

Response to the Consultation for the Development of Sustainable Aviation

jointly from:

**Plane Stupid
and
Cirencester People and Planet**

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Summary of document

This documents will demonstrate that the government's belief that aviation can be sustainable at its current level is unfounded, that any growth is impossible and that supporting either growth or the current status-quo is morally unacceptable.

The government's current strategy for sustainable aviation is based on three main propositions:

1. Aviation emissions can be reduced through the introduction of new technology
2. Aviation emissions can be reduced through the use of biofuels
3. Aviation emissions can be ameliorated through the concept of carbon trading.

The aviation industry maintains they contribute only 2% of global anthropogenic greenhouse gas emissions and they are essential to the economic development of this country and the global economy and therefore they are entitled to special consideration.

This document will show that none of the palliatives above will reduce greenhouse gas emissions. Furthermore in the face of the extreme planetary emergency brought about through climate change, a managed retreat from aviation must be the government's overriding objective.

Aviation has no part to play in the development of the sustainable economy that we urgently need to ensure our long term survival.

This document examines the science behind climate change and provides supportive evidence to justify a managed retreat from the current levels of aviation.

The document has been prepared jointly by the following organisations:

- Plane Stupid – anti aviation campaigners
- Cirencester College People and Planet Group

Plane Stupid has been instrumental in developing the environmental argument against the expansion of aviation in the UK. It worked with the local residents of Heathrow to campaign against the third runway and was a key agent in the Climate Camp that was set up at Heathrow in 2008. The high profile campaigning of Plane Stupid has set the template for other countries across Europe and now the United States.

Cirencester People and Planet Group have been active lobbyists and worked to oppose highly damaging developments such as the thrust into biofuels by Tesco. They are primarily college students, in the age range of 16-19 and represent the interests of the younger generation. This is the section of society which will lose the most in the face of the escalating danger of climate change. Their voice should carry more weight in the consultation process and be of utmost importance to the final decision the government makes. Their views are more significant in the final deliberations than those of the industrialists who seek to maximise their short term profits.

The document is co-ordinated by Kevin Lister. He has a degree in Aeronautical Engineering, an MBA and is currently a post graduate maths student. Kevin Lister has been involved with Plane Stupid and other environmental pressure groups.

The Status Of Climate Change And Aviation's Contribution

The planet and our civilisation faces an existential threat from climate change and there is little time to take the concerted action to limit greenhouse emissions. The magnitude of the threat is increasing in line with increasing world wide CO₂ emissions whilst the opportunities for making major emission reductions to avoid cataclysmic collapse are diminishing.

It can be proved that the safe level of atmospheric CO₂ to avoid runaway climate change is 350 ppm¹. As of August 2011 (time of preparation of this document), the level of atmospheric CO₂ stands at 390 ppm², considerably above the safe level.

Extreme danger from climate change is imminent for two important reasons.

Taking an analogy with a car. A car travelling at a constant speed can be slowed down by application of the brakes, but when the car is accelerating it is near impossible to bring it to a halt. Likewise CO₂ emissions are rising at an accelerating pace, making reduction of atmospheric CO₂ a much more difficult proposition.

The graph below shows the trend from the Manua Loa CO₂ recordings which have been ongoing since 1957. When a best fit line is drawn through the data, it is clear that rate of increase is increasing. With relatively straight forward mathematical modelling, the trend can be extrapolated to conclude that by 2035 the global CO₂ levels will be at 450 ppm. Once the greenhouse gas level has built up to this level runaway climate is unavoidable³. Thus at the very best, we have no more than 24 years to take decisive action, if it is not too late already.

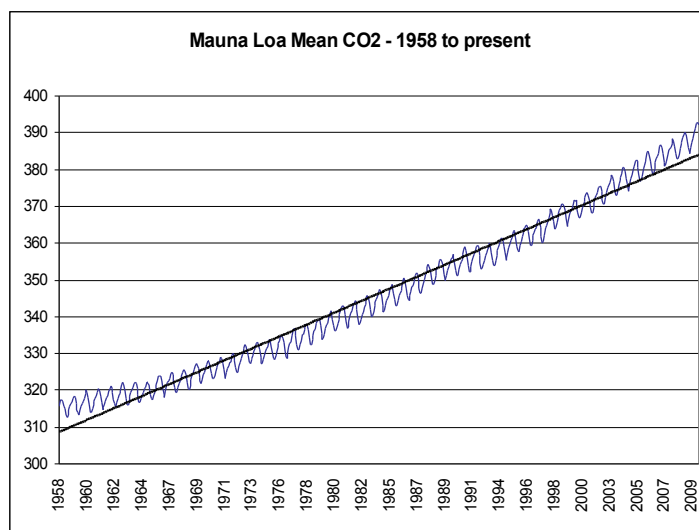


Illustration 1: Atmospheric CO₂

The accelerating rate of increase in CO₂ emissions, especially as observed since 2009 is leading to the major concern that our CO₂ levels are rising at a “super exponential” rate⁴. With super exponential growth, the rate of growth is proportional to the amount of atmospheric CO₂. Thus as CO₂ increases in the atmosphere, the rate of increase increases. If super exponential growth does turn out to be the most appropriate model for CO₂ build up, then the 24 year time period quoted

1 [http://droyer.web.wesleyan.edu/Target_CO2_\(Hansen_et_al\).pdf](http://droyer.web.wesleyan.edu/Target_CO2_(Hansen_et_al).pdf)

2 <http://www.esrl.noaa.gov/gmd/ccgg/trends/>

3 The revenge of Gaia, James Lovelock

4 http://arxiv.org/PS_cache/arxiv/pdf/1101/1101.2832v3.pdf

above will be considerably reduced.

With this explosive increase in CO₂ emissions, the scoping document's objective to “*undertake an assessment of the relative cost effectiveness and abatement potential of different measures for reducing aviation CO₂ emissions out to 2050*” is doomed to failure as major action must be taken long before 2050. By 2050 catastrophic climate change will be well under way unless major policy changes are implemented now.

The second major reason is the build up of non carbon greenhouse gases. Other pollutants such as NO_x, Fluoride and CH₄ gases have a significant global warming impact and these have also been increasing. The IPCC reports indicate that as of 2005 the CO₂ equivalent was already at 455 ppm⁵ when these additional greenhouse gases are included. This puts us far above the safe level of the 350 ppm and effectively into uncharted territory. A significant proportion of these global warming gases are fluorides which are extremely inert and will be long lasting in the atmosphere. We should assume that they will never be removed by normal environmental regulatory processes in the same way as CO₂ can be removed by vegetation and weathering of rocks. Climate modelling evidence now suggests that the only thing preventing runaway climate change is the cooling effect from the large amount of sulphide gases in the high atmosphere as a result of coal burning. The danger now is that if countries burning substantial amounts of coal such as China and some Eastern European nations clean up their exhaust emissions we could immediately tip into runaway climate change.

It is against this background that the aviation industry continues to argue that it should be able to grow because they contribute only 2% of total anthropogenic greenhouse gases. This is both wrong and deliberately misleading.

The 2% refers to 1990 data⁶ and thus is hopelessly outdated. Since 1990, the aviation industry has been growing between 5% and 9% per annum which is far higher than world economic growth. Applying this rate of growth to aviation's 2% contribution to anthropogenic emissions, it can be conservatively calculated that as of 2010 aviation's contribution to anthropogenic CO₂ will have risen to approximately 4% of total emissions.

The second major flaw is that by continually claiming to be contributing only 2% of anthropogenic carbon dioxide, the aviation industry skirts round the fact that anthropogenic carbon dioxide has itself been increasing at an unsustainable rate. Thus, the as claimed 2% is a percentage of an increasing rate it will increase in totality. It is the totality that is the issue of prime importance.

At present anthropogenic emissions are increasing at 3.4% per annum⁷ which is far beyond what the planet can bare. This is despite the much hyped promise of low carbon technologies, carbon trading agreements and environmental initiatives by large corporations and governments. At a 3.4% compound growth rate annual emissions double in approximately 20 years. This places the planet's CO₂ growth projections well beyond the worse case scenario of the IPCC reports which has a doubling period of 30 years. So using the airlines own argument, that they only contribute 2% of total CO₂ emissions we would expect their annual emissions to double in 20 years.

In reality aviation emissions are increasing at a far higher rate and the EU reported⁸ in 2006 that aviation emissions had increased by 87% since 1990. This equates to an annual growth rate of 4% and a doubling time of 17 years. The EU reported that,

5 http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf

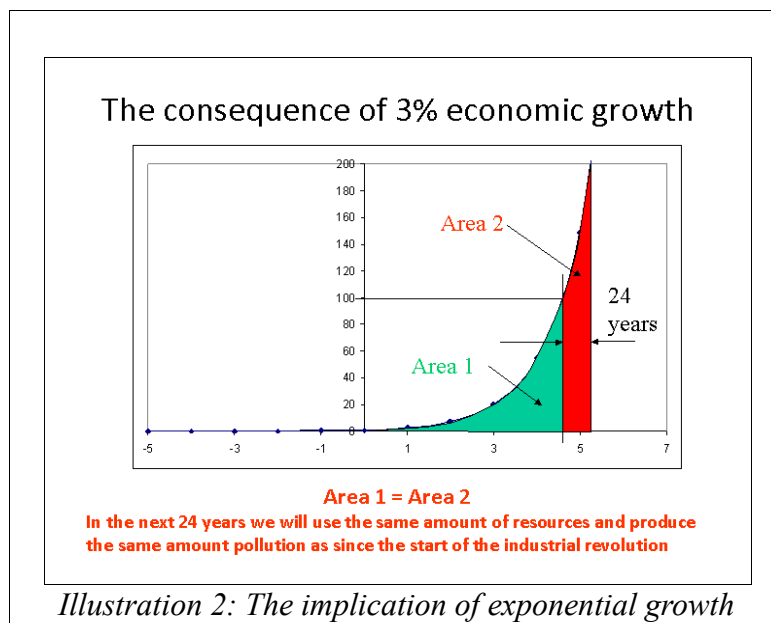
6 http://www.ipcc-nggip.iges.or.jp/public/gp/bgp/2_5_Aircraft

7 <http://www.who.edu/page.do?cid=63506&ct=162&pid=7545&tid=282>

8 <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1862>

“Without action, the growth in emissions from flights from EU airports will by 2012 cancel out more than a quarter of the 8% emission reduction the EU-15 must achieve to reach its Kyoto Protocol target. By 2020, aviation emissions are likely to more than double from present levels. “

Though the concept of doubling greenhouse gases is important, what is of even greater significance is the area under the curve. This receives far less attention. During each doubling period the area under the curve is equal to the area from negative infinity to the start of the doubling period. If the world economy is to grow at 3% per annum, the mathematics shows that the doubling period is 24 years.



This is a truly terrifying concept. If the world economy is to grow at 3% per annum, then we will inject the same amount of CO₂ into the atmosphere in the next 24 years as we have injected since the start of the industrial revolution some 250 years ago. We are already seeing our ecosystem falling apart under the current greenhouse gas loading. We have no past precedent that will indicate how our planet and its ecosystem will respond when the CO₂ loading is doubled in such a short period of time.

In this context, the statement in the Framework document that “*The aviation sector has an important role in helping to achieve the Government’s objective of strong, sustainable and balanced economic growth, and needs to be seen in the context of the wider initiatives we are taking to put the UK on the path towards sustainable growth.*” is fundamentally wrong. Growth can not simultaneously be strong and sustainable and this falsehood can only be maintained for short time period before major collapse through either pollution build up or resource shortages ensues. It is hopelessly optimistic to think that the growth that the government hopes for and the financial institutions demand can be delivered using renewable energy. Despite all the best efforts, coal still contributes to 47% of all global energy production⁹, and fossil fuels will dominate as the principle energy supply in the UK for the foreseeable future. The economic growth the government hopes for can only be achieved by expanding fossil fuel use and ignoring the crisis on climate change.

As regards aviation, with a growth rate of 4% and a doubling period of 17 years, the inescapable conclusion is that in the next 17 years, the industry will require the same amount of fuel as it used since the Wright Brothers launched the first powered flight, and the industry will produce the same

9 http://www.iea.org/index_info.asp?id=2018

amount of greenhouse gases since that first flight.

These quoted growth projections of greenhouse gases are in line with those of Big Aviation. Both Airbus and Boeing expect their markets to more than double over the next 20 years.¹⁰

In addition to the CO₂ emissions from planes, there are other greenhouse forcing gases that significantly increase aviation's impacts on the environment. When these are taken into consideration, aviation's contribution rises considerably above their 2% claim. The two main factors are the impact of NO_x gases which have a warming effect of 400 times that of CO₂ and high altitude water vapour.

The NO_x gases are produced in the combustion chamber of the engines as a consequence of the high pressure and temperature combustion which causes the nitrogen in the air to combine with the oxygen. The fundamental compromise this leads to is that as engines are designed to operate at high temperature and pressures to maximise fuel efficiency, then they become more prone to NO_x production.

At high altitude water vapour causes the formation of cirrus clouds. While these to a certain extent reflect some of the sun's energy, this is countered by the warming effect that they cause by preventing heat from the earth's surface being radiated back to space. The total warming effect is highly positive, and again is estimated to be at least equivalent to the actual CO₂. So in total, the combination of the NO_x gases and high altitude vapour give an uplift factor which is currently assessed as being between 2 and 4 times the actual CO₂ impact, and is known as radiative forcing.

The current situation on climate change is so desperate it is difficult to imagine a worse case. In these circumstances, it does not matter if an industry's emissions are 2% or 20% of the total anthropogenic CO₂ as everyone's moral obligation must be to massively reduce greenhouse gas emissions over and above everything else. So the aviation industry's argument that they should be allowed to continue business as usual because their 1990 emissions were only 2% of total anthropogenic emissions is a hollow claim and a cruel distortion of the facts.

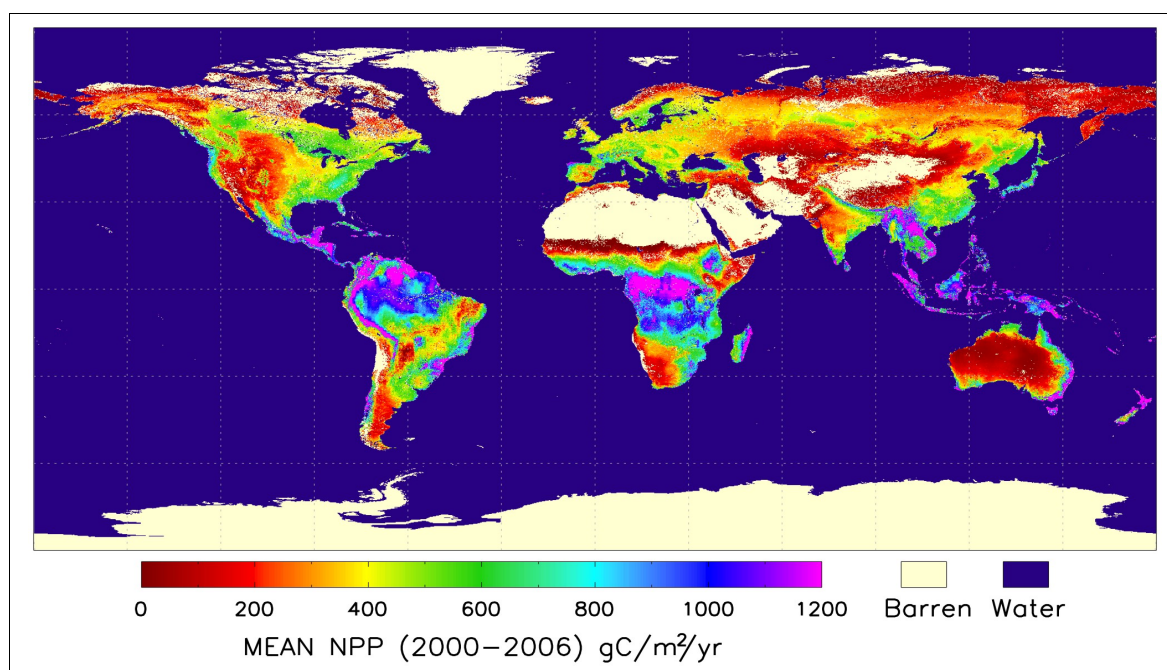
¹⁰ Airbus, Global Market Forecast, 2011, and Boeing, Current Market Outlook 2011-2030, 2011

The Fallacy of Biofuels

The supporters of Biofuel claim it is carbon neutral and this proposition is being used by the aviation industry to provide a mechanism for continued growth. However, even in a perfect world, where biofuel could be converted into petrol or diesel, with no energy required and no CO₂ emissions from the associated land use change, then biofuels would still be an environmental and economic disaster. The fundamental failure of biofuel as an environmentally sound solution to our energy needs is that it inherently reduces the ability of the global climate control system to recover from perturbation by reducing the amount of carbon that can be sequestered from the atmosphere.

In reality, almost as much energy is needed for processing and shipping as is produced¹¹ thus further destroying its claim as an environmentally effective alternative. In essence the fault lies with a combination of poor terminology, poor understanding of the science of climate change and wishful thinking.

The fundamental assumption the proponents of biofuel make in advocating the fuel source on the basis of carbon neutrality is that the current level of CO₂ in the atmosphere is sustainable. It is not. We know that both CO₂ levels and global average temperatures are rising at dangerous rates and that we are exceeding the planet's photosynthetic ceiling.



The photosynthetic ceiling determines how quickly the solar energy being globally absorbed can remove the build up of greenhouse gases and stabilise the climate. The balance is determined by two things, the amount of carbon that is converted into CO₂ and the amount of vegetation that is available to sequester CO₂. This balance had been maintained for millions of years and formed a stable feedback control system that is essential to the preservation of life. It is not possible to fundamentally alter this balance in any way and still maintain a habitable planet. Deciding to obtain energy from biofuel rather than fossil fuels is just another way of continuing to destabilise the balance.

The illustration above shows the Net Primary Productivity of the planet. This is a measure of the amount of CO₂ converted by plant photosynthesis to biomass minus the plant respiration. It is a

¹¹ <http://petroleum.berkeley.edu/papers/Biofuels/NRRPaper2.pdf>

fundamental measure of the planet's ability to absorb CO₂ gases. Purple indicates high productivity, red indicates low productivity. It shows that the most productive part of the planet is the tropical belt, thus most of the CO₂ absorption takes place in these regions. This also is where much of the biofuel is either being grown or proposed to be grown in the future. So the growth of biofuel is simply displacing the most critical parts of the planet's control system to restore its CO₂ levels.

As a result, two arguments regularly used by biofuel supporters and manufactures are false: The argument that the tropics are the ideal place to grow biofuels is false because it reduces the planet's most productive area for sequestration of CO₂, and the idea that there is abundant waste ground where biofuel can be grown is false because we need all our land to be reducing our excessive CO₂ emissions.



To maintain the myth that biofuels can be grown without destabilizing the control systems that have inherently sustained life on earth for billions of years is to argue that the Earth can provide infinite and instantaneous supplies of pure air, fertile soil, clean water and all necessary nutrients, whilst at the same time feeding 7 billion people and satisfying all their demands for travel, entertainment and consumer products.¹²

In 2008 the Gallagher report¹³ was commissioned by the UK government to review the direct effects emerging from the thrust towards biofuel, namely:-

- Land use change
- Impact on greenhouse gas life cycle emissions
- Biodiversity loss
- Rising food prices

The content of the report was damning with respect to the long term viability and sustainability of biofuels.

The report highlighted the massive CO₂ releases that are being brought about by land use changes and that land use changes result as an indirect consequence of biofuel, such that when biofuel is

12 <http://www.hubbertypeak.com/Patzek/CanWeOutliveOurWayOfLife20070809.pdf>

13 http://www.dft.gov.uk/rfa/_db/_documents/Report_of_the_Gallagher_review.pdf

grown in this country it results in having to grow food elsewhere. The report states “*Mechanisms do not yet exist to accurately measure, or to avoid, the effects of indirect land-use change.*” In the worst case, the land use changes are resulting in carbon emissions through natural vegetation clearances that require a 400 year payback. It is impossible to imagine how these gas injections into the atmosphere will ever be removed when the forests that would normally sequester the CO₂ are simultaneously destroyed. The report specifically avoids this issue.

It goes on to say that biofuels can be grown on land that is “*idle and marginal,*” but later qualifies this as saying that “*there is enormous uncertainty around the estimates*” of the available idle land. The report suggests that idle land would be found in areas that are arid, too hot or too cold. It does not emphasise that these areas are the least fertile in the world and would not be able to support the high rate of plant growth that the biofuel industry is dependent on, hence the reason why much biofuel is either being grown or proposed to be grown in the tropics or in other fertile parts of the planet such as the grain basket of the USA.

The executive summary acknowledges biofuels complicity with deforestation, rising food prices and dubious climate change benefits. Despite this, the report concludes “*A slowdown in the growth of biofuels is needed.*” This is a blatant oxymoron. Slowing down the growth merely delays the time taken to reach to a critical point. It does not remove that point. To avoid the problems that the report highlights, a moratorium is needed as the report actually recognises but which has not been translated into government policy.

Since the preparation of the Gallagher report in 2008, the worst case scenarios and predictions from the report and from environmentalists who campaigned against biofuels have been realised.

The evidence that biofuels are contributing to the price increases in food is indisputable. Donald Mitchell of the World Bank has observed that the World Bank's index of food prices has increased by 120% from January 2002 to February 2008. By the calculations of the World Bank, 75% of this increase is attributable to biofuels¹⁴. The report dismissed the notion that high food prices are the result of the speculation, with the observation that “*Export bans and speculative activities would probably not have occurred because they were largely responses to rising prices*” Since falling back in 2009, largely as a consequence of the credit crunch, the food price index has started to rise again and is back in the territory of 2008¹⁵.

It also warns that, “*The rapid rise in food prices has been a burden on the poor in developing countries who spend roughly half of their household incomes on food.*” When people are on subsistence wages a small increase in the price of staple goods can change a regular slight surplus into a crippling deficit. This is now the experience of millions of the world's poor. Recent reports from the World Bank suggest up to 1 billion people are now going to face hunger¹⁶.

The worst case scenarios are now being realised and social unrest is being felt in cities across the world, from London to Damascus. The “Arab Spring” uprisings are fundamentally down to increasing food prices and rising poverty despite the much hyped press reports that people are desperate for freedom and democracy. The danger now is that as people get the freedoms that they have won through the spilling of so much of their blood, they will find that the hoped for social and economic improvements fail to materialise due to continually rising food prices which will precipitate a next wave of much more serious violent eruptions.

14 http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2008/07/28/000020439_20080728103002/Rendered/PDF/WP4682.pdf

15 http://www.worldbank.org/foodcrisis/food_price_watch_report_feb2011.html

16 <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/0,,contentMDK:21941591~menuPK:258659~pagePK:2865106~piPK:2865128~theSitePK:258644,00.html>

It is no coincidence that “Arab Spring” is occurring simultaneously with riots and protests in Western cities. The riots in this country come at a time when solicitors report that the courts in the UK are becoming increasingly occupied with cases where people are unable to pay council taxes and now face jail sentences. In Australia those on low incomes are having to rely on food hand outs¹⁷, and in the United States 47% of the population is too poor to pay tax. The rise in staple food prices has been one of the main driving forces behind the current surge in inflation. The inflation that we are witnessing now affects critical staples and bites into the living standards of the poor.

The hardest hit are those who have been forced to over borrowed to buy property and transport. As a consequence, they have no resilience to a price rise in staples and have found themselves in the same position as those in the developing countries, such that when a small and regular surplus turns to a small and regular deficit, the consequence is total bankruptcy and mortgage default. The result is the sub-prime crisis that has precipitated the world wide credit crunch.

This proposition that a principle cause of the credit crisis is attributable to biofuels runs counter to the opinions expressed by the political leaders of all parties. They suggest that the entire problem is the result of lax legislation or greedy bankers and can ultimately be solved by improved oversight and cash injections. Discussion of the more profound causes is avoided as it goes to the heart of our economic system.

Fundamental problems cannot be avoided. We live in a world where the economy has grown exponentially since the start of the industrial revolution. Because of that continual growth it is increasingly strained and unstable as it approaches the ultimate limits of growth. These limits are inevitable and maintaining growth in the face of them becomes increasingly impossible¹⁸.

It is no coincidence that today's credit crunch is occurring at the same time as environmental collapse and over population, as it is fundamentally the environment that drives the economy. No society that has neglected its environment has survived.¹⁹

Along with the poor economics of biofuel come human rights abuses on a scale not seen since the atrocities of the Second World War. People are being forced into starvation worldwide and huge numbers of others are subjected to forcible land clearances where peoples' land and livelihoods are being stolen and large scale murder is committed in the process²⁰. This is happening in most of the biofuel producing regions of the world. Many of the main non Government Organisations such as Friends of the Earth²¹ and Oxfam²² have now reported on these abuses.

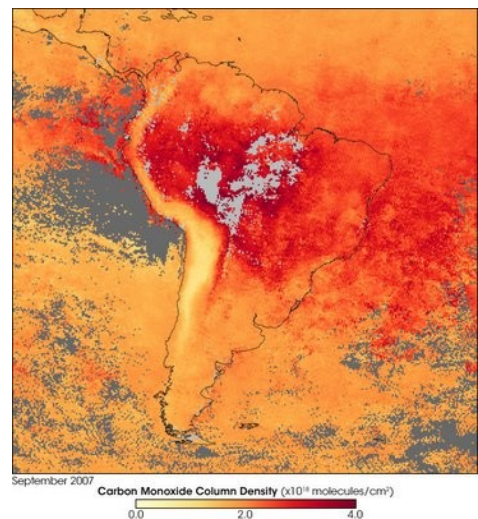


Illustration 4: NASA image of Amazon fires

The incidence at which these abuses are occurring is accelerating. It is highly correlated with the price of the biofuel feedstocks and the subsequent

17 <http://www.3news.co.nz/Video/Australians-queue-for-free-food-handouts/tabid/313/articleID/76343/cat/251/Default.aspx>

18 Impossibility, the Science of Limits and the Limits of Science, Barrow, ISBN 0198518900

19 Jared Diamond, Collapse - How Societies Choose to Fail or Succeed, ISBN 978-0670033379

20 <http://quotha.net/node/1958>

21 <http://www.foe.co.uk/resource/reports/losingground-summary.pdf>

22 http://www.oxfam.org.uk/resources/policy/climate_change/downloads/bp114_inconvenient_truth.pdf

deforestation. Given the increasing market demand for biofuel, the pressure for deforestation is rising. Illustration 4 is a NASA earth satellite photograph of the Amazon taken in September 2007 showing the largest and most destructive forest fires to this date and which were set to clear land.

As a consequence of land grabs from the indigenous peoples of the world, much of the biofuel being sold today is stolen property. This needs to be accepted as the default legal position due to the total lack of evidence of sustainability. This can be seen in the Renewable Fuel Agency and Gallagher reports. The onus is not on opponents of biofuels to prove that the products being sold are stolen. It is for the vendors to prove that they are not.

The proponents of biofuel will continue to argue that the problems being evidenced around the world today will be resolved with second and third generation biofuels, or through careful selection of appropriate biofuel crops. These claims are without foundation.

Jatropha was hailed by biofuel companies as a wonder crop that could be grown on marginal lands across the tropics. However, the reality of the crop yields has caught up with common sense, and crops grown on marginal land yield only marginal crops. Once land has been converted to Jatropha production, it can not be converted back to food production. The crop is poisonous and as it is an invasive weed so re-establishment of normal food crops is extremely difficult and time consuming. As a measure of the danger of Jatropha, it is classified as an invasive weed and is banned in Australia and attempts are being made to have it banned in New Zealand despite it being a key part in the biofuel strategy of Air New Zealand.

Having failed with Jatropha, the industry is pushing the idea of using genetically modified algae, but there is no large scale proven production process. Many of the schemes propose using the CO₂ emitted from power stations as a feedstock. This is not carbon neutral, as aviation simply delays by a couple of weeks the time it takes for dangerous power station gases to be released into the atmosphere. Furthermore, recent evidence is emerging that the energy needed to produce algae based fuels is far higher than initially thought and even worse than corn ethanol²³. The economics have become so marginal that companies such as Shell have withdrawn their investments in this field²⁴. This is supported by the RAND Corporation analysis which concludes that the US Military will not be able to rely on biofuel as a future fuel as yields will be far below requirements²⁵.

The use of genetically modified algae is highly risky. Genetic stability could be endangered if the newly developed algae out compete naturally occurring strains. The evidence everywhere on the planet is that when new species have been introduced into alien environments the results have been universally bad. This risk is very serious as algae forms the base of the food chain.

Following the recently introduced new service by Thomson Airways using biofuel, Tesco was asked to comment on the risk this would impose to their ability to maintain food security²⁶. Tesco refused to comment. The likely reason is that the super store has a significant stake in Greenery – a major biofuel supplier. When the biggest food retailer in the UK is not able or willing to enter debate on an issue of such critical importance and where the science is so clear the government has no option but to take a highly proactive leadership role in securing food supplies.

In conclusion there is no evidence that biofuel will be able to provide significant reductions in

23 <http://www.dailytech.com/Report+Blasts+Algae+Biofuel/article17567.htm>

24 <http://www.fastcompany.com/1723391/shell-ditches-algae-biofuel-during-year-of-choices>

25 <http://www.nytimes.com/cwire/2011/01/25/25climatewire-biofuels-of-no-benefit-to-military-rand-11643.html>

26 <http://kevscimatecolumn.blogspot.com/2011/09/tesco-unprepared-to-protect-food.html>

carbon emissions for the aviation industry. On the contrary there is overwhelming evidence that biofuels will exacerbate food insecurity, leading to economic collapse and major political instability while simultaneously increasing greenhouse gas emissions. In these circumstances no government support for biofuel should be provided either directly in the form of financial subsidies or indirectly in the form of carbon credits within the EU carbon trading scheme.

Given the failure of biofuels, the government should be pressing to scrap the Renewable Energy Directive requirement that 10% of transportation fuel should be biofuel which the framework document refers. The emerging evidence is that this volume of biofuel will cause major sustainability and economic stability issues. Even worse, as the target is only a percentage of the total, it would not stop the totality of fossil fuel from increasing.

The Limitations of new Technology

Since the Wright Brothers flew their first plane, the aviation industry has continued developing and improving technology. Every major technical advance that has been introduced since that date has resulted in performance improvements to planes. As a result, aircraft can fly faster, fly further or fly more economically. But, at no time since the first powered flight has there been a single documented case where the growth of the total greenhouse emissions curve has fallen following the introduction of a new technology, and most certainly emissions have never decreased as a consequence.

Thus the statement in the scoping document *“Technological improvements are vital to improving fuel efficiency and reducing CO2 emissions. There have already been significant changes over the last decades in the efficiency of aircraft, which are today 70 per cent more efficient than the first commercial jets,”* is totally without foundation.

The reverse is true. As new technologies are introduced that allow planes to operate more efficiently, they actually find their true utility in either allowing planes to fly faster or more frequently. It is an unimaginably large risk to assume that from now on technology will reverse a trend that has existed for over 100 years and that the greenhouse gas emissions will start to significantly reduce.

A brief history of aviation demonstrates this argument.

The first step change improvement in technology after the second world war was the introduction of jet engines and swept wings on passenger planes. The Boeing 707 led the way. However, this was significantly less fuel efficient than the Lockheed Constellation which it replaced in service. It is only now with the very latest aviation technology that we have returned back to the level of fuel efficiency of the Constellations, which was based on 1940s technology. The new technology did not improve fuel efficiency per passenger, it merely allowed passengers to be flown further, faster and more frequently. Table 1 below takes the maximum fuel capacity of a plane, the maximum passenger load and the range to calculate the efficiency in terms of litres per-passenger kilometre.

	First flight	Number of passengers	Fuel, litre	Range (km)	Number flying	fuel per passenger	fuel per passenger/ km	Development cost
Lockheed Constellation	1943	90	23,974	7,950	525	266	0.034	N/A
Boeing 707	1957	202	90,160	6,920	1,010	446	0.064	\$185 million
Boeing 747	1969	600	216,840	9,200	1,418	361	0.039	\$ 1 billion
Boeing 777	1994	500	181,283	11,120	949	363	0.033	\$ 5 billion
Boeing 787	2011	350	138,700	14,000		396	0.028	\$10 billion

Table 1: Aviation efficiency since the 2nd World War

It is clear from the table that for many years nothing could match the economy of the Lockheed Constellation. The figures quoted can be adversely impacted when a plane is fitted out with large numbers of business class and 1st class seats. This can immediately negate all the technological improvements. The extreme case is the Airbus A380 super jumbos being sold as a private jets. The scenarios assumed for the analysis in the table are based on planes being fitted out for maximum passenger capacity.

There are two critical factors that are often overlooked and which combine to ensure that

technology will never deliver the ACRE claim in the scoping document of a “50 per cent reduction in emissions for a new aircraft produced in 2020 compared to a similar one produced in 2000.”

It becomes increasingly difficult to improve efficiency once designs have optimised aerodynamics, thermodynamics and the structural strength to weight ratios. The law of diminishing returns prevails. This is where we are today. With the introduction of the new Boeing 787 into service, the improvement over previous generation planes such as the B777 is only of the order of 10-15%. This will not provide the 50% reductions in greenhouse gas emissions claimed in the scoping document.



Illustration 5: The most fuel efficient plane of modern time – Lockheed Constellation

In particular, the second law of thermodynamics limits the thermal efficiency of an engine to around 45%. Modern jet engines are already operating near this level and significant improvements in efficiency are impossible. Likewise, worthwhile improvements in aerodynamic efficiency are increasingly hard to achieve.

Today's high level of optimisation makes further improvements increasingly costly to achieve as the research and development budgets escalate along with the cost of specialist manufacturing processes, while the risk exposure to cost and delay increases.

This is shown by in the development costs of new passenger planes which are listed in the table above. It demonstrates the rapidly escalating development costs from one generation of plane to the next.

As these costs increase larger orders are needed which defeats the efforts to reduce fuel consumption by relying on technological development.

The outstanding example is new Boeing 787. This is billed by the aviation industry as “green.” Its development costs have sky rocketed but this is unlikely to be disastrous for Boeing whose costs are offset by the largest order book at launch for any plane in history. Total confirmed orders are already standing at 850. The final total build is likely to be in the measure of several thousands. This will totally negate any greenhouse gas savings that the plane is able to provide.

The expected record order book of the 787 is complemented by record orders for other classes of planes. Recently American Airlines announced the largest orders ever of the latest generation Boeing 737s and Airbus A320s. At best these are only able to offer savings of 15% over previous generation planes. The additional emissions from these will dwarf the efficiency savings.

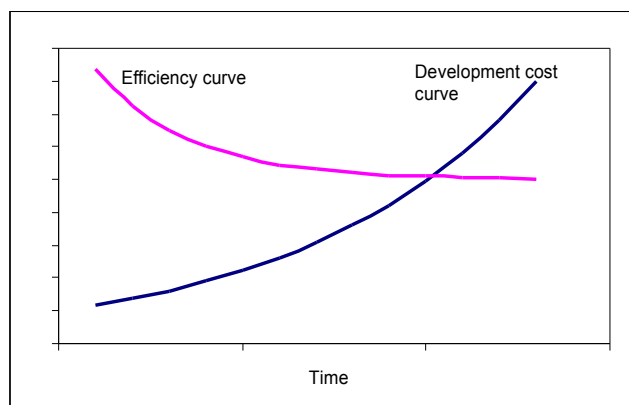


Illustration 6: Exponentially increasing developments costs versus diminishing efficiency improvements

There is no aircraft in service, in development or on the drawing board that will deliver the targeted greenhouse gas savings of 50% that the scoping document refers to. If any new plane was to enter service and produce these levels of savings it would need as yet untested technology such as blended wings and a different propulsion system. The associated development cost would far exceed the \$10 billion of the B787 which is essentially a conventional aerodynamic platform with existing engine technology. This immense cost could only be recuperated with massive sales, and subsequently massive CO2 emissions. These costs would defeat the whole objective of reducing CO2 emissions through technological innovation.

The Power of Big Aviation to Fight Back

The aviation industry makes many statements about how concerned it is about climate change. These protestations of virtue are bogus. The reality is the boards of the aviation companies are legally obliged to maximise shareholder returns. This is incompatible with the requirement to reduce greenhouse gas emissions. To avoid taking action, the companies that comprise big aviation lobby hard and use their enormous advertising budgets to subvert the message on climate change.

Many of the advertising campaigns about the environmental credentials of the industry are based on false claims. Because they speak the message that many people want to hear, they are extremely effective. This strategy is backed up by positive news reports about the aviation industry in the main media. A common example is the regular stories about the prospect of new routes from expanding airports creating jobs²⁷ and another is the simple brainwashing of children as in the Blue Peter report following the opening of Heathrow's Terminal 5²⁸.

The effectiveness of the campaigns is illustrated by the study of the advert that Airbus ran in conjunction with the National Geographic.

It was run in July 2009 accompanied by a web based campaign which is still running on Airbus's web site. The proclamation²⁹ in the National Geographic claimed that *“Airbus sees the bigger picture, and works to minimize environmental impact by reducing greenhouse gas emissions, lowering fuel consumption, and creating quieter, more efficient aircraft”*



Illustration 7: Airbus advertising

This is incorrect and deliberately misleading. There was no reference at all to the fact that the totality of aviation emissions is increasing exponentially and no admission that lowering fuel consumption does not lead to reductions in greenhouse gas emissions if more planes are flown. Given that Airbus' objective is to maximise sales, fuel savings from efficiency improvements will be quickly eliminated by increased sales. While running this advert Airbus announced the sale of an

27, http://www.thewestonmercury.co.uk/news/new_destination_to_be_offered_by_airline_1_1073119

28 <http://www.telegraph.co.uk/travel/travelnews/3702355/Blue-Peter-attacked-by-Stansted-climate-protestors-Plane-Stupid.html>

29 <http://kevsclimatecolumn.blogspot.com/2009/07/copy-of-complaint-to-asa-regarding.html>

A380 Super Jumbo as a private jet to a Middle Eastern client. In these circumstances, it is incomprehensible they can say or imply that they are working to reduce greenhouse gas emissions. Because this seductive message is what people want to hear many passengers, investors and politicians see it as evidence that emissions will soon be on a downward trend.

Being advertised in the prestigious National Geographic magazine and done as part of a co-sponsored competition for children to photograph endangered species gave unwarranted credibility to their false claims. It is the job of the National Geographic to criticise corporations that do so much damage to the environment. It should not provide implicit support. The National Geographic was silenced.

There are disturbing parallels between this advert and the advertising campaigns of the cigarette industry in that both industries targeted children.

As well as being effective in encouraging children, these adverts are also effective in encouraging politicians. At the time of this advertising campaign, Peter Mandelson, then the trade and industry minister, approved a £350 million government backed loan to Airbus for the development of the A350. He justified this by claiming that it would be environmentally friendly³⁰.

The Airbus advert was in violation of the following Advertising Standards Agency's codes³¹:

49.1 The basis of any claim should be explained clearly and should be qualified where necessary. Unqualified claims can mislead if they omit significant information.

The National Geographic advert was unqualified. The advert merely says “*working towards.*” It did not say how long it will take. It did not say by how greenhouse gases would be reduced, nor did it explain the basis of its claim. It is equivalent to the early claims of the cigarette industry saying they were working towards safe and cancer free cigarettes.

49.2 Claims such as ‘environmentally friendly’ or ‘wholly biodegradable’ should not be used without qualification unless marketers can provide convincing evidence that their product will cause no environmental damage when taking into account the full life cycle of the product. Qualified claims and comparisons such as ‘greener’ or ‘friendlier’ may be acceptable if marketers can substantiate that their product provides an overall improvement in environmental terms either against their competitors’ or their own previous products.

Airbus had no substantive evidence of its claims that it is working towards reducing greenhouse gases. On the contrary, the Tindal Centre and the EU both report that emissions from aviation are continuing to rise and that any claims that the airline industry is reducing, or can reduce emissions, without major reductions in capacity is false.

49.3 Where there is a significant division of scientific opinion or where evidence is inconclusive this should be reflected in any statements made in the marketing communication. Marketers should not suggest that their claims command universal acceptance if that is not the case.

There is no division of scientific opinion on climate change nor on the need to make dramatic cuts in CO₂ emissions. Even at the time of this advert, the scientific consensus was that cuts in excess of 80% need to be made to greenhouse gas emissions. There is no scientific evidence that suggests the aviation industry can achieve any significant cuts at all with a business as usual scenario.

Despite the breaches of the Advertising Standards Authorities own codes, it would not enforce a ban on the advert. After appeal the final adjudication³² from the Authority was that “*freedom of expression must be preserved.*”

30 <http://news.sky.com/home/business/article/15361041>

31 <http://www.asa.org.uk/NR/rdonlyres/AE1CB9D7-0981-4792-8FF1-C27A39DA917E/0/CAPCode.pdf>

32 <http://letterinthebattleagainstclimatechange.blogspot.com/2009/09/letter-from-independent-review-of-asa.html>

It is deeply disturbing when such a powerful organisation which is in receipt of so much tax payers money, is given license to make false and misleading claims.

The combined marketing budget of big aviation is in the billions of pounds per year. The Airbus example shows there is little constraint on how they use this resource to project their arguments. Thus, a one sided battle is now being fought in the media by the high carbon industries that have so much more marketing and advertising resources at their disposal compared with those organisations and scientific bodies that are opposing the environmental destruction that comes with the expansion of the aviation industry.

Following the unsuccessful challenge to Airbus, Flying Matters were targeted who were at the time then main aviation industry lobby group. It had pressed the argument that the aviation industry would be able to “*reduce its emissions to 2000 levels by 2050 against a threefold increase in passenger numbers*”³³ and would “*improve fuel efficiency of new planes by 50% by 2020.*”³⁴ In principle these are the same claims made in the scoping document.

These claims are false. They violate basic engineering and scientific principles. Flying Matters claimed that they had a “*road map*” which would demonstrate the validity of these assertions³⁵. When pressed they were unable to provide any supporting documentation or evidence, despite them deferring to every other aviation industry group.

Their claims were knowingly false. They were made for gain. This is in breach of the fraud act. An appeal was made to the Serious Fraud Office to instigate proceedings against the directors of Flying Matters and the companies that supported Flying Matters.

The SFO chose not to instigate proceedings. Flying Matters was disbanded shortly after this complaint.³⁶

While the regulatory authorities fail to act, big aviation maintains a barrage of false claims into the media. This subverts the debate on climate change. The fraud has become so common, that it is now accepted as normal.

Meanwhile BA has chosen this consultation period to launch it's new advertising campaign which claims “*to fly is to serve.*” Though this advert is related to BA, it's actual message is about the glories of flying and the normality of continuing to fly. Just as the Airbus advert in the National Geographic coincided with government and EU decisions on financial support for the A350 and biofuel for aviation, then the new BA advert is a cynical attempt to use its £400 million year marketing budget³⁷ to influence the outcome of this consultation process. This should be of serious concern to the DfT and the Minister for Aviation.

33 <http://kevclimatecolumn.blogspot.com/2010/11/letter-to-flying-matters-just-pointing.html>

34 <http://kevclimatecolumn.blogspot.com/2010/11/dear-michelle-regards-statements-on.html>

35 <http://kevclimatecolumn.blogspot.com/2010/11/dear-michelle-regards-statements-on.html>

36 <http://kevclimatecolumn.blogspot.com/2011/04/congratulations-to-flying-matters.html>

37 <http://www.travelweekly.co.uk/Articles/2011/09/21/38280/video+ba+launches+to+fly+to+serve+campaign+with+90-second+tv+ad.html>



Illustration 8: BA's attempt to subvert the current consultation process

During the consultation period BA has had several sympathetic reports in the financial section of the Telegraph³⁸, yet not a single article as been written in any news paper about the need to reduce flights to comply with climate change requirements. It is far more difficult to get the alternative message presented in the media. Hence the move to direct action is the only alternative. When action is taken, the legal system works efficiently against people who protest. Many protesters have suffered police raids on their homes, computers confiscated, jobs threatened and the prospect of fines or even prison sentences³⁹.

The author of this document was subject to an early morning raid on his home. He was arrested for fraud and kept on bail for over a year for posting a spoof web site (see Illustration 9). It asserted the Fairford Air Tattoo of 2010 would be the last to run because of climate change. For this he faced up to 10 years in prison. It should be noted that one of the charitable objectives of the Fairford Air Tattoo was “to support aviation in all its guises.” Despite continuous coverage of the event in all local media not a single newspaper, TV report or radio station ever questioned the legitimacy of this as a charitable objective. The impact that aviation would cause on the environment was ignored.

There is a contrast between the willingness of the authorities to prosecute protesters while they are prepared to allow fraudulent claims from the aviation industry to stand.

Likewise the recent refusal of the US authorities to admit John Stewart of HACAN into America for a speaking tour is another example of how the advocacy of the alternative message is blocked.

Given the imbalance in the legal system towards the rights of large carbon intensive industries to pollute, the ineffectiveness of organisations such as the Advertising Standards Authority, the inherent support that aviation receives in the media and the enormous marketing budgets it is incumbent on the government to be absolutely resolute in implementing a strategy that properly communicates the ecological damage the aviation industry causes and that ministers and senior decision makers are not mislead by advertising initiatives.

38 <http://www.telegraph.co.uk/finance/newsbysector/transport/8829387/New-minister-compromised-over-Heathrow-expansion-says-Willie-Walsh.html>

39 <http://kevsclimatecolumn.blogspot.com/2011/04/police-statement.html>

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Royal International Air Tattoo > Important Announcement

About the Air Tattoo

Important message from the Airshow Chief Executive - Tim Prance OBE

Dear Airshow Visitor and Supporter,

It is with great regret that I must announce that this will be the last airshow we will be running.

The science is now clear and the evidence before us is equally clear - runaway climate change has all but started. Latest scientific evidence demonstrates that we must reduce our atmospheric CO₂ to 350 ppm, yet at present we are at 450 ppm (CO₂ equivalent) and the CO₂ level is rising at an increasing rate. With the current rate of increase, by the end of this century we will face global average temperature rises of potentially 10 deg C. This will lead to the loss of all life on the planet.

We have reluctantly accepted that this airshow and others like it create unacceptably large amounts of CO₂ and other greenhouse gases. This is especially unacceptable when they serve no useful purpose. Furthermore, they give the impression that we can tackle climate change whilst maintaining business as usual - this is wrong and we will not support this falsehood.

We are also unhappy with some airplane manufacturers that will be at our show, such as Airbus. Airbus have claimed to be working to reduce greenhouse gases, but have taken orders to supply A380 Super Jumbos to Middle East customers for use as private jets. As a responsible organization, we can not support duplicitous companies such as this and we will not allow ourselves to support their Greenwash.

You are all being urged to cut your own emissions and you face rising electricity costs to tackle climate change. Many of you will face unprecedented economic hardships in the years ahead due to peak oil and climate change. We thus recognize in these circumstances it is morally unacceptable to continue this event, especially when it is largely tax payer funded.

The recent disaster of the Copenhagen agreement shows how the planet's future is dependent on international cooperation on a scale that we have never seen before. This is already difficult, but will be made impossible if we continue to point guns towards each other.

The American Department of Defense recognizes the immediate and pressing danger posed by climate change. They forecast large scale wars and social unrest due to resource shortages, drought, famine and mass migration in the near future. They also acknowledge the vital importance of taking a lead in making massive CO₂ cuts. We aim to help them by eliminating the need for their planes to fly over here.

The only hope for planetary survival is an immediate move towards a zero carbon economy. This is a challenge that is unlike any other and we will rise to it by cancelling all future shows and working with other organizations around the world for similar cancellations.

If you find this information disturbing and you conclude that you can no longer support this year's airshow, we will be delighted to offer you a full refund if you have already bought a ticket.

I trust that you will support us with this difficult but necessary decision.

Tim Prance OBE
 Chief Executive Fairford Air Tattoo

Order Now...
 Take advantage of FREE parking and Showground Shuttle Bus

The Aviation Club

- Private Grandstand & Garden
- Private Marquee
- Inclusive Lunch
- VIP 'fast track' traffic route
- Dedicated on-base parking

MORE INFO >>>
 Making your day out a very special occasion!

Sign up for e-news...
 Get the latest news, events and offers here by signing up for RIAT e-news now.

Illustration 9: Spoof web site claiming the Fairford Air Tattoo would be cancelled due to climate change in an attempt to challenge non critical coverage of the event in the media and its support for the aviation industry

The Limitations of Carbon Trading

A key part of the government's sustainable aviation strategy is carbon trading through the EU ETS mechanism. The framework document states *“The inclusion of aviation in the EU ETS is estimated to reduce the net CO₂ emissions from flights departing from UK airports by 90 million tonnes of CO₂.”* There is no evidence to support the contention that savings will be achieved.

The basic premise of carbon trading is that it is impossible for aviation to make significant cuts in emissions through technological development, then emission savings can be bought from other companies that do reduce emissions.

This has fundamental flaws. The initiative has been so corrupted by big aviation industry that it can not deliver the greenhouse gas emission cuts that are envisaged. These flaws are:

1. It is not only the aviation industry that is struggling to make major reductions in CO₂, emission, all other energy intensive industries are finding it equally difficult. This was reflected in Lakshmi Mittal's⁴⁰ successful lobbying for extra carbon credits for his steel businesses. He threatened to relocate his steel manufacturing to China if not provided. Likewise the world wide collapse of carbon capture and storage projects⁴¹ means there will be no effective carbon saving that the aviation industry can trade.
2. The industry lobbied the EU into being allowed to purchase unused carbon credits within the EU ETS. Initially the intent was that the aviation industry would only be able to trade internal savings. This concession allows the aviation industry to continue to grow by purchasing carbon credits from other industries. The example above of Lakshmi Mittal shows how easily additional carbon credits can enter the market and thus allow the aviation industry to credits to continue polluting, irrespective of the fact that no savings are being made elsewhere.
3. The EU ETS allows carbon credits to be brought from other countries that are operating in the carbon market. This is open to abuse and fraud⁴². Credits can be claimed for efficiency and renewable energy projects that would have been implemented anyway, carbon savings can be overstated, and projects can be deliberately set up to exploit loopholes such as the Indian companies that produced highly dangerous refrigeration gases just to destroy them and claim the carbon credits⁴³. These are billions pound frauds. It is inconceivable that carbon trading could be implemented in a way that did not leave itself wide open to massive fraud. The introduction of aviation into this market simply adds further opportunity for dishonest fortunes to be made.
4. Big aviation is seeking to overturn the EU ETS with legal action that is backed by the US and Chinese governments.
5. If a carbon market could be implemented fraud free and if it was successful in forcing down carbon emissions through a market mechanism then the only outcome is that the right to pollute would progressively transfer to the most wealthy in society. Ultimately, those on lower incomes would be priced out of all staple resources, from electricity, basic transport and even food as their rights to the carbon allowances were effectively bought up by the rich and powerful in society.

40 http://business.timesonline.co.uk/tol/business/industry_sectors/industrials/article6945991.ece

41 <http://www.guardian.co.uk/environment/2011/sep/22/carbon-capture-and-storage-energy?newsfeed=true>

42 http://www.deloitte.com/assets/Dcom-Australia/Local%20Assets/Documents/Services/Forensic/Carbon_credit_fraud.pdf

43 <http://www.dailymail.co.uk/home/moslive/article-1188937/The-great-carbon-credit-eco-companies-causing-pollution.html>

The Impact of Peak Oil

Much has been written about the onset of peak oil and the dangers of a subsequent economic collapse. All emerging economic data now supports this theory.

Wikileaks⁴⁴ quotes Al-Husseini (former Executive Vice President for Exploration and Production at Saudi Aramco) saying during 2008, *“that the recent surge in oil prices reflects the underlying reality that global demand has met supply, and is not due to artificial market distortions,”* and in the same Wikileaks he believes, *“that a global output plateau will be reached between 2012 and 2017.”*

What has not been so well discussed is the form that the economic collapse will take given the concurrency of peak oil with climate change and world over population. The combination of these factors significantly increases the risk that our society faces if we continue to ignore the evidence and cling to business-as-usual growth orientated economic models.

Our economic system is based on the expectation of continuous growth. This can only be delivered if energy can also be delivered at a corresponding growing rate. Every economic transaction relates to the consumption of energy, be that buying petrol for a car, buying food, buying a car or buying a plane ticket. None of this can happen without energy being consumed. The price for any product or service fundamentally represents the amount of energy consumed. Our economic system is based on the expectation that transactions can continue and expand indefinitely. It is the confidence that comes with this expectation that allows people and business to take out loans. The continual issuing of loans by banks is the lifeblood of our financial system. Paying off the loans is not a problem when the economy is growing. So the economic growth that we have taken for granted depends on a virtuous cycle where loans get taken on the basis of future expectations of economic growth and the loans themselves provide the financial liquidity to drive the economic growth.

The critical problem comes when the energy supply can no longer expand, either through energy availability limitations due to peak oil, or recognition of limits through pollution from climate change. Once realisation comes in the population that the economy can no longer grow and consumption can only go down, virtually no one and no businesses will be prepared to take out fresh loans as they will not be able to pay them off. Once this threshold of confidence is passed and fresh loans are not introduced a rapid and non linear collapse of the financial system will ensue along with a break down of society.

Rapid and non linear changes are common features of dynamic systems and can be demonstrated with the underlying mathematics⁴⁵. In our case, we have an economic system that is designed around continuous economic growth and it has served us well up to this point of human development. However, there is no evidence that it will remain viable in a period of continual economic contraction and the risk of non linear collapse must now be taken seriously⁴⁶, see Illustration 10: Non linear collapse.

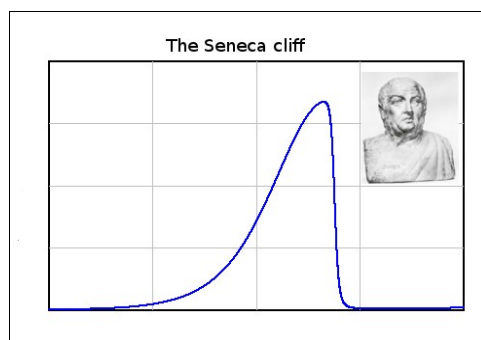


Illustration 10: Non linear collapse

Rather than recognise the reality of this scenario and plan accordingly the current position of this government and governments elsewhere is to find ways to maintain growth, however impossible this is. But reality can only be avoided for so long and the processes of maintaining the status quo exposes our society and economy to unacceptable risk exposure as we search for the last sources of energy. These are more energy intensive to extract and are found in more environmentally or

44 <http://www.guardian.co.uk/business/2011/feb/08/oil-saudi-arabia?intcmp=239>

45 Jordan, D. W.; Smith, P. (2007). Nonlinear Ordinary Differential Equations (fourth ed.). Oxford University Press. ISBN 978-0-19-9208241

46 <http://www.theoil Drum.com/node/8317#more>

politically dangerous parts of the world.

This trend towards an increasing risk profile is evident in all areas of energy extraction. The US is moving large parts of Canada to ecological collapse through the tar sands development. Despite the Gulf of Mexico disaster we are increasing our risk exposure by moving to deep water drilling off the West of the Shetland Island and the Arctic Ocean. As we pursue these remaining sources of energy, the strength of our economy and the global economy will simultaneously diminish as the energy resources become constrained and the cost of extraction increases. The consequence is that we will soon reach the state where recovery from disasters will be beyond the capabilities of the economy.

This situation has become a reality for many countries where the shortage of energy has forced high risk strategies. As a result, the Ukrainians are unable to clean up Chernobyl, the Japanese are unable to clean up Fukushima, the Nigerians are unable to clean up pollution from oil extraction in their river deltas⁴⁷ and the Canadians are unable to clean up the tar sands tailing ponds. The common characteristic behind all these disasters is that they are far bigger and more serious than any man made environmental disaster over the preceding 100 years.

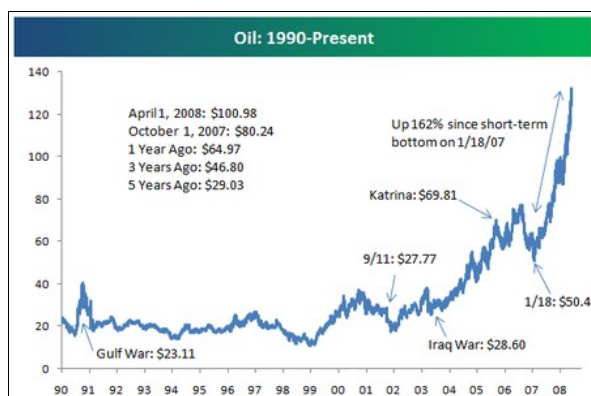


Illustration 11: Rising oil prices

Even if the developments proposed to the West of the Shetlands and the Arctic were successful and no oil was spilt, it would only give a reprieve of a 10 to 20 years before the reservoirs are depleted. Exploration would have to start again in an even more hostile area and when the economy is further weakened. This will force us to take on higher risks in the future than those we have to take on today.

The importance of peak oil also needs to be considered in view of the extreme urgency of tackling climate change. Sea levels will rise, food supplies will be disrupted and mass migration will occur. These large scale problems will require large scale infrastructure projects such as relocating whole cities. This will require enormous amounts of energy and resources at a time when energy itself is becoming scarce and when we also need to be reducing our CO2 emissions.

Given this imminent and unavoidable prospect, it is incumbent on us to preserve existing energy supplies and not to squander these on unnecessary luxuries such as holiday flights and luxury consumer goods.

When it becomes clear that environmentally high risk projects will not deliver adequate energy for the world economy, then the response will be to secure oil through war. It is no coincidence that the second Gulf War started in 2002, as it must have figured in the calculus of George Bush and Tony Blair that the oil prices would start to rise with the increasing demand and falling world supply. They must equally have realised, even if subconsciously, that if they did not start the war in 2002⁴⁸, then they would not have the economic strength to wage war later as their economies would weaken in the face of rising oil prices. This war has left in its wake the depleted uranium disaster⁴⁹ in Iraq which is an environmental catastrophe beyond the combined capabilities of the UK and US economies to rectify and which has the potential to be one of the biggest man-made disasters of all time.

47 <http://www.guardian.co.uk/world/2010/may/30/oil-spills-nigeria-niger-delta-shell>

48 <http://www.independent.co.uk/news/uk/politics/secret-memos-expose-link-between-oil-firms-and-invasion-of-iraq-2269610.html>

49 <http://www.guardian.co.uk/world/2010/dec/30/faulluja-birth-defects-iraq>

The thrust to biofuel that has been mandated by the EU and advocated by the aviation industry is another form of warfare. It differs from other wars only in that it is neither publicly declared nor publicly discussed, but the human misery that has been forced on the poorest people of the world is on a par with some of the biggest wars that have ever been fought. As of 2008, Oxfam⁵⁰ estimated that over 100 million people have been forced into poverty as a result of biofuels. Since that date large scale land grabs and human rights abuses have escalated by the agents of large corporations.



Illustration 12: The impact of Depleted Uranium from modern resource wars

This is the dilemma of a zero-sum game where the wealth in the “game” is constant, or in our case the wealth is actually going down.

In this scenario it is in the interests of the player who will weaken the quickest to make a first strike against his opponent while he is strong enough.

If we continue to ignore the evidence that is now in front of us, the result of a winner takes all competitive economy which supports the pursuit of high carbon, luxury-lifestyle-choice industries such as aviation in the face of increasing poverty and global resource shortages will ultimately force pre-emptive war and conflict from national to international levels. These resource conflicts will occur at a time when the planet can least afford such wars.

It is therefore incumbent on the government to consider the security implications associated with allowing the aviation industry to continue its current demand on resources, and to do everything to minimise further demands on finite resources. Failure to do so is supporting a de facto declaration of war on the world's poorest by the world's richest.

50 http://www.oxfam.org.uk/resources/policy/climate_change/downloads/bp114_inconvenient_truth.pdf

The Consequences of Direct Action Following Inner City Riots

Direct action and political protest are seen by many people as the only way that the debate on climate change can be advocated against the vested interests of large corporations and powerful individuals that either do not care about their responsibilities to society or are ignorant of the issues that we collectively face. As such, direct action has become the only defence against a system that rewards and legitimises excess consumption.

The Heathrow protest and other similar climate change protests demonstrated the command that the environmental movement has over the moral high ground. The demonstrations gave the opportunity for arguments on climate change to be articulated in the wider press in a way that would be expected in a democratic society. By contrast, organisations such as BAA consistently fell back on tactics that were illegal or unethical such as employing under cover agents⁵¹ to infiltrate protest groups or lying about their business case as BAA did in support of the third runway. The fact that BAA had to employ such methods demonstrated the moral bankruptcy of their position. So, as well as stopping high carbon developments such as airport expansions and coal fired power stations, the climate change protests demonstrated that those who control power and wealth in our society no longer have the moral authority to pollute that they once took for granted, in contrast to the legal rights that they have to expand and pollute.

Though these protests have been highly successful they represent a dangerous development. By continually drawing to the attention of the wider populace that the system of governance and power distribution is inherently corrupt and morally bankrupt, the main underlying principle of it being in everyone's collective interest to abide by the law is destroyed. Once it becomes the overwhelming view that abiding by the law is not in the general interest, civil collapse is inevitable.

This is the situation that we are currently moving towards. Policies are being implemented that directly favour those with the most wealth at the expense of those with least. Example are; the biofuel disaster allows the most well off in society to continue holidaying by pricing the least well off from being able to afford basic food or the continued right of corporations to emit large volumes of greenhouse gas emissions when the poorest in society are already having their lives destroyed through climate problems such as rising food prices and migration.

The tinderbox of simmering social discontent can now be ignited with only the slightest spark. If consultations such as this do not achieve visible and quantifiable reductions in greenhouse gas emissions along with social justice, there will be more high profile direct action protests targeting the aviation industry and their backers that will further undermine the existing system of governance and provide the context for more serious riots, especially when tensions start rising in the near future over food shortages arising from the consequence of rising global population and falling food production.



Illustration 13: Heathrow protests



Illustration 14: UK Inner city riots

51 <http://www.guardian.co.uk/environment/2011/jan/11/spying-undercover-officers>

In this new and dangerous economic paradigm that we are entering of continual economic contraction due to the combined impacts of peak oil and climate change, then it will be totally destabilising for governments to capitulate to the interests of large high polluting companies at the expense of the interests of the wider community. Ill considered green-wash solutions such as carbon trading and biofuels will quickly exacerbate dangerous situations.

The Unpalatable Conclusions

1. The strategies of introducing new technology, biofuels and carbon trading which form the basis of the sustainable framework document will not deliver any reduction in aviation greenhouse gas emissions. This is an unacceptable position given the critical risk that humanity faces due to the unsustainable build up of greenhouse gases.
2. Aviation emissions can only be reduced by imposing a strict ceiling on plane movements or aviation fuel sales. This ceiling must then be reduced in line with the objective of reducing CO₂ emissions by 80%.
3. The principle objective of the Department for Transport should be to work with other equivalent departments in other countries to implement a similar policy and to find ways to reduce demand for transport.
4. The Department of Transport will have to show considerable courage to stand up to the advertising and lobbying campaigns that the aviation industry has already launched to subvert any movement towards recognising and taking action on climate change. The legal definition of fraud should be reviewed and test cases implemented against companies that make blatantly false environmental claims.
5. The final adjudication that the government makes must take cognisance of the impact that rising oil prices will have on both the long term viability of the aviation industry and the full risk of wider instabilities in society and in the international arena.
6. The forced reduction in aviation will fundamentally change the economic model and philosophies that our society has built on by forcing a clear acknowledgement that economic growth can not continue indefinitely and limits have been reached. As such, this consultation must be integrated with the debate on the introduction of individual carbon rations⁵² or the imposition of a carbon tax⁵³, where the receipts are distributed directly to the population as advocated by James Hansen.
7. It will not be possible to achieve the large reductions in aviation within the debt based economic system that we operate today. However, to maintain the existing growth based system will result in large scale impoverishment of society, climate collapse and war.

52 <http://www.teqs.net/>

53 <http://www.carbontax.org/blogarchives/2010/04/25/scientist-james-hansen-proposes-%E2%80%9Cpeople-%E2%80%99s-climate-stewardship-act%E2%80%9D-a-simple-carbon-fee-with-revenue-returned-to-americans/>

Statement from the Generation of Tomorrow.

The following statement was written by Cirencester People and Planet group, who are predominantly of the age group 17 - 19, and the members' friends. It is aimed to give the young person's view of their future with regard to climate change and sustainable aviation.

All the problems that the international community is facing (and creating) today will inevitably be left for tomorrow's society to sort out. That means us. As such our opinions should be acknowledged when making important decisions. Reading the above document highlighted what we will be facing when we are your age, and we're not prepared to sit back and let you try resolve the short-term problems by compounding those that are long-term; it is the duty of your generation, being largely responsible for climate change spiralling out of control, to do everything in your power to leave us with some hope for the future.

I imagine that the majority of you are parents; do you not spend inordinate amounts of money and time trying to make your children happy? What is the point of short-term happiness if this means creating a world for your children that will be even more financially, socially and environmentally unstable? We have been encouraged for as long as we can remember to strive in the present to improve our future - a future that you are making increasingly hard with each selfish decision you make. Education has become obsessed with test culture, and finding solutions to the combined crises will be the ultimate test. Have you ever considered the irony of flying your children half way around the world for an exotic holiday? Perhaps you should start leading by example.

The growth of the aviation industry is not something that we believe to be relevant in today's climate, in fact the growth of any industry should be discouraged until we have stabilised the climate. It is a general belief amongst all concerned that short haul flights, particularly those within the same country, should be phased out in favour of train and bus travel and land travel actually keeps you much more in touch with nature. What international travel that we are left needs to be limited to essentials only, such as humanitarian disaster relief. We accept these restrictions on our future.

The business community will have to adapt to functioning by video conferencing, and the international tourist industry will have to adapt by serving their local markets.

From a less selfish perspective, the majority of people in the poorest countries will have absolutely no voice in, and no understanding of the consequences of consultations such as yours. We speak for them also. We sympathize with the suffering they endure. Biofuel production that you advocate will destroy many of their lifestyles and livelihoods, leaving many destitute and desperate on the fringes of modern society. As the global population continues to climb and the area of land available for food production decreases, starvation will rocket. However, as the global economy adjusts to the new environment the balance of power between developed and developing countries will change; this could mean that the now privileged children - us and your children - will be adversely affected by the future lack of resources.

We urge you to have the courage to take the right action to defend our future.