



**ACT>>>**  
**GLOBAL**

ICAO: UNITING AVIATION ON CLIMATE CHANGE

# ICAO Colloquium on Aviation and Climate Change

## ICAO Technology Goals Process for Aviation Environmental Protection

**Ebad Jahangir, Ph.D.**

**Environment Officer**

**International Civil Aviation Organization**

**12 May 2010**



# Agenda



ICAO Goals for  
Environment



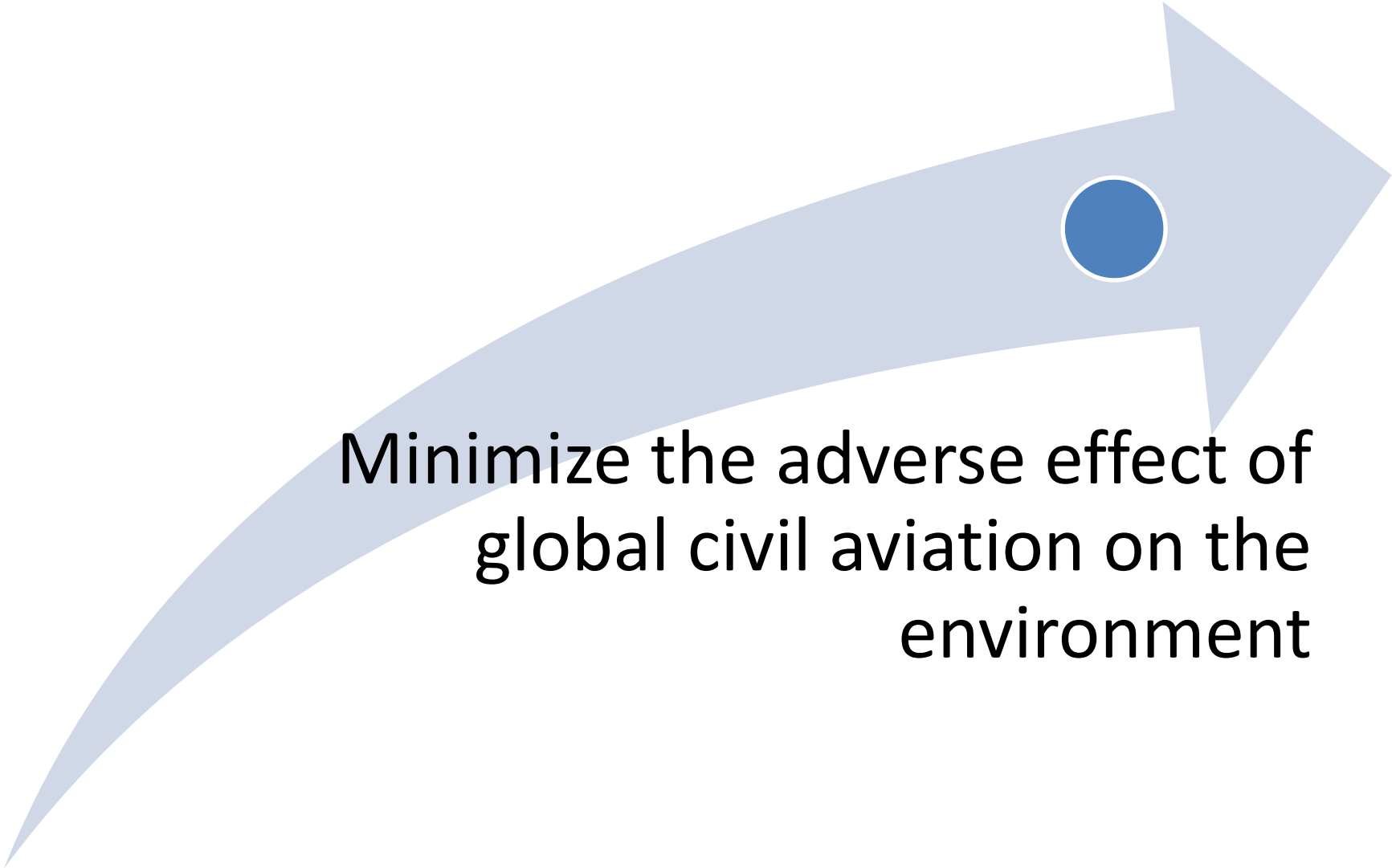
Technology  
Standards



Technology and  
Operations Goals



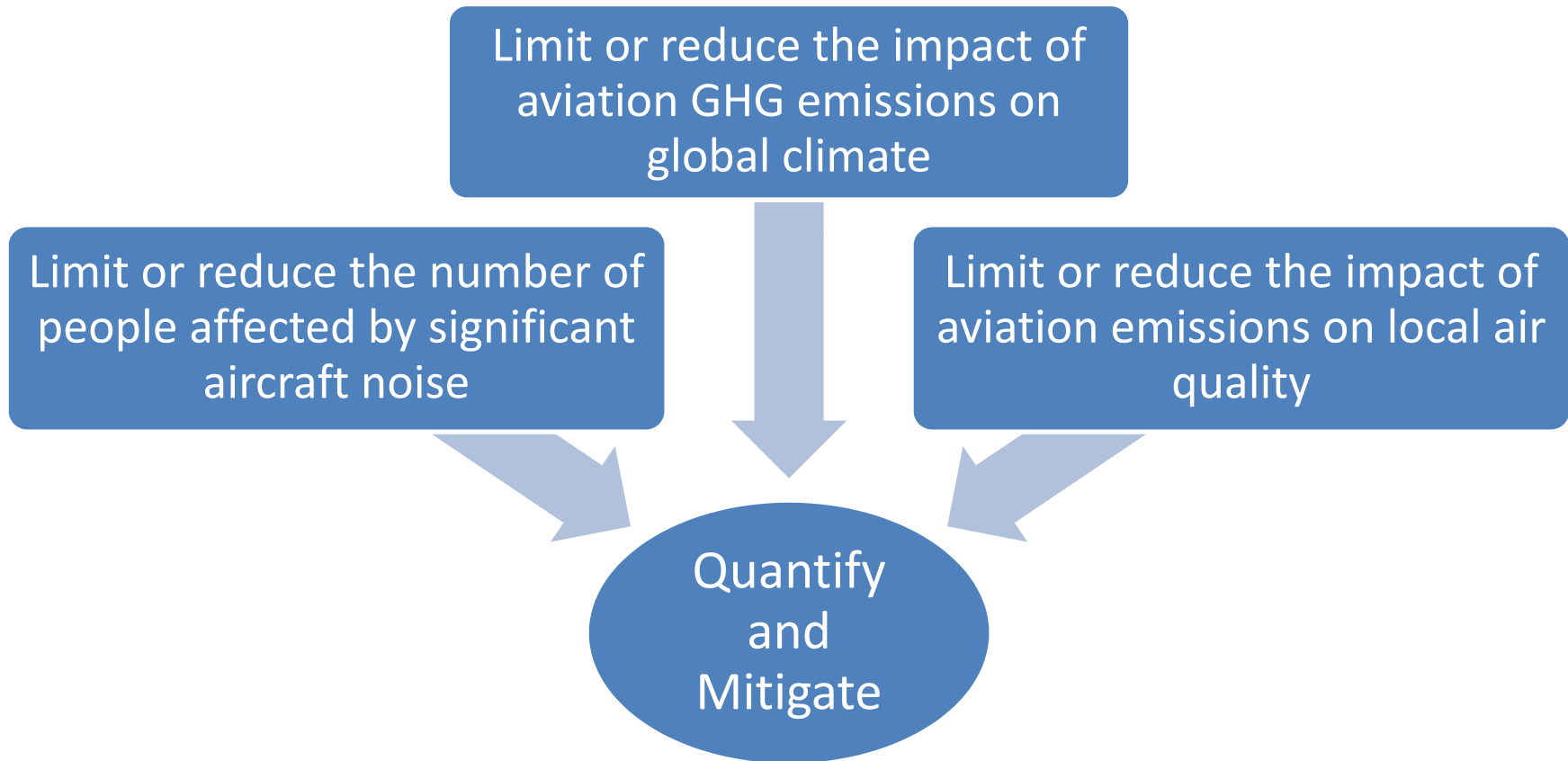
## ICAO Strategic Objective for Environment

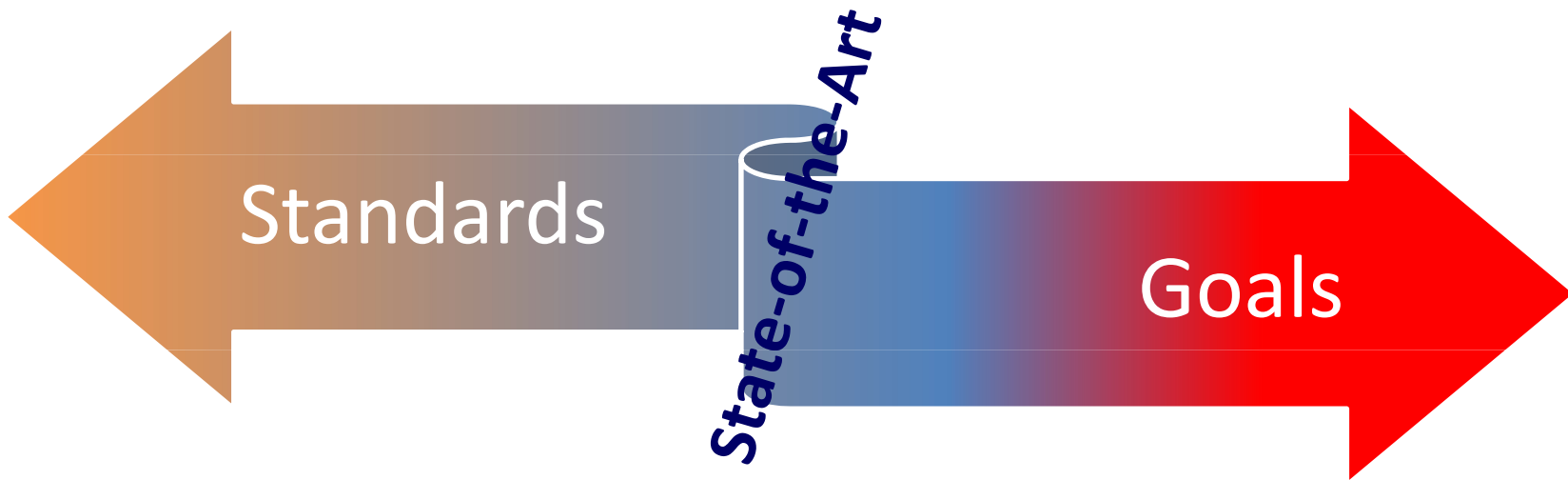


Minimize the adverse effect of  
global civil aviation on the  
environment



# ICAO Environmental Goals

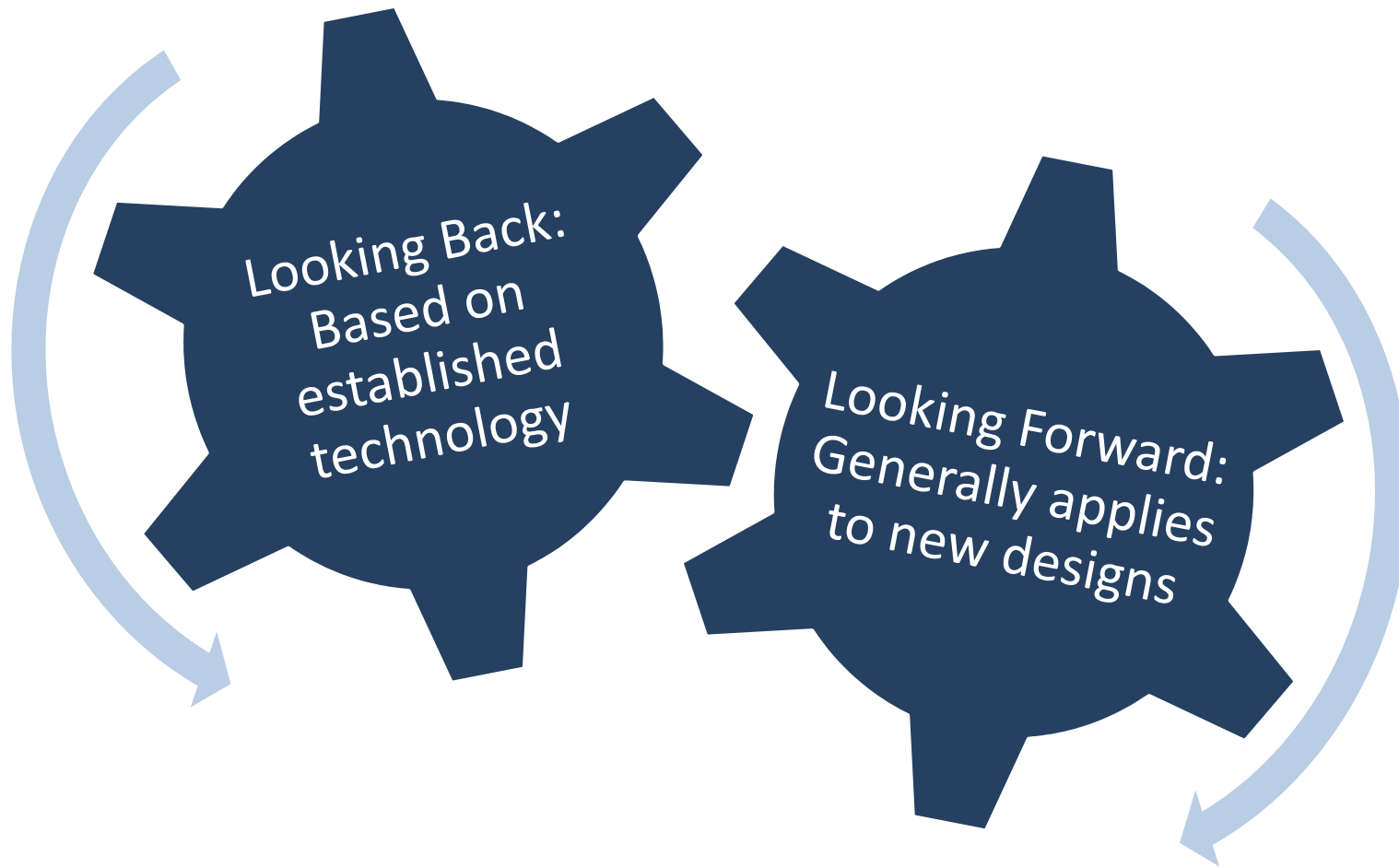




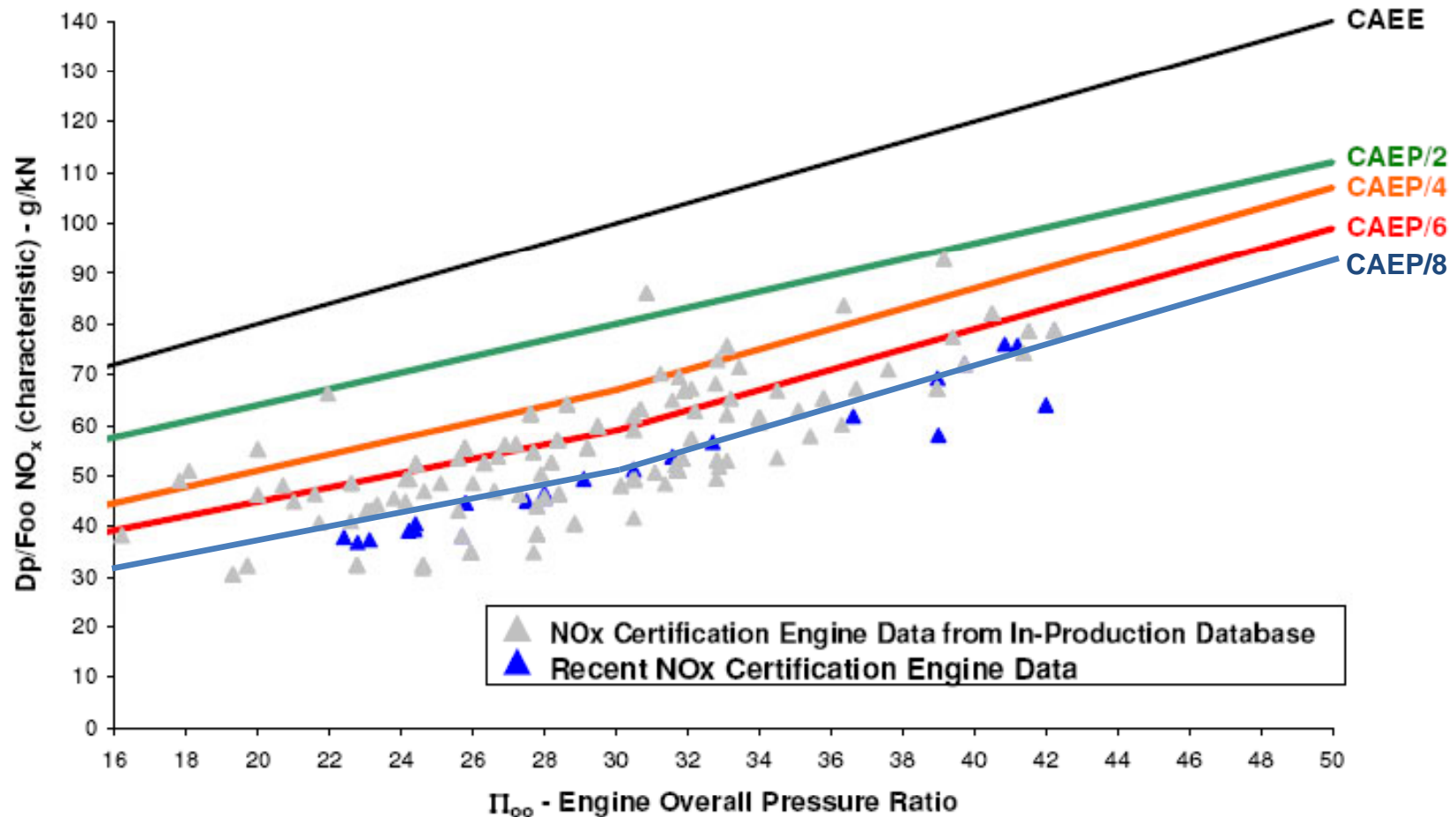
## Establishing Technology Standards



# Technology Standards

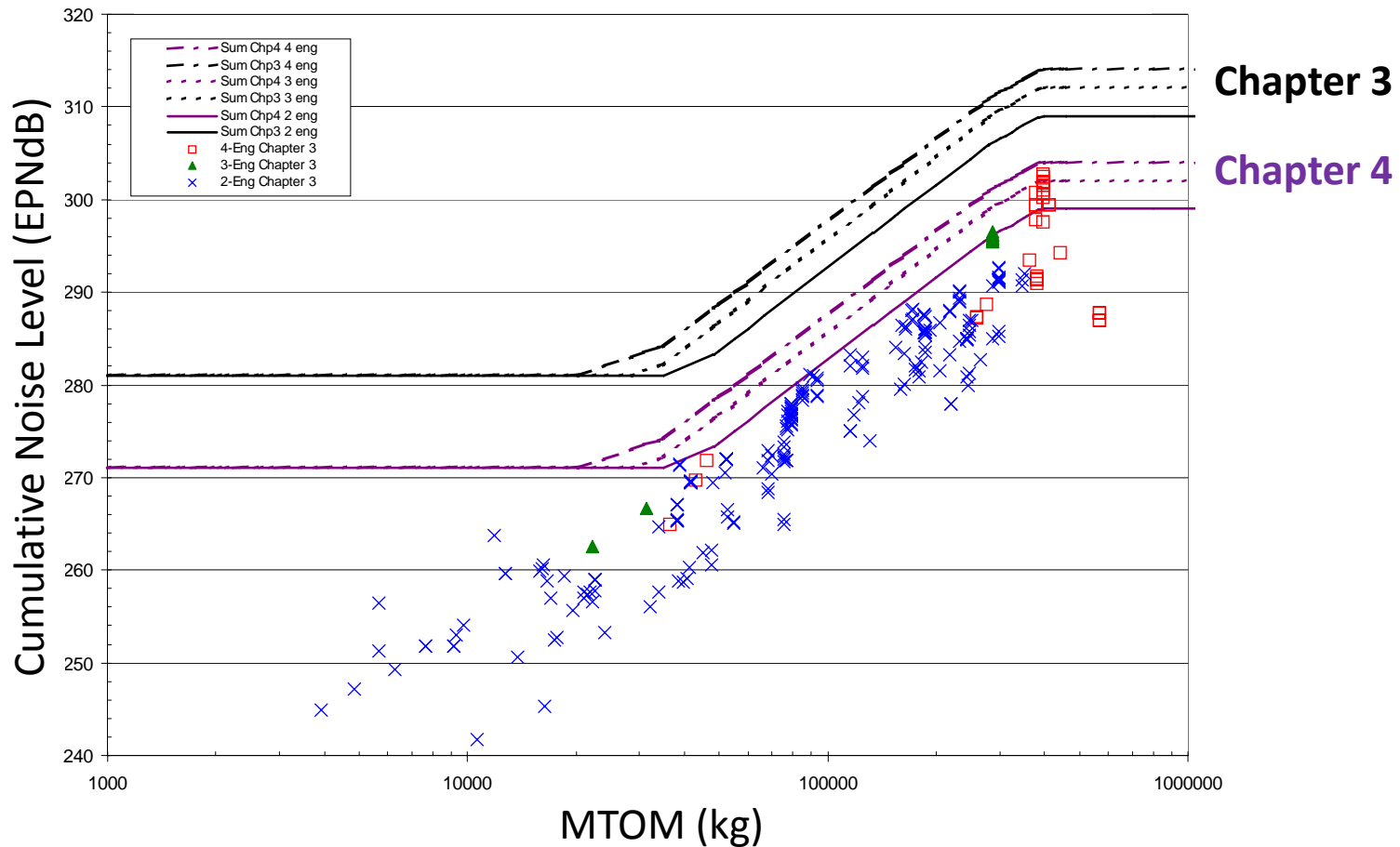


# ICAO Technology Standards for NOx

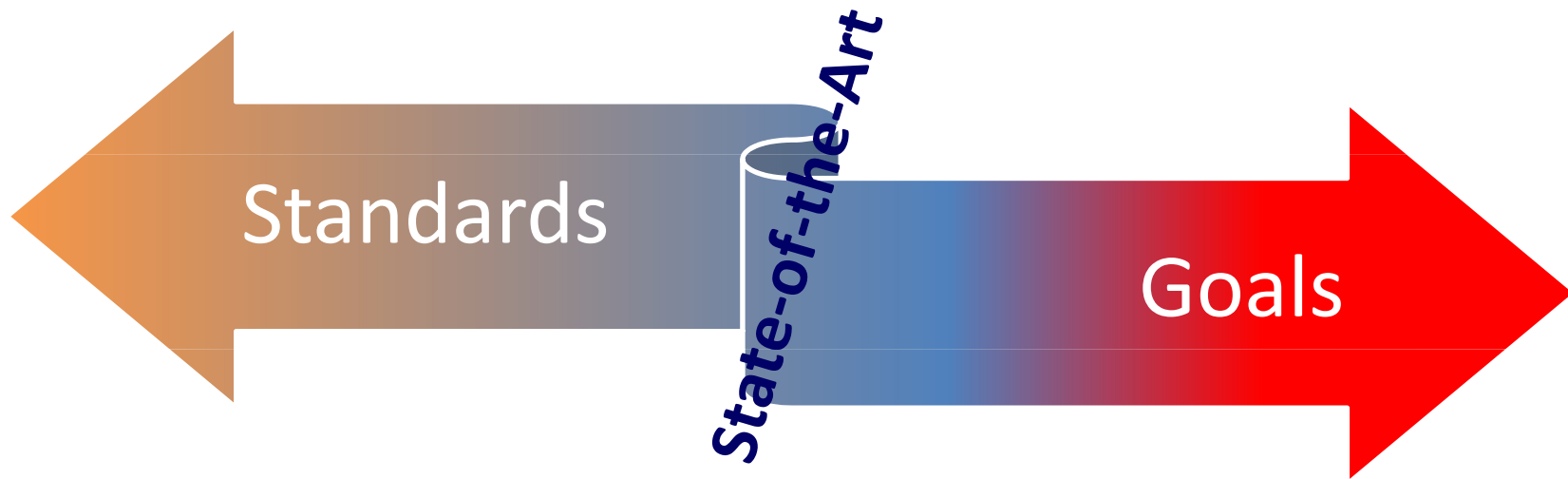


# ICAO Technology Standards for Noise

**Cumulative Noise Levels of Best Practice Aeroplanes  
(2, 3 and 4-Engine Aeroplanes)**

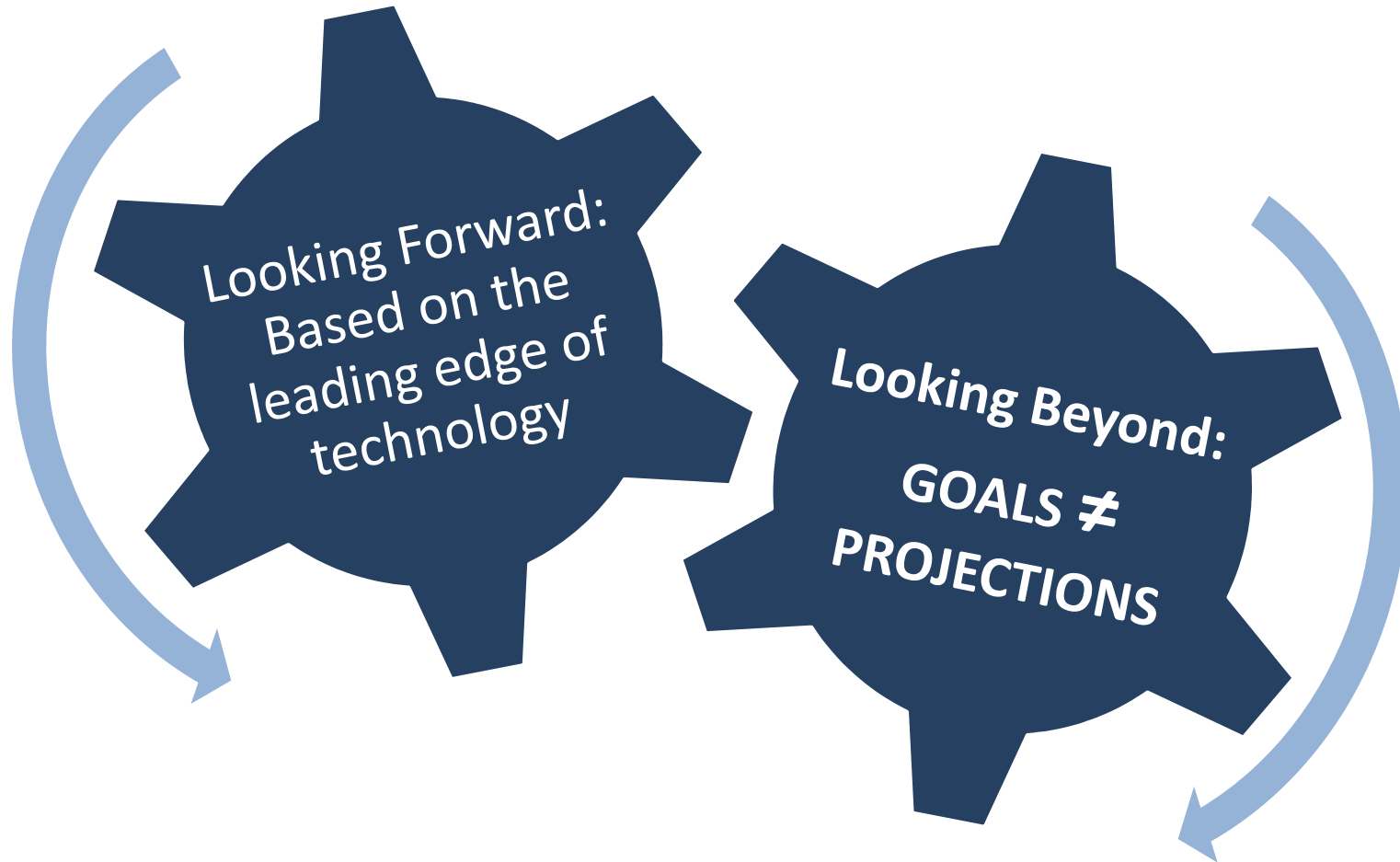






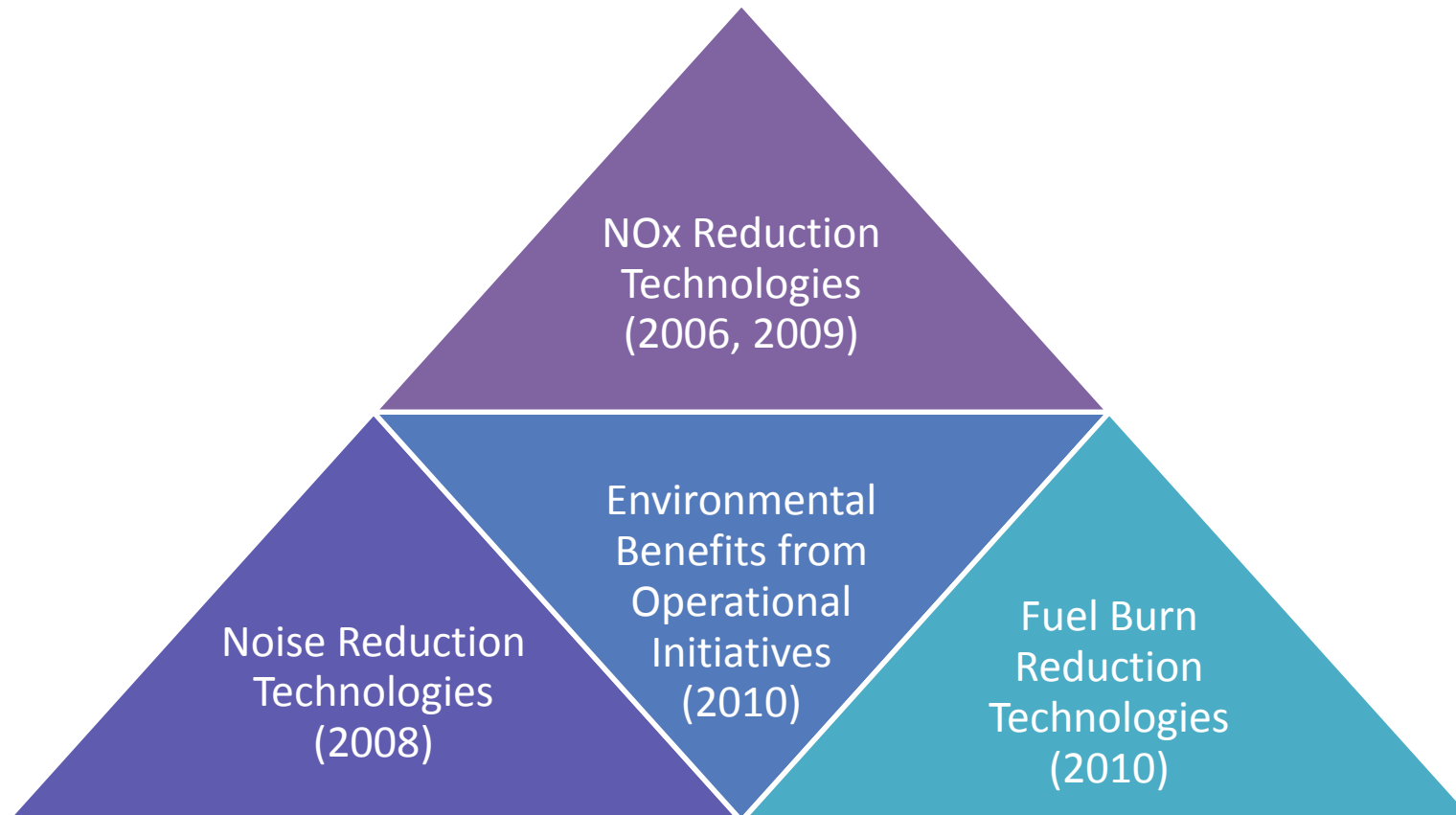
## Establishing Goals

# Technology and Operations Goals





# Goals Setting in CAEP



# Goals Setting in CAEP

Independent  
Experts  
Panels

Broad representation

Manageable number

“Independent”

Common  
Assumptions

Baselines

Aircraft Categories

Realization Factors

# Technology and Operations Goals

Balance environmental benefit with technological feasibility, economic viability, *and do not adversely impact other environmental factors*

## Purpose

Provide stretch targets for industry R&D to aim at in cooperation with States

## Principles

Use the same metric as certification to enable direct comparison

Technology Goals based on Current TRL < 8 technologies that will be TRL>8 at a given time

Technology availability with at least one manufacturer

Technology availability specific to the seat-class considered

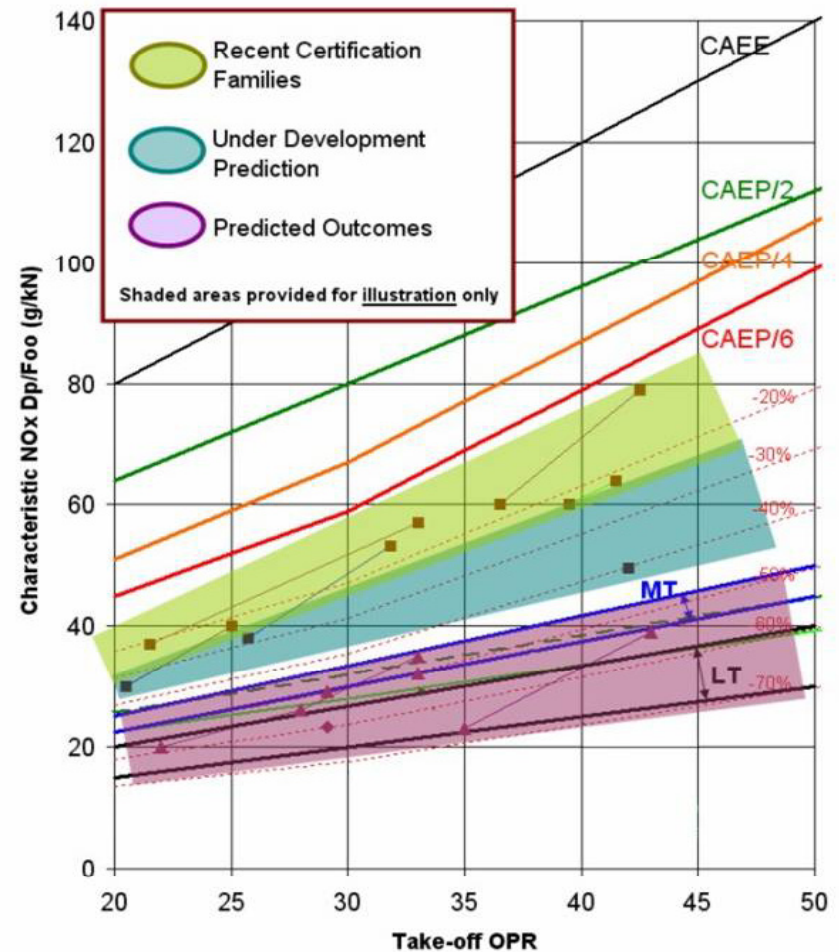
# ICAO Technology Goals for NOx

## Mid Term (2016)

- 45% ± 2.5% below CAEP/6 @ OPR 30

## Long Term (2026)

- 60% ± 5.0% below CAEP/6 @ OPR 30

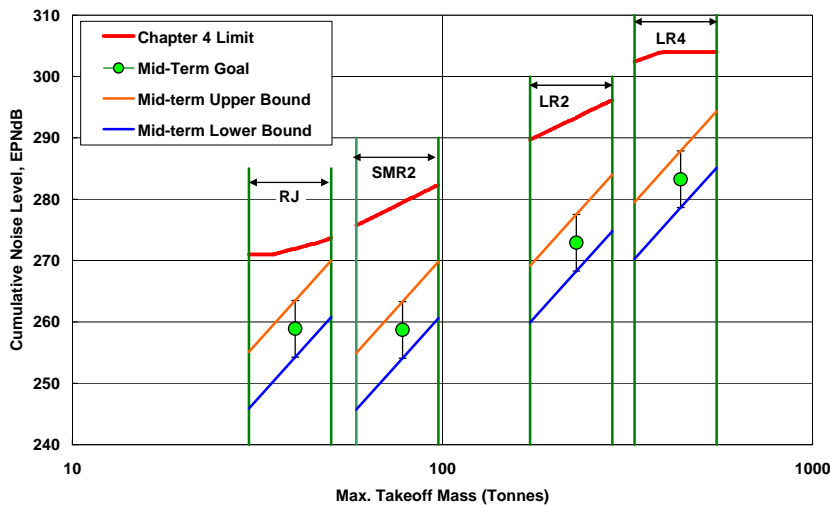




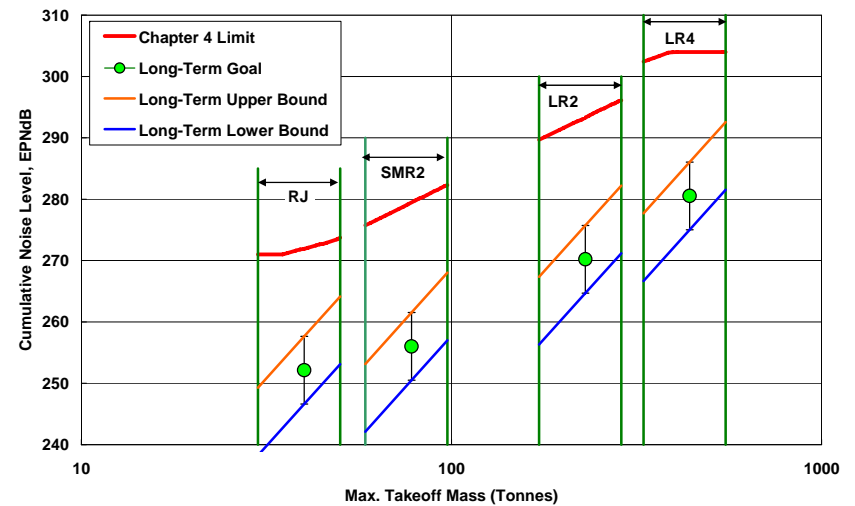
# ICAO Technology Goals for Noise

Aircraft Category	Cumulative EPNL re: Chapter 4 Limits at TRL8	
	Mid-Term (2018)	Long-Term (2028)
Regional Jet	13.0±4.6	20.0±5.5
Twin	21.0±4.6	23.5±5.5
Long-Range Twin	20.5±4.6	23.0±5.5
Long-Range Quad	21.0±4.6	23.5±5.5

Medium Term (2018) Cumulative Noise Goals



Long Term (2028) Cumulative Noise Goals



Ref: Independent Experts Noise Review and the Establishment of Medium and Long Term Technology Goals for Noise, 2010

## ICAO Technology Goals for Fuel Burn



- A wish for more fuel-efficient aircraft versions seems to be overtaking the traditional emphasis of keeping maximum commonality across fleets
- Concern about likely increased costs of new technology and possible changes in infrastructure





## Independent Expert Led Reviews for Technologies – Operational Initiatives

- The global civil ATM system goal is to achieve an average of 95% operational efficiency by 2026\*
- Agreement to continue this effort during the CAEP/9

\* The goal has a lot of caveats associated with it and should not be used in isolation



# ICAO Environmental Policy Framework

## Climate Change, Local Air Quality, Noise

ICAO Environmental Goals  
(International Aviation)

Status, Projections and  
Trends

Technology and  
Operations Goals

Global Harmonization through  
Standards and Recommended Practices

Goals & Standards – Quantify & Mitigate



**ACT>>>**  
**GLOBAL**

# ICAO Colloquium on Aviation and Climate Change



# QUESTIONS?