AIR TRANSPORT ASSOCIATION

The Commercial Airlines' Climate Change Commitment

Statement of James C. May
President and CEO
Air Transport Association of America, Inc.
before the
House Select Committee on Energy Independence and Global Warming

April 2, 2008

Thank you, Mr. Chairman. ATA airline members transport more than 90 percent of all U.S. airline passenger and cargo traffic.[1] Our airlines take their role in controlling greenhouse gas emissions very seriously and I appreciate the opportunity to appear before you today to discuss what we are doing to tackle this important issue.

INTRODUCTION AND OVERVIEW

In the broadest policy terms, the task before Congress and this Select Committee is how the nation can achieve reductions in greenhouse gas (GHG) emissions while maintaining its economic stability and enhancing energy independence. Commercial aviation has a vital role to play in this regard.

For generations, flying has contributed to a better quality of life in America. Commercial aviation has been essential to the growth of our economy, yielded breakthrough technologies and brought people together and transported critical cargo – all while achieving an exceptional environmental track record. Today's airplanes are not just smarter – they are quieter, cleaner and use less fuel than ever before – but we also fly them smarter. That's why our industry represents just two percent of all GHG emissions in the United States, while driving three times more economic activity. But we are not stopping there. The initiatives that we are undertaking to further address GHG emissions are designed to responsibly and effectively limit our fuel consumption and GHG contribution while allowing commercial aviation to continue to serve as a key contributor to the U.S. economy. I want to emphasize three points that are essential to moving this effort forward:

First, ***commercial airlines are extremely GHG-efficient.*** For the past several decades, commercial airlines have dramatically improved our GHG efficiency by investing billions in fuel-saving aircraft and engines and innovative technologies like winglets and cutting-edge route optimization software. Fuel is our largest cost center, creating an economic imperative to maintain our record of continuously improving GHG efficiency. And while commercial aviation accounts for only two percent of domestic man-made GHG emissions, we shepherd this to good use, driving a far larger percentage of economic activity, not only directly, but also indirectly, as a necessary element in the airport and tourism

sectors and in all business sectors that rely on the rapid delivery of goods and human resources.

Second, ***ATA airlines are proactively committed to further limiting their GHG footprint*** through a set of measures that will simultaneously address climate change and energy independence while preserving economic stability and the opportunity to grow. At the core of these measures is the ATA carriers' commitment to an additional 30 percent fuel efficiency improvement by 2025 – improvement that only comes from the airlines' investment in new aircraft, new aircraft engines, navigation aids and enhanced operational procedures. In addition, we are dedicating ourselves to developing commercially viable, environmentally friendly alternative jet fuel, which could be a game-changer in terms of aviation's GHG output. Moreover, we are central stakeholders in partnering efforts to modernize the outdated air traffic management (ATM) system and to reinvigorate research and development in aviation environmental technology.

Third, ***there is a critical role for the federal government to play*** , not for the industry and hopefully not against the industry, but, rather, with it. While the ATA airlines' 30 percent fuel efficiency improvement target will be met purely through the airlines' investments and operating initiatives, the other measures in the package require a significant measure of congressional support. For example, although we are working with the Federal Aviation Administration (FAA) on plans to replace the antiquated ATM system – an upgrade that promises to bring 10-15 percent emissions improvement on top of the ATA commitment – congressional approval is needed before significant progress can be made in implementing this system. Further, the commercial airlines cannot stimulate the development of environmentally friendly alternative jet fuel and aircraft environmental technology on our own. Congressional support and funding and other incentives are vital to these research-intensive initiatives.

Just as we ask Congress to continue to work with us, we also urge Congress to calibrate any climate change-related legislation so it does not work against our efforts. To have the resources to continue our fuel efficiency and other advances, we must have the capital to invest in newer aircraft and other emissions-reducing measures. Punitive economic measures that siphon funds out of our industry would severely threaten that capability, as would unilateral efforts that do not take the international nature of aviation into account. A vibrant, competitive and growing aviation sector is a key part of the solution – not an impediment to ensuring a future where a strong economy, freedom from foreign oil and cleaner air are the order of the day.

Commercial Aviation Is Extremely GHG Efficient

Recently, there have been reports from the press, many coming out of Europe, raising alarm bells about commercial aviation's contribution to climate change. In fact, the very subtitle of this hearing, "Curbing Soaring Aviation Emissions," picks up on such a theme. Let me set the record straight. U.S. commercial aviation contributes about two percent of domestic U.S. GHG emissions.[2] To put that into context, as illustrated in Figure 1, power plants account for over a third of domestic GHG emissions, and road transport accounts for over a fourth.[3] The picture is similar when viewed on a worldwide basis. On a global basis, worldwide commercial aviation contributes about three percent of man-made GHGs.[4] To put this into perspective, cattle and other livestock account for approximately 18 percent.[5]

Figure 1 – U.S. Aviation Greenhouse Gas Emissions Two Percent of the Inventory

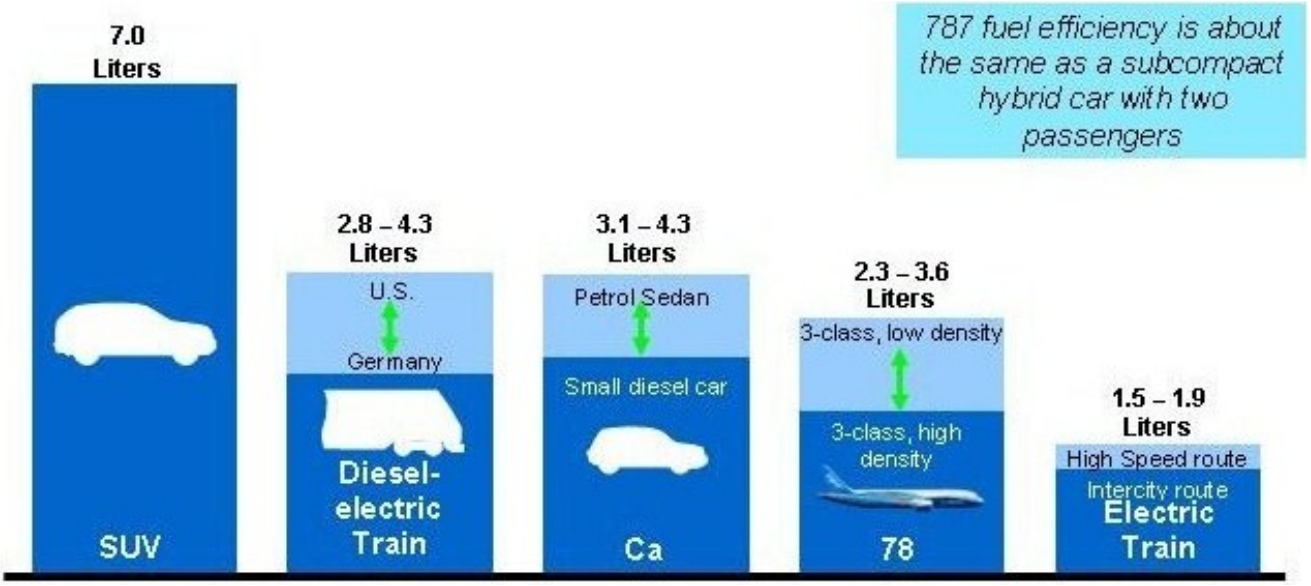
At the same time, commercial aviation is critically important to local, national and global economies, enabling

a large percentage of U.S. economic output. A March 2006 study by the Campbell-Hill Aviation Group found that "the national economy is highly dependent on commercial aviation, which is directly or indirectly responsible for 5.8 percent of gross output, 5.0 percent of personal earnings and 8.8 percent of national employment."[6] The study further noted that this translated into $380 billion in earnings, 11.4 million jobs and $1.2 trillion in U.S. output in 2004. Placing our economic output side-by-side with our GHG output, it is clear that commercial aviation is an extremely GHG-efficient economic engine, bringing good "bang" for our GHG "buck."

We have been able to deliver such strong economic output while reducing our emissions by continually improving our fuel efficiency through reinvestment in technology and more fuel-efficient operations. In fact, U.S. commercial airlines (passenger and cargo combined) improved their fuel efficiency by 103 percent between 1978 and 2006, which (given the one-to-one relationship between fuel consumption and carbon dioxide (CO_2)) has resulted in 2.3 billion metric tons of CO_2 savings – roughly equivalent to taking 17 million cars off the road each of those years. The improvement in recent years has been particularly dramatic. Bureau of Transportation Statistics data confirm that U.S. carriers burned four percent less fuel in 2006 than they did in 2000, resulting in absolute reductions in GHG emissions, even though they carried 12 percent more passengers and 22 percent more cargo.

Commercial aviation's GHG efficiency compares very favorably to other modes and other sectors. While commercial aviation improved its per-passenger fuel efficiency 4.7 times from 1990 to 2005, freight trucks showed the reverse trend, with GHG emissions growing faster than vehicle miles traveled.[7] EPA also has confirmed that passenger vehicles have lagged far behind aircraft in fuel and GHG efficiency.[8] (***See*** Figure 2). Within the aviation sector, it is important to remember that different types of commercial aircraft have vastly different impacts on the environment. Commercial jets are five to six times more fuel efficient than corporate jets. The math is simple: carrying 200 people and cargo across the country in a single plane burns a lot less fuel than 33 separate corporate jets, each flying six people.

Figure 2 – Among the Most Efficient Modes of Transportation, But More Than Six Times Faster



• Computed per 100 passenger kilometers, assuming average modal load factors (1.6 passengers for SUV and cars, 38.7% for German diesel train, 70% for low density 787, 90% for high density 787 and 47.6% for electric trains). Load factor not available for U.S. train and based on total system wide energy consumption and passengers carried in 2000.

• CO_2 generated by each transportation mode converted to equivalent liters of diesel for comparative purposes.

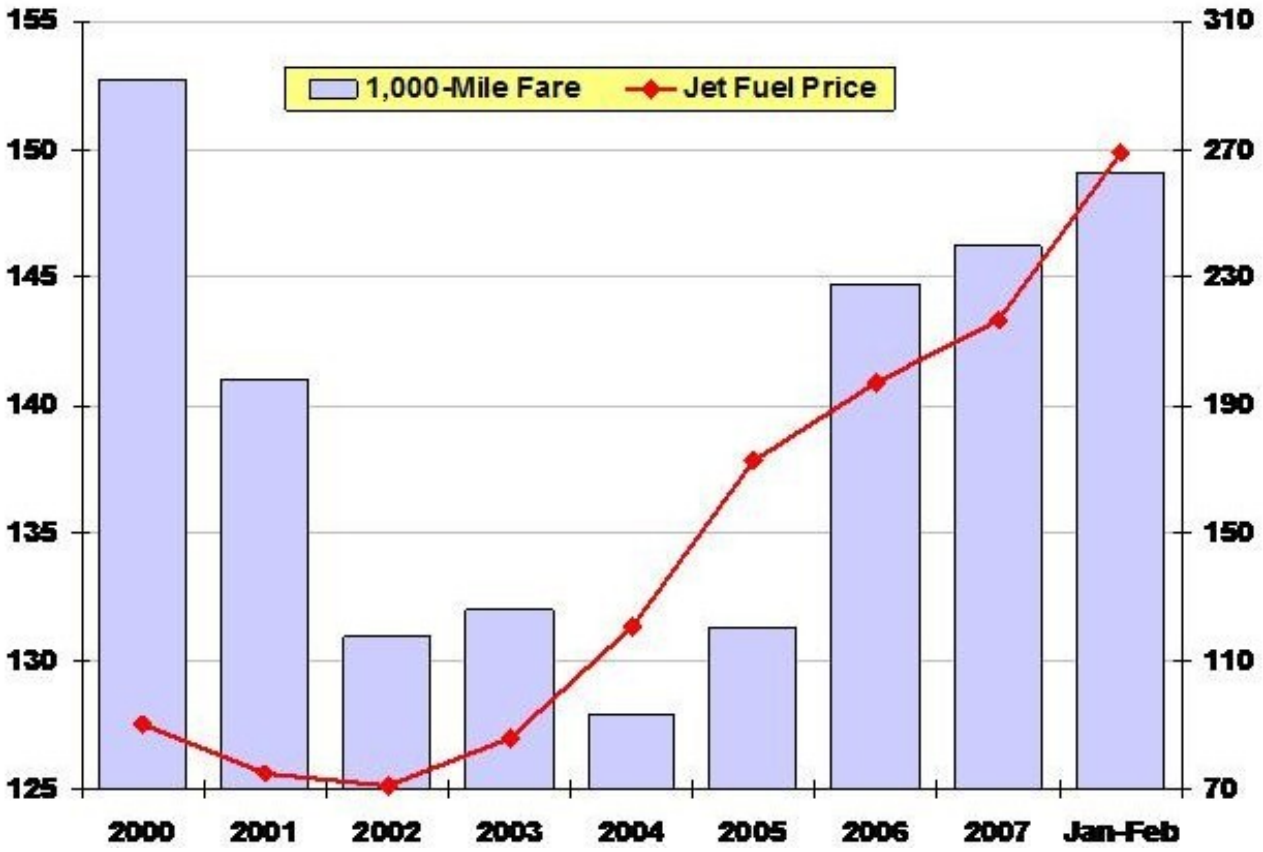
- Comparable-basis subcompact hybrid car efficiency is 2.7 liters /100 passenger km.

- Diesel-electric train system predominantly diesel-powered.

- EU electric trains are assumed to have typical electricity generation factors, reflecting a mix of fossil fuels, nuclear and hydroelectric sources.

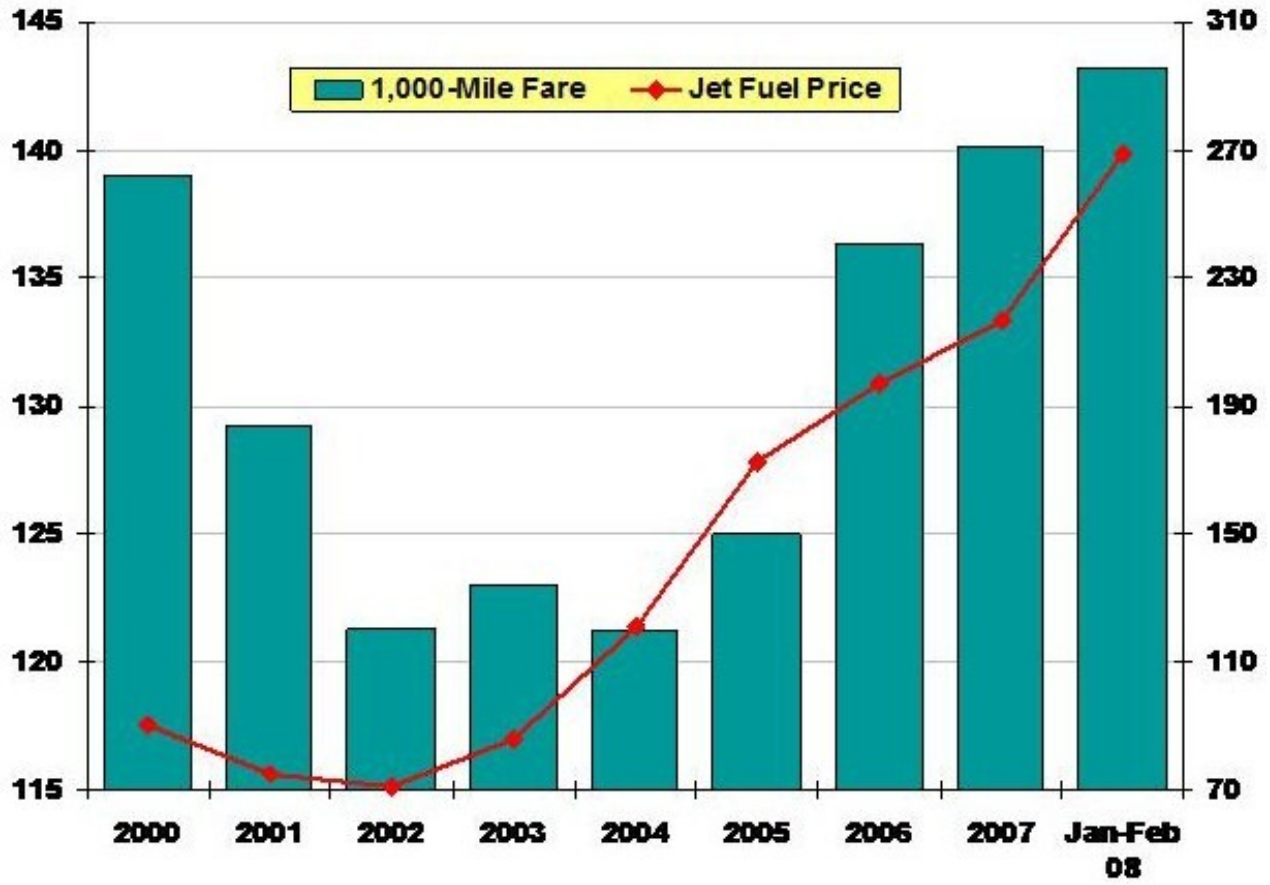
U.S. airlines are highly motivated to continue this trend. Fuel, long one of the two highest costs for airlines, is now our largest cost center, averaging between 30 to 50 percent of total operating expenses and costing $41.2 billion in 2007. And contrary to popular belief, the airlines cannot pass on significant portions of these costs. Indeed, as illustrated in Figure 3, today's U.S. domestic air fares remain below 2000 levels, although fuel prices have tripled. While a slightly more robust international aviation market has allowed today's systemwide fares to increase approximately three percent above 2000 levels, this hardly makes up for the three-fold increase in fuel prices over the same period. (***See*** Figure 4.) Thus, the market already is sending the commercial airlines a "price signal" that some call for in legislation. We have an unrelenting economic imperative to reduce fuel consumption; therefore, an economic win is an environmental win.

Figure 3 – As of Early 2008, Domestic Airfares Remain Below 2000 Levels, While Jet Fuel Prices Have Tripled



Source: ATA monthly passenger revenue report (DOM + EXP) and U.S. Energy Information Administration

Figure 4 – As of Early 2008, Systemwide Airfares Just Above 2000 Levels, While Jet Fuel Prices Have Tripled

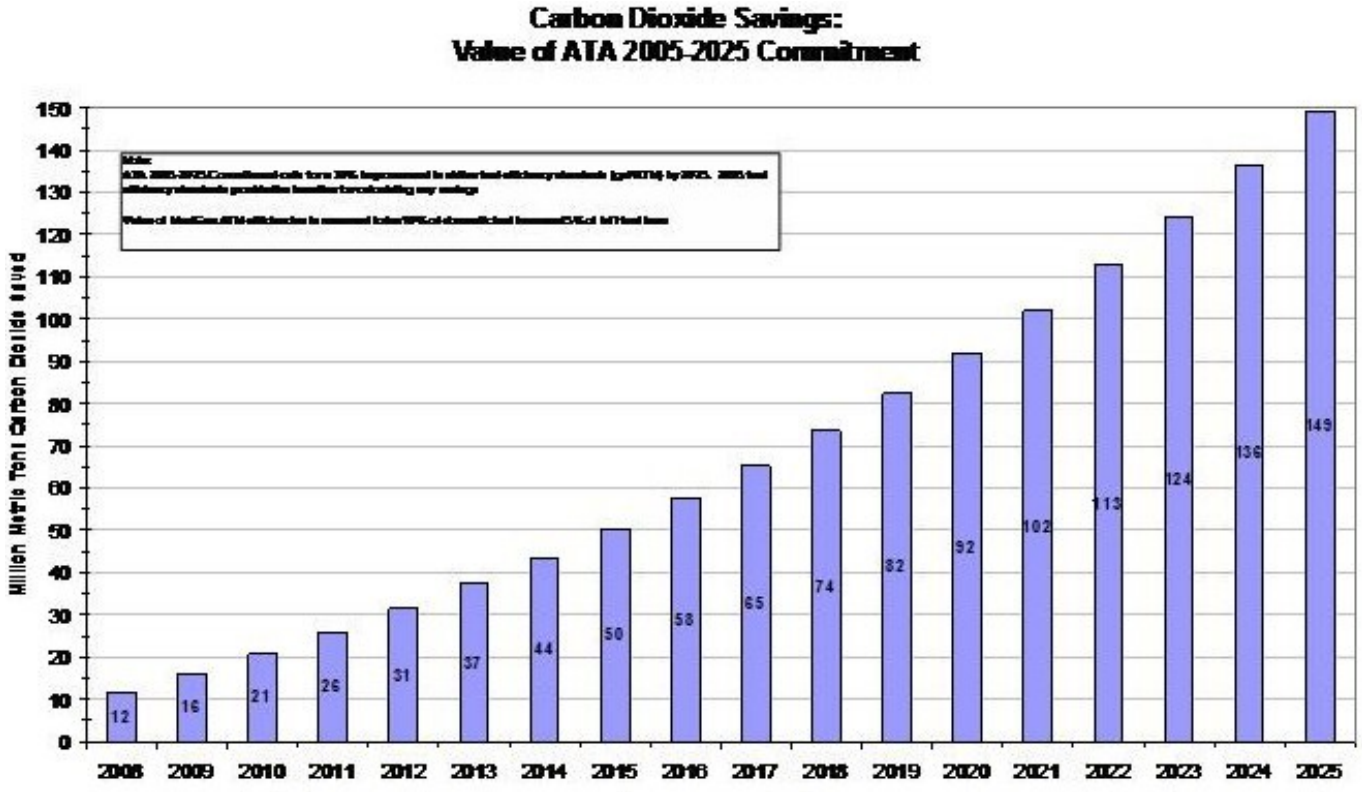


Source: ATA monthly passenger revenue report (DOM + EXP) and U.S. Energy Information Administration

ATA ' s Airlines Are Proactively Committed to Further Limiting Their GHG Footprint

In the invitation letters for this hearing, the Select Committee noted its concern that the demand for air services going forward will lead to "soaring" GHG emissions. It is true that as demand for air passenger and cargo services grows, some growth in aviation emissions is predicted. However, the Intergovernmental Panel on Climate Change (IPCC), which is considered the authority on this issue, has determined that under the most likely scenario, CO_2 from global aviation in 2050 will account for only about three percent of total man-made CO_2 emissions and that aviation's overall GHG impact will be around five percent.[9] Yet even though those remain relatively small numbers, the ATA carriers are relentlessly pursuing measures to further limit their GHG footprint.

Figure 5 – ATA's 30 Percent Fuel Efficiency Goal Will Translate Into CO_2 Savings



At the core of our efforts, the ATA carriers have made a commitment to achieve an additional 30 percent systemwide fuel efficiency improvement through 2025, on top of prior improvements. That equates to an additional 1.2 billion metric tons of CO_2 saved – roughly equivalent to taking over 13 million cars off the road each year. (***See*** Figure 5). To accomplish this, our airlines will continue and step-up the tremendous investments in new equipment and in operational innovations that have allowed us to achieve such great fuel efficiency improvements in the past. We are leaving no stone unturned. Some examples of our efforts include:

- **Upgrading Fleets**. Even in the highly constrained financial environment we now find ourselves in, the ATA airlines are expending billions to upgrade their fleets through investments in new airframes and engines, removing less fuel-efficient aircraft from their fleets, installing winglets to reduce drag, altering fan blades and other measures aimed at improved aerodynamics. As a critical element of our commitment to achieve an additional 30 percent fuel efficiency improvement by 2025, Boeing estimates that the North American carriers will spend approximately $730 billion on new aircraft through 2026.[10]
- **Introduction of Innovative, Cutting-Edge Technologies**. Our airlines also are investing millions of dollars in technologies to make existing airframes more efficient. For example, the airlines have undertaken equipage for Required Navigation Performance (RNP) approach procedures, which provide navigation capability to fly a more precise path into an airport. The ATA airlines also have developed software to analyze flight paths and weather conditions, allowing aircraft to fly more direct, efficient routes (subject to air traffic approval).
- **Improved In-Flight Operations**. The ATA airlines are doing all they can within the existing ATM system to utilize systems to optimize speed, flight path and altitude, which not only reduces fuel consumption in the air, but avoids wasting fuel waiting for a gate on the ground. In addition to pursuing the use of RNP approach procedures at additional locations, the ATA carriers have worked with FAA to pioneer protocols for continuous descent approaches (CDAs), which reduce both emissions and noise, and we are doggedly pursuing implementation of CDAs where the existing ATM system

allows.[11] Further, our carriers are implementing Automatic Dependent Surveillance Broadcast (ADS-B) satellite tracking technology, which avoids the circuitous routings that occur with today's radar-based systems. Demonstrating that the efforts extend to the smallest details of airline operation, our members also have worked on redistribution of weight in the belly of aircraft to improve aerodynamics and have introduced life vests on certain domestic routes, allowing them to overfly water on a more direct route.

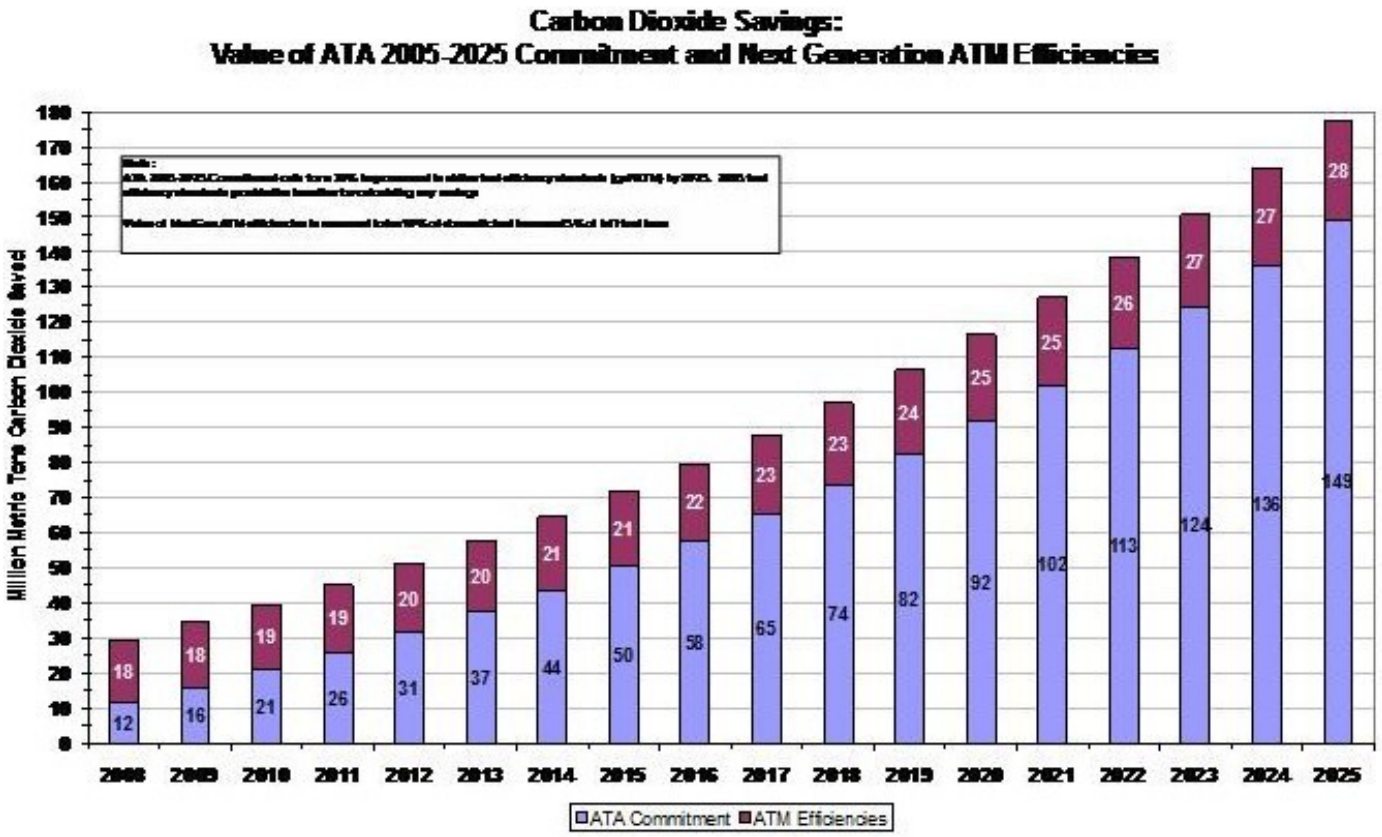
- **Improved Ground Operations**. The ATA airlines also are introducing single-engine taxiing when conditions permit, redesigning hubs and schedules to alleviate congestion and converting to electric ground support equipment when feasible. They also are improving ground operations by plugging into electric gate power where available to avoid running auxiliary power units and using tugs to position aircraft where feasible.
- **Reducing Onboard Weight**. The ATA airlines continue to exhaustively review ways, large and small, to remove aircraft weight – removing seat-back phones, excess galley equipment and magazines, introducing lighter seats and beverage carts, stripping primer and paint and a myriad of other detailed measures to improve fuel efficiency.

Second, recognizing that improving fuel efficiency with today's carbon-based fuel supply can only take us so far, ATA and its airlines are making extensive resource commitments to stimulate the development of commercially viable, environmentally friendly alternative fuels. As a framework for doing this, we are a founding and principal member of the Commercial Aviation Alternative Fuels Initiative (CAAFI), a consortium of airline, government, manufacturer, fuel suppliers, airports and other stakeholders who hold the various keys to research, development and responsible implementation of alternative jet fuels. Developing alternative jet fuels is a "higher hurdle" than developing alternative fuels for ground-based units, as jet fuel must meet rigorous FAA specifications, which include reliability and stability at altitude and in greatly varying temperature and pressure conditions to ensure safety. Thus, absent a cooperative initiative like CAAFI, fuel providers almost certainly would not undertake the investments needed to clear this higher hurdle, opting instead for the surer payoff at ground level.

While each entity involved in CAAFI has a role to play, our airlines understand that – as end users of the ultimate product – they must not only make clear their specifications for alternative jet fuels, but also signal the market that we will financially back fuels meeting those specifications. Last week the ATA Board of Directors took another significant step in this regard, issuing the "ATA Alternative Fuels Principles Document." Among other things, that document stipulates that the ATA carriers require that any future alternative jet fuel be more environmentally friendly, on a life-cycle basis, than the jet fuel available today. Through CAAFI and other partnerships, we are undertaking the work to be sure that tomorrow's alternative jet fuel meets that criterion. And accomplishing that will ensure the full decoupling of growth in aviation demand from growth in GHG emissions.

Third, while the ATA airlines are doing all that they can to promote efficiencies within the current ATM system, the limitations of that system account for between 10-15 percent of unnecessary fuel burn and resulting emissions. To address this, and to achieve much-needed modernization of our outdated ATM system, ATA and its carriers are working with FAA and other agencies on a fundamental redesign of the system through the Next Generation Air Transportation System (NextGen) project and on various regional airspace design initiatives. ATA is supporting this modernization initiative, which is bound up in the FAA reauthorization process that appears to be stalled in Congress, through our "Smart Skies" program.[12] However, congressional approval, including fair and equitable distribution of costs among all system users, is needed before significant progress can be made in implementing this system. Congressional authorization and implementation of this initiative will bring 10-15 percent additional savings on top of the ATA 30 percent commitment. (***See*** Figure 6).

Figure 6 – CO2 Saved Under ATA and NextGen Initiatives
(As if NextGen Implemented in X Year)



Fourth, at the same time ATA and its members are pushing the envelope with existing technology, we continue to contribute to work that will advance new technology. For example, ATA participates in key, joint government/stakeholder initiatives, including the Steering Committee of the Partnership for AiR Transportation Noise & Emissions Reduction (PARTNER) and the Environment and Energy Subcommittee of FAA's Research Engineering and Development Advisory Committee. While additional evolutionary environmental improvements are in the pipeline as a result of such initiatives, revolutionary environmental breakthroughs can only come about through the reinstatement of significant federal investments in basic aeronautics research and development programs at NASA and FAA. Indeed, Pratt & Whitney's new geared turbofan engine, which offers both noise and emissions benefits, as well as many features of Boeing's more environmentally efficient 787 were spawned through such programs. As we have noted in other contexts, however, congressional funding to these agencies for aeronautics research and development – specifically including for environmental projects – has been cut significantly (by about 50 percent) in the past 8-10 years, compromising the public-private partnership for exploring and bringing to market products with significantly improved environmental performance.[13] Thus, we continue to urge Congress to provide this needed funding.

Congress Has a Positive, Partnering Role to Play

We are confident that the measures ATA is undertaking and supporting will continue to limit and reduce aviation's GHG footprint, such that commercial aviation will remain a very small source of GHGs, even as air traffic grows with the future improvements in the economy. However, Congress has a key role to play. First, as noted, congressional approval for implementation of a modernized ATM system is critical, as is reinstatement of funding for research and development programs to foster aviation environmental technology breakthroughs. Further, while Congress generally is supporting several alternative fuel research programs, specific support and funding should be provided for the development of environmentally friendly alternative jet fuels.

Just as we ask Congress to continue to work with us, we also urge Congress to calibrate any climate change-related legislation so it does not work against our efforts. To have the resources to continue our fuel efficiency and other advances, we must have the capital to invest in newer aircraft and other emissions-reducing measures. Indeed, FAA estimates that 90 percent of the fuel efficiency and emissions improvements that the airlines have achieved come through the airlines' own investments in technology. Punitive economic measures that siphon funds out of our industry would severely threaten our ability to continue that record.

Against this backdrop, we are compelled to share our concerns about the apparent front-runner cap-and-trade legislation in the U.S. Senate, S. 2191, the "Lieberman-Warner Climate Security Act," in the hopes that the House of Representatives will craft its legislation to avoid or minimize those concerns.

First, the Lieberman-Warner bill would, in effect, impose a punitive emissions tax on aviation, which would not only harm the economy but also would be counterproductive. As drafted, the bill proposes to cover the transportation sector – including aviation – indirectly, through a cap-and-trade system "upstream," which would require fuel producers to acquire allowances sufficient to cover the GHG content of the fuel they sell to the transport sector. Fuel producers will incorporate the cost of these allowances into fuel prices, passing the costs on to fuel consumers (including airlines) – in effect, operating as a fuel tax on jet fuel and other transportation fuels. This would have significant economic repercussions on the airline industry and the economy, as every penny increase in the price of a gallon of jet fuel drives an additional $190-200 million in annual fuel costs for U.S. airlines.

It is not difficult to calculate the likely costs of application of the Lieberman-Warner bill to aviation. Unlike most sectors, commercial aviation is required to report all of its fuel consumption to the federal government, which compiles and reports this data. Based on this data, and factoring in FAA forecast information, the annual costs to the commercial airlines of the Lieberman-Warner bill in 2012 would be approximately $5 billion, assuming a $25 emissions allowance price. Using analysts' estimates that emissions allowance prices likely will be in the $40 range by 2020, the annual costs to aviation would escalate to almost $9 billion in that year, and would grow thereafter. These increased costs would diminish the airlines' ability to continue to realize the tremendous fuel efficiency improvements and emissions reductions we have achieved within the industry and, therefore, would be counterproductive. Indeed, it is difficult to imagine how we could handle a GHG-based surcharge on top of the exorbitant fuel prices we are experiencing.

Second, based on our fuel and GHG efficiency records and commitments, application of a cap-and-trade bill to commercial aviation simply is unnecessary. As noted, we already are incentivized by the market to minimize GHGs, without further market-based measures. However, if such a measure is to be applied to aviation, it should be carefully calibrated to take key considerations into account, which the Lieberman-Warner bill currently does not do.

One such mechanism would be to provide the commercial airlines with allowances up front, either directly or as a required pass-through from fuel providers, in recognition of the fuel efficiency achievements we have made to date and the importance of preserving the airlines' ability to continue to invest in new aircraft technology. As drafted, the Lieberman-Warner bill does not do this. In contrast, the bill would accord to several sectors – including to industries that do not come anywhere near our fuel and GHG efficiency record – a tremendous amount of free allowances, purportedly to cushion the economic blow and to allow them to invest in modernizing their equipment and facilities to reduce emissions. In effect, the bill would require our industry to subsidize future efforts of other industries that have done comparatively little to reduce their GHG profiles. The U.S. House of Representatives can avoid the inequity and public policy flaws in this approach in crafting its own legislation.

Another key calibration mechanism would be to take some of the proceeds generated from the auctioning of allowances and reinvest those proceeds into aviation. This could allow for additional funding of programs and technologies that promise to further reduce aviation GHG emissions. With a 10-15 percent GHG savings directly on the line, equipage for NextGen is perhaps the most significant candidate in this regard, but funding for aviation alternative fuel and aircraft environmental technology breakthroughs are also well-deserving candidates. A fundamental flaw of the Lieberman-Warner bill is that while it proposes to rechannel

proceeds from auctions into industries like automobile manufacturing, it does not include any provisions for reinvestment in aviation.

Further, any climate change legislation proposing to cover aviation should be crafted to take into account the international nature of aviation, not only that aviation is a global industry and that U.S. carriers must compete with the airlines of other nations on many routes, but also that the United States by treaty has agreed that the International Civil Aviation Organization (ICAO) has the authority to establish standards and policy for international flights.[14] Arguably, the United States should defer to ICAO for additional measures addressing aviation GHGs. At a minimum, however, we should ensure that any measures taken in the United States are compatible with our international aviation agreements.

As an additional example of the need to carefully calibrate any climate change legislation, it is important to recognize that policies that make flying more expensive can have the effect of pushing more people into their cars. This would result not only in increased GHG emissions from the less fuel-efficient ground transportation sector, but also in more GHG emissions and increased traffic deaths, as the highways are much less safe than the air. Again, the U.S. House of Representatives has the opportunity to factor such concerns into its work on this issue.

CONCLUSION

I close by asking you to note the achievements that commercial airlines have made in reducing fuel burn and GHGs, particularly when compared to other industries, and the actions that we are taking to continue our progress in this regard. While we are fully committed to working with Congress and are asking for congressional leadership and support in each of the areas I have described, we are not asking you to work for us, we're asking you to work with us in addressing this environmental and energy concern. We also are urging you to refrain from adopting policies that would work against our efforts. A vibrant, competitive and growing aviation sector is a key part of the solution – not an impediment to ensuring a future where a strong economy, freedom from foreign oil and cleaner air are the order of the day.

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[1] ATA airline members include ABX Air, AirTran Airways, Alaska Airlines, Aloha Airlines, American Airlines, ASTAR Air Cargo, Atlas Air, Continental Airlines, Delta Air Lines, Evergreen International Airlines, Federal Express Corporation, Hawaiian Airlines, JetBlue Airways, Midwest Airlines, Northwest Airlines, Southwest Airlines, United Airlines, UPS Airlines and US Airways. Associate members are: Air Canada, Air Jamaica Ltd. and Mexicana.

[2] According to the most recent United States Environmental Protection Agency (EPA) analysis of GHG emissions in the transportation sector, commercial aviation's contribution to the total GHG emissions in 2003 was 1.75 percent. EPA, ***Greenhouse Gas Emissions from the U.S. Transportation Sector – 1990 -2003*** (March 2006) at pages 5 and 21 ("transportation sources were responsible for about 27 percent of total U.S GHG emissions in 2003," "[a]ircraft produced about 9 percent of U.S. transportation greenhouse gas emissions in 2003," and "[c]ommercial aircraft produced 72 percent of U. S. aircraft GHGs in 2003.") The most recent general inventory of GHG emissions estimates total GHG emissions from "commercial aircraft" to be 158.1 teragrams of carbon dioxide equivalent (Tg CO2 Eq)., or about 2.2 percent of the nation's 7260.4 Tg. Eq., ***EPA Inventory of Greenhouse Gas Emissions and Sinks*** : 1990-2005, Table A-108 at A-123 and Table ES-2 at p, ES-6 (April 15, 2007). It is not clear what is included in the commercial aircraft category, but it is clear that the category has been expanded to include operations other than those conducted by carriers like ATA members. See note c to Table 3-7 at p. 3-9. EPA's draft 1990 to 2006 inventory further confirms that commercial aviation's share

of the total in 2006 was two percent.

[3] EPA, ***Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005.***

[4] It is estimated that on a worldwide basis, commercial aviation accounts for approximately three percent of total GHGs, while at the same time contributing over eight percent of the world's economic activity. ***See*** International Air Transport Association, ***Debunking Some Persistent Myths about Air Transport and the Environment.***

[5] United Nations, Livestock Environment and Development Initiative, ***Livestock's Long Shadow – Environmental Issues and Options*** (2006) at p. 271.

[6] The Campbell-Hill Aviation Group, ***Commercial Aviation and the American Economy***, March 2006.

[7] EPA, ***GHG Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005*** at 3-8.

[8] ***Id.*** at 3-7.

[9] IPCC, ***Aviation and the Global Atmosphere*** (1999) at 8.

[10] The Boeing Company (2008).

[11] For example, one of our carriers is achieving an average savings of 1300 pounds of CO_2 savings per flight for approaches into the Atlanta airport.

[12] "Smart Skies" is a national campaign led by ATA airlines, which advocates modernization of the U.S. ATM system and its funding mechanisms. For more on this initiative, see the Smart Skies Web site, at http://www.smartskies.org

[13] While later funding cuts were even more drastic, a 2002 study by the National Academy of Sciences observed:

In constant year dollars, NASA funding for aeronautics research was cut by about one-third between 1998 and 2000, reducing the breadth of ongoing research and prompting NASA to establish research programs with reduced goals, particularly with regard to TRL (technology readiness level). This significantly reduces the likelihood that the results of NASA research will find their way into the marketplace in a timely manner, if at all. The ultimate consequence is that the federal expenditures are inconsistent with the long-term goal of support for an aviation enterprise compatible with national goals for environmental stewardship.

See National Academy of Sciences, Committee on Aeronautics Research and Technology for Environmental Compatibility, ***For Greener Skies: Reducing Environmental***

Impacts of Aviation , 44 (2002).

[14] This is pursuant to the Convention on International Civil Aviation, commonly referred to as the "Chicago Convention," to which 190 countries, including the United States, are parties.

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