



Aviation

in a low carbon world

Virgin Group

The following document has been created
in collaboration with the Virgin airlines and
outlines our views and actions on Climate
Change and Aviation



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Summary

Flying is crucial to the global economy and central to many people's lifestyles – it links families, communities, and businesses resulting in vibrant and successful cultures and economies. Compared to other industries, aviation emits a small percentage of the world's greenhouse gases (GHGs); however, these emissions are emitted at altitude, they often cause contrails, and they are growing as more and more people fly. As a result, we are committed to ensuring that Virgin branded airlines not only grow responsibly, but also remain committed to finding solutions that will make a low carbon aviation industry possible in the foreseeable future. While the pace of change to reduce carbon emissions is heavily reliant on new aircraft and new engines, new biofuels, and more efficient airspace use, we are committed to making each of these things happen sooner. In addition, we are also committed to our continued investment in new aircraft and use of operational practices that already reduce our current emissions. Finally, and most importantly, we believe that it is critical for all airlines to embrace a global emissions cap and trade scheme that will ensure our global airline industry measures, manages, and ultimately reduces its GHG emissions--so that we can help do our part to control global warming. To that end, we believe it is critical that the European Union, the United States and other countries adopt a cap and trade scheme that is integrated with the Copenhagen framework. We believe that is the only way we can ensure a successful worldwide solution for a worldwide problem.

Introduction

by Sir Richard Branson

I believe in flying, and I believe in a low carbon world. I have therefore asked my colleagues at our Virgin branded airlines to help create a plan to square this circle. This note outlines the plan and our thinking behind it.

In 1984, when Virgin Atlantic completed its first flight from London to New York, the debate on climate change was confined to a small group of scientists who were seen to be the outsiders.

Now in 2009, twenty five years later, things have dramatically changed. The debate on climate change is over, global warming is occurring, and it is up to everyone, including airlines, to find a solution to this critical problem.

This year I achieved my ambition to have a portfolio of airlines operating routes which circumnavigate the globe. Alongside Virgin Atlantic, the Virgin Group has stakes in Virgin Blue the second largest Australia domestic airline, we are a minority owner of high tech, low-cost, Virgin America in the U.S., and we also own part of Air Asian X, the low-cost Malaysian based airline.

As the airline industry continues to grow to satisfy supply the global need for flying, so too has the need for us to help find solutions to mitigate and address climate change. Scientific solutions have been rapidly evolving, but we will need to work harder with aircraft manufacturers and politicians to ensure we structure the industry to focus and capitalise on significant breakthroughs. Climate change will be the subject of the largest UN conference yet in Copenhagen at the end of the year, and this conference will involve complex political global negotiations balancing economics with environmental concerns.

One seat on a Virgin flight from London to New York has a carbon footprint of more than 600kgs and Virgin Group's entire aviation footprint now exceeds seven million tonnes. Whilst the total GHG emissions from the airline industry remain small when compared to others, especially those of the power and automotive industries; we, at Virgin and at various Virgin-branded airlines, have no hesitation in agreeing that airlines should report and control our carbon emissions and we all need to remain committed to their reduction.

This short paper outlines the various views of each of the Virgin branded airlines and our opinions and commitments to achieve a low carbon aviation industry. It also reflects the specific actions the Virgin Group is taking and includes views on what we believe is required from others and public policy makers to consolidate these measures and accelerate the pace of change.

Not surprisingly, we are pro-aviation and pro-growth - if it is done in an environmentally responsible way. We believe in the positive contribution global travel makes to the world. There are some who believe the world and its economies would be better off without networks of airlines and that more airlines or more aircraft flying is incompatible with the concept of a carbon constrained world. We would politely argue the contrary; we believe airlines have made the world a better place, and if done correctly and in an environmentally responsible way, the airline sector could actually grow while emitting less CO₂ than it does today.

This note outlines our opinions. We know there are others. We welcome informed debate and argument. We believe what we say but remain open to challenge.

Virgin Airline CEO Joint Accord

We believe the world is a better place because of air travel. We are committed to tackling climate change by delivering a service in a lower carbon way, and we believe every airline on the planet needs to share that commitment.

We also believe we need to ensure the growth of aviation that doesn't result in growth in emissions, and we strongly believe the actions required to mitigate climate change are worth the investment.

Since our suggested solutions rely on greater efficiency, innovation, and global co-operation, we believe that these efforts will make the world at large a better place, even if the current predications for increased global warming do not materialise.

Virgin branded companies only represent some of the many companies that believe more needs to be done at national and international policy level to prepare for the inevitable (and likely rapid) decline in the availability of oil.

Crude oil is getting more difficult and potentially more environmentally damaging to extract from the ground. This adds to the case for identifying, testing and investing in new sustainable alternatives to today's oil based kerosene jet fuel.

We believe a lower carbon aviation industry can and should be created by industry and government investments in three key areas: Efficiency, Fuel, and Policy.

Efficiency. We believe all airlines should invest in modern fleets operating to the highest levels of efficiency, supported by low carbon ground support. Air traffic control must be organised and utilized to create the most direct routes possible with processes that minimize congestion and delays prior to take off and landing.

Fuels. We believe that airlines and aircraft/engine manufacturers need to ensure we develop and use fuels based on second generation biofuels—fuels that are harvested from sustainable sources which will not only reduce our dependency on declining oil supplies, but also reduce the carbon footprint of our collective operations.

Global policy. We believe we need an effective, international cap and trade scheme that requires airlines to report and manage their emissions and provides for economic and regulatory incentives and penalties that ensure emissions efficiency and reductions within our industry and others.

Sir Richard Branson – President and Founder – Virgin Group

Stephen Murphy – CEO, Virgin Group

Steve Ridgway CBE – CEO, Virgin Atlantic

Brett Godfrey – CEO, Virgin Blue

David Cush – President & CEO, Virgin America

Aviation and Climate Change

Whilst the aviation industries in the USA and Western Europe are reaching maturity and absolute emission growth is slowing, it is undeniable that, at the global level, the continued growth in aviation means that carbon dioxide emissions from this sector will increase at a pace that outstrips “business as usual” fuel efficiency gains

Add to this, the fast approaching “end of cheap oil”. A recent report (November 2008, in part sponsored by Virgin), argued the crude oil that could be easily extracted is in decline; thus, we may soon be left with only more difficult and expensive “unconventional” fossil fuel reserves. These fossil fuels will also be more energy and carbon intensive to extract, and the large-scale environmental impact on areas such as the tar sands in Alberta, Canada is problematic.

Airlines are just one stakeholder in the aviation industry. They are reliant on air traffic control, airframe and engine manufacturers, airports, fuel companies, ground handlers and a range of other industry players who also play key roles. Thus, it makes sense when considering aviation’s role in a carbon constrained world, to clearly define (i) what lies within the direct influence of Virgin and Virgin branded airlines, (ii) what needs to be taken forward with other industry stakeholders, and (iii) what is outside of the industry’s direct control.

Virgin and Virgin affiliated airlines are active in a variety of international climate change organizations that were founded to address climate change, CO₂ emissions, and sustainability. These organizations include trade associations like BATA, AEA and IATA, leaders’ councils such as the Cambridge Business Leaders’ Forum and Copenhagen Business Council, cross industry taskforces such as the Sustainable Aviation Fuel Users Group and partnerships with sustainable development organizations such as Forum for the Future, the Climate Group, CERES, The EPA Climate Leaders and the Climate Registry. We rely on these groups to share best practices, collaborate on industry and global initiatives, challenge us, and to raise the profile of airline GHG emissions and the dangers of global warming.

People will continue to fly

People do not fly because they want to spend several hours sitting on an aircraft. They fly because they want to get somewhere for a business deal or conference, to solve political, economic, and environmental problems, to see friends and family, to experience new cultures and countries, and to relax on holiday. Often, flying cannot be readily substituted by other “lower carbon” means of transport due to cost, time, or a lack of any realistic alternative (especially for transoceanic travel).

Society is becoming more international – a recent poll showed that the majority of the UK, EU, and U.S. populations had a friend or relative living overseas, whom they would visit by air. In addition, the majority of people in the developed world have grown accustomed to regular business and political trips, foreign vacations or weekends away, and the availability and usefulness of relatively low cost air travel is increasingly seen as a right rather than a privilege.

Virgin Atlantic, despite maintaining a healthy growth curve, will see its emissions peak within the next decade. This decoupling of airline growth from emissions growth is as a result of investing in a substantially more fuel efficient fleet and focusing on operating the fleet as efficiently as possible.

Several surveys of young people, such as Vancouver airport’s forward planning consultation, have indicated that tomorrow’s air travelers would prefer to sacrifice other carbon intensive aspects of their lifestyle in order to continue flying. Polls have also shown that the people who consider themselves to be most environmentally conscious, who recycle and buy ethical products, are actually the group most likely to travel frequently short- and long-haul by air. When questioned further, they argued that this focus on sustainability issues in their day-to-day lives was to enable them to “spend” their carbon on seeing the world, particularly in relation to flying long haul.

Flying also has a role to play in sustainable development. Developing safe, affordable and reliable air links between neighbouring countries can foster economic development within that region. The focus on building airport and airline capacity in India and China demonstrates the value placed on a competitive aviation industry by emerging economies, as a key driver for tourism and trade relationships.

Despite the negative attention that air-freighted fruit and vegetables have received over the last few years, there is a strong argument to be made about their role (when produced responsibly, e.g. through Fairtrade) in providing economic and social benefits to the communities or regions which cultivate them. When the British Soil Association threatened to remove its organic certification from fruit and vegetables imported into the UK by air, there was a significant backlash from farmers in Kenya and elsewhere in the developing world. The Soil Association ultimately decided to reconsider this decision, recognising the complexities and nuances of the sustainable development arguments surrounding aviation in a carbon constrained world.

We must, however, address the impacts on local communities, economies and environments of large scale tourism. Whilst many tour operators and airlines are working with hotel and tourism service providers to implement environmental management programmes and to support local

farmers' or artisans' cooperatives, the longer-term impacts of a reliance on revenues from one industry and the fickle or cyclical nature of inbound tourism flows must also be taken into account. Virgin Atlantic, with its tour operator arm Virgin Holidays and Virgin Management in the UK, will be focusing on this issue over the coming months.

Towards a low carbon aviation industry – Virgin's navigation points to a lower carbon aviation world.

As we said in our CEO joint accord:

A low carbon aviation industry will be created by three distinct investments: Efficiency, Fuel and Policy.

Efficiency: a modern fleet, operating with the highest levels of efficiency, supported by modern low carbon ground support.

New Fuels: fuels based on second generation biofuels harvested from sustainable sources.

Global policy: An environmentally effective and economically efficient international mechanism to enable aviation to play its part in post-Kyoto climate change targets, such as a global emissions trading scheme.

1 - Efficiencies:

We are:

- Investing in new technologies as and when they become available and commercially viable
- Reducing weight – loading onboard catering more effectively, using different products/ materials/packaging, minimising waste, encouraging passengers to take less luggage with them, minimizing overfueling.
- Investing in advanced flight planning and flight management- GPS equipped cockpits, cost index flying, reduced speed descents, pilot engagement, operating to best practice procedures, APU Management, RNAV & RNP approaches and departures
- Undertaking fuel efficiency targeted maintenance
- Supporting technology step changes, i.e. composite materials, open rotor engines, more aerodynamic design (e.g. blended wing)
- Reforming air services – Flextracks, ATC efficiencies.
- Re-evaluation of airport design – discouraging cul de sacs around gates and more direct taxiways
- Managing air traffic efficiencies, e.g. collaborative decision making (UK NATS project), ASPIRE and continuous descent approaches, NYC airspace redesign and more RNAV and RNP approaches in the U.S. and Australia

Opportunities that lie outside the industry's control:

- Major air traffic management projects, (e.g. Single European Sky, U.S. NextGen, etc.)

Emissions growth will not be equal in all markets, or indeed across all airlines. The Western European, Australian and some North American industries are more mature and (generally) have younger, more technologically advanced fleets than their counterparts in the developing world where most of the passenger and freight growth will occur. Notably, more mature airlines like Virgin Atlantic will see a decoupling of the growth in their operations from their emissions profile within the next decade, through an aggressive investment programme in more fuel efficient aircraft and a strong corporate focus on fuel efficiency and new fuels.

In the UK, the Virgin Group also supports a Government move towards a more intermodal approach to transport policy: integrating air, maritime, rail and road hubs to allow a more efficient use of transportation infrastructure; considering the most time and cost effective way to convey passengers and goods from A to B, rather than just looking at road or rail or air in isolation; and considering the regional and/or global perspective when deciding on new airport capacity (e.g. the mainline rail hub proposed as part of the UK Department's 2009 announcement of a third runway at Heathrow).

The IPCC Special Report on Aviation and the Global Atmosphere, 1999, made it clear that efficiencies alone will not be enough on a global industry wide scale. Although significant technology challenges remain, improvements to air traffic management efficiency and an airline-level focus on fuel efficiency could result in an overall efficiency gain of 1.5% per annum. However, more dramatic initiatives like sustainable biofuels are needed because these efficiency gains will be outstripped by a projected industry growth of up to 4% per annum. This is partly due to the length of time it takes for these new technologies to reach full market penetration. With an average aircraft retirement at around 20 years, the lighter-weight airframe and more fuel efficient engines as seen on the Boeing 787-9 Dreamliner which will enter into service within the next few years will take decades to achieve full market penetration.

2 - Fuel:

Virgin Atlantic assumed a leadership role in the area of nextgen fuels when it operated the first ever partially biofuel powered flight in February 2008. This was a critical test because it proved that biofuels could work for high altitude jet flight operations. As a result of the success of this test flight, Virgin Atlantic is now working with other airlines, fuel makers, Boeing and Airbus, to accelerate the development of truly sustainable fuels for our industry. Virgin Atlantic and Virgin America aspire to have biofuels to represent 10% of their fuel mix by 2020.

Although technological developments in airframe, engine and airspace design, coupled with an ongoing emphasis on implementing fuel efficiency best practices will make significant contributions to a lower carbon future for Virgin and Virgin branded airlines, true “low carbon flying” will only be possible with new fuels. In order to achieve short to medium-term deployment, and avoid the need to retrofit aircraft and fuel supply infrastructure, these new fuels will have to be “drop in” fuels that can be used by current aircraft (i.e. they will need to replicate the performance characteristics of conventional kerosene). This will allow these new fuels to be passed through the stringent jet fuel certification standards and be approved for regular use onboard aircraft in varying blend ratios.

Although biofuels are not yet being produced on viable scales, it is anticipated that sustainable second generation feedstocks like algae, jatropha and salt water tolerant halophytes could be commercialized to levels required by aviation within the next five years. Virgin Atlantic anticipates that up to 5% of its fuel uplift will come from sustainable biofuels by 2015, with at least 10% by 2020.

Virgin Atlantic and Virgin Blue, through the “Sustainable Aviation Fuels Users Group” with Boeing, UOP and several other airlines together representing 15% of global jet fuel demand, has signed a sustainability pledge committing to sourcing only fuels which are truly sustainable and do not compete for land or water with food cultivation. These have lower life cycle carbon footprints than traditional jet fuel; do not lead to deforestation or the loss of high conservation value ecosystems; and retain socioeconomic benefits in the communities in which they are cultivated.

Virgin and Virgin branded airlines plan to promote further investment in research and development of emerging fuels, and they also plan to maintain pressure on the fuels certification committees

to ensure these new fuels are approved for use as and when they are produced in commercially viable quantities. Detailed life cycle emissions analysis of jatropha and algae as new sources of biofuel for the transportation sector are currently underway, supported by the Sustainable Aviation Fuel Users Group, with initial results suggesting that jatropha-based jetfuel could offer a 40-60% lower lifecycle carbon footprint than conventional kerosene.

We are also active members of the Roundtable on Sustainable Biofuels, helping create the standards and audit protocols to make it possible to specify biofuels that come from sustainable sources and ensure that that carbon benefits we believe are being created, truly exist.

3 - Global policy:

Virgin and Virgin branded airlines also believe that emissions from international aviation should be included in the Copenhagen (post-Kyoto) climate change framework as the first step towards developing policy instruments that will allow aviation to play its part in achieving global carbon reduction targets.

We recognise this is a very complex issue and there are many challenges ahead as we balance the need to control climate change with the challenges of a worldwide recession. Yet, we believe the airline industry needs to take a meaningful role in meeting global climate change targets, and we believe there are no good reasons left why aviation shouldn't be included in a global emissions scheme, and plenty of excellent reasons why it should.

Aviation is an international industry – it's hard to fairly allocate emissions from aviation between countries or regions – so it makes absolute sense to deal with it at an international level. We want to ensure that the eventual policy instruments developed for our sector - such as a mandatory, sector-wide global emissions and trading schemes – are environmentally efficient, operationally and economically pragmatic, and that any new scheme will deliver the “common but differentiated responsibilities” that are at the heart of the UNFCCC's efforts. We also believe we need to find a way for developing countries such as India, China, and the Caribbean islands to reap the economic and social benefits of their growing aviation industries, whilst encouraging the adoption of new, lower carbon technologies.

This is why Virgin Atlantic is one of the founding members of the Aviation Global Deal (AGD) Group, established in 2008 to help shape and support international efforts to develop an environmentally and economically sustainable global policy framework for reducing CO₂ emissions from aviation sector.

The carriers in this group which also include the Virgin Blue Group believe that without a global scheme for an international industry like aviation, there is a risk of developing a patchwork of conflicting schemes which create significant competitive distortions within the industry without delivering the net environmental benefits for which they were intended. The effort and cost involved in meeting the different monitoring, reporting and verification requirements of each regional scheme would also be significant, and may unfortunately bring no additional benefit to the environment.

In February 2009, the AGD Group issued a communiqué to publicly set out the principles it

believed should be fundamental for a global aviation framework to be successful. The AGD Group believes that cost effective market-based measures – such as a mandatory, sectoral carbon reporting and trading scheme - should be established internationally for aviation. This should be integrated into the overall UNFCCC framework but would be specifically designed to take account of the characteristics of international aviation.

By developing workable and effective policy instruments that will deliver environmental benefits without adversely impacting the competitiveness of our industry, it is hoped that our work and that of the AGD Group will complement the efforts already being made through ICAO and GIACC, and will ensure that aviation can take its place at the negotiators' table in Copenhagen this year.

Until such time as a global deal is reached for aviation emissions, we are likely to see a continued proliferation of disjointed and possibly ineffective national and regional schemes for tackling carbon dioxide emissions. With the European Union, Australia and now the U.S. all developing emissions trading schemes for aviation, it is critical to ensure they compliment and work with each other especially if the U.S. and EU focus on different actors for implementation (e.g. air carriers or fuel suppliers) and with a different external cost, or carbon value, being applied. Without a single global approach to a sector like aviation, which is subject to international competition from airlines based in regulatory environments which are unlikely to take a similarly strong approach to carbon emissions, there is a strong risk of carbon leakage.

There are still many questions that we're working hard to answer, but we think it's definitely worthwhile. We need the support of national governments and their international climate change negotiators, as they are the ones who need to collaborate and sign this type of agreement on behalf of all of us.

In the meantime, we believe the UNFCCC should also reconsider the inclusion of avoided deforestation in the clean development mechanism. It has been suggested that, in the next five years, the destruction of rainforests will release carbon dioxide emissions equal to the sum of all of aviation's carbon emissions in the 100+ years since the Wright brothers' first flight. Without developing the monitoring and emissions reductions certification processes that will give an economic value to the protection of rainforests, we risk losing a better carbon sequestration solution than we are ever likely to invent for ourselves.

**For more information please email
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