The Regional Economic Impact of Philadelphia International Airport (PHL) and Northeast Philadelphia Airport (PNE)

Technical Report

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ESI ECONSULT SOLUTIONS INC.

economics | policy | strategy

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About Econsult Solutions, Inc.

This report was produced by Econsult Solutions, Inc. ("ESI"). ESI is a Philadelphia-based economic consulting firm that provides businesses and public policy makers with economic consulting services in urban economics, real estate economics, transportation, public infrastructure, development, public policy and finance, community and neighborhood development, planning, as well as expert witness services for litigation support. Its principals are nationally recognized experts in urban development, real estate, government and public policy, planning, transportation, non-profit management, business strategy and administration, as well as litigation and commercial damages. Staff members have outstanding professional and academic credentials, including active positions at the university level, wide experience at the highest levels of the public policy process and extensive consulting experience.

Introduction and Methodology

Owned and operated by the City of Philadelphia, the Philadelphia Airport System consists of two airports: Philadelphia International Airport (PHL) and Northeast Philadelphia Airport (PNE). Both facilities are managed by the City's Division of Aviation ("DOA"), but are financially self-sustaining, receiving no local tax dollars. Throughout this report, impacts attributed to "the airport" encompass the collective impacts of both facilities. Impacts by facility are presented individually in the summary section at the conclusion of the report.

The Philadelphia Airport System

Philadelphia International Airport (PHL)

PHL is the Philadelphia metropolitan region's major aviation hub, with 25 airlines providing non-stop service to 141 domestic and international destinations (as of summer 2019). In calendar year 2018, PHL served 31.7 million passengers, its highest level in a decade, and moved more than 555,000 tons of cargo.

PHL is situated on approximately 2,584 acres located partly in southwestern Philadelphia and partly in Tinicum Township in Delaware County, Pennsylvania. The majority of passenger terminals are within the city limits, while the majority of the airfield and total acreage are in Delaware County.

Major airport facilities onsite at PHL include:

- Four runways and additional interconnecting taxiways within the airfield;
- Seven terminal units (A-West, A-East, B, C, D, E and F) totaling approximately 3.3 million square feet, including ticketing areas, passenger hold rooms, baggage claim areas, and approximately 180 food, retail, and service establishments;
- Passenger-related facilities outside of the terminals including a connected 400 room hotel, parking, and ground transportation; and
- Commercial facilities including six cargo facilities, aviation support and maintenance facilities (including two American Airlines maintenance hangars), and an office complex located at the western end of the airport.

Northeast Philadelphia Airport PNE)

PNE is situated on approximately 1,126 acres within the City of Philadelphia (about 10 miles northeast of Center City). PNE does not currently feature scheduled commercial service, but serves as a reliever airport for PHL and provides for general aviation, air taxi, corporate, and occasional military use. This activity totaled nearly 59,000 plane movements in 2018.

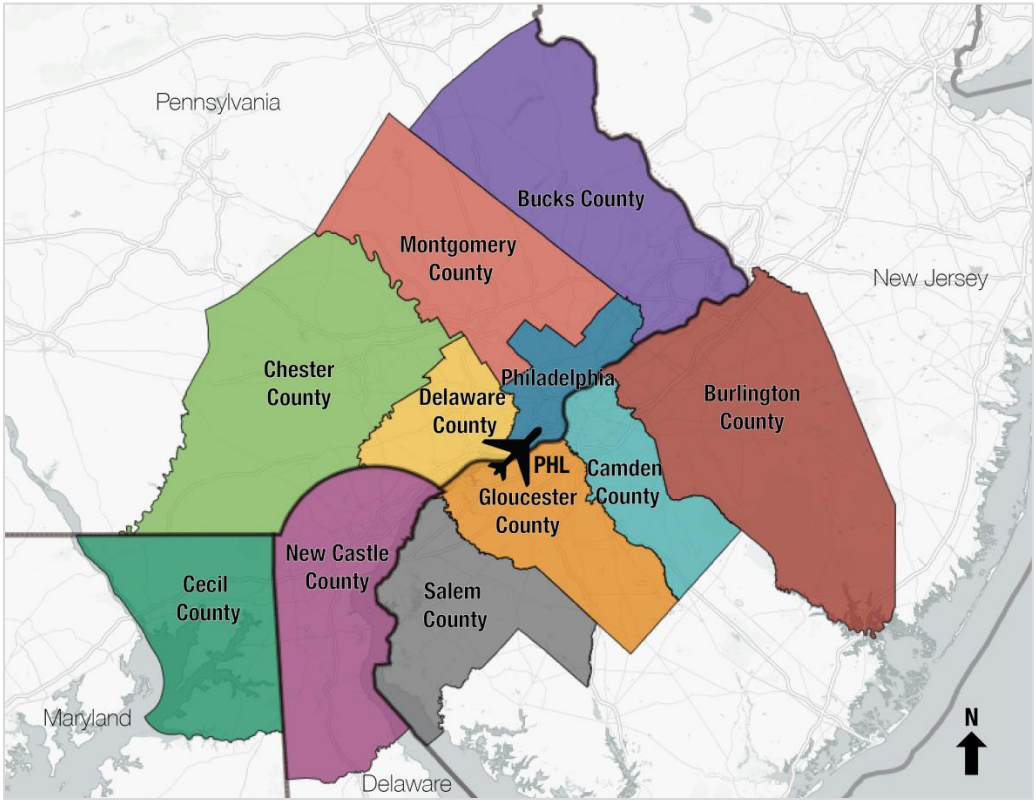
PNE's facilities include:

- Two runways of approximately 7,000 and 5,000 feet, respectively;
- 85 T-hangars, nine corporate hangars, and six open hangars, supporting approximately 175 general aviation aircraft based at PNE; and
- Commercial space supporting a range of tenant uses on the property, most notably the manufacturing and sale AgustaWestland Helicopters by Leonardo.

Study Area

PHL is the only major airport serving the Philadelphia region and its population of more than 6 million residents. The study area is defined as the Philadelphia Metropolitan Statistical Area (MSA), a collection of 11 counties across four states (see Figure I.1). As noted in Section 3 of this report, PHL is the closest major airport for an even broader catchment area (extending west into Pennsylvania and east to the New Jersey shore) with a population of 8.3 million.

Figure I.1 – Study Area (Philadelphia MSA)



Source: Econsult Solutions

In addition to its accessible location at the center of the broader region, PHL is located about seven miles from Center City Philadelphia, which can be accessed in about 15 minutes from the airport.

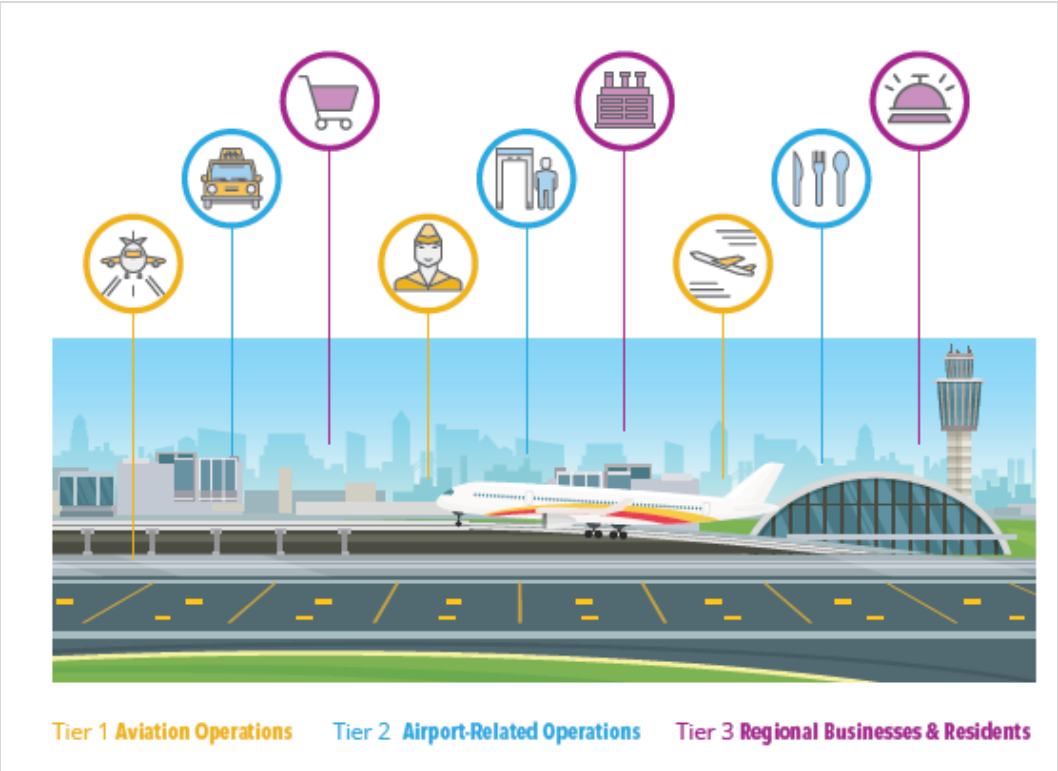
Impacts on the Regional Economy

Airports play a vital role in the competitive positioning of regions within the modern economy. Transportation networks are essential to the movement of goods and people that allow regions to attract and retain investment and talent, to grow, and to support quality of life for residents.

Economic impacts defined in this study can be thought of as originating from activity at the airport itself and radiating out across the region in three "tiers." This report addresses each tier of activity within a distinct chapter, and then summarizes regional impact results in the final chapter.

1) **Tier 1: Aviation Operations** quantifies the economic impact from the operational spending of the Aviation Division, the capital investments initiated by the Aviation Division, airlines and other tenants, and the operations of PHL's airlines. These impacts are based on activity taking place directly within the airport facilities and relating directly to its primary aviation function.
2) **Tier 2: Impact from Airport-Related Operations** quantifies the economic impact from private operators on and around the airport. This category includes government, retail, parking, ground transportation, hospitality, general aviation, cargo, freight and mail, office and commercial, and aviation manufacturing activity. These impacts are based on activity taking place on or near the airport facilities and relying on proximity to the airport and the customer base or logistics services it provides to support a business platform.
3) **Tier 3: Impact on Regional Business and Residents** quantifies the broad regional implications of the airport's services, including visitor spending attracted to the area, travel arrangement activity related to airport services, and accessibility value for residents from airport flight activity. These impacts are regional in nature and help to illustrate the collective benefit of airport activity.

Figure I.2 – Economic Impact Tiers



Economic Impact Methodology

Econsult Solutions, Inc. (ESI) previously undertook a comprehensive study of PHL's annual regional economic impact. Released in March 2017, that analysis was based largely on data from 2015 and 2016. This study updates all impact categories to a new annualized impact level based on more recent data and changes in activity levels at PHL in the intervening years. Notably, the parallel nature of the methodologies between studies allows for a comparison of impact over time, which is included in the summary section of this analysis.

This technical report provides full documentation on the updated calculation of all impact categories. It does not restate in full all additional benefits associated with the airport described in the comprehensive report. This technical report is accompanied by a stylized executive summary, which presents key findings documented herein in a more concise and visual format.

Input-Output Modeling

Economic impact estimates for each category are derived by estimating the amount of direct activity attributable to PHL by geography and then using input-output modeling to translate this direct economic activity into the total amount of economic activity that it supports (inclusive of "spillover" impacts).

Direct activity attributable to PHL is estimated for a wide variety of categories within this analysis,

reflecting the variety of ways in which the airport contributes to the regional economy. Accordingly, a range of data sources and approaches are utilized and documented throughout this analysis. Estimates rely on the most recent year of representative data available for each analysis and are expressed on an annualized basis. Care is also given to ensure that impacts are discrete and non-overlapping between categories, to ensure that results can be summed into an aggregate annual economic impact result.

Direct activity estimates are then translated into total economic output estimates using industry-standard input-output modeling techniques. In an interconnected economy, every dollar spent generates two spillover impacts:

- First, a portion of that expenditure which goes to the purchase of goods and services gets circulated back into the economy when those goods and services are purchased from local vendors. This represents what is called the "**indirect effect**," and reflects the fact that local purchases of goods and services support local vendors, who in turn require additional purchasing with their own set of vendors.
- Second, a portion of that expenditure which goes to labor income gets circulated back into an economy when those employees spend some of their earnings on various goods and services. This represents what is called the **"induced effect**," and reflects the fact that some of those goods and services will in turn be purchased from local vendors, further stimulating a local economy.

The role of input-output models is to determine the linkages across industries in order to estimate the magnitude and composition of these spillover impacts to all industries associated with a dollar spent in any one industry and geography. ESI has developed a customized economic impact model using the IMPLAN modeling framework, which accounts for the flow of commodities through economies.

The total economic impact is calculated as the sum of direct, indirect, and induced impacts within the Philadelphia MSA. Estimates are then "shared down" to each of the component counties based on the share of direct activity occurring in each county, as well as economic data describing the relative activity levels among the counties in the impacted industry. County level results can also be aggregated to impact results within each state (though these results exclude any additional spillover activity to portions of each state located outside of the Philadelphia MSA).

Employment and Earnings

The direct and spillover economic activity associated with the airport supports a significant level of employment and associated earnings. Job estimates generated by IMPLAN and used in this analysis are based on "job-years," or the level of employment supported over a 12-month period. A seasonal job (lasting less than a year) will be expressed as a fraction of a job-year. However, this measure includes both full-time and part-time jobs across a time period (distinguishing it from full-time equivalent jobs).

Income supported by direct, indirect, and induced jobs is calculated as employee compensation. This includes wage and salary, all benefits (e.g., health, retirement) and payroll taxes (e.g. both sides of social security, unemployment taxes). Therefore, earnings estimates calculated by IMPLAN and included in this analysis should be understood as a measure of gross pay as opposed to strictly wages.

Fiscal Impact

This direct and spillover activity also produces increases in various tax bases, which in turn lead to increased tax revenue collection for local and state governments. ESI relies on a custom fiscal model to determine the relationship between various types of economic activity and known tax revenue collections (i.e. effective rates) for different jurisdictions. Since PHL is operated by a government entity, care is given to ensure that tax-exempt economic activity is excluded from this analysis.

This approach is used to model the effect of incremental activity attributable to the airport on tax collections for the City of Philadelphia, Commonwealth of Pennsylvania, State of New Jersey, State of Delaware and State of Maryland (based only on economic activity occurring within the composite counties of the 11-county region within those states). While the economy of Philadelphia is wholly contained with the Pennsylvania economy, the City and Commonwealth are separate political entities with distinct bases, meaning that fiscal impacts are additive and non-overlapping.

Notably, economic activity attributable to the airport also grows the tax base for smaller jurisdictions, including suburban municipalities, school districts, and county-level governments throughout the region. Much of this increase is in the form of enhanced property values from the economic activity generated, which are not directly estimated in this analysis. These additional amounts are not captured within this report.

1. Tier 1: Impact from Aviation Operations

The operations of the airport and of its airline tenants are economic generators through the onsite employment and procurement footprint that they require. In addition, the airport and its partners undertake large-scale capital investments each year that support the local construction industry and related sectors. Aviation operations and capital investments generate an estimated $7.4 billion in annual economic impact in the region. This activity and the operations of the airport facilities also serve as the foundation for the related activity and regional economic benefits described throughout the report.



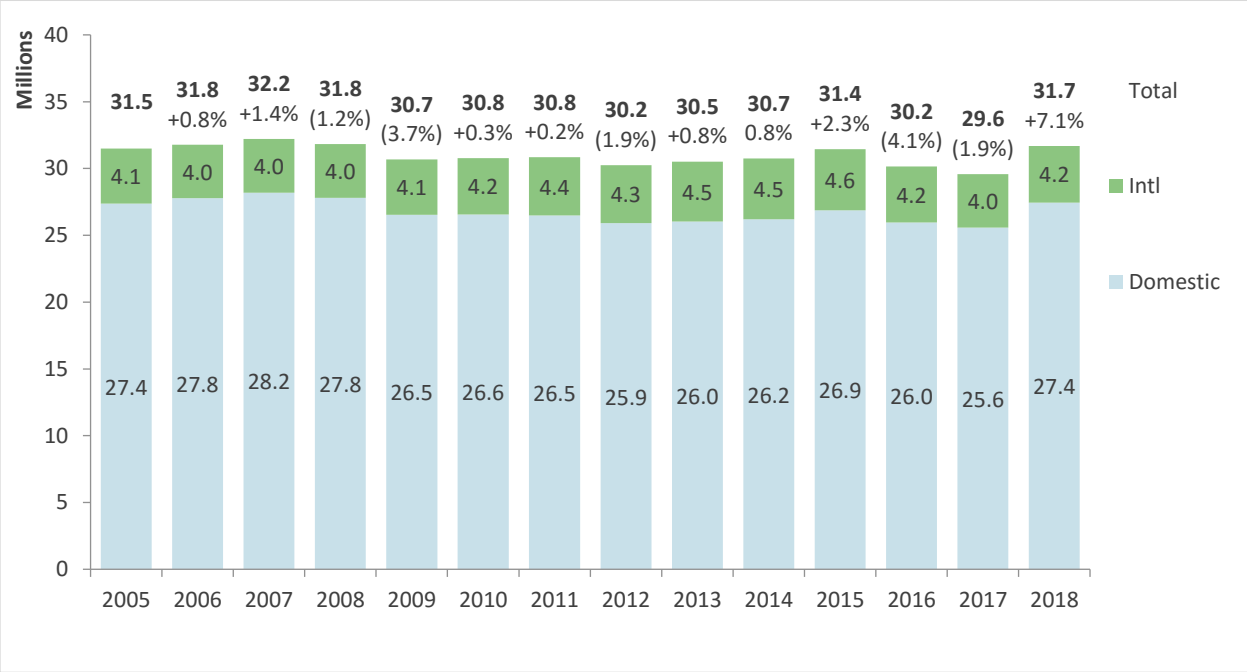
Photo Source: Visit Philadelphia

Passenger Volume

PHL served 31.7 million total inbound and outbound passengers in calendar year 2018, an average of 86,800 passengers per day. This total was comprised of 27.45 million domestic and 4.25 million international passengers. Based on passenger volume from 2017 (the last year for which a national comparison is available), PHL ranks 21st among US airports in passenger activity.

Figure 1.1 below shows annual passenger volume (by domestic and international passengers) at PHL from 2005-2018. Passenger volume has been relatively flat over this period as a whole, but reached its annual peak in 2007 before falling during the recession. PHL also experienced a contraction in passenger volume in 2016 and 2017 as its lead carrier American Airlines reworked its route network, before rebounding strongly in 2018 with growth of 7.1% (with strong growth in both domestic and international volume).

Figure 1.1 – PHL Annual Passenger Volume, 2005-2018 (in Millions)



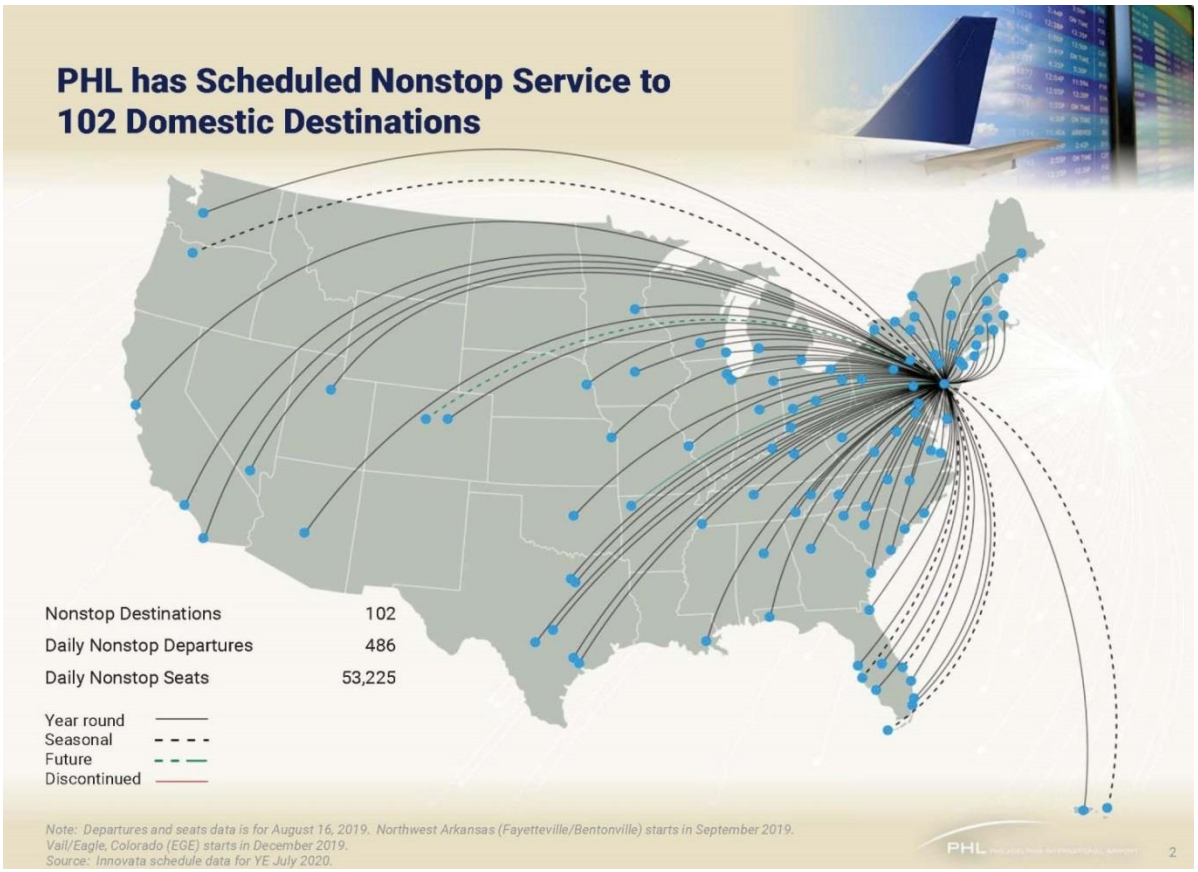
Source: Philadelphia International Airport (2019)

Air Service

PHL is served by 25 different airlines, including all major domestic carriers and six foreign airlines. American Airlines, the world's largest carrier, counts Philadelphia as one its nine primary U.S. hub locations. American and its partners account for about 70% of passenger traffic at PHL and provide a wide range of domestic and international connections. Growth in passenger traffic and connections in recent years has also come from ultra low-cost carriers, which expand options for consumers by opening new routes or increasing competition along existing ones.

Domestic passenger traffic grew 7.3% in calendar year 2018 on the strength of new non-stop flights launched by American, Frontier Airlines, Spirit Airlines and Delta Airlines to 27 destinations. As of fall 2019, PHL maintains scheduled non-stop service to 102 domestic destinations, with nearly 500 daily departures (see Figure 1.2).

Figure 1.2 – PHL Domestic Routes



Source: Philadelphia International Airport (2019)

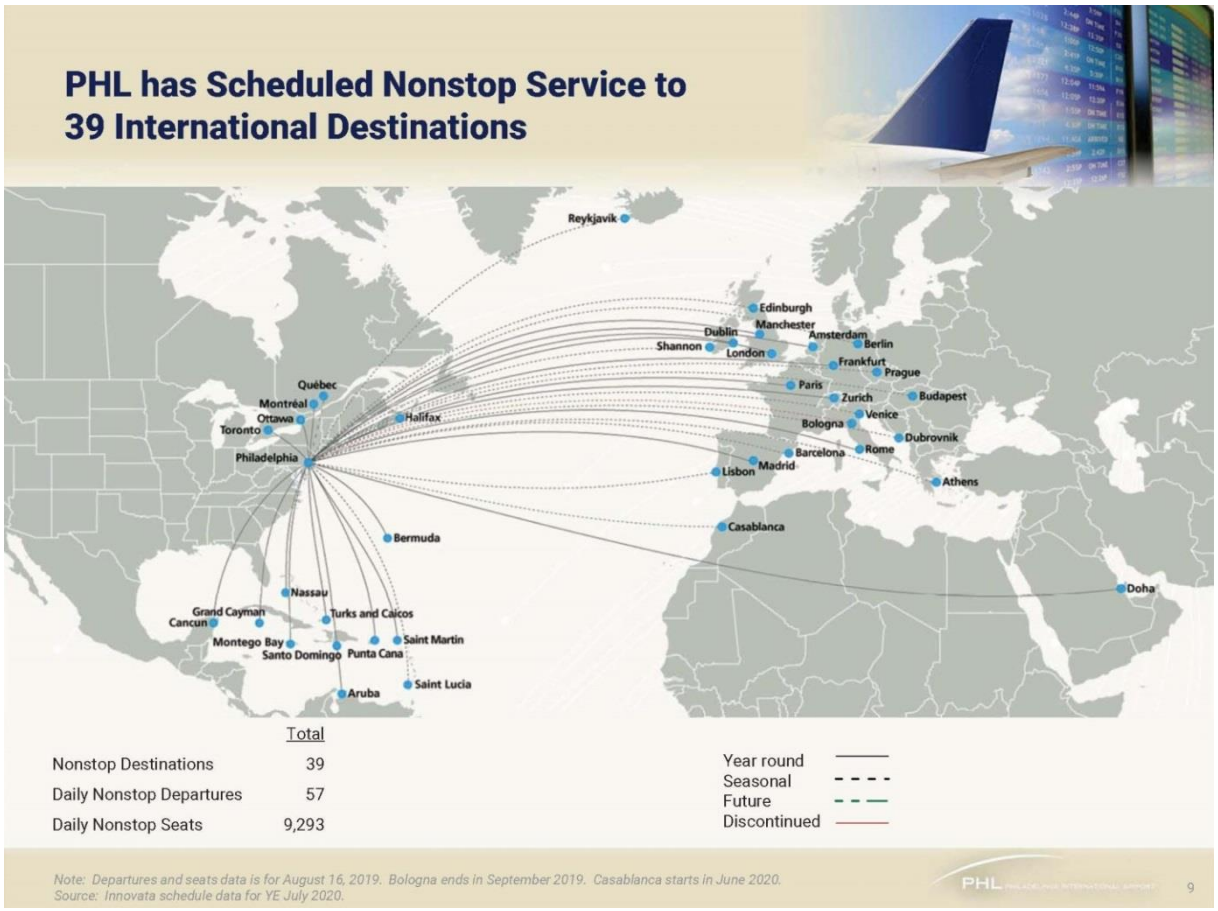
PHL also serves as the primary European and transatlantic gateway for American Airlines, with direct connections to several major European cities. American has recently added or increased service to a variety of European destinations, including Zurich, Budapest, Prague, Dubrovnik, Berlin, and Reykjavik. In addition, Aer Lingus began year-round service to Dublin in 2018. This represents the second foreign

flag carrier added at PHL in as many years, with Icelandair initiating service to Reykjavik in 2017.

In June 2020, American will begin seasonal service to Casablanca, Morocco. This route is both PHL's and American Airlines' first scheduled service to the continent of Africa, opening new one-stop access to the continent for tourists and businesses.

Service expansions helped fuel a 6% increase in international passenger traffic in 2018. As of summer 2019, PHL maintains scheduled non-stop service to 39 international destinations, with 57 daily departures (see Figure 1.3).

Figure 1.3 – PHL International Routes



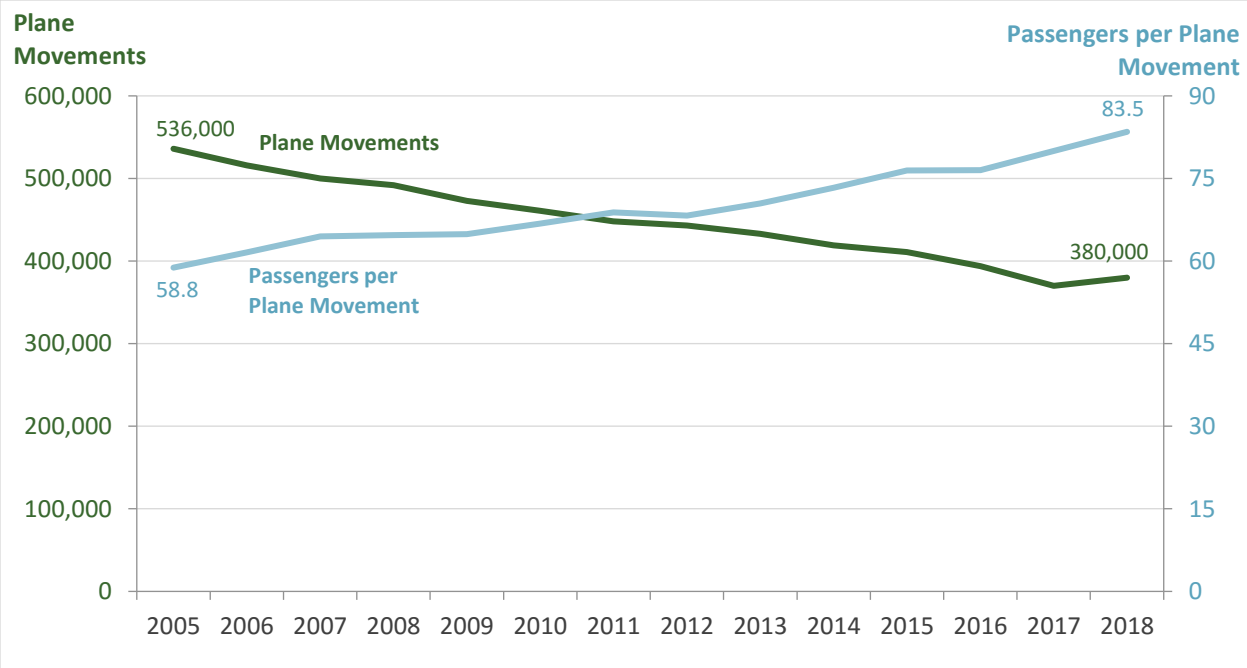
Source: Philadelphia International Airport (2019)

Collectively, PHL offers direct service to 141 domestic and international destinations as of summer 2019. Air service patterns are always in flux, as airlines respond to market forces to optimize their route network. On balance, PHL has seen a significant net service increase in recent years. From 2015 through summer 2019, airlines added 86 new destinations (including both new service to destinations already served by another carrier and new service to destinations not previously connected directly to PHL) and removed service to 47 destinations, for a net increase of 39 destinations.

PHL saw a total of about 380,000 plane movements (takeoffs and landings) in calendar year 2018, an increase of 2.6% from 2017. This represented the first increase in plane movements in more than a decade, as industry-wide trends have seen carriers reducing their number of flights while using larger planes to accommodate more passengers per flight (and achieving higher occupancies). This trend creates operating efficiencies and also reduces the carbon footprint of the airline industry on a per passenger basis.

Figure 1.4 plots the declining trends in plane movements (in green) and the increasing trend in passengers per flight (in blue) at PHL from 2005-2018. In 2005, PHL saw 536,000 plane movements carrying 31.5 million passengers, for an average of 58.8 passengers per plane. By 2018, plane movements declined by nearly 30% to 380,000, but passengers per plane increased by an even greater to proportion to 83.5, resulting in a slightly higher total passenger volume of 31.7 million.

Figure 1.4 – PHL Annual Plane Movements and Passengers per Plane, 2005-2018



Source: Philadelphia International Airport (2019)

Onsite Employment

PHL closely tracks the number of workers employed directly within the airport through security badge data, which includes the employer and residential location of each worker. Badge data as of February 2019 shows onsite employment of nearly 21,000.[1]

Zip code analysis indicates that the home locations of these workers are distributed across the region. 17,700 workers, or 85%, live within the 11-county Philadelphia region, and more than 9,000 (43%) live within the City of Philadelphia (see Figure 1.5).

These employees support a wide range of activities at the airport as discussed throughout this report, including airline activity, facility operation and management, in-terminal concessions, government safety services, cargo activity, and more.

Figure 1.5 – PHL Badged Employees by County of Residence

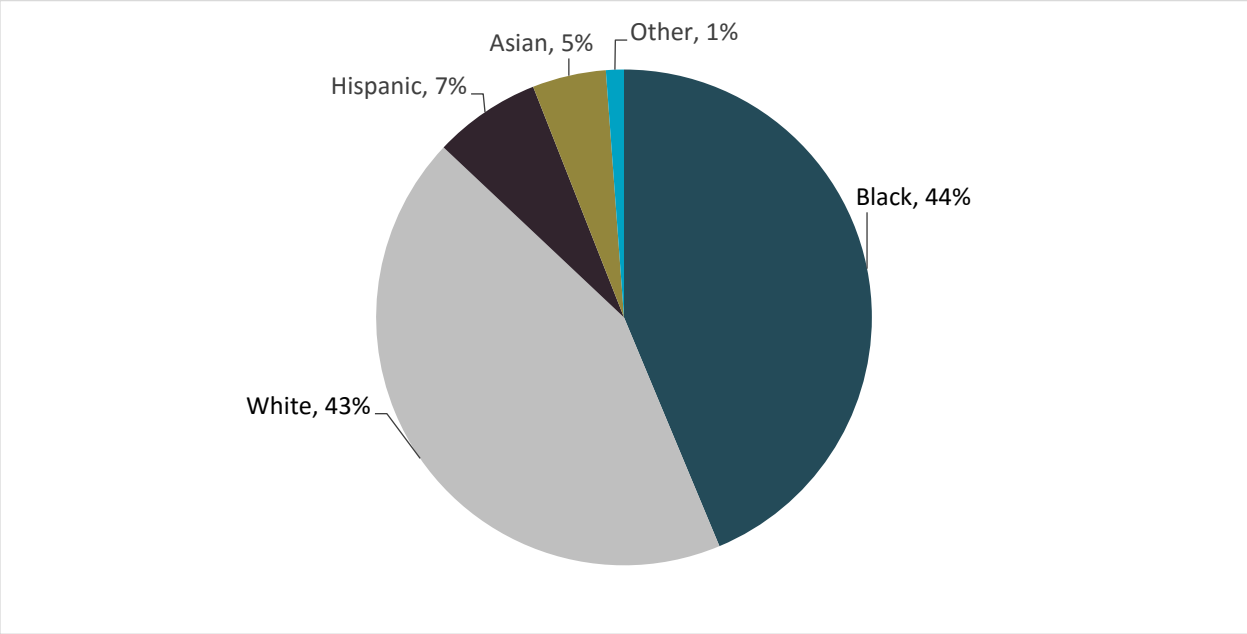
Geography	Badged Employees	Share of Badged Employment (%)
Pennsylvania		
Bucks County, PA	696	3.3%
Chester County, PA	428	2.0%
Delaware County, PA	3,768	18.0%
Montgomery County, PA	809	3.9%
Philadelphia County, PA	9,067	43.3%
New Jersey		
Burlington County, NJ	478	2.3%
Camden County, NJ	900	4.3%
Gloucester County, NJ	521	2.5%
Salem County, NJ	62	0.3%
Delaware		
New Castle County, DE	958	4.6%
Maryland		
Cecil County, MD	46	0.2%
11 County Total	**17,733**	**84.8%**
Other Locations	3,186	15.2%
Total	**20,919**	**100.0%**

Source: Philadelphia International Airport (2019)

[1] This badged employee count represents an increase of about 6% relative to data provided in 2016 in support of ESI's prior economic impact analysis. Importantly, this count represents only direct onsite employees who require security clearance. As described throughout this analysis, a large volume of employment activity attributable to the airport occurs outside of the badged areas of the property, at nearby sites or throughout the region.

The badge data also indicates that the airport supports a diverse workforce, with a majority of workers identifying as non-white. Of the more than 20,000 badged employees, 44% identify as Black, 43% as white, 7% as Hispanic, 5% as Asian, and another 1% as other races and/or ethnicities (see Figure 1.6).

Figure 1.6 – Distribution of PHL Badged Employees by Race/Ethnicity



Source: Philadelphia International Airport (2019)

1.1. Aviation Division Operations

PHL and PNE are owned by the City of Philadelphia and operated by the City's Division of Aviation (DOA). The ongoing operations of the airport require a significant volume of employment and procurement activity by the city each year.

Importantly, airport operations are fully self-sustaining, and receive no revenue from the City's general fund. PHL charges fees and rents to its tenants and other private operators that utilize the facility. These charges generated a total of $379 million in revenue in FY 2018. DOA's revenue from airline rents, landing fees and passenger fees was $247 million in FY 2018, or 65% of the total. This represented an increase of 17% from FY 2017, due to both an increase in flight and passenger activity and an increase in rates. DOA revenue from a range of non-airline sources totaled $132 million, representing the remaining 35% of total revenues (see Figure 1.7).

Figure 1.7 – Aviation Division Operating Revenues, FY 2018

Category	Revenues ($M)
Airline Revenue	***$247 million***
Rents	$122
Landing Fees	$89
Passenger Fees	$36
Non-Airline Revenue	***$132 million***
Parking	$34
Food/Beverage/Retail Rent	$33
Rental Car	$19
Ground Transportation	$8
Other Operating	$39
Total Operating Revenues	**$379 million**

Source: Philadelphia International Airport (2018)

DOA's budgeted operating expenditures for FY 2018 totaled $443 million. Direct expenditures by DOA on personnel, contracted services, materials, supplies, and equipment in support of airport operations totaled $260 million. Interfund transfers to compensate the City of Philadelphia for services such as police, fire, and utilities, and for employee benefits for DOA employees totaled $117 million, while debt service interest payments for historical borrowing for capital projects totaled $68 million.

For the purposes of economic impact modeling, debt service payments are excluded, as they represent a transfer of financial assets rather a new expenditure to the region. Depreciation is also excluded because it represents an accounting cost allocation method rather than an actual transfer of cash.

With these deductions, modeled operating expenditures for FY 2018 total $263 million (see Figure 1.8).

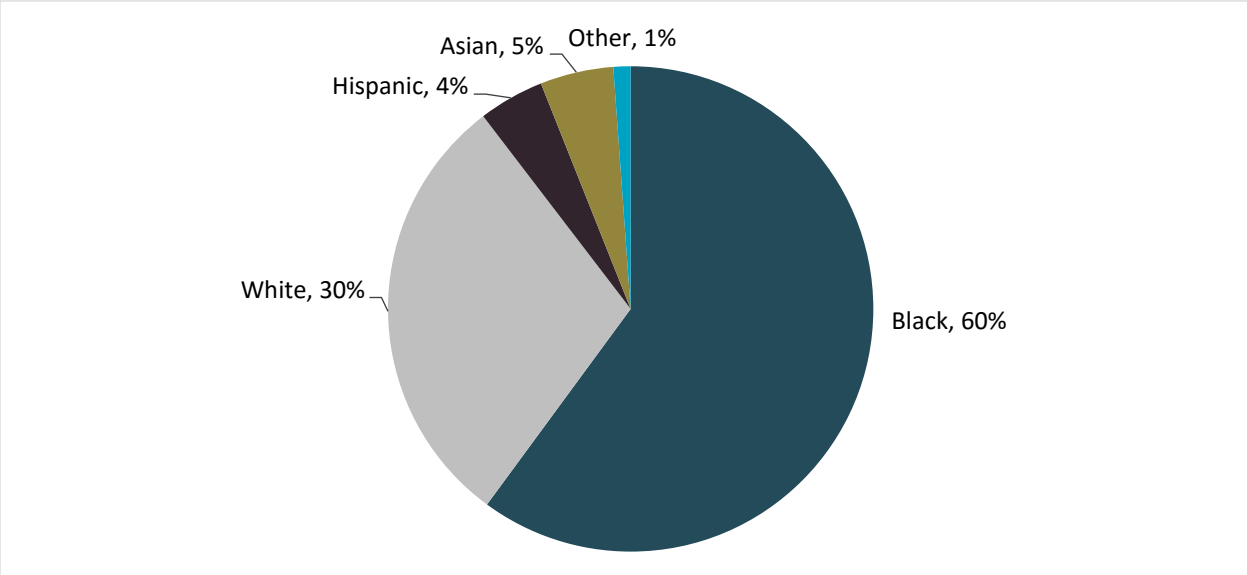
Figure 1.8 – Modeled Aviation Division Operating Expenditures, FY 2018

Category	Expenditures ($M)
Total Expenditures	***$443 million***
DOA Expenditures	$258
Interfund Transfers	$117
Debt Service Interest	$68
(Excluded Expenditures)	***($180 million)***
Debt Service Interest	($68)
Depreciation	($112)
Total Modeled Expenditures	**$263 million**

Source: Philadelphia International Airport (2018), Econsult Solutions (2019)

A significant portion of operating expenditures is allocated to personnel services. The DOA employs nearly 1,000 individuals, who are subject to residency requirements within the City of Philadelphia. The DOA is committed to inclusionary hiring practices, resulting in a diverse workforce. Among the DOA's workforce, 60% of employees identify as Black, 30% as White, 4% as Hispanic, 5% as Asian, and 1% as other races and/or ethnicities (see Figure 1.9).

Figure 1.9 – Distribution of DOA Employees by Race/Ethnicity



Source: Philadelphia International Airport (2019)

DOA operations are also responsible for significant regional procurement activity, and its procurement policies promote diversity in its suppliers, ensuring that spending provides opportunities for disadvantaged business enterprises. Data provided by PHL indicates that over $37 million in current operating contracts, or 22%, are committed to minority- and woman-owned businesses.

1.2. Capital Investments

In addition to ongoing operations, the DOA oversees and executes capital improvements to the airport, facilities, airfield, and environs. This activity is supplemented by third-party investments in airport-related infrastructure. All of this activity generates significant demand for the local construction industry and related sectors.

The airport is currently in the midst of a multi-year, multi-billion dollar Capital Development Plan (CDP) to make critical improvements and develop new infrastructure at both PHL and PNE. This package of projects bring innovations and improvements to the terminal and to the airfield, improving the customer experience, laying the groundwork for future development, and enhancing the airport's role as a regional economic engine. Key projects in progress or recently completed include:

- *Runway Extension*: PHL's primary east-west runway (9R/27L) was extended by 1,500 feet to a total length of around 12,000 feet, making it among the longest on the east coast. The project, which totaled around $200 million with associated investment in infrastructure for taxiing, was funded in part with federal and state grants. This extension enables PHL to move traffic more efficiently on the airfield and to better accommodate larger modern aircrafts.
- *Terminal Modernization Program*: A broad package of improvements and capacity enhancements in PHL's terminals are working to enhance passenger flow and baggage handling and screening, and adding a variety of amenities. This $400 million effort is part of a broader focus on improving the customer experience within PHL, benefitting travelers, regional residents, and the airport's tenants.
- *Terminal F:* PHL completed the renovation and expansion of this terminal, along with a new baggage claim facility within a $161 million dollar effort. The project included a significant expansion to the terminal's central hub, new security screening checkpoint and a new pedestrian corridor. The new baggage claim facility represents the first LEED Gold project at PHL.
- *Rehab and Replacement*: Significant investments are being made to keep the existing capital stock in a state of good repair. These include items like roof repairs and replacements, road resurfacing, systems upgrades, and more. Collectively, these investments total more than $140 million since July 2015, or about 16% of the activity already completed under the CDP (shown in Figure 1.10).
- *Fuel Farm*: The onsite fuel farm owned and operated by a consortium of airline operators is undergoing a $95 million investment to its facility and supporting infrastructure. This investment, which includes a new pipeline connection, new operations facilities, additional tanks, and modifications to the load access, improves the reliability of the airlines fuel supply (adding several days of on-hand capacity) while reducing operating costs. This project represents an example of third-party investments in and around PHL, which supplement DOA expenditures as part of the CDP.

The ongoing CDP is developed through an Airline Agreement and funded by PHL's airline tenants and through other supplemental sources. The current iteration was initially approved in July 2015 in the amount of $1.7 billion and has grown to more than $2.5 billion through the subsequent approval of additional projects. The CDP is funded by airport revenue bonds issued by the City and backed by airport -generated revenue sources (such as passenger facility charges), user fees (such as the customer facility charges funding the car rental facility project), and federal and state government contributions, and is supplemented by third-party investments (such as the fuel farm project).

From July 2015 through calendar year 2018, the airport and its partners have completed or substantially completed nearly $850 million in projects out of the $2.5 billion CDP. Of this expenditure, more than $200 million was dedicated to land acquisition costs to facilitate development. From an economic modeling standpoint, these purchases represent a transfer of economic value rather than the generation of new activity, and are therefore excluded from impact modeling. With this deduction, annualized activity over the 3.5 years of the current CDP totals $183 million. Third-party investments adding to this total vary from year to year, and are estimated at an annualized level of $50 million over this time period.[2]

Inclusive of third-party investments, modeled annual capital activity totals $233 million (see Figure 1.10).

Figure 1.10 – Modeled Annual Capital Investments

Initiator	Description	Annual Spending
	Completed & Substantially Complete Projects	$846 million
	(-) Less Land Costs	($204 million)
PHL	(=) Total Modelable Spend	$642 million
	(÷) Time Period (Years)	3.5 years
	(=) Annual Modelable Spend	$183 million
Third-Party	Annual Capital Spend	$50 million
Combined	**Total Annual Modeled Capital Spending**	**$233 million**

Source: Philadelphia International Airport (2019), Econsult Solutions (2019)

[2] Third-party investments in recent years include the Fuel Farm project undertaken by a consortium of airline operators, improvements to their sorting facility undertaken by UPS, and a series of investments in employee, cargo and maintenance facilities and the customer experience undertaken by American Airlines. In addition to continued investment of this type at PHL, Leonardo recently announced a $65 million investment in a training facility at PNE. Due to the variable nature of these projects and the difficulty in obtaining exact third-party capital expenditure data, the annualized estimate of $50 million in third party capital utilized in ESI's prior comprehensive study of the airport's economic impact is retained in this study as representative of the annual activity level.

Contracting for PHL's capital programs represents a major economic opportunity for local firms in construction, engineering, planning, and related industries. DOA undertakes significant outreach to equitably share these benefits by ensuring opportunities for participation among local enterprises, including minority-owned, women-owned, disabled-owned and disadvantaged business enterprises (M/W/D/DBEs).

Analysis of capital vendor data as of February 2019 indicates that among active contracts on major projects, 43 of 44 (98%) were held by prime contractors located within the Philadelphia region, including 33 (75%) located within Pennsylvania and 11 (25%) located within the City of Philadelphia. Further, 89% of sub-contractors were located within the region, including 72% within Pennsylvania and 33% within the City of Philadelphia.

PHL also tracks minority participation in total contracting dollars and funds paid to date on its active capital projects. Collectively, DBE firms have received more than $30 million to date on active projects, or 17% of funds, approaching PHL's participation goal of 20% with the Office of Economic Opportunity.

1.3. Airline Operations

Privately operated airlines represent the airport's largest tenants, and their air service is the base on which passenger traffic and the demand for related services (transportation, retail, hospitality, etc.) is built. In addition to their contributions to the DOA operating expenditures and capital investments through fees and charges, airlines are themselves large scale employers and generators of economic activity through their ongoing activity.

PHL is served by 25 different airlines, each of which therefore has an operating footprint in Philadelphia. The airport's largest carrier is American Airlines, which carried 22.1 million passengers in calendar year 2018, representing 70% of total passenger traffic. Southwest, Delta, Frontier, and United combined to carry seven million passengers in 2018, with the remaining 20 airlines accounting for 2.4 million passengers (see Figure 1.11).

Figure 1.11 – Passenger Volume for Largest Airlines at PHL, 2018

Operator	Total Passengers 2018 (M)	Share of PHL Total
American Airlines	22.1	70%
Southwest Airlines	2.2	7%
Delta Air Lines	1.9	6%
Frontier Airlines	1.6	5%
United Airlines	1.3	4%
Other	2.4	8%
Total	**31.7 million**	**100%**

Source: Philadelphia International Airport (2019)

The strength of American Airlines' presence at PHL is relevant not only for the air service it provides, but also for the additional economic activity it attracts to the region. American Airlines locates activities including management, maintenance and repair, and ground support in Philadelphia, creating a presence more robust than that required to serve its flight volume alone. Activity has increased at PHL since the 2013 merger between American Airlines and US Airways (which previously used Philadelphia as a hub), with American recently reporting that is has increased its employment footprint at PHL by more than 1,000 to 8,700.[3] As discussed in Section 1.2, American is also a major initiator of capital improvements at the airport.

According to employee badge data provided by PHL, other airlines serving PHL have a collective presence of about 1,000 employees to serve a combined passenger volume of nearly 10 million annually.[4] IMPLAN data on industry averages within the Philadelphia region are used to translate this level of employment into an estimate of annual revenues supported. Modeled annual revenues for airline operations total $3.37 billion (see Figure 1.12).

Figure 1.12 – Modeled Annual Airline Employment and Revenue

Metric	American	Others	Total
Passenger Volume	22.1 million	9.6 million	31.7 million
Direct Employment	8,700	1,000	9,700
Modeled Revenues ($M)			**$3.37 billion**

Source: American Airlines (2018), Philadelphia International Airport (2019), IMPLAN (2015), Econsult Solutions (2019)

[3] Philadelphia Business Journal, "How American Airlines $18B Merger Turned into a win for PHL," December 17, 2018.

[4] This lower employment footprint per passenger relative to American is consistent with the differential in economic activity and investment associated with American's hub activities.

Tier 1 Economic Impacts

Direct expenditures by the DOA and by the airlines generate "spillover" effects across the regional economy, stimulating business activity and supporting employment across a variety of sectors. Spillover effects include indirect impacts from increased supply chain activity and induced effects from the recirculation of labor income as household spending across the regional economy. The total impact in each tier is the sum of these direct, indirect, and induced impacts.

The $3.87 billion in direct activity from aviation operations is estimated to generate an additional $3.52 billion in spillover activity within the Philadelphia region. Inclusive of these spillover effects, **annual impacts from Tier 1 activity total $7.39 billion, supporting 30,700 jobs with $1.94 billion in earnings in the Philadelphia region** (see Figure 1.13).

Figure 1.13 – Annual Economic Impact in the Philadelphia Region from Aviation Operations

Annual Impacts	Aviation Division Operations	Capital Investments	Airline Operations	Total
Direct Output ($M)	$263	$233	$3,371	$3.87 billion
Indirect & Induced Output ($M)	$234	$213	$3,070	$3.52 billion
Total Output ($M)	**$497**	**$447**	**$6,442**	**$7.39 billion**
Annual Employment Supported	2,300	2,700	25,700	30,700 jobs
Employee Compensation ($M)	$122	$156	$1,660	$1.94 billion

Source: IMPLAN (2015), Econsult Solutions, Inc. (2019)

2. Tier 2: Impact from Airport-Related Operations

The passenger traffic associated with the aviation activity in Tier 1 generates demand for a variety of additional services. A range of support industries including government, retail, parking, ground transportation, and hospitality generate a significant economic activity at or around the airport. In addition, the facilities, connections, and air space associated with PHL and PNE create a platform for additional activity in the general aviation, cargo and freight, office, and aviation manufacturing sectors. These related industries represent a significant footprint of employment and purchasing activity, generating an estimated $5.4 billion in annual economic impact in the region.



Photo Source: PHL

2.1. Government

In addition to the City of Philadelphia's Division of Aviation (whose operations are modeled in Section 1.2), a number of additional federal and local government agencies have operations at PHL. The primary function of these agencies is to ensure the safety and security of the facility and its passengers through essential functions like screening passengers, directing air traffic, addressing border-related issues for international passengers, and providing a police presence and fire safety.[5]

These activities require a significant footprint of government employees based in Philadelphia, as well as local purchasing needs. These expenditures support economic activity within the region. Importantly, this federal government activity is nationally-funded and could easily be transferred elsewhere if it were not required by the activity level at PHL.

Security badge data (as of February 2019) provided by PHL defines the number of employees associated with each agency that work within the airport. Government employees number 2,062, with the majority (1,771) coming from federal agencies. Publicly available budget documents define the overall expenditures for each of these agencies, which total $113 billion, as well as their total employment. A ratio analysis is undertaken using the share of nationwide employment for each relevant agency to estimate the share and level of federal expenditures at PHL, and a parallel analysis is performed based on municipal budget documents and employment ratios.

This approach yields allocated annual expenditures of $301 million from federal agencies and $28 million from local government for a total of $329 million (see Figure 2.1).

Figure 2.1 – Modeled Annual Expenditures Associated with Government Activity at PHL

Type	Total Budget ($M)	Total Employment	Philadelphia Employment	Share (%)	PHL Gvt Spending ($M)
Federal	$113,440	861,845	1,771	0.3%	$301
Municipal	$970	10,361	291	2.9%	$28
Total	**$114,410 M**	**872,206**	**2,062**	**0.3%**	**$329 million**

Source: Philadelphia International Airport (2018), City of Philadelphia (2018), Township of Tinicum (2017), Department of Homeland Security (2018), Department of Justice (2018), Federal Aviation Administration (2018), United States Postal Service (2018)

[5] Key federal agencies performing these functions include the Transportation Security Administration (TSA), US Customs and Border Patrol (CBP), US Immigration and Customs Enforcement (ICE), Federal Aviation Administration (FAA), Federal Bureau of Investigation (FBI), Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), and the Drug Enforcement Agency (DEA). This activity is supplemented by local government services from the City of Philadelphia and Tinicum Township.

2.2. Onsite Retail

The seven terminal facilities at PHL feature nearly 180 concession locations providing passengers with a variety of retail options. Recent upgrades like the full scale revamp of Terminal B have increased the quality of retail offerings, and with it the amount of economic activity captured.

Passenger terminals are split between Delaware County (Terminals A-West and A-East) and Philadelphia County (Terminals B through F). PHL acts as landlord for retail space within these terminals, and collects detailed data on the tenant type and level of sales at each location. Concession sales for calendar year 2018 totaled $223 million (of which $165 million took place in Philadelphia County and $58 million took place in Delaware County), with food and beverage representing the largest expenditure category at $140 million.

For the purposes of economic impact modeling, a "retail margin" adjustment is made to purchases in certain categories to reflect that only a portion of the sale price is retained locally to support retail operations.[6] With this deduction, modeled activity from onsite sales totals $178 million annually in the region, comprised of $131 million in Philadelphia County and $47 million in Delaware County (see Figure 2.2).

Figure 2.2 – Modeled Annual Onsite Sales at PHL by Location

Sales Type	City of Philadelphia ($M)	Delaware County (Tinicum Twp) ($M)	Total ($M)
Food and Beverage	$117	$23	$140
Various Retail	$46	$10	$56
Services and Currency Exchange	$2	$20	$22
Duty Free Retail	$0	$5	$5
Total	**$165**	**$58**	**$223**
(Less Retail Margin)	($34)	($11)	($45)
Modeled Amount	**$131 M**	**$47 M**	**$178 million**

Source: Philadelphia International Airport (2018), IMPLAN (2015), Econsult Solutions (2019)

[6] Items sold at a store are typically purchased from a wholesaler, who derives some of the economic value through the production process, while the economic value added by retailers is only the "margin" by which the sales price exceeds their purchase price from their supplier. When the goods are not sourced locally, only this margin recirculates within the local economy, and the cost of the good is therefore removed from the model.

2.3. Parking

PHL features both onsite public parking spots operated by the Philadelphia Parking Authority (PPA) and nearby parking through private operators.

Onsite PPA parking facilities provide 18,940 spaces, through a garage with nearly 11,000 spaces, a surface lot with more than 7,000 spaces, and short-term parking of more than 800 spaces. PPA budget information from Fiscal Year 2018 indicates that these spots generated nearly $71 million in annual revenue, or $3,740 per space.

In addition, there are several privately operated parking facilities in close proximity to PHL that cater to long-term parking needs and offer shuttle service to the airport. Spatial analysis of these lots was used to assess the aggregate number of parking spaces, which was estimated at around 8,700. Applying the revenue per space data drawn from the onsite parking financials yields an estimate of around $32 million in additional revenue associated with these spaces, for a total of $103 million.

PPA uses a portion of revenues from onsite parking for operational needs at the airport, a portion for debt service on past capital investments at the airport facility, and transfers the remaining proceeds (around $32 million in FY 2018) to PHL. For the purposes of economic impact modeling, this transfer to PHL is deducted, since these funds support PHL's operational expenditures and are thus already accounted for in impacts modeled in Section 1.2. Further, the debt service payments are deducted, since they represent a transfer to a financial institution rather than new expenditures in the region. Following these deductions, modeled activity from parking totals $53 million annually (see Figure 2.3).

Figure 2.3 – Estimated Annual Parking Revenue Onsite and Around PHL

Measure	PPA	Est. Third-Party Parking	Total
Spaces	18,940	8,700	27,640
Revenue per Space ($)	$3,740		
Annual Revenue ($M)	$71	$32	$103
(Less PPA Transfer to DOA) ($M)	($32)		($32)
(Less PPA Debt Service) ($M)	($18)		($18)
Modeled Amount	**$21 M**	**$32 M**	**$53 million**

Source: Philadelphia International Airport (2018), Philadelphia Parking Authority (2018), Econsult Solutions (2019)

2.4. Ground Transportation

PHL's passengers and workforce require transportation to get to and from the airport, generating an additional layer of economic activity through a range of transportation providers. PHL is about a 15 minute drive from downtown Philadelphia, and is centrally located in the region's highway network via its direct access to I-95.

Travelers have a variety of mode choices to get to and from PHL, including rental cars, ridesharing providers, limo and taxi providers, and public transit. PHL collects detailed information on the activities of transportation providers (in part through various fees that providers pay to access the facility) that can be used to estimate the annual volume of activity by provider type.

Twelve rental car companies located on and around the airport reported a total of $198 million in revenue in calendar year 2018, the bulk of which ($185 million) was generated by the seven onsite providers. Pick up and drop off fees paid by Transportation Network Companies (TNC) like Uber and Lyft show more than 2.6 million total trips in 2018, an increase of 39% over 2017 and more than twice the number from 2016. Utilizing average fares from an analysis of business travel expense data by Certify,[7] revenues from these rides are estimated at $68 million annually. Taxi and limousine revenues are similarly derived by estimating the volume of trips from per trip fees collected by PHL, and applying estimated average fares. Combined, these modes accounted for an estimated 938,000 trips in calendar year 2018 and $42 million in revenue. Finally, SEPTA's airport line offers rail service directly to downtown Philadelphia running twice an hour at peak. Route statistics published by SEPTA for 2017 indicate ridership of more than 2.3 million, with total fare revenue of more than $4 million.[8]

Combining these categories, annual ground transportation revenues associated with PHL total $312 million (see Figure 2.4).

Figure 2.4 – Estimated Annual Ground Transportation Ridership and Revenue at PHL

Transit Type	Est. Rides	Est. Average Fare	Revenues ($M)
Rental Cars			$198
TNC (Ridesharing)	2,623,000	$26	$68
Limousine	344,000	$65	$22
Taxi Cab	594,000	$33	$20
SEPTA	2,323,000	$2	$4
Total	**5.88 million**		**$312 million**

Source: Philadelphia International Airport (2018), SEPTA (2017), Econsult Solutions (2019)

[7] Certify, "Q4 2018 Report: Ground Transportation: North American Business Travel & Expense." Notably, average fares for Uber and Lyft are estimated at around $26, compared to $31 for taxi providers, which track closely with typical fares from PHL to downtown Philadelphia.

[8] SEPTA, "Route Statistics 2017." Notably, the average fare per passenger (derived from dividing the total revenues by the passenger count) differs from the base ticket fare because many passengers may have monthly subscriptions, senior discounts, or other such payment options.

2.5. Hospitality

The airport area also features a significant stock of hotel rooms, including the 419-room Airport Marriott, which is a tenant of the airport and connects directly to the terminals. These hotels primarily serve airport passengers and airport-related demand as their core business.

Hotel analytics firm Smith Travel Research identifies about 5,100 nightly hotel rooms within the Philadelphia "Airport Stadium Market" as of year-end 2018. About two-thirds of this supply is located within Philadelphia County, with the remaining third in Delaware County. Reported occupancy for these hotels was a healthy 75% for 2018, resulting in more than 1.4 million occupied hotel rooms across this market for calendar year 2018.

Average daily rates for an occupied room within this market were $121 for calendar year 2018. In addition to room sales, hotels derive a portion of their revenue (and associated operational spending) from ancillary services like food and beverage, event space, etc. These ancillary services represent a relatively small proportion of total revenues for most airport hotels, which are "limited service," with a focus on convenience for airport travelers rather than amenities, although the Airport Marriot is full-service hotel with amenities like a restaurant, in-room delivery, and 15,000 square feet of meeting space. Using an estimate of 85% of revenue from room sales and 15% from non-room spending, total revenues per occupied room are estimated at around $142.

Combing the estimates of occupied rooms and spending per occupant yields an estimate of $199 million in annual revenues associated with nearby hotels, comprised of $137 million in Philadelphia County and $62 million in Delaware County (see Figure 2.5).

Figure 2.5 – Estimated Annual Revenues for Nearby Hotels

2018 Hotel Measures	Philadelphia County	Delaware County	Total
Daily Room Supply	3,500	1,600	5,100
Annual Room Supply	1,277,500	584,000	1,161,500
Room Occupancy			75.3%
Annual Occupied Rooms	962,000	439,700	1,401,710
Average Daily Room Rate ($)			$120.80
Est. Avg non-Room Spending ($)			$21.30
Average Spending per Occ Room ($)			$142.10
Total Revenue	**$137 M**	**$62 M**	**$199 million**

Source: Smith Travel Research (2019), Econsult Solutions (2019)

2.6. General Aviation

General Aviation covers a range of aviation activity outside of scheduled commercial air service, including chartered flights, corporate aircraft, and recreational flying. While small in volume compared to commercial travel, general aviation services are used for corporate, cultural, and political activities that contribute to the character and economic vibrancy of the region.

PNE, which does not feature regularly scheduled commercial service, had 58,800 general aviation plane movements in calendar year 2018, for an increase of 1.5% over 2017. PHL had an additional 14,500 general aviation plane movements, for a combined total of 73,300. There are approximately 175 general aviation aircraft based at PNE, including a mix of corporate and privately owned aircraft.

Atlantic Aviation is the chief general aviation operator at both PHL and PNE. Its onsite staff handles services and ground transportation connections for chartered and corporate aircraft, from aircraft maintenance to concierge services. In addition, major regional corporations like Comcast and Aramark feature their own corporate aircraft and associated crew.

Data from the Bureau of Labor Statistics indicates that 150 employees work in the "non-scheduled chartered passenger air transportation" sector within the Philadelphia MSA, accounting for $17 million in payroll. Based on industry data on payroll and expenditures as a portion of sales, general aviation activity is estimated to represent $99 million in regional expenditures on an annual basis (see Figure 2.6).

Figure 2.6 – Modeled Expenditures for General Aviation Activity at PHL and PNE

Industry	Establishments	Employees	Payroll ($M)	Payroll Share of Total Sales	Total Sales ($M)
Nonscheduled Chartered Passenger Air Transportation	35	150	$17	17%	**$99 million**

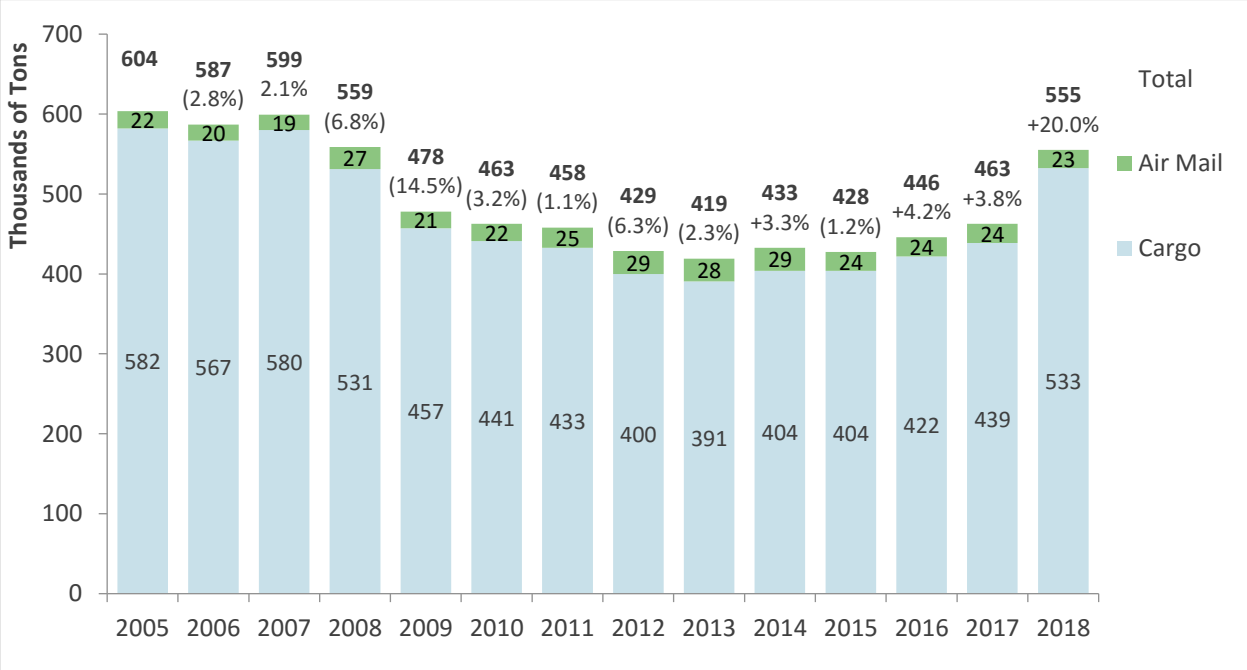
Source: Quarterly Census of Employment and Wages (2018), Bizstats.com (2016), Econsult Solutions (2019)

2.7. Cargo, Freight and Mail

Logistics sectors like cargo, mail, and freight forwarding are major tenants and beneficiaries of the airport and its flight activity. Many private operators use PHL's air access and facilities as the basis for their business activity moving and delivering goods. Importantly, the analysis in this section includes only the economic value from the transportation component of cargo activity. The economic value of the goods themselves is of course much higher, and the import and export patterns necessary to sustain the economy of the Philadelphia region would not be possible without PHL.

The total tonnage of cargo, freight, and mail moved through PHL in calendar year 2018 was 555,000, a substantial increase of 20% from the prior year (see Figure 2.7). Growth was driven primarily by an uptick in activity by UPS, which carries the majority of total cargo, as well as an increase in the use of "belly cargo" by air carriers on their commercial flights.

Figure 2.7 – PHL Annual Cargo Tonnage, 2005-2018 (in 000s)



Source: Philadelphia International Airport (2019)

Recognizing the importance and growth potential of this activity, PHL acquired a 135-acre tract of land west of the Airport in 2018. Planning efforts have begun to incorporate the property into the airfield infrastructure to support further air cargo development. Conceptual facility layout plans have been completed, which include new cargo warehousing and distribution buildings, taxi lanes, and other support areas to optimize the opportunities afforded by this new parcel.

UPS has its East Coast regional hub on a privately owned parcel at the southern end of the airport property, abutting the Delaware River. This hub is a major cog in UPS's overnight delivery system, and a key connection point to UPS's main European hub in Koln, Germany. The UPS air fleet brings packages to

and from destinations up and down the east coast to the 681,000 square foot facility, where they are sorted and routed to their destination.

FedEx is the next largest carrier, moving 94,000 tons of cargo in FY 2018. Badged employment for FedEx totals 590, a ratio of roughly 160 tons per employee.[9] Applying this ratio to the 117,000 tons moved by other carriers (primarily airlines) produces an estimate of about 740 employees associated with other carriers, reaching a total of more than 4,700 employees onsite when accounting for the UPS facility.

The primary carriers beyond UPS and FedEx are the airlines, with American Airlines representing the majority of the remaining tonnage. These revenues are already accounted for within this study in the analysis of airline operations (Section 1.3). Therefore, for the purposes of economic impact modeling, all activity from other carriers is conservatively excluded.[10]

IMPLAN data on industry averages within the Philadelphia region is then used to translate this level of employment into an estimate of the annual revenue supported. Modeled annual revenues in this category total $637 million (see Figure 2.8).

Figure 2.8 – Modeled Local Revenues Cargo Activity

FY 2018	UPS	FedEx	Others	Total
Cargo Volume (tons)	300,000	94,000	117,000	511,000
Tonnage per Employee	88	159	*159*	118
Est. Employment	3,390	590	*740*	4,720
(net Employment Overlap)			(740)	3,980
Modeled Revenues				**$637 million**

Source Philadelphia International Airport (2019), IMPLAN (2015), Econsult Solutions, Inc. (2019)

[9] Notably, the ratio of tonnage to employees for FedEx is much higher the same ratio for UPS, because of the labor-intensive hub functions sorting and rerouting parcels undertaken at the UPS facility.

[10] It is acknowledged that this approach may exclude a small volume of activity from freight and cargo carriers other than UPS, FedEx, and airlines.

2.8. Office and Commercial

The areas surrounding PHL and PNE also feature a range of office and commercial tenants benefiting from access to the facilities and the associated demand and amenities.

The airport serves as the direct landlord for significant office and commercial space near each facility.[11] In 2015, PHL purchased International Plaza, a two-building, 500,000 square foot office complex immediately adjacent to the airport terminals. The facility hosts a range of tenants, including government- and airport-related users as well as firms attracted to the location for its logistical advantages. PNE features 14 tenants at various locations around the facility.

Rental revenues collected from tenants at PHL and PNE total $12.8 million annually (based on rent rates as of February 2019). An adjustment is made for the portion of this activity that comes from tenants undertaking activity already accounted for in other sections of this analysis to avoid double counting.[12] Accounting for these deductions, the remaining firms generate rental revenues of nearly $10 million annually. Rental amounts are translated to an annual revenue estimate for these firms using a standard ratio of 5% of revenue dedicated to rent.

Using this approach, it is estimated that tenants in office and commercial facilities owned by the airport generate $197 million in annual revenue (see Figure 2.9).

Figure 2.9 – Estimated Revenues of Commercial Tenants on Property Owned by PHL and PNE

Measure	International Plaza (1+2)	PNE	Total
Annual Rental Revenue ($M)	$11.2	$1.6	$12.8
(Less Included in other categories)	($1.9)	($1.0)	($2.9)
Unique Rental Revenue ($M)	$9.3	$0.6	$9.9
(÷) Est. Rent Share of Revenue	5%	5%	5%
Modeled Unique Tenant Revenue	**$186 M**	**$11 M**	**$197 million**

Source: (Philadelphia International Airport (2018), Econsult Solutions (2019)

[11] Notably, calculations in this category include only commercial and office tenants in property directly held by PHL, conservatively excluded those at nearby locations like the AmeriHealth Caritas headquarters that also benefit from airport proximity.

[12] For example, major PNE tenants include AugustWestland, which is included in the Aviation Manufacturing calculation in Section 2.9, and Atlantic Aviation, which is included in the General Aviation calculation in Section 2.6, while major PHL tenants include airlines (included in Section 1.1), government (included in Section 2.1) and logistics firms (included in Section 2.7).

2.9. Aviation Manufacturing

The airport and its environs are also the platform for high value aviation manufacturing activity that takes place on or adjacent to airport facilities and draws significant investment into the region.

Italian multinational Leonardo manufactures AgustaWestland helicopters onsite at PNE, and serves as its largest tenant. The site and airspace is also used for testing, training, repair, and sales, and serves as the U.S. corporate headquarters of the company. According to financial documents from Leonardo, annual revenues associated with the Philadelphia site are €110 million, or $126 million.

Boeing's plant in Ridley (immediately south of PHL), designs and produces Chinook and Osprey helicopters for the U.S military and international purchasers. Direct employment at the plant is reported at around 4,000, and documentation from Boeing indicates that nearly 50 aircrafts were delivered in 2018. Based on Department of Defense procurement data, these deliveries are estimated to generate $3.3 billion annually in revenue for Boeing. Based on the amount of assembly and manufacturing work performed at this facility, it was estimated that the Ridley Park facility captures roughly 12% of operating costs, or $391 million annually.

In September 2018, Leonardo and Boeing joined together on a successful bid to supply the Air Force with MH-139 helicopters as the first portion of a procurement of up to $2.38 billion. The helicopters will be assembled at the Leonardo facility and then outfitted with weapons systems at the Boeing facility. As noted in Section 1.3, Leonardo also announced plans in March 2019 to invest $65 million to build a training facility at the site, which will increase the footprint at the facility by 166 employees and attract thousands of pilots each year for training, bringing additional spending into the region. These developments suggest that this activity could generate an even larger economic footprint going forward.

While not directly related to manufacturing, Sky Chefs plays a crucial role in supporting airlines' abilities to provide comfortable service to their passengers. According to employee badge data, Sky Chefs has a workforce of about 90 employees at its location directly east of the airport property, out of a global workforce of more than 35,000. Applying this share of employment to the $3.7 billion in annual global revenues reported by the company yields an estimated $9 million in annual revenues associated with the Philadelphia location.

Combined, these three firms generate a direct employment footprint of nearly 4,700 and estimated revenues of $526 million annually in the region (see Figure 2.10).

Figure 2.10 – Estimated Revenues of Aviation Manufacturing Supported by PHL and PNE

Company	Philadelphia-Area Employment	Program Revenues ($M)	Est Philadelphia Share (%)	Est. Philadelphia Revenues ($M)
AgustaWestland	590	$126	100%	$126
Boeing	4,000	$3,340	12%	$391
Sky Chefs	90	$3,698	0.2%	$9
Total	**4,680**	**$7,165 M**	**7.3%**	**$526 million**

Source: Philadelphia International Airport (2018), LSG Group (2018), Leonardo (2018), Department of Defense (2018), Boeing (2018), ESI (2019)

Tier 2 Economic Impacts

The direct expenditures within the industries relying on the airport to support their business platform generate spillover effects through the regional supply chain and through the recirculation of labor income. The $2.53 billion in direct activity from airport-related operations is estimated to generate an additional $2.86 billion in spillover activity within the Philadelphia region. Inclusive of these spillover effects, **annual impacts from Tier 2 activity total $5.39 billion, supporting 38,000 jobs with $2.06 billion in earnings in the Philadelphia region** (see Figure 2.11).

Figure 2.11 – Annual Economic Impact in the Philadelphia Region from Airport-Related Operations

Category	Direct Output ($M)	Indirect & Induced Output ($M)	Total Output ($M)	Annual Employment Supported	Employee Compensation ($M)
Government	$329	$524	$853	4,700	$333
Onsite Retail	$178	$160	$338	3,400	$132
Parking	$53	$66	$119	1,700	$38
Ground Transport	$312	$328	$640	5,900	$204
Hospitality	$199	$161	$360	2,400	$130
General Aviation	$99	$83	$182	700	$45
Cargo, Freight, & Mail	$637	$737	$1,374	8,600	$471
Office	$197	$224	$421	2,500	$157
Aviation Manufacturing	$526	$574	$1,100	8,100	$552
Total	**$2.53 billion**	**$2.86 billion**	**$5.39 billion**	**38,000 jobs**	**$2.06 billion**

Source: IMPLAN (2015), Econsult Solutions (2019)

3. Tier 3: Impact on Regional Businesses and Residents

Air service and activity at and around the airport ultimately serves as an amenity and economic driver for the region and its residents. Travel into PHL from outside the area facilitates valuable tourism activity in communities throughout the region, supporting local employment through spending by out of towners. Outbound travel through PHL benefits regional residents through travel time and cost savings, enhancing business competitiveness and supporting activity in the travel arrangement industry. In addition to quality of life benefits, these travel services produce a significant amount of economic activity, generating an estimated $4.0 billion in annual economic impact in the region.



Photo Source: Visit Philadelphia

3.1. Visitor Spending

ESI's prior impact study estimated the level and distribution of visitor spending throughout the Philadelphia region attributable to PHL as of calendar year 2015.[13] This analysis is updated to calendar year 2018 by accounting for changes in both the number of visitors traveling through PHL and changes in per capita spending patterns across visitor-serving sectors.

Changes in travel volume attributable to PHL are estimated by comparing total passenger volume through PHL.[14] Passenger volume grew from 31.44 million in 2015 to 31.69 million in 2018, an increase of 0.8% (see Figure 3.1).

Figure 3.1 – Airport Passenger Volume Growth, 2015-2018

	2015	2018	Growth (%)
Passenger Volume	31.44 million	31.69 million	0.8%

Source: Philadelphia International Airport (2019)

Annual changes in per capita visitor spending in several sectors are drawn from ESI's annual economic impact analysis of the Greater Philadelphia tourism industry, which is commissioned by the regional tourism promotion agency Visit Philadelphia.[15] Changes in expenditures by sector can result from a combination of inflationary effects (i.e. changes in the cost of travel services) and changes in visitor behavior and/or spending patterns. The analysis relies on a mix of indicators including survey panel data, aggregated credit card transactions, government inflation data sets, and direct industry data (such as hotel rates and airfare prices) to estimate annual changes in per capita spending by sector.

Annual growth estimates for travel years 2016 and 2017 are extrapolated to 2018 (using the average annual growth rate) to produce estimated per capita spending growth estimates for 2018 relative to 2015. This growth in per capita spending is then combined with the 0.8% passenger growth estimated in Figure 3.1 above to produce estimates of the percentage growth by sector in airport-attributable visitor expenditures between 2015 and 2018. These growth rates are applied to the level of airport-attributable visitor spending from 2015 estimated in the prior study to yield estimates for 2018.

Total airport-attributable visitor spending is estimated at $2.86 billion for 2018, an increase of 4.4% over 2015 (see Figure 3.2). Lodging and Food & Beverage represent the largest visitor expenditure categories.

[13] For a complete accounting of this methodology, see Section 6.1 and Appendix C of ESI's March 2017 "Regional Economic Impact of Philadelphia International Airport" study.

[14] Note that this approach assumes a consistent ratio of "origin & destination" travelers through PHL relative to connecting travelers, who do not have an expenditure footprint in the region (outside of the airport itself).

[15] See for example: "Greater Philadelphia Tourism Impact 2017: Detailed Report" available at <www.visitphilly.com/research>. Notably, this analysis has been conducted through a consistent methodology and time series over several years, and also served as a basis for the visitor spending estimates in ESI's prior impact analysis for PHL.

Figure 3.2 – Airport-Attributable Visitor Spending by Category

Sales Type	2015 Spending Estimate ($M)	Spend per Capita Chg 2015-2018	Spend Chg 2015-2018 (w/Passenger Growth)	2018 Spending Estimate ($M)
Lodging	$889	7.1%	8.0%	$960
Food & Beverage	$621	6.5%	7.3%	$667
Retail	$292	0.8%	1.6%	$296
Recreation	$237	2.9%	3.7%	$246
Air Transport	$584	(4.0%)	(3.3%)	$565
Other Transport	$111	8.4%	9.2%	$121
Gasoline Stations	$7	13.9%	14.8%	$8
Total	**$2.74 billion**	**3.6%**	**4.4%**	**$2.86 billion**

Source: ESI for Visit Philadelphia (2016, 2018) and PHL (2016)

For the purposes of economic impact modeling, adjustments are required to ensure that visitor expenditures already captured in other aspects of this analysis are not double counted within the aggregate impact. Most importantly, air transportation expenditures by visitors traveling through PHL are reflected in the operations of the airlines based at PHL (Section 1.3 of this report). Other overlaps include visitor expenditures (Section 2.5), expenditures in the airport terminals (Section 2.2), and ground transportation expenditures getting to and from the airport (Section 2.4).

Calculations undertaken within those sections are used to identify $875 million in airport-attributable visitor spending that overlaps with these categories. Further, as in the earlier analysis of onsite retail activity, a deduction is required for purchases within certain categories to reflect that only a portion of the sales price is retained locally to support vendor operations.[16]

Accounting for these deductions, additional annual visitor spending attributable to PHL totals $1.80 billion (see Figure 3.3).

[16] Items sold at a store are typically purchased from a wholesaler, who derives some of the economic value through the production process, while the economic value added by retailers is only the "margin" by which the sales price exceeds their purchase price from their supplier. When the goods are not sourced locally, only this margin recirculates within the local economy, and the cost of the good is therefore removed from the model.

Figure 3.3 – Modeled Additional Annual Regional Visitor Spending Attributable to PHL

Sales Type	PHL Attributable Spend ($M)	Overlap with Other Categories	(Less Spend Overlap) ($M)	Modeled Spend ($M)
Lodging	$960	Hospitality (2.5)	($169)	$790
Food & Beverage	$667	Onsite Retail (2.2), Hospitality (2.5)	($64)	$603
Retail	$296	Onsite Retail (2.2)	($17)	$279
Recreation	$246	--	--	$246
Air Transport	$565	Airline Operations (1.3)	($565)	--
Other Transport	$121	Ground Transport (2.4)	($61)	$60
Gasoline Stations	$8	--	--	$8
Direct Total	**$2,863**		**($875)**	**$1,988**
(Less Retail Margin)				($186)
Modeled Total				**$1.80 billion**

Source: ESI (see other sections)

3.2. Travel Arrangement

PHL also serves as an amenity for regional residents traveling outbound to other regions or countries. This yields quality of life benefits for residents, which are discussed in Section 3.3 below. It also helps to support activity in the region's travel arrangement industry, which relies in part on booking outbound airfare for local residents traveling through PHL.

Data from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages indicates that there are more than 370 establishments in this sector in the Philadelphia region, supporting more than 4,800 employees with $265 million in wages.[17] National industry data from the American Society of Travel Agents is used to extrapolate these earnings to industry sales based on share of total operating costs represented by payroll, and the share of total revenues represented by operating costs. Using this approach, annual industry revenues of the travel arrangement industry within the Philadelphia region are estimated at $485 million (see Figure 3.4).

[17] Note that for certain smaller counties within the region (Gloucester and Salem, NJ and Cecil, MD), establishment counts are provided within this sector but data on employment and earnings is suppressed due to privacy concerns. Employment and wages are estimated for these counties by applying the industry-average employment per establishment and earnings per employee derived from the remaining counties in the region.

Figure 3.4 – Estimated Annual Sales of the Regional Travel Arrangement Industry

Measure	Phila MSA
Travel Arrangement Industry Employment	4,816
Annual Sector Wages ($M)	$265
(%) Est. Payroll Share of Operating Costs	60%
(%) Est. Operating Costs as Share of Revenues	91%
Annual Industry Revenues	**$485 million**

Source: Quarterly Census of Employment and Wages (2018), American Society of Travel Agents (2015), Econsult Solutions (2019)

The proportion of these industry sales attributable to the airport is then estimated through a two-step process. First, the $485 million in estimated revenues are allocated by category type based on national data on expenditure patterns from the American Society of Travel Agents. A proportion of spending in each of these categories is then attributed to the airport based on activity type.

Based on these proportions, it is estimated that 47% of industry sales, or $226 million in annual travel arrangement sales within the Philadelphia region is attributable to the airport (see Figure 3.5).

Figure 3.5 – Modeled Airport-Attributable Annual Sales

Revenues by Segment	Share of Total	PHL Attributable (%)	PHL Attributable ($)
Annual Industry Revenues	$485 million		
Airfare	23%	100%	$112
Cruises	26%	0%	--
Hotels	11%	50%	$27
Car rental	3%	50%	$7
Tour/packages	33%	50%	$80
Other	5%	0%	--
Modeled Airport-Attributable Revenue		**47%**	**$226 million**

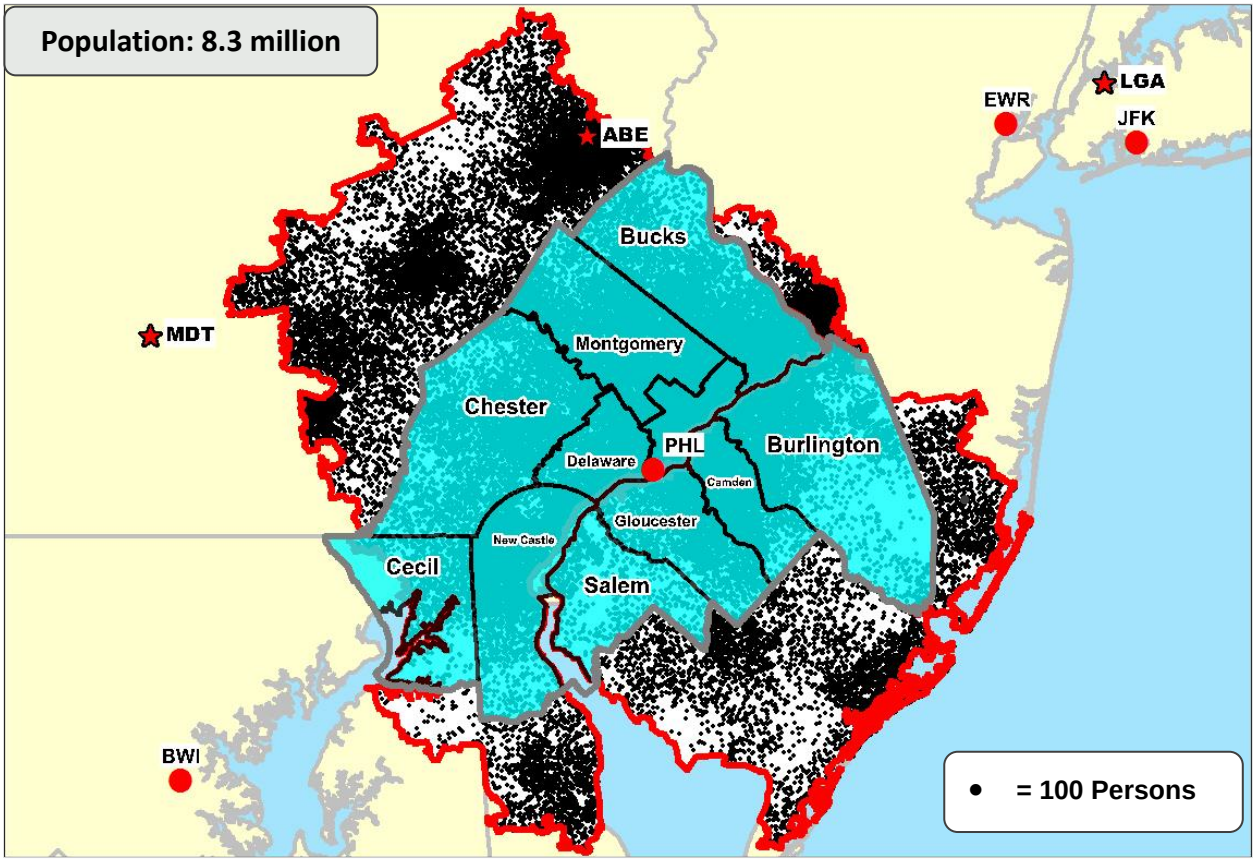
Source: American Society of Travel Agents (2015), Econsult Solutions (2019)

3.3. Resident Travel Benefits

PHL and its air service connections directly benefit regional residents in their capacity as travelers. PHL is centrally located within the region, and captures the majority of travel demand from its catchment area. The ability for regional residents to utilize PHL rather than alternative airports located outside of the region deliver tangible economic benefits by saving travel time and travel expenditures.

In addition to the study region defined by the 11 counties representing the Philadelphia MSA, PHL tracks a "catchment area" defined by those locations for which PHL is the closest major airport. This catchment area is extends beyond the Philadelphia MSA, containing a population of 8.3 million residents (see Figure 3.6). Dense population centers outside of the 11-county region such as Trenton, Atlantic City, Allentown, and Reading all fall within the PHL catchment area.

Figure 3.6 – PHL Catchment Area Population



While PHL is the primary airport for the Philadelphia region, there are a number of alternative airports of varying size and scale that are accessible from different parts of the region.

- Newark Liberty International Airport (EWR), located 85 miles northeast of downtown Philadelphia, and Baltimore Washington International Airport (BWI), located 105 miles southwest of downtown Philadelphia, offer similar passenger and flight volume to PHL.

- Trenton-Mercer Airport (TNN), located 35 miles northeast of downtown Philadelphia, Atlantic City International Airport (ACY), located 55 miles east of downtown Philadelphia, and Lehigh Valley International Airport (ABE), located 65 miles northwest of downtown Philadelphia, are all smaller airports offering commercial service to a limited set of destinations.

PHL's central location in the Philadelphia region means that it yields a travel savings for most regional residents relative to their next best alternative airport outside the region. A statistical technique known as "gravity modeling" is utilized to define the magnitude of these travel savings. Using empirical research identifying distance and air service volume as key predictive variables of consumer airport choice, the model compares alternative airport options from the centroid of each zip code, and calibrates the model specifications based on the observed market share of regional demand captured by PHL of 85%.[18]

The model is then re-run without PHL to predict the distribution of trips by regional residents to alternative airports if PHL did not exist (based on the distance and air service relationships embedded in the models). The results of these two models are then compared to estimate the change in airport usage by zip code with and without PHL, and to isolate two key metrics: travel distance saved and travel time saved.[19]

Travel distance saved due to the presence of PHL (on both outbound and return trips) is estimated at 215 million miles annually. Based on average car operating costs per mile (including gas, wear and tear, etc.) estimated by AAA at $0.59 cents per mile,[20] this distance savings yields a travel cost savings of $127 million for regional residents.

This distance savings also translates into a time savings of an estimated 3.2 million hours annually for regional residents. The U.S. Department of Transportation provides guidance on the economic value of travel time for leisure and business travel, which averages $20.95 per hour.[21] Applying this average time value to the travel time savings yields an estimated benefit to residents of $67 million in time value savings.

Combined, travel cost and time value savings for regional residents due to the presence of PHL are estimated at $194 million (see Figure 3.6).

[18] Section 7 and Appendix D of ESI's 2017 "Regional Economic Impact of Philadelphia International Airport" Study includes a complete discussion of this research, and detail on the specifications of the gravity model. These specification from that initial model have been retained for this study, with data updated on the demographic characteristics (the population and proportion of the population with access to a vehicle) of each zip code within the region

[19] Travel time from the centroid of each zip code to each airport is estimated using Google Maps.

[20] AAA, "Your Driving Costs," 2018.

[21] U.S. Department of Transportation, "Revised Departmental Guidelines on Valuation of Travel Time in Economic Analysis," September 2016. An even split between business and leisure travel is assumed, matching approximate proportions of trip types for PHL passengers.

Figure 3.6 – Estimated Annual Travel Cost and Time Value Savings to Regional Residents

Metric	Value	Source
Travel Distance Savings due to PHL (miles)	215 million	ESI Model, Google Maps
(x) Vehicle Operating Cost per Mile ($)	$0.59	AAA (2018)
(=) Resident Travel Cost Savings ($)	**$127 million**	
Travel Time Savings due to PHL (hours)	3.2 million	ESI Model, Google Maps
(x) Blended Hourly Travel Time Value ($)	$20.95	U.S. Dept. of Transportation
(=) Resident Travel Time Valuation ($)	**$67 million**	
Combined Resident Benefit	**$194 million**	

Source: Econsult Solutions (2019)

In addition to these travel savings relative to alternative airports, the volume of flight service at PHL also helps regional residents save on air travel costs by encouraging competition among carriers. As of summer 2019, 19 of the top 20 destinations for PHL are served by more than one carrier. The presence of multiple options can generate significant savings for regional residents and businesses.

Tier 3 Economic Impacts

Direct benefits for the region's businesses and households generate spillover effects throughout the regional economy.[22] The $2.03 billion in direct activity from regionwide activity is estimated to generate an additional $1.97 billion in spillover activity within the Philadelphia region. Inclusive of these spillover effects, **annual impacts from Tier 3 activity total $4.00 billion, supporting 38,100 jobs with $1.45 billion in earnings in the Philadelphia region** (see Figure 3.7).

Figure 3.7 – Annual Economic Impact in the Philadelphia Region from Regional Business and Resident Benefits

Annual Impacts	Regional Tourism	Travel Arrangement	Resident Travel Cost Savings	Total
Direct Output ($M)	$1,802	$226	-	$2.03 billion
Indirect & Induced Output ($M)	$1,591	$302	$80	$1.97 billion
Total Output ($M)	**$3,393**	**$528**	**$80**	**$4.00 billion**
Annual Employment Supported	33,600	4,000	500	38,100 jobs
Employee Compensation ($M)	$1,207	$216	$24	$1.45 billion

Source: IMPLAN (2015), Econsult Solutions (2019)

[22] Resident travel cost savings are modeled based on the additional household expenditures supported by these savings. For the purposes of impact modeling, these savings are not counted as a direct impact, but rather are situated entirely within induced impacts. Resident time value savings do not result directly in additional expenditures in the region, and therefore are excluded from impact modeling.

Regional Economic Impact Summary

Philadelphia International Airport (PHL) serves as a hub of activity and a major economic generator for the Philadelphia region. Supporting the movement of more 31.7 million passengers annually, PHL is also a major center of employment and procurement activity. In addition, a broad set of industries located on or near the airport offer complementary services to fulfill passenger demand (such as retail, hospitality, and ground transportation) or capitalize on the logistical and airfield capacity provided by the airport (such as cargo and aviation manufacturing). Finally, the regional economy and its residents benefit through the inbound and outbound leisure and business travel enabled by PHL's air service, enhancing regional quality of life in addition to economic activity.

Collectively, airport impacts in these three tiers generate an estimated $16.8 billion in annual economic impact in the region. These economic impacts are felt in every county in the region, and through a variety of sectors, due to both the diverse nature of the direct activity and to the spillover impacts throughout regional supply chains and via household spending of earnings. Most of these impacts occur within the private sector, and accordingly generate significant tax revenues for local and state governments.

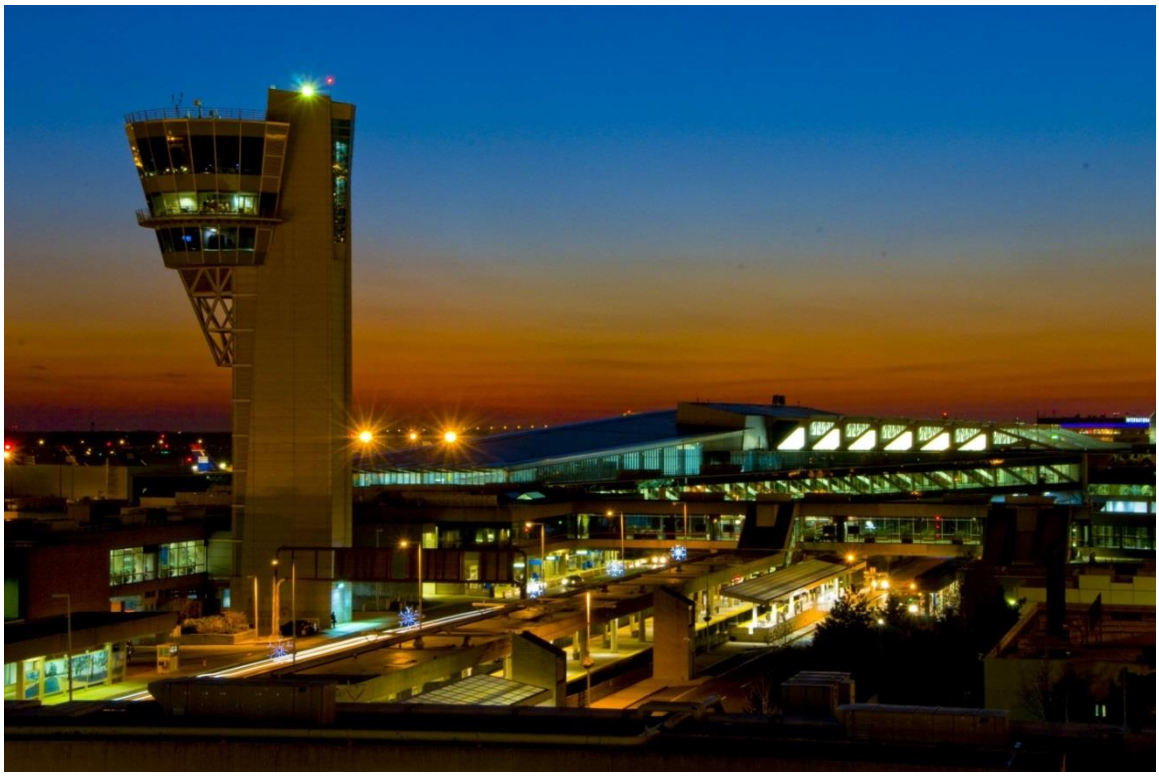


Photo Source: Philadelphia International Airport

Summary of Economic Impacts

Direct expenditures from aviation operations, airport-related operations, and regionwide business and resident impacts all generate "spillover" effects across the regional economy. Increases in supply chain activity produce "indirect effects," and the recirculation of labor income in the form of household spending produces "induced effects," growing regional economic activity above and beyond the direct expenditures documented throughout this analysis.

Combining all three tiers of activity, the $8.43 billion in direct activity is estimated to generate an additional $8.35 billion in spillover activity within the Philadelphia region. Inclusive of these spillover effects, **the annual impact of Philadelphia International Airport totals $16.78 billion, supporting 106,800 jobs with earnings of $5.45 billion** (see Figure S.1).

Figure S.1 – Annual Economic Impact in the Philadelphia Region

Annual Impacts	Tier 1: Aviation Operations	Tier 2: Airport-Related Operations	Tier 3: Business and Residents	Total
Direct Output	$3.87 B	$2.53 B	$2.03 B	$8.43 B
Indirect & Induced Output	$3.52 B	$2.86 B	$1.97 B	$8.35 B
Total Output	**$7.39 billion**	**$5.39 billion**	**$4.00 billion**	**$16.78 billion**
Annual Employment Supported	30,700 jobs	38,000 jobs	38,100 jobs	106,800 jobs
Employee Compensation	$1.94 billion	$2.06 billion	$1.45 billion	$5.45 billion

Economic Impact Breakdown

Economic impacts for each category and tier are calculated based on a region-wide model of the local economy, covering the 11-county Philadelphia Metropolitan Statistical Area (MSA). Starting with these regional calculations for each category, ESI has developed a "sharedown" approach to estimate the aggregate economic impact of airport activity in each county within the region (and accordingly in each of the four states represented within the MSA).

Estimates by county begin by assigning proportions of direct activity to the relevant counties. Within Tiers 1 and 2, all direct activity takes place within Philadelphia and Delaware counties, where the airport facilities and nearby activity are located, and locational data sources utilized to develop direct impact estimates are applied to assign shares to each of the two counties. Tier 3 includes regionwide benefits, for which proportions are estimated based on visitor spending patterns and employment shares in the travel arrangement industry.

Next, indirect and induced activity in each category is allocated by county. For Philadelphia and Delaware counties, IMPLAN modeling is undertaken to estimate indirect and induced activity, reflecting the tendency for a disproportionate share of spillover activity to be captured closer to the location of direct activity. The net differential between total regional spillover activity and spillover activity in

Philadelphia and Delaware counties is then allocated to the remaining nine counties in the MSA. Allocations are based on employment shares in each sector weighted by the representation of sectors in the modeled indirect and induced activity. Shares are based on 2018 data from the Bureau of Labor Statistics, using two-digit codes (twenty different sectors) from the North American Industry Classification System (NAICS).

Figure S.2 below shows resulting economic impact, employment, and earnings estimate for each county within the region, and for the four states represented. The City of Philadelphia accounts for $8.8 billion in annual impact, or slightly more than half of the total. At the state level, the Commonwealth of Pennsylvania (inclusive of Philadelphia and the suburban counties of Bucks, Chester, Delaware and Montgomery) accounts for $14.9 billion in impact, with the additional impact divided between New Jersey ($1.1 billion), Delaware ($665 million) and Maryland ($70 million).

Figure S.2 – Annual Economic Impact in the Philadelphia Region from Airport-Related Operations

Geography	Total Output ($M)	Annual Employment Supported (jobs)	Employee Compensation ($M)
Pennsylvania			
Bucks County, PA	$505	3,800	$160
Chester County, PA	$515	3,900	$165
Delaware County, PA	$4,095	25,500	$1,430
Montgomery County, PA	$1,000	7,400	$320
Philadelphia County, PA	$8,825	51,100	$2,760
New Jersey			
Burlington County, NJ	$415	3,300	$135
Camden County, NJ	$425	3,500	$140
Gloucester County, NJ	$225	1,900	$75
Salem County, NJ	$35	300	$10
Delaware			
New Castle County, DE	$665	5,400	$225
Maryland			
Cecil County, MD	$70	700	$25
11 County Total	**$16.78 billion**	**106,800 jobs**	**$5.45 billion**
Aggregate by State			
Pennsylvania	$14.94 billion	91,700 jobs	$4.84 billion
New Jersey	$1.10 billion	9,000 jobs	$361 million
Delaware	$665 million	5,400 jobs	$225 million
Maryland	$70 million	700 jobs	$25 million

Regional economic impact modeling throughout this analysis is inclusive of both facilities in the airport system, Philadelphia International Airport (PHL) and Northeast Philadelphia Airport (PNE). Impacts can also be attributed by airport between PHL and PNE. Allocations of regional impact are undertaken based on the relative share of activity attributable to each facility in each impact category, applied to the total regional impact (including employment impacts) for that category.

Within Tier 1, DOA operations and capital investments are allocated to PNE based on the share of operating budget activity, generating an impact of $21 million per year at PNE, with the remainder attributable to PHL. No activity is assigned to PNE from airline operations.

Within Tier 2, PNE features the majority of general aviation activity (which is allocated based on the volume of plane movements), a portion of commercial/office activity (which is allocated based on rent revenue information), as well as aviation manufacturing (via AugustaWestland). Combined, these categories generate $435 million in annual impact at PNE, with the remainder attributed to PHL.

Within Tier 3, a portion of tourism, travel arrangement activity, and outbound resident travel occurs through PNE's general aviation activity rather than scheduled commercial flights. While these represent a small share of passenger volume, leisure and business travelers utilizing privately chartered air service tend to have a disproportionately large spending profile, which is conservatively allocated at 1% of regional activity. These categories generate $40 million in annual impact at PNE, with the remainder attributed to PHL.

Collectively, annual impacts at PNE are estimated at nearly $500 million per year, supporting 3,150 jobs across the region. The remaining $16.3 billion in impact and 103,650 jobs are attributable to PHL (see Figure S.3).

Figure S.3 – Distribution of Impact by Airport Facility

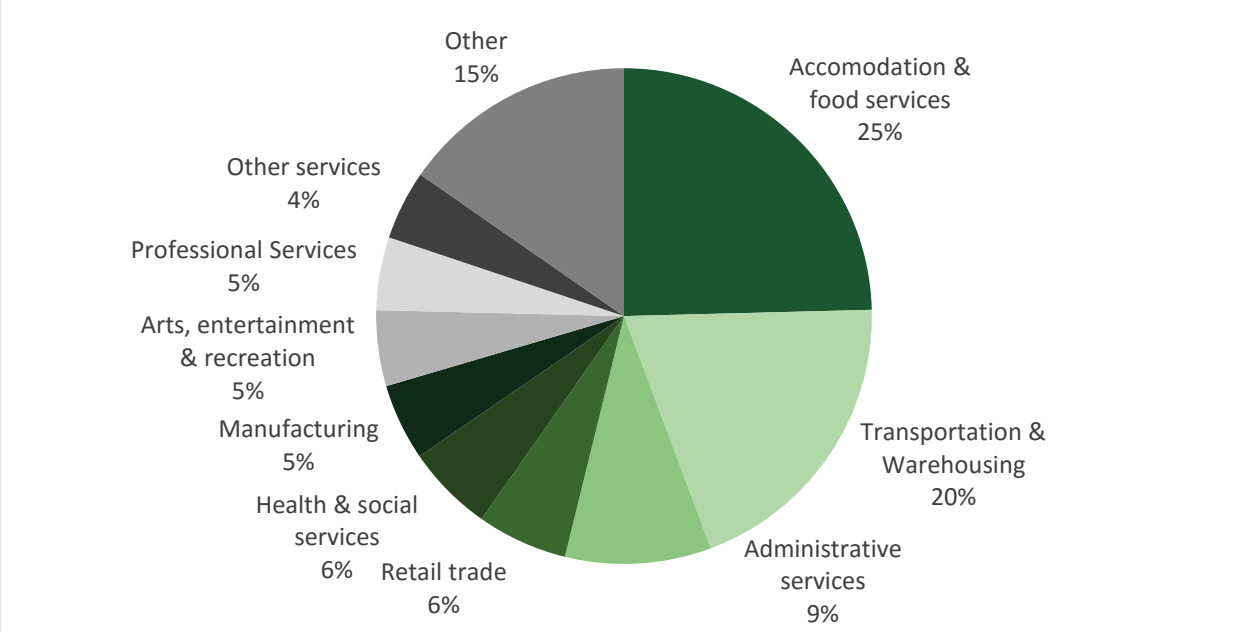
Annual Impacts	Total Output	PHL	PNE	Total Employ	PHL	PNE
Tier 1: Aviation Operations	$7.39 B	$7.37 B	$21 M	30,700	30,580	120
Tier 2: Airport-Related Operations	$5.39 B	$4.95 B	$435 M	38,000	35,350	2,650
Tier 3: Business & Residents	$4.00 B	$3.96 B	$40 M	38,100	37,720	380
Total	**$16.78 B**	**$16.28 B**	**$496 M**	**106,800**	**103,650**	**3,150**

As evidenced by the activity tiers, the economic impact from the airport has a wide range of types and beneficiaries. The breadth of this variation can also be visualized through the economic sectors in which employment attributable to PHL occurs. As reviewed throughout this report, direct activity includes not only transportation but also support industries like hospitality, retail, and manufacturing. Further, indirect activity ripples through the supply chains of each of these industries, touching a variety of sectors including professional services and administration. Finally, induced activity is generated by the re-circulation of labor income generated by the direct and indirect employment in the form of household spending. At this stage, impacts circulate far and wide based on the spending profile of

households, including sectors like health care and real estate.

Figure S.4 below shows the distribution by sector of the 106,800 of jobs supported by PHL's direct and spillover activity. Accommodation and food service, which is heavily supported by both tourism activity and induced household spending, is the largest job category at 25%, slightly ahead of the transportation and warehousing sector (20%). The top remaining sectors include administration, retail, health care, manufacturing, recreation, professional services and other services. Activity in 11 additional sectors account for another 15% of employment.

Figure S.4 – Industry Distribution of PHL Employment Impact within the Philadelphia MSA



Source: IMPLAN (2015), Econsult Solutions (2019)

Notably, earnings associated with these 106,800 jobs total more than $5.4 billion, implying average annual earnings of more than $51,000 (inclusive of benefits). The diverse nature of these jobs means that they are accessible at a variety of skill, earnings, and experience levels.

Aggregate Fiscal Impacts

The economic activity attributable to the airport also generates a significant increase in tax revenue collection for state and local governments. While some aspects of the economic activity of the airport are tax-exempt due the role of the City of Philadelphia and other government entities, much of the direct activity takes place within the private sector and is therefore tax revenue-generating. Further, the spillover activity generated by the airport takes place largely within the private sector, and therefore also contributes to local and state tax bases.

Tax revenue impacts from direct and spillover activity are modeled based on the relationship between

activity types and tax collections (i.e. effective rates) for various jurisdictions, with exclusions made where tax-exempt status is applicable. Annual revenue impacts are modeled for the City of Philadelphia and for the states of Pennsylvania, New Jersey, Delaware, and Maryland.[23]

At the state level, Pennsylvania collects $232 million in income, sales, and business tax revenue from economic activity generated by PHL. New Jersey collects $22 million in revenue, Delaware collects $18 million, and Maryland collects $1 million. In total, the four states in the MSA collect $273 million in tax revenue (see Figure S.5).

Figure S.5 – Annual State Tax Revenue Collections Attributable to PHL

Tax Category	Pennsylvania	New Jersey	Delaware	Maryland	Total
Income Tax ($M)	$97	$8	$5	$1	$111
Sales Tax ($M)	$106	$11	$0	$0	$117
Business Tax ($M)	$29	$3	$13	$0	$45
Total Revenue ($M)	**$232**	**$22**	**$18**	**$1**	**$273 million**

Source: IMPLAN (2015), Commonwealth of Pennsylvania CAFR (FY 2017), Commonwealth of Pennsylvania Tax Compendium (2017), Federal Reserve Bank of St. Louis (2017), State of New Jersey CAFR (FY 2015), State of New Jersey Department of The Treasury (2015), Bureau of Economic Analysis (2015, 2017), State of Delaware CAFR (FY 2018), State of Maryland CAFR (FY 2015), Comptroller of Maryland (2014, 2015)

Figure S.6 shows impacts for the City of Philadelphia, as well as aggregate impacts for Philadelphia and the four states represented within the region. The City of Philadelphia collects $123 million in tax revenue from economic activity generated by PHL. Together, the tax revenue collected by the City of Philadelphia and the four states totals $396 million. The largest category is income and wage taxes, which are fueled by the $5.4 billion in earnings supported by PHL.

Figure S.6 – Annual City and State Tax Revenue Collections Attributable to PHL

Tax Category	City of Philadelphia	State Total	Total
Income / Wage Tax ($M)	$87	$111	$198
Sales and Use Tax ($M)	$13	$117	$130
Business Tax ($M)	$23	$45	$68
Total Revenue ($M)	**$123**	**$273**	**$396 million**

Source: IMPLAN (2015), City of Philadelphia CAFR (FY 2016), Pennsylvania Department of Revenue (FY 2015), Bureau of Economic Analysis (2016)

[23] Airport-related economic activity also supports tax revenues for various suburban jurisdictions and school districts throughout the region. These amounts are more diffuse and challenging to quantify, and are not included in this analysis. In addition, further spillover effects in other counties within these states but outside of the Philadelphia MSA are excluded from the calculation.

Comparison to Prior Report

ESI conducted a similar study to estimate PHL's impact that was released in early 2017 (based largely on data from fiscal and calendar year 2015).[24] This analysis represents the most accurate quantification of PHL's current impact level given available data and methods (largely from fiscal or calendar year 2018) rather than a direct update of this prior analysis. Nonetheless, the methodologies pursued are broadly similar, and economic results for each tier and for the airport as a whole can be compared to give an order of magnitude sense of the growth in PHL's economic impact over the intervening period.[25]

Figure S.7 below compares results from the two studies (by tier and in aggregate) for annual economic output, annual employment, and annual earnings. Relative to the prior study, the annual impact of the airport has grown by 9%, employment impacts have grown by 11%, and earnings impacts have grown by more than 13%.

Figure S.7 – Growth in Annual Impacts

	2017 Study	2019 Study	Net Growth	Growth %
Economic Output				
Tier 1: Aviation Operations	$6.88 B	$7.39 B	$510 M	7.4%
Tier 2: Airport-Related Operations	$5.02 B	$5.39 B	$370 M	7.3%
Tier 3: Business & Residents	$3.54 B	$4.00 B	$460 M	12.9%
Total Economic Output	**$15.44 billion**	**$16.78 billion**	**$1.34 billion**	**8.6%**
Employment Impacts				
Tier 1: Aviation Operations	25,900	30,700	4,800	18.5%
Tier 2: Airport-Related Operations	37,300	38,000	700	1.9%
Tier 3: Business & Residents	33,100	38,100	5,000	15.1%
Total Employment	**96,300 jobs**	**106,800 jobs**	**10,500 jobs**	**10.9%**
Earnings Impacts				
Tier 1: Aviation Operations	$1.58 B	$1.94 B	$360 M	22.7%
Tier 2: Airport-Related Operations	$2.03 B	$2.06 B	$30 M	1.6%
Tier 3: Business & Residents	$1.20 B	$1.45 B	$250 M	20.6%
Total Earnings	**$4.81 billion**	**$5.45 billion**	**$640 million**	**13.3%**

[24] Note that impact results in both studies are calculated on an annualized basis using the most recent available and appropriate data inputs. Estimates should be understood to represent annual levels, but should not be interpreted as represent any precise 12 month time period.

[25] Note that due to updates in available data and methodological approaches where warranted, comparisons for any individual expenditure category or geography may be unreliable as a measure of growth over the intervening time period.



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