

Assignment #1

PSC 313 - Mr. Kevin Redding

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Air Force Fuel Emissions

Anthropogenic-induced acceleration of increases in global temperatures is the environmental issue I am most concerned with. However, there is no one effectual problem of climate change and thus, there is certainly no one solution. This class is enlightening me on the ignorance I have had to the nuances of the political situation of climate change. I cannot know all that there is to know about our resource concerns, but perhaps those of the institution I hope to be employed by, the U.S. Air Force (USAF), are the appropriate ones to consider first. More specifically, I am interested in the extent to which our country's military aircraft fleet contributes to, and what actions are available for minimizing fuel emissions.

With crude research, I have estimated that there are at least 4,500 active air crafts in the U.S. Air Force as of 2020.¹ According to a study on the impacts of transport, air is the form of travel which most affects surface temperatures, even though it is proportionally under-utilized compared to cars (Borken-Kleefeld, Berntsen, and Fuglestvedt 2010). Cars and airplanes use relatively similar fuel (typically a mixture with varying amounts of gasoline, kerosene, naphtha, etc.) but that of cars is more diluted (ATSDR, 2011). Additionally, airplanes are burning said fuels closer to the ozone layer, higher in the troposphere and nearer to the stratosphere.

According to another study on these emissions, "aircraft emissions add more soot particles to the [troposphere] than do surface soot emissions," adding to factors which trap heat in our

atmosphere, such as cirrus cloud formation (Penner, Chang, Wang, and Liu 2009). Heat-trapping is to a great extent the general issue of climate change, in that it affects the manner of which our vegetation grows -- or doesn't. In order for the USAF to take part in reducing these effects, their air fleet must replace the fuels currently in use with alternatives that do not produce heat trapping to the same extent.

Continuous research will improve the quality of aircraft design over time, but swapping the present jet fuel for new forms of jet fuel will commence the process of "cleaning" our air now. The Federal Aviation Administration published a list of newly approved fuels that could utilize sugars, oils and fats, and municipal waste for conversion into fuel (FAA 2016). The International Air Transport Association has also developed biojet fuel alternatives using cooking oil, jatropha, camelina, and algae (IATA 2019). The alternatives exist, the USAF merely has to choose to adopt them, even if the initial step is for testing purposes.

Because the Air Force is a government institution, the first step necessary for my policy on emission regulation would take place in the form of a bill in the House. Assuming, however, that Congress reducing USAF fuel emissions would simply fall within the Environmental Protection Agency's (EPA) pre-existing legal compliance because the current limitations are rather extensive,² there is only one other part of the "higher" government that would work directly with data on USAF emissions: the Government Accountability Office (GAO). Part of the legislative branch, the tasks of the GAO would inevitably require consolidating records on USAF efficiency of biojet fuel in comparison to the previously used regular jet fuel over time.³ They analyze the benefits of the financial investment against a potential net loss of the costs in short- and long-term intervals. Their analysis would consider, for example, how much the biojet fuel

actually reduces the planes' contributions to fuel emissions, the personnel required to administer the new fuel use and how much it would cost to hire and/or train them, and an estimation of the speed at which these costs would change over time. However, the GAO has no authority on enforcing the regulations, they can only provide suggestions to the individual agencies and departments of the USAF in order to comply with their own targets.

Two offices would be responsible for implementing strategies for exchanging current jet fuels with biojet fuels: the Assistant Secretary of the Air Force for Energy, Installations and Environment (SAF/IE) and the Air Force Civil Engineer Center (AFCEC). The SAF/IE are responsible for anything in the Air Force pertaining to the environment and energy use. In transitioning from jet fuel to biojet fuel, the SAF/IE would overlook the cleaning or replacement of storage and transportation infrastructure for the new fuel, the tools and materials necessary for the exchange, as well as ensuring that the instruments utilized for regulating and recording data are appropriate for the new fuel. The AFCEC, on the other hand, guarantees the proper disposal of Air Force waste or product that may be harmful to the environment. In removing the old fuel, in accidents with the new fuel, and any execution mistakes relating to potential harm the fuel can cause on the land or in the air, the AFCEC generates programs that address these issues. As for the personnel, the Fuels career path would begin to include sustainability and environmentally-aware requirements in their certification procedures or prior education. The training curriculum for those personnel who choose the Fuels position would be rewritten to account for biojet fuel as equal to regular fuel, and the respective practice simulations would involve biojet fuel handling.

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Theoretically, then, if my policy was that 50% of aircrafts must function solely on biojet fuel by 2050, the USAF would have approximately 30 years to accomplish the previously described process. Every department and agency would alter a slight aspect of their regulations and requirements to accommodate for the three main parts: the purchase and sale of the fuel itself by Congressional authority; hiring and re-training personnel for the new type of fuel that they have not yet used in the Air Force on a regular basis; and the building or renovating of infrastructure for transport, removal, and other unforeseen situations like spills or interacting chemicals through the SAF/IE and the AFCEC. The GAO is already in place to evaluate the metrics: If in 15 years, the number of aircrafts that must function on biojet fuel is only 450 airplanes (approx. 10%), then the Air Force is behind on the conversion by 15%. Although the GAO's suggestions are not the enforcement of a law, they are capable of notifying the EPA of the Air Force's non-compliance with the standards they set for themselves. The central issue with any national policy is that the numbers are too large for the guarantee of rigid implementation. Additionally, we cannot account for the global market's influence on biojet fuel production, an aspect of the resource issue that was not even addressed. Contrastingly, if the regulations are set too low, then the desired impact over the course of those thirty years is wasted.

It is more likely that the USAF is successful in accomplishing their targets than most other institutions because the military functions on organization and discipline. Having the Air Force move towards renewable and sustainable energy in their airplanes would set an example for a pace of environmental awareness for the rest of the military and in turn, the rest of the country.

Endnotes

1. The number is uncertain due to varying reports. There is also the possibility that the military does not release true estimates for security purposes. Additionally, the military often works with private contractors, meaning that there may be some airplanes used by the U.S. Air Force that are not accounted for because they are not owned by the USAF.
2. The EPA does indeed have jurisdiction over certain aspects of the military, but they are very general (see second source from EPA). Congress may authorize the EPA for an overarching demand, but the USAF has its own departments, agencies, and programs for implementing the law, unlike commercial airlines or privately owned airplanes.
3. See the source for GAO's review on the EPA. Evidently, the GAO does not believe that the EPA is successful at its job.

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