

The CAAFI Coalition....Leading the Quest for a New, Sustainable Jet Fuel Dynamic



Presentation for the Financial Community

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Agenda

CAAFI

CAAFI's philosophy

CAAFI's approach to development

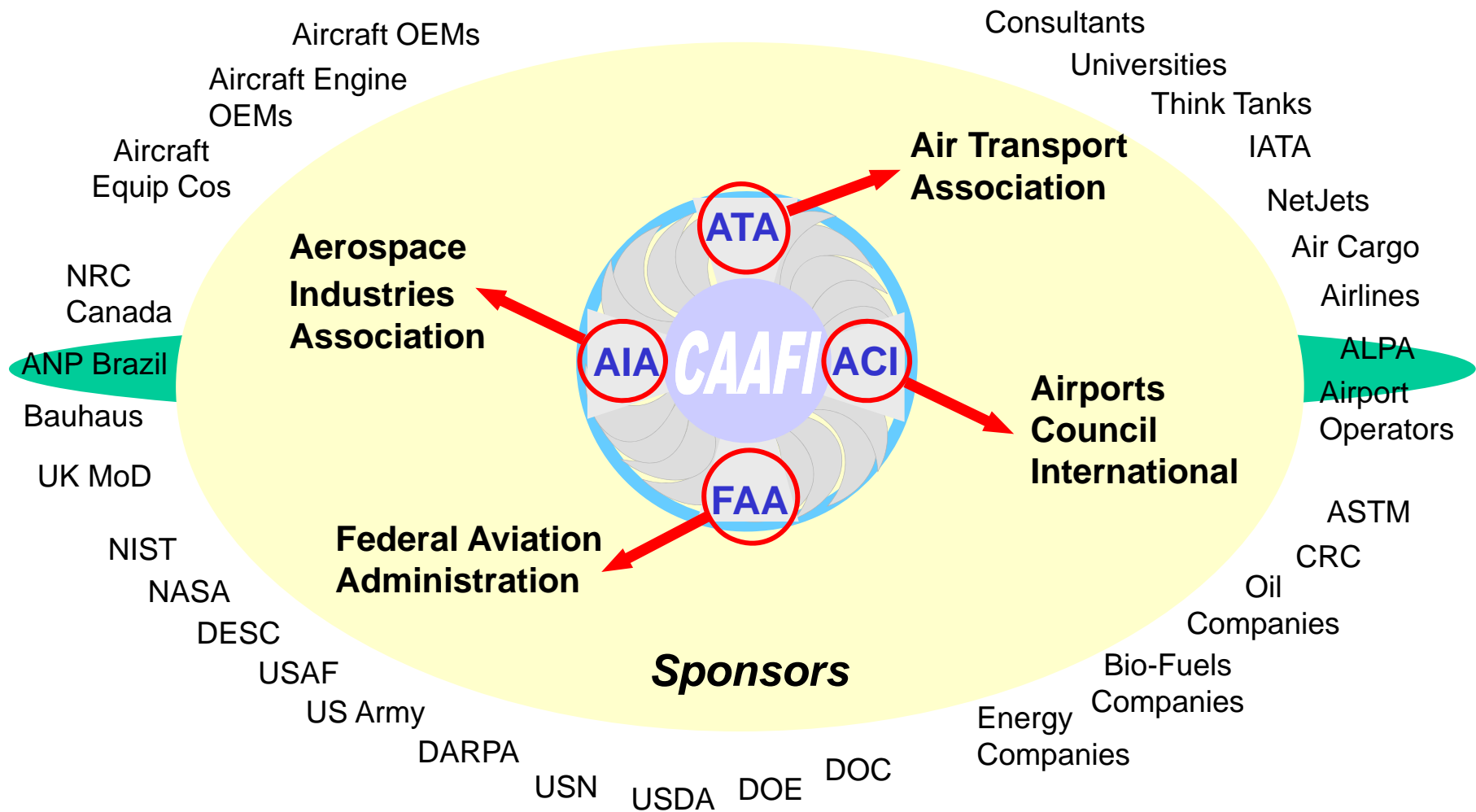
How is CAAFI organized to meet goals in the U.S? Globally with partners?

CAAFI's financing and deployment strategy



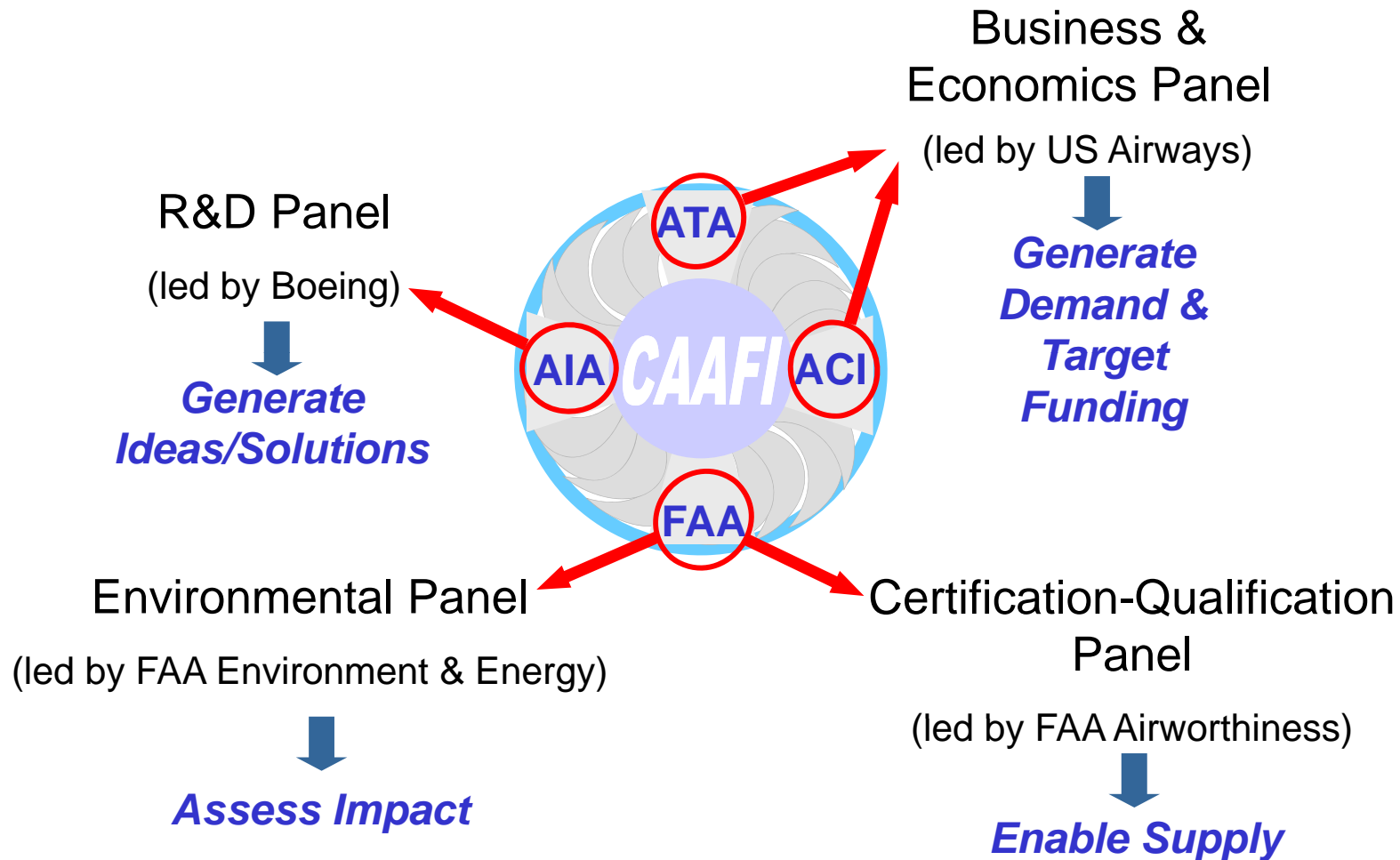
Dedicated to Deployment of Alternative Aviation Fuel

Stakeholders



....Over 300 Sponsors/ Stakeholders from All Continents

CAAFI Leverages Sponsor Strengths



.....Process Owners Lead Teams & Drive Outcomes

CAAFI's Sustainability Mission

The CAAFI Coalition seeks energy security and environmental sustainability for aviation

... to promote the development of alternative fuel options that offer equivalent levels of safety and compare favorably with petroleum based jet fuel on cost and environmental basis, with the specific goal of enhancing security of energy supply.

CAAFI Global Vision

- **Speed Development of Alternative Aviation Fuels**
 - **Single R&D Roadmap**
 - **One LCA Framework**
 - **Promote Multiple Feedstocks & Projects**
- **Engage ICAO – Nov. Conference prior to UN Climate Change Conference**
- **Consulting with EU**

CAAFI Major Milestones

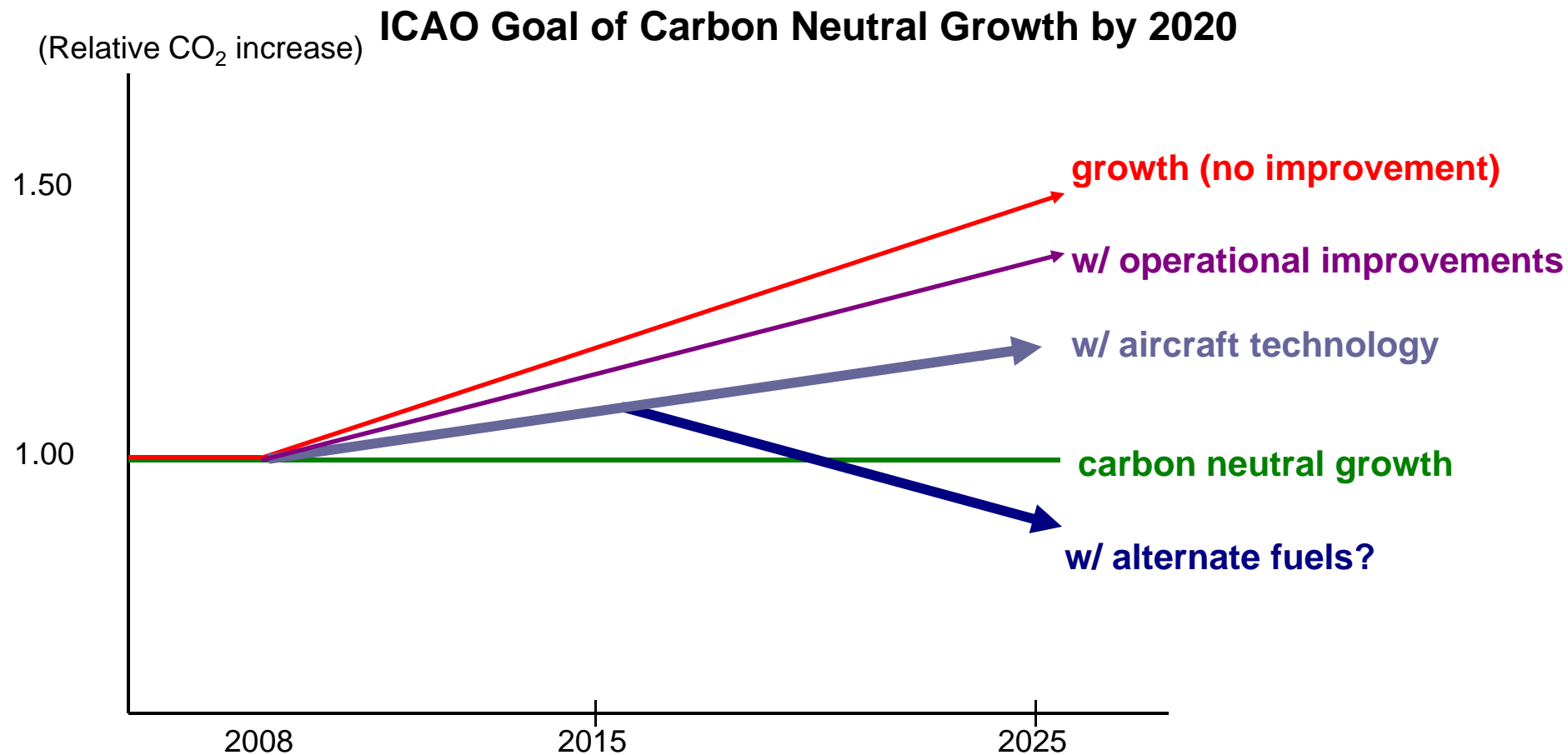
- CAAFI founded – 06
- USAF – 600,000 gallon bio fuel buy current
 - 50/50/50 by 2016 (25% of US based consumption)
- DOE grant program for alternative energy projects
- USDA loan guarantee program with aviation availability 08
- DARPA funding of algae research – 09-11
- Demonstration flights – 08 & 09
- Presidential directive to USDA and DOE on common policy for alternative energy – 09
- ASTM - first level approval FT Process – June 09

CAAFI Future Targets

In future.....

- ASTM full approval of FT Sept. 2009
- Achieve common ICAO position at conference in Nov 2009
- ASTM approval of hydro treated renewable jet – end 2010
- Deployment of 10 projects by 2013
- ICAO carbon neutral growth by 2020

CAAFI'S Challenge: Reduce Carbon Footprint



Source: Richard Altman

CAAFI's Approach to Development

- Ensure safety
- Support certification
- Promote alternative non-food based feedstocks
- Reduce LCA & promote common analytics
 - ICAO wheels-to-exhaust
 - FAA/MIT ground-to-plane
- Improve air quality
- Leverage airline purchasing power
- Speed deployment through global vision



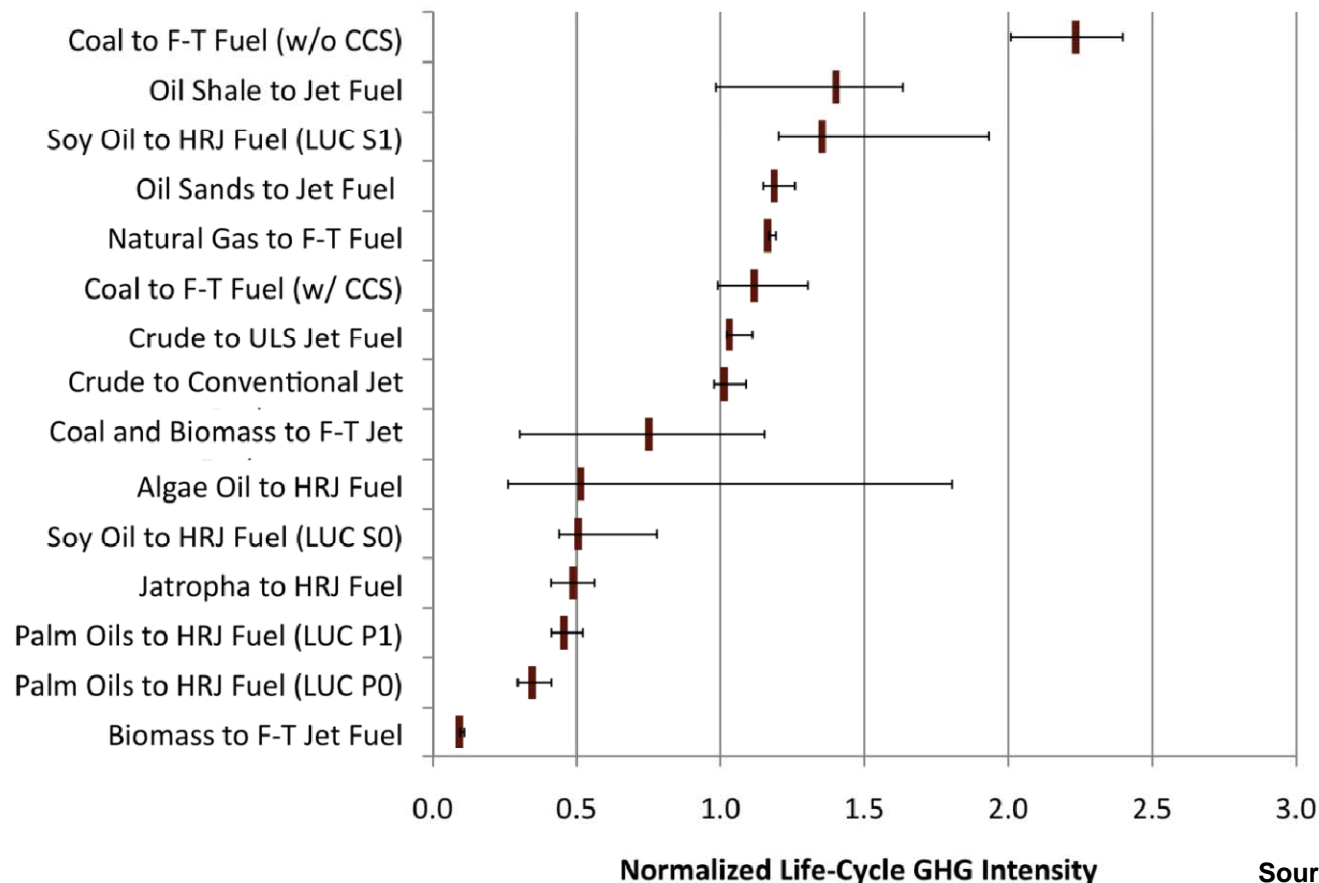
Reduce LCA and Promote Common Analytics

Three pathways meriting additional analysis:

- 1) Coal-Biomass to F-T Fuel
- 2) Algae to Biojet (HRJ)
- 3) Jatropha to Biojet – added feedstocks (e.g. Camelina) (HRJ)



Additional pathways being considered (e.g. halophytes to HRJ)

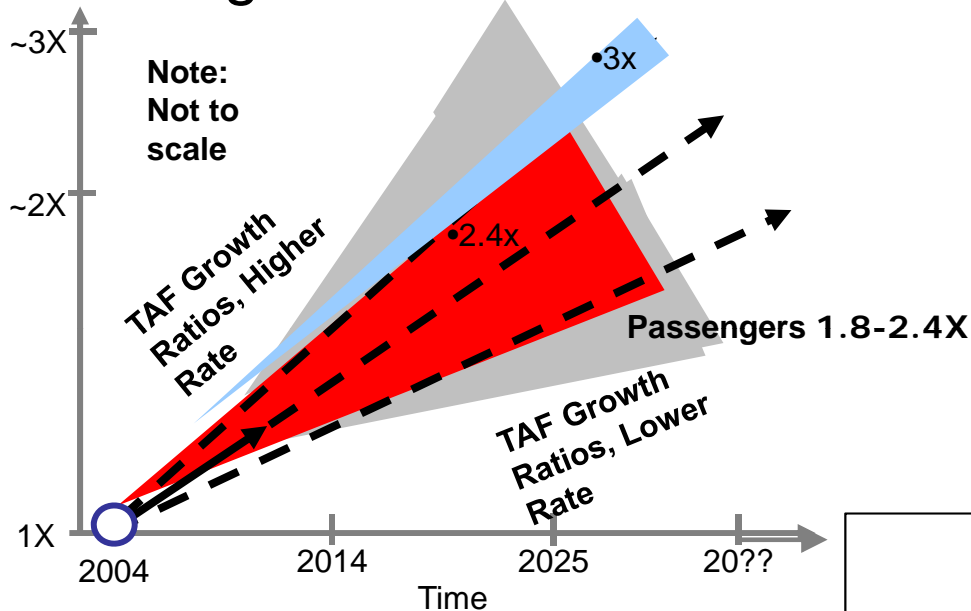


For additional information, contact:
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Source: GIACC/4, subject to change 04/09.

Air Quality (PM_{2.5}) Can Limit U.S. Aviation Growth

Growing demand ...



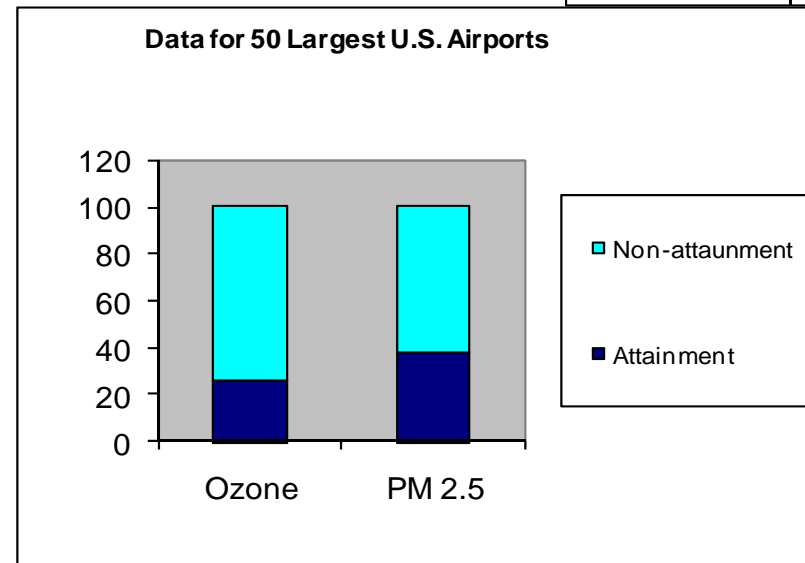
Preliminary Analyses of Emissions Growth for NextGen Scenarios

... a growing footprint

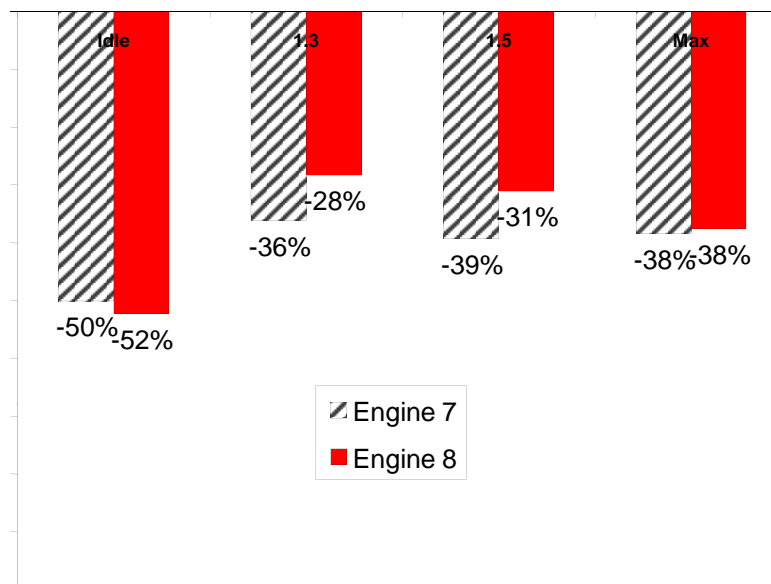
| | 2X Change |
|-----|-----------|
| HC | + 75% |
| CO | + 70% |
| NOx | + 90% |
| SOx | + 85% |

...precursor to PM_{2.5} driven capacity constraints?

...controllable with alternative fuels?



Improve Air Quality

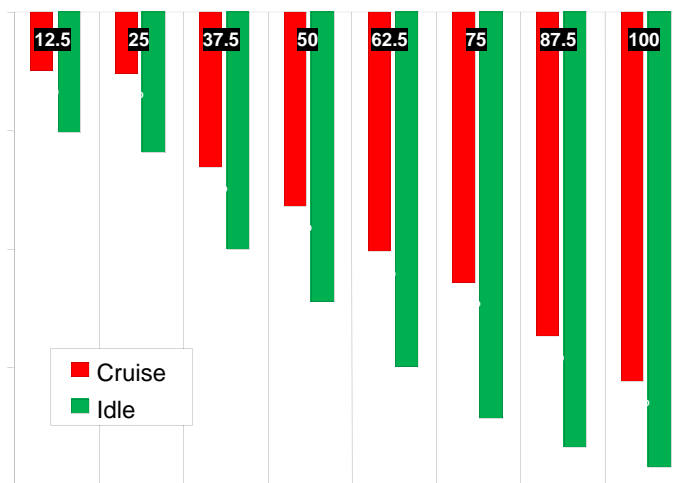


TF33 Engine/ B-52 Aircraft

**30-50%
reduction in
Particulate Mass
EI with 50/50
FT/JP-8**

T63 Engine

**75-95% reduction in
Particle Number with
100% FT**



Leverage Airline Purchasing Power

- Identify airport fuel cost differences
- Quantify airport fuel consumption needs
 - Airlines
 - Ground support equipment
- CAAFI Economics Council evaluate industry purchasing opportunities
- Use “champions” to support deployment opportunities

Financing & Deployment Strategy

- Promote awareness of CAAFI & its resources
- Support projects with airline industry purchase contracts
- Dispense information of financing availability to project sponsors
- Promote knowledge of alternative energy and industry needs to public and private financing sources
- Identify needs of private sector investors
- Support required incentives
- Joint initiatives

Recommendations/Ideas

- Information on your alternative energy initiatives
- How can CAAFI help you?
- Invitation to CAAFI September meeting
- Agree on follow up