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Kind Regards,

Miki Barnes

This article is also available on-line at <http://www.oregonaviationwatch.org/articles/OAW-LoomingPlanetaryCrisis.php> <<http://www.oregonaviationwatch.org/articles/OAW-LoomingPlanetaryCrisis.php>> .

To: Members of the Joint Committee on Carbon Reduction

From: Miki Barnes, PO Box 838, Banks, OR 97106, 503-324-0291

Date: 1/22/19

Topic: The Importance of Reducing Carbon Dioxide Emissions Generated by Aircraft

Looming Planetary Crisis Posed by Climate Change by Miki Barnes

This update has two parts. The opening section comments on the global threat posed by climate change, while the second part hones in on Oregon in general and aviation greenhouse gas emissions in particular.

United Nations on Climate Change

At an international United Nations climate conference in Poland on 12/3/18, the renowned British naturalist, David Attenborough, issued an ominous warning about the future of the planet:

"Right now we are facing a man-made disaster of global scale, our greatest threat in thousands of years: climate change. If we don't take action, the collapse of our civilizations and the extinction of much of the natural world is on the horizon." [1] <<file:///C:/DOCUME~1/Miki/LOCALS~1/Temp/??.htm>>

Attenborough's statement followed the release of an October 2018 United Nations Intergovernmental Panel on Climate Change (IPCC) report [2] emphasizing the importance of limiting global warming which, even at current rates, is leaving death, disease, and destruction in its wake.

Washington Post editorialist, Eugene Robinson, elucidated some of the findings cited in the IPCC publication

"The burning of fossil fuels on an industrial scale has raised global temperatures by about 1 degree Celsius (1.8 degrees Fahrenheit). That may not sound like much, but look at the consequences we're already seeing: Stronger, slower, wetter tropical storms. Unprecedented heat waves. Devastating floods. Dying coral reefs. A never-before-seen summer shipping lane across the Arctic Ocean." [3]

"The obvious solution is to dramatically reduce carbon emissions. The IPCC says that emissions need to decline by at least 40 percent by 2030, and to reach net zero by 2050, if we are to hold warming to one more degree. Yet last year, according to the International Energy Agency, global emissions hit an all-time high." [4] <<file:///C:/DOCUME~1/Miki/LOCALS~1/Temp/?.htm>>

U.S. Government Details Devastating Impacts of Climate Change

Yet another study, this one released by the U.S. government in November 2018, also sounded the alarm. Per a New York Times article:

"A major scientific report issued by 13 federal agencies on Friday presents the starkest warnings to date of the consequences of climate change for the United States, predicting that if significant steps are not taken to rein in global warming, the damage will knock as much as 10 percent off the size of the American economy by century's end." [5]

"But in direct language, the 1,656-page assessment lays out the devastating effects of a changing climate on the economy, health and environment, including record wildfires in California, crop failures in the Midwest and crumbling infrastructure in the South. Going forward, American exports and supply chains could be disrupted, agricultural yields could fall to 1980s levels by mid-century and fire season could spread to the Southeast, the report finds." [6]

Global Warming in Oregon

DEQ Greenhouse Gas Emissions Report

In May of 2018, the Oregon Department of Environmental Quality (DEQ), released a report entitled Oregon's Greenhouse Gas Emissions Through 2015: A Review of Oregon's Sector-Based and Consumption-Based Greenhouse Gas Emissions. [7] The document, a 5 year update to a 2013 greenhouse gas publication which will be discussed later in this paper, stated that, "The combustion of fossil fuels, whether occurring within Oregon or as a result of our consumption, is the key driver of greenhouse gas emissions," and further identified transportation as the largest contributor to global warming in the state. [8] The authors distinguished between two types of emissions - sector-based emissions "produced in Oregon from its transportation, residential, commercial, industrial and agricultural sectors, including electricity produced elsewhere but used in the state" and consumption-based emissions, which are "produced around the world due to Oregon's consumption of energy, goods and services." [9] Per the 2018 publication,

"Oregon has statutory goals to reduce in-state emissions 10 percent below 1990 levels by 2020 and 75 percent below 1990 levels by 2050. These statutory goals apply to emissions that occur inside

Oregon. Both sector-based and consumption-based inventories include portions of these in-state emissions, but also include emissions that occur outside of Oregon. Current trends in emissions are not moving in the direction of these goals. Both inventories compiled by DEQ are above their respective 1990 levels. Consumption-based emissions are rising, while sector-based emissions are no longer decreasing."

"Oregon's emissions are approximately one percent of the world's second largest global emitter, the United States, emitting emissions equivalent to countries like Portugal and Ireland. Oregon has experienced an increase in emissions within the transportation, residential, commercial and agriculture sectors when compared to 1990 levels and a small decrease within the industrial sector within the same time period. While Oregon's emissions have decreased slightly since 2007 that trend has not continued in recent years and Oregon's 2015 emissions are still 10 percent higher than 1990 levels." [10]

It is worth noting that the population of Portugal is more than twice that of Oregon and the population of the Republic of Ireland and Northern Ireland combined exceeds that of Oregon by more than 2 million, thus the per capita global warming footprint in Oregon is significantly higher than in these countries.

In addition, it is important to recognize that China, with a population quadruple that of the United States, is the top emitter of greenhouse gases worldwide, while the U.S. holds the second spot. However, on a per capita basis the U.S. generates more than twice the carbon dioxide footprint from the use of fuel than China does. [11] <file:///C:/DOCUME~1/Miki/LOCALS~1/Temp/?.htm>

Aviation and Global Warming in Oregon

In an article for Oregon Business following the release of the May 2018 DEQ document, Linda Baker wrote about what she referred to as the Port of Portland's "dirty little secret." [12] Per Baker, the report pointed out that "greenhouse gas emissions from airline transport in Oregon grew from 1.3 million metric tons in 2005 to 1.7 million metric tons in 2015." [13]

In addition, she referred to a study by the European Parliament environment committee finding that, "if left unchecked, aviation is on target to increase contributions to global carbon dioxide emissions from today's 3% to 22% by 2050. Emissions from marine activity show a similar trajectory." Yet as Baker points out, despite their significant contribution to climate change "airlines and ships are not included in local and international efforts to curb greenhouse gas emissions" nor are they "subject to reductions under the Paris Climate Agreement." [14]

When addressing aviation, DEQ's 2015 report focused primarily on commercial passenger flights and international trade. However, the amount of greenhouse gas emissions generated by general aviation, including the extensive network of flight training airports in combination with recreational and military training flights in Oregon, is not directly addressed. The majority of the flight training operations stay within Oregon's borders. It would be instructive to see a detailed breakdown by individual airports, flight training companies and other aviation business owners to obtain more comprehensive data on their contribution to the global warming crisis and to determine the extent to which these activities were factored into DEQ's analysis.

Along a similar vein, an earlier DEQ report released in July of 2013, Oregon's Greenhouse Gas Emissions Through 2010, [15] was described as a collaborative effort by the Oregon Departments of Energy,

Environmental Quality, and Transportation. This document focused its aviation transportation analysis primarily on commercial passenger flights and aviation freight. In so doing it failed to provide a comprehensive picture of the environmental impacts of the aviation industry including flight training, recreational flyers, air taxis, corporate jets, and the military.

This is a serious omission in light of the fact that the Oregon Department of Aviation lists 97 public use airports in the state, 8 of which are categorized as commercial, and over 360 private use airports.[16] To add perspective, in 2017, the Port of Portland's general aviation airports - Hillsboro and Troutdale - which primarily serve Hillsboro Aero Academy's international flight training school, logged over 300,000 annual operations, 75,000 more than Portland International, the largest commercial airport in the state.[17]

Regarding commercial flights, the 2013 DEQ report acknowledged that "Short-haul air trips (e.g. Portland to Seattle) produce more greenhouse gas emissions per passenger mile because taxi, take-off, and climb are a larger proportions of total trip emissions, and the aircraft type, often regional jets, are less efficient per passenger mile." [18] <file:///C:/DOCUME~1/Miki/LOCALS~1/Temp/???.htm> Short haul averaged 0.2477 kilograms of CO2 per passenger mile compared to 0.1818 for long haul.[19]

Unfortunately, neither greenhouse gas report provided emissions data for corporate and business jets such as those used by Intel, Nike, Fred Meyers, and other Oregon corporations, nor did they provide emissions data for general aviation flights, most of which remain within state boundaries, and many of which engage in repetitive touch and go operations and training patterns both close-in and at a distance from their sponsoring airports.

The report did, however, acknowledge that air freight has the highest rate of carbon dioxide emission rates than all other forms of transportation - 1,472 grams of CO2 per ton mile, "over four times higher than the truck rate,"[20] and more than 52 times higher than shipping by rail, which came in at 28 grams of carbon dioxide emissions per ton mile.[21]

Reports Fail to Capture Foreign and Out of State Student Pilot CO2 Emissions

Both DEQ reports speak of estimating CO2 emissions by Oregonians. In discussing their consumption-based inventory in their 2013 greenhouse gas publication, DEQ stated,

"Emissions from energy use by Oregon businesses are included only if the energy is used in the course of satisfying Oregon consumption..."[22]

Specific to transportation the report noted that,

"Estimates were made of the emissions resulting from the travel of Oregon households regardless of where they travel (in-state or out-of-state). Conversely, the emissions of the residents of other states were not assessed, even if those emissions occurred or are projected to occur within Oregon's boundaries." [23]

The 2013 report found that emissions from the expanded transportation sector which takes "An enhanced look at the emissions associated with travel by Oregonians and the impacts of inbound freight movement...increased 30% from 1990 to 2010. Proportionately, the biggest increase in emissions was from the air passenger travel market, which doubled during the period. Emissions from the freight

market provided the largest increase overall." [24] Again, no mention of the contribution of general aviation, flight training or military contributions to global warming.

It appears that the above narrowly defined parameters for estimating greenhouse gas emissions may have absolved the DEQ from accurately including the emissions released by student pilots recruited from outside the state and overseas of responsibility for their substantial contribution to global warming. It remains unclear as to whether or not this oversight was corrected in the May 2018 release. Thus the question arises: Were carbon dioxide emissions generated by the Hillsboro Airport (the largest general aviation airport in the state), where the majority of operations are training flights to accommodate foreign and out of state pilots, factored in? If so, how were these emissions calculated and by whom? Similarly, were the emissions generated by flight training and general aviation activity at the more than 450 airports located in Oregon comprehensively addressed and, if so, where is the data on this mode of transportation?

Hillsboro Aviation and Hillsboro Aero Academy are both Hillsboro Airport tenants. Per their website "Hillsboro Aviation has logged over 1.2 million flight hours since 1980." [25] Similarly Hillsboro Aero Academy boasts of being one of the largest flight training schools in the U.S., with years of experience in training pilots from over 75 countries." [26] Yet the greenhouse gas emissions generated by these companies were not mentioned in the transportation sector of Oregon's 2013 or 2018 greenhouse gas reports nor was detailed information provided specific to other Oregon airports.

Key Points and Possible Solutions for Reducing Aviation Greenhouse Gas Emissions

- * Aviation is a significant contributor to global warming.
- * Oregon's flight training industry is a major emitter of carbon dioxide. When measuring greenhouse gases generated by this industry, it is important to factor in the emissions released during the international flights required to transport prospective pilots from their native countries to Oregon. These emissions are in addition to those released during the flight training itself, which involves repetitive touch-and-go activity as well as practicing in training patterns further from the airport. Additional recreational flying student pilots may engage in also needs to be factored in. In a similar vein, emissions generated by out of state students flying to and from Oregon for flight training in addition to their actual training and recreational activity must be considered to assure accuracy when reporting on this industry.
- * The City of Hillsboro and Washington County appointees recently participated in developing the Hillsboro Airport Master Plan - a document that promotes the flight training industry and further growth at this airport. It is important that the city and county's elected officials recognize that they are called upon to represent the people of this jurisdiction rather than the airports and business that pose a significant health and environmental threat, not only to the community but to the entire globe.
- * Portland Community College must also recognize that their Aviation Sciences flight training program, which is involved in training international and out-of-state student pilots, poses a significant threat to the environment and health of the entire planet.
- * A 2018 DEQ report indicated that "greenhouse gas emissions from airline transport in Oregon grew from 1.3 million metric tons in 2005 to 1.7 million metric tons in 2015." [27] It remains unclear as to whether or not the 0.6 million metric ton increase over the space of 10 years included general aviation and flight training activity. This needs to be clarified by publicly releasing data on how the emissions were calculated.
- * Military operations also release significant amounts of carbon dioxide. Figures specific to Oregon National Guard and other military training exercises in Oregon need to be made public. Similarly, data

about the greenhouse gas emissions associated with the massive military industrial complex in the U.S. needs to be taken into account. The actual impacts of waging war, instead of negotiating peace, on the long term health of the planet must be determined.

* Local, state and federal politicians and elected representatives who expect to benefit economically and professionally from promoting aviation interests should be required to recuse themselves when votes related to airports are on the table. Safeguards need to be established to insure that their personal self interest does not continue to compromise the health and well-being of current and future generations.

* Regarding commercial flights, DEQ has acknowledged that "Short-haul air trips (e.g. Portland to Seattle) produce more greenhouse gas emissions per passenger mile because taxi, take-off, and climb are a larger proportions of total trip emissions, and the aircraft type, often regional jets, are less efficient per passenger mile." [28] <<file:///C:/DOCUME~1/Miki/LOCALS~1/Temp/?.htm>> Short haul averaged 0.2477 kilograms of CO2 per passenger mile compared to 0.1818 for long haul.[29] This suggests that investing in high speed rail, which is a far more environmentally sustainable mode of transportation compared to aviation, could help reduce global warming emissions.

* DEQ found that air freight has the highest rate of CO2 emission rates when compared to all other modes of transportation - 1,472 grams of CO2 per ton mile, "over four times higher than the truck rate,"[30] and more than 52 times higher than shipping by rail, which came in at 28 grams of CO2 emissions per ton mile.[31]

* Clearly, Oregon's promotion of the aviation industry has contributed to the perilous global warming threat now looming over the entire planet. Just as ordinary residents are encouraged to reduce their environmental footprint, so too should the aviation sector. Prohibiting all international and out of state flight training is a reasonable first step. Local flight students should also be fully educated about the negative effects of this activity on the impacted communities

* The cost of climate change and other environmental pollutants needs to be factored into all decisions related to airport expansion and upgrade projects proposed by the Port of Portland, other Oregon port authorities, the Department of Transportation, and individual airports across the state. It is troubling that while individual residents are exhorted to reduce their emissions by driving and traveling less, using public transport, and engaging in zero carbon generating activities such as bicycling and walking, the Port, Oregon Department of Aviation, and aviation enthusiasts continue to promote aviation growth and expansion while ignoring the significant costs and environmental impacts. In regards to these areas of concerns, all cost benefit analyses should include the significant expense and damage, both short and long term, inflicted upon the planet by this fossil fuel burning mode of transportation.

* As noted in the 2018 Biennial Oregon Global Warming Commission to the Legislature, "Transportation GHG emissions have risen during each of the past three years and have grown from 35% of the statewide total in 2014 to 39% in 2016." [32]

Closing

The aviation sector frequently touts airports and aviation businesses as major contributors to the economy, however, assertions of this nature deserve further scrutiny, particularly in light of the costs associated with the health impacts in combination with environmental damage and economic losses due to wildfires and other natural disasters.

The 2018 Oregon Global Warming Commission report listed some of the costs of global warming already effecting Oregonians, "The 80,000 acre 'Substation Fire' near The Dalles, Oregon in July burned 1-2 million bushels of wheat at a cost of > \$5 million...The Oregon Department of Forestry estimates gross

state costs of wildfire control in 2018 at more than \$100 million" and further stated that Oregon's net fire-fighting costs averaged \$39 million per year over the last 6 years (2013-2018)..." The report also addressed the toll the fire season took on the Ashland Shakespeare Festival which "had to cancel or relocate 26 performances from its outdoor theatre in 2018..." This translated into an estimated loss of \$2 million to the festival plus additional losses to the shops, restaurants, hotels and inns that suffered a downturn in business as a result of the drop in tourist visitors. [33] And these figures don't even begin to include the huge loss of life and property as well as financial losses resulting from the wildfires in California, Washington and other parts of the world due to global warming.

As stated by Oregon's Global Warming Commission,

"...climate change is occurring in real time. Its effects are being felt in Oregon and around the world today, and not in some distant and uncertain future. If we ended GHG [greenhouse gas] emissions tomorrow, climate change effects would persist and worsen for decades to come. Cutting climate change off from its GHG is like stopping a ship's engines: it does not stop the inertial forward motion but only allows it to gradually slow. Our children, and theirs, will be living with the worsening consequences of our failure to take timely action when we knew we should. Bad as that is, further delay only makes it worse." [34] <<file:///C:/DOCUME~1/Miki/LOCALS~1/Temp/?.htm>>

As we approach this environmental precipice, Oregon leaders and elected officials are called upon to make momentous decisions. Are they going to continue with business-as-usual policies, that protect the short-term, self-serving profit motives of airport owners, operators, and aviation businesses, or will they at long last prioritize the long term health of this planet? Their failure to reduce and regulate this significant source of deadly emissions will have serious ramifications on current and future generations. Meanwhile the fragile fate of the planet lies in the balance.

For additional information on aviation issues visit www.oregonaviationwatch.org
<<http://www.oregonaviationwatch.org>> .

[1]Domonoske, Camila. David Attenborough Warns of 'Collapse of Civilizations at U.N. Climate Meeting. National Public Radio (NPR) (12/3/18) Last accessed on-line on 12/4/18 at <https://www.npr.org/2018/12/03/672893695/david-attenborough-warns-of-collapse-of-civilizations-at-u-n-climate-meeting> <<https://www.npr.org/2018/12/03/672893695/david-attenborough-warns-of-collapse-of-civilizations-at-u-n-climate-meeting>> .

[2] Global Warming of 1.5°C,: An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. International Panel on Climate Change (IPCC). Last accessed on-line on 1/8/19 at <https://www.ipcc.ch/sr15/> .

[3] Robinson, Eugene. Opinion: New Climate Report Reveals Planetary Horror Story. Washington Post. (10/9/18). Last accessed on-line on 12/4/18 at https://www.oregonlive.com/opinion/index.ssf/2018/10/opinion_new_climate_report_rev.html <https://www.oregonlive.com/opinion/index.ssf/2018/10/opinion_new_climate_report_rev.html> .

[4] Ibid.

- [5] Davenport, Coral and Pierre-Louise, Kendra. U.S. Climate Report Warns of Damaged Environment and Shrinking Economy. New York Times. (11/23/18). Last accessed on-line on 12/4/18 at <https://www.nytimes.com/2018/11/23/climate/us-climate-report.html> <<https://www.nytimes.com/2018/11/23/climate/us-climate-report.html>> .
- [6] Ibid.
- [7] Oregon's Greenhouse Gas Emissions Through 2015: An Assessment of Oregon Sector Based and Consumption Based Greenhouse Gas Emissions. Oregon Department of Environmental Quality. (May 2018. Last accessed on-line on 12/10/18.at <https://www.oregon.gov/deq/FilterDocs/OregonGHGreport.pdf> <<https://www.oregon.gov/deq/FilterDocs/OregonGHGreport.pdf>> .
- [8] Ibid. Pg. 4.
- [9] Ibid. Pg. 1.
- [10] Ibid. Pg. 42.
- [11] Each Country's Share of CO2 Emissions. Union of Concerned Scientists. Last accessed on-line at <https://www.ucsusa.org/global-warming/science-and-impacts/science/each-countrys-share-of-co2.html#.XDPTOtQrLGg> <<https://www.ucsusa.org/global-warming/science-and-impacts/science/each-countrys-share-of-co2.html#.XDPTOtQrLGg>> on 1/7/19.
- [12] Baker, Linda. Elephants in the Room. Oregon Business. (5/21/18). Last accessed on-line on 12/4/18 at <https://oregonbusiness.com/article/energy-environment/item/18338-elephants-in-the-room> <<https://oregonbusiness.com/article/energy-environment/item/18338-elephants-in-the-room>> .
- [13] Ibid.
- [14] Ibid.
- [15] Oregon's Greenhouse Gas Emissions Through 2010: In-Boundary, Consumption-Based and Expanded Transportation Sector Inventories. Oregon DEQ, Oregon Dept. Of Energy, and Oregon Sept. of Transportation. (7/18/13). Last accessed on-line on 12/3/18 at <https://digital.osl.state.or.us/islandora/object/osl%3A369539/datastream/OBJ/view> <<https://digital.osl.state.or.us/islandora/object/osl%3A369539/datastream/OBJ/view>> .
- [16] Oregon Dept. of Aviation Annual Report July 1 2014 Through June 30 2015. Pg. 12. Last accessed on-line at https://www.oregon.gov/aviation/docs/FY_2014_2015_Annual_Report.pdf <https://www.oregon.gov/aviation/docs/FY_2014_2015_Annual_Report.pdf> .
- [17] Aviation Statics. Portland International Airport. Last accessed on 12/3/18 at <https://popcdn.azureedge.net/pdfs/Dec2017webstats.pdf> <<https://popcdn.azureedge.net/pdfs/Dec2017webstats.pdf>> .
- [18] Oregon's Greenhouse Gas Emissions Through 2010: In-Boundary, Consumption-Based and Expanded Transportation Sector Inventories. Oregon DEQ, Oregon Dept. of Energy, and Oregon Dept.of Transportation.(7/18/13). Pg. 60.
Last accessed on-line on 12/3/18 at <https://digital.osl.state.or.us/islandora/object/osl%3A369539/datastream/OBJ/view> <<https://digital.osl.state.or.us/islandora/object/osl%3A369539/datastream/OBJ/view>> .
- [19] Ibid.
- [20] Ibid. Pg. 58.
- [21] Ibid.
- [22] Ibid. Pg 29-30.
- [23] Ibid. Pg. 51.
- [24] Ibid. Pgs. 1-3.
- [25] Hillsboro Aviation website. Last accessed on 12/3/18 at <https://www.hillsboroaviation.com/> <<https://www.hillsboroaviation.com/>> .

[26] Why Choose Hillsboro Aero Academy. Hillsboro Aero Academy website. Last accessed on 12/3/18 at <https://flyhaa.com/why-choose-haa/> <<https://flyhaa.com/why-choose-haa/>> .

[27] Baker, Linda. Elephants in the Room. Oregon Business. (5/21/18). Last accessed on-line on 12/4/18 at <https://oregonbusiness.com/article/energy-environment/item/18338-elephants-in-the-room> <<https://oregonbusiness.com/article/energy-environment/item/18338-elephants-in-the-room>> .

[28] Oregon's Greenhouse Gas Emissions Through 2010: In-Boundary, Consumption-Based and Expanded Transportation Sector Inventories. Oregon DEQ, Oregon Dept. Of Energy, and Oregon Sept. of Transportation. (7/18/13). Pg. 60.

Last accessed on-line on 12/3/18 at

<https://digital.osl.state.or.us/islandora/object/osl%3A369539/datastream/OBJ/view> <<https://digital.osl.state.or.us/islandora/object/osl%3A369539/datastream/OBJ/view>> .

[29] Ibid.

[30] Ibid., Pg. 58.

[31] Ibid.

[32] Oregon Global Warming Commission: 2018 Biennial Report to the Legislature for the 2019 Legislative Session. Pg. 8. Last accessed on-line at the Keep Oregon Cool website at

<https://static1.squarespace.com/static/59c554e0f09ca40655ea6eb0/t/5c2e415d0ebbe8aa6284fdef/1546535266189/2018-OGWC-Biennial-Report.pdf>

<<https://static1.squarespace.com/static/59c554e0f09ca40655ea6eb0/t/5c2e415d0ebbe8aa6284fdef/1546535266189/2018-OGWC-Biennial-Report.pdf>> on 1/6/19.

[33] Ibid. Pg. 14-16.

[34] Ibid. Pg. 5.

Miki Barnes

miki@psg.com