

Opinion: The Uncomfortable Truth About Aviation Emissions

The aviation community must face the truth about CO2

Antoine Gelain, Aviation Week & Space Technology | Aug 10, 2016

When it comes to sustainability of air travel, the aviation community is lying to itself. There is an elephant in the room and nobody wants to see it. Without more significant efforts—some would call them sacrifices—air travel will continue to be a huge contributor to this planet’s pollution and global warming, with dire consequences for future generations, whether they are air travelers or not.

Last month, the U.S. Environmental Protection Agency (EPA) for the first time officially acknowledged its duty to promulgate standards applicable to greenhouse gas (GHG) emissions from commercial aircraft. Indeed, aircraft remain the single largest GHG-emitting transportation source not yet subject to GHG standards in the U.S.

Facing Facts

- Air travel and related emissions have doubled in the past 15 years
- Aircraft is the largest transportation source not subjected to U.S. greenhouse gas standards
- Forecasted growth in air travel is unsustainable if climate change is to be tackled

The uptake of sustainable alternative fuels, which are meant to be a large part of the solution by 2050, has been extremely slow, with only two airports in the world—Oslo and Los Angeles—offering biofuels to airlines.

As for the International Civil Aviation Organization’s (ICAO) progress on setting a CO2 emissions standard, it is as slow as it can get. Having set some “aspirational” goals in 2010 for global net carbon emissions, it is only now getting to the point of recommending that new aircraft models entering service after 2020 and existing aircraft models coming off the production line after 2023 meet the new technical standard—which has yet to be introduced.

The bottom line is that with all the talk about the aviation community being committed to action on climate change (see, for example, the Air Transport Action Group’s position paper signed by aviation industry leaders in 2012) and about how various supply-driven measures will improve air travel’s sustainability, everybody knows that serious progress will not be achieved unless we address the other part of the equation, aviation’s “sacred cow”—demand.

Air travel has essentially doubled in the past 15 years and is expected to double again over the next 15 years. There is just no way supply-based measures such as technology and infrastructure improvements will come close to offsetting such rapid growth and its impact on the environment. As for the so-called “market-based measures,” such as the European Union’s Emissions Trading

System or other carbon-offsetting schemes, they are just gap-filling measures that make people feel good without really changing the fundamental dynamics of the industry.

These dynamics are essentially about convincing as many people as possible to fly as often as possible. This is achieved in two ways: First, by making air travel affordable for mass consumption and second, by enticing business travelers with all sorts of bells and whistles.

The low-fare airline model has certainly made air travel more accessible to many, but in that process it has contributed to its excessive commoditization. And while it may be “low-fare,” it certainly is not “low-cost” as far as the environment is concerned. In that respect, air travel is very much akin to fast food: It may seem to be a bargain, but it passes the true cost on to the public health and purse and pushes it into the future.

As for major airlines, they are just milking the top of the market by catering to the desires of an international business community that is self-important enough to believe it deserves nothing less than increasingly dedicated and expensive services such as all-business-class flights, upscale cabins, exclusive lounges and loyalty rewards. Yet frequent-flier programs themselves create the wrong incentives, as they encourage business customers—most of which do not pay for their tickets themselves—to fly more and spend more on flights than may be necessary.

If we in the aviation community are really serious about addressing climate change, we first need to accept that the current and forecasted demand for air travel is unsustainable and therefore must be dampened. We as air travelers must become wiser customers: Do we actually need to fly to all these business conferences? Is it worth paying 10 times the price of an economy ticket for better wine, free lounge food and a more comfortable seat? Do we really believe a €20 (\$22) trip from London to Copenhagen covers its true cost and true value?

Traveling to different countries can be one of the most enriching experiences in life. Let’s not trivialize it to the point where we do not think twice before buying a cheap air ticket. Let’s be honest with ourselves and accept the basic but uncomfortable truth that to make air travel sustainable, we first need to change our individual behaviors and become more discerning consumers. In the must-win fight for sustainability, there cannot be gain without pain.

Antoine Gelain is the managing director of Paragon European Partners. He is based in London.
Editor’s note: This article was edited to correct information about CO2 growth.

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(Highlights, footnotes and minor edits may have been added, but only to add clarification)

138 comments as of 8/10/2016 at 12:10PM PDT:

[aalexandre](#)

on Aug 9, 2016

Those grumpy EPA agents are some kind of useless as long as they create disaster themselves in Colorado River.

Those contrails are so lovely like ski marks on virgin snow, poetic.

Farting animals pollute too! And so do the nation administrations by creating such useless agencies!

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[B748capt](#)

on Aug 10, 2016

As a B747 Capt, I love having 4 engines. I miss flying the DC-8! I say build / fly as much as the market will allow. Humans need to move around the world, and we do not need Govt or Environment extremist to Regulate our lives. Climate change is a political tool to give governments for money and control. Through legislation and deals, they want to control energy in our "best interest".

Governments do not/should not decide commerce, the Free Market should. As this article points out, the Green loons, through doomsday predictions, want to control aviation!

Their motto of "it's for our grandchildren" really means put \$ in our pocket now.

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[aalexandre](#)

on Aug 10, 2016

So you are an endangered spice, 4 engines birds is a breed in the verge of extinction!

I agree with you the bureaucrats who are stealing our money, this industry money and crippling the entire Eco-system of MRO and so on!

What about voting in our respective nauseous pounds to get rid of all that mess and put for good those useless employees at the unemployment agency!

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[B748capt](#)

on Aug 10, 2016

Notice this article is not about the huge fuel savings in engines since the later 1950s first jet transports. It's about frequency of planes flying. Well to bad! People and goods need to move, and the populations are greater today. Let the jets fly!

I have no doubt the authors article will curtail my flying schedule lol

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[msadesign](#)

on Aug 10, 2016

"Governments do not/should not decide commerce, the Free Market should"

Why?

Every decision should be measured against profits and cost, is that what you are saying?

Should we have seat belts in cars? Should industry dump poison into streams and rivers? Should the ocean be fished until there are no fish to sell in the Free Market? We know the sanders to these questions if the free market is left to decide them.

But the 'free market' is not the ultimate arbiter of the quality of life.

I get your point that government shouldn't 'decide commerce'. But the government can, and should, protect a level playing field, guiding social goals in a manner decided by elected officials but neither favoring nor denying any particular company.

Seat belts are a good example: seat belt performance is specified; every company must meet the requirement; how it's done is up to them. Similarly pollution: stop dumping crap in the air. Don't care how you do it.

But everyone gets the same rule. Very simple concept, Captain.

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[B748capt](#)

on Aug 10, 2016

Seat Belts and safety are great. Airplanes flying above people do not create a hazard, unless they land short of their destination.

We will not live any shorter life reducing planes flying around the world, that's my point.

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[paulrjohnson](#)

on Aug 10, 2016

Typical leftist drivel. Markets drive prosperity, prosperity drives environmental concern, concern drives action. No poor country cares about the environment, they're too hungry to care.

Should we have seat belts in cars? When they became mandatory in the late 60's, every manufacturer offered them as standard or optional equipment. Government decided it could reduce ITS costs for medical care by forcing everyone to buy them; a simple cost calculation.

Would a company that dumped poison into streams and rivers survive in today's marketplace? Only the EPA gets to do that without consequence. Aren't the best managed fisheries in the world run by those whose livelihoods depend on their sustained productivity?

Government should not be the ultimate arbiter of the quality of life.

Today the government can, and does, tilt the playing field, guiding social goals in a manner decided by elected officials, favoring the elites who fund them.

Climate change is a good example; bureaucrats hype a concern into a crisis; proclaim a dubious and ineffective solution and every company must comply. Which over-priced and heavily-subsidized "green" energy you chose is up to you.

But everyone gets the same shafting. Get in line, Captain.

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Heliocentric

on Aug 10, 2016

As a B747 captain, you are probably good at your job but clearly you're not an economics expert. You are in fact an anarchist. Just keep in mind that without rules and regulations you probably wouldn't even be a pilot.

Your false utopian vision of a totally free market is at this very moment trying to steal away our freedom to fly and use it to control profits by allowing the airlines to control what is currently the responsibility of our representative democratic Government. Letting the prisoners guard themselves so to speak.

A system that is solely and exclusively motivated by profit is efficient at making money but will blindly destroy anything in its path to do so...including this planet. It's up to us as people to keep things on the right track, not some blind policy of pure capitalism.

Stop spouting the propaganda as if you know what you're talking about.

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B748capt

on Aug 10, 2016

Safety and rules are needed. I just do not agree in reducing flying for some theory. Planes will not affect your health unless they land short of their destination.

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B748capt

on Aug 10, 2016

Government regulate safety. Not Airlines flight frequency and schedules. Regulation was eliminated by Jimmy Carter. Airlines will be free to order/fly as much as they want. Anybody that wants to force a reduction does not own an airline. I am sure the same people drive cars and fly themselves lol
Row a boat and walk around the world and we will talk.
In the mean time , welcome on board the B747-8, sit back and relax, knowing fossil fuels propelling you at Mach .90

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monnides

on Aug 10, 2016

interesting

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Blueairone

on Aug 10, 2016

Ground all airlines and transfer all freight and 600 million passengers to trucks and autos, an then see the impact on CO2 emissions. Aircraft are emission reducers not generators.

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shloime

on Aug 10, 2016

i agree with your sentiment, but that's not where this guy is coming from. he's arguing that those goods and services should not travel at all, by any means.

which is okay for a european, with a dwindling economy and a shrinking worldview, but not viable for most of the rest of the world, with serious distances to cover, and work to do.

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DeweyV

on Aug 10, 2016

Regarding paragraph 1, Your knowledge of the EPA and the Animas River Gold King mine disaster are pathetically lacking, besides being out of context with aviation and atmospheric sciences. The EPA did not cause the Gold King mine breach, their contractor did. The EPA took charge of that toxic old mine because after 75 years, the OWNERS, and the State of Colorado had neglected their responsibility. Colorado has 15,000 old hardrock mines that need serious mitigation. The EPA is not the ogre there, or in the skies above your intellectually challenged cranium.

The rest of your comment is beneath the dignity of a response

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chris_kis@yahoo.com

on Aug 10, 2016

Thank you DeweyV for your comment. The only one of the many that had some rational.

Hey, fill her up and let's fly everywhere. Burn baby burn. I feel sad for the way will leave the state of the world for my grand-grand-grand children after our opulent consumption.

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TuckerM

on Aug 10, 2016

The Author makes a good point, if we actually believe in global warning, an fast going aviation industry does not work. Then he goes on to bash business class travel. Why? How does how much a consumer pays for a flight have any affect on CO2 emissions?

Unfortunately Antoine your message is totally lost in your hatred for those who can afford luxuries you probably can't.

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airborn

on Aug 10, 2016

Possibly because that same flight, and associated emissions, could be supporting (carrying or delivering) twice as many individuals in economy class? Which in turn could mean yet another flight to meet the needs of the less fortunate among us - like he says, an elephant non of us want to acknowledge!

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GEM555

on Aug 10, 2016

Think of the language you are using "if we actually believe in global warning". I don't have to "believe in" the moon being 238,900 miles from earth. It's just a fact. Global warming isn't a "fact". That's why they call it "climate change" now. The globe wasn't warming like the "scientific consensus" said that it would back in '86-'87. The whole thing is based on computer models and projections. These are things that show what is EXPECTED to happen. NOT the actual future. The history of science is carpeted with theory and predictions that didn't work out or come true. "Global Warming" is just one more.

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JeffHagen@veriz...

on Aug 10, 2016

Yep. Given that every testable prediction made by the warmists have so far failed to come true, I'm not too worried about it.

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USAF.RET

on Aug 10, 2016

Actually they have and are well documented.

Don't do science much?

There are potential alternative paths that permit a habitable future for all of us. Most of them require that the costs of CO2 emission not be externalized to all who don't create the CO2 - that is a market-based solution that will still permit you to worship at the alters of "free-market" economies.

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martin.velek@se...

on Aug 10, 2016

Yessir, and the bloody Arctic, sub-Arctic and Antarctic ice melts because of continuing drop in global temperature. If you burn zillion tons of kerosine at 30 K ft, you just get something like angel's flatus, indeed.

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Rabbit1960

on Aug 10, 2016

@GEM555 You start off correctly, stating that there are facts and it doesn't matter what we "believe". Then you go off declaring that facts aren't facts, and telling us what you believe. Really?

The Earth most certainly is warming - even the most ardent deniers of human involvement as the cause do now have to admit to the obvious facts demonstrated by a simple thermometer. To declare that this is irrelevant because it doesn't match some earlier computer models is just whistling past the graveyard.

We still cannot predict the absolute path a hurricane will take, but the consensus of various models is a very good guide - they don't differ wildly. The same is true of global climate models - they continue to improve as more data is collected - and they don't differ wildly. We know enough, with sufficient certainty, to see that climate change is real and dangerous.

That fact doesn't go away just because we can't guarantee exactly how bad it will be in a specific place by some specific date. It's enough to know that nothing good will come of it.

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shloime

on Aug 10, 2016

the earth has been a lot warmer, and a lot colder, in its history. the net effect of one or two degree changes is not fact, but prediction, and those predictions seem to be overly simplistic, for global changes.

perhaps the climate orthodoxy should try factoring in the fact that we are overdue for the next ice age, and if not for human activity, most of the earth's land masses would already be accumulating snow cover. except that that conflicts with their belief system.

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Idadho

on Aug 10, 2016

A simple thermometer does not demonstrate global warming. When heat islands are accounted for, the temps are not going up. Should we replace asphalt and concrete with grass ? That would resolve heat island effect. Temps have been measured at airports for decades. Those airports have become hotter due to expanded pavement and hot exhaust from engines, etc.

No computer model has been able to be created that can predict what has already happened. It is not a data issue except that data has been tweaked to support warming claims.

This magazine is about technology and markets, not propaganda. This author has no here place

with his unsupported claims.

With increasing populations, we need more CO2 because we need more green to feed the masses. History shows that CO2 levels increase with food production. Sounds good to me.

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[Heliocentric](#)

on Aug 10, 2016

In one sentence you accept that climate change is a fact, then you say it's not really happening. That makes no sense.

People who deny the fact that the global climate has been warming at an ever accelerating pace and is still warming right now and is the direct result of human actions are absolutely no different than people who believed the earth was flat because they didn't understand how to observe the curvature themselves.

As a pilot who's flown all over this planet I can tell you with certainty that I've directly observed the effects of pollution on our atmosphere. For my colleagues who can't see it, you're simply not looking or you refuse to believe in something distasteful which is really just human nature.

I find it sad that so many pilots, who live and work in the skies of our beautiful planet, look away from it's destruction.

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[seashuttle](#)

on Aug 10, 2016

Ouch!

Look, there's probably some complex nuance that was left out for conciseness of prose...I think arguing that Business Class uses more CO2 than Economy could be done by looking at things that contribute to CO2 in airlines in general - such as the like volume of manufactured material in business seats (mass, production costs), the space in an aircraft allocated to a single person that could be occupied by three (efficiency), the quality+range+size of food offered (manufacturing emissions plus additional weight on board). I think he's saying to think about more than just the bums on seats.

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[merlrennes@gmail.com](#)

on Aug 10, 2016

The fact is that while airlines burn fossil fuels (and there is not really any option for this) other transport means could use much less. A good freight trains service could replace many of the

thousands of trucks on the roads. Electric cars are fast becoming a reality. France is the lowest greenhouse gas emitter in Europe because it uses Nuclear Power (which of course the Environmentalists are against).

The arguments against air travel in this article are typical of an activist and make little sense. The problem of the influence of air travel on Global Warming are very complex and deserve a scientifically bases analysis.

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[johnmiller](#)

on Aug 10, 2016

Agreed! The great irony of anti-nuclear activists is that their not wanting nuclear meant that coal was going to be the primary means of electrical power production. And, that meant titanic amounts of dust and pollutants being pumped into the air instead of the steam nuclear plants would have produced. Not very environmental, was it?

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[Mik2](#)

on Aug 10, 2016

I have worked in the industry for many years. Unfortunately the nuclear industry has yet to develop a solution for long-term waste storage. We have built plants with a 40 year life-span, have included an on-site waste fuel pool with each plant. Now that the plants need to be dismantled and the waste disposed of, we have no place to put the stuff. The Nevada repository for the US is deemed non-viable. Proponents of nuclear power should at least understand the industry constraints before making uninformed statements in public forums.

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[jhnkoy](#)

on Aug 10, 2016

Actually the nuclear industry is exactly working on that problem: newatlas.com/hitachi-reactor/33585/?hc_location=ufi

Also new reactor design product far less 'ashes' that need to stored long term

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[GEM555](#)

on Aug 10, 2016

"The Nevada repository for the US is deemed non-viable"
It's perfectly viable. Just not politically viable.

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AWK

on Aug 10, 2016

"The Nevada repository for the US is deemed non-viable". False. Harry Reid and the environmentalists prevented that on purely political grounds.

The environmentalists WANT local storage of nuclear waste to become such a big problem that nuclear has to shut down. In the name of nuclear (excuse me - "nuclear") nonproliferation Jimmy Carter shut down breeder reactors that could be used to reprocess the most long-lived waste products. Since our current president just gave the bomb to Iran, and North Korea, at least, already has the bomb, I'd say that cat's out of the bag.

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GEM555

on Aug 10, 2016

"A good freight trains service could replace many of the thousands of trucks on the roads." Trucks are on the road because rail service is miserable. As a former coordinator of delivery services, I can tell you that trucks are a godsend. Stuff gets delivered reasonably on time - enough that you can run production schedules on it. Trains? Never. Great for point-to-point long distance, but for the interstate stuff? Fagetabout it!

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imp@avigex.ca

on Aug 10, 2016

Electric cars, in most areas of the planet, except Quebec, use electricity that is generated by coal or other fuel burning plants....Pollution is just generated "elsewhere".

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AWK

on Aug 10, 2016

Exactly correct. I see people driving their Teslas with bumper stickers smugly proclaiming "Zero emissions". I've been tempted to sticker them over with a bumper sticker saying "Remote emissions".

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[AirCargo2015](#)

on Aug 10, 2016

I'm glad someone else realizes this farce. In Germany 20 year ago a engineer was explaining to me that the diesel powered SmartCar (excess of 60MPG) has fewer emissions that an electric car charged from a coal-fired power plant. Odd isn't it that the US Govt doesn't allow the diesel model into the country??

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[727 fan](#)

on Aug 10, 2016

Long term problems are not solved quickly or easily.

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[airborn](#)

on Aug 10, 2016

Absolutely correct - baby steps! First acknowledge the existence of the elephant, then let's celebrate an important baby step completed earlier by the Solar Impulse team...

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[m.herben4@kpnpl...](#)

on Aug 10, 2016

Go to atag.org

Here you can find some real facts. Aviation is responsible for 2% of CO2 emissions. The simple statement that aviation has doubled and thus emission too, is questionable.

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[CAGNE](#)

on Aug 10, 2016

Gatwick Airport predominantly deals in long Hal and short haul holiday flights They must be contributing to emissions and thus impacting carbon trading for UK

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[davidinnes2002@...](#)

on Aug 10, 2016

I agree with "merlrennes". Aviation cannot be treated alone, but as part of a bigger picture. Trucks on the road vs use of rail for example. In UK in 1960s politics/employment in trucking industry close a large part of UK rail infrastructure, so now we have no choice but to accept the pollution congestion. I live in Germany & Switzerland and on Sundays most trucks are "grounded" for most of daylight hours. To give some. Our obsession with eating meat results in animal "out-gassing" in large quantities. I can hear the "freedom/choice" groups clamouring for my head, but unless we address these issues collectively, across the board, we will get nowhere. Token gestures bring warm feelings and little benefit. I believe that those who advocate low carbon but non nuclear electrical supplies should suffer the intermitencies and outages typical of most renewable sources. Oh you can't see because the lights are out and there is no wind, bad luck/grow up. You don't want a wind turbine because it spoils the view..... This is a global problem and needs a global solution, We are past "peak oil" and need to be maturing new technologies now. BTW As I write my house is exporting over 1kw from our solar panels, our electricity bills are much lower and we get a "Feed in tariff" but I doubt at a macro level, it is good economics, since other consumers pay more to subsidise me.

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[greghorrall@gma...](#)

on Aug 10, 2016

First of all, as too few are aware, but some very smart people are, e.g. Burt Rutan (See his website's papers on AGW, anthropogenic global warming)...AGW is by no means a proven theory. Also, even if there is some basis in this theory and even it is going to be a bad thing overall for the planet to undergo some warming and increased CO2 levels, also far from certain...increased CO2 levels may be a net benefit when we count all factors...Airline travel contributes only ~ 2% of the world's CO2 emissions and is still an extremely fuel-efficient way to travel, with the US airliner fleet average of 65 seat-MPG.

Let's clear away this miasma of CO2 emissions and AGW as the threats to sustainability and take a more certainty-based approach along with a more positive attitude about what the airlines need to be doing in response to the certainty of our current situation.

The thing that is certain is that we are more and more rapidly burning-up the planet's economically-recoverable reserves of fossil oil, the product, by the way, of previous geological eras in which, guess what, CO2 levels were much higher than today's.

Our current transport tech, including the few EVs (charged by a fossil fueled grid) on the road and even a very few in the skies, runs on fossil fuels, especially oil. BP gives us 50 years of economically-recoverable reserves and others say even less, depends on many factors more or less known or predictable. We are running out of oil, even if there are some yet undiscovered economically-recoverable reserves out there, because the earth is finite and the ages in which algal oil accumulated, and was deposited in sediments, were also limited.

There is a finite supply of oil in the earth, and that's indisputable. The only thing disputable is how much longer we can keep economically recovering it, burning it, and relying upon it, like addicts, to keep our economies alive and moving, literally.

So, I see two real and certain drivers for us to increase our efficiency in the air transport field: 1. the finiteness of fossil oil, only 50 more years to make a total transition to renewable fuels, truly a gargantuan task esp if we keep guzzling it, and 2. Making airliners far more fuel-efficient than they are now, a perfectly feasible thing technologically, would mean not only helping ,a little at least (remember that 2% figure above) to extend our fossil fuel supplies and also to reduce investments needed, won't be cheap, for creating the renewable fuel tech infrastructure that we must establish well before fossil oil is effectively used-up, AND as airline owners and airliner manufacturers know, a much more fuel-efficient airliner can make air travel even more attractive and thereby bring about continued growth in the industry. It also can keep away threats like Hyperloops and high-speed rail...A future airliner that's as efficient as it could be will be more efficient in every way, energy, total cost, travel time, land, than any of these, but if airliners are not developed to a new paradigm, these forms of transport may have a chance to put them out of business, except maybe for crossing the oceans.

We have the technology now/near-term to build airliners 10X more efficient and to make them VTOL, and we need to get serious on developing that, and that means getting beyond the 707-paradigm to a new paradigm that synergizes tech in composites, laminar aerodynamics, high-aspect-ratio wings, and advanced recip-propellor propulsion. Let's get moving on that, instead of being Chicken Littles worried about AGW, and also instead of wasting so much resources on building the next super-stealth bomber.

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[dugnology@opton...](#)

on Aug 10, 2016

Finally, some reason. The 800lb Gorilla isn't climate change. It is wasting a non-renewable resource for no reason. Oil might not go away in the next few decades, but if we keep up the way we are going, it will get much more expensive. Now is the time to reduce our reliance on it. Oh, and forget kerosene burners, my plane uses LEADED avfuel. We had something like 40 years to fix that problem, some companies DID fix the problem (Rotax uses mogas), but we are still using it. The only reason we may stop using it is if they stop making lead additives (which they should). All the reasons to keep lead in avfuel seem to keep us using 1940's technology. The fix is simple, make the certification process less costly. Encourage change.

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[jhknoy](#)

on Aug 10, 2016

Since I live below sealevel, this issue is quite important to me. So I will chase another elephant into the room: airtravel will peak during the next 5 years and go into free fall after that.

The need for business travel will evaporate when better Virtual and Augmented reality options will become available that minimize the difference between this option and "in real life".

It is ludicrous that in my local supermarket I can buy apples grown in Chili. Vertical farming and more consumer awareness will slash into the produce transportation market.

Just some thoughts...

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[GEM555](#)

on Aug 10, 2016

Hey! Good news for you! in 2005 the United Nations Environment Programme (UNEP) warned that “man-made global warming” would cause sea levels to rise by 2010, causing 50 million “climate refugees” to flee from islands and coastal areas.

Not a single “climate refugee” has yet had to flee. The UNEP took its “climate refugees” map off its website last year.

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[aalexandre](#)

on Aug 10, 2016

Living below sea level is a mistake. It is like going to mine field! You are free to live there but face the consequences. I live near an airport, I do not complain. If I am not happy I am free to go elsewhere! Freedom has a cost!

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[czarnajama](#)

on Aug 10, 2016

Even greater than CO2 emissions is the effect of contrails, shown in a number of studies, most famously after 9/11. While contrails are short-lived while CO2 stays for a very long time, they have been shown to have a profound effect on weather. I have seen the development of extensive cirrus clouds due to massed contrails in places as diverse as north-eastern Poland and the French

Riviera. Certainly sobering. We need to consider the altitude at which emissions occur, and what types of propulsion systems will cause least harm.

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[Clarinetinski](#)

on Aug 10, 2016

Global warming? What global warming?

Now, almost in the middle of August, we got 13°C, at 12.40 p.m. That is, in Bavaria, not in northern Sweden. According to [accuweather.com](#) (a web site showing you local conditions on hourly basis, almost in every little village), they have meagre 28°C in Aleria on Corsica. In the '70s, '80s and '90s, it used to be around 40°C at this time of the year during the day.

Were the 5ft high snowdrifts in Portugal and Morocco the Winter before last part of the global warming, too? Same goes for the snowdrifts in Algeria, Jordan and elsewhere in recent Winters, just as for the -40°C in the North East of the U. S. A. last Winter and for the growing glaciers on New Zealand.

Not too long ago, a TV team had to abandon their attempt to produce a documentary on effects of global warming in Antarctica because too much of snow.

Gobbledeegook!! Propaganda, just to scare people to death. The more people get scared, the easier it is to control them. That's what it all is about.

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[GEM555](#)

on Aug 10, 2016

...and that's why they call it "climate change" now. Too hot? Climate change. Too cold? Climate change. No major storms? Climate change.

It's really quite brilliant.

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[Rabbit1960](#)

on Aug 10, 2016

@GEM555 Your argument here defies rationality. You admit to abnormal weather events, and somehow conclude that this is evidence AGAINST climate change?

One extreme event can rightly be dismissed as the variability of weather. But, when we see extreme events worldwide, simultaneously, and they repeat and amplify...that's not just weather. As you yourself said, this is not a matter of what you believe...facts are undeniable.

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Discuss this Article 138

[Cadence](#)

on Aug 10, 2016

Clarine - Yes, absolutely! Very disappointing Aviation Week would publish such tripe.

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[PilotMinion](#)

on Aug 10, 2016

It's called global warming as in the entire globe. Not Bavaria warming. This is not about one particular locality. It's not about one particular day or year. I choose to believe in the vast number of scientists that have used facts and data, including NASA, that agree on the issue. I trust them more than people like you talking out of your ass. If you have data to dispute this, I'm sure the whole scientific community would love to hear it and put this issue to rest.

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[johnh53157](#)

on Aug 10, 2016

Ok, let's stop flying and driving! Get your walking shoes on, especially all the greenies, who fly all over the world, preaching doom and gloom, collecting ever increasing consulting fees. There is no more room in the world for fossil fuels. And oh by the way, once the fossil fuels are curbed, then we will have to remove the largest emitters of methane, on the planet, you and me!! We must stop this fear monger madness!!

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[GEM555](#)

on Aug 10, 2016

CO2 is really just a cost. Carbon happens when people make things. Like a living. Here's a question: Under what circumstances will the warming bed-wetters declare the climate to be "fixed" and go find a real job?

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[Flynlr](#)

on Aug 10, 2016

stupidest article I have ever seen on this site.

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[B748capt](#)

on Aug 10, 2016

Agree!

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[aalexandre](#)

on Aug 10, 2016

I would expect more serious than that stuff. +10

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[AirCargo2015](#)

on Aug 10, 2016

"stupidest article I have ever seen on this site."

That's for sure. Seems the kooks have invaded this place.

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[Rowboat71](#)

on Aug 10, 2016

"if we actually believe in global warning"

We don't.

The globe is not warming, sea level is not rising, and the polar ice caps are not melting.

If sea level is rising, why are we dredging the seaports. and why are we restoring the Everglades, which will soon be under salt water, according to the tree huggers.

The alternative to burning carbon is to burn hydrogen

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[rcktmn](#)

on Aug 10, 2016

climate.nasa.gov/vital-signs/global-temperature/
climate.nasa.gov/vital-signs/sea-level/
climate.nasa.gov/vital-signs/land-ice/
climate.nasa.gov/vital-signs/arctic-sea-ice/

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B748capt

on Aug 10, 2016

Agree !

[Log In](#) or [Register](#) to post comments

jetme

on Aug 10, 2016

As difficult as it may be for it to accept, no user of oil wastes more unnecessarily than aviation. Using 80 billion gallons oil a year, sustainability also should be a major concern. It won't change unless public law or regulations force the change.

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Changey

on Aug 10, 2016

Fossil fuels are truly sustainable as the earth is constantly creating petro molecules and doing it for free, no cost to tax payers. The earth produces it in huge abundance too.

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waltal

on Aug 10, 2016

I am sorry for the AvWeek editorial board. Y'all have evidently lost your way and have a lack of opinion material from actual sane people. Every single thing this writer suggests is a terrible idea. The basis of every idea of this writer is pure hoax propaganda. Next thing you will be publishing pro-Marxist pieces and discussing the inevitable nationalization of the entire commercial aircraft industry. Because, you know, they are paying CEOs too much.

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Pat.D

on Aug 10, 2016

The biggest short term improvement would be fewer flights with more passengers on board. The capacity of the 747 enabled low cost transatlantic travel, but very large capacity aircraft seem to be out of favour, with multiple airlines competing with hourly services on the same route consuming scarce runway slots and impacting the environment around airports etc. Perhaps it is time where the flight slot cost included the CO2 & other quantified environmental damage to alter aircraft selection criteria.

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GEM555

on Aug 10, 2016

CO2 is just a cost, and you don't manage that cost by making people poor.

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jetme

on Aug 10, 2016

Right on!

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VADM

on Aug 10, 2016

WHO WRITES THIS DRIVEL?? Worse, who believes it? Just as human beings require oxygen to survive, ALL plant life worldwide REQUIRE CO2 to survive. Ingesting CO2 is how plant life reproduces OXYGEN for us to breathe. Pay attention!! Don't believe drivel. Climate Change is a LIE being used to make money for promoters and further restrict our liberty.

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headlesschicken...

on Aug 10, 2016

Climate has been changing for eons but the vanity required to think we nudge the needle is a greater pollution. Speaking of vanity, not to mention duplicity, I do think I will post this piece over at Richard Branson's Twitter page. ;)

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[greghorral@gmail...](#)

on Aug 10, 2016

Amen brothers and sisters, or is that what one should say in the church of AGW, rather than the church of rationality and science? But, please do pay attention to fossil oil depletion. That's a reality, and the sooner we deal with that, the better.

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[denis.thornton@...](#)

on Aug 10, 2016

The scientific illiteracy shown by most of the commentators here drives me to despair.

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[bbelotti](#)

on Aug 10, 2016

Such stupid comments below that article. For one, global warning is a fact that's not open for discussion. The average sea level has increased in the last 100 years. That's a fact. The average temperature has increased. That's a fact. The amount of ice in the Arctic is dramatically decreasing. That's a fact, not an opinion or a prediction as some suggest (and there are plenty of examples, I could go on). For two, yes we do need to question ourselves in the way we use the system, and that includes other things that just technology. That includes having people wondering about the environmental cost of trashable meal boxes on airplanes, the one of travelling on short distances (in the USA for example), where other means of transportation such as train should be available (but no one in the US wants to hear about something else than cars and airplanes). So yes, it is going to be painful, especially for the most closed-minded and stubborn of us, but it is more necessary than ever.

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[Zack63](#)

on Aug 10, 2016

> For one, global warning is a fact that's not open for discussion

Gravity is a fact not open for discussion. Global warming is an unproven theory. Give me a weather forecast that is accurate for a week, then maybe I'll believe your predictions for the next several decades.

It seems common sense is lost. Do we not expect the weather of the world to fluctuate?

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jrumble@tavares.org

on Aug 10, 2016

It's kind of sad , but aided by conservative entertainment complex , we have become a post truth society with science dismissed for political reasons. The bulk of the responses are what you hear parroted every day on Fox News and conservative talk shows. Liberal conspiracy indeed.

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[sh40](#)

on Aug 10, 2016

"The bulk of the responses are what you hear parroted every day on Fox News and conservative talk shows"

Perhaps the "parroted" responses can be debunked? No. Where are the climate refugees? Where are the worsening tornados? Where are the stronger hurricanes? Where is the spike in sea level rise? Why is the antarctic growing? Why does temperatures stay flat with ever increasing levels of CO2?

Maybe it's you who is parroting the tripe put out by the EPA. The only "facts" out there point to a very benign response to CO2 production and certainly no "catastrophic manmade climate change".

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[jimmbbo](#)

on Aug 10, 2016

Perhaps you can enlighten the unwashed masses as to why

- 1) CO2 has continued to INCREASE independent of temperatures having STABILIZED
- 2) 130+ climate computer models overestimated globull warming by as much as 1000%
- 3) When programmed with HISTORICAL DATA these models cannot reproduce REALITY
- 4) Why the "experts" cannot explain the 19 year "pause" in globull warming
- 5) Since the scientific method DEMANDS skepticism and full disclosure of data for discussion, that St. Algore the Large (a NON SCIENTIST) can pontificate that "the science is settled" when data has been fudged, hidden, cherry picked and generated from whole cloth.

The world breathlessly awaits your enlightened response. Meanwhile, I'm going to fire up the BBQ and cook some steaks.

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jimmbbo

on Aug 10, 2016

Well done!! you got the entire Globull Warming Gestapo talking points list in ONE POST!!

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launcher

on Aug 10, 2016

Global Warming
The Washington Post

The Arctic Ocean is warming up, icebergs are growing scarcer and in some places the seals are finding the water too hot, according to a report to the Commerce Department yesterday from Consulate, at Bergen , Norway

Reports from fishermen, seal hunters, and explorers all point to a radical change in climate conditions and hitherto unheard-of temperatures in the Arctic zone. Exploration expeditions report that scarcely any ice has been met as far north as 81 degrees 29 minutes.

Soundings to a depth of 3,100 meters showed the gulf stream still very warm. Great masses of ice have been replaced by moraines of earth and stones, the report continued, while at many points well known glaciers have entirely disappeared.

Very few seals and no white fish are found in the eastern Arctic, while vast shoals of herring and smelts which have never before ventured so far north, are being encountered in the old seal fishing grounds. Within a few years it is predicted that due to the ice melt the sea will rise and make most coastal cities uninhabitable.

* * * * *

I apologize, I neglected to mention that this report was from November 2, 1922, as reported by the Associated Press and published in The Washington Post - 94 years ago.

Go take your meds. Reason: "global warning is a fact that's not open for discussion". I think that what you have just displayed is called "a closed mind".

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Rowboat71

on Aug 10, 2016

The frenetic pace of construction along the waterfront is proof that no one believes your "facts".

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yars@yarsley.com

on Aug 10, 2016

Bio fuels? Their combustion yields the same amount of CO2 and NOx as refined fuels do - the chemistry is the same. You could quibble over sulfur compounds, I guess...

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KFLITNER@PARKER.COM

on Aug 10, 2016

US Jet Fuel consumption has not doubled as the author suggests, it has gone down. (rita.dot.gov)
Let's applaud the success of the industry and continue to challenge ourselves to be better.

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user-1763522

on Aug 10, 2016

These comments are pretty predictable. It would be like the NRA Rifleman magazine publishing an article advocating gun control. Few aviation enthusiasts, myself included, enamored of the biggest and fastest flying machines, want to acknowledge the dire effect of dumping billions of tons of CO2 into the air. Much easier to allege some grand conspiracy by 98% of the world's climate scientists, which may help one sleep at night but won't forestall the consequences.

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jimmbbo

on Aug 10, 2016

Ad hominem attack FAIL

Red herring FAIL

Appeal to authority FAIL

Logic FAIL

Argument FAIL

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[dadRussell](#)

on Aug 10, 2016

What a crock ! Totally unsupported by the FACTS ! Oh- Pardon me! When did facts ever matter to the EPA ???

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[aalexandre](#)

on Aug 10, 2016

Just a question to AWST editors by such articles you are taking part of scuttling this lovely industry who bring millions of jobs worldwide. What do you expect? Definitely not George Clooney but for sure more complicated rules, higher fare, taxes and even more expensive tickets, and crappier services.

You could be proactive and advertise good for our industry! We have enough greenies ditching our activities not to add layers of mess!

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[Acey](#)

on Aug 10, 2016

Lets face it, nothing can or will change much regarding aviation emissions, in the next 50 years anyway. The EPA does more harm than good with their goofy ideas. And climate change has been happening and will continue to happen for as long as the earth will exist.

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[wally@wallyrobe...](#)

on Aug 10, 2016

No doubt there is some complex climate change. But, can humans do anything about it? I suggest another U.N. experiment: eliminate 90% of the world's human population then study the results for 50 years. And, perhaps the remaining elite can also stop those pesky volcanos from messing up their study.

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[jrprimm](#)

on Aug 10, 2016

I have a reasonable and easy solution--the UN and its fellow travelers in arrogant behavior management, i.e., telling the benighted ignorant rabble (the 99%) what to do and how to live--should stop flying around the world exotic places and burning fuel that could be used for better use in actually solving problems. The vast increase in air travel frightens some who don't want the average man or woman to be able to travel and better themselves. By the by, AGW is the most arrogant of all ideas and is used as a club to strangle progress and scientific research.

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Alabama

on Aug 10, 2016

Something doesn't make sense on the surface: "Air travel has essentially doubled in the past 15 years (and so have related CO2 emissions) "

New engines and aircraft since then are far more fuel efficient and output much less emissions than older generations. In the past 15 years, airlines have been aggressively updating their fleets and removing older aircraft from service.

According to ATAG.org, aviation is 2% of CO2 emissions and 12% of transport emissions (compared to 74% from road sources). This article seems overblown. Agricultural emissions are far greater. Marine shipping does very considerable environmental pollution. And aviation cannot make sudden or quick changes as the author implies. This industry isn't a relatively large polluter and they are constantly putting forth worldwide efforts to reduce emissions and fuel consumption.

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noworreeze

on Aug 10, 2016

Sick and tired of all these "scientists" justifying their existence by drawing sweeping conclusions on little evidence and no "facts".

Climate change is a fact. It's been changing since way before GHG, as long as we've been tracking it, which is only a couple hundred years if that. A hundred years ago scientists were making the same predictions. Yep...things are cyclic. That's the only certain conclusion. We don't really know the consequence of these cycles....we just take a convenient emotional stab at it. But some things never change. Over 100 years ago there was an outcry about the poles melting and flooding the coasts...that went away, and in the '70s there was a cooling "crisis". Remember that? We call it "climate change" now because we can't make up our minds what the hell it's really doing. You need a LOT more time based evidence to draw that conclusion. '

Engine manufacturers amidst all this confusion have taken huge steps to minimize emissions and maximize efficiency of power plants. So has the automotive industry. They haven't been forced necessarily. Give them some credit.

In the meantime, enjoy the swirling contrails, those evil clouds of doom that are sure to put an end to life as we know it.

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[mark@classmprod...](#)

on Aug 10, 2016

More AvWeek pseudo science & brainless support for social engineering. This article is very disappointing and well below the journalistic standards of the past. The "elephant in the room" is the inept editor lacking the guts to trash can this bogus piece of "news".

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[garykennys@yahoo.com](#)

on Aug 10, 2016

This article is click bait.

It makes you wonder how many others are written using incorrect facts to grab our attention. One more and Aviation Week goes to the spam folder.

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[Akeel Tahir](#)

on Aug 10, 2016

cars are the problem for generating the CO2 and worse than that the most lethal toxic gas from the not burned fuel or gas, which is polluting our life all around the world, I am talking engines, which is in let say three types mainly, as the reciprocating one, that all cars and moving on the roads vehicle, including bulldozers and so on large machines, which does only burn 70% to 80% of the injected fuel, then the jet engines with all its type, which burn more ratio of the heavy fuel that is using compared to the vehicle engines, as its exhaust gas is very limited as the number of the flying jet engines are limited around the world till now, which does not exceed the six digit, as it is far less than that, because of the very limited life time to the air frame that attached to it, the bad gases is really limited around the airports area, where the take off and landing do happen, so why it is unhealthy to be around it, the other type of engines are the rocket boosters engines, where they use either solid fuel or liquid fuel as a mix of hydrogen and oxygen, and it is very seldom to be fired in the space, so I think it is still in the safe limits still when it comes to the jet engines and the airline passengers travel market and business . but we need to invent more cleaner and friendly environment thrust engines to put us in the skies, for the sake of the aviation technology .

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[787flyer](#)

on Aug 10, 2016

The green left will never be satisfied until all fossil fuel use is stopped. At the same time they fly around the world to their self serving climate change conferences with the bureaucrats and politicians in business class creating four times the emissions of an economy class passenger. In the province of Ontario Canada, the government is implementing a cap and trade (dunce cap and trade in my opinion) emission scheme costing the taxpayers about \$2 billion a year. The supposed reduction in global temperature is calculated at one millionth of a degree very five years. So by the end of the century this province will be out some \$170 billion for a global reduction of 17 millionths of a degree. The poor citizens will have lost tens of thousands of jobs, at a minimum, wrecking more communities and families. General Motors is closing its Oshawa assembly plants with production of one lines moving partly to China and Mexico. India and China open a coal fired electrical plant every week.

Climate change has been going on for 4.4 billion years. Where I am now sitting writing this was under a mile of ice 10,000 years ago. In the sixties and seventies we were told by the experts that the earth was cooling. Yes the global temperature may rise. I hope where I live in Canada it certainly does.

The real question is what is the ideal climate and can something be done about it and at what cost. These are same leftie green politicians who think it's ok to bring millions more into The USA and Canada and pave over farmland to house them. So what about all that aspha.t and concrete adding to the temperature. They won't talk about that and if you do then you are told you are anti-immigrant.

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[Tim S](#)

on Aug 10, 2016

Because "anthropogenic climate change" is real, no sane person who is well educated can argue that it doesn't exist. This allows devious people with ulterior motives to grossly exaggerate the effects and make bogus claims about future disaster. This is the condition we face -- a very weak, but real effect, that has been blown way out of proportion and defended by the claim that it is real, when the crime is the exaggeration of the true effect that is very much weaker than the hype would suggest.

Make no mistake, the IPCC computer models that predict doom and gloom fail the hindcast test and are now proven to be invalid because they have been tuned-up to produce the desired effect rather than based on real science that is valid.

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[Len Hobbs](#)

on Aug 10, 2016

The U.S. EPA is a discredited gaggle of pompous, overpaid, arrogant, ignorant bureaucrats with a left/liberal political agenda - and USED by a left/liberal consortium of government agencies.

However, the EPA, as an organization of 'brown shirts', and EPA employees as stooges, are simply willing accomplices in a much more sinister campaign of political propaganda.

The article above is sheer nonsense, irrelevant and 'created' to foment anxiety among low-information residents of the U.S.

"There is an elephant in the room and nobody wants to see it".

That fabricated, provocative and STUPID comment is a demonstration of the baseless, false, exaggerated and manufactured claims by the 'climate change terrorists' who are 'lemming-like' in conduct and schizophrenic in thought.

We have endured this mentally disturbed 'riot' for nearly thirty years. We have YET to see, listen to or read ONE WORD of coherent, lucid, demonstrable EVIDENCE of ANY change in the earth's climate - good or bad. There is no evidence and there is NO climate change!

I view the climate change/CO2/greenhouse gas/melting arctic ice 'screamers' as a circus of clowns, in sloppy clothes, painted faces, paper hats with limited vocabularies, little education and living on grant money.

The climate change scam is starting to unravel. The 'hangers-on' are a ragged coalition of untruthful, agenda driven socialists, Bernie Madoff sychophants and remaining numbers are simply stupid.

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[aalexandre](#)

on Aug 10, 2016

Just face the facts, this industry is at least responsible for 100 millions of jobs. This is industry brings jobs to both civilians and Military, then you have manufacturers, MRO, hotels, car rental, civil engineering, then airports employees goods created by the ability to trade and to send quickly goods and services. Then you have farmers who send their products at the opposite side of the world in less than 24h. I suggest to people employed by this industry and by this Eco-system to resign right now and to get of-grid in Alaska, Northern Canada or Siberia. Please AWST we had our disagreements it would be kind to focus and support this industry and not putting fire on that non-sense. You have a job too thanks to that industry. So I prefer stories about technology to be as far as I am concerned less stupid than yesterday, historical adventures and facts!

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[smurfiest](#)

on Aug 10, 2016

It's sad to see so many people who should be science-minded display such cave man-like attitudes when told that unless we make some big changes the party is over for aviation, forget AGW for a minute, oil is a finite resource whose cost will steadily increase in the near future. BTW, the bulk of commercial aviation is a LUXURY, not a necessity like food production or commuting to work, those who are indifferent to its impact on the environment need to grow up. This can be a great opportunity to prove we have the common sense and decency to take responsibility for our actions by using our tremendous engineering talent and wealth to find solutions so our kids don't get stuck with the mess we have made. BTW, there are no uranium mines in France, and no nuclear waste sites either, their low emissions come at a high price for people in other places who don't have big screen TVs or SUVs.

We need electric airliners more than a new bunch of ICBMs or LRBs or boomers, let's for once get our priorities straight! There are plenty of good jobs and money to be made doing the RIGHT thing, this point seems lost on the science deniers on this site.

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[MPowerd](#)

on Aug 10, 2016

This article is a crock! CO2 is just more bullshit for the govt to tax and take from the people... Funny how none of the predictions about the effects have come true but how could they consider it if they were based on faked research...

Stick to true articles on aviation and leave the fantasy writing for the morons at the NY Times

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[Bradlem](#)

on Aug 10, 2016

All very impressive, however there are only TWO matters " the human race needs to deal with 1) overpopulation

2) corruption

Deal with these, then everything else will then fall into place.

Regrettably, Mans ego and a COMPLETE lack of LEADERSHIP from those we elect (if you are fortunate to live in a democracy) to govern will mean this won't happen.

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Discuss this Article 138

[sh40](#)

on Aug 10, 2016

I'm glad to see most of the commenters on this board can see through the propaganda that is catastrophic manmade global warming. I lost all confidence when John Christy of UAH put out a

paper stating that if we eliminated the entire U.S. emissions (AKA wiping out the USA) tomorrow, we would lower global temps by...wait for it.....0.5C in 50 years.

Manmade climate catastrophe is a crock, that's why nobody will debate about it.

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[aalexandre](#)

on Aug 10, 2016

With a lot of humor the western administrations, UN, NGO are contaminated by Soviet ideology that is scuttling our capitalistic model.

"Humor Alert".

US capital is now Moscow.

Soviet Capital is Washington DC.

It is a lot of sense of humor!

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[burt rutan](#)

on Aug 10, 2016

This has not been updated in 5 years, but its conclusions are even more valid when you add recent data. Global warming should be discussed while looking at ALL the data, not cherry-picking pieces that support your political agenda.

Go to burtrutan.com and click on hobbies, then read the pdf titled "an engineer's critique.

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[chuckwilkerson@...](#)

on Aug 10, 2016

The real elephant in the room is Hitler's Reichminister of Propaganda who put forth the theory of the repeated lie: "If you tell a lie and repeat it often enough, it will come to be believed. The people can be protected from the lie ... the state must suppress dissent for the truth is the mortal enemy of the lie and, thus by extension, the truth is the mortal enemy of the state." (Look it up).

What we have in the man-made CO2 climate change fraud is the most successful application of a bald face scientific class lie ever foisted on mankind. Get off your dierriere, check out some factual articles not written by "scientists" on the government doll and get to the truth. Or ask me. I'm an expert. (Right. No modesty ;-))

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[mark.ruch@faith...](#)

on Aug 10, 2016

If we assume that aviation is responsible for ~ 2% of the world's CO2 emissions, perhaps the real elephant in the room is the other 98%? How about we tackle the problem of the largest emitters first?

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[LTE-ak](#)

on Aug 10, 2016

Yes, we must. These 2% ARE the largest emitters.

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[LoosMoose](#)

on Aug 10, 2016

All predicated on the belief that "global warming" is real. It's not. There has never been a case where scientists who disprove those theories needed to falsify the evidence or warn other like minded scientists to avoid using data that would undermine their attempts. So called Global Warming, or Climate Change when the data doesn't support their preconceived conclusions which are set first and then the attempt is made to make it fit. It doesn't. This is THE LARGEST scam on the American people since PROHIBITION and we all know how THAT turned out. The "hole" in the ozone layer is improving and these clods want to take credit for it. Still, if they do, that means the current corrections have already reversed the trend and will correct it in a period of time. The greatest mystery to Global Warming is how to make as much money from it as Al Gore has in the last 20 years which is a sizeable undertaking. These are the same people that now tell us it's OK! to create wind farms that are killing off the endangered species that they were fighting to preserve last year.

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[djr2222](#)

on Aug 10, 2016

Of course global warming is an unproven theory. Of course there is no scientific evidence for "climate change." Where would you get such evidence. Its a bit like asking for evidence that something will cause the extinction of mankind.

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[jimmbbo](#)

on Aug 10, 2016

The pseudo science of Manmade Global Warming is based on 130+ computer models that universally overestimated the effect of CO2 in the last 20 years, and cannot reproduce the HISTORICAL, OBSERVED DATA of the "pause" in warming. A "model" that cannot reflect REALITY is useless.

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[DeweyV](#)

on Aug 10, 2016

Sheesh. I expected the readership of AW&ST to be more intellectual , better informed, and capable of their own critical thinking. Most of the commentors are sadly not.

Talk to any retired airline pilot who used to fly turboprops and transitioned to jets. The contrails left by turbine engines have definitely increased cirrus cloud formation along the routes. My old DC-3 driver friend who retired out of Boeing 737's recalls that in the early days when pulling up out of Stapleton Field in Denver he could easily see the Teton Mountains in Wyoming 325 miles away at altitude. Today the pilots have trouble seeing 75 miles , because of the haze from both the jetliners and the urbanity below. Anecdotally.

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[LTE-ak](#)

on Aug 10, 2016

I suspect that what you are witnessing here is not the AW&ST readership, but a paid-for boiler room operation.

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[jimmbbo](#)

on Aug 10, 2016

CO2 and Global Warming are such critical issues that every six months the "enlightened ones" fly 1500 business jets halfway around the world to the world's most exclusive cities to attend conferences to eliminate it.

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[smurfiest](#)

on Aug 10, 2016

When the science deniers can tell us how they intend to keep flying when we run out of affordable oil THEN maybe we will start listening to them, otherwise they are just sticking their collective heads in the sand. Through higher efficiency and using the unlimited amounts of wind and solar power we have everything we need to survive, the Germans and Chinese understand this and are making the appropriate investments-we are not. Kudos to AW for poking the hornets nest, nice to see some signs of courage and leadership somewhere, it's time for the industry and government to get on board.

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[Jack Tingle](#)

on Aug 10, 2016

It's a rather poorly thought out article. What the author should be advocating is some kind of fleet-wide metric like "passenger-km/kg of fossil fuel burned". You can then attack aviation's contribution by increasing passenger counts per flight (load-factor), overall aircraft cruise specific range, and the use of renewable fuels. Odd polemics about business-class perks don't add much to the discussion.

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[Joe Anselmo](#)

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on Aug 10, 2016

This rebuttal to Mr. Gelain's column was sent to Aviation Week by Michael Gill, executive director of the Air Transport Action Group in Geneva, Switzerland. All views expressed are his.

Dear Editor,

Antoine Gelain's views on aviation's carbon emissions are inaccurate and his proposed solution would simply not work. He states – twice – that aviation's carbon emissions have doubled since 2000. In fact, emissions have risen by around 50% over this period, during which time passenger numbers more than doubled. This shows that the huge collective effort from across the industry to decouple emissions growth from passenger growth has been successful. But even this is not enough, which is why our sector became one of the first in the world to set global climate goals. The industry's technology, operations and infrastructure measures are bearing significant fuel efficiency and emissions savings results, with more on the way.

Mr Gelain's proposal for demand management is a first-world-centric solution that is neither economically desirable nor politically realistic. Aviation supports some 62.7 million jobs and \$2.7 trillion in global GDP. We transport a third of world trade by value and half of all international tourists. But, more importantly, we help to connect people, families, businesses and communities in our global economy. To restrict demand through higher prices means cutting off this connectivity, and going back to the days where only the rich could fly.

This is very much an affront to the small exporting businesses and rising middle classes across the developing world who rightfully aspire to travel and see the world. We must therefore find a way to balance our growth as a transport mode with the need to reduce the environmental burden that it creates. This balance is exactly why we developed the global climate goals the way we did; and why we are pushing governments so hard to reach agreement on a global offsetting scheme for aviation at ICAO this year.

Yours sincerely,

Michael Gill
Executive Director, Air Transport Action Group

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Thomas67

on Aug 10, 2016

The best way to reduce CO2 emissions is to get everyone to stop breathing! FYI, CO2 makes plants grow better!

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serickson@conwa...

on Aug 10, 2016

Just a parallel thought: In the early 1970s I had occasion to interview one of the original interstate highway system planners. He said that the planners never foresaw the ground vehicle traffic growth that would occur because of the interstate highway system. If they had, he said, they would never have designed a highway system, but would have opted for a high speed rail system instead. Many parts of Europe already have an intermodal system (road, rail, air). Perhaps it's time for the U.S. to begin planning a new overall system, including telecommunications, rather than trying to regulate individual modes and their contributions to emissions.

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jimmbbo

on Aug 10, 2016

God knows how many people could have been fed, clothed and provided cheap FOSSIL FUEL energy with the BILLIONS flushed down the globull warming toilet. Burning wood as fuel in Africa is killing millions

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Dugg

on Aug 10, 2016

EPA Ending Productivity in America

EPA Employment Prevention Act

EPA Enforcing President's Agenda

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Changey

on Aug 10, 2016

I'll believe aviation is a part of some crisis when celebs and govt officials swear off private jets for their fun travels. When they fly commercial to give a speech; give up luxury private jets to go vacay in some uber luxurious locale. When these people shrink their carbon foot print to the shoe size of the masses. When Bill Clinton goes commercial to give one of his \$500,000 a pop speeches to other's who flew in on private jets to hear him.

When the hypocrisy ends, I'll take note.

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shloime

on Aug 10, 2016

unfortunately, "groupthink" is more "group" than "think".

the author chose 15 years to demonstrate the growth of aviation. but is it a coincidence that this just happens to be 15 years and one month, almost exactly, after 9/11? so his lead off argument is based on one of the most obvious outliers of all time, which specifically crippled the airline industry.

and the connection between worldwide biofuel availability and greenhouse gas emissions is another leap of imagination. biofuels are a substitute for dinosaur poop, but they burn just the same.

as for reducing air travel, even though trains are a feasible way to get from london to glasgow, maybe, they're not so good from paris to mumbai, or from new york to los angeles.

and the business class thing is just muddled thinking. if incentives increase flying, then surely higher prices, such as business class, are the best disincentive?

the bottom line is, this article is an opinion piece, more indicative of european beliefs and attitudes, certainly "an uncomfortable reality", than of the actual state, or future, of the aviation industry.

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cmadams0@bellso...

on Aug 10, 2016

I agree article is stupid. Aircraft manufacturers since civil aviation began and still looking to use less fuel. It means less pollution and bigger profits.

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[markusmedusa](#)

on Aug 10, 2016

Paragon Partners? Really? Why was this published?

Dear Antoine, Shove it.

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[justcallmeworldwide](#)

on Aug 10, 2016

Animals raised for food make more co2 emissions than airplanes. I will continue to eat meat.

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[Joe Anselmo](#)

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on Aug 10, 2016

While this Viewpoint is the opinion of a guest columnist and not Aviation Week, it was pointed out to us that a factual error slipped in that overstated growth in CO2 emissions during the past 15 years. An estimate from the Air Transport Action Group in Geneva puts aviation emission growth at around 50% since 2000. We have modified the original post to remove the error.

Joe Anselmo
Editor-in-Chief

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[tonytales](#)

on Aug 10, 2016

There seems to be a basic confusion between "sustainable" and "climate change". Biofuels use has nothing to do with climate change. It is burned just like Jet A with similar exhaust effluents. In the last ten years there has been so much oil reserves discovered that its use is not needed for many years. The processing of bio material into fuel creates pollution by itself not to mention the fertilizers and pesticides needed to grow it. I see no link between biofuels and climate change. Over my fifty + years in aviation I have seen aircraft efficiency grow, We no longer vent engine fuel cans overboard, engines burn cleaner, no more long smoky trails behind the jets. Fuel efficiency has grown as has aircraft efficiency and size.

It is obvious that some will not be happy until all of humanity is confined to tiny box apartments and pedicabs and eat only veggies.

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[AirCargo2015](#)

on Aug 10, 2016

While all of the 'climate change' movement is all about money, the CO2 is the easiest to dispute. It is fact that CO2 is required for humans to survive. It is fact that one volcano can spew more CO2 in a day than all human activity combined. It is also fact that we could not change the climate on a global scale if we tried. Yes, the climate warms and cools naturally over the centuries but we have no control over it. Garbage like this article only serves to feed the trolls.

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[caseydodd@sbcgl...](#)

on Aug 10, 2016

Chuckwilkerson,
Usually, when I see piercing wisdom, among a pile of trolls I think, "Caste not thy pearls among the trolls". But with you and your last comment, I beg you, keep casting!!!, keep casting!!!

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[caseydodd@sbcgl...](#)

on Aug 10, 2016

Traveled much of the world. Love New York (especially the River Cafe), (God I wish I could get a couple tickets to see, "Hamilton". Probly haf ta git ah sekond morgauge.)

Love to spend time in Ohio, Arizona and California; which I do all the time. (Kids- lots and lots of Grand Kids).

Spent most of my professional career in D.C. Love it. Love Southern Virginia. My absolute favorite city? Charlston, South Carolina. Favorite small town Beaufort, South Carolina.

None of these places have been more beautiful than they are now.

Ever read, "The Grapes of Wrath" published April, 1939. Ever seen a picture of Oklahoma during the dust bowl. Drive western Oklahoma when you get a chance. It's lush and beautiful.

Me? Well travelled. But lived in the same area since birth. (Was that last one a real sentence?)

Don't care. I liked it.

Point is, America has never looked so good. But during my lifetime it has gone from 160 million folks too 330 million. The weather where I live is absolutly the same as it was when I played hide and seek with my pals. Well, except for a 3 year cold snap a few years back. Ice storms took a real toll on our trees.

Ever been to the Keys, gone scuba diving. Never been more beautiful down there, especially

since science has learned how to build coral. Back some years ago, uninformed tourists were really had on it. Go experience it now. The weather is fabulous. Just like it is where I live, about 2000 miles away. Oh! Ever been to Padre Island? It's south of Galveston, Texas. Beautiful place. Just out in the Gulf of Mexico a ways. My neighbor, a, ah, well, a hard drinkin 85 year old pal of mine loves to fish down there. All the time. Guy has more gear then carter has liver pills. Catches fish, and I mean big fish relentlessly. Eats'em to.

Anyway, if we have global warming I'm love'n it. Also appreciated the EPA before it became a tool of the leftist. When I was 20 the Mississippi River was the colon of the USA. And the Great Lakes were dead. Not any more.

But the far leftists took over after Carter. Jeez, whata...never mind.

Take care of the environment? Absolutely!

But first we must abolish the BLM and the EPA, only way we can get rid of the leftist agenda and there false science. Start over with stone cold, highly educated, very well paid ACTUAL SCIENTISTS whose only agenda is....good science.

Want to do good folks. Use our national clout to stop the slaughter of whales and manta rays. They are being eaten to extinction.

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smurfiest

on Aug 10, 2016

Maybe some of the science deniers should re-read the first sentence of the article, it is about "sustainability", which is an issue that the industry should take VERY seriously because when fuel goes to \$6 or \$8 bucks a gallon those profits will wither and so will the ENTIRE industry. So where is your plan for that day science deniers? Do you have one or are you committed to ignoring that fact for as long as possible and keep the country bankrupt by spending our wealth on weapons and wars for oil? Do you all want to just kick the problem down the road for our kids to solve? BTW, AGW is almost completely accepted by the farming community because we have to accept reality-it isn't hypothetical for us when your crop gets sunburned or doesn't get a good fruit set due to lack of chilling hours in the winter. Ag has to make huge changes to be sustainable and they are beginning to, the aerospace industry needs to do the same.

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vkess1

on Aug 10, 2016

If one wants to talk about aircraft emissions, leaded avgas is of much more concern to rational beings (beings that are not interested in making \$\$ off of unproven causes). Why we still put lead in some 98% of GA aircraft that don't need it is more proof that "if there ain't no \$\$ in it, the issue goes to the back of the bus". Trying to get STC's for these aircraft that don't need 100LL is very hard and impractical. Why? Because available fuel (i.e. auto-gas) has additives mandated by the EPA, lobbied by farmers, that doesn't really do anything to reduce harmful exhaust emissions. Somehow by diluting the emissions, it supposedly reduces it? (same amount of

harmful emissions coming out a tailpipe, but diluted). "Getting the Lead Out" has been made into an unnecessary and complicated endeavor. If the EPA and pols were really interested in helping the environment, they'd start there.

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jetdoc2@me.com

on Aug 10, 2016

Wow! Lots of comments, and heated responses: First off, there is emperical evidence that climate change is occurring, and with it, emperical evidence that we, as humans, have contributed to it.

Next, we can look at all the emissions reductions, thrust gains, engine fuel efficiency increases and airframe efficiency gains that aircraft and engine manufacturers have made in the last 50 years. In some cases, there have been upwards of 20% gains. These factors have to provide some offset to the increased air travel stats energy usage.

The article didn't mention any of these factors.

If we were all to believe that the earth is warming, and CO2 emissions play a large part in this, hence, aircraft emissions contribute largely to this issue, would we be willing to give up travel to solve the problem? I would think not.

Maybe there are lots of travellers that don't really need to travel? Given the state of aircraft seating, flight delays, etc, I am not sure that people would willing subjects themselves to this environment. I was a business traveller for most of my aviation career. The last 15 years or more were no fun. And yes, I enjoyed all the perks of a business traveller.

I take the point about people driving Tesla's that exhibit decals or bumper stickers, or personalised plates stating that they are thumbing their noses at oil powered transport. How many fossil fuel products did it take to build each vehicle? How much coal or oil or gas was burned to generate the power to charge the Tesla?

As others have said, it's simply trading one energy source for another. Most of the time that source comes from the burning of fossil fuel. BTW, I have installed a solar power array at my home, and I live in a state with an abundance of hydro electric power.

This is a complex problem that won't be solved by articles such as this: Why? Because our travel options all consume energy that comes from fossil fuels for the most part. I like to think I'm a closet environmentalist, but I'm also a practicalist: We need to start embarking on alternative energy sources for aviation and also other forms of transportation, or living. However, we will have to use fossil fuels to get there. You can't build windmill parts, solar panels, electric motors, superconducting magnets etc without energy sources that come from fossil fuels. Not yet at least.

There is a research program that Rolls Royce, and I think EASA and maybe Airbus are doing, using power cells to store power to power a 4 engined electric engined airliner, that uses one jet engine to generate power. I can't remember the website address, but there is a cartoon presentation of how this hybrid system could work. It's enlightening, but is going to be reliant on

the development of powerful electric fan engines that use superconductor technology, and a power cell that will store enough electricity to last throughout the flight. It's worth looking at.
Cheers

John

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Maru

on Aug 10, 2016

There is another elephant in the room and nobody wants to see it. Air pollution from jets on the ground, subjecting people to toxic chemical emissions.

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wessexnet@btint...

on Aug 10, 2016

I have a question. What would happen if you dumped nuclear waste direct into a volcano (one that's only bubbling)?

Also what would be the cost impact in sending it into space, would it be cost effective?

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Paul Densmore

on Aug 10, 2016

I'm stunned at the blind, irrational, stupidity displayed on a site that should be dominated by an engineering mind set. Turn off Fox News and do some independent, objective research.

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