

## Executive Summary

This greenhouse gas (GHG) emissions inventory was completed for Philadelphia International Airport (PHL or Airport) for the year 2019. The inventory provides the Airport with a number of useful applications, including, but not limited to, the following:

- Identifying the principal sources of GHGs associated with the operation of the Airport;
- Assisting PHL staff in quantifying GHG emissions under current conditions;
- Understanding the Airport's GHG emission trends;
- Improving the management of, and further advancing, the emission-reduction strategies and efforts to achieve the Airport's sustainability goals;
- Measuring progress toward minimizing emissions aimed at the Airport's on-going commitment to sustainability and environmental stewardship; and
- Meeting the Level 3 reporting requirements of the Airports Council International (ACI) Airport Carbon Accreditation (ACA) program for future application.

The inventory was prepared following guidance established by the U.S. Environmental Protection Agency (USEPA), and the Intergovernmental Panel on Climate Change (IPCC). The assessment also utilized guidance produced by the Transportation Research Board (TRB) Airport Cooperative Research Program (ACRP). The most up-to-date operational data and other information specific to PHL representing 2019 conditions were used to the fullest extent possible.

The 2019 GHG emissions inventory for PHL is summarized in **Table ES-1**. This table lists emissions by scope, ownership (which indicates the operational boundaries of the Airport, tenants, and the public), and source type. Consistent with the IPCC guidelines, this emissions inventory addresses the primary GHGs associated with airport operations. This includes carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). GHGs such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>), occur at airports from refrigeration and air-conditioning usage, but to a far lesser extent. The results of the emissions inventory are reported in units of metric tons (MT) of CO<sub>2</sub> equivalents (CO<sub>2</sub>e) based on the appropriate Global Warming Potentials (GWPs).

GHG emissions in **Table ES-1** are reported as either Scope 1 (from sources owned and controlled by the Airport), Scope 2 (from the generation of electricity consumed by the Airport and its tenants), or Scope 3 (associated with sources owned and controlled by tenants and public). As shown, aircraft-related sources (i.e., Scope 3) are by far the highest emitting sources, with ground access vehicles (GAV) being the second-highest emitting source.

**Table ES-1. PHL GHG Emissions Inventory for 2019**

Scope	Ownership	Source		MT CO <sub>2</sub> e
1 - Direct	Airport	Mobile	GAV - Employee Vehicles and On-Airport Traffic <sup>1</sup>	23,605
			GAV - DOA-Owned Fleet Vehicles <sup>2</sup>	1,757
			GSE – Snow Removal Equipment <sup>3</sup>	13
			GAV - Contracted Shuttles <sup>4</sup>	4,441
		Stationary	Stationary	19,458
			Refrigerants <sup>5</sup>	5
			De-icing Activities	2,008
			Fire Training Activities	202
<b>Subtotal</b>			<b>51,490 (1%)</b>	
2- Indirect	Airport/Tenant	Purchased Electricity	Electrical Usage – Airport	30,188
			Electrical Usage – Tenant <sup>6</sup>	26,894
		<b>Subtotal</b>		
3 - Indirect and Optional	Tenant/Public	Aircraft	Aircraft <sup>7</sup>	4,163,747
			Auxiliary Power Units	6,947
			GSE – belt loaders, baggage tractors, etc. <sup>8</sup>	13,016
		Mobile	GAV - Tenant employee vehicles, vehicles from parking lots, and off airport traffic <sup>9</sup>	177,819
			GAV - Tenant-Owned Fleet Vehicles <sup>10</sup>	122
			Public Transit – SEPTA <sup>11</sup>	8,501
		<b>Subtotal</b>		
<b>Total</b>			<b>4,478,724 (100%)</b>	

Notes: MT CO<sub>2</sub>e – metric tons of carbon dioxide equivalents. DOA – Division of Aviation. Values may reflect rounding. Ground access vehicles (GAVs) encompass all landside motor vehicles traveling on- and off-airport roadways, within airport parking facilities, and idling along terminal curbsides (e.g., private autos, taxis/limos, shuttles, vans, buses, rental cars, etc.).

Ground support equipment (GSE) are all airside vehicles/equipment used for servicing the aircraft and airport.

<sup>1</sup> Scope 1 GAVs include employee vehicles and on-airport traffic vehicles. Under the Airport Carbon Accreditation (ACA) program, these emissions are instead categorized as Scope 3.

<sup>2</sup> Scope 1 emissions associated with airport-owned fleet vehicles (i.e., DOA fleet vehicles).

<sup>3</sup> Scope 1 GSE includes only airport-owned snow removal equipment.

<sup>4</sup> Scope 1 emissions from contracted shuttles include the airport's First Transit shuttles as well as the COBUS shuttles leased by American Airlines. Under the ACA program, the COBUS shuttles are associated entirely with American Airlines activities and therefore categorized as Scope 3.

<sup>5</sup> Refrigerants may also be considered Scope 3 sources, as these emissions may be associated with sources/activities that are owned and controlled by the Airport as well as by other entities. However, for this inventory they were assumed to be Scope 1.

<sup>6</sup> Emissions associated with tenant-related electrical usage is based on building square footages and omits ground leases. Under the ACA program, any sub-metered tenant electricity usage is categorized as Scope 3.

<sup>7</sup> Scope 3 aircraft emissions include startup, taxi, above the ground to 3,000 feet and cruise mode to destination. Under the ACA program, emissions associated with the cruise mode of aircraft are excluded from Scope 3 emissions.

<sup>8</sup> Scope 3 GSE includes tenant operated equipment such as belt loaders, baggage tractors, etc.

<sup>9</sup> Scope 3 GAVs include tenant employee vehicles, vehicles travelling in parking lots and off-airport traffic vehicles.

<sup>10</sup> Scope 3 emissions associated with tenant-owned fleet vehicles (i.e., non-DOA fleet vehicles).

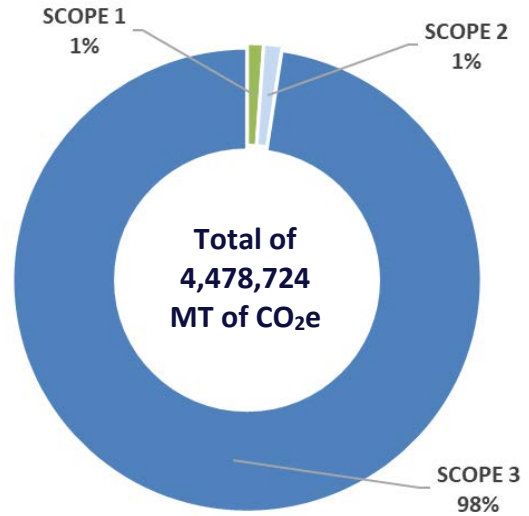
<sup>11</sup> Southeastern Pennsylvania Transportation Authority (SEPTA) public transit includes those commuter rail and bus routes servicing the airport.

Source: KB Environmental Sciences, Inc., August 2020.

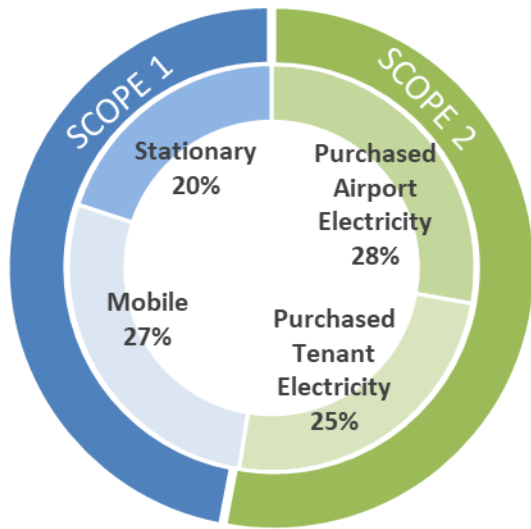
For ease of comparison, the 2019 PHL GHG emission inventory results are presented graphically by scope in **Figure ES-1**. As shown, Scope 3 comprises 98% of the Airport's total GHG emissions; and Scope 1 and 2 emissions account for the remaining 2%.

**Figures ES-2** and **ES-3** further breakdown Scopes 1 and 2, and Scope 3 emissions, respectively, by source. As shown in **Figure ES-2**, Scope 1 emissions comprise of stationary (20%) and mobile (27%) sources with Scope 2 representing emissions from purchased electricity by the Airport (28%) and tenants (25%). Scope 3, presented in **Figure ES-3**, include aircraft (96%) and mobile (4%) sources.

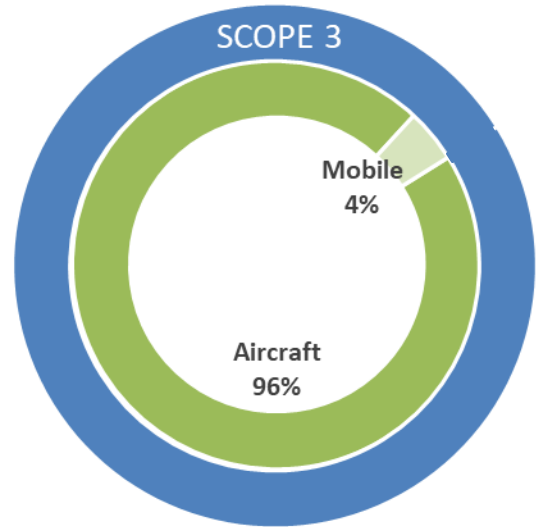
In 2019, PHL reduced its GHG emissions by 5,607 MT CO<sub>2</sub>e as a result of waste management practices, by diverting materials from the landfill through recycling initiatives by the tenants and Airport (the Airport recycled a total of approximately 988 tons of material).<sup>1,2</sup>



**Figure ES-1. PHL GHG Emissions by Scope**



**Figure ES-2. PHL Scopes 1 & 2**

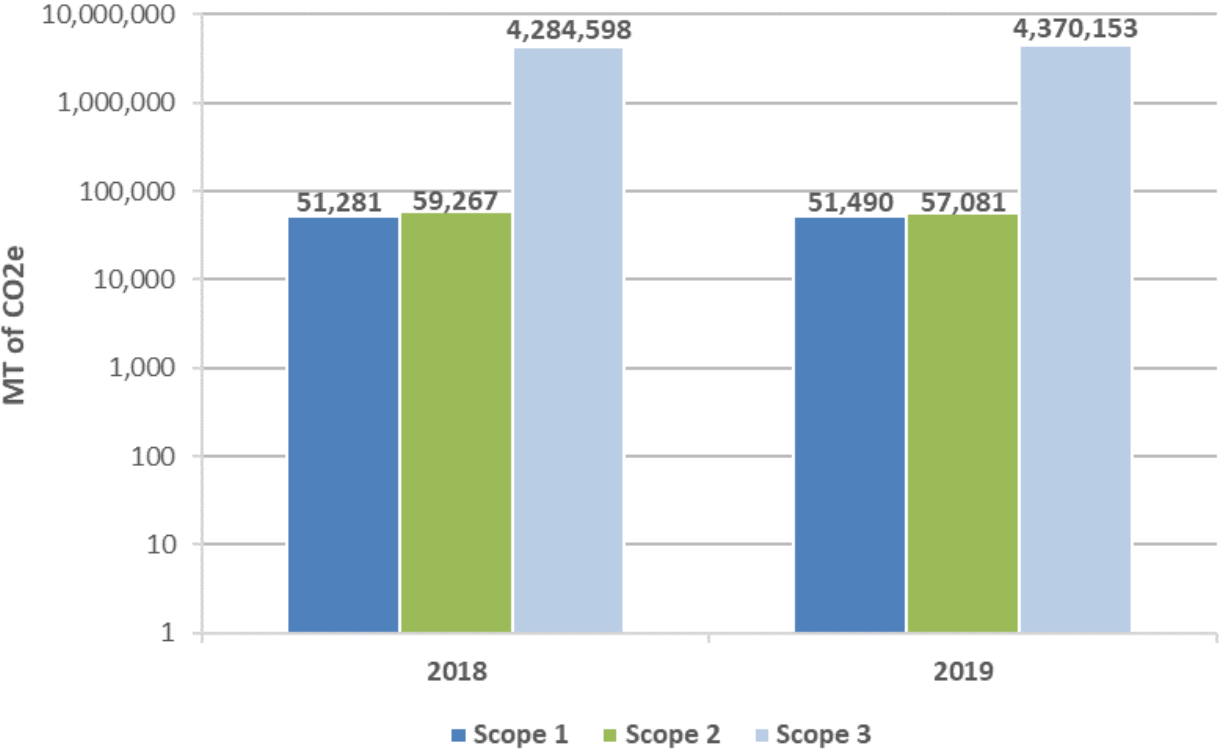


**Figure ES-3. PHL Scope 3**

<sup>1</sup> As compared to a scenario in which all waste is landfilled. See Appendix C for further details on waste management reduction emission calculations.

<sup>2</sup> Emissions estimates based on data available from the City of Philadelphia's Division of Aviation (DOA), American Airlines, and MarketPlace Philadelphia. Recycling quantities are not inclusive of all tenants at PHL.

Furthermore, compared to the Airport’s prior 2018 GHG emissions inventory, the 2019 inventory shows an overall increase in GHG emissions of approximately 2%. This increase is primarily attributable to a 3% increase in aircraft operations and a 4% increase in passenger activity levels. Notably, taken individually, Scope 1 emissions have not changed (less than 1% increase), Scope 2 emissions decreased 4%, and Scope 3 emissions have increased 2% from 2018 (see **Figure ES-4**).



**Figure ES-4. 2018 and 2019 PHL GHG Emissions by Scope**