



Data Collection and Baseline Estimation

2026 ICAO APAC Online Training on State Action Plan (SAP) to Reduce CO2 Emissions from International Aviation

Bangkok, 29 – 30 July 2026

**INTERNATIONAL
CIVIL AVIATION
ORGANIZATION**



Differentiating between international and domestic emissions

- **International flight:** the operation of an aircraft from take-off at an **aerodrome of a State** or its territories, and landing at an **aerodrome of another State** or its territories.
- **Domestic flight:** the operation of an aircraft from take-off at an **aerodrome of a State** or its territories, and landing at an **aerodrome of the same State** or its territories.
- **Methodologies** to account for the CO₂ emissions attributed to international flights:
 - a) **ICAO:** each State reports the CO₂ emissions from all international flights, which are operated only by aeroplane operators attributed to the State, the attribution of an aeroplane operator to a State shall be determined as per Annex 16, Vol. IV, Part II, Chapter 1, 1.2;
 - b) **IPCC:** each State reports the CO₂ emissions from all international flights departing from all aerodromes located in the State or its territories.

Collecting or Estimating Historic Air Transport Activity and Fuel Consumption Data

Doc 9988 Chapter 3

APER, EBT, ICEC

- ICAO requires that States 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**. Reporting instructions for this and other forms is provided at <http://www.icao.int/staforms>.
- For the purposes of developing a State Action Plan, States are encouraged **to aggregate the fuel burn and emissions data submitted by all of their international aeroplane operators for each year**. Using this aggregated data, the State Action Plan Focal Point can forecast the future fuel burn and emissions data in order to develop the State Action Plan Baseline Scenario.
- The baseline scenario included in the State Action Plan is understood to be an **estimation only**.

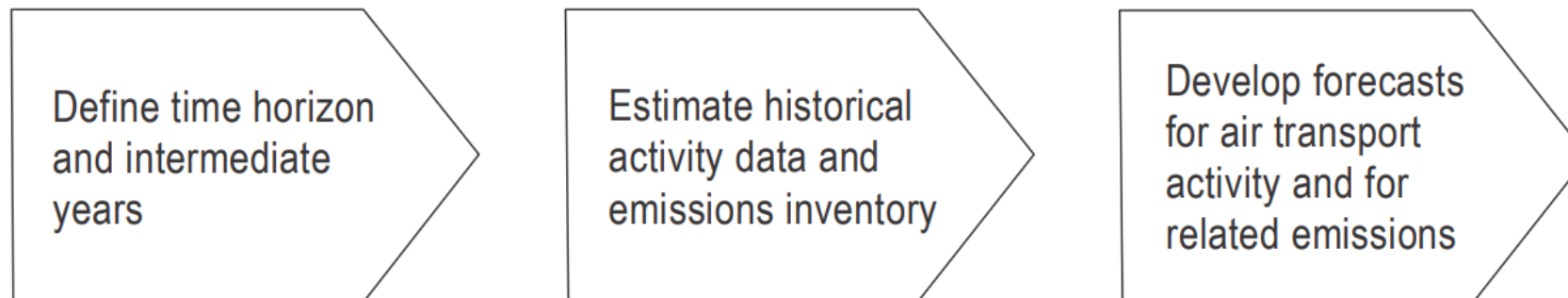
Forecasting Future Baseline Traffic and Fuel Consumption

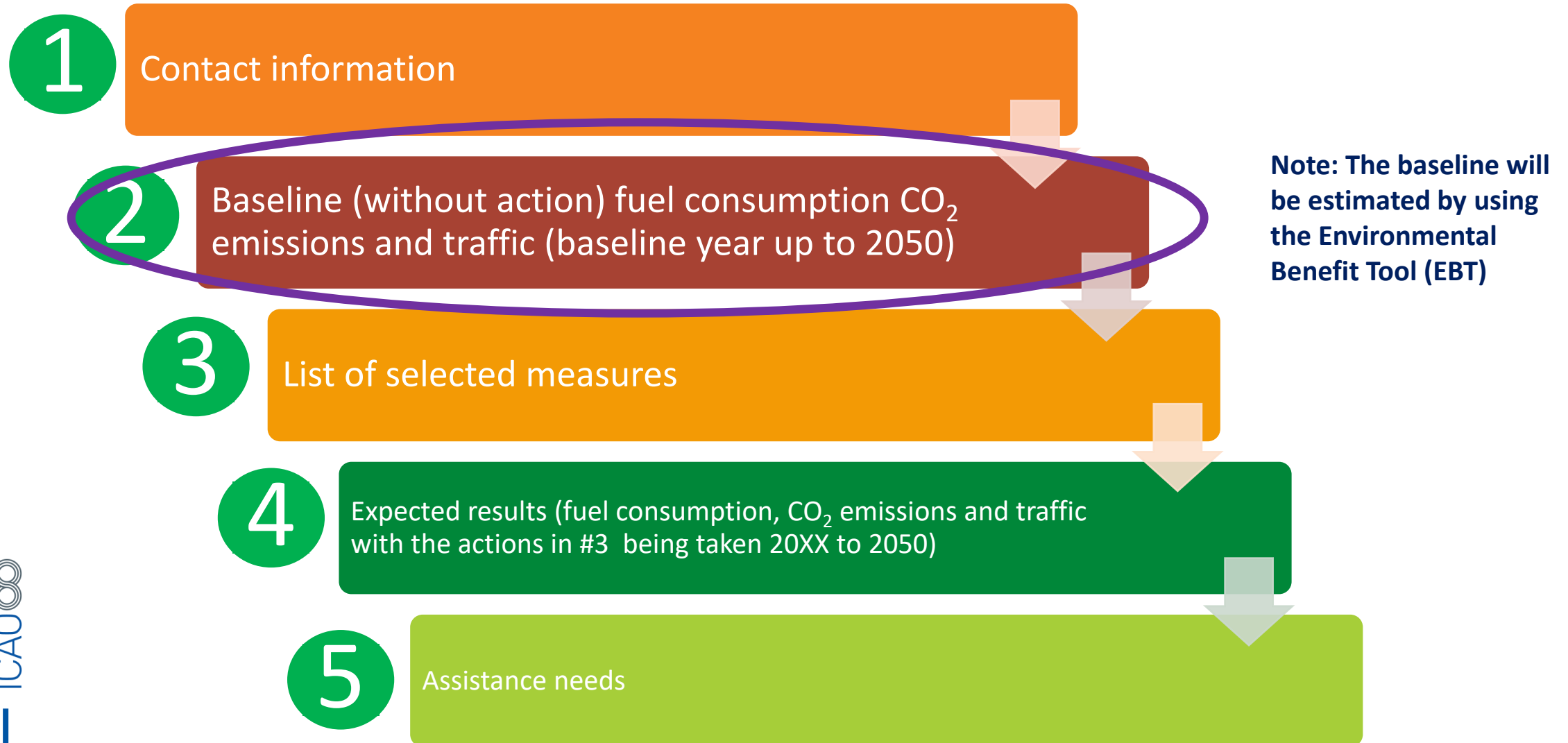
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- The baseline scenario is intended to reasonably represent the fuel consumption and traffic that would occur in **the absence of action**. This corresponds to the “**business as usual**” or “**do-nothing additional**” scenario.
- It will be important that States make explicit the assumptions behind the baseline they establish.

The establishment of a baseline involves the following steps:

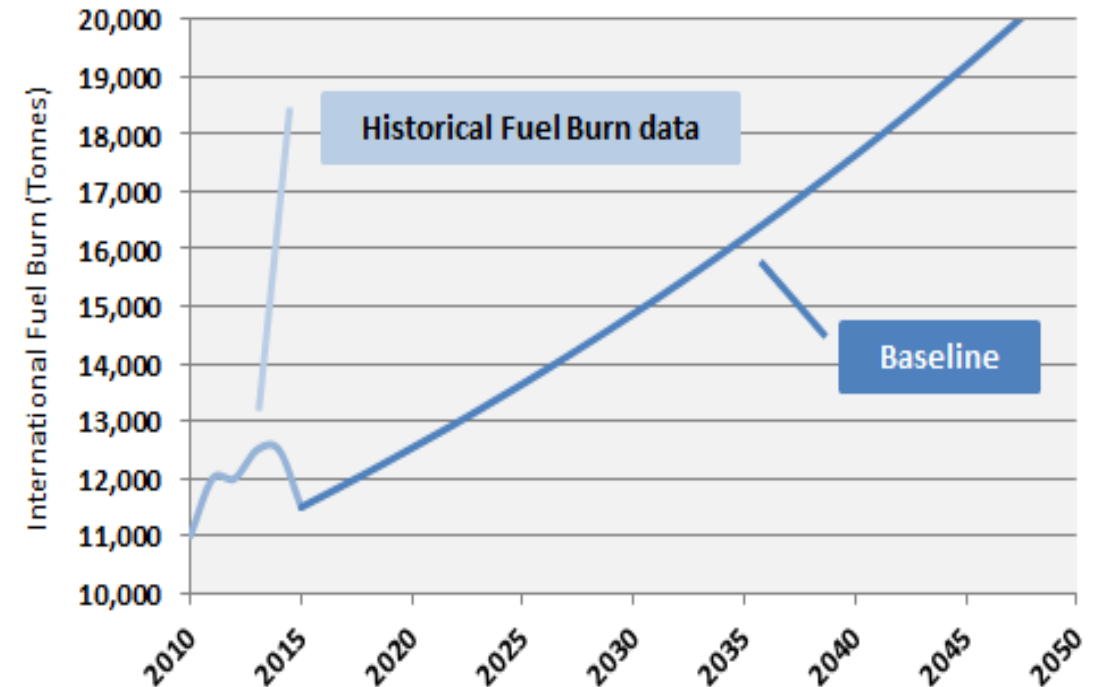




What is a Baseline ?

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Example			
Year	Historical Data		Fuel efficiency
	RTK * ('000)	Fuel Burn (tonnes)	
2010	25'000	11'000	0.440
2011	30'000	12'000	0.400
2012	32'000	12'000	0.375
2013	33'000	12'500	0.379
2014	32'000	12'500	0.391
2015	30'000	11'500	0.383



* **Revenue-Tonne Kilometre (RTK)** = revenue load (persons and cargo) in tonnes (t) * distance flown in kilometres (km)

RTK represents a measure of the size of air transport.

Assumptions: 1 passenger + 1 luggage = 100 kg

Fuel Burn

- Crosscheck Fuel Burn data (e.g. compare Fuel Burn data provided by Airlines with the Fuel Burn data provided by Fuel providers)

RTK

- If you know flight details (i.e. origin-destination, number of flights and aircraft type used), you can approximate the RTK and then compare it with the RTK provided by airlines

Fuel Efficiency

- Fuel efficiency is a good parameter to check if Fuel Burn and RTK are consistent by combining them together

$$\text{Fuel efficiency} = \text{Fuel Burn} / \text{RTK}$$

- Fuel efficiency is a measure of performance
- Fuel efficiency [kg/RTK] = Fuel used [kg] to carry a certain amount of load (passengers and cargo) [t] over a certain distance [km]

$$\underbrace{0.4 \text{ kg/RTK}}_{\text{Fuel Efficiency}} = \underbrace{400 \text{ kg}}_{\text{Fuel burn}} / \underbrace{(10 \text{ t} * 100 \text{ km})}_{\text{RTK}}$$

- The lower the result of the fuel efficiency, the better is the performance



Thank You!