



Selection of Mitigation Measures

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

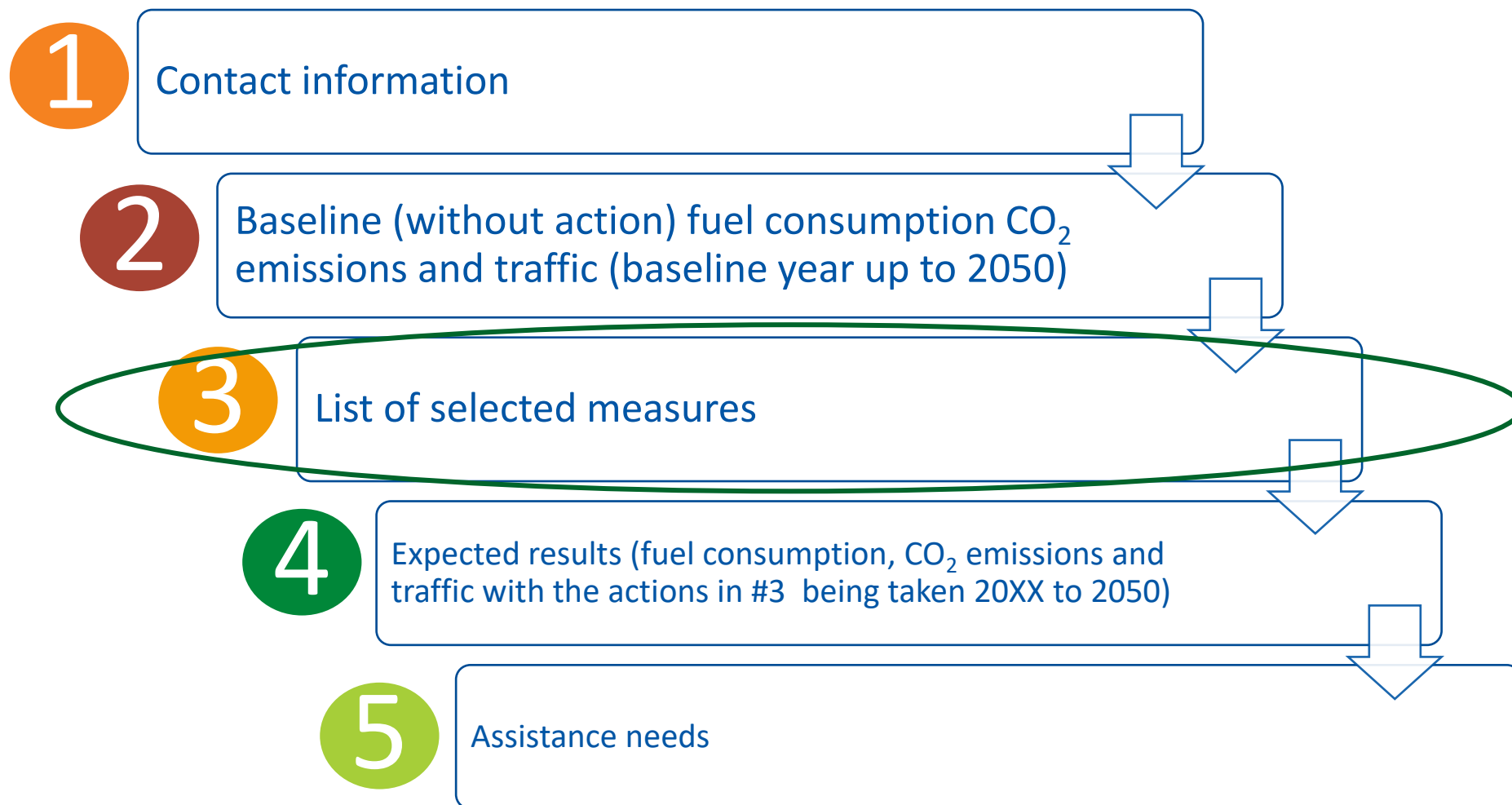
Bangkok, 29 – 30 July 2026

**INTERNATIONAL
CIVIL AVIATION
ORGANIZATION**



Context within the Action Plan Development Process

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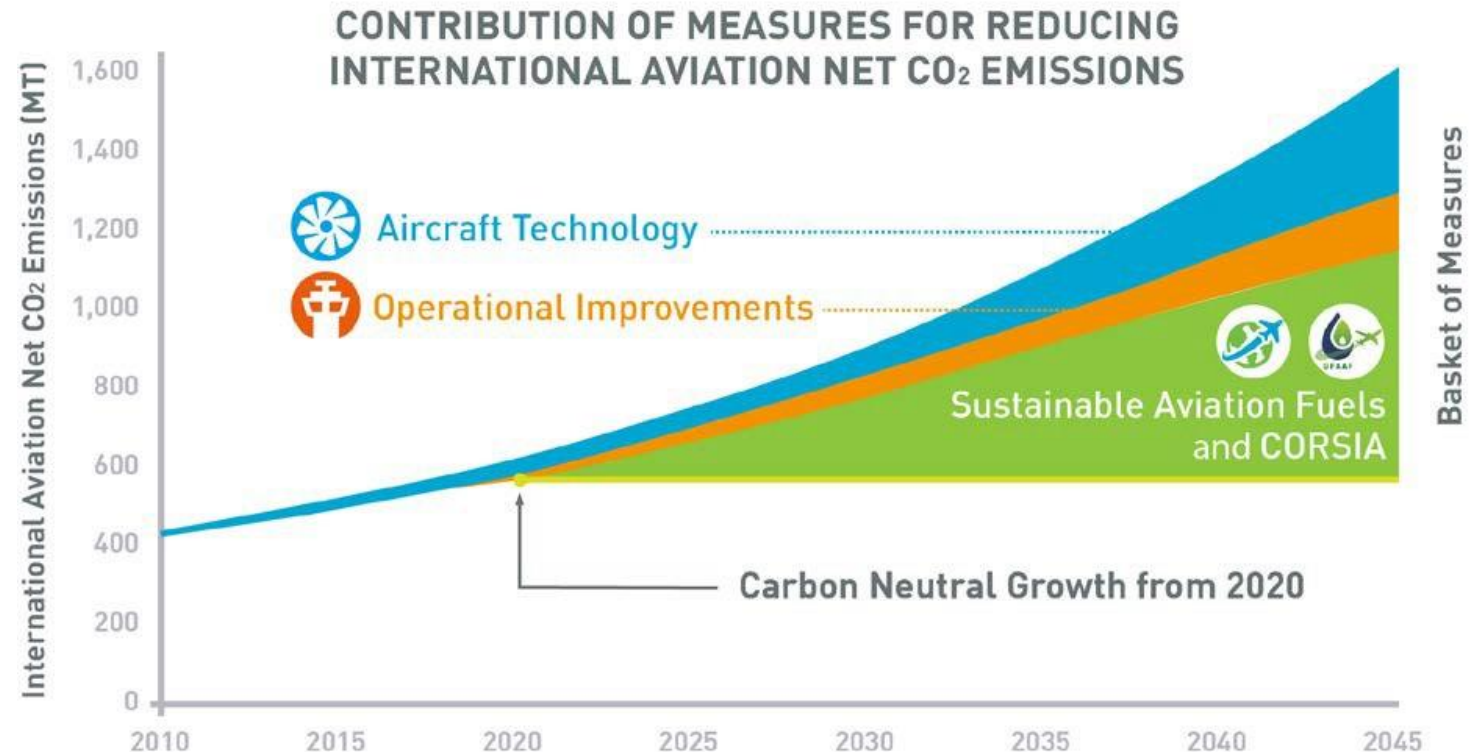


The Basket of Measures

Doc 9988 Chapter 4

APER, EBT, IFSET, MACC

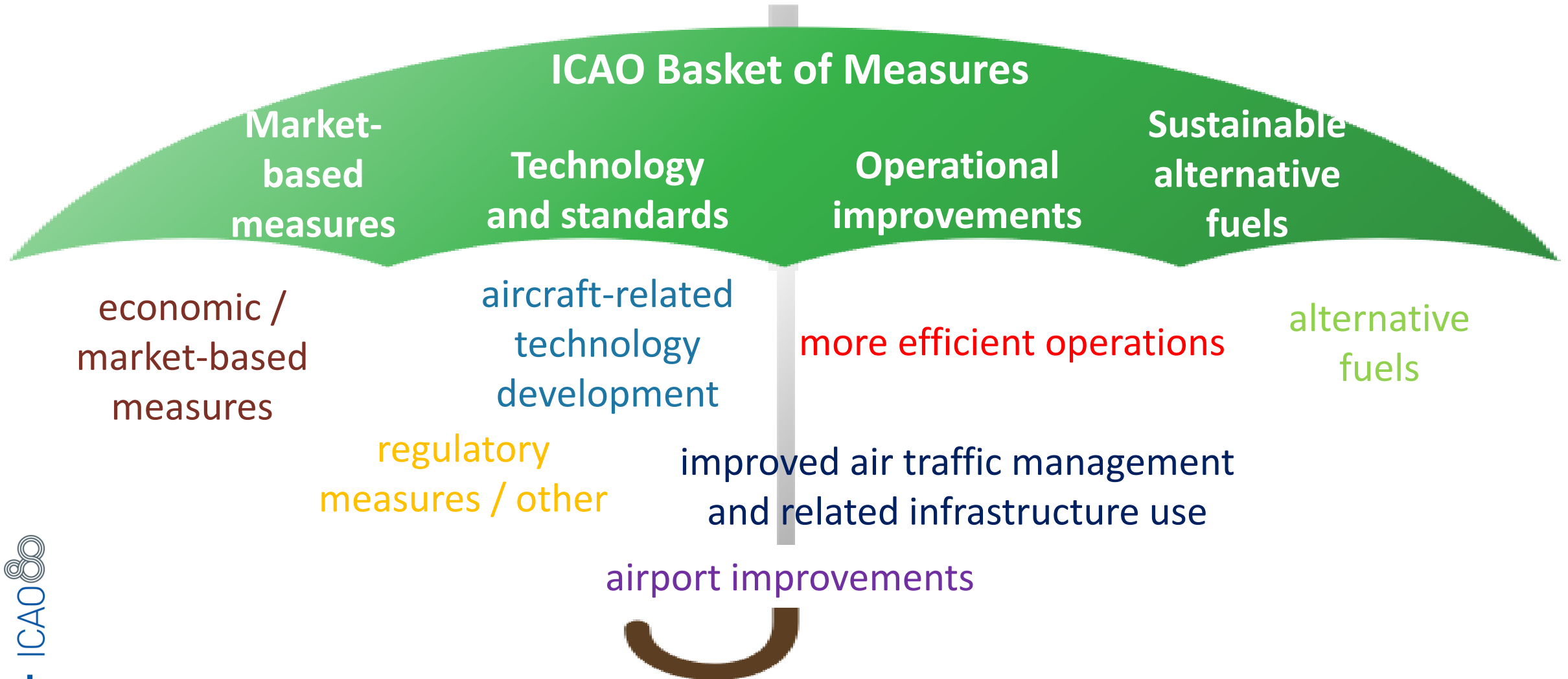
- Aircraft Technology
- Operational Improvements
- Sustainable Aviation Fuels (SAF)
- Market-Based Measures



Select measures and quantify their expected results: feasibility, emissions reduction potential, prioritization of measures, quantification of fuel & CO₂ reduction results

Categories of measures:

1. Aircraft-related technology development;
2. Alternative fuels
3. Improved air traffic management and related infrastructure use
4. More efficient operations
5. Economic/market-based measures
6. Regulatory measures/other; and
7. Airport improvements



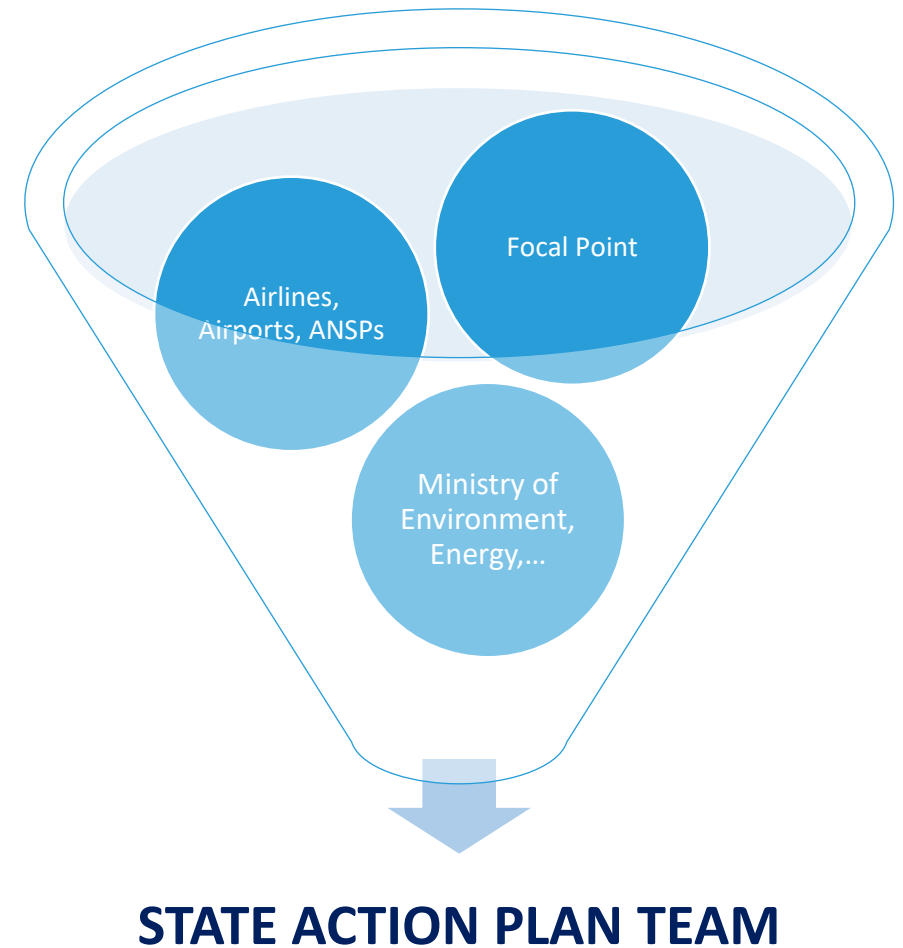
☐ Reference material:

- **ICAO Doc 9988** Appendices A, C, D, E and F
- Guidance on Environmental Assessment of Proposed Air Traffic Management Operational Changes – **ICAO Doc 10031**
- Operational Opportunities to Reduce Fuel Burn and Emissions – **ICAO Doc 10013**

☐ Considerations:

- Steps required
- Resources needed (time, cost, human resources)
- Timing of measures
- Entity responsible for tasks
- Environmental benefits

- The Focal Point should always work in collaboration with the National Action Plan Team
- **Context** is key for the selection of appropriate mitigation measures





Examples of Mitigation Measures

Appendix A

**BASKET OF MEASURES TO LIMIT OR REDUCE
CO₂ EMISSIONS FROM INTERNATIONAL CIVIL AVIATION**

- There are continuous efforts to improve fuel efficiency through:
 - Aircraft structures – weight reductions
 - Propulsion
 - Aerodynamics
- For example:
 - Aircraft minimum fuel efficiency standards;
 - Retrofitting and upgrade improvements on existing aircraft;
 - Optimizing improvements in aircraft produced in the near- to mid-term;
 - Avionics;
 - Adoption of revolutionary new designs in aircraft/engines.

Sustainable Alternative Fuels

- Development of aviation fuels with lower life-cycle CO₂ emissions;
- Implementation of new, and update of existing, ICAO standards and recommended practices;
- Development of partnerships with stakeholders for SAF, LCAF and other aviation cleaner energies ;
- Development of feasibility studies;
- Policies chosen to promote the development and deployment of cleaner energy for aviation.

$$\text{emission reduction [tonnes]} = 3.16 \times M \times \left(1 - \frac{L}{89}\right)$$

Where:

M – Mass of SAF or LCAF (tonnes), and

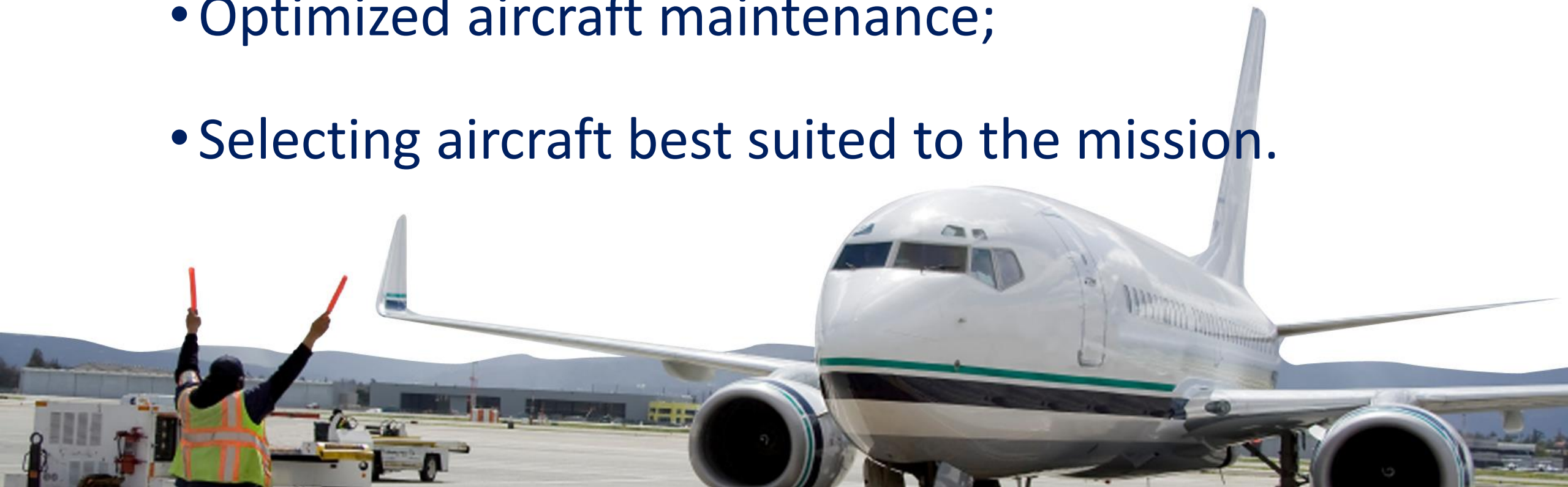
L – life cycle emission value of the SAF or LCAF (gCO₂e/MJ).



- Potential for significant emissions reductions
 - ✓ Depends on feedstock type and cultivation, conversion process...
- Emissions reductions achievable with existing aircraft
- Benefits will depend on:
 - ✓ the availability of such fuels and the time profile of their deployment;
 - ✓ their actual lifecycle emissions reduction
- Challenges
 - ✓ Decreasing production cost
 - ✓ Investment in feedstock production and conversion facilities
 - ✓ Ensuring a sustainable deployment
- States' policy support is required

- More efficient Air Traffic Management (ATM) planning, ground operations, terminal operations (departure, approach and arrivals), en-route operations, airspace design and usage, aircraft capabilities;
- More efficient use and planning of airport capacities;
- Collaborative research endeavours.

- Best practices in operations – ICAO Doc 10013;
- Optimized aircraft maintenance;
- Selecting aircraft best suited to the mission.



More Efficient Operations

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Engine washing



Use of Ground Power Units

- Voluntary inclusion of a State in CORSIA
- CORSIA remains the only global MBM for CO₂ emissions from international aviation
- Covering approximately 99% of CO₂ emissions from international aviation.



- Airport movement caps/slot management
- Enhancing weather forecasting services
- Requiring transparent carbon reporting
- Conferences/workshops
- Other

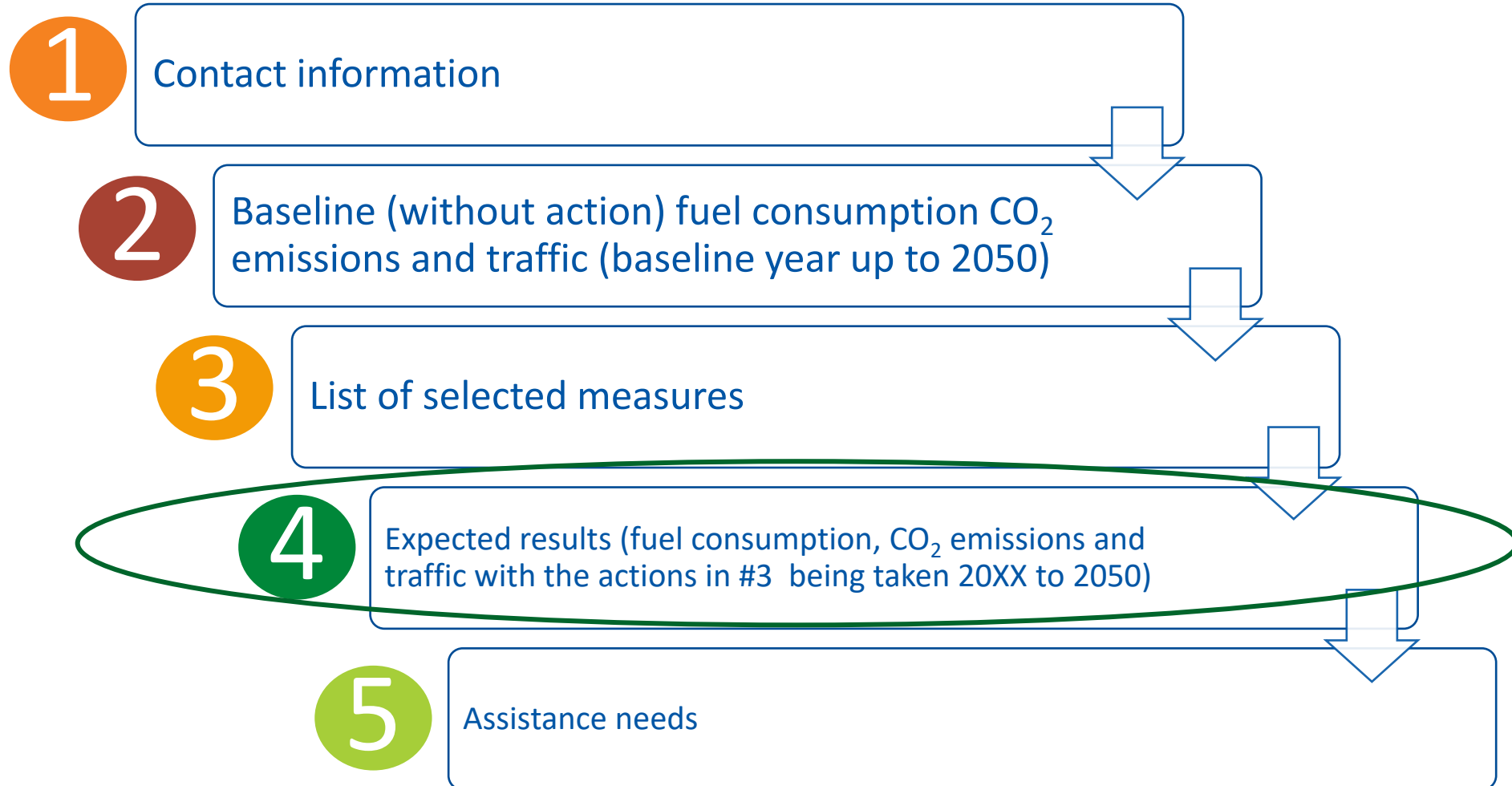


- Airfield improvements
- Reduced energy demand and preferred cleaner energy sources
- Enhanced GSE (Ground Support Equipment) management
- Conversion of GSE to cleaner fuels
- Improved transportation to and from airport



Context within the Action Plan Development Process

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- ICAO Assembly Resolution A41-21, para 11 *“Invites those States that choose to prepare or update action plans to submit them to ICAO”* and in doing so, include *“quantified information on the expected environmental benefits from the implementation of the measures chosen from the basket”*
- Expected results are the effect of the implementation of the selected measures on the baseline
- Only aggregate expected results need to be submitted
- Encourage States to include this quantified information in the Action Plan
- Promote the use of the Environmental Benefit Tool (EBT) available to Focal Points on the ICAO APER website.



Based on today's presentations and Guidance Document 9988, *Chapter 4*, you will be able to determine which mitigation measures are most appropriate for the aviation industry in your State



Once you have selected your mitigation measures, you can use the EBT to estimate the impacts of their implementation on your baseline (calculating your expected results)

Thank You

