



**Asia-Pacific  
Economic Cooperation**

# **Develop Air Connectivity in the APEC Region**

**THAILAND**

**Tourism Working Group**

**October 2016**

APEC Project: TWG 01 2014A

Produced by



**International Air Transport Association**

Head Office Canada:

800 Place Victoria, PO Box 113

Montreal H4Z 1M1, Quebec,  
Canada

[www.iata.org/consulting](http://www.iata.org/consulting)

For

Asia-Pacific Economic Cooperation Secretariat

35 Heng Mui Keng Terrace

Singapore 119616

Tel: (65) 68919 600

Fax: (65) 68919 690

Email: [info@aphec.org](mailto:info@aphec.org)

Website: [www.aphec.org](http://www.aphec.org)

© 2016 APEC Secretariat

APEC#216-TO-01.20

## Table of Contents

Glossary.....	5
List of Abbreviations .....	5
1. Introduction to the project.....	10
2. Approach followed and data used.....	11
2.1 Data fueling the model .....	11
2.2 Gap analysis .....	12
2.3 Induction.....	13
2.4 Connecting potential .....	14
2.5 Demand growth.....	15
2.6 Other.....	15
2.7 Final route forecast.....	16
3. Thailand .....	16
3.1 Economy and demographics .....	16
3.1.1 Demographics.....	16
3.1.2 Economy .....	17
3.1.3 Tourism.....	18
3.2 Aviation demand .....	18
3.2.1 Recent demand growth .....	18
3.2.2 Current air service from Thailand.....	19
3.2.3 Aviation and the economy.....	19
3.2.4 Government position on aviation.....	20
3.3 Airport-specific information .....	21
3.3.1 Busiest airports in Thailand .....	21
3.3.2 Principal airline operators .....	22
4. Medium-term new route opportunities.....	23
4.1 Service gaps .....	23
4.1.1 Economy pair analysis .....	23
4.1.2 City pair analysis by APEC economy .....	25
4.2 High-level feasibility considerations.....	28
4.3 Proposed route analysis .....	29

4.3.1	Route BKK-LAX .....	30
4.3.2	Route BKK-JFK .....	30
4.3.3	Route BKK-DLC .....	31
4.3.4	Route BKK-SHE .....	32
4.3.5	Route HKT-BNE .....	32
4.3.6	Route BKK-SFO .....	33
4.3.7	Route BKK-YVR .....	33
4.4	High-level feasibility analysis .....	34
4.4.1	Route BKK-LAX .....	35
4.4.2	Route BKK-JFK .....	35
4.4.3	Route BKK-DLC .....	36
4.4.4	Route BKK-SHE .....	36
4.4.5	Route HKT-BNE .....	37
4.4.6	Route BKK-SFO .....	37
4.4.7	Route BKK-YVR .....	38
5.	Conclusions and opportunities .....	38
5.1	Connectivity improvement .....	39
5.2	Route frequency increase .....	39
5.3	Long-term new route opportunities .....	40
5.4	Development of aircraft technology .....	41
6.	Recommendations to air connectivity .....	41
6.1	Generic recommendations .....	41
6.2	Specific recommendations .....	42
6.3	How the APEC economy's regulator can help .....	42
7.	Appendix .....	43
7.1	Overview of IATA and IATA Consulting .....	43
7.1.1	IATA .....	43
7.1.2	IATA Consulting .....	43
	Bibliography .....	46

## Glossary

The following section presents a list of commonly used expressions and abbreviations found in the report.

**Connecting Potential** – Common rates of passengers connecting beyond/behind when traveling through a hub to/from a particular region.

**Induction/Stimulation** – Initial spike in passenger demand when new nonstop service is offered due to better accessibility, shorter travel time, lower cost, etc.

## List of Abbreviations

**PDEW** – Passenger daily each way (passenger demand in each direction between a select origin and destination).

**SDEW** – Seats daily each way (number of seats offered in each direction on a nonstop or one-stop flight segment).

**OD** – Origin and destination.

### Airport Codes:

AAQ – Anapa, RUS	BCD – Negros Occidental, PH	BWN – Bandar Seri Begawan, BD
ACA – Acapulco, MEX	BDJ – Banjarmasin, INA	BXU – Butuan, PH
ADL – Adelaide, AUS	BHE – Blenheim, NZ	CAN – Guangzhou, PRC
AER – Sochi, RUS	BJX – Silao, MEX	CBO – Cotabato, PH
AGU – Aguascalientes, MEX	BKI – Kota Kinabalu, MAS	CCP – Concepción, CHL
AKJ – Asahikawa, JPN	BKK – Bangkok, THA	CEB – Cebu, PH
AKL – Auckland, NZ	BLI – Bellingham, US	CEI – Chiang Rai, THA
ANF – Antofagasta, CHL	BMV – Buon Ma Thuot, VN	CEK – Chelyabinsk, RUS
AOR – Alor Setar, MAS	BNA – Nashville, US	CEN – Ciudad Obregón, MEX
AQP – Arequipa, CHL	BNE – Brisbane, AUS	CGK – Jakarta, INA
ARH – Arkhangelsk, RUS	BOS – Boston, US	CGO – Zhengzhou, PRC
ASF – Astrakhan, RUS	BPN – Balikpapan, INA	CGQ – Changchun, PRC
ATL – Atlanta, US	BUR – Burbank, US	CGY – Cagayan de Oro and Iligan, PH
AUS – Austin, US		
AYP – Ayacucho, PE		

CHC – Christchurch, NZ	DPS – Bali, INA	IAD – Washington, US
CJA – Cajamarca, PE	DRW – Darwin, AUS	IAH – Houston, US
CJC – Calama, CHL	DTW – Detroit, US	ICN – Seoul, ROK
CJJ – Cheongwon-gu, ROK	DUD – Dunedin, NZ	ILO – Ilo, PE
CJU – Jeju, ROK	DVO – Davao City, PH	IQQ – Iquique, CHL
CKG – Chongqing, PRC	EAT – Douglas County, US	IQT – Iquitos, PE
CLT – Charlotte, US	EWR – Newark, US	ISG – Ishigaki, JPN
CME – Ciudad del Carmen, MEX	EZE – Buenos Aires, ARG	ITM – Osaka, JPN
CNS – Cairns, AUS	FAT – Fresno, US	IWK – Iwakuni, JPN
CNX – Chiang Mai, THA	FLL – Fort Lauderdale, US	JFK – New York, US
CSX – Changsha, PRC	FOC – Fuzhou, PRC	JHB – Johor, MAS
CTS – Hokkaido, JPN	FSZ – Shizuoka, JPN	JJN – Quanzhou, PRC
CTU – Chengdu, PRC	FUK – Fukuoka, JPN	JNZ – Jinzhou, PRC
CUN – Cancun, MEX	GDL – Guadalajara, MEX	JOG – Yogyakarta, INA
CUZ – Cusco, PE	GEG – Spokane, US	JUL – Juliaca, PE
CVG – Cincinnati, US	GMP – Seoul, ROK	KBR – Kota Bharu, MAS
CXR – Nha Trang, VN	GUM – Tamuning and Barrigada, GUM	KBV – Krabi, THA
DAD – Da Nang, VN	GYS – Guangyuan, PRC	KCH – Kuching, MAS
DAL – Dallas, US	HAK – Haikou, PRC	KGD – Kaliningrad, RUS
DCA – Washington, US	HAN – Ha Noi, VN	KHH – Kaohsiung, CT
DEN – Denver, US	HGH – Hangzhou, PRC	KHN – Nanchang, PRC
DFW – Dallas, US	HKG – Hong Kong, China,	KIX – Osaka, JPN
DGO – Durango, MEX	HKC	KKE – Kerikeri, NZ
DGT – Dumaguete, PH	HKT – Phuket, THA	KLO – Kalibo, PH
DJB – Jambi City, INA	HND – Tokyo, JPN	KMG – Kunming, PRC
DLC – Dalian, PRC	HNL – Honolulu, US	KNH – Kinmen, PRC
DLI – Da Lat, VN	HRB – Harbin, PRC	KNO – Kuala Namu, INA
DME – Domodedovo, RUS	HUI – Hue, VN	KOJ – Kirishima, JPN
DMK – Bangkok, THA	HUZ – Huizhou, PRC	KRR – Krasnodar, RUS
		KUF – Samara, RUS

KUL – Kuala Lumpur, MAS	MSP – Minneapolis–Saint Paul, US	PLM – Palembang, INA
KWL – Guilin, PRC	MTT – Cosoleacaque, MEX	PLW – Palu, INA
KZN – Tatarstan, RUS	MTY – Apodaca, MEX	PMC – Puerto Montt, CHL
LAS – Las Vegas, US	MZG – Magong City, CT	PMR – Palmerston North City, NZ
LAX – Los Angeles, US	NBC – Nizhnekamsk, RUS	PNK – Pontianak, INA
LED – Saint Petersburg, RUS	NGB – Ningbo, PRC	POM – Port Moresby, PNG
SVX – Yekaterinburg, RUS	NGO – Nagoya, JPN	PPQ – Paraparaumu, NZ
LGA – NY–La Guardia, US	NKG – Nanjing, PRC	PQC – Phu Quoc, VN
LGK – Padang Matsirat, Langkawi, MAS	NKM – Nagoya, JPN	PSP – Palm Springs, US
LHW – Lanzhou, PRC	NNG – Nanning, PRC	PUS – Busan, ROK
LIM – Lima, PE	NPE – Napier, NZ	PVG – Shanghai, PRC
LOP – Lombok, INA	NPL – New Plymouth, NZ	PVR – Puerto Vallarta, MEX
LPF – Liupanshui, PRC	NRT – Tokyo, JPN	PXU – Pleiku, VN
LPT – Lampang, THA	NSN – Nelson, NZ	PYX – Pattaya, THA
MBT – Masbate City, PH	NTG – Nantong, PRC	RDU – Raleigh, Durham, US
MCC – Sacramento, US	OAK – Oakland, US	REP – Siem Reap, KHM
MCO – Orlando, US	OAX – Oaxaca, MEX	REX – Reynosa, US
MDW – Chicago, US	OKA – Naha, JPN	RGN – Mingaladon, MMR
MDZ – Mendoza, ARG	OOL – Gold Coast, AUS	RNO – Reno, US
MEL – Melbourne, AUS	ORD – Chicago, US	ROC – Rochester, US
MEX – Mexico City, MEX	OVB – Novosibirsk, RUS	ROT – Rotokawa, NZ
MFM – Macau, MAC	OZC – Ozamiz, PH	ROV – Rostov-on-Don, RUS
MIA – Miami, US	PDG – Sumatra, INA	RSU – Yeosu, ROK
MLM – Alvaro Obregon, Michoacan, MEX	PEK – Beijing, PRC	RTW – Saratov City, RUS
MNL – Manilla, PH	PEN – Penang, MAS	RXS – Roxas City, PH
MRY – Monterey, US	PER – Perth, AUS	
	PHL – Philadelphia, US	
	PHX – Phoenix, US	
	PIU – Piura, PE	

SAN – San Diego, US	SYX – Sanya, PRC	USM – Koh Samui, THA
SCL– Santiago, CHL	SZX – Shenzhen, PRC	VCL – Chu Lai, VN
SEA – Seattle, US	TAC – Tacloban, PH	VDH – Dong Hoi, VN
SFO – San Francisco, US	TAM – Tampico, MEX	VER – Veracruz, MEX
SGN – Ho Chi Minh, VN	TAO – Qingdao, PRC	VII – Vinh, VN
SHA – Shanghai, PRC SHE	TAV – Tau, ASM	VKO – Moscow, RUS
– Shenyang, PRC	TBP – Tumbes, PE	VOZ – Voronezh, RUS
SIN – Singapore, SGP	TDX – Trat, THA	VSA – Villahermosa, MEX
SIP – Simferopol, UKR	TGG – Kuala Terengganu,	VVO – Vladivostok, RUS
SJC – San Jose, US	MSA	WAG – Whanganui, NZ
SJD – San Jose del Cabo,	TGZ – Chiapa de Corzo,	WEH – Weihai, PRC
MEX	MEX	WLG – Wellington, NZ
SLC – Salt Lake City, US	TIJ – Tijuana, MEX	WNZ – Wenzhou, PRC
SLP – San Luis Potosi,	TKG – Bandar Lampung,	WRE – Whangarei city,
MEX	INA	NZ
SMF – Sacramento, US	TLC – Toluca, MEX	WUH – Wuhan, PRC
SNA – Santa Ana, US	TNA – Jinan, PRC	WUX – Wuxi, PRC
SOC – Solo/Surakarta,	TPE – Taipei, CT	XIY – Xi'an, PRC
INA	TPP – Tarapoto, PE	XMN – Xiamen, PRC
SPN – Saipan, US	TRC – Torreon, MEX	YEG – Edmonton, CDA
SRG – Semarang, INA	TRU – Trujillo, PE	YGJ – Yonago, PRC
STL – St. Louis, US	TSA – Songshan, CT	YHZ – Halifax, CDA
STW – Stavropol Krai,	TSN – Tianjin, PRC	YKA – Kamloops, CDA
RUS	TTJ – Tottori, JPN	YLW – Kelowna, CDA
SUB – Surabaya, INA	TXG – Taichung, CT	YNJ – Yanji, PRC
SVO – Moscow, RUS	TYN – Taiyuan, PRC	YOW – Ottawa, CDA
SVX – Koltsovo, RUS	UFA – Ufa, RUS	YPR – Prince Rupert, CDA
SWA – Jieyang Chaoshan,	UIH – Qui Nhon, VN	YQM – Moncton, CDA
PRC	UKB – Kobe, JPN	YQR – Regina, CDA
SYD – Sydney, AUS	UPG – Makassar, INA	YSJ – Saint John, CDA
SYO – Sakata, JPN	URC – Urumqi, PRC	YTS – Timmins, CDA



YUL – Montreal, CDA

YVR – Vancouver, CDA

YWG – Winnipeg, CDA

YXC – Cranbrook, CDA

YXS – Prince George, CDA

YXT – Terrace-Kitimat,

CDA

YYB – North Bay, CDA

YYC – Calgary, CDA

YYJ – Victoria, CDA

YYZ – Toronto, CDA

YZP – Sandspit, CDA

YZR – Sarnia, CDA

ZAL – Valdivia, CHL

ZCL – Calera de Victor  
Rosales, MEX

ZQN – Queenstown, NZ

ZUH – Zhuhai, PRC

## 1. Introduction to the project

The APEC Secretariat and Economies have observed that the flow of goods, services, capital and people in the APEC Region is constrained by air connectivity limitations and gaps that exist between the APEC economies, particularly between the Americas and Asia Pacific. Improving connectivity is a long-term target of the APEC economies. The APEC Tourism Working Group (TWG) and Transport Working Group (TPTWG) are particularly interested in pursuing this long-term target.

This Project (the “Project”) was proposed in 2014 by Thailand and co-sponsored by Australia; Indonesia; Malaysia; Peru; the Philippines; and Chinese Taipei and aims to develop air connectivity in the APEC Region and in turn stimulate a more efficient flow of goods, services, capital and people. The Project has the following objectives:

- To develop market demand-based recommendations for potential new routes, improved flight schedule connection times, and hubs between APEC economies based on analysis of air passenger flow, schedules and new aircraft range capability, including analysis of the number of seats, flights and air traffic.
- To help airlines and regulators develop more accurate demand predictions so they can in turn help APEC economies by providing better air connectivity services, capacity and schedules.

The Project was approved in December 2014, with IATA Consulting selected as the consultant in May 2015. IATA was mandated to complete the following tasks:

1. Develop market demand-based recommendations for potential new routes.
2. Provide recommendations to improve connections between flights at the main hubs linking the APEC economies.
3. Determine which APEC market-pairs could benefit from the introduction of new aircraft with extended range.

## 2. Approach followed and data used

This section explains the methodology applied by IATA and presents the data used to feed the various underlying analysis. To conduct the analysis, IATA took systematic steps identified in Figure 1.

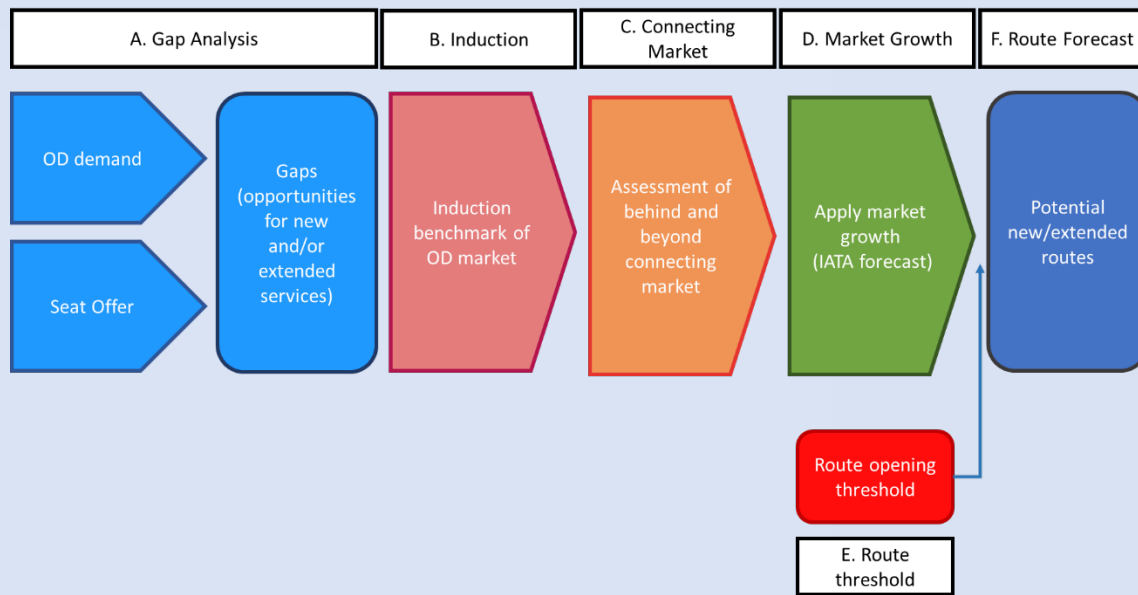


Figure 1: Process used to complete analytical work

The first step involved a demand-supply gap analysis aimed at identifying the unserved routes, presenting potential demand for future development. The size that this potential demand could actually represent if turned into direct service in the future was subsequently forecast, using realistic assumptions related to induction, connecting potential and demand growth.

### 2.1 Data fueling the model

Principal data for the model originates from Airport IS. IATA’s Airport IS system uses IATA billing and settlement plan data to provide detailed demand and supply information on total air traffic. This data has been available for over a 10-year historical period (since 2005).

**Approximately 18,500 international APEC routes were analyzed in the execution of this study. Airport IS data was particularly relevant in the gap analysis and assumption development.**

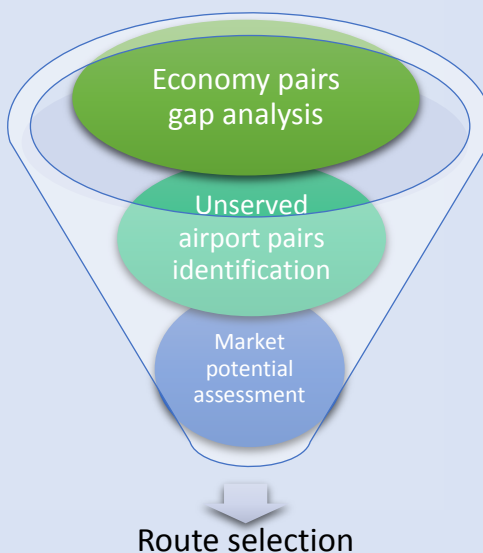
Academic articles and published ratios were also used to justify some of the assumptions, including induction and origin destination traffic captured through direct service.

For some of the other variables used in the final traffic determination, economic forecasts were extracted from IHS Global Insight, one of the world’s largest commercially available economic databases.

Tourism data was extracted from the World Travel and Tourism Council.

## 2.2 Gap analysis

IATA applied a funnel approach in conducting the analysis. It first considered the market at the economy pair level, followed by city pairs leading to a market potential assessment (see figure below). Both seat supply and seat demand were considered in the analysis to identify gaps in air service.



*Figure 2: Funnel approach used to conduct analysis*

The economy-pair analysis allowed IATA to identify unserved markets.

The analysis showed that there is a daily demand of 825 Passengers Daily Each Way (PDEW) via existing connecting routings between Thailand and the United States where no non-stop service is presently available.

When extending the analysis down to the city pairs, it was possible to identify the largest unserved routes between the two economies: there are 165 PDEW traveling between BKK and LAX.

The top 30 unserved routes for the entire APEC region are presented in the table below.

Origin Airport	Origin Economy	Destination Airport	Destination Economy	2015 OD Demand (PDEW)	non-stop seats in 2015 (SDEW)	1-stop seats in 2015 (SDEW)
BKK	Thailand	LAX	United States	165	0	199
BKK	Thailand	JFK	United States	121	0	0
BKK	Thailand	DLC	China	99	0	197
BKK	Thailand	SHE	China	97	0	45
HKT	Thailand	BNE	Australia	94	0	0
BKK	Thailand	SFO	United States	82	0	0
BKK	Thailand	YVR	Canada	57	0	0
BKK	Thailand	DAD	Viet Nam	56	0	0
HKT	Thailand	ADL	Australia	52	0	0
BKK	Thailand	YYZ	Canada	51	0	0
HKT	Thailand	SHE	China	50	0	85
HKT	Thailand	SHE	China	50	0	86
USM	Thailand	PEK	China	50	0	0
USM	Thailand	PEK	China	50	0	0
BKK	Thailand	IAD	United States	50	0	0
HKT	Thailand	NRT	Japan	50	0	0
DMK	Thailand	KCH	Malaysia	48	0	0
BKK	Thailand	ORD	United States	46	0	0
BKK	Thailand	SHA	China	46	0	0
DMK	Thailand	BKI	Malaysia	45	0	0
USM	Thailand	PVG	China	45	0	0
HKT	Thailand	SGN	Viet Nam	44	0	0
HKT	Thailand	HND	Japan	44	0	0
BKK	Thailand	SEA	United States	42	0	0
BKK	Thailand	SUB	Indonesia	41	0	0
USM	Thailand	MEL	Australia	41	0	0
BKK	Thailand	CGQ	China	37	0	9
HKT	Thailand	DPS	Indonesia	36	0	0
HKT	Thailand	VVO	Russia	36	0	0
HKT	Thailand	SGQ	China	36	0	55

Table 1: Top 30 unserved routes within APEC, 2015 data

## 2.3 Induction

To determine realistic estimates of the success of new air service, various assumptions were considered and applied to current passenger demand.

Induction is a well proven concept that explains how new direct air service has a significant impact on increasing the total number of O&D passengers on a city pair market. This is due to product improvement: shorter travel time, greater convenience and more affordable ticket prices.

The extent to which the market will be stimulated varies based on current levels of service (price and flight frequency) offered on a particular route. As stated in the Successful Air Service Development presentation (ICF International, 2014) a market’s first nonstop flight can stimulate demand by 100% to 300%.

IATA quantified this induction value to show a relationship between two primary factors: region pair and the size of the market before a new route is initiated.

The table below shows the stimulation rates considered for this analysis of Thailand. For some instances where inadequate data (less than 4 routes) to conduct a region pair analysis was available, other variables were considered, including the average of all routes, the average of long-haul routes or the average of short-haul routes, depending on the specific market.

Market	Base of 10,000 annual pax	Base of 25,000 annual pax	Base of 50,000 annual pax
All APEC Economies	130%	42%	18%
Long Haul	101%	36%	16%
Short Haul	150%	50%	21%
Australasia - South East Asia	159%	75%	44%
North America-Asia	104%	40%	
Asia - South East Asia	162%	53%	
Asia - North East Asia	155%	58%	27%
South East Asia - China	203%	78%	
South East Asia - North East Asia	125%		
Within Asia	160%	55%	24%
Within Southeast Asia	205%		

*Table 2: Induction rates used during the analysis*

## 2.4 Connecting potential

Increasing the quality of connections through alliance agreements, codeshares, shorter journey times or fewer stops increases overall travel demand in connecting markets. It is a normal phenomenon for new routes to not only increase demand for the city pairs served but also for beyond and behind destinations that are now more easily accessible (Swan, 2008). On long-haul routes, typically two-thirds of the passengers will make a connection.

IATA’s analysis found that connecting markets would stimulate at various rates depending on the region of origin and the hub airport being flown through. These ratios are applied in determining the impact of a new route on connecting flows.

For Thailand, it is both the hubs at the destinations flown to and the hubs within Thailand that will have an impact on this value. The tables below present the connecting ratios at BKK and a selection of hubs flown to and from Thailand in the various APEC regions.

	<b>BKK</b>
<b>North America</b>	54.1%
<b>Australia</b>	45.7%
<b>Asia</b>	13.0%
<b>South East Asia</b>	19.7%
<b>China</b>	7.2%
<b>North Asia</b>	10.1%
<b>Russia</b>	5.8%

*Table 3: Connecting potential rates used when flying to/from APEC regions and BKK*

	<b>NRT</b>	<b>CAN</b>	<b>TPE</b>	<b>SIN</b>	<b>SYD</b>	<b>YYZ</b>	<b>LAX</b>	<b>JFK/EWR</b>
<b>South East Asia</b>	19.90%	17.50%	16.20%	17.50%	13.00%	49.60%	31.30%	55.40%

*Table 4: Connecting potential rates used when flying to/from South East Asia to a selection of other main hubs*

## 2.5 Demand growth

This refers to the consideration of the natural growth observed on a market segment. IATA Economics publishes a detailed inter- and intra-regional global traffic forecast. These demand growth forecasts were used to provide a regionally specific rate of growth to and from Thailand between 2016 and 2018. Growth was typically seen to be around 5%. Demand growth also refers to the fact that approximately 80% of a market will choose a non-stop flight option if it is available (Belobaba, 2015).

## 2.6 Other

Other factors, including distance and available traffic rights, were used to refine the assessment of potential new service to be offered. Distance considers the feasibility of offering a non-stop flight with existing technology, using 15,000km as a maximum distance. Available traffic rights consider the bilateral agreements between economies and the current use of those bilateral rights.

## 2.7 Final route forecast

After conducting the gap analysis and applying the established rates from the various assumptions, the future market potential was estimated, as illustrated in Figure 3 below for the HKT-BNE route.

Origin Airport	Destination Airport	Destination Economy	2015 OD Non-direct Demand	1 OD Captured Though Deorect Service	2 OD Stimulation	4 Behind/Beyond Connecting Potential	Calculations	
HKT	BNE	Australia	(A) 94	(B) 80%	(C) 58%	(D) 13%		
				(1) 75			(1) = AxB	
				(2)	45		(2) = 1xC	
			Subtotal	(3)	120		(3) = 1+2	
			<b>HKT - BNE Total Market Potential (2015 Base)</b>				<b>(4) 137</b>	(4) = 3/(1-D)

Figure 3: Example of the various assumptions being applied to determine the potential for new air service.

## 3. Thailand

A summary of Thailand's economy and demographics, aviation demand and airport-specific information is presented in this section.

### 3.1 Economy and demographics

Thailand is located in the middle of Southeast Asia, with the northern borders neighbouring Cambodia, Laos and Myanmar, and the southern border connecting to Malaysia.

#### 3.1.1 Demographics

Thailand's population was estimated at 68,110,490 as of April 2016, making it the 20<sup>th</sup>-most populous nation in the world (United Nations, 2016). Its population density is approximately 133 inhabitants per square kilometres (United Nations, 2016). While the economy's population is spread fairly well, a substantial number of people live in the capital city Bangkok and the surrounding Bangkok Metropolitan Region. More than 22 million people reside in Bangkok, located in central Thailand, and the surrounding urban area, accounting for approximately 33% of the total Thai population.

There is a diverse range of ethnic groups within the economy. The 2011 estimates claim that the total population is made up of 75% ethnic Thai, 1% Thai Chinese and 3% ethnic Malay (National statistics office of Thailand, 2011). The remaining population falls into small minority groups including hill tribes, Khmers and Mons. The national official language is Thai.



Thailand's population is expected to grow at an average annual rate of 1.0% over the next 10 years (United Nations, 2016), slightly decreasing from the 1.2% annual growth rate between 2005 and 2015.

About 50% of the population live in the urban areas (World Bank, 2014). Major urban cities and populations include:

City	Population (million)
1. Bangkok	5.10
2. Samut Prakan	0.39
3. Mueang Nonthaburi	0.29
4. Udon Thani	0.25
5. Chon Buri	0.22
6. Nakhon Ratchasima	0.21
7. Chiang Mai	0.20
8. Hat Yai	0.19

*Table 5: National Statistics Office of Thailand, 2016*

### 3.1.2 Economy

Thailand is a newly industrialized economy. Its national revenue can be broken down into agriculture (12.1%), industry (43.6%) and services (12.1%) (Central Intelligence Agency, 2015). With a robust manufacturing sector, Thailand is one of the largest producers of electronics, and its automobile manufacturing sector is one of the 10 largest in the world. In 2015, Thailand ranked 27th in economy size as measured by GDP and 74th in terms of per capita income (International Monetary Fund, 2016). Thailand's GDP growth has been approximately 2.1% p.a. over the past three years.

Thailand's top export destinations are China; Hong Kong, China; Japan; Malaysia; and the United States. The top import origins are China; Japan; Malaysia; the United States, and the United Arab Emirates.

The Thai economy faces headwinds and growth has been modest at 2.8 percent in 2015 after 0.9 percent in 2014, partly on the basis of government consumption and investment, and partly on declining imports. The outlook for 2016 is 2.5 percent. The rate of economic recovery and reigniting

growth will depend on how fast Thailand can overcome factors constraining growth and promote a more inclusive growth model (World Bank, 2016).

### 3.1.3 Tourism

Thailand is famous for its natural, cultural and historical attractions, such as Buddhist temples, exotic wildlife and islands. In 2014, Thailand was the 10th “top tourist destination” in world tourism rankings, with 24.8 million international arrivals (World Tourism Organization, 2015).

Tourism is a major economic contributor in Thailand. In 2014, it contributed to 19.3% of Thailand GDP (both direct and indirect), and this percentage is projected to grow to 25.8% in 2025. By 2025, international tourist arrivals are forecast to total 51,121,000, generating expenditure of THB2,828.6 billion, an increase of 7.7% p.a. (World Travel and Tourism Council, 2015)

## 3.2 Aviation demand

### 3.2.1 Recent demand growth

Thailand has traditionally been a popular tourism destination in Southeast Asia and the demand of aviation has grown significantly, thanks partly to the development of low-cost carriers in the economy serving both domestic and international markets. With ASEAN open skies and the potential open skies agreement between ASEAN and the EU, the Thai aviation market is set to grow at a strong pace in the short to medium term.

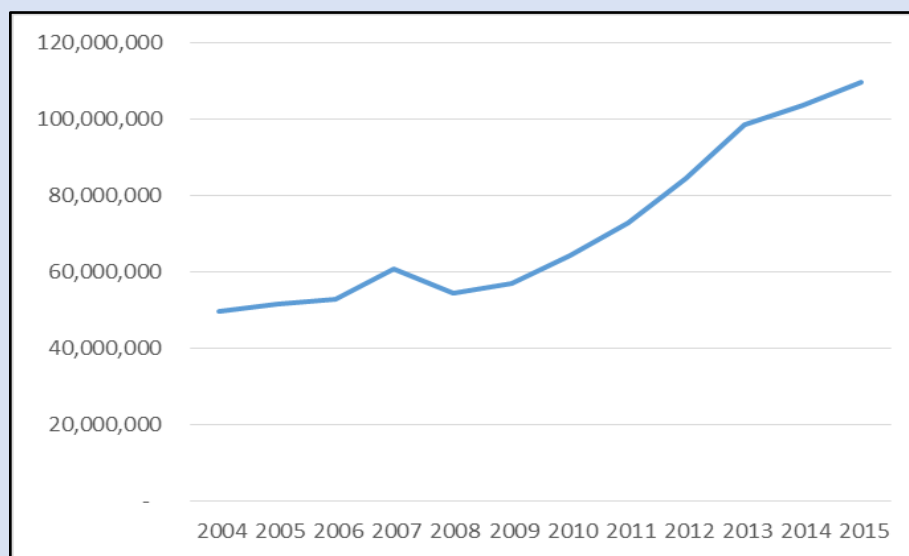


Figure 4: Total Air Traffic of Thailand 2004-2015 (Source: Albatross Airport, 2016)

### 3.2.2 Current air service from Thailand

Thailand currently has more than 200 direct routes to other APEC economies, with a very heavy concentration in Asia. Since Thai Airways stopped direct service between BKK and LAX in 2012, there are no direct trans-pacific flights from Thailand.

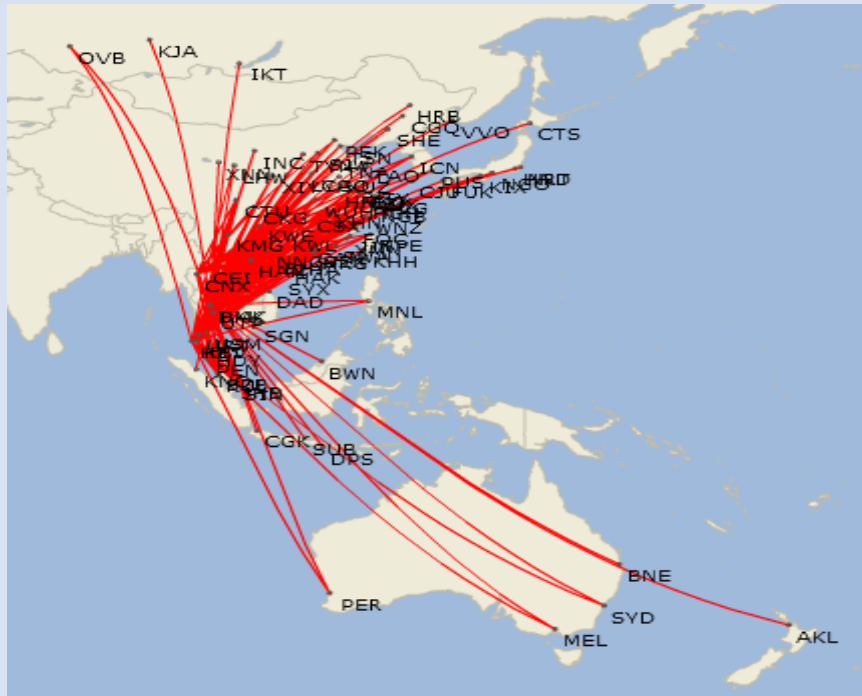


Figure 5: Nonstop international service from Thailand within the APEC region 2016 (Source: Airport IS)

Like many other APEC economies in Southeast Asia, air services across the Pacific from Thailand to North and South America are not always feasible. This is partly due to the limitations in current aircraft technology in terms of range. It is also costly for the airlines to operate such ultra-long-haul routes. At present, a lot of the trans-pacific traffic is routed through other aviation hubs in APEC economies in North Asia such as HKG, HND, and NRT, and ICN. IATA anticipates that these hubs will continue to perform their current function in the short to medium term. However, it is expected that more trans-pacific routes will turn into direct services when new aircraft with longer range comes online (such as the B777-8/-9/-10 and the A350-900ULR) in the next five years or so.

### 3.2.3 Aviation and the economy

#### Economic Footprint

The aviation industry and its related activities provide around two million jobs in Thailand and contribute USD29 million in GDP to the Thai economy (IATA, 2016). This comprises direct and indirect spending. Almost 80% of tourists arrived in Thailand by air and in 2009, the Thai travel and

tourism industry directly contributed THB572 billion to the Thai economy (GDP) and THB598 billion indirectly when considering the support of tourism toward its supply chain.

### **Consumer Benefits**

The aviation industry has benefits for visiting friends and family and the shipping of high-value products. In 2009, a total of 40 million passengers and 1.1 million tonnes of freight travelled to, from and within Thailand by air (Oxford Economics, 2011).

### **Long-term Impact**

Economically, aviation has a long-term impact in Thailand. According to Oxford Economics (2011), air travel enables long-term economic growth by:

- Opening up foreign markets to Thai exports.
- Lowering transport costs, particularly over long distances.
- Increasing the flexibility of labor supply, which should enhance allocative efficiency and bring down the natural rate of unemployment.
- Encouraging Thai businesses to invest and specialize in areas that play to the economy's strengths.
- Speeding the adoption of new business practices, such as just-in-time-inventory management that relies on quick and reliable delivery of essential supplies.
- Raising productivity and hence the economy's long-run supply capacity. It is estimated that a 10% improvement in connectivity relative to GDP would see a THB5.8 billion per annum increase in long-run GDP for the Thai economy.

### **3.2.4 Government position on aviation**

Thailand traditionally had been a well-connected hub in Southeast Asia and the government acknowledges the benefits aviation brings to the economy, especially for tourism. In 2003, the government set a goal for Thailand to become a center for regional aviation and provide a full suite of aviation support services (for example, maintenance and repair, and crew training). The Thai government also intends to expand BKK, Thailand's international gateway, to accommodate the strong traffic growth of recent years. The expansion is expected to be complete by 2019 and will handle 80 million passengers.

In 2015, aviation safety in Thailand came under the spotlight, with ICAO and FAA downgrading Thailand's aviation safety rating to Category 2, which implied the economy did not comply with international standards. The downgrading will likely impact airlines in Thailand starting new international routes.

### 3.3 Airport-specific information

#### 3.3.1 Busiest airports in Thailand

The two airports in the capital city of BKK and DMK, are the busiest airports in the economy. HKT and CNX also attract a significant amount of air traffic and are popular destinations for international tourists:

Rank	Airport	Most Recent Annual Traffic Statistics	% of total Market
1	BKK	46,423,352	45%
2	DMK	21,546,568	21%
3	HKT	11,401,498	11%
4	CNX	6,630,624	6%
5	HDY	3,147,281	3%
6	KBV	2,700,950	3%
7	USM	1,990,154	2%
	Other Airports	9,870,837	10%

Table 6: Top 7 busiest airports in Thailand (Source: Albatross Airport, 2016)



Figure 6: Map of Thailand's busiest airports (Source: Google maps)

### 3.3.2 Principal airline operators

There are ten airlines with scheduled services based in Thailand:

#### **Thai International Airways**

Thai International Airways is the flag carrier of Thailand and started operating in 1960. The main hub is in BKK, with operating bases in CNX and HKT. It is one of the founding members of Star Alliance.

Thai Airways has a fleet of around 80 aircrafts, with another 16 new aircrafts on order for delivery before 2022. The majority of the new aircrafts will be replacing older aircrafts.

Internationally within the APEC region, Thai Airways provides service to Australia; China; Hong Kong, China; Indonesia; Japan; Republic of Korea; Malaysia; New Zealand; Singapore; Chinese Taipei; and Viet Nam;.

#### **Bangkok Airways**

Bangkok Airways has a fleet of 31 aircrafts, with a mix of jet aircraft and ATR 72 turboprops. It started operations in 1968.

Internationally within the APEC region, Bangkok Airways provides service to China; Hong Kong, China; Japan; Malaysia; Singapore; and Viet Nam.

#### **Thai AirAsia/Thai AirAsia X**

Thai AirAsia was founded in 2003 with the main operating base at DMK airport and a fleet of 48 Airbus A320 aircrafts. Thai AirAsia X operates six A330-300 aircrafts capable of flying medium- to long-haul routes (for example, Don Mueang to Japan).

Within the APEC region, Thai AirAsia provides service to China; Hong Kong, China; Indonesia; Japan; Republic of Korea; Malaysia; Singapore; Chinese Taipei and Viet Nam

#### **Nok Air**

Nok Air started operations in 2004 with a primary focus on domestic routes. It has slowly expanded into the international arena and now covers destinations in Singapore and Viet Nam among the APEC economies. With 21 Boeing 737-800 jet aircrafts and eight turboprops, Nok Air has its primary hub at DMK.

#### **NokScoot**

NokScoot is the joint venture between Nok Air and Singapore's Scoot airline. It is based at DMK, operating a long-haul LCC model, and commenced operations in 2015 with a fleet of three aircrafts. NokScoot serves routes in China; Japan; and Chinese Taipei.

#### **Orient Thai Airlines**

Orient Thai was founded in 1995 and is based at DMK. It operates a fleet of 20 aircrafts and serves China and Hong Kong, China among the APEC economies.

### **Thai Lion Air**

Thai Lion Air is associated with Lion Air in Indonesia. It operates from DMK with a fleet size of 17 B737-900ER aircrafts. Its international services cover destinations in Indonesia and Singapore.

### **Thai Smile**

Thai Smile is the subsidiary of Thai Airways and operates a hybrid business model that is in between full-service carrier and LCC. It has a fleet of 15 A320 aircrafts and flies thinner feeder routes for Thai Airways. Its service within the APEC region covers Changsha in China.

### **Thai Vietjet Air**

A subsidiary of Vietjet, the LCC in Viet Nam, Thai Vietjet commenced operations in 2015 and is based at BKK. Thai Vietjet Air currently has only one aircraft and flies solely domestic routes, but Thai Vietjet is expected to operate international markets soon.

## **4. Medium-term new route opportunities**

This section of the report is dedicated to explaining potential new air service developments to and from Thailand within the APEC region over the next three years. Service gaps, route traffic forecasts and high-level feasibility analysis will be conducted.

Charter flights are an important segment in Thailand, carrying both inbound and outbound tourists. While the analysis for charter flights is not included in the scope of this study, IATA suggests that Thailand conducts further studies into the charter flights market to obtain a holistic picture of the aviation demand.

### **4.1 Service gaps**

As part of the process, air services to Thailand were considered at an economy pair and city pair basis.

#### **4.1.1 Economy pair analysis**

The following table outlines supply and demand for air travel between Thailand and other APEC economies. The data essentially shows the economy pairs where

- Nonstop service is sufficiently supplied (in green).
- Air service is adequate but may need to be improved in the long term (in yellow).
- Air service is at a shortfall and should be improved in the medium term (in red).

Origin Economy	Demand (PDEW)	Nonstop Seat Offer (SDEW)	One-Stop Seat Offer (SDEW)	Ratio of Demand to Supply
Australia (AUS)	2,017	2,927	4	69%
Brunei Darussalam (BD)	87	145	0	60%
Canada (CDA)	232	0	0	***
Chile (CHL)	9	0	0	*
People's Republic of China (PRC)	16,194	21,701	2,102	68%
Hong Kong, China (HKC)	5,903	9,990	0	59%
Indonesia (INA)	2,001	2,333	0	86%
Japan (JPN)	5,458	7,331	0	74%
Republic of Korea (ROK)	3,802	5,354	600	64%
Malaysia (MAS)	4,390	8,138	0	54%
Mexico (MEX)	12	0	0	*
New Zealand (NZ)	203	166	401	36%
Papua New Guinea (PNG)	3	0	0	*
Peru (PE)	3	0	0	*
The Republic of the Philippines (PH)	800	1,533	0	52%
Russia (RUS)	355	305	35	104%
Singapore (SGP)	6,098	9,625	0	63%
Chinese Taipei (CT)	1,809	3,108	0	58%
Thailand (THA)	70,069	112,445	697	62%
United States (US)	799	0	292	274%
Viet Nam (VN)	2,603	4,516	0	58%

Table 7: Total daily demand (PDEW), nonstop seat offer (SDEW), one-stop seat offer (SDEW) and demand-to-supply ratio (Source: IATA analysis of Airport IS Data)

\* Delineates an economy pair with no air services that has inadequate demand to consider air service in the long term.

\*\*\* Delineates an economy pair with no air services that has adequate demand for service in the short to medium term (within the next 5 years).

In some cases, the demand-to-supply ratio is less than 60%, however supply is still adequate as the low percentage figure may be representative of high rates of connecting passengers flying between economies (not shown in the above table – only OD traffic is displayed).



Where demand-to-supply ratios are higher than 80%, seat offer should be increased between economy pairs (e.g. Thailand to the United States at 274%, where the one-stop supply only covers a portion of the total demand between the economies).

Based on the analysis at the economy level, Thailand may need to improve service to seven economies in the long term (highlighted in yellow) and could take action to increase service frequencies with four economies in the medium term (highlighted in red). The remaining 10 destination economies are adequately served at an economy pair level or have inadequate demand for non-stop services within the scope of this report. The following section will look into greater detail at the shortfalls in supply at a city pair level.

#### 4.1.2 City pair analysis by APEC economy

When considering the shortfall in service to city pairs in Thailand, 32 routes were examined that have a demand of 35 or greater PDEW (12,775 annual pax) with no non-stop service. These city pairs listed by economy are seen in the table below. The section following the table provides a narrative description of the phenomenon seen at a combined economy pair and city pair level for the economies where air service development is a possibility.

Origin Airport	Origin Economy	Destination Airport	Destination Economy	2015 OD Demand (PDEW)
HKT	Thailand	BNE	Australia	94
HKT	Thailand	ADL	Australia	52
USM	Thailand	MEL	Australia	41
BKK	Thailand	YVR	Canada	57
BKK	Thailand	YYZ	Canada	51
BKK	Thailand	YUL	Canada	35
HKT	Thailand	SHE	China	50
USM	Thailand	PEK	China	50
USM	Thailand	PVG	China	45
BKK	Thailand	DLC	China	99
BKK	Thailand	SHE	China	97
HKT	Thailand	SHE	China	50
USM	Thailand	PEK	China	50
BKK	Thailand	SHA	China	46
USM	Thailand	PVG	China	45
BKK	Thailand	CGQ	China	37
HKT	Thailand	CGQ	China	36
BKK	Thailand	SUB	Indonesia	41
HKT	Thailand	DPS	Indonesia	36
HKT	Thailand	NRT	Japan	50
HKT	Thailand	HND	Japan	44
DMK	Thailand	KCH	Malaysia	48
DMK	Thailand	BKI	Malaysia	45
HKT	Thailand	VVO	Russia	36
BKK	Thailand	LAX	United States	165
BKK	Thailand	JFK	United States	121
BKK	Thailand	SFO	United States	82
BKK	Thailand	IAD	United States	50
BKK	Thailand	ORD	United States	46
BKK	Thailand	SEA	United States	42
BKK	Thailand	DAD	Viet Nam	56
HKT	Thailand	SGN	Viet Nam	44

Table 8: APEC routes to/from Thailand over 35 PDEW with no nonstop service (Source: IATA analysis of Airport IS data).

### Australia (AUS)

At a national scale, the level of service in terms of total seat offer between Australia and Thailand is satisfactory and does not need overall capacity improvements in the short term. When examining individual routes, some markets are inadequately served. In particular, one route with strong market potential is BNE-HKT; this is identified in section 4.3.5 below.

### **Canada (CDA)**

Considering the APEC economies, Canada has the largest passenger market with no non-stop or one-stop service to Thailand. It's likely that the long distance between the economy pairs has delayed route development. Currently when considering individual city pairs, BKK-YVR presents the optimal route geographically between the two economies. Market size is adequate to commence non-stop service on this route; a detailed description is presented in section 4.3.7 below.

### **Peoples' Republic of China (PRC)**

Overall China and Thailand are well connected, with a 68% supply-to-demand ratio. China is the largest international APEC market from Thailand with approximately 21,700 non-stop seats per day. As the Chinese economy has grown quickly over the past decade, the market size at a number of destinations has grown to initiate non-stop service. Stimulation rates between China and Thailand are typically quite high, yet connecting potential when flying to non-hub airports is low. Two new routes between China and Thailand are presented in section 4.3 and several existing routes are suggested to increase capacity.

### **Indonesia (INA)**

At an economy pair level, Indonesia and Thailand could be better connected. The two economies show an 86% supply-to-demand ratio, which is slightly higher than the optimal 80%. Due to the overall disparity of the market share to smaller cities, no single city pair has adequate demand to initiate new non-stop service. Service on existing city pairs could be increased in some cases, including DMK to SUB.

### **Japan (JPN)**

The two economies are well connected with no immediate need to increase air supply. As demand increases, additional frequencies will be required and in the medium to long term (5-10 years), new services between Japan and Thailand (particularly those listed in Table 8 above) will become viable.

### **Malaysia (MAS)**

Malaysia and Thailand have a liberalized market with supply well above demand between the two economies. The low demand to supply ratio is also associated with strong rates of passenger connections through both economies. As demand grows, it will likely become viable to redistribute capacity away from the main hub airports and serve smaller destinations, such as those listed in Table 8 above.

### **United States (US)**

The United States is the largest market from Thailand with no non-stop service. One-stop service is available between the economies, which alone only captures one-third of the daily passenger demand each way. In part due to the distance between the United States and Thailand (approximately 13,000km), there is very little non-stop air service between the economies. As new aircraft technologies have emerged, it is now more viable to commence ultra-long-haul routes. Three route suggestions to the United States are presented in section 4.3 below.

## **Viet Nam (VN)**

Currently Thailand and Viet Nam are well connected at an economy pair level with strong seat offer proportionate to the rate of demand. Certain city pairs have a demand greater than 35 PDEW and would have a viable market size for new non-stop service in the medium to long term.

### **4.2 High-level feasibility considerations**

City pairs with 35 PDEW (12,775 annual passengers each way) were considered the minimum threshold for analysis. There are 32 routes to and from Thailand that met this criterion.

To further define viable route selections, IATA used two metrics: distance and market size. Due to aircraft range restrictions, city pairs more than 15,000km from each other were eliminated. The second criterion applied induction and connection potential rates (unique to each region and route type) to determine if the route would garner a minimum demand threshold within the coming three years (113 PDEW for short-haul routes under 4,000km, 130 PDEW for long-haul routes or 158 PDEW for ultra-long-haul routes over 12,000km). The selection process is seen in the table below.

Origin Airport	Origin Country	Destination Airport	Destination Country	2015 OD Demand	2015 Estimated Market Potential	Distance viable for non-stop flight with current technology	Market size adequate for non-stop service in medium term	Proposed Route
BKK	Thailand	LAX	United States	165	333	✓	✓	Yes
BKK	Thailand	JFK	United States	121	257	✓	✓	Yes
BKK	Thailand	DLC	China	99	117	✓	✓	Yes
BKK	Thailand	SHE	China	97	116	✓	✓	Yes
HKT	Thailand	BNE	Australia	94	137	✓	✓	Yes
BKK	Thailand	SFO	United States	82	190	✓	✓	Yes
BKK	Thailand	YVR	Canada	57	169	✓	✓	Yes
BKK	Thailand	DAD	Viet Nam	56	109	✓	✗	No
HKT	Thailand	ADL	Australia	52	81	✓	✗	No
BKK	Thailand	YYZ	Canada	51	138	✓	✗	No
HKT	Thailand	SHE	China	50	73	✓	✗	No
HKT	Thailand	SHE	China	50	73	✓	✗	No
USM	Thailand	PEK	China	50	82	✓	✗	No
USM	Thailand	PEK	China	50	82	✓	✗	No
BKK	Thailand	IAD	United States	50	135	✓	✗	No
HKT	Thailand	NRT	Japan	50	77	✓	✗	No
DMK	Thailand	KCH	Malaysia	48	77	✓	✗	No
BKK	Thailand	ORD	United States	46	148	✓	✗	No
BKK	Thailand	SHA	China	46	76	✓	✗	No
DMK	Thailand	BKI	Malaysia	45	73	✓	✗	No
USM	Thailand	PVG	China	45	77	✓	✗	No
USM	Thailand	PVG	China	45	77	✓	✗	No
HKT	Thailand	SGN	Viet Nam	44	78	✓	✗	No
HKT	Thailand	HND	Japan	44	63	✓	✗	No
BKK	Thailand	SEA	United States	42	141	✓	✗	No
BKK	Thailand	SUB	Indonesia	41	82	✓	✗	No
USM	Thailand	MEL	Australia	41	72	✓	✗	No
BKK	Thailand	CGQ	China	37	64	✓	✗	No
HKT	Thailand	DPS	Indonesia	36	58	✓	✗	No
HKT	Thailand	VVO	Russian Federation	36	58	✓	✗	No
HKT	Thailand	CGQ	China	36	58	✓	✗	No
BKK	Thailand	YUL	Canada	35	111	✓	✗	No

Table 9: Viable distance is used as any route under 15,000km, viable demand is calculated as any route serving a minimum of 113, 137 or 158 PDEW within the coming three years (depending on whether or not the route is short-haul, medium-haul or long-haul. Calculations are shown in market potential analysis below.

### 4.3 Proposed route analysis

Based on the filtering process applied above, IATA identified seven routes that could be established through Thailand in the medium term. This analysis does not consider the fares paid by passengers, instead used only the rates of supply and demand to base the analysis. The section below decomposes the route potential and presents a forecast of the current demand in the medium term.

### 4.3.1 Route BKK-LAX

2015 BKK-LAX total route potential definition:

Origin Airport	Destination Airport	Destination Economy	2015 OD Non-direct Demand	1	2	4	Calculations	
				OD Captured Though Deorect Service	OD Stimulation	Behind/Beyond Connecting Potential		
BKK	LAX	United States	(A) 165	(B) 80%	(C) 16%	(D) 54%		
				(1) 132	21		(1) = AxB	
				(2)			(2) = 1xC	
			Subtotal	(3)	153		(3) = 1+2	
			<b>BKK - LAX Total Market Potential (2015 Base)</b>				<b>(4) 333</b>	(4) = 3/(1-D)

IATA estimates that the BKK-LAX route would present a base market potential of 333 PDEW in 2015 if direct service were to be introduced.

This potential would grow to 385 by 2018, as displayed below. This forecast uses the 2015 estimated demand and applies to it the IATA inter- and intra-regional global traffic forecast published by our Economics Division.

Economy Pair	City Pair	Served non-stop in 2015	2015 Base	2016	2017	2018
Thailand - United States	BKK-LAX	No	333	350	367	385

### 4.3.2 Route BKK-JFK

2015 BKK-JFK total route potential definition:

Origin Airport	Destination Airport	Destination Economy	2015 OD Non-direct Demand	1	2	4	Calculations	
				OD Captured Though Deorect Service	OD Stimulation	Behind/Beyond Connecting Potential		
BKK	JFK	United States	(A) 121	(B) 80%	(C) 12%	(D) 54%		
				(1) 97	12		(1) = AxB	
				(2)			(2) = 1xC	
			Subtotal	(3)	108		(3) = 1+2	
			<b>BKK - JFK Total Market Potential (2015 Base)</b>				<b>(4) 236</b>	(4) = 3/(1-D)

IATA estimates that the BKK-JFK route presents a base market potential of 236 PDEW in 2015 if direct service were to be introduced between the city pairs.

This potential would grow to 297 by 2018, as displayed below. This forecast uses the 2015 estimated demand and applies to it the IATA inter- and intra-regional global traffic forecast published by our Economics Division.

Economy Pair	City Pair	2015 Base	2016	2017	2018
Thailand-United States	BKK-JFK	236	248	261	273

### 4.3.3 Route BKK-DLC

2015 BKK-DLC total route potential definition:

Origin Airport	Destination Airport	Destination Economy	2015 OD Non-direct Demand	1 OD Captured Though Deorect Service	2 OD Stimulation	4 Behind/Beyond Connecting Potential	Calculations	
BKK	DLC	China	(A) 99	(B) 80%	(C) 37%	(D) 7%		
				(1) 79	30		(1) = AxB	
				(2)			(2) = 1xC	
			Subtotal	(3)	108		(3) = 1+2	
			<b>BKK - DLC Total Market Potential (2015 Base)</b>				<b>(4) 117</b>	(4) = 3/(1-D)

IATA estimates that the BKK-DLC route presents a base market potential of 117 PDEW in 2015 if direct service were introduced between the city pairs.

This potential would grow to 137 by 2018, as displayed below. This forecast uses the 2015 estimated demand and applies to it the IATA inter- and intra-regional global traffic forecast published by our Economics Division. The traffic between BKK and DLC is adequate, as this is a short-haul route that requires a threshold of 113 PDEW.

Economy Pair	City Pair	2015 Base	2016	2017	2018
Thailand - China	BKK - DLC	117	124	130	137

#### 4.3.4 Route BKK-SHE

2015 BKK-SHE total route potential definition:

Origin Airport	Destination Airport	Destination Economy	2015 OD Non-direct Demand	1 OD Captured Though Deorect Service	2 OD Stimulation	4 Behind/Beyond Connecting Potential	Calculations	
BKK	SHE	China	(A) 97	(B) 80%	(C) 38%	(D) 7%		
				(1) 78			(1) = Ax B	
				(2)	30		(2) = 1xC	
			Subtotal	(3)	107		(3) = 1+2	
			<b>BKK - SHE Total Market Potential (2015 Base)</b>				<b>(4) 116</b>	(4) = 3/(1-D)

IATA estimates that the BKK-SHE route presents a base market potential of 116 PDEW in 2015 if direct service were to be introduced between the city pairs.

This potential would grow to 136 by 2018, as displayed below. This forecast uses the 2015 estimated demand and applies to it the IATA inter- and intra-regional global traffic forecast published by our Economics Division. Because this is a short-haul route that can be served by a narrow-body aircraft, the threshold for service is 113 PDEW.

Economy Pair	City Pair	2015 Base	2016	2017	2018
Thailand - China	BKK - SHE	116	122	129	136

#### 4.3.5 Route HKT-BNE

2015 HKT-BNE total route potential definition:

Origin Airport	Destination Airport	Destination Economy	2015 OD Non-direct Demand	1 OD Captured Though Deorect Service	2 OD Stimulation	4 Behind/Beyond Connecting Potential	Calculations	
HKT	BNE	Australia	(A) 94	(B) 80%	(C) 58%	(D) 13%		
				(1) 75			(1) = Ax B	
				(2)	45		(2) = 1xC	
			Subtotal	(3)	120		(3) = 1+2	
			<b>BKK - SHE Total Market Potential (2015 Base)</b>				<b>(4) 137</b>	(4) = 3/(1-D)

IATA estimates that the HKT-BNE route could present a base market potential of 137 PDEW in 2015 if direct service were to be introduced between the city pairs.



This potential would grow to 161 PDEW by 2018, as displayed below. This forecast uses the 2015 estimated demand and applies to it the IATA inter- and intra-regional global traffic forecast published by our Economics Division.

Economy Pair	City Pair	2015 Base	2016	2017	2018
Thailand - Australia	HKT - BNE	137	145	152	161

#### 4.3.6 Route BKK-SFO

2015 BKK-SFO total route potential definition:

Origin Airport	Destination Airport	Destination Economy	2015 OD Non-direct Demand	1 OD Captured Though Deorect Service	2 OD Stimulation	4 Behind/Beyond Connecting Potential	Calculations	
BKK	SFO	United States	(A) 82	(B) 80%	(C) 33%	(D) 54%		
				(1) 65	22		(1) = Ax B	
				(2)			(2) = 1xC	
			Subtotal	(3)	87		(3) = 1+2	
			<b>BKK - SFO Total Market Potential (2015 Base)</b>				<b>(4) 190</b>	(4) = 3/(1-D)

IATA estimates that the BKK-JFK route presents a base market potential of 190 PDEW in 2015 if direct service were to be introduced between the city pairs.

This potential would grow to 219 by 2018, as displayed below. This forecast uses the 2015 estimated demand and applies to it the IATA inter- and intra-regional global traffic forecast published by our Economics Division.

Economy Pair	City Pair	2015 Base	2016	2017	2018
Thailand - United States	BKK-SFO	190	199	209	219

#### 4.3.7 Route BKK-YVR

2015 BKK-YVR total route potential definition:

Origin Airport	Destination Airport	Destination Economy	2015 OD Non-direct Demand	1 OD Captured Though Deorect Service	2 OD Stimulation	4 Behind/Beyond Connecting Potential	Calculations	
BKK	YVR	Canada	(A) 57	(B) 80%	(C) 49%	(D) 60%		
				(1) 45	23		(1) = Ax B	
				(2)			(2) = 1xC	
			Subtotal	(3)	68		(3) = 1+2	
			<b>BKK - YVR Total Market Potential (2015 Base)</b>				<b>(4) 169</b>	(4) = 3/(1-D)

IATA estimates that the BKK-YVR route presents a base market potential of 169 PDEW in 2015 if direct service were to be introduced between the city pairs.

This potential would grow to 195 by 2018, as displayed below. This forecast uses the 2015 estimated demand and applies to it the IATA inter- and intra-regional global traffic forecast published by our Economics Division.

Economy Pair	City Pair	2015 Base	2016	2017	2018
Thailand - Canada	BKK - YVR	169	177	186	195

#### 4.4 High-level feasibility analysis

This section considers the above route through three main feasibility criteria:

- air service agreements
- airline network strategies and fleets
- route economics

Additionally, proposed operational aspects of the route are presented, including an indicative start date based on market maturity, a proposed airline to serve the route, type of aircraft to be used, flight frequency and estimated load factors. The demand capture rate is reduced on services that are not served on a daily basis.

A map of the proposed routes is presented below.

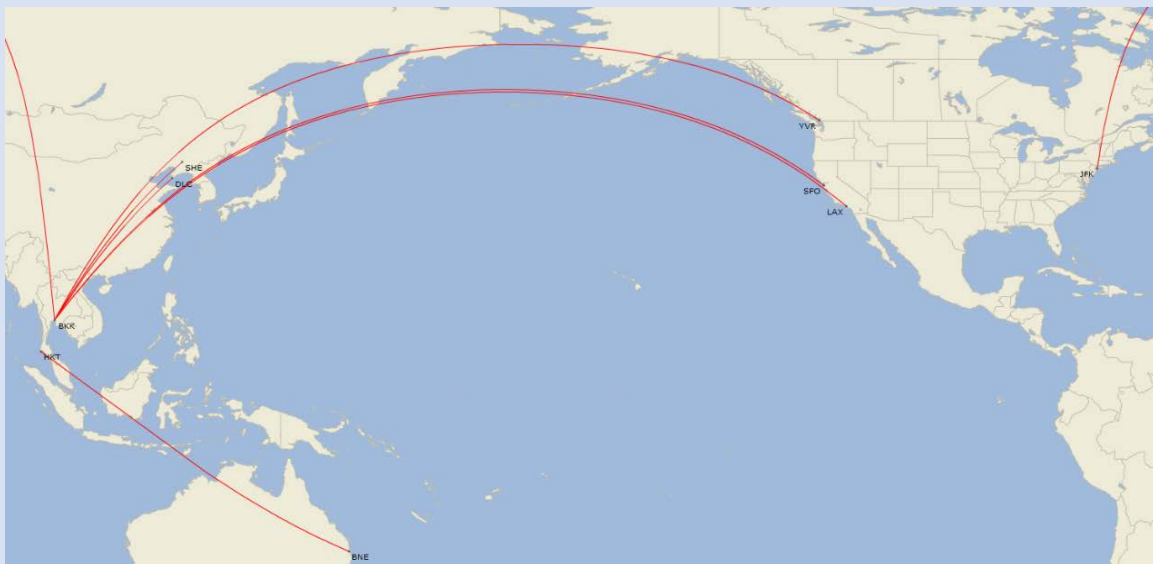


Figure 5: Map of proposed new routes to/from Thailand in the medium term

#### 4.4.1 Route BKK-LAX

BKK-LAX is an ultra-long-haul route (approx. 13,300km) that would need to be served by a wide-body aircraft capable of operating this distance, such as Boeing 787 and Airbus A350.

Thai Airways was suggested as the operator for this route due to the fact that connecting rates are higher for passengers in BKK traveling to/from North America in BKK than the connecting rates seen in LAX.

Based on 2017 estimated demand, the route can be operated by Thai Airways utilizing A350-900 aircraft with 10 flights a week. The load factor is estimated to be around 80%:

Route (non-directional)	Minimum Opening Date	Airline	Aircraft	# of Seats	Frequency per Week	Number of Pax per Flight	Load Factor
BKK-LAX	2017	Thai Airways	A350-900	321	10	257	80%

Operating conditions such as prevailing wind may affect aircraft performance, and aircraft payload may need to be restricted in certain directions.

In terms of air service agreements, IATA does not foresee any roadblock for this route to be operated based on the current high-level policies in place in Thailand and the United States. This point should, however, be further validated based on the official bilateral agreements in place (not available for consultation by IATA).

#### 4.4.2 Route BKK-JFK

BKK-JFK is an ultra-long-haul route (about 13,900km) that would need to be served by a specific wide-body aircraft capable of operating this distance.

Delta Airlines is suggested as the operator for this route, due to the fact that connecting rates are higher for passengers in JFK traveling to/from Southeast Asia than the connecting rates seen in BKK. Delta was also selected due to its use of the 777-200 LR, which is one of the few aircrafts operated by a North American carrier that could serve this distance.

Considering 2016 estimated demand, daily service could be operated from inception, making the route particularly attractive.

The proposed service would therefore allow for an 85% average load factor, as illustrated below:

Route (non-directional)	Minimum Opening Date	Airline	Aircraft	# of Seats	Frequency per Week	Number of Pax per Flight	Load Factor
BKK-JFK	Now	Delta Airlines	Boeing 777-200	291	7	248	85%

Operating conditions such as prevailing wind may affect aircraft performance, and aircraft payload may need to be restricted in certain directions.

In terms of air service agreements, IATA does not foresee any roadblock for this route to be operated. This point should, however, be further validated based on the official bilateral agreements in place (not available for consultation by IATA).

#### 4.4.3 Route BKK-DLC

BKK-DLC is a short-haul route (about 3,485km) that could be served by a narrow-body aircraft.

Thai Airways is suggested as the carrier to operate this route due to its strong hub presence in Bangkok and experience serving numerous destinations in mainland China. Based on the distance and market size, an A320 is recommended to serve the route.

Considering 2016 estimated demand, service of five flights per week would adequately match supply to demand. This proposed service is estimated to operate at an average load factor of 91%, as illustrated below:

Route (non-directional)	Minimum Opening Date	Airline	Aircraft	# of Seats	Frequency per week	Number of Pax per Flight	Load Factor
BKK-DLC	Now	Thai Airways	Airbus A320	172	5	156	91%

In terms of air service agreements, IATA does not foresee any roadblocks for this route to be operated based on current high level policies in place in China and Thailand. This point should, however, be further validated based on the official bilateral agreements in place (not available for consultation by IATA).

#### 4.4.4 Route BKK-SHE

BKK-SHE is a short-haul route (about 3,800km) that could be served by a narrow body aircraft.

Thai Airways is suggested as the carrier to operate this route due to its strong hub presence in Bangkok and experience serving numerous destinations in mainland China. Based on the distance and market size, an A320 is recommended to serve the route.

Considering 2016 estimated demand, service of five flights per week would adequately match supply to demand. This proposed service is estimated to operate at an average load factor of 89%, as illustrated below:

Route (non-directional)	Minimum Opening Date	Airline	Aircraft	# of Seats	Frequency per Week	Number of Pax per Flight	Load Factor
BKK-SHE	Now	Thai Airways	Airbus A320	172	5	154	89%

Finally, in terms of air service agreements, IATA does not foresee any roadblock for this route to be operated based on current high level policies in place in China and Thailand. This point should, however, be further validated based on the official bilateral agreements in place (not available for consultation by IATA).

#### 4.4.5 Route HKT-BNE

HKT-BNE is a long-haul route (approximately 7,000km) that would need to be served by a wide-body aircraft capable of operating this distance. This route would largely serve as an outbound tourism destination for passengers traveling from Australia.

Jetstar Airways is suggested as the operator for this route due to its strong presence on the Australian international leisure market and its presence on routes to HKT from MEL and SYD. The 787 is the only long-haul aircraft deployed by Jetstar. A frequency of 3 times per week is slightly less than seen on the SYD-HKT and MEL-HKT routes (due to the smaller demand base at BNE) and is estimated to provide a strong load factor, as is typically seen on routes operated by Jetstar.

Considering 2016 estimated demand, a three-times-per-week service is suggested. This would allow for a high 88% load factor.

Route (non-directional)	Minimum Opening Date	Airline	Aircraft	# of Seats	Frequency per Week	Number of Pax per Flight	Load Factor
HKT-BNE	Now	Jetstar Airways	Boeing 787-8	335	3	288	86%

With regard to air service agreements, IATA does not foresee any roadblock for this route based on available information concerning capacity entitlements between Australia and Thailand. In 2015, approximately 30% of the total capacity available to Australian carriers between Thailand and Australia was used (Australian Airports Association, 2015).

#### 4.4.6 Route BKK-SFO

BKK-SFO is an ultra-long-haul route (about 12,700 km) that would need to be served by a specific wide-body aircraft capable of operating this distance.

Thai Airways is suggested as the operator for this route due to the fact that connecting rates are higher in BKK for passengers traveling to/from North America (54%) than the connecting rates seen for passengers in SFO traveling to/from Southeast Asia (20%).

Considering the 2017 estimated demand, service of six times weekly could be operated from inception.

The proposed service would therefore allow for an estimated 76% load factor, as illustrated below:

Route (non-directional)	Minimum Opening Date	Airline	Aircraft	# of Seats	Frequency per Week	Number of Pax per Flight	Load Factor
BKK-SFO	2017	Thai Airways	A350-900	321	6	244	76%

Similar to the LAX and JFK services, the operating conditions such as prevailing wind may affect aircraft performance, and aircraft payload on certain direction may need to be restricted.

Finally, in terms of air service agreements, IATA does not foresee any roadblocks for this route to be operated based on current high level policies in place in Thailand and the United States. This point should, however, be further validated based on the official bilateral agreements in place (not available for consultation by IATA).

#### 4.4.7 Route BKK-YVR

BKK-YVR is an ultra-long-haul route (about 12,000km) that would need to be served by a specific wide-body aircraft capable of operating this distance.

Air Canada is suggested as the operator for this route due to the fact that connecting rates are higher for passengers in YVR traveling to/from Southeast Asia than the rates seen in BKK for passengers traveling to/from North America.

The Boeing 787-8 is suggested as the aircraft to operate this route as it is capable of serving this range of distance at a high frequency (6-weekly). Due to its recent addition to the Air Canada fleet, it also provides a positive passenger experience that will help attract passengers to the new service.

The proposed service would yield an estimated 78% average load factor, as illustrated below:

Route (non-directional)	Minimum Opening Date	Airline	Aircraft	# of Seats	Frequency per Week	Number of Pax per Flight	Load Factor
BKK-YVR	Now	Air Canada	Boeing 787-8	251	6	196	78%

Finally, in terms of air service agreements, IATA does not foresee any roadblocks for this route to be operated based on current high level policies in place in Thailand and Canada. This point should, however, be further validated based on the official bilateral agreements in place (not available for consultation by IATA).

## 5. Conclusions and opportunities

In addition to the development of new air services in the medium term, other opportunities for air service development such as connectivity improvement, route frequency increases, and long-term developments are also presented.

## 5.1 Connectivity improvement

This section identifies poorly connected markets that could be better served by improved connecting times, thereby granting additional access to already existing yet less accessible connecting markets.

IATA examined flights operating to and from BKK for this analysis. A small selection of improvements can be identified based on optimal connecting time-related considerations. Below is a summary of the potential optimizations:

- Thai Airways flight 121 from CNX currently arrives into BKK at 22:10. By bringing the arrival time forward by 40 minutes, it will enable the connections to HND, PEK and ICN.
- Thai Airways flight 476 from SYD currently arrives into BKK at 16:20 and misses the connections to CNX and KBV by 20 minutes. These connections can be enabled by rescheduling the SYD.
- Thai Airways flight 222 from HKT arrives into BKK at 22:00. If the flight can be rescheduled to arrive 30 minutes earlier, it will allow connections onto HND, PEK and ICN.
- Thai Airways flight 491 to AKL currently departs BKK at 18:45. By pushing back the departure time by 20 minutes, it will allow connections from CTU, CAN and HKT.
- Bangkok Airways flight 274 from HKT currently arrives into BKK at 16:05. If the arrival time is brought forward by 20 minutes, it will allow connections to CNX, TDX, LPT and CEI.

## 5.2 Route frequency increase

IATA considered all of the international non-stop routes from Thailand to determine whether the current non-stop supply adequately matches demand. Numerous city pairs from Thailand with inadequate non-stop service were identified.

Due to the fact that most aircrafts fly at only an average 80% load factor, the ideal demand-to-supply ratio should be under 80%. All of the identified routes in the table below have demand-to-supply ratios of greater than 80%.

Origin Airport	Origin Economy	Destination Airport	Destination Economy	2015 OD Demand (PDEW)	Non-stop Seats in 2015 (SDEW)	Demand Excess over Supply (PDEW)	Ratio of Demand to non-Stop Supply
BKK	Thailand	KWL	China	28	6	22	473%
BKK	Thailand	HRB	China	55	20	35	281%
DMK	Thailand	SUB	Indonesia	41	34	7	121%
CNX	Thailand	NNG	China	17	20	-3	85%
KBV	Thailand	CAN	China	150	180	-30	83%
HKT	Thailand	OVV	Russia	28	34	-6	82%
HKT	Thailand	MNL	The Philippines	42	51	-9	82%

Table 10: Description of the route for frequency increase

The two routes that show the greatest opportunities for increased service are in China.

### 5.3 Long-term new route opportunities

As economic growth is expected to continue within Thailand and the APEC region, many of the routes identified in section 4 are expected to become viable in the longer term (approximately eight years):

Origin Airport	Origin Economy	Destination Airport	Destination Economy	2015 OD Demand	2015 Estimated Market Potential	Distance viable for non-stop flight with current technology	Market size adequate for non-stop service in long term	Proposed Route
BKK	Thailand	YYZ	Canada	51	138	✓	✓	Yes
USM	Thailand	PEK	China	50	82	✓	✓	Yes
HKT	Thailand	NRT	Japan	50	77	✓	✓	Yes
USM	Thailand	PVG	China	45	77	✓	✓	Yes
BKK	Thailand	SEA	United States	42	141	✓	✓	Yes

Table 11: Long-term route opportunities to and from Thailand

As seen in Table 11, there are long-term potential routes to various regions within APEC, representing both short- and long-haul segments.



## 5.4 Development of aircraft technology

The latest aircraft available on the market, Airbus' A350-900 and Boeing's B787-9, are capable of flying ultra-long-haul routes. The technical capabilities of these aircraft will allow new direct routes to be operated between APEC economies across the Pacific. The following map illustrates the range limit<sup>1</sup> of the A350-900 and B787-9.



Figure 6: Range limit for the latest generation of aircraft from Bangkok (Source: GCMaP)

## 6. Recommendations to air connectivity

Various recommendations to improve feasibility both generically and specifically for each APEC member economy are presented in this section.

### 6.1 Generic recommendations

Generic recommendations are those that could be applied to all economies, such as greater liberalization of air routes by allowing more access and the elimination of curfews and operational restrictions.

---

<sup>1</sup> For illustration only. Based on published range for the base model of each aircraft type. Specific operating conditions may affect the range of the aircraft.

- Continue to liberalize the air services market to other APEC economies, allowing the fullest access to Thai airports.
- Explore the feasibility to lift potential restrictions in place at Thai airports.

## 6.2 Specific recommendations

- Keep investing in operational safety and efficiency to maintain international standards.
- Ensure that the capabilities and capacity of existing airports remain adequate to cater future demand, particularly in the main international gateways BKK and HKT.

## 6.3 How the APEC economy's regulator can help

- Work closely with different stakeholders, such as the Tourism Authority of Thailand, local chambers of commerce, etc., to gain a deeper understanding of the development of aviation demand.
- Maintain liberal visa requirements for international tourists.
- Reduce the Passenger Movement Charge on international air passengers.

## 7. Appendix

### 7.1 Overview of IATA and IATA Consulting

#### 7.1.1 IATA

IATA – The International Air Transport Association was founded in 1945 as the prime vehicle for inter-airline cooperation in promoting safe, reliable, secure and economical air service for the benefit of the world’s consumers. IATA is fully committed to supporting the commercial aviation industry’s stakeholders and governments in their efforts to achieve profitability and long-term viability.

**IATA’s mission:**

- To represent, lead and serve the airline industry.

**IATA’s vision:**

- To be the force for value creation and innovation, driving a safe, secure and profitable air transport industry that sustainably connects and enriches our world.

**IATA in numbers:**

- 250+ member airlines
- 83% of total air traffic
- \$387B processed by IATA financial systems
- 1,400+ employees
- 54 offices in 53 countries

#### 7.1.2 IATA Consulting

**IATA Consulting overview**

IATA Consulting has comprehensive experience in the full array of business challenges facing the aviation sector. Serving the airline industry for 70 years, IATA has developed unrivalled practical experience, which we bring forth to provide the best solutions to our clients.

With our depth and breadth of aviation industry experience, we assist clients to maximize the value of their operating model, realize growth ambitions and gain insights that translate into sustainable competitive advantages.

IATA Consulting has expertise in the following areas:



#### **SAFETY & FLIGHT OPERATIONS**

Solutions for aviation organizations and airlines to improve safety, efficiency and air transport management.



#### **ENVIRONMENT & ECONOMICS**

Solutions for fulfilling the vision of a safer, more competitive and sustainable aviation industry.



#### **AIRLINES**

Solutions to achieve real and lasting results in every aspect of airline commercial and operational management.



#### **AIRPORTS, PASSENGERS & SECURITY**

Solutions to plan your airport efficiently to avoid costly mistakes and profit from untapped opportunities.



#### **GROUND HANDLING & CARGO**

Solutions to optimize your operations and improve your safety and security while reducing costs.

### **Our Clients**

IATA Consulting has successfully demonstrated its capabilities by providing airlines, airports, tourism offices and other organizations with accurate, unbiased and reliable high quality information and analysis to help them define and understand their markets, while ensuring their long-term facility development and financial success.

IATA is trusted by multiple clients all over the world including airlines, airports, governments and aviation institutions.



### Why IATA Consulting was chosen for this project

IATA has, over time, recruited and retained some of the most highly experienced and capable aviation consulting resources within the aviation industry. Due to its position at the heart of the industry, IATA has access to exceptionally skilled and informed subject matter experts and specialists. IATA Consulting’s objective is to make a positive difference in its clients’ performance, while delivering quality services to all industry stakeholders.

IATA Consulting provides its customers with vast knowledge and expertise in all sectors of the industry worldwide. Our approach has been finely tuned to leverage IATA’s global presence and industry thought leadership position in the development of tailored solutions that fit with local cultural considerations and embody international best practices. Our consultants rely on international state-of-the-art standards, unmatched access to data, and products and expert resources to provide cost-efficient and highly informed solutions.

IATA is backed by a robust set of decision support tools, Airport IS and Pax IS have been essential to undertake this study.



**Airport IS** and **Pax IS** are the most comprehensive aviation databases available in the marketplace, capturing 100% of traffic around the world and bringing together total market supply and demand under a single platform. The data provided is accurate and reliable, as it is captured through IATA’s Billing and Settlement Plan (BSP).

## Bibliography

- Airport Intelligence Services. (2016). *Airport IS reports*. Retrieved from <https://airport-is.com/ais/siteMenu.jsp>
- Albatross Airport. (2016). Retrieved from World Airports Traffic Report: <https://www.airport-information.com/data/>
- Australian Airports Association. (2015). *Liberalising Australia's Air Services Agreements: An Economic Opportunity*. Retrieved from <https://airports.asn.au/web/dev/uploads/others/Deliotte%20Executive%20Overview%20-%20An%20Economic%20Opportunity%20August%202015.pdf>
- Belobaba, P. (2015). *The Global Airline Industry*. Wiley Publishing.
- Central Intelligence Agency. (2015). *World Factbook*. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/th.html>
- IATA. (2016, February 18). *Thailand must act to ensure benefits from aviation*. Retrieved from IATA: <http://airlines.iata.org/agenda/thailand-must-act-to-ensure-benefits-from-aviation>
- ICF International. (2014). *Successful Air Service Development*.
- International Monetary Fund. (2016). *List of per capita nominal GDP for countries and dependencies*. Retrieved from <http://www.imf.org/external/index.htm>
- Oxford Economics. (2011). *Economic Benefits from Air Transport in Thailand*. Retrieved from <https://www.iata.org/policy/Documents/Benefits-of-Aviation-Thailand-2011.pdf>
- Swan, W. (2008). *Forecasting Air Travel with Open Skies*. Retrieved from Seabury Airline Planning Group: [www.sauder.ubc.ca/.../Forecasting%20Asia%20Open%20Skies.ashx](http://www.sauder.ubc.ca/.../Forecasting%20Asia%20Open%20Skies.ashx)
- The World Bank. (2016). Retrieved from Urban Population : <http://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS>
- World Travel and Tourism Council. (2015). *Travel and Tourism Economic Impact*. Retrieved from <http://www.wttc.org/-/media/files/reports/economic%20impact%20research/countries%202015/thailand2015.pdf>

Produced by



**International Air Transport Association**

Head Office Canada:

800 Place Victoria, PO Box 113

Montreal H4Z 1M1, Quebec,

Canada

[www.iata.org/consulting](http://www.iata.org/consulting)

For

Asia-Pacific Economic Cooperation Secretariat

35 Heng Mui Keng Terrace

Singapore 119616

Tel: (65) 68919 600

Fax: (65) 68919 690

Email: [info@apec.org](mailto:info@apec.org)

Website: [www.apec.org](http://www.apec.org)

© 2016 APEC Secretariat

APEC#216-TO-01.20