


**FIJI's  
STATE ACTION PLAN FOR THE REDUCTION  
OF AVIATION GREENHOUSE GAS  
EMISSIONS**

**ICAO CAPACITY BUILDING SEMINAR ON LOW EMISSIONS AVIATION MEASURES  
23-24<sup>TH</sup> MAY 2018, NADI FIJI**

# OBJECTIVE

- ▶ **To present an overview of Fiji's State Action Plan for the reduction of aviation GHG emissions**
  - ▶ **To highlight challenges encountered by Fiji in the compilation of the plan and what actions we will employ moving forward**
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- A decorative graphic consisting of several parallel white lines of varying lengths, slanted upwards from left to right, located in the bottom right corner of the slide.

# OUTLINE

- ▶ **SETTING THE SCENE**
  - ▶ **FIJI'S MAJOR PLAYERS**
  - ▶ **OVERVIEW OF FIJI'S STATE ACTION PLAN (SAP)**
  - ▶ **BRIEF ON DEVELOPMENT OF FIJI'S SAP**
  - ▶ **CHALLENGES FACED**
  - ▶ **MOVING FORWARD**
  - ▶ **QUESTIONS?**
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# SETTING THE SCENE

- ▶ **CAA Fiji - provides aviation safety oversight of Fiji's civil aviation industry**
- ▶ **Under the Chicago Convention, Fiji through Fiji Airports, provides air navigation services to aircraft operating within the Nadi Flight Information Region (FIR)**
- ▶ **The Nadi FIR**
  - ▶ **area of 6.5 million square kilometers**
  - ▶ **lies between longitudes 163°East and 170°West and latitudes 0330°North and 30°South**
  - ▶ **includes the sovereign air space above Fiji, Tuvalu, New Caledonia, Kiribati and Vanuatu.**

# SETTING THE SCENE

## ▶ Fiji

- ▶ ~333 islands with total land area ~18,300 km<sup>2</sup>
- ▶ 2 International aerodromes & 22 Domestic aerodromes
- ▶ 1 International/Regional “National” carrier
- ▶ 13 domestic carriers
- ▶ Tourism is Fiji’s largest foreign exchange earner
- ▶ Air transport represents the most viable means of international/regional transportation to support tourism, trade and commerce
- ▶ Transport sector accounts for 12% of national GDP

# MAJOR PLAYERS

## FIJI AIRPORTS

- ▶ **Government Commercial Company**
- ▶ **Owns and operates the Nadi International Airport and manages Nausori International Airport and 13 other domestic outer island airports on behalf of the Government.**
- ▶ **Provides air navigation services in the Nadi FIR**

## FIJI AIRWAYS

- ▶ **Fiji's national carrier**
- ▶ **Majority shares owned by government**
- ▶ **Modern Boeing aircraft; 5 Boeing 737 and 5 Airbus A330 aircraft**
- ▶ **Subsidiary Fiji Link operates ATR 72-600, ATR 42-500 and DHC6 aircraft which service the domestic and regional routes**

# FIJI'S STATE ACTION PLAN - OVERVIEW

## Meet ICAO Assembly Resolution A38-18

### Fiji's Plan

- ▶ Details Fiji's strategies to address international aviation emissions
- ▶ Attempts to quantify effectiveness of actions identified to meet the global goals set by Assembly Resolution A38-18
- ▶ divided into five sections:
  - Section 1 — Background information and contacts
  - Section 2 — Baseline
  - Section 3 — Measures to mitigate CO2 emissions
  - Section 4 – Expected results
  - Section 5 – Assistance needs

Submitted to ICAO - 02<sup>nd</sup> September 2015

- ▶ ICAO Interactive Web Interface - Action Plan Website (APER - Action Plan on Emission Reduction)

# DEVELOPMENT OF THE FIJI SAP

**ICAO Doc 9988 'Guidance on the Development of States' Action Plans on CO<sub>2</sub> Emissions Reduction Activities'** *very useful in the compilation of plan*

## Baseline established

- ▶ only International emissions taken into consideration
- ▶ Doc 9988 method 3 utilized; single base year value used and the future fuel efficiency assumed to be constant
- ▶ Fiji's "Baseline year" used - 2010
- ▶ Estimated fuel consumption and CO<sub>2</sub> emissions for international aviation for 2010 calculated using ICAO calculation tools (IFSET) available on the APER website



# DEVELOPMENT OF THE FIJI SAP

## Methodology -

### 1. Obtained historical data

**Aircraft movement data from aircraft flight movement schedule for 2010.**

*Note:-Only scheduled flights were taken into account.*

**2. Data entered into the ICAO Carbon Emissions Calculator and the CO2 emissions in kg for all flights extrapolated.**

**3. “Establishing the baseline calculator” was then used to enter data pertaining to Fuel consumption in litres and RTK to obtain fuel efficiency**

**a. The international scheduled RTK by State of Air Operator Certificate (AOC) as published by ICAO in its Annual Report (2012) was used to obtain Fiji's RTK**

**b. The annual international RTK growth rate of 6.30% based on ICAO Circular 313 for the Asia/Pacific region was used as the forecasted traffic growth rate (RTK)**

# DEVELOPMENT OF THE FIJI SAP

YEAR	INTERNATIONAL RTK ('000)	INTERNATIONAL FUEL BURN (LITRES)	INTERNATIONAL CO2 EMISSIONS (kg)
2010	408, 946.31	292, 062, 050	737,631,913

## BASELINE FORECAST

YEAR	International Fuel (litres)	International CO2 emissions (kg)
2010	292,062,050.00	737,631,913.48
2011	310,461,959.15	784,102,724.03
2018	476,147,211.64	1,202,557,397.72
2019	506,144,485.97	1,278,318,513.78
2049	3,164,262,071.81	7,991,660,288.55
2050	3,363,610,582.33	8,495,134,886.73

# MEASURES TO MITIGATE CO2 EMISSIONS

**Assembly Resolution A38-18 recommends;**

***“action plans should include information on the basket of measures considered by States, reflecting their respective national capacities and circumstances, and information on any specific assistance needs”.***

**Reviewed categories constituting the basket of measures endorsed by the High-Level Meeting on International Aviation and Climate Change and developed proposed actions in these areas.**

# MEASURES TO MITIGATE CO2 EMISSIONS

BASKET OF MEASURES	Fiji's proposed actions
aircraft-related technology development;	Replacement of the national carriers aging aircraft. B747s (1989)/B767 (1994) replaced with more fuel efficient aircraft; A330s and B737-800 series.
improved air traffic management and related infrastructure use	ASBU methodology used to upgrade Fiji's ANS capabilities:- <ul style="list-style-type: none"> <li>• New ATM system (more efficient use of airspace, optimum routing/levels)</li> <li>• Improved enhanced en-route trajectories; UPR and DARPs</li> <li>• Implementation of ADS-B/ATC Surveillance Control</li> <li>• PBN initiatives; PBN departures, RNAV/GNSS approaches, introduction of STARs, introduction of RNP-AR approach</li> <li>• Introduction of CCO and CDO</li> </ul>
more efficient operations	Aircraft operational approvals (e.g. PBCS – RNP4) to facilitate UPR/DARP and special departure tracks with reduced track miles Vs normal SIDs
airport improvements	LED lights replacing classic runway lights, use of Solar panels
regulatory measures/other	State has mandated carriage of ADS-B Workshops/Seminars to educate and drive mitigation actions
alternative fuels	Still in exploratory stage
economic/market-based measures	Still in exploratory stage

BASELINE FORECAST		
Year	International Fuel (litres)	International CO2 emissions (kg)
2010	292,062,050.00	737,631,913.48
2011	310,461,959.15	784,102,724.03
2012	330,021,062.58	833,501,195.64
2013	350,812,389.52	886,011,770.97
2014	372,913,570.06	941,830,512.54
2015	396,407,124.97	1,001,165,834.83
2016	421,380,773.85	1,064,239,282.42
2017	447,927,762.60	1,131,286,357.22
2018	476,147,211.64	1,202,557,397.72
2019	506,144,485.97	1,278,318,513.78
2020	538,031,588.59	1,358,852,580.15
2021	571,927,578.67	1,444,460,292.69
2022	607,959,016.13	1,535,461,291.13
2023	646,260,434.14	1,632,195,352.48
2024	686,974,841.50	1,735,023,659.68
2025	730,254,256.51	1,844,330,150.24
2026	776,260,274.67	1,960,522,949.71
2027	825,164,671.97	2,084,035,895.54
2028	877,150,046.31	2,215,330,156.96
2029	932,410,499.23	2,354,895,956.85
2030	991,152,360.68	2,503,254,402.13
2031	1,053,594,959.40	2,660,959,429.46
2032	1,119,971,441.84	2,828,599,873.52
2033	1,190,529,642.68	3,006,801,665.55
2034	1,265,533,010.17	3,196,230,170.48
2035	1,345,261,589.81	3,397,592,671.22
2036	1,430,013,069.97	3,611,641,009.51
2037	1,520,103,893.37	3,839,174,393.10
2038	1,615,870,438.66	4,081,042,379.87
2039	1,717,670,276.29	4,338,148,049.80
2040	1,825,883,503.70	4,611,451,376.94
2041	1,940,914,164.43	4,901,972,813.69
2042	2,063,191,756.79	5,210,797,100.95
2043	2,193,172,837.47	5,539,077,318.31
2044	2,331,342,726.23	5,888,039,189.36
2045	2,478,217,317.98	6,258,985,658.29
2046	2,634,345,009.01	6,653,301,754.76
2047	2,800,308,744.58	7,072,459,765.31
2048	2,976,728,195.49	7,518,024,730.53
2049	3,164,262,071.81	7,991,660,288.55
2050	3,363,610,582.33	8,495,134,886.73

Year	International RTK	International Fuel (litres)	International Fuel Efficiency	International CO2 Emissions (kg)
2010	408,946,313.00	292,062,050.00	0.714	737,631,913.48
2011	434,709,930.72	310,461,959.15	0.714	784,102,724.03
2012	462,096,656.35	329,942,087.58	0.714	833,301,736.38
2013	491,208,745.70	326,306,345.77	0.664	824,119,306.87
2014	522,154,896.68	348,407,526.31	0.667	879,938,048.44
2015	555,050,655.18	371,901,081.22	0.670	939,273,370.73
2016	590,018,846.45	396,874,730.10	0.673	1,002,346,818.33
2017	627,190,033.78	422,526,068.85	0.674	1,067,131,839.48
2018	666,703,005.91	450,745,517.89	0.676	1,138,402,879.99
2019	708,705,295.28	480,742,792.22	0.678	1,214,163,996.04
2020	753,353,728.88	512,629,894.84	0.680	1,294,698,062.41
2021	800,815,013.80	546,525,884.92	0.682	1,380,305,774.96
2022	851,266,359.67	582,557,322.38	0.684	1,471,306,773.40
2023	904,896,140.33	620,858,740.39	0.686	1,568,040,834.74
2024	961,904,597.17	661,573,147.75	0.688	1,670,869,141.95
2025	1,022,504,586.79	704,852,562.76	0.689	1,780,175,632.51
2026	1,086,922,375.76	750,858,580.92	0.691	1,896,368,431.97
2027	1,155,398,485.43	799,762,978.22	0.692	2,019,881,377.80
2028	1,228,188,590.01	851,748,352.56	0.693	2,151,175,639.22
2029	1,305,564,471.18	907,008,805.48	0.695	2,290,741,439.11
2030	1,387,815,032.87	965,750,666.93	0.696	2,439,099,884.39
2031	1,475,247,379.94	1,028,193,265.65	0.697	2,596,804,911.73
2032	1,568,187,964.88	1,094,569,748.09	0.698	2,764,445,355.78
2033	1,666,983,806.66	1,165,127,948.93	0.699	2,942,647,147.81
2034	1,772,003,786.48	1,240,131,316.42	0.700	3,132,075,652.74
2035	1,883,640,025.03	1,319,859,896.06	0.701	3,333,438,153.48
2036	2,002,309,346.61	1,404,611,376.22	0.701	3,547,486,491.77
2037	2,128,454,835.44	1,494,702,199.62	0.702	3,775,019,875.37
2038	2,262,547,490.08	1,590,468,744.91	0.703	4,016,887,862.14
2039	2,405,087,981.95	1,692,268,582.54	0.704	4,273,993,532.07
2040	2,556,608,524.81	1,800,481,809.95	0.704	4,547,296,859.20
2041	2,717,674,861.88	1,915,512,470.68	0.705	4,837,818,295.95
2042	2,888,888,378.18	2,037,790,063.04	0.705	5,146,642,583.21
2043	3,070,888,346.00	2,167,771,143.72	0.706	5,474,922,800.57
2044	3,264,354,311.80	2,305,941,032.48	0.706	5,823,884,671.63
2045	3,470,008,633.44	2,452,815,624.23	0.707	6,194,831,140.56
2046	3,688,619,177.35	2,608,943,315.26	0.707	6,589,147,237.03
2047	3,921,002,185.52	2,774,907,050.83	0.708	7,008,305,247.58
2048	4,168,025,323.21	2,951,326,501.74	0.708	7,453,870,212.79
2049	4,430,610,918.57	3,138,860,378.06	0.708	7,927,505,770.82
2050	4,709,739,406.44	3,338,208,888.58	0.709	8,430,980,369.00

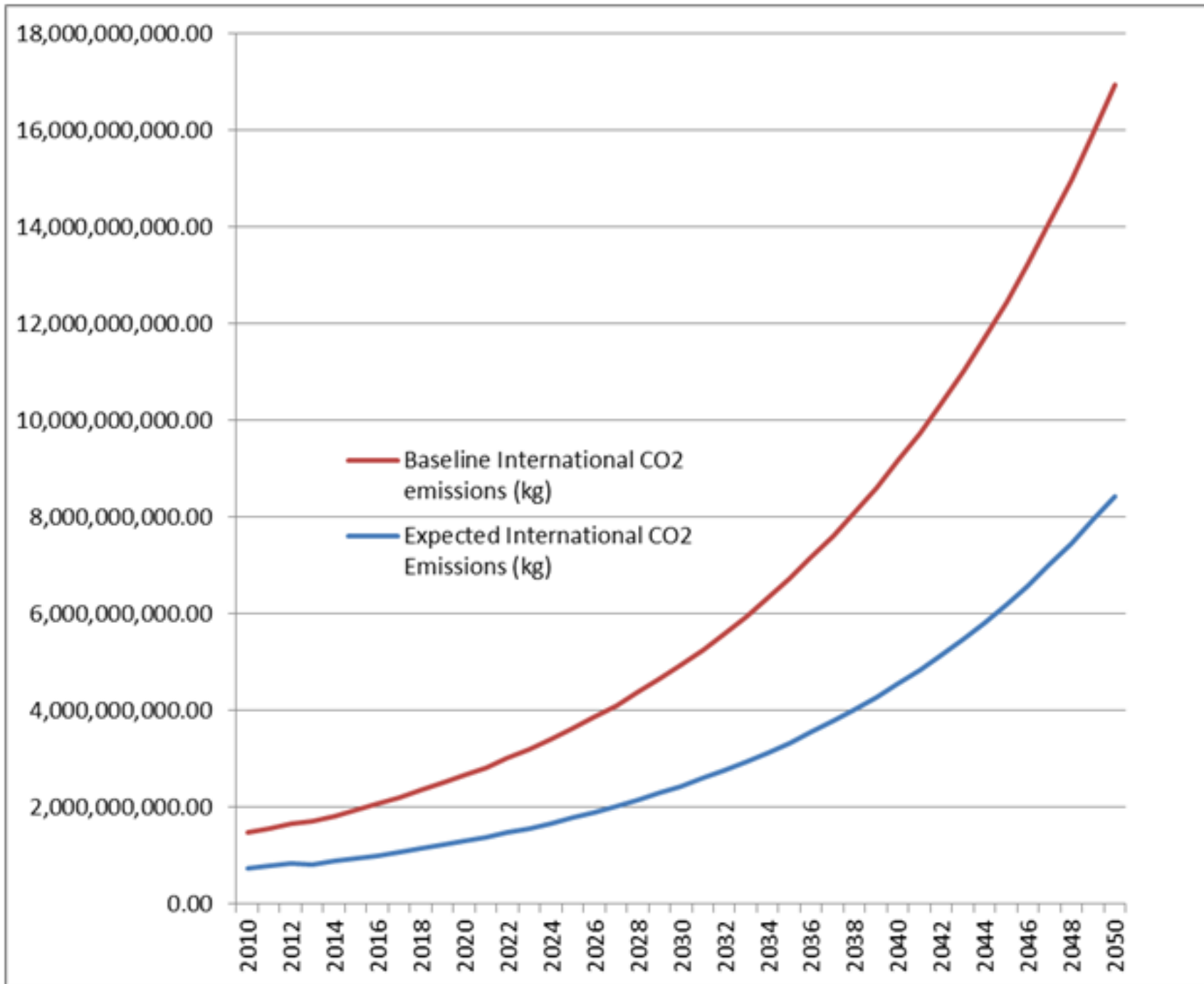


Figure 1 Comparison between Baseline and Expected Emissions

# CHALLENGES FACED

## Difficulty in obtaining data required

- ▶ Project started late 2014, due to delays/unavailability of key data - took a year to complete
- ▶ some key data not available (fuel uplift/consumption/efficiency etc.)  
Thus other methods employed to derive the information

## Limited training of SAP team (particularly on use of ICAO APER website, preparation of the SAP document, identification of other measures and use of the different calculation tools available)

- ▶ ICAO assisted with a review of the plan and guidance on the use of APER

# **MOVING FORWARD**

**Training and capacity building – ‘HOW TO’**

**Review of the 2015 State Action Plan**

**Monitoring Reporting Verification (FJA)**

**Increased Stakeholders**

**August 2018/Publicly available**

**Engagement with other agencies working towards the same goal – ensure our plans are aligned**



**THANK YOU**

**QUESTIONS???**

