BOEING

2009 Environment Report

Creating
a better future

Pioneering
new technologies

Measuring
our progress

Reducing
our environmental footprint

» Jim McNerney
Chairman, President and
Chief Executive Officer

Mary Armstrong
Vice President of Environment,
Health and Safety

Message from Jim McNerney

Protecting our planet's environment and finding new ways to harness diverse energy resources continues to be a priority for Boeing. And we are demonstrating our commitment through action.

Over the past year, the pace of progress has accelerated even in the face of a global economic slowdown. Boeing has introduced effective new technologies for improving the environmental performance of our products, services and operations. And we continue to apply our resources to the most important areas for improvement.

Among our environmental initiatives, a clear priority is to reduce emissions of carbon dioxide—the main gas associated with climate-change concerns—from our operations as well as our products.

On the operational front, one year into our five-year plan for environmental improvement, we are on track to meet our goal of absolute reduction in greenhouse gas emissions of 1 percent. That goal will require a 25-percent improvement in energy efficiency by 2012. It's an aggressive target that has our full attention.

Within our industry, we continue to help lead efforts to safeguard the environment. Early in 2008, Boeing and a host of industry stakeholders signed the "Aviation

» Jim McNerney
Chairman, President and
Chief Executive Officer

Mary Armstrong
Vice President of Environment,
Health and Safety

(continued from page 2)

Industry Commitment to Action on Climate Change." It's a statement of the commercial aviation industry's commitment to pursuing carbon-neutral growth and the aspiration eventually to eliminate carbon emissions from our products in the long term.

That is a major undertaking for which there is no single solution—and certainly no easy answer. Boeing's strategy is to focus on three coordinated pathways: continuing to improve the fuel efficiency of our airplanes; improving the efficiency of the air-traffic systems in which they operate; and improving the life-cycle carbon dioxide emissions of the fuels that power our airplanes.

This holistic approach recognizes that energy and environmental issues are tightly intertwined. The challenge of environmental improvement demands that we harness diverse energy sources while improving overall efficiency to reduce carbon dioxide emissions in the most beneficial and effective ways.

Airplane fuel efficiency

The 787 Dreamliner is the most dramatic example of progress in improving fuel efficiency and reducing emissions. In it, we are applying our latest technological innovations to produce an airplane that will be 20 percent more fuel efficient than the airplanes it will replace.

Alternative fuels

And all of our airplanes—including the 787—may benefit from the potential of using alternative fuels that can reduce carbon dioxide emissions over their life-cycles.

Some of our most exciting and innovative achievements over the past year have been in the development and testing of a diverse set of sustainable, plant-based fuels. Airlines Virgin Atlantic, Air New Zealand, Continental and JAL have all worked with Boeing, engine manufacturers and fuel developers to conduct demonstration flights in real-world flight conditions.

Initial results have been positive. These flights are proving the economic and environmental viability of biofuels derived from jatropha, algae and camelina—sustainable fuels that don't compete with food and land resources. And the diversity of viable sources increases the potential for making them available to

» Jim McNerney
Chairman, President and
Chief Executive Officer

Mary Armstrong
Vice President of Environment,
Health and Safety

(continued from page 3)

more regions of the world and accelerating market viability.

Air-traffic system efficiency

The third pathway to reduce aviation emissions is through improved efficiency of our transportation systems. As you will see in the report, Boeing has participated in and helped develop a number of new methods (with airports, air-traffic management systems and airline operational changes) that have delivered real and substantial emissions savings over the past year—and some exciting models for the future.

I want to finish with an acknowledgment of how Boeing and its collaborators are achieving these substantial improvements: Throughout our business, employees are applying their commitment, talent and urgency to these challenges. In the past year, many Boeing employees were directly involved in meeting a major environmental goal—achieving certification to the ISO 14001 environmental management standard at all of our major manufacturing sites by the end of 2008. Indeed, our independent third-party auditor praised what it termed one of the most aggressive examples of certification it had ever seen and highlighted our employee involvement and recycling programs.

This doesn't surprise me. Today's employees are advancing the same spirit of innovation that has driven Boeing's leadership in aerospace for nearly 100 years. That spirit will continue to help us meet our commitments to protect our environment and create a better future.

Jim McNerney
Chairman, President and Chief Executive Officer

» Jim McNerney
Chairman, President and
Chief Executive Officer

Mary Armstrong
Vice President of Environment,
Health and Safety

(continued from page 4)

Commitment through Action

Since May 2008, Boeing:

Received approval from the U.S. Environmental Protection Agency's Climate Leaders program for our five-year greenhouse gas emissions reduction target.

Pursued clear targets for environmental improvement at our facilities and for our commercial airplane products, while also improving how we report our environmental progress and impact.

Brought our industry together to focus on working together on real improvement opportunities.

Demonstrated real-world solutions for reducing greenhouse gas emissions in commercial aviation using sustainable biofuels for airplanes and improved transportation management systems.

Expanded certification to the globally recognized ISO 14001 environmental standard to all major manufacturing sites.

Jim McNerney
Chairman, President and Chief Executive Officer

» Mary Armstrong
Vice President of Environment, Health and Safety

Message from Mary Armstrong

Boeing continues to strengthen its ability to protect the environment. In 2008, we met a number of significant improvement goals—a reflection of our employees' tremendous energy and passion to create a better future.

There is a clear understanding at Boeing of how important environmental improvement is to our communities and marketplace and why it must continue to be integrated into our business strategy going forward.

Boeing aims to demonstrate leadership from our supply chain and operations through to our products and services. As a positive side effect, our focus on environmental performance has generally resulted in a direct positive impact on our productivity.

In 2008, Boeing committed publicly to five-year 25 percent environmental improvement targets for greenhouse gas emissions intensity, recycling, energy efficiency and hazardous waste that are aggressive and transparent.

We think of these like we do our financial targets—our Executive Council led by Boeing Chairman, President and Chief Executive Officer Jim McNerney sets the targets and the business leaders must perform to that plan. The organization I lead, Environment, Health and Safety, provides the framework and integration required to

Jim McNerney
Chairman, President and Chief Executive Officer

» Mary Armstrong
Vice President of Environment, Health and Safety

(continued from page 6)

measure, maximize impact and report on progress.

And that progress has been solid. As you can read in this report, Boeing is on track to meet the five-year goals; indeed we are well ahead in our target for recycling. We also have found many opportunities for water conservation.

Boeing completed a major goal by certifying all of its major manufacturing facilities to the globally recognized ISO 14001 environmental standard by the end of 2008. We achieved this through outstanding commitment by our employees, and now we have the advantage of a standard system to drive improvement across our company.

As I promised in last year's report, this year we expanded our focus on environmental performance across Boeing's value chain—from suppliers to end of service.

On supply chain, we have developed and deployed a 'collaboration and engagement' strategy that builds on Boeing's internal work on productivity improvements and waste elimination—a process we call 'Lean+'.

The idea is simple—we will work with our suppliers on opportunities for footprint reduction—and cost reduction. We will also make clear to suppliers that our strategy is to prefer environmentally progressive materials and services. We're sharing where we're going and helping them understand how to come with us—and in some cases, we are learning from and with them.

Great examples of Lean+ in action are highlighted in this report—including a delivery solution our teams developed with stationery supplier OfficeMax that reduces packaging waste, carbon dioxide emissions from delivery trucks and costs; and workshops led by our employees in Winnipeg, Canada, to see how they could achieve zero waste to landfill at a selected manufacturing area. Results from these projects are extremely encouraging and we expect to see similar efforts replicated across the company.

Much of this work is the result of employee innovation. Boeing is encouraging and directing employee involvement in 'Green Teams' to improve performance at our facilities. Since the beginning of 2008, the number of Green Teams has increased from five to over 20—and those teams have broad access to

Jim McNerney
Chairman, President and Chief Executive Officer

» Mary Armstrong
Vice President of Environment, Health and Safety

(continued from page 7)

resources to help guide their work and share it across the enterprise.

Through innovative community partnerships, we are bringing about positive change and advancing environmental philanthropy. Working with groups such as TreePeople on reforestation in California and on projects like protecting the Thane Creek wetlands around Mumbai, India, our motivated employees have showed their interest and commitment by volunteering with environmental groups around the world.

Boeing does still have areas of challenges associated with its current and legacy operations. The effect to our communities is something we take extremely seriously. We paid fines totaling $23,607 in 2008—linked mainly to hazardous waste and emissions. One example was excess dust and solvent emissions from dirty rags at our Mesa facility.

Boeing is actively cleaning up sites where past practices have led to damage to the environment. Boeing continues to progress toward positive outcomes at sites including Santa Susana in California, which the company will clean up and then transfer for use as open space.

Our customers are increasingly demanding improved environmental performance from our products. Boeing is incorporating elements of design that will improve environmental performance earlier into our product lifecycles as well as providing new technology that can improve existing products.

Boeing supports efforts to diversify energy sources and accelerate the market viability of sustainable sources of biomass-derived fuels for the aviation industry to reduce overall carbon dioxide emissions.

Embracing accountability and improving our communication to all stakeholders about our environmental challenges and opportunities continues to be a priority. In addition to this report and ongoing briefings about our performance, Boeing has engaged with the U.S. Environmental Protection Agency's Climate Leaders program—committing to an absolute five-year greenhouse gas reduction target of one percent.

We also have embraced a critical external review of our strategy and performance by participating in the Carbon Disclosure Project—an investor-oriented program for ranking corporate understanding and transparency around climate-change risks. Our 2008 Carbon Disclosure Project score improved from

Jim McNerney
Chairman, President and Chief Executive Officer

» Mary Armstrong
Vice President of Environment, Health and Safety

(continued from page 8)

35 to 53 of 100, putting us ahead of aerospace peers—although only middle of the road as a manufacturer. We are aiming higher in 2009.

We also have listened to stakeholders that would like us to format our environmental activity to Global Reporting Initiative standards, and we will be making more of that information available in a GRI format starting this year.

Boeing believes that by embracing thoughtful efforts at transparency and standardization the company is better positioned for future changes in regulatory frameworks—particularly around greenhouse gas emissions.

Ultimately, we will be judged by our ability to deliver on our commitments. In that sense, our 2008 achievements—meeting our operational environmental improvement targets, certifying to the ISO 14001 standard and pursuing our sustainable biofuel development work—are positive.

Boeing's strength is its ability to pioneer new technologies to improve environmental performance and our dedication to changing our operations to reduce our impact on the ecosystem.

As we look ahead the strategy is clear and our challenge is to execute it well.

Mary Armstrong
Vice President of Environment, Health and Safety

Jim McNerney
Chairman, President and Chief Executive Officer

» Mary Armstrong
Vice President of Environment, Health and Safety

(continued from page 9)

Environmental Affiliations

Boeing participates in focused, progressive and action-oriented programs with business, government and the community to improve environmental performance:

U.S. Environmental Protection Agency (EPA) Climate Leaders

By joining the industry-government partnership, Boeing has committed to reduce the company's environmental impact by completing a companywide greenhouse gas emissions inventory, pursuing established reduction targets and reporting progress to the EPA on an annual basis. Boeing's five-year greenhouse gas emissions reduction target was approved by the Climate Leaders program in 2008.

World Business Council for Sustainable Development

Boeing joined this 200-company coalition focused on sustainable development through business leadership. Member companies can explore sustainable development, share knowledge, experiences and best practices, and advocate business positions on these issues.

Carbon Disclosure Project

Boeing has participated in the Carbon Disclosure Project, an independent nonprofit organization that has become the standard for carbon disclosure methodology and process, since 2006. In 2008, Boeing's Carbon Disclosure Leadership Index score of 53 led aerospace competitors and ranked mid-range for all manufacturers.

The Nature Conservancy

Boeing serves as a member of the International Leadership Council of The Nature Conservancy, one of the world's leading corporate forums on conservation. Boeing is also involved with local state chapters of The Nature Conservancy at many of our major U.S. operating locations.

Pew Center on Global Climate Change Business Environmental Leadership Council

Boeing participates in this group of major companies that exhibit environmental leadership through investment in environmentally progressive products and the support of domestic and global measures to achieve cost-effective reductions in emissions.

Jim McNerney
Chairman, President and Chief Executive Officer

» Mary Armstrong
Vice President of Environment, Health and Safety

(continued from page 10)

Air Transport Action Group

For Boeing's work in commercial aviation, the company supports environmental activities for the Air Transport Action Group, an independent coalition of member organizations and companies throughout the global air transport industry that advocates the environmentally responsible development of aviation infrastructure.

Department of Energy/EPA Energy Star

Boeing participates in the joint U.S. Department of Energy and EPA Energy Star program for energy management.

U.S. Green Building Council

Boeing is a member of the U.S. Green Building Council, a nonprofit organization dedicated to sustainable building practices that develops and administers the Leadership in Energy and Environmental Design building standards.

World Environment Center

Boeing participates in the World Environment Center, a global non-profit organization that helps companies around the world implement environmentally sustainable business strategies and operations.

Aggressive Operations Targets

Boeing is pursuing aggressive targets for improvements in energy efficiency and recycling rates and reductions in greenhouse gas emissions intensity and hazardous waste from 2008 to 2012:

- 25 percent increase in energy efficiency
- 25 percent reduction in greenhouse gas emissions intensity
- 25 percent reduction of hazardous waste per dollar of revenue
- 25 percent increase in solid waste recycling rates

Pioneering Environmental Technologies

Boeing is developing industry-leading technologies in three key fields—environmentally progressive products and services, the air transport systems in which they operate, and alternative energy sources—to reduce emissions of greenhouse gases and other environmental impacts. We are also devoting research and development to improve the environmental performance of our products and services—and to design, develop and build them in an environmentally responsible manner.

787 Dreamliner 20 percent more fuel and CO_2 efficient

747-8 16 percent more fuel and CO_2 efficient

Tailored Arrivals trials that enhance air traffic management have significantly reduced fuel use and CO_2 emissions.

Advanced-Generation Biofuels conducted a series of successful commercial aviation flights using sustainable biofuels.

Solar Cells developed some of the world's most efficient solar cells to convert sunlight to electricity.

Boeing is driving environmentally progressive technologies into its products and services. Blended Winglets, wing tip extensions that lower fuel use, emissions and noise, entered into commercial service on the 767 in March 2009. Photo courtesy American Airlines and Aviation Partners Boeing.

Boeing's C-17 Aircrew Training System provides fully-integrated training solutions through a high-fidelity, full-motion simulator that replicates the C-17 flight deck. Each year, thousands of new student pilots and active, reserve and Air National Guard aircrew complete training exercises in this simulator rather than in actual aircraft, which significantly reduces fuel consumption and the amount of greenhouse gas emissions and noise produced.

Environmentally Progressive Products and Services

Boeing has an ongoing legacy of integrating environmental performance improvements through technology advancements. Over the past 50 years, commercial jet carbon dioxide (CO_2) emissions have been reduced by approximately 70 percent and the noise footprint area has been reduced by approximately 90 percent. That legacy continues today with every airplane we design and build.

Boeing's newest airplanes, the 787 Dreamliner and the 747-8, highlight the company's commitment to environmentally progressive design innovation. Incorporating four innovative technologies—new engines, increased use of lightweight composite materials, high-efficiency systems applications, and modern aerodynamics—the 787 is designed for the environment with an impressive 20 percent improvement in fuel use and an equivalent reduction in CO_2 emissions compared to today's similarly-sized airplanes. The 747-8 offers a 16 percent improvement in fuel use and CO_2 emissions over the 747-400.

We are also integrating environmentally progressive technologies in our current airplane programs. Advanced technology Blended Winglets reduce drag and improve performance, lowering total fuel use and CO_2 emissions by up to 4 percent on the 737, up to 5 percent on the 757 and up to 5.5 percent on the 767. The blended winglet technology also improves 737 and 767 takeoff performance and reduces required thrust, resulting in lower emissions and noise.

Retrofit Performance Improvement Packages on the 777 include low-profile vortex generators, improved RAM air systems and drooped ailerons to lower fuel consumption by 1 percent and reduce emissions. On the typical 777-200ER, the Performance Improvement Packages reduce fuel use by approximately 1 million pounds and CO_2 emissions by 3 million pounds annually. By the end of 2008, 15 airlines had adopted the packages on 285 airplanes.

Boeing's Commercial Aviation Services unit is driving further improvements through our integrated support and service offerings. We apply a lifecycle solutions approach to achieve operational and environmental performance

(continued from page 13)

improvements, resulting in increased fuel efficiency and reduced noise and emissions. For example, the Airplane Health Management (AHM) Performance Monitoring Module automates and enhances the process of fuel and CO_2 emissions performance monitoring by airline personnel. It applies advanced health management technology to identify conditions that may affect fuel performance and provides research tools and decision support information within the context of the overall airplane condition.

While our improvements to date are significant, we are continually striving to do more. That's why we have committed to improving the fuel efficiency of each new generation of commercial airplanes by at least 15 percent.

Boeing is also pioneering the technologies our U.S. and international government and military customers need to achieve their aggressive goals for energy efficiency and independence.

Unstable and rising fuel prices, a growing dependence on foreign oil and overstretched budgets have the U.S. military—the world's largest consumer of oil—seeking sustainable solutions for improving energy security and fuel efficiency as well as its impact on the environment. For example, the U.S. Army published its first annual Sustainability Report in November 2008. And the U.S. Air Force plans to certify its aircraft fleet to use a 50-50 blend of sustainable biofuel and traditional jet fuel by 2013. By 2016, the Air Force would like to purchase half the aviation fuel it uses in the U.S., approximately 400 million gallons, from domestically produced sources that have a lower environmental footprint than petroleum.

Current efforts at Boeing Integrated Defense Systems include—

• Increasing the efficiency and decreasing the environmental footprint of our platforms through advanced aerodynamics, structures, materials and efficient operations and logistics (e.g., composites, electric aircraft systems, virtual live training, aircraft loading and route planning).

• Accelerating total energy solutions for Defense Department facilities and forward bases (e.g., solar, fuel cell and hybrid systems, as well as advanced facility energy management).

• Working with our wholly-owned Spectrolab subsidiary to produce some of the

Boeing Integrated Defense Systems President and CEO Jim Albaugh and Boeing Commercial Airplanes President and CEO Scott Carson highlight our environmental commitments.

(continued from page 14)

world's most efficient solar cells for Earth- and space-based uses.

• Applying technologies developed and lessons learned by Boeing Commercial Airplanes to support the development of alternate fuel programs (e.g., fuel cells, sustainable biofuels and hydrogen-fueled vehicles).

• Finding environmentally preferred substitutes for hazardous materials.

Messages from Jim Albaugh and Scott Carson

"As environmental concerns continue to grow and energy independence remains a key national security goal, defense, space and government customers are increasingly seeking energy-efficient and environmentally-progressive products that do not sacrifice mission performance. The IDS team must be prepared to meet the needs of our customers as their environmental priorities emerge. In the meantime, we can demonstrate our environmental commitment through implementation of Lean and green practices throughout our operations."

Jim Albaugh

President and Chief Executive Officer
Boeing Integrated Defense Systems

"As an industry leader, we have a responsibility to our customers, our industry, our company and our society to aggressively pursue continuous innovation that will further enhance aviation's environmental performance. Even in a challenging economic business environment, we must continue to invest resources that can help us improve efficiencies, address our environmental footprint and take that next great technological leap forward."

Scott Carson

President and Chief Executive Officer
Boeing Commercial Airplanes

Boeing Shanghai Challenge

The Boeing Shanghai Challenge, hosted by Boeing, Boeing Shanghai Aviation Services, Tsinghua University and the University of North Carolina at Chapel Hill

(continued from page 15)

in June 2008, invited teams of students from across China to prepare environmentally progressive concepts and solutions for the Boeing Shanghai Aviation Services MRO operation.

More than 35 teams from 10 top universities and five aeronautical universities in China participated. The entries were judged on creativity of solution, technical feasibility, depth and completeness of technical analysis, and clarity of presentation.

After a blind review by a panel consisting of Boeing executives and university faculty from participating institutions, the top five teams were invited to come to Beijing to make a final presentation to Boeing to determine the top three "all-around" winners. The winners received prizes of US $1,500, $1,000, and $750 at an award presentation ceremony in July 2008 in Beijing. The three top winners were: Research on Green Disposal of Aging Aircraft by Northwestern Polytechnical University, Building an Environmental and Efficient MRO Supply Chain by Wuhan University and Environmental Progress and Practice: Improving the Environmental Effectiveness of Boeing Pudong MRO by Huazhong University of Science and Technology team.

Students from Tsinghua University and Huazhong University of Science and Technology won special awards for Technical Merit and Creative Merit for their respective projects.

The Boeing 747-8 Intercontinental and 747-8 Freighter: Designed for Environmental Performance

On the new 747-8 family Boeing is leveraging the technologies from the 787 Dreamliner to further its commitment to creating environmentally preferred commercial jetliners.

Lower Fuel Use

Three key features—new engines, more efficient structure and advanced aerodynamics—contribute to a 16 percent improvement (on a per-seat basis) in fuel use for the 747-8 compared to the 747-400.

The new GEnx-2B67 engines incorporate the latest technologies—such as a composite fan case and blades and a revolutionary turbine—to create double-digit efficiency gains over the engines it replaces. The ultra-efficient structure of

(continued from page 16)

the 747-8 provides the lowest operating empty weight per seat of any large airplane. Lastly, the new-design wing incorporates the latest aerodynamic airfoils, raked tips and a simplified lightweight flap design, further improving the overall fuel efficiency of the 747-8.

Reduced Emissions

Carbon dioxide is produced as a result of fuel consumption. This means that with reduced fuel use comes an equivalent reduction in carbon dioxide emissions. Another key emission standard for commercial jet engines is nitrogen oxides (NOx). Specific regulations have already been set for future airplane engines based on the thrust ratings of the engines.

The 747-8 is being designed to ensure that it will perform significantly better than required by today's requirements, and it will be better than the future, more stringent standards adopted by the Committee on Aviation Environmental Protection (CAEP).

Quieter Takeoffs and Landings

By designing with noise reduction in mind, Boeing was able to reduce the 747-8 noise footprint around an airport by 30 percent compared to today's 747-400.

Boeing 787 Dreamliner Being Designed for Environmental Performance

With the 787 Dreamliner, Boeing is introducing new technologies to create better environmental performance for commercial jetliners.

Fuel Use Reduced

Four key technologies contribute to an impressive 20 percent improvement in fuel use for the 787 Dreamliner as compared to today's similarly sized airplane. New engines, increased use of light weight composite materials, more-efficient systems applications and modern aerodynamics each contribute to the 787's overall performance.

Emissions Cut

Carbon dioxide (CO_2) is produced as a result of fuel consumption. This means that with reduced fuel use comes an equivalent reduction in carbon dioxide emissions.

Another key emission standard for commercial jet engines is nitrogen oxides (NOx). Specific regulations have already been set for future airplane engines,

(continued from page 17)

using a complex formula that is based on the thrust ratings of the engines. The 787 is being designed to utilize engines that will be significantly better than the future, more stringent standards adopted by the Committee on Aviation Environmental Protection (CAEP).

Quieter Takeoffs and Landings Delivered

The 787 Dreamliner uses a number of new technologies—most importantly, acoustically treated engine inlets and high bypass ratio along with other special treatments for the engines—to help ensure that all sound of 85 decibels (about the level of loud traffic heard from the side of the road) stays within the airport boundaries. In fact, the noise footprint of the 787 is 60 percent smaller than those of today's similarly sized airplanes.

Point-to-Point Travel Enabled

Connecting people more directly to their destinations offers a number of environmental benefits. A more direct route uses less fuel, which means fewer emissions. Likewise, fewer takeoffs and landings reduce the total noise footprint.

The 787 is designed to transport passengers and cargo from their city of origin to their final destinations in an environmentally efficient manner.

Manufacturing Technologies Mean Less Waste

Because the 787 is made primarily of carbon-fiber composite material, which is trimmed like cloth, manufacturing processes will produce less scrap material and waste.

The result will be an overall manufacturing and maintenance process that produces less waste and uses fewer hazardous materials.

Air Transportation Systems

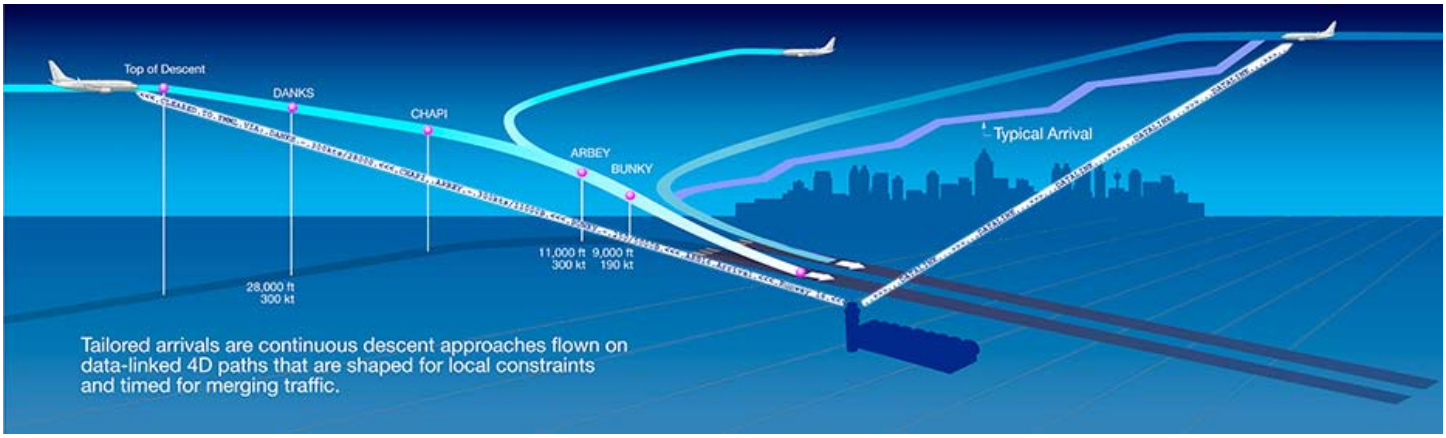
Significant environmental benefits can be realized by improving the efficiency of the global transportation system. In fact, the International Air Transport Association (IATA) estimates that air traffic management enhancements could improve fuel efficiency and reduce carbon dioxide (CO_2) emissions by up to 12 percent.

Boeing recognizes that air traffic management improvements provide critical near-term opportunities for reducing greenhouse gas emissions. That's why we are working with industry, regulators, airlines and airports to improve management of the air space and ensure efficient, safe and seamless operation around the world.

Our work includes the development of air traffic management solutions, such as Tailored Arrivals, that reduce fuel use by minimizing delays and holding patterns over airports and capitalize on precision navigation technologies in modern aircraft often left unexploited in the legacy system.

And in 2008, Boeing signed an agreement to work together with Airbus to reduce aviation's impacts on the ecosystem by accelerating improvements to the world's air transportation management system to eliminate unnecessary traffic congestion.

Tailored Arrivals



An innovative Air Traffic Management concept called Tailored Arrivals has been demonstrated to significantly lower fuel consumption and CO_2 emissions. This graphic shows the difference between a Tailored Arrival (on the left) and a traditional, step-down approach (on the right).

(continued from page 19)

Boeing helps initiate ATM concepts that save fuel, reduce emissions

Boeing is continuing to work with industry, regulators, airlines and airports to implement advanced Air Traffic Management concepts that provide short-term opportunities to improve environmental performance of the air transportation system. The most notable example is the Boeing-developed Tailored Arrivals concept, which increases airplane arrival efficiency by establishing a predictable continuous descent rather than the current fuel intensive step-down descent. What makes an approach a Tailored Arrival is that controllers are able to look over an aircraft's flight path from the top of descent to landing and "tailor" it to avoid conditions that might slow it down.

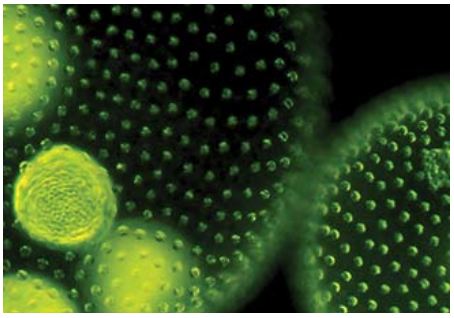
Tailored Arrivals was a key element of three ASPIRE (Asia & South Pacific Initiative to Reduce Emissions) demonstration flights in 2008. In one of the ASPIRE flights, conducted by United Airlines, a Tailored Arrivals approach, along with the use of 10 other fuel-saving initiatives from gate to gate, helped to reduce the use of fuel by 1,564 gallons and cut carbon dioxide (CO_2) emissions by 32,656 pounds as the 747-400 flew from Sydney, Australia to San Francisco.

Tailored Arrivals has been in regular use by four airlines at San Francisco International Airport since December 2007. Over a year's time—from Dec. 3, 2007 through Dec. 3, 2008—Tailored Arrivals reduced fuel use by 1.1 million pounds (523,862 kilograms) and CO_2 emissions by 3.6 million pounds (1.6 million kilograms) for the airlines that used the procedure—United, Air New Zealand, Qantas and JAL. The results cover 1,000 flights.

As the leader of Tailored Arrivals development, Boeing has been using its worldwide reach to bring together a range of international companies comprised of airlines, industry and Air Navigation Service Providers to ensure that Tailored Arrival solutions and procedures are globally interoperable.

Since 2004, successful trials of the Tailored Arrivals concept have been conducted at airports in Sydney and Melbourne, Australia, at Amsterdam Schiphol Airport in the Netherlands and at San Francisco. Design activity has been under way to extend Tailored Arrivals to airports in Miami and Los Angeles.

The benefits being catalogued by Tailored Arrivals include significant reductions in fuel burn, CO_2 emissions and flight time for participating airlines as well as reductions in noise for surrounding communities.



Boeing is focused on encouraging the development and commercialization of sustainably-grown, advanced-generation biofuels that do not compete with food crops or for water resources such as algae, a photosynthetic microorganism that offers the potential to reduce greenhouse gas emissions.

Alternative Energy Solutions

Boeing is pioneering advancements in alternative energy sources that offer the potential to reduce greenhouse gas emissions—from advanced-generation sustainable biofuels to solar cells.

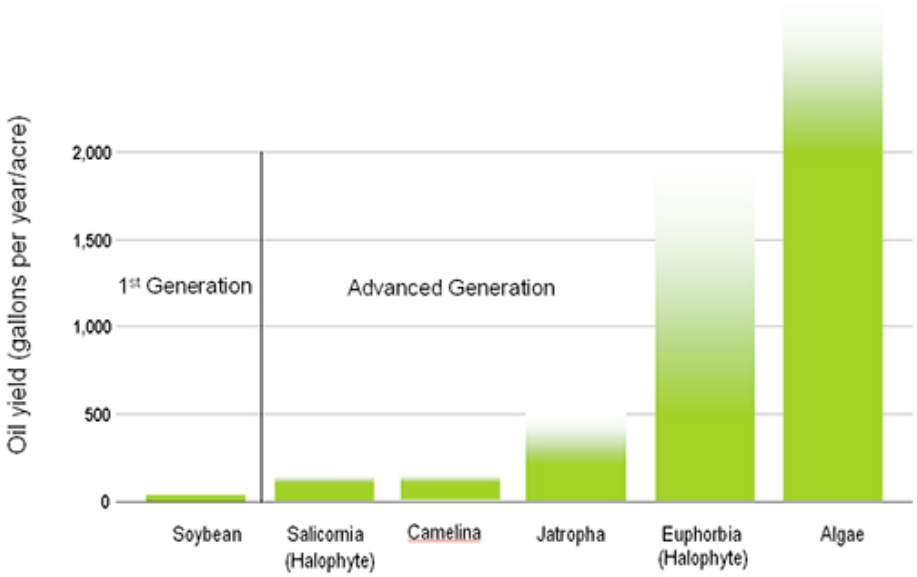
Advanced-Generation Biofuels

Boeing is helping guide the industry toward supporting the development and commercialization of a new generation of sustainable, plant-based fuel sources that offer a lower lifecycle carbon footprint and don't compete with food and land resources. These advanced-generation sustainable biofuels afford significant environmental benefits when considered on a lifecycle basis. Since plant-based fuel sources absorb carbon dioxide (CO_2) when they are grown, fuels that are produced through sustainable growing practices have the potential to reduce the industry's dependence on fossil fuels, while offering a 50-80 percent CO_2 reduction over the course of their lifetime.

In February 2008, Boeing, Virgin Atlantic and GE Aviation proved the technical feasibility of using biofuels in a commercial jetliner during the first biofuel flight using a sustainable biofuel mixed with kerosene-based fuel. That effort was followed by a sustainable biofuels test flight in December with Air New Zealand and Rolls-Royce. In early 2009, Boeing conducted another series of evolutionary test flights with Continental Airlines and GE Aviation, and Japan Airlines and Pratt & Whitney, respectively, with all of the flights emphasizing sustainable biofuels that potentially can be applied to the existing airplane fleet to reduce CO_2 emissions, regardless of the feedstock origin.

Boeing is focused on promoting the development of sustainably grown, advanced-generation biofuels that do not compete with food crops (among other advantages). The chart on the next page highlights the relative yields of various biofuel feedstocks.

(continued from page 21)



Near- and long-term viable biofuels

The body of knowledge generated through the sustainable biofuels flight test program will directly contribute to the effort to certify these fuels through the ASTM International (formerly the American Society for Materials and Testing) standards board. The overarching goal of that effort is to change the current jet fuel specification requirement that states it must be derived from petroleum-based source material.

2008 also saw the formation of the Sustainable Aviation Fuel Users Group, a thought-leading group of airlines, industry leaders, environmental organizations and fuel technology leaders, to accelerate the development and commercialization of sustainable new aviation fuels. This activity will help enable the commercial use of renewable fuel sources that can reduce greenhouse gas emissions, while lessening commercial aviation's exposure to oil price volatility and dependence on fossil fuels, and makes aviation the first global transportation sector to voluntarily promote acceptance of sustainability practices into its fuel supply chain. Collectively, the nine airline members account for approximately 15 percent of commercial jet fuel use.

Our government and military customers are also pursuing advancements in sustainable biofuels. The U.S. Air Force plans to certify its aircraft fleet to use a 50-50 blend of sustainable biofuel and traditional jet fuel by 2013.

Harnessing solar energy reduces reliance on fossil fuels. Spectrolab, a wholly-owned Boeing subsidiary, uses state-of-the-art photovoltaic solar cells in concentrator modules of various sizes and power-generating capabilities.

(continued from page 22)

Solar Cells

Our wholly-owned subsidiary Spectrolab is one of the world's leading manufacturers of solar cells, powering everything from satellites and interplanetary missions to renewable solar energy companies in California, Arizona and Australia. In 2006, Spectrolab's Earth-based concentrator cells achieved a new world record with 40.7 percent efficiency in converting sunlight to electricity—and the company is pioneering new technologies anticipated to yield further improvements.

Sustainable Biofuel Demonstration Flights

Sustainable biofuel demonstration flights held over the past year with Boeing, airlines, engine companies and fuel processing technology leaders highlight the technical feasibility of using biofuels in commercial jetliners and are a significant step toward a long-term vision of fully sustainable, low-carbon-lifecycle fuel solutions for the aviation industry.

Air New Zealand Biofuel Flight

On Dec. 30, 2008, Boeing, Air New Zealand and Rolls-Royce, working with Honeywell's UOP, conducted the first sustainable biofuels flight using jatropha as a fuel source. One of the airline's 747 engines was flown with a 50/50 mixture of jatropha-based biofuel mixed with traditional jet fuel.

Continental Airlines Biofuel Flight

On Jan. 7, 2009, Boeing, CFM International and Honeywell's UOP helped Continental Airlines become the first U.S. carrier to conduct a biofuels test flight, and also the first to use algae as a fuel source. The algae was mixed with jatropha-based biofuel and traditional jet fuel, and flown in a single engine of a 737 Next-Generation aircraft. Photo courtesy Continental Airlines.

Japan Airlines Biofuel Flight

On Jan. 30, 2009, Boeing, Japan Airlines (JAL), Pratt & Whitney and Honeywell's UOP moved aviation closer to a sustainable fuel supply by demonstrating a new low-carbon-lifecycle biofuel in a commercial jetliner. During a 90-minute flight from Haneda Airport in Tokyo aboard a 747-300, JAL became the first airline to use the energy crop camelina as a fuel source. The 90-minute test flight combined sustainable biofuel from camelina, algae and jatropha mixed with conventional jet fuel in one of the aircraft's four engines.

(continued from page 23)

The sustainable biofuels used in these demonstration flights required no modifications to the airplanes or engines. Results from these flights will help pioneer a diverse and sustainable fuel supply for commercial aviation.

Accelerating Development and Availability of Sustainable Biofuels

Sustainable Aviation Fuel Users Group

In 2008, CEOs from leading global air carriers, environmental groups, fuel processing technology leaders and Boeing signed an industry-leading commitment to sustainability practices and principles, and to help accelerate the development, certification and commercial use of environmentally and socially sustainable aviation fuel for the future. With support and advice from two of the world's leading environmental organizations, the World Wildlife Fund (WWF) and Natural Resources Defense Council (NRDC), the Sustainable Aviation Fuel Users Group makes commercial aviation the first global transportation sector to voluntarily promote acceptance of sustainability practices into its fuel supply chain. In collaboration with Yale University and the NRDC, the group is focused on two initial research projects to conduct comprehensive sustainability assessments on biofuel feedstocks jatropha curcas and algae.

Algal Biomass Organization

Working with fuel technology leaders, academia and global air carriers, Boeing helped establish the Algal Biomass Organization, the first global trade association dedicated to advocacy and commercialization of algae as a renewable energy source.

Boeing Participates in the Solar America Initiative

In 2007, the U.S. Department of Energy selected a team led by Boeing's Research & Technology division as a participant in the Solar America Initiative, an effort to make solar energy more affordable and cost competitive with conventional electricity sources in the United States by 2015. Under this initiative, Boeing is researching the combination of some of the world's most efficient solar cells with innovative, advanced optics to produce less expensive, more efficient solar power systems.

Last year, the company achieved a significant milestone by installing an outdoor solar array test facility in Seal Beach, California, to monitor the long-term

(continued from page 24)

performance of the arrays. The first 3.6 kilowatt array installed at the facility has met all performance expectations and is currently operating on the electrical grid. In addition, four remote test systems, or “mini” arrays, have been deployed for lifetime performance testing. Boeing partners include Southern California Edison, National Renewable Energy Laboratory, Light Prescription Innovators, PV Powered, James Gregory & Associates (Sylarus), and the California Institute of Technology.

Jean Ray, an Associate Technical Fellow in Fuels and Lubrication Technology for Boeing Commercial Airplanes, examines test specimens after exposure to a candidate biofuel. Boeing is exploring advanced-generation sustainable biofuel testing to identify renewable alternative fuel sources for aviation uses.

Research and Development

Ensuring that our own environmental technology strategy has a clear focus is a key element of our environmental commitments. Developing environmentally progressive technologies that can be efficiently and effectively incorporated into Boeing's current and future products is one of the major pillars of Boeing's enterprise technology strategy, which aims to integrate and leverage technology development across Boeing's diverse product line and manufacturing base.

Researchers are actively pursuing technologies selected to provide strategic capabilities, including improved energy efficiency, reduced emissions, noise and hazardous materials, and increased material recycling. In addition, analysts are developing thorough and transparent methods to accurately characterize the life-cycle footprint of Boeing's products and services.

Key technology programs are addressing lightweight advanced materials, aerodynamics, aircraft emissions, efficient aircraft operations, noise reduction, passenger comfort, alternative fuels, sustainable manufacturing processes and materials, and recycling and reuse of Boeing products.

Much of our airplane development work is focused on fuel efficiency. In fact, more than 75 percent of Boeing Commercial Airplanes' research and development effectively contributes to improving the environmental performance of our products. Fuel efficiency continues to be a core focus of our R&D efforts—for each liter of fuel that isn't burned, it means not emitting 3.2 liters of carbon dioxide (CO_2). Through the introduction of progressive new aircraft such as the 787 Dreamliner and the 747-8 Intercontinental, we are poised to deliver significant reductions in noise, fuel use and emissions. But environmental performance isn't simply a by-product of aircraft design; it's a very deliberate effort that drives us to continually improve fuel efficiency for our customers. In an age of volatile fuel prices, that's good business sense and good for the environment.

Our approach to research and development combines the best ideas in aerodynamics, materials, propulsion and systems, which are brought together and then optimized to work together in the most thoughtful and integrated manner. The result is innovation, thought leadership and design principles that will help guide aviation going forward.

Aerodynamic design must also balance manufacturing and structural requirements, coupled with advanced engine designs that provide the needed thrust to lift aircraft into flight. With propulsion, engines balance power against

(continued from page 26)

engine size, weight and emissions, while striving to limit maintenance and repair costs while aiming for quiet operation during departures, landings and in-flight. Structural materials are chosen for their strength and durability, but must be as lightweight as possible to increase fuel efficiency.

International Research Focuses on the Environment

Via its international research centers in Europe and Australia, Boeing Research & Technology, the company's central R&D unit, is actively finding and creating environmentally progressive technologies.

In Madrid, Spain, Boeing Research & Technology-Europe researchers and engineers, who hail from seven different European countries, work on ways to incorporate clean fuel-cell technology in aerospace applications. They also are looking at environmentally progressive corrosion protection of aluminum alloys and composite materials for airplane cabin interiors. In addition, they are developing advanced trajectory prediction and management techniques that will help relieve crowded airspace and airports in an efficient, collaborative and fair manner.

In Brisbane and Melbourne, Australia, Boeing Research & Technology-Australia researchers are integrating advanced air traffic management technologies from across Boeing to demonstrate reduced fuel burn and noise for commercial and military aircraft. Researchers also are engaged with Boeing Commercial Airplanes to provide in-country advocacy and strategy coordination regarding the use of advanced-generation sustainable biofuels for commercial airplanes.

In addition to work at our international research centers, Boeing and three European technology companies—Rolls-Royce, RUAG Aerospace and Deharde Engineering—have entered into a collaborative research agreement to explore the potential of fuel-efficient open-fan propulsion technology for future commercial airplanes. Using technologies and techniques contributed by each of the parties, tests of a model concept airplane with open-fan engines are planned for early in 2010 at the RUAG Low Speed Wind Tunnel in Emmen, Switzerland. Open-fan propulsion technology has potential for reducing specific fuel consumption significantly below current turbofan engines.

Environmental Stewardship

Boeing is working every day to find ways to improve the environmental performance of our products, services and operations. We are driving environmental thought and action throughout our company by pursuing aggressive operations and product performance targets, leading enterprisewide environmental strategy through a corporate organization, adhering to an environmental policy, strengthening our environmental management system and remediating locations affected by past business operations. We are also working with our supply chain to promote environmental stewardship.

Aggressive Performance Targets

15%

Improvement in fuel efficiency and CO_2 emissions for each new generation of commercial airplane.

25%

Improvement at our major manufacturing facilities from 2008 to 2012 in: energy efficiency, greenhouse gas emissions intensity, hazardous waste per dollar of revenue and solid waste recycling rates.

Boeing is driving improved environmental performance into our operations, as well as our products and services. All major manufacturing facilities are certified to the ISO 14001 environmental management system standard.

Our Environmental and Climate Change Policies

Boeing is committed to operating in a manner that promotes environmental stewardship. We will strive to:

- Conduct operations in compliance with applicable environmental laws, regulations, and Boeing policies and procedures.
- Prevent pollution by conserving energy and resources, recycling, reducing waste and pursuing other source reduction strategies.
- Continually improve our environmental management system.
- Work together with our stakeholders on activities that promote environmental protection.

Boeing's Climate Change Approach

Boeing believes that climate change is a serious environmental challenge that requires credible action. Recognizing this, Boeing is committed to reduce emissions of greenhouse gases from our facilities and products.

As the global community develops approaches to reducing greenhouse gas emissions, Boeing acknowledges that voluntary measures alone may not be enough and supports development of mandatory yet flexible frameworks to address emission reductions.

Boeing recognizes that appropriate action may vary from one sector to another. A comprehensive approach would take into account the most effective way to deal with each industry sector.

As a technology and aerospace industry leader, Boeing will work with our customers and other industry stakeholders to:

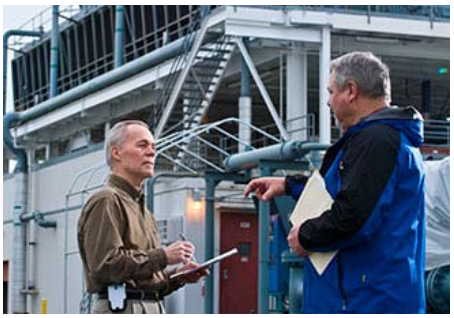
- Pioneer new technology to improve the global transportation system
- Increase research to improve efficiencies throughout the system: air and ground operations, in-service fleet environmental performance and introduction of sustainable advanced-generation biofuels

(continued from page 29)

- Accelerate adoption of environmentally progressive products and services
- Reduce carbon intensity of air transportation by reducing CO_2 emissions 15 percent with each new generation of commercial aircraft

Boeing's greatest contribution will continue to be through innovation—and Boeing will remain committed to improving technologies for sustainable, renewable energy systems.

In addition, Boeing set aggressive and transparent enterprisewide performance targets to drive environmental thought and action throughout its operations. By 2012 at its major manufacturing facilities, Boeing targets 25 percent improvement goals for solid waste recycling rates, energy efficiency and greenhouse gas emissions intensity, and a comparable goal for hazardous waste reduction. Boeing also expanded certification to the internationally recognized ISO 14001 environmental management system standard to all of its major manufacturing sites around the globe.



Boeing's Environment, Health and Safety organization has leadership direction and a mandate for strategic direction and guidance on the environment from the most senior level in the company.

Environment, Health and Safety Organization

Environmentally focused initiatives inside Boeing are consolidated into one corporate organization—Environment, Health and Safety—which is driving an integrated, enterprisewide strategy that includes our products, services, processes and facilities, and considers the impact of our suppliers and customers.

Our strategy is guided by the Environment, Health and Safety Policy Council, led by Boeing Chairman, President and Chief Executive Officer Jim McNerney. This EHS Policy Council helps assure that strategy and performance targets are set and monitored at the highest levels of company leadership.

We are sharpening our focus on important environmental issues that bear on our business by identifying and integrating them into a strategic plan that is managed centrally and includes work we do with our suppliers and customers. And we are embedding environmental thought and action at the center of our operations and our business.

The Environment, Health and Safety organization contains functions focused on occupational safety and health, and safety, environmental and regulatory compliance as well as:

- Establishing enterprise strategies and objectives to address current and potential future environmental issues associated with Boeing products, services, facilities and technologies, and those of its suppliers and customers.
- Defining and implementing enterprise environmental management systems and tools for integrating environmental capabilities into the company's core operating processes, such as design and manufacturing.
- Establishing standards, processes and guidelines for routinely tracking Boeing's and its business partners' performance to these environmental plans and objectives.

A site of great natural, cultural and historic significance, Santa Susana will be preserved as a vital undeveloped open space link in the Santa Susana Mountains for future generations. Boeing will continue to work closely with our neighbors, government agencies and the local community toward this goal.

Commitment to Remediation

Boeing is committed to doing its part to clean up locations affected by past business operations.

Protecting human health and the environment in the communities where we operate remains our top priority. We are engaged and play a leadership role with local communities, remediation professionals and regulatory authorities to find the best cleanup solutions and conduct our work in an open and transparent manner.

Santa Susana is a site of great natural, cultural and historic significance. Located in Southern California, the facility was home to nuclear energy research as well as rocket engine testing that supported virtually every major space program in U.S. history, from the earliest satellite launches to the space shuttle.

The focus at Santa Susana has moved from production and maintenance to remediation and demolition, and under regulatory oversight, Boeing is committed to an effective clean-up that protects the health of the community. We continue to meet our commitments and submit agency-required work plans and reports on schedule. More than 25 key compliance deliverables were submitted in 2008, including work plans, investigative reports and data summaries.

Managing storm water runoff from the site continues to be a priority and in 2008 Boeing reported 97 percent compliance on more than 1,500 water quality standard analyses. Corrective actions have already been put into place, including the improvement of existing storm water treatment systems and pilot testing of advanced water treatment technologies. We will continue to explore other alternatives to ensure full compliance.

Boeing is continuing to work with government agencies, community organizations and conservation groups on a land use plan that would preserve Santa Susana as open space and serve the public for future generations. As protected open space, Santa Susana will provide a link to the wildlife corridor that connects the Sierra Madres to the Santa Monica Mountains and the Pacific Ocean.

We have also made progress in our efforts to finalize cleanup plans for the Duwamish Waterway in Washington State. Boeing continues to work closely with local, state and federal agencies, local community groups and tribes to develop cleanup plans. While this work is taking place, we have been

(continued from page 32)

aggressively cleaning up sources of potential contaminants from our historic operations in adjacent areas.

Boeing continued to make significant progress on other remediation programs in 2008. Highlights included employing innovative in situ cleanup technologies and achieving major milestones in soil and groundwater cleanup at several projects in California. Steady progress was made at numerous other sites with the achievement of intermediate milestones that will ultimately lead to completion of investigation and cleanup activities at these sites.

Performance Targets

Boeing is working to a clear five-year environmental performance plan at our operations, building on the significant reductions in energy consumption and hazardous waste we have already achieved. In 2008, we established aggressive targets to improve energy efficiency, greenhouse gas emissions intensity and recycling rates 25 percent by 2012 at our major manufacturing facilities, with a comparable goal for hazardous waste reduction. This equates to an absolute 1 percent reduction in greenhouse gas emissions, hazardous waste and energy use and an improvement in recycling rates from about 60 percent to 75 percent of solid waste. While aggressive, these targets are achievable and will ensure that we hold down waste and emissions.

2008 was the first year in our five-year plan, and we are on track to achieve these targets. In fact, we increased our recycling rates from 58 percent to 64 percent in 2008, outperforming our one-year plan. We also outperformed our 2008 plan for the remaining targets, performing approximately 24 percent better than plan for hazardous waste generation and approximately 2 percent better than plan for energy efficiency and greenhouse gas emissions.* We are continuing to drive environmental thinking and action into every facet of our business to help us achieve these aggressive goals.

Our commitment to environmental stewardship extends beyond our operations to our products. Boeing Commercial Airplanes has committed to continue our dedication to environmental design innovation by:

- Improving fuel efficiency and carbon dioxide emissions for each new generation of airliners by at least 15 percent.
- Directing more than 75 percent of research and development to benefit environmental performance, including work on fuel efficiency.
- Improving the performance of worldwide fleet operations, focusing on an industry goal of 25 percent improvements in worldwide fleet fuel use and CO_2 emissions by 2020.

*2008 performance reflects both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.

Supplier Collaboration

Boeing's commitment to environmental stewardship extends beyond our products and our own manufacturing processes. Our life-cycle view seeks environmental improvement through all stages of our product's life — beginning with our suppliers, through in-service use, all the way to end-of-life recycling or recovery.

Boeing is creating a more systematic program of collaboration and engagement between our company and our suppliers in the area of environmental protection.

As a frequent sponsor and participant in many industry forums, Boeing encourages the sharing of ideas and actions that help the environment. We are now increasing these efforts in two ways:

- Expanding targeted collaboration with selected suppliers.
- Providing new forums to enhance broader general sharing of ideas and advanced practices among supply chain participants.

To supplement this collaboration, Boeing will be reinforcing its encouragement of suppliers to align their activities with Boeing's strategic environmental direction. Far from a one-size-fits-all approach, Boeing will use supplier data and supply-base analysis to shape a program that is adaptable to the diversity inherent in our global supply base. Two primary facets of this strategy will focus on:

- Applying more explicit contract requirements and provisions that support Boeing's environmental strategies.
- Expanded use of environmental criteria in evaluating and selecting suppliers.

Boeing continues to hold, as a basic expectation, that our suppliers will conduct their business in a responsible way, in accord with the laws, regulations and industry practices that govern them. But we are going a step further as we invite our suppliers to join us on our journey to develop and share better practices.

(continued from page 35)

Partnering with Suppliers Drives Innovative Solutions

Boeing and its office supply provider OfficeMax are using Lean+ tools to drastically reduce packaging waste, fuel use and carbon emissions. A team found that random supply orders result in OfficeMax trucks making daily trips to Boeing sites, even when an order was small and not urgent. With each order packed in its own cardboard box, the process generated a large amount of packaging that then needed to be recycled.

After a Lean collaboration workshop held late last year, Boeing and OfficeMax began testing a new approach that cuts deliveries and replaces cardboard boxes with reusable containers, all while implementing lean and efficient methods for managing office supplies.

“We’re currently testing this in a few buildings in Renton (Washington),” said Doug Perry of Boeing Shared Services Supplier Management, who leads the Environment, Health and Safety Supplier Engagement Team. “And we think this idea—or a variation of it—is probably the right thing to do across the enterprise,” he said.

Similar projects with suppliers are happening at aircraft assembly sites.

Boeing Commercial Airplanes technical teams have been working with suppliers for years to redesign shipping crates for aircraft parts to reduce waste or to make containers reusable.

One team at the Boeing Interiors Responsibility Center in Everett, Washington, was concerned that 60 to 70 wooden pallets were being discarded each week after shipments from a California-based supplier were unloaded. By working with the supplier, the empty pallets are now reloaded on the supplier’s returning truck to be reused for future shipments.

A supplier of insulation blankets for the C-17 also stopped using disposable cardboard packaging after working with Boeing to reengineer the blanket production process to increase quality and productivity. The project with supplier Orcon Mexico focused primarily on reducing inventory and unnecessary handling, which has many environmental benefits such as paperless ordering, reduced transportation and related emissions, and saving 5,600 cardboard shipping containers annually.

(continued from page 36)

Surveying the Supplier Landscape

With thousands of suppliers world-wide, Boeing recognizes that engaging suppliers is not a one-size-fits-all proposition. Boeing's Environment, Health and Safety Supplier Engagement Team is carefully analyzing the company's supply base to understand the environmental management practices of our suppliers.

To gather supplier data for its baseline analysis, Boeing turned to the Carbon Disclosure Project, a research organization that has assembled the largest corporate greenhouse gas emissions database in the world. The CDP annually publishes reports that provide detailed analysis of how the largest companies around the globe are responding to climate change.

The Boeing supplier study, conducted by the CDP in 2008, analyzed data from approximately 60 Boeing suppliers, selected to represent a broad cross-section of various industries. The results give Boeing important information about the risks, opportunities, goals and plans that shape each industry. This multi-faceted view will help Boeing refine its own goals and plans, as well as shape a set of long-range expectations for its supply base in a way that is practical and adaptable to the diverse array of Boeing suppliers.

Boeing intends to repeat the supplier survey periodically to monitor progress and spot emerging trends.

Through the integration of Boeing's Lean+ production philosophy, certification to the internationally recognized ISO 14001 environmental management system standard and a commitment to recycling, Boeing facilities are continually improving their environmental performance.

Environmental Management

We are committed to continually reducing our environmental footprint and are driving improvements into our core operations in three key ways.

ISO 14001

To help reduce pollution and waste and improve energy efficiency and recycling rates, Boeing expanded certification to the internationally recognized ISO 14001 environmental standard to all of its major manufacturing facilities by the end of 2008. This achievement ensures Boeing products, from our super-efficient airplanes to military aircraft, solar cells and satellites, will be manufactured in facilities that conform to the ISO 14001 standard of environmental management. An independent team of auditors recognized Boeing's environmental performance with over 80 positive noteworthy items, from recycling efforts to employee involvement programs, and noted no major noncomformances. Sites that previously achieved ISO 14001 certification continue to document improvements in environmental performance.

The following sites are ISO 14001-certified.

International locations:

- Australia: Bankstown, Exmouth, Fishermans Bend
- Canada: Winnipeg

U.S. locations:

- Alabama: Huntsville
- Arizona: Mesa
- California: El Segundo, Long Beach, Seal Beach, Sylmar, Taft, Torrance
- Florida: Kennedy Space Center
- Georgia: Macon
- Kansas: Wichita
- Missouri: St. Louis, St. Charles
- Oregon: Portland
- Pennsylvania: Philadelphia

(continued from page 38)

- Texas: San Antonio
- Utah: Salt Lake City
- Washington: Auburn, Everett, Frederickson, Renton and North Boeing Field, Integrated Defense Systems sites in Puget Sound

Lean+

Lean+, a set of continuous improvement principles and practices, is a natural ally of the environment. While not strictly an environmental program, its key components include increasing operational efficiency, minimizing waste and conserving resources. We are applying Lean+ across the company by embedding environmental thinking into continuous improvement activities. We are sharing our Lean+ expertise and other approaches and tools with our suppliers to help them better measure their environmental footprint and identify waste reduction opportunities. Through the relentless prevention and elimination of waste and replication of best practices across the company, even relatively small efficiency gains add up to yield impressive results.

A Commitment to Recycling

We are working to ensure that materials used in our products, services and operations, including metals and composites, are recycled for high-value industrial uses wherever feasible. We also reduce and recycle everyday materials, including paper and packaging, and are identifying waste reduction opportunities such as paper-free work processes. In 2008, we increased our solid waste recycling rate from 58 percent to 64 percent and standardized recycling programs to heighten employee awareness and increase usability. And the printers and copiers in offices and factories at our U.S. sites use paper containing 30 percent post-consumer recycled content.

Recycling goes beyond our operations. In 2008, Boeing and its supplier Alenia Aeronautica announced that Boeing is helping support the establishment of Italy's first composite recycling facility, which will be located in the Puglia region, near the Alenia Aeronautica manufacturing center and its supply chain production centers. The composite recycling facility is expected to be operational later this year and, when fully operational, is expected to process an average of 1,100 tons of composite scrap annually. Boeing and its supplier Alenia will support the project by working together to advance associated knowledge and technologies and reuse of recycled aircraft parts and manufacturing materials.

(continued from page 39)

In 2006, Boeing helped bring 11 companies together into a common industry working group called the Aircraft Fleet Recycling Association (AFRA). The AFRA network provides the most complete set of tools for aircraft owners to deal with the end-of-life of their equipment—now and in the future. The association has grown to 41 members, who share a commitment to improving older fleet asset management and fostering the recovery and the safe and environmentally progressive reuse of aerospace materials. AFRA has now published a compendium of 42 voluntary best practices intended to promote the safe and environmentally responsible management of reclaimed aircraft parts and assemblies based on their collective member experience. Collectively, AFRA member organizations have:

- Recycled more than 6,000 commercial aircraft
- Recycled more than 1,000 military aircraft
- Re-marketed approximately 2,000 airplanes

Our objectives for aircraft recycling include offering airline customers end-of-life and maintenance options that will allow for the resale of planes that are fit to return to service, offering safe parts recovery, scrapping and recycling planes that are not fit for service, and greatly improving materials recovery from retired planes and manufacturing scrap.

Eco-engaged Employees

Employee enthusiasm is helping to drive environmentally-progressive improvements into the company's products and operations. Our environmental engagement program is working to embed conservation and environmental considerations into all our daily business processes, where even the smallest actions yield big results when replicated across the company. It is fully supported by corporate leadership, is overseen by an Employee Environmental Advisory Council and uses multiple approaches to encourage participation and collaboration.

Proactive, employee-led Green Teams are one of the program's key strategies for reducing the environmental footprint of Boeing's operations. Green Teams usually organize regionally and focus on identifying and implementing specific improvements, such as:

- Environmentally innovative products and services

(continued from page 40)

- Manufacturing or business process improvements
- Conservation of energy and resources, recycling, reduction of waste and source reduction strategies
- Environmental efforts that better our communities

Site Green Teams have been growing rapidly, with more than 20 active groups in U.S. locations, including El Segundo, California; St. Louis, Missouri; Everett, Washington; San Antonio, Texas; and Huntsville, Alabama. The teams are participating in some successful projects:

- The Green Team at the Everett Interiors Responsibility Center in Washington State collaborated with its largest supplier to accept 33 tons of pallets and shipping materials for reuse over the past seven months. In addition, the team eliminated more than 60 forklift trips per day by relocating dumpsters closer to factory operations.
- A Green Team in Computing and Network Operations is working across the enterprise to power VoIP phones from data closet switches instead of individual power packs, reducing energy consumption by over 1.1 million kilowatt-hours per year.
- The El Segundo Green Team held a one-day e-recycling event at which employees collected nearly three tons of personal electronic waste for appropriate disposal.
- The Huntsville Green Team was recognized for their efforts to reduce energy consumption and increase employee environmental awareness with City of Huntsville 2008 Air Pollution Control Achievement Awards in two categories: Energy Conservation and Employee Education. The team was also recognized for helping the city of Huntsville garner the nation's top award for an electronics recycling program.

Employees in several nations — including Australia, the United Kingdom, Canada, Germany and Sweden — have also contributed, and that number is expected to grow.

Boeing Winnipeg, Canada, Aims for Zero Waste Manufacturing

(continued from page 41)

Boeing Winnipeg, Canada, part of Boeing Fabrication, recently hosted a Lean+ event aimed at creating a zero-waste-to-landfill manufacturing cell. Once implemented later this year in the 747-8 area, it will be the first manufacturing area of its kind in Boeing.

The workshop explored ways to reduce energy and increase recycling in areas such as packaging, metals and solid waste. The team created a plan to divert 98 percent of the waste created away from landfills and to reduce energy consumption in the cell by 76 percent. The ultimate goal is to send no waste to landfills.

“The goals for energy and waste reduction that were established during this workshop are a great accomplishment by the team. This strongly supports our focus on the environment and our commitment to the ISO 14001 environmental standard,” said Willy Geary, general manager of Boeing Winnipeg.

All of Boeing’s major manufacturing facilities, including Winnipeg, are certified to the ISO 14001 environmental standard. The team’s initiative supports Boeing’s aggressive targets to increase recycling rates and energy efficiency 25 percent by 2012.

Operational Performance

The work that we have done to date is the foundation for the extensive efforts that lie ahead. Here is a snapshot of our operational environmental performance in energy and water conservation, carbon dioxide emissions, hazardous waste and recycling, as well as the recognition we've received for our environmental efforts.

Operational Performance Improvements

On a revenue-adjusted basis since 2002, Boeing has reduced:

- Energy consumption by 23 percent
- Carbon dioxide emissions by 22 percent
- Hazardous waste by 35 percent

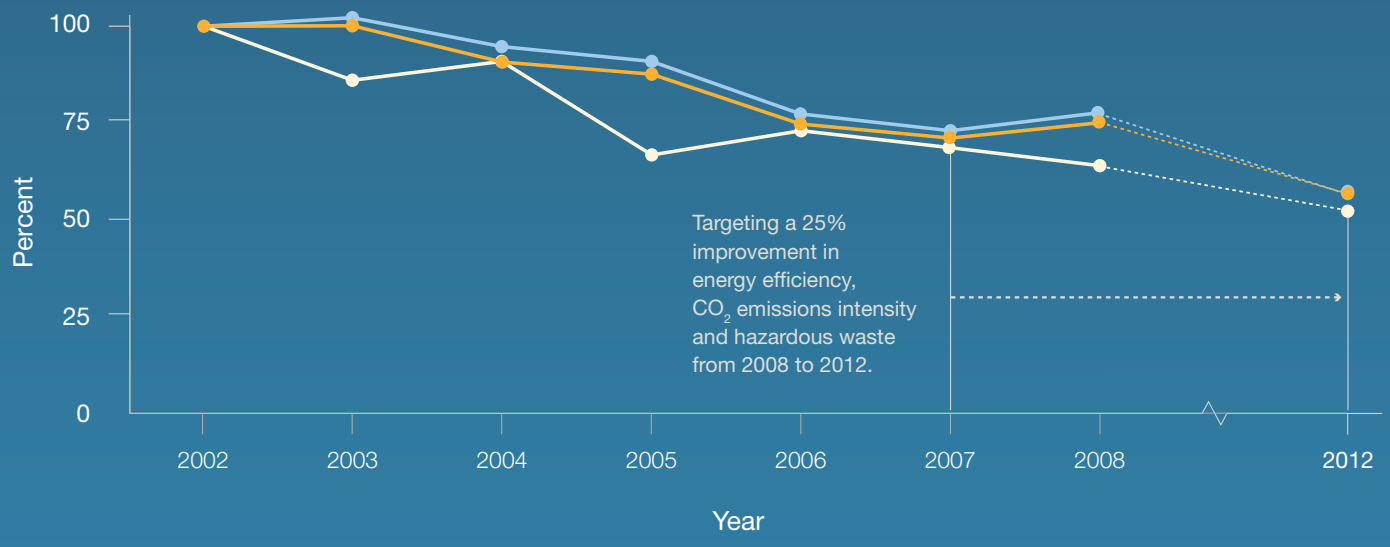
Environmental Recognition

Boeing has won numerous environmental awards, including:

- Water quality awards
- Energy efficiency and recycling recognition
- Clean Air and Air Pollution Control Achievement awards
- Secretary of the Navy Award for Environmental Excellence

Operational Performance

Energy, Emissions and Waste – 2002 to 2008



Progress achieved as of 2008

- Energy Efficiency: -23.8%
- CO_2 Emissions Intensity: -22.1%
- Hazardous Waste -35.4%

Performance indicators normalized to revenue. Energy: MMBtu / $mil. CO2 Emissions: metric ton / $mil. Hazardous Waste: ton / $mil.
Footnote: We reduced our absolute energy consumption, greenhouse gas emissions and hazardous waste in 2008. However, our 2008 revenue declined 8 percent to $60.9 billion, due primarily to the effects of the strike which reduced commercial airplane deliveries by approximately 70 units and revenues by an estimated $4.3 billion.

Energy Conservation

Boeing reduced absolute energy consumption in 2008, and has reduced energy consumption on a revenue-adjusted basis by 23.8 percent since 2002.* From 2002 to 2008, we conducted 54 Lean energy events at sites across the United States, identifying potential energy savings of approximately 957,000 MMBtus. We sponsor internal energy awards to document and replicate best practices across the company; from 2003 to 2008, our sites submitted 152 projects that resulted in annual energy consumption reductions of over 1.1 million MMBtus.

We also diligently implemented energy conservation programs and increased efficiencies by integrating lighting, heating and cooling systems directly to occupancy and upgrading lighting, energy management control systems and HVAC and other mechanical systems in our buildings and sites. Examples include:

- New environmental control systems that reduce annual electric consumption by more than 85 percent in office buildings at our Wichita, Kansas, facility, which earned the site a Clean Air Award from the city of Wichita.
- Energy conservation projects implemented at our airplane manufacturing facility in Everett, Washington, that saved 4.8 million kilowatt hours, enough to power 450 homes for one year and reduce greenhouse gas emissions by 4.5 million pounds.
- Boeing's first Energy Star certification, earned by our Houston, Texas, facility, by retrofitting air conditioning and heating systems along with more efficient lighting controlled by an automated system, reducing energy consumption by more than 2 million kilowatt hours.
- The completion of nearly 50 conservation projects at our Long Beach, California, site since 2006, including the installation of improved lighting and climate-control systems that reduce electricity consumption and greenhouse gas emissions, earning the site an energy efficiency award from Flex Your Power, California's energy efficiency campaign.

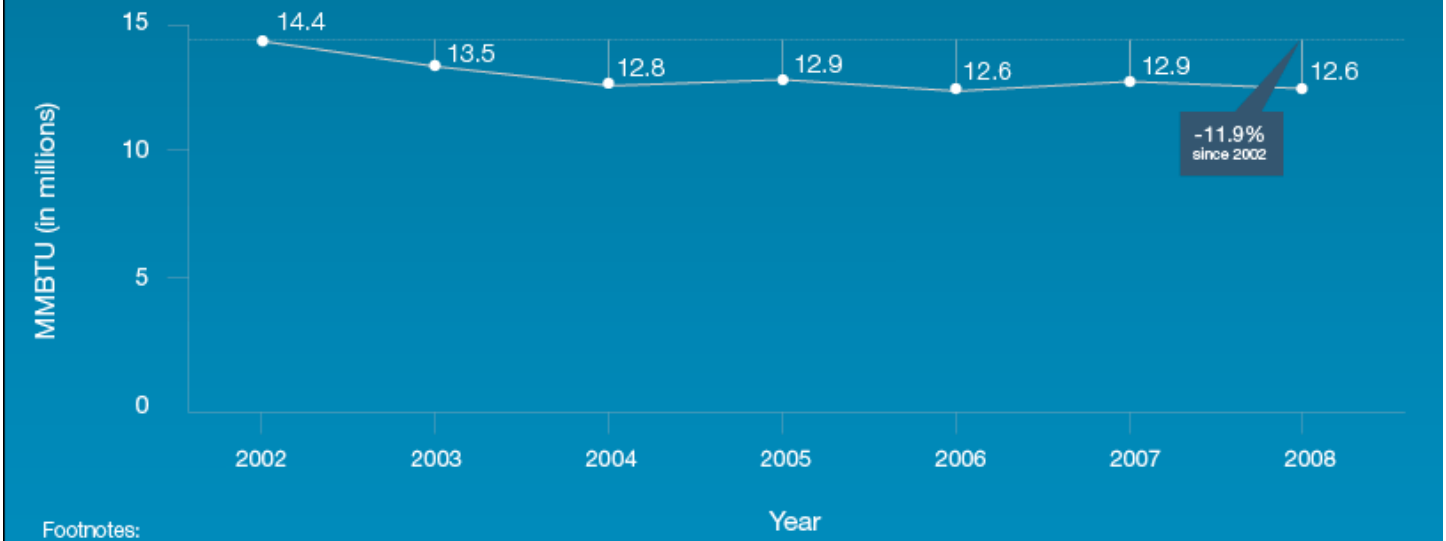
We also increased communications with our employees to raise awareness of behavioral conservation opportunities. Increased conservation and infrastructure investments are anticipated to yield further reductions, in support of our five-year target to increase our energy efficiency 25 percent by 2012.

*2008 reductions in energy consumption reflect both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.

(continued from page 45)

And Boeing employees are engaged in conservation efforts not just at work, but also at home and in their communities. Employees replaced more than 18,000 incandescent light bulbs in their homes with compact fluorescent lights during the Energy Star Change a Light pledge drive, saving approximately 8 million pounds of greenhouse gas emissions.

Energy Use at Major U.S. Sites

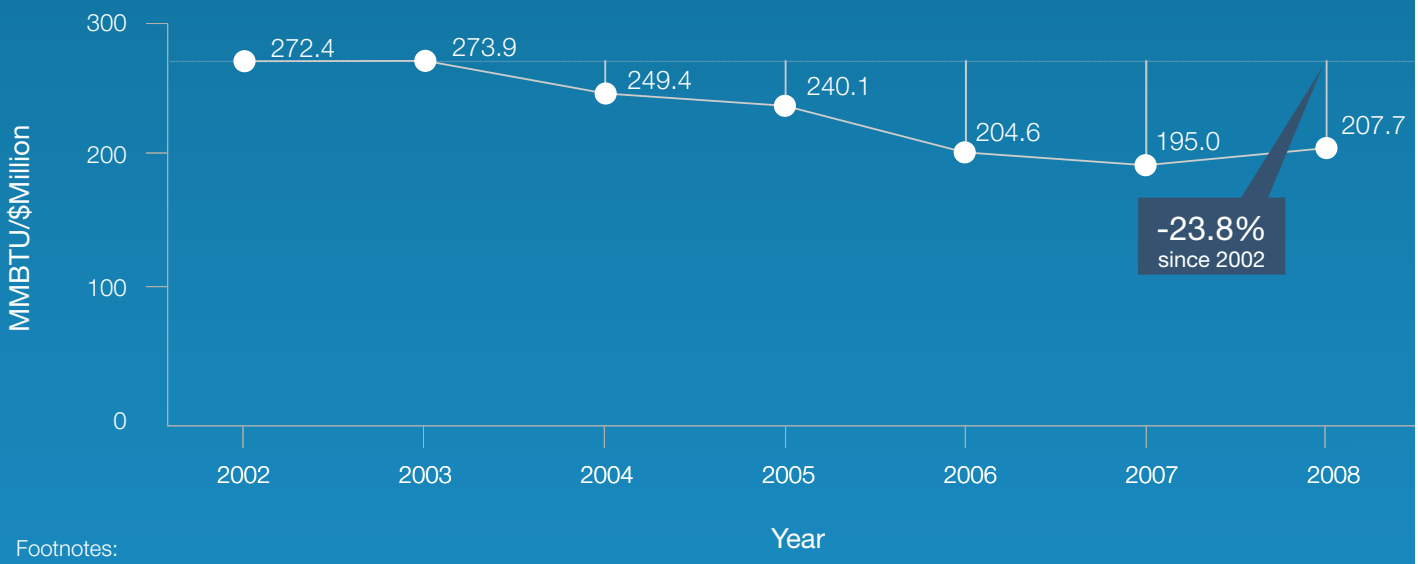


Footnotes:

- Energy is calculated from electricity and natural gas. Fuel oil consumption for our Philadelphia operations, our only significant user of fuel oil, is included. Other fuels are not represented in these totals.
- In our 2008 report, data reflected energy use from our major U.S. manufacturing operations. In this year's report, we expanded the scope to include five additional U.S. sites. Consumption totals for each year increased as a result.
- 2008 data reflects both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.
- Normalized for divestitures by excluding Wichita, now Spirit AeroSystems, from 2002 to 2005. IDS Wichita is included.

(continued from page 46)

Energy Efficiency at Major U.S. Sites



Footnotes:

- Energy is calculated from electricity and natural gas. Fuel oil consumption for our Philadelphia operations, our only significant user of fuel oil, is included. Other fuels are not represented in these totals.
- In our 2008 report, data reflected energy use from our major U.S. manufacturing operations. In this year's report, we expanded the scope to include five additional U.S. sites. Consumption totals for each year increased as a result.
- 2008 data reflects both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.
- Normalized for divestitures by excluding Wichita, now Spirit AeroSystems, from 2002 to 2005. IDS Wichita is included.
- 2008 revenue declined 8 percent to $60.9 billion, due primarily to the effects of the strike which reduced commercial airplane deliveries by approximately 70 units and revenues by an estimated $4.3 billion.

Carbon Dioxide Emissions

Reductions in carbon dioxide emissions result from our reduced energy consumption. Boeing reduced absolute CO_2 emissions in 2008, and has reduced our CO_2 emissions on a revenue-adjusted basis by 22.1 percent since 2002.* And we will continue to reduce emissions to support our five-year goal of reducing greenhouse gas emissions intensity 25 percent from 2008 to 2012.

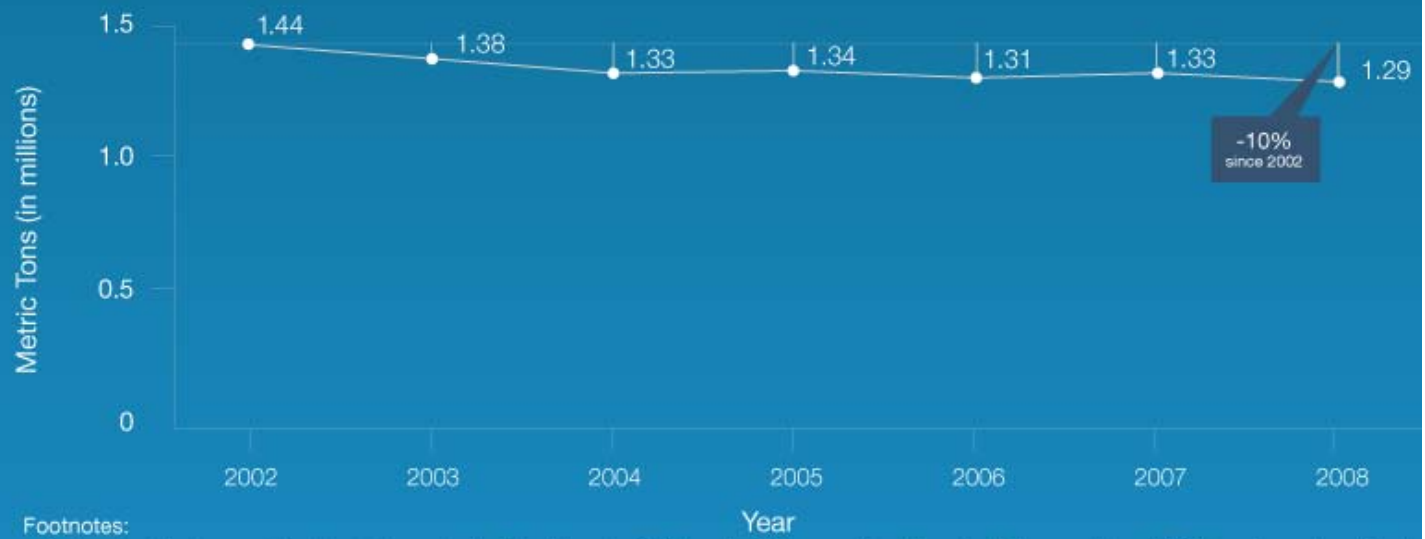
In this report, Boeing uses measurements of electricity consumption and natural gas use (and fuel oil from our Philadelphia operations, the only significant fuel oil user) to calculate carbon dioxide emissions from major U.S. facilities. This year, we expanded the scope to include five additional U.S. sites. This method allows us the most consistent and accurate way to measure targets and performance improvements. The energy consumption at those facilities in 2008 resulted in 1.29 million metric tons of CO_2.

Boeing will later in 2009 disclose an estimate of more comprehensive carbon dioxide emissions and energy use figures under the scope of the Carbon Disclosure Project (CDP7).

*2008 reductions in CO_2 emissions reflect both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.

(continued from page 48)

CO_2 Emissions at Major U.S. Sites

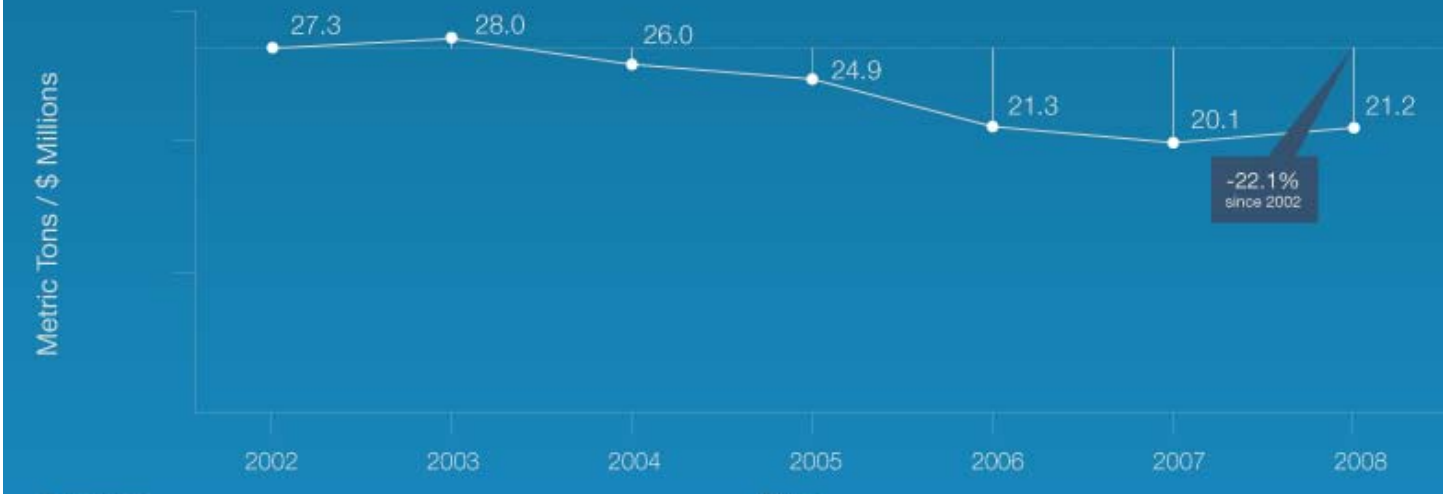


Footnotes:

- Boeing calculates its corporate-wide emissions using the Climate Leaders GHG Inventory Guidance, which defines how Partners working with EPA inventory and report their GHG emissions. This Guidance is based on the existing GHG Protocol Corporate Accounting and Reporting Standard developed by the World Resources Institute and the World Business Council for Sustainable Development.
- Like energy use, CO2 emissions are calculated from electricity and natural gas. Fuel oil consumption for our Philadelphia operations, our only significant user of fuel oil, is included. Other fuels are not represented in these totals.
- In our 2008 report, data reflected energy use from our major U.S. manufacturing operations. In this year's report, we expanded the scope to include five additional U.S. sites. Emissions totals for each year increased as a result.
- Regional eGRID electricity CO2 factors changed in 2008 per the EPA and DoE. Historical totals were adjusted with the updated factor to maintain year over year consistency.
- 2008 data reflects both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.
- Normalized for divestitures by excluding Wichita, now Spirit AeroSystems, from 2002 to 2005. IDS Wichita is included.

(continued from page 49)

CO_2 Emissions Intensity at Major U.S. Sites



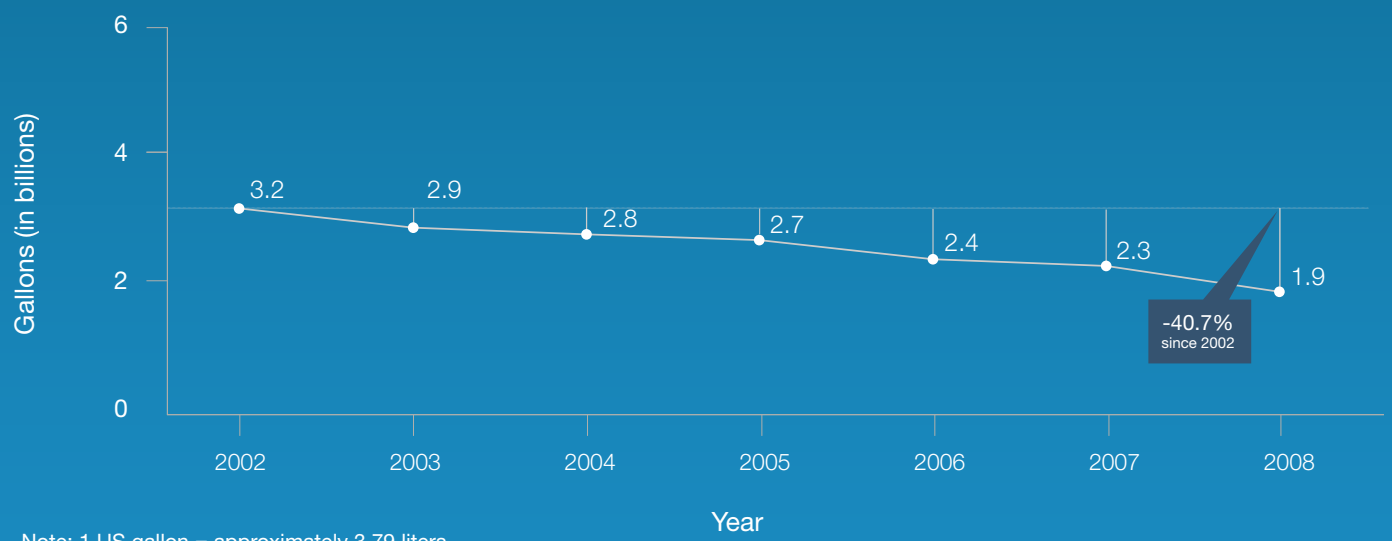
Footnotes:

- Boeing calculates its corporate-wide emissions using the Climate Leaders GHG Inventory Guidance, which defines how Partners working with EPA inventory and repo their GHG emissions. This Guidance is based on the existing GHG Protocol Corporate Accounting and Reporting Standard developed by the World Resources Institute and the World Business Council for Sustainable Development.
- Like energy use, CO2 emissions are calculated from electricity and natural gas. Fuel oil consumption for our Philadelphia operations, our only significant user of fuel oil, included. Other fuels are not represented in these totals.
- In our 2008 report, data reflected energy use from our major U.S. manufacturing operations. In this year's report, we expanded the scope to include five additional U.S. sites. Emissions totals for each year increased as a result.
- Regional eGRID electricity CO2 factors changed in 2008 per the EPA and DoE. Historical totals were adjusted with the updated factor to maintain year over year consis tency.
- 2008 data reflects both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.
- Normalized for divestitures by excluding Wichita, now Spirit AeroSystems, from 2002 to 2005. IDS Wichita is included.
- 2008 revenue declined 8 percent to $60.9 billion, due primarily to the effects of the strike which reduced commercial airplane deliveries by approximately 70 units and revenues by an estimated $4.3 billion.

Water Conservation

Boeing reduced water usage in 2008 and has reduced water consumption by 40.7 percent since 2002 by aggressively implementing improvements in our production processes and building systems equipment.* We chartered a Water Conservation team to lead our improvement efforts, implemented major water reduction projects ranging from total wastewater and steam condensate recycling to rinse water reduction, and outfitted our newly constructed and renovated buildings with low-flow toilets, faucet aerators and auto-off faucets. These efforts are leading to significant reductions in consumption; for example, our El Segundo, California, site completed a water conservation project expected to save approximately 870,000 gallons of water each year by installing motion-activated faucets, dual-flushometer toilets and associated valves. And we will continue to pursue further improvements in this important area.

Water Use at U.S. Sites



Note: 1 US gallon = approximately 3.79 liters

Footnotes:

- Reflects water usage from U.S. operations only.
- 2008 data reflects both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.
- Includes Wichita, now Spirit Aerosystems, from 2002 to 2005.

*2008 reductions in water consumption reflect both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.

Hazardous Waste and Recycling

Boeing is aggressively pursuing reductions in hazardous waste across the value stream, from better coordination with our suppliers to reduce unused chemicals to replacing hazardous materials with more environmentally progressive solutions. Boeing reduced hazardous waste in 2008, and since 2002, hazardous waste has been reduced by 35.4 percent on a revenue-adjusted basis.* Our facilities in Mesa, Arizona, and Macon, Georgia, are separating solvents from used paint and ink and recycling them for safe reuse. At our Mesa facility, the solvent recycling effort has resulted in the elimination of 4,700 pounds of hazardous waste since its implementation in late 2008, and is anticipated to continue yielding additional improvement. And the solvent recycling system implemented in Macon has significantly lowered emissions and reduced hazardous waste from the paint process by approximately 78 percent. The site is expanding solvent recycling equipment to additional paint shops at the facility.

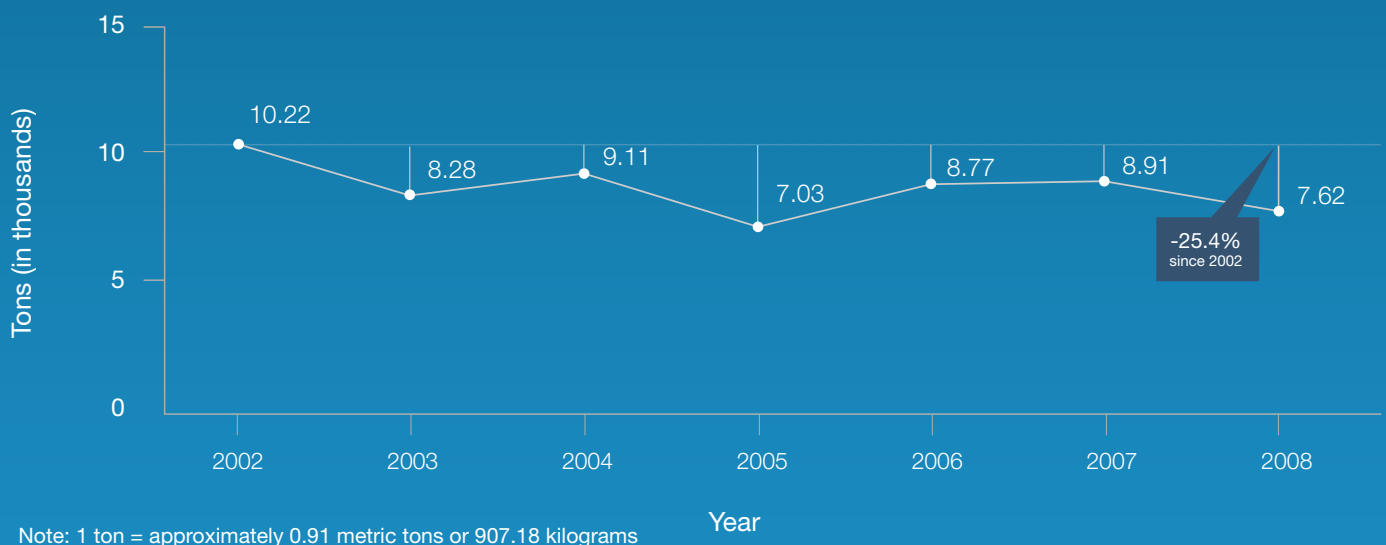
To reduce chrome usage and hazardous waste, our Mesa facility uses chrome-free paint primer on Apache helicopters in production. And our paint hangars in Everett, Seattle and Renton, Washington, have replaced the conventional chromated conversion coat with a Boeing-invented sol-gel material to eliminate chromium.

We will boost our recycling rates to 75 percent by 2012 through a number of different initiatives, including the maturing of office recycling programs to reduce cans, bottles and paper from landfills. We have already made significant progress, increasing our recycling rate from 58 percent to 64 percent in 2008 and standardizing recycling programs to increase employee awareness and usability. Specific sites have made noteworthy improvements. For example, our Winnipeg, Canada, facility is aiming to create a zero-waste-to-landfill manufacturing cell, reducing energy consumption and increasing recycling in areas such as packaging, metals and solid waste. And employees in the Renton, Washington, wings area recycle all aluminum chips left over from wing manufacturing, resulting in approximately 1,750 pounds of scrap aluminum recycled each week.

*2008 reductions in hazardous waste reflect both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.

(continued from page 52)

Hazardous Waste at U.S. Sites



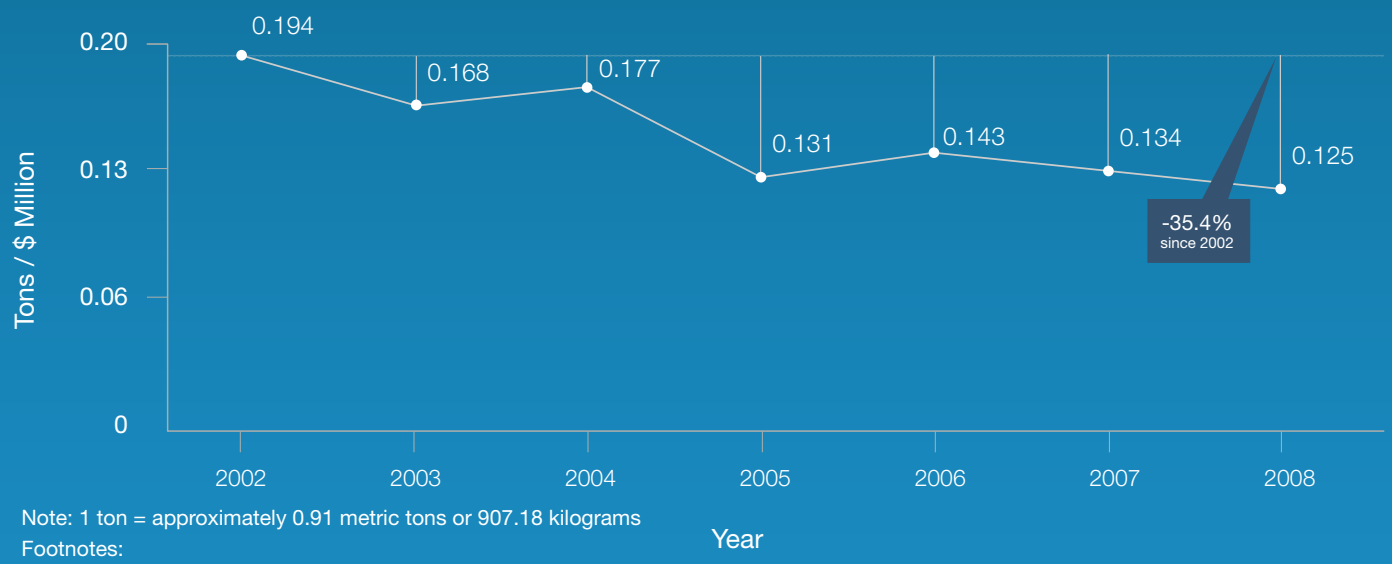
Note: 1 ton = approximately 0.91 metric tons or 907.18 kilograms

Footnotes:

- Reflects hazardous waste from U.S. operations only.
- 2008 data reflects both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.
- Totals normalized for divestitures by excluding Wichita, now Spirit AeroSystems, from 2002 to 2005.
- Operational hazardous waste does not include remediation and construction activity.

(continued from page 53)

Hazardous Waste Normalized to Enterprise Revenue



Note: 1 ton = approximately 0.91 metric tons or 907.18 kilograms

Footnotes:

- Reflects hazardous waste from U.S. operations only.
- 2008 data reflects both improved operational performance and also reduced production demands due to the IAM work stoppage in Washington, Oregon and Kansas.
- Totals normalized for divestitures by excluding Wichita, now Spirit AeroSystems, from 2002 to 2005.
- Operational hazardous waste does not include remediation and construction activity.
- 2008 revenue declined 8 percent to $60.9 billion, due primarily to the effects of the strike which reduced commercial airplane deliveries by approximately 70 units and revenues by an estimated $4.3 billion.

Toxic Release Inventory

Boeing has reduced its Toxic Release Inventory releases by 58 percent since 2002 through the reformulation of more environmentally progressive manufacturing materials and the application of Lean+ principles to minimize usage and waste.

However, transfers increased significantly in 2007, primarily due to a one-time reclamation effort at our Integrated Defense Systems facility in Wichita. Approximately 10,500 tons of old and unused tooling and materials were transferred to brokers for appropriate recycling. Boeing is committed to the safe and environmentally progressive disposal of discarded materials.

(continued from page 55)

Toxic Release Inventory (TRI) in lbs

Releases	2002	2003	2004	2005	2006	2007
Total Releases (millions of lbs)	1.27	1.06	0.88	0.48	0.25	0.25
Wichita	0.66	0.59	0.55	0.27		
Total release less BCA Wichita	0.61	0.47	0.33	0.22	0.25	0.25
Percentage change		-23%	-46%	-65%	-59%	-58%
Normalized to revenue (lbs/million $ revenue)	12	9	6	4	4	4
Percentage change from normalized		-18%	-45%	-65%	-65%	-67%
Transfer						
Total Transfers (millions of lbs)	8.17	6.79	6.80	4.74	3.27	24.07
Wichita	6.09	5.09	5.01	3.06		
Total transfers less BCA Wichita	2.08	1.70	1.79	1.68	3.27	24.07
Percentage change		-19%	-14%	-19%	57%	1058%
Normalized to revenue (lbs/million $ revenue)	39	34	35	31	53	363
Percentage change from normalized		-13%	-12%	-20%	35%	820%
Total release and transfers (millions of lbs) - -(less BCA Wichita)	2.69	2.16	2.11	1.90	3.52	24.32
Percentage change		-20%	-21%	-30%	31%	804%
Normalized to revenue (lbs/million $ revenue)	51	44	41	35	57	366
Percentage change from normalized		-14%	-19%	-31%	12%	618%
Revenue (millions)	52,720	49,311	51,400	53,621	61,530	66,387

Normalized for major divestitures, including the Wichita site.
Releases are direct to air, water and land.
Transfers are shipments off-site and to Public Owned Treatment Works (POTW).
2008 data will be submitted to the U.S. EPA in July 2009.
2008 revenue declined 8 percent to $60.9 billion, due primarily to the effects of the strike which reduced commercial airplane deliveries by approximately 70 units and revenues by an estimated $4.3 billion.

Sea Launch has been recognized for environmental achievement by the California-based Port of Long Beach's Green Flag Awards.

Environmental Awards

We are committed to working with the community and being transparent in our operations and remediation activities. Our efforts have been recognized by a number of independent organizations, but our real satisfaction comes from knowing our work is having a positive effect on the environment. Recognition received for our environmental efforts includes:

- The P-8A Poseidon Environment, Safety and Occupational Health team received the Secretary of the Navy Award for Environmental Excellence and the Chief of Naval Operations Environmental Excellence in Weapon System Acquisition team award for exceptional environmental stewardship.
- The F/A-18E/F and EA-18G Acquisition Programs Green Hornet Team captured its fourth consecutive Chief of Naval Operations Environmental Excellence in Weapon System Acquisition team award.
- A Crystal Cabin Award recognizing outstanding aircraft cabin products and concepts in the Greener Cabin, Health and Safety category for our concept to replace standard aircraft carpeting with 100 percent recyclable carpet tiles, developed in collaboration with supplier InterfaceFLOR.
- The 2009 Jane's ATC Global Award in the Industry category for the development of the innovative Air Traffic Management concept of Tailored Arrivals, which reduce fuel burn, emissions and noise. The awards recognize achievements in air traffic management and help raise awareness of contributions made across the industry. Winners are selected by a panel of senior representatives from the U.S. Federal Aviation Administration, Eurocontrol, IATA, CANSO, Jane's Information Group and ICAO.
- The Port of Long Beach has recognized Sea Launch repeatedly for environmental achievement through its Green Flag awards, a voluntary program initiated in late 2005 to reduce the amount of carbon emissions released by ships entering and exiting the port. Sea Launch has participated in the program since its inception and has reached 100-percent compliance annually for both the Sea Launch Commander and the Odyssey Launch Platform since 2006.
- Five current and former Boeing employees—Steven Baughcum, Mikhail Danilin, Douglas DuBois, Stephen Henderson and Donald Sutkus—were presented certificates of appreciation by the International Panel on Climate

(continued from page 57)

Change (IPCC) for their work as lead authors on chapters focused on aircraft emissions scenarios, modeling of aircraft emissions impact on atmospheric composition, aircraft technology, and aircraft-produced aerosols and cloudiness for the 1999 IPCC Special Report "Aviation and the Global Atmosphere." Boeing is continuing to study how aviation can improve its environmental performance.

- Boeing Huntsville received Air Pollution Control Achievement Awards from the City of Huntsville for energy conservation projects and employee education efforts.
- Local water quality awards were presented by water treatment districts to many Boeing sites, including Renton, Washington; Palmdale/Edwards Air Force Base and El Segundo, California; El Paso, Texas; St. Charles and St. Louis, Missouri; and Wichita, Kansas.
- Boeing San Antonio, Texas, received a Recognition for Recycling Excellence award from Vista Fibers for recycling 314 tons of paper products.
- Boeing Wichita, Kansas, received a Clean Air Award from the city of Wichita for significantly reducing electric consumption by installing new environmental control systems.
- Boeing's Long Beach, California, site received an energy efficiency award from Flex Your Power, California's energy efficiency campaign, for the site's efforts to conserve electricity.
- Boeing Information Technology received a Global Green 100 award from the Uptime Institute for its outstanding commitment to energy efficiency in enterprise computing data centers.

Investing in Our Community and Our Environment

Boeing made cash contributions of more than $15 million over the past six years to support innovative environmental programs.

Boeing employees collectively donate thousands of hours of their own time to company-sponsored environmental volunteer events each year.

Investing in Our Communities

Through our Global Corporate Citizenship function, Boeing is actively involved in efforts to preserve the environment by investing money and providing volunteers in communities where we have a business presence around the world.

Through the Korea Green Foundation, students are taught environmental awareness as they participate in the Climate Change Classroom.

Courtesy of Korea Green Foundation

Boeing Environmental Philanthropy

Recognizing the interdependence between our business and our communities, we believe that working with nonprofits and other key community stakeholders to promote environmental preservation is key to our role as a global corporate citizen.

In fact, the environment is one of Boeing's five strategic community investment areas. In 2008, Boeing made cash contributions of approximately $5.7 million to community-based programs that inspire environmental citizenship and educate citizens to minimize their impact on the environment; reduce greenhouse gas emissions, increase recycling and energy efficiency; and protect and restore critical natural assets and habitats.

Last year, our environmental preservation efforts included grants to:

• TreePeople, one of California's largest independent environmental organizations, to launch the California Wildfire ReLeaf Initiative and begin the reforestation process in areas devastated by wildfires. With a $1 million grant from Boeing, TreePeople will expand partnerships with public agencies that manage land impacted by wildfires to realize logistical efficiencies, such as equipment storage and transportation and water and seedling procurement.

• The Chicago Field Museum's Environment, Culture and Conservation (ECCo) team, which engages communities to protect the natural environment, builds links with neighboring communities and increases their understanding of issues that affect their environment and quality of life. Boeing's support for ECCo will help conserve and sustain landscapes in some of the most diverse and threatened habitats on earth. An example includes the Andes-Amazon project, which will increase protected areas in South America by three-to-four million acres in a north-south corridor in the Amazon and along intact swaths of vegetation from lowlands to mountain crests in the Andes. The experience will then be parlayed into strategies that will impact land and people close to home.

• The Cascade Land Conservancy (CLC), one of Washington State's largest conservation organizations, to help lay the foundation for a 100-year regional vision that will ensure the Puget Sound area remains a desirable place to work, live and visit. Called The Cascade Agenda, the plan brings together key stakeholders, including elected officials, scientists, business leaders, loggers, farmers, timber companies, students and private citizens, to find and implement creative solutions to the region's greatest challenges. Boeing is heavily invested in the region, and has long supported CLC and its projects.

(continued from page 60)

• The Conservation Action Trust, which Boeing has supported for the past two years. The Trust is restoring the habitat of Thane Creek in Mumbai, India, by establishing two Mangrove Wetland Centers along the creek in Mumbai and Navi Mumbai. The Centers, which are designed to have the smallest possible ecological footprint, will be the first of their kind in India and are intended to protect mangroves by building a better understanding of their importance in preserving coastlines throughout Mumbai and the world.

• The Korea Green Foundation, the largest environmental nongovernmental organization in Korea, to support the Climate Change Classroom. The Classroom engages youths aged 11–13 in becoming more responsible and environmentally aware global citizens. Over a three-month period, students participate in a multifaceted learning experience involving lectures, movies, outdoor activities and field trips.

• The "Natural..mente scuola: educazione ambientale e tecnologia," in Italy, a program created to bring young people closer to environmental protection issues and technological innovation. The program involves 590 classes from 37 secondary schools in the Italian province of Taranto. Its goal is to increase children's awareness of the importance of protecting the environment.

• The Mercer Slough Environmental Education Center, based at the Mercer Slough Nature Park, a 320-acre wetland in the heart of urban Bellevue, Washington. The Center will reach the next generation of scientists and stewards, serving as many as 40,000 students, teachers and family members annually. Boasting diverse plant life and animals, Mercer Slough is an ideal place for hands-on environmental study.

• Seeds of Discovery: Botanic Gardens Conservation International, which stems from the global coordination of a singular goal—storing the seeds of endangered plants and working with local institutions to plant some of those seeds in order to preserve the species. It's a plan that is engineered by one body, but carried out by dozens and dozens of local partners. This grant also provides Boeing employees an opportunity to participate. Since the company has employees all over the globe, our employees can partner with their local botanic gardens to aid in the care of these endangered species.

These nonprofits and the many more like them that we support each year underscore our clear strategy to take action as a responsible corporate citizen and neighbor.

(continued from page 61)

Alenia Aeronautica, Boeing launch environmental education, technology collaboration

Boeing and its supplier Alenia Aeronautica, together with local institutions and Alenia Composite executives, announced the launch of "Natural..mente scuola: educazione ambientale e tecnologia" in November 2008. The program was created to bring young people closer to environmental protection issues and technological innovation.

The program involves 611 classes from 38 secondary schools in the Italian province of Taranto. Its goal is to increase children's awareness of the importance of protecting the environment, said Rinaldo Petrignani, president of Boeing Italy.

Support for the environmental education campaign has been received by the Puglia Region office of the Ministry of Education; the Regional Center for Environmental Education–the Puglia regional government ministry of the environment; the province of Taranto; and the municipalities of Grottaglie and Monteiasi.

"Boeing is committed to protecting the environment and sets stringent objectives for the reduction of its environmental impact, in terms of energy and water consumption, gas emissions and dangerous waste materials," Petrignani said. "Our approach goes along with the awareness of our responsibility to the local communities that host the plants where our airplanes are built. This is why we see cooperation with local stakeholders as a key component of our social responsibility."

The municipalities of Monteiasi and Grottaglie host the new Alenia Composite center of excellence for the development and production of fuselage sections for the 787 Dreamliner. Its lighter structure will provide airlines with unmatched fuel efficiency, resulting in exceptional environmental performance.

The "Natural..mente scuola" project includes several activities, including a toolkit for teachers to educate their classes about everyday behavior that can improve the environment. The program also established two teaching laboratories, which give students hands-on experience in activities directly related to sustainable technologies development. In addition, a competition was held among classrooms focusing on the students' vision of a greener world and their ideas to make it happen.

Boeing employee volunteers, like the two pictured here, have participated in several TreePeople tree-planting activities.
Photo courtesy of Juan Villegas for TreePeople

Boeing-Sponsored Employee Volunteerism

Boeing employees are integral to the company's commitment to environmental improvement, and they are active in company-sponsored volunteer work activities and cleanup events to which they collectively donate thousands of hours of their own time each year. These activities often leverage relationships with grantees in order to maximize Boeing's impact. One example is the annual volunteer event with Florida nonprofit Keep Brevard Beautiful, where Boeing's Kennedy Space Center employees participate in a cleanup event at the "spoil islands" in the Indian River Lagoon.

In addition, the Employees Community Fund of The Boeing Company, one of the world's largest employee-owned and directed giving programs of its kind, makes grants to environmental nonprofits using contributions from employee members.

For example, the Employees Community Fund of Boeing California has been a proponent of California-based nonprofit TreePeople for more than 25 out of the nonprofit's 35 years of existence. Among the innovative TreePeople programs funded by the ECF of Boeing California are the Elementary Education Eco-Tour Program, which brings city schoolchildren to Coldwater Park Canyon to learn about forests and the importance of their protection and conservation, and the Campus Forestry Program, which funded the distribution of the TreePeople Citizen Forestry Books to school libraries throughout Los Angeles, Orange, Riverside and San Bernardino counties.