



National Institute of  
Environmental Health Sciences

# NIEHS Sustainability Report 2017





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# Introduction: Putting Ideas to Work

## Mission

The National Institutes of Health (NIH) mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.

The mission of the National Institute of Environmental Health Sciences (NIEHS) is to discover how the environment affects people in order to promote healthier lives.

## Vision

The vision of NIEHS is to provide global leadership for innovative research that improves public health by preventing disease and disability.

## Sustainability

Sustainability is an active part of the NIEHS mission. The Environmental Protection Agency (EPA) defines sustainability as the conditions under which humans and nature can exist in productive harmony to support present and future generations. At NIEHS, sustainability is incorporated into our mission to ensure that we have, and will continue to have, the resources needed to protect human and environmental health.

NIEHS utilized worldwide, federal, and local standards for reporting sustainability in this report. In accordance with the National Environmental Policy Act (NEPA), NIEHS is committed to incorporating sustainability into our facility operations. In addition to NEPA, NIEHS strives to meet and exceed all applicable federal sustainability requirements, including those listed below.

- Executive Order (E.O.) 13693, Planning for Federal Sustainability in the Next Decade.
- E.O. 13571, Streamlining Service Delivery and Improving Customer Service.
- National Strategy to Promote the Health of Honey Bees and Other Pollinators.
- Energy Independence and Security Act (EISA), Section 142: Federal Fleet Conservation Requirements.
- Energy Policy Act of 2005, Section 104: Procurement of Energy Efficient Products.
- Energy Independence and Security Act of 2007, Section 525: Federal Procurement of Energy Efficient Products.
- Montreal Protocol.
- Solid Waste Disposal Act.
- Resource Conservation and Recovery Act (RCRA), Section 6002: Recycling and Procurement.
- 40 Code of Federal Regulations (CFR) Part 247, Comprehensive Procurement Guideline for Products Containing Recovered Materials.

On March 19, 2015, E.O. 13693, Planning for Federal Sustainability in the Next Decade, revoked E.O. 13514, Federal Leadership in Environmental, Energy, and Economic Performance, establishing a new set of sustainability goals and requirements for federal agencies. Since this sustainability report covers fiscal years (FYs) 2015 and 2016, E.O. 13693 is one of the primary drivers for the NIEHS sustainability targets and goals discussed in this report.





E.O. 13693 promotes sustainability, by creating targets and goals for federal agencies regarding many environmental aspects, including, but not limited to, emissions produced, energy consumed and generated, water used and reused, building design, and waste management.

In addition to the federal requirements for government agencies, NIEHS also follows sustainability initiatives determined at the cabinet and agency level by the U.S. Department of Health and Human Services (HHS) and NIH. HHS maintains the Affirmative Procurement Plan, and Office of Management and Budget (OMB) Scorecard on Sustainability and Energy.

The Affirmative Procurement Plan provides guidance on purchasing a variety of environmentally preferable products. The plan provides guidelines for an effective green purchasing program that encompasses the purchasing and use of designated recycled content, and Energy Star®, EPEAT-registered, energy-efficient, biobased, and environmentally preferable products.

The OMB Scorecard serves as a benchmark for NIEHS to identify and track the best energy-related opportunities to reduce pollution, improve efficiency, and cut costs, and incorporates directives outlined in E.O. 13693.

The NIEHS sustainability goals are also supported by the NIH Sustainability Implementation Plan, which outlines sustainability initiatives and performance metrics. The plan details 10 sustainability goals for the 27 NIH institutes and centers, including NIEHS, regarding greenhouse gas reduction, sustainable buildings, clean and renewable energy, water use efficiency and management, fleet management, sustainable acquisition, pollution prevention and waste reduction, energy performance contracts, electronic stewardship and data centers, and climate resilience planning.

NIEHS exceeds federal sustainability requirements, by following the reporting guidelines set forth by the Global Reporting Initiative (GRI) Sustainability Reporting Standards 2016, which are the most widely used sustainability reporting standards in the world.

GRI sustainability reporting standards most applicable to NIEHS operations focus on biodiversity, water, and effluents and waste. Other GRI sustainability reporting standards are not referenced in this report, as they do not directly apply to the NIEHS mission and operations.

This report details the NIEHS sustainability progress regarding the previously mentioned federal requirements and GRI sustainability reporting guidelines for FYs 2015 and 2016.

NIEHS also considered regional sustainability initiatives, such as the City of Durham Water Shortage Response Plan, in the development of this report. Sustainability initiatives in FYs 2015 and 2016 are detailed for energy and water conservation, pollution prevention and waste reduction, transportation, green purchasing, and our community.



## A Message From the Director

### **NIEHS seeks to integrate sustainability into many aspects of its operations.**

As the leader of NIEHS, I am proud of the many ways we incorporate sustainability into our everyday activities. Over the years, our employees have worked diligently to seek out opportunities to make our workplace more sustainable. As a result, NIEHS has become a leader in sustainability at NIH, and our efforts often serve as a model for other agencies.

The NIEHS campus is a rich source of natural resources. We have taken steps to increase habitat for birds, pollinators, and other wildlife, while also cultivating native plant species and controlling invasive ones.

NIEHS has decreased energy use and has completed energy projects, such as adding additional solar panels, converting outdoor lighting to more efficient LED technology, and completing construction of a new net-zero energy building, which is the first of its kind within HHS.

Water use has been reduced on campus since 2010, exceeding the goal of a 2 percent annual reduction since 2010. In 2016, we began using reclaimed water from on-site sources, to reduce water used in utility plant operations.

We continue to lead NIH in recycling and waste by diverting more than 85 percent of our waste away from landfills. A more thoughtful approach to green purchasing has led to an award-winning composting program and shift toward the use of green products throughout the institute.

Additional efforts related to transportation, including vanpools, carpooling, and telework, demonstrate our commitment to reducing fuel use and air emissions.

We are committed to building on past successes and further integrating sustainable practices into operations. We are proud of the dedication demonstrated by our employees in making NIEHS a better and more sustainable workplace.

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

Director, NIEHS and the National Toxicology Program (NTP)

Linda S. Birnbaum, Ph.D.  
NIEHS Director



## Natural Resources

The NIEHS campus in Research Triangle Park, North Carolina, encompasses 375 acres, including woodlands, grasslands, wildflower meadows, and Discovery Lake. NIEHS values its natural resources, and works to conserve the natural surroundings and create new habitat, especially for pollinators. This report details NIEHS initiatives in FYs 2015 and 2016, regarding the management of natural resources on campus.

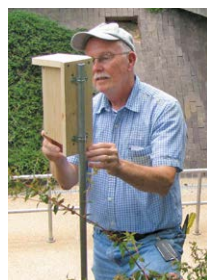
The following standards provide the basis of initiatives for management of NIEHS natural resources.

- E.O. 13693
- E.O. 13571
- GRI 304-1, Biodiversity
- GRI 304-2, Biodiversity
- GRI 304-3, Biodiversity
- National Strategy to Promote the Health of Honey Bees and Other Pollinators

## Creating New Habitat

In FYs 2015 and 2016, NIEHS expanded existing habitat on its campus by building homes for pollinators, including bees, birds, and bats. This was done as part of the Wildlife and Industry Together (WAIT) program, in which NIEHS partners with the N.C. Wildlife Federation to maintain habitat on campus.

In FY 2015, NIEHS installed bat roosting boxes for bats whose populations are decreasing due to disease and habitat loss. Bat species found in Southeastern North Carolina and likely to use NIEHS bat boxes include Big Brown Bat (*Eptesicus fuscus*), Mexican Free-Tailed Bat (*Tadarida brasiliensis*), Eastern Pipistrelle (*Pipistrellus subflavus*), Eastern Red Bat (*Lasiurus borealis*), Evening Bat (*Nycticeius humeralis*), Hoary Bat (*Lasiurus cinereus*), Seminole Bat (*Lasiurus seminolus*), Silver Haired Bat (*Lasionycteris noctivagans*), Rafinesque's Big-Eared Bat (*Corynorhinus rafinesquii*), and Southeastern Bat (*Myotis austroriparius*). Not only are bats crucial pollinators, they also control mosquito populations.



NIEHS increased bird habitat by adding nesting boxes in FYs 2015 and 2016. The boxes can accommodate at least 55 new nesting pairs. In FY 2015, 10 new bluebird nesting boxes were added for a total of 38 on campus. Another 29 new boxes were placed on campus for the Brown-Headed Nuthatch. In FY 2016, a Purple Martin house was erected that can accommodate 12 nesting pairs and their offspring.

In FY 2016, NIEHS created a pollinator-friendly habitat for bees by adding bee hive boxes that are popular among mason and leafcutter bees. In addition, the Institute began serving as a host site for several honey bee hives that are a part of an EPA citizen-science project, in which scientists research the honey bee immune system and hive health.



## Conserving Native Habitat and Water

In FYs 2015 and 2016, NIEHS focused on conserving native habitat on campus. As part of this effort, in FY 2016, campus surveys were conducted that located and identified native species for protection, as well as non-native invasive plants for removal. The North Carolina Native Plant Society lists of native and invasive species served as valuable guides for identifying plants on campus.

As a result of the survey, milkweed, a native plant that serves as critical habitat for the monarch butterfly, was found on campus. Milkweed is now protected from active mowing to conserve the habitat for the monarch. The U.S. Fish and Wildlife Service is in the process of determining if listing the butterfly as an endangered, threatened, or listed species is warranted.

In FYs 2015 and 2016, NIEHS continued to maintain natural areas on campus by conserving approximately 34 acres of riparian zone, or areas bordering bodies of water, for wildlife, and about two acres of dedicated wildflower meadows for the North Carolina Butterfly Highway Program. NIEHS is a participant in this program, along with the North Carolina Wildlife Federation.

In FY 2016, NIEHS managed several invasive species on campus. Approximately 20 ash trees were treated to protect against the emerald ash borer, an invasive beetle that, upon infestation, kills the ash tree.

By switching from urea nitrogen-based ice melt to rock salt, NIEHS reduced the amount of nitrates flowing into Discovery Lake. Reducing nitrates in the lake prevents the spread of some invasive weeds, such as water primrose (*Ludwigia peploides*) and algae.

Also, NIEHS increased the number of carp in Discovery Lake from about 150 in FY 2012 to 200 in FY 2016. The carp added to the lake are sterile so they do not become overpopulated. Since carp eat the noxious weed water primrose, they serve as a non-toxic alternative to pesticides for removing invasive species. Water primrose was reduced by approximately 90 percent by the end of FY 2016.

On two acres of wildflower meadows located adjacent to the Environmental Parkway, NIEHS conducted soil tilling and cutting of seed heads, in lieu of pesticides, to control invasive plants, such as Johnsongrass (*Sorghum halepense*).

## Biodiversity Reporting

Biodiversity often refers to the variety and variability among species on the planet, and underscores the importance of ecosystems. The NIEHS values its biodiversity and encourages habitat for a variety of wildlife on campus. The bald eagle is the only known federally listed species found on-site. Although habitat exists for the endangered plants Michaux's sumac (*Rhus michauxii*) and smooth coneflower (*Echinacea laevigata*), these plant species have not been observed. Furthermore, NIEHS is unaware of any protected or high-biodiversity areas on, or adjacent to, the campus.

Significant impacts to biodiversity may occur from construction, pollution, introduction of invasive species, reduction of species, habitat conversion, and changes in ecological processes. No significant impacts to NIEHS campus biodiversity occurred during FYs 2015 and 2016. NIEHS is in accordance with the GRI biodiversity reporting standards.



# Energy Conservation

## Clean and Renewable Energy

NIEHS promotes sustainable energy by decreasing non-renewable energy consumption and increasing clean and renewable energy use. The institute utilizes a variety of energy sources, including solar panels, fuel oil, natural gas, and electricity.

Natural gas and fuel oil are used in the boilers that provide heating, while electricity powers the chillers and cooling towers that supply campus cooling. Overall, energy use decreased in FYs 2015 and 2016, as compared to the FY 2008 baseline.

The institute capitalized on opportunities to use renewable energy by installing 228 new solar photovoltaic cells for a total of 378. In addition, street lamps were upgraded by installing light-emitting diode (LED) bulbs, saving both energy and money.

The following GRI standards and Executive Orders (E.O.) were adhered to in managing energy fixtures and consumption.

- OMB Scorecard
- E.O. 13693
- GRI 302-1, Energy
- GRI 302-3, Energy





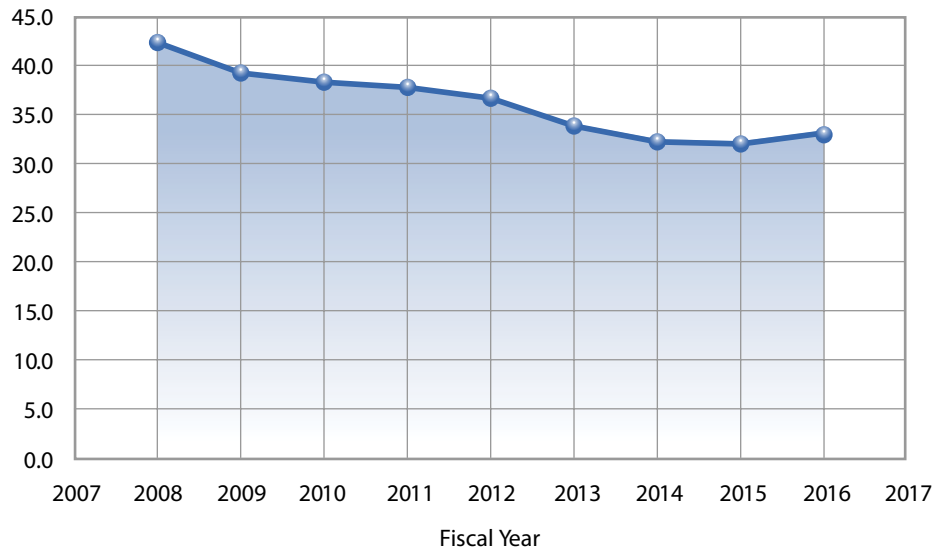


## Energy Consumption

NIEHS consumes fuel oil, natural gas, and electricity to provide energy to its campus. Consumption of electricity increased from FY 2015 to FY 2016, while consumption of fuel oil, natural gas, and water decreased.

Although electricity use increased by 2.7 percent from FY 2015 to FY 2016, annual electricity use in megawatt-hours (MWH) decreased by 22.3 percent from FY 2008 to FY 2016, as shown in the figure below.

**Annual Electricity Consumption (MWH)**



The amount of fuel oil and natural gas consumed decreased from FY 2015 to FY 2016. Typically, NIEHS heating is powered by natural gas. However, due to an especially cold winter in FY 2015, the institute was required to curtail natural gas consumption and used fuel oil instead. Natural gas curtailment is an agreement with the gas provider to accept reduced gas availability in exchange for a cheaper energy rate.

Due to the increase in fuel oil use in FY 2015, there was a decrease of 98.4 percent in oil consumption from FY 2015 to FY 2016. Since the FY 2016 winter was not as cold as the FY 2015 one, total natural gas consumed also decreased by 21.5 percent during this time frame.

Although NIEHS had a colder winter in FY 2015 than FY 2016, reconfiguration of the boilers accounted for a slight increase of 0.5 percent in heat consumption from FY 2015 to FY 2016. While heat consumption increased slightly, NIEHS cooling demand decreased by 14.3 percent during this period.

## Renewable Energy Use

In FY 2015, NIEHS installed 228 additional solar panels (photovoltaic cells) that can generate a total of 60 kilowatts (kW) of electricity. This renewable energy effort expanded upon the existing 150 solar panels, which generated approximately 30 kW of electricity. The renewable energy produced by this 378-panel solar array is distributed to campus buildings to reduce use of purchased electricity. By increasing the number of solar panels utilized on campus, NIEHS simultaneously decreased both its electrical consumption and carbon footprint.



As part of the net-zero energy building 110 warehouse construction, all power consumed in the building is generated by solar panels. The building was completed in July 2017.



## Energy Efficiency Upgrades

In FY 2015, NIEHS converted all exterior roadway and walkway lights from metal halide to light-emitting diode (LED) units, a brighter and more energy-efficient technology. The effort resulted in a net savings of 300,000 kilowatt hours and an \$18,000 reduction in annual utility costs. Compared to metal halide, LED bulbs have a lower energy cost per bulb, but the same light output.

In addition, NIEHS plans to upgrade an aging chiller with a much more energy efficient model. This initiative is projected to reduce chiller energy consumption by almost 20 percent.

## Data Center Efficiency

NIEHS is committed to improving data center energy conservation. Efficiency is often determined by an industry-derived energy efficiency ratio called power use effectiveness, which is defined as the total data center facility energy use divided by the information technology (IT) equipment energy use.

Data center facility refers to IT equipment, power management units, and facility support systems, such as HVAC, uninterruptable power supply, diesel generator, switchgear, and lighting. IT equipment refers to all servers, storage devices, network gear, and auxiliary data processing equipment located within the data center.

In FYs 2015 and 2016, NIEHS averaged a power use effectiveness (PUE) of approximately 2.2, and is constantly seeking ways to increase its data center efficiency. Planning efforts were undertaken in FY 2016 to add a system to monitor and measure power utilization in the data center facility so that more accurate measuring and reporting of efficiency may be obtained.





# Water Conservation

## Water Use Efficiency and Management

NIEHS focused on implementing sustainable water use initiatives in FYs 2015 and 2016. The institute utilizes water for a variety of purposes, such as drinking, labglass cleaning, animal cagewash, restroom sinks and toilets, laboratory activities, and air conditioning.

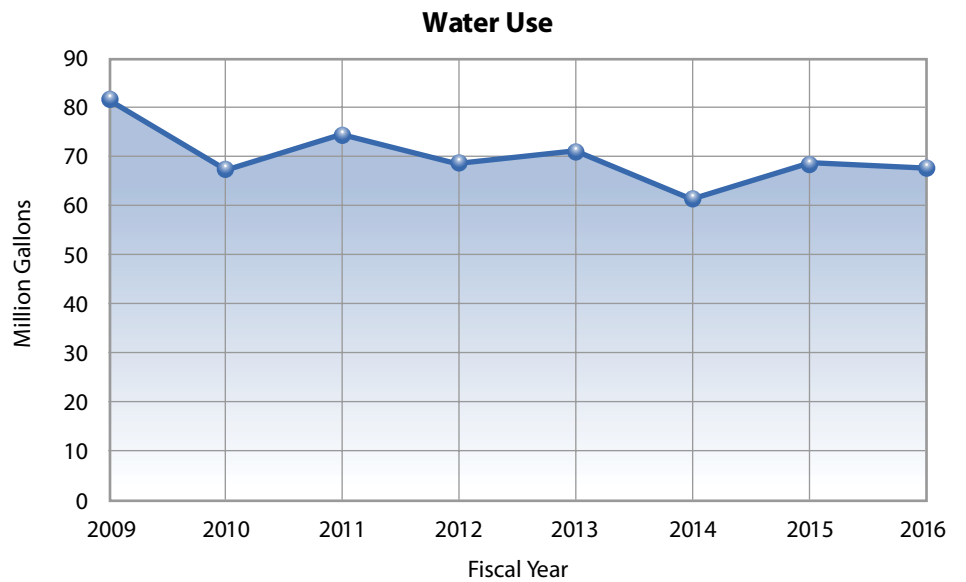
Most of the water is used in the campus air conditioning system, which includes five chillers and two cooling towers. Due to the large volume of water used in the cooling towers, water conservation efforts mainly focus on increasing the efficiency of the cooling towers.

NIEHS also promotes sustainable actions that employees can take daily to conserve water. The basis of water use conservation initiatives includes the following standards.

- OMB Scorecard
- E.O. 13693
- GRI 303-1, Water
- GRI 303-2, Water
- City of Durham Water Shortage Response Plan

The City of Durham supplied 100 percent of NIEHS water during FYs 2015 and 2016. Durham obtains drinking water from Lake Michie and Little River Reservoir. These lakes provide city customers with 37 million gallons of safe drinking water per day.

In FYs 2015 and 2016, NIEHS consumed 69,175,040 and 68,105,934 gallons, respectively. Compared to the baseline water consumption of 82,597,900 gallons billed in FY 2009, the institute has exceeded its goal of decreasing water use by more than 2 percent annually. The NIEHS water use trend is displayed in the following graph.







## Landscaping Water Use Efficiency and Management

NIEHS conserves landscaping water by using Discovery Lake water for irrigation. In FYs 2015 and 2016, consumption was considered zero because only lake water was used for irrigation. In accordance with relevant executive orders, the institute has practiced net-zero landscaping water consumption since the baseline year of FY 2010.

## Industrial Water Use Efficiency and Management

A majority of NIEHS water is used for industrial water activities. Most of the water is used in the cooling towers and chillers for air conditioning purposes. Other industrial uses include washing research animal cages, cleaning laboratory glassware, and scrubbing the medical and pathological incinerator emissions. Industrial activities use about 75 percent of all water consumed by the institute. The remaining water use sources are non-industrial, which includes laboratory sinks, bathrooms, and cafeteria activities. NIEHS is continuing to work to achieve a goal of reducing water use by 2 percent annually, primarily by focusing on efforts to reduce industrial water use.

In FY 2015, NIEHS used a reverse osmosis system in one of the cooling towers, which allowed for recycling of about 70 percent of the water.

In FY 2016, NIEHS began two new projects to reduce water use on campus.

- Reusing treated sewer water, known as greywater, from the local publicly owned treatment plant works to support cooling tower operations, which is expected to cut costs in half.
- Constructing a condensate capture system that reclaims wastewater from air handling systems to help support cooling tower needs.

## Water Conservation Efforts

In addition to these upcoming cooling tower enhancements, NIEHS continued campus-wide water conservation awareness efforts in FY 2015. Efforts for the last two fiscal years included the following.

- Water conservation training for new employees.
- Water conservation awareness information added to the Environmental Management System website.
- Promotion of hand sanitizer use to reduce sink water use.

In FY 2016, an audit of 300 laboratories was conducted to observe existing practices and discuss sustainable alternatives. Based on the results of the audit, the following water conservation practices were suggested.

- When performing weekly emergency eyewash station inspections, use eyewash water to rinse and clean sink.
- Ensure leaky faucets are repaired promptly.
- Fill sink with water and let labware soak instead of running water to clean them.
- Seek alternatives to water-cooled lab equipment and instrumentation.
- Seek digital imaging alternatives instead of chemical photo processing.

NIEHS attributes the 1.5 percent reduction in water use from FY 2015 to FY 2016 largely to the cooling tower reverse osmosis system installation and campus water conservation awareness efforts.



## Pollution Prevention and Waste Reduction

NIEHS monitors wastewater, as well as hazardous and non-hazardous solid waste, to prevent pollution and reduce waste. The amount of non-hazardous solid waste generated from FY 2015 to FY 2016 decreased through recycling and composting programs, as well as a reduction in construction and demolition projects. The amount of hazardous solid waste generated in FYs 2015 and 2016 also decreased through increasing the promotion of green chemistry practices and non-hazardous chemical substitutions in lab assays.

In FYs 2015 and 2016, NIEHS trained employees on methods to reduce hazardous waste use in laboratories. Although solid waste generation decreased, the amount of wastewater that was generated from FY 2015 to FY 2016 increased slightly.

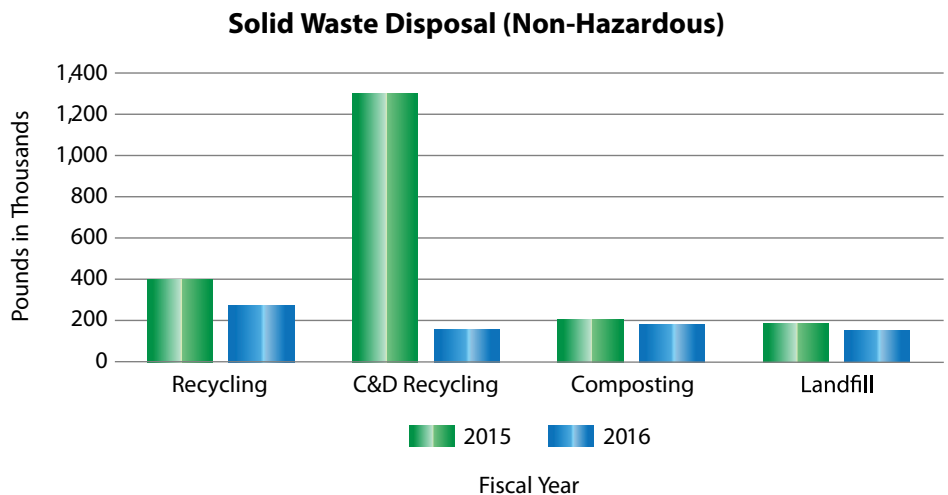
The following GRI standards guide NIEHS pollution prevention, as well as waste reduction practices and reporting.

- E.O. 13693
- GRI 306-1, Effluents and Waste
- GRI 306-2, Effluents and Waste
- GRI 306-3, Effluents and Waste
- GRI 306-4, Effluents and Waste
- GRI 306-5, Effluents and Waste

### Non-Hazardous Solid Waste

NIEHS generates a variety of non-hazardous solid waste, including food, office supplies, and construction and demolition (C&D) material. The institute aims to divert as much of this waste from the landfill as possible by implementing recycling and composting programs on campus. NIEHS generated approximately 1,100 tons of non-hazardous solid waste in FY 2015, and 534 tons of non-hazardous solid waste in FY 2016.

The 51 percent difference in non-hazardous waste generation between FY 2015 and FY 2016 may be explained by two construction projects that occurred in FY 2015 – the demolition of trailers at the former Burdens Creek site, where 400 tons of waste was recycled, and the exterior lighting upgrade project, which resulted in the recycling of 300 tons of concrete and 15 miles of copper wire. In 2016, there were no major construction or demolition projects. The following chart displays the amount and type of solid waste disposed during FY15 and FY16.





In FYs 2015 and 2016, NIEHS diverted 91 percent and 86 percent, respectively, of its non-hazardous waste from landfills. This exceeded the goal set in E.O. 13693 to divert at least 50 percent of non-hazardous solid waste, including food, compostable materials, and construction and demolition materials, from landfills.

In addition to the reduction in construction and demolition projects in FY 2016, NIEHS reached this goal, in part, due to a comprehensive cafeteria waste and animal bedding composting program. The institute composted approximately 9.4 tons of cafeteria waste — an increase of 18.6 percent from FY 2015.

However, NIEHS faces challenges in contamination of the compost stream due to non-compostable food containers and plastic utensils. To overcome contamination challenges, the institute aimed to increase visitor and employee awareness of non-compostable materials by training NIEHS employees on proper disposal of waste. In addition, NIEHS meeting organizers provide awareness at meetings about composting efforts to ensure that attendees who are not employees use proper composting practices.

In FY 2015, NIEHS upgraded the research animal cage system to utilize more efficient cages that require less bedding. In FY 2016, 82 tons of animal bedding was used — a reduction of 47 percent compared to 155 tons in 2013. Also, the institute composted 100 percent of animal breeding colony bedding used in FYs 2015 and 2016. This compost is often reused on-site to maintain the plant beds and landscaped areas.

## Hazardous Waste

Hazardous solid waste generated on campus is grouped into three categories — universal, energy recovery, and incinerated waste.

Universal waste includes common hazardous waste materials, such as batteries, pesticides, mercury-containing equipment, and mercury lamps. Batteries and mercury-containing bulbs are shipped off-site to be recycled.

Energy recovery waste refers to waste solvents from NIEHS research operations that is sent off-site for use as a fuel.

The remainder of NIEHS-generated RCRA-regulated waste is sent off-site for incineration, since incineration results in the greatest possible volume reduction.

Radioactive hazardous waste is transported off-site by a special contractor. NIEHS does not transport, import, export, or treat hazardous waste.

In FYs 2015 and 2016, the institute generated 32,015 pounds and 28,667 pounds, respectively, of hazardous waste, a decrease of about 10.5 percent.

In addition to industry advances that led to less toxic chemicals in smaller biomedical tests, NIEHS promoted campus-wide initiatives that encouraged lab employees and managers to reduce the amount of hazardous chemicals used in labs. Initiatives included the promotion of green chemistry and non-hazardous chemical substitution in lab tests.

The EPA defines green chemistry as the design of chemical products and processes that reduce or eliminate the generation of hazardous substances. NIEHS continued training employees on methods to reduce hazardous waste, including the following practices.

- Buying only the amount of hazardous chemicals needed, despite discounts offered for buying larger quantities.
- Sharing chemicals to avoid unnecessary purchasing and disposal of hazardous chemicals.
- Avoiding mixing hazardous and non-hazardous chemicals unless necessary.
- Minimizing use of radioactive tests.





## Wastewater Effluent

Industrial and sanitary wastewater from the NIEHS campus is discharged to the Durham County Triangle Wastewater Treatment Plant. In FYs 2015 and 2016, industrial and sanitary wastewater discharge was 32,230,330 gallons and 34,980,684 gallons, respectively – an increase of 8.5 percent.

The institute holds an industrial wastewater discharge permit with Durham County that requires monitoring for 16 parameters.

### Monitored continuously

- Flow

### Monitored quarterly

- Zinc

### Monitored semiannually

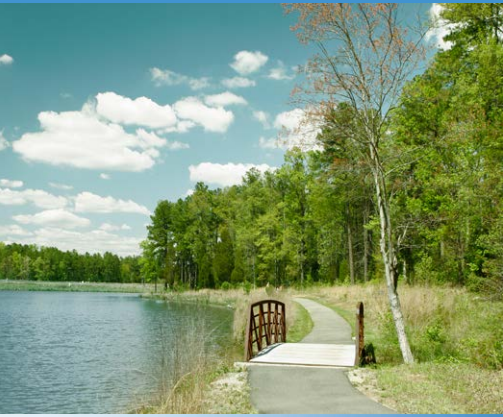
- Ammonia
- Cadmium
- Chloride
- Cyanide
- Fluoride
- Mercury
- Oil and Grease
- Silver
- Total Nitrogen
- Volatile Organic Compounds
- Temperature
- pH

### Monitored annually

- Molybdenum
- Total Phosphorus

NIEHS complied with all wastewater permit requirements during FY 2015. In FY 2016, one non-compliant monitoring result for mercury was noted. However, two follow-up samples for mercury fell within wastewater permit limits, indicating the initial non-compliant event was not indicative of an ongoing compliance issue.

All the other sampling parameters monitored during FY 2016 fell within permit requirements. Standards and methodologies used in reporting NIEHS wastewater discharges were completed in accordance with the Durham County Sewer Use Ordinance.



## Stormwater

NIEHS monitors stormwater discharges to ensure that the campus and downstream environment are not negatively impacted. NIEHS experienced one unplanned discharge to the stormwater management system in both 2015 and 2016. Although both events required reporting, there were no negative environmental or regulatory impacts.

Stormwater from the campus discharged from outfalls and drains into Discovery Lake. The lake is home to many fish, including bluegill, triploid grass carp, largemouth bass, hybrid striped bass, sunfish, and catfish, as well as aquatic vegetation, including sedges and cattails. Discovery Lake is considered an unnamed tributary of Burdens Creek, which discharges into Jordan Lake. This watershed, and the NIEHS campus, are part of the larger Cape Fear River Basin, which encompasses almost 10,000 square miles.

## Air Emissions

NIEHS strives to reduce its air emissions to the furthest extent possible.

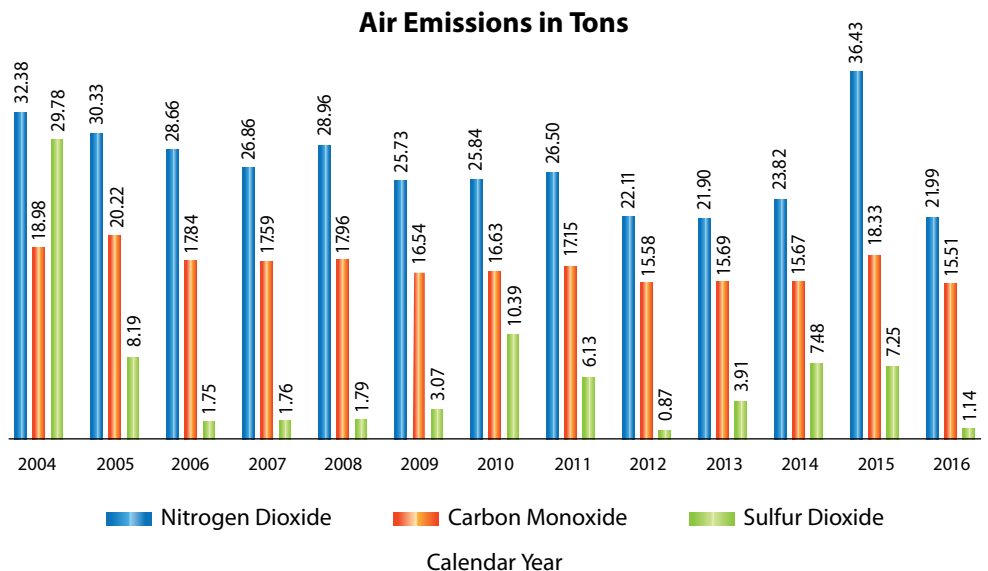
To reduce sulfur emissions, ultra-low sulfur diesel (ULSD), which contains only 15 ppm sulfur, is used in emergency generators. It is also used in boilers during natural gas curtailment. Emergency generator operations, for maintenance and testing purposes, are limited to approximately one hour per month to conserve fuel and minimize air emissions.

The campus incinerator uses a wet scrubber for highly effective control of metals, acid aerosols, and other byproducts. The number of incinerator operating days has been decreased by about 15 percent to reduce natural gas usage during the two-hour preheat and two-hour burndown.

All four boilers use oxygen trim systems to optimize combustion efficiency. Also, three of the four boilers are outfitted with burners designed to minimize nitrogen oxide emissions.

Additionally, NIEHS continues to add low-emission vehicles to its fleet, which includes both hybrid and electric vehicles.

The institute has received no air quality violations for eight years. The State of North Carolina considers the NIEHS facility to be a model for medium-sized permitted facilities in the Raleigh region, which includes 16 central North Carolina counties. NIEHS annual emissions of nitrogen dioxide, carbon monoxide, and sulfur dioxide are provided in the following graph.





## 2015 Air Quality Data

Sulfur dioxide emissions were elevated in calendar year 2015, due to natural gas curtailment caused by colder weather in February, the coldest February since 1978. About 110,000 gallons of fuel oil were burned in the boilers during the month. NIEHS is contractually obligated to switch from natural gas to #2 fuel oil during periods of curtailment.

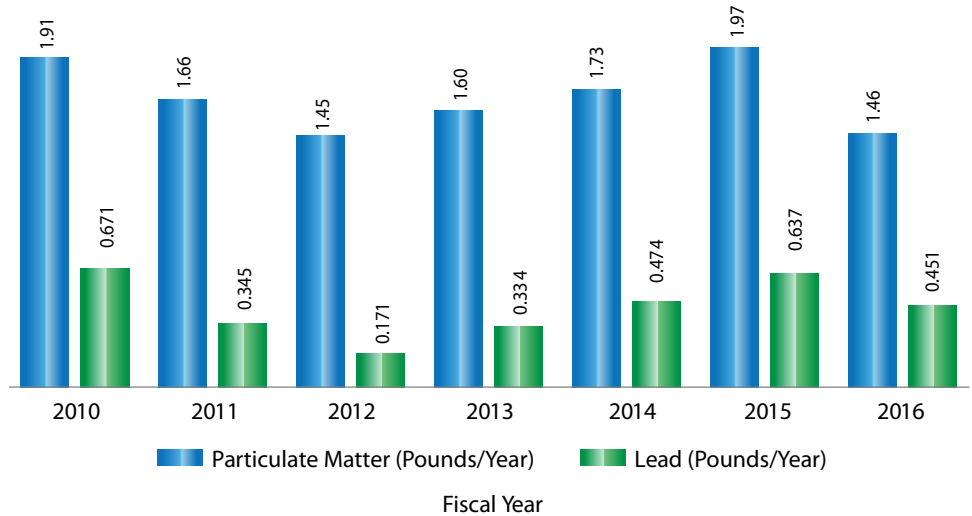
Nitrogen oxide emissions were elevated during calendar year 2015, due to a campus-wide electrical outage needed to update the main mechanical relays with digital versions. The emergency generators operated for about 31 hours to power critical functions during the outage.

## 2016 Air Quality Data

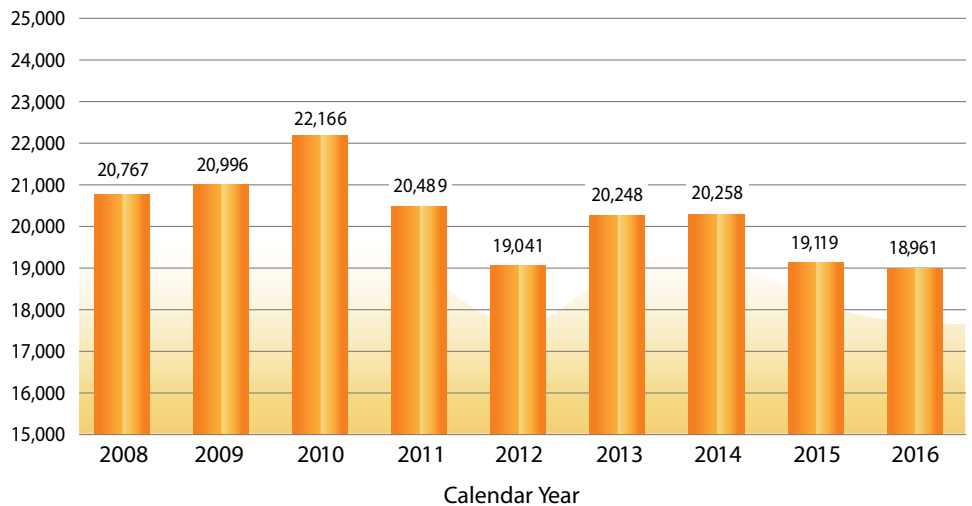
Overall air emissions were reduced in calendar year 2016, due to no major electrical outages or other events that require emergency generator operations. Therefore, the generators operated only one to two hours per month for testing purposes.

In addition, there were no natural gas curtailment events, and fuel oil was only briefly used in the boilers as part of testing and maintenance. This minimized sulfur dioxide emissions. Although nitrogen dioxide and sulfur dioxide are the NIEHS pollutants of concern, the Institute also tracks emissions of particulate matter, lead, and carbon dioxide. The next two graphs summarize emissions of these pollutants.

### Particulate Matter and Lead Emissions



### Carbon Dioxide Emissions in Tons







## Transportation

Sustainable transportation practices are an integral part of the NIEHS commitment to sustainability. In FYs 2015 and 2016, the institute promoted these practices through fleet management, employee alternative transportation, and community transportation planning efforts. The following standards provided the basis of sustainable transportation management.

- OMB Scorecard
- E.O. 13693
- EISA, Section 142

## Fleet Management

NIEHS quantifies improvements in fleet management practices by measuring reductions in average fuel consumption and monitoring fleet emissions. The fleet was comprised of 39 vehicles in FYs 2015 and 2016.

Despite fleet travel increasing in FY 2016, fleet petroleum consumption was down 7.8 percent, as compared to the baseline of FY 2015. This savings exceeded the 2 percent annual reduction in fleet consumption of petroleum products required by the executive orders and federal goals listed above.

The fleet-wide carbon dioxide (CO<sub>2</sub>) equivalent per-mile greenhouse gas emissions increased from 6,604 grams in FY 2015 to 6,684 grams in FY 2016, due to increased fleet travel. Although NIEHS was unable to reduce its per-mile greenhouse gas emissions that would support a 4 percent reduction goal by FY 2017, as prescribed in E.O. 13693, the institute aims to meet the FY 2020 goal of reducing the per-mile greenhouse gas emissions by 15 percent, and the FY 2025 goal of 30 percent, relative to a FY 2014 baseline.

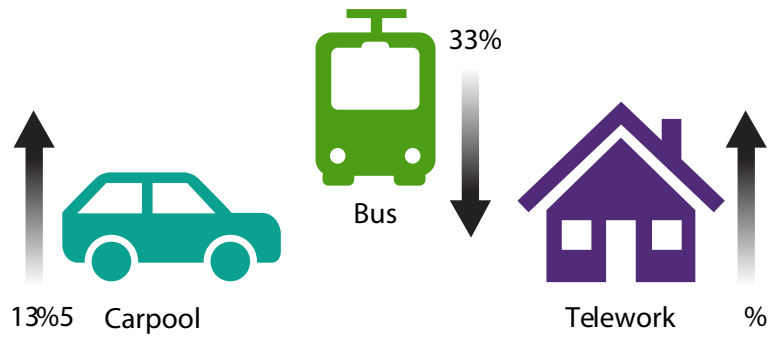
## Alternative Transportation

NIEHS supports sustainable employee alternative transportation efforts. In FYs 2015 and 2016, the institute subsidized the cost of vanpool ridership and bus passes for employees. The following alternative transportation methods have helped reduce greenhouse gas emissions associated with commuting to and from work.

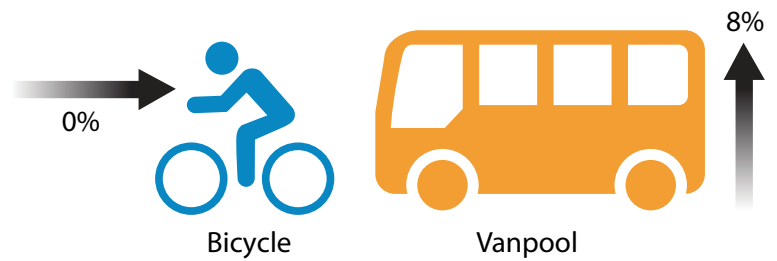
- Vanpool
- Bus
- Carpool
- Bicycle
- Telework

The percentage of NIEHS employees who use alternative transportation to travel to and from work varied from FY 2015 to FY 2016. In FY 2015, 52 to 62 percent of employees used alternative transportation, and in FY 2016, 54 to 65 percent did. These percentages do not include the NIEHS Bethesda campus.

The range in percentage of NIEHS employees using alternative transportation is due to an overlap in employees utilizing multiple forms of transportation, for example, teleworkers who carpool on the days they go into the office. The figure below shows the change in percentage of NIEHS employees using alternative transportation from FY 2015 to FY 2016.



**Percentage Change in Employees Using Alternative Transportation FY 2015 – FY 2016**



In partnership with GoTriangle, NIEHS provides free emergency ride home services to employees commuting to work by alternative means, such as bus, vanpool, or carpool. This service provides employees with emergency rides during hours when alternative transit is not available. This service also helps bicycle commuters who may need emergency transport to a location that is not quickly or easily accessible by bicycle, such as home or a hospital.

**Community Transportation Planning**

NIEHS participates in regional transportation planning, and promotes existing community transportation infrastructure. In FYs 2015 and 2016, the institute participated in regional planning efforts, in coordination with the Research Triangle Foundation Smart Commute Committee, to discuss existing transportation infrastructure, and plans for infrastructure, in the Research Triangle Park area.

Existing infrastructure discussions focused on information sharing about road construction and public transit services. Future transportation planning efforts included outreach events and public email communications. Also held were information sessions on plans for Durham and Orange Counties’ Light Rail Project, a 17.7-mile light rail that is expected to provide more than 26,000 trips per day.



## Green Purchasing

In FYs 2015 and 2016, NIEHS utilized new procurement practices that promote sustainability efforts, also known as green purchasing. The institute provides green purchasing training for all purchase cardholders and card approving officials, as well as employee training that refreshes green purchasing goals.

The NIEHS Office of Acquisitions follows the federal acquisition regulation and E.O. requirements, as mandated by NIH and HHS. The following standards guide green purchasing practices.

- E.O. 13693
- Energy Policy Act of 2005, Section 104
- EISA Section 525
- Montreal Protocol
- Solid Waste Disposal Act
- RCRA, Section 6002 and 40 CFR, Part 247
- HHS Affirmative Procurement Plan

In FYs 2015 and 2016, the Office of Acquisitions conducted pre-solicitation and pre-award contract reviews for all new solicitations and contract actions to ensure the sustainability of new acquisitions. They ensured that at least 95 percent of new contract actions for the supply of products and acquisition of services, including construction, were one or more of the following.

- Energy-efficient, that is ENERGY STAR or Federal Energy Management Program-designated.
- Water-efficient.
- Biobased.
- Environmentally preferable, for example, EPEAT-registered, or non-toxic or less toxic alternatives.
- Non-ozone depleting.
- Made with recovered materials.

For purposes of meeting the 95 percent sustainable acquisition requirement, contract actions include new and existing contracts, as well as task and delivery orders placed against them.

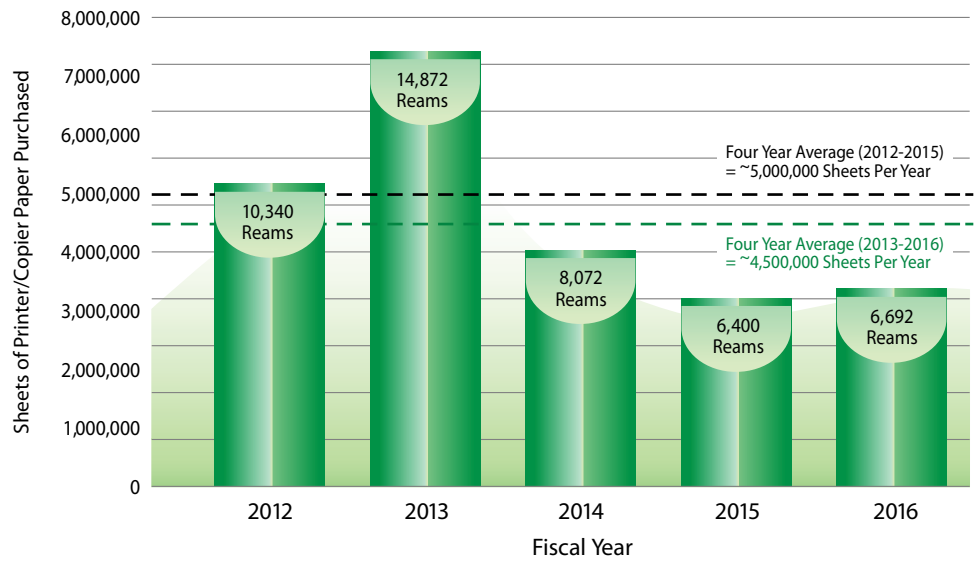
NIEHS stipulated that products required by contract agreements, entered into in FYs 2015 and 2016, met agency performance standards for green purchasing. The institute considers products required by contract actions to include those that are one or more of the following.

- Delivered to the government during performance.
- Acquired by a contractor for use in performing services at a federally controlled facility.
- Furnished by a contractor for use by the government.
- Following are examples of NIEHS green purchasing efforts during FYs 2015 and 2016.
- Use of two outdoor electrical transformers that run on biobased oil.
- Construction of the net-zero energy building warehouse, which has steel structural components containing recycled materials.
- 90 percent of custodial products used had a Green Seal of Approval or other green product certification.
- 100 percent of cafeteria plates, cups, bowls, straws, and disposable food containers were compostable.
- 100 percent of computers and electronic equipment purchased met ENERGY STAR or EPEAT requirements.

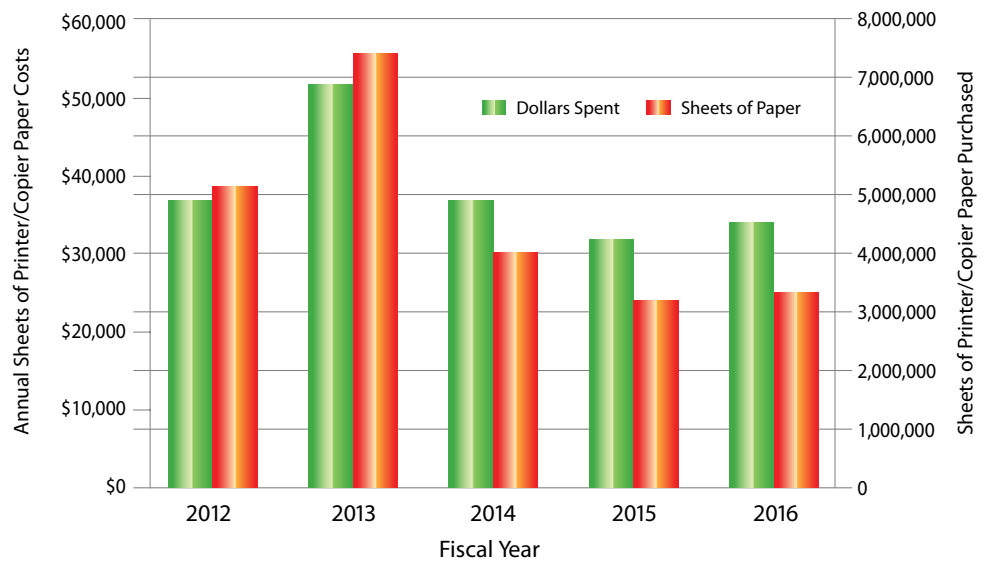


As part of the green purchasing initiatives in FYs 2015 and 2016, the institute purchased and used only 100 percent post-consumer fiber content recycled letter-sized printer/copier paper.

From FYs 2015 to 2016, NIEHS decreased the amount of printer/copier paper purchased, as compared to the 2012 baseline of 5,170,000 sheets. This trend is displayed in the following chart.



Furthermore, as seen in the following chart, the costs associated with purchasing printer/copier paper have decreased from about \$36,000 in FY 2012 to \$34,000 in FY 2016.



From FY 2015 to FY 2016, the amount of letter-sized printer/copier paper used increased by 4.6 percent from 3,200,000 sheets to 3,346,000 sheets.

NIEHS took the following actions in FY 2015 to decrease the amount of paper used.

- The Environmental Awareness Advisory Committee distributed helpful information regarding alternatives to printing, such as sharing electronic documents through email and posting documents on shared drives, as well as ways to minimize print job size, including printing double-sided and resetting default margin settings from one inch to three-quarters of an inch.
- The NIEHS Printer Policy was implemented. This policy was designed to reduce the amount of energy, paper, and ink consumed by all printers.





# Progress Through People

NIEHS promotes sustainability within the workplace, as well as locally, nationwide, and globally.

While at work, employees can take advantage of a variety of opportunities to participate in environmentally conscious activities on campus. For example, interested employees can join one or more of seven committees and groups that promote sustainability at the workplace, or implement small changes that can have a big impact on the environment.

NIEHS also promotes workplace sustainability in its campus management and planning, and participates in community-focused events and conferences in North Carolina, across the United States, and around the world, to help create healthy, sustainable environments.

## Workplace Sustainability

Employees can participate in a variety of sustainability efforts at NIEHS, such as joining or attending environmentally focused groups or committees, or using low-cost tips for decreasing their impact on the environment. Staff can join any of the following internal NIEHS committees or groups.

- NIEHS Environmental Awareness and Advisory Council
- NIEHS Health, Safety, and Environment Committee
- NIEHS Environmental Management System Workgroup
- NIEHS Site Ecology Team

There are also several groups under the NIH Environmental Management System that employees can join.

- NIH Sustainability Management Team
- NIH Green Team Leads Council
- NIH Sustainable Laboratory Practices Working Group

A brief overview of these committees and groups is discussed below.

### NIEHS Environmental Awareness and Advisory Council

Promotes awareness of the environmental impact of NIEHS employees' actions. Acts as an advisory body to the NIEHS Director and Associate Director for Management.

### NIEHS Health, Safety, and Environment Committee

Promotes occupational safety and health in all areas of NIEHS for the benefit of employees and visitors.

### NIEHS Environmental Management System Workgroup

Establishes and maintains the NIEHS Environmental Management System, which is a self-correcting and continual improvement system that seeks to reduce environmental impacts associated with a facility's activities, while helping to ensure compliance with environmental regulations.

### NIEHS Site Ecology Team

Provides coordination, guidance, and awareness for campus land and water ecology, including leading the NIEHS Wildlife and Industry Together program, which is discussed in the Natural Resources section.

### NIH Sustainability Management Team

Provides oversight and direction for the NIH Sustainability and Environmental Management System. The team advises the Chief Sustainability Officer on matters pertaining to the impact of activities on the environment, and advises and champions changes that NIH can implement to reduce its environmental impact. They also encourage continuous improvements to protect and promote human health and the environment, while supporting science.



### NIH Green Team Leads Council

Serves as a forum for all NIH institutes and centers, including NIEHS, to share best practices, and communicate challenges and opportunities encountered when implementing sustainability initiatives.

### NIH Sustainable Laboratory Practices Working Group

Examines laboratory activities and develops procedures, tools, and best practices for making those activities more sustainable. The group also identifies new opportunities for greening laboratory activities at NIH.

Apart from joining a sustainability-focused committee or group, employees and interested individuals can decrease their impact on the environment at little or no cost. NIEHS has compiled the following tips that staff can implement to incorporate sustainability and decrease environmental impact at work.

- Recycle paper, plastic, and glass consumables.
- Compost cafeteria food waste and foodware.
- Use electronic documentation to limit printing.
- Print only double-sided, when printing is necessary.
- Utilize energy-saving mode on computers, copiers, and other electronics.
- Utilize carpool, vanpool, bike, or public transit for transportation to work.
- Telework.
- Turn off the lights when not in use.
- Take the stairs rather than using the elevator, when possible.
- Walk rather than drive to nearby campus buildings.

## Environmental Awards and Recognition

HHS established the Green Champion Awards to recognize federal agencies' efforts to reduce greenhouse gas emissions, energy and water consumption, and pollution. The awards were established in response to E.O. 13693, issued by President Barack Obama in March 2015.

In FY 2015, HHS presented NIEHS with two out of 10 Green Champion Awards in the Energy and Fleet Management, and Environmental Stewardship categories, for exhibiting excellence and innovation in sustainability efforts. In FY 2016, NIEHS received two awards for continued distinction in sustainability. These awards were in the Environmental Stewardship and Good Neighbor categories, highlighting efforts in local environmental education outreach and climate resilience planning.

### Energy and Fleet: Lighting Upgrade Project

The Facilities Management Branch of the NIH Office of Research Facilities, and NIEHS, accomplished significant energy savings in FY 2015, through the installation of a 60-kW photovoltaic (solar panel) array, and the conversion of all exterior roadway and walkway lighting from metal halide to light-emitting diode. The project resulted in an annual net energy savings of approximately 300,000 kWh and \$18,000, as well as the recycling of approximately 300 tons of construction debris created by the upgrade.

### Environmental Stewardship: Burdens Creek Project

NIEHS recycled the bulk of waste materials located at the abandoned Burdens Creek site, located on the northern end of campus. Burdens Creek was the site of temporary offices, housed in trailers, for employees during construction of the main campus. The trailers also served as additional storage space and contained potentially hazardous materials, which led to challenges in their disposal.



In FY 2015, the project team displayed excellence in sustainability by recycling 65 tons of metal, 120 tons of concrete, 200 tons of construction and demolition debris, 720 fluorescent light bulbs, 12 mercury thermostats, and 12 smoke detectors, as well as recapturing 63 pounds of Freon. Additional information on the Burdens Creek demolition project can be found in the Pollution Prevention and Waste Reduction section of this report.

### **Environmental Stewardship: Preparing the Next Generation of Environmentalists**

NIEHS promotes environmental stewardship through agency-wide efforts to inspire and develop future champions of the environment. From the operation of the NIEHS nationally recognized child care center, to many educational community outreach efforts, such as Bring Your Kids to Work Day: Explore Urban Gardening; Developing Local Junior Leaders; and Science in the Cinema, the institute aims to instill environmental awareness into the lives of children on campus, locally, nationally, and around the world.

Details regarding community environmental education efforts, and articles about animals, ecology, plants, and invasive species, can be found on the NIEHS Kids' Pages, part of the NIEHS website. This resource is available to the public. Schools and families around the world bookmark the website for child-friendly environmental education content.

In addition to the NIEHS Kids' Pages, the NIEHS website provides science education materials, covering a wide range of topics related to environmental and human health, such as air contamination, environmental justice, lead, mold, pesticides, toxicology, and water quality.

The website also provides information on summer research and employment opportunities for students. For example, the Scholars Connect Program is designed to provide a unique opportunity for highly motivated science, technology, engineering, and math-focused undergraduate students to connect with NIEHS scientists for an academic yearlong commitment. The institute hopes that the children, young adults, and adults who participate in the environmental education efforts will grow to be the future environmentalists, instilled with the lessons of conservation and sustainability that NIEHS values.

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



The First Environments Early Learning Center (FEELC) contributed greatly to the NIEHS Environmental Stewardship award, Preparing the Next Generation of Environmentalists. FEELC is a nonprofit child care center, located on the NIEHS/U.S. Environmental Protection Agency (EPA) campus, that is available to the public. The center, which has been operating for 30 years, is jointly managed by NIEHS and EPA. FEELC achieved the highest possible rating of five stars from the North Carolina Department of Health and Human Services, Division of Child Development and Early Education. The center is accredited by the National Association for the Education of Young Children.

FEELC instills a sense of environmental stewardship into about 180 infants, toddlers, and preschoolers who are enrolled at the center. From the first day, the center's program has emphasized nature as a third teacher. Environmental stewardship begins early, and sustainability permeates both the program and operations. The FEELC grounds have many gardens, including an edible garden that is harvested for meals.

In calendar year 2015, more than 800 pounds of fruits and vegetables were grown by, and for, the children in the center's Seed to Table garden. In addition, FEELC has a sensory wall of herbs for touching, sniffing, and tasting, connecting children with nature from a very young age.



Natural areas abound for exploration, and found objects are made into art that hangs from ceilings and walls. Even the roof is put to good use — solar panels, installed by a local power company, generate enough power for 120 households, which further invites discussion and learning for the children. Water from the roof is collected into cisterns and barrels, with more than 3,000 gallons in overall capacity used to water the grounds and gardens.

FEELC has a wealth of natural habitat that children explore and teachers integrate into lesson plans. In calendar year 2016, honeybee hive sites were established around the campus. The preschoolers decorated hives and learned about pollinator health. Mason and cutter bee boxes were also installed and maintained to further support pollinator habitat and associated environmental education. A monarch butterfly garden was designated by moving existing milkweed plants from the NIEHS campus to the child care center to further promote children's education on pollinators.

In addition, the rain garden collects stormwater runoff, allowing teachers to incorporate lessons about rain, water quality, and plant wet/dry habitat.

A camera has been rotated among several campus locations to better understand the variety and distribution of nocturnal wildlife. For example, raccoons raiding turtle nesting sites has been documented. High-quality photographs will be used by FEELC and the North Carolina Museum of Natural Sciences to help in their wildlife monitoring program and outreach efforts. The center and ongoing NIEHS environmental education efforts contribute to institute-wide efforts to inspire and develop future champions of the environment.

### **Good Neighbor: Climate Resilience Planning**

HHS presented NIEHS with a Green Champion Award for climate resilience planning in FY 2016. The climate resilience team worked collaboratively to identify vulnerabilities, determine impacts and stakeholders, and develop resilience measures in the event of severe weather events. The effort required extraordinary teamwork and consensus building to prioritize, score, and rank vulnerabilities and resilience measures. The effort supports E.O. 13693, requiring facilities to develop plans that integrate weather and climate considerations into agency operations.

### **Community Engagement**

In FYs 2015 and 2016, NIEHS engaged in community-focused initiatives, locally, nationwide, and globally, to promote healthy sustainable environments. Through community engagement activities, the institute has forged connections, and engaged in dialogue and activities that promote a sustainable, healthy future for all. These activities are organized around the following themes.

- Forging connections to create a healthier future.
- Employee wellness and enrichment.
- Healthy North Carolina communities.
- Engaging communities nationwide.
- Global environmental health.

These community engagement themes and accompanying activities represent only a small sample of the wide array of NIEHS community engagement activities that occurred in FYs 2015 and 2016. The Environmental Factor, the NIEHS monthly online newsletter, covers many of the activities, both on campus and elsewhere.





## Forging Connections

NIEHS collaborates widely to create a healthy, sustainable future. In FY 2015, NIEHS forged connections with scientists, policymakers, nonprofit groups, and unions, to further alleviate negative human, animal, and environmental health impacts from climate, animal testing, and the Gulf of Mexico oil spill.



FY 2015

### **Changing Climate Toolkit**

Virtual

NIEHS Senior Advisor for Public Health John Balbus, M.D., coauthored Primary Protection: Enhancing Health Care Resilience for a Changing Climate, a part of President Obama's Climate Action Plan. The guide offers health care providers and system managers, public health professionals, and policymakers a set of approaches for enhancing the resilience of health care systems to climate impacts.

### **NIH Public Forum on Animal Use in Safety Testing**

Bethesda, Maryland

Members of the Interagency Coordinating Committee on the Validation of Alternative Methods discussed alternatives for chemical and product safety testing during the NIH public forum on animal use in safety testing. Twelve public participants, 100 webcast viewers, and 15 committee members discussed subjects such as transparency in the industry's reporting of animal use, training for regulators on available non-animal methods and strategies, and communication with the public on the science behind non-animal testing methods.

### **Virtual Forum on Roadway Air Pollution**

Virtual

NIEHS helped to broaden public understanding of air pollution health impacts by hosting a virtual forum, Near-Roadway Pollution and Health. More than 300 participants viewed the forum. Panelists addressed questions sent in from across the country by email and Twitter.

### **HHS Climate Justice Conference: Responding to Emerging Health Effects Conference**

Research Triangle Park, North Carolina, and Virtual

More than 100 scientists, public health professionals, and community members from across the nation converged on NIEHS for the 2015 HHS Climate Justice Conference, Responding to Emerging Health Effects. The event attracted attendees from federal, state, and local agencies, as well as representatives of community nonprofit groups and unions, with 55 more participating by webcast.

### **Gulf of Mexico Oil Spill and Ecosystem Science Conference**

Houston, Texas

Researchers from more than 35 states and 20 countries met in Houston to focus on results from oil spill, ecosystem, and public health research, five years after the Deepwater Horizon disaster. The 2015 Gulf of Mexico Oil Spill and Ecosystem Science Conference attracted representatives from 140 universities, 80 companies, and 17 government agencies. About 1,000 people participated in sharing the results of research and application of findings. Also, several NIEHS grantees presented their research at the conference.



## Employee Enrichment

As a part of the guiding principles for environmental stewardship and sustainability, NIEHS promotes workforce wellness and quality of work life by integrating the development of buildings and grounds with the natural environment, promoting indoor environmental quality, and hosting events, such as the following.

### FY 2015

#### **NIH Postbac Poster Day**

Bethesda, Maryland

NIEHS sent four postbaccalaureate Intramural Research Training Award fellows to NIH Postbac Poster Day at the NIH campus in Bethesda. All four expressed excitement about incorporating research into their career paths.

### FY 2016

#### **Earth Week Observances**

Research Triangle Park, North Carolina

The NIEHS celebration of Earth Day, officially observed on April 22 each year, encompassed a full week of activities around the theme “Then, Now, and Next,” inspired by the NIEHS 50th anniversary. Earth Week events included an electronics and small appliance recycling pickup, and multiple presentations and interactive talks on environmental topics, including implementing residential solar power and controlling invasive species.

#### **Bring Your Kids to Work Day: Explore Urban Gardening**

Research Triangle Park, North Carolina

NIEHS incorporated hands-on discovery activities during its annual Bring Your Kids to Work Day. These activities centered on the theme of urban gardening, providing the almost three dozen children with first-hand experience in the scientific process. For example, one activity focused on introducing children to soil nutrients by having them perform soil tests for potassium, nitrogen, and acidity.



## Engaging Regional Communities

The guiding principles for environmental stewardship and sustainability state that NIEHS will comply with all applicable federal, state, and local environmental laws, statutes, regulations, and other environmental requirements. The institute goes beyond compliance by engaging directly with the community, including local teachers, university students, professors, junior leaders, and others in a variety of events related to environmental stewardship, some of which are shown below.

### FY 2015

#### **Training to University Students and Teachers**

Research Triangle Park, North Carolina

The NTP Pathology Support Group provided state-of-the-art laboratory facilities and training to student researchers from the North Carolina Agricultural and Technical State University. Participants learned the latest techniques for collecting, processing, sectioning, and staining biological samples.

#### **Science, Teachers, and Research Summer Institute**

Research Triangle Park, North Carolina

NIEHS hosted an energetic group of North Carolina public school teachers for the two-week Science, Teachers, and Research Summer Institute. The nine teachers took part in hands-on laboratory research, science talks, facility tours, and discussion sessions.

#### **America Recycles Day**

Research Triangle Park, North Carolina

NIEHS employees celebrated America Recycles Day by picking up trash from a 1.2-mile stretch of Hopson Road, bordering the NIEHS campus. The lunchtime outing was part of the North Carolina Adopt-A-Highway Program, a long-standing effort to reduce litter on local roadsides and preserve the natural beauty of North Carolina.

### FY 2016

#### **Community Forum on Gene-Environment Interaction**

Research Triangle Park, North Carolina

NIEHS celebrated 50 years of environmental health research with a community forum, held for the first time in its own backyard. The sold-out event drew more than 300 people who wanted to learn more about the topic of gene-environment interactions. Speakers included Linda Birnbaum, Ph.D., NIEHS and NTP director; and four local scientists — Susan Sumner, Ph.D., RTI International; Dave Peden, M.D., University of North Carolina at Chapel Hill; Heather Patisaul, Ph.D., North Carolina State University; and Joel Meyer, Ph.D., Duke University.

#### **Developing Local Junior Leaders**

Research Triangle Park, North Carolina

Twenty-five sophomore students from high schools across Durham, North Carolina spoke with scientists at NIEHS to gain a better understanding of environmental health issues. The visit was organized by Junior Leadership Durham, a nonprofit, community-wide program designed to shape the future of high school students by promoting teamwork, developing leadership skills, and fostering self-confidence and personal growth.

#### **Science in the Cinema**

Raleigh, North Carolina

About 200 kids and parents attended the first-ever Science in the Cinema event, hosted by NIEHS at the Marbles IMAX Theatre. A free screening of the movie "WALL-E" was followed by hands-on activities led by institute scientists and staff, highlighting some of the environmental topics raised in the film.

#### **Women's Health Awareness Day**

Durham, North Carolina

NIEHS sponsored the second annual Women's Health Awareness Day, which attracted nearly 600 to North Carolina Central University. The event provided health awareness, education, information, resources, and on-site screenings to inform and empower women to take responsibility for their health.

#### **NIEHS Teacher Training Pathways**

Research Triangle Park, North Carolina

Two groups of science teachers gathered at the institute for training sessions sponsored jointly by NIEHS and North Carolina Association for Biomedical Research. Over the 21 years of partnership between the two organizations, more than 700 North Carolina science teachers and administrators have received training through Rx for Science Literacy workshops.

## Engaging Communities Nationwide

Beyond complying with applicable federal environmental laws, statutes, regulations, and other requirements, the institute engages with communities, nationwide, to promote environmental stewardship and sustainability. Below are just a few of the many events and programs that promoted environmental justice and health with diverse communities in FYs 2015 and 2016.

### FY 2015

#### **Tribal Forum**

Tucson, Arizona

Representatives of more than 20 tribes joined members of the University of Arizona Southwest Environmental Health Sciences Center and NIEHS for a tribal forum.

The institute regularly holds community forums around the country to learn about local environmental health concerns and to share research. With a focus on environmental health challenges faced by Native Americans, the forum drew more than 115 tribal community members.

#### **Community Conversation on Toxic Risk, Climate Change, and Health**

Brooklyn, New York

NIEHS and NTP Director Linda Birnbaum, Ph.D., spoke at a community forum in Brooklyn. The series, which began in 1998, has featured NIEHS directors at grassroots meetings in communities across the nation. The forum featured Birnbaum and community leaders, in dialogue with members of the community, in what was billed as a post-Hurricane Sandy Community Conversation on Toxic Risk, Climate Change, and Health. The forum and afternoon bus and walking tour of Brooklyn's Sunset Park community were hosted by UPROSE, Brooklyn's oldest community-based Latino organization dedicated to environmental justice.

#### **White House Summit on Climate Change**

Virtual

The White House held a live webcast from Washington, D.C., to highlight data and innovation related to health and climate change. The event was part of a broader White House effort to raise awareness of the health implications of climate change, in recognition of National Public Health Week. NIEHS Senior Advisor for Public Health John Balbus, M.D., was on hand to demonstrate new online resources and to chair a panel on climate change and infectious diseases. Balbus and Kimberly Thigpen Tart, J.D., NIEHS program analyst, led the team that developed the health topic section of the U.S. Climate Resilience Toolkit website.

### FY 2016

#### **Appalachian Forum on Health Disparities**

Whitesburg, Kentucky

Birnbaum visited southeastern Kentucky for the Appalachian Health and Well-Being Forum. Before the event at the Letcher County Cooperative Extension Office, Birnbaum visited community groups, health organizations, and a clinic in the region. The University of Kentucky, which hosted the event, and other organizers targeted the Appalachian region's long-standing disparities in health and well-being by focusing the event on innovative programs, stories of success and lessons learned, and potential resources.

#### **Native American Health Forums**

Flagstaff, Arizona

Birnbaum received the Dr. Phillip L. Smith Award from the Native Research Network at the 26th Native Health Research Conference. Birnbaum and Symma Finn, Ph.D., NIEHS health scientist administrator, attended the Tribal Environmental Health Summit at Northern Arizona University.

#### **NIEHS Informs Federal Response to Flint Michigan Water Crisis**

Flint, Michigan

Nicole Lurie, M.D., HHS Assistant Secretary for Preparedness and Response (ASPR), called on NIEHS to provide scientific leadership and coordination of the research efforts focused on the environmental emergency of drinking water lead contamination in Flint. The institute led the federal science response for the ASPR Science Preparedness Research Interagency Team, communicating findings of the NTP review of low-lead effects on children; supporting the incorporation of new lead priorities into the President's Task Force on Children's Environmental Health; reviewing new proposals for time-sensitive and researcher-initiated grantees; working with current grantees to use their resources and connections to address community concerns; and funding health and safety training for workers who remove corroded lead pipes.



## Global Collaboration

NIEHS provides global leadership in environmental stewardship by hosting and participating in global forums and conferences related to environmental sustainability and stewardship, focused on hazardous electronic-waste, also known as e-waste; climate and health; environmental health; and international climate accords. Following are a few of the forums held in FYs 2015 and 2016 related to global environmental stewardship.

### FY 2015

#### **Global Collaboration to Combat E-waste**

West Java, Indonesia

NIEHS and the World Health Organization (WHO) convened a workshop in Indonesia focused on strategies to reduce exposure to e-waste. Collaborators included the Chulabhorn Research Institute in Thailand; the Children's Health and Environment Program at the University of Queensland, Australia; and U.S.-based nonprofit Pure Earth. The workshop followed the 16th International Conference of the Pacific Basin Consortium for Environment and Health held at the University of Indonesia in West Java. At the conference, NIEHS and WHO co-chaired a panel on e-waste.

#### **Understanding Climate and Health Associations in India**

New Delhi, India

NIEHS collaborated with organizers in India to host a training workshop, Understanding Climate and Health Associations in India. The event was held to raise awareness and train public health researchers and professionals on the health impacts of climate change.

### FY 2016

#### **Global Environmental Health Day**

Research Triangle Park, North Carolina

As part of the yearlong celebration of the NIEHS 50th anniversary, 120 attendees, including scientists, policy experts, public health practitioners, fellows, and others, gathered at the institute for Global Environmental Health Day. Nearly 70 attendees joined by webcast.

#### **NIEHS Global Health Representative Attends Paris Climate Talks**

Paris, France

NIEHS played a key role in highlighting the potential impacts of climate change on health and health care facilities at the Paris climate talks November 30 through December 12. The topic received more attention than ever before, according to Balbus, a participant in several events.

#### **NIEHS Worker Training Program on Infectious Disease Prevention and Responses**

Research Triangle Park, North Carolina

The NIEHS Worker Training Program brought together veteran worker safety training experts to discuss training needs for future infectious disease outbreaks, ranging from influenza and Ebola, to newly emerging biological threats. The innovative approach targets workers, beyond direct health care providers, to train others who might be affected by an infectious disease outbreak, such as lab technicians, janitors, garbage handlers, first responders, and morticians.

#### **NIEHS Public Service Officers Support Ebola Public Health Crisis**

Margibi County, Liberia

NIEHS staffers, Commander Debra King and Lieutenant Commander John McLamb, spent two months at the Monrovia Medical Unit in Liberia, during the Ebola public health crisis. King, a medical technologist in the NTP Cellular and Molecular Pathology Branch, was the lead for the on-site clinical laboratory, where she performed testing for basic chemistry, hematology, malaria, and HIV, in collaboration with nearby off-site facilities where Ebola testing was performed. McLamb served as an infection control officer for the unit, ensuring that individuals who entered the hot zone were properly trained and outfitted in personal protective equipment.



## Looking Ahead

NIEHS continues to recognize the need to actively incorporate sustainable practices into everyday operations. In FYs 2015 and 2016, the institute began planning and implementing the following projects that will help to conserve resources for years to come.

- Planned and began construction of the net-zero energy warehouse, which is expected to be certified as Leadership in Energy and Environmental Design (LEED) Platinum. The warehouse will produce at least as much energy as it uses. The facility is the first of its kind at HHS.
- Began construction of a porous pavement fire lane adjacent to the net-zero energy warehouse to promote sustainable stormwater management and decrease unwanted runoff.
- Planning to add a fully electric vehicle to the NIEHS fleet and install an electric vehicle charging port. The electric vehicle will join a hybrid vehicle that is already a part of the NIEHS fleet. Staff will be able to use the electric vehicle for eco-friendly business transportation in the coming years.
- Planning the purchase of a new high-throughput laboratory cage/rack washer to replace an existing tunnel washer. The new cage washer will save about 115 gallons of water per wash and 550,000 gallons of water annually. In addition, the new equipment would require less electricity and natural gas than the existing tunnel washers, thus dramatically reducing emissions.
- To reduce water use on campus, NIEHS began a project to use greywater from the local, publicly owned treatment plant to support cooling tower operations. In addition, NIEHS began constructing a condensate capture system that will reclaim waste condensate water from air handling systems to support water cooling tower needs. Using greywater is expected to decrease industrial water use and reduce cooling tower water costs by 50 percent.
- Planning to upgrade an aging chiller with a much more energy-efficient one, which is projected to reduce energy consumption by almost 20 percent.

Through these initiatives, and ongoing sustainable operations and programs, NIEHS aims to meet and exceed all possible sustainability goals and targets in coming years. Through strategic planning, the institute will continue to integrate sustainability into everyday campus operations, supporting both the environment, the humans that depend on it, and the NIEHS mission.