

FLYING HAS BECOME MORE ENERGY EFFICIENT THAN DRIVING

LONDON: Flying has become less energy intensive than driving, at least in the United States, according to the surprising findings of an analysis of energy consumption by the University of Michigan's Transportation Research Institute.

Transporting one person a distance of one mile by aircraft consumed on average the energy equivalent to 2,465 British thermal units (BTUs), compared with 4,211 BTUs for moving one person one mile by car, in 2012.

If fuel use is adjusted to account for commercial freight and mail carried on passenger aircraft, flying consumed just 2,033 BTUs per person mile, according to researcher Michael Sivak.

One BTU is formally defined as the amount of energy needed to raise the temperature of one pound of water by one degree Fahrenheit. Informally, it is roughly the energy released by burning a kitchen match. A gallon of gasoline contains roughly 124,000 BTUs, a gallon of jet fuel about 135,000 BTUs and diesel almost 139,000 BTUs. Sivak's research shows driving consumed 71 percent more energy per person-mile than flying in 2012, or more than double if flying data are corrected for cargo ("Energy intensities of flying and driving" April 2015).

Aviation still has a reputation for being a particularly energy-intensive mode of transportation for moving people but Sivak's findings suggest that reputation may no longer be deserved.

At the start of the 1970s, aircraft were particularly inefficient and consumed twice as much fuel per person-mile than passenger cars (<http://link.reuters.com/sek64w>).

Since then, however, the amount of energy consumed per passenger-mile by aircraft has fallen by almost 80 percent while the efficiency of driving has improved by less than 17 percent. The crossover point, when aircraft became less energy-intensive than cars, occurred around the turn of the millennium.

EFFICIENCY TRENDS

The switchover in energy intensity is the result of several trends which have tended to make flying more efficient but have had a much more ambiguous effect on driving.

New aircraft are much more fuel efficient than the ones they replaced. Airlines have learned to operate them using less fuel by cutting the amount of unnecessary weight carried on board. And seat occupancy is much higher than it was in previous decades.

In contrast, cars have become heavier and more powerful and they are much more likely to be occupied by just the driver rather than passengers. Carpooling on the way to work, for example, has become much less common than it was in the 1970s and 1980s. There are several important qualifications to this analysis. The data is based on the United States, famous for its larger and more powerful passenger vehicles. Cars in the European Union and Japan, where vehicles tend to be smaller and lighter, consume far less energy per passenger mile.

Sivak's research is an important reminder about the effect that choices about energy efficiency, vehicle size and engine power have on fuel consumption.

The analysis is also sensitive to trip length. The average length of a driving trip is just 9 miles while an average flight is 914 miles — 100 times longer.

Short car journeys tend to be much more energy-intensive than longer ones because they are more likely to occur on urban roads (with lots of starts and stops) and have a single occupant.

Longer car journeys ones on the free-ways and interstate network are more fuel

efficient and more likely to involve multiple occupants, which cuts energy consumption per person-mile dramatically.

But aircraft are also more fuel efficient over longer journeys than shorter ones because so much fuel is consumed during the takeoff phase. By some estimates, take-off can account for as much as a quarter of the fuel consumed on a short flight.

MOBILITY DEMAND

Sivak's analysis reveals some important truths about energy consumption and transportation. First, energy consumption is directly related to the demand for mobility, a point which is often underplayed in discussions about energy and climate change. Aviation tends to account for a very high share of per capita fuel consumption and per capita greenhouse emissions not because aircraft are inefficient but because of the long distances involved in air travel compared with other modes of transport such as cars.

Rising fuel consumption and greenhouse emissions stem from an increase in demand for very long distance travel - especially intercontinental flights and among middle and lower income groups - which are a central part of a modern, interconnected world.

Second, modes of transport are not inherently efficient or inefficient. Better design can result in substantial efficiency improvements. The way in which modes of transport are operated is at least as important as their physical construction. And regulations and fuel prices have an important role to play driving energy efficiency.

At a global level, demand for mobility is set to increase significantly in the decades ahead. As a higher share of the world's population moves out of extreme poverty into middle income status, they too will want to travel long distances for work, leisure and to visit friends and family, and to consume products made far away, which implies an enormous increase in transport demand.

One option is to restrain the demand for mobility through regulations and actions designed to make transport much more expensive (such as increasing the cost of fuel through taxes or emissions charges).

Another is to shift people and products from transport modes with high energy intensity (such as aircraft) to ones which consume less fuel per passenger-mile (such as rail), though Sivak's analysis raises questions about some of the assumptions commonly made about the energy intensity of different modes of transport.

The third option, and in many ways the most promising, is to improve fuel efficiency within existing modes of transport. Sivak shows this course holds enormous promise through improvements in design and choices about how transport modes are operated. Airlines have become more fuel efficient, in part, because they have cut excess weight and raised seat occupancy to record levels. Cars on the other hand, at least in the United States, have become heavier and drive around with most of the seats empty.

Improvements in transport design and operation offer the best hope of meeting the world's growing demand for mobility while curbing greenhouse emissions.

Efficiency improvements are, in turn, linked to the price of fuel and government regulations. The three approaches to curbing emissions (fuel pricing, mode shifting and enhanced efficiency) are complements rather than substitutes.

Nonetheless, the biggest reductions in greenhouse emissions are likely to come from using existing transport systems more efficiently, rather than trying to force people to stay at home by making travel dramatically more expensive. — Reuters



SEATTLE: In this photo taken Thursday, April 9, 2015, Bamboo, an Asian elephant, walks in her enclosure at the Woodland Park Zoo, in Seattle. Elephants, one of the most popular animals at American zoos, could become very hard to find over the next few decades as aging pachyderms die and the rest congregate in the handful of zoos capable of caring for the large animals. Facilities like Seattle's have already made the difficult and controversial decision to move their elephants to another zoo so they can join a larger herd. — AP

POPULAR ZOO ELEPHANTS LIKELY TO GET HARDER TO SEE IN FUTURE

SEATTLE: Visitors flocked to the leafy enclosure at Seattle's zoo to watch the two elephants, Chai and Bamboo, as they used their long trunks to play with balls and snack on carrots and apples.

The elephants would sometimes exhibit other behavior. Chai would pace from side to side and bob her head up and down - a sign, animal activists say, of the stress of being confined inside the 1-acre area. It is common behavior, and a growing number of people feel the giant animals - hard-wired to roam free across thousands of square miles in Africa and Asia - don't have a place in American zoos.

Seattle's Woodland Park Zoo recently made the difficult and controversial decision to close its popular elephant exhibit and move Chai and Bamboo to a larger zoo in Oklahoma so they can join a larger herd. Others, like the Bronx Zoo in New York City, say they are moving in the same direction, but will wait until one or more of their existing herd dies. And zoos like Detroit have already retired their pachyderms to one of two U.S. animal refuges.

Many zoos can't give elephants the space they need. They are also social animals that prefer to live in a herd, but that is hard to provide as elephant numbers dwindle, both in captivity and in the wild. As of December 2014, there were 159 African elephants at 39 North American zoos and 139 Asian elephants at 34 zoos in the US and Canada, according to the Maryland-based Association of Zoos & Aquariums. The group In Defense of Animals says 21 zoos in North America have closed their elephant exhibits since 1991.

New rules

At the same time, national guidelines adopted in 2011 would require some zoos to close their elephant programs by 2017 if they cannot increase their herds and expand their facilities.

Some North American zoos have as few as one elephant, said Rob Vernon, spokesman for the Association of Zoos & Aquariums, which drew up the guidelines. The new rules encourage a herd of at least three elephants.

Woodland Park Zoo, which has had elephants in its care since 1921, started discussing the future of its herd after a third pachyderm died in 2014. A community task force recommended in 2013 that the zoo bring in more elephants and expand its facilities, but zoo President and CEO Deborah Jensen said those goals were not achievable, in part because it's so difficult to obtain new elephants.

In the end, Seattle decided their best choice was Oklahoma, where 36-year-old Chai and 48-year-old Bamboo may become the old "aunties" of the herd, Jensen said.

Activists who protested Seattle's decision believe the right place for older elephants to "retire" is at one of the nation's two sanctuaries, in California or Tennessee.

Toni Frohoff, director of In Defense of Animals' elephant campaign, said the Seattle zoo could have made a worse choice than Oklahoma, but she thinks the best choice would have been a sanctuary. Chai and Bamboo are currently in San Diego, where they were temporarily rerouted because of bad weather on their way to Oklahoma.

Not feasible

There's very little consensus - even among animal experts - about what is the right choice to make for the elephants currently in American zoos. Bringing more Asian or African elephants to this country no longer seems feasible and breeding programs have been minimally successful. Officials in Seattle, which was forced into court over its decision to move its elephants to Oklahoma, say they did what they thought would be best. Jensen was frustrated with the intense focus on Seattle's decision.

"The question is: Are we going to share the earth with elephants?" she asked, noting that African elephants are being killed at the rate of 96 a day or 30,000 a year, for their ivory. "Sadly, I am pessimistic." John Houck, deputy director of the Point Defiance Zoo and Aquarium in Tacoma, Washington, has two Asian elephants, age 50 and 51. They are too dangerous to do well in a larger group and too old to move. After they die, Tacoma plans to replace them with another endangered species, perhaps rhinoceroses.

Looking out a decade or more, Houck does not see a future for Asian, and possibly African, elephants in this country. Keeping a small group of elephants in North America would require the birth of seven to nine calves each year. That is not happening, especially as more females become too old to reproduce. During a recent visit to the Seattle zoo with her two small children, visitor Rebecca Young said she was sad to see the empty enclosure where Chai and Bamboo used to live. "I hope they find joy in San Diego or Oklahoma or wherever they land," she said. — AP

CLINIC
PAGE



Kuwait Times
248 33 199

Dr. Fahad Al-Mukhaizeem
فهد علي المخيزيم
Consultant Pediatrician استشاري أطفال
M.B. Bch. FRCPC. FAAP. PEM

Al-Jabriya - Block 1A - St. 1 - Mazaya Building - 15th Floor - Clinic B - Tel.: 22269369 - Fax: 22269368