RESOLVED: "Aviation fuel for all domestic and international flights should be taxed for the purpose of combating global climate change."

Background

The debate over whether international aviation should somehow be taxed brings together two global problems. How to control emissions which lead to climate change, and how to find additional funding for development aid - for example to help meet the Millennium Development Goals. Aircraft contribute to climate change by releasing CO2, other greenhouse gases, and also particulates (very small particles, e.g. of soot). Aviation is now estimated to produce 3% of all global CO2 emissions, but this is rising fast with the increasing affordability of flights for hundreds of millions of people worldwide. It is estimated that air travel will produce 15% of all CO2 emissions by 2050. The problem is made worse by studies which suggest that aviation is much more damaging to the climate than its level of CO2 output would suggest - the other gases it emits are even more damaging and the fact that emissions occur at high altitudes probably increases their impact. At present aviation is largely exempt from fuel taxes, although a few countries (including America and Japan) levy a tax on fuel used only on domestic flights.

Green groups have long argued that aviation should somehow be made to pay for the costs of the pollution it causes. In the Kyoto Protocol the International Civil Aviation Organisation (ICAO) was charged with looking into ways in which this could be done, but no actual measures have yet been taken. Since 2000 the EU (European Union) has increasingly discussed taking action, both unilaterally and by lobbying in international forums. The USA and Australia are particularly opposed to a global tax on aviation, but other states have been more supportive.

The sky's the limit

The Economist

Air travel is a rapidly growing source of greenhouse gases. But it is also an indispensable way of travel

THE double-decker A380, the biggest airliner the world has seen, landed at Heathrow last month to test whether London's main airport could handle the new 550-seater, due to enter commercial service at the end of this year. It was a proud moment for Britain's Rolls-Royce, the makers of the aircraft's Trent 900 engines. Rolls-Royce says the four Trents on the A380 are as clean and efficient as any jet engine, and produce "as much power as 3,500 family cars". A simple calculation shows that the equivalent of more than six cars is needed to fly each passenger.

Take the calculation further: flying a fully laden A380 is, in terms of energy, like a 14km (nine-mile) queue of traffic on the road below. And that is just one aircraft. In 20 years, Airbus reckons, 1,500 such planes will be in the air. By then, the total number of airliners is expected to have doubled, to 22,000. The super-jumbos alone would be pumping out carbon dioxide (CO_2) at the same rate as 5m cars.

That may not seem much compared with the 60m vehicles that pour off assembly lines every year—or the 1 billion vehicles already on the world's roads. But whereas cars are used roughly for about an hour or so a day, long-haul jet airliners are on the move for at least 10 hours a day. And they burn tax-free, high-octane fuel, which dumps hundreds of millions of tonnes of CO_2 into the most sensitive part of the atmosphere.

Aviation is a relatively small source of the emissions blamed for global warming, but its share is growing the fastest. The evidence is strong that emissions from jet engines, including the streaks of cloud (called contrails) they leave behind in the sky, could be especially damaging. As a result, aviation is increasingly attracting the attention of environmentalists and politicians. Amid much controversy, CO_2 caps and carbon-trading could soon be used to help curb aircraft emissions.

Frequent flyers, free riders

Airlines are accused of having a free ride in terms of air pollution because they pay no tax on the fuel they use for international flights. Even though today's aircraft are about 70% more efficient than those of 40 years ago, concerns over emissions have grown. Despite booming demand for air travel, many airlines are losing money. Now green campaigners want people to think twice before they fly.

The clamour is particularly loud in Europe, where low-cost carriers are expanding fast on busy short-haul routes. The European Parliament will vote in July on a proposal to cap aircraft emissions and include them in the European Union's emissions-trading scheme for CO_2 (called ETS). The proposal has world wide implications because it would cover all flights using EU airports—including international services.

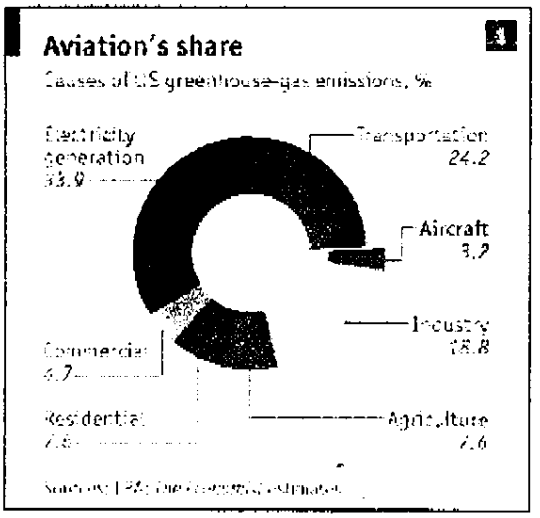
America is deeply unhappy at the prospect of its airlines being caught up in devices like ETS. Sharon Pinkerton, a senior representative of the Federal Aviation Administration insisted, on a visit to Brussels last year, that American carriers should be exempted from the scheme. This sets the scene for another transatlantic aviation row, to add to the two bitter and long-running disputes over subsidies to Europe's Airbus and the liberalisation of air traffic between the two continents.

The airlines are growing nervous. The big international carriers represented by the International Air Transport Association (IATA) would rather Europe waited for the deliberations of a United Nations body, the International Civil Aviation Organisation (ICAO), which has set technical, legal and safety rules for more than 50 years. International aviation was excluded from the Kyoto protocol on global warming, but only on condition that, by the end of 2007, countries and airlines worked under the umbrella of ICAO to come up with a way of reducing emissions through a trading scheme.

Soon after the end of the second world war the member governments of ICAO agreed that airlines should be free of fuel taxes. Some say this was to outlaw unilateral taxes that could distort markets, but others reckon it was done to boost the fledgling airline industry emerging from the fighting. The corollary was that aviation, unlike motor traffic and other forms of transport, would pay in a transparent manner for the infrastructure and services it required—air-traffic management, landing charges, flyover rights and so on. That was supposed to take care of the external costs. But no one in those days thought much about the environment.

Counting the cost

It was not until 1999 that the United Nations Intergovernmental Panel on Climate Change (IPCC) attempted to pin down the effect of aviation on the environment. Transport as a whole was judged to be responsible for about a quarter of the world's CO_2 discharges. That makes it one of the biggest sources, alongside power generation and households, as a source of the gas (see chart 1). Within transport, aviation accounts for about 13%. Its contribution to total man-made emissions worldwide is said to be around 3%.



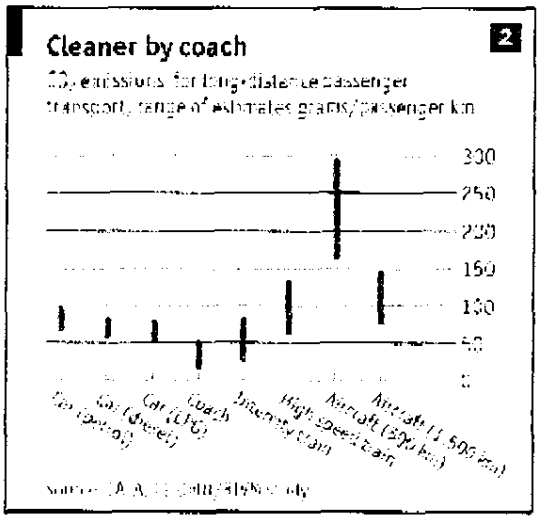
So why all the fuss about so little? One reason is that high-altitude emissions are probably disproportionately damaging to the environment. The nitrogen oxides from jet-engine exhausts

lead to the formation of ozone, another greenhouse gas. Contrails are also suspected of enhancing the formation of cirrus clouds, which some scientists think adds to the global warming effect. The IPCC estimated that the overall impact on global warming of aircraft could be between two and four times that of their CO_2 emissions alone, though there is no scientific consensus about the size of this multiplier. The EU, for instance, thinks it is only two.

Naturally, the airlines choose to measure the greenhouse gases they produce in the way that casts them in the best light—a trick they deploy on safety statistics, too. For instance, over half of aircraft accidents occur around take-off and landing. So accidents per passenger-mile compare very favourably with other means of transport. But at least one study has shown that, if accidents are measured per journey instead, aircraft are the second-most dangerous way of travelling, after motorcycles.

Likewise on greenhouse gases. IATA says an aircraft's fuel consumption is about the same as that of a family car, at 3.5 litres per 100 passenger-kilometres. So CO_2 emissions are similar. But that is true only if the aircraft is full and the car's passenger seats are empty. And even then, a jumbo jet flying from London to Sydney would be like nearly 400 Volkswagen Polos each travelling just over 16,000km—the average distance a European drives in a year. In other words, although cars and aircraft discharge roughly the same amount of CO_2 for each passenger-kilometre, the aircraft travel an awful lot farther.

In America, land of the gas-guzzler, the Federal Aviation Administration has calculated that the energy used to carry one passenger for one mile is greatest in sport-utility vehicles, pick-up trucks and transit buses. It says cars and commercial aircraft come out roughly equal. But a study for the European Commission reached a different conclusion. Assuming that aircraft are 70-75% full and cars contain 2.5 people (since longer distances usually imply family trips), CE Delft, a Dutch consultancy, came up with a comparison between different forms of travel (see chart 2). Coaches performed best, followed by liquefied-gas and diesel-powered cars or inter-city trains. Long-haul flights of more than 1,500km were 50% worse than petrol cars for each passenger-kilometre. Short-haul flights (where a smaller proportion of the time is spent on energy-efficient cruising and more on profligate climbing and descending) were fully three times worse than petrol cars.



What this means is that the eco-conscious European consumer who jets off for a series of weekend breaks is destroying his day-to-day carbon parsimony. You can buy a hybrid car, switch to low-energy light bulbs in your house and eat locally grown organic food. But the dozen daily decisions on which you base your husbandry are trivial compared with the handful of yearly choices about that holiday or this business trip.

IATA likes to make the point that civil aviation is a $400 billion business and its economic contribution is much greater than its share of carbon emissions. Four-fifths of aviation's CO_2 comes from long-haul trips of more than 1,500km, where there is no practical alternative to flying. About one-in-four airline passengers are travelling for business, with the presumption that their journey is really necessary. In any case, the demand for air travel is powered by economic growth and especially by increasing wealth. In 1980-2003 the energy consumed by commercial aircraft grew by 75% worldwide, but in rich countries it rose by 165%.

Over the long term, the growth in aviation has slackened from about 10% a year to around 5% a year, but it shows no sign of falling below that. Boeing, Airbus, the aircraft-engine makers and the airlines all work on the assumption that demand will continue to grow at that rate. To justify its faith in the market for the new A380, Airbus has even calculated that the annual increment in air travel as 2020 approaches will equal the total number of miles flown in 1969, the year that Boeing launched its first jumbo jet.

Friends of the Earth commissioned a study from the Tyndall Centre for Climate Change Research to work out what growth of 6.4% a year (its average through the 1990s) would mean for Britain over the next 40-50 years. It concluded that the total CO_2 discharges from air-traffic would soon offset all the reductions in carbon emissions scheduled under British government policies to comply with Kyoto. The European Commission (presumably neutral on such matters) accepts that, by 2012, the growth in aviation would offset more than a quarter of the reductions that its richer members hoped for.

If air travel is indispensable, so too is the technology that powers it. Jet engines have been getting more efficient at a rate of about 1% a year. According to Sir John Rose, chief executive of Rolls-Royce, they can be expected to continue doing so. But he warns: "technological innovation alone cannot solve this." In aviation, both engine and fuel need to be powerful and light and no power source can rival the energy density of aircraft kerosene.

Hydrogen fuel cells may one day routinely power emission-free buses and cars, but the need for strong heavy tanks and fuel-cell stacks rules hydrogen out for aircraft. Boeing once toyed with a blended wing-body, a sort of flying wing, to produce dramatically better aerodynamics and fuel efficiency. Passengers would have sat in a wide cabin, rather like a small amphitheatre. But tests with a mock-up produced such a negative reaction that the company dropped the technology, except for military refuelling aircraft.

One way to cut aircraft emissions would be to improve air-traffic control. IATA reckons that a cut of 12% could be made from changes such as putting European air-traffic control under one organisation instead of the 35 different national bodies that now operate the network. IATA has already brokered deals to cut corners off international [illegible]

national borders or to avoid military-training areas. One recent example is a new route over China which will cut 30 minutes off flights between China and Europe, saving each year nearly 3,000 hours of flight time, 27,000 tonnes of fuel and over 84,000 tonnes of CO_2.

Waiting to land

Crowded airports compound the problem. Busy runways at places such as Heathrow mean aeroplanes have to circle wastefully. The possibility of being held up ensures that pilots carry extra fuel, thereby increasing the aircraft's weight and, hence, its consumption of fuel. Other small changes could further save fuel and avoid carbon emissions: aircraft could be towed everywhere on the ground by electric vehicles. Consumers, too, can take a stand by voluntarily offsetting the carbon emissions associated with flying by paying, for instance, to have trees planted.

Yet given the limits of technical and operating fixes, taxes and permit trading remain the only practical ways to curb emissions. Airlines protest that taxes are a blunt instrument with only marginal environmental benefits. The European Commission has not ruled out some taxes but its main proposal is to make airlines join the ETS. The European Commission has said the effect on fares should be no more than an extra €9 ($11.60) on a ticket—which smacks of tokenism. Given that fuel surcharges of up to £70 ($132) a ticket are not trimming demand at some carriers, it is hard to see how that would make much difference to air travel. Sometimes there is no substitute for taking the plane, and airlines have no substitute for kerosene.

The European plans would, however, make airlines part of the virtuous "cap and trade" system that is supposed to reward industries that can reduce their CO_2 output. Each carrier on a route departing from Europe would be given a CO_2 allowance. Airlines could buy additional quotas needed to sustain their growth, with no net addition to global-warming gases. But enforcement might be difficult, especially with airlines from America—which does not recognise the Kyoto treaty. If American carriers were excluded, however, they would enjoy an unfair advantage over European competitors.

The way the allowances are awarded to airlines would be crucial to the success of any scheme. IATA wants them to be based on historic levels of CO_2 emissions, a practice known as "grandfathering", since it preserves the status quo favourably for its members. But the young low-cost carriers in Europe, led by easyJet and Ryanair, prefer an auction. Stelios Haji-Ioannou, the founder of easyJet, sees grandfathering as another form of subsidy for the large network carriers. If evidence that the ETS's current design favours incumbents were needed, British Airways' former chief executive, Rod Eddington, argued for extending it to include airlines.

This week IATA said the net loss of the world's airlines in the past six years would amount to almost $44 billion. Carriers have been hit by terrorism, war, recession, the respiratory disease SARS and soaring oil prices. There were hopes the industry could make a small profit in 2007, but having to pay for environmental costs could change that. Yet global warming is not something that airlines, or any other industry, can shake off for ever. Sooner or later, aviation will have to shoulder the burden it imposes on the planet.