



# SUSTAINABILITY REPORT



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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
National Institutes of Health



**NIEHS**

# Sustainability Report



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## **A Message from Our Director**



In order to sustain and improve life on Earth, we must simultaneously support human health, our environment and society. Throughout the world, there is growing consensus that human, environmental and economic well-being are interdependent.

As the world community begins to seek a more sustainable future, the National Institute of Environmental Health Sciences accepts leadership responsibility. Through our scientific research efforts, we explore the links between human health and the environment in order to improve understanding, inform public policy, and help people make decisions that lead to better lives.

While we make this scientific journey, we are acutely aware of the impacts of our own activities. Research is resource-intensive. We operate large laboratories and office buildings, consume vast amounts of energy and water, drive to and from work, use chemicals, consume paper, create waste and impact our environment in many other ways. As a result, our choices can have direct and indirect impacts on human health, the environment and our community.

I am pleased to present to you our Institute's very first sustainability report. In creating this snapshot of our current performance, we have highlighted areas of progress such as the launch of our environmental management system, reductions in water use and increased use of alternative transportation. Just as importantly, this process has also helped us to identify areas where we need to improve.

I look forward to sharing with you our continued progress in the future.

**/s/ Linda S. Birnbaum**

Linda S. Birnbaum, Director

National Institute of Environmental Health Sciences  
and National Toxicology Program



## Executive Summary

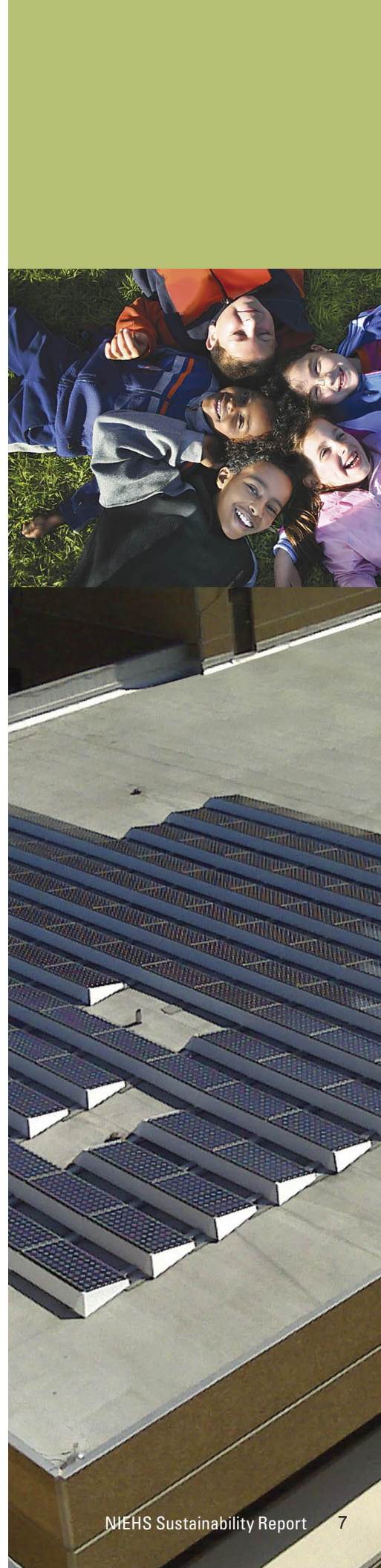
Sustainability is a core value of our Institute. Preserving and protecting the environment and human health are integral to our scientific mission. This report details the progress we have made to establish our commitment to the pursuit of more sustainable practices in operations and programs such as Energy, Water, Air Emissions, Waste and Recycling, Buildings, and Land Management. As we carry out our scientific missions, our efforts to continuously enhance the Institute's environmental performance are highlighted in a number of areas including:

- EMS – after rigorous audits by the State of North Carolina and NIH, self-certified our Environmental Management System (EMS). Updated our Institute's comprehensive Environmental Policy Statement.
- Energy – used an innovative Energy Saving Performance Contract (ESPC) to upgrade campus-wide lighting fixtures and install our first solar roof. Rather than requiring capital funding upfront, costs are covered by annual energy savings.
- Water – in response to a serious drought in our region in 2008, cut water use by 18%. Technology upgrades were coupled with voluntary efforts by employees to achieve this dramatic reduction.
- Waste – since 2004, reduced our generation of regulated and chemical waste by 43%. Recycled more than 400 tons of waste in 2008.
- Transportation – 27% of our federal employees use alternative workplace and commuting methods.

Our future endeavors will include developing a sustainability plan that will help us prioritize and coordinate efforts to improve performance. We hope to refine our data collection abilities so we can establish better baselines and targets. We also plan to prepare a greenhouse gas inventory so we can further reduce our emissions.

With this, our first Sustainability Report, we hope to demonstrate the creativity, scientific discipline and responsibility our employees bring to bear in promoting sustainability on our campus, in our labs and in our offices. Finally, through this report we reaffirm our commitment to reducing our environmental footprint as stewards of the public trust.

*Your comments on this report are welcome and appreciated. Please direct any feedback to the Chief, Health and Safety Branch, Office of Management, NIEHS.*





## Introduction

Our Earth is irreplaceable. Yet many reports show humankind progressing in an unsustainable manner at the expense of our planet, as year after year we deplete more natural resources than we allow the Earth to replace. If we fail to balance regeneration with development and advancement, we will not be able to achieve equilibrium. Reducing our dependence upon non-renewable resources will help us to responsibly meet both human and ecological needs fairly and efficiently. At the same time, exposure to unhealthy substances in the air, water, land and products can often lead to disease, suffering and death. Reducing human exposure to harmful environmental toxicants is vital to our present and future well-being.

*“Whatever you do may seem insignificant, but it is most important that you do it.”*

**–Mahatma Gandhi**

While focusing on health and the environment, we must also recognize a spectrum of social and economic needs. People need jobs, shelter, food, transportation and a variety of business and personal products. The most “sustainable” solutions, then, are those which simultaneously support the economy, the environment, human health and social well-being.

The National Institute of Environmental Health Sciences (NIEHS), located in Research Triangle Park, North Carolina, is one of 27 research institutes and centers that comprise the [National Institutes of Health \(NIH\)](http://www.nih.gov), [U.S. Department of Health and Human Services \(DHHS\)](http://www.dhhs.gov). The mission of the NIEHS is to reduce the burden of human illness and disability by understanding how the environment influences the development and progression of human disease. The National Toxicology Program (NTP) is also part of the DHHS, and functions as an integrated program with the NIEHS.

As a public health entity, the NIEHS is naturally poised to take on a leadership role in sustainability. In our laboratories as well as through research grants and contracts, we study the effects on human health of environmental pollutants, chemical substances and phenomena such as climate change to create a scientific basis for informed public policy. Understanding that there is a critical balance between ecology, the built environment and human health helps establish a foundation for sustainability.



While pursuing our scientific mission, we are committed to reducing any negative impacts of our activities on the community and the environment. Our Institute employs more than 1,500 people. We operate two campuses in North Carolina's Research Triangle Park comprised of 1.1 million square feet of laboratory and office space on nearly 400 acres of land. Each year, we manage roughly \$850 million in public funds and make hundreds of decisions that determine how that funding will be spent. In doing so, we also make choices that have consequences for the environment, human health and community well-being.

At the NIEHS, we follow the guidelines set forth in 2007 through Executive Order 13423 for the "greening of the government." As a key component, this includes the establishment of an NIEHS Environmental Management System which integrates environmental compliance with voluntary measures to help us continuously enhance our environmental performance. Through annual audits, involvement of employee advisory groups, and regular interaction with outside groups such as the State of North Carolina's Environmental Stewardship Initiative, we engage our employees and the community in our process of improvement.

In this Sustainability Report, we seek to communicate both progress made and challenges faced by describing how we measure against a number of sustainability indicators in the areas of Energy, Water, Emissions, Waste and Recycling, Buildings, Transportation, Land Management, Purchasing, Information Technology, and Community and Culture. Where quantitative data is provided, our most recent information is drawn from 2008. The NIH Office of Research Facilities Development and Operations (ORF) is responsible for operating our buildings and site, so its work at our campus is also reflected in this report.

In many ways, our Institute's activities already reinforce our environmental health mission. This Sustainability Report details significant progress in a number of areas – such as the launch of our environmental management system, campus-wide lighting upgrades, reductions in water use, innovations in electronics and food waste recycling and our first solar roof. We also have identified areas of concern and we have already begun to address some of these challenges.

*For more information on the NIEHS and the NTP, visit <http://www.niehs.nih.gov/>*





## Research

Through our exploration of environmental health science, the NIEHS helps promote a more sustainable future. We accomplish this important work in a number of ways – by funding scientific studies, by training emerging generations of scientists, by conducting basic research in our own laboratories, and by integrating toxicological research performed by multiple agencies.

### Supporting Environmental Health Research Worldwide

The NIEHS [extramural](#) research program awards funding to investigators at universities and other organizations. Each year, our extramural program typically awards more than \$300 million in [grants](#) to support basic science, disease-oriented research, global environmental health studies as well as multidisciplinary training. Most research focuses on how environmental toxicants affect the etiology and progression of human disease, applying basic research of mechanisms as well as laboratory animal models, and clinical and epidemiological studies. Details on our NIEHS grants are available at <http://tools.niehs.nih.gov/portfolio/>.

A focus on training and translational research also puts NIEHS in an active role to support the training and development of future environmental scientists. The Institute funds nearly five hundred predoctoral and postdoctoral fellows through training grants and many of these individuals proceed directly to successful careers in bioscience. Other programs include grants for career development, including two types for transitions to independent positions. In this way NIEHS, helps to train environmental health scientists for positions in industry, academia and the public sector. The NIEHS also fosters retention of talented environmental scientists in graduate studies leading to doctoral degrees. These future Ph.D. and M.D. environmental scientists are the thought leaders of tomorrow.

In addition, the NIEHS [Superfund Research Program](#) (SRP) supports environmental health research and training related to understanding the health impact of exposures from Superfund hazardous waste sites. Through a coordinated effort with the Environmental Protection Agency (EPA), the NIEHS SRP attacks problems from different perspectives, utilizing expertise in biomedical and non-biomedical sciences to investigating how these environmental toxicants behave in the environment, affect human health. The program also supports novel methods for clean-up of these challenging hazards. In addition to supporting basic scientific research, the SRP incorporates outreach activities designed to encourage the translation of the program's results to communities and organizations most concerned with the effects of hazardous substances on human health. The NIEHS Worker Education and

*Division of Intramural Research (DIR) website: <http://www.niehs.nih.gov/research/atniehs/index.cfm>*

*Division of Extramural Research Training (DERT) website: <http://www.niehs.nih.gov/research/supported/index.cfm>*

*Superfund Research Program website: <http://www.niehs.nih.gov/research/supported/srp/index.cfm>*

Training Program (WETP) supports the training and education of workers engaged in activities related to hazardous materials and waste generation, removal, containment, transportation and emergency response. Through a network of non-profit grantee organizations, the WETP provides model curricula and training programs throughout the country to help employers meet Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations & Emergency Response requirements.

### **Advancing Environmental Health Science in Our Own Laboratories**

The NIEHS **intramural** research program employs about 750 scientists and postdoctoral trainees within its own research laboratories. Researchers are divided among 75 individual groups, each with a specific theme related to environmental bioscience. The NIEHS Laboratories are clustered into categories including Environmental Biology, Environmental Disease and Medicine, Clinical Research and Environmental Toxicology, and the National Toxicology Program (NTP). Focusing on high-risk/high-reward research, this work is designed to set the stage for the future of worldwide environmental research.

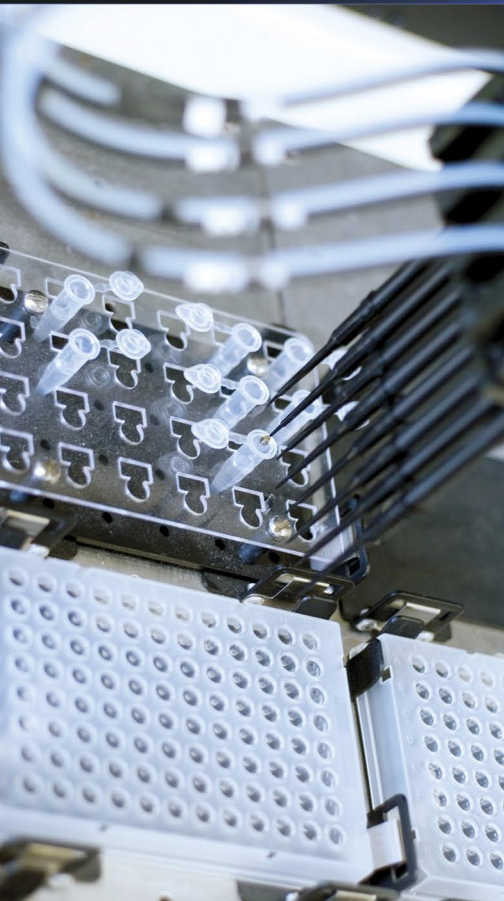
Recent examples of intramural research within this framework are illustrative. The “Agricultural Health Study” is a long-term tracking of agriculture workers and their families, gathering data to determine the impacts of environmental events such as pesticide exposure upon health of farm families. Similarly, studies of DNA modifications caused by environmental agents and pollutants measure the likelihood of genetic changes leading to disease, and even the potential for these changes to be passed from mother to unborn child. NIEHS scientists are also engaged in studies to understand how asthma is triggered by pollutants and allergens in the home. In a major collaborative interdisciplinary effort, NIEHS scientists are also engaged in studies to understand how specific genes affect a person’s susceptibility to environmental agents – exploring why some people become ill when exposed to pollutants whereas others are unaffected. These and related questions form the framework for the emerging field of environmental genetics, of which NIEHS intramural scientists are among the world leaders.

Each year, our intramural scientists publish more than three hundred peer-reviewed scientific papers in scholarly journals. This research is made available to the public free of charge through the PubMed Central website at <http://www.pubmedcentral.nih.gov/>. Moreover, NIEHS DIR scientists are frequent participants of international workshops and conferences, where knowledge relating environmental exposure and human health is shared.

Importantly, our reputation of intramural science goes beyond our campus borders. Indeed, the our research program is seen as an exciting and effective place for the next generation of







scientists to train. Every year our postdoctoral fellows evaluate their experience at NIEHS in a survey by *The Scientist*. They have consistently ranked the Institute among the best places to work in the nation, and first among NIH Institutes and Centers. Finally, partnerships with local universities and hospital clinics promote collaboration and exchanges of ideas, and many NIEHS investigators serve as adjunct professors at the seven universities within a 30-mile radius of our campus.

The National Toxicology Program (NTP) was established in 1978 amid increasing concerns about human health effects of chemical agents in our environment. Operated as a part of NIEHS, this program is mandated by Congress to evaluate substances for a variety of health-related effects including toxicity and carcinogenicity. The NTP tests hundreds of compounds and environmental agents ranging from industrial tungsten saw-blade dust to herbal remedies. Exposure studies to determine the potential toxicity of chemicals or environmental pollutants place the NTP in the forefront of public health. Validated research findings from the NTP are used by Federal and state agencies to formulate public policy regulating exposure levels for workers, the general public and our children.

NTP helps to coordinate and to integrate the findings of toxicology testing programs among agencies of the Federal Government. The Program is also a major thought leader in toxicology research, helping to guide and strengthen the science base in toxicology, as well as developing and validating improved testing methods. The NTP also provides information databases through which the general public – as well as professionals – can access research findings about potentially toxic chemicals. Results of studies are provided free of charge at <http://ntp.niehs.nih.gov/>. The NTP also produces a review of the world's scientific literature and evaluates the potential of specific agents as human carcinogens. These studies are updated with new releases; the NTP is currently preparing its twelfth "Report on Carcinogens."

National Toxicology Program website: <http://www.ntp.niehs.nih.gov>

Report on Carcinogens website:

<http://ntp.niehs.nih.gov/index.cfm?objectid=72016262-BDB7-CEBA-FA60E922B18C2540>

## Managing for Sustainability

An environmental management system is a continual improvement system that seeks to reduce the environmental impacts associated with a facility's activities while helping to ensure compliance with environmental rules, regulations, and requirements. Executive Order 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), requires Federal Agencies to develop effective environmental management systems (EMS).

One of the key elements of an EMS is the public statement of an organization's environmental policy. Through implementation of the policy, the NIEHS ensures that environmental accountability is integrated into day-to-day decision-making and long term planning. Our EMS provides the framework for assessing our environmental performance and establishing the goals and targets to enhance existing environmental management programs and further reduce environmental impacts associated with our activities.

The NIEHS EMS follows the ISO 14001 Standard for Environmental Management Systems and provides the basis for self-determination and self-declaration of conformance with that standard. In June of 2008, the NIEHS announced that we have implemented an EMS for our facilities at Research Triangle Park, North Carolina in accordance with Executive Order 13423 and implementing instructions. This self-declaration was based on an internal assessment of all EMS elements conducted by a qualified, independent audit team from the North Carolina Division of Pollution Prevention and Environmental Assistance.

Our EMS focuses on the aspects of our activities that have the greatest potential impact on the environment – such as air emissions, waste (chemical, medical and radioactive), and wastewater discharges. In addition, the NIEHS also works to improve its management of storm water runoff, public and private transportation, pesticides and fertilizers, carbon dioxide emissions, electronic waste, "green purchasing," solid waste recycling, water conservation, retention of contiguous wildlife habitat and more. These efforts are conveyed to the public at: <http://www.niehs.nih.gov/about/stewardship/initiatives.cfm>.



While supporting our Institute's scientific productivity, NIEHS management and administrative programs emphasize sustainability. Our operational programs focus on more than cost and performance, considering environment, health and community impacts as well. This applies to budgeting, acquisition, logistics, information technology, facilities management and much more.

To achieve sustainable results, partnerships between our management, scientific and program staff are essential. Multiple stakeholders must be engaged by a common focus on advancing environmental health science and a shared commitment to sustainability. Successful outcomes require structured, collaborative management processes. At NIEHS, our Environmental Management System and Environmental Policy provide a solid foundation for promoting sustainability.





## **Environmental Policy Statement for the National Institute of Environmental Health Sciences**

*The NIEHS advances our understanding of the fundamental interrelationship between human health and the environment. It is, therefore, a core value of the Institute to preserve and protect the environment. This will be proactively demonstrated by our commitment to continually improve the Institute's environmental stewardship through pollution prevention, resource conservation, and sustainable development of facilities and programs.*

### **I. Purpose and Policy**

**Purpose:** This policy establishes general goals and guiding principles for a commitment to environmental responsibility. Through implementation of this policy, the NIEHS will strive to be a leader in the advancement of environmental stewardship within our programs, facilities, and the community.

**Policy:** The NIEHS mission is to reduce the burden of environmentally associated disease and dysfunction by defining how environmental exposures affect our health, how individuals differ in their susceptibility to these exposures, and how these susceptibilities change over time. In keeping with this mission and to preserve the rights of future generations, the Institute affirms its commitment to environmental excellence and actively promotes the public's right to a healthy, quality environment. The NIEHS is committed to continual improvement in environmental compliance and pollution prevention through the implementation of an Environmental Management System that strives to integrate environmental responsibility at all levels and in the conduct of all Institute programs.

### **II. General Goals and Guiding Principles**

- A. *Compliance with Environmental Requirements.* The NIEHS is committed to complying with all applicable Federal, state and local environmental laws, statutes, regulations, and other environmental requirements. Where existing laws and regulations are not adequate to ensure protection of public health or the environment, we will establish and meet our own environmental quality standards.
- B. *Environmentally Responsible Planning and Design Principles.* The NIEHS, in conjunction with appropriate NIH offices, will assess the environmental implications in the development, construction, and operation of campus infrastructure, grounds, and buildings. To the extent practical, planning and designs for the maintenance and development of campus facilities will promote environmental sustainability through the efficient use and conservation of resources, landscaping and grounds maintenance practices that are compatible with the local environment, and modes of transportation that minimize environmental impact.
- C. *Healthy Built Environment.* The NIEHS will seek to integrate the development and operation of campus infrastructure, grounds and buildings with the natural environment in ways that promote and encourage public health, employee wellness, and quality of work-life.

- D. *Pollution Prevention.* The NIEHS will minimize solid waste generation and the potential release of pollutants into the environment first through source reduction, secondarily through reuse and recycling, and finally through treatment and disposal.
- E. *Minimize Hazardous Waste and Toxic Materials.* The NIEHS will actively strive to minimize the generation of hazardous wastes. The Institute will maintain policies and processes for the safe and efficient use, tracking, storage, and disposal of hazardous and toxic materials.
- F. *Commitment to Environmental Education and Awareness.* The NIEHS recognizes the value of on-going education and awareness of all employees and on-site contractors concerning the importance of environmental responsibility in all phases of Institute operations. Further, the Institute is committed to provide relevant and accurate information on the Institute's environmental performance to the public.
- G. *Environmentally Responsible Purchasing Decisions.* The NIEHS recognizes that environmental responsibility can be exercised through its purchasing choices. Accordingly, the Institute will strive to obtain the "best value" by balancing short and long-term costs, including consideration of the environmental, life cycle, and maintenance costs in purchasing products and services.
- H. *Efficient Use and Conservation of Energy, Water, and Other Resources.* The NIEHS will strive to reduce resource consumption by eliminating wasteful practices and promoting efficient use, and by evaluating and implementing feasible and practical conservation measures in existing buildings, renovations, and new construction.

### III. Implementation and Review

The Office of Management, Health and Safety Branch, in coordination with the NIH Office of Research Facilities shall be responsible for administering and monitoring this policy through implementation of an Environmental Management System that strives for continual improvement of NIEHS environmental management programs. All NIEHS employees and staff are expected to support the Institute's effort to meet the goals of this policy and are encouraged to offer comments and suggestions for improvement. The NIEHS EMS Work Group will coordinate an annual review of this policy statement and develop recommendations for improvements and updates as needed. Changes to this policy will be communicated and made available to all employees and to those working on behalf of the Institute.

August, 2009

Linda S. Birnbaum, Ph.D., D.A.B.T., A.T.S.

Director,

National Institutes of Environmental Health Sciences and the National Toxicology Program

Marc S. Hollander

Associate Director for Management, NIEHS



*We achieved energy savings with no upfront capital costs through an Energy Savings Performance Contract – an innovative public-private partnership to make improvements that save energy.*

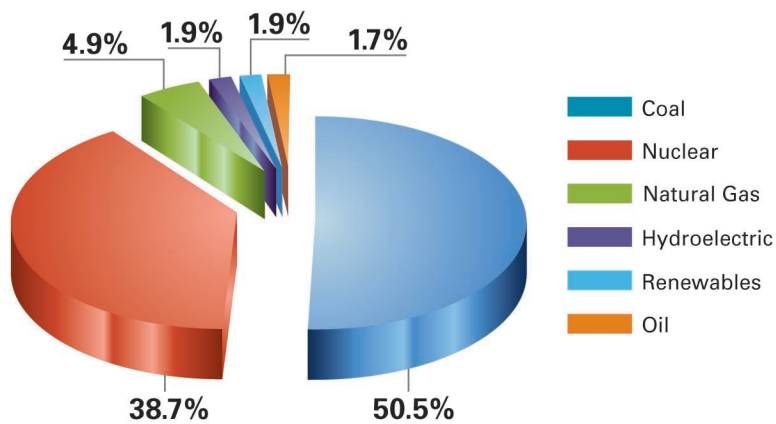
## Energy

Energy consumption has more than tripled in the US in the last 60 years with industry and manufacturing accounting for nearly one third of the nation's total consumption. Energy independence in the US is a societal and environmental issue as most energy sources are currently derived from fossil fuels. With the broadening gap between world energy demand and output, our efforts must include all approaches: conservation, alternative sources and increased research and development in new technology. With more than 1 million square feet of useable workspace heating and cooling our facilities is the largest use of energy for this institute.

Because our main building is about 30 years old, there are older, less efficient methods and equipment in use. Since replacing two outdated High Temperature Hot Water generators (HTHW, 35MBTUs ea) with one new HTHW generator (40MBTUs) we have increased efficiency of our boiler operations and expect to save energy while cutting costs and BTUs. We are also exploring the opportunity for a concerted effort to replace and optimize ventilation in the laboratory space. This future endeavor will reduce electricity costs while improving air quality for laboratories and offices.

Under Executive Order 13423 agencies are expected to acquire 50 percent of their renewable energy from new sources by 2015. By adding photovoltaic solar panels to the roof of the Rall building in 2009 we hope to reduce our indirect energy use and as a result lower CO2 emissions while reducing costs.

### Indirect Energy Consumption





## The Facts:

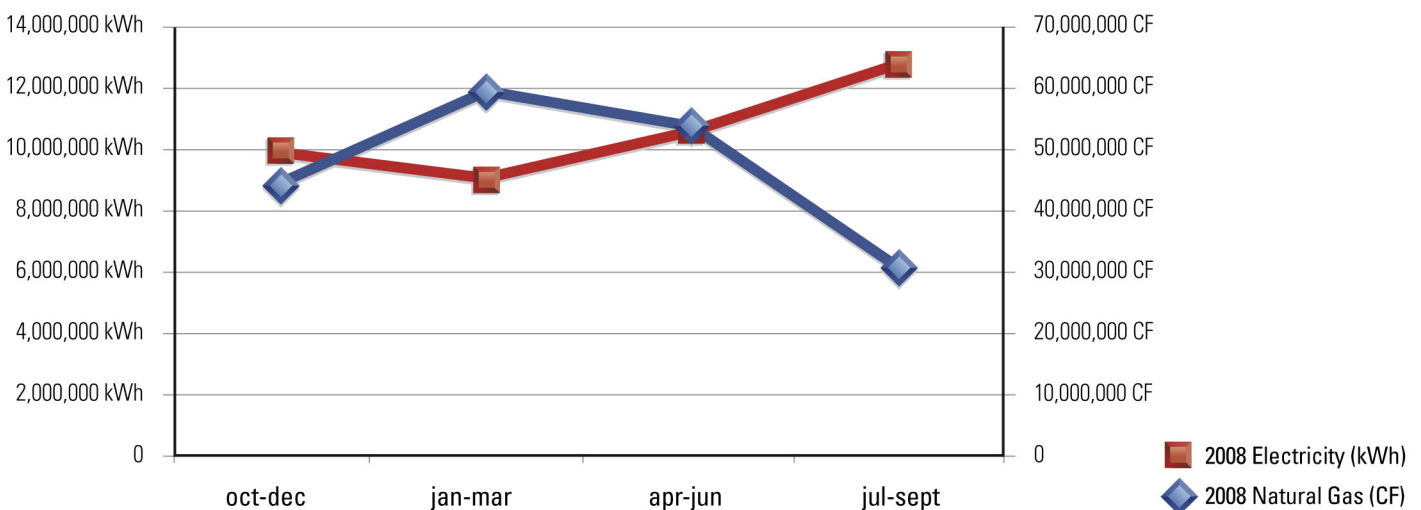
In cooperation with our natural gas provider we receive a rate reduction in exchange for allowing our natural gas service to be disrupted at peak consumption times. During the time we are off line we burn fuel oil. The fuel conversion from natural gas to fuel oil is a trade-off decreasing our emission of NOx, while increasing our emission of SO2 and potentially CO2. In 2007 and 2008 we burned no fuel oil while still receiving reduced pricing. Our energy consumption in 2008 was higher in comparison with 2006 and 2007. Typically, our usage shows seasonal variations with electricity higher in the summer and natural gas higher in the winter. This would be an excellent area to show improvement with conservation. While we make efforts to support our power company's interest in changing to more renewable energy platforms, we will also consider investing in renewable energy resources for our own campus until the alternatives become available through a local provider.

### Central Utility Plant Direct Energy Consumption<sup>1</sup>

Year/ Source	Electrical (kWh)	Natural Gas (CCF)	Diesel Fuel (gal)
2006	43,761,815	1,204,905	15,019
2007	42,075,553	1,465,938	0
2008	42,531,583	1,894,790	0

<sup>1</sup>Excluding emergency power generators

### Quarterly Energy Consumption FY 2008



*In direct response to a local drought we reduced our water consumption by 18 percent!*



## **Water**

### **Freshwater**

Freshwater withdrawals have tripled over the last 50 years. Demand for freshwater is increasing by 64 billion cubic meters a year (1 cubic meter = 1,000 liters). The world's population is growing by nearly 80 million people each year while changes in lifestyles and eating habits require more and more water consumption per capita. In the US the average [water footprint](#) of a consumer is 2,500 m<sup>3</sup>/capita/yr including both direct and indirect water uses. For the world as a whole 22 percent of the total water use is industrial. However, in higher income countries such as the US, 59 percent of the total water use is industrial while in lower income countries it is only 8 percent. As the [industrial base](#) in these countries expands, the water demand also increases, placing an additional burden on an already limited supply.

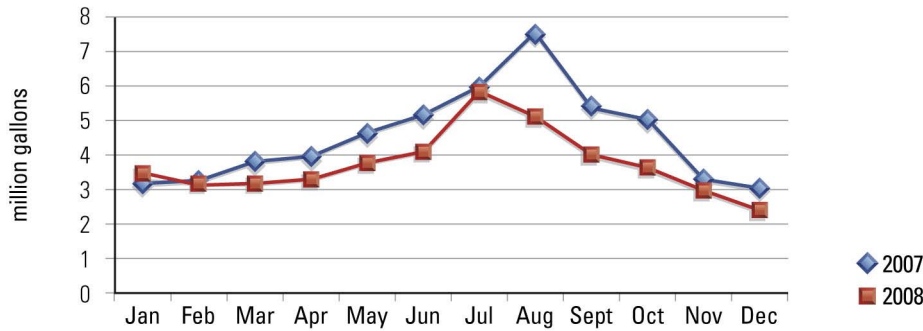
Durham County came under mandatory water restrictions beginning in September 2007 and we responded with several new initiatives. We replaced traditional urinals with waterless urinals. We also installed faucet aerators to reduce the amount of water flow from each unit while still providing adequate flow for hand washing. Placing alcohol based gel dispensers in every bathroom encouraged waterless hand washing. Flush valves were replaced reducing the flush volume by more than half from 3.5 gallons per flush (gpf) to 1.6 gpf. Showerheads in showering facilities were also replaced with heads that have a maximum flow rate of 3gal/min. In our animal facilities, cages are routinely washed twice per week. Cage washing operations were adjusted to reduce water consumption while still ensuring the maximum care and sanitation for the animals. Our cafeteria also switched from washing dishes to using compostable plates, cups and bioware to help with the drought efforts. A study is underway to decide if this change will become permanent.

Hand watering of vegetation on campus is minimized to two areas: our front entrance and the memorial garden. The institute is evaluating the cost of replacing annuals at the front entrance with native drought tolerant plants. The memorial garden was established in 2001 with only native drought tolerant trees, bushes and flowers and requires minimal watering. Our on campus lake was used as the water source for our memorial garden after Durham County imposed restrictions during the 2002 and 2007-08 droughts.

Our monthly water usage numbers peak in the summer months based on increased demand, especially due to the addition of water to the cooling towers to account for evaporative losses. Since cooling our buildings requires significant water and energy, we are trying to find ways to fill this need using more sustainable resources.



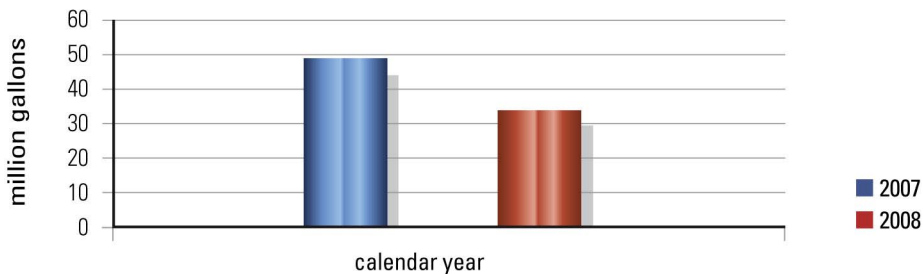
### Monthly Water Consumption 2007-2008



### The Facts

For FY2008, the Institute’s total water use from Durham City resources was 44,441,114 gallons. We are continuing our efforts to conserve and reduce our impact on freshwater resources to improve our campus sustainability and ability to respond to potential drought conditions. Our actual total volume of water recycled or reused is not currently monitored. However, we do collect water from the lake that is replenished by storm water to irrigate the memorial garden. We are currently working to evaluate storm water for other potential sustainable purposes.

### Annual Water Consumption 2007-2008



The Institute reduced our consumption of water from 54.4 million gallons in 2007 to 44.4 million gallons in 2008, a reduction of 18 percent overall. Many efforts, along with employee voluntary efforts to conserve in the offices and laboratories contributed to our total reduction for 2008. We prepare as always for the risk of mandatory restrictions for potential droughts in the future. We hope to continue to improve these efforts into 2009 and find ways to further reduce our consumption by sub metering, peer challenges, pledges, and collecting condensate and storm water for reuse.





### **Storm Water**

Pollution prevention is important for storm water on our property since any surface pollutants have the potential to collect in an on-campus lake we maintain and enjoy. We have been monitoring and analyzing our storm water runoff since 1996. The NIEHS maintains a Storm Water Permit issued by the North Carolina Division of Water Quality. This permit, effective for five years, requires that we develop and follow a Storm Water Pollution Prevention Plan including semi-annual facility inspections and visual evaluations of storm water runoff. Storm water samples are collected on a quarterly basis during the fourth year of the five-year permit.

### **The Facts:**

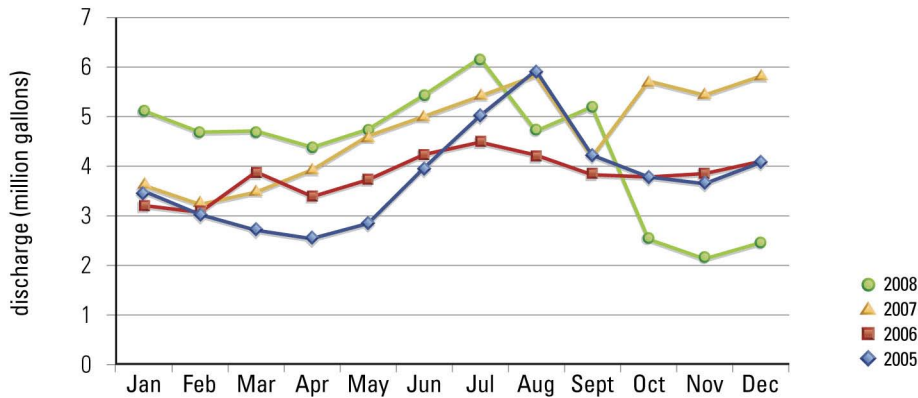
Our analysis of storm water includes precipitation, aluminum content, Chemical Oxygen Demand (COD) as well as pH. Aluminum has been the only parameter that has been detected in our runoff. Since aluminum occurs naturally in North Carolina soil, and is also present in the production of asphalt, we suspect that these are the main sources of aluminum during precipitation events. The monitoring of storm water on an on-going basis can help us understand our impact on the watershed as well as find new ways to harvest this storm water for other sustainable uses.

### **Waste Water**

Through our EMS, initiatives and goals are set for preventing pollutants from entering our wastewater, which discharges into the Durham County sanitary sewer system. An awareness of the varied activities ongoing at our institute and the materials that are used in biomedical research guides our efforts to improve the quality of the wastewater released from our campus. Controls and procedures are in place to prevent the inadvertent release of toxic or hazardous materials into the sanitary sewer. We regularly sample our wastewater to ensure we follow the regulatory guidelines set by the Durham County and the North Carolina Division of Water Quality (NCDWQ). Our program seeks to reduce the potential for pollutants to enter the sanitary sewer system through effective pretreatment, source reduction, proper chemical disposal, and other wastewater management programs.



## NIEHS Monthly Wastewater Discharge Trend



### The Facts:

In 2008, a total of 52,622,354 gallons of wastewater was discharged to the Durham County Triangle Wastewater Treatment Plant. This number represents a reduction of 3,994,648 gallons from the previous year. Installation of aerators and waterless urinals occurred in 2008 and reductions in wastewater generated as well as water consumed overall should continue in 2009.

Analysis is performed monthly for mercury, every 6 months for ammonia, chloride, total nitrogen, VOC (EPA Method 8260), and fluoride. Annually we test for total phosphorus, oil and grease, and silver. The Durham County also samples our wastewater to assure compliance with our wastewater discharge permit.

The NIEHS, and other nearby organizations, such as the EPA and Eisai, will have a future option of tapping into a grey water pipeline that the Durham County is installing east along Hopson Road from their Triangle Wastewater Treatment Plant on Highway 55. However, the projected re-plumbing of water distribution systems and potential need for pretreatment currently limit our ability to use grey water at NIEHS. While the use of grey water remains a future consideration, we are currently exploring other approaches to water reuse, such as condensate capture and rain water harvesting.



*By replacing two High Temperature Hot Water generators with one new more efficient model we will save energy while reducing our emissions.*



## **Air Emissions**

Air emissions are gases and particles that are produced and then discharged into the air from various sources such as boilers, engines and other facility equipment and processes. Some emissions such as sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), lead (Pb), and particulate matter (PM) can be harmful to humans and the environment. Energy-producing activities that require the burning of fossil fuels create harmful emission known as greenhouse gases. Half of the greenhouse gases derive from stationary sources such as power plants, and a third from mobile sources such as transportation. The remaining portion includes sources such as waste management, agriculture, and industrial processes.

Ozone depleting substances such as chlorofluorocarbon (CFC) refrigerants break down the stratospheric ozone layer that protects our planet from harmful ultraviolet radiation. This radiation causes DNA damage resulting in cancers, loss of nitrogen fixation by bacteria in crops and the loss of vital organisms such as plankton. Reducing or eliminating the production of greenhouse gases and other harmful emissions would lead to a sustainably sound and ecologically balanced planet.

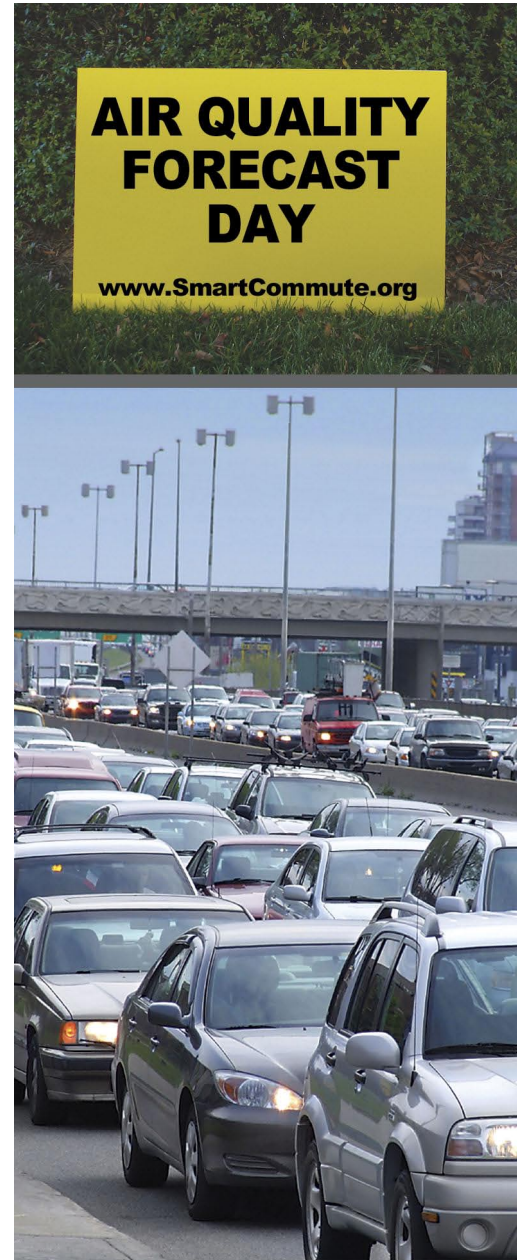
The NIEHS is permitted by the North Carolina Division of Air Quality to operate incinerators, boilers, and emergency generators. The air permit requires annual reporting of emissions data and mandates specific operating ranges and limitations for the permitted equipment. Continuous monitoring of incinerator processes and pollution control parameters including temperature, differential pressure, scrubber pH, and liquid flow is also required. The air permit also includes requirements for several pieces of equipment that are located within the adjacent EPA research facility. Pollutant emission levels must be less than 100 tons per year in order to avoid designation as a major air pollution source. Sulfur dioxide and nitrogen dioxide emissions are influenced by the type and amount of fuel combusted in the NIEHS boilers.

Since 2003 our Central Utility Plant has been generating High Temperature Hot Water (HTHW) for both the NIEHS and the EPA buildings on our campus. We therefore report emissions generated for both organizations. The industrial boilers that generate our HTHW (for heating and steam) burn natural gas to operate. Byproducts of that process primarily include nitrogen oxides, carbon monoxide (CO), and carbon dioxide. Although natural gas is the cleanest burning fossil fuel it is by no means clean, so we still are making efforts to use less and reduce emissions. An energy audit is underway to determine if we can find other ways to reduce consumption such as by reducing the pressure output of steam generators during overnight hours when there is less demand.

The NIEHS operates two incinerators on our campus. One incinerator, a 350 lb/hr unit installed in the 1980s, is used for low-level radioactive waste combustion, an event that occurs four times per year or less. In June 2002, a larger (1,000 lb/hr) technologically advanced incinerator was installed replacing two older incinerators that were not equipped with emission controls. This new incinerator reduces air emissions through wet scrubber control technology. Resulting scrubber effluent is treated to remove sediment and mercury before entering our wastewater discharge. One initiative underway is to restrict the types of wastes combusted to 90 percent or more pathological waste by January 2010 in response to federal and state incinerator regulations. Although we make great effort to recycle, some plastics are still burned as laboratory waste. An increased effort in recycling is important to reduce overall emissions from plastics in the incinerator and meet our goal of incinerating 90 percent or more pathological waste.

Incinerating of waste and heating and cooling our institute produces greenhouse gases. The Kyoto Protocol uses a system to compare the potential environmental impacts of various greenhouse gasses. Based on the mass of a gas and its radiative properties one can estimate the potential relative impacts of emissions of different gases upon the climate system. Carbon dioxide is used as the reference standard with a global warming potential of 1 over a 100-year time span (GWP<sub>100</sub>=1). To reduce our production of greenhouse gases we switched three water-cooled chillers from Dichlorodifluoromethane, or R12 (GWP<sub>100</sub> = 8100) to tetrafluoroethane, or R134A (GWP<sub>100</sub> = 1300). R12 is an ozone depleting substance that was phased out in accordance with Clean Air Act requirements. A benefit of this phase-out is that R134a has a lower GWP.

For many individuals, awareness of expected levels of ozone in our atmosphere has become important quality-of-life information. For that reason we provide our employees with the daily air quality forecast which includes ground-level ozone alerts when issued. We can simultaneously warn people with sensitive health conditions of unsuitable air quality while educating everyone about the steps that can be taken to prevent further damage. Some examples of preventive measures include making fewer vehicle trips during the day, not refueling vehicles during the heat of the day, conserving electricity and carpooling!



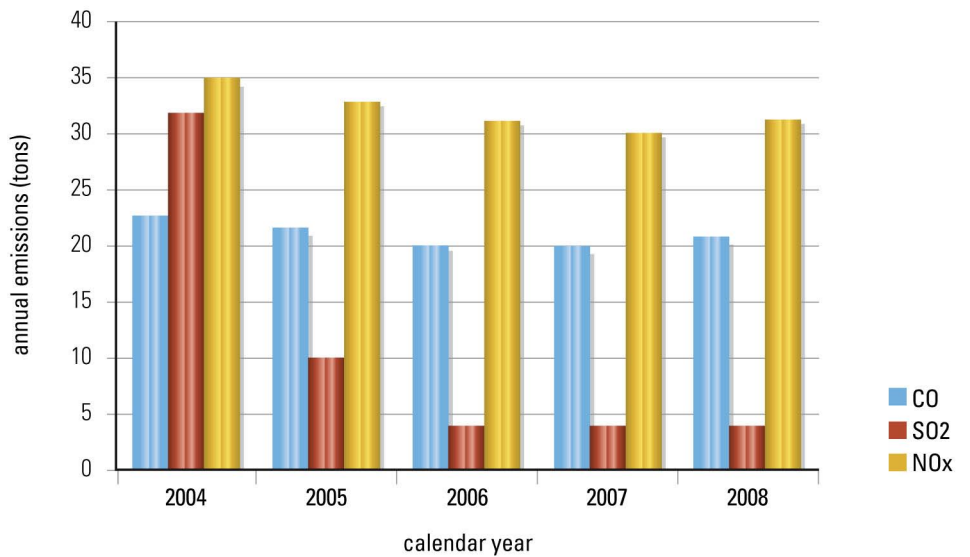




### The Facts:

During recent years, we have seen only minor changes in the combined NIEHS/EPA emissions of NO<sub>x</sub> and CO. Sulfur dioxide emissions were higher in 2004 because a larger amount of fuel oil was combusted due to natural gas service disruptions that were triggered in response to peak demand. The new EPA building was commissioned in 2003 and our central utility plant serves their campus producing HTHW and incinerating waste. Perhaps a collaborative report can be issued with the EPA for 2009.

### NIEHS/EPA NO<sub>x</sub>, SO<sub>2</sub>, CO Emissions Since 2004



A total of six emergency generators are located on our campus. These generators burn diesel fuel during scheduled maintenance operations and power outages. Typically, generators were used only for about an hour each month for testing purposes. For one test in 2008 two generators were operated over a weekend creating the spike in usage on our graph. Currently we are analyzing our emergency power capacity and considering the need for more generators.

## Waste and Recycling

### Waste

American industry generates more than 7 billion tons per year in industrial solid waste and it continues to increase. In 1976 Congress established the Resource Conservation and Recovery Act (RCRA) to govern the proper disposal of solid waste and hazardous waste. This act ensures a 'cradle to grave' approach for managing hazardous waste. Characterizing waste is the first step to proper management, including reuse, recycling or disposal. Non-hazardous waste can be collected following proper procedures and guidelines with minimal effort. However, waste that possesses a hazardous characteristic must be managed with more thought and care according to specific guidelines and procedures. Through diligent efforts by those who generate the waste and by those who manage the waste, we can minimize our waste volumes, reduce chances of spills, and protect the environment.

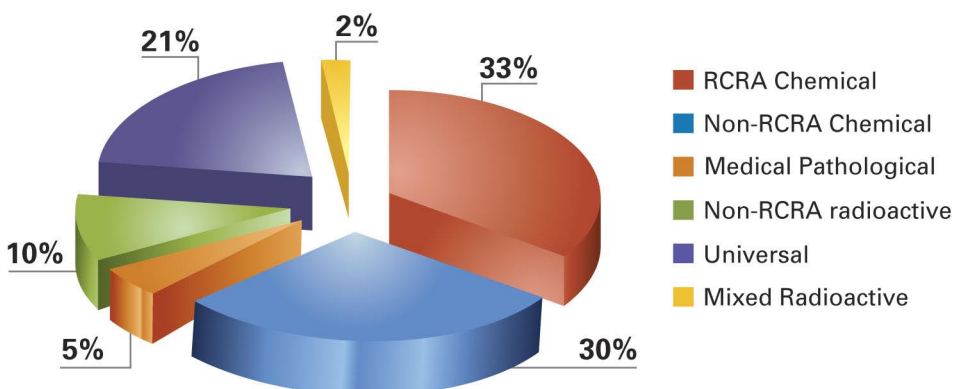
### The Facts:

At the NIEHS six categories of waste are managed by the Institute's Hazardous Waste Management Program:

- RCRA Chemical or hazardous waste;
- Non-RCRA Chemical or non regulated chemical waste;
- Medical and Pathological which is comprised of biological waste;
- Non-RCRA Radioactive or low level radioactive waste;
- Universal waste, including batteries and fluorescent light bulbs; and
- Mixed Radioactive, a chemical and radioactive waste mixture

In 2008, the program collected 41,118 lbs. of generated waste including 106 gallons of liquid waste. The largest portion of generated waste was regulated chemical waste (RCRA chemical) and non-regulated chemical (non-RCRA chemical) waste totaling 63 percent of the total waste managed.

### 2008 Waste Generation by Type (lbs.)



*All waste volumes have been reduced from 2007 except for universal waste which includes waste generated from upgrades in lighting for energy conservation.*

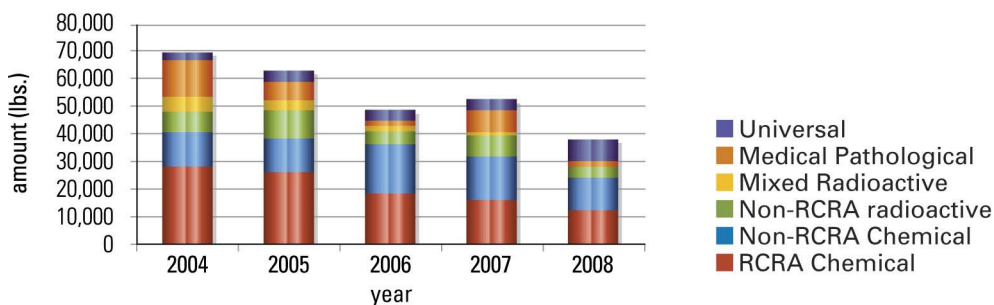


While there was an increase in universal waste generated during 2008, there were reductions in all other waste categories. Since 2004 there has been a reduction in the volume of RCRA chemical waste. Trend data shows that waste volumes vary year to year based on the types of research studies conducted within the institute. Also, variation in waste volumes will reflect research program decisions, such as periodic disposal of research tissues from large NTP studies.

For 2008 we experienced no hazardous material spills or releases for the central utility plant, waste handling facility, the incinerator plant and the laboratory and office spaces. During the year we responded to two automotive fluid leaks on the roadway of our campus and were able to quickly contain and recover the spilled fluids from both incidents preventing them from harming our campus landscape, lake or the environment.

We incinerated 499,566 lbs of pathological and laboratory waste and sent approximately the same amount to the landfill as municipal solid waste. For 2009, in response to newly implemented incinerator requirements, we plan to limit our on-site incineration to primarily pathological waste. This means that waste that was previously incinerated (such as uncontaminated laboratory plastics and discarded packaging materials) will be sent to the landfill if not recycled. Therefore, we are considering audits for each of the workspaces to ensure conservation and recycling efforts are maximized and to help reduce our waste in as many ways as possible.

### Waste Generation Trend 2004-2008

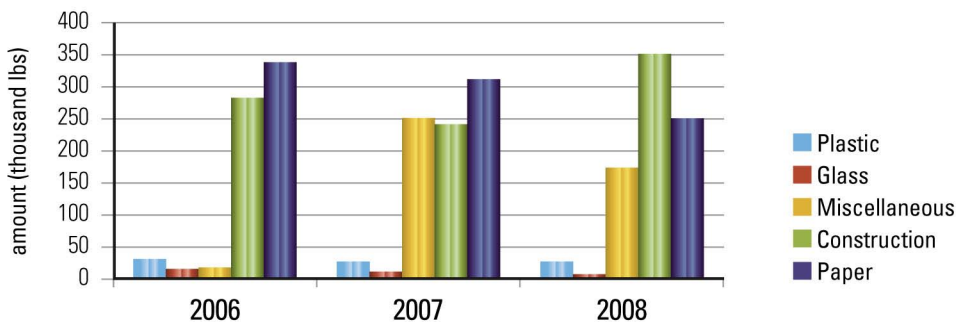


For wastes that cannot be managed on site, the Hazardous Waste Management Program systematically monitors the environmental compliance status of all waste management and processing companies accepting NIEHS hazardous waste. Sources such as the EPA Enforcement and Compliance History Online (ECHO) database and on-line environmental news services allow NIEHS to track contact information and compliance history for reliable, traceable 'cradle to grave' tracking of our generated hazardous waste. Finally, we complete and submit various regulatory reports (e.g., the NCDENR RCRA Biennial Report, and the NC Low-Level Radioactive Waste Survey) as well as an internal annual program review report.

## Recycling

Recycling turns materials that would otherwise end up in the waste stream or landfill into valuable resources. The benefits include saving energy and natural resources, decreasing emissions that contribute to climate change, preventing pollution and reducing the need for landfill disposal or incineration. Variations in recycled volumes are impacted by market changes in demand for recycled materials.

### Recycling 2006-2008



#### The Facts:

There has been a recycling program in effect at the NIEHS for 16 years. It started as a volunteer effort organized by the Institute's Environmental Awareness Advisory Committee (EAAC). The program has been recognized by the governor and also by the DHHS in 1995 as "the best and most innovative recycling program among the many within DHHS."

In 2001, this small volunteer-based operation became a larger established program that now recycles 49 percent (67 thousand pounds per month) of our annual generated waste. The program now serves all institute buildings and has extended its impact by seeking out local vendors to reuse some non-recyclables such as binders and ice packs. We purchase paper that has a minimum of 30 percent post consumer recycled content and are looking to increase that content to 100 percent in the near future.

While we do a good job recycling paper, and printer cartridges, we consume large quantities of paper. Therefore, we consider paper use reduction as an area of continued opportunity. Networked printers with duplex print capability, along with user education, are among the solutions now under consideration.

The program also includes the recovery and recycling of wooden pallets, animal bedding, electronic waste, aluminum, foam, produce compost, and other items such as ice packs, 3-ring binders and printer toner cartridges, also known as 'miscellaneous' waste. We are working to compare amounts purchased to amounts recycled for an improved assessment of our recycling efforts. The amount of material we are able to recycle will always be dependent upon types of research, renovation and construction projects that are ongoing.

*We diverted 67,000 pounds of waste each month with our recycling program.*





*The Keystone facility project focused on material reuse, recycling, energy efficiency, healthy air and water and even a “green move”*



## Buildings

With 1.1 million square feet of laboratories, offices and support space, we have made our facilities a focal point in managing for sustainability.

### Keystone Building

At the end of 2008, the NIEHS consolidated off-site offices containing 330 employees from two leased locations into a single, more efficient and sustainable building. From beginning to end we strove to reduce, reuse and recycle construction and packing materials, furnishings and workspace equipment. Costs and resources were saved by reusing 138 doors, door hardware, fire extinguishers, cabinets, ceiling tile, a domestic hot water heater and AV equipment. All of the furniture removed from existing leased office locations was reused in the Keystone building, reused in other NIEHS space or transferred offsite for reuse by other government agencies. The majority of our equipment, from white boards to copiers, was also reused in the Keystone building. Fifty-three percent of the construction and renovation waste generated by this project was recycled, diverting more than 134 tons of waste from local landfills. This included 18 tons of steel, 26 tons of acoustical ceiling tile, 81 tons of gypsum wallboard and 8 tons of concrete block.

Conservation measures installed during the renovation included motion sensing lights, daylight harvest dimmers, high efficiency light fixtures, low flow lavatory flush valves as well as waterless urinals. After construction and furniture installation, fresh air ventilation was maximized to air out the building prior and during move-in. Charcoal filters were installed for drinking fountains and kitchen sinks. Reusable crates were used instead of cardboard boxes in the employee moves into the Keystone building. Volunteer teams collected items left behind in the vacated office buildings, including toner cartridges, power cords, binders and other office supplies for reuse and recycling.

### David P. Rall Building

The main NIEHS research facility more than 15 laboratory branches and 75 investigative laboratory groups. In addition to labs, the 800,000 square foot facility houses offices, large conference rooms, a cafeteria, research support and much more. Since this building is now more than 30 years old, we have begun to work toward a Leadership in Energy and Environmental Design for Existing Buildings (LEED-EB) certification. LEED-EB is a rating system designed by the U.S. Green Building Council with standards for **environmentally** sustainable construction, maintenance and operation. These standards provide a formal structure that can help us find ways to reduce operating costs and environmental impacts for our main building. As discussed in other sections of this report, we continue to upgrade our energy and water systems, expand recycling and take other steps consistent with the goals of LEED-EB. We are currently evaluating the extent to which this building meets the specific operations and maintenance criteria under the LEED certification program for existing buildings, and we expect to share our progress on LEED-EB certification in subsequent Sustainability Reports.

*Standards for environmentally sustainable construction, maintenance and operation website:*  
<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222>



### **First Environments Early Learning Center**

This center provides on-site childcare for NIEHS and EPA employees and their families. It operates as a nonprofit cooperative venture with a NC 5-Star status scoring the highest point totals for program and education standards and also compliance history. The building was developed and built jointly with the EPA in 2003 and is LEED Silver certified. Located within walking distance of both the EPA and the NIEHS main buildings, the center offers parents the opportunity to see their children during the day without driving – supporting family needs while cutting air emissions. In addition, programs for the children, like art projects using recycled objects and nature-oriented playground activities, emphasize environmental stewardship from the earliest ages. Condensate water from air conditioning is even collected in a rain barrel and used for watering plants.

In 2009, the State of North Carolina will begin construction of a highway just along the edge of the federal site near the child care center. NIEHS and EPA worked aggressively with the N.C. Turnpike Authority in the planning stages, as well as during construction start-up, to preserve tree buffers. Negotiations also resulted in design changes that lowered the highway and installed a sound wall to help keep sound and air emissions from reaching the child care site. NIEHS and EPA also partnered with the N.C. Botanical Garden and community volunteers to rescue rare plants from the area to be cleared for construction.

### **Clinical Research Unit**

This year, we built our new clinical research facility on site. This energy-efficient, modular facility was sited in an area previously paved as a parking lot. The NIEHS reused this area rather than clearing new land, protecting site ecology and minimizing runoff while also making the project more economical.

### **Waste Handling Facility**

NIEHS operates a state of the art storage facility for hazardous materials. Following standards set by the NRC, the EPA and our own EMS, accumulated waste is safely sorted and stored or shipped off-site. This building serves both EPA and NIEHS under a single RCRA permit for the shared federal site. It includes several features specifically designed for fire protection, containment of any hazardous spills and segregation of materials by chemical compatibility. One of the environmentally protective features includes an advanced air handling system that uses gas/vapor and HEPA filters to purify all exhaust from the building.

This facility enables the institute's hazardous waste management program to use the most environmentally preferable approaches to waste management. For example, selected solvents are recovered for reuse or recycled for fuel blending. The majority of the low-level radioactive waste is held for decay in excess of 10 half-lives.





### **Data Center**

The NIEHS data center is literally a “building-within-a-building” with has separate, sealed interior walls and a waterproof Neoprene roof. This design protects the sensitive computing hardware from weather events or building leaks and adds an insulating envelope for energy efficiency. Given the need to house numerous servers, data storage and backup systems, and computational-biology parallel processing systems in a tight, 2000 square foot facility, NIEHS faces a challenge in balancing IT requirements with space constraints, environmental impacts and cost.

The data center air conditioning systems have multiple compressors, each with multiple stages such that the production of cooled air is tailored to the changing needs rather than merely on-or-off as in a residential system. This incremental response improves control and lowers power utilization. Computing equipment is placed according to its conventional front-to-back airflow, using “hot and cold aisles” to take advantage of convection rather than fighting it. The data center’s fire suppression system utilizes an EPA “SNAP-certified” agent that is non-ozone-depleting and has near-zero global warming potential, thus meeting a green-purchasing requirement.

### **Master Plan**

In order to create an organized road map to meet future facility needs, the NIH has developed a draft facility master plan for the NIEHS. The master plan was developed with a focus on sustainable development, and a number of different design strategies to ensure environmental awareness including:

- Plan the site to encourage mass transit, carpooling, biking and walking.
- Maximize native tree cover for shading and animal habitat.
- Reduce mowed areas and eliminate routine needs for watering or chemicals.
- Facilitate recycling operations.
- Orient buildings to optimize natural daylight and reduce solar heat gain.
- Provide services on-campus that will reduce daytime off-campus employee trips
- Manage storm water by reducing impervious surfaces and using plants and constructed wetlands to cleanse runoff.
- Build on areas already cleared, rather than cutting forest for new structures.
- Renovate and rehabilitate the main building (Rall Building), extending its life.
- Collect and use rainwater or condensate from air handlers.
- Utilize roofs for solar power or water heating.

We anticipate that this document will become final within the next year.

## Land Management

Managing land for the use and development of resources in a sustainable way requires careful planning, strategy, and awareness of our close relationship with the environment. Sustainable land management is determined by the interface between our built and natural environments. The ways that we manage our outdoor spaces can have dramatic effects on ecological processes, including soil health, ground and surface water quality, and the biodiversity of the flora and fauna around us.

### The Facts:

The landscape master plan created in 2001 was designed to reduce maintenance and create zones of development to reduce mowing and irrigation, increase groundcover, and develop or restore woodland understory while still maintaining the aesthetics, appeal and security of our campus. Each of these zones was examined and developed in an environmentally sensitive manner. For security reasons, facility maintenance as well as traffic safety, some open areas (grass or small shrubs and trees) must be maintained on campus including roads, parking areas, and medians. Even with these stipulations the actual amount of land maintained is less than 19 percent total (71 out of 376 acres). By choosing native plants for development of certain areas we reduce the potential for replacement because of disease or drought intolerance. Because our land management practices have been relatively stable for over 5 years, this is a great opportunity to review our landscape master plan for possible improvements. Another idea under consideration is the use of propane mowers that run cleaner, lower fuel costs and are more energy efficient.

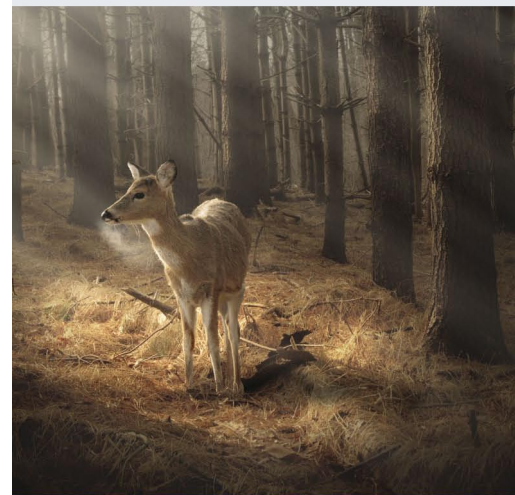
Our landscape master plan defines the scope of our outdoor maintenance activities:

- 71 acres maintained through mowing, dethatching, aerifying, fertilizing, liming & over seeding
- 10 acres of leaf removal
- 19.5 miles of edging maintained
- 6 soil pH tests performed annually
- 2400 gallons of fuel (gasoline) used annually

### Wildlife and Industry Together

Wildlife and Industry Together (WAIT) is a registered trademark for an environmental program that encourages the protection and enhancement of wildlife on industry lands. In 2005, the NIEHS was first organization in the RTP to become certified. To achieve WAIT certification a site must have a systematic program that includes: 1) environmental education of employees and community partners about wildlife and their habitat, and 2) wildlife habitat enhancements. Our wildlife enhancements include nest boxes for multiple bird species including bluebirds and purple martins, bat boxes, and butterfly gardens and soon to be

*We were the first in the Research Triangle Park to become certified for having a program to protect and enhance wildlife on our campus.*







installed wood duck boxes. Through our efforts, our campus remains a sanctuary for native wildlife, including but not limited to deer, beavers, otters, woodchucks, yellow bellied slider turtles, box turtles, five-lined skinks, amphibians and insects and over 100 species of visually confirmed bird species.

### **Memorial Garden**

In 2001 the NIEHS established a memorial garden to honor employees and contractors who have lost their lives. Name bearing plaques adorn a wall overlooking the lake, and dedicated benches, plantings and trees grace the surrounding landscape. Native and nearly native floras support a well-established and thriving garden. A walkway that adjoins the EPA and NIEHS campuses passes through the garden so that all can enjoy and appreciate this respectful tribute to our most precious resource – our employees. A plan is underway to expand this beautiful garden again in an environmentally friendly and low impact fashion.

### **The Campus Lake**

Water quality samples are annually collected and submitted to the Agronomic Division of the North Carolina Department of Agriculture and Consumer Services (NCDA&CS). Analysis results of the lake water have been consistent and within background levels for nitrogen, other minerals and salts, and pH. Concentrations of the following elements are measured: phosphorous (P), potassium (K), calcium (Ca), magnesium (Mg), selenium (S), iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B), molybdenum (Mo), chlorine (Cl) and sodium (Na). Additional determinations include ammonium nitrogen (NH<sub>4</sub>-N), nitrate nitrogen (NO<sub>3</sub>-N), urea, electrical conductivity (EC), pH, total alkalinity and hardness. Measuring and recording these parameters helps us to preserve a healthy aquatic habitat. In addition to analytical results, the report includes recommendations on usability, hazards and management strategies. The lake is the central most visually dominating feature of our campus. Besides its aesthetic qualities the lake is a viable habitat for fish and waterfowl, and serves as the stormwater retention basin for the site.



## Transportation

The average household spends eighteen percent of annual expenses on transportation. Since transportation contributes one third of all greenhouse gases, our Institute encourages employees to find alternatives to the use of single occupancy vehicles and fossil fuels.

### Employee Commuting

At NIEHS, we encourage multiple approaches to lessen the congestion, delays and pollution contributed by single occupancy vehicles. In addition to carpooling, vanpooling, cycling and public transit, this program includes telecommuting and alternative work schedules as well. Our Transhare program was started on a trial basis and has blossomed into a well established and sought after benefit. Modeled after the NIH plan, it provides support for employees to use alternative transportation. The program started in 2000 and when combined with the alternative work schedule and telecommuting, participation has grown steadily over the years.

Our Institute offers several options for non-traditional work plans that benefit the environment, the community and our employees. Teleworking allows employees to perform their work electronically from home. Alternative work schedules are another option, allowing employees to choose schedules that reduce commuting days by working longer hours on certain days according to what best suits their work and lifestyles. Because of the flexibility of that program we are looking for the best way to track the participants.

Carpooling, vanpooling and riding the bus reduce the impact on the environment while allowing employees to relax or enjoy the company of others during the commute. Prime parking spots near the building are reserved for carpools and vanpools. Added incentives to ride public transportation or vanpool include subsidized passes and an emergency ride home service for pass holders. Our bikers have the lowest emissions of all and enjoy the great outdoors and a little exercise on their way to work.

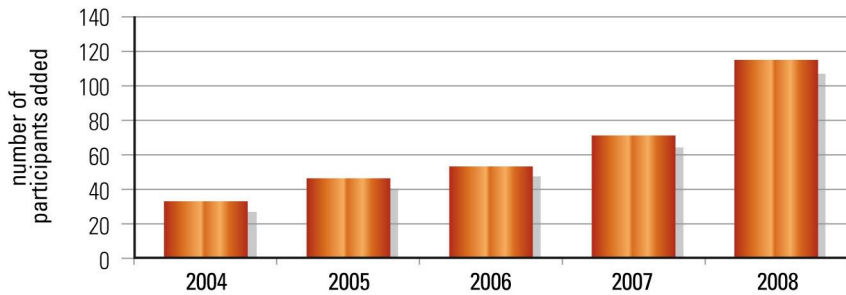
We submit an annual report for our county's Commuter Trip Reduction Program, documenting our work as environmental stewards and corporate citizens with active programs to reduce local emissions and traffic congestion. We also participate in the Research Triangle's "SmartCommute" program every year to further promote alternative commuting at the NIEHS. Because of all these efforts and more NIEHS was given a leadership award in 2005 in the large company category for its Transhare program by the Triangle Transit Authority.

*27 percent of NIEHS federal employees use alternative work and commuting methods.*





### Telecommuting Participants Added 2004-2008



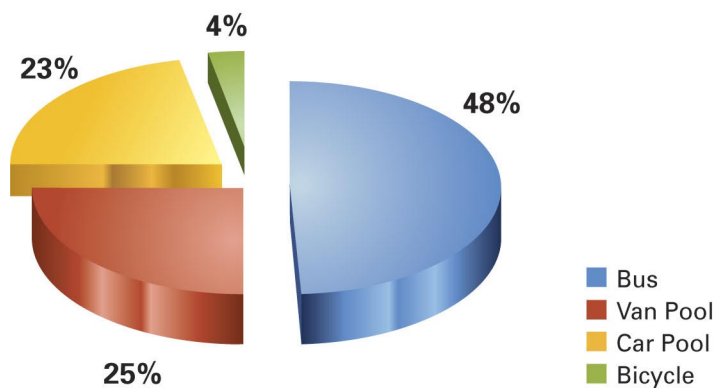
#### The Facts:

NIEHS launched the Transshare alternative commuting program in 2001. It has now expanded to include teleworking, or working from home. In 2008, our program included:

- 53 bus riders
- 27 vanpool riders
- 25 carpools supporting at least 50 employees (minimum 2 riders each)
- 25 bicyclists (ranging from 4-25, depending on the season)
- 109 telecommuters added

The telework program began in 2002 with 21 committed participants. We have had a successful increase in participants since the inception of this program. The number of “telecommuters” has steadily increased each year with 109 participants in 2008. We saw a spike in 2008 likely based on the rising price of gas in our area.

### 2008 Alternative Transportation Participants



## Vehicle Fleet Management

Cars and trucks are the cause of 25 percent of all CO<sub>2</sub> emissions. Fleet management is one way we make our travel and transportation activities more efficient and sustainable.

The Federal Government promotes the use of alternative fuels as a means of reducing our dependence on crude oil, and limiting our greenhouse gas and benzene emissions. Ethanol produced today results in fewer greenhouse gas (GHG) emissions than gasoline and is fully biodegradable, unlike some fuel additives. On a life cycle basis, ethanol produced from corn results in about a 20 percent reduction in GHG emissions relative to gasoline. With improved efficiency and use of renewable energy, this reduction could be as much as 52 percent. In the future, ethanol produced from cellulose may even have the potential to cut life cycle GHG emissions by up to 86 percent relative to gasoline. In addition, ethanol blended fuels currently in the market – whether E10 or E85 – meet stringent tailpipe emission standards. For example, E85 is less volatile than gasoline or low volume ethanol blends, which results in fewer evaporative emissions and fewer ozone action days. Using E85 also reduces carbon monoxide emissions and provides significant reductions in emissions of many harmful toxics, including benzene, a known human carcinogen. However, E85 also increases emissions of acetaldehyde – a toxic pollutant. EPA is conducting additional analysis to expand our understanding of the emission impacts of E85.

### The Facts:

We operate and maintain 38 vehicles in our fleet, including:

- 1 Bus
- 5 box trucks
- 19 trucks/SUVs/vans
- 6 minivans
- 7 cars

Thirty of these vehicles use alternative fuels. In 2008, the twenty-five flex fuel vehicles that use E85 fuel used 3,384 gallons of E85 representing 151,380 miles driven. Unfortunately, the volume of fuel consumed for the 6,072 miles driven by our diesel vehicles that use twenty percent biodiesel fuel sources, is not currently available, although we plan to capture this data so that it can be reported in the future. We also have an electric vehicle that can be used for short trips on campus. As our gasoline and diesel powered vehicles age, we will replace them with alternative fuel models whenever possible.

Underway for 2009 is the purchase of bicycles for employees to use on campus for transportation and exercise. Engaging our employees in the design and purchasing options will promote participation. With our new site fully established at Keystone we are also incorporating the use of a shuttle service for employees to transfer to and from the main campus minimizing the use of single occupancy vehicles.

*79 percent of our government vehicle fleet uses alternative fuels.*





*“Green purchasing” training is received by all staff involved in the acquisition process.*



## **Purchasing**

Executive Order 13423 sets “green purchasing” guidelines that apply to all types of acquisitions of goods and services. Guidelines promote a focus on energy efficiency, recycled content, bio-based materials, and environmentally preferable products in government buying decisions. The Executive Order also continues the requirement that agencies purchase office paper containing a minimum 30 percent post-consumer fiber.

The NIH green purchasing plan calls for conducting awareness training and incorporating green purchasing requirements into specifications and contracts. All members of the acquisition workforce are required to take Green Purchasing training every two years. This includes all Project Officers, Project Managers, Purchase Card Holders, Card Approving Officials and all Contracting Officers. Refresher training is required every two years. Green purchasing refers to federal requirements to purchase recycled content products, energy-efficient products and renewable energy technologies, alternative fuel vehicles and alternative fuels, biobased products, environmentally preferable products and services, and non-ozone depleting substances.

Contract actions account for more than two thirds of the purchases for the NIEHS. NIEHS processes the majority of the remaining actions using Simplified Acquisition Procedures (SAP). Regardless of the dollar value or procurement method, all actions are evaluated for fairness, equality and Environmentally Preferable Purchasing (EPP) as part of “best value” award determinations.

For 2008, our EMS set a goal to increase the use of environmentally friendly cleaning products. One constraint we face is that bulk purchases are made at the agency level for common office items as well as basic laboratory supplies. For such items having mandatory sources of supply we must rely on the green purchasing decisions made by NIH at the agency level.

All Federal Government agencies must have formal, written, documented green purchasing plans, policies and procedures for the implementation of the statutory and executive order requirements. The NIEHS has adopted guidelines for the following:

- EPA-designated recycled content products
- ENERGY STAR and energy efficient products, and low standby devices
- Biobased and USDA-designated BioPreferred products
- Environmentally preferable products and services



The NIEHS also considers other factors, not reported as green purchasing, but supportive of environmentally preferable procurement:

- Renewable energy
- WaterSense and other water-efficient products
- EPEAT-registered products
- Non-ozone depleting substances (ODSs) and/or those covered by EPA's Significant New Alternatives Policy (SNAP) program (chemicals and/or equipment) (<http://www.epa.gov/ozone/snap/>), and
- Alternative fuel vehicles and alternative fuels

#### **The Facts:**

More than 70 percent of NIEHS purchases are processed as formal contract acquisitions. These actions go through rigorous review and approval prior to contract award to ensure compliance with Federal, Departmental, and agency regulations – including green procurement.

This year, in consolidating our off campus leased offices into the Keystone Building, we purchased environmentally preferable products for:

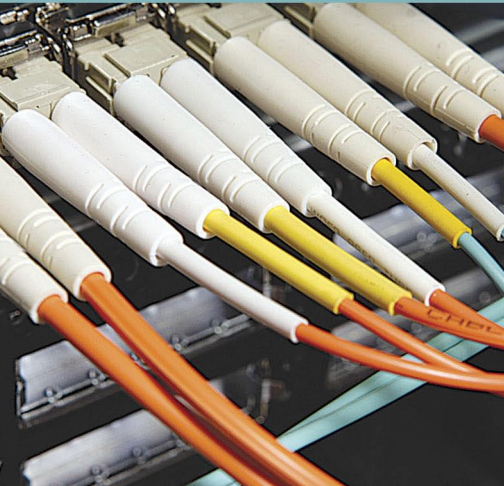
- Janitorial services
- Conference /meeting services
- Building materials such as carpet made from recycled fibers, low VOC paints, energy efficient lighting and a solar powered emergency call station.

Thus far, we have been limited in our ability to use biobased products that are both available and conform to technical performance requirements. A review is underway to identify opportunities for increasing our use of biobased products. Likewise, our use of recycled paper has been largely limited to the mandatory requirement for 30 percent recycled content. In the future, we will explore options to purchase paper with recycled contents as high as 100 percent.

Our Institute promotes the preference for green products through training, monthly newsletters, annual recycling fairs, biannual vendor shows, and Earth Day activities.



*Life-Cycle management, responsible purchasing, and data-center design are key components in the greening of our Information Technology.*



## **Information Technology**

Information technology (IT) is vital to all of the Institute's scientific and management processes, as well as public access through tens of thousands of web pages. With such a pervasive impact, IT environmental impacts are receiving increased attention.

Through a "Green IT" implementation strategy, NIEHS evaluates best practices and uses measurement and verification techniques to improve operations and guide the purchase and use of new technologies. Goals include saving energy and minimizing waste. Our Green IT program helps ensure compliance with Federal law and policy that emphasizes energy efficiency and waste minimization, including the Energy Independence and Security Act, the Energy Policy Act, Executive Order 13423 and the American Recovery and Reinvestment Act. Green IT also helps us to meet internal NIEHS environmental goals and provides a tremendous opportunity for environmental education and awareness.

### **The Facts:**

#### **Life-Cycle Management**

In promoting Green IT, life-cycle management and green purchasing are essential. The Institute owns more than \$16.5 million in IT equipment, including computers, printers, servers, network switches, disk storage, wireless devices and much more. We also lease a significant amount of equipment. IT operations also include "consumables" like paper, toner, CDs and tape cartridges. Together, our decisions on hardware and consumables can have major environmental impacts – especially in terms of energy use, paper consumption and electronic waste generation.

Our procurement mechanisms require vendors to supply products that are Electronic Product Environmental Assessment Tool (EPEAT) registered. EPEAT is a comprehensive IT standard that seeks to minimize toxics while promoting recyclability, product stewardship (take-back programs), energy efficiency and more. As we continue to make Green IT decisions, the NIEHS also considers:

- Re-purposing IT equipment in lieu of new acquisitions
- Equipment leasing, with the providers assuming life-cycle product responsibility
- Recycling inefficient, obsolete IT equipment
- Evaluating network printing technologies in order to increase efficiency
- Utilizing more efficient storage techniques
- Enabling power management for computer equipment
- Purchasing Energy Star-rated equipment

## Energy Use

While the NIEHS Data Center comprises less than one percent of our 1 million square foot main campus, it consumes about 5 percent of the Institute's electrical power. As a significant power consumer, the Data Center will continue to be a focal point for conservation. Today, many of our practices already take energy conservation into account. For example, IT equipment is positioned in "hot" and "cold" aisles, using convection to cool our devices more efficiently.

The NIEHS addresses enables Energy Star features on computers and monitors wherever possible. Many desktops at NIEHS, however, remain in a powered-up state to enable data backups outside of normal business hours. This presents a continued challenge, and is a point to be evaluated as we proceed with Green IT.

Our Institute recognizes the need for a comprehensive IT energy plan and program. With this in mind, we are planning an IT energy assessment that will identify opportunities to reduce energy use while meeting NIEHS mission requirements. The assessment will lay the ground work to help us set IT directions that leverage energy efficient policies and practices, technologies and architectures and that are aligned with our overall business strategy.

The goals of this effort are to:

- save energy and reduce our carbon footprint
- reallocate scarce resources to higher value initiatives
- identify and report IT energy savings and environmental impacts in compliance with NIEHS environmental goals and related federal policies.

## Electronic Waste

In 2008, NIEHS installed recycling boxes to collect "Techno Trash" such as IT consumables, mobile phones, batteries and small peripherals. Our federal property disposal system, used for computers and other "accountable" property, provides for IT equipment reuse, sale or recycling. Old data tapes have a high-energy content that is acceptable to mix with bio-refuse already scheduled for incineration – a step that also protects data security.



*The NIEHS emphasizes the importance of employee involvement, community partnership, outreach and education, and work-life balance.*



## **Community and Culture**

Sustainability involves more than environmental stewardship, human health and strong economics. Social considerations for individuals and communities are also vital ingredients since we tend to participate in, and support, those things we value the most.

At NIEHS, we emphasize employee involvement in activities ranging from cultural diversity celebrations in the workplace to community programs and partnerships. Following are a few examples of the social elements of our NIEHS sustainability focus.

### **Environmental Awareness**

Chartered in 1991, the Environmental Awareness Advisory Committee (EAAC) is a grassroots volunteer organization of NIEHS employees that is actively involved as an advisory body in the management of our land, buildings and operations. The EAAC launched an award winning recycling program in 1993 that has diverted more than 11 million pounds of waste from the landfill.

Each year, the group organizes the Institute's week-long Earth Day observance including information tables, games, and challenges as well as a photo contest. Members oversee the Memorial Garden with native plantings, maintain bluebird and purple martin houses, and continue to carry out new initiatives. EAAC volunteers also participate in various NIEHS groups including the EMS Work Group and the Energy and Water Conservation Task Force, making them a vital part of the Institute's efforts to motivate and educate our employees to live responsibly and reduce their impact on the environment.

### **Environmental Health Perspectives**

The Environmental Health Perspectives' mission is to serve as a forum for the discussion of the interrelationships between the environment and human health by publishing in a balanced and objective manner the best peer-reviewed research and most current and credible news of the field. With an impact factor of 6.12, EHP ranks first among monthly public, environmental, and occupational health journals.

EHP publishes articles from a wide range of scientific disciplines encompassing basic research; epidemiologic studies; risk assessment; relevant ethical, legal, social, environmental justice, and policy topics; longitudinal human studies; in vitro and in vivo animal research with a clear relationship to human health; and environmental medicine case reports. Because children are uniquely sensitive to their environments, EHP devotes a research section specifically to issues surrounding children's environmental health. EHP receives more than 1,200 research manuscripts each year. Their content is available free online at <http://www.ehponline.org/docs/allpubs.html>.

EHP has an international outreach program that includes complimentary subscriptions to qualified recipients and a Chinese-language edition published quarterly and distributed to 35,000 readers. EHP also sponsors a Science Education Program that publishes high-quality



science and interdisciplinary lessons based on selected news and research articles published in the journal. Lessons advance critical basic skills among students in middle school, high school, and undergraduate college, and are aligned with National Science Education Standards in biology, chemistry, environmental science, geology, and physical science.

### **Outreach and Education**

Establishing partnerships with the community brings ideas, openness and collaboration to the forefront. Communicating our research to the public and impacted communities and listening to their concerns helps ensure that we are working hard on the issues that are important to them. After all, as a federal research institute, the public are the true owners – or “stockholders” – of our organization.

NIEHS Town Hall Meetings provide are one means by which we engage the public. These forums are held in communities around the country and are conducted in partnership with a local university. Through discussion these meetings aim to empower individuals dealing with environmental public health issues by helping them recognize and address the potential impacts of environmental exposure. By better understanding the public’s needs, we can more clearly focus our research efforts.

Another group, the Public Interest Partners, represents diverse groups of disease, disability and environmental education and advocacy organizations. Their common interest is in preventing adverse health outcomes from environmental exposures. They lend community perspectives to our research agenda, and serve as key contributors to the translation of research findings for the public, policy makers and private foundations.

Through our Extramural Program, the NIEHS is interested in developing educational and training resources for students of all ages, educators, health care professionals and the general public to enhance their knowledge of environmental health sciences. These resources are an important part of our communication strategy that encompasses training, education, and community outreach using web-based, video or DVD and television media.

By providing students, teachers and scientists easy access to tools, classroom materials and resources we invest in the future of environmental health science. The NIEHS Science Education Committee gathered a group of Institute scientists willing to participate in science fairs as judges, give classroom presentations, tours of the NIEHS, or provide professional development resources regarding training and careers in science.

In addition to supporting basic scientific research, the Superfund Research Program funds outreach activities, which are designed to facilitate the translation of the Program’s results to the communities and organizations most concerned with the effects of hazardous substances on human health.





Funded through our extramural program, the Environmental Health Sciences (EHS) Core Centers are designed to build infrastructure and provide resources to stimulate research in environmental health sciences. These centers have established Community Outreach and Education Programs with goals to:

- Develop partnerships with stakeholders to translate and disseminate EHS Core Center science.
- Work with community-based organizations, disease advocacy groups and other local, state, or regional partners to enhance the dialogue on environmental health issues in their regions.
- Develop and implement appropriate outreach and educational programs to increase awareness and understanding of environmental health research being conducted at the EHS Core Centers.
- Evaluate outreach models, disseminate results at local and national levels, and promote models for national implementation.

The Partnerships for Environmental Public Health is a grant program that strives to coordinate and integrate new and existing initiatives that involve communities and scientists working together on contemporary issues in Environmental Public Health research. Among the program's goals are to develop and evaluate effective ways to communicate environmental public health messages to a diversity of audiences and to create and provide materials to increase awareness and literacy about environmental health risks.

Our Waste Management Team also supports and participates in the education and outreach of our employees and the community. In March, the NIEHS hosted the 2008 NC Environmental Stewardship Initiative Participant's Meeting and participated as Environmental Partners in the program. In October 2008 the NIEHS and EPA hosted a group of NCSU Environmental Science students touring the Waste Handling Facility, and learning about hazardous waste management and operations.

The program seeks new ways to improve waste management practices in NIEHS laboratories and support areas by increasing communication, awareness, and training as part of a multi-faceted approach to improve overall waste management practices on our campus. Future goals include the enhancement of periodic laboratory inspections, the development of an on-line hazardous waste training module, improved coordination to minimize the disposal of expired and abandoned laboratory chemicals, and to conduct periodic waste reduction awareness campaigns.

## Diversity

From awarding grants to hiring employees, we recognize that diversity brings a stronger core and greater depth of knowledge to tackle important scientific and cultural issues. Training grants promote diversity of underrepresented groups for recruitment and retention. Predoctoral Fellowships such as the Ruth L. Kirchstein National Research Service Award promote diversity in health-related research by supporting individuals with underrepresented racial, ethnic or disadvantaged backgrounds, as well as individuals with disabilities.

The NIEHS provides grant supplements to improve the diversity of the research workforce by supporting and recruiting students, post-doctorates and eligible researchers from underrepresented groups. Summer internships and other programs are also used by NIEHS to bring individuals with disabilities into the workplace.

Our Summers of Discovery program is designed to enhance awareness and knowledge of biomedical research for students and educators. This program strongly encourages applications from female and minority candidates, as well as persons with disabilities.

These opportunities bring culturally different people to share the knowledge and expertise of life and science in a friendly, learning environment. As a voluntary, advisory body to our senior leadership, the NIEHS Diversity Council provides insight and helps enrich the Institute's work culture.

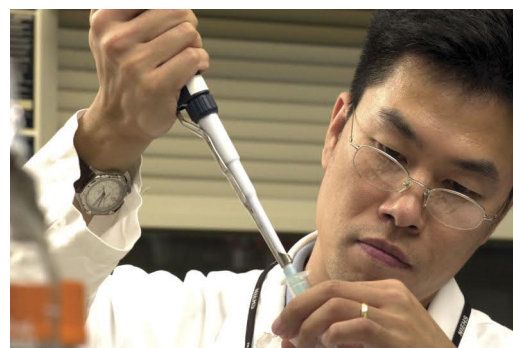
## Work/Life Programs

Finally, NIEHS Work/Life programs to help employees sustain their personal well-being, advance themselves professionally, and balance the demands of work, home and family. Offerings include opportunities to participate in fitness activities including an on-site fitness center, subsidized memberships to local fitness centers, intramural sports programs and bicycles for on campus use. The NIEHS campus includes walking trails with fitness stations, softball, volleyball and basketball fields and courts, and an attractive memorial garden.

Our health and safety program offers health screenings and physical exams as well as sponsor an annual health and fitness week with fun activities and events that promote good health and provide valuable information about current health issues.

Services available to employees include lactation rooms for mothers, an on-site cafeteria and healthy vending options, ombudsman services, an Employee Assistance Program and an on-site child care center.

A variety of special events throughout the year give employees an opportunity to socialize, learn, and share the workplace with family and friends. These include Earth Week activities, Career and Education Fairs, Take Your Child to Work Day and Friends and Family Day.



*Only those who dare  
to fail greatly can ever  
achieve greatly.”*

*~ Robert F. Kennedy*



## **Future Endeavors**

Sustainability is a core value of our Institute and is integral to our scientific mission. As documented in our Environmental Policy and our Environmental Management System, we have made a public commitment to serve as leaders in sustainability. With this in mind, we will continue to seek ways of improving our environmental stewardship while promoting a healthy workplace and community.

As we look to the future, we recognize that we have countless opportunities to improve our environmental performance. Key considerations include:

- **Strategic Sustainability** – NIEHS will evaluate the benefits of developing a sustainability strategic plan. By further integrating our EMS, volunteer advisory committees and work groups, education programs and other NIEHS activities, this plan may help us better coordinate and focus our sustainability efforts.
- **Federal Mandates** – the goals established by existing and new Executive Orders will require innovation and creativity to meet expectations for environmental performance in the areas of energy, water, and other resource conservation. Some requirements, such as aggressive targets for increasing the use of renewable energy, will be difficult for any agency to meet. NIEHS and its partners in NIH and at the local EPA will need to be exceptionally creative and resourceful.
- **Data Collection** – we have been somewhat limited in our ability to track energy and water data. In the past, some utility data has been measured only at the “campus” level. New meters currently being installed at the “building” level will provide more detailed information on energy and water use. In the future, this “sub-metering” will help us pinpoint problems and opportunities, leading to improved management and greater conservation.
- **Greenhouse Gas Inventory** – in the future, decisions on facility planning and operations will require a more comprehensive understanding of the upstream and downstream environmental implications. NIEHS recognizes that knowledge concerning the carbon footprint of our campus operations and listing GHG emissions will be valuable. We are now evaluating the prospect of performing a detailed greenhouse gas inventory for our Institute.



## Resources | Acronyms

DHHS	Department of Health and Human Services
NIH	National Institute of Health
NIEHS	National Institute of Environmental Health Sciences
DERT	Division of Extramural Research and Training
NTP	National Toxicology Program
RTP	Research Triangle Park
EMS	Environmental Management System
LEED	Leadership in Energy and Environmental Design
SRP	Superfund Research
EPA	Environmental Protection Agency
DIR	Division of Intramural Research
HTHW	High Temperature Hot Water
MBTUs	Million British Thermal Units
CUP	Central Utility Plant
EAAC	Environmental Awareness Advisory Committee
COD	Chemical Oxygen Demand
NO <sub>x</sub>	Nitrates, Nitrites
SO <sub>x</sub>	Sulfur Oxides
NCDWQ	North Carolina Division of Water Quality
DENR	Department of Environment and Natural Resources
RCRA	Resource Conservation and Recovery Act
ECHO	Enforcement and Compliance History Online
AHMP	Alliance of Hazardous Materials Professionals
NCSU	North Carolina State University
ICS	Incident Command System
MOU	Memorandum of Understanding
LEED EB	Leadership in Energy & Environmental Design for Existing Buildings
GHG	Greenhouse Gas
WAIT	Wildlife And Industry Together
NCD&CS	North Carolina Department of Agriculture and Consumer Services
USDA	United States Department of Agriculture
SNAP	Significant New Alternatives Policy
GSA-FAS	General Services Administration Federal Acquisition Service
EPEAT	Electronic Product Environmental Assessment Tool
FAR	Federal Acquisitions Regulation
HHSAR	Health and Human Services Acquisition Regulation
FEMP	Federal Energy Management Program
PEHP	Partnerships for Environmental Public Health
SEC	Science Education Committee
EHP	Environmental Health Perspectives

## Resources | Websites\*

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