

Aviation and Emissions: Managing the Challenge of Growth

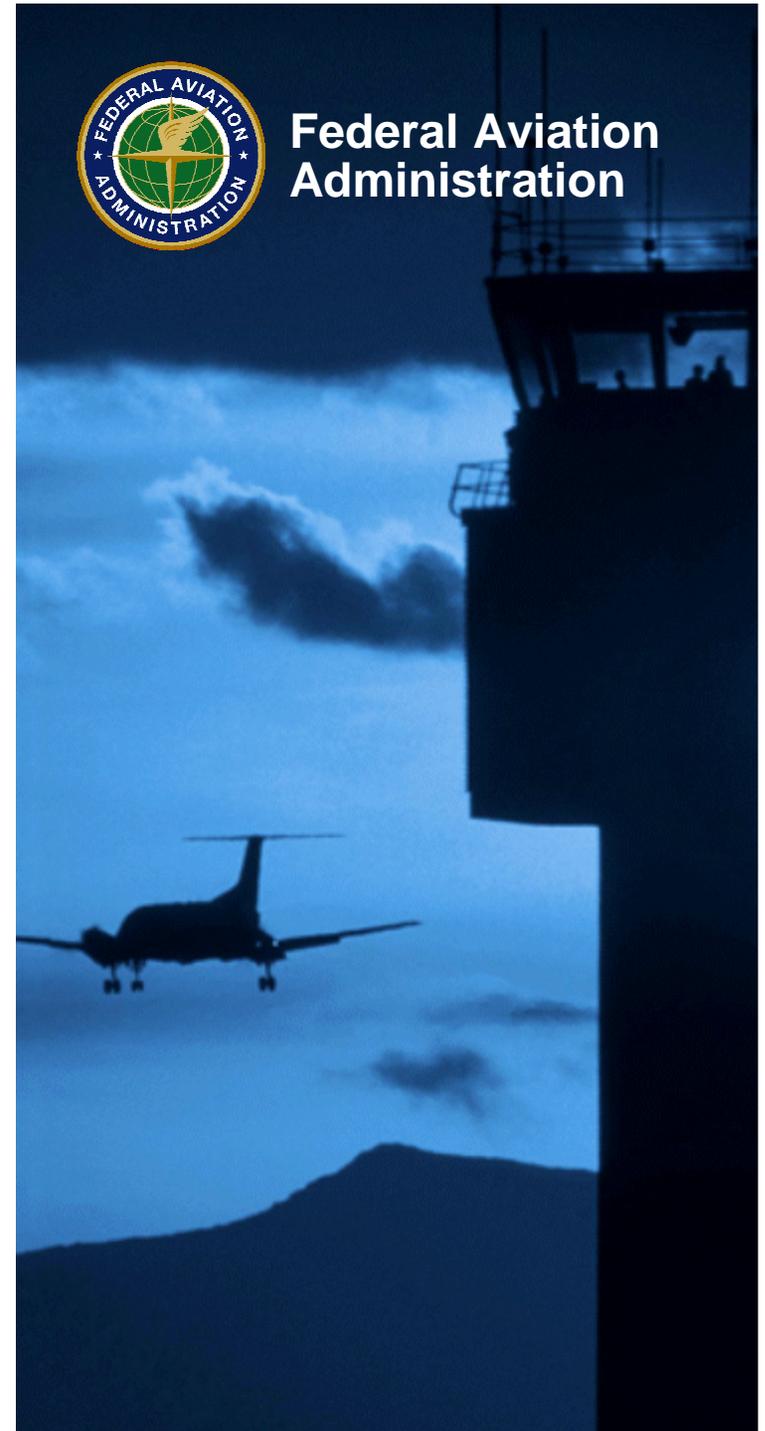


Federal Aviation
Administration

Meeting: Aircraft Emissions Control Technology
Forum – South Coast Air Quality
Management District

By: Carl Burleson,
Director
FAA Office of Environment & Energy

Date: February 13, 2008



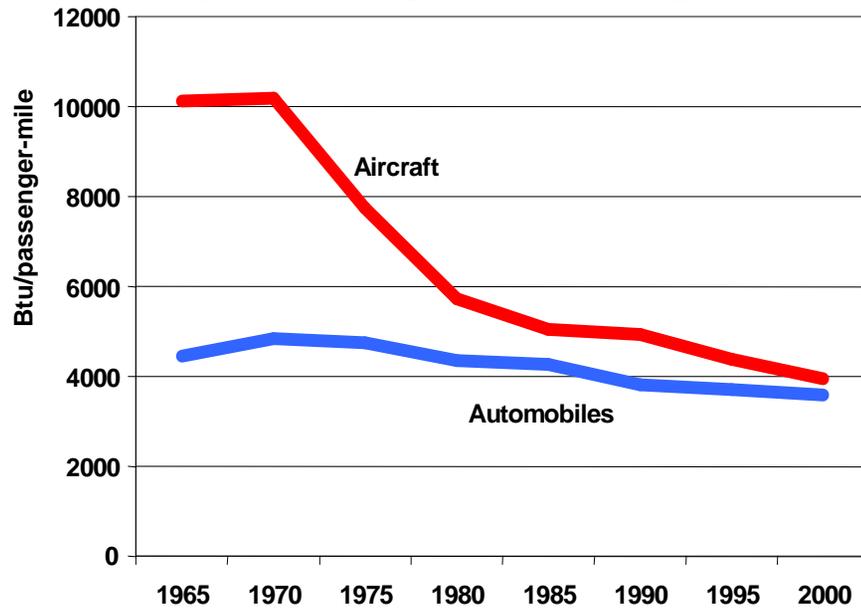
Outline

- The Historical Record
- Some Evolving Issues
- NextGen- The Way Forward
- Closing Observations

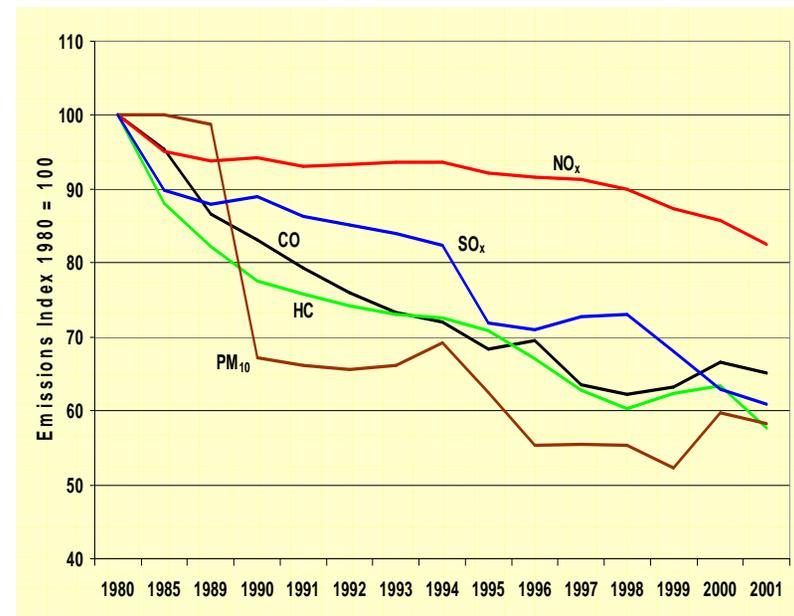


The Record: Significant Improvements

Energy Intensity Per Passenger Mile



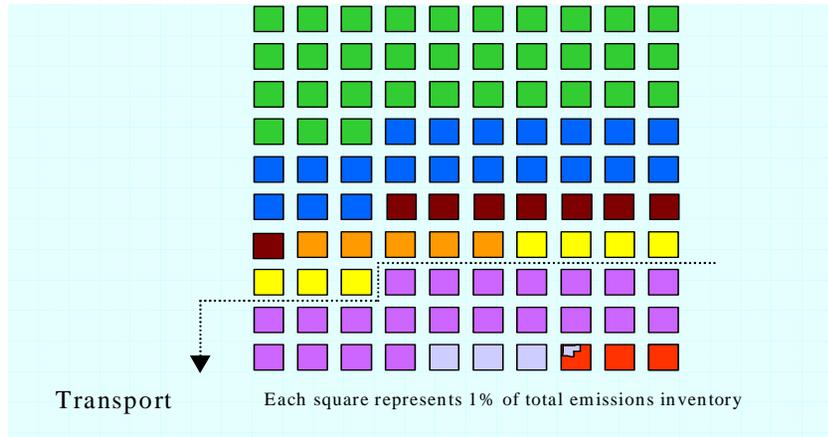
Good Progress on Criteria Pollutants



Source: FAA Emissions Primer

Aviation Emissions- Greenhouse and Local

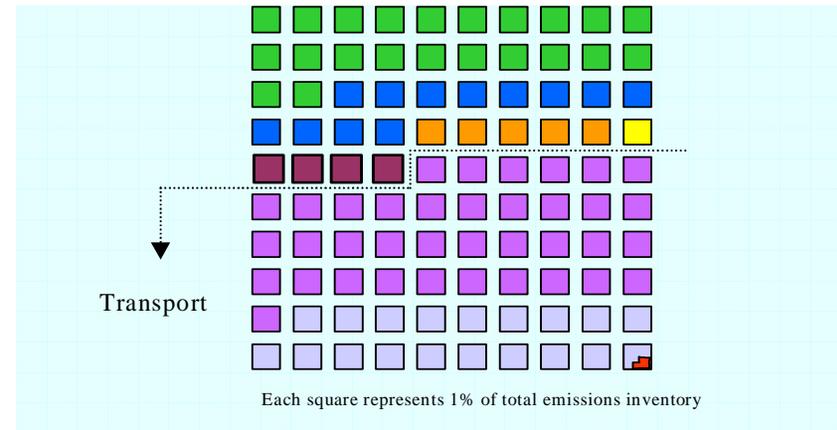
Greenhouse Gas Emissions



Non- Transport		Transport	
	Electric Utilities		On-Road Vehicles
	Industry		Non-Road Vehicles
	Agriculture		Aviation
	Commercial		
	Residential		

National greenhouse gas emissions in 2001

Local NO_x Emissions

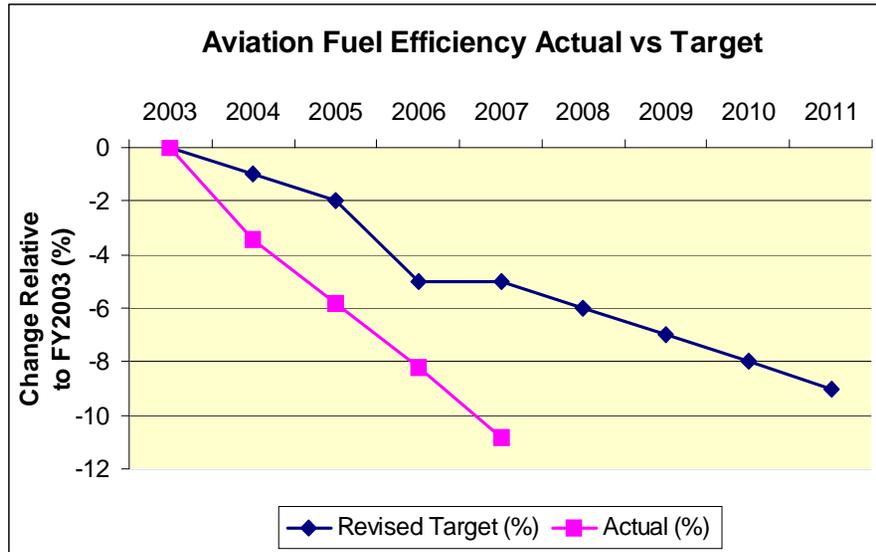


Non- Transport		Transport	
	Electric Utilities		On-Road Vehicles
	Industry		Non-Road Vehicles
	Commercial/Institutional		Aviation
	Misc. area/point sources		
	Manufacturing		

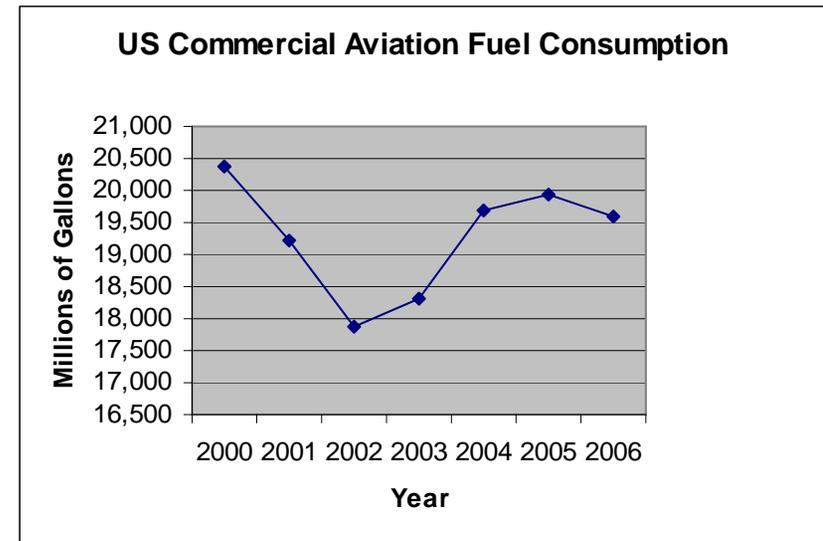
While all transportation makes up more than 55 percent of the total national NO_x inventory, aviation represents only about 0.4 percent.

Source: FAA Emissions Primer

The Record: US Aviation Emissions Growth Down



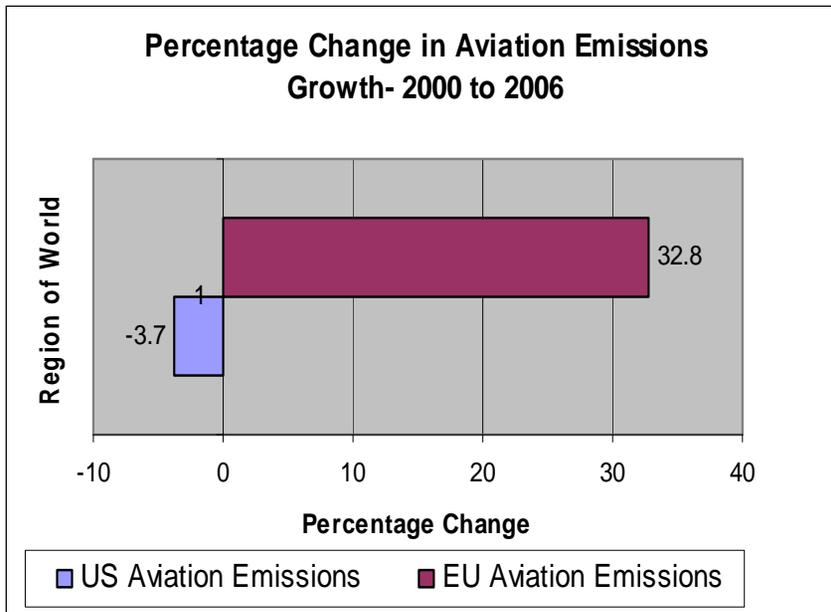
Source: FAA



Source: BTS



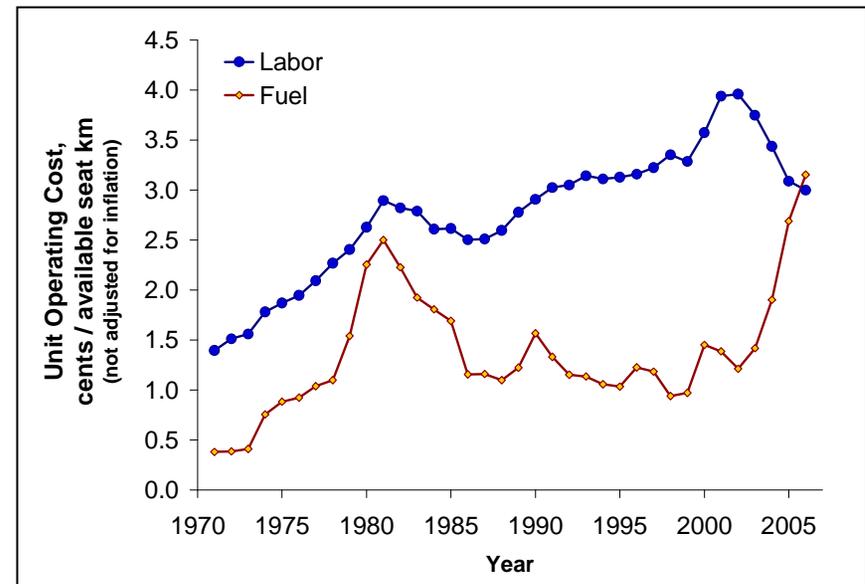
The Record: US Aviation Performance on GHG Emissions



Source: FAA; (EU 15)

...certainly helped by fuel costs incentive.

Good performance compared to other major mature aviation market...



Source: ATA

Evolving Issues: Multiple Environmental Challenges

Community Noise Impacts



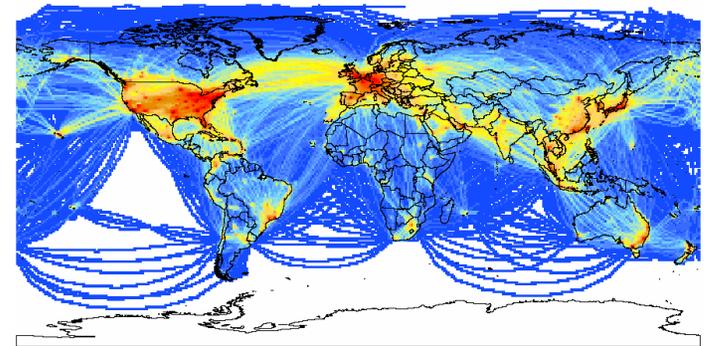
Air Quality



Energy



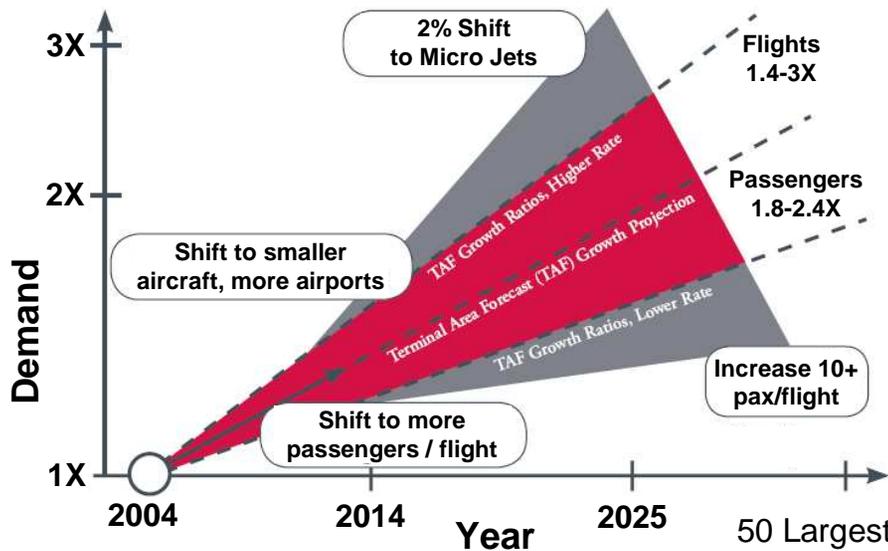
Water Quality



Global Climate

Evolving Issues: Demand Growing and Potential Constraints

Growing Demand



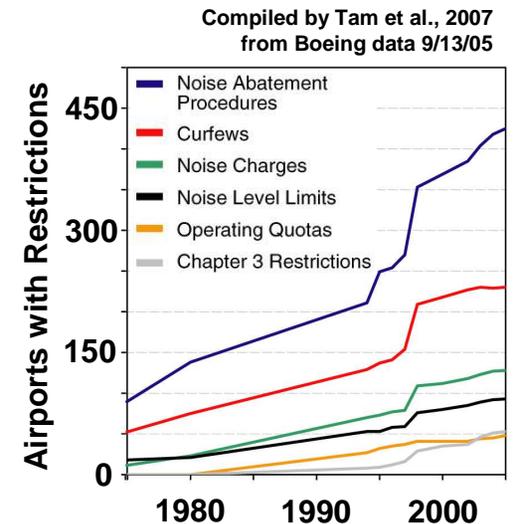
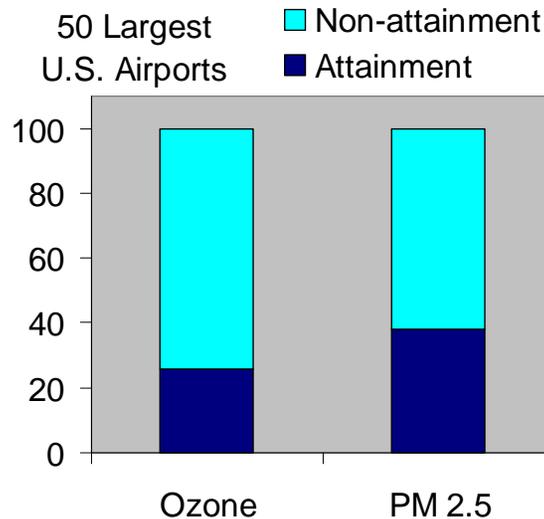
Source: NextGen Integrated Plan, 2004

... as is the environmental footprint...

Preliminary Emissions for NextGen 2X Growth Scenario

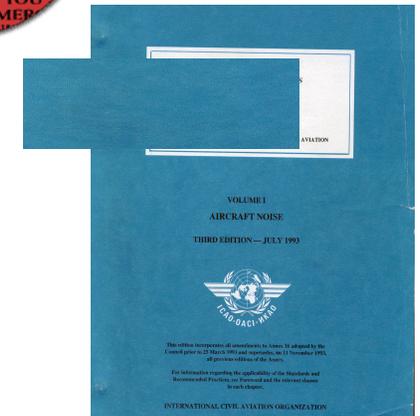
HC	+ 75%
CO	+ 70%
NOx	+ 90%
SOx	+ 85%

... and this is coupled with environmental capacity constraints.



Evolving Issues: International Framework on Aviation GHG

- **United Nation Framework Convention on Climate Change (UNFCCC) 1992**
 - General commitment to reduce certain greenhouse gas emissions
- **Kyoto Protocol 1997 (2005)**
 - International aviation subject to ICAO plan (per Article 2.2)
- **ICAO Decisions**
 - 2001: Study of market-based measures to manage emissions.
 - 2004: Adopt goal to limit or reduce the impact from aviation greenhouse gas emissions on climate change and provide ETS guidance by 2007.
 - 2007: Approved Emissions Trading Guidance based on mutual consent* and created Group on International Aviation and Climate Change
- **EU Decision**
 - 2006: Launched legislation on ETS for aviation



Note: 42 European States reserved on ICAO Resolution on issue of mutual consent.

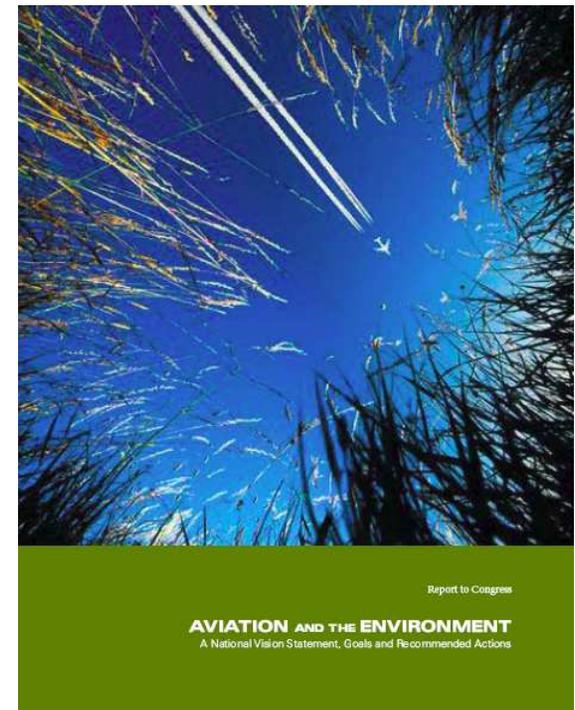
The Way Forward for the US: NextGen Plan

NextGen Vision

Provide environmental protection that allows sustained aviation growth

Key Initiatives:

- Better Science & Integrated Modeling
- Accelerate ATM Modernization
- Encourage New Aircraft Technology
- Explore Alternative Fuels
- Policy Initiatives
- International Collaboration

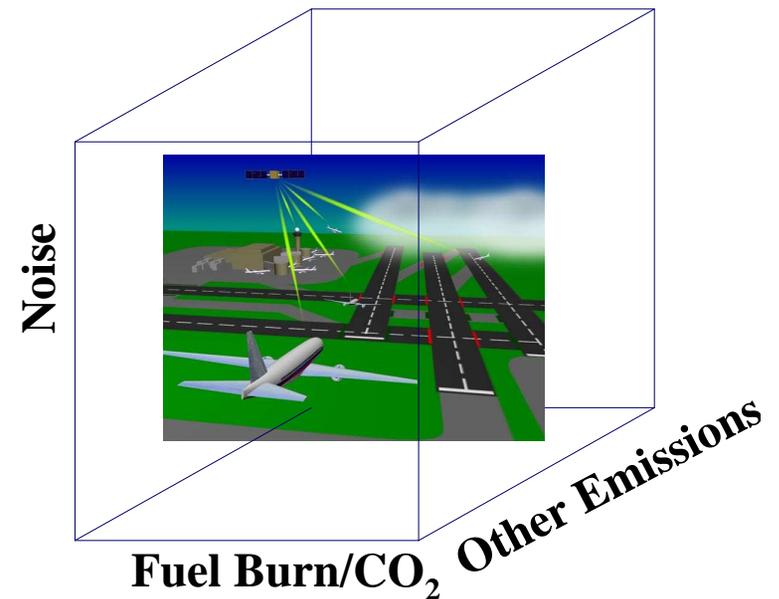


The Way Forward: Better Science & Integrated Analysis

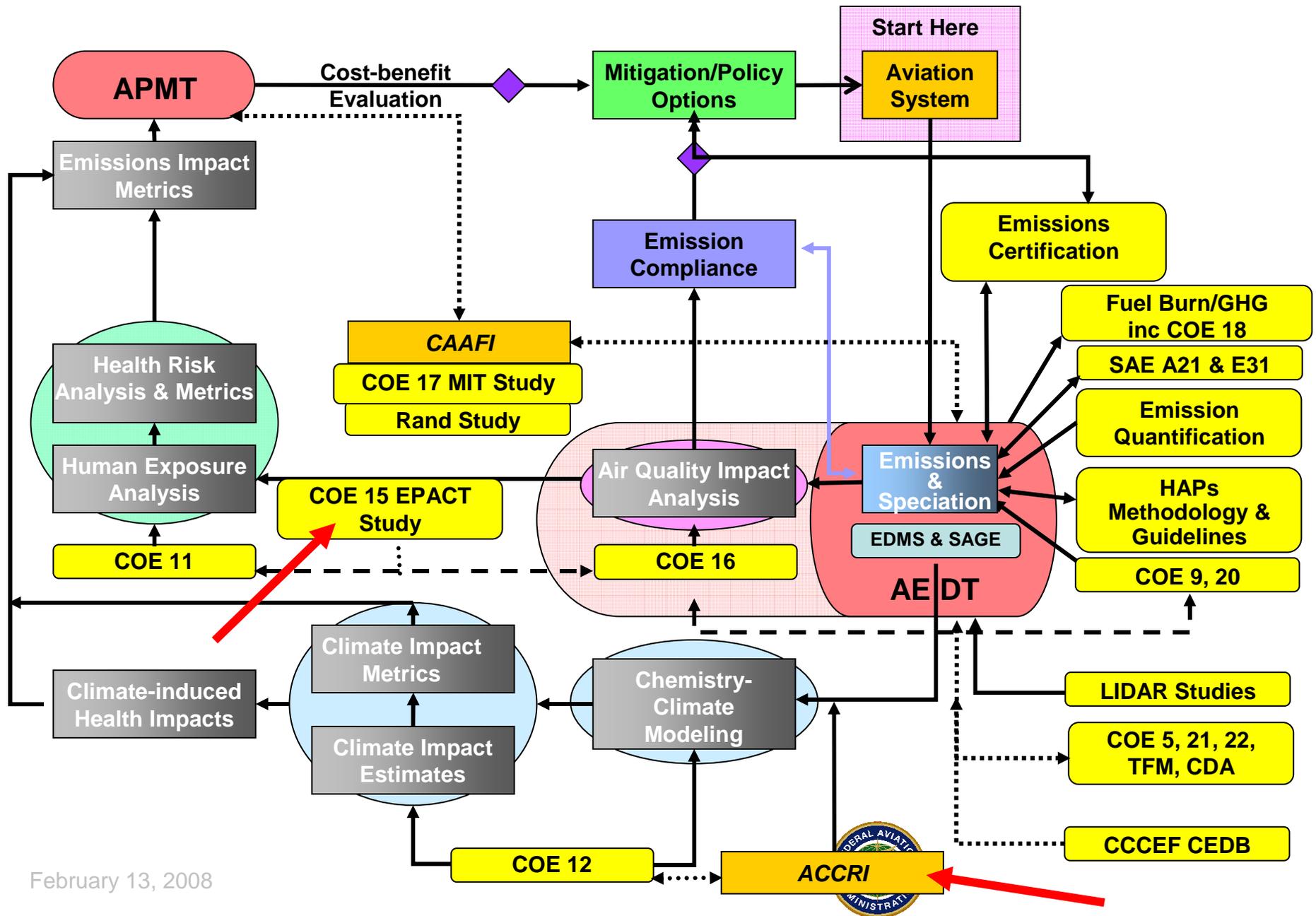


Improved metrics, measurement techniques, and modeling capability to quantify and predict impacts and to understand inter-relationships of aviation environmental factors

- **Environmental Design Space (EDS)**
- **Aviation Environmental Design Tool (AEDT)**
- **Aviation Environmental Portfolio Management Tool (APMT)**

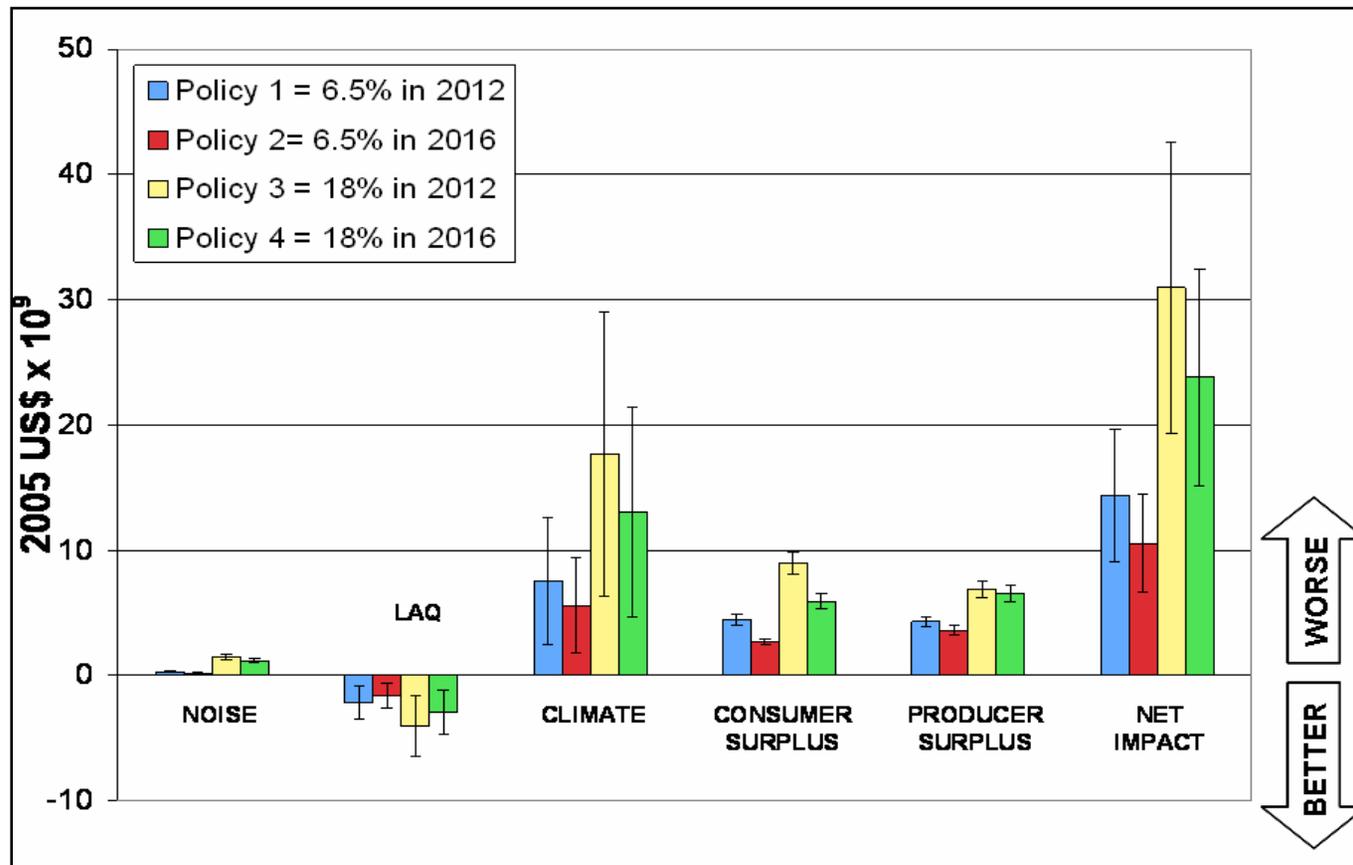


FAA Emissions Research Framework



The Way Forward: Integrated Environmental Assessment

Sample Analysis for Increased Stringency for NOx Standards in Aircraft Engines...



Note: The numbers in the charts are not for citation. They are based on provisional data used in sample problems to help develop models

The Way Forward: Accelerate Improved ATM

Opportunities

- New technologies to improve air traffic management will help reduce emissions. An example is RVSM – Reduced Vertical Separation Minimums. Full implementation of RVSM may reduce fuel use by ~300 million gallons each year.
- Other operational approaches, such as continuous descent arrivals, can reduce fuel burn as well as noise
- Reducing congestion, and optimizing airport ground and terminal air space operations offer great promise for future reductions of noise and emissions

