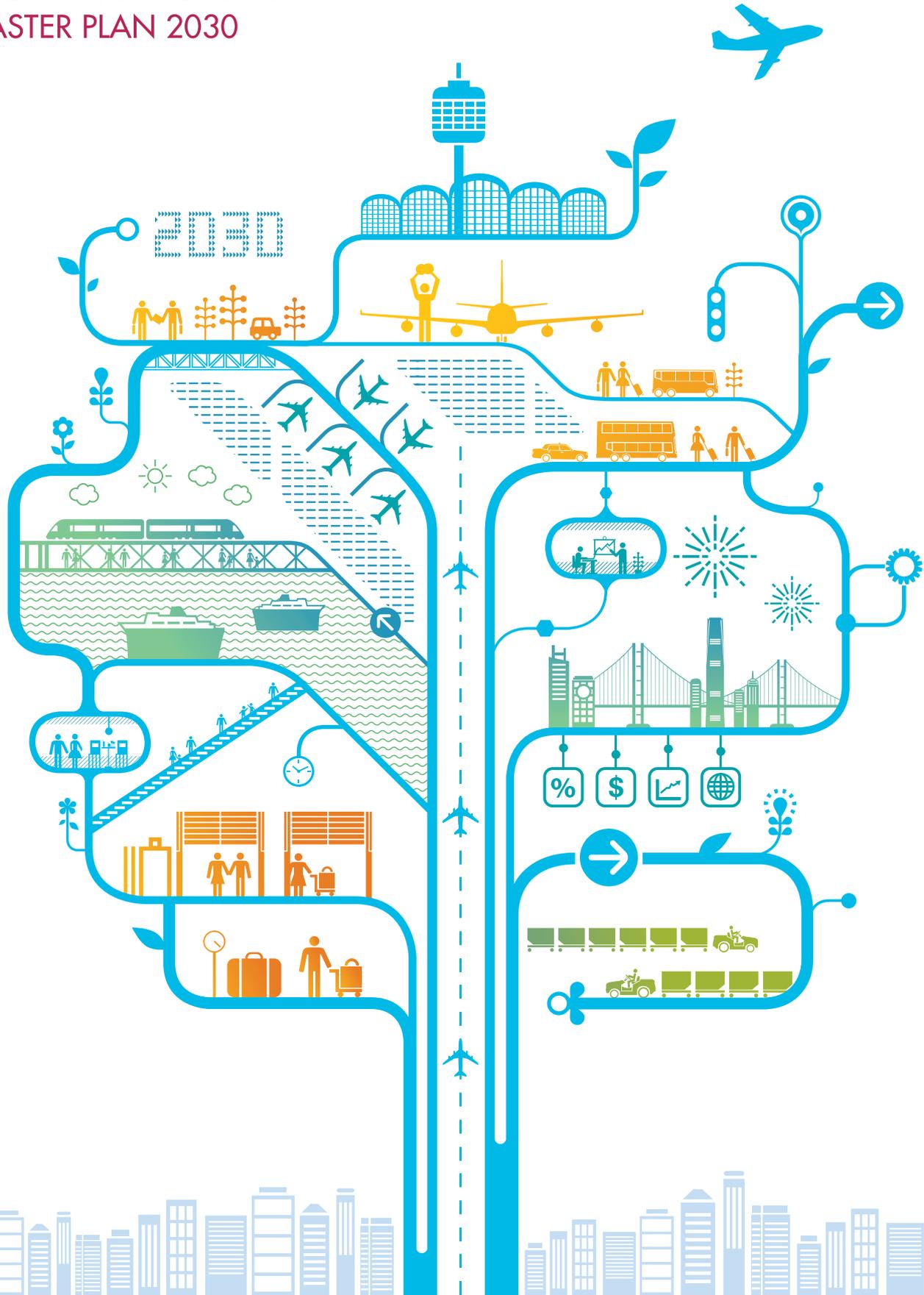


# OUR AIRPORT OUR FUTURE



## HONG KONG INTERNATIONAL AIRPORT MASTER PLAN 2030



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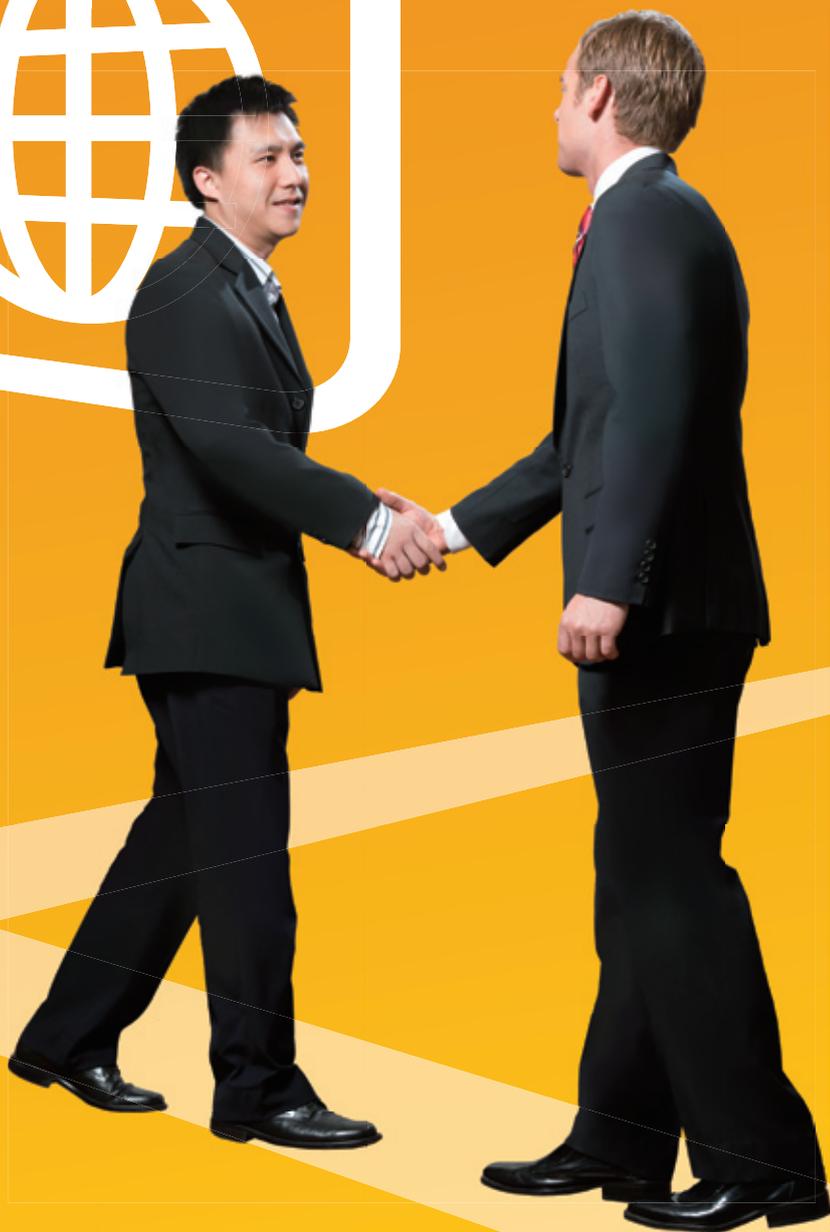


# HKIA: OPPORTUNITIES AND CHALLENGES





2030





services, trade and shipping), to nurture its emerging industries and develop the six industries where Hong Kong enjoys clear advantages, and to deepen economic cooperation with the Mainland.

The rapid growth of HKIA into an aviation hub is due to many factors. Leveraging on our geographical location at the heart of Asia Pacific and at the doorstep of the growing Mainland market, we have over the years developed an aviation network that does not only serve origin-and-destination traffic but also transfer traffic of passengers and transshipment of cargo around the world. Transfer traffic tends to flow through aviation hubs with the best connections and such traffic would in turn facilitate aviation hubs to develop a thicker

network with higher frequency of services. The development of HKIA was supported by the progressive liberalisation policy on air services adopted by the Government that positions HKIA as a gateway destination and opens access to a wide network of destinations around the world. Our own professional management and continued investment in the airport infrastructure, as well as the investments and contributions made by Hong Kong-based airlines and key stakeholders of the airport community, contribute further towards sustaining HKIA's global reputation.

HKIA's status as an international aviation hub is best testified to by its remarkable growth in throughput and connectivity. In 1998, HKIA



HK\$78 BILLION

generated by Hong Kong's aviation industry in 2008





handled 28.6 million passengers and 1.6 million tonnes of cargo, with 450 air traffic movements (ATMs, also known as flight movements) per day to about 120 destinations. The level of throughput reached 50.9 million passengers and 4.1 million tonnes of cargo, respectively with more than 850 ATMs per day to about 160 destinations at the end of 2010.

## A VIBRANT AVIATION MARKET

In accordance with our air traffic demand forecast (discussed in detail

in Chapter 3), the global aviation market, and the market in this region in particular, is expected to grow in leaps and bounds in the next two decades.

Between 2008 and 2030, the global GDP is forecast to grow at a compound annual growth rate (CAGR) of 4% and the Mainland GDP growth at an even higher rate of 7%. Accordingly, the aviation market is also expected to grow robustly. In the light of this rising demand for air travel, many airports in this region are responding by mapping out plans to enhance their facilities. Figure 1.1

summarises the plans we gathered from publicly available information.

Air connectivity is crucial to maintaining Hong Kong as an international business centre and Asia's World City. However, as HKIA approaches its maximum runway capacity, the growth of our air connectivity will slowly grind to a halt unless we continue to invest and expand our handling capacity. Hong Kong's overall competitiveness would be at risk (discussed in Chapter 7). This could be avoided by planning well ahead, hence, the need for the HKIA Master Plan 2030.



Figure 1.1 Planned Developments of Airports in the Region

Airport	Existing Number of Runways	Planned Number of Runways
Beijing Capital	3	Planning to build a second international airport
Guangzhou Baiyun	2	To be increased to 5
Shanghai Pudong	3	To be increased to 5
Shenzhen Bao'an	1	2 in 2011, to be increased to 3
Bangkok Suvarnabhumi	2	3 by 2016
Seoul Incheon	3	5 by 2020

# 2

## HKIA MASTER PLAN 2030



### PLANNING AHEAD

Airport development is capital investment-intensive and requires a long lead time with considerable advance planning. In view of the impending “capacity crunch”, we must act promptly to map out the future development strategy for Hong Kong International Airport (HKIA) in order to secure our competitiveness.

Over the years, we have continuously invested in the infrastructure of HKIA and planned for its future expansion. Hitherto, about HK\$18 billion has been invested in capital expenditure since airport opening, and a further HK\$9.3 billion has just been committed to the Phase 1 of Midfield Development.

Planning and development of airport infrastructure around the world requires a long lead time, due invariably to the complicated planning process, extended public consultation and approval procedures required, let alone the often highly complicated construction works involved. In Japan, Narita Airport Authority took 16 years, from 1986 to 2002, to plan and construct a second runway.

In Germany, Frankfurt has taken 13 years to plan and build the Frankfurt Airport’s fourth runway, which is expected to be completed in late 2011.

### THE MASTER PLANNING PROCESS

Since the commissioning of HKIA in 1998, we have adopted a forward looking approach in addressing the airport’s long-term needs. This is done through the preparation of a 20-year Master Plan, which is reviewed and updated every five years.

We regularly review market changes and ensure that airport facility enhancements are planned in time to meet the needs of the aviation industry. The master planning process is highly structured. A step-by-step approach of the process is summarised in Figure 2.1.

We have so far published two master plans, namely Master Plan 2020 and Master Plan 2025. Both planning documents have guided the development of our airport to date, including some of the major projects undertaken in recent years (see Figure 2.2).

Figure 2.1 Master Planning Process

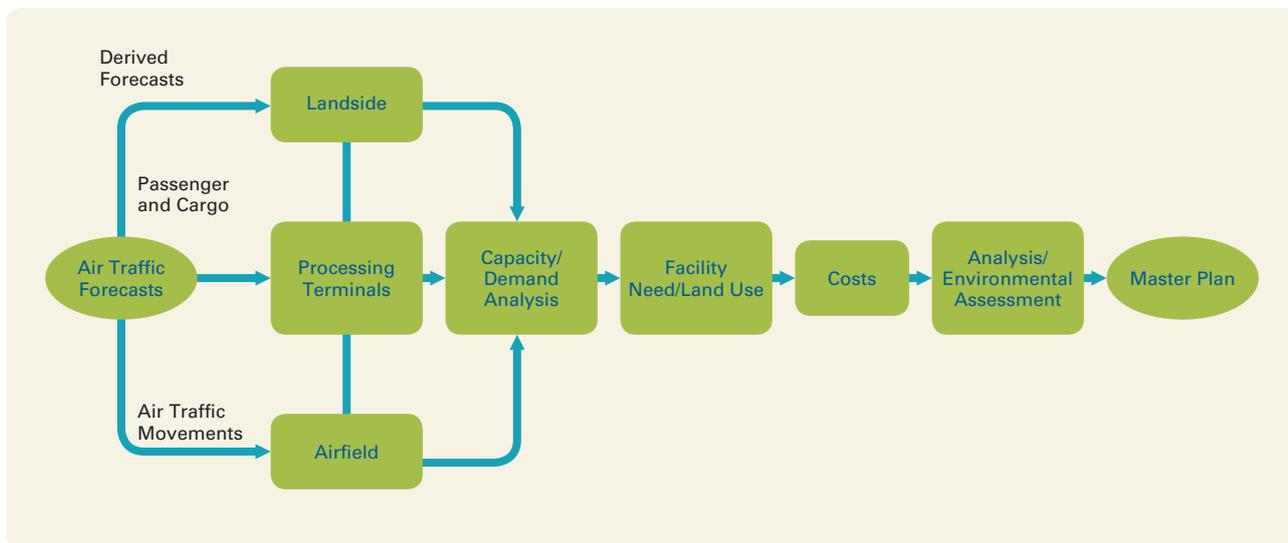


Figure 2.2 Major Projects Undertaken in Recent Years

	Completion Year
Enhancements to the airfield facilities for A380 operation	2006
Terminal 2	2007
Addition of 10 cargo stands and taxiways	2008
SkyPier	2010
North Satellite Concourse	2010
Capacity and services enhancements to Terminal 1 including its Central Concourse, Arrival and Departure processing facilities, and baggage handling system	2011





## MASTER PLAN 2030

Through the preparation of the Master Plan 2030, we hope to map out the development needs that help HKIA achieve sustainable growth while retaining its long-term competitiveness and position as an international aviation hub. On the basis of the airspace and runway capacity analysis completed by the National Air

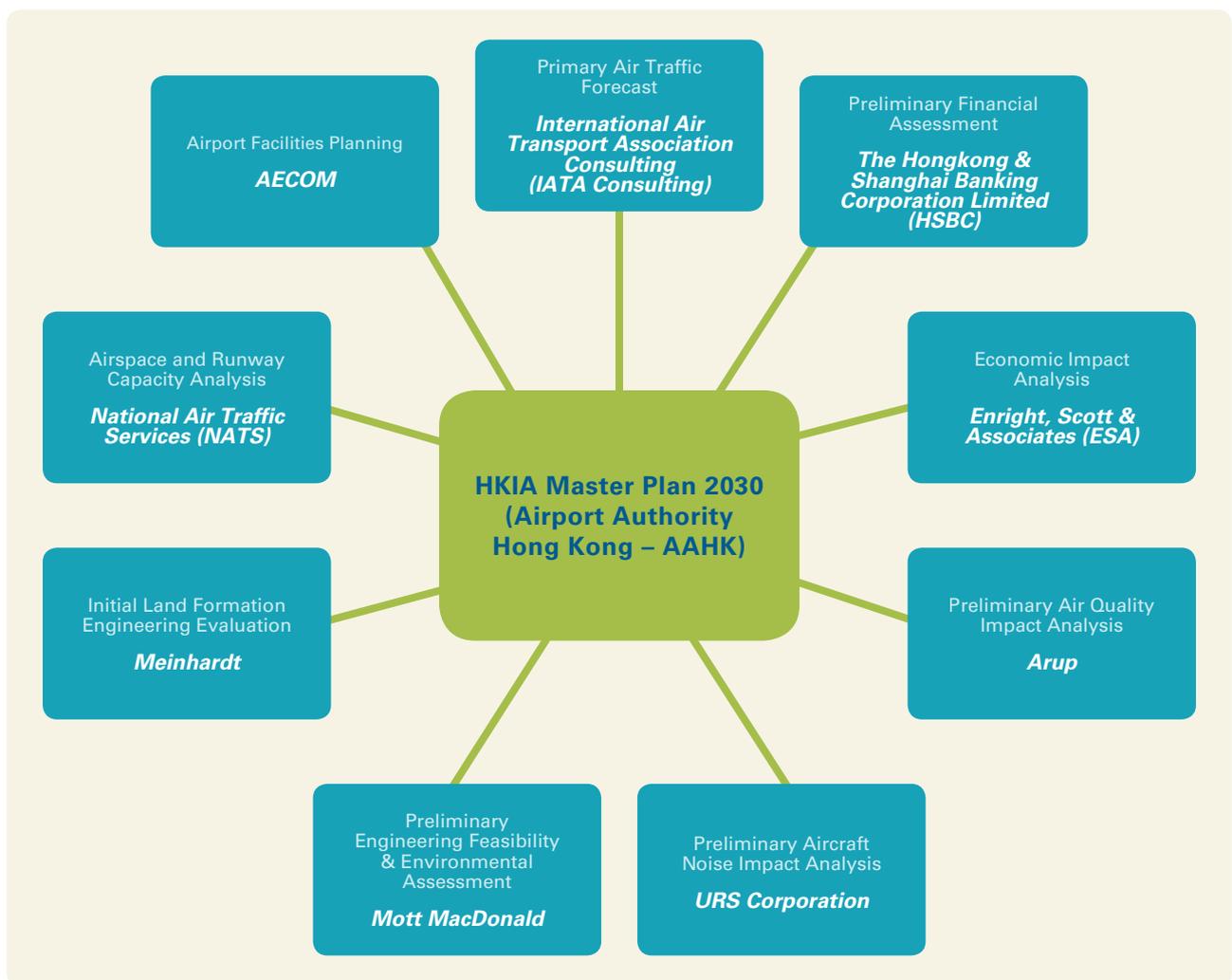
Traffic Services (NATS) in 2008, we have evaluated the optimum airport layout plan and land use development strategy to accommodate the air traffic forecast demand up to 2030 and the potential growth beyond, including a preliminary engineering feasibility and environmental assessment of building a third runway and its supporting facilities and infrastructure.

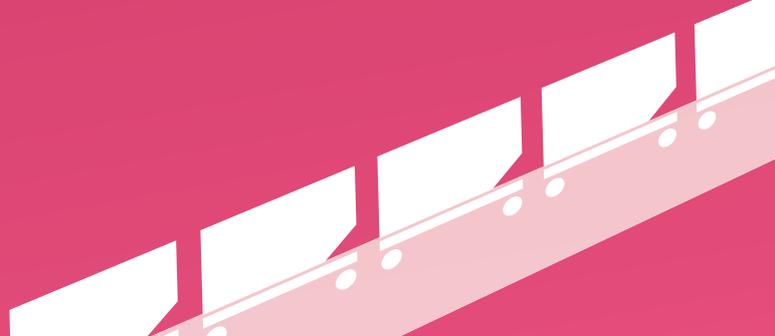
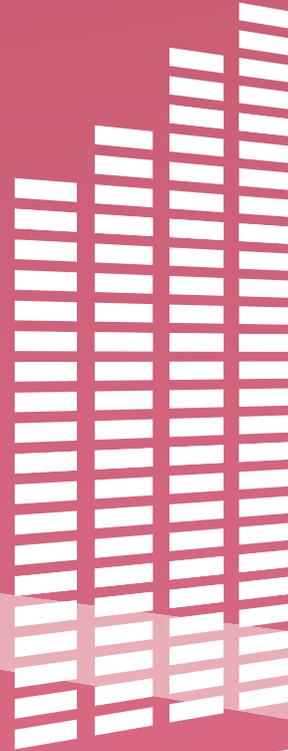
To ensure a transparent, professional and objective planning process, we have commissioned nine independent consultants – experts in their respective fields – to research into different strategic aspects of airport development, which have been consolidated into the Master Plan 2030.

The master planning process also involves consulting the airport community through the Airport Infrastructure Planning and Development Users Working Group (AIPDUWG). AIPDUWG has 25 members covering the core airport-related community including Hong Kong based airlines, airport support services providers, airport community associations (for example, the Board of Airline

Representatives in Hong Kong, the Airline Operators Committee, etc.) and relevant Government departments. Since October 2008, AIPDUWG has met periodically to discuss potential operational and technical issues related to HKIA's further development. AIPDUWG's comments and suggestions have been duly incorporated into the Master Plan 2030.

Figure 2.3 Consultants Appointed for the Development of HKIA Master Plan 2030



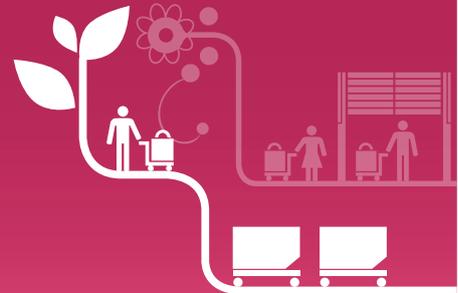


# GROWING WITH HONG KONG



# 3

## AIR TRAFFIC DEMAND FORECAST



The first step of the master planning process is to determine the long-term air traffic demand forecast up to 2030. International Air Transport Association (IATA) Consulting has been commissioned to undertake this task, which is a very structured process involving –

- (a) Evaluating the best model to apply for the forecast;
- (b) Compiling gross domestic product (GDP) forecast;
- (c) Producing preliminary traffic forecasts based on GDP;
- (d) Adjusting traffic forecasts based upon the latest market changes;

- (e) Carrying out reality checks with aviation-related industries;
- (f) Determining a set of primary projections for passenger and cargo traffic and air traffic movements (ATMs, also known as flight movements); and
- (g) Conducting sensitivity analysis to produce a range of estimates for high, low and base cases.

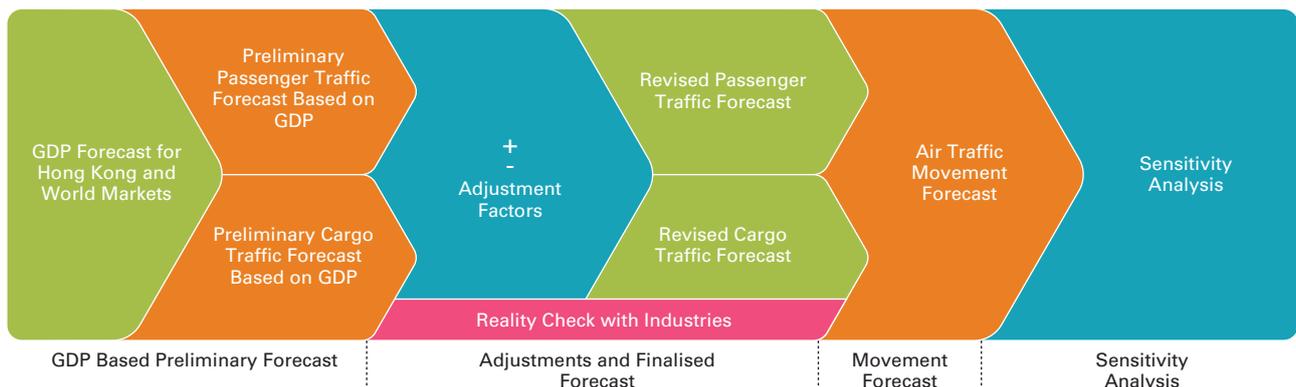
### GDP FORECAST

Compiling a GDP forecast is a very important step as it provides the essential building block for the entire traffic demand forecast. IATA Consulting’s research clearly

demonstrated that air traffic growth bears a strong correlation with the global GDP growth. Figure 3.2 shows the two trends in the past four decades.

As Hong Kong is an international city with an open market and externally-oriented economy, the correlation between air traffic growth and GDP growth in Hong Kong is even more pronounced, as can be seen from the close correlation between historical traffic derived from the regression formulae used by IATA Consulting and the actual traffic (see Figures 3.3 and 3.4). For passenger demand forecast, IATA Consulting adopted simple linear regression based on Hong Kong

Figure 3.1 A Structured Air Traffic Demand Forecast Process



GDP. For cargo demand forecast, IATA Consulting adopted multiple linear regression based on Hong Kong and global GDP.

Despite the global economic slowdown and Severe Acute Respiratory Syndrome (SARS) epidemic in 2001-2003, Hong Kong's GDP experienced an increase by almost 4% per annum between 2004 and 2009. Following the recovery from the global financial crisis and economic downturn in 2008-2009, the Government estimated 6.5% GDP growth for 2010<sup>2</sup>. On the basis of input from Economist Intelligence Unit (EIU)<sup>3</sup> of July 2009 and Global Insight<sup>4</sup> (July 2009), IATA Consulting compiled the following GDP forecast between 2008 and 2030 –

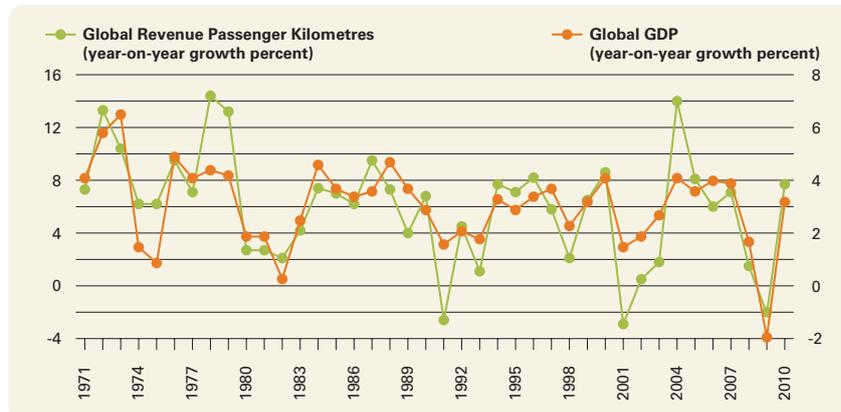
- (a) Hong Kong's GDP will grow at a Compound Annual Growth Rate (CAGR) of 3.2%;
- (b) Mainland's GDP will grow at a CAGR of 7%; and
- (c) The global economy will grow at a CAGR of 4%.

<sup>2</sup> HKSAR Government, November 2010.

<sup>3</sup> The Economist Intelligence Unit (EIU) is the world's leading resource for economic and business research, forecasting and analysis. Founded in 1946 as an in-house research unit for *The Economist*, it now delivers trusted business intelligence and advice to over 1.5 million decision-makers from the world's leading companies, financial institutions, governments and universities.

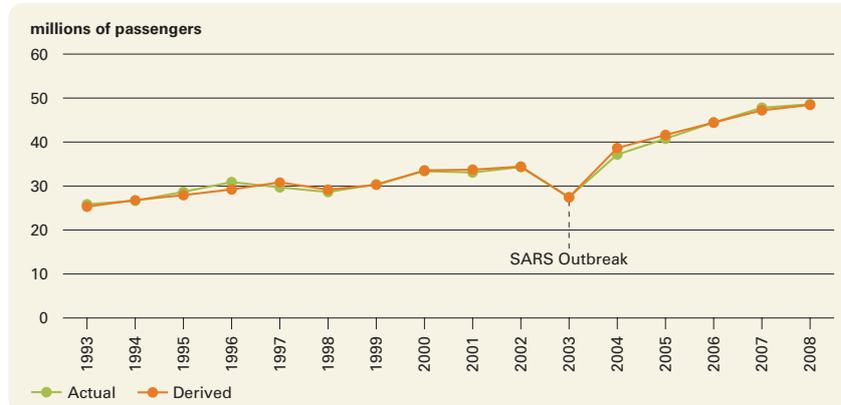
<sup>4</sup> Global Insight was founded in 2001 through the merger of Wharton Econometric Forecasting Associates and Data Resources, Inc. In October 2008, Global Insight became part of the Information Handling Services (IHS) family. Based in the New England Region in the US, IHS Global Insight provides comprehensive economic, financial, and political country and industry intelligence products to support planning and decision making.

**Figure 3.2 Global Air Traffic versus Economic Growth**



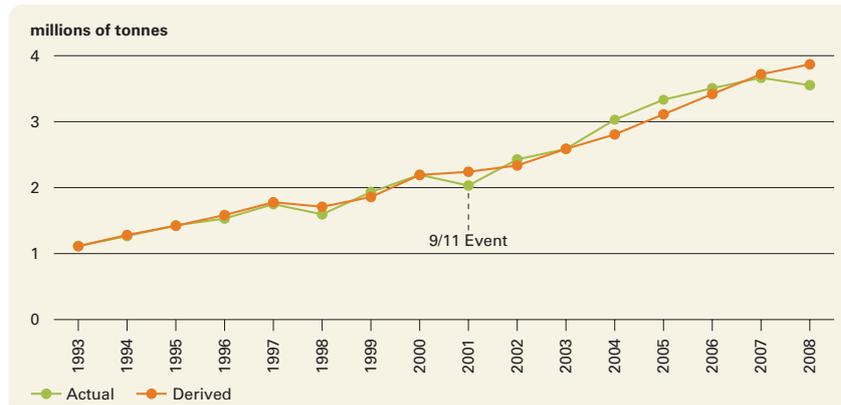
Source: Traffic data from International Civil Aviation Organization (ICAO) and International Air Transport Association (IATA), GDP data from International Monetary Fund (IMF) and Economist Intelligence Unit (EIU)

**Figure 3.3 Comparison between Actual and Derived HKIA Passenger Traffic Based on Hong Kong GDP**



Source: Airport Authority Hong Kong (AAHK) traffic data, IATA Consulting estimates

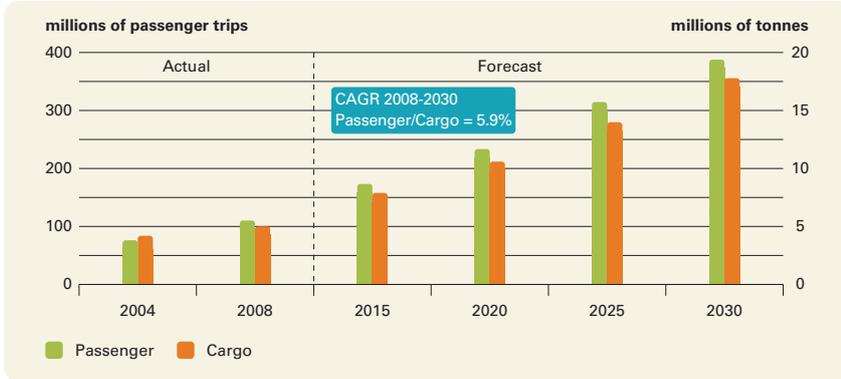
**Figure 3.4 Comparison between Actual and Derived HKIA Cargo Traffic Based on Hong Kong GDP and Global GDP**



Source: AAHK traffic data, IATA Consulting estimates

# 3 AIR TRAFFIC DEMAND FORECAST

Figure 3.5 GPRD Airports Passenger and Cargo Traffic Forecast



Note: GPRD airports include Hong Kong, Guangzhou, Shenzhen, Macao and Zhuhai airports  
 Source: Civil Aviation Administration of China (CAAC), AAHK for actual figures, IATA Consulting forecast

Figure 3.6 Five Major GPRD Airports



Landsat-7 Satellite Image provided by Geocarto

## AVIATION MARKET OUTLOOK : THE MAINLAND AND GPRD

IATA Consulting forecasts that air traffic to and from the Mainland will reach nearly 2.1 billion trips by 2030, while cargo traffic will reach 44 million tonnes. This projection is supported by a number of observations. On the passenger side, the World Tourism Organisation forecasts that the Mainland will become the world's fourth-largest tourist source market and the largest domestic tourist market by 2015. The Mainland's GDP per capita will reach approximately US\$14,000 in 2030<sup>5</sup>, and as the economy grows, the desire and ability of the people on the Mainland to travel both domestically and internationally will grow rapidly.

The Mainland is also the manufacturing capital of the world, and its cargo must be delivered to their overseas destinations around the world. Rising foreign direct investment, improving living standards, more liberal trade policies and a growing express cargo and logistics sector support a robust cargo growth projection. Also, cargo traffic of Mainland airports has increased by a CAGR of over 10% each year in the past decade, reaching 9.5 million tonnes in 2009. The Mainland's substantial trade volume and growing economy will be key factors in its cargo growth.

The Pearl River Delta (PRD)<sup>6</sup> – HKIA's catchment area – is one of the Mainland's most diverse and fastest growing regions. It is one of the Mainland's centres of manufacturing and most affluent areas. With the

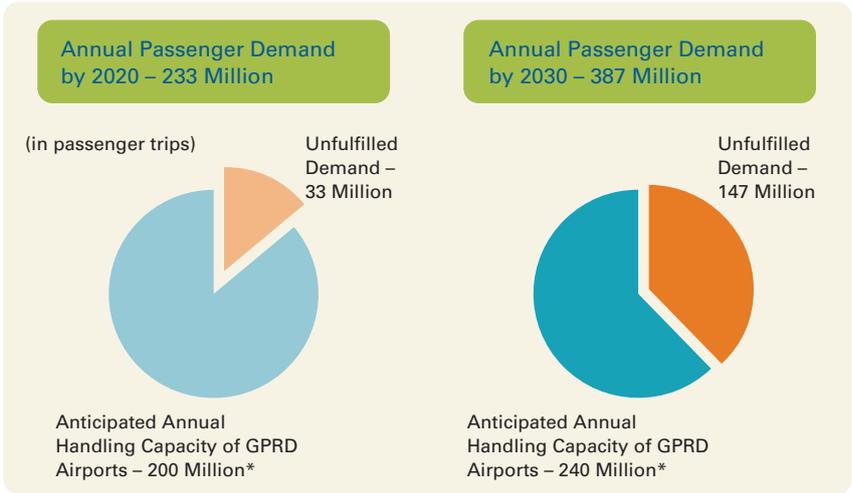
<sup>5</sup> World Bank, IATA Consulting estimates based on Global Insight.  
<sup>6</sup> The PRD comprises Dongguan, Foshan, Guangzhou, Huizhou, Jiangmen, Shenzhen, Zhaoqing, Zhongshan and Zhuhai.



continuous growth in trade and in the overall economy, IATA Consulting estimates that the aviation market in the Greater PRD (GPRD)<sup>7</sup> will grow to 387 million passenger trips and 18 million tonnes of cargo by 2030 (see Figure 3.5).

Within the GPRD, there are five major airports, namely, HKIA, Guangzhou Baiyun International Airport, Shenzhen Bao'an International Airport, Macao International Airport and Zhuhai Airport (see Figure 3.6). Having taken into account the anticipated increase in the handling capacity of the five airports in the next 20 years, IATA Consulting forecasts that there would still be a significant unfulfilled demand for air services both in the medium term up to 2020 and in the long term up to 2030 (see Figure 3.7).

**Figure 3.7 GPRD Airports Capacity and Forecast Passenger Demand (2020 and 2030)**



\* For HKIA, the capacity assumed is 60 million based on completion of the committed Midfield Phase 1 Development  
 Source: CAAC, IATA Consulting analysis and estimates

<sup>7</sup> The Greater PRD comprises PRD plus Hong Kong and Macao.

# 3 AIR TRAFFIC DEMAND FORECAST



In 2008, we handled about 80% of GPRD airports' international passengers (excluding Hong Kong – Mainland traffic) and about 90% of its international cargo throughput. As long as our handling capacity is not constrained, we are well positioned to continue to capture a handsome portion of this growing market by leveraging our extensive international air network.

## ADJUSTMENT FACTORS RELEVANT TO HKIA

IATA Consulting has specifically looked into a range of special factors (namely, air services agreements, cross-strait direct flights, trade agreements, travel policy, tourism development, cross-boundary infrastructure development, passengers' travelling preferences, modal competition from containerised shipping, developments of

surrounding airports and airlines' strategies) that might affect its air traffic demand forecast. Most, if not all, of them have been found to be either having negligible impact or have already been factored into IATA Consulting's economic models. The assessments on the two most frequently cited factors are set out below.

### Cross-Strait Direct Flights

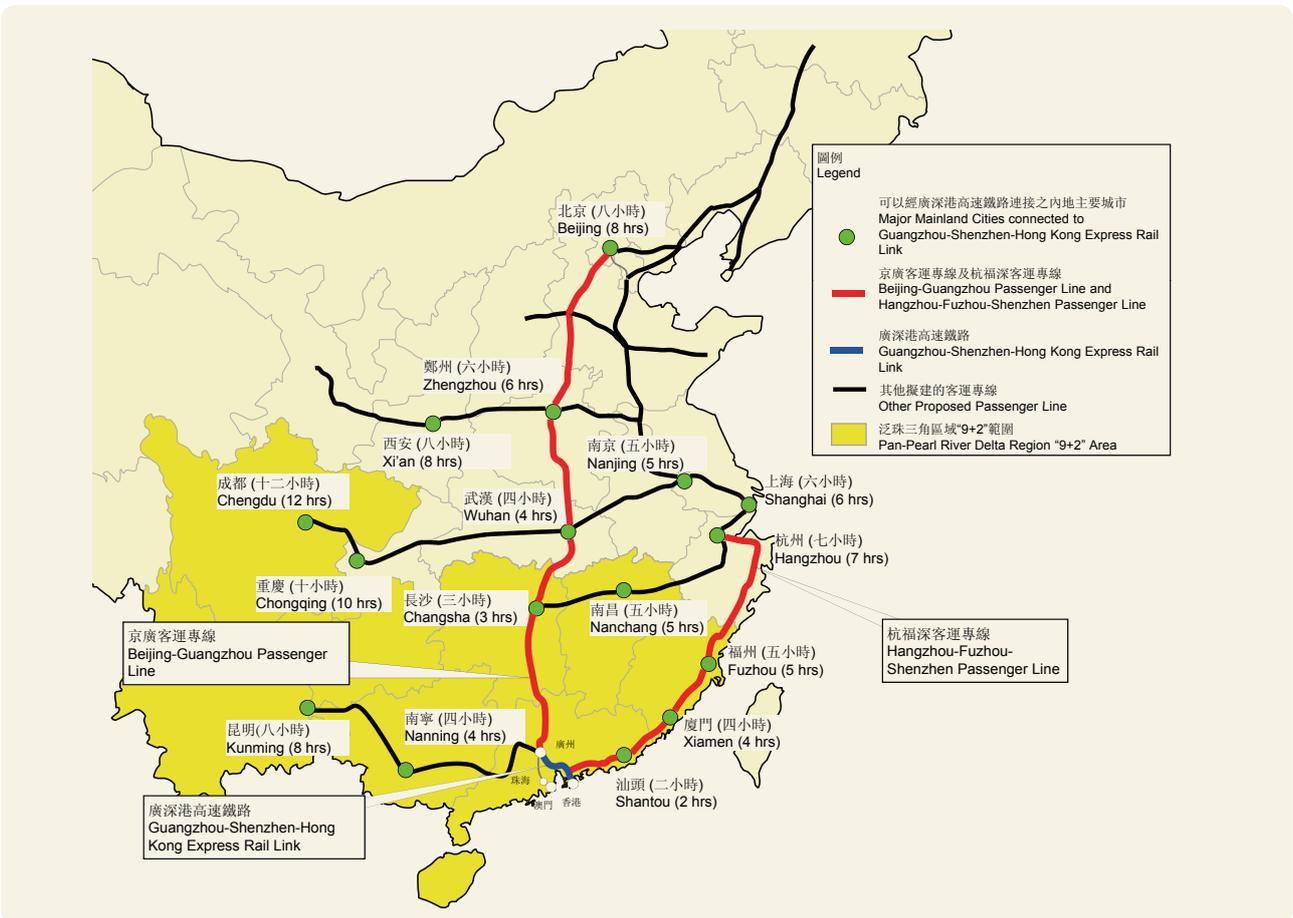
Hong Kong/Taiwan has for many years been the busiest air route out of HKIA with currently about 50 flights per day. Before cross-strait direct flights first commenced in July 2008, passenger traffic segments potentially impacted by direct flights constituted about 16% (i.e. 7.7 million) of our total throughput in 2007, which has been decreased to 10% (i.e. 4.9 million) in 2010. Cargo traffic was reduced from 17% (i.e. 0.6 million tonnes)

of our throughput in 2007 to 13% (i.e. 0.5 million tonnes) in 2010. However, this short-term negative impact has been partly mitigated by the relaxation of the policy for Mainlanders to visit Taiwan and the new demand for air travel stimulated by increased cross-strait economic activities. In 2010, overall passenger and cargo traffic between Hong Kong and Taiwan grew 4% and 14% respectively, over 2009. Looking ahead, increasing tourism and trade activities across the strait is expected to stimulate further growth in the Hong Kong/Taiwan passenger and cargo market.

### High-Speed Rail

The high-speed rail would cut current rail travel time by nearly two thirds and is therefore generally expected to compete with air services on short-haul and overlapping markets. With the development of the Express

Figure 3.8 Chinese Railway Infrastructure Development Map



Source: Transport and Housing Bureau

Rail Link (XRL) connecting Hong Kong to the Mainland's high-speed train network, and further expansion of the high-speed rail network within the Mainland (see Figure 3.8), the high-speed rail could potentially affect the competitiveness of air travel between Hong Kong and short-haul Mainland destinations like Shantou, Changsha, Nanning, Xiamen, Wuhan, Nanjing, Nanchang and Fuzhou (see Figure 3.9). However, all these regional Mainland routes combined contributed only about 3% of HKIA's passenger throughput in 2010. Therefore, any negative impact from XRL would unlikely be significant. On the other hand, trains provide

Figure 3.9 Projected High-Speed Rail Travel Time versus Air Travel Time from Hong Kong in 2020



Note: Air travel time includes an additional three-hour dwell and access time on top of the flight duration.  
Source: IATA Consulting estimates, Transport and Housing Bureau

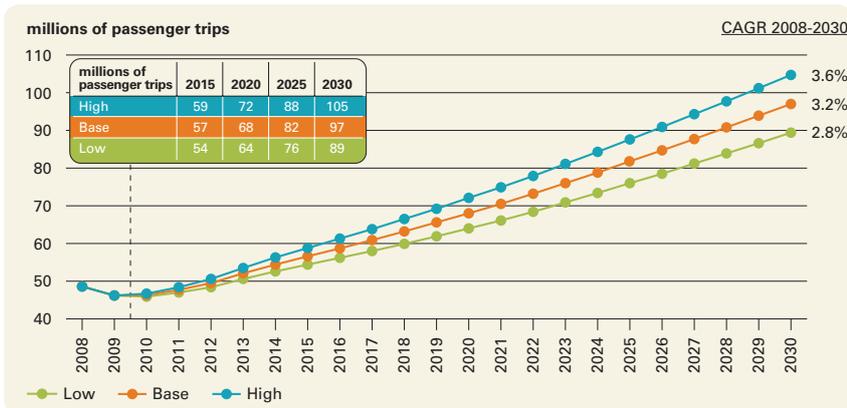
# 3 AIR TRAFFIC DEMAND FORECAST

Figure 3.10 HKIA Air Traffic Movement Projection (Up to 2030)



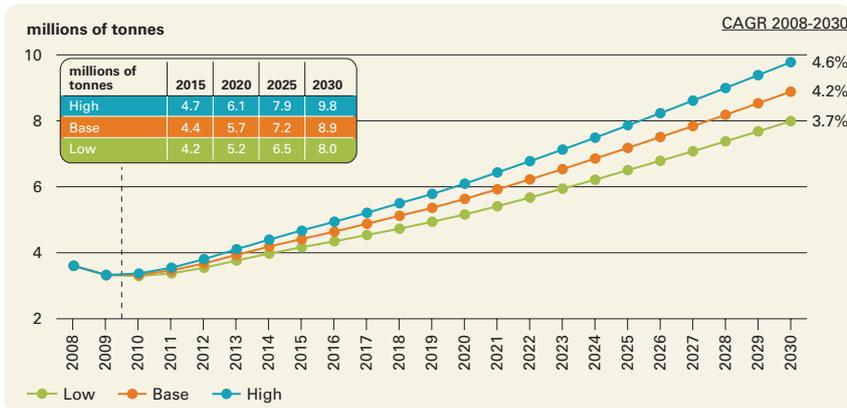
Source: IATA Consulting estimates; AAHK statistics for actual figures

Figure 3.11 HKIA Passenger Traffic Projection (Up to 2030)



Source: IATA Consulting estimates; AAHK statistics for actual figures

Figure 3.12 HKIA Cargo Traffic Projection (Up to 2030)



Source: IATA Consulting estimates; AAHK statistics for actual figures



convenient and frequent link-up to second-tier and third-tier locations outside major cities, thus potentially enlarging the catchment area for HKIA. Experiences in Europe and Japan indicate that the introduction of high-speed rail may negatively affect short-haul and overlapping markets but it can increase people's willingness to travel and, in the medium to long term, increase the overall market size for both rail and air transportation, thereby compensating (or, as in most cases, over-compensating) for the potential air traffic loss on individual short-haul routes.

## AIR TRAFFIC DEMAND FORECAST

According to the GDP regression based forecasting model, and taking



into account various aspects of HKIA’s market environment, such as industry trends, regional market dynamics, changes in policies and so on, IATA Consulting estimates that air traffic demand forecasts for HKIA will fall within the range of 89 – 105 million passengers and 8 – 9.8 million tonnes of cargo by 2030, growing at respective CAGRs of 2.8% – 3.6% and 3.7% – 4.6% between 2008 and 2030. Flight movements will reach about 550,000 – 650,000, growing at a CAGR of 2.8% – 3.6%.

The IATA Consulting analysis included, among other things, a “reality check” of its traffic forecast against the projections of the global aircraft manufacturing industry, which are considered to be particularly relevant. Traffic forecasts from both Boeing and Airbus indicate that over

**Figure 3.13** Traffic Forecasts from Boeing and Airbus

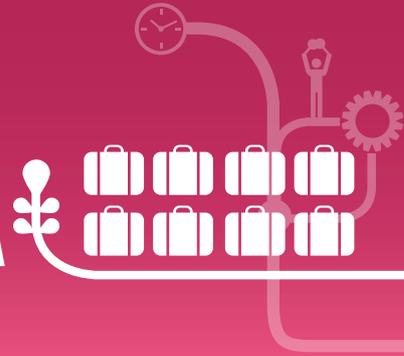
CAGR 2009-2028	Boeing	Airbus
<b>Asia Pacific Region</b>		
Passenger	6.3%	6.1%
Cargo	6%	6.3%
<b>China</b>		
Passenger	7.6%	7.3%
Cargo	6.6%	7.8%
<b>World</b>		
Passenger	4.7%	4.5%
Cargo	5.2%	5%

the next 20 years, global passenger and cargo traffic will each grow at around 5% a year. Asia Pacific – driven by the Mainland – will see even higher growth, at about 6%, due to the region’s development potential. These projections have

already taken into account the recent financial and economic events of 2008-2009. They also acknowledge the traditional resilience of air travel to external shocks and the strong long-term fundamentals of the industry.

# 4

## PRACTICAL MAXIMUM CAPACITY OF HKIA'S TWO-RUNWAY SYSTEM



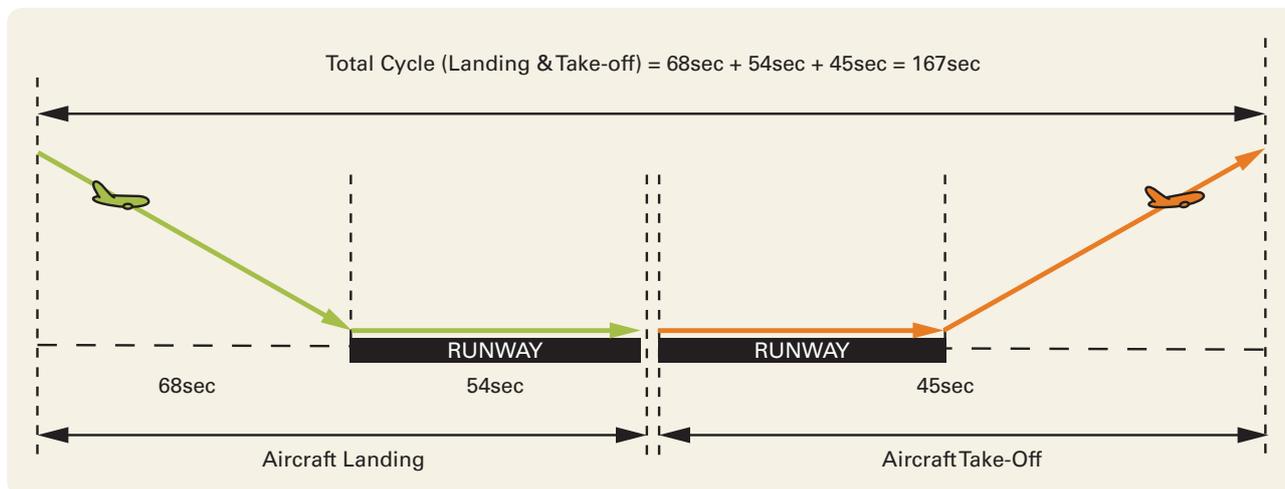
According to the 1992 published New Airport Master Plan (NAMP), Hong Kong International Airport (HKIA) was designed to handle an ultimate capacity of 87 million passengers, 8.9 million tonnes of cargo and 376,000 air traffic movements (ATMs, also known as flight movements) per annum in 2040. However, the latest base-case traffic demand forecast from International Air Transport Association (IATA) Consulting by 2030 is 97 million passengers, 8.9 million tonnes of cargo and 602,000 ATMs per year. The main reason for the discrepancy between the 1992 NAMP and the IATA Consulting estimates for annual ATMs is that many of the working assumptions adopted back in early 1990s were based on the operating environment of Kai Tak Airport which at that time was highly constrained and fully stretched –

(a) The 1992 NAMP assumed the forecast flights at HKIA would comprise a very high percentage of wide-bodied aircraft (84%), resulting in a high average passenger load forecast of over 300 people per aircraft. When Kai Tak exhausted its runway capacity, it was natural that airlines

maximised the value of each slot by deploying the biggest aircraft possible. The opening of HKIA with two runways has provided more runway capacity for airlines to increase frequency, serve new secondary destinations (especially on the Mainland) and deploy narrow-bodied aircraft (less than 200 seats) on routes that have yet to mature. The average passenger load per aircraft as a result decreased from around 200 at airport opening in 1998 to about 190 since 2000. For the same passenger throughput of 87 million passengers, IATA Consulting forecasts that it would entail 437,000 ATMs, instead of 278,000 ATMs that were originally estimated in the NAMP.

(b) The 1992 NAMP also assumed extensive use of wide-bodied freighters (for example, B747F of 100 tonnes) and lower than actual cargo tonnage carried by freighter at 45% of the total cargo throughput. As it turns out, the extraordinary growth of the cargo market in the last decade (supported by the Government's progressive liberalisation policies on air services) and the rapid

Figure 4.1 Single Runway's Arrival/Departure Cycle under a Mixed Mode Operation



Note: The landing aircraft must be at least 3 nautical miles from the runway end when the departure begins and may not touch down before the departing aircraft has left the runway.

development of express cargo services at HKIA has resulted in a much greater percentage of cargo traffic being carried by freighter (at 60%) and the greater use of medium-sized freighters (for example, A300F of 55 tonnes), thus increasing the overall ATMs at HKIA. As opposed to 66,000 freighter ATMs carrying 8.9 million tonnes that were forecast in the NAMP, IATA Consulting estimates that 108,000 freighter ATMs would be required.

## THEORETICAL RUNWAY CAPACITY OF THE TWO-RUNWAY SYSTEM

Under a completely unconstrained environment and operating under a "Mixed Mode" (i.e. allowing both landing and take-off), a runway can deliver a maximum of 44 ATMs per hour<sup>8</sup>, based on International Civil Aviation Organization (ICAO)

recommended practices and other relevant factors such as the traffic mix at HKIA. Accordingly, two runways operating completely independently should theoretically deliver 88 ATMs per hour (44 ATMs x 2). However, in reality, this is rarely the case. Due to different constraints, none of the runway capacity currently declared by airports in the region with two runways could reach this theoretical maximum.

## PRACTICAL MAXIMUM RUNWAY CAPACITY OF HKIA

HKIA started with a single runway operation (South Runway) with 34 ATMs per hour at the airport opening in 1998. Since the opening of the second runway (North Runway) in 1999, the dual runway system has been operating under a Segregated Mode (i.e. South Runway dedicated to departures and North Runway to

arrivals). The Civil Aviation Department (CAD) has gradually increased the declared runway capacity from 40 in 1999 to 61 in 2011. The length of time taken is to allow sufficient time for CAD to familiarise its air traffic controllers with dual runway operations and gradually build up its air traffic control capacity.

In order to establish the practical maximum capacity of HKIA's two-runway system, National Air Traffic Services (NATS), a leading provider of air traffic management services based in the United Kingdom, was commissioned to study and identify measures required to further raise HKIA's runway capacity against different possible modes of operation including –

- Segregated operation – one runway exclusively for departures and the other runway exclusively for arrivals;

<sup>8</sup> There can be  $3,600\text{sec (seconds)} \div 167\text{sec} = 21.56 \approx 22$  cycles (i.e. 22 pairs of landing and take-off) per hour, thus 44 movements per hour.

# 4 PRACTICAL MAXIMUM CAPACITY OF HKIA'S TWO-RUNWAY SYSTEM

- Mixed operation – both arrivals and departures are allowed on each runway.

NATS concluded that given HKIA's special circumstances (for example, terrain constraint surrounding HKIA including the Lantau Peak, Lo Fu Tau and Sunset Peak on Lantau Island as well as Tai Mo Shan and Castle Peak, congested and complicated airspace management, the aircraft mix at HKIA, etc.) and to remain fully in compliance with ICAO's safety and minimum separation requirements, the practical maximum runway capacity of HKIA can only be increased from 61 to 68 ATMs per hour by 2015 regardless of the mode of operation. This has been verified and accepted by CAD.

On the basis of 68 ATMs per hour, NATS assessed that the practical maximum daily movements is about 1,200 per day. This assessment

was based on the historical flight movement pattern of a typical busy day and having taken into account –

- Alternate closure of the two runways each night for about 8 hours for routine maintenance;
- The matching of slot availability at HKIA and the destination airports;
- Typical hourly fluctuations of a busy day; and
- Provision for recovery periods to cater for operational delays.

The practical maximum daily movements of 1,200 can be translated into the practical maximum annual movements of 420,000, taking into account the historical seasonal adjustment of flight movements by airlines as reflected in their flight schedule published twice a year for the summer and winter seasons respectively. The practical maximum annual movement capacity is

expected to be reached sometime between 2019 and 2022 as indicated in Figure 4.2.

## LATEST DEVELOPMENTS

To support HKIA's continued growth, we have committed HK\$9.3 billion to the first phase of the Midfield Development which will enable HKIA to optimally accommodate, in terms of both its terminal and apron facilities, approximately 60 million passengers and 5 million tonnes of cargo per year. This is mainly to meet the additional passenger and freighter aircraft stands demand in the interim, while maintaining HKIA's high service standards. The project involves –

- The construction of 20 aircraft parking stands including 11 airbridge-served stands, as well as an "I-shaped" passenger concourse at the Midfield;

Figure 4.2 Forecast Air Traffic Movements to Reach the Two-Runway Capacity Between 2019 and 2022

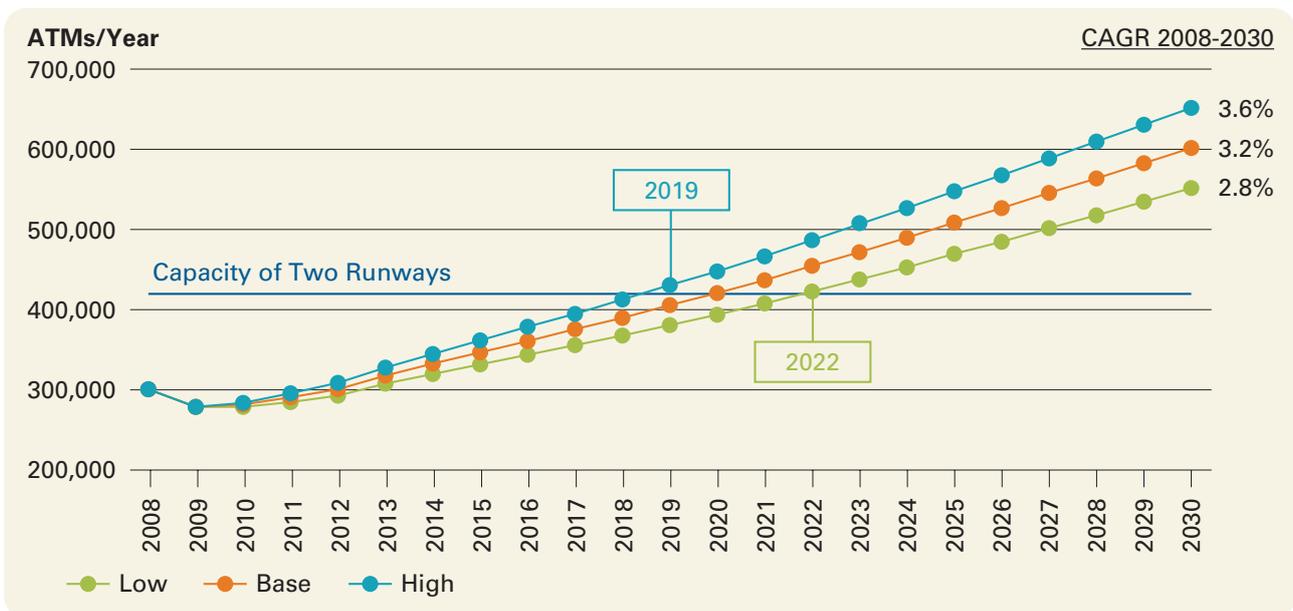
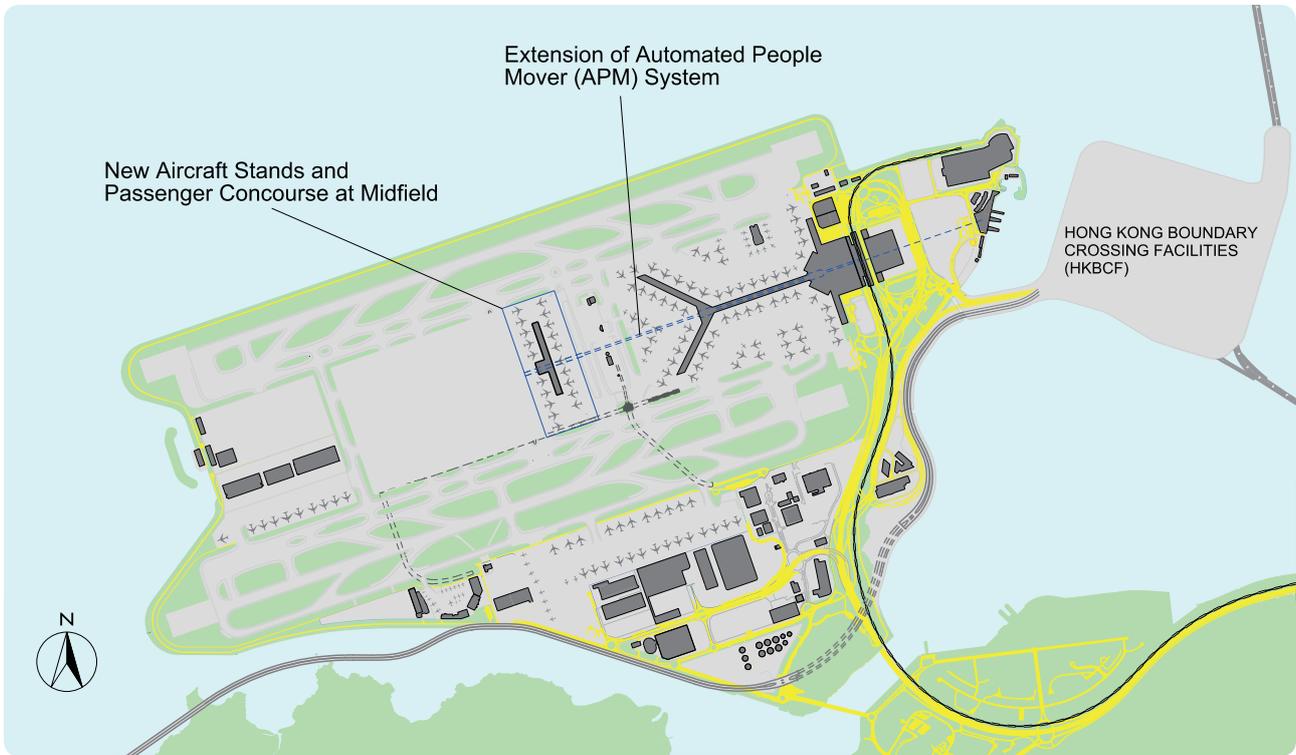


Figure 4.3 Planned Midfield Development by 2015



- (b) An extension of the existing automated people mover (APM) system from Terminal 1 to the passenger concourse at the Midfield;
- (c) Minor enhancement works on the baggage handling system; and
- (d) The building of a new cross-field taxiway.

With these enhancements, HKIA will be able to meet the unconstrained demand forecast of about 60 million passengers and 5 million tonnes of cargo per year by 2015. Beyond that, we must explore other development options. The Master Plan 2030 has evaluated different options to cater for the “capacity crunch” beyond 2015. These are analysed in the following chapters.



An artist's impression of the Phase 1 of Midfield Development.

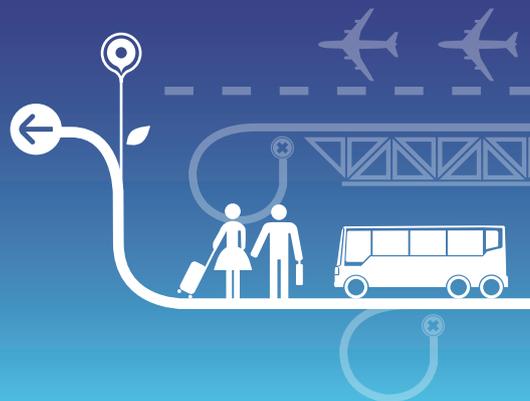


# TODAY'S MASTER PLAN TOMORROW'S MASTERPIECE



# 5

## OPTION 1: TWO-RUNWAY SYSTEM



Under Option 1, we have examined to what extent airport infrastructure and facilities at Hong Kong International Airport (HKIA) could be further enhanced to fully support the practical maximum air traffic movements (ATMs, also known as flight movements) capacity of the two-runway system (420,000 ATMs/year), without compromising service quality.

### CAPITAL INVESTMENT

By continuing the Midfield development and further expanding the following facilities, at an estimated cost of approximately HK\$23.4 billion (in 2010 dollars) or HK\$42.5 billion (at money-of-the-day [MOD] prices)<sup>9</sup>, including provisions for design, project management and contingency, phased over 15 years between 2016 and 2030<sup>10</sup>, HKIA's capacity could be increased to handle a maximum of about 74 million passengers and 6 million tonnes of cargo annually.



<sup>9</sup> The final construction cost of the capital projects will be increased from the current estimate based on 2010 dollars to the MOD amounts, in line with the Tender Price Index (TPI) which is estimated to increase at the rate of 5% per annum from 2011 to 2014, 5.5% per annum from 2015 to 2020 and 3% per annum thereafter.

<sup>10</sup> The cost breakdown is in 2010 dollars.

Figure 5.1 Option 1 – Airport Layout Plan in 2030



(a) Passenger terminal expansion (HK\$6.9 billion)

- expand Terminal 1's gross floor area by 14%, or 82,000 square metres, to provide additional space required for more check-in counters and roadside kerb at departure level, baggage reclaim carousels at arrival level, immigration/customs/security processing facilities and more room in general for circulation and amenities
- increase check-in counters at Terminal 2 from the existing 56 to 112

(b) Apron and passenger concourse expansion (HK\$8.3 billion)

- expand the Midfield concourse, including the addition of a second I-shaped passenger concourse
- add another 20 remote stands for freighters and another 20 airbridge-served passenger aircraft stands at the Midfield

(c) Automated People Mover (APM) extension (HK\$2.3 billion)

- extend the APM system to reach the new second "I-shaped" passenger concourse at the Midfield

(d) Baggage Handling System (BHS) enhancement (HK\$2.1 billion)

- develop additional baggage make-up laterals and reclaim carousels within the expanded footprint of Terminal 1
- develop a new high-speed baggage system for the Midfield passenger concourses

# 5 OPTION 1: TWO-RUNWAY SYSTEM

Figure 5.2 Base Case Constrained Air Traffic Movement Forecast

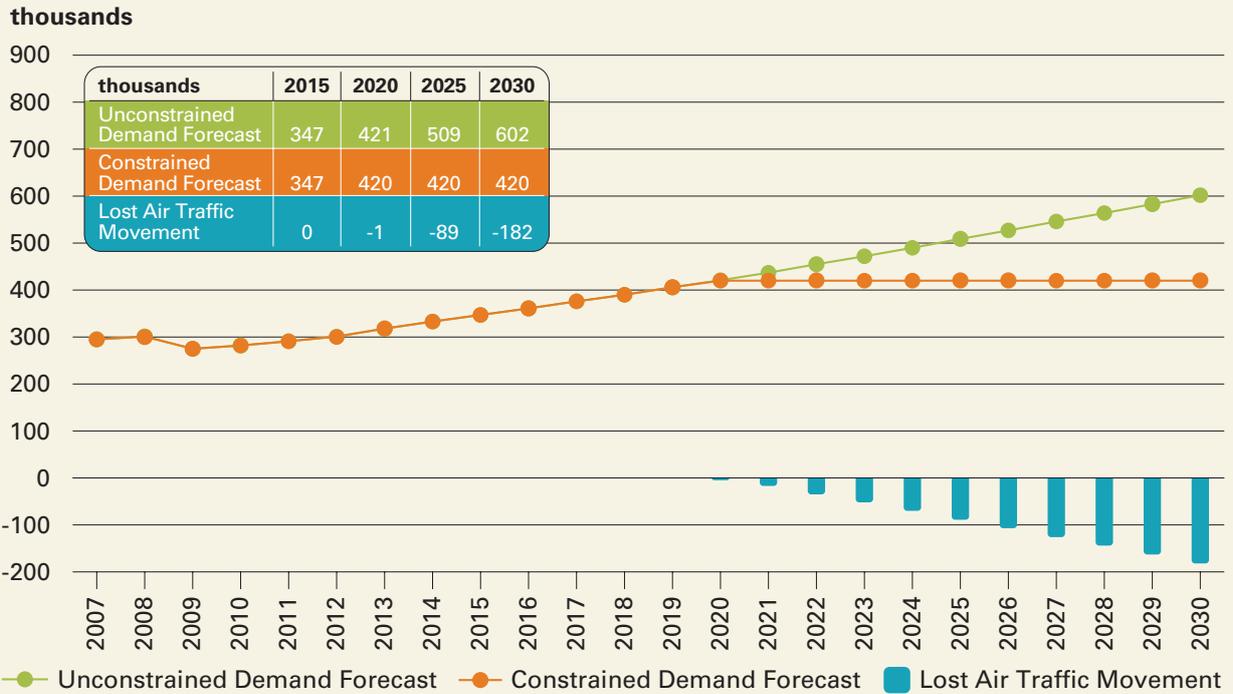


Figure 5.3 Base Case Constrained Passenger Traffic Forecast

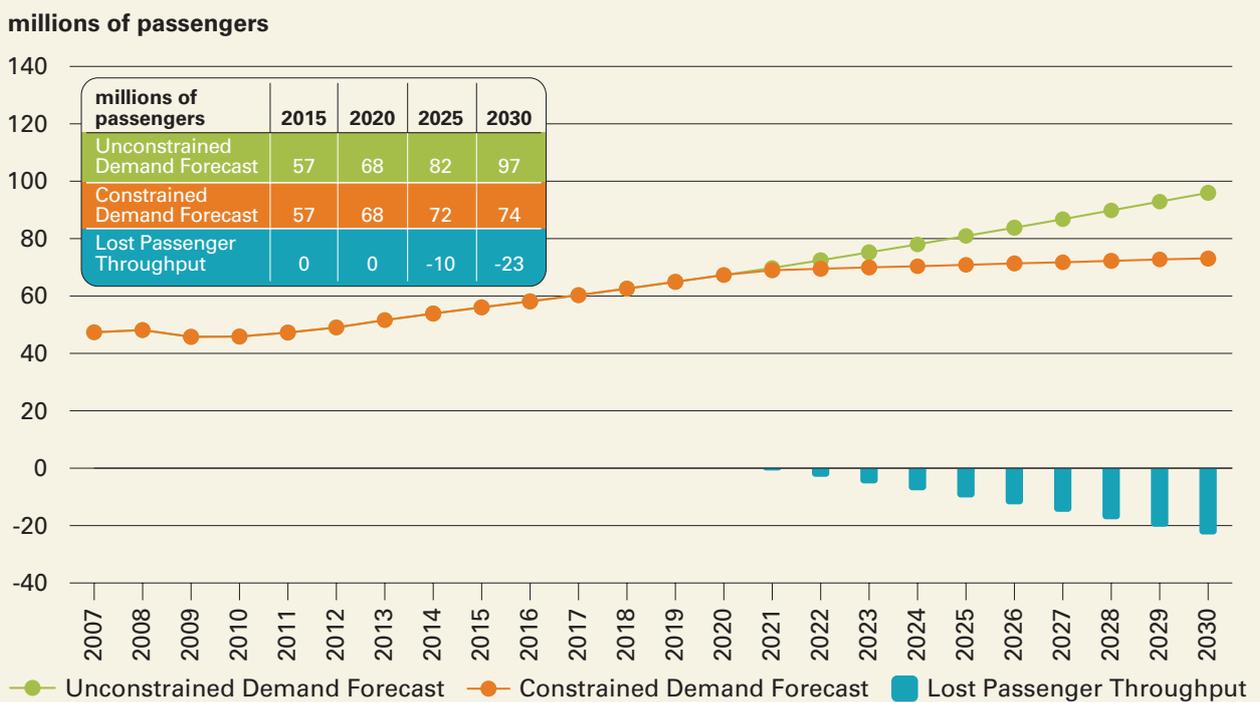
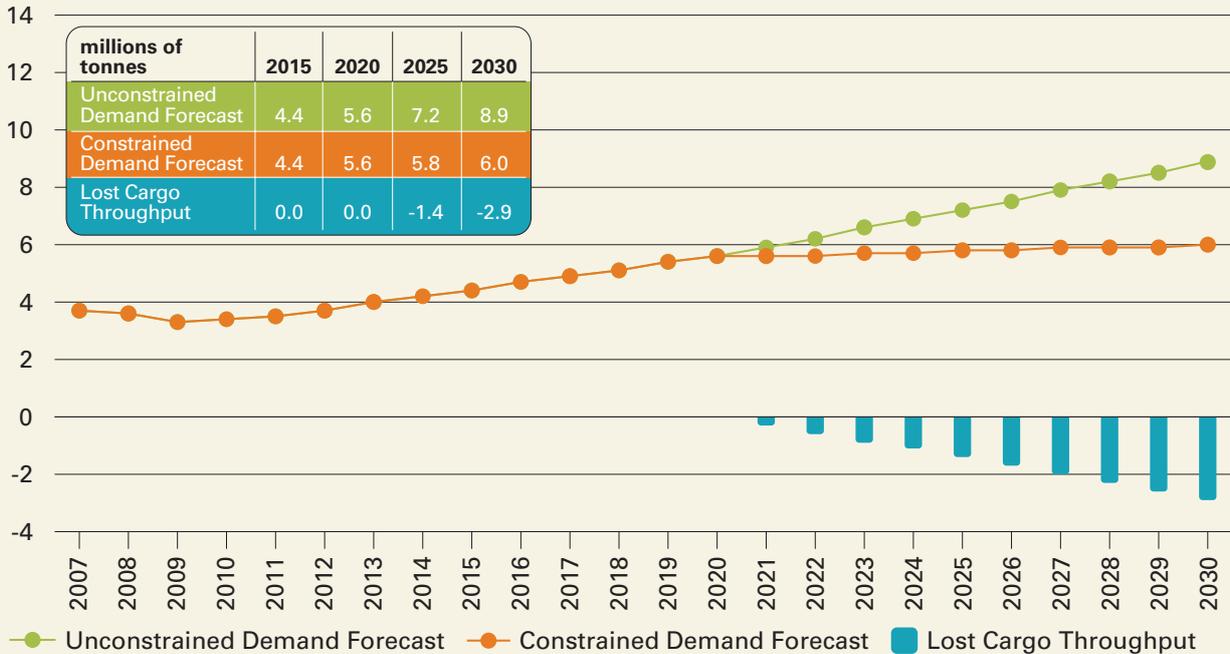


Figure 5.4 Base Case Constrained Cargo Traffic Forecast

millions of tonnes



(e) Road network and landside transportation facilities expansion (HK\$3.8 billion)

- undertake road network improvement works
  - approximately 6km of road and 2km of viaduct and ramp improvement works at the South Interchange, Chun Wan Road, Chun Yue Road and Chek Lap Kok South Road
- construct two multi-storey car parks comprising a total of 2,800 car parking spaces with coach staging
- relocate existing Limousine Lounge

In line with the growth of air traffic, relevant aviation support functions may also need to be expanded, such as the air cargo terminal, freight forwarding and logistics, aircraft maintenance, business aviation centre, inflight catering, ground support equipment maintenance, etc. Under this option, sufficient area on the airport island (about 40 hectares) has been reserved for these purposes. According to the current policies, these facilities are to be provided through franchises and franchisees would be responsible for the capital investment involved. Figure 5.1 highlights the planned developments under Option 1.

Under this option, HKIA will be able to cope with air traffic demand up to 2020 (base case) (see Figure 5.2). Beyond that, HKIA would not be able to accommodate any more additional flight movements.

While runway capacity would be reached in 2020 (base case), the actual passengers and cargo throughput would continue to grow nominally beyond 2020, up to HKIA's maximum handling capacity of 74 million passengers and 6 million tonnes of cargo (see Figures 5.3 and 5.4). This is because of the natural changes in air traffic pattern when the airport reaches its runway capacity (for example, airlines' tendency to switch to larger aircraft). The implications of reaching runway capacity are discussed in Chapter 7.



Figure 6.1 Proposed Three-Runway Alignment and Operating Mode



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## PRACTICAL MAXIMUM RUNWAY CAPACITY

Further to the practical maximum runway capacity assessed for the two-runway system as explained in Chapter 4, National Air Traffic Services (NATS) has also evaluated the practical maximum capacity increase that could be achieved with a third runway. NATS concluded that the three-runway system could support a practical maximum runway capacity of 102 ATMs per hour with the following arrangements –

- (a) The Third (new) runway dedicated for “arrivals” only;
- (b) The Second (existing North) runway dedicated for “departures” only; and

- (c) The First (existing South) runway for both “arrivals” and “departures”.

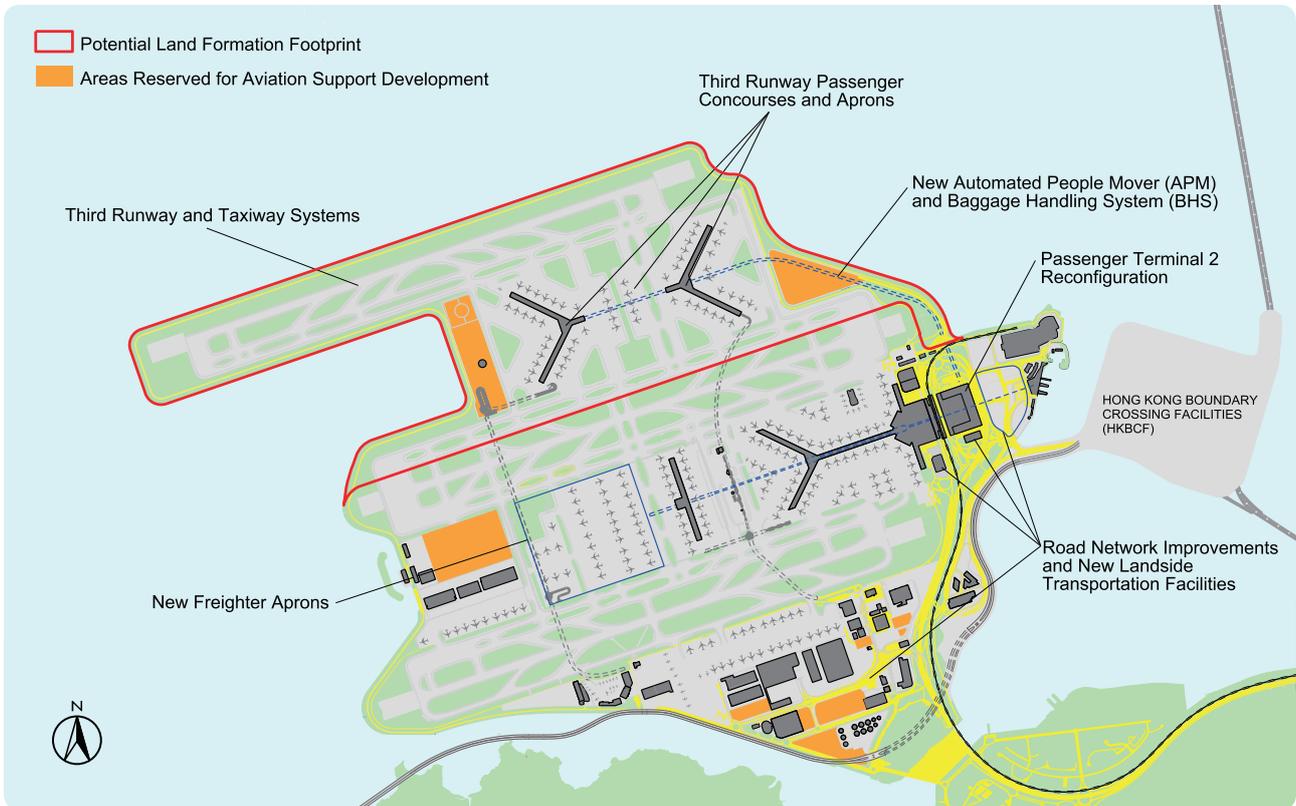
Following the same considerations as explained in Chapter 4, the practical maximum runway capacity of 102 ATMs per hour could be translated into practical maximum daily movements of about 1,800 ATMs per day and practical maximum annual capacity of about 620,000 ATMs per year. There could be potential to further increase the runway capacity in future with enhancements in aircraft and air traffic control technology and management of the Pearl River Delta (PRD) airspace.

## AIRPORT DEVELOPMENT LAYOUT CONFIGURATION

In terms of the alignment of the third runway, NATS has investigated a total of 15 alignment options with regard to operational safety, obstacle clearances, environmental issues, PRD airspace issues, air traffic control procedures, runway usability and capacity. NATS concluded that the best alignment for a third runway would be parallel to and north of the existing two runways.

Based on the recommended parallel alignment of a third runway, 18 different airport layout options

Figure 6.2 Option 2 – Airport Layout Plan in 2030



have been developed by AECOM for airport facilities planning. This is to ensure that the different permutations of the location of the passenger processing terminal, passenger concourses, and aircraft parking aprons required to support the third runway have been fully evaluated before recommending the most suitable airport layout.

The 18 airport layout options have been evaluated against the following five major criteria –

- (a) Airfield efficiency;
- (b) Passenger convenience;
- (c) Cargo operations efficiency;

- (d) Surface access; and
- (e) Environmental impact.

The final recommended airport layout features a northward expansion as illustrated in Figure 6.2.

## CAPITAL INVESTMENT

On the basis of the final recommended airport layout, our consultants have worked out the necessary airport infrastructure that fully utilises the maximum runway capacity (620,000 ATMs/year) and its costing. They have recommended an estimated capital investment of approximately HK\$86.2 billion (in 2010 dollars) or HK\$136.2 billion

(at money-of-the-day [MOD] prices)<sup>11</sup>, including provisions for design, project management and contingency, and phased over 15 years between 2016 and 2030<sup>12</sup> as follows –

- (a) Land formation (HK\$38.9 billion)
  - reclaim about 650 hectares of land north of the existing airport island
- (b) Third runway, related taxiway systems and airfield facilities (HK\$7.5 billion)
  - construct the third runway
  - construct a dual parallel taxiway and connect taxiways to the passenger concourses and apron areas

<sup>11</sup> The final construction cost of the capital projects will be increased from the current estimate based on 2010 dollars to the MOD amounts, in line with the Tender Price Index (TPI) which is estimated to increase at the rate of 5% per annum from 2011 to 2014, 5.5% per annum from 2015 to 2020 and 3% per annum thereafter.

<sup>12</sup> The cost breakdown is in 2010 dollars.

(c) Third runway aprons and passenger concourses (HK\$14.0 billion)

- construct 58 new passenger aircraft parking stands
- construct new passenger concourses for the third runway

(d) Midfield Concourse and Freighter Apron expansion (HK\$4.5 billion)

- construct 36 new remote stands at the Midfield, extend both the Eastern and Western Vehicular Tunnels to the third runway aprons and extend the Concourse

(e) Reconfiguration of Passenger Terminal 2 (T2) (HK\$8.6 billion)

- reconfigure T2 to accommodate both arrival and departure processing facilities

(f) Automated People Mover (APM) extension (HK\$4.2 billion)

- extend the APM to connect the third runway passenger concourses with T2

- construct a new APM depot to accommodate maintenance, storage and other future needs, preferably underground and to the immediate east of the reconfigured T2 for convenient access by all APM lines

(g) Baggage Handling System (BHS) enhancement (HK\$4.3 billion)

- install a new high-speed baggage system servicing the third runway passenger concourses along with the new baggage facilities under T2 catering for departures and arrivals

(h) Road network and landside transportation facilities expansion (HK\$4.2 billion)

- implement road network improvement works in the passenger and cargo areas (approximately 21km of road improvement works and 4km of viaducts and ramps)

- construct four new multi-storey car parks near Terminals 1 and 2 providing a total of 6,500 car parking spaces
- construct a multi-modal transport facility providing remote additional coach parking (110 spaces), taxis and limousines staging areas, pre-booked taxis pick-up area (200 spaces), etc.

As for the future expansion of aviation support functions, sufficient land (about 40 hectares) has been reserved on the proposed reclamation in addition to the areas reserved under Option 1 (see page 29). This is for potential operational requirements to locate aviation support functions near the new apron in future, for example, aircraft maintenance, ground support equipment maintenance, navigation and meteorological installations, airport rescue and fire-fighting and a second operational air traffic control tower. Franchisees and government departments concerned will be responsible for the capital investment involved.



# SUSTAINING GROWTH AT A NEW LEVEL





# 7

## COMPARISON BETWEEN THE TWO OPTIONS



Chapters 5 and 6 discuss two very different approaches in planning the future development of Hong Kong International Airport (HKIA) in the next 20 years. They have their respective pros and cons. A detailed comparison between the two options against key considerations is discussed below.

### CONSIDERATION 1 : AIR CONNECTIVITY

Air connectivity is essential for Hong Kong to maintain its attractiveness as an international business hub as well as competitiveness on the global economic and financial stage.

Air connectivity is commonly defined by the number of destinations served and the frequency of flights along each of those routes. The better HKIA is connected to the world, the greater the frequency of services it could offer, resulting in more reliable air services and a lower threshold for opening new routes. With every new flight it adds to its network, HKIA's connectivity will be further enhanced. Passengers, particularly business travellers, who have access

to an airport with great connectivity would benefit from a wider range of services and frequency.

It is widely recognised that air connectivity plays a crucial role in attracting foreign business. Moreover, the availability of air freight services further facilitates trade by enabling businesses to operate in the most flexible and time-sensitive manner. Global connectivity is particularly important to those sectors characterised by internationalised, high-value products and services, that are also dependent on mobile workforces and face-to-face relations. Among them are financial and business services, which are the cornerstone of Hong Kong's economy.

As Hong Kong's air connectivity increases, it in turn makes Hong Kong more attractive to foreign investment and increases the potential for business efficiency, ultimately generating a virtuous cycle of connectivity and economic growth.

Hence, in comparing the two options, air connectivity is one of the most critical considerations. According to International Air Transport Association (IATA) Consulting's

forecast, Option 1 can only meet the unconstrained demand for air traffic of Hong Kong up to 2020 (base case), at which time the maximum runway capacity would be reached. Should that happen, the following changes in air traffic pattern would likely occur, as experienced by both Kai Tak and overseas airports such as Heathrow –

- (a) Once all available slots were taken up, it would be impossible for existing operators to introduce new destinations or additional frequency on existing routes except for substituting existing flights. This will put a halt to the growth of our aviation network and remove the room for introducing competition on existing routes;
- (b) With slots at a premium, airlines may deploy bigger aircraft, use available slots for lucrative routes instead of the less profitable ones. This would gradually reduce the frequency of less profitable routes and may eventually eliminate them from our network. The reduction in frequency would result in longer connecting time; and the shrinking network, in less choices and higher prices on most routes. The higher yield origin-and-destination

traffic may gradually replace the relatively lower yield transit/transfer traffic. All these would eventually render Hong Kong a less attractive place for transit/transfer traffic to hub through;

- (c) When the runway is operating to its limits, there will be less flexibility to cope with operational delays or disruptions due to weather or other unforeseen incidents. This will invariably lead to longer flight delay and deterioration of the overall airport experience;
- (d) Should all of the above happen, travellers who wish to use HKIA would be pushed to consider using other neighbouring airports that provide services they need, resulting in considerable inconvenience for travellers as a whole; and

(e) In the wider context, when HKIA is saturated, the growth of our hub airport would be halted and the economic benefits for Hong Kong associated with that potential growth would be lost. Hong Kong's overall competitiveness in terms of its position as an international business centre would be adversely affected. Hong Kong's market share across the whole spectrum of the logistics industry, including freight forwarding and insurance, would shrink as we lose our edge to other airports with increasing connectivity.

In this respect, Option 2 has a clear advantage over Option 1 as the runway capacity of a three-runway system would be able to meet Hong Kong's unconstrained traffic demand up to and possibly beyond

2030. Option 2 would ensure that our connectivity is maintained and developed in line with demand. Failure to do so would result in our connectivity being eroded over time relative to other neighbouring or regional airports with expansion plans.

Adopting Option 1 now and then reverting to Option 2 at a later stage is not a viable proposition. Firstly, it would be very wasteful as part of the infrastructure built under Option 1 would have to be taken down to make way for a different airport layout under Option 2. Secondly, due to the long lead time required to implement Option 2, any substantial delay in implementing that option will mean that the capacity of HKIA would be exhausted before the third runway is built. During that period, traffic may be lost to other airports with increasing connectivity and,



# 7 COMPARISON BETWEEN THE TWO OPTIONS



once lost, would be hard to regain. It is in the best interest of Hong Kong to ensure that sufficient capacity at HKIA is developed in time to cater for the anticipated demand.

## Relying on Neighbouring Airports is Not an Option

Some advocates have argued that greater cooperation with Greater Pearl River Delta (GPRD) airports (most notably Shenzhen Bao'an Airport) could possibly remove the need for us to expand HKIA's capacity. We, however, do not believe that it is a viable proposition, for the following reasons –

(a) Air services to and from an airport are regulated by individual jurisdiction and governed internationally through

a network of bilateral air services agreements. Therefore, flight movements that we cannot accommodate due to capacity constraints cannot be funnelled to other airports purely based on demand or at our wishes;

- (b) It would not be in the interest of most passengers who would likely find using or transferring through another airport highly inconvenient; and
- (c) Most importantly, relying on other airports to meet our demand would inhibit the growth of our hub airport and thus adversely affect Hong Kong's overall competitiveness as a world city.

It should be noted that the Hong Kong-Shenzhen Western

Express Line (WEL), which is currently under feasibility study by the Government, may provide an efficient mode of transport to allow seamless passenger flight connections between the two airports, and to make it even more convenient for the GPRD's travelling public to fly via HKIA internationally or Shenzhen airport domestically. The project is subject to further studies, including alignment options, patronage forecasts, the functionality of the railways, technical standards, operational and service requirements, etc. If and when the WEL is constructed, the benefit it brings would equally apply to both Options.

This is an example of our cooperation with other GPRD airports. We enhance consumer choice by making smooth travel. A recent example is

the Hong Kong-Shenzhen Airports Link, which is a service to make it more convenient to travel via HKIA or Shenzhen Bao'an Airport. Such efforts are however different from directing to other GPRD airports traffic which would have chosen Hong Kong due to market forces if there had been sufficient capacity at HKIA.

## CONSIDERATION 2 : ECONOMIC BENEFITS

Experience overseas has shown that investment in airports provides very handsome economic return and that airports produce significantly higher economic impact than other transport infrastructure to the local economy<sup>13</sup>. In order to understand precisely the economic implications of expanding HKIA, Enright, Scott & Associates (ESA) was tasked to conduct an Economic Impact Analysis to assess the potential impact of such an investment on Hong Kong's economy.

In general, an investment's economic impact is measured by its direct, indirect, and induced contributions to the economy, usually expressed in terms of "value added"<sup>14</sup> and percentage contribution to gross domestic product (GDP) in a certain year.

In the context of HKIA –

- (a) "Direct" contribution refers to employment and income generated by the aviation sector in Hong Kong, including the direct operation of the airport, such as airlines, air cargo terminal operators, catering operators, aircraft maintenance and other services operators, and Airport Authority Hong Kong (AAHK), etc., as well as non-aviation businesses at HKIA, including retail, food and beverage, hotels and convention and exhibitions;
- (b) "Indirect" contribution refers to employment and income generated by the suppliers of goods and services to the direct activities of the aviation sector in Hong Kong and non-aviation businesses at HKIA, such as utilities suppliers, fuel suppliers, construction and cleaning companies, food and retail goods suppliers, etc.; and
- (c) "Induced" contribution refers to the employment and income generated by the spending of income by the direct and indirect employees on local goods and services, such as spending of airline employees, utilities supplier employees, AAHK employees, etc.

In estimating the relevant economic contribution components of airport investment, ESA has quantified the direct value added (VA) impact of airport-related activities, as well as those indirectly generated VA impact arising from a change in airport activities. ESA has also adopted a set of VA "multipliers"<sup>15</sup> for selected sectors related to the airport in its calculations and estimated the VA generated from additional spending due to the income projected from the direct and indirect impacts mentioned above.

To ascertain whether an investment is worthwhile, analyses were conducted based on two widely used investment analysis tools: Economic Net Present Value (ENPV) and Economic Internal Rate of Return (EIRR). However, based on the options presented for analyses, Option 1 involves leveraging mainly on existing assets to serve additional demand, and Option 2 involves heavy investments in building up new assets to serve additional demand. Given the significant difference in investment profiles and the noted shortcoming of EIRR (that it tends to favour projects with short-term paybacks at the expense of projects with longer paybacks regardless of the overall value generated by the project), ESA recommended to use ENPV as the tool to assess the relative merits of the two options.

<sup>13</sup> According to *Economic Impacts of Hub Airports*, a report commissioned by British Chamber of Commerce in July 2009, the wider economic benefits of hub airports can be two to five times that of rail.

<sup>14</sup> "Value added" is defined as the value of gross output less the value of intermediate consumption (the value of goods and services used up in the course of production).

<sup>15</sup> The VA multipliers comprise the sectors' own ability to generate VA and the spillover effect to other sectors. The multipliers relating direct plus indirect VA to gross output or business receipts were provided by the Economic Analysis and Business Facilitation Unit of the Hong Kong SAR Government as broad working assumptions for the current economic impact analysis. These are produced based on the observed linkages between sectors and the resultant pattern of intermediate consumption, import leakages of the various economic activities, gross margin of external trade and the ratios of VA to gross-output and business receipts for the affected sectors in recent years. As these impact estimates are largely judgmental, they should only be taken as working assumptions for the current economic impact analysis, and should not be regarded as "official estimates" of the Government.

# 7 COMPARISON BETWEEN THE TWO OPTIONS

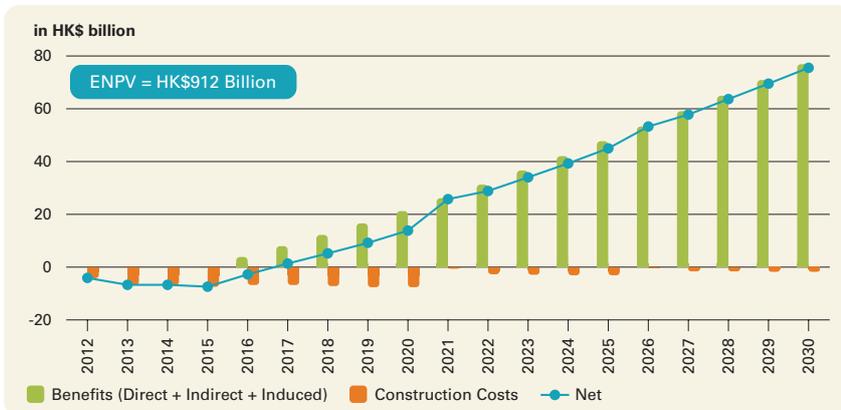
Figure 7.1 Cost and Benefit Flows of Option 1



Note: ENPV is calculated based on 50-year return (till 2061) and discount rate of 4% which is used generally for Government infrastructure projects. Benefits are measured in value added. For simplicity, graph illustrates cash flow up to 2030 only.

Source: Enright, Scott & Associates Ltd

Figure 7.2 Cost and Benefit Flows of Option 2



Note: ENPV is calculated based on 50-year return (till 2061) and discount rate of 4% which is used generally for Government infrastructure projects. Benefits are measured in value added. For simplicity, graph illustrates cash flow up to 2030 only.

Source: Enright, Scott & Associates Ltd

## Economic Impact of Option 1 (Two Runways)

ESA estimates that the direct, indirect and induced contribution of HKIA to Hong Kong's GDP in 2030 under this option would be HK\$120 billion<sup>16</sup>, equivalent to around 3.3% of Hong Kong's GDP forecast for 2030 (compared to 4.6% in 2008). Direct employment would be increased from 62,000 in 2008 to 101,000 in 2030. Indirect and induced employment would be increased from 124,000 in 2008 to 143,000 in 2030.

With the given construction costs under this option<sup>17</sup>, and the corresponding stream of additional traffic up to 2061 (a 50-year life span is assumed for infrastructure), the ENPV<sup>18</sup> is estimated to be HK\$432 billion<sup>19</sup>.

The foregone economic benefits due to constrained passenger and cargo throughput will in turn translate into lower economic contribution of the airport and its associated industries, and the ripple effect would ultimately affect the GDP growth in Hong Kong.

## Economic Impact of Option 2 (Three Runways)

ESA estimates that given the higher construction costs under this option<sup>20</sup>, the direct, indirect and induced contribution to Hong Kong's GDP in 2030 would be HK\$167 billion<sup>21</sup>, equivalent to

<sup>16</sup> In 2009 dollars.

<sup>17</sup> Cost details are in Chapter 5.

<sup>18</sup> ENPV refers to the difference between the present value of the future economic benefits from an investment and the present value of the investment amount.

<sup>19</sup> In 2009 dollars.

<sup>20</sup> Cost details are in Chapter 6.

<sup>21</sup> In 2009 dollars.



Figure 7.3 Summary of the Economic Impact Analysis

	2008 (Actual)	2030	
		Option 1 (Two Runways)	Option 2 (Three Runways)
Economic contribution (Direct + Indirect + Induced)	HK\$78 billion	HK\$120 billion	HK\$167 billion
% of GDP	4.6%	3.3%	4.6%
Direct employment	62,000	101,000	141,000
Indirect + induced employment	124,000	143,000	199,000
		2012-2061	
ENPV	-	HK\$432 billion	HK\$912 billion

around 4.6% of the Hong Kong's GDP forecast for 2030 (compared to 4.6% in 2008). Direct employment associated with HKIA would reach 141,000 and indirect and induced employment would increase to about 199,000 by 2030. The ENPV up to 2061 under Option 2 is estimated to be HK\$912 billion<sup>22</sup>.

### Summary

Figure 7.3 provides a summary of the economic impact analysis.

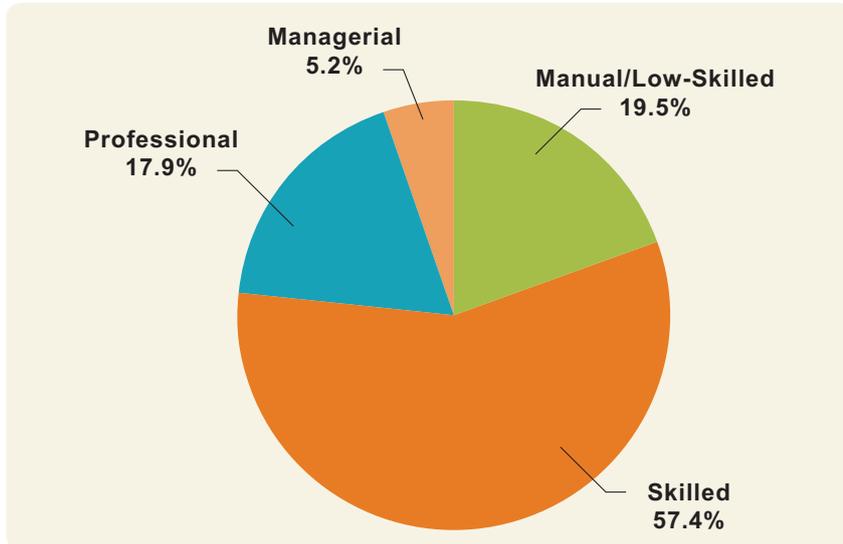
Option 1 is no doubt a less expensive option in terms of capital investment and would bring about an ENPV of HK\$432 billion. Option 2, however, has a projected ENPV of

HK\$912 billion and is a "front-loaded" investment that is projected to generate a much higher value added in the long term.

Between the two options, Option 2 brings a substantially higher economic contribution in the long term (a difference of HK\$480 billion in ENPV) and

<sup>22</sup> In 2009 dollars.

Figure 7.4 Breakdown of Airport Island Employment in 2010



Source: HKIA Workforce Survey 2010

Definitions: Manual/Low-Skilled: Jobs involving simple and routine tasks carried out often with some physical effort and help of hand-held tools. Skilled: Jobs requiring special knowledge and skills acquired through training in order to perform well. Professional: Jobs requiring qualifications and knowledge of a specialised field. Managerial: Jobs which are responsible for the management of a section, department, division or a company in the achievement of organisation objectives.

provides a significantly greater boost to local employment. One important aspect of the economic analysis that deserves particular attention is the gradual decrease of HKIA's economic contribution as a percentage of Hong Kong's GDP under Option 1 (below the 2008 level). As Hong Kong's economy continues to grow, it is obvious that Option 1 does not allow HKIA to grow in tandem due to its constrained capacity<sup>23</sup>. In addition, constrained capacity is likely to affect air connectivity. Experience in Heathrow bears this out clearly: In 1990, Heathrow ranked second among airports in Europe, after Frankfurt, in the number of destinations served, but as its capacity became constrained, it slipped to seventh in 2010 behind Frankfurt, Paris, Amsterdam, Munich, Rome and Madrid<sup>24</sup>.

Between the two options, Option 2 would provide substantially more direct jobs than Option 1 (141,000 jobs under Option 2 vis-à-vis 101,000 jobs under Option 1). Further to the ESA analysis, we have surveyed nearly 400 different companies and organisations operating on the airport island in 2010. Of the 65,000 people employed, around 20% of the employment belongs to manual/low-skilled jobs. According to returns from the survey, it is anticipated that roughly 50% of the new jobs created under both Options 1 and 2 would be manual/low-skilled jobs. As Hong Kong is currently in need of employment opportunities for manual/low-skilled labour, the expansion of HKIA would contribute towards filling this gap.



## CONSIDERATION 3 : CONSTRUCTION COST

The construction cost estimates are supported by the preliminary engineering feasibility assessment conducted, with approximate work quantity measured to the level of design details available and costs per unit of construction floor areas benchmarked with existing similar projects on the airport island.

Option 2 costs considerably more than Option 1 (estimated at HK\$86.2 billion vis-à-vis HK\$23.4 billion in 2010 dollars or HK\$136.2 billion vis-à-vis HK\$42.5 billion at money-of-the-day [MOD] prices) as the former entails a sizeable reclamation and extensive airport ancillary facilities required to efficiently integrate the third runway with the rest of the airport.

<sup>23</sup> The comparison of the projected economic impact of the two options was made against independently forecast GDP figures. Such figures have not been adjusted to take into account potential slower economic growth in Option 1 than in Option 2.

<sup>24</sup> *Strategy: Process, Content, Context, An International Perspective* by Bob De Wit, Ron Meyer, 4th Edition.



The high construction cost of Option 2 is attributed to the following factors –

(a) The proposed reclamation falls on a wide stretch of Contaminated Mud Pits (CMPs). In order to contain the CMPs in-situ, a special reclamation method called “Deep Cement Mixing” would be employed and this element alone would cost HK\$9.0 billion more than conventional reclamation methods. Moreover, unlike the reclamation of the existing airport island where a considerable amount of fill was obtained from the original island, the fill for the proposed reclamation under Option 2 would have to be imported from the Pearl River Delta or beyond, which would drive up the land formation cost significantly;

(b) A provisional amount of 20% of the construction cost has been included to cover uncertain elements of this project given its massive scale, the innovative reclamation method adopted on a large scale, and that only preliminary engineering assessment has been done hitherto; and

(c) The airport is a unique piece of infrastructure that needs to be designed to meet a whole host of stringent standards for safety, security, efficiency and service quality. It can only operate efficiently with specialist automation systems such as baggage handling and automated people mover systems. All these add up to the capital intensive investment required, particularly so for Option 2, where the operation of the third runway has to be

integrated fully with the rest of the airport infrastructure to sustain the same level of airport experience.

The construction cost figures above would have to be updated in due course after the statutory Environmental Impact Assessment process and preliminary design have been completed.

## CONSIDERATION 4 : FUNDING

Under the Airport Authority Ordinance, we are required to conduct our business according to prudent commercial principles. We have maintained an efficient capital structure in line with comparable commercial entities. Leveraging our strong revenue base and superior credit rating, we operate with

# 7 COMPARISON BETWEEN THE TWO OPTIONS

a prudent level of borrowings (average year-end debt balance at about HK\$9.0 billion). This has helped us achieve a financial rate of return on equity of 10.7% in the year ending March 2011<sup>25</sup>.

To ascertain our capability in undertaking the Master Plan 2030, The Hongkong and Shanghai Banking Corporation Limited has been commissioned as our independent financial advisor to evaluate the financial feasibility of the development options under the Master Plan 2030 and advise on our prudent borrowing capacity based on our cashflow projections.

The cashflow projections under both Options 1 and 2 are prepared on the following assumptions –

- (a) The final construction cost of the capital projects will be increased from the current estimate based on 2010 dollars to the MOD amounts, in line with the Tender Price Index (TPI) which is estimated to increase at the rate of 5% per annum from 2011 to 2014, 5.5% per annum from 2015 to 2020 and 3% per annum thereafter;
- (b) Our operating revenue will increase in line with traffic growth based on IATA Consulting's base case traffic forecast for this period;
- (c) Airport charges will be adjusted in line with Consumer Price Index (CPI) movements (assuming 3% CPI increase per year up to 2030);
- (d) The majority of our profits will be distributed by way of dividends to our shareholder each year at a similar rate as in previous years; and

Figure 7.5 Option 1 – Annual Capital Expenditure

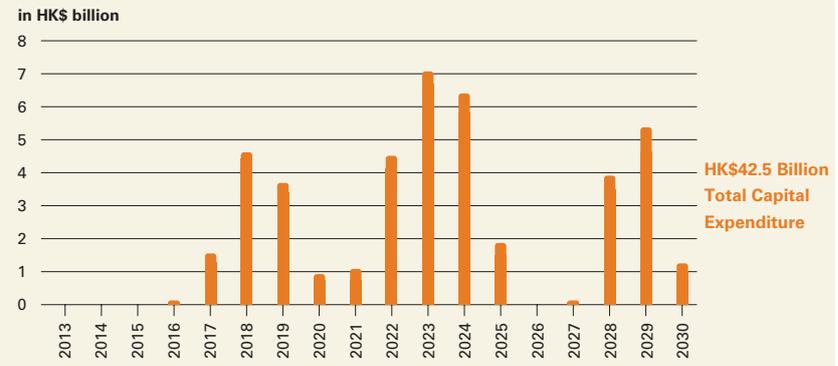
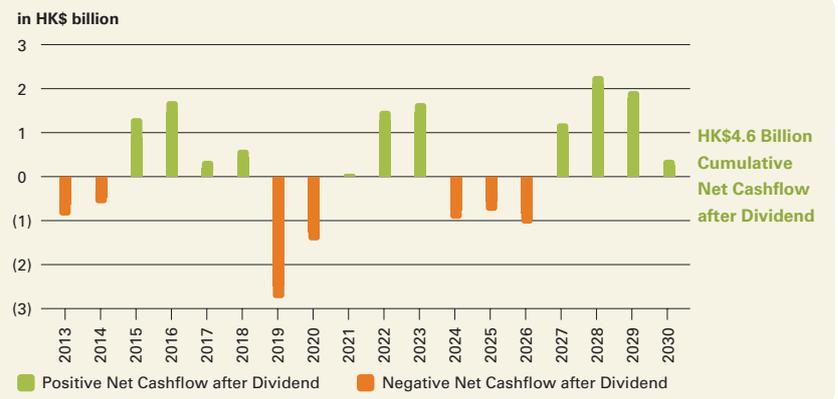


Figure 7.6 Option 1 – Annual Net Cashflow after Dividend



- (e) We will continue to invest in our committed capital projects, such as Phase 1 of the Midfield Development, and the routine replacement of fixed assets.

## Cashflow Analysis – Option 1

Under Option 1, capital expenditure to be incurred would amount to HK\$23.4 billion (in 2010 dollars) or HK\$42.5 billion at MOD prices between 2013 and 2030. The annual cash outflow of the capital expenditure is shown in Figure 7.5.

The results of our operations for each year based on the above-mentioned assumptions show a trend of rising profits. As depreciation is charged before arriving at our profits, the cashflow generated from our operations is the aggregate of our profits and the depreciation charge but less any increase in our working capital. At the same time, expenditure is incurred on the committed capital projects such as Phase 1 of the Midfield Development and routine replacement of fixed assets.

<sup>25</sup> According to 2010/11 unaudited accounts.

Hence, such expenditure should be deducted from our cashflow from operations to arrive at the net cashflow before dividend payments.

Under the Airport Authority Ordinance, the Financial Secretary has the power to request AAHK to distribute dividend after consultation with the AAHK Board. We have distributed about 80% of our profits in past years by way of dividends. We have assumed the same level of distributions in the projections.

Based on the foregoing, the forecast profits for the period from 2013 to 2030 under Option 1 will amount to HK\$101.6 billion after depreciation charges of HK\$68.2 billion and a net increase in working capital of HK\$6.1 billion. In the same period, capital expenditure on committed capital projects and routine replacement of fixed assets will amount to HK\$79.5 billion. On the basis of the previous practice of payment of approximately 80% of the preceding year's profits by way of dividends, which will amount to HK\$79.6 billion, the net cashflow after dividend is forecast to amount to HK\$4.6 billion (representing  $HK\$101.6 + HK\$68.2 - HK\$6.1 - HK\$79.5 - HK\$79.6$  billion).

When comparing the cash outflow required for the capital expenditure with the net cashflow after dividend, it is clear that there would be a funding shortfall for most of the years between 2013 and 2030. The annual funding shortfall is shown in Figure 7.7 and the total funding shortfall between 2013 and 2030 is estimated to be HK\$37.9 billion, peaking in 2030 (see Appendix 1 for details).

Figure 7.7 Option 1 – Annual Funding Shortfall/Surplus

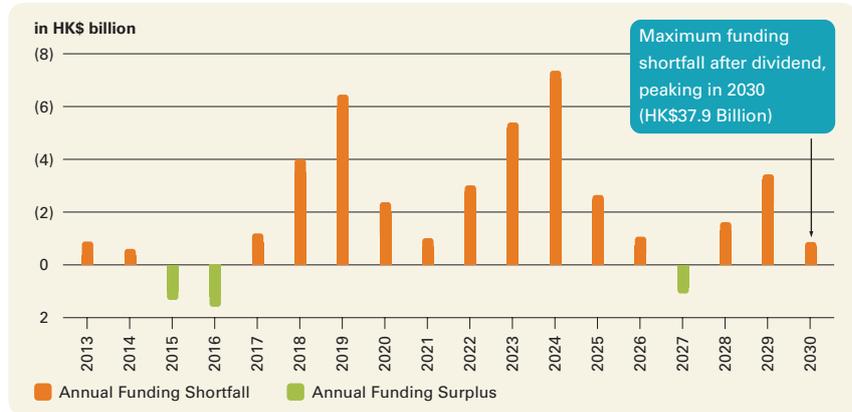
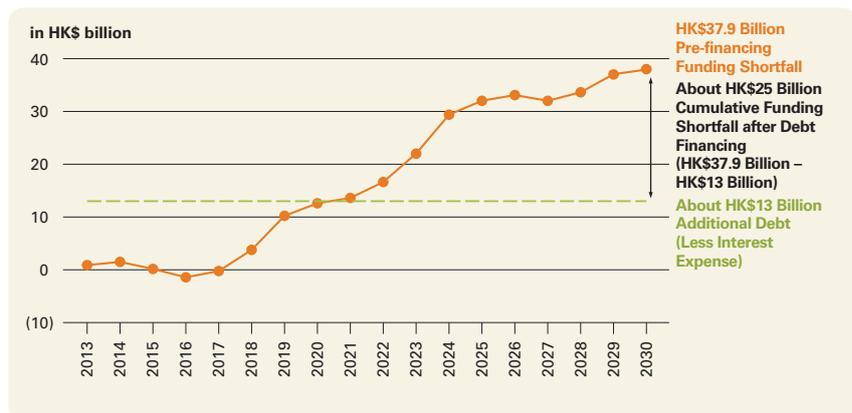


Figure 7.8 Option 1 – Cumulative Funding Shortfall after Debt Financing



Based on the assumptions set out on page 46, our financial advisor has assessed our prudent borrowing capacity on the assumption that we would expect to maintain a high investment grade standalone credit rating (at a minimum of A) so as to ensure our continued access to the debt market at a reasonable cost<sup>26</sup>. The advisor considered that the amount that we could borrow on this basis is approximately HK\$26.0 billion, representing a net

additional borrowing capacity of about HK\$17.0 billion over our average level of borrowings of about HK\$9.0 billion. As additional interest costs would be incurred on these borrowings, the net incremental cashflow available from borrowings up to 2030 would amount to approximately HK\$13.0 billion under Option 1. This amount would not be sufficient to meet the funding shortfall as shown in Figure 7.8.

<sup>26</sup> In determining our prudent borrowing capacity, the financial advisor has applied a range of criteria which take into account the key financial metrics analysed by rating agencies, lenders' measures of AAHK's ability to service debt and the robustness of AAHK's financial profile.

# 7 COMPARISON BETWEEN THE TWO OPTIONS



**HK\$167**  
BILLION

contribution to Hong Kong's GDP by 3-runway system



Figure 7.9 Option 2 – Annual Capital Expenditure



## Cashflow Analysis – Option 2

Under Option 2, capital expenditure to be incurred would amount to HK\$86.2 billion (in 2010 dollars) or HK\$136.2 billion at MOD prices between 2013 and 2030. The annual cash outflow of the capital expenditure is shown in Figure 7.9.

As described on page 46, our net cashflow generated from our operations represents our profits, plus depreciation charges and changes in working capital less capital expenditure on committed capital projects and dividends to our shareholder. On the assumptions

set out on page 46, the forecast profits for the period from 2013 to 2030 under Option 2 will amount to HK\$102.7 billion after depreciation charges of HK\$87.2 billion and increase in working capital of HK\$4.6 billion. In the same period, capital expenditure on committed capital projects and routine replacement of fixed assets will amount to HK\$83.0 billion. On the basis of the previous practice of payment of approximately 80% of the profits of the preceding years by way of dividends, which will amount to HK\$78.9 billion, the net cashflow after dividend is forecast to amount to HK\$23.4 billion (representing  $HK\$102.7 + HK\$87.2 - HK\$4.6 - HK\$83.0 - HK\$78.9$  billion).

When comparing the cash outflow required for the capital expenditure with the net cashflow after dividend, it is clear that there would be a funding shortfall for most of the years between 2013 and 2030, with the exception of a few years beyond 2025. The funding shortfall is also much bigger than that of Option 1. The annual funding shortfall is shown in Figure 7.11 and the total funding shortfall would peak at HK\$112.8 billion in 2030 (see Appendix 2 for details).

A similar approach to debt sizing has been adopted in Option 2 as for Option 1, resulting in a net additional borrowing capacity of approximately HK\$17.0 billion. After allowing for the related interest cost over a slightly longer period, the net incremental cashflow available from borrowings would amount to approximately HK\$11.0 billion under Option 2. This amount would not be sufficient to meet the funding shortfall as shown in Figure 7.12.

Figure 7.10 Option 2 – Annual Net Cashflow after Dividend

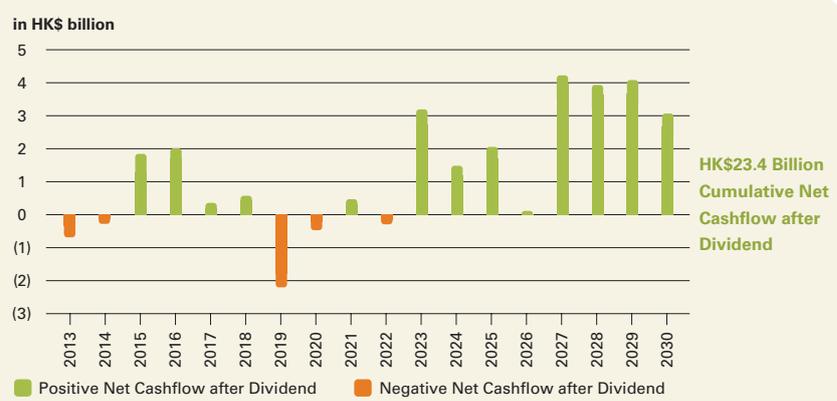


Figure 7.11 Option 2 – Annual Funding Shortfall/Surplus

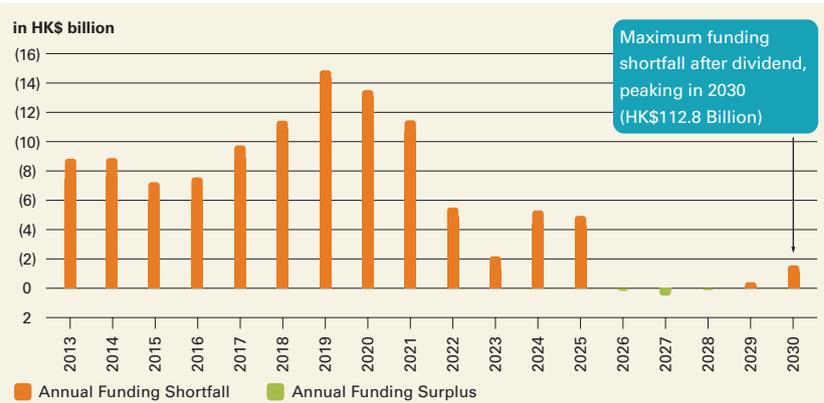
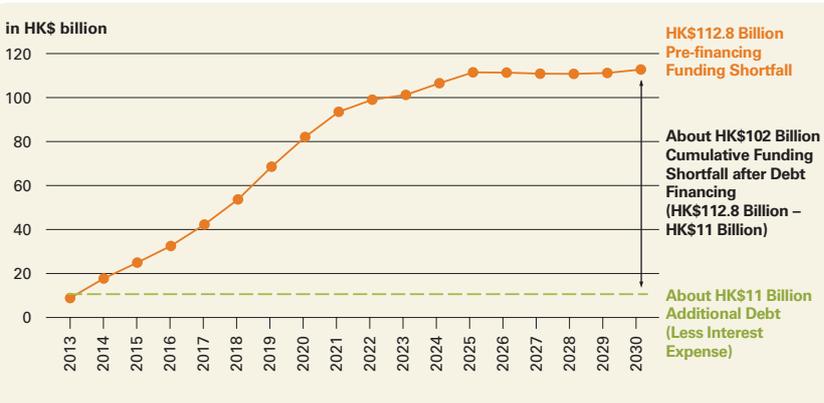


Figure 7.12 Option 2 – Cumulative Funding Shortfall after Debt Financing



# 7 COMPARISON BETWEEN THE TWO OPTIONS

## Funding the Two Options

The above analysis is predicated on the base case financial projections of AAHK and Master Plan 2030 construction costs. It shows that we cannot finance either of the options through our internal cashflows and external prudent borrowing capacity. While we may be able to reduce the shortfall by reviewing our existing revenue framework with a view to increasing our revenue, the magnitude of such additional revenue sources would unlikely be material within this time frame. Subject to views gauged on the way forward for the Master Plan 2030, further discussion on how best to bridge the funding gap between AAHK and the Government would be necessary.

## CONSIDERATION 5 : ENVIRONMENTAL ISSUES

Care for the environment is at the heart of HKIA's long-term commitment to sustainable growth. A voluntary Environmental Impact Assessment (EIA) was conducted and included in the 1992 New Airport Master Plan (NAMP) – EIA. This was updated in 1998 to provide a thorough evaluation of the potential environmental impacts associated with the ultimate airport development envisioned by the NAMP for the two-runway operations at design capacity, with a range of commitments made to ensure that environmental impacts would be effectively mitigated over the operational lifespan of the airport. We do not underestimate the challenges involved in both options, particularly in Option 2. In line with HKIA's long-term commitment to

sustainable growth, we will rise to these challenges by addressing the environmental concerns. Should Option 1 be pursued, a review will be undertaken based on guidelines as stipulated in the statutory EIA process to assess whether the proposed developments under Option 1 will constitute material changes to the NAMP to trigger the requirement for an EIA study and environmental permit.

For Option 2, we commissioned Mott MacDonald to conduct a preliminary environmental assessment to assess the potential constraints associated with the various alternative airport expansion layouts of the third runway. While this preliminary assessment does not replace a full-scale statutory EIA and compliance with all legal requirements, we must ensure that the final recommended airport expansion layout under Option 2



Figure 7.13

Proposed Land Reclamation in Relation to Contaminated Mud Pits



should minimise environmental impact as far as possible. In the course of the statutory EIA process, we will be able to address environmental concerns in detail. The following paragraphs briefly summarise the key findings of the preliminary environmental assessment of the recommended airport expansion layout under Option 2.

### Hydrodynamics, Water Quality, Marine Ecology and Fisheries

With the reclamation involved, Option 2 is undeniably associated with more environmental issues than Option 1. In planning Option 2, every attempt has been made to maximise

the use of land on the existing airport island, thus keeping the requirement for new land reclamation to a minimum. The conceptual design of the expanded airport layout plan identifies that about 650 hectares of reclamation would be required.

About 40% of the proposed reclamation falls upon an area of Contaminated Mud Pits (CMPs) – an area subject to substantial disturbance in the past and considered to be of low ecological value. This area was identified by the Government in 1991 as the preferred disposal site for contaminated dredged sediment, based on a Contaminated Spoil Management Study. Reclamation in this area cannot be carried out through the conventional “Undredged

with Vertical Drains” reclamation method as it involves potential release of polluted mud and leachate. Our consultants have recommended the “Deep Cement Mixing” reclamation method which has the advantage of minimising disturbance to the contaminated mud. While this method needs to be further considered in subsequent detailed studies, including on-site trials, it has been widely used overseas, particularly in Japan, where it is a well established means of improving the integrity of the soft ground and providing a robust foundation for reclamation.

Hydrodynamic and water quality models from Delft Hydraulics have been used in a preliminary assessment of the potential impacts

## 7 COMPARISON BETWEEN THE TWO OPTIONS

of the proposed reclamation on water sensitive receivers (WSRs) and ecological sensitive receivers (ESRs) in the North Western Water Control Zone (WCZ). According to the assessment, during the construction phase, except for a marginal exceedance predicted at Sha Chau and Lung Kwu Chau Marine Park which can be addressed when mitigation measures are applied, the predicted suspended solids concentrations at all WSRs and ESRs resulting from the proposed reclamation are expected to be in compliance with the Water Quality Objectives. As to the preliminary assessment for the operation phase, the expanded airport footprint has been simulated and is shown to have no significant large-scale impact on the tidal

flow regime, although some local impacts are projected, for example small increases in flow speed at the western end of the third runway. No significant change in the flushing capacity of the channel between the airport platform and North Lantau is anticipated, nor in the major channel from Urmston Road to Ma Wan Channel. As a result, no large-scale changes in water quality within the North Western WCZ are anticipated.

A desktop literature review has established a good understanding of both the physical and marine ecological environments in the areas that could be impacted by the proposed reclamation. In terms of marine ecology, most ecologically sensitive areas (such as coral sites, intertidal habitats of horse-shoe crabs and coastal sea-grass beds)

are located quite a significant distance from the proposed reclamation, along the North Lantau coastline. Preliminary assessment has also indicated that despite a significant loss in soft bottom seabed areas, the significance of impacts will be low insofar as the direct loss of marine lives living on the seabed and intertidal flora and fauna is concerned – in particular given that much of the proposed reclamation footprint has been subject to substantial human disturbance in the past (note: around 40% of the footprint is located above the CMPs) and is not known to be inhabited by species of conservation importance, other than Chinese White Dolphins.

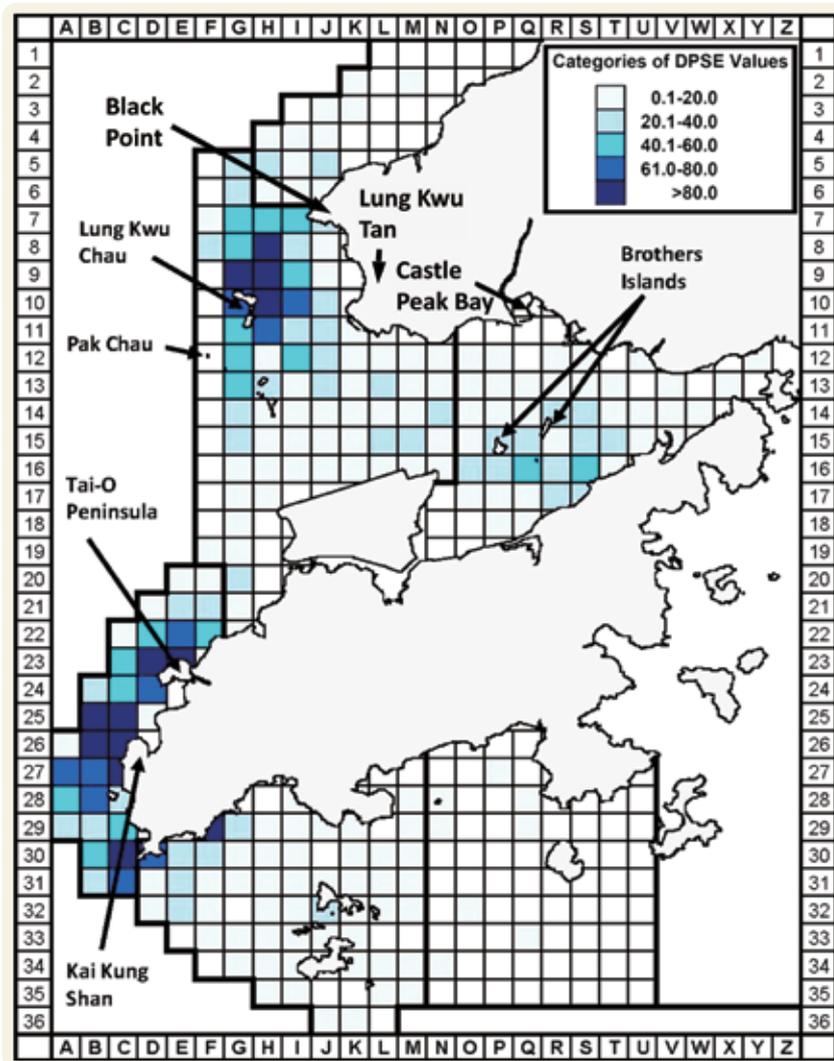
The preliminary fisheries impact assessment has looked into those areas sensitive to the proposed





Source: AFCD

Figure 7.14 Chinese White Dolphins Sightings



Note: Density of Chinese white dolphins with corrected survey effort per sq.km. in waters around Lantau Island, using data collected during 2002-2009. DPSE = no. of dolphins per 100 units of survey effort.

Source: AFCD

reclamation works, including the marine fish culture zone at Ma Wan and capture fisheries in the North Western WCZ. Based on preliminary water quality modelling results, construction activities are not expected to result in any significant impact on the culture fisheries at Ma Wan Fish Culture Zone. However, the permanent loss of water body would affect fisheries resources and fishing operations, as the proposed reclamation area currently supports a medium-low fisheries production. The permanent loss in fisheries production is preliminarily estimated to be around 0.08% of Hong Kong's yearly production (58,700-117,400 kg loss). The mechanism for compensation for capture and culture fisheries impacted by reclamation and/or construction works is well established. Should Option 2 be pursued, further discussions with the Government and the affected parties would be required.

### Indo-Pacific Humpback Dolphin

Potential impact on the Indo-Pacific humpback dolphin (*Sousa chinensis*), or Chinese White Dolphin (CWD), is another important issue. The local population of dolphins in Hong Kong waters is estimated to be about 100 – 200 individuals, depending on the time of year<sup>27</sup>. The Agriculture, Fisheries and Conservation Department's (AFCD) current database (see Figure 7.14) on CWD has been reviewed. The review identified that CWDs are widely distributed throughout northwest Lantau, northeast Lantau, west Lantau and southwest Lantau, while they are rarely observed in the

<sup>27</sup> AFCD, 2007

# 7 COMPARISON BETWEEN THE TWO OPTIONS

Deep Bay, southeast Lantau and Lamma areas. CWD sightings (and the areas of highest abundance) are common in the waters east of Lung Kwu Chau, between Lung Kwu Chau and Black Point, near Pak Chau, around the Brothers Islands and throughout the west Lantau area. Abundance is especially high along the stretch of waters between the Tai O Peninsula and Kai Kung Shan. CWDs are much less frequently observed in waters north of the HKIA platform, and in northeast Lantau waters.

In broad terms, expanding the existing airport island northwards would overlay a marine area of low CWD abundance. Nonetheless, the reclamation could potentially impact on dolphins during both the

construction and the operation stages, extending to loss of habitat, disruption of breeding and calving areas, and disturbance of activities such as feeding and socialising. A range of working methodologies, mitigation and compensation measures developed from other EIA studies over the years have been considered effective in minimising such impacts. All options for minimising, mitigating and compensating the potential impacts on CWDs would be fully investigated in the course of the statutory EIA process.

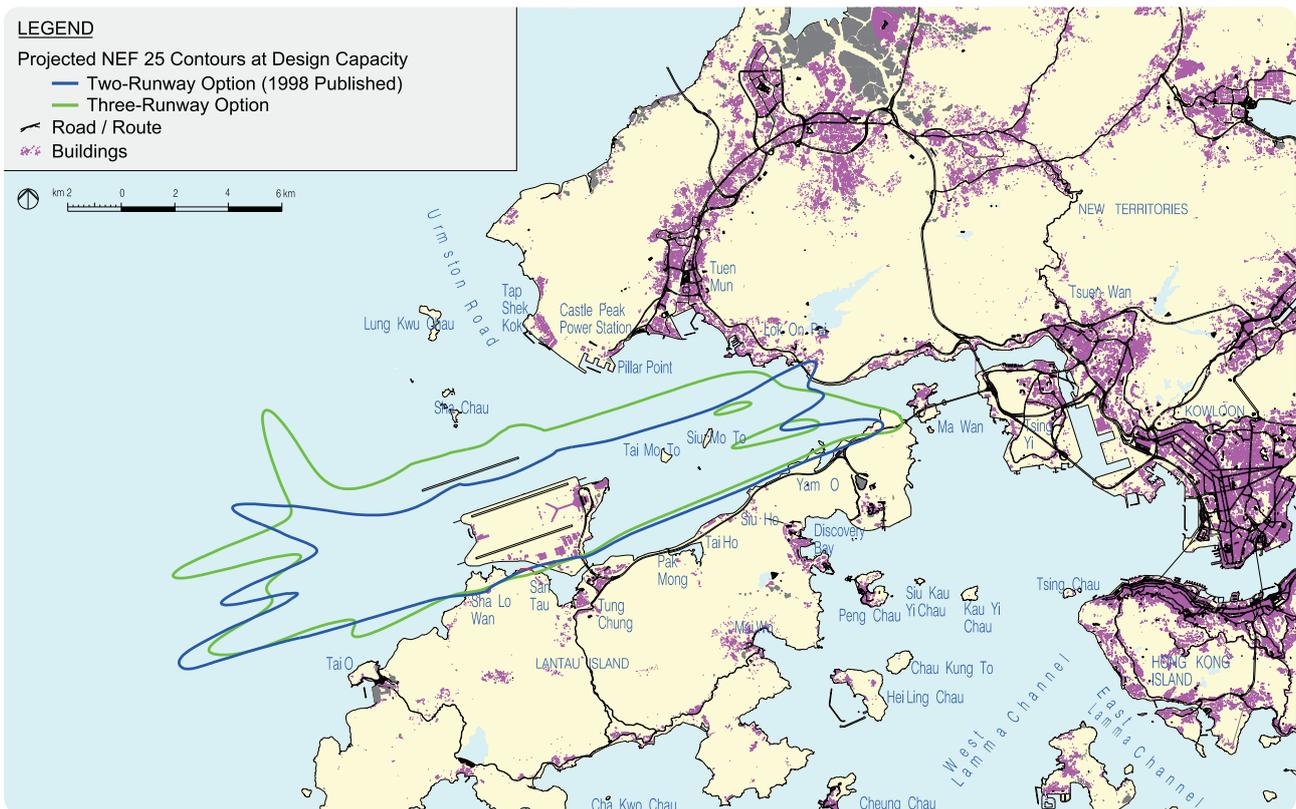
## Noise Impact on Noise Sensitive Receivers

Residential communities along the flight paths are subject to a varying degree of aircraft noise. We follow guidelines established

by the International Civil Aviation Organization (ICAO) and the United States Federal Aviation Administration (FAA), which indicate areas of aircraft noise exposure by using Noise Exposure Forecast (NEF) contours around an airport and its flight paths. According to the "Hong Kong Planning Standards and Guidelines" (HKPSG), noise sensitive uses such as domestic and educational premises should not be located within the NEF 25 contour. This is in line with the standards adopted by many developed countries.

In 1998, we published NEF contours that represented a projection of the existing two-runway system operating at its design capacity. We have also conducted a preliminary projection of NEF

Figure 7.15 Preliminary Projection of Three-Runway NEF Contours for HKIA





contours for a three-runway layout at design capacity. With newer aircraft producing less noise and the introduction of new flight paths and flight procedures made possible by the three-runway system, the preliminary NEF contours projected for Option 2 do not differ significantly from the 1998 NEF contours. More detailed NEF contour forecasts will be carried out in subsequent studies under the statutory EIA process.

### Air Quality

Our consultants have carried out preliminary studies on the possible air quality impact of the air traffic movements (also known as flight movements) projected for 2030 under Option 2 and the results

indicate that it would not exceed the prevailing Air Quality Objectives (AQOs) for all air sensitive receivers around HKIA. They also show that our operations make a relatively small contribution to the overall air quality of Hong Kong. We understand that the Government is currently reviewing Hong Kong's AQOs and taking into account the outcome of the Government's review, a detailed air quality impact assessment will be conducted under the statutory EIA process.

### Summary of Environmental Considerations

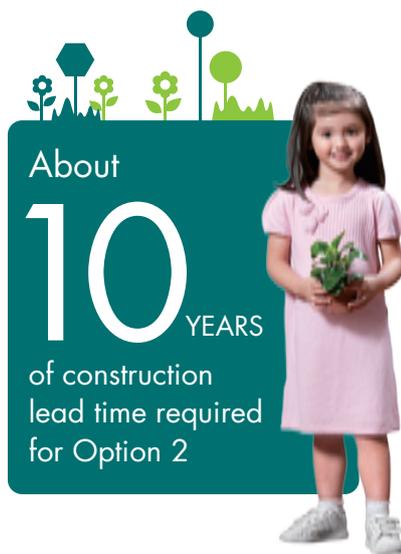
It is worth noting that the preliminary environmental assessment undertaken at this stage for Option 2

has covered potential environmental issues involved and has explored, albeit on a preliminary basis, possible mitigation and compensatory measures.

Option 1 does not involve any reclamation. Hence, comparatively speaking, Option 2 will potentially create more environmental issues than Option 1. We are committed to addressing the environmental concerns associated with both Options. For example, in the course of the statutory EIA process, we will fully investigate the environmental issues in question to ensure that practical and feasible plans are advanced and their residual environmental impacts are minimised.

# 8

## THE TIME TO ACT IS NOW



The Master Plan 2030 is a very detailed study. We have tried to cover as many issues as possible that are relevant to the future development of Hong Kong International Airport (HKIA) to enable the community to have an informed discussion, and hopefully leading to an educated consensus on this very important subject.

HKIA is growing busier every day and the time for making a decision on its future development is running short. Both Options 1 and 2 require long lead time for conducting further detailed studies and obtaining regulatory approvals before works can commence. Option 2, in particular, requires a construction lead time of about 10 years as shown in Figure 8.1.

With economic activities forecast to grow at an enormous rate on the Mainland, Hong Kong – one of the

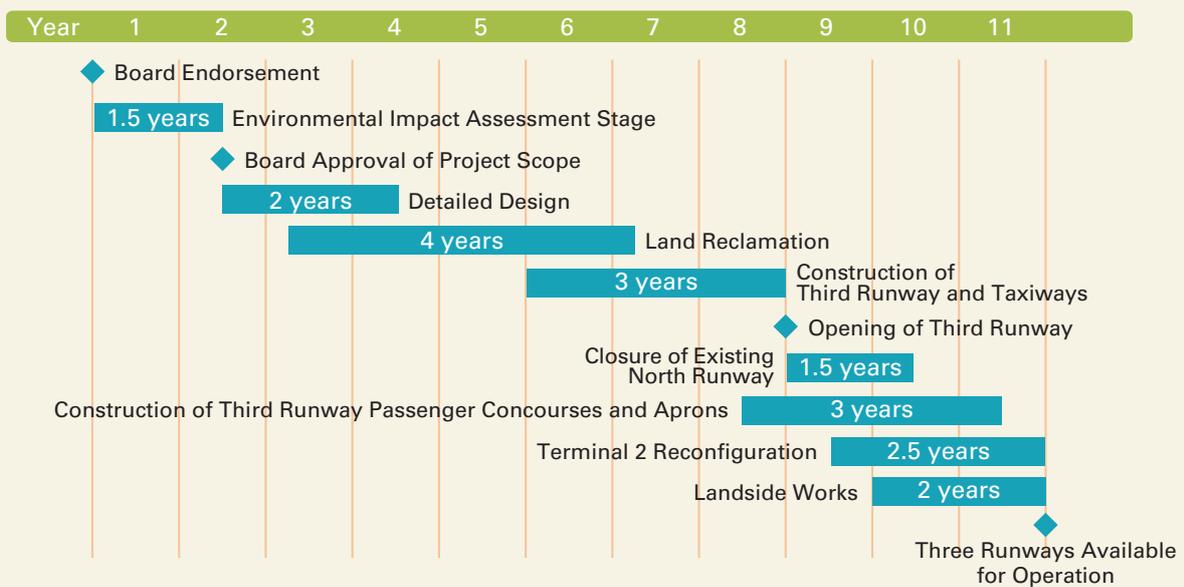
major gateways to China – stands to benefit economically from the inevitable rise in demand for aviation services. An expanded HKIA is the key. While Options 1 and 2 have their respective pros and cons, only the latter can fully meet Hong Kong's long-term needs.

In view of the vibrant aviation market, both globally and regionally, many of our neighbouring airports have laid out expansion plans to cope with this rising demand in air travel. Unless we put our act together, it is highly possible that our status as an international aviation hub would be weakened. Traffic lost would be hard to re-gain.

If we are to seize the golden opportunity before us, create a wealth of new benefits for Hong Kong and retain our position as the world's premier aviation hub, the time to act is now.



Figure 8.1 Estimated Implementation Programme of the Third Runway



## APPENDIX 1

### Option 1: Summary Table of Cashflow and Funding Shortfall <sup>(Note 1)</sup>

(HK\$ billion)	Option 1 Capex (A)	Cash Generated from Our Operations (B)	Expenditure on Committed Capital Projects and Replacement of Fixed Assets (C)	Net Cashflow before Dividend (D) = (B) + (C)	Dividend (Note 2) (E)	Net Cashflow after Dividend (F) = (D) + (E)	Funding Surplus/(Shortfall) for the year after Dividend (F) + (A)	Cumulative Funding Surplus/(Shortfall) before Dividend (Note 3) $\sum_{i=1}^n [(D) + (A)]$	Cumulative Funding Surplus/(Shortfall) after Dividend (Note 3) $\sum_{i=1}^n [(F) + (A)]$
2013/14	–	7.1	(5.0)	2.2	(3.1)	(0.9)	(0.9)	2.2	(0.9)
2014/15	–	6.2	(3.3)	2.9	(3.5)	(0.6)	(0.6)	5.1	(1.5)
2015/16	–	6.5	(1.4)	5.1	(3.8)	1.3	1.3	10.2	(0.2)
2016/17	(0.1)	7.0	(1.5)	5.5	(3.8)	1.7	1.6	15.6	1.4
2017/18	(1.6)	8.3	(4.1)	4.2	(3.8)	0.4	(1.2)	18.2	0.2
2018/19	(4.6)	8.4	(3.5)	4.9	(4.3)	0.6	(4.0)	18.5	(3.8)
2019/20	(3.7)	8.7	(7.1)	1.6	(4.4)	(2.8)	(6.5)	16.4	(10.2)
2020/21	(0.9)	7.7	(4.5)	3.2	(4.6)	(1.5)	(2.4)	18.7	(12.6)
2021/22	(1.1)	8.7	(4.0)	4.7	(4.7)	0.1	(1.0)	22.3	(13.6)
2022/23	(4.5)	10.4	(4.5)	5.9	(4.4)	1.5	(3.0)	23.7	(16.6)
2023/24	(7.1)	10.3	(3.6)	6.7	(5.0)	1.7	(5.4)	23.3	(22.0)
2024/25	(6.4)	10.4	(6.3)	4.1	(5.1)	(1.0)	(7.4)	21.0	(29.4)
2025/26	(1.9)	8.9	(4.5)	4.4	(5.2)	(0.8)	(2.6)	23.5	(32.0)
2026/27	–	9.8	(5.8)	4.0	(5.1)	(1.1)	(1.1)	27.6	(33.1)
2027/28	(0.1)	10.6	(5.0)	5.6	(4.4)	1.2	1.1	33.0	(32.0)
2028/29	(3.9)	11.9	(4.7)	7.2	(4.9)	2.3	(1.6)	36.3	(33.6)
2029/30	(5.4)	11.8	(5.1)	6.8	(4.8)	1.9	(3.4)	37.7	(37.1)
2030/31	(1.3)	10.9	(5.7)	5.2	(4.8)	0.4	(0.9)	41.6	(37.9)
Total (2013/14-2030/31)	(42.5)	163.7	(79.5)	84.2	(79.6)	4.6	(37.9)		

Note:

- The above projections are presented for illustration purposes only and do not represent any forecast adopted by AAHK on its future business performance. The actual outcome of the projections will depend on many factors which cannot be foreseen at this time, and which are outside the control of AAHK.  
The above figures are subject to rounding differences.
- Dividend refers to payout based on 80% of the net profit of the preceding year.
- Cumulative funding surplus/(shortfall) refers to the sum of preceding year's annual funding surplus/(shortfall) and current year's annual funding surplus/(shortfall).

Option 2: Summary Table of Cashflow and Funding Shortfall <sup>(Note 1)</sup>

(HK\$ billion)	Option 2 Capex (A)	Cash Generated from Our Operations (B)	Expenditure on Committed Capital Projects and Replacement of Fixed Assets (C)	Net Cashflow before Dividend (D) = (B) + (C)	Dividend (Note 2) (E)	Net Cashflow after Dividend (F) = (D) + (E)	Funding Surplus/(Shortfall) for the year after Dividend (F) + (A)	Cumulative Funding Surplus/(Shortfall) before Dividend (Note 3) $\sum_{i=1}^n [(D) + (A)]$	Cumulative Funding Surplus/(Shortfall) after Dividend (Note 3) $\sum_{i=1}^n [(F) + (A)]$
2013/14	(8.2)	7.2	(5.0)	2.4	(3.1)	(0.7)	(8.8)	(5.8)	(8.8)
2014/15	(8.6)	6.6	(3.3)	3.2	(3.5)	(0.3)	(8.9)	(11.1)	(17.7)
2015/16	(9.1)	6.8	(1.4)	5.4	(3.6)	1.8	(7.2)	(14.8)	(24.9)
2016/17	(9.6)	7.3	(1.5)	5.8	(3.8)	2.0	(7.6)	(18.6)	(32.5)
2017/18	(10.1)	8.3	(4.1)	4.2	(3.8)	0.4	(9.7)	(24.5)	(42.3)
2018/19	(12.0)	8.4	(3.5)	4.9	(4.3)	0.6	(11.4)	(31.6)	(53.7)
2019/20	(12.7)	9.3	(7.1)	2.1	(4.3)	(2.2)	(14.9)	(42.1)	(68.6)
2020/21	(13.0)	8.7	(4.5)	4.1	(4.6)	(0.5)	(13.5)	(51.1)	(82.1)
2021/22	(11.9)	9.1	(4.0)	5.2	(4.7)	0.5	(11.5)	(57.8)	(93.5)
2022/23	(5.2)	9.1	(4.5)	4.7	(4.9)	(0.3)	(5.5)	(58.4)	(99.0)
2023/24	(5.4)	10.4	(3.6)	6.8	(3.6)	3.2	(2.2)	(56.9)	(101.2)
2024/25	(6.8)	11.7	(6.2)	5.5	(4.0)	1.5	(5.3)	(58.2)	(106.5)
2025/26	(7.0)	11.5	(5.0)	6.5	(4.4)	2.1	(4.9)	(58.8)	(111.5)
2026/27	–	11.0	(6.3)	4.8	(4.7)	0.1	0.1	(54.0)	(111.3)
2027/28	(3.7)	14.1	(5.5)	8.6	(4.4)	4.2	0.5	(49.1)	(110.9)
2028/29	(3.8)	14.5	(5.1)	9.3	(5.4)	3.9	0.1	(43.6)	(110.8)
2029/30	(4.5)	15.4	(5.6)	9.8	(5.7)	4.1	(0.4)	(38.3)	(111.2)
2030/31	(4.6)	15.9	(6.8)	9.1	(6.0)	3.1	(1.6)	(33.9)	(112.8)
Total (2013/14-2030/31)	(136.2)	185.3	(83.0)	102.3	(78.9)	23.4	(112.8)		

Note:

- The above projections are presented for illustration purposes only and do not represent any forecast adopted by AAHK on its future business performance. The actual outcome of the projections will depend on many factors which cannot be foreseen at this time, and which are outside the control of AAHK.  
The above figures are subject to rounding differences.
- Dividend refers to payout based on 80% of the net profit of the preceding year.
- Cumulative funding surplus/(shortfall) refers to the sum of preceding year's annual funding surplus/(shortfall) and current year's annual funding surplus/(shortfall).



More details about the *HKIA Master Plan 2030* are available in the *HKIA Master Plan 2030 Technical Report* at [www.hkairport2030.com](http://www.hkairport2030.com)

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