



# Embraer China Market Outlook

## 2011-2030



**EMBRAER**

*Commercial Aviation*

executive summary

a look  
forward

china regional market

trends and  
analysis

market forecast

by the  
numbers

definitions



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# China Market Outlook 2011-2030

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Chinese regional aviation market.



关东元

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# Towards a Bright Future

World aviation showed signs of recovery last year after the economic crisis in 2008 with China emerging as one of the fastest growing and most important air transport markets. That trend is reflected in Embraer's forecast that global aviation will grow at an annual rate of 5.2% over the next twenty years, higher than last year's prediction. By 2030, some 7,000 jets in the 61 to 120-seat category will be added to airline fleets.

Deployment versatility and low operating costs have allowed jets in the 61 to 120-seat segment to fill the gap between smaller regional jets and larger, single aisle mainline aircraft. Airlines around the world are using the new jets to replace their ageing fleets, right size capacity and open new markets. Traffic in the Asia Pacific region, including China, is forecast to grow the fastest with demand for new 61 to 120-seat aircraft eventually exceeding that of Europe. Airlines in China are expected to purchase 975 of these jets, about 13% of global orders.

That particular capacity segment is home to Embraer's E-Jets family which, in 2011, has seen strong demand for new orders. Since the first aircraft entered revenue service seven years ago, 60 customers from 40 countries have ordered more than 1,000 E-Jets and nearly 800 have been delivered. Here in China, China Southern Airlines and Hebei Airlines will become new E-Jet operators increasing the number of customers flying the popular twin jets in this country to four.

China Southern Airlines will deploy its new E190s in Xinjiang, an area that showcases the power of E-Jets to unlock the region's enormous potential. This outlook contains an in-depth analysis of how regional aviation

will transform the economy and connectivity of Xinjiang. It can serve as a blue print for regional air transport development in other parts of China.

Airlines in China have recognized the success of Embraer's commercial aircraft. As of the end of June 2011, the company had received 135 firm orders from eight customers and delivered 90 aircraft of various models. That number represents half of the regional aircraft fleet in China. By year end, more than 100 aircraft will have been delivered. And to better serve our customers, we have increased our investments and established a comprehensive before and after-sales service and safety network.

The rate of development of air transport in China will remain high over the next one or two decades which will increase the country's influence in global aviation. Growth in regional air transport will serve to transform local economies as a large number of new airports are built in the central and western regions under the Essential Air Service program. Based on the policies and subsidies that will promote new air service, the outlook for regional aviation in China is very promising.

**Join us as we build a bright future for the Chinese regional aviation market.**









executive summary

# a look forward

## Executive Summary

The air transport industry has recovered from the last economic recession. Airlines are more efficient on capacity management and better structured to deal with future shocks.

Looking ahead, despite recent fuel price increase and natural disasters, Embraer forecasts that world air transport demand will grow by 5.2% per year from 2011 to 2030.

There will be a requirement for 31,435 new aircraft deliveries over the next 20 years representing a total market value of US\$3 trillion.

### Forces Driving Demand

The world economy has been recovering from the recession at different paces. Emerging markets are driving economic growth, fueled by the impressive growth of China and other Asian countries. Developed countries are growing at a much slower rate.

In the long term, the key trend is the shift in global power from West to East and in some extent to South. Countries, such as BRICS, are full of optimism due

to their economic prosperity, robust population growth, urbanization and increase of income per capita which will stimulate a significant increase of personal consumption and air travel demand.

### Middleweight Cities Driving World Economic Growth

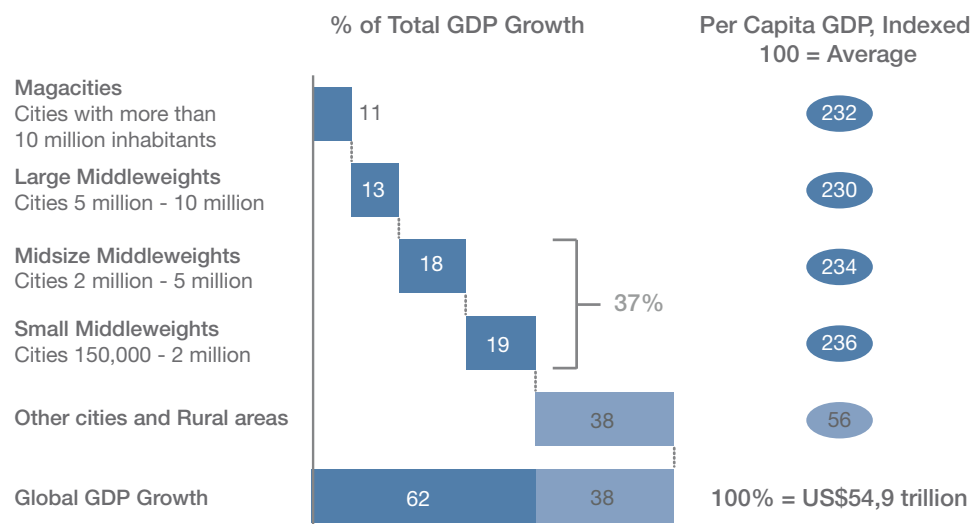
Midsized and small middleweight cities – defined as cities with a population between 150,000 and five million inhabitants – are poised to drive almost 40% of the global economic growth over the next 15 years. (Chart 1)

Developed economies together with emerging market megacities have been generating more than 70% of global GDP. This characteristic directly influenced the air transport industry. Even after many years of air travel development, the existing network and capacity supplied are very concentrated in major airport hubs.

However, future economic growth will take place in middleweight and small cities. This trend will generate a need for the development of more secondary airports and opportunities for airlines to explore low and medium-density markets with right-sized aircraft.

Chart 1

### World GDP Growth Contributors



Source: 2011 McKinsey Global Institute Cityscope 1.0

Another characteristic is that the economic role of cities varies widely among regions. In addition, economic development based on clusters of these cities will favor more regional integration.

### More Air Services Liberalization

Historically, the air transport industry benefits from deregulation and open skies agreements, creating more opportunities for airlines and more travel options for passengers.

The trend towards more liberalized air services will continue around the world (e.g. Asia and East Europe).

### Environmental Pressure Driving New Technologies

Environmental concerns affect all industries and government policies related to emissions and noise are getting tougher.

Although aircraft CO<sub>2</sub> emissions account for only 2% of total global greenhouse emissions, a very strict legislative proposal is about to take effect in 2012, in Europe-ETS (Emissions Trading Scheme) will generate additional costs to airlines.

In order to overcome these penalties, the aviation industry is stepping up its efforts

to develop products with new technologies that will reduce fuel consumption, use more alternative fuels, increase efficiency and generate fewer emissions.

### Air Traffic Demand Forecast

Embraer forecasts that world air transport demand will increase more than 2.7 times until 2030, reaching 13 trillion revenue passenger kilometers (RPK), with an average annual growth of 5.2% supported by 3.2% annual GDP growth. (Chart 2)

Emerging markets will lead growth in air transport demand. Over the next 20 years, China will be the fastest-growing market, with an average annual RPK growth rate of 7.5%, followed by Latin America with 7.2%, the Middle East with 6.9% and Asia Pacific with 6.1%.

Developed economies will grow less due to their market maturity, North America with 3.5% and Europe with 4.4%.

By 2030, Asia Pacific and China will be the largest market in the world accounting for 36% of world RPKs. Europe and North America will be the following largest markets accounting for 21% of RPKs each.

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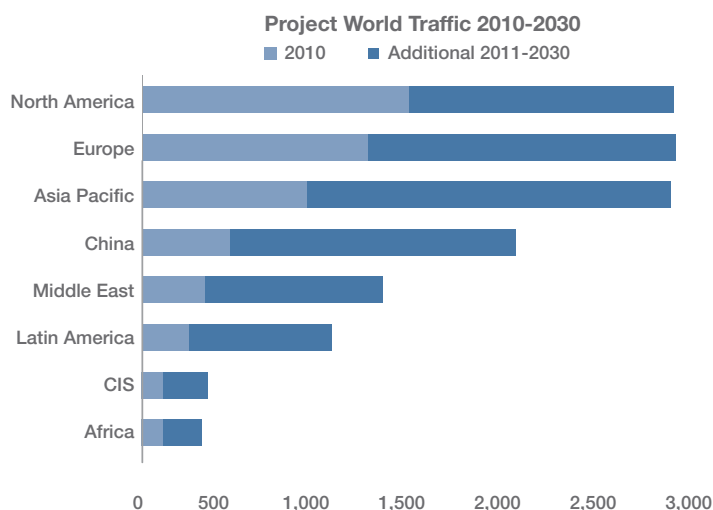
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forward



Chart 2

### Projected Traffic and Economic Growth (2011-2030)

RPK (Billion) by Region



Annual Growth Rate	
2011-2030	
RPK	GDP
3.5%	2.6%
4.4%	2.0%
6.1%	3.2%
7.5%	6.1%
6.9%	4.0%
7.2%	4.3%
5.9%	3.3%
5.4%	4.4%
World	
5.2%	3.2%

Source: Global Insight, The Economist, Embraer

### 30 to 120-Seat Jet Segment

Embraer foresees a world demand for 7,225 new jets in the 30 to 120-seat capacity segment over the next 20 years, representing a total market value of US\$320 billion.

From 2011 to 2020 there will be 3,125 new aircraft to be delivered and the remaining 4,100 units will enter the market between 2021 and 2030. The 91 to 120-seat segment will be the largest market, with 57% of new deliveries (4,125), followed by the 61 to 90-seat segment with 37% (2,670) and 50-seaters with 6% (430).

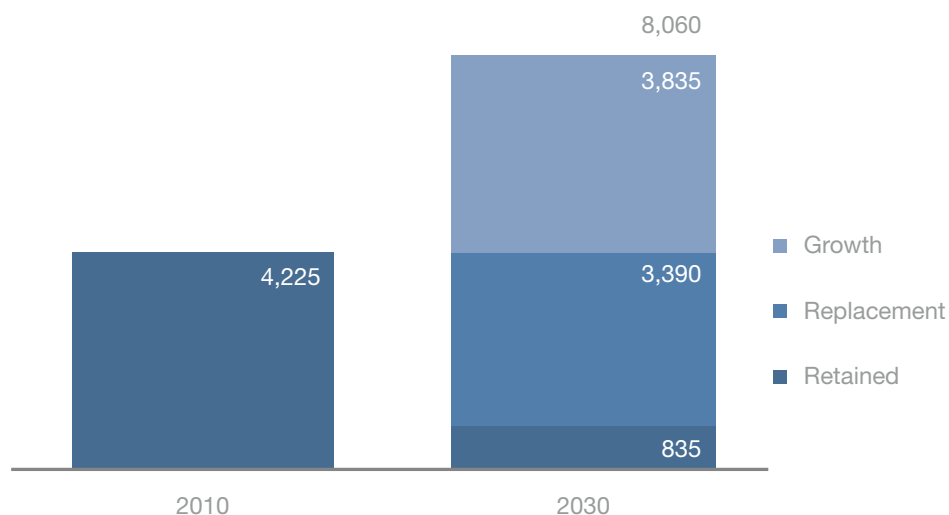
Market Segment (Seats)	2011 2020	2021 2030	2011 2030
30-60	15	415	430
61-90	1,265	1,405	2,670
91-120	1,845	2,280	4,125
<b>30-120</b>	<b>3,125</b>	<b>4,100</b>	<b>7,225</b>

The 30 to 120-seat segment plays an important role in aviation providing flexibility to airlines to deal with the volatility of the market, complementing larger aircraft operation with proper capacity as well as allowing them to open new low to medium-density markets.

The 50-seater market has been impacted by high fuel prices and low yield environment. However they still are essential to feed hubs in the USA and to develop regional aviation in other regions such as CIS, Africa and Latin America.

The 61 to 120-seat segment has been providing much needed flexibility and efficiency improvements to airlines by right-sizing larger jets, replacing ageing aircraft, developing new markets and expanding from smaller regional jets.

**Chart 3**  
**World Jet Fleet Evolution**  
Number of Aircraft (30 to 120-Seat Segment)



Source: Embraer



## Commercial Jet Delivery Forecast 30 to 120-Seat Segment, by Region (2011-2030)

World Region	Total Deliveries	Share
Africa	195	3%
Asia-Pacific	615	9%
China	975	13%
Europe	1,675	23%
Latin America	670	9%
Middle East	310	4%
North America	2,350	33%
Russia/CIS	435	6%
<b>Total</b>	<b>7,225</b>	

The world fleet in service of 30 to 120-seat jets will increase from 4,225 aircraft in 2010 to 8,060 by 2030. In this period, 53% of new deliveries (3,835 units) will be added to support market demand growth and 47% (3,390) to replace ageing equipment. By 2030, 20% (835 jets) of the current fleet will still be in operation. (Chart 3)

## Turboprops

High oil prices and growing focus on emissions and noise footprint issues are favoring turboprops demand growth. However, their optimum operation and attractiveness are limited to short-haul and niche markets. In the medium and long-haul market, jets will still be preferred.

By 2030, 2,440 new turboprops (with a capacity of 30 seats and greater) will be delivered: 50% to support market growth and 50% to replace ageing aircraft. More than 80% of turboprops demand will be in the capacity segment of 60 seats and greater.

Aircraft Seat Segment	2011 2020	2021 2030	2011 2030
30-60	185	255	440
60+	880	1,120	2,000
<b>30+</b>	<b>1,065</b>	<b>1,375</b>	<b>2,440</b>

In 2010 there were 2,080 turboprops in service with an average age of 15 years. By 2030, 41% of the current fleet will still be in service and the total turboprop fleet will increase to 3,295 aircraft. (Chart 4)

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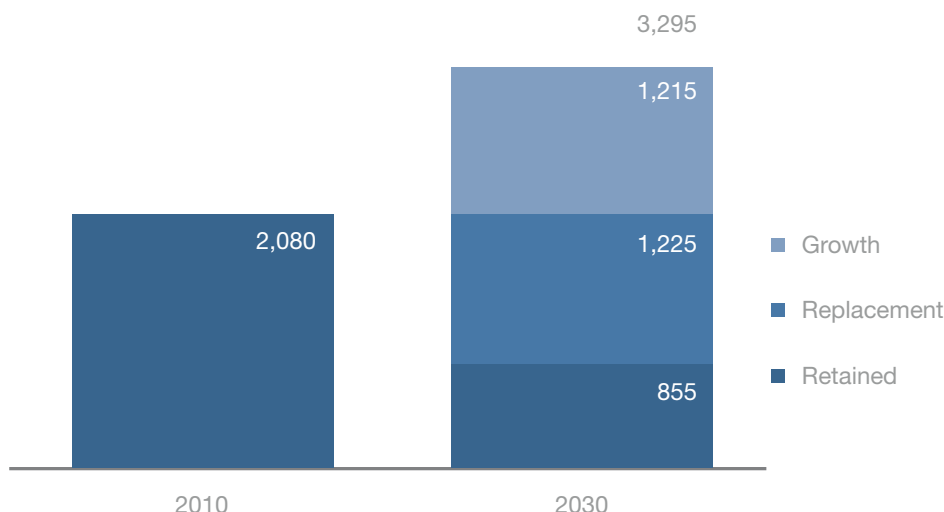
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forward



Chart 4

### World Turboprop Fleet Evolution

Number of Aircraft (30+ Seat Segment)



Source: Embraer

## Narrow and Wide-Body Aircraft

Over the next 20 years, airlines will require 21,770 new jets with more than 120 seats (69% of total new aircraft deliveries) being 16,185 narrow-bodies and 5,585 wide-bodies.

Aircraft Seat Segment	2011 2020	2021 2030	2011 2030
<b>NB (120-210)</b>	7,415	8,770	16,185
<b>WB (210+)</b>	2,575	3,010	5,585
<b>NB+WB (120+)</b>	<b>9,990</b>	<b>11,780</b>	<b>21,770</b>

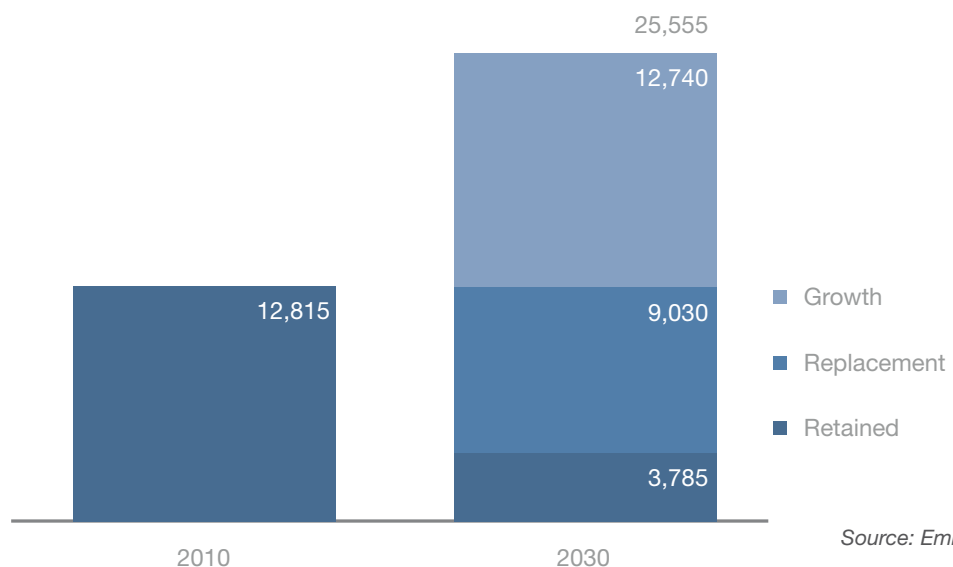
Of total new deliveries, 59% will be to support market growth and 41% to replace old aircraft. By 2030, 30% of the current fleet in service will remain in operation. [\(Chart 5\)](#)

In this segment, the world fleet in service will increase from 12,815 aircraft in 2010 to 25,555 units in 2030.

Chart 5

### World Narrow and Wide-Body Fleet Evolution

Number of Aircraft (120+ Seat Segment)



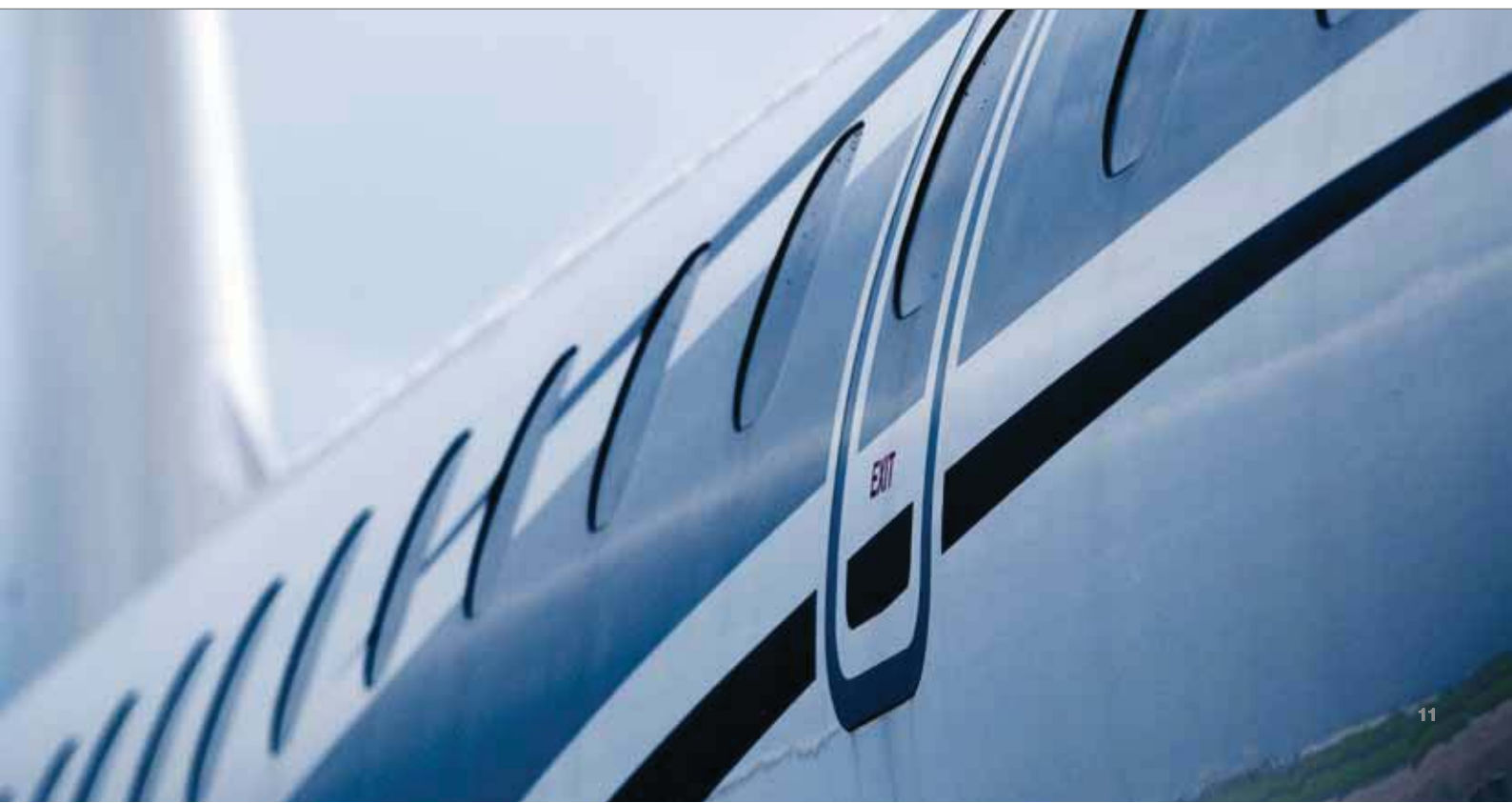
Source: Embraer

World Projected New Deliveries					
	Seat Segment	2011 - 2020	2021 - 2030	2011 - 2030	Share
Turboprop	30-60	185	255	440	2%
	60+	880	1,120	2,000	6%
	Total Turboprops	1,065	1,375	2,440	8%
Jet	30-60	15	415	430	1%
	61-90	1,265	1,405	2,670	9%
	91-120	1,845	2,280	4,125	13%
	Total 30-120	3,125	4,100	7,225	23%
	NB 121-210	7,410	8,775	16,185	51%
	WB >210	2,570	3,015	5,585	18%
	Total 120+	9,980	11,790	21,770	69%
	Total Jets	13,105	15,890	28,995	92%
Total		14,170	17,265	31,435	

World Fleet In Service			
	Seat Segment	2010	2030
Turboprop	30-60	1,390	885
	60+	690	2,410
	Total Turboprops	2,080	3,295
Jet	30-60	1,730	710
	61-90	1,100	2,845
	91-120	1,395	4,505
	Total 30-120	4,225	8,060
	NB 121-210	9,665	19,025
	WB >210	3,150	6,530
	Total 120+	12,815	25,555
	Total Jets	17,040	33,615
Total		19,120	36,910

executive summary

a look  
forward









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trends and  
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Civil aviation in China entered a new phase in 2001 and has since become one of the fastest growing and most important aviation markets in the world. In that seminal year, the industry posted a profit of RMB43.4 billion, a dramatic increase of RMB32.4 billion over the previous year, which generated record high traffic movements and economic benefits.

Regional aviation has also made great progress in China with its own characteristics and trends.

### China's Regional Aviation Market – An Overview

According to the Civil Aviation Administration of China (CAAC), there were 1,371 scheduled domestic routes operated by all airlines in 2010, an increase from the previous year. Nearly seventy-eight percent of those routes (1,062 regional city pairs) carried, on average, fewer than 300 one-way passengers per day. (Chart 6)

Medium and low-volume routes have three characteristics. First, most routes are served with fewer than two daily flights. There are 794 markets (including some newly opened routes) with less than one flight per day (Chart 7). Second, although the number of routes is high, the traffic volume

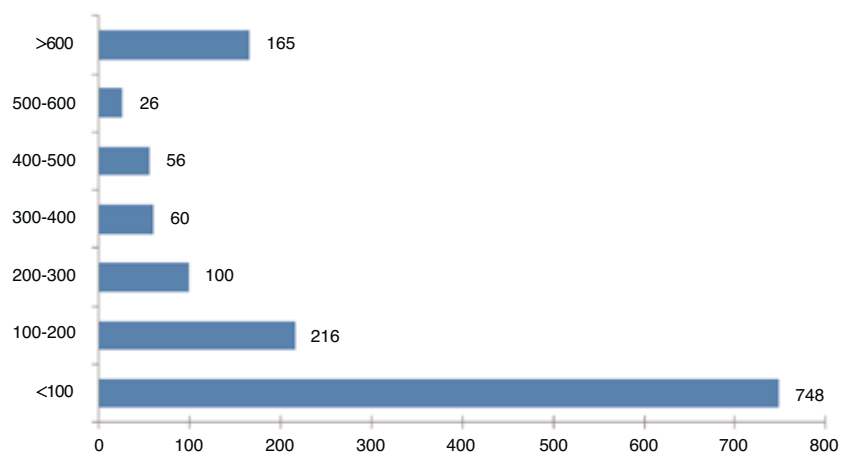
is low – fewer than 60 million passengers were carried in 2010. That number was less than one quarter of the total number of domestic passengers carried in the country and corresponded to only 5.4% of the total revenue passenger kilometers (RPK) generated. There was no significant change in RPKs compared to the previous year. Third, the number of passengers per flight is low. Three quarters of all departures carried fewer than 120 passengers (Chart 8) while 21% of flights had fewer than 60 passengers. The statistics include routes with medium and low traffic volumes where some flights to popular tourist destinations attract more passengers while others may have high loads due to low flight frequency. By comparison, there were 160 million passengers on regional flights in the USA in 2010 with those RPKs accounting for more than 15% of the domestic total.

The imbalance in the development of trunk and regional air services has been a long-standing problem in China. According to the CAAC, passenger throughput at the top 25 airports accounted for 80% of the total volume at all 175 airports in the country in 2010. Yet more than half of all airports have fewer than 10 takeoffs and landings per day and the passenger throughput at 108 airports is less than half a million annually. All of these airports are built for regional

Chart 6

#### Number of Domestic Routes by Passenger Volume

Daily Passengers Each Way

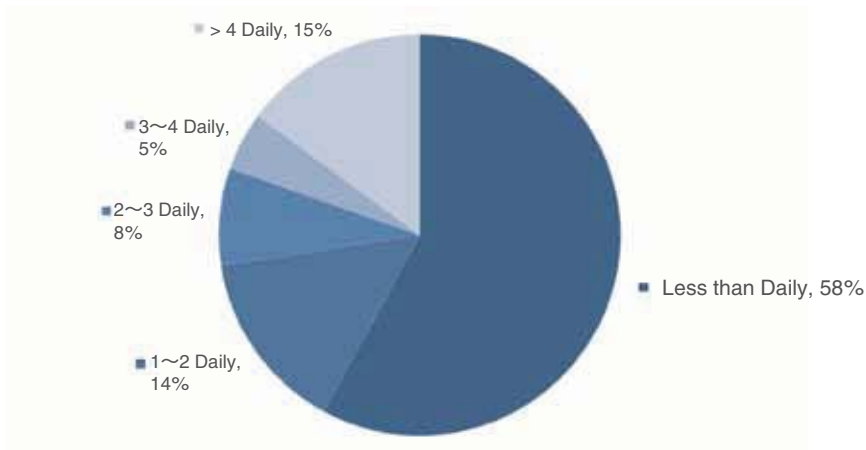


Number of Routes

Source: Civil Aviation Administration of China (CAAC)

Chart 7

## Frequency Distribution - Scheduled Domestic Flights

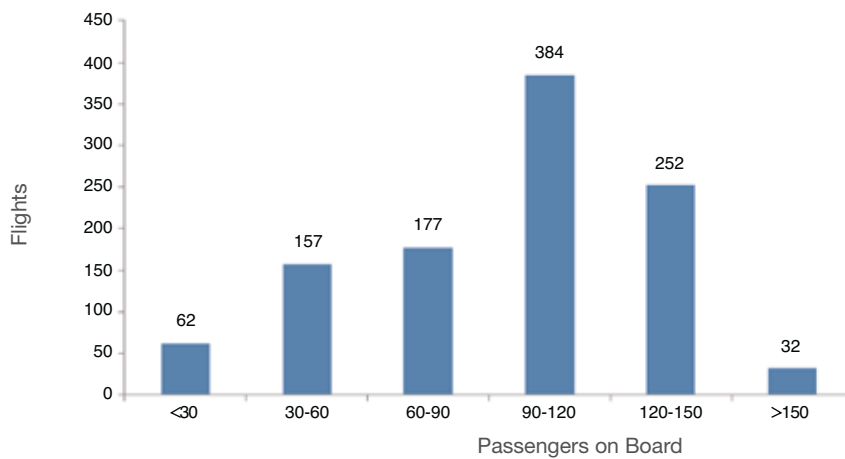


Source: Civil Aviation Administration of China (CAAC)

Chart 8

## Passengers per Flight on Medium and Low Volume Scheduled Routes

Number of flights



Source: Civil Aviation Administration of China (CAAC)

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trends and  
analysis



services. The estimated annual financial loss associated with these underutilized regional airports is RMB1.68 billion however there is some good news. The volume of passengers at most of these airports is growing at a rate above 20% which indicates great potential for development of China's regional aviation market.

Because of their shorter sector lengths and less competition, yields on regional services command a 15% premium over trunk routes (Chart 9) which can lead to improved profitability for regional carriers.

High cost is still a major factor restricting the development of regional aviation. On May 25, 2011, the National Development and Reform Commission (NDRC) issued a document in which it declared an increase in the price of aviation fuel for the domestic market from RMB6,840/ton to RMB7,640/ton, which surpassed the record high in 2008 (Chart 10). The long-term high fuel price has further increased airline operating costs. With their lower capacity, the fuel burn per seat of a regional aircraft is higher than that of a larger aircraft used on trunk routes. Consequently, high fuel prices negatively impact regional aircraft more than larger jets and that creates a persistent challenge in the long term. This situation should prompt government authorities to issue

new policies to improve airline profitability and support the development of regional aviation, including a reduction to several taxes related to regional flight operations.

A small number of airlines are engaged in regional aviation. Some carriers have gradually transitioned from regional to trunk services. With the exception of Tianjin Airlines and China Express, most carriers in China consider regional operations as a supplement to their main business. In the USA by comparison, the Regional Airline Association had 62 registered members in 2009. In that country, regional aviation plays an extraordinarily significant role in the whole air transportation system.

Having a diversified business model is a new trend that has recently emerged in China's regional aviation market. China Express has been cooperating with local governments for most of its flights and can obtain subsidies as well as a steady source of passengers that provides both social and economic benefits. The Inner Mongolia Airport Corporation introduced a "virtual flight" business concept in which airlines are not required to be registered or buy aircraft that operate under a corporate structure. These entities can lease aircraft from other airlines, pay for the rentals through daily usage rates and fly on any





Chart 9

### Comparative Price Index – Trunk and Regional Routes

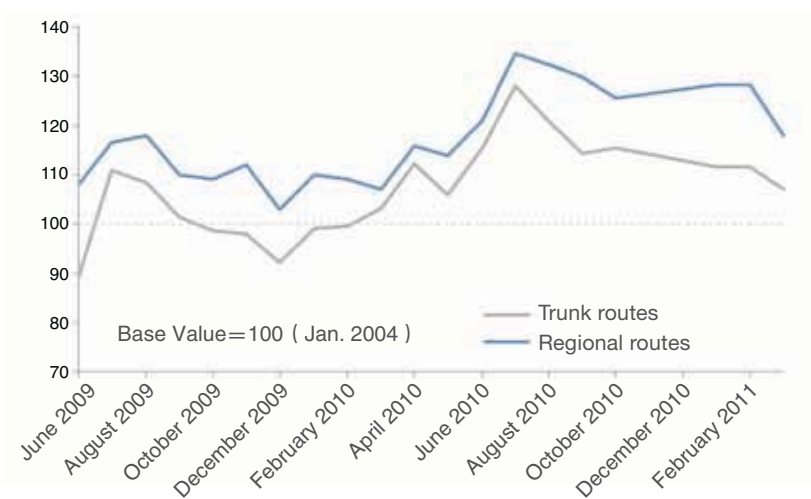
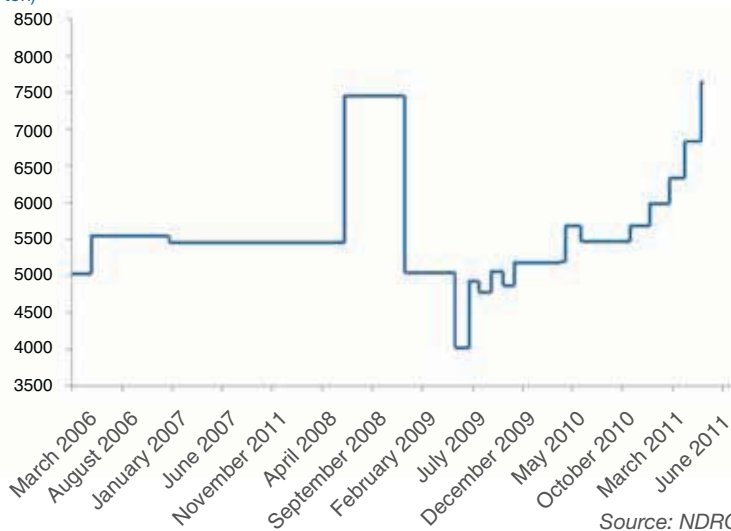


Chart 10

### Fuel Price Change on Domestic Markets

(RMB/ton)



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trends and  
analysis



regional route within Inner Mongolia over a long period of time. Regional aviation in Inner Mongolia has been very successful using this approach yet simple and outdated business models are still among the reasons limiting robust development of the regional sector. Other more mature foreign business models such as Capacity Purchase Agreements (CPA) and flight code sharing have not yet been accepted by Chinese airlines. How to carry out win-win business cooperation between airlines and explore a revenue model that is best for China will be an important issue that needs to be addressed in order to develop the regional industry in the future.

Government subsidies have become a major driver in the development of regional aviation. Shandong Airlines, for example, received a total of RMB9.5 million in subsidies for regional operations from all branches of the CAAC in 2010. That money helped increase the airline's net profit by some RMB7.125 million. According to government statistics, the central budget allocated a total of RMB7.3 billion in universal service subsidies to airports and airlines in the "Eleventh Five-Year Plan" which prompted a further RMB10 billion in subsidies from local governments. These subsidies greatly aided the development of regional aviation.

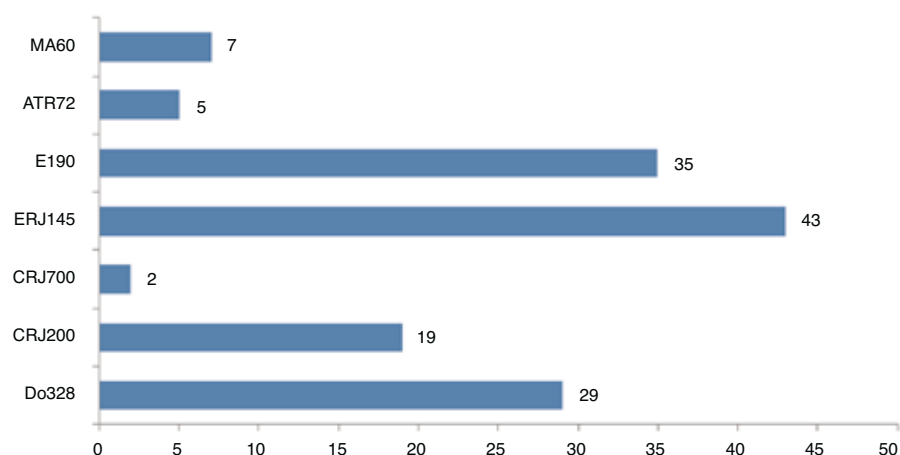
## China Regional Aviation – Fleet Overview

By the end of 2010, Chinese airlines operated 1,597 aircraft. About 8.7% of the fleet (140 units) was regional aircraft with fewer than 100 seats, a slight increase in the proportion from the previous year. The regional fleet was comprised of 43 ERJ145, 29 Dornier 328, 21 CRJ200/700, 35 E190, 5 ATR-72 and 7 Modern Ark 60 (Chart 11). The profile of the regional aircraft included older aircraft such as 15 year old ATR-72s and new aircraft such as one year old E190s. Airlines have drawn up replacement plans for those aging aircraft.

Ten airlines currently operate regional aircraft. With the exception of Tianjin Airlines, the fleets of the regional airlines are too small to derive true economics of scale which explains their relatively high operating costs.

Analyzing the profile of the civil fleet over the past decade, it is not difficult to see that airlines have always preferred trunk routes to regional routes and purchased aircraft accordingly. The disproportionate number of large jets to regional aircraft has not been addressed over the past few years and changes to the trend have been marginal (Chart 12).

**Chart 11**  
**Regional Fleet in China**  
As of December 2010



Source: Civil Aviation Administration of China (CAAC)



Table 1

## Distribution of Regional Aircraft

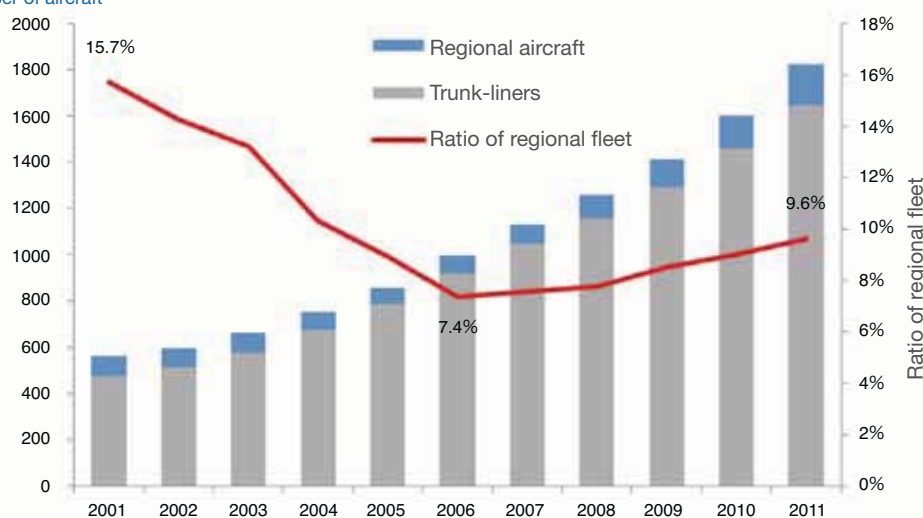
As of December 2010

	China Eastern Airlines	China Southern Airlines	Sichuan Airlines	Tianjin Airlines	Hebei Airlines	China Express Airlines	Shandong Airlines	Henan Airlines	Okay Airlines	Joy Airways
MA60									2	5
E190				31				4		
ERJ145	10	6	3	22	2					
CRJ200	10					4	5			
CRJ700							2			
ATR72		5								
Do328				29						

Chart 12

## Fleet Profile of Chinese Airlines

Number of aircraft



Source: compiled from Statistical Data on Civil Aviation of China

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trends and  
analysis



This imbalance forces the trunk airlines to serve medium and low volume routes with large aircraft. More than 75% of routes with fewer than 300 PDEW (passengers per day each way) were flown by aircraft with 120+ seats (Chart 13). In comparison, the average size of the US regional fleet on similar sized markets is 55 seats. Bigger aircraft inevitably lead to over capacity on some routes and adversely affect operating efficiency.

In 2010, regional aircraft in China carried 7.89 million passengers or 3.17% of the total passenger volume in the country, 26.6% more than 2009. According to CAAC statistics, Embraer's ERJ145 and E190 are the dominant airplane types in the regional aviation market (Chart 14). These aircraft have been recognized by both airlines and passengers for their reliability and comfort.

operation of regional airports in the central and western parts of the country. Over the next five years, China will construct 48 new airports raising the total number to 223. Regional airports will constitute the majority of the new facilities.

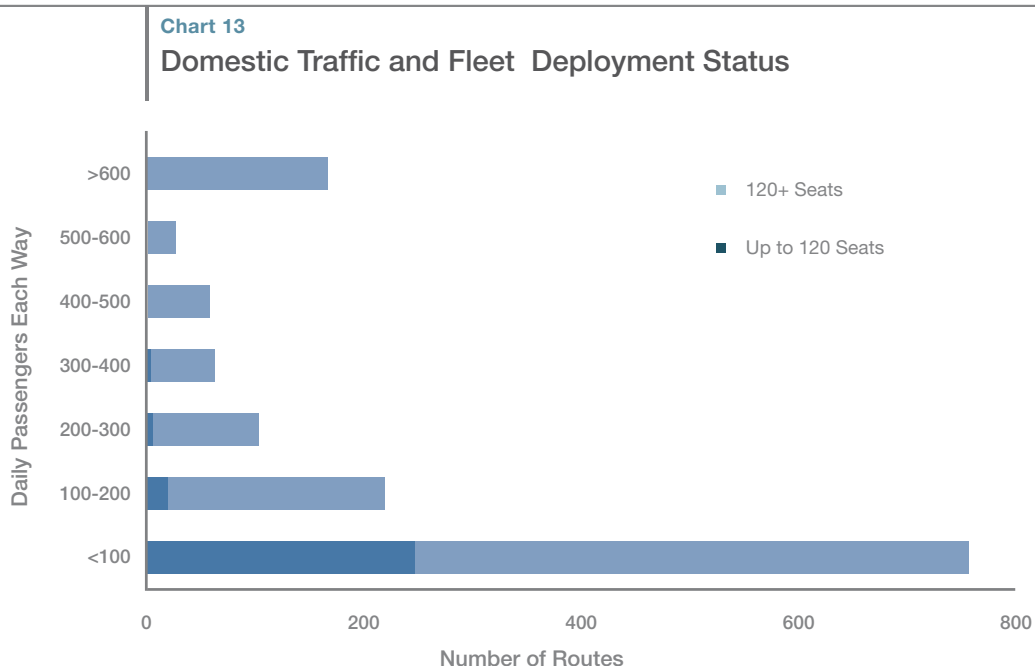
At the same time, the Government will also adjust and improve current regional aviation subsidy policies to encourage airlines to operate on regional routes. These revisions include an exemption on import duties and the value-added tax for spare parts of regional aircraft, and exemption of airport construction fees allocated to regional flights. Implementation of these new policies will effectively reduce the cost of travel for passengers, stimulate consumer demand, enhance sector profitability and encourage airlines to increase capacity on routes connecting small and medium-sized cities. The new demand will, in turn, increase the utilization of regional airports.

## Growth Opportunities for the Regional Aviation Market

### Strong Government Support for Regional Aviation Development

In order to promote the development of regional aviation, the Government will continue to support the construction and

In order for people living in remote areas to benefit from air transport, the Government will need to better understand the experience of the mature airline industries in developed countries so that it can improve its local policies and guarantee basic services. The Government will also provide more support to those small and medium-sized regional airports that have



Source: Civil Aviation Administration of China (CAAC)

low passenger volumes and to airlines in the form of funding and policies to increase capacity on regional sectors.

### Airlines Becoming More Rational

The rapid development of Chinese aviation has led to fierce competition among airlines in the more developed parts of the country. Carriers are shifting their attention to remote areas where they can aggressively tap into the regional aviation market potential.

Today, there is still a lack of nonstop flights between many second and third-tier cities. Any existing frequencies are very low. In the future, airlines will need to serve these markets with more economical aircraft that are configured with fewer seats to maximize both social and economic returns.

### Coexistence of Opportunities and Challenges of High Speed Rail

The opening of high-speed rail lines between Wuhan-Guangzhou and Shanghai-Beijing ushered China into a new era and the country took another step forward in its goal of providing “convenient travel for people and the smooth flow of goods.” It is evident that high-speed rail means more competition

and challenges for air transport since rail is a direct substitute but it also signals new opportunities for regional aviation.

Firstly, high speed rail’s large capacity, high volume, mass market characteristics mean the train is designed to work best in densely populated and economically developed regions. China’s high speed rail network of the future will be concentrated mainly in the eastern and southern regions. In the long term, air transport, especially regional aviation, will be the dominant mode for fast travel in the central and western areas of the country. Today, the impact of high speed rail on trunk air routes in the east and south is far greater than that on regional routes in the center and west.

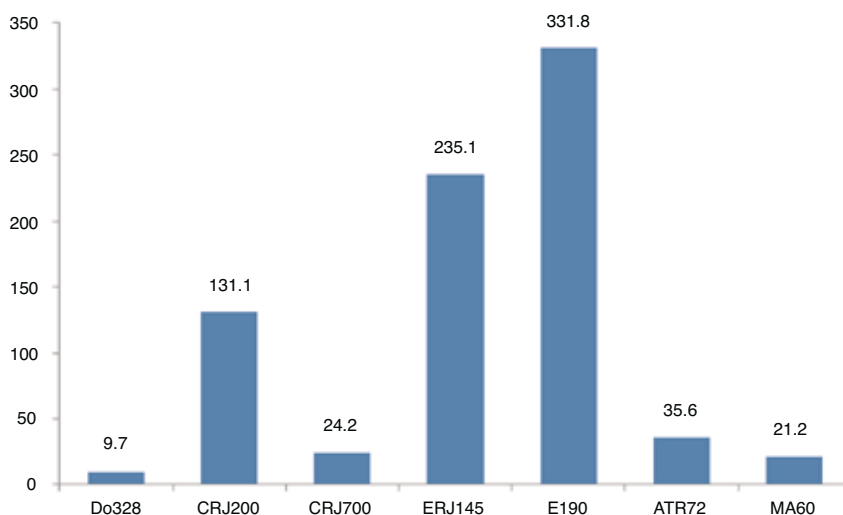
Secondly, there is a more comprehensive and mature network of air routes compared to high speed rail city pairs. Airline passengers can connect to remote cities in the country from anywhere in the world, a convenience that is not possible by high speed rail. The regional airline network plays an important role in this connectivity.

Thirdly, the impact of high speed rail will accelerate the optimization of aircraft types with capacity that is better matched to route demand. On some city pairs also served by high speed rail, airlines will certainly face a problem of over capacity

china regional market  
**trends and  
analysis**



**Chart 14**  
**2010 Passenger Volumes - 30 to 120-Seat Aircraft**  
x 10000



Source: Civil Aviation Administration of China (CAAC)

as their passengers migrate to rail. In order to stay competitive and profitable, carriers will need aircraft with fewer seats. Regional jets with their small seat capacity will become powerful competitive tools.

### Optimized Aircraft Types Save Energy and Reduce Emissions

Airlines in China are facing increasing pressure to adopt practices that protect the environment. Replacing old aircraft with new types with greater fuel efficiency is one such example. Airlines are also gradually realizing that improving the efficiency of flight operations will be another effective way to save energy and reduce emissions.

According to the CAAC, about 16% of the 2.155 million flights in 2010 carried fewer than 100 passengers. Over 51% (172,000 flights) used large aircraft with too many seats which generated a system wide passenger load factor (PLF) less than 60%. At best, PLFs reached only 80%.

Theoretically, if these flights were all operated by 100-seat aircraft with each flight saving 600kg of fuel, the civil aviation industry as a whole could save 103,000 tons of fuel per year. This would be equivalent to 0.7% of the total

fuel consumed in 2010. The industry's operating cost could be reduced by RMB826 million (assuming that one ton of fuel costs RMB8,000). Furthermore, if burning 100kg of fuel produces 320kg of carbon dioxide, the 103,000 tons of saved fuel would equate to a reduction of 329,000 tons of carbon emissions. Therefore, optimizing aircraft type and improving airline operating efficiency will not only bring greater economic benefits but also help carriers realize their energy savings and emissions reduction objectives.

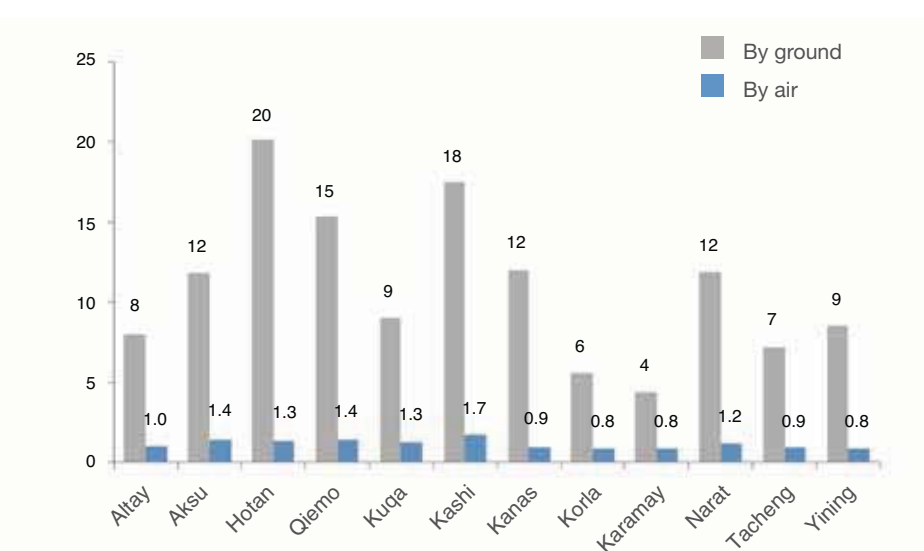
Embraer is very optimistic about the future of aviation in China. With the implementation of new policies and the construction of new airports, China's regional aviation network is destined to become more comprehensive. Concurrently, airlines will need to purchase more regional aircraft to increase capacity in the market which, in turn, will accelerate the development of the sector.

### Xinjiang: An Example of Regional Aviation Development

Air transport can play a role in both stimulating and facilitating a local economy's expansion. Xinjiang's regional aviation market is a typical example. An analysis of its development could offer a

Chart 15

#### Air and Ground Travel Time from Urumqi to Cities in Xinjiang



Source: Xinjiang Airport (Group) Co., Ltd.

deeper insight into the potential for more regional services throughout the country.

## Regional Aviation - Promoting Economic Development

The Xinjiang Autonomous Region is a vast area that covers 1/6 of China's land area. Today, travel on the Lanzhou-Xinjiang Express Railway is the only way to access most of Xinjiang. Given the immense size of the territory and the dispersed arrangement of cities with their low population densities, conditions are ideal for regional air service.

Xinjiang is considered to have a typical oasis economy since its cities are located far from each other. Air service is a natural way to circulate people and cargo. Traveling from Urumqi to Hotian is a good example of the attractiveness of air service - it takes more than 20 hours by bus and only 80 minutes by air (Chart 15). Air service can improve exchange and trade between Xinjiang and the mainland, improve the local investment environment and promote the development of local tourist and associated industries.

Xinjiang is a main tourist destination. The cities of Turpan, Kumul, Yining, Atlay, Hotan and Kashi are popular with both local and international travelers. Loulan, Kanas and

Narat also offer great potential for future tourism. Airlines not only bring many domestic and foreign tourists to Xinjiang, they also make significant contributions to the local economy. Transportation from international tourism generated 23% of Xinjiang's foreign exchange revenue in 2009 of which aviation services accounted for 14%. (Chart 16)

Xinjiang possesses unique geographical and cultural advantages that are conducive to developing cross-border trade. Xinjiang borders eight countries, including Russia and Kazakhstan, that have port cities to facilitate global commerce. Xinjiang also shares similar written and spoken languages, religion, customs and culture with its neighboring countries. These elements are ideal for developing bilateral cross-border trade which has already contributed to the economies of Yining, Bole and Tacheng and new demand for air transport.

As a large energy producing province in China, Xinjiang is rich in petroleum, natural gas, coal, and wind power resources. The Government has set a goal of turning Xinjiang into large-scale bases for the production and processing of oil and gas, coal, and petrochemicals. The area will also serve as a national showcase for large-scale use of renewable energy sources.

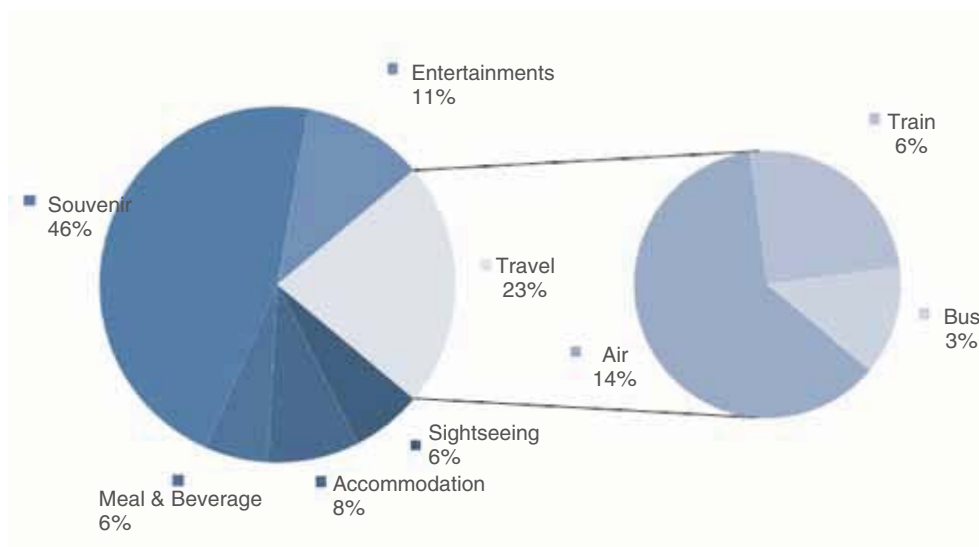
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Chart 16

### Components of Revenue from Tourism



Source: 2010 Xinjiang Statistical Yearbook



These plans and visions will become new growth drivers for air transport in Xinjiang.

In order to promote Xinjiang's regional economy, the Government has decided to establish two economic development zones in Kashi and Korgas. The Government will introduce special policies and flexible measures to build the two cities into gateways for western-oriented business practices. These two zones will not only drive the rapid economic development of South Xinjiang, they will also influence the demand for air service to South, Central and West Asia. In the near term, Kashi will become the main center for international trade with those regions of the continent. Air transport will facilitate a new era in economic growth.

Ranked after Beijing, Shanghai and Guangzhou, Urumqi Airport has the greatest number of international routes and with the opening of more markets, the facility has become the gateway to Western China. Urumqi's airline network covers Western and Northern China and will soon expand domestically to provide more connections with Central Asia, West Asia and Europe. Regional aviation is playing an integral role in the construction and development of the larger network.

Civil aviation in Xinjiang, especially regional aviation, has entered a period of rapid

growth and its contribution to the economy and social welfare of the population is marked. Statistical data show the ratio of investments in civil air transport to economic return to the nation is essentially stable at about 1:8.

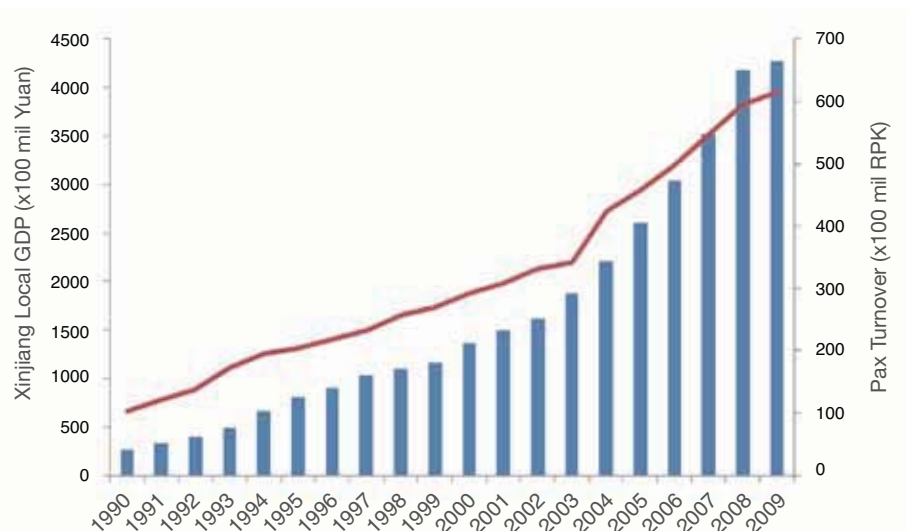
### Economic Development Raises the Need for Regional Aviation

Statistical data also show that the volume of air movements grows in proportion to local economic development ([Chart 17](#)) and that the rate is much higher than that of rail and road transport. Over the last two decades, the annual growth rate of air transport was 11.1%, well above rail (6.5%) and road (7.9%). In 2010, Xinjiang recorded 11.6989 million passenger enplanements, a 41.89% increase from 2009. That growth has helped stimulate the local economy promoting even greater development which, in turn, is further increasing demand for air transport in three ways.

Firstly, a steadily expanding economy and movement of people necessitates the establishment of air routes within Xinjiang province. After years of continual growth, Xinjiang has seen the construction of 15 regional airports that now form a viable airline network with Urumqi as its hub (see [Diagram 18](#)). Despite the benefits of

**Chart 17**

### Growth of Xinjiang GDP and Airline Passenger Volume



Source: 2010 Xinjiang Statistical Yearbook

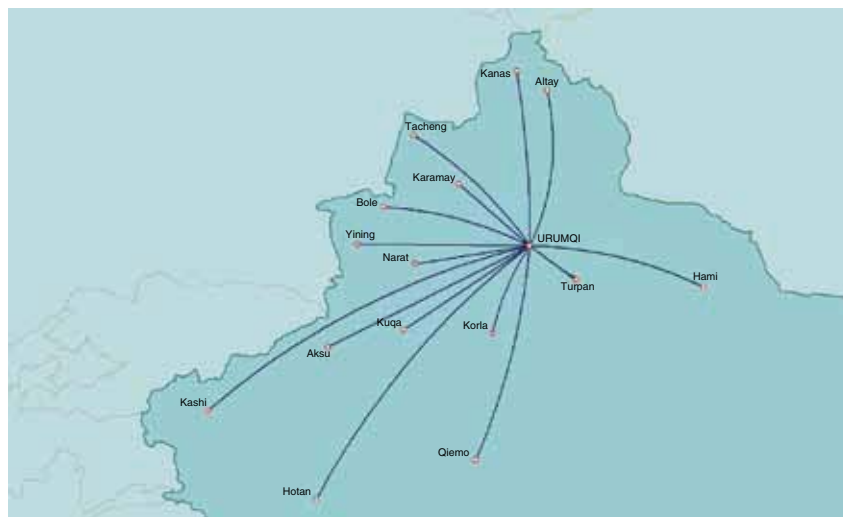
Urumqi's hub-and-spoke route pattern that gives travelers greater access to the provincial capital, there are some limitations. Since there are no nonstop flights between counties, passengers must connect in Urumqi which is time consuming and costly. This is especially inconvenient when traveling between Kashi and Yining, Kashi and Korla, Yining and Korla, Aksu and Yining, and Hotan and Korla. Establishing intra-provincial nonstops is feasible and necessary to complete a true regional network within Xinjiang. In the future, airlines could use regional aircraft with their right-sized capacity, such as the ERJ

145, to link secondary cities in Xinjiang, a province which is destined to be the new hotspot for regional aviation.

Secondly, more flights need to be deployed on existing routes to facilitate passenger travel. The low number of flights on existing regional routes is a common problem in Xinjiang. For example, on average, there is only one flight per day between Urumqi and Kuqa, Tacheng, Kanas, Narat and Karamay. While this is a considerable inconvenience for passengers, it represents an opportunity for airlines. In the future, airlines must allocate more capacity to the Xinjiang market and increase flights on existing routes while

Chart 18

### Regional Route Network from Urumqi



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analysis



developing new city pairs that will bring economic benefits to carriers and residents.

Thirdly, while opening up more nonstop routes, airlines will need aircraft types with the right capacity to serve those markets. Today's network from Urumqi is fan-shaped with links to the east and south of Xinjiang. As new routes are added at Kashi in the future, which is one of Xinjiang's key development objectives, there will be two regional hubs with fan-shaped networks. Urumqi Airport will serve cities in North Xinjiang and Kashi Airport cities in South Xinjiang that will both connect various domestic points in the east, and Central and West Asia and Europe to the west. (Chart 19). As these networks evolve with more nonstop routes, airlines will need to focus on selecting the right aircraft type. Carriers must be careful not to acquire aircraft with too many seats since opening new markets carries an element of risk associated with low passenger volumes during the early years. Xinjiang's special geographical location requires aircraft to have good performance capabilities and superior cabin comfort. Some regional jets that have adopted state-of-the-art technology, such as Embraer's family of E-Jets, will be the best choice for airlines.

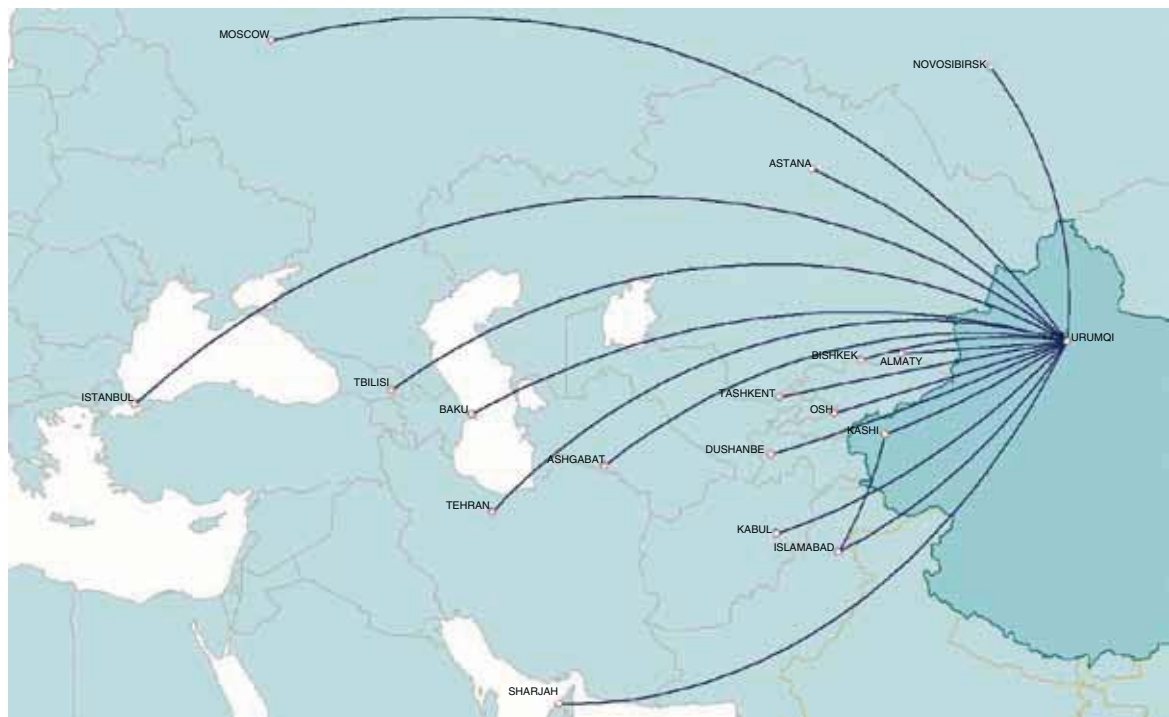
There are seasonal variations in traffic demand in Xinjiang which require airlines to evaluate aircraft types that are compatible

with the fluctuations. Xinjiang enjoys abundant tourism resources and leisure travelers account for a large portion of the overall traffic volume. For example, the passenger volume on the Urumqi-Yining route in peak season is more than 2.5 times that of the volume in low season (Chart 20). This requires airlines to deploy bigger aircraft or to operate more flights in peak season and to reduce capacity in low season. To optimize the supply-demand equation, it is necessary for airlines to perform a thorough analysis of applicable aircraft types. For the prosperity of Xinjiang's air transport industry, airlines will need to deploy a greater number of regional aircraft with the right seat capacity.

In order to accelerate economic development in Xinjiang, the Government of China held the Aid to Xinjiang Work Conference and the Xinjiang Work Forum in 2010 in which the administration arranged and implemented partnership assistance from various provinces and municipalities for Xinjiang. This made Xinjiang the center of economic investment and development once again. Transportation leads economic growth and carriers have been busy opening new routes. To facilitate access for people and supplies to Xinjiang, Air China opened the Beijing-Hotan-Kashi route; China Eastern Airlines introduced service between Hangzhou and Aksu, Nanjing and Yining, and Hefei and

Chart 19

### Route Network to Central and West Asia and Europe Taking Shape





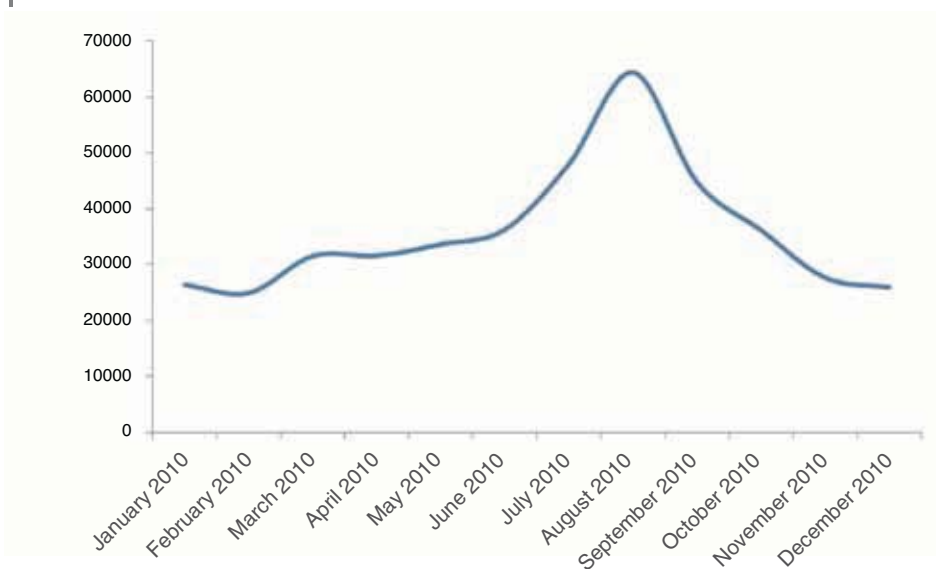
Hotan. China Southern Airlines opened the Guangzhou-Kashi and Zhengzhou-Kumul routes while Sichuan Airlines extended its Urumqi services to cover Kashi and Yining. Many domestic airlines are participating in the Xinjiang market and are bringing new strength to regional aviation.

To promote even greater development of regional aviation in Xinjiang, the CAAC issued Some Opinions on Enhancement of Civil Aviation Services in Xinjiang in May 2010. In the document, the CAAC announced plans to construct “two networks and two routes” in Xinjiang – one in the south and one in

the north. Xinjiang will construct domestic air routes connecting Eastern China, and a western international network connecting Central Asia, all with Urumqi as the hub. At the same time, airlines will be encouraged to operate intra-provincial routes to enable all of Xinjiang’s ethnic groups to have access to air service. By the end of the “Twelfth Five-Year” plan, Xinjiang will have completed construction and relocation of 6 regional airports which will increase the number to 21 from the current 15. Construction of these new airports and routes will undoubtedly provide a broader platform for the development of regional aviation in Xinjiang.

Chart 20

### Passenger Volumes - Urumqi-Yining (2010)



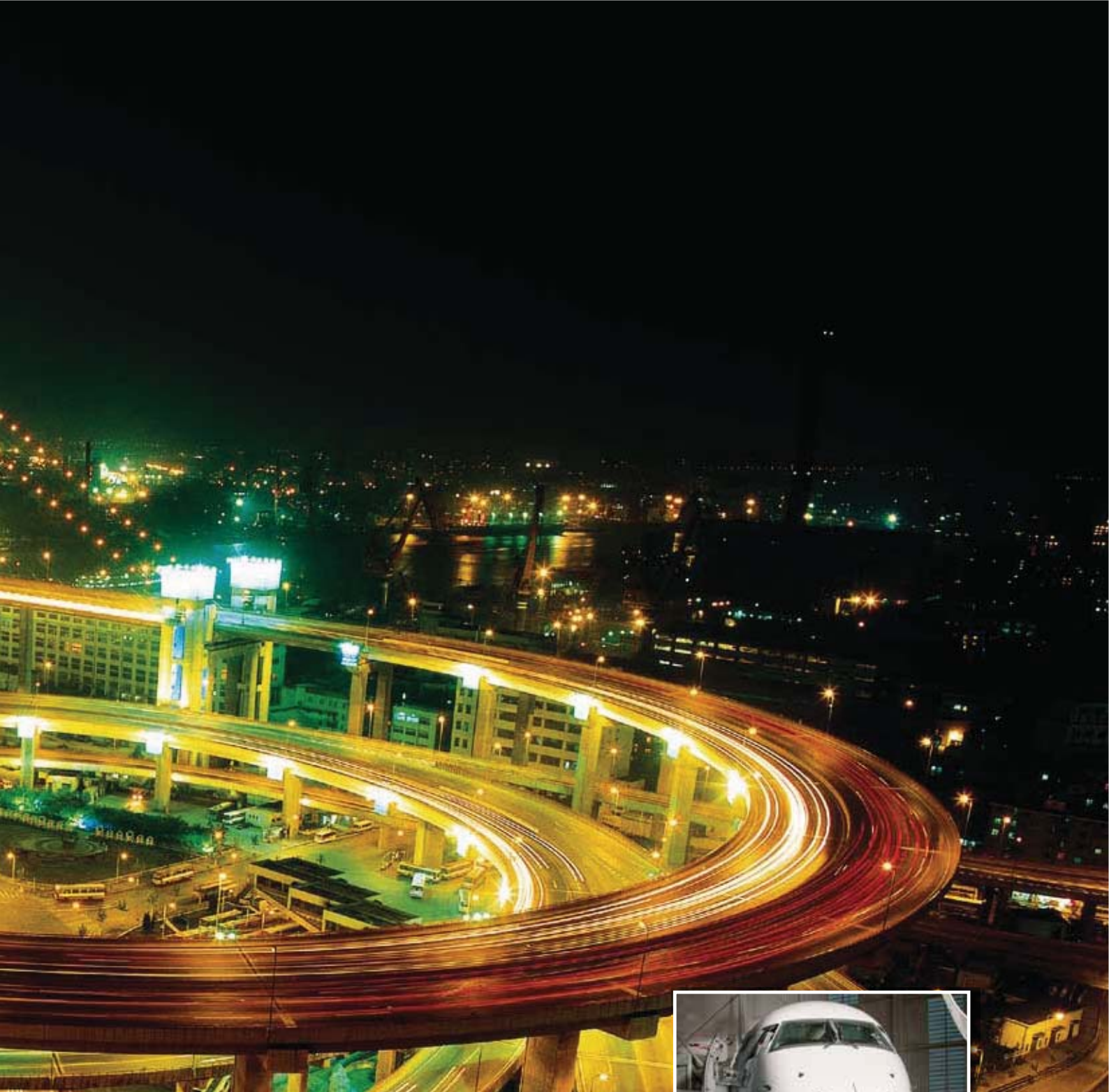
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numbers



Key Figures			
	2010	2030	CAGR
Fleet in Service	1,700	4,565	5.1%
Population (Million)	1,350	1,460	0.4%
RPK (Billion)	450	1,900	7.5%
GDP (US\$ Trillion)	4.1	13.45	6.1%
RPK/GDP Ratio	---	---	1.22

## A New Economic Power Rises

China's impressive growth over the past decade will establish it as the nation with the second-largest economy in the world in 2011. This growth contributed to a boom in the country's aviation sector in which air transport demand grew an average of 13% per year between 2000 and 2010. In addition to economic prosperity, the aviation industry is benefiting from government policies that promote development of different parts of China through many initiatives: boosting domestic consumption, accelerating urbanization and upgrading manufacturing and service industries from low-end to high-end.

It is expected that passenger demand will grow an average of 7.5% per year, the highest rate in the world, resulting from 6.1% annual GDP growth over the next 20 years.

## Fleet and Backlog Profile

There were 1,670 jets (98% of the commercial fleet) and 30 turboprops flying scheduled services in 2010. The average age of the 1,700 aircraft was 7 years. The order backlog stood at 715 jets.

The 30 to 120-seat jet segment accounted for 8% of the total fleet and 16% of the backlog. The existing fleet has been used to build a more comprehensive regional structure by linking individual route networks together.

In 2010, narrow-body and wide-body aircraft represented 91% of the total fleet in service and 84% of the order backlog. The future addition of some 600 large capacity jets on order will maintain the disproportionately low percentage of regional aircraft.

## Market Forecast

By 2030, total fleet will reach 4,565 aircraft representing 12% of the world fleet.

## The 30 to 120-Seat Jet Segment

Embraer forecasts a need for 975 new aircraft in the next 20 years: 88% to support growth and 12% to replace old

China Projected New Deliveries				
Seat Capacity Segment		2011 - 2020	2021 - 2030	2011 - 2030
Turboprop	30-60	40	60	100
	60+	5	15	20
	Total Turboprops	45	75	120
Jet	30-60	5	10	15
	61-90	225	215	440
	91-120	200	320	520
	Total 30-120	430	545	975
	NB 121-210	1,120	1,480	2,600
	WB >210	290	330	620
	Total 120+	1,410	1,810	3,220
	Total Jets	1,840	2,355	4,195
	Total	1,885	2,430	4,315

aircraft. The 30 to 120-seat jet fleet will increase from 130 units in 2010 to 990 by 2030.

## Turboprops

From 2011 to 2030, 120 new turboprops will be delivered: 24% to replace old aircraft and 76% to support market growth. The turboprop fleet in service is projected to increase from 30 to 120 aircraft. By 2030, 10% of the current fleet will still be in service.

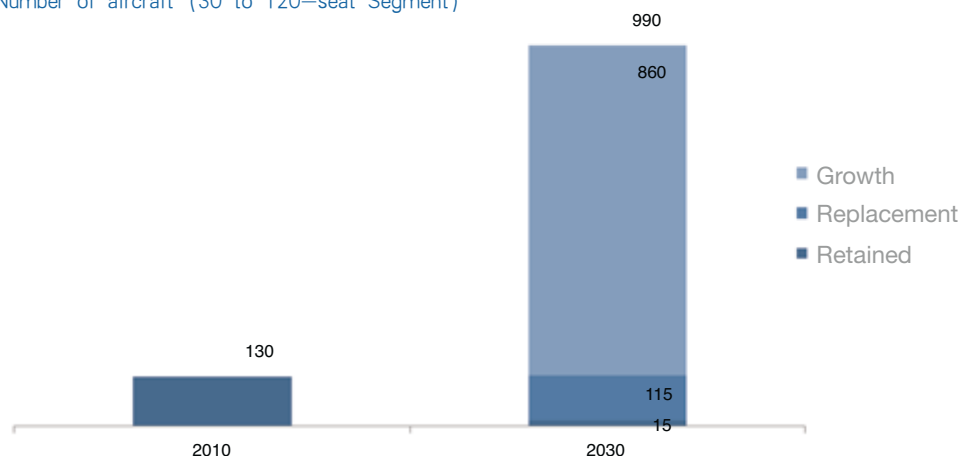
## Narrow and Wide-Bodies

Embraer forecasts a requirement for 3,220 new aircraft in the next 20 years: 42% to replace old aircraft and 58% to sustain growth. The narrow and wide-body commercial jet fleet will grow from 1,540 to 3,455 aircraft in the next 20 years. By 2030, 9% of the current fleet in service will still be in operation.

Chart 21

### China RJ Fleet Evolution

Number of aircraft (30 to 120-seat Segment)



Source: Embraer

market forecast  
by the  
numbers



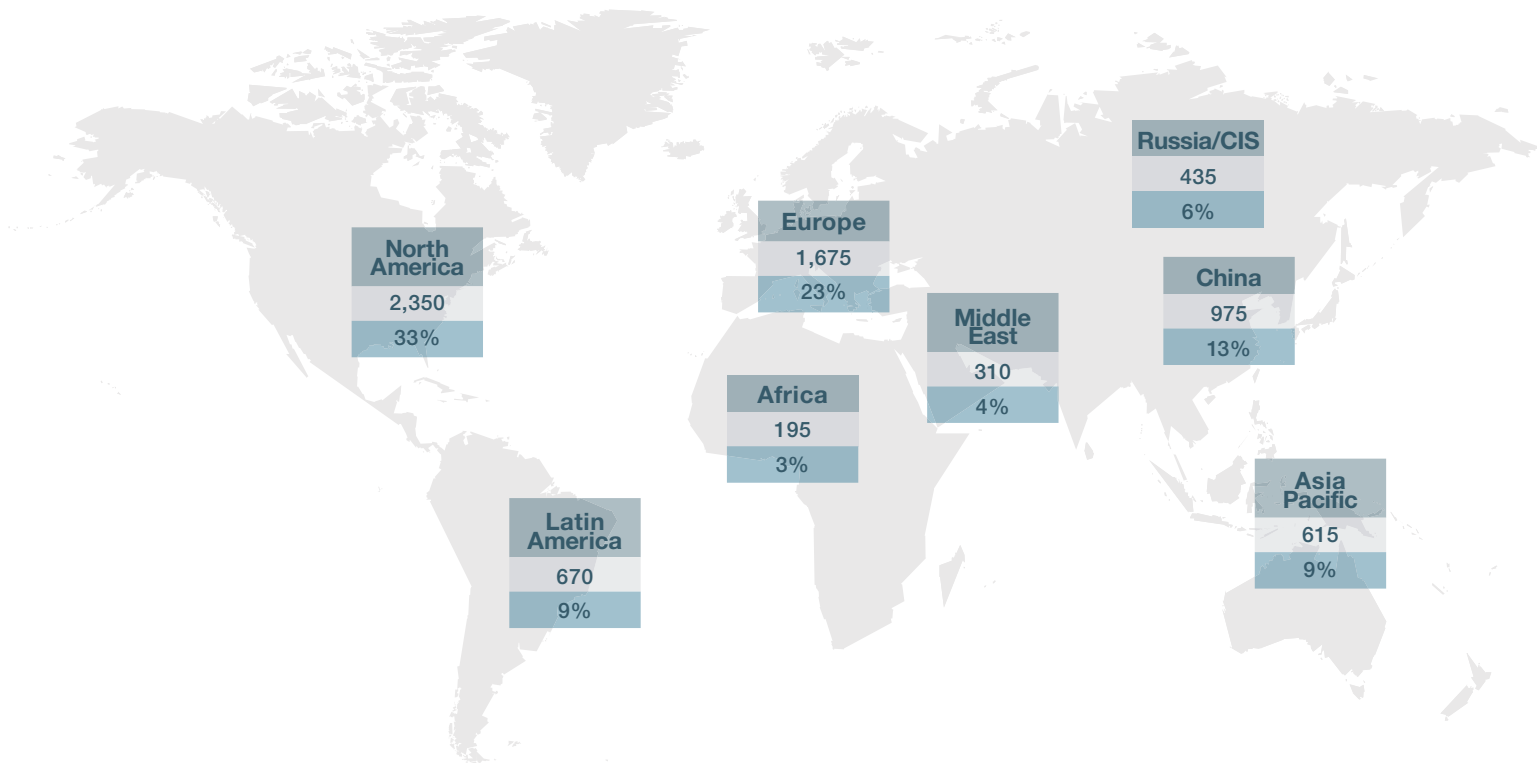
China Fleet In Service			
Seat Capacity Segment		2010	2030
Turboprop	30-60	25	100
	60+	5	20
	Total Turboprops	30	120
Jet	30-60	90	20
	61-90	5	440
	91-120	35	530
	Total 30-120	130	990
	NB 121-210	1,275	2,710
	WB >210	265	745
	Total 120+	1,540	3,455
	Total Jets	1,670	4,445
Total		1,700	4,565



## Market Forecast

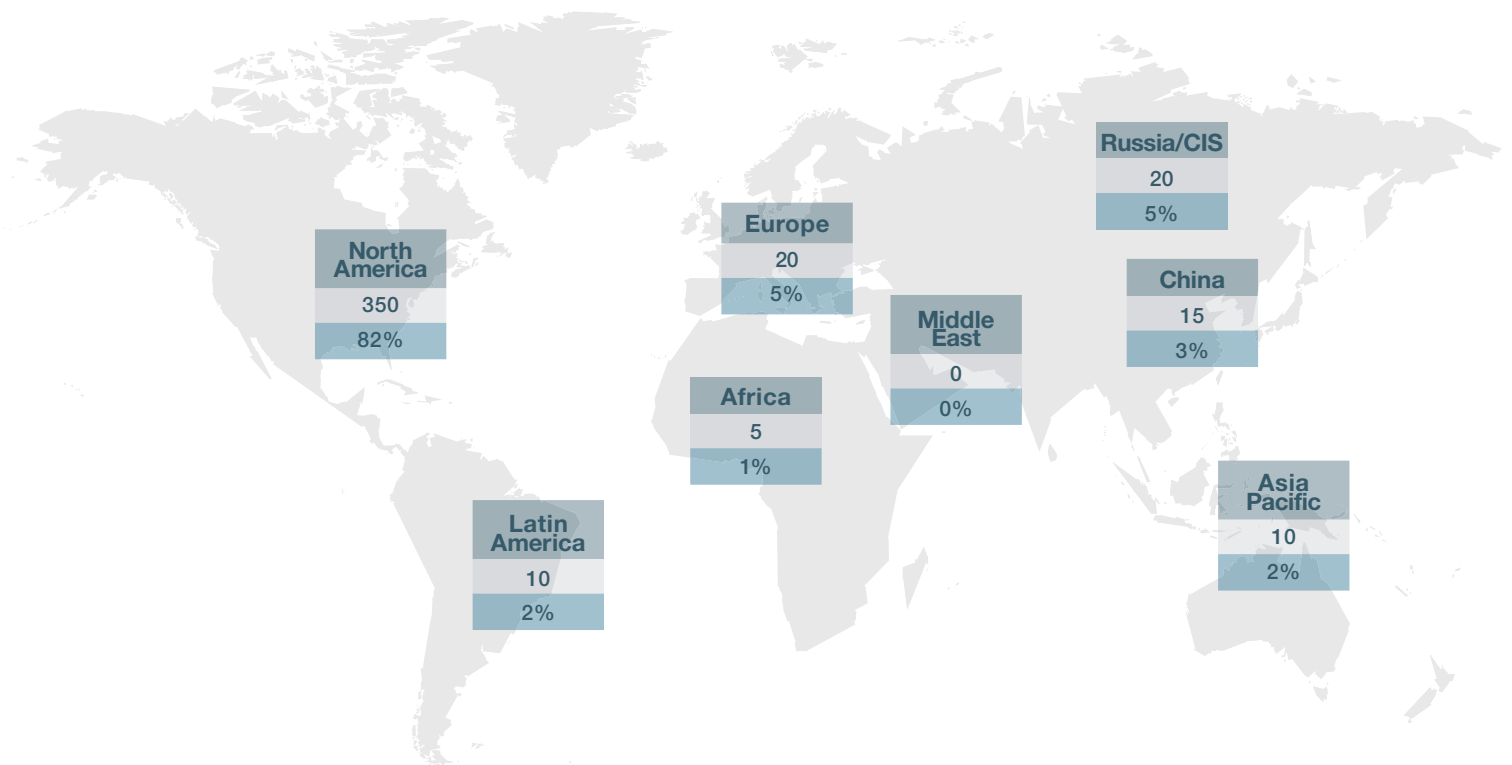
### 30 to 120-Seat Jet Segment

Projected New Deliveries				
Region	2011-20	2021-30	2011-30	%
Africa	85	110	195	3%
Asia Pacific	255	360	615	9%
China	430	545	975	13%
Europe	720	955	1,675	23%
Latin America	340	330	670	9%
Middle East	145	165	310	4%
North America	920	1,430	2,350	33%
Russia/CIS	230	205	435	6%
<b>World</b>	<b>3,125</b>	<b>4,100</b>	<b>7,225</b>	<b>100%</b>



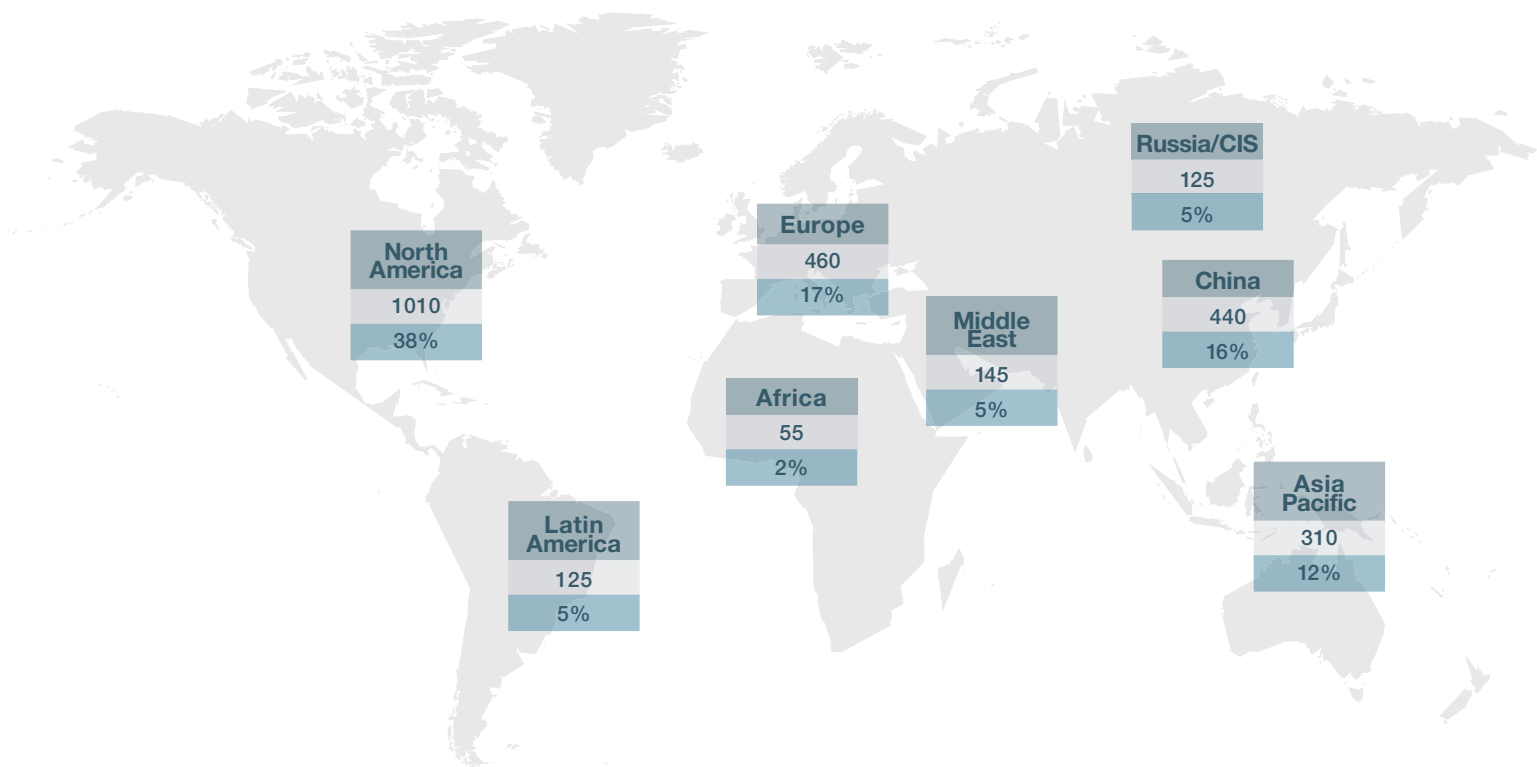
## 30 to 60-Seat Jet Segment

Projected New Deliveries				
Region	2011-20	2021-30	2011-30	%
Africa	0	5	5	1%
Asia Pacific	0	10	10	2%
China	5	10	15	3%
Europe	0	20	20	5%
Latin America	0	10	10	2%
Middle East	0	0	0	0%
North America	0	350	350	82%
Russia/CIS	10	10	20	5%
<b>World</b>	<b>15</b>	<b>415</b>	<b>430</b>	<b>100%</b>



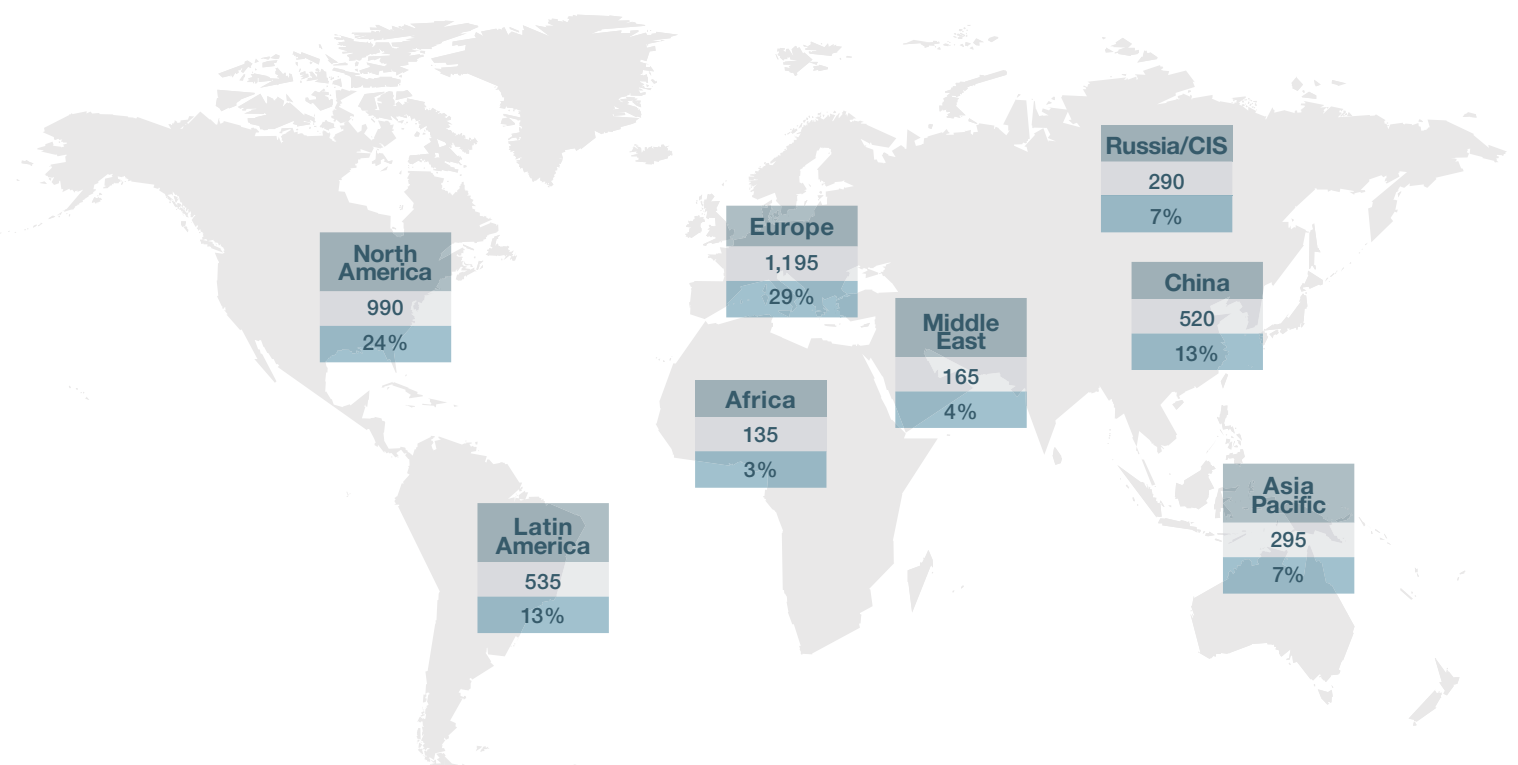
## 61 to 90-Seat Jet Segment

Projected New Deliveries				
Region	2011-20	2021-30	2011-30	%
Africa	25	30	55	2%
Asia Pacific	110	200	310	12%
China	225	215	440	16%
Europe	220	240	460	17%
Latin America	55	70	125	5%
Middle East	65	80	145	5%
North America	500	510	1,010	38%
Russia/CIS	65	60	125	5%
<b>World</b>	<b>1,265</b>	<b>1,405</b>	<b>2,670</b>	<b>100%</b>



## 91 to 120-Seat Jet Segment

Projected New Deliveries				
Region	2011-20	2021-30	2011-30	%
Africa	60	75	135	3%
Asia Pacific	145	150	295	7%
China	200	320	520	13%
Europe	500	695	1,195	29%
Latin America	285	250	535	13%
Middle East	80	85	165	4%
North America	420	570	990	24%
Russia/CIS	155	135	290	7%
<b>World</b>	<b>1,845</b>	<b>2,280</b>	<b>4,125</b>	<b>100%</b>









definitions



## Definitions

### Aircraft Segmentation

Embraer defines its forecast according to these categories:

30 to 60-Seat Turboprops	60+ Seat Turboprops	
ATR-42	ATR-72	
Q300	Q400	
Antonov An-140	Ilyushin Il-114	
MA60	BAe ATP	
EMB-120		
Dornier DO328		
Q200		
Saab 340, 2000		
Fokker 50, F-27		
Jetstream 41		
30 to 60-Seat Jets	61 to 90-Seat Jets	91 to 120-Seat Jets
ERJ-135, -140, -145	EMBRAER 170, 175	EMBRAER 190, 195
CRJ100, 200, 440	CRJ701, 705, 900	A318
328Jet	Antonov An-148	B737-600
YAK-40	TU-134	CRJ1000
	BAe 146-100, -200,	Superjet 100
	AVRO-RJ70, -RJ85	B717, 727-100, 737-100, -200, -500
	Fokker F28, F70	Fokker F100
	DC9-10, -20	BAe 146-300, AVRO-RJ100
	ARJ-21	DC9-30, -40, MD87
	Mitsubishi MRJ90	YAK-42, BAC-111
		CS100



120+ Seat Narrow-Body Jets	210+ Seat Wide-Body Jets
A319, A320, A321 B737-700, -800, -900	A330, A340, A380 B777, B747
B707, 757, 727-200, 737-300, -400 DC9-50 MD-80, -81, -82, -83, -88, -90 Tupolev TU-154, -204 Ilyushin IL-62	A300, A310, B767 DC10 MD11 Ilyushin IL-86, -96
CS300	A350 B787

definitions





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