



Complete version of Boeing's 2010 Environment Report is available at [www.boeing.com/environment](http://www.boeing.com/environment).

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# 2010 Summary Environment Report



# Creating a Better Tomorrow



Boeing recognizes the importance of protecting our ecosystem. That is why we are unleashing the expertise of Boeing employees to design environmentally progressive products, research cleaner fuels, enhance the global air traffic system to reduce the carbon footprint of air travel, and expand into new markets where Boeing technologies show tremendous promise.

## Improving the Supply Chain's Environmental Performance

Our life cycle approach to the environment starts with our global supply chain. In 2010, Boeing employees will lead more than 400 workshops educating suppliers about ways to reduce emissions and cut back on the amount of materials sent to landfills.

Later this year, we will introduce new contracting provisions establishing suppliers' environmental initiatives as a key factor in doing business with Boeing. The next step is to work with other major aerospace companies to establish a recognized environmental standard for our global supply base.

## Achieving Aggressive Internal Targets

Boeing employees, using Lean+ tools, are developing innovative ways to meet aggressive environmental targets inside our own facilities.

These efforts are delivering results. At our major U.S. facilities since 2002, we have reduced CO<sub>2</sub> emissions by 31 percent, energy consumption by 32 percent and hazardous-waste generation by 38 percent on a revenue-adjusted basis. We reduced water consumption by 43 percent on a revenue-adjusted basis, and earlier this year set a challenging target to continue this progress.

## Innovative Solutions

Operation of Boeing products represents our biggest potential impact on the environment and our greatest opportunity for a positive change. Commercial aviation accounts for 2 percent of man-made greenhouse gas emissions, and our industry is addressing this issue with credible actions.

Aerospace was the only industry to present a clear plan to the United Nations Climate Change Conference in Copenhagen. We called for global guidelines placing tough fuel-efficiency standards on new airplane designs, improvements in the global air traffic control system to cut air travel-related CO<sub>2</sub> emissions by 12 percent, and continued efforts to commercialize sustainable biofuels — all with the aim of achieving carbon-neutral growth across the industry by 2020.

Since December, two new Boeing jetliners — the 747-8 and the 787 — have entered flight test. Both airplanes will consume less fuel and produce a smaller carbon footprint than the jetliners they replace.

## Summary of Environmental Performance (2007-2009)

	2007	2008*	2009	% Improvement Absolute ('07-'09)
<b>Revenue</b> (U.S. dollars in millions)	\$66,387	\$60,909	\$68,281	
<b>U.S. Employment</b> (Year End)	159,313	162,191	157,073	
<b>Energy consumption</b> (MMBtus or Millions of British Thermal Units)	12,951,825	12,679,255	12,642,153	2.4%
<b>CO<sub>2</sub> emissions</b> (Metric Tons)	1,331,663	1,295,187	1,291,286	3.0%
<b>Water consumption</b> (Thousands of U.S. gallons)	1,788,759	1,770,002	1,672,285	6.5%
<b>Hazardous waste</b> (Tons generated)	8,956	7,647	8,105	9.5%
<b>Recycling rates</b> (As a percentage of total nonhazardous solid waste generated)	58%	64%	68%	
<b>Environmental fines**</b> (U.S. dollars in millions)		\$0.024	\$0.028	

\* 2008 revenues and manufacturing production were affected by a 58-day Machinist strike in Washington, Oregon and Kansas.

\*\* Environmental fines do not include a settlement for storm water permit violations at Santa Susana, Calif., between 2006-2009.

Boeing has tested enhanced air traffic control systems at major airports in Australia, Europe and North America. If these innovations were adopted worldwide, airlines would reduce annual emissions by millions of tons. That is why we continue to urge governments to update aging air traffic control systems.

Together with leading researchers and industries, Boeing employees are advancing ways to develop sustainable biofuels made from algae and other feedstocks that reduce emissions over their life cycle without competing with food crops for land or water. In the past two years, six customers — five airlines and the U.S. Navy — have flown Boeing airplanes powered by sustainable fuels.

Applying innovations designed to meet complex national security challenges, Boeing is working with the U.S. Department of Energy and utilities to provide smart grid technology to improve the efficiency and security of power distribution systems.

## End-of-Service Recycling and Recovery

We believe that when our products reach the end of their useful lives, they still can provide value. That is why Boeing helped bring together 11 companies to form the Aircraft Fleet Recycling Association.

This group has grown to 42 members that, combined, have efficiently recycled more than 7,000 commercial and military aircraft.

These are just a few ways Boeing is applying our technical leadership to enhance environmental performance across our industry.

We recognize that this is the start of a long journey. We also believe the innovative spirit that helped us conquer seemingly impossible challenges, such as landing on the moon, will help us pioneer new technologies to address environmental issues and enable people around the world to continue to grow and prosper.

Jim McNerney  
Chairman, President and Chief Executive Officer  
The Boeing Company

Mary Armstrong  
Vice President  
Boeing Environment, Health and Safety

» To learn more, go to [www.boeing.com/environment](http://www.boeing.com/environment)

## Pioneering Environmental Technologies

Boeing recognizes the serious global challenges of climate change and pollution. That is why we are working aggressively to improve the environmental performance of our operations around the world and develop innovative new products and services.

### Aggressive Performance Targets

Boeing is on track to achieve the following environmental performance targets, on a revenue-adjusted basis, at our major facilities in the United States between 2007 and 2012:

25% reduction in greenhouse gas emissions

25% reduction in energy consumption

25% reduction in water consumption

25% reduction in hazardous-waste generation

We have also set a target for a 25 percent increase in recycling rates (on a nonrevenue-adjusted basis) for the same period.



### Improving Product Performance

Boeing is introducing the world's two newest commercial airplanes, the 787 Dreamliner and the 747-8, which are significantly more fuel efficient and produce lower emissions than the airplanes they will replace. We also are making enhancements to existing airplanes — including the 737, 767, 777 and F/A-18 — to improve their environmental performance.

Improving fuel consumption is key to our research and development efforts because each kilogram of fuel not burned equates to 3.16 kilograms (approx. 6.96 pounds) of carbon dioxide not emitted.

### Sustainable Biofuels

Working with airlines, industry groups, the U.S. Navy, the U.S. Air Force Research Laboratory and more than a dozen universities and research institutions worldwide, Boeing is leading efforts to demonstrate the viability of sustainable aviation biofuels made from algae and other renewable resources that do not compete with food crops for land or water.

We have conducted a series of test flights with Boeing commercial jetliners and a Navy F/A-18, and we anticipate sustainable biofuels will be certified for use in commercial aviation by the end of 2010 or early 2011. These tests have shown that sustainable biofuels, which reduce greenhouse gas emissions from their life cycle, meet or exceed all technical parameters for aviation fuel.



Photo: Air Traffic Control the Netherlands (LVNL)

### Efficient Air Transportation Systems

Improving air traffic management will provide the greatest short-term opportunities to enhance the environmental performance and fuel efficiency of commercial air travel. Updating the world's aging air traffic control systems would reduce the carbon footprint of commercial aviation by 12 percent, according to studies by the International Air Transport Association. Cutting the length of the average commercial flight by one minute would eliminate 4.8 million tons of CO<sub>2</sub> emissions annually.

Boeing researchers have developed an advanced procedure, known as Tailored Arrivals, that has proved effective in tests at major airports in Amsterdam, Los Angeles, Melbourne, Miami, San Francisco and Sydney. At San Francisco, four airlines participated in the test, reducing fuel consumption by 1.1 million pounds (495,000 kilograms) and lowering CO<sub>2</sub> emissions by nearly 3.5 million pounds (nearly 1.6 million kilograms) over a one-year period.

### Alternative Energy Solutions

Boeing is pioneering advancements in solar cells, fuel cells and environmentally progressive energy sources that offer the potential to reduce greenhouse gas emissions and conserve resources.

Boeing's recently formed Energy Solutions group received three contracts to demonstrate smart grid technologies in different regions across the United States. Boeing also is teaming with a Danish technology company to offer a system that could result in a 25 to 35 percent reduction in the amount of energy needed to power streetlights in major cities.



» To learn more, go to [www.boeing.com/environment](http://www.boeing.com/environment)

# Measuring Our Progress

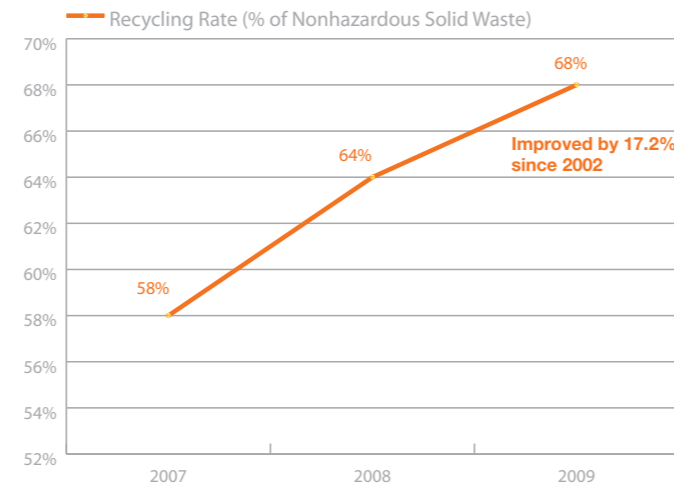
Since 2002, on a revenue-adjusted basis, Boeing has reduced CO<sub>2</sub> emissions by 31 percent at our major U.S. manufacturing sites. During the same period, we have reduced water consumption by 43 percent and hazardous waste generation by 38 percent.

## Major Manufacturing Sites

- Boeing considers the following to be its major U.S. manufacturing sites:
- Alabama: Huntsville
- Arizona: Mesa
- California: Anaheim, El Segundo, Huntington Beach and Boeing Defense, Space & Security's Long Beach operations
- Kansas: Wichita
- Missouri: St. Charles and St. Louis
- Oregon: Portland
- Pennsylvania: Philadelphia
- Texas: San Antonio and Houston
- Washington: Auburn, Developmental Center, Everett, Frederickson, Kent Space Center, North Boeing Field/Plant 2 and Renton

## Solid Waste and Recycling

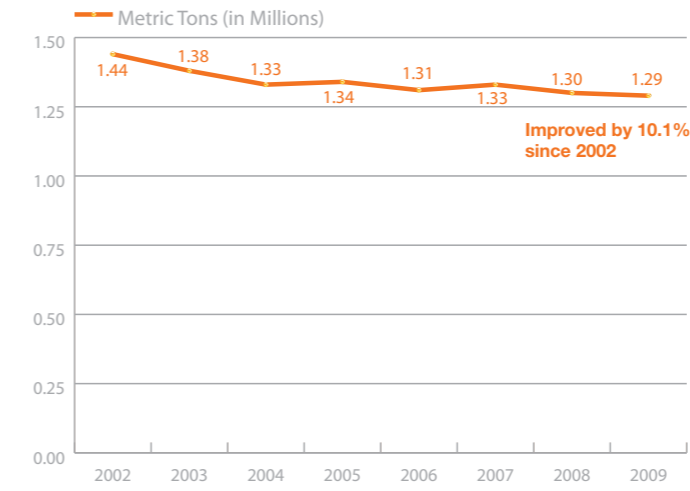
### Recycling Rates at Major U.S. Sites – Absolute



- In addition to data from Boeing's 20 major sites, also includes data from Bellevue, Wash., Boeing Commercial Airplanes operations in Long Beach, Calif., Seal Beach, Calif., and West Hills, Calif.
- Recycling rate is calculated by dividing the amount of nonhazardous solid waste recycled by the total amount of nonhazardous solid waste generated.

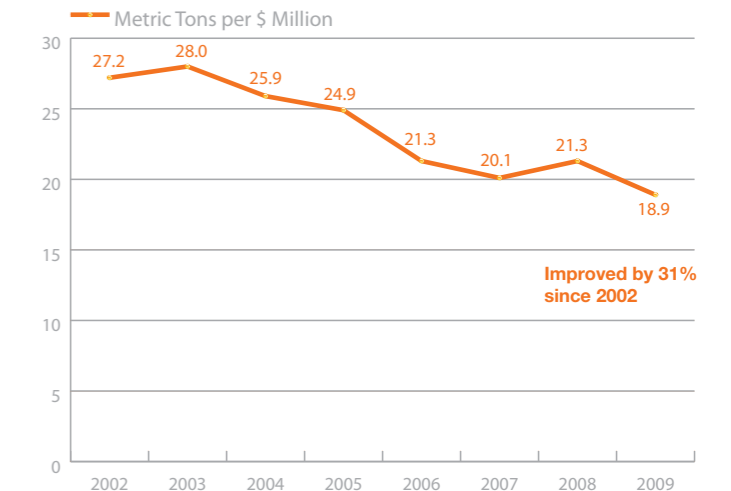
## Air Emissions

### CO<sub>2</sub> Emissions at Major U.S. Sites – Absolute



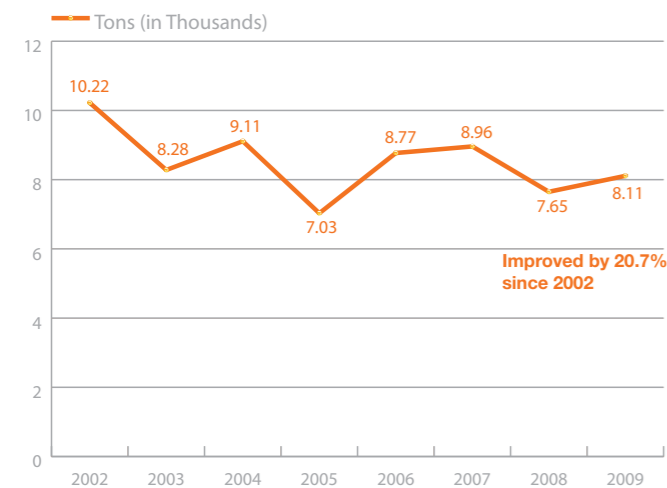
- In addition to data from Boeing's 20 major sites, also includes data from Bellevue, Wash., Chicago, Boeing Commercial Airplanes operations in Long Beach, Calif., Seal Beach, Calif., and West Hills, Calif.
- Energy use is calculated from consumption of electricity, natural gas and fuel oil. (Our facility in Philadelphia is the only major U.S. site that uses fuel oil for energy.) Consumption of other fuels is not represented.
- Five additional sites were included in data collection beginning in 2008. Energy consumption totals for previous years were adjusted to reflect this change in reporting practices.
- 2008 data reflects reduced production demand due to the IAM work stoppage in Washington, Oregon and Kansas.
- Data in the chart is normalized for divestitures by excluding Boeing Commercial Airplanes operations in Wichita (now Spirit AeroSystem) from 2002 to 2006. Boeing Defense, Space & Security's Wichita operations are included in this data.

### CO<sub>2</sub> Emissions at Major U.S. Sites – Revenue Adjusted



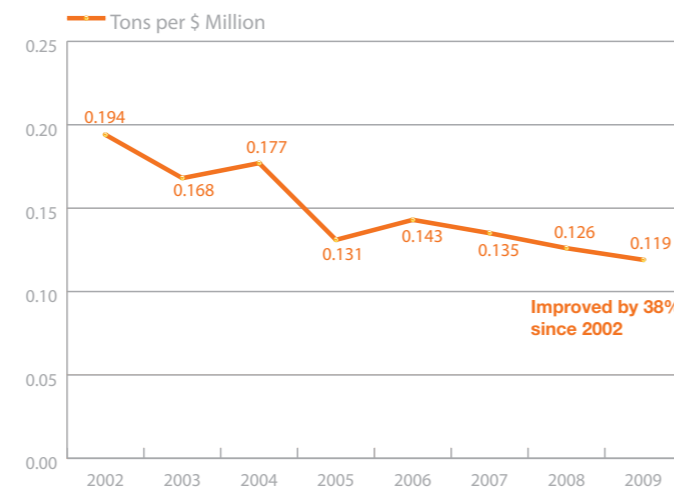
## Hazardous Waste

### Hazardous Waste at Major U.S. Sites – Absolute



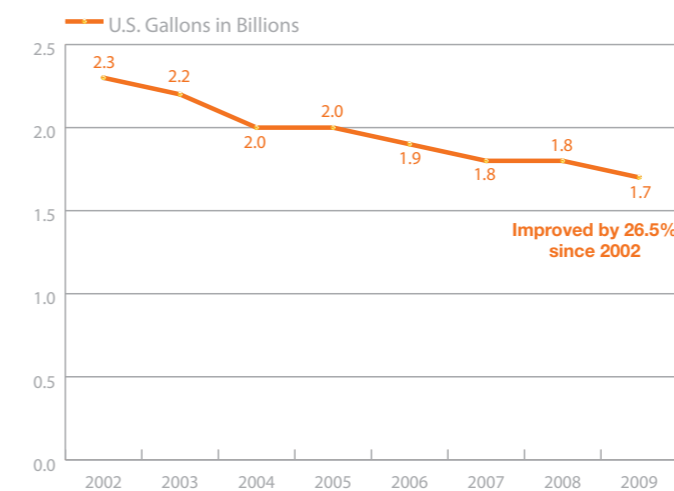
- In addition to data from Boeing's 20 major sites, also includes data from El Paso, Texas, Heath, Ohio, Macon, Ga., Salt Lake City and Sylmar, Calif.
- 1 ton = approximately 0.91 metric tons or 907.18 kilograms.
- 2007 and 2008 data has been restated to reflect the fact that, for internal purposes only, one Boeing site previously misclassified certain waste as remediation waste rather than hazardous waste.
- 2008 data reflect both improved operation performance and reduced production demand due to the IAM work stoppage in Washington, Oregon, and Kansas.
- Operational hazardous waste does not include wastes derived from remediation and construction activity.
- Total normalized for divestitures by excluding Boeing Commercial Airplanes Wichita (now Spirit AeroSystem) from 2002 to 2005.

### Hazardous Waste at Major U.S. Sites – Revenue Adjusted



## Water Conservation

### Water Use at Major U.S. Sites – Absolute



- In addition to data from Boeing's 20 major sites, also includes data from Chicago, Boeing Commercial Airplanes' operations in Long Beach, Calif., and West Hills, Calif.
- 1 U.S. gallon = approximately 3.79 liters.
- To align with reporting practices for energy, emissions, hazardous waste and recycling, Boeing has begun reporting water use at major U.S. sites. Previously, Boeing reported on water use at all of its U.S. locations, which is a higher level of consumption.
- Data in the chart is normalized for divestitures by excluding Boeing Commercial Airplanes operations in Wichita (now Spirit AeroSystems) from 2002 to 2006. Boeing Defense, Space & Security's Wichita operations are included in this data.
- 2008 data reflects reduced production demand due to the IAM work stoppage in Washington, Oregon and Kansas.

### Water Use at Major U.S. Sites – Revenue Adjusted

