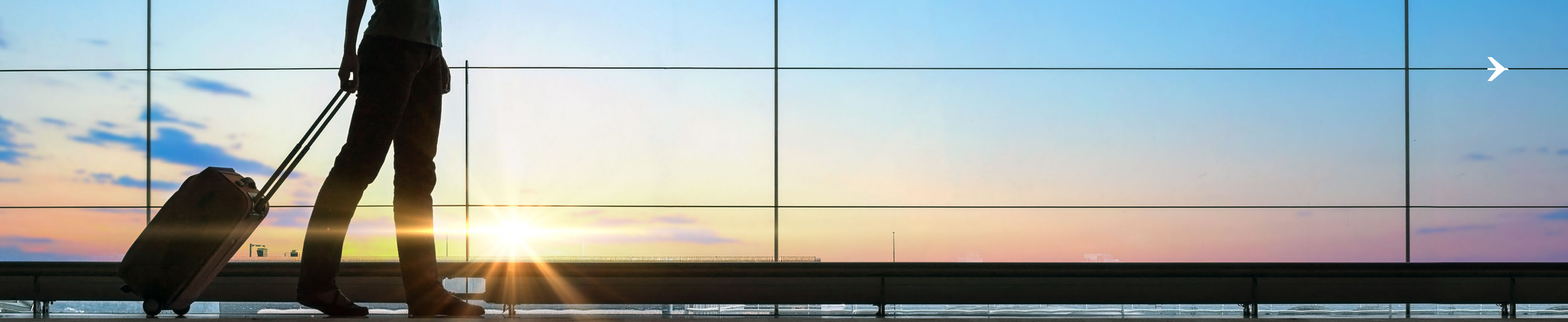

EMBRAER
MARKET
OUTLOOK
2024

MARKET OUTLOOK 2024



A MESSAGE FROM THE CEO

A MIXED FLEET STRATEGY FOR THE NEW AVIATION LANDSCAPE

2024 marks an important milestone in the aviation industry – the return to 2019 demand levels. But it doesn't mean we're back to previous practices. The world has changed and airlines that quickly identify permanent shifts in demand behavior in the post-covid era will thrive. Pandemic aftershocks, like supply chain disruptions, the deceleration of the global economy, and uncertainties from multiple geopolitical conflicts will continue to affect the market.

Some airlines are pursuing a strategy to up-gauge aircraft. Yet we see risks associated with that approach, especially when social changes are driving a shift to regionalization. That, in turn, creates a need for better airline network connectivity as we live, work, and trade in more decentralized communities. It's a shift that impacts both passenger and cargo aircraft capacity.

We believe an optimal mix of sub-150-seat jets and larger narrowbodies is more conducive to the new environment. The market sizes and demand patterns are simply too varied to support a fleet strategy focused solely on larger aircraft. Mixed fleets address that diversity.

Specifically, the environmental aspect is huge. We're already seeing steady advancements in green technologies as the industry works toward Net Zero by 2050. The big question is how we can make those technologies affordable. The sub-150-seat aircraft segment is critical to that goal. These aircraft are essential in reducing the costs of overcapacity, generating healthy load factors, maintaining yields, and providing travelers with high-frequency flights across a comprehensive route network.

I invite you to explore the insights and analysis in this Market Outlook 2024. I hope you'll share our confidence in this category of aircraft that will shape commercial aviation for decades to come.

ARJAN MEIJER
President & CEO
Embraer Commercial Aviation

EXECUTIVE SUMMARY

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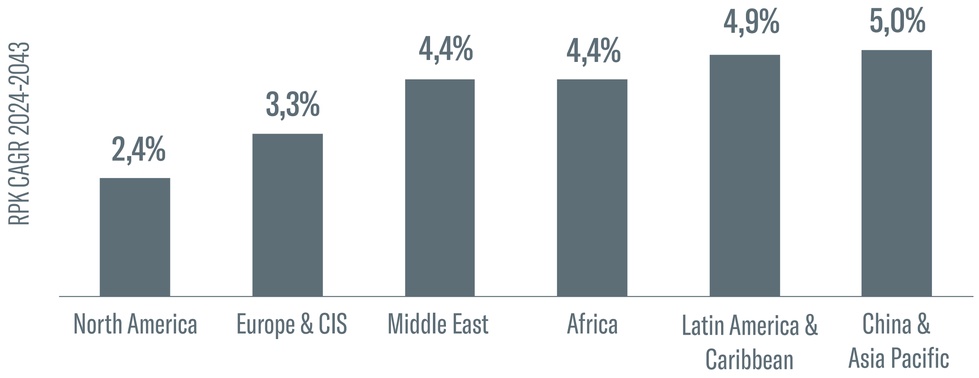
AIR TRANSPORT DEMAND FORECAST: RPK GROWTH RATES BY REGION

World passenger traffic is expected to grow at an average annual rate of 4.0% (CAGR) between 2024 and 2043. The rate is a notable deceleration compared to pre-pandemic growth rates for the next two decades, a reflection of the expected slowing of the global economy, the impacts of the transition towards net zero emissions and the uncertainties related to the occurrence of more geopolitical conflicts.

Over the next 20 years, Asia Pacific (including China) will show the strongest growth with RPKs increasing 5.0% annually. This will be followed by Latin America (4.9%), Africa (4.4%), the Middle East (4.4%), Europe (3.3%, including CIS) and North America (2.4%).

FIGURE 1 - WORLDWIDE AIR TRANSPORT DEMAND GROWTH: 2024-2043



Source: Embraer

World RPKs will reach 17.8 trillion by 2043. Asia Pacific will be the largest market by then, with 38% of global traffic. Combined, Europe and North America will generate the same 38% of total air transport demand.

THE UP TO 150-SEAT MARKET

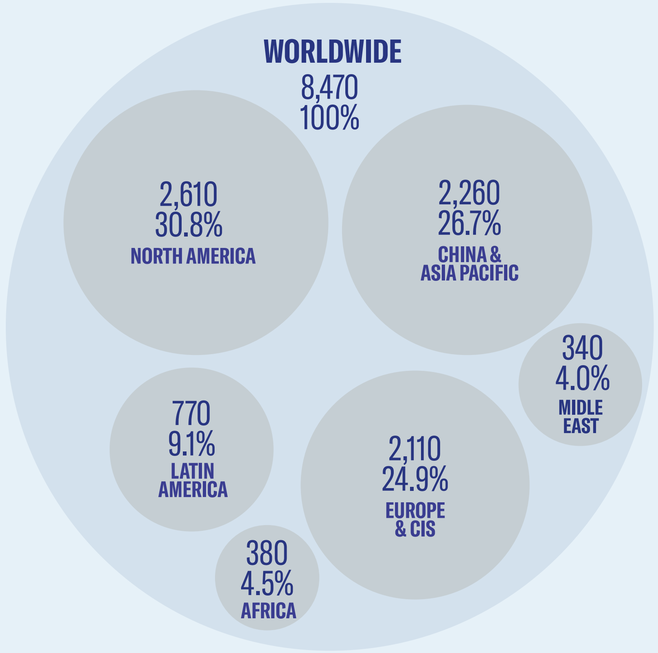
Embraer foresees world demand for 10,500 new up-to-150-seat aircraft over the next 20 years with a market value of USD 640 billion. Replacement of aging aircraft will account for 54% of all new deliveries while 46% will be used to grow markets.

EXECUTIVE SUMMARY

THE JET SEGMENT

Smaller aircraft will drive worldwide demand for 8.470 jets up-to-150-seat capacity. Of these, 51% will support market growth and 49% will replace aging aircraft. The trend to smaller aircraft reflects overall weaker demand growth, traffic patterns favoring short-haul versus long-haul, an increasing need for flexibility, connectivity, and efficiency, and fleet and network transitions to a decarbonized industry through new technology.

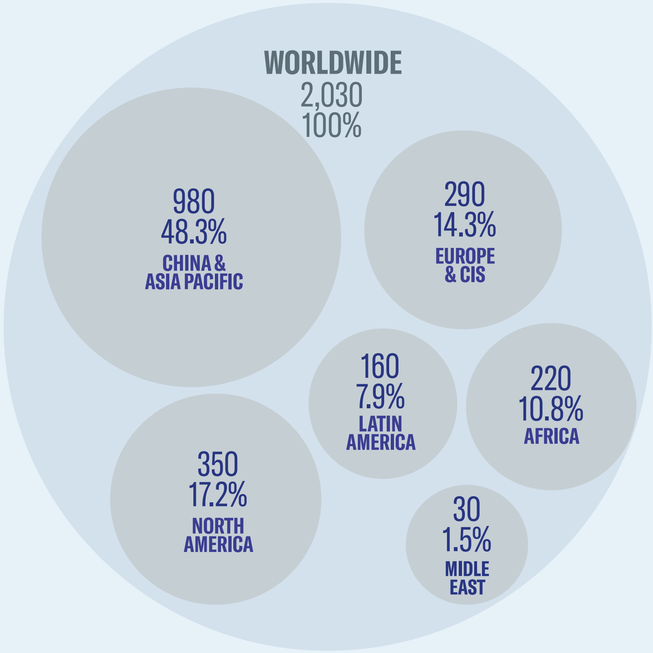
The need for better fleet versatility and more efficient use of assets favors a mixed fleet that includes the up-to-150-seat jet segment. In uncertain times, it is more important than ever that demand is matched with optimal capacity in order to maximize profitability.



UP-TO-150-SEAT JETS
- NEW DELIVERIES / SHARE OF TOTAL

THE TURBOPROP SEGMENT

Short-haul operations will drive worldwide demand for 2,030 turboprops, mostly focused in Asia Pacific, Europe, and North America.



TURBOPROPS
- NEW DELIVERIES / SHARE OF TOTAL

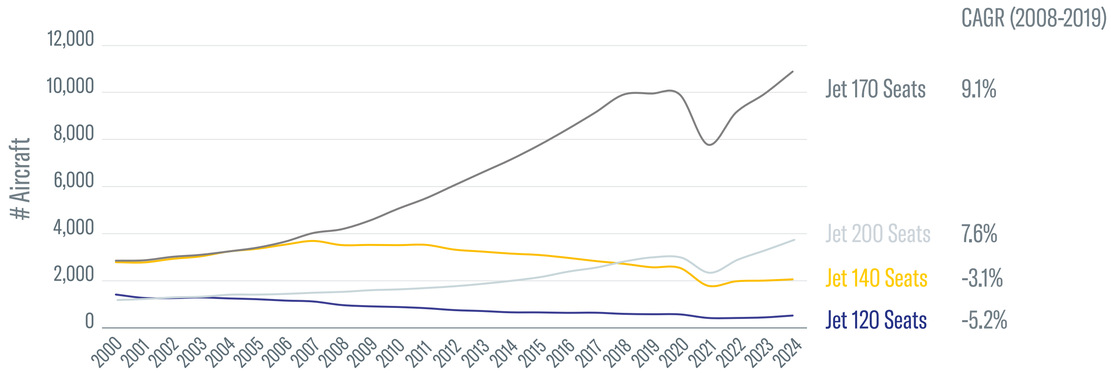
GLOBAL TRENDS

GLOBAL TRENDS

BEYOND UP-GAUGING

The evolution of the world fleet profile shows an inflection point around 2007 when the number of larger aircraft started growing (Figure 1).

FIGURE 1 - EVOLUTION OF WORLD NARROWBODY FLEET

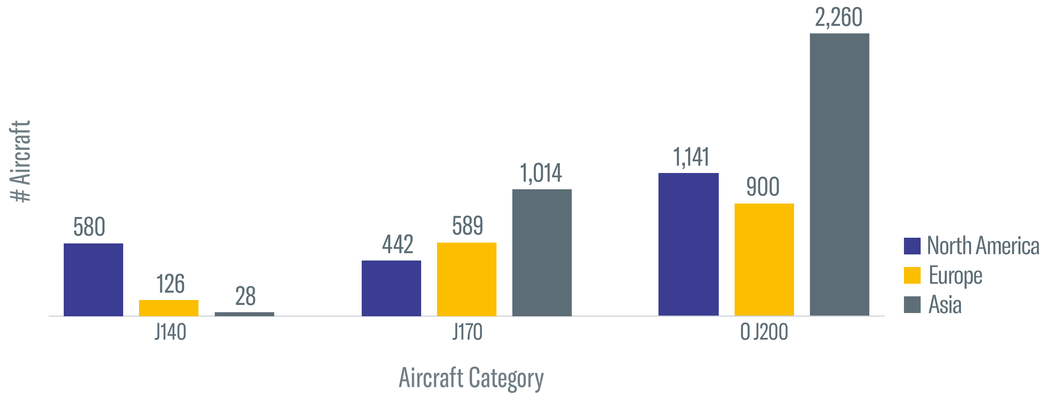


Source: Cirium

The number of 170-seat jets grew 9.1% and 200-seat jets grew 7.6% annually between 2008 and 2019. In the same period in the smaller jet categories, the number of 140-seat jets declined 3.1% and 120-seat jets declined 5.2% annually.

Inevitably, the share of larger jets should strengthen in the coming years. The number of jets with 200 seats is estimated to grow more, as shown by the order backlog in the J140, J170 and J200-seat categories (Figure 2).

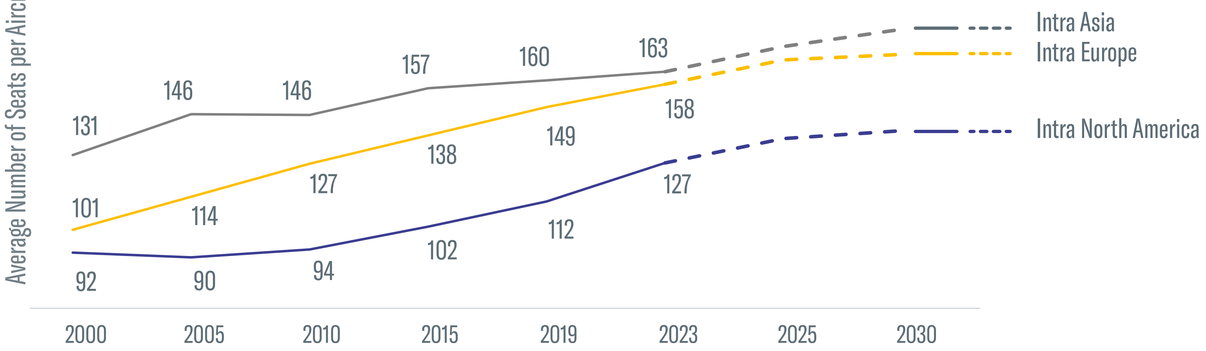
FIGURE 2 - NARROWBODY AIRCRAFT BACKLOG - 2024



Source: Cirium

Accordingly, the average aircraft size used in domestic and intra-regional markets is expected to increase (Figure 3).

FIGURE 3 - EVOLUTION OF AVERAGE AIRCRAFT SIZE



Source: Sabre

However, the market environment that led to the increase in average aircraft size will not be the same in the future. Consequently, the growth trend likely will not continue.

THE FIRST UP-GAUGING WAVE

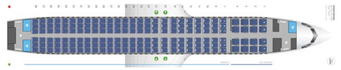
Three factors contributed to the up-gauging trend which will no longer apply in the future.

1. **Aircraft Densification - big cost-per-seat reduction (CASM/CASK) with minimal impact on trip cost**

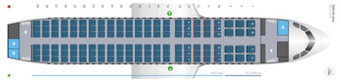
Airlines around the world moved toward economy class seating densification of existing aircraft in 2010. The initiative peaked in 2017. Increased capacity was achieved by reducing seat pitch, reducing seat width in some cases, and adding more seats. This initiative will not be repeated.

FIGURE 4 - AIRCRAFT CONFIGURATION DENSIFICATION

B737-800 — 150 Seats → Retrofit to 160 Seats



B737-800 / A319 / A320 — 150 Seats → Retrofit to 166 Seats



A319 — 120 Seats → Retrofit to 132 Seats

A320 — 141 Seats → Retrofit to 150 Seats

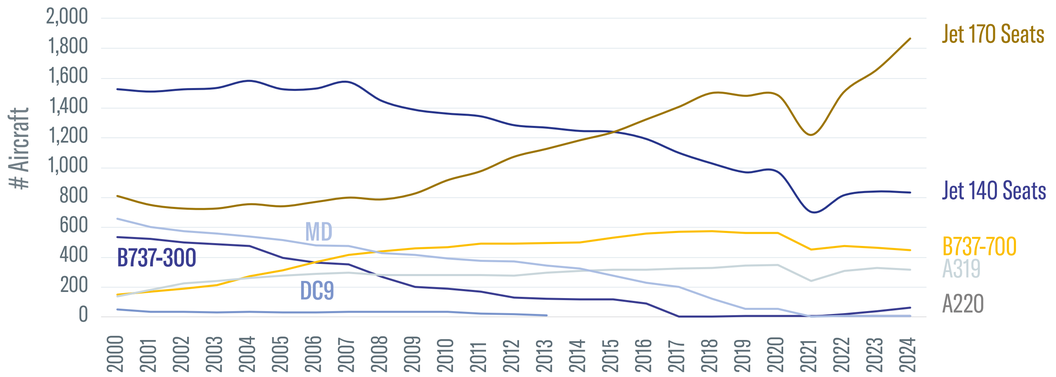
2. Old Aircraft Replacement - big cost-per-seat reduction (CASM/CASK) with minimal impact on trip cost

Extending aircraft operating life increases maintenance – more wear and tear, more frequent and thorough inspections, and potential replacement of parts at fatigue limits. This incurs higher cost, longer ground times, and potential disruptions to flight schedules.

Airlines historically replaced smaller, old-generation jets (mostly in the 140-seat category) with larger aircraft. In the 2010s, since there was no suitable direct replacement option on the market, airlines defaulted to aircraft in the bigger 170-seat category.

Figure 5 shows the decline in the number of 140-seat jets, the result of airlines replacing their B737-300s, B737-700s, A319s, DC-9s and MDs with larger aircraft. The number of 170-seat jets is increasing.

FIGURE 5 - EVOLUTION OF WORLDWIDE FLEET-IN-SERVICE

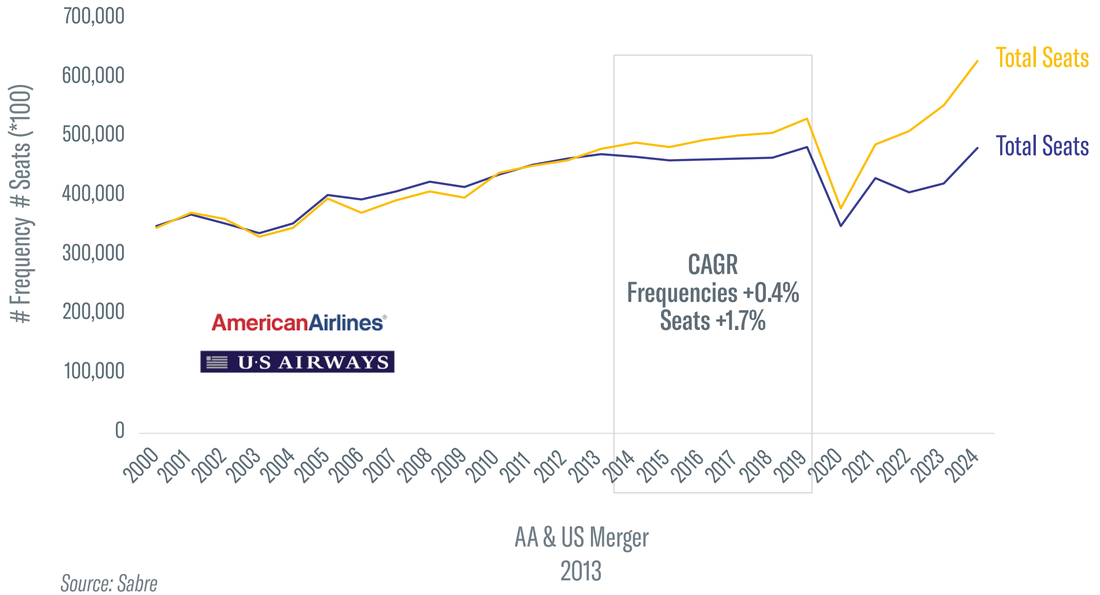


Source: Cirium

3. Airline Consolidation - optimize selected hubs by increasing the number of seats while maintaining the same number of frequencies

An example of this is the optimization of Charlotte International Airport in the USA (Figure 6). When US Airways and American Airlines merged in 2013, they identified and optimized hubs for the new, consolidated entity. Charlotte was one of those hubs. From 2013 to 2019, the number of seats grew 1.7% while the number of frequencies was almost unchanged at 0.4%. The capacity increase was achieved by using larger aircraft in the mainline fleet.

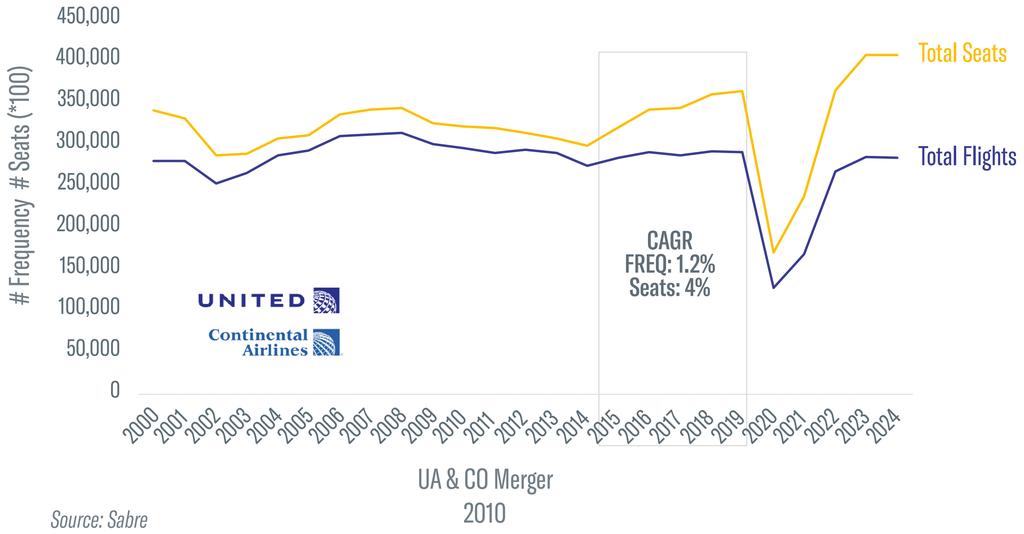
FIGURE 6 - CHARLOTTE AIRPORT HUB



Source: Sabre

United Airlines and Continental Airlines adopted a similar strategy for their hub at Newark Airport when they merged in 2010. Capacity increased 4% while frequencies grew only 1.2% from 2014 to 2019.

FIGURE 7 - NEWARK AIRPORT HUB



Source: Sabre

Consolidation has peaked and is expected to slow. Most hubs are now optimized and airlines are focusing on expanding their networks.

There are risks associated with up-gauging to larger aircraft.

1. **Demand Uncertainty:** According to the FAA's 2024-2044 Aerospace Forecast, in the medium-term, airlines will need to determine which shifts in post-pandemic demand will be permanent and which will fade.

2. **Demand Behavior:** Changes to both day-of-week and time-of-day travel patterns emerged after the pandemic due to fewer business trips and more hybrid business/leisure trips. The previous patterns may not return although many carriers are investing in premium cabins with the expectation that customers will continue to be willing to pay for an upgraded experience. That trend has been evident over the past two years, but it is not certain to continue.

3. **Opportunities are in the Smaller Markets:** Short-haul connectivity is key to long-haul success. Smaller markets are driven by operational realities such as infrastructure limitations including runway length, or commercial optimization for variations in demand and schedule frequency. Smaller jets offer the ability to fly more daily frequencies at different times throughout the day to satisfy customer preferences.

GLOBAL TRENDS

The industry will find a mixed-fleet sweet spot that minimizes cost and maximizes efficiency and yields.

The up-gauging trend has made 200-seat jets the most prolific aircraft size (Figures 1 & 2).

No single aircraft type perfectly satisfies passenger demand on every flight, on every route, every day of the week throughout the year. Maximizing passenger yield and minimizing operating costs for each market is a complex balancing act that requires a combination of aircraft sizes.

The difficulty in matching fixed aircraft capacity to varying route demand is an age-old problem made even more difficult as markets evolve. The solution is a fleet comprised of smaller jets that complement 200-seat jet capacity.

Structural changes in the global environment will drive greater efficiency.

Three post-covid trends are leading carriers to more extensive, connected networks, and greater cost efficiency.

1. **Regionalization:** The transition to a multipolar world accelerated at the onset of the pandemic in 2020. There are new realities in global trade – reshoring, near-shoring, friend-shoring - as geopolitical blocs seek strategic autonomy across different industries to strengthen their own economies and supply chains.

   This impacts air transport. New patterns of demand will emerge to support domestic growth in passenger and cargo services. Greater connectivity, in the form of new nonstop flights, will be required as will smaller-capacity aircraft to optimally serve secondary and tertiary markets.

2. **Social Revolution:** The pandemic changed travel patterns. Corporate business travel still lags 2019 levels by some 20%. The number of hybrid business/leisure trips is growing. Airlines have been revisiting their decades-old approach to flight scheduling which focused on peak days and times to attract high-yield business travelers.

   Traditional peak and off-peak schedules could become less prominent in airline networks. Carriers will respond to new demand patterns according to their own business models, target customers, and fleet strategy.

3. **Environment**: The costs associated with decarbonizing aviation are still not clearly defined, yet the impact will surely be reflected in higher ticket prices. Smaller aircraft will be strategic tools for airlines to expand their networks to new, low, and medium-density markets. Those airplanes have an advantage – a similar cost-per-seat and higher profit-per-seat compared to larger narrowbody jets.

A mixed fleet of large and smaller narrowbodies will be the optimal fleet to ensure future cost volatility is kept in check over the next 20 years as the industry moves to Net Zero.

AFRICA

AFRICA

KEY MESSAGES

- Shaping the future: Africa is one of the world's fastest growing regions with a huge opportunity to build a robust, efficient air transport network.
- Fundamentals of the region are conducive to sub-150-seat aircraft: thinner markets with lower demand are better served by smaller aircraft to efficiently increase frequencies, load factors, and yields.
- Advance intra-regional trade: connectivity is central to promoting growth but needs political coordination and the right aircraft types.

Economic & Traffic Growth 2024-2043	
GDP **3.6%**	RPK **4.4%**

New Deliveries 2024-2043	
Up to 150-Seat Jets: **380**	TurboProps: **220**

FLEET IN SERVICE - UPTO 150	
2024: **470**	2043: **850**

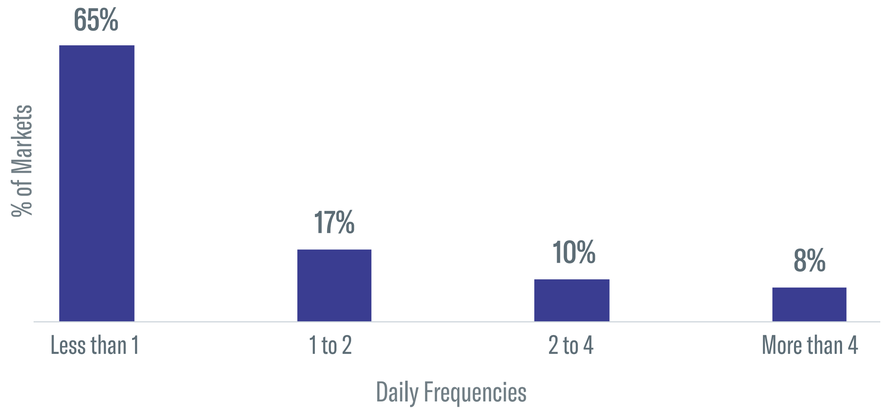
MARRAKESH MENARA AIRPORT, MOROCCO

AFRICA

Africa is one of the world's fastest growing regions, yet it continues to have the lowest volume of intra-regional trade. It is handicapped by poor infrastructure with air transport networks that do not adequately serve the population or geography. Of the more than 300 commercial airports in 2023, only 25% had links to more than 5 cities. In fact, 65% of all domestic and intra-regional markets have less than one daily flight (Figure 1). Investing in airline network connectivity will facilitate movement within the continent, advancing trade and regional development.

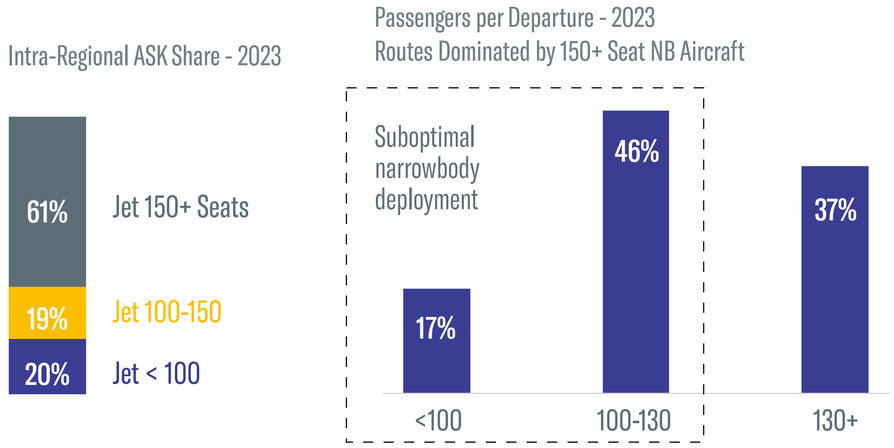
Additionally, there is an opportunity to address the persistent problem of low load factors due to overcapacity. Although the majority of intra-regional ASKs are generated by larger narrowbody jets, over 60% of markets served by these aircraft carry fewer than 130 passengers per flight (Figure 2). Accordingly, replacing narrowbodies with sub-150-jets can help airlines improve load factors, produce higher yields, and lead to a more profitable industry.

FIGURE 1 - UNDERSERVED DOMESTIC AND INTRA-REGIONAL MARKETS - 2023



Source: Sabre

FIGURE 2 - IMBALANCED FLEET DRIVING INEFFICIENCY AND LOSSES



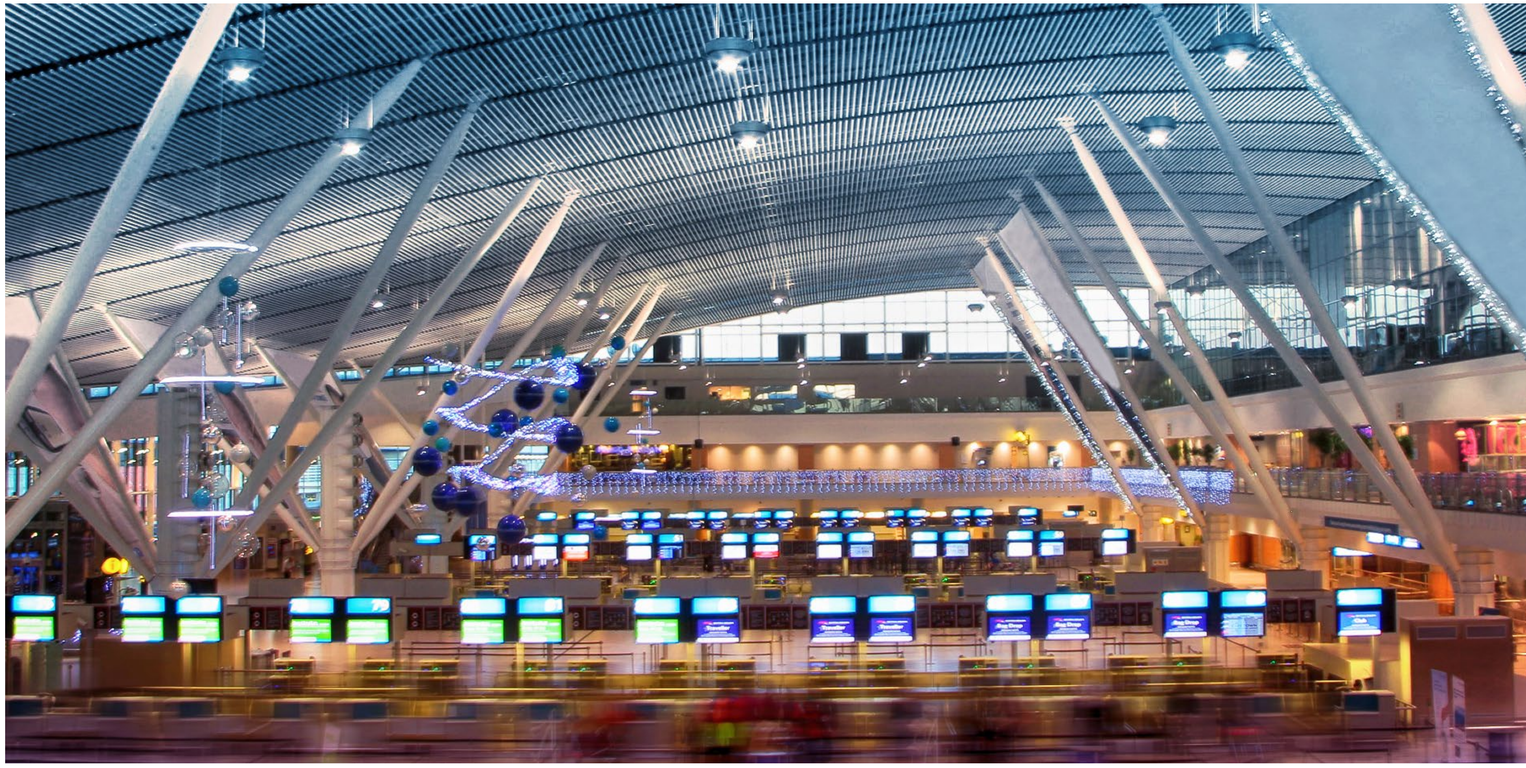
Source: Sabre

AFRICA

Air travel is an essential service in most countries and a vehicle for promoting tourism and advancing trade and regional development. Extensive network connectivity – with a mix of small and large narrowbody jets - is a hallmark of the North American airline industry and one of the reasons it consistently records high profit margins.

Azul Airlines of Brazil has adopted a similar connectivity strategy. Rather than competing head-to-head in busy markets, the carrier is growing its network by linking underserved domestic cities with a mixed fleet that is deployed on domestic, regional and international routes.

Africa can benefit from a similar mixed-fleet approach. Smaller, more efficient narrowbodies can drive long-term economic and social prosperity. Initiatives that could help build a stronger aviation sector include a push for a more collaborative environment and better cooperation between African airlines. This would support the development of intra-regional markets and increase local carrier competitiveness against airlines from other regions of the world.



CAPE TOWN AIRPORT


CHINA
&
ASIA
PACIFIC

CHINA & ASIA PACIFIC

KEY MESSAGES

- Enhancing market potential and economic growth results from improved air network connectivity and adaptability.
- Increasing synergy between turboprops, sub-150-seat jets, and large narrowbodies can counter operational inefficiencies, grow markets, and facilitate network expansion, especially with new-generation aircraft.
- Achieving sustainable and green growth will require versatile and efficient aircraft, regardless of market demand.

Economic & Traffic Growth 2024-2043	
GDP **3.5%**	RPK **5.0%**

New Deliveries 2024-2043	
Up-to-150-Seat Jets: **2,260**	TurboProps: **980**

FLEET IN SERVICE - UPTO 150	
2024: **1,590**	2043: **3,360**

JEWEL CHANGI AIRPORT, SINGAPORE

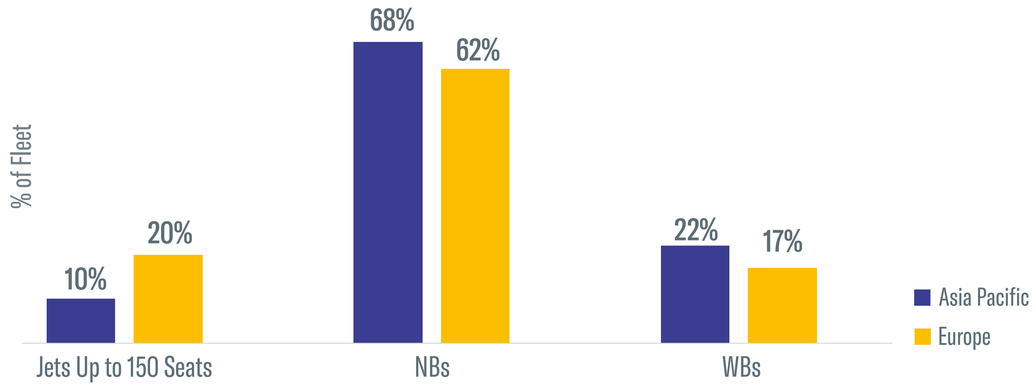
CHINA & ASIA PACIFIC

By mid-2024, Asia Pacific was the only world region where demand for air travel had not recovered to 2019 levels. This challenges the expectation that the region will have the same market volume as North America and Europe combined by the end 2043.

The need for better passenger and cargo air connectivity increases as more people start flying as a result of economic growth and long-term investments in infrastructure. When the region's major hubs reach maximum operating capability, new airports and markets become the clear untapped opportunities to be pursued. However, given Asia's diverse economies, characteristics, and varying distribution of demand, no single aircraft category satisfies all those needs. Airlines with more versatile fleets will be well positioned to capitalize on those opportunities.

The commercial aircraft fleet in Asia is dominated by large aircraft. The imbalance is further exacerbated by a strong order backlog for large-capacity jets which makes it even more difficult for carriers to access smaller, lucrative markets in the future.

FIGURE 1 - FLEET-IN-SERVICE PROFILE - 2024



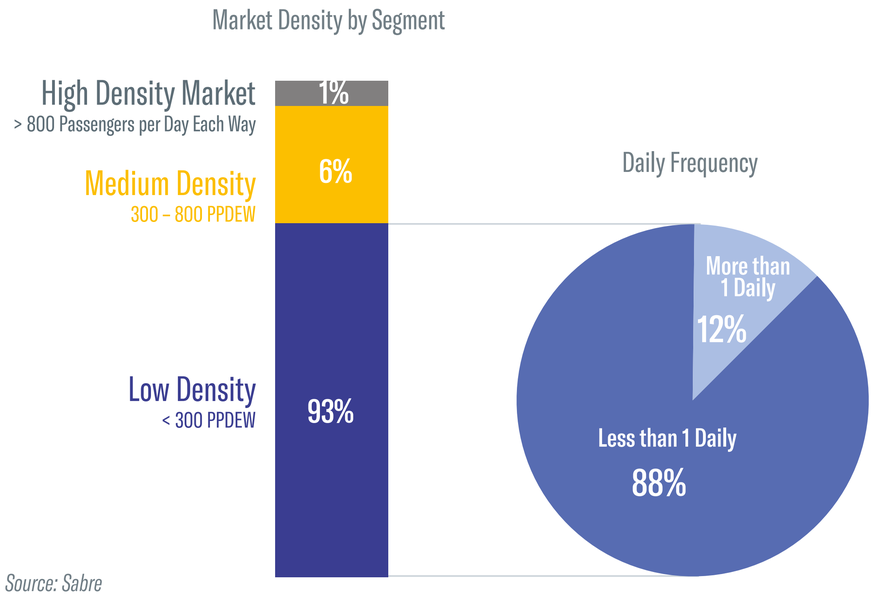
Source: Cirium

Australia and Northeast Asia countries already have smaller capacity jets that will need to be replaced in the next 20 years. The SAARC and ASEAN sub-regions will lead future growth and represent new opportunities for sub-150-seat jets. Annual passenger demand for air travel, measured in Revenue Passenger Kilometers (RPKs) is forecast to grow 6.5% for SAARC and 5.0% for ASEAN.

Yet airline networks remain undeveloped beyond the major cities. Over 40% of intra-regional SAARC markets have less than one daily flight, and only 27% in ASEAN markets. There is untapped potential to open new routes and increase flight frequencies to secondary markets with smaller narrowbody jets that can complement an airline's fleet of larger narrowbodies.

The domestic air transport industry in China has an enormous potential, too. It has demonstrated remarkable growth and resilience, despite the impact of the pandemic, to become the world's second largest air travel market. It is still forecast to surpass the USA in annual passengers carried. Yet China trails the EU and USA in flight frequencies per capita. That gap can be narrowed by improving network connectivity and airline fleet versatility.

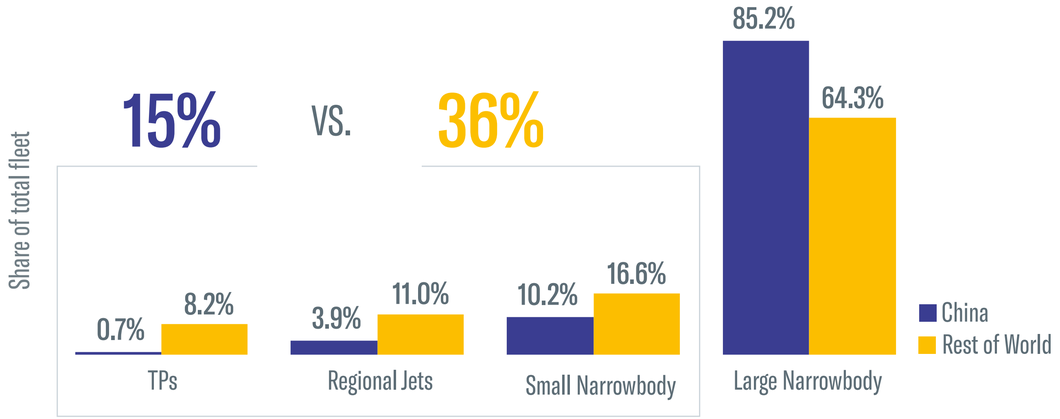
FIGURE 2 - CHINESE DOMESTIC MARKET - 2023



Source: Sabre

Improved versatility is achieved with a mix of small narrowbody jets complementing larger narrowbodies. Today, large jets dominate the Chinese national fleet which impacts the efficiency of asset allocation and generates excess seat capacity when the aircraft are deployed on thin-demand routes. That, in turn, can affect ticket prices, limit network connectivity, and impede growth.

FIGURE 3 - DISTRIBUTION OF COMMERCIAL FLEET IN CHINA - 2023



Source: Sabre

A mixed fleet solution better matches capacity to market demand. Since China's domestic network is vast and diverse, large narrowbodies are naturally best for trunk routes and high-volume city pairs that connect urban hubs. Small narrowbody jets, and even turboprops, are more cost-effective in medium and lower demand markets where they can:

- open new routes
- add frequencies to improve network connectivity
- add capacity in small increments to better preserve yields
- replace larger jets that can be deployed more profitably elsewhere
- improve overall asset utilization and efficiency.

Small and large narrowbodies are complementary and ensure asset utilization and efficiency are maximized to generate the highest return.

EUROPE & CIS

EUROPE & CIS

KEY MESSAGES

- Smaller-capacity aircraft will soften the up-gauging trend in order to build sustainable and efficient air travel across the region.
- A path to sustainable connectivity: greener flights will cost more which will raise ticket prices and reduce demand for air travel. Intra-European traffic is mostly served by low-frequency, large narrowbodies. Left unchecked, aircraft size will become too large.
- The current network needs a more versatile fleet: today's air transport model was built on the premise that different market sizes can all be served by large narrowbodies jets. That model is incompatible with post-pandemic shifts in demand patterns, greater economic sovereign autonomy and efficient, sustainable network connectivity. Small aircraft will lead the industry in the transition to new technology applications and decarbonization.

Economic & Traffic Growth 2024-2043	
GDP	RPK
1.5%	**3.3%**

New Deliveries 2024-2043	
Up-to-150-Seat Jets:	TurboProps:
2,110	**290**

FLEET IN SERVICE - UPTO 150	
2024:	2043:
1,400	**2,600**

BAJARAS AIRPORT, MADRID

EUROPE & CIS

LCC expansion to the continent: the origin of up-gauging

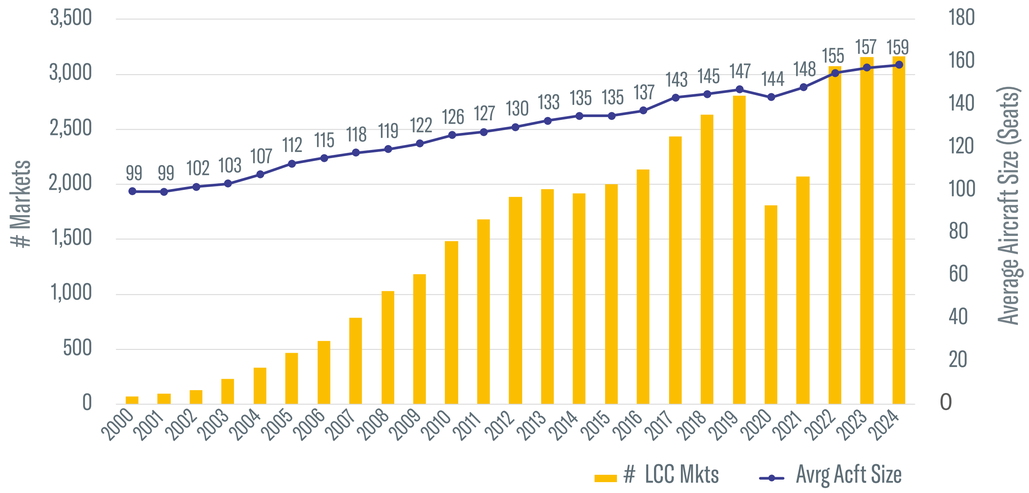
In 2000, shortly after European air transport liberalized in 1997, low-cost airlines easyJet and Ryanair began expanding to the continent. Their rapid growth was fueled by new cabotage rules which gave sweeping access to new markets.

In the ten years from 2000 to 2010, the number of LCC markets grew an average of 35% annually while average aircraft size increased by 26 seats (Figure 1). Over the next decade, from 2011 to 2021, the number of markets grew 7% while aircraft size grew by 21 seats.

The rate at which new markets are added with large aircraft is slowing. This implies that new route opportunities with bigger jets are limited. Increasing average aircraft size impacts quality of service, daily frequency and, consequently, connectivity.

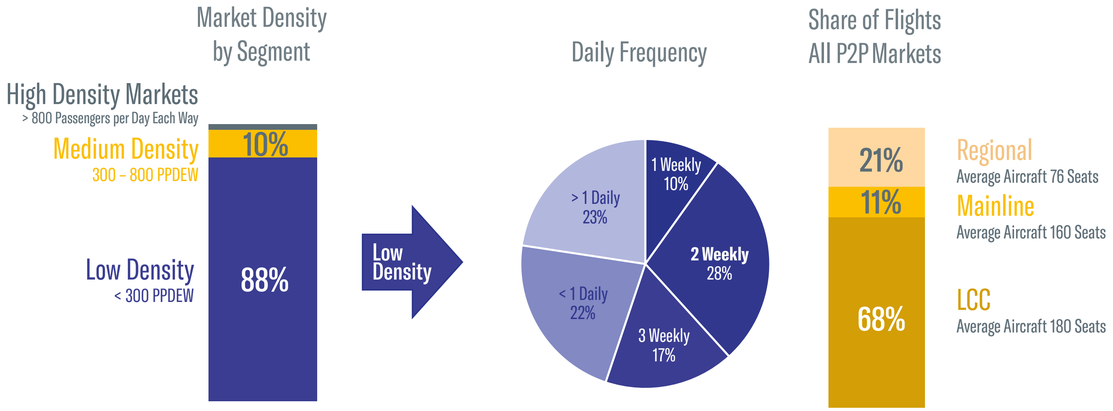
Among all 5,450 European point-to-point markets, 88% (4,800) are low-density routes that carry fewer than 300 daily passengers (Figure 2).

FIGURE 1 - EVOLUTION OF LCC MARKETS AND AVERAGE AIRCRAFT SIZE – INTRA-EUROPE



Source: Sabre

FIGURE 2 - POINT-TO-POINT MARKET PROFILE



Source: Sabre

EUROPE & CIS

Among these, over half (55%, 2,640 routes), are very-low and low frequency, 10% (480 routes) have a single weekly flight, 28% (1,344) have 2 flights per week, and 17% (816) have 3 weekly flights. What is remarkable is that 68% of all flights in these low-density markets are operated by LCCs that use aircraft averaging 180 seats.

If the trend to bigger aircraft continues, can airlines profitably add more seats and frequencies in these low-demand markets? Fuel cost is one component that may impact the future viability of large jets on these routes. Higher taxes, revised regulations, and supply issues will negatively impact operating economics:

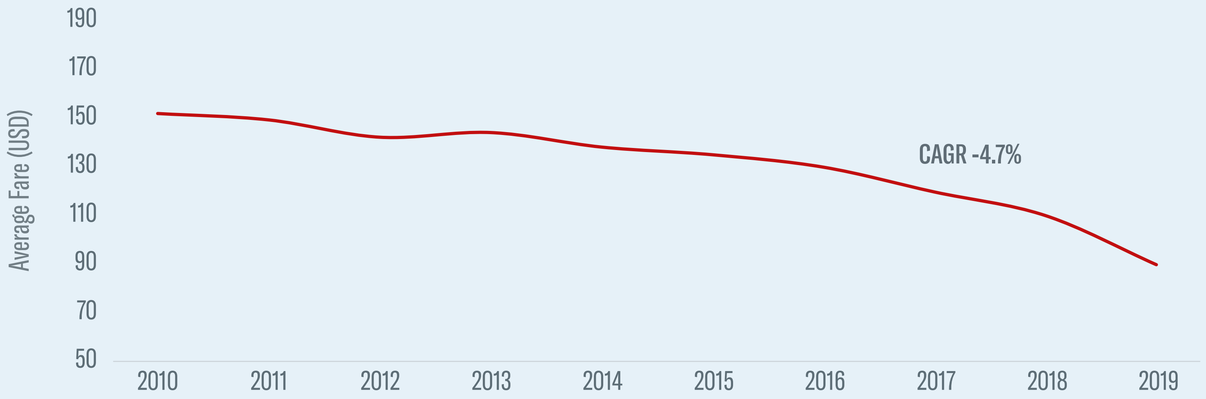
1. **Energy Taxation Directive (ETD)**
   - / SAF Blending Obligation (2% tax in 2025 will increase to 63% by 2050)
   - / Synthetic Aviation Fuel Tax (0.7% in 2030 to 28% by 2050)

2. **Increase to Kerosene Tax (Intra-Europe flights)**
   - / From 10% in 2024 to 70% by 2050

3. **Emissions Trading Scheme**
   - / Free-emissions allowances phased out after 2027

4. **SAF Pricing**
   - / SAF supply will not meet industry demand by 2050

FIGURE 3 - EVOLUTION OF AVERAGE FARE - POINT-TO-POINT MARKETS



Source: Sabre

The additional fuel expenses will undoubtedly be passed on to consumers through higher ticket prices.

The average intra-European airfare has dropped 4.7% annually over the last decade (Figure 3). Airlines have adjusted to the low-fare environment with aggressive cost reduction measures. If the average aircraft size continues to increase, will large jets be as viable if ticket prices rise and demand declines?

That risk can be mitigated with smaller, 140-seat aircraft that have an operating cost-per-seat equivalent to a large narrowbody. With fewer price-sensitive passengers, smaller jets could generate higher load factors, better margins, and still be used to serve existing markets and develop new routes.

A mixed fleet of small and large narrowbodies can maintain effective airline network connectivity as Europe faces a future of greater strategic economic autonomy, higher aviation fuel taxation, volatile airfares, and changes to the world geopolitical order.

LATIN AMERICA & CARIBBEAN

LATIN AMERICA & CARIBBEAN

KEY MESSAGES

- Regional hubs to create new demand flows: better and new infrastructure capacity will build connectivity for underserved and new markets.
- New connecting flows require a new fleet profile: dormant demand that is not currently served by point-to-point networks will change air travel dynamics.

Economic & Traffic Growth 2024-2043	
GDP	RPK
2.8%	**4.9%**

New Deliveries 2024-2043	
Up-to-150-Seat Jets:	TurboProps:
770	**160**

FLEET IN SERVICE - UPTO 150	
2024:	2043:
460	**1,030**

JORGE CHÁVEZ AIRPORT, PERU

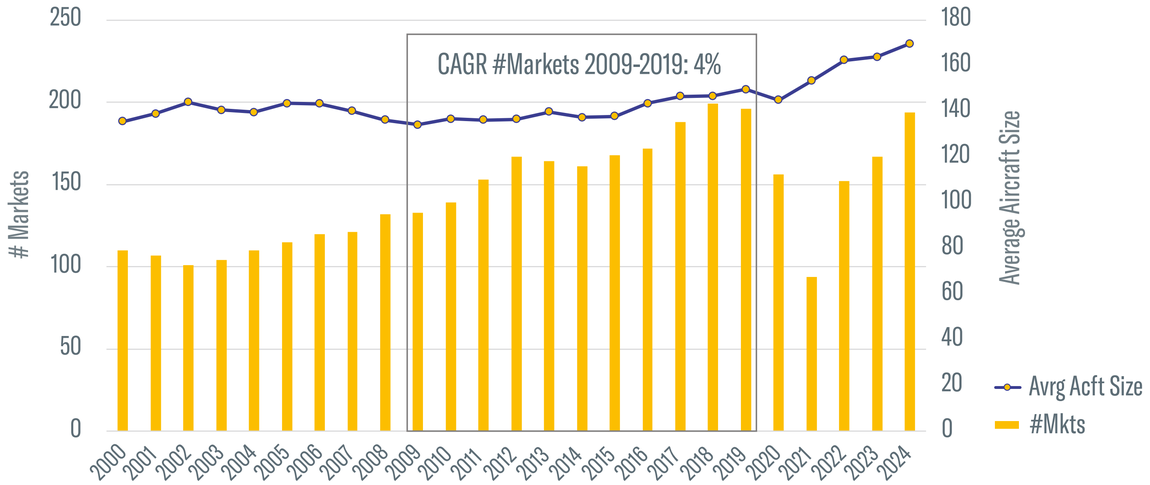
LATIN AMERICA & CARIBBEAN

An Opportunity to Build Connectivity Efficiently

The average aircraft size in the region has not changed appreciably in the two decades before the onset of the pandemic (Figure 1). In the ten years from 2009 to 2019, the number of markets grew only 4% annually on average.

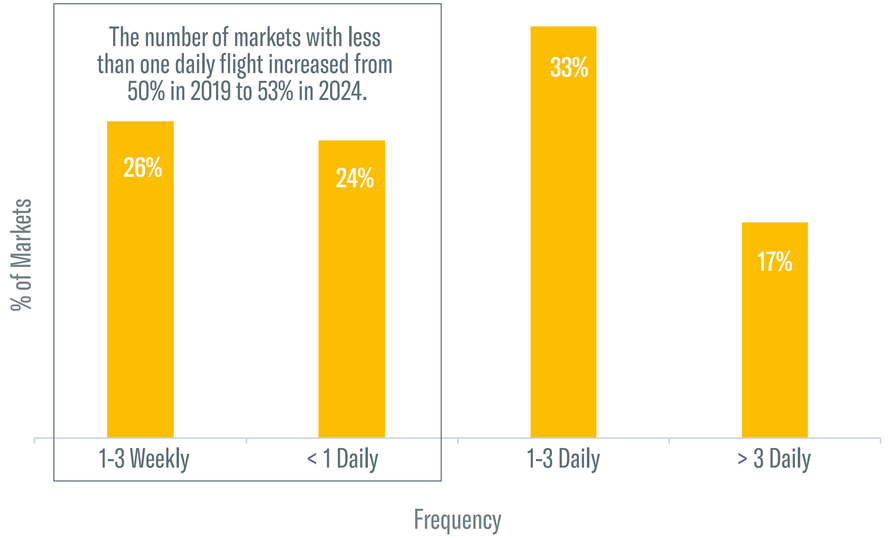
In the five years since the pandemic, the number of markets is still about the same (194) in 2024 as in 2019 (196). However, the average aircraft size has grown significantly from 150 seats to 170 in the same five-year period. Those larger jets were not employed to increase frequency or build network connectivity since almost no new markets were opened.

FIGURE 1 - EVOLUTION OF NUMBER OF MARKETS & AVERAGE AIRCRAFT SIZE - INTRA-LATIN AMERICA



Source: Sabre

FIGURE 2 - INTRA-LATIN AMERICA FREQUENCY PROFILE - 2024



Source: Sabre

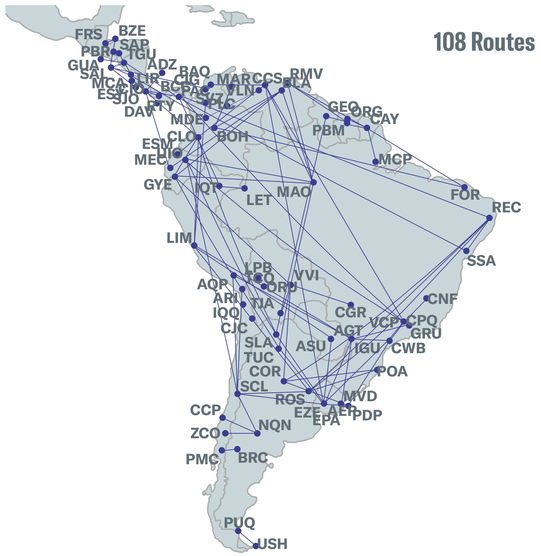
LATIN AMERICA & CARIBBEAN

In 2019, half of all intra-Latin America markets were served by less than one daily flight (Figure 2). Today, that number has increased to 53%.

The lack of connectivity between countries is detrimental to the economic development of the region. Many routes that were launched from 2000 have been discontinued due to a lack of demand, too few flights, deployment of aircraft that had too much capacity rendering the routes financially unviable, or because there has been no economic growth in the cities. Consequently, it is difficult to attract new businesses to smaller communities.

From 2000 to 2024, 108 markets with nonstop flights were discontinued (Figure 3).

FIGURE 3
CANCELLED ROUTES
2000 TO 2024



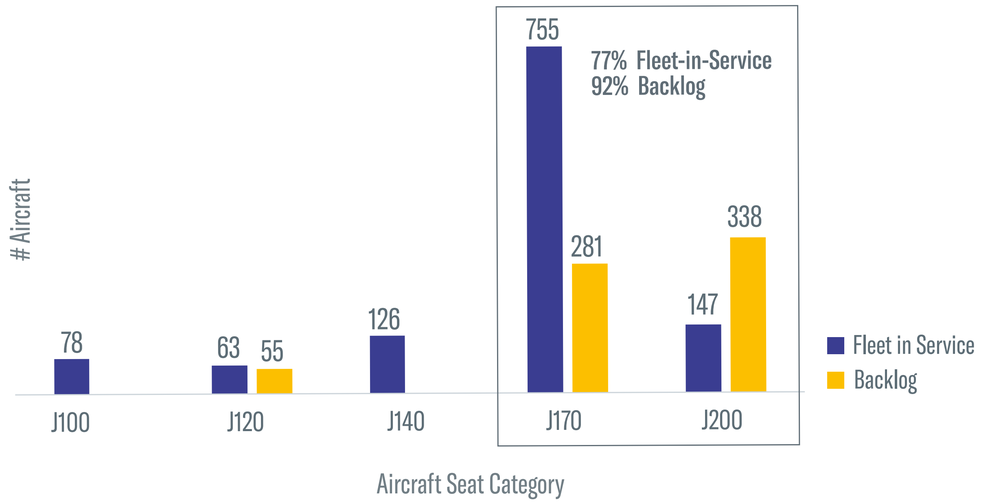
Source: Sabre

Regional hubs are essential to develop new intra-Latin America markets so that passengers and cargo can connect more efficiently to domestic and global air networks. Brazil is in the process of privatizing many of its airports which could encourage more direct international links with secondary cities to strengthen those hubs.

Elsewhere on the continent, connections from secondary cities are still funneled through major hubs in Bogotá, Lima, Santiago, and Quito, for example.

Today, 170 to 200-seat jets dominate (77%) the Latin America airline fleet (Figure 4).

FIGURE 4 - FLEET-IN-SERVICE – LATIN AMERICA



Source: Cirium

LATIN AMERICA & CARIBBEAN

The prevalence of so many large aircraft can hinder network expansion, especially when adding low-density markets where too many seats can make a route economically unviable.

Optimal regional connectivity requires high-frequency flights with the right seat capacity whether flying through hubs or flying point-to-point.

A mixed fleet of 120 to 140-seat and larger aircraft better allocates capacity to variations in route demand. Smaller jets are ideal for developing new low and medium-density domestic and international markets to build broader networks over time.

Global geopolitical changes, including near-shoring, supply chain realignment, and the rise of economic blocs represent new economic growth opportunities for Latin America. Airlines that work now to improve connectivity for people and freight will benefit from those opportunities over the next 20 years.

GUARULHOS INTERNATIONAL AIRPORT, SÃO PAULO


MIDDLE
EAST

MIDDLE EAST

KEY MESSAGES

- Future growth lies within: following the successful establishment of the global hubs in the region, Middle East airlines should start to look inward for growth opportunities.
- Saudi Vision 2030: stimulating domestic and intra-regional aviation will support the Kingdom's strategy to become a tourism-based economy.
- Fleet versatility will be essential to explore underserved short-to-medium haul markets.

Economic & Traffic Growth 2024-2043	
GDP	RPK
2.9%	**4.4%**

New Deliveries 2024-2043	
Up-to-150-Seat Jets:	TurboProps:
340	**30**

FLEET IN SERVICE - UPTO 150	
2024:	2043:
130	**370**

QUEEN ALIA INTERNATIONAL AIRPORT, JORDAN

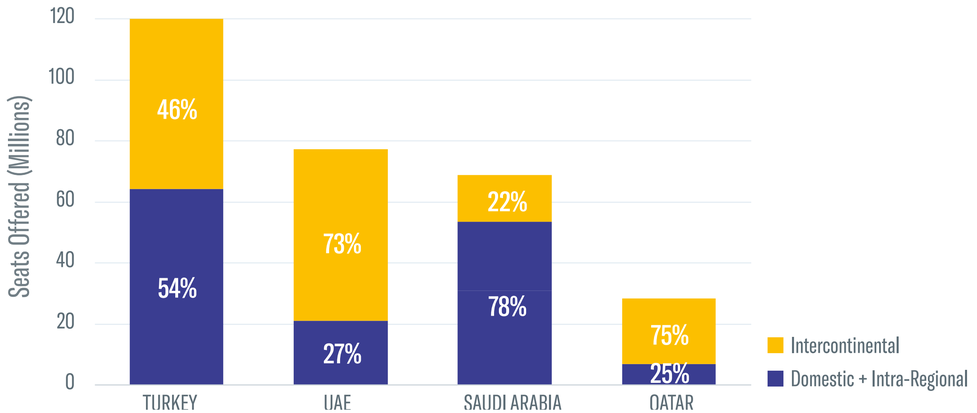
MIDDLE EAST

Mega-airlines and mega-hubs dominate the region which are strategically positioned geographically to efficiently link long-haul north-south and east-west international traffic. In fact, the majority of the world's population is with an eight-hour nonstop flight of most Middle East hubs.

Despite the predominantly long-haul international profile of the region, shorter haul domestic and intra-regional demand is maturing and now accounts for 54% of all seat capacity in the Middle East.

Four countries – Turkey, the UAE, Saudi Arabia, Qatar – generate the most seats and there is a fundamental difference in their market structures (Figure 1). Airlines in Turkey and Saudi Arabia have well-developed domestic and intra-regional networks. Airlines in the UAE and Qatar, in the absence of domestic networks, almost exclusively serve long-haul and intercontinental markets.

FIGURE 1 - SEGMENTATION OF THE TOP FOUR MIDDLE EAST MARKETS - 2023



Source: Sabre

Despite gaining relevance, there are still opportunities to develop domestic and intra-regional markets further. Intra-regional trade remains sluggish. Greater connectivity, especially new nonstop air service to secondary and tertiary cities can facilitate the flow of goods, services and people, a fundamental driver of economic growth.

The region's fleet, however, is still comprised of large aircraft which are not conducive to serving small and developing markets. Sub-150-seat aircraft can help establish secondary hubs, open new point-to-point routes, and incentivize trade and cargo transport.

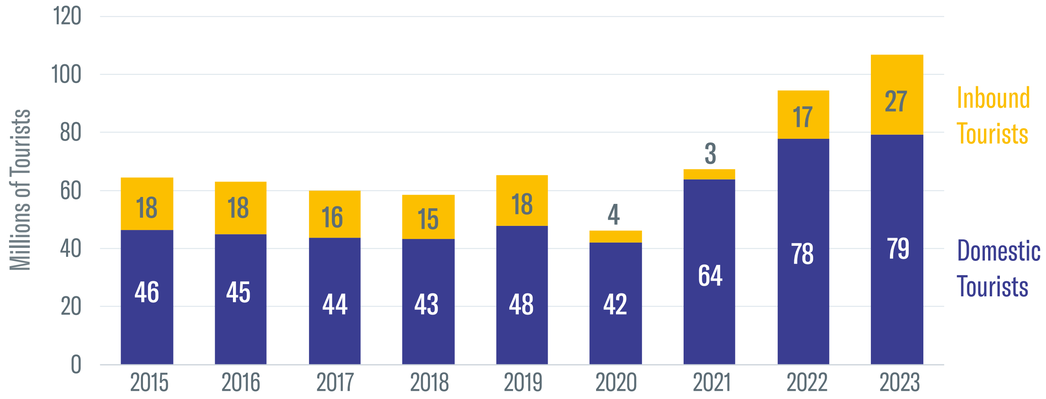
Opportunities within: Saudi Arabia's Vision 2030 strategy and the role of aviation

One country that is embracing domestic and regional expansion is Saudi Arabia. The Kingdom's Saudi Vision 2030 is a comprehensive strategic blueprint tabled in 2016 that seeks to position the country as a leader in sustainable development by creating a more diversified economy and reducing dependence on oil revenues.

One of the project's key initiatives is to grow the tourism industry with the goal of revenues accounting for over 10% of GDP. It is an endeavor that may drive disruptive change in Middle East aviation. The Kingdom's Ministry of Tourism had planned to reach 100 million annual tourists by 2030 by implementing its National Tourism Strategy but exceeded that target in 2023. The NTS has since revised the target to 150 million visitors per year (Figure 2).

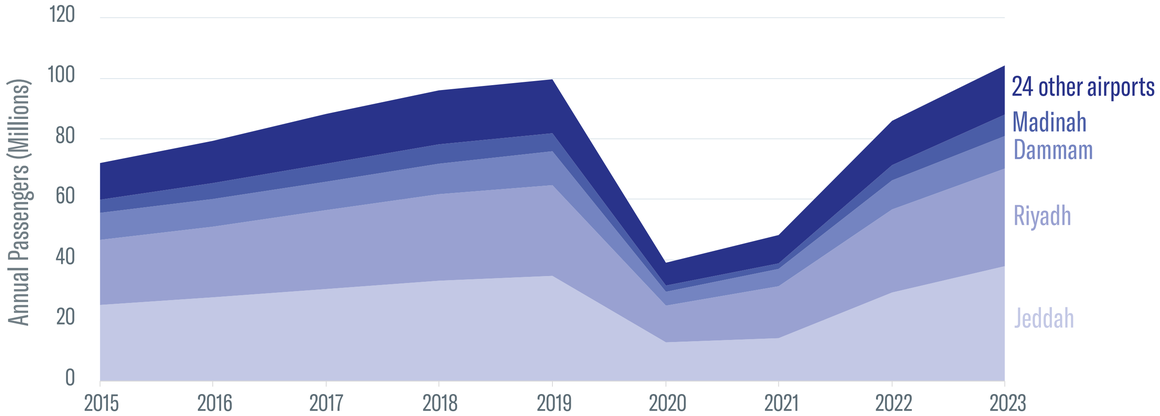
MIDDLE EAST

FIGURE 2 - TOURISM IN SAUDI ARABIA IS THRIVING



Source: Saudi Arabia Ministry of Tourism

FIGURE 3 - TRAFFIC IS CONCENTRATED AT FOUR AIRPORTS



Source: Sabre

Stimulating regional market demand is essential to further promote the country as a tourist destination. Traffic in the Kingdom is heavily concentrated at a few airports. The top four - Jeddah, Riyadh, Dammam, Madinah - account for over 80% of passenger traffic (Figure 3).

Government initiatives continue to support previously undeveloped regions. The Red Sea Project will establish a mega-tourist resort, expected to be completed by 2030, on the west coast of Saudi Arabia. The government is also pursuing an ambitious plan to build Neom, a smart desert city and tourist destination in the Tabuk region. These ventures will require new air service which may require small narrowbodies to provide the right combination of capacity and frequency to help the markets grow.

NORTH AMERICA

NORTH AMERICA

KEY MESSAGES

- 65 to 76-seat jets are the backbone of the region's network: their role will be further strengthened with the ongoing retirement of 50-seat RJs.
- Relevance of small narrowbody jets: by complementing both RJs and NBs, the segment plays a central role in delivering a gradual fleet up-gauge that maintains connectivity without compromising on costs.

Economic & Traffic Growth 2024-2043	
GDP **1.6%**	RPK **2.4%**

New Deliveries 2024-2043	
Up-to-150-Seat Jets: **2,610**	TurboProps: **350**

FLEET IN SERVICE - UPTO 150	
2024: **2,840**	2043: **3,470**

DENVER INTERNATIONAL AIRPORT, USA

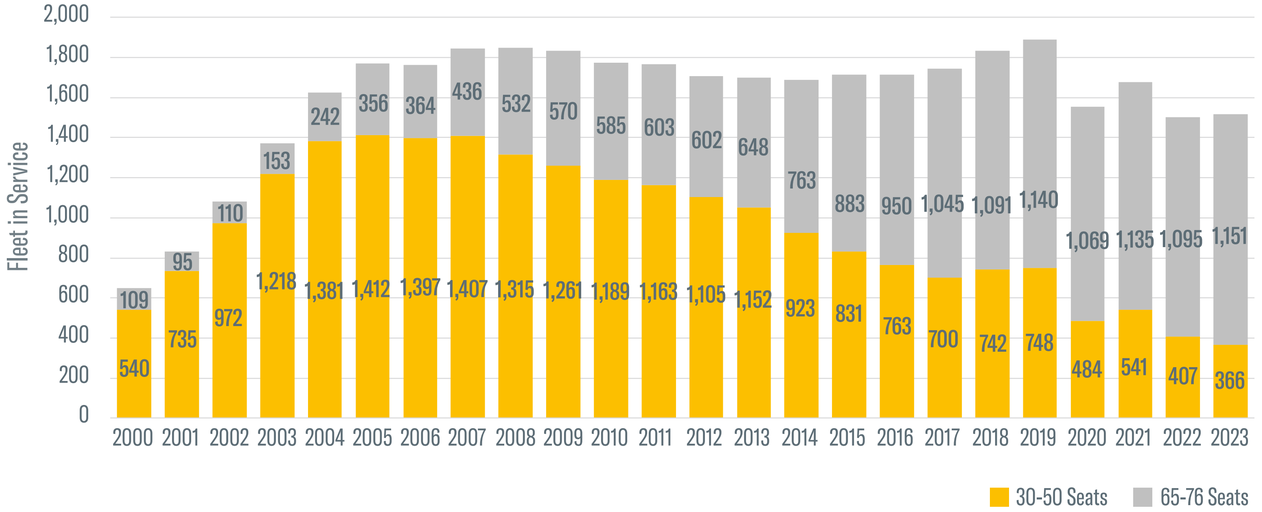
NORTH AMERICA

The North American airline market is the industry leader in revenue generation and profitability. It has the most comprehensive network on the globe, facilitating seamless connections even for the most remote communities to major cities around the world. Its unparalleled connectivity, derived from an enduring hub & spoke system, is the hallmark of the North American air transportation system.

Regional aircraft are fundamental to the market and revolutionized air travel when the first 50-seat RJs were introduced in 1991. In 2019, over 700 were still in operation. Five years later, the North American 30 to 50-seat RJ fleet is half the size. Almost all of those aircraft will reach the end of their economic and structural lives by the end of this decade, and will be replaced by 65 to 76-seat regional jets.

Despite restrictive pilot scope clauses which limit the seat capacity, weight, and number of regional aircraft an airline may operate, the size of the 65 to 76-seat North American fleet is at a record high (Figure 1).

FIGURE 1 - 65-76 SEAT JETS DOMINATE THE REGIONAL MARKET



Source: Cirium

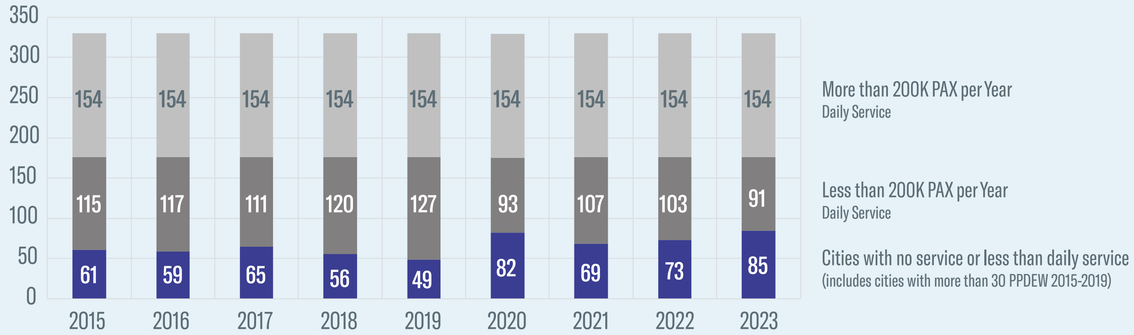
North American carriers are up-gauging their aircraft, particularly in the large narrowbody category above 190 seats. Between 2015 and 2023, total seats flown increased 20% yet the number of cities served remained almost unchanged (1%) (Figure 2).

NORTH AMERICA

FIGURE 2 - EVOLUTION OF SEATS FLOWN VS. CITIES SERVED

Source: Sabre - largest scheduled airlines (99% of market capacity)

FIGURE 3 - NUMBER OF CITIES SERVED BY ANNUAL PASSENGER VOLUME



Source: Sabre

This trend suggests that airlines are abandoning some low-demand markets and prioritizing service on large, highly competitive markets where their large narrowbodies are more viable. Since 2019, the number of low-demand cities that have lost air service has increased more than 70% (Figure 3).

That loss represents new opportunities for small narrowbodies, especially with the post pandemic work-from-home and migration from large urban area trends. Abandoned cities or those which previously had less than one daily flight are better served by small narrowbodies which, in turn, promote better network connectivity.

CARGO MARKET OUTLOOK

CARGO MARKET OUTLOOK

KEY MESSAGES

- E-commerce is one of the driving forces incentivizing the air freight industry to grow and adapt.
- Small narrowbody jets: reach more distant destinations or add essential time-on-ground for loading compared to turboprops; replace or complement larger narrowbody jets to serve decentralized regions cost-effectively.

Economic & Traffic Growth 2024-2043	
GDP	CTK
2.5%	**3.6%**

New Deliveries 2024-2043
Up to 20-ton payload aircraft (feeders):
600

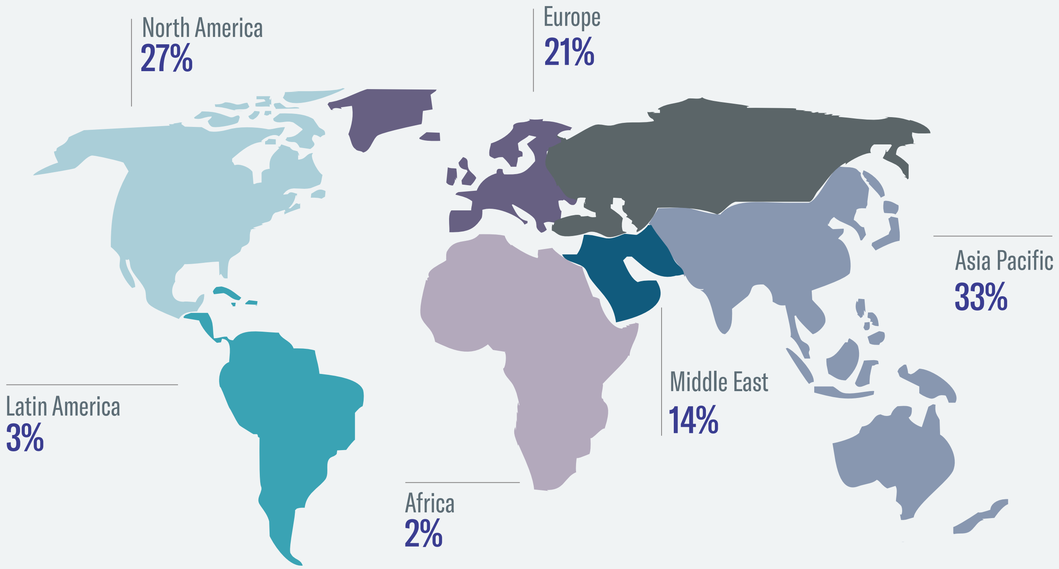
Fleet-In-Service – Up to 20-ton payload aircraft	
2024:	2043:
400	**630**

CARGO MARKET OUTLOOK

The air cargo industry continually faces fluctuations in demand, particularly from geopolitical and economic forces. Adapting to the dynamic environment is key to its success.

Three regions - Asia, North America, Europe – are the largest markets. Combined, they accounted for 81% of all Freight Ton Kilometers (FTKs) in 2023 (Figure 1).

FIGURE 1 - SHARE OF FTKS BY MAJOR WORLD REGION - 2023

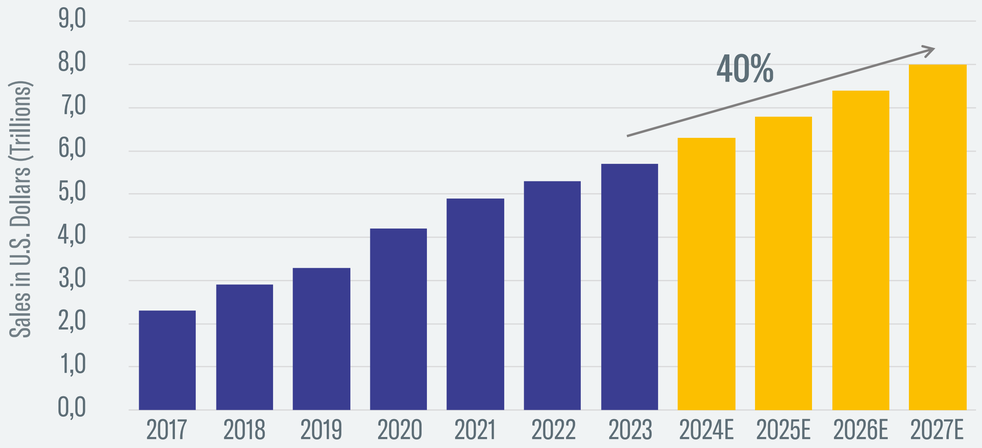


Source: Adapted from IATA

E-commerce has emerged as a new sector with lucrative opportunities. The growth estimate for the sector is impressive. According to analyses by IATA and McKinsey, e-commerce represented just 15% of air cargo volume in 2019. After the onset of the pandemic, FTKs from e-commerce had already exceeded the expected 10-year growth forecast in the second quarter of 2020.

Worldwide e-commerce sales increased 72% between 2019 and 2023. Sales are expected to grow another 40% by 2027. The value of that trade is estimated to be USD 8 trillion (Figure 2).

FIGURE 2 - WORLDWIDE E-COMMERCE RETAIL SALES



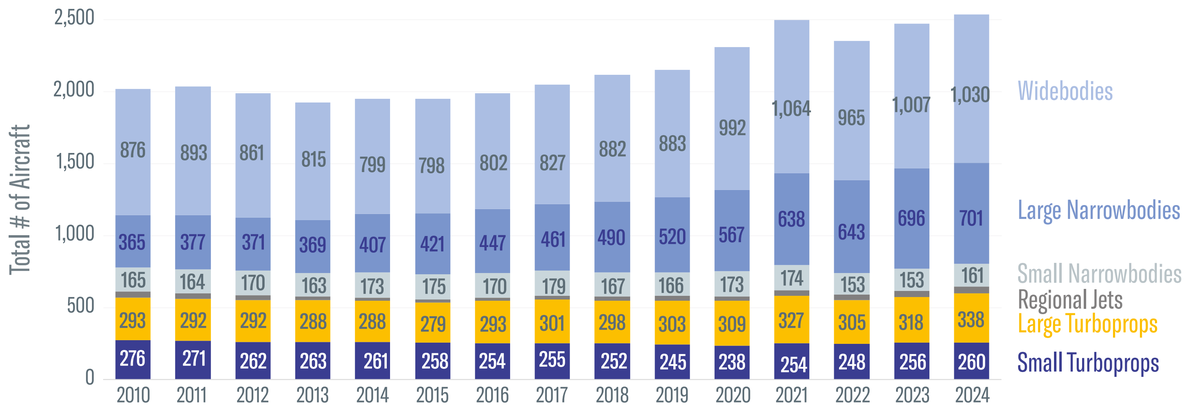
Source: Adapted from Statista and Embraer analysis

CARGO MARKET OUTLOOK

Freight carriers, airlines, and manufacturers were quick to respond to the sudden increase in e-commerce trade and the consequences of the pandemic. Demand for cargo space peaked in 2021 after airlines grounded passenger flights, eliminating the huge volume of daily belly capacity on both narrow and widebody scheduled commercial jets almost overnight.

Operators endeavored to deploy as many freighters as possible to replace the lost space. Passenger aircraft were converted to all-cargo configurations. Consequently, the industry reported three consecutive years of record-high conversions. More than 200 aircraft were converted in 2023. The world cargo fleet-in-service has increased markedly since the pandemic (Figure 3). Between 2010 and 2019, the number of aircraft grew by only 6%. Over the next five years from 2019 to 2024, the fleet grew 18%, three times higher than the previous decade. The number of large narrowbody freighters, in particular, grew 35% over the last five years.

FIGURE 3 - EVOLUTION OF CARGO FLEET-IN-SERVICE BY SEGMENT



Source: Cirium

The sudden flood of capacity, the post-pandemic return of commercial aircraft belly space, and the volatility of demand related to geopolitical trade tensions resulted in overcapacity in the cargo market starting in the second half of 2022.

Despite the glut, there are emerging opportunities for smaller freighters to satisfy the tremendous growth in e-commerce. Those aircraft can feed main cargo hubs, linking smaller-demand markets faster and more cost-effectively, with just the right capacity and frequency, than larger narrow and widebody jets.

DATA SOURCES

ALL ANALYSIS DEVELOPED USING DATA FROM:

- *S&P Global IHS Markit*
- *The Economist, OECD, World Bank, IMF, McKinsey Global Institute, Morgan Stanley Research, Global Trade Alert*
- *OAG*
- *ICAO, IATA*
- *US Census Bureau, US BTS*
- *Sabre*
- *Cirium Fleet Analyzer*
- *Embraer Market Intelligence*
- *Airlines*
- *Seabury Cargo*

REGIONAL DEFINITIONS

- *North America*
- *Latin America (includes Mexico & Caribbean)*
- *Europe (includes CIS & Israel)*
- *Africa*
- *Middle East (includes Egypt & Turkey)*
- *Asia-Pacific (includes China)*

AIRCRAFT SEGMENTATION

UPTO 150-SEAT AIRCRAFT:

- *Turboprops: ATR42/72, DHC8-100/200/300/400, EMB-120, Saab 340/2000, MA 60/600/700, Il114, Fokker 50, D328, TBD TP*
- *Regional Jets: ERJ 135/140/145, CRJ 100/200/550/700/900, E170/E175/E175-E2, Fokker 70, AVRO RJ70/85, ARJ21-700, TBD RJ*
- *Small Narrowbody Jets: E190/E195/E2, CRJ1000, SSJ100, Fokker 100, AVRO RJ100, BAe 146-300, 737-200/300/500/600/700, 717, 737 MAX7, MD-87, A318, A319, A319neo, A220-100/300, MC21-200, TBD Small NB*

For more information, please visit: www.embraercommercialaviation.com/marketoutlook

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