



**Malaysian
Aviation Commission**
Suruhanjaya Penerbangan Malaysia

Aeronautical Charges Framework – Consultation Paper

19 October 2018

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	5
2.0	BACKGROUND AND INTRODUCTION.....	6
	Background.....	6
	Introduction	6
	Summary of consultation made to date	7
	Summary of feedback from stakeholders	8
	Timeline for future development of the framework.....	9
3.0	Context.....	10
	Introduction	10
	Airport network structure in Malaysia.....	10
	Airport operators and their responsibilities	10
	Joint responsibilities for capital investment provide challenges	10
	Senai market power assessment	12
4.0	Overview of RAB framework.....	14
	Introduction	14
	Features of RAB	14
	Key building blocks	14
	Calculation of RAB.....	15
	Discussion on specific operating cost items	17
	Calculation of regulated revenue: 2017 actual and illustration of 2020-2022	18
	Historic analysis	18
	2018-2022 analysis.....	18
	Tariff calculation.....	21
	Introducing tariff differentiation	21
	Introducing new types of tariffs.....	21
	Consultation and verification process.....	22
5.0	Key issues for stakeholders' consideration	23
	Tariffs set at national, grouping or other level.....	23
	Differentiating charges by geographic groupings.....	23
	Weighted Average Cost of Capital (WACC)	24
	Ability to outperform the WACC.....	27
	Capital expenditure and affordability	28
	Main capital enhancement projects being discussed by MAHB and GoM	29
	Form of charges control	31
	Traffic forecasts	32
	Prefunding.....	32
6.0	CURRENT LEVEL AND STRUCTURE OF CHARGES	33
	Structure of charges.....	33
	Level of charges.....	33
	Benchmarking of current charges to comparators	34

7.0 Case studies of other airport networks with incentive-based price controls	36
Portugal (a network of 10 airports)	36
Spain (a network of 46 airports)	37
India (a network of 125 airports).....	38
8.0 Summary of key questions for consultation.....	40
Details of the consultation	42

TABLES

Table 1 – Charges framework development timeline.....	9
Table 2 – Terminal utilisation rate at Malaysian airports in 2017	11
Table 3 – Building blocks of the RAB	15
Table 4 – MAHB asset data in 2017 (RM million)	16
Table 5 – Depreciation policies	17
Table 6 – Illustration of regulated revenue requirement (on a RM per departing passenger basis; in constant 2017 prices).....	20
Table 7 – MAVCOM illustration of potential groupings of airports under consideration.....	23
Table 8 – MAVCOM illustration	24
Table 9 – WACC assumptions	26
Table 10 – Historic levels of capital expenditure by MAHB.....	29
Table 11 – Capital expenditure (in real 2017 price for period 2020-2024) affordability by average charge.....	31
Table 12 - Charges levied at Malaysia’s airports from 1 January 2018.....	34
Table 13 – Turnaround costs assumptions.....	34
Table 14 – Turnaround costs for international airport service benchmarking.....	35
Table 15 – Turnaround costs for domestic airport service benchmarking	35

AIRPORT CODES

No.	Airport Code	Airport Name	No.	Airport Code	Airport Name
1	AOR	Sultan Abdul Halim Airport (Alor Setar)	17	MKZ	Melaka Airport
2	BKI	Kota Kinabalu International Airport	18	MYY	Miri Airport
3	BTU	Bintulu Airport	19	MZV	Mulu Airport
4	IPH	Sultan Azlan Shah Airport (Ipoh)	20	PEN	Penang International Airport
5	JHB	Senai International Airport	21	SBW	Sibu Airport
6	KBR	Sultan Ismail Petra Airport (Kota Bharu)	22	SDK	Sandakan Airport
7	KCH	Kuching International Airport	23	SZB	Skypark Terminal Sultan Abdul Aziz Shah Airport (Subang)
8	KTE	Kerteh Airport	24	TGG	Sultan Mahmud Airport (Kuala Terengganu)
9	KUA	Sultan Ahmad Shah Airport (Kuantan)	25	TWU	Tawau Airport
10	KUL	Kuala Lumpur International Airport	26	MNL	Manila Ninoy Aquino International Airport
11	KUL-T1	Kuala Lumpur International Airport Terminal 1	27	CGK	Jakarta Soekarno-Hatta International Airport
12	KUL-T2	Kuala Lumpur International Airport Terminal 2	28	DMK	Don Mueang International Airport
13	LBU	Labuan Airport	29	BKK	Suvarnabhumi Airport
14	LDU	Lahad Datu Airport	30	SGN	Ho Chi Minh City Tan Son Nhat International Airport
15	LGK	Langkawi International Airport	31	SIN	Singapore Changi Airport
16	LMN	Limbang Airport	32	HKG	Hong Kong International Airport

1.0 EXECUTIVE SUMMARY

The Malaysian Aviation Commission is responsible for the economic regulation of the airports industry in Malaysia. The Malaysian Aviation Commission (hereafter “MAVCOM” or “Commission”), established in March 2016 as an independent economic regulator to the civil aviation industry in Malaysia, is responsible for the economic regulation of the airports industry in Malaysia, which includes the power to set aeronautical charges¹ such as the Passenger Service Charges (“PSC”), aircraft landing and parking fees.

Continuing the consultation process for an incentive-based, cost-related airport aeronautical charges setting framework. The Commission has been developing an aeronautical charges mechanism which shall serve as the long-term methodology for setting airport charges for all commercial airports in Malaysia. MAVCOM’s plan to develop this framework was announced to industry players in August 2017 and an information paper was provided in February 2018. This document represents the second consultation paper with a further MAVCOM consultation paper setting out draft proposals for the level of aeronautical charges expected in 2019. The objective of this paper is to provide stakeholders with an update on the progress, as well as an opportunity to provide feedback on the ideas presented.

Cycle to coincide with a period of investment and asset replacement. The Commission is aware that the first price cycle beginning the third quarter of 2019 will coincide with a period of investment as part of the asset maintenance and replacement cycle, as well as investment for expansion and de-bottlenecking at some congested airports. This investment cycle has to be balanced against key stakeholder issues such as their impact on airport user costs, the quality of service, the timing of the process, the allowable cost of capital, passenger traffic forecast, funding affordability and amount of capital expenditure; as well as possible freedoms for the airport operator to set different tariff levels at different airports and to introduce new tariffs.

Consultation amongst players is key. One of the benefits of the framework is the consultation process which will ensure a constant dialogue between players. The industry’s interest, and by extension the country’s, will be best served with good cooperation between both airport operators and airlines.

The Commission invites comments on this document. MAVCOM is inviting comments within 4 weeks of publication of this Consultation Paper (to be received by 5pm on 16 November 2018). MAVCOM will release another consultation paper in the first quarter of 2019 to seek feedback from industry stakeholders regarding the further development of the aeronautical charges framework.

Disclaimer: The opinions and information contained in this document are for consultation purposes only and should not be taken as the final aeronautical charges framework. The views reflected in this consultation paper only provide an indication on the suggested approach to the aeronautical charges framework and must not be construed as the Commission’s final stance on the aeronautical charges framework. The Commission shall not be responsible for any decision made in reliance of this document.

¹ Airport aeronautical charges refers to the charges on “aviation services” as provided for in the Malaysian Aviation Commission Act 2015.

2.0 BACKGROUND AND INTRODUCTION

Background

MAVCOM is responsible for the setting of airport aeronautical charges. Section 46 of the Malaysian Aviation Commission Act 2015 states that the Commission, whose objectives include the role to facilitate the continued economic development of Malaysia's aviation industry – for airlines, airports and ground handling services – shall have the power to do the following:

- a) set charges, including maximum charges, or establishing the method for determination of such charges for aviation services;
- b) carry out reviews of PSC, aircraft landing and parking fees, third party ground handling charges and other aviation charges at such intervals as the Commission decides; and
- c) following such reviews, revise any charges set or method established as the Commission decides.

MAVCOM had conducted PSC reviews in 2016 and 2017. Following a review, the Commission conducted a PSC revision in October 2016 which included the introduction of an ASEAN PSC, the equalisation of PSC at Kuala Lumpur International Airport (“**KLIA**”) in one years' time and the introduction of a service level mechanism called the Quality of Service (“**QoS**”) framework. The Commission then issued a consultation paper on the full equalisation of the rates at KLIA and klia2 in August 2017. Subsequently, the Commission then embarked on the development of a cost-based aeronautical charges setting framework. Both frameworks are intended to result in more robust capital expenditure planning, service levels and shall thus function as the two principal levers by which MAVCOM regulates the airport sector in Malaysia.

Introduction

Purpose of the paper is to continue the consultation process with stakeholders. The purpose of this Consultation Paper is to provide stakeholders with an update on progress, the opportunity to understand the key issues arising with the development of the long-term, incentive-based charges framework for Malaysia's airports and to provide them with the opportunity to provide feedback on the emerging ideas presented in this document by MAVCOM.

This Consultation Paper shall be read together with MAVCOM's Information Paper published in February 2018.

Summary of consultation made to date

In summary, MAVCOM has made the following points to date during its consultation with industry players and stakeholders:

- a) A structured framework of economic regulation of the airports industry in Malaysia is required due to the airport network structure of the major airport operator, leading to a high degree of market power;
- b) The objective of economic regulation is to balance the interests of stakeholders by setting airport charges which will allow a consistent approach over time, create regulatory certainty for stakeholders and protect the reasonable interests of airport users;
- c) The framework is underpinned by some key principles, namely the enablement of effective investment, encouraging efficient use of infrastructure, protecting airport users' interest, providing a consultation process for stakeholders and ensuring economic viability for the industry. The framework will also be in line with international best practices as per International Civil Aviation Organisation ("ICAO") policies adopted globally;
- d) The economic regulatory format for the framework has been identified as the Regulated Asset Base ("RAB") or Incentive-Based Regulation ("IBR"). The standard RAB or "building blocks" approach provides a direct link between capital investment and the level of charges and is already practiced in Malaysia - the Energy Commission has implemented this for its licensees in the power sector, and it has been applied in the aviation sector in other countries;
- e) The main options for the form of economic control are revenue cap (a cap on total revenues collected), price cap (a cap on unit revenue) or hybrid cap (mix of both). Similarly, there are three options for the type of till (single till (all costs and revenues taken into consideration), dual till (separation of non-regulated (commercial) from regulated costs and revenues) or hybrid till);
- f) The mechanism will likely consist of the "single till" as a first step due to the lack of data availability on costs and asset allocation which does not readily permit the allocation between regulated aeronautical and non-aeronautical (commercial) operations. The single till mechanism is also widely implemented in major airports globally such as Heathrow Airport in the United Kingdom ("UK") and Changi Airport in Singapore;
- g) A 3-year price cycle for the initial regulatory period may be best as it allows for the mechanism to be amended to address emerging issues with implementation which will also result in a reduction of regulatory uncertainty to investors in the future, compared to a 5-year cycle;
- h) The regulated entity may set their own tariffs (PSC, landing and parking) within the price cap, subject to approval from MAVCOM and the consultation process with various stakeholders, particularly airlines;
- i) A grouping of airports is likely in order to allow for differentiation of charges, with the concepts of RAB, efficient operating costs and rate of return being applied at a specific group level, rather than to individual airports. This will allow for a continuation of the

concept of cross-subsidy within the group which in strict economic theory may not be optimal but may better meet national policy objectives, such as lower charges for domestic travel; and

- j) Capital expenditure responsibility under the Operating Agreement (“**OA**”) is shared between the Government of Malaysia (“**GoM**”) and Malaysia Airport Holdings Berhad (“**MAHB**”). The RAB mechanism is usually applied where the airport has full responsibility and autonomy for both expansion and operational expenditure at the airport, and the framework to be applied in Malaysia will consider the local context accordingly.

Summary of feedback from stakeholders

In summary, stakeholders’ feedback received was generally supportive and in favour of the RAB framework, with some key questions as follows:

- a) how the framework needs to be “sufficiently adaptable to allow for potential changes in industry structure” and what entails an “efficient” investment;
- b) how the cap on charges will be broken down to PSC, landing and parking charges; and subsequent differentiation between airports or categories (if any);
- c) what are the benefits of single-till approach and dual-till approach and whether the cross-subsidisation within the airport network is still appropriate;
- d) how the Weighted Average Cost of Capital (“**WACC**”) is going to be derived and whether the Return on Invested Capital (“**ROIC**”) of airport operators will be limited to the level of the WACC prescribed;
- e) how the charges mechanism will provide incentives to airport operators to outperform forecasts;
- f) whether user fees payable to GoM will be included in the RAB framework;
- g) will KLIA’s capital expenditure be included, even though it was spent by the GoM and not by the airport operator;
- h) whether Marginal Cost Support (“**MARCS**”) will still be applied once the framework commences;
- i) the frequency of charges being set (whether annually or otherwise); and
- j) MAVCOM’s view on prefunding.

Timeline for future development of the framework

MAVCOM recognises that there are some issues to be resolved ahead of the introduction of the incentive-based, long-term charges framework. The Commission is currently targeting to conclude and introduce this framework in 2019. Achieving these dates will require the cooperation and provision of information and views of the industry.

A high-level timeline is provided below.

ACTIVITY	TIMELINE
Stakeholder consultation document	October 2018
Deadline for the comments from stakeholders	November 2018
Consultation with stakeholders	4Q 2018
Shadow price control	1Q – 2Q 2019
Final Consultation Paper	1Q – 2Q 2019
MAVCOM proposed charges framework consultation	1Q – 2Q 2019
Implementation of long-term charges framework	3Q 2019

Table 1 – Charges framework development timeline

Source: MAVCOM

3.0 CONTEXT

Introduction

The introduction of an incentive-based, long-term charges framework needs to be placed in the context of Malaysia's airport industry structure and operating arrangements. In this section we describe the key factors that will influence the approach to implementation of the framework.

Airport network structure in Malaysia

Malaysia is one of several countries in the world which has an airport network structure, where one company operates and manages most of the commercial airports within a single ownership and control structure. The entity, MAHB, manages and operates 39 out of 42 commercial airports. The remaining commercial airports are operated by Senai Airport Terminal Services Sdn Bhd ("**SATS**") in Senai, Johor; Sanzbury Stead Sdn Bhd ("**Sanzbury**") in Kertih, Terengganu; and Tanjung Manis Development Sdn Bhd ("**TMDSB**") in Tanjung Manis, Sarawak.

Airport operators and their responsibilities

MAHB and SATS operate through operating and concession agreements signed in 2009 and 2003 respectively with the GoM. MAHB has the rights to operate and manage 39 airports via a 25-year OA signed with the GoM in 2009² (which superseded a Concession Agreement that was previously signed in 1998), while SATS similarly has a 50-year Concession Agreement signed with the GoM in 2003. As per the OA with MAHB, the GoM has an obligation to provide capital expenditure for expansion or upgrades in capacity (development capex) while MAHB's responsibility is to provide for maintenance and replacement capex (operational capex). In comparison, SATS is required to bear the development and operational capex as per its Concession Agreement. All airport assets funded by the GoM and airport land remain under the ownership of the GoM.

Joint responsibilities for capital investment provide challenges

The split responsibilities between GoM and MAHB in relation to capital expenditure is a unique arrangement and has caused some challenges. The GoM's funding responsibility for airport development as stated in the OA has resulted in most of Malaysia's airport infrastructure (such as KLIA) being paid out of general GoM taxation revenues. This means that the GoM is responsible for the oversight and financing of airport expansion and upgrades, rather than MAHB as the airport operator, while MAHB is responsible for maintaining and operating the airports.

² MAHB obtained an approval-in-principle from GoM to extend the OA for an additional 35 years upon expiry of the current 25 years concession period in December 2016. The terms and conditions for this extension are currently in the process of being negotiated.

Subsequently, MAHB is required to obtain the approval of GoM for expansion or upgrade works at a particular airport before proceeding with the tender and award of projects. MAVCOM thus notes that returning the approving authority to the airport operator would result in a more efficient and disciplined capital planning process which may in turn improve the quality of the passenger experience at Malaysia’s airports.

Furthermore, the Commission notes that the OA imposes certain profitability ratios which may have resulted in a reduced propensity to spend for MAHB. The lack of a cost-based charges mechanism in the past also meant that MAHB had no assurance of an allowable rate of return in their investments despite the significant upfront capex required. Table 2 below illustrates the airport utilisation levels.

No.	Airports	Terminal Design Capacity (mppa*)	Terminal Utilisation Rate (%)	2017 Traffic (million pax)
1	SZB	1.50	192.04	2.88
2	LGK	1.50	184.51	2.77
3	KBR	1.50	132.55	1.99
4	LDU	0.10	127.65	0.13
5	MZV	0.05	125.31	0.06
6	PEN	6.50	111.26	7.23
7	MYY	2.00	109.40	2.19
8	KCH	5.00	101.90	5.10
9	TWU	1.50	91.66	1.37
10	BKI	9.00	88.96	8.01
11	JHB**	3.50	87.71	3.07
12	BTU	1.00	84.96	0.85
13	KUL	70.00	83.65	58.55
	- T1	25.00	113.15	28.29
	- T2	45.00	67.26	30.27
14	SBW	1.80	83.19	1.50
15	SDK	1.40	64.02	0.90
16	TGG	1.50	62.91	0.94
17	LMN	0.08	65.95	0.05
18	AOR	1.50	53.49	0.80
19	KUA	0.50	48.26	0.24
20	IPH	0.60	45.69	0.27
21	LBU	2.20	26.25	0.58
22	MKZ	0.50	12.42	0.06

* million passengers per annum

**operated by SATS

Note: the table excludes Short Take-Off and Landing airports (“**STOLports**”)

Table 2 – Terminal utilisation rate at Malaysian airports in 2017

Source: MAVCOM, MAHB, SATS

Going forward, MAVCOM proposes to move towards a framework where the user pays for airport infrastructure (“user-pay principle”) rather than burdening taxpayers, some of whom may not be air travellers. The elaboration of the framework and its benefits can be found in Section 4. However, the Commission recognises that this is a significant change from the current arrangement and highlights a key question of how quickly this transition can take place and how much investment is affordable to users, especially in the context of the requirements for expansion investment identified in Table 2.

Case studies:

The joint responsibility between GoM and MAHB is unusual, and not in line with global standards where a single airport operator is responsible for capital investment, maintenance and replacement. There are some examples of differences from this usual form of operations:

- In Europe there are examples where specific terminals at Brussels Airport in Belgium and Birmingham Airport in the UK were built using separate funding sources and Special Purpose Vehicle established to raise funds for the construction of those terminals. The overall responsibility was with the project company for building, maintaining and operating the terminal.
- Changi Airport Group (“**CAG**”) shares the financing responsibility for the Changi East development with the Government of Singapore. Apart from this project, CAG has historically had commercial and financial autonomy independent from the Government of Singapore.
- An example of split funding and managerial responsibility was Zurich Airport (before the year 2000) when it was operated by two companies Flughafen-Immobilien-Gesellschaft (“**FIG**”) and Flughafen-Immobilien-Gesellschaft (“**FDZ**”). FIG was responsible for the airport real estate (including terminals), while FDZ was the airport operator and responsible for construction and maintenance of runways, taxiways and slopes. The two companies were merged in 1999 to form a consolidated airport operator which was subsequently privatised in 2000.

Senai market power assessment

MAVCOM has undertaken a market power assessment and concluded that SATS is the monopoly provider of air transportation infrastructure to airlines servicing the airport’s 17 direct destinations at Senai Airport. Despite the monopoly status, Senai Airport is unable to exercise its market power due to the countervailing buyer power of a dominant airline operating at the airport. This resulted in—on average—a high level of incentive or rebate given on the aeronautical charges collected by the airport from the airlines.

MAVCOM’s assessment has determined that Senai Airport is the sole operator in the market for air transportation services between Senai and 17 direct destinations. The small but significant and non-transitory increase in price (“**SSNIP**”) test methodology applied via a passenger survey exercise found that a large majority of outbound passengers (85.9%) would continue to use Senai Airport for their journeys in the event of a hypothetical increase in airfares by 10%. Other modes of transport and other alternative airports were not considered feasible substitutes to Senai Airport.

Despite Senai Airport's status as the monopoly operator, MAVCOM found that the airport is unable to exercise its market power by increasing aeronautical charges on its customers. This is largely due to the presence of countervailing buyer power of a dominant airline operating at Senai Airport. The dominant airline may be able to exercise its buyer power to exert downward pressure on the negotiated aeronautical charges. MAVCOM's assessment also revealed that, on average, SATS has been giving higher levels of incentives and rebates to its customers relative to MAHB.

On the basis of this assessment, MAVCOM is proposing that **SATS be excluded from the regulated aeronautical charges framework** and will be able to set its own level of charges as determined by market conditions.

More information on the market power assessment are as attached in the **Appendix**.

4.0 OVERVIEW OF RAB FRAMEWORK

Introduction

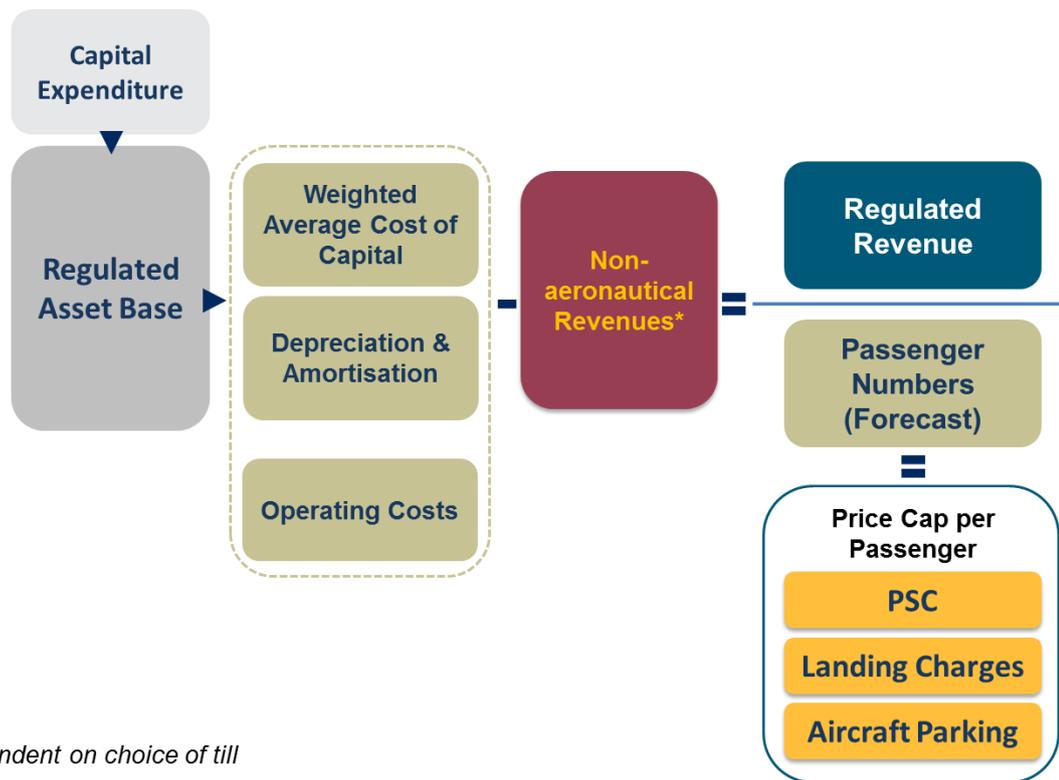
As described in the Information Paper published in February 2018, the incentive-based, long term charges framework has the following principles underpinning its development:

Features of RAB

- Charges will be **cost-based and transparent**.
- Instils **operating and capital expenditure discipline**.
- Requires **stakeholders' consultation** for airport expansions or developments.
- Ensures **appropriate airport capex planning** and **procurement processes** in place.
- **Allows differentiated tariff rates** for airports of different service levels and infrastructure.
- **Clarity on impact to consumers** whenever capital is expended, whether by the airport operator or by the GoM.
- Ensures airport operators are **fairly remunerated**.
- The methodology adheres to **ICAO policies** on charges.
- Based on **international practises**.
- Targeted for **implementation in 2019**.

Key building blocks

In Table 3 below, the key regulatory building blocks used in the RAB framework are illustrated. For each building block, MAVCOM, based on the information provided by MAHB, will determine the reasonable, but incentive-based, level of assumptions for the regulatory period. MAHB will submit its Business Plan (“**BP**”) and Capital Investment Plan (“**CIP**”) to MAVCOM, who will subsequently assess each of the components of the plan to determine the level of regulated revenue per passenger (from PSC, landing charges and aircraft parking charges) that is needed across the period of the price control. Each of the key building blocks will be carefully considered: the regulated asset base (as charged on an annual basis through depreciation charges and the regulated return as measured by the WACC); operating costs and non-regulated revenues (predominantly commercial revenues from retail, car parking and property). The required regulated revenue yield per passenger will subsequently be calculated based on the passenger number forecasts.



* - dependent on choice of till

Table 3 – Building blocks of the RAB

Source: MAVCOM

Calculation of RAB

The RAB is built from the fixed assets of the airport operator. It is based on the assets used for the provision of aeronautical and related services and will include, under a single till regime: all assets used for aviation activities as well as commercial activities [e.g. runways, terminals, retail, car parking, property used for these customers (hotels, offices), etc.]. These will usually lie within the airport perimeter boundary, but by exception lie outside it.

If a hybrid or dual till was applied, an allocation of assets between regulated and non-regulated activities would need to take place. As discussed previously, MAVCOM assesses, based on the information made available by MAHB to date, that a framework based on a single till is the practical option for implementation in 2019.

For MAHB, the Commission has included all assets which MAHB has invested in and which are used to operate airports in Malaysia including: intangible assets, land and concession rights. These mainly consists of MAHB's investment in klia2 and some other airport investments.

MAVCOM has excluded assets held at overseas airports and ancillary operations which are not used to operate airports. Current assets such as cash, inventories and short-term investments are not included in the RAB.

The main components of MAHB's asset base are categorised into building and structures, infrastructure and operating equipment. These categories of assets are reported in the financial statements as follows:

- Intangible assets (terminal building, plant and infrastructure, capital work in progress, Concession rights). These are largely the concession rights on the assets that were taken over from the GoM and used since the start of the concession. The classification as intangible assets are linked to the concession arrangements and accounting rules; and
- Tangible assets (property, plant and equipment).

For the intangible assets, values are measured on initial recognition at cost. Following initial recognition, the intangible assets are carried at cost less any accumulated amortisation and any accumulated impairment of assets.

In Table 4 below, the 2017 financial statements MAHB assets, are distinguished between assets (excluding concession rights and assets in the course of construction), concession rights and assets in the course of construction³. At the end of 2017, the depreciated asset value is RM8.4 billion.

RM mil	Assets excluding concession rights and assets in the course of construction	Concession rights	Assets in the course of construction	Total assets
Opening Balance	6,801.9	1,530.2	172.9	8,505.0
New assets	99.3	-	70.8	170.1
Disposals	(3.6)	-	-	(3.6)
Depreciation	(296.4)	(19.5)	-	(315.9)
Closing balance	6,601.2	1,510.7	243.7	8,355.6

Table 4 – MAHB asset data in 2017 (RM million)

Source: MAVCOM analysis, MAHB

Note: Table 4 above includes approximately RM0.1 billion of headquarters assets. However, as headquarters assets are used to service more than MAHB's airports in Malaysia (e.g. overseas airports and ancillary assets) then an allocation of these assets might be more appropriate.

³ Assets in the Course of Construction ("AICC") represent assets which are being built or developed but not yet completed and available for use at the end of the financial year. Once completed they are transferred to asset categories and depreciated.

The depreciation policies for property, plant and equipment are set out in MAHB's 2017 Annual Report:

Asset category	Depreciation assumption
Freehold land	Not depreciated
Leasehold land	Over lease period
Buildings and building renovation	2%-20%
Hotel property	2%
Infrastructure, safety equipment and motor vehicles	4%-50%
Office, communication and electronic equipment	10%-50%
Furniture and fittings	10%-20%
Plant and machinery	10%-20%
Crockery, glassware, cutlery and linen	20%

Table 5 – Depreciation policies

Source: MAHB notes to financial statements

The GoM had granted an approval-in-principle to extend MAHB's concession by a further 35 years in December 2016. MAHB capitalises concession rights and amortises this amount annually throughout the concession. The amount of concession rights amortised was adjusted to reflect the concession extension, with the annual amortisation amount being lower due to the longer concession period.

With the exception of concession rights, the accounting data provided by MAHB only includes fixed assets in the asset register. MAHB amortises concession rights, land and runway resurfacing in its income statement. All other depreciation and amortisation in the accounts relates to the depreciation of fixed assets.

Intangible assets are amortised in line with passenger volumes and other airport activity metrics. The amortisation of intangible assets therefore reflects MAHB's Directors' judgements on these metrics with respect to expectations over the total concession period.

These asset value estimates do not include terminal infrastructure and other development capex on assets financed and developed by the GoM. Therefore, the airport charges calculated from the RAB framework is calculated on a smaller base compared to the total airport assets in Malaysia.

Discussion on specific operating cost items

In general, all operating costs used to maintain and operate the airport should be included in the operating costs building block. However, there are a number of cost items where MAVCOM has considered whether they should be included given the nature of the cost items:

- **User Fees:** Pursuant to the OA, User Fees are paid by MAHB to the GoM for the right to operate the airports and provides a source of funding for GoM's airport capital expenditure. Any commercial activities that generate revenues from the use of airport infrastructure provided by the GoM, assets provided or financed by the GoM or land belonging to the GoM are subject to User Fees payable to the GoM. The User Fees percentage consists of a Baseline Percentage which is equivalent to 8.30% for the first quarter beginning 1 April 2008 plus a cumulative quarterly increase of 0.0625% per quarter which is capped at maximum of 33.0%. These User Fees, in effect an operating cost to MAHB, can also arguably be seen to represent a proxy remuneration of the GoM assets (airport development capex).
- **Headquarters' costs:** Essential services for the operation of the airports managed by MAHB are provided by headquarters and therefore the costs of these services should be able to be recovered through the pricing regime. An allocation of headquarters costs to each of the airports or airports groups is needed when looking at MAHB on a de-consolidated basis. Some headquarters costs should be allocated to the non-regulated business (overseas airports and plantations).
- **Management fee:** Represents an internal fee to the airport operator, a margin on performance and may be used to reward shareholders.

On balance, following assessment, MAVCOM is likely to include the first two costs in the allowable operating cost base for MAHB but exclude the management fees.

Calculation of regulated revenue: 2017 actual and illustration of 2020-2022

In this section, an illustration of the framework as described in the figure above are provided, using MAHB's actual 2017 costs and applying a range of assumptions for a 2020-2022 price control.

Historic analysis

Using 2017 actual financial data for MAHB's airports, the Commission has applied the framework to find a required revenue yield per departing passenger (price cap), averaged over the 2015-2017 period of RM35.8 (in 2017 prices). The building block components of this average revenue yield are provided in Table 6 below. Please note that the value applies to the MAHB airport network in total. In comparison, the actual average revenue per departing passenger that was collected by MAHB was RM33.6 in 2017.

2018-2022 analysis

For purposes of illustration, the Commission has taken some simple assumptions building off the 2017 actual financial statements to come up with a range of projected outcomes for the 2020-2022 price cycle. All data is presented in constant real 2017 terms. The illustration takes a single till approach. The key assumptions MAVCOM used are as follows:

- **Passenger traffic forecasts:** Based on MAHB's forecasts, which has not been independently verified by MAVCOM, at this stage, for the illustration in this paper.
- **Operating costs (excluding maintenance):** This mainly consists of staff costs and administrative costs. Assumed a 90% elasticity growth in operating costs (excluding maintenance costs) in relation to passenger traffic growth to reflect the economies of scale of airport operations, which is comparable to historical elasticity growth of 89%. Hence, a 10% traffic growth may result in a 9.0% growth in operating costs. Nevertheless, the Commission has noted that internationally the operating costs elasticity fall between 50% to 80% of passenger growth (depending on the extent of the step change expansion taking place), which depicts the opportunity to improve the efficiency of operating costs. Where step changes in capacity take place, elasticities of over 100% at an individual airport level may be incurred.
- **Maintenance costs:** Historically this has been delivered at a level of between 3% and 4% of the depreciated asset base. For this illustration, a value of 5.5% has been applied. This will need to be investigated further in the context of international benchmarks and the classification of costs between capital and operating capital expenditure during MAVCOM's upcoming review of the MAHB BP and CIP.
- **Non-aeronautical revenues:** Assumed an 85% elasticity in all non-aeronautical revenues (retail, car parking, property, other) to passenger traffic growth. Hence, a 10% traffic growth may result in an 8.5% growth in non-aeronautical revenues. There may be an opportunity for a higher elasticity, depending upon the number of contracts that are based on fixed revenues against variable revenues. This is based on the single till approach to the price control.
- **Cost of capital:** Assumed a 7.0% real pre-tax WACC (see discussion in Section 5).
- **Depreciation:** Used the actual depreciation costs for 2017; for forecasts 2018-2022, a straight-line depreciation over 13 years was used (in other jurisdictions a range of between 10 and 15 years have been used). In principle, the depreciation from MAHB's financial statements, or a regulatory depreciation assumption can be taken into the building block calculation.
- **Capital expenditure:** The proposed capex profile is based on specific projects, dependent on the timeline of the roll-out and has yet to be verified by the Commission. Timing also affects the categorisation of assets e.g. asset under construction / asset may be spent in the next cycle. We have run a scenario (Scenario 1) where capital expenditure remains at the current level for the five-year period (approximately RM220 million per annum) of RM1.1 billion. In addition, based on preliminary information provided by MAHB we have applied a range of capital expenditure profiles from RM4.0 billion to RM10.0 billion over the 2018-2022 period. Note that the capital expenditure from 2023 onwards is not included in the RAB for the first price cycle.
- **Single price cap:** The illustration in Table 6 assumes a single RAB which subsequently generates a single price cap across the whole airport network. For the actual RAB, MAVCOM will decide between a single price cap or multiple price caps across different groupings.

These assumptions are designed to be **illustrative** and provide a range of outcome values to demonstrate the sensitivity of the framework to the key assumptions used. They do not represent a realistic business plan or any plan that has been endorsed by MAHB and MAVCOM. The key issues surrounding the assumptions are discussed further in Section 5.

In Table 6 below, MAVCOM provides both the 2017 historical value and the 2022 outcome for five (5) scenarios using different assumptions for maintenance and capital expenditure as described below:

- **Scenario 1:** Capital expenditure RM1.1 billion and maintenance of 5.5% of asset base.
- **Scenario 2:** Capital expenditure RM4.0 billion and maintenance of 5.5% of asset base.
- **Scenario 3:** Capital expenditure RM6.0 billion and maintenance of 5.5% of asset base.
- **Scenario 4:** Capital expenditure RM8.0 billion and maintenance of 5.5% of asset base.
- **Scenario 5:** Capital expenditure RM10.0 billion and maintenance of 5.5% of asset base.

RM (per departing passenger)	2015-2017 (average)	2020 – 2022 price cycle				
		Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Operational costs	38.4	35.5	37.0	38.1	39.1	40.2
<i>Repair and maintenance</i>	6.9	6.3	7.8	8.8	9.9	10.9
<i>Other operational costs</i>	31.5	29.2	29.2	29.2	29.2	29.2
Depreciation	8.0	9.3	11.9	13.6	15.4	17.2
Cost of capital	13.7	8.0	9.9	11.3	12.6	13.9
Total non-regulated revenue (non-aero. revenues and non-regulated aero. revenues) (offset)	-24.3	-22.7	-22.7	-22.7	-22.7	-22.7
Regulated revenue requirement (price cap)	35.8	30.2	36.2	40.3	44.4	48.6

Table 6 – Illustration of regulated revenue requirement (on a RM per departing passenger basis; in constant 2017 prices)

Source: MAVCOM

The results show the sensitivity of the required yield per passenger to capital expenditure and maintenance costs assumptions. As discussed later in this consultation paper, due to the structure of the industry in Malaysia, there has been under investment within the industry. However, the affordability of addressing these issues will need to be considered by industry

stakeholders. Please note the figures are reported in constant 2017 terms. If MAVCOM assumes an annual price inflation of 2.5%, then option 2 for example will equate to a required revenue yield per departing passenger of approximately RM38.9 in outturn nominal prices in 2020, a 15.9% increase from the collected revenue of RM33.6 per departing passenger in 2017.

The key issues relating to the assumptions are discussed further in Section 5.

Tariff calculation

As the regulated entity, MAHB may then set a menu of tariffs (PSC, landing and parking charges) within the price cap, subject to **approval and verification from MAVCOM and the consultation process with various stakeholders**, particularly airlines.

In the example of option 2 as illustrated above, assuming an equal weighting of PSC, landing and parking charges as the three regulated charges to be included under the RAB framework, and assuming equal increases in tariffs, PSC for domestic passengers will be increasing by 15.9% to RM12.7 from RM11.0 currently while the PSC for long-haul passengers will be increasing by 15.9% to RM84.6 from RM73.0 currently for Year 2020 (all prices in real 2017 terms). The PSC and other regulated charges for Year 2021 and 2022 will also be adjusted by the inflation rate annually during the price cycle.

Introducing tariff differentiation

In principle the airport operator could maintain the current structure of tariffs on a uniform basis or introduce differentiated tariffs according to airports, types of passengers or groupings of airports as a part of the reform of airport charges. This is discussed further in section 5.

Introducing new types of tariffs

In addition, the airport operator could consider introducing new types of tariffs. There are a number of examples throughout the world where transfer passengers pay PSC, although often it is at a discounted rate as compared to the full rate for point to point passengers as the facilities used by the transfer passengers are arguably less than point to point passengers.

Another option would be for the differentiation between charges to Malaysian nationals or international passengers. The basis of such an approach would be more centred around the government's social policy rather than real cost differences of providing facilities to these categories of passenger.

Consultation and verification process

The key information requirements of the process are an airport BP and associated CIP developed by the airport operator. It is essential that this plan is **well thought through, coherent and backed by credible assumptions** that can be made transparent to the industry.

MAVCOM's role will be to **critically review and independently verify the BP and CIP together with the key assumptions** that underpin it. Within the time available, MAVCOM will seek to independently challenge and verify the assumptions made by the airport operator, and where necessary, make changes to these assumptions that underpin the values used in the incentive-based charges framework. A key underlying principle will be whether the capital expenditures have been reviewed against a detailed evaluation process including traffic forecasts, site evaluation, engineering estimates, strategic options, user needs and program affordability. As part of the RAB mechanism, the airport's BP and CIP will also **be reviewed through a consultation process with its users**, primarily the major airlines operating at the airports.

MAVCOM will also seek the views of industry stakeholders about draft proposals for the charges in 1H 2019, which are then reflected in its final decision to be implemented in 2019.

We welcome the industry's comments on:

- **Whether the airport charges should be differentiated by airport groupings or by having uniformed rates throughout all airports.**
- **The option of introducing different tariffs e.g. a tariff for transfer passengers in the regulated asset base (e.g. transfer PSC) which would result in a wider band of revenue sources for the regulated revenue.**
- **Any aspects of this section, including the numbers used as well as the methodology.**

5.0 KEY ISSUES FOR STAKEHOLDERS' CONSIDERATION

As described in Section 4, there are a number of components in determining the level of charges under an incentive-based, long-term framework. In this section, we describe some of the key issues for stakeholders' consideration.

Tariffs set at national, grouping or other level

As described earlier in the document, tariffs are currently set at a national level with uniform tariffs set for all airports in Malaysia (for the PSC, landing and aircraft parking charges). This is largely an outcome of historical decisions and that the main airport operator for 39 of Malaysia's airports is MAHB (in an airport network structure).

In principle, within an incentive-based framework with an average aeronautical revenue yield cap, the airport operator can set its own structure and level of charges as long as it meets the cap. For example, tariffs may be set at a national level or via groupings, which could be based on size or level of facilities and services.

Differentiating charges by geographic groupings

One option being considered is for the grouping of airports based on geographic location rather than size or level of facilities or services. This would lead to different price cap values, and associated tariff and charging levels, by group in 2022. Some of the groupings under consideration are provided in Table 7 below.

Airport group
All airports
KLIA, all other MAHB airports
KLIA, Peninsular, Sabah and Sarawak
Peninsular, Sabah, Sarawak
KLIA and Melaka, Subang, Northern Peninsular, Eastern Peninsular, Sabah, Sarawak

Table 7 – MAVCOM illustration of potential groupings of airports under consideration

Source: MAVCOM

Using indicative values of possible capital expenditure programmes provided by MAHB, this would lead to different price cap values by group in 2022. Table 8 illustrates for the example of three groups: Peninsular (including KLIA); Sabah and Sarawak the charges and traffic achieved in 2017. This approach would still allow some cross-subsidisation between airports within each group.

The Commission also notes that the outcome of the ongoing OA renegotiations will need to be taken into consideration in the event that the regulated revenue is to be calculated based on any groupings, whether based on size, geographic or otherwise.

Airport group	5-Year historical traffic CAGR (%)	Passenger traffic in 2017 (million pax)	Average yield per passenger 2017 (RM)
Peninsular (including KLIA)	8.5	75.8	36.2
Sabah	5.4	11.0	28.7
Sarawak	3.5	9.9	18.8

Table 8 – MAVCOM illustration
Source: MAVCOM

We would welcome the industry's comments on:

- **The appropriateness of airport groupings (whether based on size or geographic region).**
- **In particular, any challenges, to the introduction of charges based on the proposed groupings.**

Weighted Average Cost of Capital (WACC)

Airport operators, under the framework and as per ICAO principles, are allowed to earn a fair return on capital. This is provided through an allowance of the WACC applied to the RAB.

MAVCOM has undertaken some preliminary analysis of the fair value of the WACC to apply under the framework. The values have been built up by applying standard economic regulatory calculations to Malaysia's circumstances. The foundation for, and range of WACC values are provided in the table below.

The methodology is built on the basis of the Capital Asset Pricing Model ("**CAPM**") using MAHB's actual debt levels and applying an optimal debt to capital ratio of 60% (Debt/(Debt + Equity)). The assumed inflation rate is 3.0% per annum and the WACC will be fixed throughout the regulatory period.

The calculation of the WACC is complex as the formula has to adjust for the impact of both inflation and tax impacts in coming up with WACC component of the allowed regulated revenue. There are three main formulas for WACC:

- a) **Pre-tax WACC:** Pre-tax WACC is used by regulators when the forecast tax expenses is not included in the forecast operating expenses and the tax impact is actually included in the WACC calculation itself by dividing the post-tax WACC with the tax shield (1-t), i.e. to allow for the airport operator to fund the tax liabilities as part of the ongoing operating expenses of the business, which should be recovered from users. Examples of regulators using this method are those in the UK (Heathrow) and Germany (Frankfurt). Formula: $WACC \text{ (pre-tax)} = G \times K_d + (1-G) \times K_e \times (1/(1-t))$ [see definitions below in Table 9]
- b) **Post-tax WACC:** In this method, the allowable operating expenses do include the forecast tax expenses and there is no adjustment to the standard WACC formula. This would be suitable in situations when the airport operator has materially different effective tax rates from year to year, which would lead to varying degrees of under and over recoveries of the tax impact into the regulated revenue. In addition, this method would allow the airport operator to capture the tax benefit associated with increasing debt levels (by reducing the cost of debt with the tax shield). However, there is also an argument against using this method as the interest payable on the debt can be deemed to be already factored into the regulated revenue. Examples of regulators using this method are those in New Zealand (Auckland) and also the electricity industry in Malaysia (Tenaga Nasional Berhad). Formula: $WACC \text{ (post-tax)} = G \times K_d \times (1-t) + (1-G) \times K_e$
- c) **Vanilla WACC:** This formula does not account for the tax shield in any of the debt or equity cost components. When this is the chosen method, the regulator may deem that it is necessary for the regulated entity to fund the tax payments as part of the operating costs of the business. Alternatively, the regulator may also allow the forecast tax payments to be included into the forecast operating expenses, such as in India. Formula: $WACC \text{ (vanilla)} = G \times K_d + (1-G) \times K_e$

Theoretically, the different usage of the three WACC methodologies listed above, together with the corresponding treatment of allowable operating expenses to be included in the RAB, should yield the same amount of regulated revenue. However, in reality they may yield different outcomes, for example, if the effective tax rates and statutory tax rates are materially different and depending on how the inflationary effects are taken into account (for example, using the Fisher formula compared to using additive formula to account for real or nominal rates). For this Consultation Paper, the Commission has chosen the real pre-tax WACC methodology to account for the tax impact (and leaving out the inflation impact). The charges control will be calculated in real terms (yield per passenger) and then apply annual inflationary assumptions. The operating expenses calculations will exclude forecast tax payments.

WACC calculation component	Assumption	Basis
Risk free rate (R_f)	3.9% - 4.0%	<ul style="list-style-type: none"> Monthly average Malaysian Government Securities (“MGS”) The period used is from July 2008 to May 2018
Beta (levered)	0.7 - 1.5	<ul style="list-style-type: none"> 7-year weekly average Beta of MAHB The period is from 1 July 2011 to 30 June 2018
Corporate tax rate (t)	24.0%	<ul style="list-style-type: none"> The current corporate tax rate in Malaysia
Optimal Debt/Capital ratio – (G)	40.0 - 60.0%	<ul style="list-style-type: none"> Based on range of optimal gearing for airports that use asset-based frameworks used by regulators globally
Adjusted Beta (re-levered) (β)	1.2 - 1.7	<ul style="list-style-type: none"> The Beta is re-levered based on optimal Debt/Capital The re-levered beta is then adjusted to account for future beta
Market return (R_m)	11.0%	<ul style="list-style-type: none"> Empirical study on Equity Risk Premium study by Aswath Damodaran, average of 2017 and 2018 Market risk is based on 10-year average return
Cost of equity (K_e)	12.3% - 15.7%	<ul style="list-style-type: none"> It is derived based on the following formula: $R_f + \beta(R_m - R_f)$
Cost of debt (K_d)	4.1% - 4.5%	<ul style="list-style-type: none"> Based on MAHB’s historical averages of Effective Interest Rate, period ranging from 2007 to 2017 The debt calculation covers short term and long-term borrowings, as well as perpetual sukuk The interest also includes the total dividend paid to bondholders
Range of Real Pre-tax WACC (different values of β and cost of debt)	5.8% to 7.7%	<ul style="list-style-type: none"> The nominal Pre-tax WACC range is derived based on the following formula: $\frac{G \cdot K_d \cdot (1-t) + (1-G) \cdot K_e}{(1-t)}$ Real pre-tax WACC is derived based on Fisher’s formula Cost of debt and Beta calculated in a range from 3 to 10 years The period is between 1 July 2011 to 30 June 2018
Range of Nominal Pre-tax WACC (different values of β and cost of debt)	9.0% to 11.0%	

Table 9 – WACC assumptions
Source: MAVCOM; Thomson Reuters

The Commission notes that a wide variety of factors need to be taken into account when determining the WACC. The number of years’ data used to calculate the risk-free rate, for example, can range from 3 to 10 years, with 3 years being a closer proxy to the price cycle but 10 years representing a full economic cycle. The range is relatively narrow, with a 3-year range yielding 3.96% and 10-year range yielding 3.92%.

The number of years used to calculate the value of beta also needs to be carefully considered as it includes the market movements attributable to MAHB as a corporation which includes its non-Malaysian business, namely its investment into Turkey which has materially increased its beta. Ideally, the beta needs to be calculated post 2009 after the OA was signed as this represents the current market environment MAHB is operating in, but excludes the years when it upgraded its investment status in Turkey from an associate to a subsidiary level. The levered beta is an important parameter, ranging in value from 0.7 (2009-2013) to 1.5 (7 2011-2018).

Most regulators apply an optimal gearing ratio to the calculation of WACC to illustrate that the airport business is stable and may deserve a higher gearing ratio for a more efficient cost of capital. For this illustration, the Commission has used a 60% debt to capital ratio which was in turn utilised in both the re-levered beta and WACC weighting calculation.

As for the cost of debt, the Commission has considered MAHB's historical averages of the Effective Interest Rate, for the period 2007 to 2017 which includes several short-term and long-term borrowing instruments, including its perpetual sukuk. The Commission will look to extract out the tranches specifically relating to non-Malaysian business for the cost of debt calculation to be consistent with applying a WACC specifically for the Malaysian airports business.

Note that in this consultation paper, the range of values and discussion on the WACC are representative of the Commission's emerging thoughts. For the next steps leading up to the draft proposals' consultation paper in 1H 2019, the Commission will be making a comparison between the range of numbers presented as well as MAHB's proposed WACC calculation before making a final decision.

We would welcome the industry's comments on:

- **The value of WACC presented for MAHB.**
- **The values of the component assumptions of the calculation of the Weighted Average Cost of Capital and whether they are appropriate (e.g. Beta, risk free rate, historic cost of debt, etc).**
- **Comments on whether the optimal (60%) or actual gearing ratio should be applied to the calculation.**

Ability to outperform the WACC

The WACC sets the ex-ante allowance in the incentive-based framework. However, in practice the airport operator can outperform or under-perform compared to the WACC when it reports its actual ROIC.

Over or under performance can be provided through a range of behaviours:

- a) If traffic is higher (upside) or lower (downside) than predicted in the regulatory assumptions.

- b) If costs are lower (upside) or higher (downside) than predicted in the regulatory assumptions.
- c) If non-regulated revenues (commercial) are higher (upside) or lower (downside) than predicted in the regulatory assumptions.

An example of an airport operating under a similar incentive-based scheme that has experienced ROIC higher and lower than the regulatory WACC is Heathrow airport in the UK. In its current price control period, (2014-2019) it is currently outperforming the allowed WACC (for example in 2017 it reported a 6.2% ROIC versus an allowed regulatory return of 5.5%. This contrasted to the situation during the Global Financial Crisis in 2008 when actual ROIC was 3.1% compared to the allowed regulatory return of 6.6%).

Historically MAHB, at a corporate level, has delivered a relatively low ROIC, with some analysts⁴, on average, reporting 2.5% in FY2015, 2.7% in FY2016 and 4.7% in FY2017.

We would welcome the industry's comments on:

- **The ability for airport operators to outperform or underperform the regulatory return.**

Capital expenditure and affordability

As described Section 3 above, under the current arrangements for MAHB the responsibility for funding and paying for capital infrastructure is split between the GoM (taxpayer funds) and MAHB (user fees).

The incentive-based framework seeks to allow the airport operator to recover the capital costs (via an allowed depreciation charge) with an allowed return (via the WACC). The current arrangements have not facilitated high levels of capital expenditure and maintenance operating expenditure over the past three years, as illustrated by Table 10 below. The level of capital investment in 2015 to 2017 can be contrasted to a depreciated asset value of approximately RM8 billion, thus representing only between 2% and 4% of the asset value. The Commission notes that there are a number of airports where passenger throughput has exceeded design capacity, with some airports coinciding with a 20-year asset replacement cycle (such as KLIA) which would require significant expansion capital expenditure (see below). This illustrates a potential backlog of required projects for investment across the Malaysian airport system. However, the affordability of such a programme, given funding ability and user constraints, needs to be considered.

⁴ Average from figures reported by CGS-CIMB (2015, 2016, 2017), Credit Suisse (2017) and CLSA (2016 and 2017).

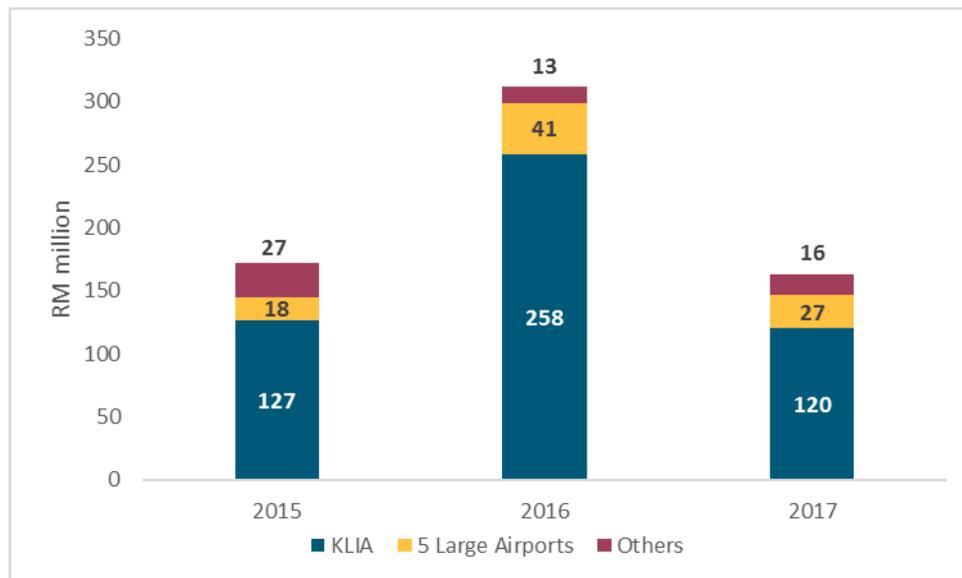


Table 10 – Historic levels of capital expenditure by MAHB

Source: MAVCOM

Main capital enhancement projects being discussed by MAHB and GoM

MAHB has been working with the GoM to identify the airport development projects which are needed at Malaysia’s airports. In many cases the proposals lead to substantive changes to the airport facilities (new piers, extensions to terminals, etc). The main projects being discussed but have yet to be verified include:

- **KLIA:** baggage handling system and train track system, new parking apron and taxiway, new satellite building or extension of existing terminal from 25 million to 45-50 million passengers’ capacity. Current throughput is 28.3 million passengers
- **Klia2:** new parking apron and taxiway, extension and upgrading of existing terminal from 45 million to 50 million passengers’ capacity. Current throughput is 30.3 million passengers.
- **Penang:** additional parking apron and taxiway, extension and upgrading of existing terminal from 6.5 million to 12 million passengers’ capacity. Current throughput is 7.2 million passengers.
- **Kota Kinabalu:** additional parking apron and taxiway, extension and upgrading of existing terminal from 9 million to 14-16 million passengers’ capacity. Current throughput is 8.0 million passengers.
- **Kuching:** additional parking apron and taxiway, new ATC tower, extension and upgrading of existing terminal from 5 million to 8.5-10 million passengers’ capacity. Current throughput is 5.1 million passengers.

- **Subang:** additional parking apron and taxiway, extension and upgrading of existing terminal from 1.5 million to 5 million passengers' capacity. Current throughput is 2.9 million passengers.
- **Sibu:** extension and upgrading of existing terminal from 1.8 million to 2.8 million passengers' capacity. Current throughput is 1.5 million passengers.
- **Tawau:** additional parking apron and taxiway, extension and upgrading of existing terminal from 1.5 million to 2.5 million passengers' capacity. Current throughput is 1.4 million passengers.
- **Sandakan:** widening of parking apron, new taxiway and runway extension to allow longer range international flight.
- **Kota Bharu:** new parking apron and taxiway, extension and upgrading of existing terminal to increase capacity from 1.5 million to 4.0 million passengers' capacity. Current throughput is 2.0 million passengers.

Projects to be included in the RAB will be subject to MAVCOM's independent verification process and user consultation that would be carried out as part of the RAB framework development. The charges will be dependent on the outcome of the verification process as well as consultations with stakeholders.

MAHB is working with the GoM to consider operational priorities as well as working through a renegotiation of the OA to clarify the responsibilities for expansion, replacement and maintenance capital expenditure. The Commission notes that the projects will likely need to be funded by MAHB given the constraints on GoM's funding ability and resources.

In this section, based on provisional data provided by MAHB, the potential impact of different sizes of capital programme are illustrated on the back of current charges levied in Malaysia. To afford a materially higher level of capital expenditure than has happened over the past years at MAHB, material increases in user charges will be needed.

To help the industry understand the potential consequences, the Commission has illustrated the impact of different total capital programs over the five years 2020-2024. The user charges values represent the average revenue yield per departing passenger (in real 2017 terms) collected from a combination of PSC, landing and aircraft parking charges. In comparison, the average value collected across all MAHB airports in 2017 was RM33.6 per departing passenger (RM37.6 at KLIA and RM26.9 at all other MAHB airports).

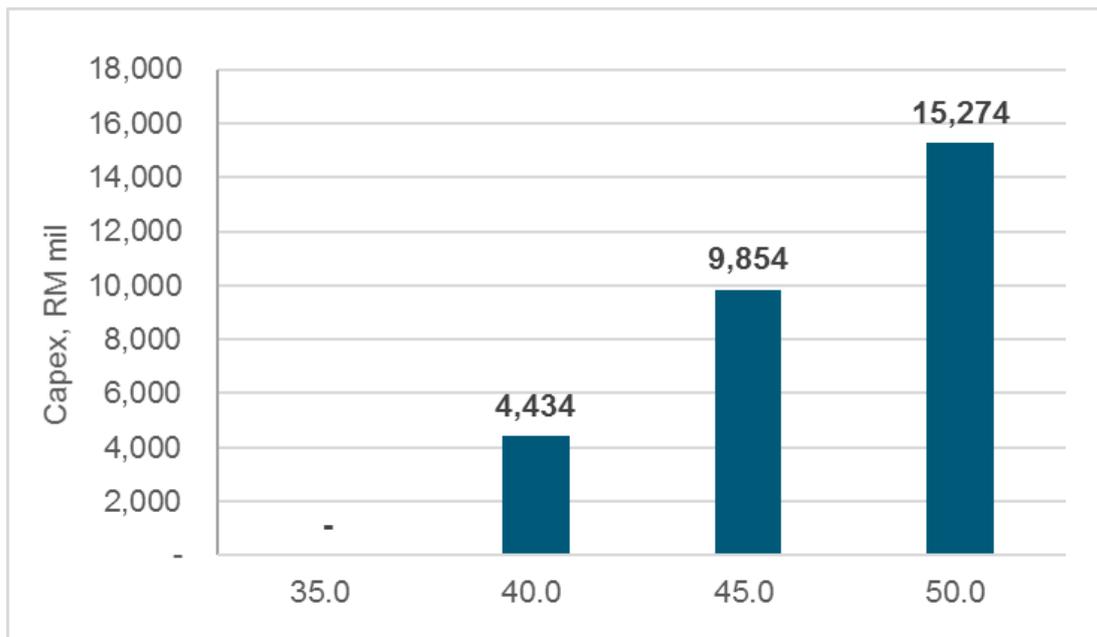


Table 11 – Capital expenditure (in real 2017 price for period 2020-2024) affordability by average charge

Source: MAVCOM

We would welcome the industry's comments on:

- The main capital investment priorities being discussed by GoM and MAHB and whether they are needed in the timescales to 2025.
- The affordability of Malaysia's airports capital program.
- The ability of the industry to cope with higher airport charges than currently so as to improve Malaysia's airport infrastructure.

Form of charges control

As described in the Information Paper, there are number of implementation options for the form of charges control: a price control, a revenue control or hybrid control (which has part price and part revenue controls). The differences between the options are which party takes the risk of under or over traffic forecasting during the control period. In a price control the risk is with the airport operator as the revenue received from regulated charges is proportionate to the actual traffic throughput. In a revenue control the risk is with the airlines as the total charges to be paid are fixed and divided by the actual traffic throughput.

Following further discussion, and feedback on the information paper, the Commission is of the view that it prefers the implementation of the charges control for mid-2019 to 2022 to be via a price control. The time period is relatively short: 3 and a half years. The price control has the advantage of being simple to understand and the traffic forecasts should be the responsibility for MAHB to manage.

We would welcome the industry's comments on:

- **The Commission's preference to introduce the charges control through a price control rather than a revenue or hybrid control.**

Traffic forecasts

The importance of traffic forecasts in setting an incentive based, long-term charges framework is illustrated in the previous chapter and in the discussion for the potential for out or under performance during the period due to actual traffic being different to that forecast at the time of setting the regulatory control.

The Commission will need to evaluate MAHB's traffic forecasts to ensure its reasonableness for setting the long-term charges, taking into account MAVCOM's in-house forecasts and market consensus forecasts. As discussed in the Information Paper, there are options available which can share the risks of the under or over forecasting of traffic through a hybrid revenue/ price cap.

The discussion serves to illustrate the importance of starting the regulatory period with the best information. This is particularly the case where there is a time lag ahead of the period under review. For example, if the incentive-based regime is implemented in mid-2019, the historic data that can be used to set forecasts for the period till the end of 2022 might, at best, be 2018 figures.

We would welcome the industry's comments on:

- **Factors that are to be taken into consideration when evaluating the traffic forecasts.**

Prefunding

In line with ICAO guidelines and policies, the Commission is of the opinion that prefunding of capital expenditures are acceptable, provided that the charges are clearly earmarked for projects relating to the airports' provision of services within civil aviation, transparent accounting of the basis of charges are provided and the application of charges are limited to a period of time (until the project is completed).

6.0 CURRENT LEVEL AND STRUCTURE OF CHARGES

The current level and structure of charges is important to understand ahead of any proposed changes.

Structure of charges

The same structure and level of charges is applied across all airports in Malaysia. This means that airport users at KLIA pay the same charges for use of airport facilities as do users at smaller airports in Malaysia, such as Lahad Datu and Limbang. This is, in part, due to MAHB operating the majority of commercial airports in Malaysia as a single airport network operator with no external financial reporting on an airport by airport basis, allowing financial operations at a group consolidated level.

Level of charges

The current structure and level of charges as applied from 1 January 2018 are provided in the table below. Regulated charges that would be covered by the incentive-based, long-term charges framework cover PSC (including PSSC), landing and aircraft parking charges.

Fee type	Applicable to and basis	Rate
Passenger Service Charge (PSC)	Domestic passengers (per departing passenger)	RM 8.00
	ASEAN passengers (per departing passenger)	RM 29.00
	International passengers (per departing passenger)	RM 67.00
Passenger Security Service Charge (PSSC)	Domestic passengers (per departing passenger)	RM 3.00
	To international destinations	RM 6.00
Landing charges	Aircraft with MTOW 0-5,000kg (very light aircraft) per kilo per arriving aircraft	RM 3.90
	Aircraft with MTOW 5,001-45,000kg (turboprop / regional jets) per kilo per arriving aircraft	RM 39 + RM 10.4 per 1000kg above 5,000kg
	Aircraft with MTOW 45,001-90,000kg (narrow body such as A320, 737) per kilo per arriving aircraft	RM 455 + RM 13.2 per 1000kg above 45,000kg
	Aircraft with MTOW 90,001-135,000kg (large narrow body/small widebody) per kilo per arriving aircraft	RM 1,004 + RM 13.8 per 1000kg above 90,000kg
	Aircraft with MTOW above 135,000kg (widebody such as A330, 777) per kilo per arriving aircraft	RM 1,625 + RM 14.8kg per 1000kg above 135,000kg
Aircraft parking fees	For each period of 12 hours or any part of 12 hours and for the space occupied 10 square meters or part of 10 square meters	RM 1.00

Fee type	Applicable to and basis	Rate
	For the space occupied 10 square meters or part of 10 square meters	RM 0.81

Table 12 - Charges levied at Malaysia's airports from 1 January 2018

Source: MAVCOM

The majority of revenues are collected by PSC charges, with landing charges accounting for approximately 19% and aircraft parking charges approximately 1% of the total regulated aeronautical revenues in 2017.

Benchmarking of current charges to comparators

MAVCOM has undertaken benchmarking of Malaysia's airport charges compared to other airports in the region and worldwide. In general, for turnaround costs, the charges are some of the lowest for both domestic and international passengers in the region.

The analysis of turnaround costs for domestic and international passengers is provided in 4 and 5 below. The analysis shows that, at least in principle, Malaysia's airport charges have some room for growth before becoming in mid to above average territory as compared to its competitors in the region.

The Commission has undertaken a comparison of charges on the basis of aircraft turnaround costs, for A320 and A330 aircraft, shown in the charts below, considering international flights both within ASEAN and on long-haul (Int) routes and domestic routes. Table 13 below sets out the assumptions used in estimating the benchmark turnaround costs.

Criteria	A320 (International)	A330 (International)	A320 (Domestic)
No of seats	180	377	180
MTOW (tons)	73.5	230.0	73.5
Load Factor	87%	79%	87%
No of Passengers	157	298	157
Share of O&D passengers	100%	100%	100%
Turnaround time	25min	75min	25min
Stand	Contact	Contact	Contact
Operation	Daytime	Daytime	Daytime

Table 13 – Turnaround costs assumptions

Source: MAVCOM

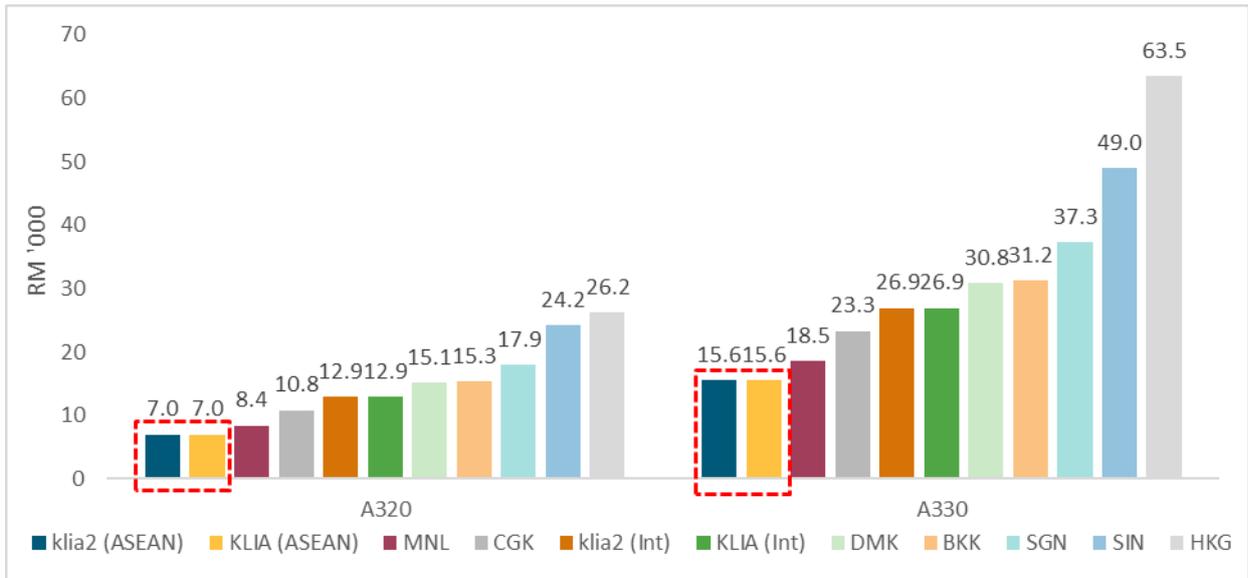


Table 14 – Turnaround costs for international airport service benchmarking
Source: Published charges, MAVCOM analysis, as at 31 July 2018

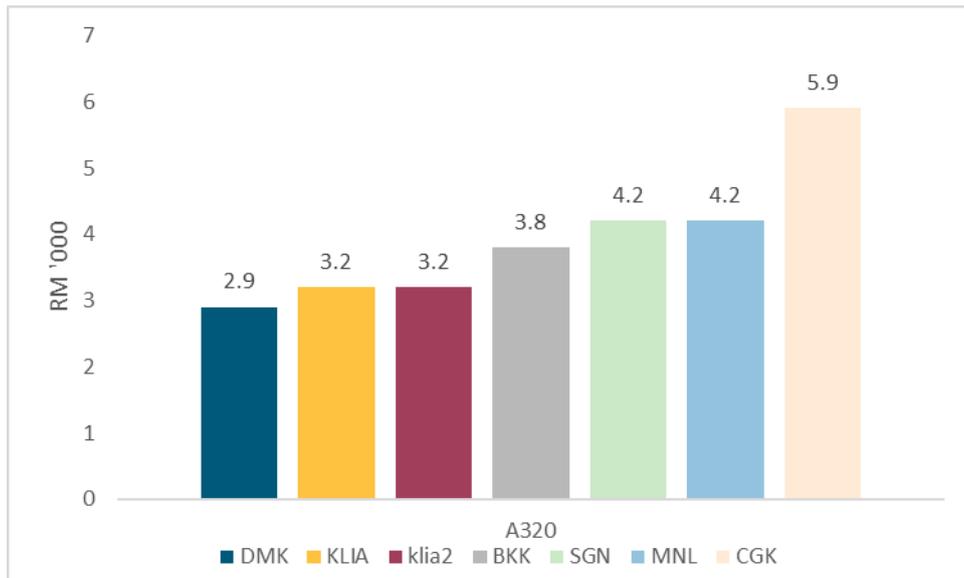


Table 15 – Turnaround costs for domestic airport service benchmarking
Source: Published charges, MAVCOM Analysis, as at 31 July 2018

7.0 CASE STUDIES OF OTHER AIRPORT NETWORKS WITH INCENTIVE-BASED PRICE CONTROLS

Portugal (a network of 10 airports)

Aeroportos de Portugal (“ANA”) operates 10 airports in Portugal, which account for the vast majority of Portugal’s traffic. Alongside Lisbon, these include three airports on the Portuguese mainland and six airports on the Azores and Madeira islands. The assets (pre-concession) were owned by the Government of Portugal and under the Concession the operator is provided with the right to use these assets and is required to maintain and develop the airport over the life of the concession.

In 2013 ANA was sold to Vinci under a 50-year concession agreement. Law number 254/2012 (November 2012), which was passed during the privatisation process of ANA, sets out the legal framework related to the public service concession for the support of civil aviation in Portugal, to be granted to ANA. Article 67 of the law states the economic regulation of airport charges determined in the concession contract (specifically in Annex 12). In their accounts, the assets comprise fixed assets built during the concession period as well as intangible assets for concession rights equating to the goodwill consideration at the time of award and software assets.

The levels of charges specified within the concession contract are modulated according to airport groups; the three airport groupings are Faro airport, Porto airport and the Lisbon Group (which includes Lisbon, and island airports). Charges are set within the concession contract, using a rolling price cap formula until 2022, with provision for a possible extension until the end of the concession term.

The initial price cap per passenger in the first year of the concession (2013) at the Lisbon Group airports was set at €11.45 and applies to all revenue generated from list of regulated activates specified within the concession agreement.

The starting 2013 price cap per passenger excluded the impacts of 2012 airside retail revenue – inflated to 2013 prices using the Harmonised Index of Consumer Prices (“HICP”) – divided by the forecast level of 2013 passengers. ANA stated, as part of their consultation response, that its airports are operated under a Hybrid till system; however, airlines have argued the decrease in retail contribution effectively moves Lisbon Airport towards dual-till.

Beyond 2022, the regulatory revenue cap at the Lisbon Group will be determined by either an “Airline Supported Proposal” or a “Regulated Revenue Cap Formula for 2023 onwards” – both of these options are defined in Annex 12 of the concession agreement. The Airline Supported Proposal is a five-year proposal supported by at least three airlines that have accounted for more than 65% of passengers at Lisbon in 2022 and the Regulated Revenue Cap Formula for 2023 onwards uses a similar method and adjustments to the 2017-2022 period, although also takes account of the ratio of capital investment to the EBITDA.

Spain (a network of 46 airports)

Spain has 46 commercial airports, which are owned and operated by Aeropuertos Españoles y Navegación Aérea (“**AENA**”) and form an airport network which is the largest in Europe in terms of passenger traffic, carrying 230 million passengers at its Spanish airports in 2016. AENA was created in 1991, attached to the Ministry for Transport, Tourism and Communications, which was responsible for the operation of Spanish airports and the provision of air navigation services in Spain. In February 2011, the two components of AENA were split up into AENA Aeropuertos S.A (the operator of the airports) and AENA (Public Corporate Entity), which was responsible for air navigation services and which was later renamed ENAIRE. In 2013 a 49% share in AENA Aeropuertos S.A. was sold to a consortium of private investors through an initial public offering (“**IPO**”). The remaining 51% is controlled by the Spanish State.

A number of different legal and regulatory measures have been adopted since 2011, leading to the creation of a fully defined system for the regulation of airport charges. Law 1/2011 (State Programme of Operational Safety for Civil Aviation) grouped Spanish airports into five categories:

- Group I: Madrid Barajas and Barcelona El Prat;
- Group II: Airports with more than 6 million passengers;
- Group III: Airports between 2 million and 6 million passengers;
- Group IV: Airports between 0.5 million and 2 million passengers; and
- Group V: Airports with fewer than 0.5 million passengers.

These categories have been preserved in the implementation of the subsequently adopted airport charges regulations, except that AENA has split Madrid and Barcelona into two separate categories.

Spanish law provided for the regulation of aeronautical charges over a five-year period (quinquennium) according to rules and formulas set out in a Document for Airport Regulation (“**DORA**”). The DORA document was drafted by the Ministry of Development (Ministerio de Fomento) through the Directorate-General of Civil Aviation (Dirección General de Aviación Civil, DGAC) and was formally approved by the Government of Spain (Council of Ministers) in January 2017. Several key parameters for setting charges are defined Law 18/2014 and the DORA document:

- The maximum annual revenue per passenger for the AENA airport system as a whole (“**IMAP**”) is defined based on forecast operating costs and a return on the capital in the regulated asset base (RAB);
- The rate of change of IMAP each year during the quinquennium, which is based on a formula under which it changes each year by a constant factor X such that the net present value (“**NPV**”) of the aeronautical revenues including the X factor equals the net present value of the Required Regulated Revenue projected for the quinquennium;

- An adjusted annual revenue per passenger (“**IMAAJ**”), based on the IMAP and adjustments including a quality of service indicator, a factor relating to the non-delivery of mandated infrastructure improvements, a factor for unforeseen changes in traffic and a factor for approved changes to investments or operating expenses;
- The level of infrastructure investments during the regulatory quinquennium, which is capped to €450 million;
- A transition to dual till system in 2018, with certain “non-essential” airport costs being excluded from the regulatory asset base.

A key feature of the regulatory approach is that the cap on aeronautical charges is set at an airport-network-wide level for all 46 airports, not at individual airports. Nevertheless, AENA sets charges based on six categories of airport, but with Madrid and Barcelona split into separate categories. AENA’s network is classed as a Service of General Economic Interest (“**SGEI**”) by law, which allows loss-making airports to be subsidised by profitable ones.

AENA’s published aeronautical charges⁵ indeed show a strong hierarchy based on the airport category, with Madrid being the most expensive and the sub-500,000 passenger category being the cheapest. Landing charges are nearly three times as expensive at Madrid as at the sub-500,000 category airport while passenger charges are over six times more expensive.

India (a network of 125 airports)

The majority of India’s airports are operated by Airports Authority of India (“**AAI**”), a public-sector enterprise under the Ministry of Civil Aviation (“**MoCA**”) that was formed in 1995, as a result of the merger between National Airports Authority and International Airports Authority of India. AAI manages a total of 125 airports and owns the assets and land (in 2018 it is considering selling 5% of its land to provide funds for future airport development).

Five airports are currently operated under the public-private partnership (“**PPP**”) model. Cochin International Airport was the first greenfield airport in India to be built under the PPP structure. Subsequently, four major airports (Bangalore and Hyderabad in 2004, Delhi and Mumbai in 2006) have been privatised under long-term concessionaire agreements. Together these five airports handled 55% of the total passenger traffic in India in the 2017-2018 financial year.

Prior to these privatisations, all regulatory tasks were performed by the Ministry of Civil Aviation. On 5 December 2008 the parliament passed the Airports Economic Regulatory Authority of India Act 2008, under which a new body called the Airports Economic Regulatory Authority (“**AERA**”) was established. According to the Act, AERA is responsible for the regulation of tariffs and other charges for the aeronautical services rendered at India’s major airports and the monitoring of the performance standards at these airports.

⁵ Latest version is Aena’s price guide 2017 - June edition, <http://www.aena.es/csee/ccurl/92/771/Aena%20price%20guide%202017%20June%20edition.pdf>

The AERA Act defined “major airports” as those with annual passengers in excess of 1.5 million. Under this definition, 25 airports are classified as major, 17 of which are operated by AAI. According to Section 13(1) of the AERA Act, AERA is responsible for determining the tariff levels for the aeronautical services at each of the 25 major airports, taking into consideration amongst others, the capital expenditure, services, costs and economic factors.

The aeronautical charges are regulated over five-year-periods. The procedure for the determination of tariffs is set out in the AERA (Terms and Conditions for Determination of Tariff for Airport Operators) Guidelines, 2011 document. The maximum yield per passenger at each airport is limited by the Aggregate Revenue Requirement (“**ARR**”). This is calculated by the authority based on a fair rate of return applied to the RAB, the forecast operation and maintenance expenditure as well as forecast depreciation, taxation and revenue from non-aeronautical services at each airport.

The ARR is used to calculate a price cap for the first year of each Control Period. The cap for each subsequent Tariff Year is then adjusted according to the forecasted WPI inflation. A different approach is used in the cases of Delhi and Mumbai airports, where caps are determined for each individual tariff instead of an aggregate yield per passenger (as specified within the concession agreements).

Until 2017, AERA has been using a Single Till system to determine the charges at most of India’s major airports. Exceptions are the four privatised airports, where a Hybrid Till approach is used. In the case of Delhi and Mumbai, the concession agreements prescribed a Hybrid Till system where 30% of the non-aeronautical revenues are considered in the calculation of the aeronautical charges price caps. The MoCA directed AERA to adopt a similar approach for Hyderabad and Bangalore airports. On this basis, AERA decided to transition to the Hybrid Till model for all major airports, with 30% of the non-aeronautical revenues being used to cross-subsidise aeronautical charges (Order No. 14/2016-17).

The tariff levels at all non-major airports (less than 1.5 million passengers per annum) are determined and approved by the MoCA. The existing rates were increased by 10% in FY 2017 and a 5% annual increase has been decided for each subsequent year (AIC SI. No. 4/2017).

In July 2018, the Minister of State for Civil Aviation introduced the Airports Economic Regulatory Authority of India (Amendment) Bill. It proposes to amend the definition of major airports, increasing the threshold of annual passengers to 3.5 million passengers. This comes as a consequence of the rapid growth of traffic at India’s airports, which has resulted in the increase of major airports from 12 in 2007 (before AERA was established) to 25 in 2018.

Moreover, the Bill suggests that AERA should not be responsible for regulating the tariff structures in cases where these have been already specified as part of a concession agreement. In such cases, the Bill provides that AERA will be consulted in the determination of the tariffs incorporated in the bid document.

8.0 SUMMARY OF KEY QUESTIONS FOR CONSULTATION

In this section we consolidate and repeat the key questions raised for consultation with stakeholders (primarily airlines and airports and any relevant stakeholder). MAVCOM also invite general comments on the paper and anything required for the draft proposals' consultation paper due on first quarter 2019.

Section 4.0: Overview of the RAB Framework

We would welcome the industry's comments on:

- Whether the airport charges should be differentiated by airport groupings or by having uniformed rates throughout all airports.
- The option of introducing different tariffs e.g. a tariff for transfer passengers in the regulated asset base (e.g. transfer PSC) which would result in a wider band of revenue sources for the regulated revenue.
- Any aspects of this section, including the numbers used as well as the methodology.

Section 6.0: Key issues for stakeholders' consideration

Differentiating charge by geographic groupings:

We would welcome the industry's comments on:

- The appropriateness of airport groupings (whether based on size or geographic region).
- In particular, any challenges, to the introduction of charges based on the proposed groupings.

Weighted average cost of capital (WACC):

We would welcome the industry's comments on:

- The value of WACC presented for MAHB.
- The values of the component assumptions of the calculation of the Weighted Average Cost of Capital are whether they are appropriate (e.g. Beta, risk free rate, historic cost of debt, etc).
- Comments on whether the optimal (60%) or actual gearing ratio should be applied to the calculation.

Outperforming or underperforming the regulated return:

We would welcome the industry's comments on:

- The ability for airport operators to outperform or underperform the regulatory return.



Capital investment:

We would welcome the industry's comments on:

- **The main capital investment priorities being discussed by GoM and MAHB and whether they are needed in the timescales to 2025.**
- **The affordability of Malaysia's airports capital program.
The ability of the industry to cope with higher airport charges than currently so as to improve Malaysia's airport infrastructure.**

Form of control:

We would welcome the industry's comments on:

- **The Commission's preference to introduce the charges control through a price control rather than a revenue or hybrid control.**

Traffic forecasts:

We would welcome the industry's comments on:

- **Factors that are to be taken into consideration when evaluating the traffic forecasts.**

Other comments:

General comments on the consultation paper:

We would welcome the industry's comments on:

- **Any other issues raised in the consultation paper**
- **Any other issues that stakeholders would like to see addressed in the draft proposals' consultation paper (planned for 1st quarter of 2019).**



Details of the consultation

MAVCOM is inviting comments within 4 weeks of publication of this Consultation Paper (to be received by 5pm on 16 November 2018).

All comments on the document must be in writing and are to be delivered via email to airport.charges@mavcom.my or by post to the following address:

Malaysian Aviation Commission
Level 19, Menara 1 Sentrum
201, Jalan Tun Sambanthan
50470 Kuala Lumpur, Malaysia
Attn: Ms. Yusniza Wan Yahya

In parallel, during October and November MAVCOM will be meeting with industry stakeholders to explain the approach to the finalisation of the incentive-based long-term charges framework and hear reactions and comments from the industry.



APPENDIX

Baseline Findings

Senai Airport's Passenger and Airline Profile

Approximately 1.7 million passengers travelled outwards from Senai airport in 2017. This makes Senai the fifth largest airport in Malaysia, in terms of outbound passengers, behind Kuala Lumpur Airport, Kota Kinabalu Airport, Penang Airport, and Kuching Airport. Senai Airport's passenger traffic constitutes approximately 3.2% of Malaysia's total air passenger traffic.

A large majority of outbound passengers from JHB (95.0%) are Origin and Destination (O&D) passengers, while the remainder are hub passengers that travel via JHB from another airport to their destination.

Most of JHB's outbound passengers travel to domestic destinations (86.0%). The top three passenger destinations for passengers travelling from Senai Airport are Kuala Lumpur Airport (28.4%), Subang Airport (16.3%), and Penang Airport (12.2%). A minority of passengers (14.0%) travel to international destinations, with the top three international destinations being Guangzhou (3.7%), Ho Chi Minh (3.5%), and Surabaya (2.1%). Table below shows the distribution of passengers by their respective destination airports.

Airport	Number of Passengers	Percentage (%)	Airport	Number of Passengers	Percentage (%)
Kuala Lumpur	472,427	28.4	Langkawi	22,743	1.4
Subang	271,441	16.3	Tawau	22,607	1.4
Penang	203,058	12.2	Ipoh	20,684	1.2
Kuching	195,949	11.8	Kuala Terengganu	13,349	0.8
Kota Kinabalu	117,980	7.1	Macao	5,437	0.3
Guangzhou	61,054	3.7	Shenzhen	4,470	0.3
Sibu	60,495	3.6	Incheon	4,072	0.2
Ho Chi Minh	58,102	3.5	Calcutta	3,842	0.2
Surabaya	35,616	2.1	Bandung	1,876	0.1
Don Mueang	33,269	2.0	Changsha	1,278	0.2
Miri	28,373	1.7	Changi	5	0.0
Jakarta	24,418	1.5	Total	1,662,545	100.0

Source: MAVCOM Analysis, AirportIS

There were eight airlines operating at Senai Airport in 2017, with AirAsia being the largest airline in terms of passengers carried. Other carriers (MAB, FireFly, and Malindo) have substantially smaller market shares of below 10% each. The table below shows the market shares of the airlines operating at Senai Airport in terms of passengers.

Airline	Number of Passengers	Percentage (%)
AirAsia	1,159,848	69.8
Malindo	164,711	9.9
MAB	147,535	8.9
Firefly	143,354	8.6
Indonesia AirAsia	35,616	2.1
Spring Airlines	4,470	0.3
Asiana Airlines	4,072	0.2
Sichuan Airlines	2,939	0.2
Total	1,662,545	100.00

Source: MAVCOM Analysis, AirportIS

Alternative Airports and Modes of Transport

The closest alternative airport to Senai is Changi Airport in Singapore, which is within the 100km catchment area of Senai airport. Out of the 17 destinations served by airlines at Senai Airport, 14 are also served by airlines operating at Changi Airport. However, airfares from Changi Airport are consistently higher than Senai Airport across these overlapping destinations. Therefore, passengers may not consider Changi Airport as an alternative airport to Senai for these destinations.

Other modes of transport may exert competitive pressure on air transport on routes where they are available. Out of the 17 destinations from Senai, only seven have alternative modes of transport such as rail, bus, or car. Whilst air travel tends to provide the shortest traveling time, this advantage may be somewhat negated by the higher costs of airfares relative to bus or train tickets.