The Future of Air Transportation: Implications for Intercity Transportation System Environmental Impacts

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Emissions from aircraft overwhelm savings potentials from other modes

Philadelphia: Reduce VMT by 596 million per year

1 year of daily flights between Philadelphia-Doha

Boston: Hubway Bicycle Program saved 350 tons of CO₂ from 2011-2014

Between 2014-2015, Boston’s new international flight to Beijing, China emitted 58,530 tons of CO₂

In the past year, U.S. aircraft emitted

- 11 percent of GHG emissions from the transportation sector in the U.S.
- 3 percent of total U.S. GHG emissions
- 29 percent of GHG emissions from all aircraft globally
- 0.5 percent of total global GHG emissions
- System growth and system contraction
- Economic development
- Technology, procedures, and regulations
Congestion
Damage Cost for One Flight by Airport

![Graph showing damages ($2013 USD) from one of each aircraft by airport.](image)

Nahlik, M., Chester, M., Ryerson, M.S. Spatial Differences And Local Costs Of Air Pollution Damages Across U.S. Airports. In review, submitted August 2015.
Congestion Peaks Unpredictability
Airline Contingency Planning

- 4.48% of the fuel consumed by a single flight is due to carrying unused fuel
- 1.04% of the fuel consumed by a single flight is due to carrying additional contingency fuel above a reasonable buffer
- Reducing contingency planning across the entire U.S. domestic aviation industry would reduce as much CO$_2$ as removing 1-2% of California VMT

Open Skies, Joint Ventures, and Gulf Carriers
New Travelers, Travel Patterns, and Modes

Traveling with Millennials

It makes sense to travel now, instead of saving travel for a future that is in no way guaranteed.
- System growth and system contraction
- Economic development
- Technology, procedures, and regulations
Major U.S. airports are routinely expanded with the justification of economic development.

Airport funded airline incentive programs

- System growth and system contraction
- Economic development
- Technology, procedures, and regulations
New Airframes, New Engines, New Fuels, New Procedures

“Aircraft remain the single largest GHG-emitting transportation source not yet subject to GHG standards in the U.S.”

E.P.A. Takes Step to Cut Emissions From Planes

By JAD MOUAWAD and CORAL DAVENTPORT  JUNE 10, 2015
Greener Skies

New NextGen satellite procedures over Elliott Bay in Seattle are saving airlines money and fuel, and getting passengers on the ground quicker.

NextGen Precision Route
- Current Radar +4 minutes
- Current Radar +8 minutes

Alaska Airlines
- 154 Flights per day
- Save 0.6 minutes per flight

112,420 Barrels annually
- Annual savings potential $13,490,400

www.faa.gov/nextgen
Figure 1. The Aviation Industry’s Long-term Targets

Aviation’s emissions reduction road map

- Business-as-usual emissions
- Known technology, operations, and infrastructure measures
- Biofuels and additional technology
- Carbon-neutral growth from 2020
- Gross emissions trajectory
- Economic Measures

Source: Air Transport Action Group (ATAG).