Case Study from the Fall 2006 *Carbon Copy*

Xerox: Energy Efficiency Initiatives for Reaching a 2012 GHG Reduction Goal

A member of EPA's Climate Leaders Program, Xerox Corporation has pledged to cut GHG emissions from its worldwide operations by 10 percent from the baseline year 2002 until the end of 2012. The target complements the company's ongoing environmental programs, which include products designed for energy efficiency and innovative remanufacturing and recycling practices. Reaching the target is expected to require up to a 30 percent improvement in average energy efficiency in company operations compared to 2002 levels. With rising energy and fuel costs, these efforts also present a significant opportunity to control energy related expenditures.

Xerox is on track to reach its goal. By 2005, energy consumption had decreased by 9 percent, and GHG emissions were more than 7 percent lower than in 2002.

With the support of the company's CEO, Anne Mulcahy, Xerox launched an internal program called Energy Challenge 2012 that encompasses the strategies and tactics being taken to ensure it meets its GHG reduction goals. Xerox's EHS organization is leading this company-wide effort, along with the active involvement of many organizations across the company such as manufacturing, corporate real estate, technical services, global procurement and others worldwide. Energy Challenge 2012 is relying on Lean Six Sigma methodologies to identify reduction opportunities, implement energy saving projects, and track progress. Other key elements of the Energy Challenge management process are integration of energy targets into business objectives, regular reviews with the program's steering committee, and engagement of all employees using existing internal communication vehicles. Energy Challenge team members include process engineers, facility engineers, fleet managers and communication specialists. More than 50 employees around the company are working together to achieve a more sustainable use of energy through advanced technology and re-engineered manufacturing and service processes. Each of these project areas represent energy saving opportunities—with cost savings flowing directly to the bottom line. The projects are also consistent with the company's long-term business strategies.

Building Upon Energy-Efficient Technologies

One example of Xerox's commitment to energy efficiency is its emulsion aggregation (EA) technology for toner. This advanced toner requires an estimated 25 percent less energy to make when compared to conventional toner. The second of two Xerox plants that will produce EA toner is under construction in Webster, New York. The 100,000 square-foot facility represents a $59 million investment for Xerox. It is scheduled for completion in Fall 2007.

A key design goal for the plant has been to take energy out of the process everywhere possible. To meet that goal, Xerox engineers integrated the planning of the building and the manufacturing process from the start. The result is an "intelligent building," packed with sensors and organized into multiple zones that can be separately controlled for most

efficient operation. There will be more than 3,000 sensors in the five-story building, feeding information about temperature, humidity, air flow, and other variables into a networked system. The system divides the plant into zones and will schedule temperature and lights as well as toner production in each separate zone. Depending on the process being run, whole zones of the building might be shut off to reduce energy use. Xerox is installing chillers and air compressors with variable-speed drives so that the plant will be able to respond to incremental changes in the operating environment rather than just being off or operating at full speed. There will be variable intensity lighting and small back-up compressors available for very low use.

Ingredients for Process Improvements

An important way to reduce energy demand is to redesign production processes. For example, Xerox is implementing changes to its manufacturing of conventional toners. E-Agent—or embrittling agent—is a special chemical ingredient that is reducing the amount of energy needed to make certain Xerox printer toner by up to 22 percent. Xerox is the inventor and world's largest manufacturer of toner, producing it in eight locations worldwide. Toner is the "dry ink" powder fused on paper to make laser prints and copies. In the conventional toner manufacturing process, large particles of plastics, colorants, and other additives are mechanically pulverized into small, relatively uniform toner particles. About 50 of these toner particles are required to print a period on this page. The grinding process is the most energy-intensive step, consuming up to 40 percent of the total energy used for making toner. The "grinding" happens when toner particles are blown against each other at high speeds inside a chamber, and the collisions cause the particles to split apart. Xerox engineers knew that if the toner particles became easier to grind, the whole process would become more energy efficient. They discovered that by adding E-Agent to the toner "recipe," particles would be more likely to shatter upon contact and reach the desired particle size more quickly. By 2008, the energy savings associated with Xerox's use of E-Agent is expected to avoid more than 18,000 metric tons of carbon dioxide emissions—the equivalent to emissions for 3,270 cars. Project payback was achieved well within acceptable limits.

Emissions Reductions Driving Fleet Management Improvements

Xerox's service and sales operations are responsible for about 20 percent of Xerox's GHG emissions. With more than 10,000 vehicles operated worldwide and about 100 million miles driven in the United States alone, this part of the company's business plays an important role in meeting its Energy Challenge 2012 goals. Xerox's strategies include improving the efficiency of the vehicles in its fleet while continuing to meet the operational needs of the service workers and reducing miles driven.

Xerox is procuring more fuel-efficient vehicles as they become available and are consistent with its business needs. The company is studying the full range of options—hybrids, clean diesels, and flexible-fuel vehicles—and is tracking the development of alternate fuels such as ethanol. Xerox is also concentrating on the basics—fitting drivers to the right-size vehicle depending on the geographic area they service and the need to carry service parts.

Reducing the miles driven to service customer equipment starts with product design. Xerox engineers continue to innovate so its products are increasingly reliable and parts last longer. Xerox multifunctional equipment also reduces the need to service multiple pieces of equipment by providing all document processing functions—print, copy, fax, and scan—in one "box." And more support is offered online and through remote diagnostic systems. Call management is also important to reduce the overall number of miles driven. All of these efforts mean that fewer service calls are necessary, resulting in fewer miles driven by Xerox technicians and reduced gasoline consumption. Longer-lasting parts also mean that less manufacturing energy is invested over the life of a Xerox product. Through these efforts, Xerox reduced the number of miles driven in the United States alone by nearly 17 million miles between 2002 and 2004.

Leveraging Public-Private Partnerships

Xerox is also working to identify opportunities to reduce GHG emissions through renewable sources of energy such as wind and solar. Several Xerox sites—including those in the United Kingdom and United States—are purchasing "green power," reducing annual GHG emissions by more than 6,000 metric tons. As a member of Sustainable Energy Ireland, Xerox's manufacturing facility in Dundalk, Ireland, is participating in a project whose goal is to move the community to a more sustainable pattern of energy supply and use. One possible outcome of this public-private partnership is construction of a wind turbine on the Xerox campus to produce electricity generation for the Xerox site and surrounding community. Acceptable capital financing terms for this project will be made possible through the efforts of multiple stakeholders.

Xerox has found much value in its partnerships with organizations such as Climate Leaders as it developed its GHG emissions reduction program. Xerox is also a member of the Business Roundtable Climate Resolve.

About Xerox

Xerox Corporation is a $16 billion global enterprise that helps businesses find better ways to work through innovative technology integrated with document-management services. Over the past 40 years, Xerox has demonstrated leadership in sustainability and citizenship by designing "waste-free" products built in "waste-free" plants, investing in innovation that delivers measurable benefits to the environment, supporting educational and community projects around the world, and many other integrated initiatives.