2019 CARBON FOOTPRINT SUMMARY REPORT

1.0 ABOUT EA

Headquartered in Hunt Valley, Maryland, EA Engineering, Science, and Technology, Inc., PBC (EA) is a 100 percent (%) employee-owned public benefit corporation (PBC) that provides environmental, compliance, natural resources, and infrastructure engineering, technology, and management solutions to a wide range of public and private sector clients. In calendar year (CY) 2019, EA had an average headcount of 538 employees (540 full-time equivalents [FTE][1]) working through a network of 26 commercial offices across the United States including Alaska, Hawaii, and Guam.

First initiated in 2009, this is EA's eighth tabulation of greenhouse gas (GHG) emissions resulting from the company's operations and activities, and their associated carbon footprint. Carbon footprint reports were published biennially from CY 2008 through CY 2015, with each report summarizing two full CYs. Beginning with CY 2016, the company transitioned to publishing annual reports. This is EA's fourth annual report and represents EA's Carbon Footprint Report for CY 2019.

2.0 INVENTORY MANAGEMENT PLAN

This GHG analysis has been prepared in accordance with the GHG Protocol Corporate Accounting and Reporting Standard[2] (hereafter referred to as "the Standards"), developed and published by the World Resources Institute and the World Business Council for Sustainable Development. This method is the most widely used international accounting tool for governments and businesses to identify, quantify, and manage GHG emissions. The Standards require accounting for the six "Kyoto Protocol" GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFC), and perfluorocarbons (PFC)—emissions of which are reported in terms of carbon dioxide equivalents (CO_2e). Other gases with global warming potential may be included in such analyses, but are not included in EA's analysis because EA, as a professional services firm, does not use/generate them. This report accounts primarily for CO_2 emissions, which represent the vast majority of GHG emissions from most sources, but also includes CH_4 and N_2O (which together with CO_2 are referred to as the "Big Three"). Starting with this 2019 report, EA collected data on HFC emissions resulting from lost refrigerant in building cooling systems, and has included these data in our report.

EA accounts for direct and indirect GHG emissions from its business operations in accordance with defined GHG scopes delineated in the Standards:

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1. Calculations in this report that rely on personnel totals (e.g., solid waste and wastewater) are completed using a normalized FTE total of 540. Normalized FTE is calculated as EA's total Occupational Safety and Health Administration labor hours reported in 2019 divided by 2,080 (the number of hours in a typical full-time year assuming 52 standard 40-hour work weeks): 1,123,596 ÷ 2,080 = 540.

2. World Business Council for Sustainable Development and World Resources Institute. 2004. *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. Revised Edition.* March. Available at: https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf.

- Scope 1: Direct GHG Emissions – direct GHG emissions from operations

- Scope 2: Electricity Indirect GHG Emissions – indirect GHG emissions from purchased energy generated elsewhere

- Scope 3: Other Indirect GHG Emissions – indirect GHG emissions from supply/delivery chain and other activities.

Scope 1 GHG emissions from EA's business operations include emissions from fleet vehicle operations, boat operations, portable power generators, emissions associated with combustion of fuels used for heating offices and other buildings, and emissions of refrigerants from building cooling systems. Emissions from energy use in residential "satellite offices" (i.e., officially designated home offices used by EA employees who do not work from an established commercial office) are not included in Scope 1.

Scope 2 GHG emissions from EA's business operations are limited to emissions from power generating stations supplying electric energy to EA's offices and other buildings. Emissions arising from energy use in residential "satellite offices" are not included in Scope 2.

Scope 3 GHG emissions arise from other elements of EA's business operations, including:

- Employee commutes to and from EA commercial office locations and employee business travel using personal vehicles
- Employee business travel, inclusive of air, rail, rental car, and rideshare travel
- Emissions from recycling, composting, and disposal of solid wastes generated at EA offices and other work locations (e.g., temporary field/project offices)
- Emissions from potable water consumption and wastewater treatment
- Emissions arising from shipment of samples, work products, and other materials to and from EA offices and to client/project sites
- Emissions associated with elements of the supply/delivery chain and other activities. *NOTE: EA's Carbon Footprint calculations do not account for emissions attributed directly to our supply chain partners due to difficulties associated with collecting accurate emissions data from third parties. EA's focus is on using environmentally preferred purchasing decision-making to effect sustainable change where possible (e.g., coordination of more sustainable packaging from vendors, consolidated shipment of orders, contracting from local vendors/sources when possible, etc.).*

Additionally, as an aspect of continual improvement to further align with World Resources Institute and to ensure consistent analysis of data year to year, EA developed a Carbon Footprint Inventory Management Plan[3] that details data collection procedures and quality control measures, and identifies data and factors to be used to estimate GHG emissions associated with

3. EA Engineering, Science, and Technology, Inc., PBC. 2019 (updated annually). *Carbon Footprint Inventory Management Plan.*

EA's business operations. The Inventory Management Plan summarizes EA's operations, details data collected for each GHG scope area, quantifies emissions calculation methods utilized, and outlines data management methods and verification process controls calculations. The Inventory Management Plan is considered an internal "evergreen" document that will be updated annually, or more often as best practices dictate. It is used to ensure annual GHG accounting and reporting are relevant, complete, consistent, transparent, and accurate.

3.0 2019 REPORTING

3.1 Reporting Overview

This report is intended to provide an accurate assessment of EA's operations as a company and the associated carbon footprint. To achieve this objective, this report incorporates verified data for our corporate headquarters location, which represents approximately 31.1% of our leased space, as well as office-specific data from the majority of our other commercial offices. Where office-specific data were not available, data used for emissions determinations were extrapolated using the remaining data set. Prior to 2016, assessments of company-wide emissions were reliant on extrapolating data from EA's leased headquarters space as well as regional energy use intensity and related factors. This and future carbon footprint reports will continue to build on the practice of collecting and incorporating verified data from additional EA commercial offices, when and where data are available.

Under the U.S. Environmental Protection Agency's (EPA's) Mandatory GHG Reporting Rule at 40 Code of Federal Regulations Part 98, most GHG sources are only required to report their emissions to EPA if they exceed 25,000 metric tons of carbon dioxide equivalents ($MTCO_2e$) per year. Since 2011, EA has calculated and reported its GHG emissions (carbon footprint) using a team of volunteers to gather data and build the emissions estimate *from the bottom up*. Total gross emissions (i.e., not factoring in offsets) have consistently been in the range of from 4,000 to 5,000 $MTCO_2e$; hence, EA is considered a minor GHG source. Nevertheless, in keeping with our corporate sustainability reporting commitments, we will continue to disclose our carbon footprint and identify opportunities to reduce impacts.

3.2 Changes in Greenhouse Gas Analysis and Reporting Tool

As noted above, EA has analyzed its carbon footprint for more than a decade, and resultant gross GHG emissions have remained fairly consistent as measured in total and on a *per employee* basis. As a result, EA is transitioning to the use of EPA's Center for Corporate Climate Leadership Simplified GHG Emissions Calculator (SGEC) to calculate its carbon footprint. The SGEC is a spreadsheet-based, menu-driven tool for calculating GHG emissions. The SGEC includes some contributions not previously addressed by EA (e.g., refrigerants and industrial gases), but does not take into account some contributions that were previously included (e.g., water, wastewater, and solid waste) as these are considered typically inconsequential sources of GHG for contributors as small as EA. However, since SGEC is a public, open source application, it is possible to add other calculation modules without affecting the central integrity of the tool. As such, EA added calculation modules for GHG emissions associated with potable water usage, wastewater disposal, and solid waste disposal to continue capturing company emissions in these areas. Despite transitioning to use of the SGEC, with minor exceptions noted

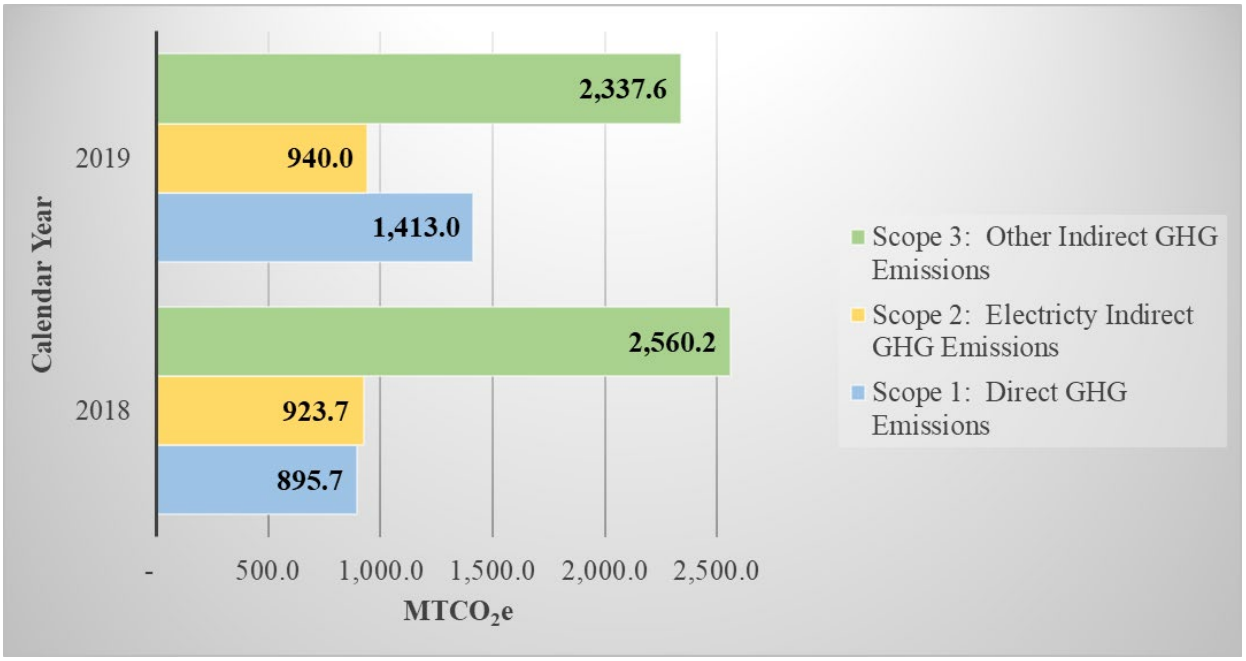
below, data gathering remains largely as it has been in the past. That said, once every 3 years, the company will assess its carbon footprint following both the SGEC tool as well as the detailed procedures previously employed to verify comparability of carbon footprint data in accordance with the Standards.

- CY 2019 is the first reporting year to incorporate inclusion of emissions from the loss of refrigerants (HFCs) from building cooling systems; this added approximately 300 MTCO2e to the total emissions inventory.
- Based on an assessment of program benefits, EA ended the company's contractual participation in the United Parcel Service (UPS) Carbon Neutral Program toward the end of calendar year 2018. EA personnel responsible for shipping using UPS CampusShip accounts remain able to select the option of "carbon neutral shipping" for an additional fee per shipment. In lieu of data previously reported through the UPS program, EA has estimated shipping-related emissions based on readily available shipping data, which includes credits associated with shipments made using the carbon neutral option.
- Following a 2018 recommendation made by EA's *Leased Energy Working Group*, EA committed to offset 100% of the company's Scope 2 emissions through the purchase of Renewable Energy Certificates (RECs). For comparison, EA's prior REC purchases offset approximately 64% of EA's Scope 2 emissions. CY 2019 represents the first year that EA's Scope 2 emissions have been fully offset.

Appendix A provides the full Emissions Summary from the EPA's Center for Corporate Climate Leadership SGEC.

Figure 1 provides a comparison of EA's Scope 1, 2, and 3 emissions (represented as net $MTCO_2e$) for calendar years 2018 and 2019 to illustrate that data analyzed for EA's carbon footprint using the SGEC are generally consistent with previous years' data.

Figure 1. Comparison of Total Emissions by Scope by Calendar Year (2018 and 2019)



3.3 Carbon Offsets

Carbon offsets are reduction credits that can reduce emissions through activities such as recycling, composting, etc. Offsets, as well as purchased credits such as RECs[4], are used to compensate for emissions generated by a corporation. They do not account or take credit for emissions that were wholly prevented as a result of limiting or eliminating a specific emissions-generating activity.

In 2019, EA offset approximately 1,231 $MTCO_2e$ through a combination of operational activities designed to sustainably impact GHG emissions as well as purchased RECs. EA's offsets fall into four categories:

1. ***Single Stream Recycling and Composting***—All EA offices have recycling programs in place, and several (Hunt Valley, Maryland; Alameda, California[5]; and Seattle, Washington) have in-place composting programs. Offsets resulting from recycling and composting are estimated based on volume of solid waste diverted from EA's waste stream based on annual waste disposal information secured for EA's Hunt Valley location, calculations of actual compost weights collected in Hunt Valley, and use of EPA volume-to-weight conversion factors[6] to estimate compost totals from the Seattle and Alameda offices.

2. ***Air Travel Offsets***—EA purchases verified CO_2 offsets annually from TerraPass[7] to effectively reduce the impact of company air travel. All TerraPass carbon offsets, which support United States-based projects, have been verified by independent third parties and standards including the Gold Standard, Verified Carbon Standard, Climate Action Reserve, and American Carbon Registry.

3. ***RECs***—A REC is a tradable asset that represents the environmental attributes of 1 megawatt hour (MWh) of renewable electricity. RECs are sold separately from actual power generated to consumers who want to "green" their existing power sources by contributing to the use of renewable energy sources. As discussed in Section 3.2, EA purchased RECs to offset 100% of EA's Scope 2 emissions. To offset 2019 Scope 2 emissions, EA purchased 2.5 million kilo-watt hours (kWh) of 100% wind technology RECs from Sterling Planet[8]. Sterling Planet RECs are certified by the Green-e® Energy program.

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4. RECs are tradable assets that represents the environmental attributes of 1 MWh of renewable electricity. RECs are sold separately from actual power generated to consumers who want to "green" their existing power sources by contributing to the use of renewable energy sources.

5. EA's California operations moved from Alameda to Sacramento in July 2019. The Sacramento office does not currently have a composting program in place; therefore, composing totals for California are limited to the first half of the year.

6. EPA, Office of Resource Conservation and Recovery. 2016. *Volume-to-Weight Conversion Factors.* April. Available at: https://www.epa.gov/sites/production/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf.

7. https://www.terrapass.com/.

8. https://www.sterlingplanet.com/.

4. ***Carbon Neutral Shipping Offsets***—Offsets resulting from packages sent under the UPS carbon neutral shipping program. While no longer a program partner, EA often selects this option when using UPS' carrier services.

With regard to EA's offsets for Single Stream Recycling and Composting, we note a significant year-over-year decline in offsets. This is the result of reduction in solid waste diversion on the part of the waste management company servicing EA's Hunt Valley headquarters. As noted in prior reports, EA leases its commercial office space and, as a tenant, we are unable to maximize diversion of EA's waste stream to waste-to-energy facilities.

Copies of EA's 2019 offset certificates for purchased offsets (Air Travel and RECs) are provided in ***Appendix B.***

4.0 SUMMARY OF EA'S 2019 CARBON FOOTPRINT

In CY 2019, EA generated an estimated total of 4,691 $MTCO_2e$ of GHG emissions from its operations. Approximately 26% of these emissions were offset, resulting in net GHG emissions from operations of 3,460 $MTCO_2e$ (Appendix A). In 2019, emissions associated with EA employee commutes continued to be the largest single source of GHG, contributing 1,242 $MTCO_2e$ (26.2%). Purchased electricity generated an estimated 940 $MTCO_2e$ (20%) while emissions associated with EA's business travel contributed 1,022 $MTCO_{2e}$ (21.8%). EA's top three sources for emissions—Employee Commutes, Purchased Electricity, and Air Travel—have consistently been the top emissions sources since CY 2016.

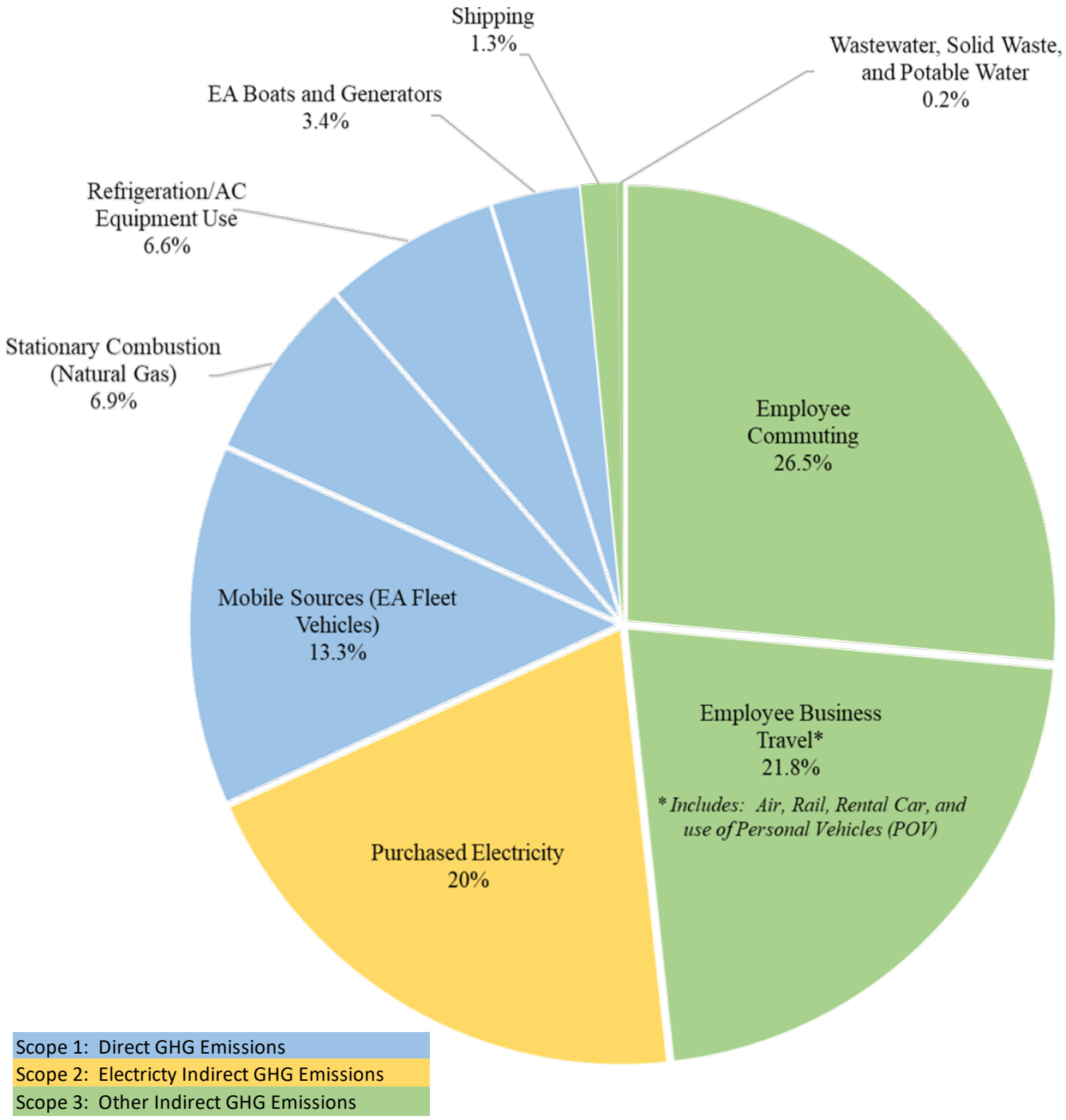
Normalized by total labor hours worked, EA's 2019 net carbon footprint was 6.4 $MTCO_2e$ per FTE—a slight increase from 6.1 $MTCO_2e$ per FTE based on 2018 net emissions. The 5% increase is primarily attributed to the minor differences in data calculations as a result of using the SGEC tool, which includes HFC emissions in the carbon footprint. Table 1 documents EA's carbon footprint trends in $MTCO_2e$ and FTEs for the past 5 years.

Table 1. Carbon Footprint Trends for the Last 5 Years

Calendar Year	2019	2018	2017	2016	2015
Total Gross Emissions*	4,690.6	4,379.6	4,483	4,651.5	4,742.6
Total Carbon Offsets*	(1,230.7)	(1,252.4)	(754.4)	(844.0)	(528.2)
Total Net Emissions*	3,460.0	3,127.2	3,728.6	3,807.5	4,214.4
No. of FTE Employees	540	511	516	507	523
Net Footprint Per FTE *	6.4	6.1	7.2	7.5	8.1
* Measured in $MTCO_2e$.					

Figure 2 and Table 2, on the following pages, summarize the findings of EA's CY 2019 Carbon Footprint Report.

Figure 2. Emission Sources Expressed by Percentage of Total 2019 Carbon Footprint



NOTE: *Fire Suppression and Purchased Gases* account for 0% of EA's net emissions; as a result, this source is not illustrated above.

Table 2. Summary of Emissions and Offsets Contributing to EA's 2019 Carbon Footprint

Emissions Sources	2019 $MTCO_2e$	% of 2019 Total Footprint	2018 $MTCO_2e$
Scope 1: Direct GHG Emissions			
Mobile Sources (EA Fleet Vehicles)	624	13.3	410.5
EA Boats and Generators	158	3.4	188.3
Stationary Combustion (Natural Gas)	322	6.9	296.9
Refrigeration/Air Conditioning Equipment Use	309	6.6	-
Fire Suppression	0	0	-
Purchased Gases	0	0	-
Scope 2: Electricity Indirect GHG Emissions			
Purchased Electricity	940	20	923.7
Scope 3: Other Indirect GHG Emissions			
Employee Commuting	1,242	26.5	1,303.0
Employee Business Travel (Air Travel*)	1,022	21.8	771.3
Employee Business Travel (Rail Travel*)			1.5
Employee Business Travel (Rental Car Travel*)			132.3
Employee Business Travel (Employee Vehicle)			139.8
Solid Waste Disposal	1.7	0.04	11.9
Shipping	62.7	1.3	193.8
Potable Water	3.4	0.07	2.9
Wastewater Treatment	5.8	0.12	3.7
Total Emissions	**4,690.6**	**100**	**4,379.6**
Carbon Offsets**			
Single Stream Recycling and Composting Offsets	(72.9)		(133.3)
Air Travel Offsets (Purchased)	(150.0)		(150)
Renewable Energy Certificates (Purchased)***	(962.4)		(923.7)
Shipping Offsets (Purchased)	(45.4)		(45.4)
Total Reduction	**(1,230.7)**	**(26.2)**	**(1,252.4)**
NET EMISSIONS**	**3,460**		**3,127.2**

* Travel data provided by EA's corporate travel agent, Safe Harbors.

** Offsets result in a decrease in net emissions and are denoted by parentheses. Net emissions represent the sum of EA's Scope 1, 2, and 3 emissions less earned/purchased offsets.

*** 1 REC = 1 MWh = 1,000 kWh. EA utilized approximately 2,445 MWh of purchased electricity in 2019. Based on EPA e-GRID regional factors, the SGEC estimates that 1 MWh = 0.384 $MTCO_2e$ equating to approximately 940 $MTCO_2e$ from Scope 2: Purchased Electricity in 2019. Because EA purchases RECs in advance of calculating our Carbon Footprint for the year, we estimate RECs needed based on the previous year's data with an increase of 5–7% to account for annual growth projections. Based on 2018 electrical energy use (2,351 MWh), EA purchased 2,500 MWhs (2,500,000 kWh) of RECs, providing for a 6.3% growth allowance resulting in carbon offsets for 962.4 $MTCO_2e$.

NOTE: Calculations have been rounded to one significant digit unless two significant digits were required to prevent a "0" total from influencing overall accuracy (e.g., % of 2019 Total Footprint for Solid Waste Disposal, Potable Water, and Wastewater Treatment) or in cases where an official emissions factor used for calculations includes more than one.

Appendix A: Center for Corporate Climate Leadership Simplified Greenhouse Gas Emissions Calculator – Emissions Summary

Back to Intro

EPA CENTER FOR CORPORATE CLIMATE LEADERSHIP
U.S. Environmental Protection Agency

Emissions Summary

Guidance

The total GHG emissions from each source category are provided below. You may also use this summary sheet to fill out the *Annual GHG Inventory Summary and Goal Tracking Form* as this calculator only quantifies one year of emissions at a time.

https://www.epa.gov/climateleadership/center-corporate-climate-leadership-annual-ghg-inventory-summary-and-goal-tracking

By entering the data below into the appropriate cell of the *Annual GHG Inventory Summary and Goal Tracking Form*, you will be able to compare multiple years of data.

If you have multiple Calculator files covering sub-sets of your inventory for a particular reporting period, sum each of the emission categories (e.g. Stationary Combustion) to an organizational total, which then can be entered into the *Annual GHG Inventory Summary and Goal Tracking Form*.

(A) Enter organization information into the orange cells. Other cells on this sheet will be automatically calculated from the data entered in the sheets in this workbook. Blue cells indicate required emission sources if applicable. Green cells indicate scope 3 emission sources and offsets, which organizations may optionally include in their inventory.

(B) The "Go To Sheet" buttons can be used to navigate to the data entry sheets.

Organizational Information:

Organization Name:	EA Engineering, Science, and Technology, Inc., PBC			
Organization Address:	225 Schilling Circle, Suite 400 Hunt Valley MD 21031			
Inventory Reporting Period:	CY2019	Start:	1/1/2019	End: 12/31/2019
Name of Preparer:	EA Carbon Footprint Team			
Phone Number of Preparer:	4105847000			
Date Prepared:	2/24/2020			

Summary of Organization's Emissions:

	Scope 1 Emissions		
Go To Sheet	Stationary Combustion	322	CO_2-e (metric tons)
Go To Sheet	Mobile Sources	624	CO_2-e (metric tons)
Go To Sheet	Refrigeration / AC Equipment Use	309	CO_2-e (metric tons)
Go To Sheet	Fire Suppression	0	CO_2-e (metric tons)
Go To Sheet	Purchased Gases	0	CO_2-e (metric tons)
	EA Boats and Generators	158	CO_2-e (metric tons)
	Location-Based Scope 2 Emissions		
Go To Sheet	Purchased and Consumed Electricity	940	CO_2-e (metric tons)
Go To Sheet	Purchased and Consumed Steam	10	CO_2-e (metric tons)
	Market-Based Scope 2 Emissions		
Go To Sheet	Purchased and Consumed Electricity	0	CO_2-e (metric tons)
Go To Sheet	Purchased and Consumed Steam	10	CO_2-e (metric tons)
	Total organization Emissions		
	Total Scope 1 & Location-Based Scope 2	2,363	CO_2-e (metric tons)
	Total Scope 1 & Market-Based Scope 2	1,265	CO_2-e (metric tons)
	Reductions		
Go To Sheet	Offsets	1,231	CO_2-e (metric tons)
	Net Scope 1 and 2 Location-Based Emissions	1,132	CO_2-e (metric tons)
	Net Scope 1 and 2 Market-Based Emissions	1,265	CO_2-e (metric tons)
	Scope 3 Emissions		
Go To Sheet	Employee Business Travel	1,022	CO_2-e (metric tons)
Go To Sheet	Employee Commuting	1,242	CO_2-e (metric tons)
Go To Sheet	Product Transport	0	CO_2-e (metric tons)
	Shipping	62.7	CO_2-e (metric tons)
	Solid Waste Disposal	1.7	CO_2-e (metric tons)
	Potable Water	3.4	CO_2-e (metric tons)
	Wastewater Treatment	5.8	CO_2-e (metric tons)
	Required Supplemental Information		
Go To Sheet	Biomass CO_2 Emissions from Stationary Sources	0	CO_2-e (metric tons)
Go To Sheet	Biomass CO_2 Emissions from Mobile Sources	0	CO_2-e (metric tons)

TOTAL	4,691	CO_2-e (metric tons)
NET EMISSIONS	3,460	CO_2-e (metric tons)

Appendix B: Offset Certificates

THIS CERTIFICATE OF SUSTAINABILITY IS PROUDLY PRESENTED TO

EA Engineering, Science, and Technology, Inc., PBC

150 mT of Carbon Offsets from the Business Carbon Offset Package

terrapass™
RESTORE THE BALANCE

QHNCXRLS-28606

Certificate Number

December 10, 2019

Date

CERTIFICATE

OF ENVIRONMENTAL STEWARDSHIP

STERLING PLANET

CERTIFIES THAT

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

HAS MATCHED **100%** OF ELECTRICITY USE WITH

2,500,000 KILOWATT-HOURS OF STERLING GREEN™ WIND RENEWABLE ENERGY

TERM OF DELIVERY: 1.1.2019 – 12.31.2019
DATE OF CERTIFICATE ISSUANCE: 4.9.2020
SERIAL NUMBER: 20200407000001

STERLING PLANET CHAIRMAN

THIS PURCHASE OF RENEWABLE ENERGY CERTIFICATES (RECS) AVOIDS ~ 3,896,891 POUNDS OF CARBON DIOXIDE EMISSIONS AND ALSO ADVANCES THE U.S. ECONOMY, ENERGY SECURITY AND ENERGY INDEPENDENCE.

Green-e Energy CERTIFIED

Estimated Environmental Benefits

Green-e Energy Certified Renewable Energy Certificate Purchase

EA Engineering, Science, and Technology

has purchased

2,500,000 kWh

Product: 100% Wind Technology RECs
Term: January 1, 2019 – December 31, 2019

Equivalent to:

3,896,891 pounds of CO_2 avoided[1]

OR

Annual greenhouse gas emissions from:	CO_2 emissions from:	Carbon sequestered by:
4,386,104 Miles/year driven by an average passenger vehicle[2]	198,897 Gallons of gasoline consumed[4]	16,660 Tree seedlings grown for 10 years[6]
OR	OR	OR
601 Tons of waste sent to the landfill[3]	67,150 Incandescent lamps switched to CFLs[5]	2,308 Acres of U.S. forests in one year[7]

Sources
[1] Based on eGrid 2012 GHG Annual non-baseload output emission rates: (#kWh x 1.54936 lbs per kWh) = pounds of CO2 avoided
[2-7] Calculations use the above minimum U.S. emission rate and are based on the EPA greenhouse gas equivalencies calculator found at http://www.epa.gov/cleanenergy/energy-resources/calculator.html
[2] 8.89 x 10^{-3} metric tons CO_2/gallon gasoline x 1/21.4 miles per gallon car/truck average x 1 CO_2, CH_4, and N_2O/0.986 CO_2 = 4.17 x 10^{-4} metric tons CO_2E/mile
[3] 0.76 metric tons of carbon equivalent/ton x 44 kg CO_2/12 kg C = 2.79 metric tons CO_2 equivalent/ton of waste recycled instead of landfilled
[4] 8,887 grams of CO_2/gallon of gasoline = 8.887 x 10^{-3} metric tons CO_2/gallon of gasoline
[5] 47 watts x 3 hours/day x 365 days/year x 1 kWh/1,000 Wh = 37.2 kWh/year/bulb replaced; 37.2 kWh/bulb/year x 1,671 pounds CO_2/MWh delivered electricity x 1 MWh/1,000 kWh x 1 metric ton/2,204.6 lbs = 2.82 x 10^{-2} metric tons CO_2/bulb replaced
[6] 23.2 lbs C/tree x (44 units CO_2 ÷ 2,204.6 lbs) = 0.039 metric ton CO_2 per urban tree planted
[7] -0.29 metric ton C/acre/year* x (44 units CO2 / 12 units C) = -1.06 metric ton CO_2 sequestered annually by one acre of average U.S. forest.

STERLING PLANET