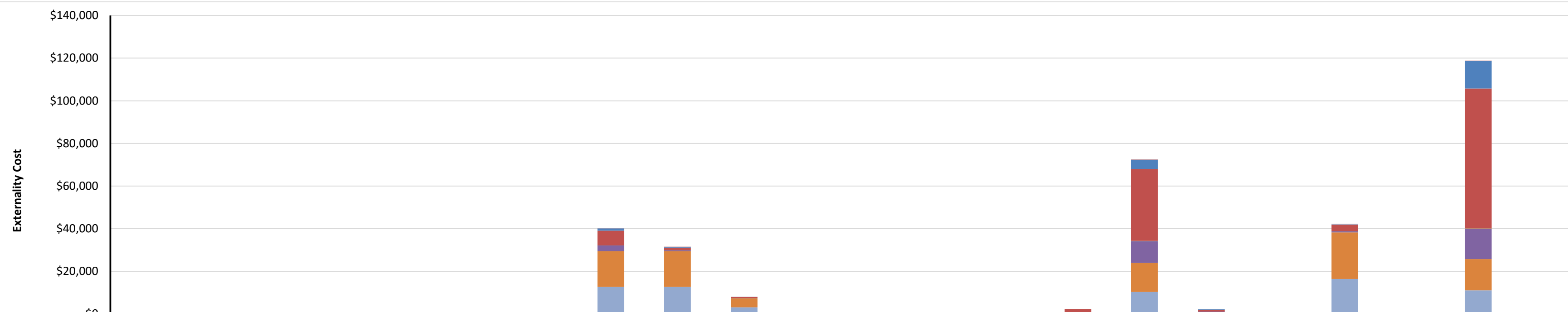
Remaining Lifetime Well-to-Wheels Petroleum Use and GHGs - Off-Road Fleet

	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
Petroleum Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GHGs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Remaining Lifetime Vehicle Operation Air Pollutants - Off-Road Fleet

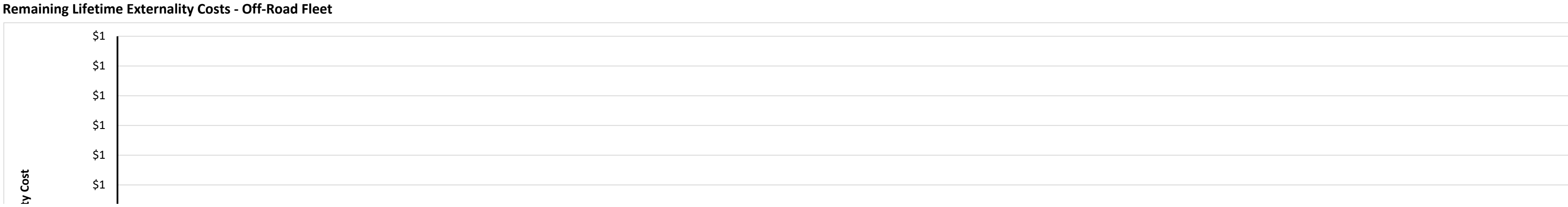
	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
CO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOx	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Current Year Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$264	$264	$66	$0	$0	$0	$0	$5	$215	$7	$0	$344	$0	$231	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$1,130	$191	$41	$0	$0	$0	$0	$84	$4,408	$325	$0	$227	$0	$12,871	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$6,900	$1,234	$472	$0	$0	$0	$0	$1,510	$33,714	$863	$0	$2,895	$0	$65,688	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$19	$3	$2	$0	$0	$0	$0	$4	$110	$3	$0	$9	$0	$196	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$2,690	$454	$91	$0	$0	$0	$0	$208	$10,252	$467	$0	$569	$0	$14,129	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$16,773	$16,773	$4,193	$0	$0	$0	$0	$335	$13,628	$419	$0	$21,805	$0	$14,677	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$12,669	$12,669	$3,167	$0	$0	$0	$0	$253	$10,293	$317	$0	$16,469	$0	$11,085	$0

Remaining Lifetime Externality Costs - Off-Road Fleet



	Aerial Lifts	Agricultural Tractors	Airport Support Equipment	All Terrain Vehicles	Chain Saws	Commercial Turf Equipment	Cranes	Crawler Tractor/Dozers	Excavators	Forklifts	Golf Carts	Lawn & Garden Tractors	Lawn Mowers	Leafblowers/Vacuums	Rollers	Rubber Tire Loaders	Skid Steer Loaders	Snowblowers	Sweepers/Scrubbers	Terminal Tractors	Tractors/Loaders/Backhoes	Trimmers/Edgers/Brush Cutter
SOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
VOC	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM2.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
PM10	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
NOx	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
CO	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
GHGs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Petroleum Use	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

King County GHG Emissions Worksheet Data Tables

Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet (in thousands of square feet)	Emissions Per Unit or Per Thousand Square Feet (MTCO2e): Embodied	Energy	Transportation	Lifespan Emissions (MTCO2e)
Single-Family Home............................	0		98	672	792	**0**
Multi-Family Unit in Large Building	0		33	357	766	**0**
Multi-Family Unit in Small Building	0		54	681	766	**0**
Mobile Home..	0		41	475	709	**0**
Education		0.0	39	646	361	**0**
Food Sales		0.0	39	1,541	282	**0**
Food Service		0.0	39	1,994	561	**0**
Health Care Inpatient		0.0	39	1,938	582	**0**
Health Care Outpatient		0.0	39	737	571	**0**
Lodging		0.0	39	777	117	**0**
Retail (Other Than Mall).......................		0.0	39	577	247	**0**
Office		0.0	39	723	588	**0**
Public Assembly		0.0	39	733	150	**0**
Public Order and Safety		0.0	39	899	374	**0**
Religious Worship		0.0	39	339	129	**0**
Service		0.0	39	599	266	**0**
Warehouse and Storage		0.0	39	352	181	**0**
Other		71.0	39	1,278	257	**111766**
Vacant		0.0	39	162	47	**0**

Section II: Pavement........................

Pavement...		522.00				**26100**

Total Project Emissions: **137866**

Data entry fields

Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet (in thousands of square feet)	Emissions Per Unit or Per Thousand Square Feet (MTCO2e) Embodied	Energy	Transportation	Lifespan Emissions (MTCO2e)
Single-Family Home............................	0		98	672	792	0
Multi-Family Unit in Large Building	0		33	357	766	0
Multi-Family Unit in Small Building	0		54	681	766	0
Mobile Home.......................................	0		41	475	709	0
Education		0.0	39	646	361	0
Food Sales		0.0	39	1,541	282	0
Food Service		0.0	39	1,994	561	0
Health Care Inpatient		0.0	39	1,938	582	0
Health Care Outpatient		0.0	39	737	571	0
Lodging		0.0	39	777	117	0
Retail (Other Than Mall)......................		0.0	39	577	247	0
Office		0.0	39	723	588	0
Public Assembly		0.0	39	733	150	0
Public Order and Safety		0.0	39	899	374	0
Religious Worship		0.0	39	339	129	0
Service		0.0	39	599	266	0
Warehouse and Storage		0.0	39	352	181	0
Other		551.0	39	1,278	257	867371
Vacant		0.0	39	162	47	0

Section II: Pavement........................

Pavement..		921.00				46050

Total Project Emissions: **913421**

Data entry fields

King County Local Services PERMITS

Section I: Buildings

Type (Residential) or Principal Activity (Commercial)	# Units	Square Feet (in thousands of square feet)	Emissions Per Unit or Per Thousand Square Feet (MTCO2e) Embodied	Energy	Transportation	Lifespan Emissions (MTCO2e)
Single-Family Home............................	0		98	672	792	0
Multi-Family Unit in Large Building	0		33	357	766	0
Multi-Family Unit in Small Building	0		54	681	766	0
Mobile Home..	0		41	475	709	0
Education		0.0	39	646	361	0
Food Sales		0.0	39	1,541	282	0
Food Service		0.0	39	1,994	561	0
Health Care Inpatient		0.0	39	1,938	582	0
Health Care Outpatient		0.0	39	737	571	0
Lodging		0.0	39	777	117	0
Retail (Other Than Mall)......................		0.0	39	577	247	0
Office		0.0	39	723	588	0
Public Assembly		0.0	39	733	150	0
Public Order and Safety		0.0	39	899	374	0
Religious Worship		0.0	39	339	129	0
Service		0.0	39	599	266	0
Warehouse and Storage		0.0	39	352	181	0
Other		14.0	39	1,278	257	22038
Vacant		0.0	39	162	47	0

Section II: Pavement.........................

Pavement...		1,089.00				54450

Total Project Emissions: **76488**

Data entry fields

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