



Written Statement of  
**Len Higashi**  
Acting Executive Director  
Hawaii Technology Development Corporation  
before the  
**Senate Committee On Ways and Means**  
Thursday, April 1, 2021  
9:30 a.m.  
Videoconference

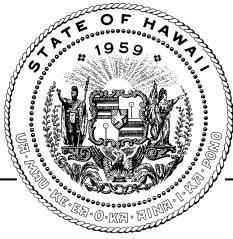
In consideration of  
**HB683, HD2**  
**RELATING TO SUSTAINABLE AVIATION FUEL.**

Chair Dela Cruz, Vice Chair Keith-Agaran, and Members of the Committee.

The Hawaii Technology Development Corporation (HTDC) offers **comments** on HB683, HD2 that establishes the sustainable aviation fuel program to provide matching grants to any small business in Hawaii that is developing products related to sustainable aviation fuel or greenhouse gas reduction from commercial aviation operations.

HTDC supports initiatives aimed at growing tech and innovation jobs. HTDC's Hawaii Center for Advanced Transportation Technologies has previously piloted various hydrogen fuel technology demonstrations. HTDC supports the intent of this initiative to reduce emissions through local innovation provided it does not supplant the priorities in the Administration's budget.

Thank you for the opportunity to offer these comments.



# HAWAII STATE ENERGY OFFICE STATE OF HAWAII

DAVID Y. IGE  
GOVERNOR

SCOTT J. GLENN  
CHIEF ENERGY OFFICER

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Testimony of  
**SCOTT J. GLENN, Chief Energy Officer**

before the  
**SENATE COMMITTEE ON WAYS AND MEANS**

Thursday, April 1, 2021  
9:30 AM  
State Capitol, Conference Room 211 & Videoconference

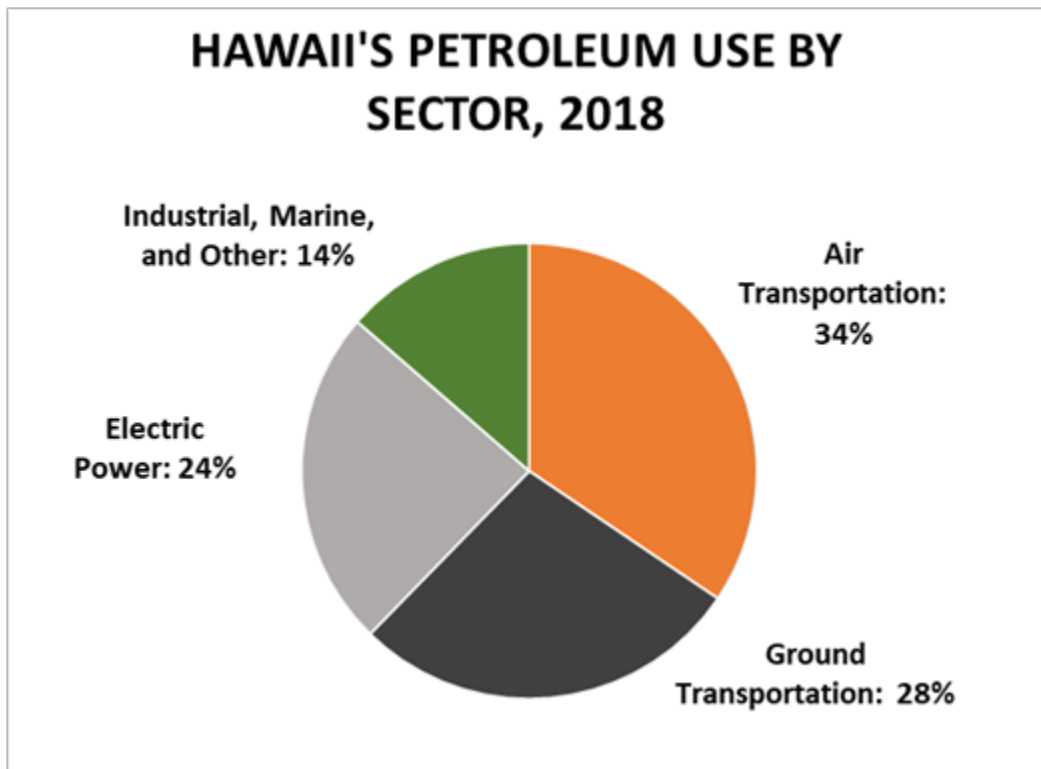
In support of  
**HB 683, HD2**  
**RELATING TO SUSTAINABLE AVIATION FUEL.**  
(Written Testimony Only)

Chair Dela Cruz, Vice Chair Keith-Agaran, and Members of the Committee, the Hawaii State Energy Office (HSEO) supports HB 683, HD2, which authorizes the State's High Technology Development Corporation (HTDC) to provide matching grants for any small business in the State that is developing products related to sustainable aviation fuel or greenhouse gas reduction from commercial aviation operations, provided it does not supplant the priorities in the Administration's budget. HSEO defers to HTDC regarding administration of the program.

Hawaii is dependent upon aviation for its economy and way of life. The impacts of COVID-19 on tourism and subsequently on the production of jet fuel and other fossil fuels produced in Hawaii underscores the importance of aviation and aviation fuel to a thriving Hawaii.

Furthermore, greenhouse gas emissions from air travel need to be addressed since jet fuel is one of the largest sources of Hawaii's greenhouse gas emissions.

As shown in the figure, the air transportation sector uses more petroleum than either ground transportation or electric power generation.

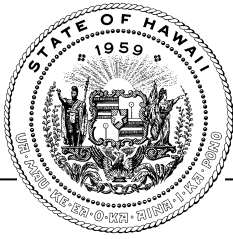


Greenhouse gas reduction in aviation operations and the development of sustainable aviation fuels provide many opportunities for innovation. Hawaii is well positioned to develop solutions and to continue to be a leader in the promotion of sustainable aviation fuels, building upon the success of the Federal Green Initiative For Fuels Transition - Pacific (GIFTPAC), which was based in Hawai'i from 2009-2019, followed by the Hawaii Aviation and Climate Action Summit in 2019.

HSEO's comments are guided by its mission to promote energy efficiency, renewable energy, and clean transportation to help achieve a resilient, clean energy, decarbonized economy.

HSEO looks forward to successful developments in this important area.

Thank you for the opportunity to testify.



# OFFICE OF PLANNING STATE OF HAWAII

DAVID Y. IGE  
GOVERNOR

MARY ALICE EVANS  
DIRECTOR  
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Statement of  
**MARY ALICE EVANS**  
Director, Office of Planning  
before the  
**SENATE COMMITTEES ON WAYS AND MEANS**  
Thursday, April 1, 2021  
9:30 AM  
State Capitol  
in consideration of  
**HB 683, HD2**  
**RELATING TO SUSTAINABLE AVIATION FUEL.**

Chair Dela Cruz, Vice Chair Keith-Agaran, and Members of the Senate Committee:

The Office of Planning offers the following **comments** on HB 683, HD 2. The purpose of HB 683, HD 2 is to establish a sustainable aviation fuel program to provide matching grants to any small business in Hawai'i that is developing products related to sustainable aviation fuel or commercial aviation operations greenhouse gas reduction.

The Office of Planning and its newly established Statewide Sustainability Program is actively working on the sustainable development and climate adaptation of the state to meet the needs of the present without compromising the ability of future generations of Hawai'i to meet their own needs.

The Office of Planning recently published in December 2019 the [\*Feasibility and Implications of Establishing a Carbon Offset Program for the State of Hawai'i\*](#). The publication was provided to the Hawai'i State Legislature and is also available online at the Office of Planning's website.

Through this publication, the Office of Planning recommended the adoption of alternative fuels in transportation, such as sustainable aviation fuels, to reduce Hawai'i's greenhouse gas emissions to meet Hawai'i's Zero Emissions Clean Economy Target by 2045.

Similarly, from a global perspective, international initiatives have positively influenced markets and corporations to reduce greenhouse gas emissions, including Boeing's commitment to transition its commercial aircraft to be ready to fly 100% on sustainable aviation fuels by 2030.

HB 683, HD 2 supports these greenhouse gas reduction efforts through the exploration a sustainable aviation fuel program in Hawai'i; however, the HD 2 includes no appropriation language to finance the proposed matching grants.

The Office of Planning looks forward to supporting the Hawai'i Technology Development Corporation in these sustainable and climate adaptive endeavors.

Mahalo for the opportunity to submit testimony on HB 683, HD2.



# Environmental Caucus of The Democratic Party of Hawai‘i

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Thursday, April 1, 2021, 9:30 am

Senate Committee on Ways and Means

HOUSE BILL 683 – RELATING TO SUSTAINABLE AVIATION FUEL: aviation fuel program with matching grants

Position: Support

Me ke Aloha, Chair Donovan Dela Cruz, Vice-Chair Gilbert Keith-Agaran, and Members of the Committee on Ways and Means:

The Energy and Climate Action Committee of the Environmental Caucus of the Democratic Party supports this bill as a means to advance technology in an industry with a very large contribution to global atmospheric emissions. We see it as a means to curb emissions in the short run even if this is ultimately an impossible situation. It appreciates the testimony of Airlines for America and generally concurs with its position, while we believe technical optimism tends to provide more hopeful accounts than warranted, and the Civil Aviation Organization seems optimistic about its timeline. The world is on a crash course with terrible new climate impacts and the Sixth Mass Extinction. We will keep saying this until people realize this is not hyperbole, but continually upstaged fact (as even a 13-year old can see, “we need to act as if our house is on fire – because it is”).

Sustainable Aviation Fuel’s most hopeful technology may lie in hydrogen fuel cells, which is burdened with its own production dilemmas, and even the emission of water vapor from fuel cell use is seriously destructive of the upper atmosphere traveled by trans-Pacific flights. Clearly aviation is currently a critical part of today’s tourism industry (we are still in the infancy of digital communications!), such that it is the largest part of Hawaii’s greenhouse gas emissions. We believe that the Jevons Paradox will be active in generating more climate disruption from increased flights with each presumed improvement in technology. Nonetheless, the current situation is demonstrably hopeless, and sustainable aviation fuel is intermediary to our ultimate solution of less aviation.

Our Committee wishes to find ways to assist these projects, and has been investigating the technologies to understand how to move these ideas forward. Along with other pressing problems such as our burgeoning wasteload and increased pollution of land, air, food, water, and ocean, our intention is to learn and to promote good ideas. It looks like we will be gainfully occupied for the foreseeable future.

Thank you for the opportunity to address this important issue.

/s/ Charley Ice and Edward Bohlen, Co-Chairs, Energy and Climate Action Committee, Environmental Caucus of the Democratic Party of Hawaii



**Airlines for America®**

*We Connect the World*

**Testimony**

**Written Testimony of Airlines for America  
in Support of House Bill 683 H.D. 2 Relating to Sustainable Aviation Fuel**

**Submitted by Nancy N. Young  
Vice President, Environmental Affairs**

Airlines for America® (A4A) appreciates the opportunity to provide written testimony in support of House Bill (HB) 683, as amended (HB 683HD 2),<sup>1</sup> which would establish the Sustainable Aviation Fuel program.<sup>2</sup> This bill would complement the aviation industry's efforts to reduce its greenhouse gas (GHG) emissions while supporting Hawaiian businesses and energy security within the State. We urge the Hawaii State Legislature to adopt this legislation and enable the Hawaii Technology Development Corporation to proceed to implementation expeditiously.

By way of background, the U.S. airlines are a very small contributor of man-made GHG emissions. Before COVID-19 struck, we were transporting a record 2.5 million passengers and 58,000 tons of cargo per day,<sup>3</sup> while contributing just 2 percent of our nation's GHG emissions.<sup>4</sup> Indeed, our members have been and remain keenly focused on fuel efficiency and GHG emissions savings. For the past several decades, the U.S. airlines have dramatically improved fuel efficiency and reduced GHG emissions by investing billions in fuel-saving aircraft and engines, innovative technologies like winglets (which improve aerodynamics), and cutting-edge route-optimization software. As a result, the U.S. airlines have improved their fuel efficiency over 135 percent since 1978, saving over 5 billion metric tons of carbon dioxide (CO<sub>2</sub>), which is equivalent to taking more than 27 million cars off the road on average in *each* of those years. Taking a more recent snapshot, data from the Bureau of Transportation Statistics confirm that the U.S. airlines improved their fuel- and CO<sub>2</sub>-emissions efficiency by 40 percent between 2000 and 2019.

But the U.S. airlines are not stopping there. Since 2009, we have been active participants in a global aviation coalition that committed to 1.5 percent annual average fuel efficiency improvements through 2020, with goals to achieve carbon-neutral growth beginning in 2020 and a 50 percent net reduction in CO<sub>2</sub> emissions in 2050, relative to 2005 levels.<sup>5</sup> The initiatives the

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<sup>1</sup> Available at [https://www.capitol.hawaii.gov/session2021/bills/HB683\\_HD1\\_.PDF](https://www.capitol.hawaii.gov/session2021/bills/HB683_HD1_.PDF).

<sup>2</sup> A4A is the principal trade and service organization of the U.S. airline industry. A4A's members are: Alaska Airlines, Inc.; American Airlines Group; Atlas Air, Inc.; Delta Air Lines, Inc.; Federal Express Corporation; Hawaiian Airlines; JetBlue Airways Corp.; Southwest Airlines Co.; United Continental Holdings, Inc.; and United Parcel Service Co. Air Canada is an associate member.

<sup>3</sup> See <https://www.airlines.org/dataset/a4a-presentation-industry-review-and-outlook/#>.

<sup>4</sup> See U.S. EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018* (April 2020) at Table ES-6: U.S. Greenhouse Gas Emissions Allocated to Economic Sectors (p. ES-25); Table 2-13: Transportation-Related Greenhouse Gas Emissions (p. 2-33). Available at: <https://www.epa.gov/sites/production/files/2020-04/documents/us-ghg-inventory-2020-main-text.pdf>.

<sup>5</sup> See A4A, "A4A's Climate Change Commitment," available at <https://www.airlines.org/a4as-climate-change-commitment/>; A4A, "Airlines Fly Green," available at <https://www.airlines.org/airlines-fly-green/>;

U.S. airlines are undertaking to further reduce GHG emissions are designed to limit responsibly and effectively their fuel consumption, GHG contribution, and potential climate change impacts while allowing commercial aviation to continue to serve as a key contributor to the U.S., state, and local economies as our nation works to recover from the devastating COVID-19 crisis.

The availability of sustainable aviation fuel (SAF) in significant quantities is a key pillar to the achievement of the aviation industry's goals, and A4A and its members have been working hard to lay the groundwork for the establishment of a viable SAF industry. SAF is particularly critical to the industry's GHG reduction strategy as aviation, unlike ground transportation, cannot electrify in the near-term and is therefore reliant on liquid fuels.

The aviation industry has created the foundation for airline deployment of SAF, which results in an up to 80 percent reduction in GHG emissions relative to petroleum-based jet fuel, through our Commercial Aviation Alternative Fuels Initiative<sup>®</sup> (CAAFI), a public-private partnership with the Federal Aviation Administration and other stakeholders that is working to ensure the development and deployment of SAF,<sup>6</sup> as well as other programs. However, as SAF currently tends to be considerably more expensive than traditional jet fuel and there is very little supply, we need complementary government policies to make SAF commercially viable and to scale up supply. This is where the program proposed in HB 683 HD 2 could help. By establishing a grant program for small businesses in Hawaii developing products related to SAF or commercial aviation GHG reduction, the State would help those local businesses participate in the development of a new, green industry while supporting the aviation sector's efforts to meet its rigorous climate goals. Further, the bill's requirement that projects supported through such grants be economically viable and beneficial to the State while reducing GHG emissions will ensure that any State funding is well spent.

The aviation industry and alternative fuels suppliers and supporting businesses are on the cusp of creating a viable SAF industry. But steady government partnership – such as that contemplated in HB 683 HD 2 – is needed in the near term to provide policy support to help get SAF over the cusp. With sustained support, SAF will literally get off the ground.

While we support the bill and urge the legislature to adopt it and forward it to the Governor for his signature, we would like to take this opportunity to provide a suggested revision to the legislative finding in section 1(6) of the bill. This legislative finding pertains to the International Civil Aviation Organization's (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation, better known by its acronym, CORSIA. In addition, we offer technical suggestions with respect to the provisions in section 2 on the "Hawaii jet fuel baseline carbon intensity" and the proposed definition of the term "sustainable aviation fuel."

The finding in section 1(6) states that CORSIA "requires commercial airlines to reduce [GHG] emissions by fifty per cent below 2005 levels by 2050." This is not quite accurate. As indicated above, the 50% GHG reduction by 2050 is an industry-wide target; it is not a requirement of CORSIA, which is slated to run through 2035 and is designed to help aviation achieve its carbon-neutral goal beginning in 2020. Consistent with this, we respectfully request that section 1(6) be revised to read as follows:

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see also Air Transport Action Group, "Climate Change," available at <https://www.atag.org/our-activities/climate-change.html>.

<sup>6</sup> For more on CAAFI, see <http://caafi.org/>.

(6) Commercial airlines have committed to reducing their greenhouse gas emissions by fifty per cent below 2005 levels in 2050;

Turning to the legislative text in section 2 of the bill, having linked the legislative findings in part to CORSIA, we appreciate the proposal to also link the “Hawaii jet fuel baseline carbon intensity” to the baseline established by ICAO. While that is a well-supported technical baseline, we note that a higher baseline could be considered for purposes of the Sustainable Aviation Fuel program, both as a technical matter and should the State wish to establish a baseline that would not put SAF at a policy disadvantage to other alternative/renewable fuels (e.g., renewable diesel). Thus, to the extent the State of Hawaii locks that in – the carbon intensity of conventional jet fuel -- for purposes of the SAF program, we would note that it would be appropriate for the State to consider setting a higher conventional jet fuel carbon intensity baseline to further incentivize SAF under other State programs.

Although we generally support the definition of “sustainable aviation fuel” set forth in section 2, we recommend that the term “renewable” be stricken from the second line in the definition. Additionally, we seek confirmation that the list of materials from which such fuel can be derived, as set out in the cross-referenced section 269-91, is broad enough to include waste gases and captured gaseous carbon oxides, which are promising feedstocks for certain SAF production processes. Section 269-91 notes that both “municipal solid waste” and other “solid waste” are eligible materials. Even though not “solid” per se, the U.S. Environmental Protection Agency long ago confirmed that so-called “solid wastes” can be gases. Accordingly, to the extent the State of Hawaii plans to use the list of materials in section 269-91 to define what may meet the sustainable aviation fuel definition, we would urge the State to ensure that waste gases are included.

With these minor revisions and additional considerations, we express our strong support for the creation of the Sustainable Aviation Fuel program and urge you to approve HB 683 HD 2. Thank you for your consideration.





## HB 683, HD 2, RELATING TO SUSTAINABLE AVIATION FUEL

APRIL 1, 2021 · SENATE WAYS AND MEANS  
COMMITTEE · CHAIR SEN. DONOVAN DELA CRUZ

**POSITION:** Support.

**RATIONALE:** Imua Alliance supports HB 683, HD 2, relating to sustainable aviation fuel, which establishes the sustainable aviation fuel program to provide matching grants to any small business in Hawai'i that is developing products related to sustainable aviation fuel or greenhouse gas reduction from commercial aviation operations.

According to a report produced by the Hawai'i Climate Change Mitigation and Adaptation Commission, global sea levels could rise more than three feet by 2100, with more recent projections showing this occurring as early as 2060. In turn, over the next 30 to 70 years, approximately 6,500 structures and 19,800 people statewide will be exposed to chronic flooding.

Additionally, an estimated \$19 billion in economic loss would result from chronic flooding of land and structures located in exposure areas. Finally, approximately 38 miles of coastal roads and 550 cultural sites would be chronically flooded, on top of the 13 miles of beaches that have already been lost on Kaua'i, O'ahu, and Maui to erosion fronting shoreline armoring, like seawalls.

Furthermore, according to research conducted by Michael B. Gerrard from Columbia Law School, modern-day slavery tends to increase after natural disasters or conflicts where large numbers of people are displaced from their homes. In the decades to come, says Gerrard, **climate change will very likely lead to a significant increase in the number of people who are displaced**

**and, thus vulnerable, to human trafficking.** While the Paris Climate Agreement of 2015 established objectives to limit global temperature increases and several international agreements are aimed at combating modern-day slavery, it is highly uncertain whether they will be adequate to cope with the scale of the problem that is likely to occur as a result of climate change.

As we work to reduce carbon emissions and stave off the worst consequences of climate change, we must begin preparing for the adverse impact of sea level rise on our shores. We are now quantifying the speed at which we must act. We cannot continue to develop the 25,800-acre statewide sea level rise exposure area—one-third of which is designated for urban use—without risking massive structural damage and, potentially, great loss of life.

Therefore, we should take steps to accelerate Hawai'i's efforts to address climate change and develop a clean economy, including by working to reduce greenhouse gas emissions from air transportation related to our tourist industry. **In 2019, Civil Beat reported that flights to and from Hawai'i from all over the world produced approximately 6.3 million tons of carbon, which is the equivalent of the CO2 produced by generating electricity for almost 1.1 million homes in a year.** For the sake of our keiki, we cannot afford to wait to solidify strategies to preserve our island home for generations to come.

**Kris Coffield · Executive Director, Imua Alliance · (808) 679-7454 · [kris@imuaalliance.org](mailto:kris@imuaalliance.org)**

**HB-683-HD-2**

Submitted on: 3/30/2021 11:58:37 PM

Testimony for WAM on 4/1/2021 9:30:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Ted Bohlen	Testifying for Climate Protectors Hawai'i	Support	No

Comments:

To: The Honorable Donovan Dela Cruz, Chair, The Honorable Gilbert Keith-Agaran, Vice Chair, and members of the Senate Committee on Ways and Means

From: Climate Protectors Hawai'i (by Ted Bohlen)

Re: Hearing **HB683 HD2 RELATING TO SUSTAINABLE AVIATION FUEL.**

Hearing: Thursday, April 1, 2021, 9:30 a.m., Rm. 211 and by videoconference

Aloha Chair Dela Cruz, Vice Chair Keith-Agaran, and members of the Senate Committee on Ways and Means:

The Climate Protectors Hawai'i is a group focused on reversing the climate crisis. **The Climate Protectors Hawai'i SUPPORTS HB683 HD2.**

As a tropical island State, Hawai'i will be among the first places harmed by the global climate crisis, with more intense storms, loss of protective coral reefs, food insecurity, and rising sea levels destroying our shorelines. We must do all we can to reduce our carbon footprint and become carbon negative as soon as possible.

Air travel has historically been one of the largest sources of Hawaii's greenhouse gas emissions. Air transportation emissions are a greater share of Hawaii's greenhouse gas emissions than either ground transportation or electric power generation. Releasing carbon emissions from conventional fossil jet fuel and water vapor at high altitudes is a huge source of climate warming, very destructive for Hawaii's environment.

Hawai'i must lead the way to more sustainable travel! One of the areas where Hawai'i can theoretically make the most progress in reducing greenhouse gas emissions is in decarbonizing aviation jet fuel and making more sustainable fuel. HB683 H2 would establish the Sustainable Aviation Fuel Program to provide matching grants to any small business in Hawai'i that is developing products related to sustainable aviation fuel or greenhouse gas reduction from commercial aviation operations. This measure positions the State to continue to be a leader in the promotion of sustainable aviation fuels by providing opportunities for greenhouse gas reduction in aviation operations and the

development of sustainable aviation fuels. HB683 HD2 will assist our efforts to reduce Hawaii's greenhouse gas emissions, helping us to lead on mitigating the climate crisis, and saving costs for the State.

Please pass this bill! Mahalo for the opportunity to testify in strong support of this very important legislation!

Climate Protectors Hawai'i (by Ted Bohlen)

**HB-683-HD-2**

Submitted on: 3/26/2021 10:03:01 AM

Testimony for WAM on 4/1/2021 9:30:00 AM

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
Terry Hunter	Individual	Support	No

Comments:

I urge you to pass this measure. The need for carbon neutral jet fuel is obvious. Any company has the knowledge and technology to produce that kind of jet fuel without using oil deserves help from our state. The benefits could be enormous from such an investment. I know money is extremely tight right now, but this bill could lead to changes that would boost our struggling economy and aid in our efforts to reduce the effects of global warming and climate change.

Terry Hunter

## HB683 Testimony of Richard Tillotson

Aloha,

I strongly support HB683. Its potential has already attracted the interest of scientists at Oxford University who have invented a new, cost-efficient process of creating jet fuel by converting CO2 captured directly from the atmosphere. I recently published an article on the scientists' discovery and their interest in Hawai'i in *Civil Beat*: "Sustainable Air Travel Bill Could Be a Game-Changer." Please scroll down to see the text of the article, which includes references to numerous other articles on this discovery in both scientific and general interest magazines and newspapers.

Near-term, HB683 will generate new business investments, and these in turn will generate new, non-tourism related jobs and tax revenues. Long-term, a Hawai'i sustainable aviation fuel industry will take us a long way towards our goal of Hawai'i becoming carbon-neutral by 2045. Indeed, sustainable aviation fuel is mandatory if we are to achieve this goal. Jet fuel combustion is Hawaii's largest single source of CO2 emissions. This contributes to global warming, making our sea levels rise, our beaches disappear and our storms more frequent and violent. It will cost Hawai'i billions. In this context, the cost of HB683 is a bargain.

Thank you for your consideration and mahalo for your service.

Richard Tillotson

[CIVIL BEAT](#)  
[Community Voice](#)

### **Sustainable Air Travel Bill Could Be A 'Game Changer'**

Jet fuel combustion is Hawaii's largest single source of carbon emissions.

By [Richard Tillotson](#)

March 11, 2021 · 5 min read

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#### **About the Author**

[Richard Tillotson](#)

Richard Tillotson is a writer and retired advertising executive who formerly worked on many of Hawaii's largest tourism accounts, including the Hawaii Visitors and Convention Bureau.

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A Hawaii House of Representatives bill on sustainable aviation fuel has attracted the notice of a team of researchers at England's Oxford University who recently announced they've invented an efficient and cost-effective way of producing carbon-neutral jet fuel from atmospheric carbon dioxide.

If this proves economically viable, the bill would be a game changer for Hawaii and the world. It would take the islands a long way toward our state's goal of becoming carbon neutral by 2045.

Jet fuel combustion is Hawaii's largest single source of carbon emissions, producing more than either automobiles or electric power generation. A single passenger's round trip to the mainland is the rough equivalent to a year of automobile driving in CO2 emissions. For the environmentally conscious, it makes flying to see the grandkids into something of a guilt trip.

That's why [House Bill 683](#) was introduced by House Speaker Scott Saiki and Reps. Mark Nakashima, Aaron Ling Johanson, John Mizuno and Dee Morikawa. According to its description, the bill would provide "matching grants to any small business in Hawaii that is developing products related to sustainable aviation fuel or greenhouse gas reduction from commercial aviation operations." To date, efforts in that direction have been primarily in the area of biofuels, but the Oxford process, which creates jet fuel using only air, water, and renewable energy, would certainly qualify.

The team in England is led by Oxford professor of chemistry Peter Edwards and chemists Benzheng Yao and Tiancun Xiao. Their decade-long research has been supported by government agencies in China and Saudi Arabia. When I alerted the Oxford scientists to the potential opportunity in Hawaii and House Bill 683, the team leaders, Peter Edwards and Tiancun Xiao, replied that they are "very interested" and that they "would be happy to start up in Hawaii if proper support is available."

In a subsequent email exchange, Tiancun added, "Hawaii could become a world example to be a net-zero air travel state. I am sure our advanced catalyst system and novel process can catalyze this."

The scientists are already confident that their process is far more efficient and economical than previous methods of converting CO2 into jet fuel. Their goal now is to see if their new process is economically viable. In other words, can it compete in the marketplace with jet fuel created by refining crude oil? [Benzhen Yao was quoted in Forbes magazine saying](#), "This is the critical question that now occupies us."

Hawaii may seem a counterintuitive choice for a jet fuel manufacturing site, but because of our visitor industry, Honolulu's airport is one of the busiest in the United States. We also have a large military presence with the Navy, Air Force and Marine Corps all flying jets, so there is a substantial jet fuel market.

### **'Super-Catalyst'**

There is a refinery at Campbell Industrial Park operated by Par Pacific, but it can only refine petroleum products that get shipped here, and we are thousands of miles from the nearest oil well. Our fuel prices are among the highest in the

nation. We are, however, amply supplied with the renewable energy resources, especially wind and solar, that the Oxford process requires. If the process is going to be competitive anywhere, it should be here.

This new method of creating jet fuel is not to be confused with reforming the CO<sub>2</sub> in flue gas from refineries. That process is very fossil-fuel intensive. This new method employs CO<sub>2</sub> captured from the air, which is converted with hydrogen (H<sub>2</sub>) using a process called organic combustion and a new, “super-catalyst” made from a compound of iron, manganese and potassium to produce specific hydrocarbons. Functionally, the fuel produced is identical to the fuels currently used by the aviation industry.

### **Hawaii is amply supplied with renewable energy resources.**

First [revealed last December in the scientific journal Nature Communications](#), the Oxford discovery has since received cautious but enthusiastic notice in the British press as well as in Forbes, The Washington Post, Science News, Chemical and Engineering News and Chemistry World. Edwards [was quoted in The Daily Mail saying](#), “This is a really exciting, potentially revolutionary advance, the most important advance in my four decade career.”

So what are the prospects for House Bill 683 in Hawaii? Well, it’s a tough year for any legislation that requires spending money. But so far the bill has passed with near unanimous support in the House Committees on Economic Development, Consumer Protection and Commerce, and Finance with the Departments of Transportation, Energy, and Office of Planning all testifying in support.

A related bill, [House Bill 327](#), would convene a sustainable aviation fuel task force within the Hawaii state energy office to develop a state action plan to reduce the greenhouse gas intensity of international air transportation from Hawaii. This bill has also passed out of committees in the House. Both bills are now expected to cross over to the Senate. We can hope this new scientific discovery and the interest in Hawaii from the Oxford scientists will earn the legislation additional attention.

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**HB-683-HD-2**

Submitted on: 3/27/2021 7:52:24 AM

Testimony for WAM on 4/1/2021 9:30:00 AM

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
Ellen Godbey Carson	Individual	Support	No

Comments:

Please pass HB683. This bill will generate new business investments, and these in turn will generate new, non-tourism related jobs and tax revenues. Long-term, a Hawai'i sustainable aviation fuel industry will take us a long way towards our goal of Hawai'i becoming carbon-neutral by 2045. Indeed, sustainable aviation fuel is mandatory if we are to achieve this goal. Jet fuel combustion is Hawaii's largest single source of CO2 emissions. This contributes to global warming, making our sea levels rise, our beaches disappear, and our storms more frequent and violent. It will cost Hawai'i billions. In this context, the cost of HB683 is a bargain.

**HB-683-HD-2**

Submitted on: 3/27/2021 10:18:13 AM

Testimony for WAM on 4/1/2021 9:30:00 AM

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
Elizabeth Nelson	Individual	Support	No

Comments:

Aloha,

I support HB683. Near term, HB683 will generae new business investments and in turn then will generate new , non-tourism related jobs and tax revenues. . Sustainable aviation fuel is mandatory if we are to achieve carbon-neutrality by 2045. Jet fuel conbustion is Hawaii's largest single source of CO2 emissions. This contributes to global climate change, making our sea levels rise, our beaches disappear and our storms more frequent and violent. It will cost us billions. In this context, HB 683 is a bargain.

Thank you,

Elizabeth Nelson, Kaneohe

**HB-683-HD-2**

Submitted on: 3/28/2021 8:55:15 PM

Testimony for WAM on 4/1/2021 9:30:00 AM

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
John Kawamoto	Individual	Support	No

Comments:

My name is John Kawamoto, and I support HB 683, HD2, which establishes a program that provides matching grants to develop products related to sustainable aviation fuel or the reduction of greenhouse gases from commercial aviation.

Hawaii's economy relies heavily on tourism, which in turn is dependent on commercial aviation to transport tourists to and from Hawaii. Commercial aviation relies on large quantities fossil fuels, the burning of which emit greenhouse gases that are responsible for global warming. Hawaii must do its part to control climate change by developing fossil fuel alternatives for aviation.

To date, efforts to develop such alternatives have been primarily in the area of biofuels, However, recent research has demonstrated that it is possible to produce carbon-neutral jet fuel from atmospheric carbon dioxide, water, and renewable energy. Development must continue to create products that are commercially viable. This bill encourages research, business planning, technology development, and engineering to develop sustainable aviation alternatives.

For the foregoing reasons, I support HB 683 HD 2.

**HB-683-HD-2**

Submitted on: 3/28/2021 9:11:58 PM

Testimony for WAM on 4/1/2021 9:30:00 AM

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
Valerie Wayne	Individual	Support	No

Comments:

HB683 will generate new business investments soon after its passage, and in turn it will generate new, non-tourism related jobs and tax revenues. Long-term, a Hawai'i sustainable aviation fuel industry will help us achieve the goal of Hawai'i becoming carbon-neutral by 2045. Sustainable aviation fuel is mandatory if this is truly our plan, because jet fuel combustion is Hawaii's largest single source of CO2 emissions. Those emissions contribute to global warming, making our sea levels rise, our beaches disappear, and our storms more frequent and violent. It will cost Hawai'i billions. The cost of HB683 is a bargain in this context, and exploring better options is also the best alternative for the future of everyone in and beyond our state.

**HB-683-HD-2**

Submitted on: 3/31/2021 8:42:57 AM

Testimony for WAM on 4/1/2021 9:30:00 AM

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
Noel Morin	Individual	Support	No

Comments:

Dear Chair Dela Cruz, Vice-chair Keith-Agaran, and members of the Ways and Means Committee,

I am supportive of efforts designed to reduce air travel emissions. HB 683 HD2 suggests an effort that can result in the innovations needed to reduce air transport's carbon impact. It can also translate into careers, jobs, and a competitive advantage for Hawaii.

I recommend that the program prioritize research, technology, and projects that negate air travel's carbon impact. As an example, some technologies offer the creation of aviation fuels from atmospheric CO2. If coupled with affordable renewable energy, we have the opportunity for a carbon-neutral solution.

Thank you for the opportunity to testify.

Sincerely,  
Noel Morin

<https://www.anl.gov/article/turning-carbon-dioxide-into-liquid-fuel>

<https://www.nationalgeographic.com/science/article/carbon-engineering-liquid-fuel-carbon-capture-neutral-science>

<https://www.forbes.com/sites/davidrvetter/2021/01/05/these-oxford-scientists-just-created-carbon-neutral-jet-fuel-from-co2/>

**HB-683-HD-2**

Submitted on: 3/31/2021 9:26:46 AM

Testimony for WAM on 4/1/2021 9:30:00 AM

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
Janet Pappas	Individual	Support	No

Comments:

Dear WAM Chair Dela Cruz, WAM Vice Chair Keith-Agaran and WAM Committee members,

Our planet and humanity's existence are now in grave danger due to ongoing climate change. Scientists tell us we must take immediate steps to stop global warming. Hawaii is a huge consumer of fossil fuels, to the tune of \$5 billion of imported fuel yearly, and nearly two thirds of that is from the transportation sector. Transitioning from carbon-based fuels is critical if we are to reverse global warming.

I support HB683 HD2 which "establishes the sustainable aviation fuel program to provide matching grants to any small business in Hawaii that is developing products related to sustainable aviation fuel or greenhouse gas reduction from commercial aviation operations."

This type of research is absolutely critical to the world's success in de-carbonizing the planet. Hawaii must do its part, seeing as aviation is how our bread is buttered.

Please suport HB683 HD2.

Thank you for listening and for this opportunity to testify.

Sincerely,

Jan Pappas - Aiea, Hawaii