

Capital Development at US Airports

A near term outlook of trends, projects, and funding



This study is intended to provide insight into the magnitude of capital development planned at airports throughout the United States through 2024. The top 130 airports, ranked by passenger totals, were surveyed, and research of publicly available information was compiled to estimate the amount of investment required to meet project demands.

The study also provides observations regarding the data and research compiled regarding the changing landscape of capital improvements at airports. An interactive display of individual airport project information can be found on the [ACC website](#).

ACC would like to acknowledge and thank all the airports that shared data and insights with the research team. Without their willingness to share and transparent manner of business, this study would not be possible.

Further, ACC would like to acknowledge its Board of Directors whose vision led to the commissioning of this study which builds upon the foundation set forth in the study's inaugural edition published last in 2017.

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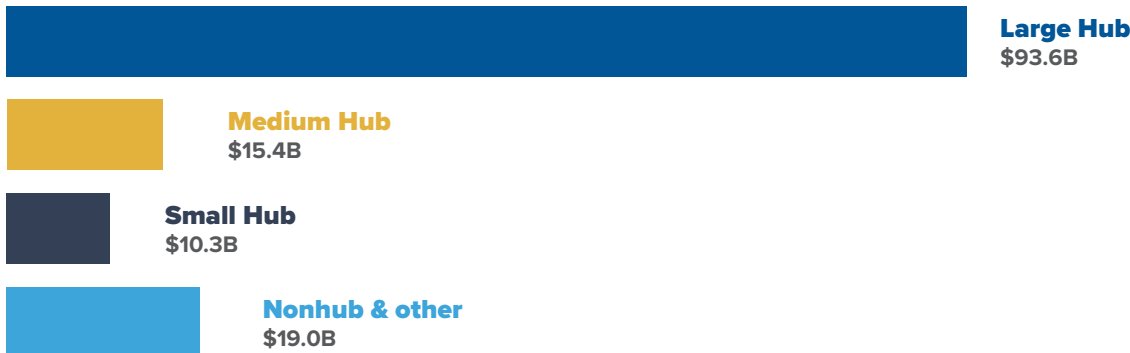
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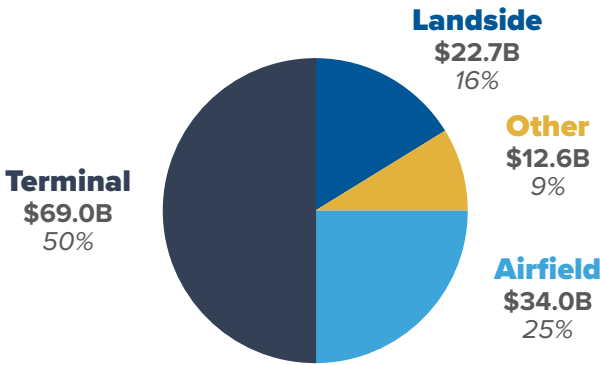
EXECUTIVE SUMMARY

Airports have an estimated \$138 billion in capital needs in the next five years alone, with most of the investment at large hub airports and terminal projects

Total 5-year capital investment



Source: InterVISTAS Consulting Inc review of publicly available data
Note: Numbers may not add to totals due to rounding



In prior years, significant spending on airfield projects along with advancements in airspace technology have resulted in highly capable airfields that can accommodate the growth in aircraft operations. In turn, this spending has resulted in airports investing heavily in terminal infrastructure to balance the capacity provided by the recent investments in airfield infrastructure. Notably, the investment in passenger terminals is to both provide additional capacity as well as modernize aging facilities.

Project development trends



Terminal projects represent the largest share of capital investments – with approximately 50% of total investment dedicated to such improvements



Investment continues in parking and rental car facilities – although airports are increasingly considering impacts of Transportation Network Companies (TNCs) and future developments such as autonomous vehicles



Climate change mitigation is increasingly a focus of improvement planning – airports are moving beyond traditional sustainability considerations and investing in mitigation measures to ensure infrastructure resiliency



Bond financing is the largest funding source for airports – bond issuances continue to fill gaps created relative to other sources



There is limited use of FAA's pilot program for airport privatization – only two US airports closing deals under the FAA pilot program



P3 and private investment continues for many individual facilities at airports – including developer and airline financing



Sustained airline profitability supports confidence – lenders, airlines and airports are investing in growing markets



Baggage handling technology continues to evolve – airports are investing in individual carrier system (ICS) upgrades to drive operational efficiencies



Airports are continuing to evaluate alternative project delivery methods – increasingly airports are looking to design-build and construction manager at risk delivery for vertical work, as they seek to balance risks of increasingly costly capital projects



Investments in passenger facilitation technology, including biometrics, is driving significant changes – changes occurring throughout the terminal, in the check-in lobby, security checkpoint, and especially the international arrivals facilities



Customer experience is a central focus of airport strategy – the competition for passengers continues, as well as the imperative to diversify airport revenues, driving increased focus on innovation and customer

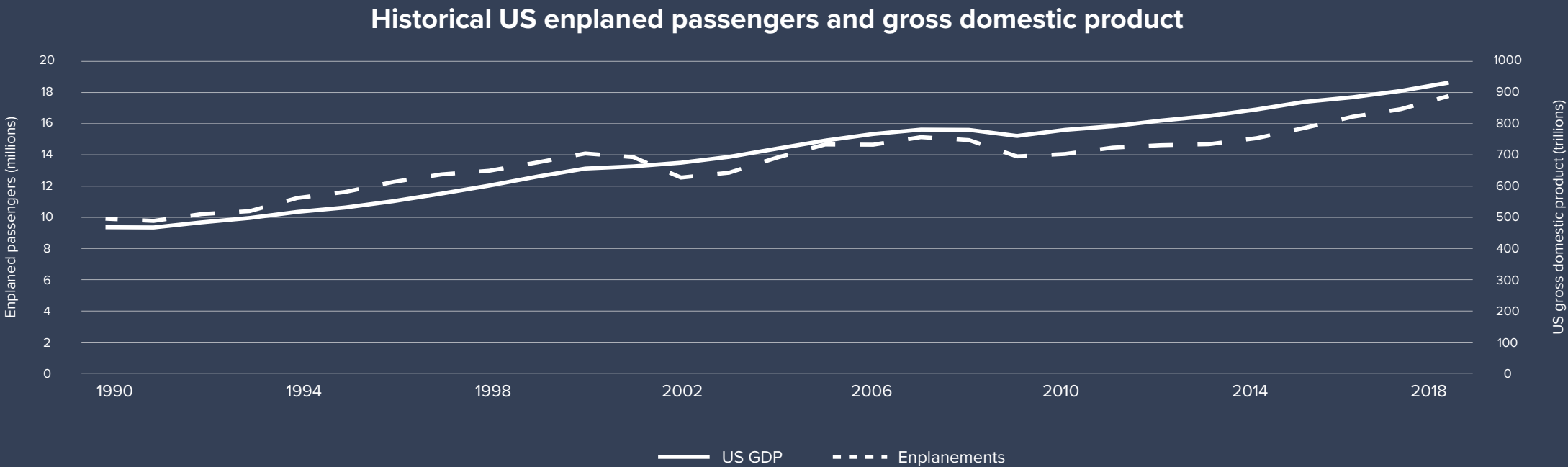


Strong growth continues in international traffic – both airports and US Customs and Border Protection are re-imagining their processes while investment in preclearance at airports outside the US has waned

GROWTH & DEVELOPMENT **AT US AIRPORTS**

Economic growth drives airport activity

- Strong historical correlation between US gross domestic product and enplaned passengers
- Long-term forecasts of US economic growth generally between 1.5% and 2.0% per year

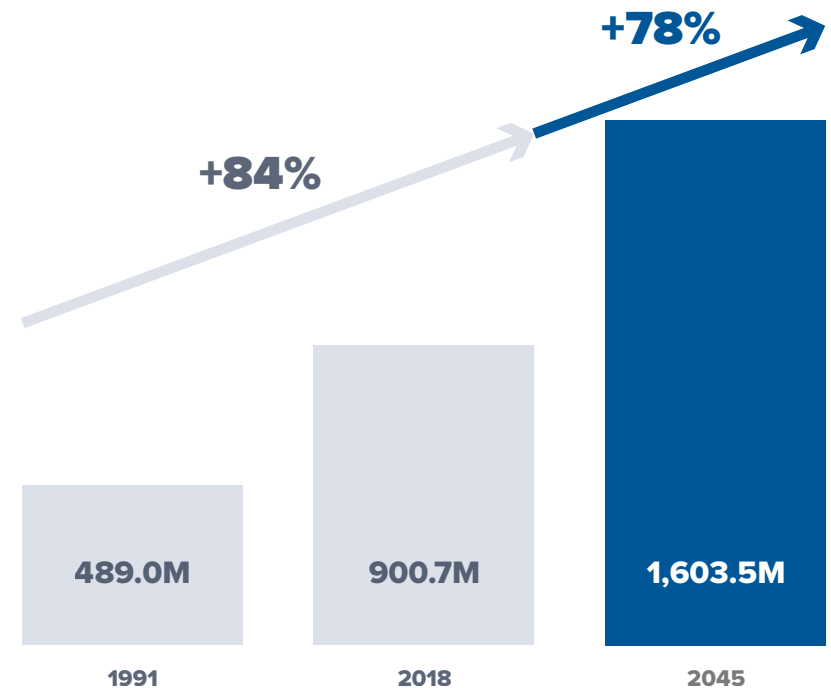


Source: FAA National Forecast FY2019-2039, Long-term growth of 1.8%/year
IMF World outlook, 1% to 2% growth next 5 years

US aviation activity growth is strong

With passenger growth, airports must invest in terminal buildings, roadways, parking facilities which serve customers

Increase in US enplaned passengers



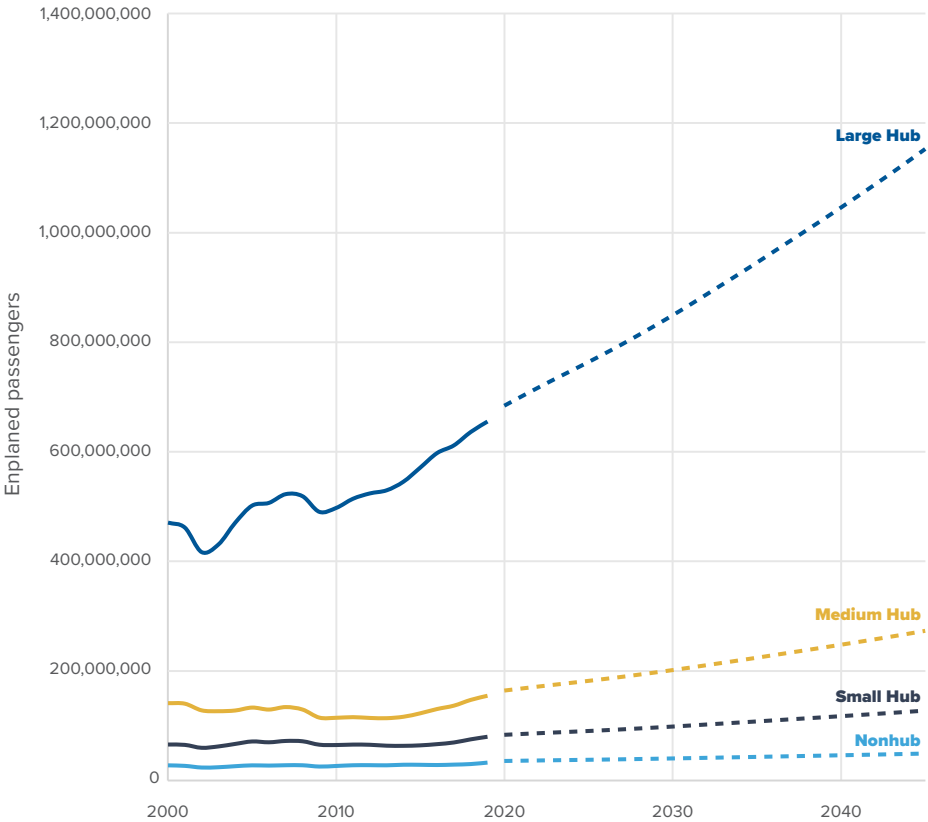
Source

Historical: FAA Enplanement report

Forecast: FAA 2018 Terminal Area Forecast

Actual Forecast

Historical and long-range growth of US Enplanements



Source: FAA 2018 Terminal Area Forecast

The majority of the growth in the number of annual passengers will occur at large hub airports

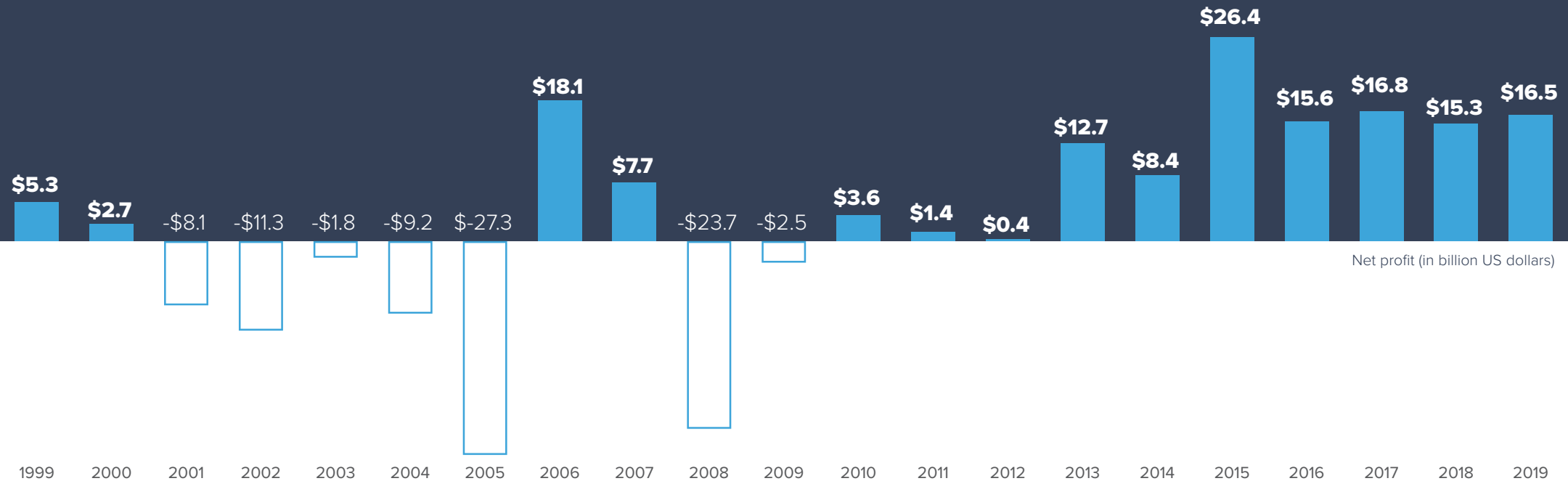
Relatively uniform growth outlook means broad investment throughout the industry, regardless of market size, with 2% annual growth for airports of all sizes

US enplaned passenger growth

	Historical (2010-2018)	Long range (2018 – 2045)	Additional enplaned passengers (2018 – 2045)
Large Hub	3.1%	2.2%	516.7M
Medium Hub	3.2%	2.3%	126.2M
Small Hub	1.9%	2.0%	52.9M
Non Hub	1.6%	1.9%	19.2M

Strong airline profitability supports capital investment by airports and airlines

- Airline profitability is important to consider in relation to investing in airport facilities
- In the last several years, airlines have been profitable at historically high levels
- Airline profitability that is sustained for several years has generated capital investment



Source: InterVISTAS review of USDOT, Form41, via Diio



Terminal projects

Terminal projects

- Innovation is occurring in passenger facilitation processes and facilities
- New technology, such as biometrics, is impacting the check-in lobby, security checkpoints, boarding areas, and the international passenger arrivals process (e.g. CBP “simplified arrivals”)
- Growth continues in aircraft size, along with up-gauging and the development of new aircraft, such as the Boeing 777x
- Significant modernization in aging facilities makes investment necessary beyond that required for new capacity alone



Airside projects

Airside projects

- Investment continues in safety projects, such as runway incursion mitigation
- There are few new runway projects in recent years or planned in coming years
- Taxiway modernization and capacity projects are common, including geometry modifications, end-around taxiways
- Runway protection zones (RPZ) are of greater focus and investment, following the focus on runway safety areas (RSA) in past years



Landside projects

Landside projects

- Airports continue to improve access and circulation roadways to accommodate the recent growth in passenger traffic
- Several airports are considering relocating TNC boarding areas in parking garages or other sites to relieve curbside congestion
- Investment continues in parking and rental car facilities, although many of the recent investments are part of long-term development projects initiated several years ago
- Going forward, when planning new landside facilities, airports will increasingly consider the impacts of TNCs on revenues and requirements, and the longer-term implications of autonomous vehicles

Airports have an estimated \$138 billion in capital needs in the next five years, with the top 130 airports spending \$119 billion

For large, medium, and small hub airports, our primary research produced the following estimates

	Large	Medium	Small	Subtotal
Total capital investment (billions)	\$94	\$15	\$10	\$119
Number of Airports	30	31	69	130
Enplaned passengers (millions)	642	150	76	868
Capital investment per airport (millions)	\$3,121	\$495	\$150	\$918
Capital investment per enplaned passenger	\$146	\$102	\$136	\$137

Source: InterVISTAS Consulting Inc review of publicly available data
Note: Numbers may not add to totals due to rounding

In addition, we referenced NPIAS for information on smaller airports

	Nonhub	Other	Subtotal
Total capital investment (billions)	\$5	\$14	\$19

Source: 2019-2023 NPIAS

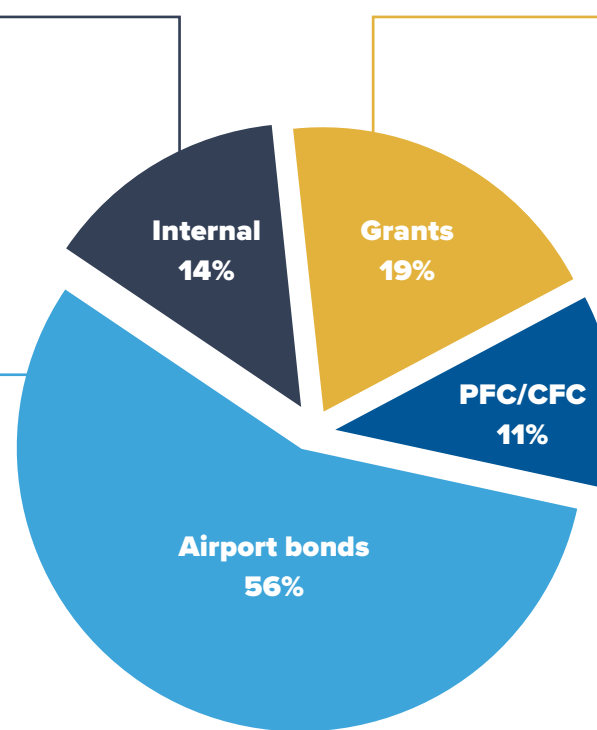
Airports continue to rely on bond financing

Internal

- Internally-generated funds from airport revenues
- Typically limited by provisions of airline agreements

Airport bonds

- “Gap Filler” funding source; especially given limited increases in other sources
- Largest funding source for large and medium hub airports
- Concerns regarding challenges to tax-exempt status



Grants

- Primarily federal grants from the Airport Improvement Program (AIP); it also includes state grants
- Federal funding a relatively small share for larger airports
- Federal grants more important for smaller airports
- No increase in authorized AIP grants for about 20 years

PFC/CFC

- User charges important funding source: both “pay as you go” and leveraging for bond issuance
- Virtually all large, medium, and small hub airports collect a PFC, and at the maximum level of \$4.50
- No increase in authorized PFC charge level for about 20 years

Source: InterVISTAS Consulting Inc review of publicly available data
Note: Numbers may not add to totals due to rounding

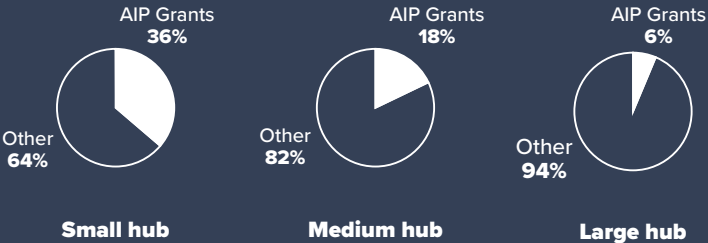
The FAA AIP Grant Program has not grown since 2000

\$3.35 billion per year allocated by FAA Reauthorization of 2018, if fully utilized would fund approximately \$16 billion in airport improvements

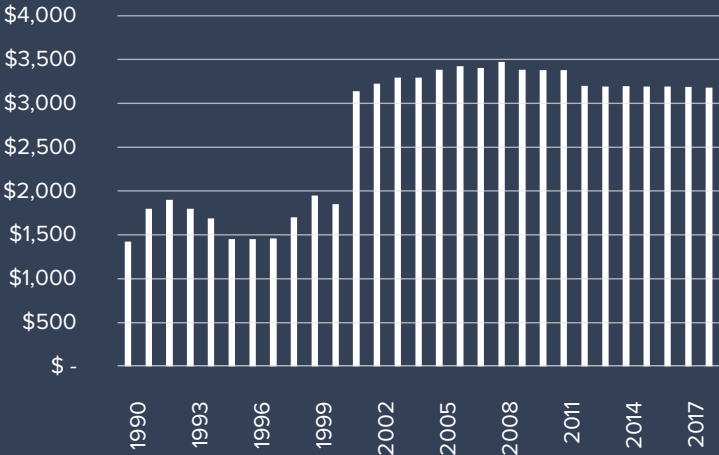
The Airport Improvement Program (AIP) provides federal grants to airports for planning and development, with the majority of grants funding airfield projects (e.g. 67% in FY2018). While the annual recurring amount totals approximately \$3.35 billion, supplemental AIP grant funding has been awarded in recent years. This supplemental funding included over \$485 million for a total of \$3.80 billion in FY2019, and over \$205 million for a total of \$3.46 billion in FY2018.

Notably, airlines' increased use of ancillary fees has reduced contributions to the Airport and Airway Trust Fund that is used to fund AIP grants as well as other government functions. ACI-NA has estimated that the charges for checked baggage alone costs the trust fund approximately \$350 million annually in foregone revenue.

Percentage of funding



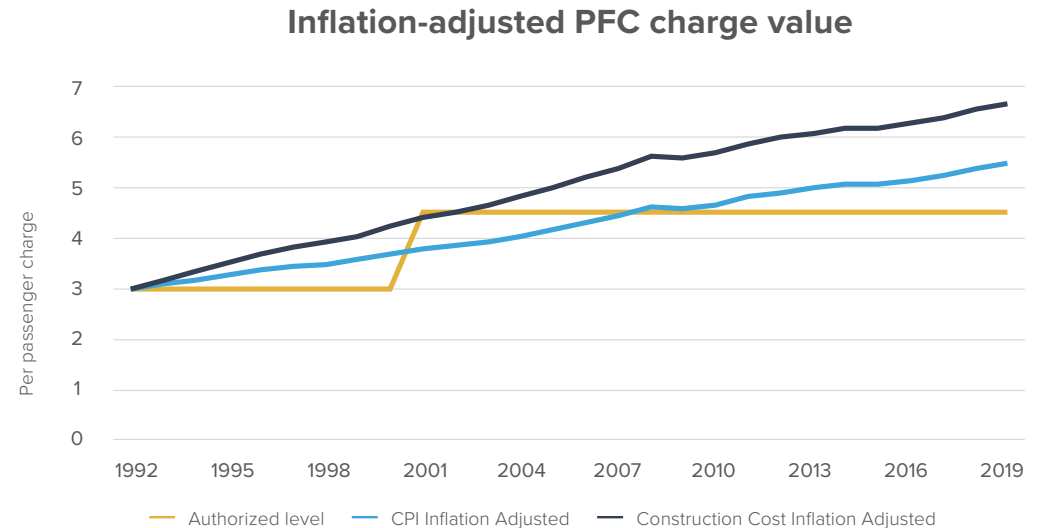
Annual grant amounts



Source: Congressional research service

The spending power of PFCs has eroded relative to its value at inception

- Nearly all commercial airports assess a Passenger Facility Charge (PFC) to assist with funding capital projects
- The PFC program was established in 1992 to assist airports in funding important capital projects
- The majority of authorized PFC funding is for terminal and landside projects (60%) which represent the majority of the critical airport projects
- The maximum per-passenger charge amount was increased from \$3 to \$4.50 in 2000, but there has been no increase since then.
- Accounting for inflation, and depending on the measure of inflation that is used, the spending power of the current \$4.50 PFC is about \$1 to \$2 less than the originally allocated \$3.00 PFC



Source: FAA (authorized level) and US BLS (inflation)

**US Department of
Transportation is
evaluating federal
credit assistance
as a new source of
airport financing**



Pursuant to Section 570 of the FAA Reauthorization, US Department of Transportation was directed to evaluate the demand for and implications of new federal credit assistance to airports seeking capital investment financing. This new credit facility will be evaluated as an expansion of eligibility under an existing credit program like the Transportation Infrastructure Finance and Innovation Act (TIFIA) and as a new standalone airport program.

A report from DOT is due out in mid-2020.

Private investment is a growing source of funding for airports

The investment takes many forms

Airport privatization	Developer P3 project	Airline project	Ancillary project
• Whole-airport privatization is rare in the United States • Mixed experience among airports who have pursued this San Juan is the largest US airport to complete the FAA privatization process	• Public-Private-Partnership (P3) between developer team and airport • Recent examples include some of the largest airport capital projects: • JFK Terminal One, by a consortium led by The Carlyle Group • LGA Terminal B, by LaGuardia Gateway Partners • LAX Automated People Mover, by LINXS • Other recent notable projects: • New terminal at Seattle's Paine Field • South Terminal at Austin	• Airlines frequently finance individual terminal projects at airports • Airlines have historically owned and operated individual terminals at the NY airports: • Delta Airlines redevelopment of LaGuardia Terminal C & D • American Airlines and British Airways modernization of JFK Terminal 8 • Airlines frequently use airport special facility bonds to access tax-exempt financing	• Private development of ancillary facilities such as: • Cargo • Fuel farm • Hotel

Airports and industry stakeholders are focusing on improving the customer experience



**Improved customer experience
to compete for passengers and
diversify revenue sources**



**New technology to improve
passenger processing**



**Informed input and
discussions regarding
future capital development**

Recent examples

- TSA has a security checkpoint innovation lab at LAS
- Airports have designated or hired chief innovation officers, e.g. Columbus Regional Airport Authority
- PHL is launching a pilot program for CBP biometric exits screening technology
- CBP is implementing biometrics into the international passengers arrivals process, referred to as “simplified arrivals”
- SAN and DAL have established “innovation labs” to test customer service enhancements and amenities
- Future Travel Experience has developed an innovation and startup hub network
- jetBlue’s “technology ventures” is investing and partnering with “early stage technology startups improving the future of travel, transportation, and hospitality”



Climate change will likely be a focus of airport strategic planning and capital investment in the coming years, as airports look to mitigate risk and address infrastructure resiliency

Selected airports evaluating resiliency-driven projects

- OAK has over \$46 million dedicated to their Airport Perimeter Dike Improvements to mitigate sea level rise and protect essential airfield and terminal facilities
- BOS has also evaluated flood-proofing measures to protect infrastructure
- SFO is planning a shoreline protection wall to protect runways and terminals for sea level rise, at a cost of over \$500 million
- PHL is evaluating mitigation to protect against flooding of the Delaware River, and has invested in upgrades to critical infrastructure

There is a national priority to develop preparedness against potential climate change events

Congress has created a \$16 billion program overseen by the Department of Housing and Urban Development to increase resilience to disasters. While not specifically directed to airports, it is indicative of a focus on mitigation for the impacts of climate change and weather events.

The air cargo industry is investing in airports to accommodate growth in the coming years

Air cargo development is primarily financed privately by the cargo operators. Much of the new development is related to activity associated with e-commerce

Rockford

- Amazon has rapidly expanded its presence at the secondary Chicago airport

Louisville

- UPS plans to invest \$0.75 billion in its main hub at SDF
- Plans include aircraft hangars, office buildings, and operations offices

Memphis

- FedEx is investing \$1.1 billion to modernize its global hub at MEM
- UPS is investing \$0.2 billion to expand its air-ground hub
- Amazon is investing in large fulfillment centers near the airport

Cleveland

- DHL announced investment in Cleveland to support demand for shipping in the region

Harrisburg

- UPS announced a major new “super hub” at Harrisburg to serve the northeast US

Cincinnati

- Amazon is investing \$1.5 billion in a major cargo hub at CVG
- Amazon has plans to base up to 100 aircraft at CVG

Lakeland

- Amazon has negotiated to develop facilities at this small airport in Florida

■ Selected developments at cargo hubs
■ Selected developments at other airports

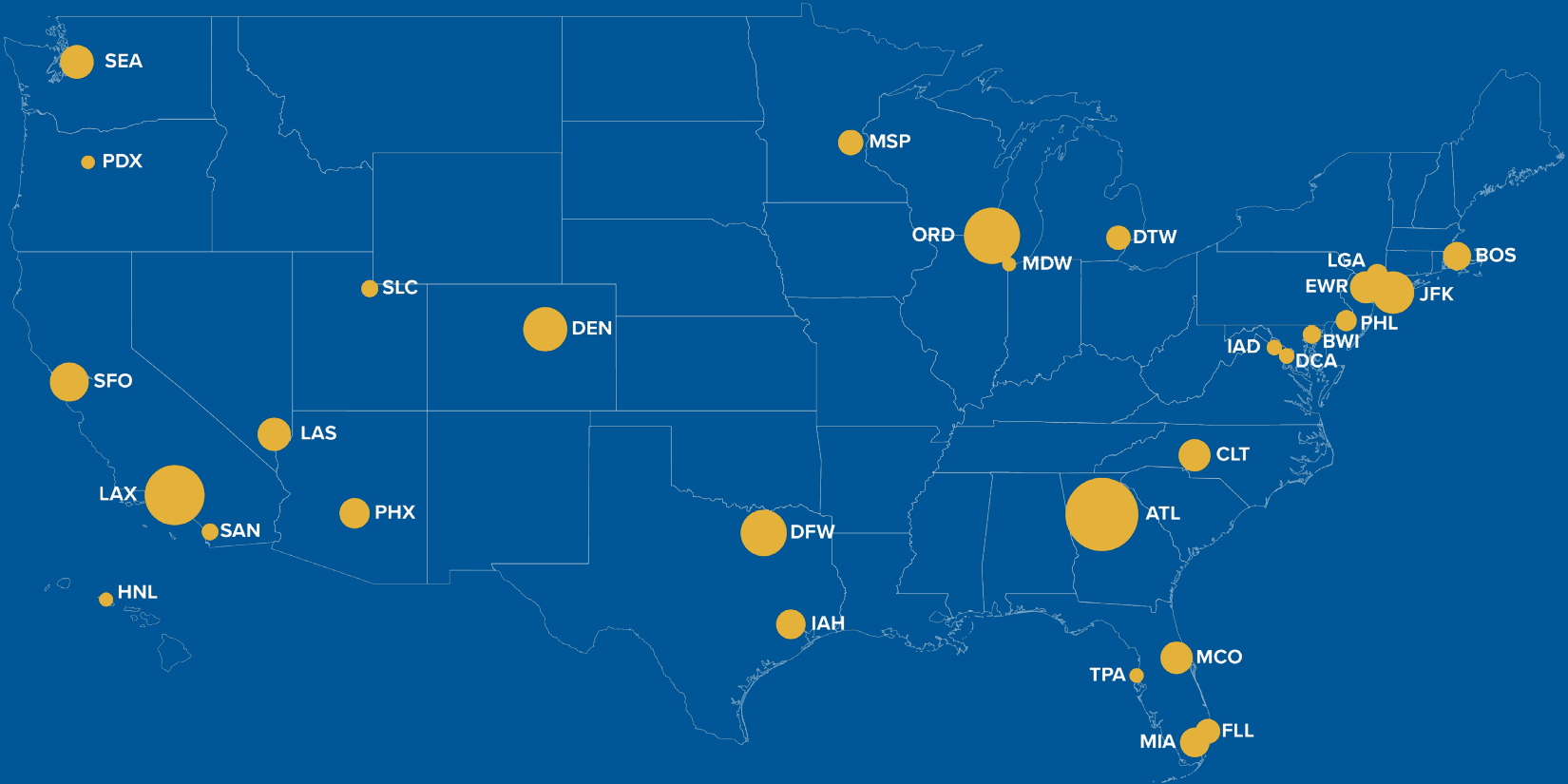
- The approximately 2,941 non-primary airports in the US account for about 64% of the total aircraft operations at US airports, primarily for general aviation
- General aviation activity has a major economic impact in communities throughout the US, and is particularly important in the more rural and remote communities
- General aviation provides mission-critical services to communities throughout the country, both large and small
 - Security and aerial observation
 - Fire-fighting and emergency rescue
 - Working services for sectors such as agriculture
 - Reliever airports for larger airports
 - Operations not available from other services (e.g., charters)
- General aviation airports do not represent the majority of the planned capital investments at US airports, but for the communities they serve, the investments are needed to continue to provide important facilities and services

**General aviation
will continue to
be an important
element of the
national
transportation
system**

LARGE HUB
CAPITAL DEVELOPMENT
—

Over the next 5 years

Large hubs are expected to spend \$78.7B for their capital improvement program



Display of large hub airports with circle size representing number of passengers

2.3%
growth rate from 2018 to 2045

\$93.6B
in capital improvements through 2024

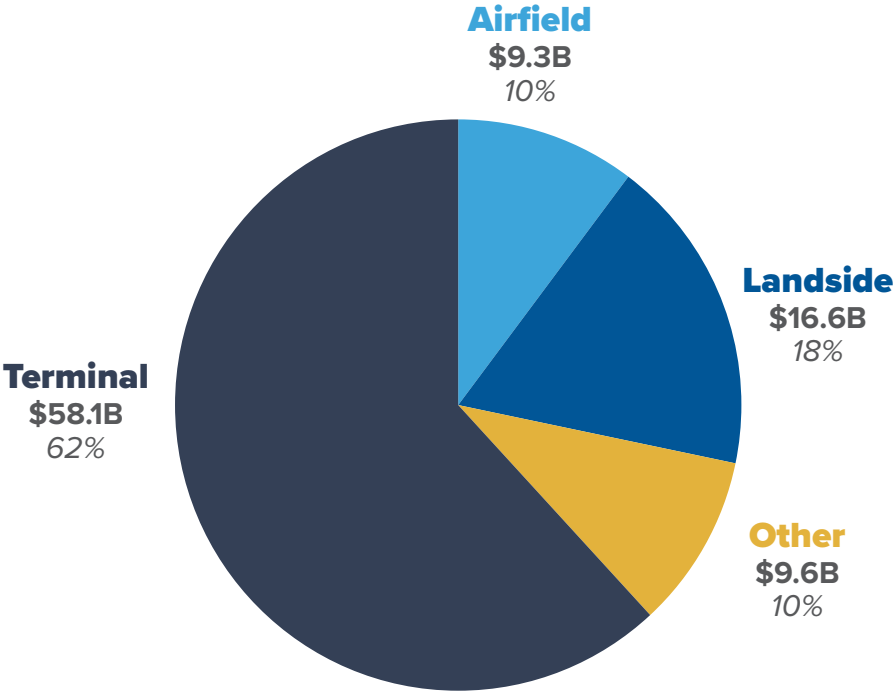
\$3.1B
per airport

\$146
capital investment per enplaned passenger

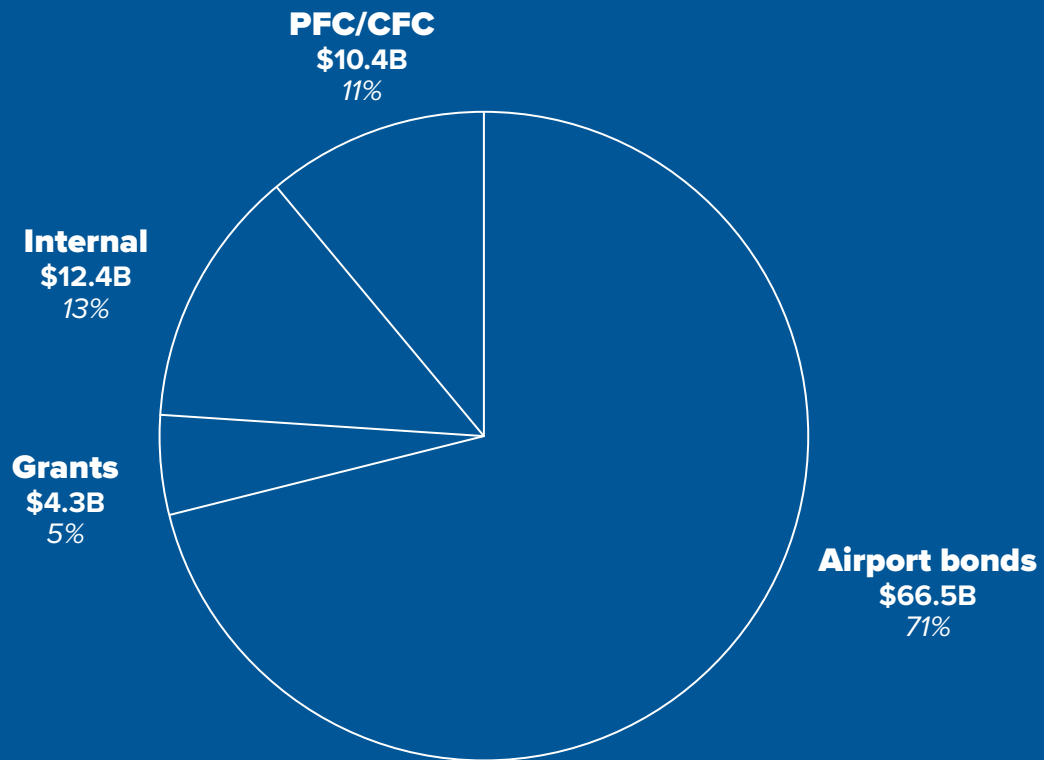
Large hub project type

Terminal projects represent the majority of large hub capital investments over the next 5 years

O’Hare International Airport presents an example of this industry-wide experience. The airport capital development program is primarily comprised of large-scale terminal investments. They recently completed the reconfiguration of the airfield that provided significant additional capacity.



Source: InterVISTAS Consulting Inc review of publicly available data
Note: Numbers may not add to totals due to rounding



Source: InterVISTAS Consulting Inc review of publicly available data
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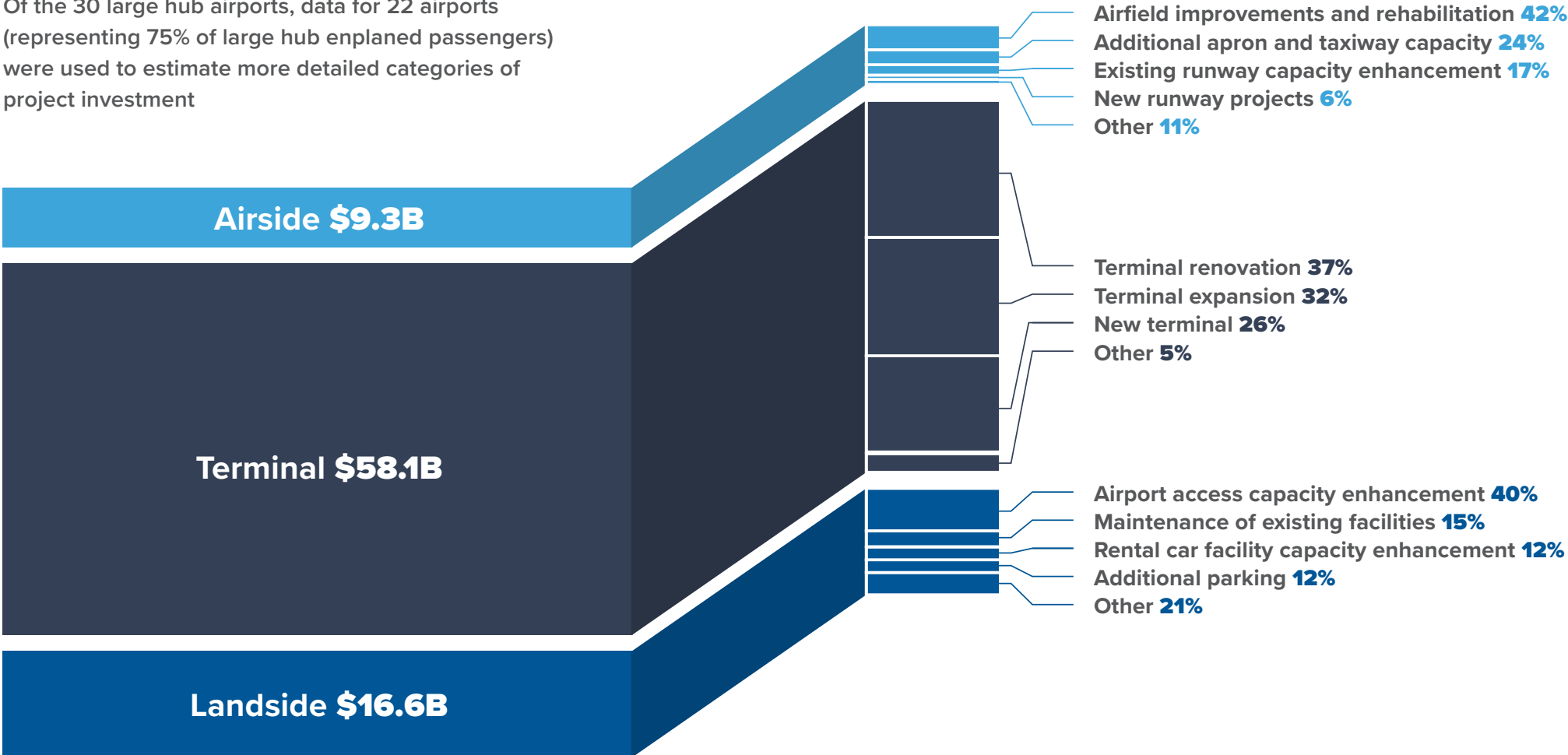
Large hub airport funding

Over the next 5 years, bond financing represent the largest funding source, with 71% of large hub capital investment expected to be funded through debt issuance.

According to FAA's NPIAS database, large hub airport AIP-eligible capital projects total about \$8.3B over this same time period. This is in contrast to the expected receipt of \$4.3B in federal grants shown in the pie chart to the left, which reinforces the need for other funding sources.

Significant categories within each project type

Of the 30 large hub airports, data for 22 airports (representing 75% of large hub enplaned passengers) were used to estimate more detailed categories of project investment



Note: Numbers may not add to totals due to rounding

Selected large hub project listing

Individual projects within the airport 5-year capital program

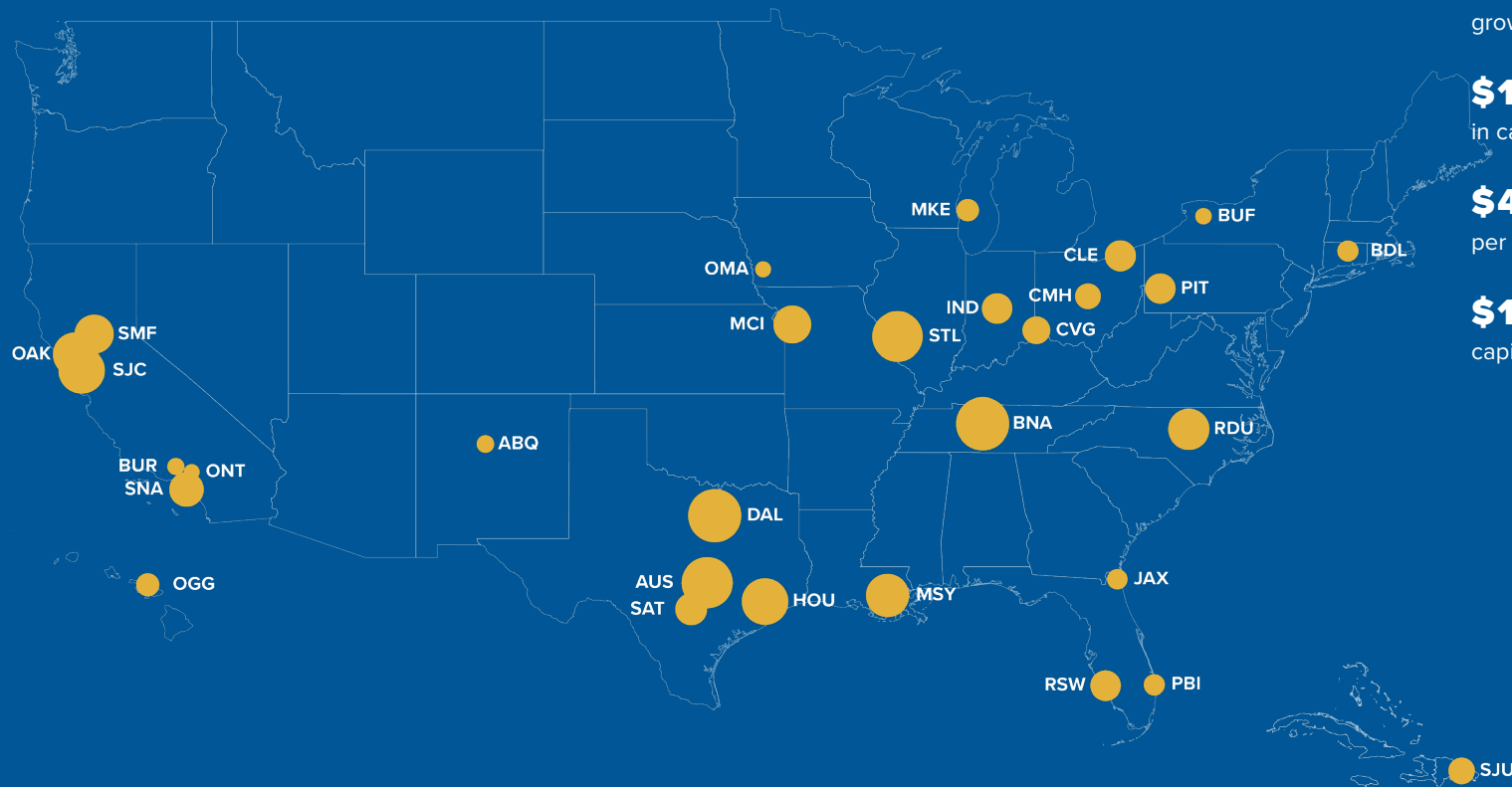
DFW	New Terminal F	\$3.0B
EWR	Terminal 1 Redevelopment	\$2.7B
JFK	Terminal 1 Redevelopment	\$7.0B
	Terminal 4 Expansion	\$3.8B
	Terminal 6/7 Redevelopment	\$3.0B
LAX	North Terminal Improvement Program	\$1.8B
	Airport People Mover System	\$1.6B
	Midfield Satellite Concourse - North Project	\$1.5B
	Consolidated Rent-a-Car Facility (ConRAC)	\$1.0B
MCO	Terminal Building - South Terminal Complex Phase 1	\$1.5B
MIA	MIA Central Base Apron & Utilities	\$1.1B
ORD	Terminal 2 Redevelopment - O'Hare Global Terminal & Concourse	\$2.6B
	Terminal Area Plan - Phase 1	\$2.1B
	Runway 9C-27C and Enabling Projects (Fully Funded)	\$1.0B
	Other Terminal Projects	\$1.0B
SAN	Terminal 1 Replacement - Phase 1A	\$1.1B
SFO	Terminal 1 Projects	\$2.4B
	Terminal 3 Projects	\$1.2B

Estimate of project investment over the next 5 years

MEDIUM HUB
CAPITAL DEVELOPMENT
—

Over the next 5 years

Medium hubs are expected to spend \$15.4B for their capital improvement programs



2.3%

growth rate from 2018 to 2045

\$15.4B

in capital improvements through 2024

\$495M

per airport

\$102.5

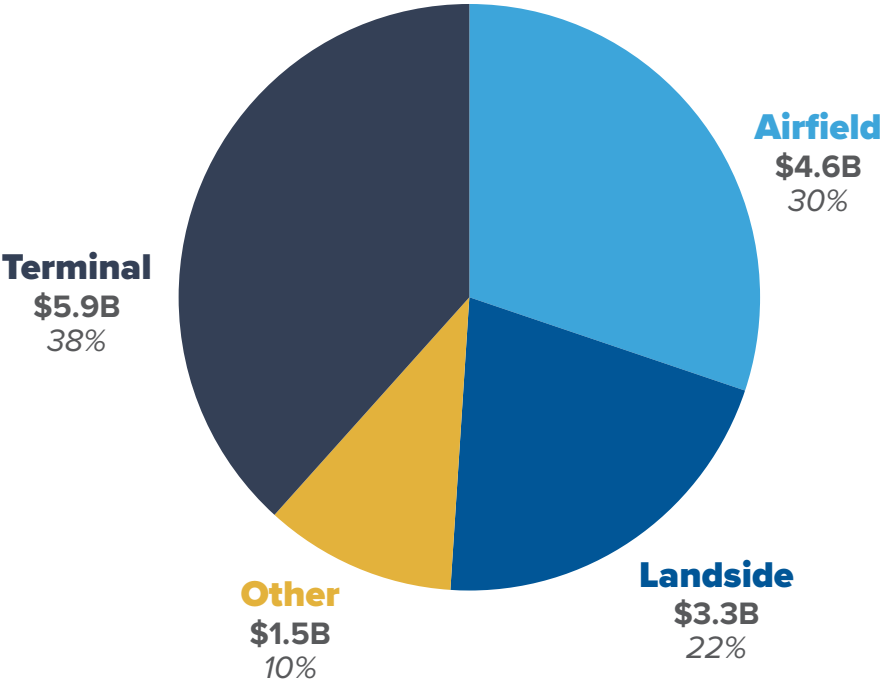
capital investment per enplaned passenger

Display of medium hub airports with circle size representing number of passengers

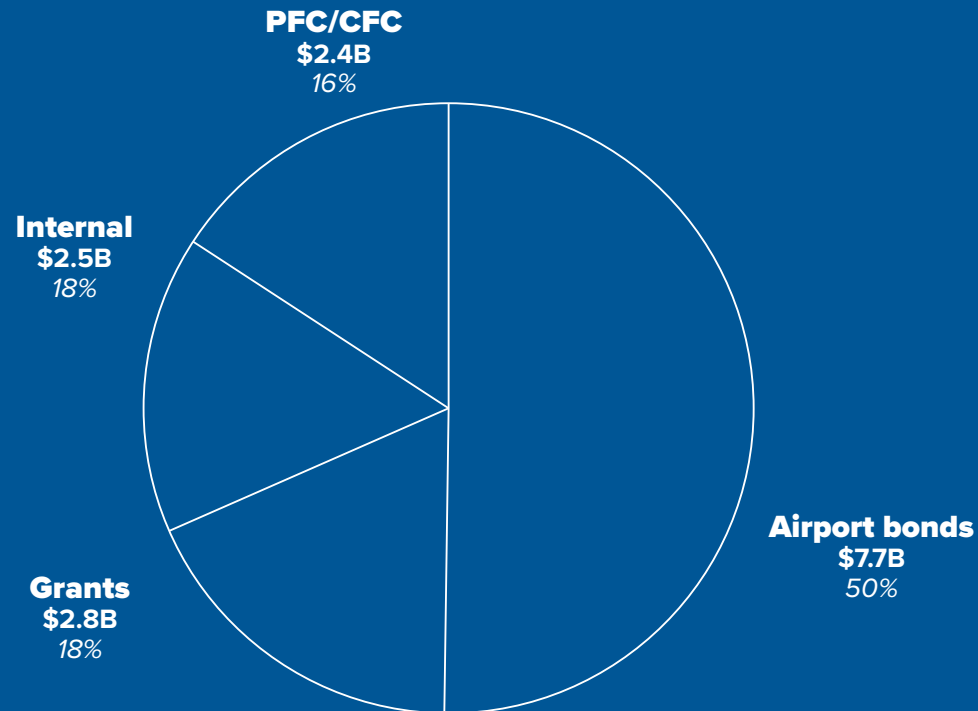
Medium hub project type

Terminal projects represent the largest share of medium hub capital improvement with \$5.9B planned over the next 5 years

The \$5.9 billion in investment includes a wide array of projects driven by growth as well as aging assets. Among the issues being addressed, airports are investing in smart building technologies, sophisticated asset management infrastructure, customer amenities, and the accommodation of larger aircraft.



Source: InterVISTAS Consulting Inc review of publicly available data
Note: Numbers may not add to totals due to rounding



Source: InterVISTAS Consulting Inc review of publicly available data
Note: Numbers may not add to totals due to rounding

Medium hub airport funding

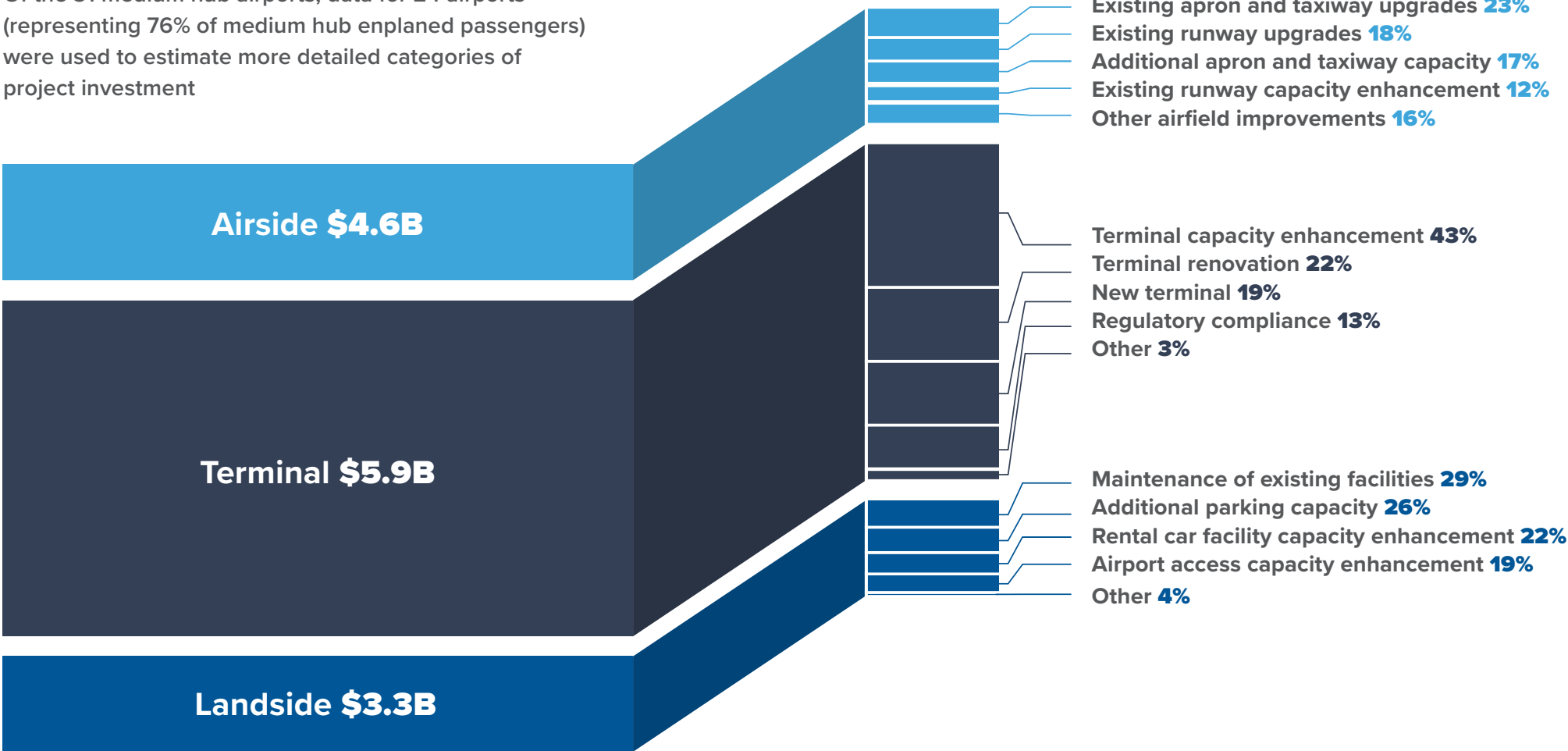
Over the next 5 years, bond financing represents the largest funding source, with 50% of medium hub capital investment expected to be funded through debt issuance.

As with large hubs, the need to issue debt to finance capital improvements will highlight the importance of demand forecasts of growth and due diligence reviews of revenue sources.

The remaining \$7.7B in improvements are anticipated to be funded by a mix of PFC and CFC, internal funds, and grants.

Significant categories within each project type

Of the 31 medium hub airports, data for 24 airports (representing 76% of medium hub enplaned passengers) were used to estimate more detailed categories of project investment



Note: Numbers may not add to totals due to rounding

Selected medium hub project listing

Individual projects within the airport 5-year capital program

AUS	New Midfield Concourse Construction	\$669.2M
	New Terminal Processor Construction	\$573.0M
	9 Gate Expansion	\$378.0M
	Relocation of Taxiway Hotel & Demo of Taxiway Hotel and Golf - Construction	\$292.0M
	Parking Garage	\$252.7M
BDL	Terminal B - Phase 1, Processor & Central Gates	\$392.1M
	Ground Transportation Center	\$200.0M
BNA	Runway 2L/20R Extension - Construction	\$300.0M
BUR	New Terminal, Access, and Parking	\$1,000.0M
IND	Airfield	\$220.5M
MCI	Terminal Modernization Program - includes Landside	\$1,500.0M
OMA	Terminal Expansion & Renovation	\$341.0M
PIT	Terminal Modernization Program - Terminal	\$784.0M
	Terminal Modernization Program - Landside	\$316.0M
RDU	Relocation of Runway 5L-23R- includes Lumley Road Relocation	\$274.8M
RSW	Terminal Expansion	\$215.7M

Estimate of project investment over the next 5 years

SMALL HUB
CAPITAL DEVELOPMENT
—

Over the next 5 years

Small hubs are expected to spend \$10.3B for their capital improvement program



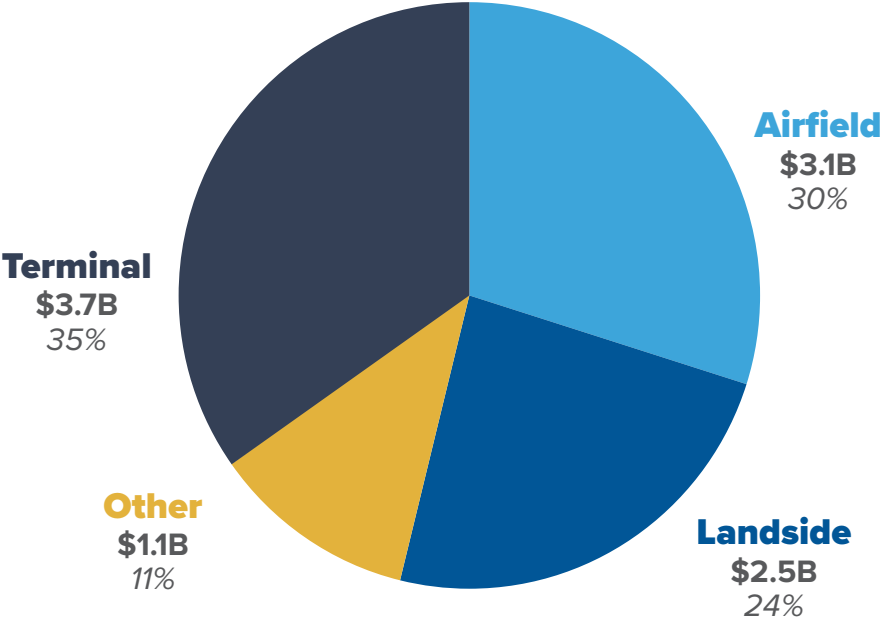
Display of small hub airports with circle size representing number of passengers

Small hub project type

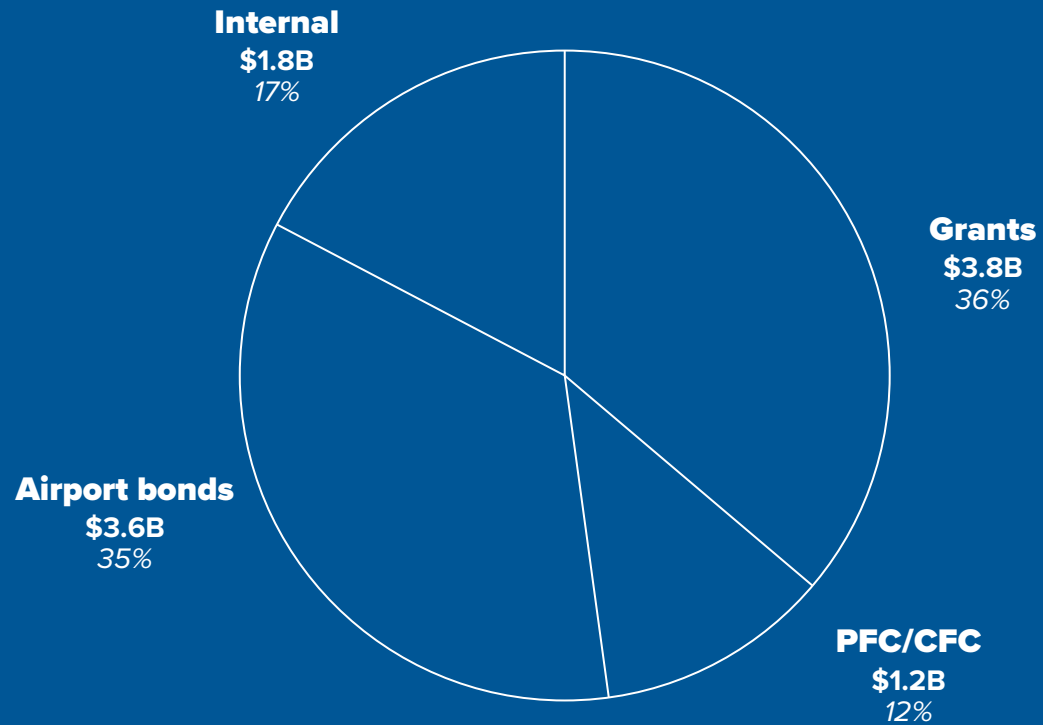
Project investment requirements at small hub airports are relatively evenly distributed between terminal, airfield, and landside projects.

In contrast to large and medium hub airports, small hub airports require a larger share of investment for airfield improvements.

There are some significant projects at small hub airports, highlighted in pages 38-40.



Source: InterVISTAS Consulting Inc review of publicly available data
Note: Numbers may not add to totals due to rounding



Source: InterVISTAS Consulting Inc review of publicly available data
Note: Numbers may not add to totals due to rounding

Small hub airport funding

According to FAA's NPIAS database, small hub airport AIP-eligible capital projects total about \$4.1B versus the expected receipt of \$3.8B in federal grants shown in the pie chart to the left.

Selected small hub project listing

Individual projects within the airport 5-year capital program

AVL	Terminal Rehabilitation and Expansion - Construction	\$50.0M
BHM	Relocate Taxiway 'A' - Design, Construction, Environmental Rental Car QTA - Design & Construction	\$55.0M \$32.7M
CHA	Terminal Phase 1 - Design/Environmental, Construction Parking Garage	\$30.9M \$26.8M
DSM	Runway 5/23 Reconstruction	\$40.8M
GRR	Concourse A Expansion International Arrivals Building Development New Parking Structure	\$97.4M \$28.0M \$26.7M
HPN	Construction of General Aviation Hangars and Apron Area	\$41.4M
ICT	Airfield Pavement Rehabilitation	\$40.2M
OKC	New Parking Garage	\$28.5M
ORF	Runway 5/23 Standardization 2019 Parking Project	\$100.0M \$69.7M
PVD	Runway 16-34 Reconstruction & Intersection of 16-34/5-23	\$33.0M
RNO	Runway 16R/34L Phase 1 Rehabilitation - Design and Construction	\$52.7M

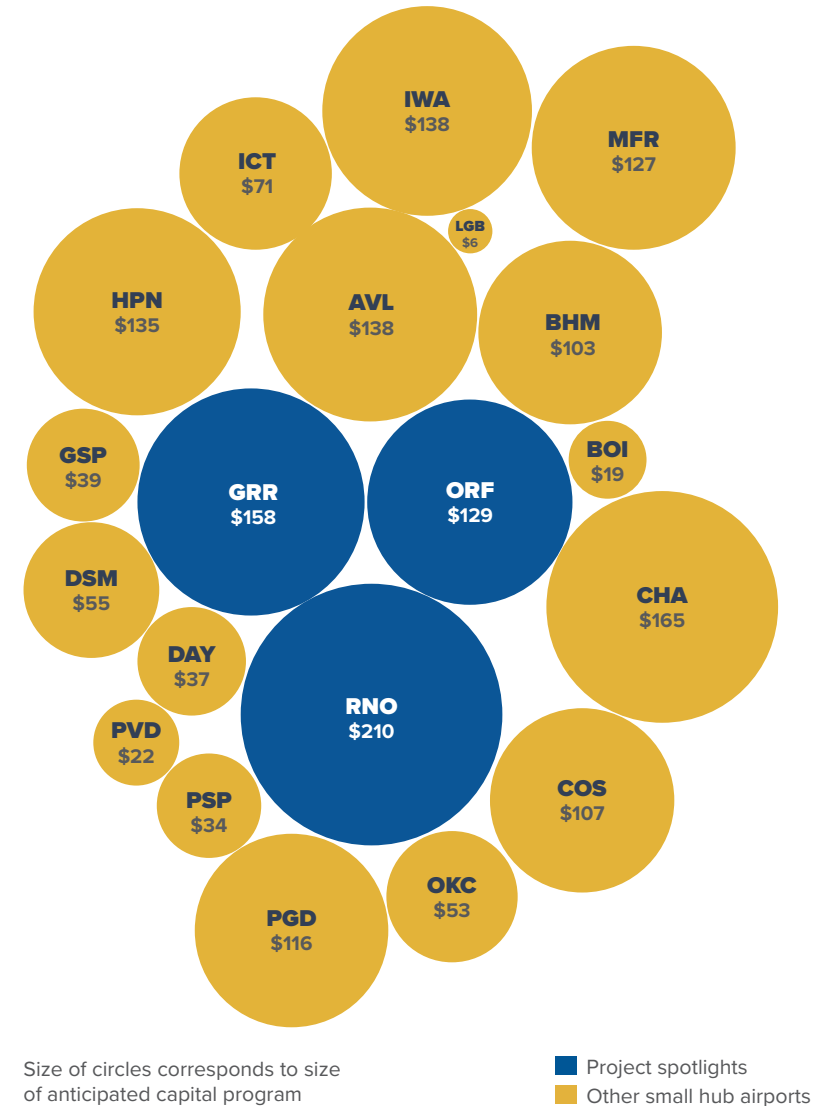
Estimate of project investment over the next 5 years

Project spotlights

The following pages provide a spotlight on airport developments at three airports – GRR, ORF, and RNO.

These three airports provided detailed information on their 5-year capital programs, and are among the larger capital programs within the group of small hub airports, from the data we were able to obtain.

As examples, these three airports also serve to highlight geographic diversity and the different projects that are planned to accommodate future growth.



Gerald R. Ford International Airport

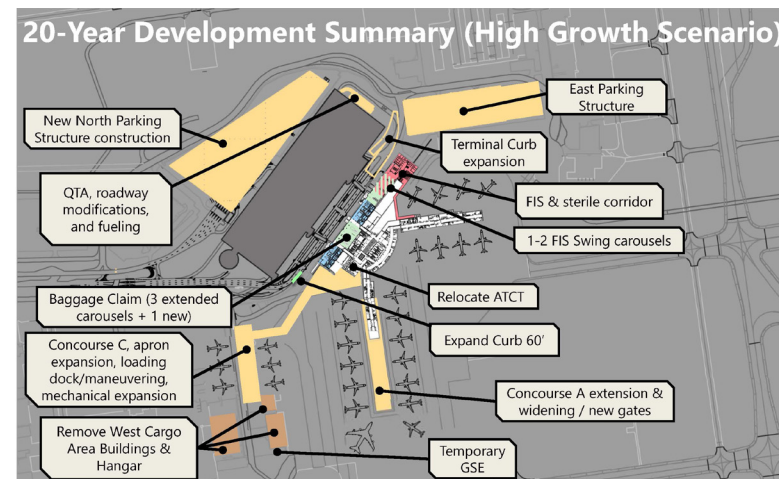
5-year capital program summary

	Capital Investment
 Airfield	\$73.6M
 Terminal	\$105.3M
 Landside	\$63.4M
 Other	\$21.2M
Total	\$257.1M

Selected projects

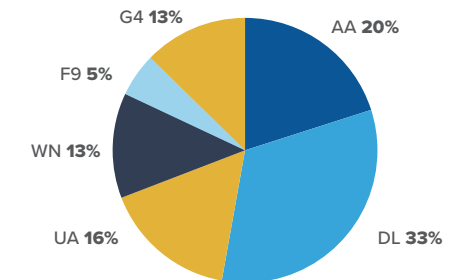
Project Elevate - concourse A expansion (years 1, 2, and 3)	\$92.1M
Additional parking structure (years 1 and 2)	\$21.3M
Project Elevate – International arrival building development (phases 1 and 2)	\$18.0M
Airfield wetland/wildlife attractant removal	\$13.2M

Long-term master plan



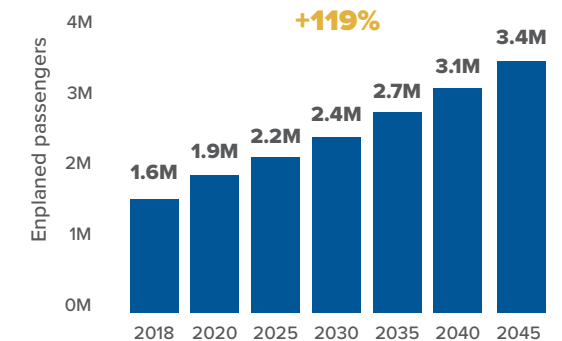
Source: GRR master plan update (June 2018)

Share of capacity by airline 2019



Source: Innovata Schedules, via Diio

Forecast growth



Source: FAA 2018 Terminal area forecast



NORFOLK AIRPORT
AUTHORITY

Norfolk International Airport

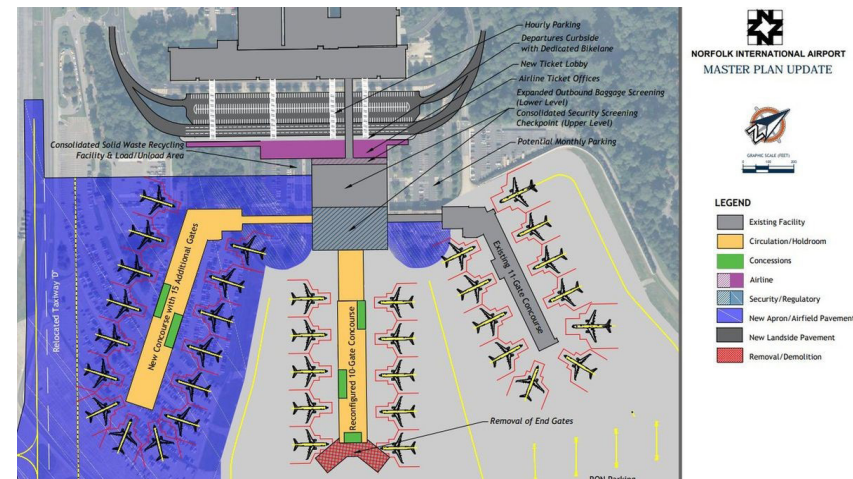
5-year capital program summary

Capital Investment		
	Airfield	\$152.9M
	Terminal	\$6.7M
	Landside	\$70.5M
	Other	\$8.51M
Total		\$238.6M

Selected projects

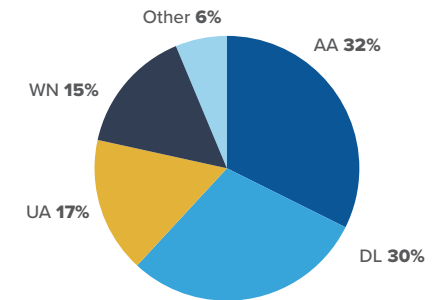
Runway 5/23 standardization	\$100.0M
2019 parking project	\$69.7M
Taxiway C south reconstruction	\$16.0M
Runway 5/23 (lighting and pavement construction)	\$13.3M

Long-term master plan



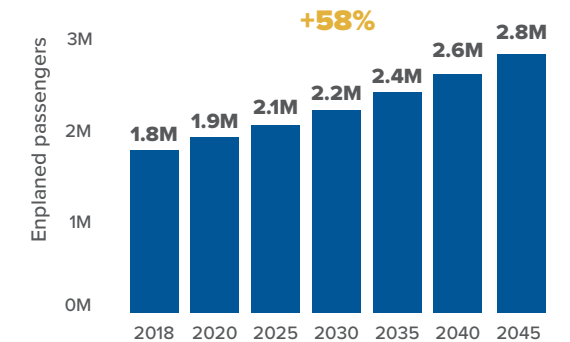
Source: ORF master plan update, facility requirements (June 2019)

Share of capacity by airline 2019



Source: Innovata Schedules, via Diio

Forecast growth



Source: FAA 2018 Terminal area forecast



**Reno-Tahoe
International
Airport**

Reno-Tahoe International Airport

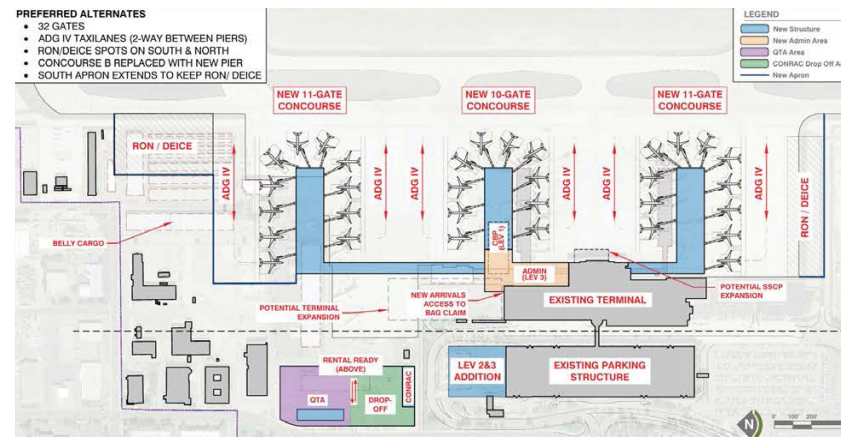
5-year capital program summary

	Capital Investment
Airfield	\$72.6M
Terminal	\$224.8M
Landside	\$117.3M
Other	\$15.1M
Total	\$429.8M

Selected projects

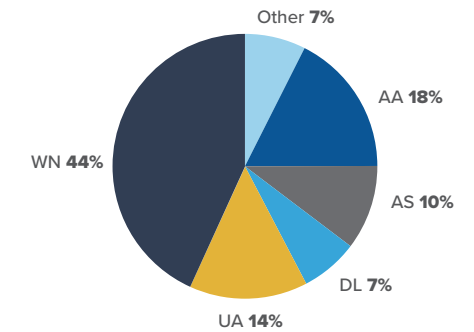
New concourse C (including new CBP facility, passenger loading bridges, and building demolition)	\$159.9M
New ConRAC (including pedestrian bridge, new QTA, landscaping, and building demolition)	\$110.0M
Runway 16R/34L Phase 1 Rehabilitation (design and construction)	\$52.7M
New admin., Counter, Bag Claim, Concessions	\$33.8M

Long-term master plan



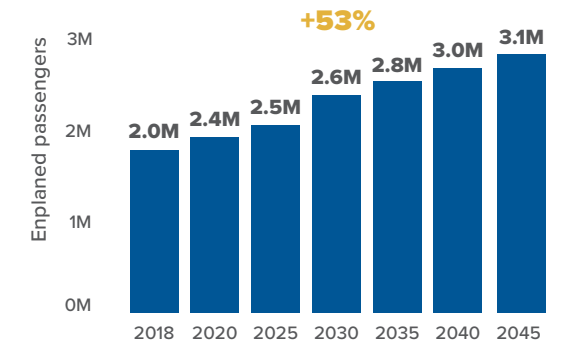
Source: RNO master plan (2018)

Share of capacity by airline 2019



Source: Innovata Schedules, via Diiio

Forecast growth



Source: FAA 2018 Terminal area forecast

NONHUB & NONPRIMARY **CAPITAL DEVELOPMENT**

Capital projects at smaller nonhub and nonprimary airports focused primarily on the airfield

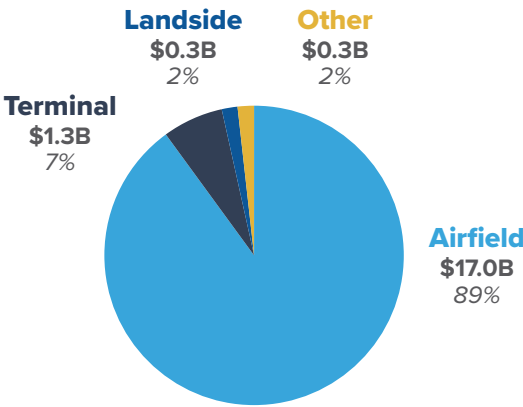
- Data sources used for larger airports generally not available for smaller nonhub and nonprimary airports
- We relied on NPIAS data, as summarized below
- NPIAS does not provide data on funding sources, but it is estimated that the majority of the project cost is funded using AIP grants

Summary data on smaller airports

	Number of airports	% Total number of US airports	% of US enplaned passengers	% of US aircraft operations
Primary Nonhub	247	7%	3%	11%
Nonprimary (other)	2,941	89%	0%	64%
Combined Nonhub plus Other	3,188	96%	3%	75%

Source: NPIAS report

- Primary Nonhub airports have more than 10,000 annual enplaned passengers, and less than 0.05% of nationwide enplaned passengers
- Nonprimary airports are those with less than 10,000 annual enplaned passengers, plus all other general aviation airports that meet criteria for inclusion in NPIAS



APPENDICES

Methodology of research

For the purpose of this report, we utilized a variety of resources

Primary large, medium and small hub airports

- We issued a survey requesting detailed information from large, medium and small hub US airports
- We received responses from airports representing about 50% of the enplaned passengers at these airports, including detailed survey responses as well as references to other data for our technical analysis
- We supplemented these survey responses with data from publicly available sources such as bond official statements and airport master plans
- Our data set as a result includes detailed information from airports representing about 87% of the enplaned passengers at large, medium, and small hub airports in the US
- We used estimates of capital investment per enplaned passenger to “fill in” the missing data, in order to produce an estimate of the total 5-year capital investment for this group of airports

Nonhub and smaller airports

- Survey data and other publicly available data were not generally available for the group of nonhub and smaller airports, which include more than 3,000 individual airports
- For nonhub and smaller airports we relied on NPIAS as a source of information for planned capital investment
- These airports are important in terms of serving national aviation demand, but do not represent a large share of anticipated future capital investment
- We added the NPIAS data to the primary research data for large, medium ,and small airports in order to generate a complete estimate of capital investment at airports for the next 5 years

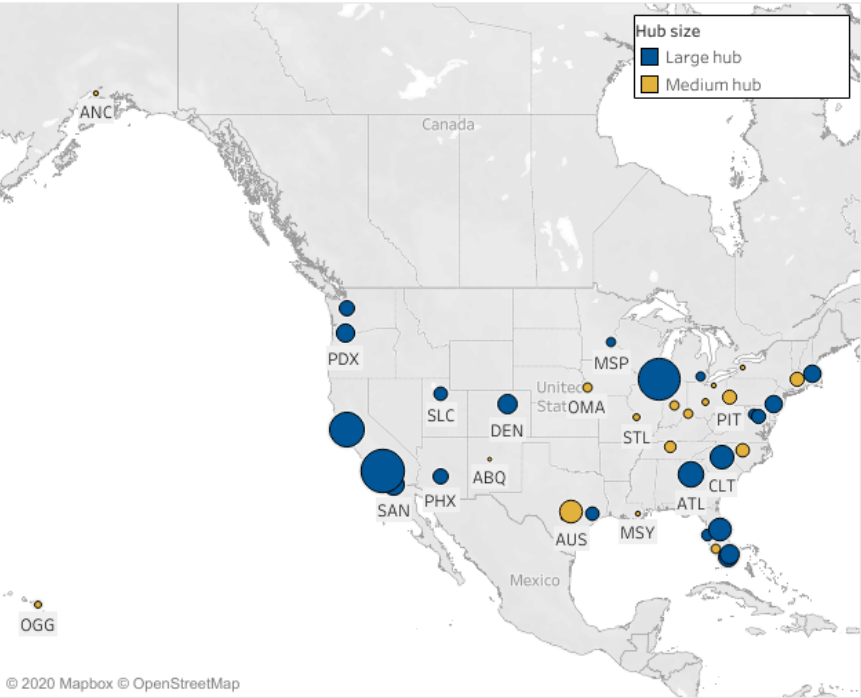
Comparison to other studies

- ACC: the ACC report “Development at U.S. Airports” from 2017 presented \$70 billion in investment based on survey results for 46 large hub and medium hub airports; the current report is based on detailed data from 46 large and medium hub airports, with a total of \$80 billion for that subset of airports, and a total of \$109 billion for all 60 large and medium hub airports when estimates are used for airports that did not provide data
- ACI: the ACI “Terminally Challenged” report from 2019 presented an estimate of \$128 billion in investment at all US airports, based on a combination of data sources and estimating; this current report presents a somewhat higher estimate of \$138 billion

Tableau dashboard

Large and medium hubs capital investment

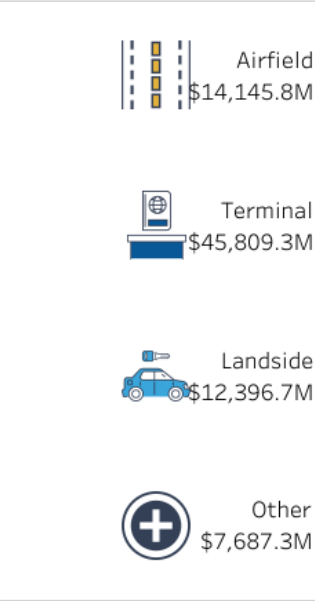
Detailed capital improvement data are available for the following airports:



Source : InterVISTAS review of airport data
The size of the dots is based on the size of the 5-year capital program

Project types

These airports are forecast to invest an estimated \$79,672.3M in the next five years



- To provide more insight and context for this study, an interactive data visualizations are made available to ACC members. This interactive storyboard includes enhanced detail on capital investments at large and medium hub US airports over the next 5 years
- Navigate the storyboard tabs, and hover and click through the different graphics to interact with the workbook for a detailed look at the 2019-2024 capital program of US airports
- The information provided in the dashboard is based on detailed survey responses from individual airports as well as references to other publicly available detailed data
- The database includes detailed information from 46 large and medium hub airports representing about 75% of the total enplaned passengers at all large and medium hub airports in the US

The report and supporting data are available at the following link on the [ACC website](#).

Glossary

National Plan of Integrated Airport Systems

2019-2023 (NPIAS) - A database containing nearly 3,330 existing and proposed US airports. It was developed and is maintained by the Federal Aviation Administration (FAA)

Large hub – Airports that serve more than 1% of total passenger boarding within the United States in the most recent calendar year before the start of the current fiscal year

Medium hub – Airports that serve at least 0.25% but less than 1% of total passenger boarding within the United States in the most recent calendar year before the start of the current fiscal year

Small hub – Airports that serve at least 0.05% but less than 0.25% of total passenger boarding within the United States in the most recent calendar year before the start of the current fiscal year

Nonhub primary airport – Airports that serve more than 10,000 passengers but less than 0.05% of total passenger boarding within the United States in the most recent calendar year before the start of the current fiscal year

Federal Aviation Administration (FAA) – A division of the Department of Transportation that regulates all aspects of civil aviation in the United States

US Department of Transportation (DOT) – A federal agency of the United States government concerned with transportation

Airport Improvement Program (AIP) – A federal grant provided by the United States government to provide airports with necessary funding to improve safety and equipment

Airport and Airway Trust Fund (AATF) – A fund that helps finance FAA investments in airports and airway systems

Customer Facility Charge (CFC) – A user fee established by an airport operator on rental car transactions and collected by rental car companies operating at the airport. The charge levels are not limited by federal legislation (in contrast to PFCs), and vary by location. CFC revenues can be used to finance new rental car capital projects and to fund ongoing operating costs of rental car facilities

Passenger Facility Charge (PFC) – The Passenger Facility Charge (PFC) Program allows the collection of PFC fees up to \$4.50 for every eligible passenger at commercial airports controlled by public agencies. PFCs are capped at \$4.50 per flight segment with a maximum of two PFCs charged on a one-way trip or four PFCs on a round trip, for a maximum of \$18 total. Airports use these fees to fund FAA-approved projects that enhance safety, security, or capacity; reduce noise; or increase air carrier competition

Terminal Area Forecast (TAF) – A forecast of aviation activity for US airports created by the FAA

Gross domestic product (GDP) – A monetary measure of the market value of all final goods and services produced in a specific time period

Capital improvement program (CIP) – A list of potential projects that comprise the future capital investments to be made; for airport projects, this typically indicates the cost, purpose, financing source(s), start year, and duration of the project

Enplaned passenger – All outgoing revenue passengers, whether originating or connecting

General aviation – All civil aviation operations other than schedule air services and non-schedule air transport operations for remuneration or hire

Landside – Part of the airport that is farthest from the aircraft, the boundary lies before security check, customs, passport control, etc.

Airside – Part of the airport that is closest to the airport, the boundary lies after security check, customs, passport control, etc.

Operations - Takeoffs and landings at an airport

Public Private Partnership (P3) - A contract between the public and private sectors for the financing, delivery, or service of a project



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