



# Air transport impacts take off

Once the preserve of well-heeled jetsetters and business people, air travel, glamorous and convenient, is now affordable for many. But does the phenomenal growth in air transport, with global air traffic growing 9% a year since 1960, have an insidious downside?

Few would complain that market forces have brought the price of air travel down, but just as few may be aware of what the environmental implications might be of this recent affordability.

A United Kingdom report by the Royal Commission on Environmental Pollution (RCEP), an independent body appointed by no lesser personage than the Queen, a special report by the IPCC (Intergovernmental Panel on Climate Change), and some scientists, such as Professor Peter Fisher of the Central Queensland University, pretty well agree that the growth in air travel does indeed have a downside.

These sources argue that the phenomenal success of air travel is proving detrimental to the environment. Its direct effects include greater noise and air pollution and resource consumption. It also potentially has less obvious indirect effects such as increased access to previously untouched wilderness areas for tourism and other development and, of most concern, a contribution to global warming due to greenhouse gas emissions.

'It's curious,' says Fisher 'that the aviation industry's greenhouse emissions are growing faster than any other sector, with the possible exception of road transport, yet while other sectors are mostly applying themselves to

the task of turning around their emissions, airlines and airport operators are making little progress in this regard.'

'It certainly seems that airlines have avoided much of the environmental regulation applied to other sectors,' says Dr Elizabeth Heij of CSIRO's Sustainability Network. 'And the problem with the cheaper airfares now on offer is that they are so tempting – this tends to lead to overuse and is more destructive to the environment than we once thought.'

But are the critics being too hard on airlines: is the environmental impact of air transport over-stated? Fisher says not. The aviation industry naturally has a very different view.

To put the industry into some perspective, the US Federal Aviation Authority predicts that by 2015, a billion passengers will travel by air in the United States alone. By the year 2010, the world's airlines could carry more than 2.3 billion passengers a year for business and pleasure. In Europe, air travel is expected to double between 2000 and 2010. Here, millions of people fly in and out of Australia each year in addition to the thriving domestic market.

International air freight is also growing fast and the, often elderly, cargo planes plying the skies are not the cleanest burning, quietest, most fuel-efficient of craft. Currently some 29 million tonnes of freight is transported by air each year. Air traffic is not about to decrease.

## Jets, air pollution and global warming

Planes generate a unique cocktail of emissions. Aircraft produce carbon dioxide (CO<sub>2</sub>), nitrous oxides (NO<sub>x</sub>), hydrocarbons, sulphur dioxide, naphthalene, benzene,

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ozone, formaldehyde and ultrafine dust particles. Over and above the problem of local air pollution near airports, several of these components and the water vapour in jet trails contribute substantially to global warming.

In 1999, the IPCC concluded that global aviation emissions were responsible for 3.5% of total 'radiative forcing' or global warming. It predicted this would increase four-fold by 2050.

The United Kingdom Department for Transport forecasts that by 2030, aircraft fuelled at UK airports alone, could have a global-warming impact equivalent to 200–300 million tonnes of CO<sub>2</sub> a year.

The *New York Times* quotes figures from the Edinburgh Centre for Carbon Management in Scotland that, on a round trip from New York to London, a Boeing 747 spews out approximately 440 tons of CO<sub>2</sub> – about the same as emitted by 80 4WD vehicles in a full year of hard driving.

The current global figure of 3.5% attributable to aviation doesn't seem too alarming, but the RCEP says that 'air travel will become one of the major sources of anthropogenic climate change by 2050'. The RCEP report recommends that the international community should aim to stabilise CO<sub>2</sub> concentrations at twice the pre-industrial level by 2050. Under this scenario, it says, aviation is on course to contribute 6–10% of all man-made warming by that date – or much more, if fleets of supersonic planes take to the skies.

**By 2010 over 2.3 billion passengers could be flying each year.** istockphoto



**The push is on for new, more frequent flights to previously quiet parts of the country.**

A discussion document by the London-based Institute for Public Policy Research states that at the current rate of growth, and given the need to reduce global greenhouse emissions by at least 60% by 2050, emissions from aviation alone could take up the entire global sustainable rate of greenhouse gas emissions by the middle of the century.

Strangely, emissions from international civil aviation are exempt from the Kyoto protocol. However, around the world pressure is mounting to bring such emissions into national Kyoto targets, as is the case for domestic aviation.

### **The industry puts its case**

The air transport industry puts a very different interpretation on the IPCC findings. Dr Phillippe Roche of the Air Transport Action Group (ATAG) reckons the 3.5% figure proves that 'the impact of aviation emissions is very limited'. He does concede though that operational and technological measures to reduce fuel consumption and emissions will be insufficient to balance the foreseeable growth in air traffic. As a result, he says, the industry's contribution to climate change is expected to grow, while emissions in other sectors will diminish.

However, the industry is vehemently opposed to any taxes or charges intended to reduce the environmental impact of aviation, for example by curbing demand for air travel. The International Air Transport Association, representing 270 airlines, in its Annual Report 2003–2004, states that 'IATA strongly opposes environmental taxes or charges that compromise airline financial health without bringing any measurable environmental benefit'. It offers a technological fix. 'Fuel-efficient aircraft reduce the direct operating costs of the airline company and the level of emissions in the atmosphere. This is a win-win solution.'

Fisher is scathing of this approach. 'Other profit-motivated companies, such as various electricity and water utilities, are using or are required to use demand management to conserve resources and protect the environment, so why shouldn't airlines?' Somehow it's hard to imagine Qantas or Virgin Blue running ads urging travellers to choose rail!

A jet fuel tax might reduce demand to some extent. The RCEP says the exemption of aviation fuel from fuel taxation is unacceptable and a 'large subsidy at the expense of other modes of transport'.

ATAG argues that today's aircraft are 70% more fuel-efficient than the first jets and claims that modern aircraft

'achieve 3.5 litres per 100 passenger-kilometres, which is comparable to the consumption of a modern car carrying two people'. It sticks by a technological solution.

However, Fisher says the IPCC predictions of a four-fold increase in aviation's contribution to global warming had already factored in big improvements in aircraft design, fuel efficiency and traffic management. The panel's reference scenario assumed fuel efficiency improvements of 40–50% by 2050 and progress in aircraft management to reduce fuel burn by another 8–18%.

'Nonetheless,' says Fisher, 'the sheer growth in air traffic, estimated at about 2–4% a year, is expected to swamp these gains, with CO<sub>2</sub> emissions, ozone concentrations, condensation jet trail cover and cirrus cloud formation all increasing. The increased demand will inevitably overwhelm any eco-efficiencies and bring us back to square one with a very solid thud.'

The IPRR also points out that there are probably trade-offs. Reduced fuel consumption during landing and take-off might only be achieved at the expense of greater noise levels. An International Civil Aviation Organisation study looking into noise and fuel burn found that a three-decibel noise reduction would increase fuel burn by about 5%. Bad news if you live near an airport.

### Towards solutions

The much higher fuel prices in recent times are likely to drive further voluntary improvements in efficiency by airlines in an attempt to hold down costs. What else can be done to minimise environmental impacts?

Short-haul passenger flights make a disproportionately large contribution to the global environmental impacts of air transport and the RCEP suggests that rail travel should be developed as a competitor. The principle would no doubt apply here in Australia. Given that CO<sub>2</sub> emissions from rail travel are 'at least an order of magnitude lower' than the same journey by air, upgrading and more government support of Australian railways would surely be a step in the right direction. The concept of high-speed rail between Brisbane, Sydney and Melbourne seems more attractive when global warming is taken into account.

The RCEP also recommends that instead of developing 'feeder' regional airports, major airports should be developed as 'land hubs' served by an efficient rail network. Schipol Airport in the Netherlands is held up as a fine example of this approach, although the tyranny of distance in Australia could be a problem. Then again, it would also magnify the environmental benefits.

Another RCEP recommendation is that air freight be reserved for very high value goods only, especially perishable ones. The CO<sub>2</sub> emissions from rail freight are 20–100 times lower than for air freight and shipping is better still.

One immediate solution that has been suggested is to cut the number of planes queuing for take-off. And an American study has estimated that the practice of taxiing planes on two engines rather than four would cut ground-level hydrocarbon emissions by 80% and CO<sub>2</sub> by 70%. It even suggested towing planes to and from terminals.

A few years ago, Australia's main airlines, then Ansett and Qantas, took a tentative step forward by signing up to the Greenhouse Challenge. The Greenhouse



Challenge was set up as a voluntary program by the Federal Government through the Australian Greenhouse Office, aiming to reduce greenhouse gas emissions. In aviation, the idea is to reduce emissions by measures such as adjusting take-off angles and routes.

Fisher has some other suggestions. He says the passenger side of the aviation business could recast itself as a combined transportation provider. Rather than competing with rail, it could invest in high-speed rail for short-haul travel.' He says Virgin Airlines in the UK and some overseas terminals already have such investments.

It is indisputable that the aviation industry provides quick and safe transport and an economically vital service to society. ATAG argues, on its web site, that the efficient and affordable access that air transport provides to markets 'helps improve living standards and fosters economic growth. This, in turn, alleviates poverty and results in reduced environmental degradation.'

But, given its emission problems, is the industry really dragging the chain on sustainability? Scientists like Fisher argue that this is the case.

'Sooner or later,' he says, 'the aviation industry will have to commit to bringing ecologically sustainable development into its core business operations. Some of its suppliers, notably BP and Shell, are setting an example by beginning such a transition. Technical innovation, as favoured by the airlines, can accomplish a good deal, but it won't carry the day on its own.'

● Steve Davidson

**Air travel is expected to become one of the major sources of anthropogenic climate change by 2050.** istockphoto

#### More information:

UK Royal Commission on Environmental Pollution Special Report, *The Environmental Effects of Civil Aircraft in Flight*: [www.rcep.org.uk/avreport.htm](http://www.rcep.org.uk/avreport.htm)

Air Transport Action Group, *Air transport – a global approach to sustainability*: [www.airport-int.com/article.asp?pubID=14&catID=576&artID=926](http://www.airport-int.com/article.asp?pubID=14&catID=576&artID=926)

Institute for Public Policy Research Discussion document, *Sustainable Aviation 2030*: [www.ippr.org.uk/research/files/team20/project19/s\\_a\\_2030\\_discuss.pdf](http://www.ippr.org.uk/research/files/team20/project19/s_a_2030_discuss.pdf)

IPCC Special Report, *Aviation and The Global Atmosphere*: [www.ipcc.ch/pub/av\(E\).pdf](http://www.ipcc.ch/pub/av(E).pdf)

CSIRO Sustainability Network article:

[www.bml.csiro.au/susnetnl/netw123E.pdf](http://www.bml.csiro.au/susnetnl/netw123E.pdf)

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