

**KINGDOM OF CAMBODIA  
STATE SECRETARIAT OF CIVIL AVIATION**



**CAMBODIA STATE ACTION PLAN  
TO REDUCE CIVIL AVIATION  
CO2 EMISSIONS**

**2022-2025**

“Revision History: SAP:V0.1”

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## 1. BACKGROUND INFORMATION AND CONTACTS

### 1.1 Contact Information

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### 1.2 Overview of Cambodia International Aviation

Responsibility for regulation of civil aviation has been based in different ministries of the Government of Cambodia, finally evolving into the present regulatory agency, the State Secretariat for Civil Aviation (SSCA), which now reports directly to the Council of Ministers

At present, Cambodia has five carriers operating: Cambodia Angkor Air, JC (Cambodia) International Airlines, Cambodia Airways, Sky Angkor Airlines and Lanmei Airlines (Cambodia). In March 2019 KC International Airlines, a Cambodian Chinese joint venture full-service airline based at Phnom Penh International Airport, ceased its operations. Prince International Airlines received its air operator certificate (AOC) in 2020 but it has not yet operating flights. 80 per cent of the air routes are dominated by the Chinese market.

The State Secretariat of Civil Aviation (SSCA) oversees the operations of all airports in Cambodia. VINCI Airports (Cambodia Airports or SCA) manages the 3 international airports in Cambodia; Phnom Penh, Siem Reap, and Sihanoukville. A public-private partnership was signed with the Royal Government of Cambodia in 1995, which gives Cambodia Airports the concession for the development and management of Cambodia's network of international airports for 45 years. In 2019, the Phnom Penh International Airport was awarded the best Asia Pacific regional airports for smaller airports category by the CAPA Centre of Aviation<sup>1</sup>.

<sup>1</sup> <https://www.b2b-cambodia.com/articles/airports-in-cambodia/>



Cambodia experienced a rapid progress over the past two decades due to a buoyant tourism industry, where aviation was a key contributor. In 2018, the three international airports, for the first time, hit a milestone of 10 million passengers<sup>2</sup>.

By the end of 2019 there were 44 airlines operating from the three international airports, also serving more than 60 destinations globally. In 2020 and 2021, Cambodia's aviation industry was severely impacted by the COVID-19 pandemic since the country Cambodia's passenger traffic through the three international airports in 2020 took a 81.3 per cent nosedive from 2019, while cargo traffic dropped 29.9 per cent<sup>3</sup>. Numbers plummeted also in 2021 as air passengers coming through Cambodia's airports dropped by 92 per cent in the first half of 2021<sup>4</sup>.

Cambodia Airports, a joint venture owned at 70% by VINCI Airports of France and 30% by Muhibbah MMC of Malaysia/Cambodia presently runs the country's three international air gateways at Phnom Penh, Siem Reap and Sihanoukville. Thoroughly dependent on the tourism sector, and with 80% of the air route dominated by the Chinese market, the Cambodian aviation sector has strongly been recently impacted by Covid-19 travelling restrictions and the recovery is still unclear.<sup>5</sup>

Following a meeting of all stakeholders to discuss the draft State Action plan (2<sup>nd</sup> March 2023) the representative from the Ministry of Environment stated that the reduction of international carbon emissions in the aviation sector is aligned with the national work with the NDC and the latest announcement of the Prime Minister stating that Cambodia will reach the carbon net zero target by 2050.

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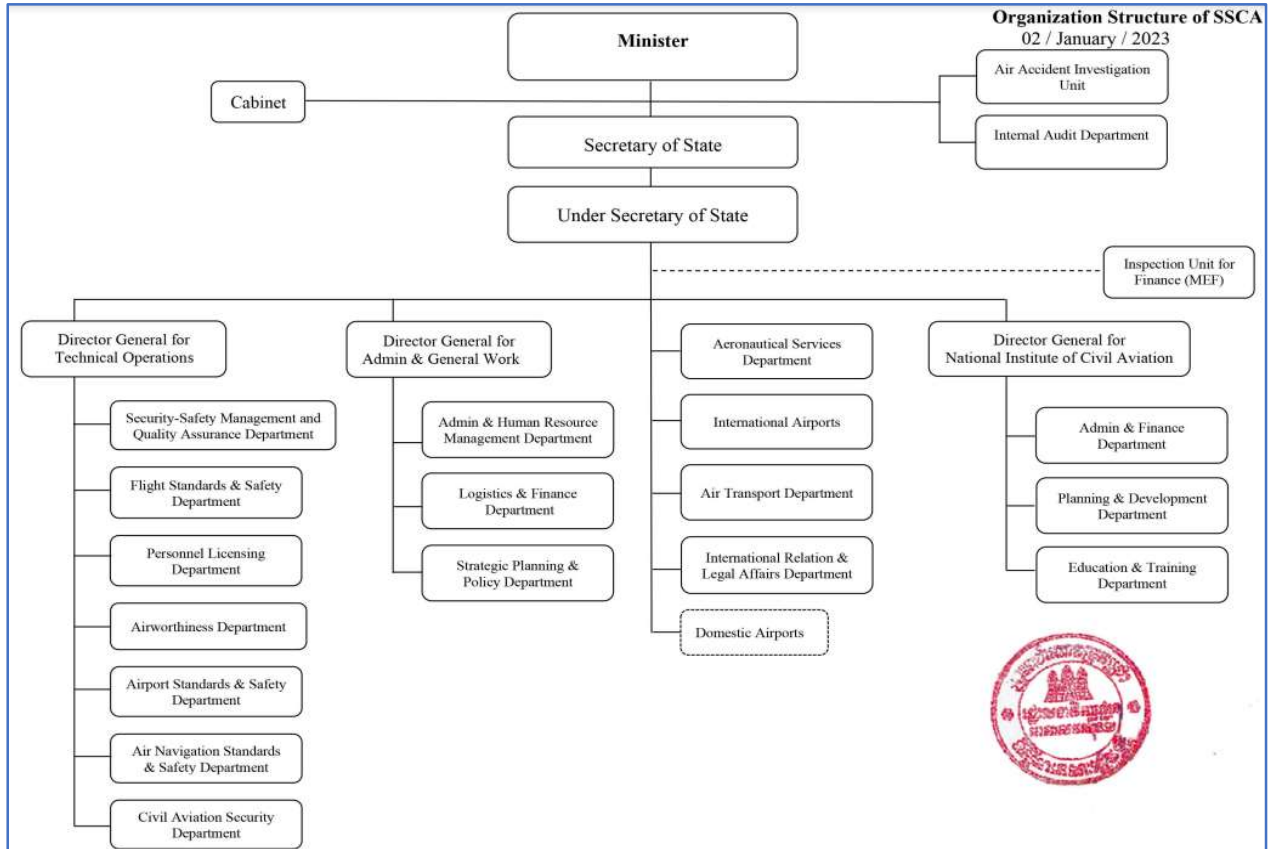
<sup>2</sup> <https://www.b2b-cambodia.com/articles/airports-in-cambodia/>

<sup>3</sup> <https://www.phnompenhpost.com/business/>

<sup>4</sup> <https://www.phnompenhpost.com/business/>

<sup>5</sup> <https://www.phnompenhpost.com/special-reports/cambodias-aviation-sector-operating-wing-and-prayer/>

### 1.3 Regulatory Structure of Aviation Industry in Cambodia



### 1.4 Environment/climate change in Cambodia

An SSCA’s outlook released in 2018 projected Cambodia’s passenger growth to be more than 18 million in 2034<sup>6</sup>. However, given the uncertain aviation recovery scenarios and the lack of updated official forecasted data, it is not possible to estimate what the growth in Cambodia will be.

### 1.5 Analysis of stakeholders in the aviation sector

#### 1.5.1. Details of airlines

Currently, airlines registered in Cambodia operating international routes are as follows:

AIRLINES	IATA	ICAO	CALL SIGN
Lanmei Airlines	LQ	MKR	AIR LANME
Sky Angkor	ZA	SWM	SKY ANGKOR
Cambodia Angkor	K6	KHV	CAMBODIA AIR
Cambodia Airways	KR	KME	GIANT IBIS
JC	QD	JCC	CAMBO

<sup>6</sup> <https://www.phnompenhpost.com/special-reports/aviation-industry-flight-path-turbulence>

New operators seem to be ready to start operating in the near future. AirAsia Cambodia has announced start of operations in 2024<sup>7</sup> and existing airlines are acquiring new aircraft and developing their route network.

### 1.5.2 Airports

VINCI Airports, through its subsidiary Cambodia Airports, has developed and operated since 1995 the country's 3 international airports.

Airport name	City/Province served	ICAO	IATA	Operator Name
Phnom Penh	Phnom Penh	PNH	VDPP	Cambodia Airports
Siem Reap	Siem Reap	REP	VDSR	Cambodia Airports
Sihanouk	Sihanoukville	KOS	VDSV	Cambodia Airports

### 1.5.3 Air Navigation Service Provider (CATS)

Cambodia Air Traffic Services Company Limited (CATS), Cambodia's Air Navigation Service Provider (ANSP), was established in April 2001 by SMART Corporation Public Company Limited. CATS is in charge of developing and operating the air traffic control and navigation systems in Cambodia under the Build, Corporate and Transfer (BCT) terms and conditions.

CATS provides air traffic services which consists of air traffic control service, flight information service and alerting service in accordance with national and international standards and regulations to ensure safety, expeditious and orderliness of air traffic across Cambodian airspace.

Aerodrome control service is provided by control tower at each airport to landing and departing aircraft within 10 nautical mile radius of the airport from ground to 3,000 feet. This service is currently provided at all the international airports in Cambodia, namely Phnom Penh, Siem Reap and Sihanouk.

For the year 2017, CATS handled 157,926 flight movements which increased by 14.2% from the previous year. In order to enhance the quality of its services, CATS has developed advanced ATS infrastructure at 1 Area Control Centre (ACC), 3 Approach Control Units (APP) and 6 Aerodrome Control Tower (TWR) with 3 secondary surveillance radar systems supplemented by 3 ADS-B ground stations and 2 Multilateration (MLAT), 3 DVOR/DME stations, and Air-Ground VHF Radio System with 3 extended-range Remote Control Air-Ground Stations<sup>8</sup>.

<sup>7</sup> <https://www.khmertimeskh.com/501212110/aviation-sector-to-soar-to-new-heights-in-2023/>

<sup>8</sup> <https://www.cats.com.kh/about-us-who-we-are.php>



## 1.6 Trends of the aviation sector in Cambodia

The COVID Pandemic of 2020/21 hit Cambodia hard with extreme travel restrictions during this period. It now remains to be seen how the industry can re-establish itself with pre-pandemic levels of growth.

This is discussed further in Section 2 as we try to establish a baseline based on historic data and predict a business as usual (BAU) scenario up to 2030.

### 1.6.1 Numbers of passenger from 2016 until 2020

The following data has been sourced from publicly available information<sup>9</sup>. The data is limited to international passenger s only and does not include domestic or cargo information.

YEAR	Number of passenger (person)	Number of passenger (person)	Numbers of Air Cargo (kilograms)	Numbers of Air Cargo (kilograms)
	(Dom & Int)	(Int)	(Dom & Int)	(Int)
2016		1,047,394		
2017		1,305,297		
2018		1,411,059		
2019		1,429,503		
2020		609,564		

## 2. BASELINE AND EXPECTED RESULTS

### 2.1 Trend in Air Traffic Statistical data and GHG Estimation

As prescribed by ICAO Doc 9988, States must report fuel consumption and traffic through Statistical Air Transport Reporting Form M — *Fuel Consumption and Traffic — International and Total Services, Commercial Air Carriers* on an annual basis.

Unfortunately, at the current time, no data has been submitted by Cambodian airlines using the ICAO Statistics forms.

The current baseline has been created based on data provided by the airlines for the period 2019-2021 from the CORSIA CERT exercise. Of the five airlines that data was provided for, only two of them seem to have verified CERT Emission Reports.

<sup>9</sup> <https://data.worldbank.org/indicator/IS.AIR.PSGR?locations=KH>





Generally, then, the data used to construct this baseline was less than ideal, being partial and of varying qualities. The quality of the resulting baseline also suffers from the fact that the period covers the time of the COVID-19 pandemic, when air traffic globally was significantly impacted and the number of operations during 2020 and 2021 could not be considered at all typical.

The following table, which follows the recommended ICAO format, has been populated with aggregated data from the CERT emissions reports. Only the data “CO2 emissions in Tonnes” (F) has been transposed.

Year	Fuel Burnt (FB)		RTK	FB/RTK		CO <sub>2</sub> Emission
	(LIT)	Tonnes	0 0 0 (Tonnes×km)	LIT/RTK	kg/RTK	Tonnes
	[A]	[B]	[C]	[D] = [A]/[C]	[ E] = ([B]/[C])/1000	[ F] = [ B] x 3.16
2019						384397
2020						111398
2021						56771

## 2.2 Development of Business-as-usual Scenario (expected results)

As only CERT Emission Report data was available, it was not possible to understand the historic RTK growth. RTK data is an important historical statistic to understand and predict future demand.

A further weakness (for the moment) is the assumption about the level of operations in 2022.

At this time, initial CERT 3 step data has been obtained for just 2 airlines for 2022. This does however give some idea about the relative number of operations compared with 2019. For the two airlines where data was available, 2022 traffic was only between 17 and 22% of 2019 operations. Media reports seem to indicate the same order of magnitude. Traffic levels in 2022 were reported to be around 78% down on 2019 levels.<sup>10</sup>

So, our original estimate at a little over 50% of the 2019 traffic, turned out to be over optimistic (not pessimistic!). For 2023, we now estimate traffic to be around 35% of 2019 traffic.

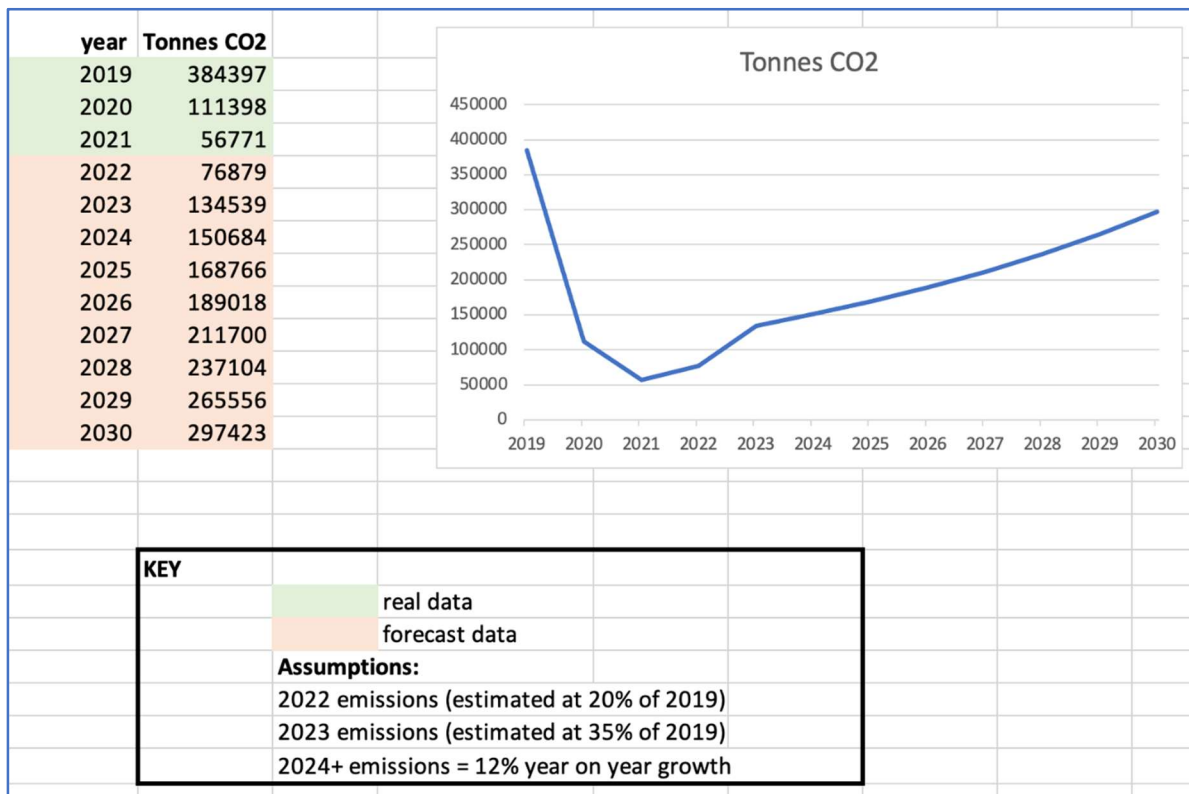
<sup>10</sup> <https://www.khmertimeskh.com/501152358/aviation-sector-expects-number-of-air-passengers-to-surge-survey/>



The assumption has been made that from 2024, traffic will now grow at 12%/year, a figure that may have been seen as quite aggressive in pre-pandemic times. In particularly in Cambodia, where restrictions suppressed demand for a longer period than, for example in Europe, we might expect to see traffic to grow very quickly in the coming years, as has been seen already in Europe.

It can be seen from the uncertainties discussed above, that real data for operations and RTK is essential for managing carbon emissions. Steps are now being taken (through the workshop to be held March 2023) to ensure that in future, all airlines operating internationally will report their fuel and RTK via the standard ICAO Statistics Forms (A, C & M).

The following chart shows one scenario of potential CO2 emissions up to 2030 considering the assumptions above:



It can be observed that even with this optimistic scenario, predicted CO2 emissions in 2030 will still be significantly less (~23% less) than pre-pandemic (2019) levels.

### 3. MITIGATION MEASURES

- a) a description of the action and an indication of its type (operational, technological, market-based, etc.);
- b) time horizon (start date and date of full implementation);
- c) anticipated change in fuel consumption and/or CO2 emissions;



- d) *economic cost and how it will be covered (domestic sources, regional funding, international assistance, etc.);*
- e) *supplemental benefits for domestic sectors (mainly for domestic aviation, but others could also be reported, if appropriate);*
- f) *reference to any relevant legislation;*
- g) *identification of any barriers to implementation and any assistance needed; and*
- h) *list of stakeholders involved.*

After discussions with SSCA operational stakeholders, including internationally operating airlines and airports, as well as the ANSP (CATS), a number of mitigation measures have been identified that could be expected to deliver CO2 savings in the next few years.

The review cycle of the SAP is normally taken to be around every 3 years, however in the circumstances of the global pandemic, and fact that 2022 has been elected as the starting point for this edition of the SAP, the period from 2022-2024 is proposed to be the scope for this action plan.

Progress and monitoring should be conducted annually.

A summary of the mitigation measures is presented here and details follow in the pages after:

	<b>Mitigation Measure</b>	<b>Basket of Measures Category</b>	<b>Stakeholder</b>
1	TMA & Enroute flight efficiency	Operational Improvements	Airlines/ANSP
2	Reduce on-stand APU usage	Operational Improvements	Airports
3	Taxi time reduction	Operational Improvements	Airports/Airlines
4	New Airport Infrastructure	Operational Improvements	Airports



Title	TMA & Enroute flight efficiency
Description	Increase TMA & Enroute flight efficiency and reduce overall route extension to bring flown distance to be closer to Great Circle (direct) route
Category-	Operational Improvements
Measure	Increase TMA & Enroute flight efficiency and reduce overall route extension
Action	Cooperating airlines will analyse historical data to understand current route extensions on their different international routes. Through actions both within their own flight planning and in collaboration with CATS and regional ANSPs (ASEAN group) improvements will be sought to reduce track miles.
Start Date	
End Date	
INDICATOR	%Annual reduction in route extension (by route and average)
BASELINE	Try to assess baseline route extension in 2022
EXPECTED BENEFITS IN TERMS OF CO2 REDUCTION	
Date of full implementation	
Economic cost	
Currency	
Reference to existing legislation	
Legislation is proposed	
Compliance	
Assistance needed	Possible assistance in analysing operations data
Amount of assistance needed	
Currency for financial assistance	
List of stakeholders involved	Airlines/ANSP
After three-year compliance period: REPORTING OUTPUTS in terms of CO2 reduction	



Title	Reduce on-stand APU usage
Description	Reduce on-stand APU usage through increasing uptake of on-stand PCA and 400Hz power as well as mobile GPUs.
Category-	Operational Improvements
Measure	Increase (as a %) the uptake of on-stand PCA and 400Hz power (compared with the base year) both at Cambodian airports and internationally
Action	Remove objections and barriers to using on-stand facilities compared with APU
Start Date	
End Date	
INDICATOR	% Uptake of PCA and 400Hz
BASELINE	2022
EXPECTED BENEFITS IN TERMS OF CO2 REDUCTION	Benefits will be calculated based using PNH inhouse Power BI reporting tool
Date of full implementation	
Economic cost	
Currency	
Reference to existing legislation	
Legislation is proposed	
Compliance	
Assistance needed	
Amount of assistance needed	
Currency for financial assistance	
List of stakeholders involved	Airport/Airlines
After three-year compliance period: REPORTING OUTPUTS in terms of CO2 reduction	



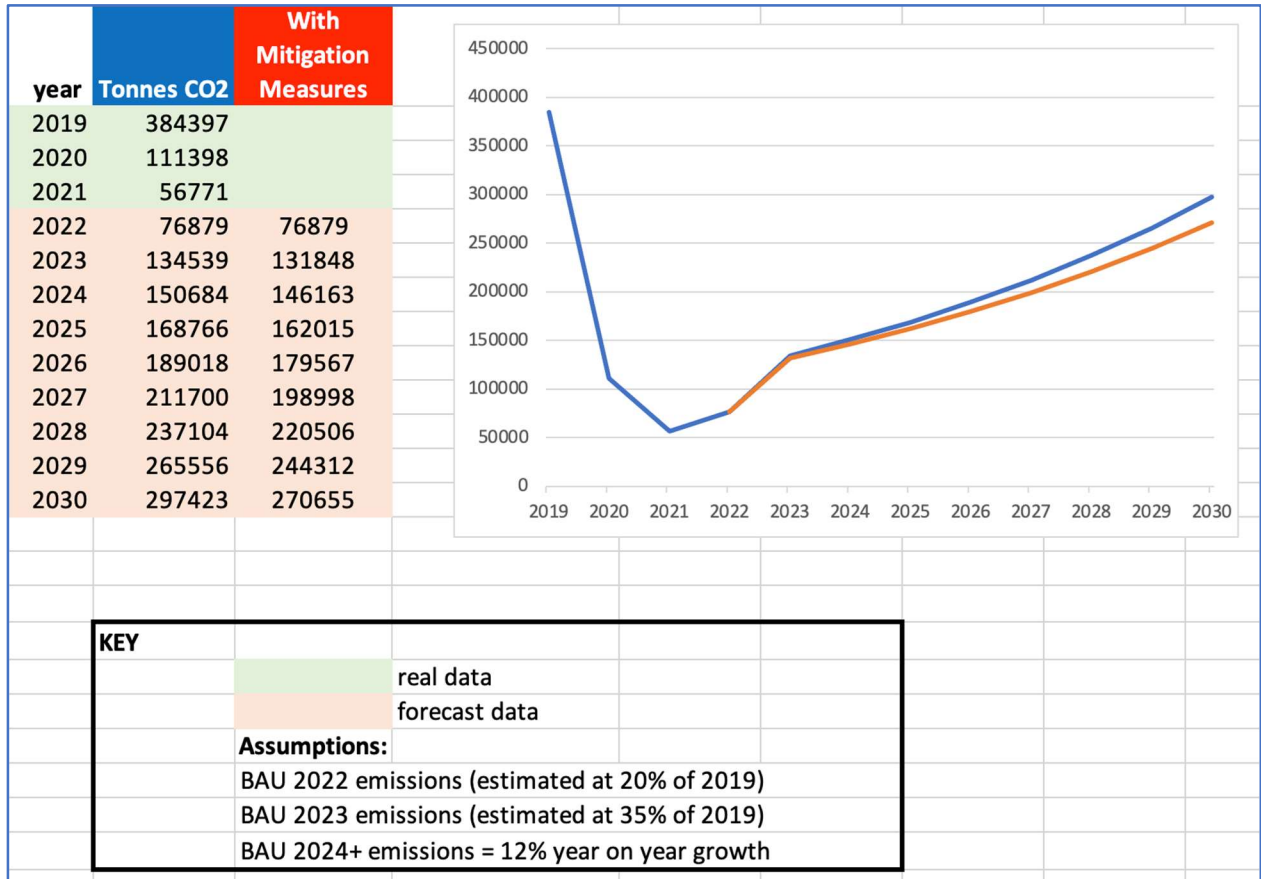
Title	Implementing Single Engine Taxiing
Description	The objective of this measure is to reduce the carbon emissions during taxi operations (compared to the baseline) by introducing airline policy to use SET where feasible (at least for taxi-in)
Category-	Operational Improvements
Measure	To allow single engine taxi (SET)
Action	State to publish circular to Airlines to consider implementation of SET (at their own discretion).
Start Date	
End Date	
INDICATOR	Number of airlines to use single engine taxi (self declaration)
BASELINE	2022
EXPECTED BENEFITS IN TERMS OF CO2 REDUCTION	
Date of full implementation	
Economic cost	
Currency	
Reference to existing legislation	
Legislation is proposed	
Compliance	
Assistance needed	
Amount of assistance needed	
Currency for financial assistance	
List of stakeholders involved	State (SCCA), CATS & Airlines
After three-year compliance period: REPORTING OUTPUTS in terms of CO2 reduction	



Title	New Airport Infrastructure
Description	Potential infrastructure investments could deliver benefits in terms of more enhanced ground movements (taxiing) and new on-stand PCA and 400Hz power.
Category-	Operational Improvements
Measure	With the construction of the new terminal and associated infrastructures, the taxi time and runway movements will be optimized
Action	New terminal to be located closer to the runway middle point with a partial parallel taxiway to facilitate runway access
Start Date	2023
End Date	2025/2026
INDICATOR	Based on average taxi time (before and after project)
BASELINE	2022
EXPECTED BENEFITS IN TERMS OF CO2 REDUCTION	
Date of full implementation	Upon completion of the new terminal (2025)
Economic cost	
Currency	
Reference to existing legislation	
Legislation is proposed	
Compliance	
Assistance needed	
Amount of assistance needed	
Currency for financial assistance	
List of stakeholders involved	Sihanouk International Airport
After three-year compliance period: REPORTING OUTPUTS in terms of CO2 reduction	



An illustration and estimation of the potential benefits, in terms of CO2 reduction, that could result from the implementation of these 4 mitigation measures, is shown in the following graphic:



The cumulative benefit has been estimated at around 2% by the end of 2023 to possibly around 9% in 2030 if the full potential of the 4 mitigation measures were to be achieved. This would mean a potential saving of more than 25,000 Tonnes of CO2 in the year 2030 and over 100,000 Tonnes cumulatively since 2023.