







#### 2007 ENVIRONMENTAL RESPONSIBILITY REPORT PREPARED BY AMR CORPORATION





## Committed to Preserving the Wonders of Our World

"We Know Why You Fly." Our current ad campaign recognizes the reasons you take to the skies. This Environmental Responsibility Report is really about the same thing. You fly to see the wonders our world has to offer: its vistas, its cultures, its *life*. Reducing our environmental footprint is central to making sure those wonders are there for generations to come.













\_\_\_ AMR Corporation & Environmental Responsibility Report



#### Dear Friends of AMR:

At AMR, we are continually evaluating our performance when it comes to running a safe, dependable and efficient operation. Likewise, we are mindful of our environmental responsibilities. This Environmental Responsibility Report (ERR) is an opportunity for us to evaluate how we're living up to those responsibilities and to share our findings with our many stakeholders.

Last year's inaugural ERR focused primarily on our company's carbon footprint. This year's report examines our broader environmental footprint. To ensure the comprehensiveness and transparency of the ERR, we have used the Global Reporting Initiative (GRI) Level C reporting requirements for sustainability reporting as its framework. You can read more about the GRI reporting requirements in Appendix A.

While there is always more to do, we — and indeed, the entire airline industry — have made important strides in reducing the impact of our activities on the environment. Much of our progress can be traced to our increasing fuel efficiency. Today, the U.S. aviation industry consumes 3 percent less fuel than it did in 2000, while carrying 20 percent more passengers and cargo. In last year's report, we committed to building on our progress to date and shared our aggressive plan to further improve fuel efficiency by 20 percent by 2020. In recent months, we — along with the other airlines belonging to the Air Transport Association — have laid out an even more ambitious goal, to increase fuel efficiency by 30 percent by 2025. Our base year of measurement is 2005, and with two years of data collected, I am pleased to announce that we are on track to meet this goal.

The less fuel we burn, the less carbon we emit into the atmosphere. And with an eye toward conserving fuel and reducing emissions, we are in the process of updating our fleet. I hope you will take a few moments to read the section of this report detailing that transformation.

There is much we can do as a corporation to reduce our environmental footprint, but the key to our success will be engaging our customers, employees, suppliers and shareholders in our effort. We all have a stake in a cleaner environment, and we all have a role to play as we demonstrate that we can protect the environment we share while simultaneously preserving the many benefits of air travel.

Thank you for your interest in our company and in environmental responsibility.

Sincerely yours,

Gerard Arpey Chairman, President, and CEO AMR Corporation and American Airlines

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# **About This Report**

#### Report Scope and Boundary\*

Our initial Environmental Responsibility Report (ERR), published a year ago, disclosed our 2006 greenhouse gas (GHG) emissions and focused on key environmental initiatives under way within the company. In this 2007 ERR, we expanded the scope to consider our broader environmental footprint and its impact on the community and the environment.

This report has been completed to meet the Global Reporting Initiative (GRI) Level C sustainability reporting requirements for AMR's two airline subsidiaries, American Airlines and American Eagle. GRI Level C sustainability reporting requirements include the disclosure of specific governance and organizational information as well as the disclosure of at least 10 performance metrics that cover relevant environmental, economic and societal areas. The operations of former AMR subsidiary American Beacon advisors were not considered in the preparation of this ERR and are not believed to have a material impact to AMR's environmental footprint.

Where constraints associated with data collection have limited our reporting ability in select areas, we have summarized data and estimated amounts. To preserve transparency, we have also included statements regarding the material impact, if any, resulting from insufficient information.

\* GRI Standard Disclosures 3.5-3.8 and 3.10-3.12

In this ERR, calendar year 2006 GHG Scope 1 direct emissions were adjusted from 30.3 million to 30.6 million metric tons, and Scope 2 indirect emissions were adjusted from 0.2 million to 0.4 million metric tons as originally reported. This is due to additional data collected regarding purchased electricity, fuel usage in ground support equipment, and availability of new emission-factor data for methane and nitrous oxide from fuel combustion.

In 2009 we will continue to expand the scope of our reporting by combining the publication of our Corporate Citizenship Report and 2008 environmental data. The resulting Corporate Sustainability Report will be our first triple-bottom-line report that includes the environmental, societal and economic performance of our company.

#### Stakeholder Engagement and Ceres Participation

AMR has long sought to engage our internal and external stakeholders: employees, suppliers, customers, regulators, airports, communities, and shareholders. In 1999, AMR joined Ceres (pronounced "series") to further this engagement. Ceres, a national network of investors, environmental organizations and other public interest groups, works with companies like us and stakeholders like you to encourage practical solutions to sustainability challenges.

We requested and became the benefactor of a Ceres stakeholder advisory team — a representative sample of our stakeholders composed of individual volunteers

from investors, environmental nonprofits and peer companies. Collectively, our team worked to discuss and review our sustainability initiatives.

Throughout the past year, we have worked jointly with our Ceres stakeholder advisory team to evaluate the 2006 ERR, discuss sustainable practices throughout our company and create this 2007 ERR. Our partnership with Ceres and the individual efforts of our stakeholder advisory team members have been and will continue to be vital to the success of AMR's sustainability efforts. Their input improves our focus and helps us maintain maximum transparency, ensuring greater future success. We value and look forward to their input regarding future endeavors.

> Throughout this report, we've identified the content that addresses GRI Standard Disclosures. Look for:

Fuel Conservation\* Just as greenhouse gas (GHG) emissions reduction may be vital to the health of our planet, fuel conservation is vital to our company's financial health. Happily, the two work hand in hand — every gallon of fuel saved results in lower expenses and fewer GHG emissions. \* GRI Performance Indicator EN5

See Appendix A on page 46 for the GRI Index references in this report.



## Environmental Awareness: Beyond the Job



Personal Profile

Jay Valenzuela, the lead environmental coordinator at Los Angeles International Airport, sees awareness spreading beyond the workplace. More than 500 American Airlines employees have been trained to be environmental coordinators at their airport facilities. These specialists assist in the oversight of American's environmental compliance at locations around our system. For these key employees, their daily routine can include a little diplomacy, plenty of public relations, a small mountain of paperwork and a ton of details to sweat.

But for Jay Valenzuela, the full-time lead environmental coordinator (LEC) at Los Angeles International Airport (LAX), it all boils down to an employee's environmental awareness.

"As an LEC, I have to maintain the environmental awareness of employees to an extent that it is on their minds regardless of what they're doing. We deal with a lot of laws and rules, but so much of it is about common sense," Jay says. "Especially here in Southern California, we have to keep everyone's awareness level high to meet what may be the most stringent environmental rules in the AA system."

Jay never expected to be in this role. He started with American in 1975 as a flight attendant. He's worked in reservations, passenger service, cargo, safety, and other management roles. But he's been the LEC at the massive LAX operation for seven years.

"I learn something new every day — it's both challenging and fulfilling. There's so much to know about the environmental aspect of this company. I've come to see how what we do at work affects me personally. What we do at work affects how everyone deals with environmental issues at home," Jay says. "More people are looking for ways to recycle, especially e-waste. People are now very aware of chemical mixing. Even if they'd never mixed things like bleach and ammonia at home, maybe they had kept them in the same tray or used them in the same room. They'd never do that now."

Little examples like that add up to an awareness level that changes the way the company operates. Jay tells people he works with to expect the unexpected.

"There's always something that comes up that we haven't seen before. But we can determine what to do in any situation if we think it through," he says. "The key is to know your station and to use common sense to guide your people to the right solution."

Jay can cite plenty of examples that demonstrate how employee awareness is reaching beyond the workplace. He describes how he got a call recently from an employee whose car was leaking what he thought was Freon in the parking lot. It was antifreeze, but the important thing to Jay was that this employee contacted him because he knew that air issues are a major concern at LAX.

Jay loves it that employees will call him with that type of question, looking for advice regarding environmental issues at home.

"It goes back to the employee's environmental awareness level. I was never green-conscious. But that's because I was unaware of the effects of my actions and what options are available to me to do the right thing," Jay says. "When one person is aware, interactions with other employees spread that awareness, whether the employee is conscious of it or not. That awareness is what changes things."

# **Commitment to Environmental Responsibility**



Although these are challenging times for the airline industry, we must maintain our commitment to environmental responsibility. In fact, we are increasing our commitment with more aggressive fuel efficiency standards and expanded reporting as explained throughout this report.

#### **AMR Environmental Policy**

AMR is committed to safeguarding the earth's environment through the ongoing development and implementation of sustainable business practices. The CEO and each employee are responsible for ensuring compliance with this policy. Station/functional management at all locations and subsidiaries shall implement policies and procedures to comply with this policy statement.

#### About AMR

See Appendix B on page 49 for AMR corporate governance information.

#### **Using This Report**

The format of this Environmental Responsibility Report was chosen to reflect our commitment to sustainable business practices. Primary distribution will be in electronic form, and we hope that few readers will find it necessary to print the entire document. To make on-screen reading easier, pages are in landscape orientation to maximize viewing on computer screens. If you must print, please consider printing only the pages you need, and always print double-sided.

#### AMR is committed to the following environmental principles:

- Compliance with environmental laws
   and regulations
- Commitment to safeguarding the earth's environment by adopting sustainable business practices, technologies, and procedures that take pollution prevention and conservation of natural resources into account
- Establishment of programs to communicate appropriate environmental information to affected employees, customers, contractors, the public, regulatory authorities, and emergency response authorities



# Fleet Renewal

The aircraft we fly generate most of our environmental footprint. We're moving forward today to create the efficient fleet of tomorrow.

# Fleet Renewal: Evolution of American's Environmental Profile

As a new era of more efficient aircraft is ushered in, the environmental impact is clear.

An airline's biggest environmental footprint is left by its most visible property: the aircraft it flies.

Our aircraft alone account for 99 percent of the direct greenhouse gas (GHG) emissions reported by AMR. It follows that an airline's most significant ability to affect its environmental impact comes in the form of the aircraft it puts in the air.

The economic realities faced by American and all commercial airlines — rising fuel costs, intense competition, and a slowing economy to name just a few — make decisions that reduce our environmental impact even more challenging. Despite the economic restrictions, we're striving to strike a balance, implementing projects that reduce our environmental footprint by using our economic resources effectively, all while maintaining the safety and reliability that are critical in our business.

At any point on American's historical timeline, our fleet included some of the most efficient aircraft available at that time. Today, we at AMR are in the midst of an effort to replace 300 aging MD-80s — by far

			Fle	eet Efficien	су			
Aircraft Narrow-Body	First Purchase	Currently in Fleet	Final Aircraft Retired	Seats	Fuel Burn (gallons/hour)	Fuel Burn (gallons/seat/hour)	CO <sub>2</sub> Emissions (pounds/seat/hour)	CO <sub>2</sub> Emissions (metric tons per flight hour)
Boeing 727	1964	0	2002	150	1,476	9.8	207.6	14.1
MD-80	1983	300	NA	140	1,073	7.7	161.7	10.3
Boeing 737-800	1999	77	NA	148	846	5.7	120 5	8.1
Wide-Body						Emis	sions	
DC-10-30	1971	0	2000	237	2,977	12.6	265.0	28.5
MD-11	1991	0	2001	238	2,600	10.9	230.4	24.9
Boeing 777	1999	47	NA	247	2,360	9.6	201.6	22.6

Boeing 727

MD-80

Table 1

Boeing 737-800

DC 10-30

MD-11

Boeing 777

Fleet Renewal



Fleet Renewal	$\rightarrow$	$\rightarrow$	$\rightarrow$	$\rightarrow$	+	$\rightarrow$	$\rightarrow$	+	$\rightarrow$									
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the workhorse of American's 655-aircraft fleet — with state-of-the-art Boeing 737-800 aircraft.

The 737-800 is the most advanced version of the 737 family of aircraft, which Boeing first introduced in 1967. Since then, more 737s have been built than any other type of aircraft. Today's 737-800 bears little resemblance to those early models. Design evolutions and revolutions — like new engines, updated wing designs, and the addition of winglets — have kept this popular aircraft at the forefront of the industry.

From an environmental perspective, the benefits of these new aircraft are obvious. The 737-800 burns 28 percent less fuel than the MD-80 and has a larger cabin that can seat more passengers. That results in a 35 percent reduction in emissions on a seatmile basis.

Modernization of our narrow-body fleet is our most pressing need as we pursue greater fuel efficiency gains that will be afforded by the new 737-800s. Our fleet already includes 77 of these efficient aircraft, and more are on the way. In early 2008, American announced it will replace 76 MD-80s with new 737-800s that will be delivered between 2009 and 2010. In time, we will evaluate alternatives for our widebody aircraft as we continue to renew the American Airlines fleet.

But why not scrap all the MD-80s immediately? Many factors play into that.

#### **Dollars and Sense**

Reductions in the GHG emissions of an aircraft fleet are connected directly to reductions in jet fuel consumption; for every pound of jet fuel not used, carbon dioxide emissions are cut by 2.8 pounds. That enables us to justify environmental gains with a sound economic program. But the business case for such changes must also incorporate costs associated with integrating new aircraft into a fleet.

The most significant cost in adding new aircraft is, of course, the price tag. Consider the case of a family that owns two cars. Replacing both vehicles at once would place a hefty burden on the family budget. Lenders, such as the local bank, may be willing to lend enough money to replace one of the cars, but not both. So



#### Fuel Efficiency

The Boeing 737-800 burns 28 percent less fuel than the MD-80 and has a larger cabin that can seat more passengers. That results in a 35 percent reduction in emissions on a seat-mile basis.

the purchases typically are staggered, minimizing the monthly car expense and giving the local bank greater assurance that the car loans will be repaid.

Similarly, if we attempted to replace our fleet of 300 MD-80s with 737-800s all at once, financing simply would not be available. Each aircraft carries a list price of \$65 million, which implies a fleet replacement cost of almost \$20 billion. With a price tag that high, lenders are cautious. Naturally, a phased approach to purchasing new aircraft is needed.

With new aircraft come changes throughout the system. Before an aircraft carries a single passenger, you have to prepare it, inspect it and test fly it. Pilots, flight attendants, and maintenance personnel need training specific to the aircraft, some of which must begin months in advance. Parts warehouses need to be restocked and staff trained on the new inventory. Fortunately, because the 737 is already present in our fleet, those costs are less significant than they would be for an entirely new aircraft introduction. Time and expense must also be dedicated to retire the old aircraft, which, unlike a used car that gets traded in, often must be reverted to its original purchase condition. The logistics involved with swapping out our MD-80 fleet mean that we are limited by how quickly we can phase in new aircraft. The introduction of two to three new aircraft a month is about the maximum we can manage. Given the size of our current MD-80 fleet, that means — at best — a fleet replacement timeline of around eight years.

#### Time to Buy

Typically, aircraft have remained in our fleet for 30 years. The MD-80 fleet, whose average age is 18 years, first began entering the American fleet in 1983. With several more years of useful life, these aircraft would not begin to be phased out until the middle of the next decade during normal times. But times have not been normal.

As the price of oil continued to hit record levels over the past few years, the airline industry struggled with a difficult dilemma. High fuel bills mean less money available to invest in new aircraft. But in order to lower fuel bills, new aircraft investments need to be made. In 2006, as the price of jet fuel passed \$80 per barrel, American opted to invest.





#### **Dollars and Sense**

Each Boeing 737 aircraft carries a list price of \$65 million, which implies a 737 fleet replacement cost of almost \$20 billion. With a price tag that high, lenders are cautious.

Fleet Renewal	<del>}</del>	+	+	+	$\rightarrow$	$\rightarrow$	$\rightarrow$	$\rightarrow$	· <b>}</b>	+	+	+	· <b>}</b>	$\rightarrow$	· <b>}</b>	) <del>)</del> )	+ ,	)
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The 737-800, despite its price tag and the accompanying integration cost, has, through its efficiency levels, overcome those obstacles to make good business sense for the American fleet. These fuel efficiency gains will help reduce fuel costs and our vulnerability to the volatile fuel market we face today. It will, in effect, hedge us from future volatility.



Fuel becomes a smaller part of our cost equation, offset by the new but predictable cost of a loan payment on new aircraft.

#### Placing the Order

The production capacity of major aircraft manufacturers also limits when we — and any other airline — can put new aircraft in the air. Unlike a consumer looking for a new car, no dealer showroom displays aircraft ready to purchase. Manufacturing aircraft takes time and is complex, requiring the assembly of millions of parts. With these constraints, Boeing's production line produces about 30 737s per month. Each aircraft is committed to a purchaser, so it is not possible to simply purchase one after it comes off the production line.

To secure a spot on the production line, airlines often sign contracts for aircraft purchases up to 10 years in advance. American's contract with Boeing included orders for 737-800s beginning in 2013. Fortunately, our flexible purchase agreement enables us to advance 76 of our 737-800 orders to bring them into our fleet in 2009 and 2010.



#### Fuel Efficiency Overcomes Cost Obstacles

The fuel efficiency gains of the 737-800 overcome other cost obstacles to make good business sense for the American fleet.

#### Fleet of the Future

The airline fleets of the future are on today's drawing boards. Aircraft and engine manufacturers are continuously updating designs to achieve greater efficiency. Just as the 737-800's efficiency advantages are enabling the retirement of the MD-80, new aircraft designs will someday make the 737-800 out of date.

But entirely new aircraft models are rare. An aircraft manufacturer spends years designing a new model such as the Boeing 787 and Airbus A350 wide-body models currently making their initial breaks into the market. These next-generation aircraft are the latest models to break into the market. They incorporate the latest engine designs and composite materials. Engine efficiency drives fuel efficiency, and the lighter composite materials mean the aircraft weighs less and, therefore, requires less fuel to fly.

A new design in the narrow-body class to succeed the 737-800 isn't expected for another decade or more. But when it comes, it will likely include similar advances in design as well as improvements that will provide even greater efficiency.

#### Greener Going Forward

At American, we're committed to the 737-800 as the best way to reduce our carbon footprint today. We expect technology advances of the future to continue to move us on that path. In the same way consumers can't yet buy a car that gets 80 miles per gallon, we cannot buy emission-free aircraft. We know we must buy the best that is currently available. New engines, updated designs, alternative fuels, the next generation of aircraft — we will study each industry development with a focus on safety, reliability, and maintaining the flexibility and agility to make the best decisions at each point in time.

But our response to the question of how to create a sustainable airline industry goes beyond our aircraft. The machines are only a part of our success. The rest of the answer lies with our people.

Our people, as you will see throughout this report, will take us to new heights of efficiency and sustainability in ways we can only imagine today. The airline fleets of the future are on today's drawing boards. Aircraft and engine manufacturers are continuously updating designs to achieve greater efficiency.

Fleet Renewal



#### Sustainable Airline Industry

Our response to the question of how to create a sustainable airline industry goes beyond our aircraft. The machines are only a part of our success. The rest of the answer lies with our people.



Fuel and energy conservation ideas come from all corners of our operation, resulting in ideas that increase our efficiency at every level.

# Fuel and Energy Use and Conservation



*Jet fuel makes the biggest mark in our environmental footprint. That's why aircraft efficiency is so important to us.* 

#### Transportation-Related Fuel

#### Use

By far the most significant resource we use in our operation, as measured by volume, weight, or any other relevant metric, is transportation-related fuels (over 99 percent, as measured in BTUs), primarily jet fuel consumed in aircraft but also gasoline and diesel for fleet vehicles and ground support equipment.

Just how much fuel do we use? Combined, American Airlines and American Eagle used more than 3 billion gallons of jet fuel in 2007. While this may sound like a large number at first, consider that it is less than the volume of fuel used by U.S. cars and trucks in just two weeks. It allowed us to carry more than 121 million passengers and almost 700,000 tons of cargo for an average distance of 861 miles.

#### **Fuel Conservation\***

Just as greenhouse gas (GHG) emissions reduction may be vital to the health of our planet, fuel conservation is vital to our company's financial health. Happily, the two work hand in hand — every gallon of fuel saved results in lower expenses and fewer GHG emissions.

\* GRI Performance Indicator EN5



#### Fuel Use Comparison

The 3 billion gallons of fuel used by American Airlines and American Eagle in 2007 is less than the volume used by U.S. cars and trucks in two weeks.



## Procedure Manual: Questioning the Routine

Timothy Tyran, a former American Airlines mechanic who is now a flight operations specialist, noticed that the engine oil leak check procedure for the MD-80 fleet's isotope inspection card seemed unnecessarily lengthy. The leak check run-time procedure called for running the engine for 3 minutes on idle, another 3 minutes at 85 percent of the core engine, and then a final 5 minutes back at idle.

"I sat there in the cockpit watching the fuel flow gauge numbers roll like a Vegas slot machine. I thought, 'Were the length of run-up and high engine power setting really necessary?' We are burning a ton of fuel and a ton of money," Tim says.

He suggested that the oil leak check could be adequately accounted for with a single 5-minute engine run at idle. The M&E power plant operations engineering team reviewed his idea and found it would not only work but would save \$50,000 to \$100,000 each year, depending on fuel prices. Today, Tim's idea has evolved into the standard procedure for more than 7,900 leak checks after isotope inspections performed each year.



The business case for sustainability is undeniable, and AMR is committed to safely improving fuel efficiency in the air and on the ground. In 2007, AMR improved fuel efficiency from 0.1861 gallons per revenue ton miles (RTM) to 0.1855 gallons per RTM. Fuel usage for 2007 was 3.13 billion gallons based on 16.86 billion RTMs compared to 3.18 billion gallons for 17.08 billion RTMs in 2006.



Figure 2



YOU MAKE THE DIFFERENCE

We expect our announced fleet changes to help maintain this trend over the next few years as we replace many of the MD-80s in our fleet with more fuel-efficient 737 aircraft and retire our A300 fleet.

#### Aircraft\*

New aircraft are only part of the environmental changes afoot within the American Airlines fleet. AMR initiated our Fuel Smart program in 2005 as a response to the rising cost of energy. Fuel Smart has proven to be both cost-effective and environmentally beneficial. This program is largely based on recommendations from employees companywide on how to improve fuel efficiency.

The American Airlines Fuel Smart program ended 2007 with an annual run rate of 96 million gallons, meaning that if the initiatives had not been implemented, we would have used an additional 96 million gallons over the next year. Fuel Smart saves 918,496 metric tons of  $CO_2e$  and 20, 275 short U.S. tons of nitrogen oxides.

\* GRI Performance Indicator EN5

#### Measuring Up

Within the airline industry, experts generally use a standard measure called revenue ton miles (RTM), which combines passenger and cargo weight with the distance flown by aircraft. RTM is the best measure of how much AMR "produces" in a year.

Most pollutants are expressed in units of U.S. short tons in the United States and units of kilograms or metric tons outside the United States. Since CO<sub>2</sub>e is generally reported under international protocols, most U.S companies report it in metric units. A metric ton is 2,204 pounds, or 1,000 kilograms, while a short U.S. ton is 2,000 pounds, or roughly 907 kilograms.

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Some of the major initiatives contributing to the Fuel Smart run rate are presented in the above table. A closer look at some of those fuel savings initiatives:

• Cleaner Engines: The turbines that power the fleet run more efficiently when they're clean. For three years, a program has been in place to test efficiencies gained from running high-pressure water through engines every six months. So far, the

program has added 4.7 million gallons to the run rate, providing support to accelerate the program in 2009. Our wash program also demonstrates our extended environmental commitment. providing an opportunity for us to work with local authorities to properly treat and return the wastewater from the wash stations to the local systems.

• Winglets: Design changes on the aircraft itself can produce substantial reductions in fuel burn - and the corresponding GHG emissions. In





#### Engine Wash

For three years, a program has been in place to test efficiencies gained from running high-pressure water through engines every six months. So far, the program has added 4.7 million gallons to the run rate, providing support to accelerate the program in 2009.

## Wasted Weight: An Eye for the **Unnecessary**

During the past year, the Fuel Smart team has been focused on taking extra equipment off aircraft to reduce fuel consumption. Norm Gonzalez, narrowbody aircraft quality inspector at the Tulsa, Okla., Maintenance Base, took this idea a step further by suggesting that the logo lights on the left and right horizontal stabilizers as well as the associated wiring could be removed from the 737 fleet.

"The lights were simply taking up space for no reason," Gonzalez says. "It seemed like a very easy solution. I had no idea something so simple could save such a large amount of fuel."

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late 2005, the first winglets were installed on 737-800 and 757-200 aircraft. The aerodynamic modifications to the wing structure have resulted in fuel savings of more than 3 percent for the 737. Once all winglets are installed this will represent approximately 25 million gallons of the annual fuel run rate. Installation is complete on our 737-800 aircraft, and the 757 program will be completed by the end of 2008. All new 737-800 aircraft will come with winglets.

- A\*A.com
- less weight, it requires less fuel. For every pound we shed from an aircraft, we can save about 12,000 gallons of fuel per year. A few of the weight-saving initiatives that we've looked at and acted on include carrying less water, removing unused ovens, purchasing lighter catering carts, using lighter LCD screens to replace heavy monitors, and replacing heavy wall liners in cargo compartments with liners made with lighter composite material. These initiatives have the possibility to trim up to 600 pounds on some fleet types and result in millions in fuel savings.

• Weight Reductions: When an aircraft weighs less or carries





#### **Reserve Reduction**

Each flight is dispatched carrying the fuel necessary to reach its destination plus additional fuel that is planned to be left over on the aircraft after arrival, usually measured in minutes. American Eagle flights have always carried more fuel reserve than is required by the federal government, sometimes more than two hours worth of additional fuel. Through the Fuel Smart program, Eagle is educating flight dispatchers and pilots to reduce the fuel reserves on days with good weather to levels that do not include any excess fuel beyond what is needed to account for any unexpected events. Fueling to that level provides substantial environmental benefits through reduced fuel burn. For each 1,000 pounds of extra fuel carried on an average Eagle flight, 40 pounds of fuel must be burned in order to carry it. Reducing the reserve when appropriate saves about 6 gallons in fuel per flight without compromising safety. With 1,600 American Eagle flights taking off daily, any small reduction adds up.

#### Ground Support Equipment (GSE)\*

Both American Eagle and American Airlines are heavily reliant on ground support equipment (GSE) to fulfill critical functions such as moving aircraft as well as bags and cargo from aircraft to terminals and cargo facilities. Correspondingly, our focus on improvements via Fuel Smart initiatives are not limited to aircraft-related issues. Our investment in electric GSE is substantial and growing with almost 2,800 pieces making up 24.2 percent of our GSE fleet. The new electric units are less expensive to operate and maintain, and they produce fewer emissions on the tarmac.

American Airlines operations at New York's John F. Kennedy International Airport (JFK) received the latest delivery of electric GSE. Aging, gas-powered units were replaced with 67 electric bag tractors and two electric belt loaders. The change at JFK required infrastructure upgrades to accommodate the charging stations, but the new equipment provides greater reliability because of superior cold-weather performance. The units also are switched off during loading and unloading, The environmental benefits of electric GSE go beyond fuel savings. Reduced emissions of pollutants such as  $NO_X$  mean a reduction of smog in nonattainment areas surrounding major airports. While electric GSE aren't completely free of environmental impacts, they divert the emissions outside nonattainment areas where the electricity is produced. As such, AMR is focusing electric GSE deliveries at our busiest stations where the most benefit can be gained in the shortest time possible.

\* GRI Performance Indicator EN5





#### High-Speed Tugs

Taxiing aircraft from the gate to the hangar is a costly proposition when you factor in the fuel required to run the jet engines. High-speed tugs, in use at five of our largest stations and soon to arrive at more, can tow an aircraft at speeds compatible with taxiing aircraft. The tugs lift the aircraft and move it without using the aircraft engines. The tugs are saving 3.2 million gallons of fuel; 1,913.53 metric tons of CO<sub>2</sub>e and 42.24 U.S. tons of NO<sub>x</sub> every year.

# Fuel Savings: *Employees Make the Difference*



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Last May, while working a flight to Dublin, Ireland, flight attendant Elizabeth Van Cleave noticed three pull-out tray tables in the middle galley of the 767, which is only used as an extra

supply galley. One specifically was under a covered area that had previously held an oven. This tray table could not be used, and Elizabeth submitted a Fuel Smart suggestion to remove the mid-galley pull-out tray tables on the 767 fleet.

"Every little bit of extra weight contributes to fuel consumption. [If something isn't being used], we should remove it," Elizabeth says.

The Fuel Smart team took Elizabeth's suggestion and carefully considered whether her idea could be implemented safely and effectively, as they do with all employee-generated fuel-saving ideas. The engineering department approved the suggestion and incorporated it into the current Cabin Improvement Project. The mid-galley pull-out trays will be removed on the 767 fleet, reducing the weight of the aircraft.

Base manager Dan Stefanis describes Elizabeth as a professional flight attendant. "She is very courteous, respectful, great to work with, and a true team player," he says.

Thanks to Elizabeth for her dedication to taking an extra step to make American a better, more efficient airline!





Figure 4



#### Non-Transportation-Related Energy Direct Energy Sources\*

Our principal efforts have been and are focused on reducing energy use associated with transportation. However, our macro environmental footprint is also shaped, in part, by other important but less significant energy sources. These energy sources include natural gas for process steam generation and comfort heating, electricity purchased from utilities, and small quantities of fuel oil to provide backup electricity. Using less energy helps to minimize AMR's environmental impact both by emitting less air pollutants, including GHGs, and also by preserving some of our natural resources for future generations.

#### Energy Use

In 2007, AMR used 598,000 megawatt-hours of electricity and 15.9 million therms of natural gas. Direct energy use was essentially flat when compared to 2006.

\* GRI Performance Indicator EN3

#### Energy Conservation\*\*

Reducing energy consumption is an effort that touches each AMR department, location, and employee. In 2005, AMR formed our Utility Management Council to bring employees together to evaluate potential projects that could reduce our utility use. Approximately 90 percent of AMR's direct utility costs are realized at just 10 of our locations, which includes major airport locations, maintenance facilities, and our headquarters campus. Thus, AMR's Utility Management Council members represent those locations and key headquarters departments.

Typically, the most effective means of reducing utility consumption is through new technology requiring capital investment. As a matter of good business, we seek outside funding to reduce our investment, such as airport funds and utility company rebates,

\*\* GRI Performance Indicator EN5, EN6, and EN7



#### AMR's Environmental Impact

Using less energy helps to minimize AMR's environmental impact both by emitting less air pollutants, including GHGs, and also by preserving some of our natural resources for future generations.

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whenever possible. To date, we have focused on projects with a quick return on investment such as relamping or other light modification work. Such projects have been completed at seven sites, saving nearly \$1.8 million. Items that the council previously considered but were not able to justify at this time include photovoltaic (solar electric) panels, wind generation at our headquarters campus and cogeneration of electricity at our maintenance facilities.





#### The Conservation Team

The employees on the Utility Management Council have implemented a wide range of projects, including:

- Increasing office temperatures slightly during summer months to reduce cooling needs
- Retrofitting lighting with more energy-efficient bulbs at office and maintenance locations as well as some airport terminals
- Rewrapping pipe insulation

# *Emissions*

We aspire to transparency in quantifying our emissions, and we empower employees to be agents of change in this movement.

# **Emissions\***

AMR is continuing with its commitment made in the 2006 Environmental Responsibility Report (ERR) to measure Greenhouse Gas (GHG) emissions on an annual basis and report this data to shareholders and the community.

# Commercial Aviation and Domestic GHG Emissions

Individually, generation of electricity and transportation each account for nearly a third of all domestic GHG emissions. The remaining third of domestic GHG emissions is produced by the aggregate emissions from industrial, agricultural, commercial and residential sources.

The most recent U.S. Environmental Protection Agency (EPA) data<sup>‡</sup> indicate that mobile aviation sources contribute approximately 2.9 percent of the nation's GHG emissions or approximately 9 percent of all transportation sources. Note that the EPA estimate for the aviation category includes operations other than those conducted by commercial carriers such as American Airlines and American Eagle.

\* GRI Performance Indicator EN16, EN17, EN18, and EN20 <sup>‡</sup>U.S. Environmental Protection Agency, "Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2006." April 15, 2008





#### Greenhouse Gas Emissions

Individually, generation of electricity and transportation each account for nearly a third of all domestic GHG emissions. Aviation sources contribute 2.9 percent of U.S. GHG emissions, or 9 percent of all transportation sources. See Appendix D on page 51 for a description of how we derived our GHG emission factors.

#### 2007 GHG Results

AMR's GHG emissions for calendar year 2007 slightly decreased from 2006 emissions. Our total GHG emissions are attributed primarily (approximately 98 percent) to carbon dioxide ( $CO_2$ ) emissions from jet fuel combustion.

Sun	nmary of GHG Emi	ssions	
	2005	2006	2007
Scope 1 direct emissions (metric tons CO <sub>2</sub> e)	31.2 million	30.6 million	30.1 million
Scope 2 indirect emissions (metric tons CO <sub>2</sub> e)	0.4 million	0.4 million	0.4 million
Total Scope 1 + Scope 2 emissions (metric tons CO <sub>2</sub> e)	31.6 million	31.0 million	30.5 million
Intensity ratio (Scope 1 metric tons CO <sub>2</sub> e per 1,000 revenue ton miles)	1.836	1.793	1.787

Scope 1 direct emissions are attributed primarily to  $CO_2$  emissions from jet fuel combustion related to aircraft operations. Other sources of Scope 1 direct emissions are not material to our cumulative GHG emissions; however, they are included in our GHG inventory for completeness.

Scope 2 indirect emissions remained essentially flat with respect to prior years and account for  $CO_2$  emissions associated with electricity that AMR purchases from electric utilities.

Scope 3 emissions are not included in our GHG inventory. Due to the quantity of jet fuel used in comparison to all other materials, jet fuel is the single most relevant factor driving our GHG. As such, the exclusion of Scope 3 emissions is not considered to have a material effect on the results presented in this ERR.

#### Table 1

#### Defining the Scope

GHG protocol defines direct and indirect emissions and refers to them based on their source: direct or indirect. The direct and indirect emissions are then divided into three broad categories, or scopes.

Scope 1: Includes all direct GHG emissions. For AMR, jet fuel combustion is the primary source.

Scope 2: Indirect emissions associated with the consumption of purchased electricity, heat or steam. For AMR, these are primarily emissions resulting from electricity purchases.

Scope 3: Reflects indirect emissions that result from activities outside the control of a reporting organization.



AMR supports several initiatives to equip employees with tools and choices that can help reduce our Scope 3 indirect GHG emissions. These tools include the following:

- Ride sharing: Employees who carpool regularly with co-workers receive preferred parking at our headquarters office.
- Discounts for mass transit: At some locations, AMR is able to negotiate discounts for employees who use local mass transit.
- Compressed work weeks: For some positions, our employees are able to complete their work week in fewer than five days. For instance, some of our employees work four 10-hour days.
- Telecommuting: Some positions allow work from home or at a satellite office. Although there are examples within the company of employees who telecommute full time (American Airlines Reservations), it is also possible for an employee to work at home a couple of times a week with the remaining time in the office.

## Flexible Savings: Putting Environmental Commitments to Work

Energy efficiency and savings at AMR go beyond the business of flight. Individual employees participate in a variety of programs that produce a reduction in the company's environmental impact and help create a better work-life balance.

Flexible work schedules can take employees out of the heavy commute hours to reduce time spent languishing in slow-moving traffic. Telecommuting full-time or just a day or two a week cuts commuting miles. One of the people responsible for promoting these programs to reservations representatives at American Airlines' Southern Reservations Office is Kirsten Walker, information center administrative coordinator.

Kirsten has worked to increase participation in American's programs since early 2006. She was even honored by the North Texas Clean Air Coalition as the Employee Transportation Coordinator of the Year in 2006. The award recognizes Kirsten's and American's efforts promoting awareness days emphasizing employee and office involvement in:

- RideshAAre, American's carpooling program
- Public transportation support and promotion
- American's home-based representative (telecommuting) and reduced work week (four-day week) programs

Her activities not only focus on making employees aware of the opportunities available, but also on providing participation encouragement through incentives like coupons to area businesses or memorabilia giveaways from the American Airlines Flight Museum. Long-term participants also earn rewards.



"It's really a part of my job that I love," Kirsten says. "It allows me to help people whether it's personal or vocational in a way that benefits everyone."

Emissions	$\rightarrow$	→	$\rightarrow$	$\rightarrow$	+	$\rightarrow$												
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#### The Big Picture

In order to compare GHG emissions to production, GHG industry experts use a comparison called intensity ratio. Intensity ratio compares GHG emissions to an industry standard measure of production. A lower intensity ratio denotes greater efficiency since fewer GHGs are emitted per standard measure of production.

2007 GHG emissions, both on an absolute basis and intensity ratio basis, decreased slightly (less than 2 percent change in each category) when compared to 2006 emissions. While AMR continues to evaluate and implement new initiatives to reduce fuel use and GHG emissions, greater progress in GHG reduction was hampered by an increase in severe weather events at our hubs and continued air traffic control congestion.

#### GHG Policy and Management Plan

We are committed to reducing GHG emissions in the future within the constraints of providing safe, reliable and affordable transportation for customers. In our 2006 ERR, we announced a goal to improve fuel efficiency by 20 percent between 2005 and 2020. Earlier this year, we have laid out a more ambitious goal to increase efficiency 30 percent by 2025. Achieving this challenging goal means continuously improving our operational efficiency by approximately 1.5 percent every year for 20 years. Are we on pace to meet our new efficiency commitment? Yes, despite the challenges faced in 2007, our intensity ratio has improved at an annual rate of just over 1.7 percent since our baseline year of 2005.

Future reductions will require more than investing in fleet replacement. Airline stakeholders will also have to invest to help make the industry more efficient. Aircraft and engine manufacturers must invest in new technologies, fuel suppliers must invest in the production of cleaner fuels, and government



·	+	$\rightarrow$	$\rightarrow$	$\rightarrow$	$\rightarrow$	+	$\rightarrow$	$\rightarrow$	$\rightarrow$	+	$\rightarrow$	$\rightarrow$	+	$\rightarrow$	$\rightarrow$	$\rightarrow$	$\rightarrow$	$\rightarrow$	$\rightarrow$	Emissic
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agencies must invest in more efficient national and international air traffic control systems.

#### **Other Air Emissions**

Emissions of regulated air pollutants (other than GHGs) are summarized on this page for AMR operations. Emissions from these sources include: jet fuel combustion in aircraft, jet fuel combustion at test cells, fuel combustion for on-site electric generation as well as steam generation and comfort heating, fuel consumption in company-owned vehicles and ground-support equipment, and process (painting and cleaning) emissions at maintenance bases.

The vast majority of nitrous oxide  $(NO_X)$ , carbon monoxide (CO), sulfur dioxide  $(SO_2)$  and 10 micrometer or smaller particulate matter (PM10) emissions are associated with jet fuel combustion in aircraft. Emissions associated with transportation are generally not reported under the Clean Air Act, state or local air emission inventory reporting requirements.

Non-transportation air emissions are reported for the Tulsa, Okla.; Kansas City, Mo.; and Fort Worth, Texas, Alliance maintenance bases.



Figure 4

Emissions	$\rightarrow$																	
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Emissions from the maintenance bases include natural gas and fuel oil combustion for process steam, comfort heating, a backup source of electricity generation, and paint and other chemical usage associated with maintaining aircraft.

#### **Ozone-Depleting Substances**

American Airlines has reduced its use of ozonedepleting substances (ODSs) nearly 17 percent since 2005. Further, 97 percent of the substances used are designated Class 2 ODSs under the Clean Air Act, which have lower ozone-depleting potential than those designated Class 1 ODSs.

Class 2 ODSs are primarily used at our aircraft maintenance stations. Hydrochlorofluorocarbons (HCFCs), such as HCFC-141b, are a Class 2 ODS that, while no longer manufactured, are still used in limited applications such as when hot brakes need to be inspected on aircraft. HCFC-141b is widely available and has properties - spray-can application, inflammability, and effective cleaning without residues - that make it very practical. In addition, it is approved by the Federal Aviation Administration.

In the aviation industry and beyond, HCFC-141b, or dichlorofluoroethane, may be one of the most popular industrial solvents ever; however, it will not be forever.





#### Halon: On the Way Out

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The sole remaining Class 1 ozone-depleting substance (ODS) used by AMR is halon, found in the small portable fire extinguishers installed on some of our aircraft. Our fleet-renewal plans will contribute to a further reduction in ODSs because each new aircraft will be equipped with lavatory fire extinguishers that use non-halon equivalents.



As a result of the Montreal Protocol, all domestic production and importation of HCFC-141b ended in 2002 as a global response to depletion of the earth's ozone layer. Under this treaty, rules were established for eliminating ODSs worldwide. First, refrigerants and solvents called chlorofluorocarbons (CFCs), halogenated fire suppressants, and other Class 1 ODSs were phased out. Currently, the industry is phasing out less damaging Class 2 ODSs; however, there are no legal restrictions to buying, stocking, selling, or using the remaining domestic supply of HCFC-141b. Not all HCFCs will be phased out equally. HCFC-141b is being phased out first due to its wide use and relatively high potential to damage the ozone as compared to other HCFCs. Less damaging Class 2 ODSs, such as HCFC-225, will be phased out by 2015.



#### Making the Switch

American Airlines is heavily involved in researching non-ODS alternatives to HCFC-141b, evaluating substances that will adequately and safely replace HCFC-141b while not emitting high levels of volatile organic compounds restricted by the Environmental Protection Agency. Unlike your neighborhood mechanic who can simply switch to any one of several commercial alternatives currently available, our ability to replace HCFC-141b with a commercially available alternative is limited by the requirement that any replacement solvent be approved and certified by the Federal Aviation Administration.

# **Resource** Conservation

Our people worldwide seek ways to take conservation and recycling efforts to heart, touching every aspect of our business.

* * * * * * * * * * * * *	$\rightarrow$	→	Resource Conservation
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# **Resource Conservation**

Reducing, reusing, and recycling in dispersed locations requires the commitment of our people and our partners.

Resource conservation is a daily commitment to reduce consumption, recycle waste material and promote overall awareness of our daily global impact. AMR is committed to promoting awareness and empowering employees to identify ways to conserve resources used to run our business through a combination of reducing, reusing and recycling.

Like other domestic airlines, American Airlines and American Eagle operate in widely dispersed facilities, both owned and leased. As a result, we rely on multiple supply-chain partners for material handling services. Existing procurement agreements do not have standardized reporting requirements; thus, results from some resource conservation initiatives were estimated.

AMR promotes minimization and recycling to reduce the volume of solid waste generated. At airports where AMR does not have control over waste disposal methods, we work with local management to recycle materials if programs are available.

#### Material Usage

Of all products we require to support our operations, fuel is undeniably the most material; however, both American Airlines and American Eagle require the use of many other material resources to conduct day-today airline operations.

An assessment of the waste inventories for American Airlines and American Eagle stations and our maintenance bases provides an indication of the other materials used in significant quantities, including: paint and related products (paint, rags, filters, etc.), turbine compressor cleaner, water, oil, lubricants, antifreeze, potable water tank cleaner, alkaline and acidic washing fluids, process acid, etc.



#### **Conservation at All Levels**

AMR is committed to promoting awareness and empowering employees to identify ways to conserve resources used to run our business through a combination of reducing, reusing and recycling.

Like other domestic airlines, American Airlines and American Eagle operate in widely dispersed facilities, both owned and leased.

# Can Collections: Recycling for a Cause

Recycling programs are always about saving money or saving the environment. Sometimes, they do both. A special program run by American Airlines flight attendants is about saving co-workers in the midst of catastrophic life events.

Through the Wings Foundation, a 501(c)3 charity, American flight attendants collect and recycle empty aluminum cans from in-flight beverage service, an effort that began in 1989. It's a prime example of how American Airlines employees merge their environmental and philanthropic passions at work and at home.

Jennifer Wilson, an American flight attendant based in Washington, D.C., got involved with the foundation's recycling efforts in 2004.

"Environmental issues have always been important to me, and I've always tried to be proactive in getting involved," Jennifer says. "Working with the Wings Foundation recycling program has been so rewarding, because it is a win-win for everyone — the environment, American, and flight attendants."

The foundation's Flight Attendant Disaster Relief (FADR) Fund receives 100 percent of the proceeds from the program, which has been on an upswing. In 2003, \$19,000 was raised through can recycling. In 2007, the yearly total hit \$109,000. Jennifer attributes the gains to the growing environmental consciousness overall and the desire to help co-workers.

"The FADR recycling fund is still only a fraction of the assistance provided by the Wings Foundation, which distributed more than \$868,000 to 227 American Airlines flight attendants in 2007, but it is a significant source of funds that grows each year," Jennifer says. "It enables us

to provide assistance to victims of home fires, hurricanes, earthquakes, or other events that create financial hardships."

When flight attendants collect trash on their final passes through the cabin before landing, empty cans are inserted into collection trays that remain on the catering carts, which are tagged to alert catering partners to the presence of the cans. The catering staff delivers the cans to their recyclers, and the money is routed back to the foundation.

"We couldn't do it without the full support of American and the local catering companies we work with, LSG Sky Chefs and Gate Gourmet," Jennifer says.

"Working with the Wings Foundation recycling program has been so rewarding, because it is a win-win for everyone the environment, American, and flight attendants."

Plans are in the works to keep expanding the program to smaller locations in the American system. When possible, cans are dead-headed back to hubs for recycling, and progress is being made toward breaking down barriers to recycling efforts such as inbound international flights where there are restrictions based on animal and plant disease control efforts.

Recently, American received the OK to run a recycling program out of Miami. American's food and beverage coordinators are also keeping an eye out for ways to expand recycling. Plastic and newspaper haven't come through as practical collection items yet, but American is keeping an eye on the markets, technology, partnerships and infrastructure that would make new recycling efforts feasible.

Flight Attendants Recycle 10 Million Aluminum Cans



Why Do Flight Attendants Recycle? The sense of the sense

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Jennifer Wilson took over the can recycling campaign for the Wings Foundation in 2003 from her friend Robert Amaya, a flight attendant based in Miami.





#### **Reduced Consumption**

The maintenance bases that make fleet aircraft modifications, such as the fuel-saving winglet additions, require people, spacious facilities, and complex systems. Consider just one, our Kansas City, Mo., facility. Historically, this facility required more than 60 million gallons of water every year. This presented significant opportunity for savings.

The Kansas City base operates on power from a central utility plant that used water from a 50,000-gallon steel tank installed in the 1970s. Replacement of that tank, which had begun to develop leaks, has contributed to reducing the base's total water consumption from 60.6 million gallons in 2005 to 43.4 million gallons in 2007, a drop of 28.4 percent.

Water savings are being realized at our headquarters campus in Dallas as well. In the past four years, American Airlines has saved 79 million gallons of water by using an irrigation system that calculates the daily moisture content of the soil to schedule watering and reduce chemical use. The Acequia process of managing irrigation uses local environmental data and its experts' knowledge of agronomy and soil sciences to simplify complex landscape maintenance.





#### Smart Irrigation

American Airlines has saved 79 million gallons of water by using an irrigation system that calculates the daily moisture content of the soil to schedule watering and reduce chemical use.

Resource Conservation 🛛 🔶		$\rightarrow$	+	$\rightarrow$	$\rightarrow$	+	$\rightarrow$	$\rightarrow$	$\rightarrow$	$\rightarrow$							
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#### Reuse and Recycling of Nonfuel Materials

AMR has some unique opportunities to minimize waste associated with the maintenance of our aircraft, since much of our maintenance is completed at our own facilities and by our own employees. Based on the available data, AMR recycled or recovered 2,468,401 pounds of waste in 2007, 53 percent of all the waste we generated at our domestic facilities, excluding common trash from our three maintenance bases.

Some of our recycling programs are corporate initiatives pushed out to employees. As an example, AMR provides employees with desk-side recycling containers for paper waste. We also encourage the placement of large recycling bins at printers and copiers to collect any unwanted paper. Other programs are directed and supported at the employee level. AMR welcomes the opportunity for its employees to develop and create further waste minimization programs to encourage participation and employee acceptance.

Controlling and reducing environmental impacts can take many forms for a corporation the size of AMR. There are ample opportunities for our facility and real estate groups to promote sustainable practices, too, and we are proud of what these groups are accomplishing. AMR's many station office facilities,

AMR's Recycled, Reused and Reclaim	ed Materials
Material	2007 (total pounds)
Oil and Related Petroleum and other high BTU chemicals sent for fuel blending or energy recovery Used oil	1,578,043 285,736
Metal and Related Metal spray and blast media Empty drums — poly and metal Elemental mercury/mercury-contaminated debris Elemental lead	214,200 73,896 4,964 1,570
Lamps and Related Fluorescent lamps — straight HID lamps U-shaped fluorescent lamps Circular fluorescent lamps	46,066 3,152 2,211 400
Batteries Nickel cadmium batteries Lead acid batteries Lithium batteries	31,617 4,765 553
Other Miscellaneous nonhazardous materials and wastewater sludge Rinsate water Antifreeze Freon	215,346 4,200 1,408 274



#### Hands-Off Waste Reduction

New automatic paper towel dispensers will be installed at the AMR headquarters in 2008 and will provide the double benefit of reducing paper consumption and, correspondingly, paper waste. Because a wave of the hand dispenses a designated length of towel, people use less. When installation is complete, we expect the 320 dispensers to reduce the waste weight from the headquarters campus by an estimated 50 percent to 70 percent.

# **Employee Champion:** Taking Initiatives to Heart

Recycling is not just a corporate initiative; it is becoming part of our culture. A prime example of how people are the driving force in AMR's environmental efforts comes out of the American Airlines operation in Dublin, Ireland.

After a corporate environmental presentation in 2007, three employees set out to form a project group to see what could be done at the local level. Starting small with awareness programs and recycling improvements, the team is gathering information about the location's environmental impacts and providing articles and tips online.

David Madden, a facility lead in American Airline's Dublin office, has proven to be an environmental champion. With waste containers in hand and access to a computer and printer, David took it upon himself to promote and widen the reach of AMR's recycling program throughout our Dublin facility. After labeling and placing collection containers in high-traffic areas, David made arrangements with the local recycling center to pick up and transport the collected materials to the off-site collection center. Thank you, David!



David Madden, Dublin facility lead, shows off the recycling containers and signs that are a first step in reducing the facility's environmental impacts.

headquarters campus buildings, and Admiral's Club locations are all doing their part. Some of their work includes the following:

- Replacing carpet at the 800,000-square-foot headquarters building with carpet manufactured partially from post-consumer content and that is 100 percent recyclable. More than 560,000 pounds of old carpet was diverted from the landfill and recycled. AMR was honored with the Greater Dallas-Fort Worth Recycling Alliance Award for Construction/Demolition Recycling for this effort.
- Purchasing green private office furniture for the headquarters campus that is certified by the Greenguard Environmental Institute, a third-party program that verifies the chemical and particle emissions meet indoor air quality guidelines, and the Forest Stewardship Council, which verifies that wood used is legally logged and harvested from well-managed forests.



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- Specifying materials for airport Admiral's Clubs from local sources such as using furniture from a Los Angeles factory in the Los Angeles International Airport club. The clubs also reupholster rather than replace worn pieces.
- Repairing office chairs rather than replacing them whenever possible and storing parts from unusable chairs for future repairs.

To the extent practical, we leverage our corporate actions to promote recycling beyond our corporate boundaries to our employees' homes. After we completed our Quantum Program — which retired 30,000 corporate computers in 2006 — we hosted an employee home recycling event on Earth Day. Employees brought in more than 1,400 computer monitors, printers and other consumer electronic items. They loved having the opportunity to responsibly dispose of their personal electronic waste and took full advantage as they delivered 25 cubic yards of personal e-waste from their own homes — enough to fill a semitrailer. A second event took place in June, and AMR plans to make this a regular Earth Day event for our employees.

# Old to New: Reaching into the Community

Another creative role has been adopted by AMR's human resource and training personnel. American Airlines training centers ship old video and audio tapes to a Columbia, Mo., company that reformats and resells them through Alternative Community Training (ACT) programs that support employment for people with disabilities. The ACT program AMR uses provides employment for more than 40 individuals who have limited employment opportunities. Our partnership with the ACT program began in October 1992, with more than 430,000 tapes donated through the years. At 7 ounces per video tape, that's more than 188,000 pounds of waste that has avoided the landfill. In 2007, 1,850 video and audio cassettes were recycled.



In 2008, Rod Pelander, a customer service agent in St. Louis, is coordinating the collection and delivery of tapes for recycling by ACT, including movies brought from home, in-flight "Eye on American" videos and corporate communications items.



#### **Beyond Headquarters Initiatives**

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American Airlines employees at Dallas-Fort Worth International Airport conducted an e-waste collection of their own. Nearly 7,000 pounds of TVs, monitors, computers, microwaves and more have been brought in for recycling in 2008. Nationwide, more than 1.5 million tons of e-waste are thrown into landfills and incinerators every year. As a result, the toxins they contain, such as lead and mercury, end up being released into the air and water. An old TV set can contain up to 10 pounds of lead.

## Pounds of Paper: Recycling Made Easy



Through American Airline's **Anything That** Tears program, nearly 790 tons of paper goods have been recycled since 2004. The key to success: It's easy. Staff at our headquarters campus, reservations office, training and conference center, and fight academy facilities collect office paper, newspaper, cardboard, and more in desk-side containers. There is no need to take the extra time to remove staples, paper clips, tape, Post-It notes, plastic tabs, or metal bindings. Additionally, strategically placed bins accommodate additional paper as well as plastic bottles and aluminum cans. The results are adding up. In 2007 alone, 262 tons of products were recycled, which equates to 4,454 trees, or 865 cubic yards of landfill space.

Program Profile





#### Material Disposal

AMR's recycling efforts are key to minimizing solid waste transferred to a landfill or other disposal facility. Waste material that cannot be recycled is disposed of off-site by incineration, placement in landfills or other means.

Many of our airport stations have integrated waste systems where solid waste generated by all station tenants (i.e. other airlines, food service companies, retail stores, cargo companies, etc.) are combined and managed by the airport authority rather than the individual airline. While this creates an economy of scale and minimizes the number of emissions from multiple trash vendors, it also places the authority and responsibility for sustainable disposal practices with the airport authority.

AMR promotes minimization and recycling to reduce the volume of solid waste generated but does not have direct control over the disposal of non-recyclable solid waste generated at facilities with integrated waste disposal services for multiple



tenants. In addition, federal regulation prohibits the recycling of any solid waste generated on international flights. All such waste is required by law to be incinerated.

Where AMR has responsibility and control over the disposal of solid waste, we contract with a local



vendor for delivery service to a local landfill or other permitted facility. In 2007, AMR generated 2.12 million pounds of nonhazardous wastes (excluding municipal solid waste or trash) and 2.54 million pounds of hazardous wastes. Appendix E provides details about our waste inventory.



Figure 2

#### See Appendix E on page 56 for waste inventory details.

# What makes up the wastes described in this report? Just over 85 percent of our hazardous wastes are generated at

What It Means

our three maintenance bases. The largest portion of these waste streams is associated with aircraft maintenance and repair. These wastes include acids, cleaners, and paint wastes derived from our metal plating and coating operations. The remaining portion is generated at our widely dispersed airport locations. Most of these hazardous wastes are related to cleaners and coatings used for minor maintenance on aircraft and support equipment to keep our aircraft in the air — what we call line maintenance work. In contrast to our hazardous waste, the majority (over 65 percent) of our non-hazardous waste is generated at our individual stations. Most of our non-hazardous wastes are petroleum-related wastes derived from jet fuel, oil, and oily water. Other non-hazardous wastes include fluorescent lights and batteries.

## Taking It Home: Passion for Green



# Personal Profile

## Steve Wallace isn't shy.

The lead environmental coordinator and technical crew chief for American's operations in Boston saw an opportunity when he spotted Steve Thomas, the renowned host of PBS television series "This Old House," in the Admirals Club.

"I knew he was a skier, so I walked up, introduced myself, and asked if he'd be interested in being part of American's charity ski event benefitting the Cystic Fibrosis Foundation," says Wallace, who started with "It's cool to research projects that have an environmental impact," Wallace says. "It's what we need to be doing."

American in 1973 as a fleet service clerk. "He signed on, and we've been friends ever since."

Recently, that friendship has put Wallace to work in his spare time, unearthing projects for Thomas' new series, "Renovation Nation" on Discovery Network's Planet Green.

Wallace also managed a major project for Thomas, one with both personal and professional ties. Thomas wanted to renovate a summer home on a remote island off the coast of Maine, using the latest in green materials and leaving only the smallest footprint on the environment. The effort is being featured on "Renovation Nation."

"The greenest thing I did was bring all the needed equipment to the island from nearby suppliers, creating a nearly carbon-neutral project. When the work was done, every trace of our presence was erased from the fields and trails we used to transport construction materials and equipment. It was like we'd never been there," Wallace says. "We built a working barn with a guest quarters featuring 100 percent recycled roofing materials designed to last 80 years." Wallace also has a long list of experimental green projects under way at work. Whether he's testing energy efficiency programs to reduce the environmental footprint of the station or evaluating a bag belt impregnated with Teflon to reduce drag — and, correspondingly, energy consumption — Wallace is passionate.

"It's cool to research projects that have an environmental impact," Wallace says. "It's what we need to be doing. It's going to save the planet eventually. I'm doing what I can to make that happen."

Wallace's efforts include recycling virtually everything at the station, testing a baggage claim belt plate made of a composite material that would reduce the belt's weight by 7,000 pounds, and installing solar panels in seldom-used vehicles to make sure the batteries stay charged enough to start when they're needed.

The Thomas house project turned into a family affair for Wallace, whose 17-year-old son Joseph came along on the project.

"He ended up building a potter's shed almost entirely by himself. He showed up a kid, but left a pretty decent carpenter."



# Noise Reduction

We work worldwide in conjunction with agencies to reduce the impacts of sound on the inhabitants of the places we operate.

# **Noise Reduction**

American and American Eagle comply with international efforts to mitigate noise issues.

The International Civil Aviation Organization (ICAO) has established a Balanced Approach for Noise Management, which serves to identify noise-related issues and to analyze and mitigate them via source reduction, land use planning, and operational procedures and restrictions.

In the United States, the Federal Aviation Administration has adopted the elements of the ICAO Balanced Approach in Part 161 and Part 150 of Title 14 of the U.S. Code of Federal Regulations. American Eagle and American Airlines comply with these requirements. In the European Union, provisions have been made to gradually remove marginally compliant aircraft from service at noise-sensitive airports. American Airlines is not operating any such aircraft internationally.





#### Sound Reduction

The new Boeing 737-800 aircraft entering the American fleet over the next decade fly quieter than the MD-80s they will replace. The winglets being added to the wings of existing American Airlines aircraft also help make them quieter.

# Looking Ahead

As we create the airline industry of the future, we look to our people to use science and technology to generate environmentally responsible solutions.

# Looking Ahead

As the airline industry moves forward, American Airlines is evaluating new ways to conserve.

#### **Commercial Aviation Alternative Fuels Initiative**

In 2006, for the first time in history, fuels became the single largest component of U.S. airline operating costs. U.S. commercial aviation consumes less than 3 percent of total U.S. energy use, but drives about 6 percent of the U.S. gross economic output and just under 9 percent of national employment. Secure and sustainable fuel sources are essential for its continued prosperity. Meanwhile, concerns have risen internationally about the environmental impacts of aviation growth.

American Airlines and many supply chain members that serve the aviation industry participate in the Commercial Aviation Alternative Fuels Initiative (CAAFI), which was established to enhance energy security and environmental sustainability for aviation by exploring the potential use of alternative fuels. CAAFI provides a forum for the U.S. commercial aviation community to engage the emerging alternative fuels industry and to work together, share and collect needed data, and motivate and direct research on alternative fuels for aviation.

CAAFI's specific goals are to promote the development of alternative fuel options that offer equivalent levels of safety and compare favorably with petroleum-based jet fuel on cost and environmental bases with the specific goal of enhancing the security of energy supply.

Our existing fleet of 655 American jet aircraft and 296 American Eagle aircraft may benefit from the combined efforts of CAAFI and aviation supply chain members, including AMR, as they strive to accelerate the development of biofuels and related logistics to create a sustainable and environmentally responsible fuel alternative for the industry.





#### The Economic Effects

U.S. commercial aviation consumes less than 3 percent of total U.S. energy use, but drives about 6 percent of the U.S. gross economic output and just under 9 percent of national employment.





#### New Technology

As part of our initiative to conserve fuel, we focused on identifying new technology solutions to improve the efficiency of our aircraft and our operation. Some of the major initiatives that will help reduce our environmental impact in the coming years include:

- 767-300 Winglets: American Airlines will be the first carrier to install winglets on 767-300 aircraft. Each winglet will be 11 feet tall and will add 11 feet to the wingspan of the aircraft. This project will kick off in early 2009 and has the potential to reap savings of up to 17 million gallons of fuel per year.
- Docking Guidance System: Automated aircraft parking devices will reduce arrival delays and improve local air quality. The system incorporates a low-level laser scanning device

with an LED screen. As an aircraft approaches the gate, the laser-scanning device identifies the aircraft. Directional arrows on an LED screen in front of the gate allow pilots to park the aircraft at the appropriate spot. By avoiding delays due to unavailable guidemen, pilots are able to park and turn off aircraft engines sooner.

• Ramplink: New technology in the hands of our ramp crew chiefs will allow them to enter data quicker and more accurately, which can save fuel by reducing taxi-out delays. The handheld devices, which we call Ramplink, allow ramp crew chiefs to receive real-time feedback on flight-critical information and use bar code scanning to enter relevant data from cargo containers.



#### Developments for the Future

New technology solutions will take our environmental efforts into the future, reducing our impacts and boosting the efficiency of our people and our aircraft.



Dear AMR Stakeholder:

On behalf of all the men and women of American Eagle, I'd like to express our commitment and support for AMR's environmental initiatives.

Our top priority at American Eagle is the personal safety of our employees and customers. This commitment to safety leads us to ensure all parts and materials we use are labeled correctly, handled properly, and disposed of in the most responsible way.

Our efforts to reduce the consumption of fossil fuels extend across our company and are manifested in:

- the use of electric vehicles on the tarmac
- the elimination of buses at most of our terminals
- the regular maintenance and washing of our aircraft engines
- our pilots' use of optimum flight plans to achieve the most direct routes for the minimization of fuel burn
- the use of more efficient ground-based power systems when our aircraft are on the ground (instead of running aircraft engines to keep the lights on and the temperature controlled)

We hope that this report demonstrates that American Airlines and American Eagle are serious about conserving energy, safeguarding our employees and customers, protecting our environment, and constantly improving the sustainability of our companies and our planet.

Sincerely,

Peter M. Bowler President and CEO American Eagle Airlines

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# Appendices

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The details of our environmental impact track our progress toward the goal of sustainability.

$\rightarrow$	Appendices																	
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# Appendix A: GRI Index\*

\* GRI Standard Disclosure 3.12

GRI Index	Description	Page
1.1	Strategy and analysis	2
2.1	Name of the organization.	50
2.2	Primary brands, products, and/or services. The reporting organization should indicate the nature of its role in providing these products and services, and the degree to which it utilizes outsourcing.	50
2.3	Operational structure of the organization, including main divisions, operating companies, subsidiaries, and joint ventures.	50
2.4	Location of organization's headquarters.	50
2.5	Number of countries where the organization operates and names of countries with either major operations or that are specifically relevant to the sustainability issues covered in the report.	50
2.6	Nature of ownership and legal form.	50
2.7	Markets served (including geographic breakdown, sectors served, and types of customers/beneficiaries).	50

GRI Index	Description	Page
2.8	<ul> <li>Scale of the reporting organization, including:</li> <li>Number of employees;</li> <li>Net sales (for private sector organizations) or net revenues (for public sector organizations);</li> <li>Total capitalization broken down in terms of debt and equity (for private sector organizations); and</li> <li>Quantity of products or services provided.</li> <li>In addition to the above, reporting organizations are encouraged to provide additional information, as appropriate, such as:</li> <li>Total assets;</li> <li>Beneficial ownership (including identity and percentage of ownership of largest shareholders); and</li> <li>Breakdowns by country/ region of the following: <ul> <li>Sales/revenues by countries/regions that make up 5 percent or more of total revenues;</li> <li>Costs by countries/</li> <li>regions that make up 5 percent or more of total revenues; and</li> <li>Employees.</li> </ul> </li> </ul>	50
2.9	Significant changes during the reporting period regarding size, structure, or ownership including: • The location of, or changes in operations, including	

GRI Index	Description	Page
	<ul> <li>facility openings, closings, and expansions; and</li> <li>Changes in the share capital structure and other capital formation, maintenance, and alteration operations (for private sector organizations).</li> </ul>	50
2.10	Awards received in the reporting period.	50
3.1	Reporting period (e.g. fiscal/ calendar year) for information provided.	50
3.2	Date of most recent previous report (if any).	50
3.3	Reporting cycle (annual, biennial, etc.)	50
3.4	Contact point for questions regarding the report or its contents.	50
3.5	Process for defining report content, including: • Determining materiality; • Prioritizing topics within the report; and • Identifying stakeholders the organization expects to use the report. Include an explanation of how the organization has applied the "Guidance on Defining Report Content" and the associated principles.	4

Appendices	$\rightarrow$	+	≁															
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GRI Index	Description	Page
3.6	Boundary of the report (e.g. countries, divisions, subsidiaries, leased facilities, joint ventures, suppliers). See GRI Boundary Protocol for further guidance.	4
3.7	State any specific limitations on the scope or boundary of the report (see completeness principle for explanation of scope). If boundary and scope do not address the full range of material economic, environmental, and social impacts of the organization, state the strategy and projected timeline for providing complete coverage.	4
3.8	Basis for reporting on joint ventures, subsidiaries, leased facilities, outsourced operations, and other entities that can significantly affect comparability from period to period and/or between organizations.	4
3.10	Explanation of the effect of any restatements of information provided in earlier reports, and the reasons for such re- statement (e.g. mergers/ acquisitions, change of base years/periods, nature of business, measurement methods).	4

GRI Index	Description	Page
3.11	Significant changes from previous reporting periods in the scope, boundary, or measurement methods applied in the report.	4
3.12	<ul> <li>Table identifying the location of the Standard Disclosures in the report. Identify the page numbers or web links where the following can be found:</li> <li>Strategy and analysis 1.1 - 1.2;</li> <li>Organizational profile 2.1- 2.10;</li> <li>Report parameters 3.1-3.13;</li> <li>Governance, commitments, and engagement 4.1 - 4.17;</li> <li>Disclosure of management approach, per category;</li> <li>Coreperformance indicators;</li> <li>Any GRI additional indicators that were included; and</li> <li>Any GRI sector supplement indicators included in the report.</li> </ul>	4; Appendix A on page 46
4.1	Governance structure of the organization, including committees under the highest governance body responsible for specific tasks, such as setting strategy or organizational oversight. Describe the mandate and composition (including number of independent members	

GRI Index	Description	Page
	and/or non-executive members) of such committees and indicate any direct responsibility for economic, social, and environmental performance	49
4.2	Indicate whether the chair of the highest governance body is also an executive officer (and, if so, their function within the organization's management and the reasons for this arrangement).	49
4.3	For organizations that have a unitary board structure, state the number of members of the highest governance body that are independent and/or non-executive members. State how the organization defines "independent" and "non- executive." This element applies only for organizations that have unitary board structures. See the glossary for a definition of "independent."	Not
4.4	Mechanisms for shareholders and employees to provide recommendations or direction to the highest governance body. Include reference to processes regarding: • The use of shareholder resolutions or other	

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GRI Inde	x Description	Page	GRI
	mechanisms for enabling minority shareholders to express opinions to the highest governance body; and Informing and consulting employees about the working relationships with formal representation bodies such as organization level		4.
	"work councils," and representation of employees in the highest governance body. Identify topics related		EN
	to economic, environmental, and social performance raised through these mechanisms during the reporting period.	49	Eľ
4.14	List of stakeholder groups engaged by the organization. Examples of stakeholder groups are: • Communities; • Civil society; • Customers; • Shareholders and providers		E
	of capital; • Suppliers; and • Employees, other workers, and their trade unions.	4; 49	EN

GRI Index	Description	Page
4.15	Basis for identification and selection of stakeholders with whom to engage. This includes the organization's process for defining its stakeholder groups, and for determining the groups with which to engage and not to engage.	4; 49
EN3	Direct energy consumption by primary energy source. (Core)	19
EN5	Energy saved due to conservation and efficiency improvements. (Additional)	13-20
EN6	Initiatives to provide energy-efficient or renewable energy-based products and services, and reductions in energy requirements as a result of these initiatives. (Additional)	13-20
EN7	Initiatives to reduce indirect energy consumption and reductions achieved. (Additional)	19-20

GRI Index	Description	Page
EN16	Total direct and indirect greenhouse gas emissions by weight. (Core)	21-23
EN17	Other relevant indirect greenhouse gas emissions by weight. (Core)	21-25
EN18	Initiatives to reduce greenhouse gas emissions and reductions achieved. (Additional)	13-20; 25
EN20	NO <sub>x</sub> , SO <sub>x</sub> , and other significant air emissions by type and weight. (Core)	26-27
EC1	Direct economic value generated and distributed, including revenues, operating costs, employee compensation, donations and other community investments, retained earnings, and payments to capital providers and governments.	Annual report, page 50
SO3	Percentage of employees trained in organization's anti-corruption policies and procedures.	49

# Appendix B: Governance\*

AMR's shareholders annually elect AMR's board of directors. Each director is required to act in the best interests of the company and its shareholders. With this in mind, the board oversees the management of the company, including the performance of the CEO and senior management. The positions of chairman of the board and CEO are filled by Gerard J. Arpey.

#### Corporate Environmental

Responsibility and authority for environmental issues is managed by AMR's Corporate Environmental Department and, by extension, specifically trained staff at our stations and maintenance bases. AMR's Corporate Environmental Department is led by a managing director who reports to the vice president of Safety, Security, and Environmental. This corporate staff directs and relies upon a much larger network of American Airlines and American Eagle staff who are trained on environmental issues and are located at all of our facilities. Together, this broadly distributed team works to ensure AMR meets or exceeds environmental requirements through a comprehensive environmental program managed by Corporate Environmental.

Specifically, the environmental program is designed to accomplish the following goals:

- Interact with stakeholders, suppliers, and customers on environmental issues impacting the company and commercial aviation.
- Identify practices that must be implemented to improve the environmental management system.

- Assist facility managers in their efforts to protect the environment and achieve compliance.
- Identify operations that raise potential environmental concerns.
- Eliminate the occurrence of environmental accidents and non-compliance.
- Reduce or eliminate the release of pollutants into the environment.
- Increase the level of employee environmental awareness.
- Verify compliance and identify non-compliance with environmental regulations and company policies.

The central objective of AMR's environmental program is to continually improve its environmental performance in the following areas:

- Air emissions
- Auditing
- Chemical import and export
- Chemical inventories and reporting
- Drinking water
- Environmental training curriculum
- Fuel hydrant systems
- Greenhouse gas emissions
- Industrial wastewater
- Noise
- Remediation
- Spill response
- Storage tanks
- Waste

\* GRI Standard Disclosures 4.1-4.4, 4.14, 4.15

#### Training

Table 1

Corporate Environmental provides specialized training to our staff at stations with specific environmental requirements. These courses are usually associated with EPA enforcement initiatives (like the recently revised oil spill prevention regulations) or serious audit findings.

American Airlines takes social responsibility very seriously and has established a variety of initiatives to educate employees, including a web-based training program on business ethics. This program includes training on American Airlines policies regarding anti-corruption, fraud, environmental responsibility, workplace harassment, unlawful discrimination and safety. Management and specific non-management employees are required to take the training. You can read about other community involvement practices in the 2008 Citizens Report at www.aa.com.

Business Ethics Tra (includes anti-corrup	Business Ethics Training (includes anti-corruption)											
Employee Group	Percentage											
Management	88%											
Non-Management	2%											
Total Employees	10%											

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# Appendix C: Organization/Report Profiles

#### **Organizational Profile\***

AMR Corporation (AMR) was incorporated in October 1982 and is based in Fort Worth, Texas. AMR's operations fall almost entirely in the airline industry. Our subsidiaries are the following:

- American Airlines, Inc. (American)
- AMR Eagle Holding Corporation (AMR Eagle)

A complete organizational profile is included with our annual report filed each year with the U.S. Securities and Exchange Commission (SEC) and published at http://www.aa.com/content/amrcorp/ investorRelations/main.jhtml. American is the largest scheduled passenger airline in the world (in terms of available seat miles and revenue passenger miles) with service to approximately 170 destinations throughout North America, the Caribbean, Latin America, Europe and Asia. Our cargo operations also make American one of the largest scheduled air freight carriers in the world.

AMR Eagle owns two regional airlines, American Eagle Airlines, Inc. and Executive Airlines, Inc., which do business as American Eagle.

#### **Report Profile\*\***

This 2007 Environmental Responsibility Report (ERR) is for the calendar year 2007 (Jan. 1, 2007, to Dec. 31, 2007). AMR began annual reporting with our 2006 ERR, which we published in the third quarter of 2007.

Questions of comments regarding this ERR should be directed to:

Mr. Tom Opderbeck Environmental Projects Manager American Airlines 4333 Amon Carter Blvd. Fort Worth, TX 76155-2664 tom.opderbeck@aa.com

\*\* GRI Standard Disclosures 3.1-3.4

\* GRI Standard Disclosures 2.1-2.10

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# Appendix D: Greenhouse Gas Inventory Methodology

AMR utilized the following greenhouse gas (GHG) inventory standards in conducting this GHG emission inventory:

- ANSI/ISO/NSF E14064-1:2006, Greenhouse Gases-Part 1: Specification with Guidance at the Organizational Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals
- Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard, Revised Edition, World Resources Institute

Consistent with these standards, this inventory is based on the following principles: relevance, completeness, consistency, transparency and accuracy. AMR has made diligent efforts to meet these principles.

Fuel usage information, refrigerant usage data, natural gas, gasoline, and other pertinent operating information was used to calculate annual emissions of each of the six GHG categories recognized under E14064. GHG is defined in E14064 as a gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the earth's surface, atmosphere, and clouds. The six chemicals recognized in E14064 and the corresponding global warming potentials covered are in *Table 1*.

Gas	Global Warming Potential
Carbon dioxide (CO <sub>2</sub> )	1.0
Methane (CH <sub>4</sub> )	21.0
Nitrous Oxide (N <sub>2</sub> 0)	310
Hydrofluorocarbons (HFCs)	varies
Perfluorocarbons (PFCs)	varies
Sulfur hexafluoride (SF $_6$ )	23,900

Table 1

Emissions of each these GHGs were converted to carbon dioxide equivalents  $(CO_2e)$  based on the Global Warming Potentials provided in Annex C to E14064 and included as Appendix A to this report. The emissions of each GHG are converted to  $CO_2e$  by multiplying by the corresponding global warming potential.

AMR GHG emissions are classified as direct and indirect emissions in accordance with industry standards.

Scope l direct emissions include GHG emissions associated with both stationary and transportation sources. Transportation sources include aircraft, company-owned vehicles and ground support equipment. Direct emissions are associated with activities at the three AMR maintenance and engineering bases. Direct Scope I emission sources at the bases include steam generation and electrical generation, jet engine testing, fuel combustion from company vehicles and ground support equipment, and fugitive emissions of HFCs from refrigeration equipment.

Scope II indirect emissions cover GHG emissions associated with purchased electricity and steam at airport terminals, office areas, and airport terminals and maintenance and engineering bases.

Scope III indirect emissions are not reported in this inventory because their reporting is optional under both the WRI and E14064. Scope III indirect emission sources include emissions generated by: workers commuting to and from work, suppliers delivering fuel or other goods to AMR locations, and contractors picking up waste and recyclable products from AMR facilities.

GHG emissions were calculated in general accordance with the principles and industry standards referenced above by multiplying a throughput by an emission factor. Throughputs are the quantities of: jet fuel consumed, natural gas burned, gasoline and diesel fuel used in fleet vehicles and ground support equipment, and electricity purchased. Emission factors represent the quantity of GHGs generated per unit of throughput.

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77	7	77	7	7	77	77	77	7	77	7	77	77	7	77	77	7	7	Appendices

The accuracy of the GHG inventory is dependent on the accuracy of emission factors and the accuracy and completeness of throughput data. The emission factor data is based on readily available information in the literature. Because the conversion from carbon to carbon dioxide is well understood, the emission factors utilized are believed to be highly accurate (within +/- 1 percent).

The accuracy of throughput data is dependent upon the methodology and tools used to track throughput data. Since more than 99 percent of Scope I direct GHG emissions are attributed to jet fuel consumption, the accuracy of throughput data is dependent primarily on the accuracy of the jet fuel usage data. AMR tracks the quantity of jet fuel consumed on each flight. The data is recorded after each flight and tabulated within a central database. AMR's annual fuel use is based on this data set and believed to be accurate to within at least +/-3 percent. The data is cross-checked by comparing to jet fuel purchased quantities to confirm data accuracy. Purchased electricity and natural gas quantities are based on the utility bills with the monthly usage quantities compiled within a central database. Fuel used in ground support equipment and fleet vehicles is tracked at the station or maintenance base. The data is tabulated and summarized at AMR headquarters. In some cases, the data point for some of the smaller stations was not readily available. In such cases, a throughput was assumed based on the throughput for a similar station. Thus, the accuracy of some of the throughputs that make minor contributions to GHG emission totals may not be highly accurate. However, the accuracy of the throughputs accounting for more than 99 percent of GHG emissions is highly accurate.

The overall accuracy of GHG inventory is believed to accurately reflect GHG emissions to within at least +/- 4 percent of actual GHG emissions based on the assumptions above regarding the accuracy of the emission factors and throughput data.

	Appendices	$\rightarrow$	1																
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				GHG Si	ummary				
Emission Factors	J	et A Fuel Combusti	on	Na	tural Gas Combust	ion		Gasoline	
	Factor	Units	Reference*	Factor	Units	Reference*	Factor	Units	Reference*
	70.8716	metric tons/10 <sup>3</sup> HHV Btu	Ref. 3, page 45; heat of combustion = 5.67 MMBtu/bbl	0.059	short ton/10 <sup>6</sup> Btu	Ref. 1, page 55	70.91	short ton/10 <sup>6</sup> Btu	Ref. 4, Page 32
CO,	9567.66600	metric tons/gallon fuel	Derived from factors above	0.0507	metric ton/GJ	Ref. 1, page 55	19.36	pounds/gallon	Ref.3, Page 64
2	9.567666	metric tons/1,000 gallons	Derived from factors above	53.06	kg CO2/MMBtu	Ref. 4. Page 32	0.008781696	metric tons/gallon	Conversion
	0.009567666	metric tons/gallon fuel	Derived from factors above	52.79	metric ton CO <sub>2</sub> /10 <sup>9</sup> Btu	Ref. 5, Appendix F			
		1			1				
	0.5	kg/terajoule	Ref. 6; 1054 Joule/Btu; 135,000 Btu/gallon Jet A	0.00528	kg/MMBtu	Ref. 7	0.001882	kg/gallon	Ref. 7
	0.0005	metric tons/terajoule	Derived from factors above	0.00528	metric ton/10 <sup>9</sup> Btu		0.000001882	metric tons/gallon	Conversion
CH.	4.74383E-07	metric tons/tera Btu	Derived from factors above						
- 4	4.74383E-19	metric tons/Btu	Derived from factors above						
	6.40417E-14	metric tons/gallon	Derived from factors above						
	6.40417E-11	metric tons/1,000 gallons	Derived from factors above						
		T	[	-	1	1	<b>F</b>	ſ	1
	2.0	kg/terajoule	Ref. 6; 1054 Joule/Btu; 135,000 Btu/gallon Jet A	0.00011	kg/MMBtu		0.000627	kg/gallon	Ref. 7
	0.002	metric	Derived from factors	0.00011	metric ton/10 <sup>9</sup> Btu		0.00000627	metric tons/gallon	Conversion

	0.002	tons/terajoule	above	
N <sub>2</sub> O	1.9E-06	metric tons/tera Btu		
2	1.9E-18	metric tons/Btu		
	2.56167E-13	metric tons/gallon	Derived from factors above	
	2.56167E-10	metric tons/1,000 gallons	Derived from factors above	

\*See page 55 for global warming potential details and references.

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				GHG S	ummary				
Emission Factors	Fuel Oil (Di	stillate/Diesel)(No.	1, 2, and 4)	F	Purchased Electricit	у		Propane	
	Factor	Units	Reference*	Factor	Units	Reference*	Factor	Units	Reference*
	72.31	kg/MMBtu	Ref. 5, Appendix H	0.69	metric tons CO <sub>2</sub> e/ megawatt-hours	Ref. 5, Appendix F	5.42	kg/gallon	Ref. 7
CO <sub>2</sub>			Ref. 3, Page 45				0.00542	metric ton/gallon	Heat content = 86,300 Btu/gallon
2	72.31	metric ton/gallon	Ref. 5, Appendix H						
	0.01026802	metric tons/gallon fuel	Derived from factors above						
	0.01055	ka/MMBtu		0.00000548	metric tons/Mw-hrs	Reference 7	0.000910565	kg/gallon	Ref. 7
CH4	0.01055	metric tons/10 <sup>9</sup> Btu					9.10565E-07	metric ton/gallon	
	1.4981E-06	metric ton/gallon	Derived from factors above						
	0.00063	ka/MMPtu		0.0000048	matria tana/MW/ bra	Dof 7	5 46220E 05	ka/aallan	Dof 7
	0.00003	Ky/ IVIIVID LU		0.0000948		пеі. <i>і</i>	0.40339E-00	ky/galloll	nei. /
N <sub>2</sub> O	0.00063	metric tons/10 <sup>9</sup> Btu					5.46339E-08	metric ton/gallon	

\*See page 55 for global warming potential details and references.

8.946E-08

metric ton/gallon

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GHGs	Global Warming Potential (Recommended 100-year GHG Global Warming Potentials)	Reference
CO <sub>2</sub>	1	Ref. 2, page 5-4
CH <sub>4</sub>	21	Ref. 2, page 5-4
N <sub>2</sub> O	310	Ref. 2, page 5-4
HFC-23	11,700	Ref. 2, page 5-4
HFC-32	650	Ref. 2, page 5-4
HFC-41	97	Ref. 2, page 5-4
HFC-125	2,800	Ref. 2, page 5-4
HFC-134	1,000	Ref. 2, page 5-4
HFC-134a	1,300	Ref. 2, page 5-4
HFC-143	300	Ref. 2, page 5-4
HFC-143a	3,800	Ref. 2, page 5-4
HFC-152a	140	Ref. 2, page 5-4
HFC-227ea	2,900	Ref. 2, page 5-4
HFC-236fa	6,300	Ref. 2, page 5-4
HFC-4310mee	1,300	Ref. 2, page 5-4
PFCs	Not applicable to AA	Ref. 2, page 5-4
SF <sub>6</sub>	23,900	Ref. 2, page 5-4

#### **References:**

- 1) Calculation Tool for Direct Emissions From Stationary Combustion, Version 3.0, July 2005
- 2) Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions, Batelle, December 2003
- 3) Technical Guidelines-Voluntary Reporting of Greenhouse Gases 1605(b) Program, Office of Policy and International Affairs, USDOE, March 2006
- World Resources Institute, Discussion Paper for a Natural Gas Transmission and Distribution Greenhouse Gas Reporting Protocol, Jan. 26, 2007
- 5) Instruction for Form EIA-1605, Voluntary Reporting of Greenhouse Gases, April 25, 2007
- 6) International Panel on Climate Change 2006 Guidelines, Volume 2, Chapter 3, Section 3.6.1.2, Table 3.6.5
- 7) Clean Air Cool Planet Campus Carbon Calculator, CA-CP version 5.0, 2006

# Appendix E: AMR Waste Inventory

Haz	Hazardous/Non-Hazardous Waste Generated By Type													
Location	2003	2004	2005	2006	2007									
Hazardous (pounds)	)													
Airport Operations Maintenance Bases	341,210 2,738,452	261,144 2,594,686	493,319 1,775,267	412,284 1,690,624	373,864 2,169,433									
Subtotal	3,079,662	2,855,830	2,268,586	2,102,908	2,543,297									
Non-Hazardous (po	unds)													
Airport Operations Maintenance Bases	617,518 935,332	876,030 1,542,783	647,105 1,810,746	779,952 794,452	1,014,541 1,108,615									
Subtotal	1,552,850	2,418,813	2,457,851	1,574,404	2,123,156									
Total	4,632,512	5,274,643	4,726,437	3,677,312	4,666,453									

2007 Disposal Summary												
Location	Recycling	Energy Recovery	Incineration	Hazardous Landfill	Aqueous Treatment	Total Waste						
Airport Operations (p	ounds)				-							
Hazardous Non-Hazardous	3,046 70,819	266,817 582,000	85,937 286,954	17,250 54,199	814 	373,864 1,014,541						
Subtotal	73,865	848,817	372,891	71,449	21,383	1,388,405						
Maintenance Bases (	(pounds)	_										
Hazardous Non-Hazardous	459 816,034	470,987 258,239	52,670 2,379	180,300 24,333	1,465,017 7,630	2,169,433 1,108,615						
Subtotal	816,493	729,226	55,049	204,633	1,472,647	3,278,048						
Total	890,358	1,578,043	427,940	276,082	1,494,030	4,666,453						

# Appendix F: 2007 Fleet Inventory

#### Flight Equipment — Operating

Owned and leased aircraft operated by the company on Dec. 31, 2007, included.

Equipment Type	Average Seating Capacity	Owned	Capital Leased	Operating Leased	Total	Average Age (Years)
American Airlines Aircraft						
Airbus A300-600R	267	10	-	24	34	18
Boeing 737-800	148	67	-	10	77	8
Boeing 757-200	188	87	6	31	124	13
Boeing 767-200 Extended Range	167	3	11	1	15	21
Boeing 767-300 Extended Range	225	47	-	11	58	14
Boeing 777-300 Extended Range	246	47	-	-	47	7
McDonnell-Douglas MD-80	139	126	67	107	300	18
Total		387	84	134	655	15
American Eagle Aircraft						
Bombardier CRJ-700	70	25	-	-	25	5
Embraer 135	37	39	-	-	39	8
Embraer 140	44	59	-	-	59	5
Embraer 145	50	108	-	-	108	5
Super ATR	64/66	39	-	-	39	14
Saab 340B/340B Plus	34	24	-	2	26	15
Total		294	-	2	296	8

A very large majority of the company-owned aircraft are encumbered by liens granted in connection with financing transactions entered into by the company.



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