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Hainan and ANA operate the most fuel-efficient transpacific flights

New study ranking 20 carriers shows 64% gap between leaders and least efficient Qantas

Hainan Airlines and All Nippon Airways (ANA) ranked first in overall fuel efficiency among transpacific carriers in a study released today by the International Council on Clean Transportation (ICCT). The study analyzed 20 airlines operating nonstop flights between the mainland United States and East Asia and Oceania. The difference in efficiency performance between two co-leaders and the least fuel-efficient carrier, Qantas Airways, was 64%, the widest gap identified in ICCT studies to date.

Hainan and ANA used different strategies to achieve similar operating performance, the study found. Hainan operates a very efficient fleet of Boeing 787 Dreamliner aircraft. ANA, in contrast, relied on robust freight operations; it carries about three times as much “belly” freight per passenger as Hainan. At the other end of the spectrum, the study attributes Qantas’ inefficiency to that fact that it operated aircraft with higher fuel burn at very low passenger and freight load factors. Overall, freight share of total payload was the most important driver of transpacific fuel efficiency in 2016, accounting for nearly half of the variance across carriers.

"This research shows that there are a variety of ways that international airlines can reduce fuel use and carbon emissions," said ICCT’s Brandon Graver, lead author of the study. "Buying new aircraft, carrying large numbers of passengers, and optimizing freight strategies all make a difference."
A general trend the study found is the fuel burn per passenger kilometer increases along with aircraft size and weight. Very large, four-engine aircraft typically have higher fuel burn per passenger than aircraft with two engines. Airlines that predominantly use the Boeing 747 and Airbus A380 – Asiana, Korean Air, and Qantas – had the lowest overall fuel efficiency on transpacific operations. In addition, the seating densities and passenger load factors on these aircraft were typically less than the industry average.

“There’s a reason airlines around the world are starting to avoid very large aircraft like the 747 and A380,” said Dan Rutherford, ICCT’s aviation program director and co-author of the paper. “Newer twin-engine widebodies provide the payload and range capabilities needed for transpacific flights with much lower fuel burn.”

Aviation is a major contributor to climate pollution, accounting for about 2.5% of global CO₂ emissions. The International Civil Aviation Organization (ICAO) forecasts airline traffic in Asia/Pacific will account for 31% of CO₂ from international aviation in 2020, with North America at 15%. In order to achieve ICAO’s long-term, aspirational goal of increasing the fuel efficiency of international flights by 2% annually, more fuel-efficient wide-body aircraft will need to be introduced to keep up with demand.

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Figure 1. Fuel efficiency of 20 airlines on transpacific passenger routes, 2016

Figure 2. Difference from industry average fuel efficiency of 31 pax-km/L for 14 aircraft types used on transpacific routes, 2016
The International Council on Clean Transportation is an independent nonprofit organization founded to provide first-rate, unbiased research and technical and scientific analysis to environmental regulators. Its mission is to improve the environmental performance and energy efficiency of road, marine, and air transportation, in order to benefit public health and mitigate climate change.