

The Impact of the U.S. Airline Industry on Global Climate Change

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ENVS 310: Intro to Environmental Law & Policy

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December 12, 2022

Executive Summary

Airlines based in the United States are responsible for 25% of all global aircraft emissions (C2ES, 2021). Emissions from the aviation industry leave a massive international carbon footprint that destroys the ozone layer, increases global warming, and traps heat in the atmosphere. More fuel-efficient planes and aircraft operations could limit carbon emissions and slow climate change by reducing the environmental impact of the United States aviation industry. Investigating solutions to lessen the impact of emissions from the aviation industry involves analyzing current flight operations and seeing how they contribute pollutants and worsen global climate change.

Part 1

Problem statement

Aviation accounts for 2% of global carbon emissions (Sustainable Travel International, 2022), with airplane emissions of carbon dioxide –a major greenhouse gas– expected to triple by 2050 (Chokshi & Kraus, 2021). Estimates show that the airline industry will consume one-sixth of the remaining 1.5°C temperature budget required to limit the effects of global warming (UKRI, n.d.). There is extensive evidence that greenhouse gas emissions from the airline industry and related emitters will exacerbate storms, droughts, cause a loss of species, and destroy ecosystems. Just 12% of the United States population is responsible for 66% of worldwide flights taken annually (Sustainable Travel International, 2022). The United States contributes greatly to global warming as airlines based in the United States fly the most annually worldwide and make up 25% of all global aircraft emissions (C2ES, 2021).

Scope and severity

In a globalized economy, air travel has become a necessity. Greenhouse gas emissions from the aviation sector already substantially contribute to global levels, and future emissions will further the negative impacts of climate change. Emissions from domestic aviation in just the United States have increased by 17% since 1990 (Oxner, 2020). Airplanes produce dangerous pollutants as they burn jet fuel and create a contrail. These pollutants include CO₂, nitrous gasses, water vapor, sulfate, and other related particles (EESI, 2019). Estimates show global aviation will constitute 5% of the remaining emissions allowable to keep global temperatures below 1.5°C (C2ES, 2021). Because flights departing from United States airports make up a

quarter of global aviation-related carbon emissions, decreasing emissions from United States-based travel is imperative to lessen the impacts of global warming.

Current policy context

Policy and regulations on airplane emissions have been relatively limited until recently. In 2020, the Environmental Protection Agency created its first set of rules to regulate greenhouse gas emissions from commercial aircraft in the United States (Oxner, 2020). This policy requires aircraft manufacturers to use fuel-efficient engines that release less heat-trapping carbon dioxide, and all new aircraft sold to commercial airlines must meet the requirements by 2028 (Oxner, 2020). Many critics cited this policy as being “another industry handout” and a “do-nothing rule” rather than being an effective method for U.S. airlines to decarbonize (Oxner, 2020).

In 2021, The Federal Aviation Administration released its Aviation Climate Action Plan detailing a plan for U.S. airlines to achieve net-zero greenhouse gasses by 2050 (FAA, 2021). This plan directed airlines to create individualized strategies. Since then, U.S.-based airlines have outlined ambitious plans to commit to becoming carbon neutral through aircraft modernization, carbon capture, and the use of sustainable aviation fuel (Carbon Credits, 2022). The Federal Aviation Administration’s 2021 plan will work with the Biden Administration's action plan to reduce aviation emissions by 20% by 2030 (White House, 2021). The White House allocated funding to produce three billion gallons of sustainable jet fuel annually and promised to match grants to increase aircraft efficiency (White House, 2021).

Stakeholder analysis

The primary stakeholders interested in the United States aviation industry are the United States-based airlines, the Federal Aviation Administration, the Environmental Protection Agency, and research institutes dedicated to sustainable jet fuel testing. The Federal Aviation Administration and United States-based airlines value profit and reputation and are affected by this issue because of how the industry pollutes the environment. Challenging the aviation industry's emission practices would change how the airlines operate. Previously, United States-based airlines and the Federal Aviation Administration have contributed to this issue by committing to reduce emissions and creating action plans to achieve a goal of net-zero carbon emissions. The Environmental Protection Agency and other research institutes working specifically on sustainable jet fuel value a clean environment with the least amount of pollutants possible due to the aviation sector. The Environmental Protection Agency has previously contributed to this issue through its greenhouse gas emissions regulations and it could further contribute through increased regulations. Research institutes working towards producing sustainable jet fuel could contribute to this issue through experimentation in jet fuel.

Secondary stakeholders include United States fliers and environmental NGOs such as the International Coalition for Sustainable Aviation. U.S. fliers prioritize the accessibility and variety of flight options.. Some fliers would view sustainable travel as being important. Previously, U.S. fliers have not specifically contributed to this issue, but could through imposed carbon offset purchases or sustainable travel choices. Environmental NGOs focused on aviation, including the International Coalition for Sustainable Aviation, have previously contributed to this issue by advocating for sustainable flight options. They could be instrumental in future contributions by advocating for widespread sustainable switches in aviation.

Part 2

Alternative #1

The first alternative is to ban frequent flier incentives and perks offered by United States-based airlines. These programs enable those who fly often to fly even more through discounted flights and related advantages (Osaka, 2022). This ban would prevent airlines from enabling frequent fliers to fly more and emit more pollutants related to those extra flights. This alternative could be evaluated by seeing if that small frequent flier population decreases their flying habits. The ban would reduce emissions because frequent fliers might not be inclined to fly as much if there is no return or discount from the airlines.

Alternative #2

Another solution to reduce emissions and push airlines towards using sustainable fuel would be to ban excessive fuel dumping and subsidize sustainable fuel research. Airplanes dump excess, unused fuel mid-air prior to landing to lighten the aircraft's weight. Banning excessive fuel dumping would eliminate unnecessary fuel from the environment. Funding sustainable fuel research could evaluate more precise fuel measurements to determine how to avoid needing to dump excess fuel. Research could also work to find sustainable fuel alternatives to the current carbon- and pollutant-heavy fuel currently used.

Alternative #3

A third alternative to reducing aviation-related emissions in the United States is to ban "ghost flights," defined as flights with less than 30% passenger occupancy. As a way to maintain heavily sought after flight slots and landing privileges at airports worldwide, airlines must

operate flights even when empty or near-empty (Ledsom, 2022). These flights operate with low levels of passengers and still emit large amounts of pollutants despite serving a small group of travelers (Sillers, 2020). Banning ghost flights could reduce emissions by eliminating less necessary flights and forcing airlines to only serve flights that maximize passengers. Eliminating flights that serve very few passengers would reduce emissions by lessening emissions related to flights and by allowing only necessary flights to fly and serve passengers and emit pollutants. This alternative could be evaluated by observing how operating only necessary flights reduces total emissions from the aviation industry.

Alternative #4

My final alternative is to impose a jet fuel tax on consumers when purchasing flights and require the revenue generated to be used to purchase carbon offsets. Carbon offsets, or carbon credits, are methods used to compensate for emissions (Carbon Offset Guide, n.d.). Carbon offsets commonly come in the form of land restoration, the planting of trees, or other methods to increase carbon storage (Carbon Offset Guide, n.d.). This would shift the responsibility to reduce flight-related emissions to the fliers themselves and possibly pressure airlines to shift towards sustainable jet fuel. Emissions could be reduced by pushing consumers from buying flights due to the added fee for fuel. This could also reduce emissions through the purchase of carbon offsets aimed at carbon sequestration and capture. Carbon offsets are effective methods to reduce carbon in the environment to achieve overall climate protection (Carbon Offset Guide, n.d.).

Part 3

I recommend combining alternatives two and three. Targeting jet fuel would allow for precise research into a sustainable alternative and would prevent excess fuel from being dumped into the environment. Banning ghost flights would reduce emissions by allowing only the most necessary flights to operate rather than every flight that is offered now. This recommendation would target airlines and the aviation industry as a whole rather than consumers specifically. Political barriers presented by the Federal Aviation Administration could include push backs against limiting flights and issues related to slow research into sustainable jet fuel. Implementing the third alternative would require looking at historical flight data to determine how to eliminate certain flights from being offered to ensure only necessary flights operate. Both alternatives target reducing emissions from airlines with methods that put pressure on airlines and the United States aviation industry to determine better solutions.

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