Port of Portland

Executive Summary: Aviation Activity Forecasts

Prepared for
Port of Portland

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Introduction

Forecasts of aviation demand are a key component of the airport master planning process, including Portland International Airport's (PDX) Master Plan Update, referred to as PDX 2045. For PDX 2045, forecasts were developed for passenger and cargo volumes and operations, as well as other air taxi, general aviation (GA), and military aircraft operations. These forecasts provide a foundation for evaluating the current facility's capacity and serve as the activity basis for determining PDX's future facility requirements.

This document summarizes PDX aviation activity forecasts through calendar year 2045. Industry trends and factors affecting aviation activity are also summarized, including market characteristics, passenger airline trends, socioeconomic data, and technological shifts. Additional details on aviation activity forecasts approach, methodology, assumptions, and results are documented in the ***PDX 2045 Aviation Activity Forecasts*** Final Report.

Forecasts are intended to represent approximate future activity levels. Future activity levels at PDX may differ from this forecast because of unexpected events, including economic, social, regulatory, political, technological, and environmental changes. Additionally, changes in aircraft operating costs, the cost of travel and availability of capacity, can influence demand, which could further affect actual future activity levels at PDX.

Aviation Activity Forecasts

This section presents the PDX aviation activity forecasts for 2024 through 2045 (the forecast period), including an approach summary for each forecast segment, as well as comparisons to the forecasts prepared for PDX's last master plan (completed in 2010) and the Federal Aviation Administration's (FAA) Terminal Area Forecast (TAF). Comparisons with TAF fall within FAA-expected tolerances.

ENPLANED PASSENGER FORECASTS

An enplaned passenger is any passenger boarding an aircraft including both those beginning their travel or connecting to their next flight at PDX. Enplaned passengers represent approximately half of the total passengers expected to fly through PDX and are an FAA-required forecast metric.

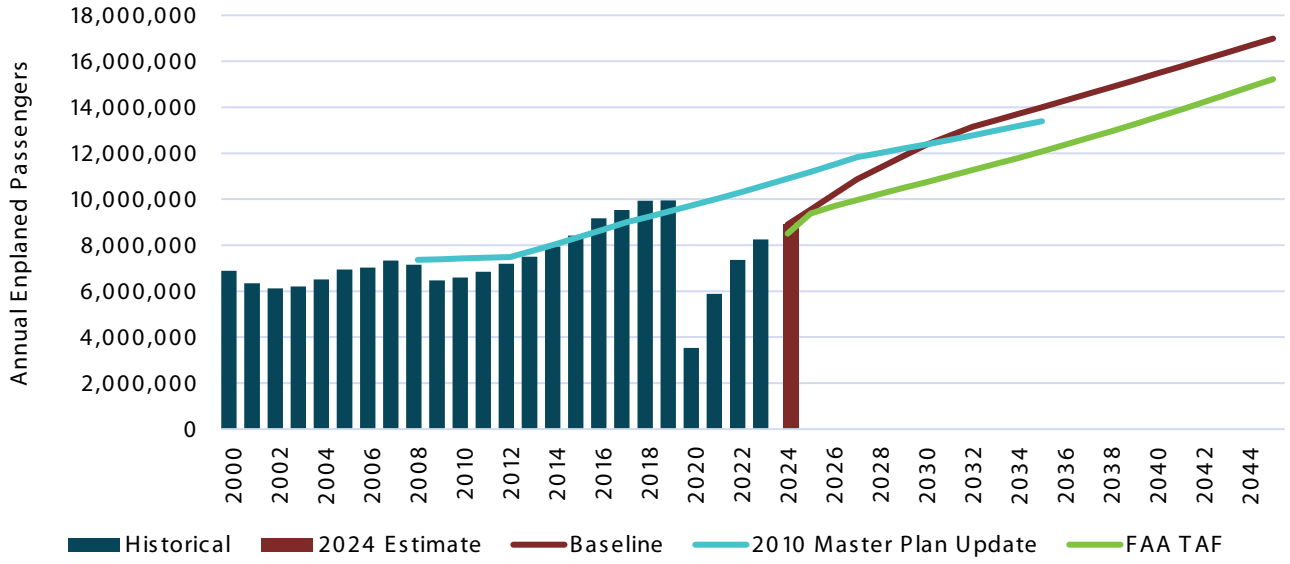
- **Forecast Results:** **Exhibit 1** presents PDX's forecast of enplaned passengers. From 2023 through 2045, enplaned passengers are forecast to **increase from 8.1 million in 2023 to 16.6 million in 2045**, a compound annual growth rate (CAGR) of 3.3% over the forecast period (CAGR of 5.9% from 2023-2030 and 2.1% from 2030-2045). Enplaned passenger growth at PDX is expected through a combination of larger aircraft, new flights, and increasing load factors.

- **Short-Term Activity Forecast Approach (2024–2030):** Socioeconomic variables used to model demand for air travel, such as economic output, employment, and personal income, are not as reliable for predicting short-term future aviation activity due to travel restrictions, fear of illness, labor shortages, aircraft supply chain issues, and other recently emerging factors. The short-term forecast was developed using the demonstrated recovery of demand since the onset of the COVID-19 pandemic in 2020. It assumes that emerging variants of COVID-19 will not result in a severe reduction in air service as experienced at the onset of the pandemic due to deployment of effective vaccines and treatments, and that if new travel restrictions are imposed due to a public health issue, they will be progressive and paired with other approaches to lessen industry impact. The short-term forecast incorporates actual reported activity for January 2024 and published airline schedules through December 2024.

- **Long-Term Activity Forecast Approach (2031–2045):** As passenger demand and airline capacity recover to pre–COVID-19 pandemic levels, it is expected that the traditional relationships between demand and socioeconomics will drive long-term passenger growth. Longer term passenger activity was forecast using socioeconomic regression analysis techniques that identified predictive statistical

relationships between historical origin and destination (O&D) passenger (those starting or ending their trip at PDX, as opposed to connecting to another flight at PDX) volumes and independent socioeconomic variables over a 20-year period ending in 2019. Activity that occurred in 2020 through 2023 was not incorporated into the socioeconomic regression analysis, as activity during this period was heavily influenced by factors that were specific to the COVID-19 pandemic. Once PDX exceeds pre-pandemic levels of activity, the COVID-19 pandemic impacts are no longer expected to influence long-term air travel demand. Independent forecasts were developed for domestic and international O&D passengers and connecting passengers using projections of relevant socioeconomic variables sourced from Woods & Poole Economics, Inc., as well as historical trends of connecting passengers at PDX. The long-term forecasts assume no major "acts of God", public health emergencies, or terrorist incidents resulting in a material impact of demand. They also assume that although economic disturbances may occur, they will not result in a long-term decrease in nationwide traffic. Connecting passenger forecasts assume the return of Alaska's pre-pandemic capacity and connecting passenger flows.

Exhibit 1 PDX Historical and Forecast Enplaned Passengers



NOTES:
The FAA TAF is presented in the federal fiscal year (October 1 to September 30).
The forecasts represent revenue-only passengers (passengers that purchase airfare as opposed to "non-revenue passengers" that travel for free or at a discount using airline employee benefits).

SOURCES
US Department of Transportation, Federal Aviation Administration, ***Terminal Area Forecast***, March 2024; Ricondo & Associates, Inc., April 2024.

AIRPORT OPERATIONS FORECASTS

Exhibit 2 presents PDX's forecast of airport operations. An operation is defined as takeoff or landing by an aircraft on a runway at PDX. Total operations represent counts of all aircraft take-offs and landings PDX and are an FAA-required forecast metric.

- **Forecast Results:** For the 2023 to 2045 period, total operations are forecast to **increase from 190,150 operations in 2023 to 328,930 operations in 2045**, a CAGR of 2.5%. Airport operations forecasts include operations for each segment (i.e., passenger airlines, cargo/integrator airlines, and other air taxi, GA, and military) of aviation activity at PDX.

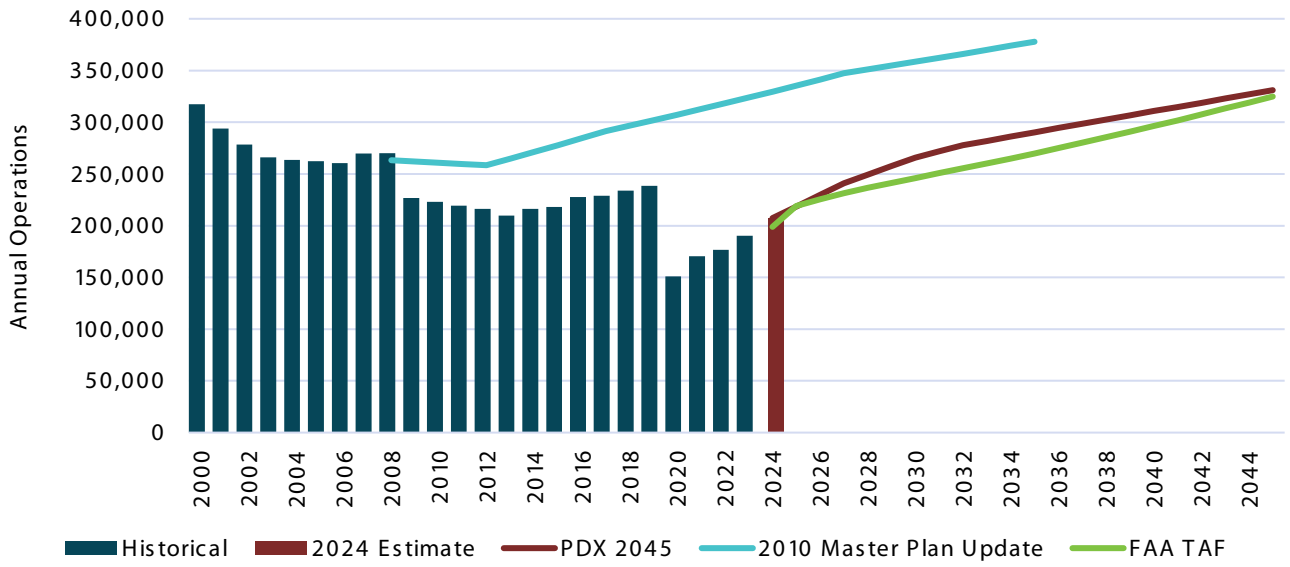
- **Passenger Airline Operations Forecast Approach:** Passenger airline operations forecasts were developed by projecting load factors and average seats per departure The average seats per departure assumptions were informed by published airline schedules through December 2023, as well as the current and expected future fleet mix of airlines serving PDX. Load factor assumptions were based on

historical patterns, with gradual increases over the long-term reflecting expected improvements in the processes and tools that airlines use to manage seat inventory more efficiently. Growth in average seats per departure and higher load factors will enable airlines to accommodate more passengers per passenger aircraft operation.

- **Cargo Operations Forecast Approach:** The forecast of cargo operations was based on the historical relationship between tonnage and aircraft operations. After a decrease in tonnage per operation in 2022 and 2023 due to the increase in cargo operations outpacing the increase in cargo volumes, cargo tonnage per operation was assumed to increase during the forecast period based on the historical trend.

- **Other Air Taxi, General Aviation, and Military Operations Forecast Approach:** Other operations consist of other (non-scheduled) air taxi, GA aircraft operations, and military aircraft operations. Together, these three categories of operations represented approximately 14% of total operations in 2023. Analyses of historical activity did not identify predictive relationships with the factors that are forecast to drive demand for passenger airline and all-cargo airline activity. Therefore, the forecast for other air taxi and GA operations was based on national growth rates established in the 2023 FAA Aerospace Forecast and an historical trend of PDX's share of these operations compared to the 2023 FAA TAF for the nation. Military operations are forecast to remain constant at 2023 levels.

Exhibit 2 PDX Historical and Forecast Annual Operations



NOTES:
The FAA TAF is presented in the federal fiscal year (October 1 to September 30).

SOURCES:
US Department of Transportation, Federal Aviation Administration, ***Terminal Area Forecast***, March 2024; Ricondo & Associates, Inc., April 2024.

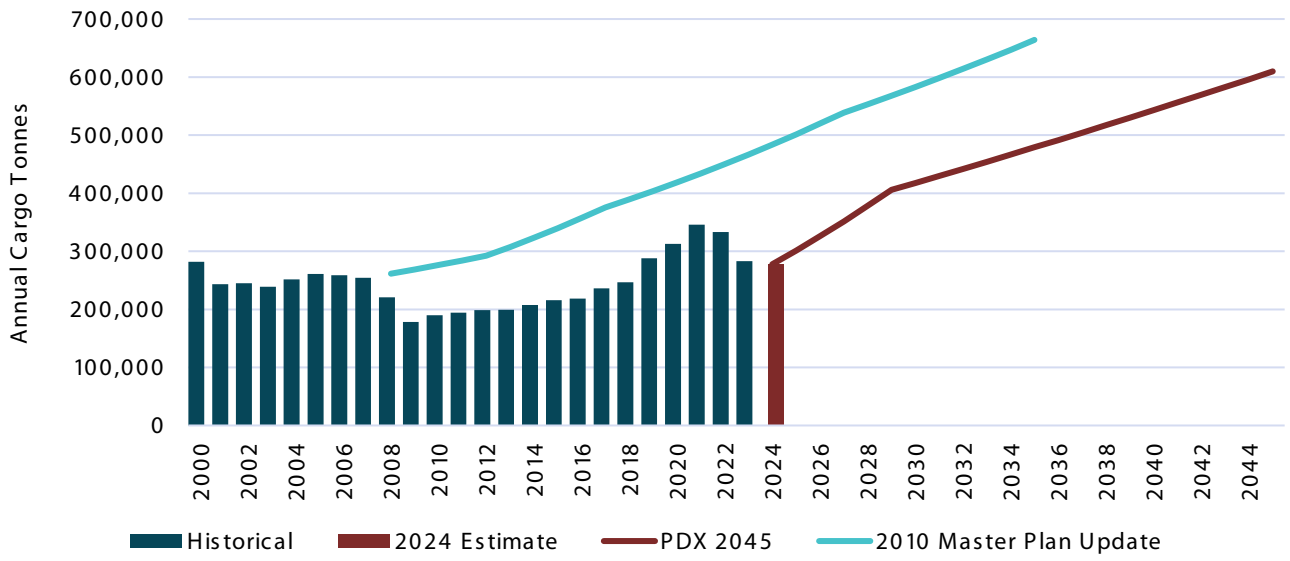
CARGO VOLUMES FORECASTS

Exhibit 3 presents PDX's aviation activity forecast of cargo volumes. Cargo volumes at PDX consist of both freight and mail volumes. Both freight and mail are carried on dedicated all-cargo freighter aircraft and in the belly compartments of passenger aircraft. Cargo volume forecasts are not required by FAA, but necessary for planning large airports with significant cargo activity, such as PDX.

- **Forecast Results:** During the forecast period, overall cargo volumes are forecast to **increase from 282,733 metric tonnes in 2023 to 526,868 metric tonnes in 2045,** a CAGR of 2.9%.

- **Forecast Approach:** The COVID-19 pandemic did not impact cargo volumes and cargo airline activity in the same manner as observed with passenger airline activity. Due to the pandemic and a reduction in passenger airline operations, most all-cargo/integrator airlines experienced growth in cargo volumes during the pandemic compared to the significant decline in passenger demand. As a result, cargo activity that occurred from 2020 to 2023 was incorporated into the socioeconomic regression analysis to inform long-term cargo volume growth. Cargo volume was forecast based on regressions with acceptable correlation coefficients between socioeconomic data (specifically population, employment, earnings, per capita personal oncome, and gross domestic/regional product) and cargo volumes.

Exhibit 3 PDX Historical and Forecast Cargo Volumes



SOURCES:
Ricondo & Associates, Inc., April 2024.

Factors Affecting Aviation Activity at PDX

This section discusses the factors that may influence future aviation activity at PDX, including passengers, operations, and cargo volumes. These factors were considered, either directly or indirectly, in developing the aviation activity forecasts for PDX.

NATIONAL AND REGIONAL ECONOMY

Historically, trends in airline travel have been closely correlated with national and regional economic trends, such as population and, most notably, changes in gross domestic product. **Table 1** presents historical and projected socioeconomic variables for both the nation and region (Portland Combined Statistical Area [CSA]), which may influence demand for air service over time. These socioeconomic data were incorporated into the analysis of the O&D passenger and cargo volume forecasts.

The Portland CSA outperformed the nation between 2013 and 2023 for all the socioeconomic variables assessed and is projected to continue to outperform the nation through 2045, except for per capita personal income. Projected

growth in socioeconomic activity is expected to generate generally increasing demand for air service. Actual economic activity may differ from this projection, especially on a year-to-year basis.

Table 1 Historic and Projected Socioeconomic Variables – Nation and Combined Statistical Area

Socioeconomic Metric and Region	2013	2023	2045	CAGR 2013 – 2023	CAGR 2023 – 2045
POPULATION (IN MILLIONS)					
Nation	316.7	335.5	382.2	0.6%	0.6%
Portland CSA	3.0	3.3	4.0	0.9%	0.8%
EMPLOYMENT (IN MILLIONS)					
Nation	182.3	211.9	272.1	1.5%	1.1%
Portland CSA	1.7	2.1	2.7	2.0%	1.2%
EARNINGS (IN BILLIONS)					
Nation	$10,095.4	$12,967.2	$19,647.7	2.5%	1.9%
Portland CSA	$92.6	$132.3	$200.8	3.6%	1.9%
PER CAPITA PERSONAL INCOME					
Nation	$44,209	$55,324	$76,783	2.3%	1.5%
Portland CSA	$41,489	$55,401	$73,883	2.9%	1.3%
GROSS DOMESTIC/REGIONAL PRODUCT (IN BILLIONS)					
Nation	$16,506.4	$21,082.2	$31,886.2	2.5%	1.9%
Portland CSA	$145.4	$201.4	$309.1	3.3%	2.0%

SOURCE:
Woods & Poole Economics, Inc., May 2023.

IMPACT OF THE COVID-19 PANDEMIC

The outbreak and spread of COVID-19 resulted in a severe contraction in demand for air travel that was driven by fear of illness, as well as government-imposed travel restrictions and quarantine requirements. The impact to air travel began in East Asia in December 2019 and rapidly accelerated to other regions of the world in March and April 2020. Airlines responded to the drastic change in demand by parking aircraft and reducing capacity across their networks.

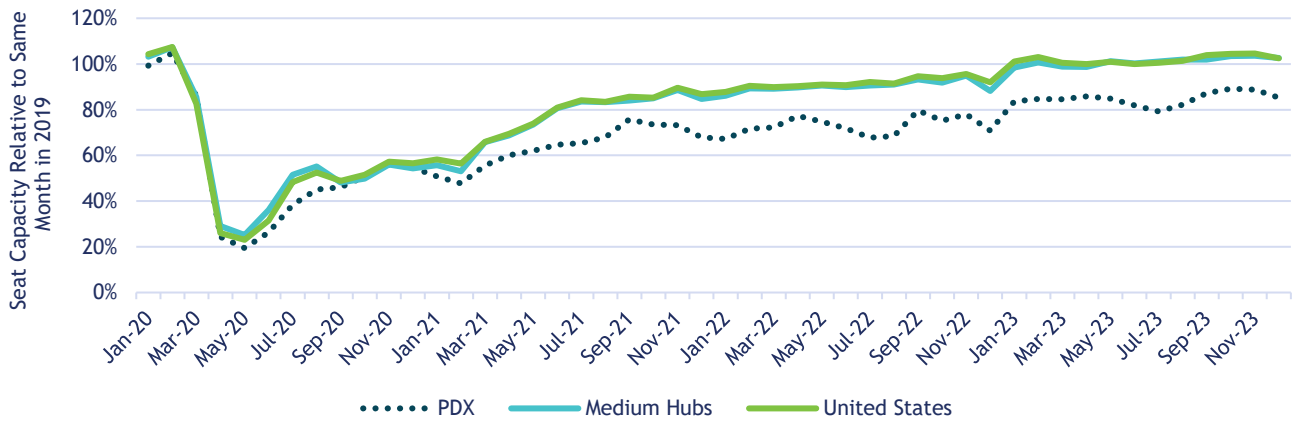
By April 2020, the low point in passenger travel in recent history, enplaned passengers decreased to 4% of what they had been a year before in April 2019 for all US airports and at PDX. Recovery since that low point was initially modest and then accelerated, and by summer 2021 fell into a pattern of steady and sustained recovery toward pre-pandemic enplanements. **Exhibit 4** and **Exhibit 5** depict PDX's seat capacity and enplaned passenger recovery relative to FAA medium-hub airports and all US commercial service airports.

Recovery at PDX has generally lagged behind national trends, similar to other airports on the west coast. By December 2023 enplaned passengers represented 98% of December 2019 enplaned passengers for all US airports, but only 79% of December 2019 enplaned passengers at PDX.

Airline response to the COVID-19 pandemic had severe impacts on airline profitability around the world. As the industry has recovered, industry profitability in the US and around the world has recovered, and in some cases has

reached record levels. Detailed discussion of airline profitability and its impacts at PDX can be found in the ***PDX 2045 Aviation Activity Forecasts*** Final Report.

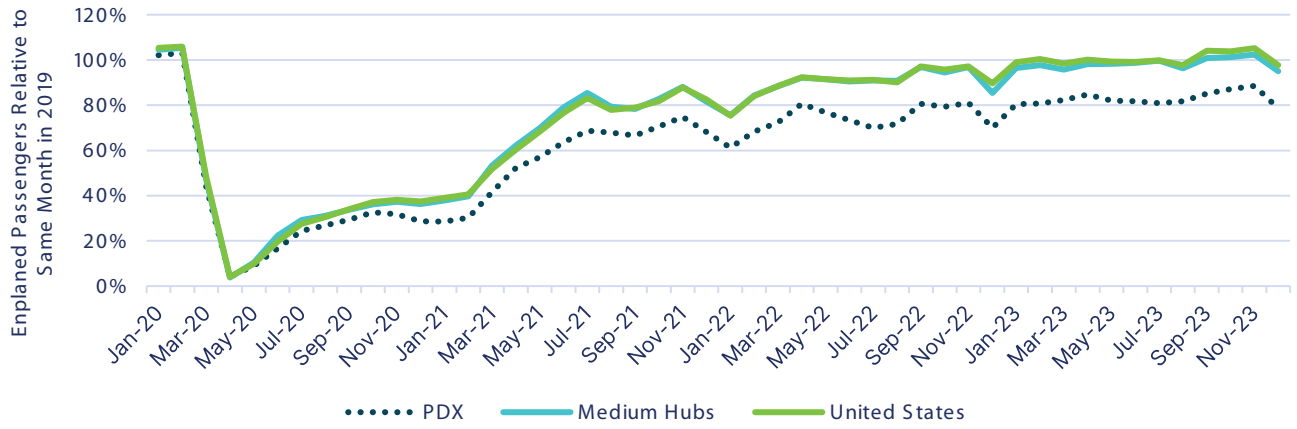
Exhibit 4 Seat Capacity Recovery – PDX, all Medium Hub Airports, and all US Airports



NOTES:
Seat capacity was indexed to the same month in 2019.

SOURCE:
Cirium Diio, April 2024 (US Department of Transportation, T-100 data).

Exhibit 5 Enplaned Passenger Recovery – PDX, all Medium Hub Airports, and all US Airports



NOTES:
Enplaned passengers were indexed to the same month in 2019.

SOURCE:
Cirium Diio, April 2024 (US Department of Transportation, T-100 data).

COST OF AVIATION FUEL

As of the third quarter of 2023, jet fuel accounted for 20.8% of total airline operating costs, second only to labor.[1] In February 2024, the average price of jet fuel was $2.83 per gallon, below previously sustained high prices in 2022 (of $4.04). Fluctuating fuel costs will continue to affect airline profitability. This could lead to changes in air service as airlines adjust capacity and pricing to address increases or decreases in the cost of fuel.

THREAT OF TERRORISM AND GLOBAL CONFLICTS

Since September 11, 2001, the recurrence of terrorism incidents against either domestic or world aviation has remained a risk to achieving forecast levels of activity. Tighter security measures have restored the public's confidence in the integrity of the US and global aviation security systems. However, any terrorist incident targeting aviation could have an immediate and significant impact on the demand for air travel.

Additionally, geopolitical issues may affect aviation activity in the future. Potential governmental or regional instability in certain countries or locations may affect access to, or demand for, aviation service in these places. As an international gateway, PDX provides service to nearly all major regions of the world so future governmental or regional instability could impact international aviation service demand at PDX.

MERGERS, ACQUISITIONS, NEW AIRLINES, AND AIRLINE RESTRUCTURINGS

Airlines in the US have merged with or acquired competitors to achieve operational and commercial synergies and to improve their financial performance. Consolidation across the industry has resulted in the realignment of several airline route networks as airlines have sought efficiency in their service. Further consolidation of the US airline industry could affect the amount of capacity offered at PDX and could alter the competitive landscape.

Between 2005 and 2013, eight carriers consolidated across numerous transactions into what are the four largest US airlines today: American, Delta, Southwest, and United. The most recent consolidation occurred in 2016 when Alaska acquired Virgin America. Alaska and Hawaiian have announced their intention to merge no later than the first half of 2025, pending government and shareholder approval. Additional mergers, particularly among the Ultra Low Cost Carriers, have been proposed and terminated for various reasons.

CLIMATE CHANGE CONSIDERATIONS

As the aviation industry continues to monitor, adapt to, and seek to minimize negative impacts to climate change, it is becoming increasingly clear that climate change will affect future aviation demand to some extent. Climate change may result in direct impacts (e.g., weather related aircraft performance) and indirect impacts (e.g., policy-mandated caps on airport activity) to aviation demand. Reliable, industry-standard methodologies for estimating those impacts are not yet available. This uncertainty will be addressed in PDX 2045 by evaluating forecast sensitivities, identifying alternative demand scenarios, and building flexibility into the recommended development plan to respond to changing circumstances.