

**National Institutes of Health
FY 2019-2020 Sustainability Implementation Plan**

Executive Summary *(Target 1 page)*

NIH has incorporated the fundamentals of sustainability into the daily operations of its campuses and facilities. This makes sustainability an integral part of the process at NIH instead of separate requirements. Energy and water use, building operations and maintenance, and central utility plant operations are monitored and reviewed to determine conservation measures and operational improvements. On construction projects, project officers coordinate with the Sustainability Branch in the pre-planning stage of project process to incorporate sustainability into the planning at the very early stages of the process.

Implementation Summary

1. Facility Management:

FACILITY ENERGY EFFICIENCY

Status FY 2017: 35% reduction from 2003 baseline
Projected Progress FY 2018: 2.5% reduction
Target FY 2019: 0.5% reduction

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p><i>Strategies: Summarize strategies employed to achieve progress and, where applicable, related savings, focusing on previous 1-2 years.</i></p> <p>Strategies: Energy efficiency investments in agency buildings. Install and monitor energy meters/submeters. Track monthly energy data in Portfolio Manager. Use this data to improve energy management and performance. These strategies have resulted in an overall reduction in energy use from the 2015 baseline of 4.6%.</p> <p><i>Note significant accomplishments, actions, initiatives, and/or projects started or completed in FY 2018.</i></p> <p>At Research Triangle Park (RTP), the agency's first net-zero building came on line. NIH is still waiting on final USGBC review to determine whether the project will be awarded Leadership in Energy and Environmental Design (LEED) Gold or Platinum.</p>	<p><i>If applicable, explain factors specific to agency operations that have had a material impact on agency strategy or progress (e.g., expansions or consolidations of operations, unique facilities, one-time or seasonal events).</i></p>	<p><i>Highlight priorities and OPDIV's areas of focus for coming year, including expected cost savings. Identify agency's top 3-5 strategic priorities and planned actions for FY 2019-20.</i></p> <p>Continue to maximize the use of cost effective Energy Savings Performance Contracts (ESPC)</p> <p>Continue to maximize the use of cost effective Utility Energy Savings Contracts (UESC)</p> <p>Incorporate energy efficiency into all construction projects, both for new construction and for renovations.</p> <p><i>Summarize core strategies - where will the OPDIV focus efforts to make continual progress?</i></p> <p>NIH will continue to utilize UESCs and ESPCs to facilitate continual progress in meeting energy reduction goals.</p>

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		<p><i>Note any major actions, initiatives, or projects planned in the next 1-2 years including estimated savings.</i></p> <p>NIH is currently renovating the E Wing of Building 10 which will substantially reduce the energy use of approximately 217,000 GSF.</p> <p>In 2019 NIH plans to award \$6.5M in performance contracting.</p> <p>In 2020 NIH plans to award \$2.5M in performance contracting.</p>
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EFFICIENCY MEASURES, INVESTMENT, AND PERFORMANCE CONTRACTING

ESPC and UESC investment amount / number of projects FY 2017: \$72M / Multiple projects

Projected investment amount / number of projects FY 2018: Approximately \$15M / One project

Target investment amount / number of projects FY 2019: Approximately \$6.5M / One project

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p><i>Summarize previous contract awards.</i></p> <p>Two large ESPC's (over \$30M) covering all NIH sites were completed in FY16. One large UESC project (over \$20M) covering multiple buildings was completed in FY16, and another was completed in FY17.</p> <p>Another UESC was completed for repair of economizers in the Central Utility Plant (CUP).</p>	<p>These projects are designed to improve efficiency and reduce energy and water consumption.</p>	<p>Summarize planned contract awards including FY 2020.</p> <p>In FY 2018, NIH is currently working on a \$15M performance contract for a multi-building lighting and water conservation project.</p> <p>For FY 2019 a \$6.5M performance contract for a thermal bridge project is planned to improve approximately 20 building on the NIH Bethesda Campus.</p> <p>For FY 2020, a projected \$2.5M performance contract for lighting and water conservation projects.</p>

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RENEWABLE ENERGY

Status FY 2017: 27.7% of total electricity use and a 16.8% total for electric and thermal energy

Projected Progress FY 2018: As needed to meet the requirements for renewable energy use

Target FY 2019: As needed to meet the requirements for renewable energy use

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
NIH has achieved targets for renewable energy purchases and is aggressively pursuing on-site solar renewable energy where feasible.	NIH has exceeded its mandated percentage of renewable energy by purchasing renewable energy credits (RECs) above requirements and is aggressively pursuing on-site solar renewable energy where feasible. NIH has been analyzing open space areas, parking garage roofs, and building roofs at the Bethesda, MD campus for large scale solar array potential, potentially as part of a UESC or Power Purchasing Agreement.	Purchase RECs to supplement installations and purchases of renewable energy, when needed to achieve renewable goals Analyze renewable energy projects for on-site application, particularly parking garages and remote site locations

WATER EFFICIENCY

Status FY 2017: NIH had a 14.8% increase in water use intensity compared to FY 2007

Projected Progress FY 2018: Approximately 4.3% reduction in water use intensity

Target FY 2019: To be determined

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
NIH had an unexpected increase in the use of water, well above the 2007 baseline. NIH identified two major issues leading to the increase in water use intensity for 2017. Strategies for resolving these issues are being assessed.	NIH continues implementation of UESC and ESPC projects signed previously which include implementation/construction of water metering, steam traps, condensate units, and fixtures to conserve water. The ESPC and UESC projects currently being implemented is expected to reduce water usage by approximately 4.3%.	Progress/accomplishments on water use efficiency and management include signing a UESC for RTP to use grey water from a nearby municipal waste water treatment plant for make-up water in cooling towers. This project is currently in the construction phase, and construction is expected to be complete in 2018.

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HIGH PERFORMANCE SUSTAINABLE BUILDINGS

Status FY 2017: 1.2% of buildings and 3.7% of gross square footage

Projected Progress FY 2018: To be determined.

Target FY 2019: To be determined.

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
NIH completed construction of the first NIH Net Zero Energy Building.		<p>Educate Operations and Maintenance & Planning staff on climate resilience issues and incorporate changes where appropriate.</p> <p>The NIH continues to target potential projects and Energy Conservation Measures (ECMs) through the Energy Management Branch (EMB). ECMs that promote increases in sustainable green buildings will be forwarded to preliminary and investment grade audits where feasible.</p>

WASTE MANAGEMENT AND DIVERSION

Status FY 2017: 54.9% Non-Hazardous Waste Diversion and 70.8% Construction & Debris Diversion

Projected Progress FY 2018: Maintain current levels of waste diversion

Target FY 2019: Maintain current levels of waste diversion (over 50% non-hazardous waste diversion and over 70% construction debris diversion)

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>In 2017, NIH achieved an agency-wide non-hazardous solid waste diversion Waste Goal Rate of 54.9%. The Waste Goal Rate includes a partial credit for Waste Converted to Energy Recovery (CWC). The agency-wide construction and demolition recycling diversion rate for FY 2017 remained strong at 71%.</p> <p>Installed upgraded recycling containers and messaging for the</p>	<p>The NIH Policy 3032 – WASTE MINIMIZATION AND MANAGEMENT AT THE NIH is the cornerstone for a robust and innovative waste management program to continually promote ‘reduce, reuse and recycle’ of all waste including hazardous and non-hazardous waste.</p>	<p>Re-establish collaborative meetings with Division of Emergency Management (DEM), Division of Occupational Health and Safety (DOHS) and Division of Environmental Protection (DEP) to clarify joint responsibilities within or adjunct to the new risk-based Emergency Plan.</p> <p>Finalize DOT HazMat security Plan.</p>

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<p>Clinical Center to meet Joint Commission life safety standards.</p> <p>Updated recycling signage for glass, metal and plastic on all commingle bins to increase recycling and avoid contamination.</p> <p>Instituted the Waste Discharge Authorization process to review/document the potential use of the sanitary sewer for specific liquid waste disposal.</p>		<p>Continue scheduled environmental audits at NIH facilities.</p> <p>Implement pilot of soft plastic film recovery at receiving areas and recycling of saline and water irrigation plastic bottles and rigid packaging of medical devices in DPM operating rooms.</p> <p>Continue to implement web-based waste disposal authorization process.</p> <p>Continue to participate in NIH Environmental Management System (NEMS) outreach events and promote the many waste management programs.</p> <p>Planning to implement pre-consumer cafeteria waste composting (estimating 12-24 tons/yr)</p> <p>Continue search for compost facility capable of handling 100 tons/month for composting animal bedding.</p> <p>Update Construction and Demolition Debris outreach program for construction Project Managers.</p> <p>Continue award winning solvent recovery and chemical recycling program and investigate acquiring a second solvent recycling unit.</p> <p>Update the NIH Policy 3032 and the NIH Waste Disposal Guide.</p> <p>ORF will conduct a non-regulatory 10 point checkup at select laboratories in preparation of the annual Maryland Resource Conservation and Recovery Act inspection.</p> <p>Complete review of MPW/SMW (Medical Pathological</p>
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		<p>Waste/Special Medical Waste) alternative treatment technologies for the Bethesda area.</p> <p>NIH is working with the Bioscience community on materials recovery.</p> <p>NIH employee participation via Institute/Center Green Teams and the Sustainable Lab Practices Working Group & Earth Day events will remain the primary approach to further reduce and eliminate waste.</p>
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2. Fleet Management:

TRANSPORTATION / FLEET MANAGEMENT

Status FY 2017: Achieved a 79% reduction in petroleum based fuel from FY 2005 baseline

Projected Progress FY 2018: Approximately 83% reduction in petroleum based fuel from FY 2005 baseline

Target FY 2019: Maintain or exceed 83% reduction levels for petroleum based fuels from FY 2005 baseline (previous EO13514 target)

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>NIH has achieved targets for alternative fuel vehicle purchases and is pursuing the use of electric vehicles where feasible.</p> <p>NIH has achieved targets for reducing greenhouse gas emissions annually and will continue to pursue greenhouse gas emission reductions.</p>	<p>NIH continues to aim for previous targets established by EO 13514, EO 13693, and Energy Policy Act of 2005.</p>	<p>NIH will continue to maximize the use of alternative fuel vehicles.</p> <p>Use a FMIS to track real-time fuel consumption.</p> <p>Continue current practice to place Hybrids and electric vehicles in locations that do not have access to the onsite alternative fuel capabilities.</p> <p>Purchase 4 electric vehicles.</p> <p>Implement vehicle idle mitigation technologies. Contact all end users if vehicles idle more than 5% of their usage.</p>

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3. Cross-Cutting:

SUSTAINABLE ACQUISITION / PROCUREMENT

Status FY 2017: To be determined number of contract actions/dollar volume of contracts

Projected Progress FY 2018: To be determined

Target FY 2019: To be determined

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>NIH purchases biobased fuels to support the fleet management program. NIH uses E85, an 85% ethanol, 15% gasoline blend, for all of its alternative fuel vehicles. Additionally, 100% of the diesel fuel acquired is a biobased B20 diesel fuel.</p> <p>All NIH contracts include green purchasing requirements.</p> <p>NIH acquisition personnel must take green purchasing training.</p> <p>New ULT freezers purchased at NIH must be Energy Star Certified.</p>	<p>The NIH Division of Environmental Protection (DEP) and the Division of Scientific Equipment and Instrumentation Services (DSEIS) conducted research to collect data on the energy consumption of a variety of Ultra-Low Temperature (ULT) freezers in various locations in NIH facilities. This data was submitted to the EPA to support EPA studies regarding ULT freezer energy utilization. However, by the time that NIH was ready to issue the Freezer Management Manual Chapter, EPA had not established Energy Star for ULT freezers. Therefore, NIH established its own threshold for energy efficiency through the Division of Environmental Protection's annual assessment of available ULT freezers. EPA has since added ULT freezers to the Energy Star Program. DEP updated the ULT purchasing requirements so that all new ULT freezers purchased at NIH must be Energy Star Certified. DEP and DSEIS have used a multimedia approach to communicate the new Energy Star requirement,</p>	<p>NIH will expand the freezer policy to lab grade freezers and specifically require that all new lab grade freezers that are purchased at NIH to be Energy Star Certified.</p>

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	including articles, presentations and exhibits, for the successful transition of the purchasing process	
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ELECTRONICS STEWARDSHIP

Status FY 2017: 95% procurement of Energy Star or FEMP designated energy-efficient products)

Projected Progress FY 2018: Maintain current levels

Target FY 2019: Maintain current levels (At least 99.9% of monitors, PCs, and laptops acquired meet environmentally sustainable electronics criteria; 97.4% of computers, laptops, and monitors have power management features enabled; 100% of electronics disposed using environmentally sound methods, including GSA Xcess, Computers for Learning, Unicor, U.S. Postal Service Blue Earth Recycling Program, or Certified Recycler.)

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>At least 95% of monitors, PCs, and laptops acquired meet environmentally sustainable electronics criteria (EPEAT registered)</p> <p>100% of computers, laptops, and monitors have power management features enabled.</p> <p>100% of disposed electronics were processed using environmentally sound methods, including GSA Xcess, Computers for Learning, Unicor, U.S. Postal Service Blue Earth Recycling Program, or Certified Recycler (R2 or E-Stewards).</p> <p>From 2011 to 2016, NIH has closed 54 of its 108 data centers: 9 of 42 (21%) of Tiered data centers and 45 of 66 (68%) of non-Tiered data centers. NIH closed six data centers in FY 17 and plans to close an additional 15 data centers by FY 2020.</p>		<p>NIH plans to increase awareness of Electronic Product Environmental Assessment Tool (EPEAT) purchasing and maintain acquisition and end-of-life compliance.</p> <p>Work with NIH Acquisitions communities to ensure procurement of equipment that meets sustainable electronics criteria.</p> <p>Implement automatic duplexing and other print management features on all eligible agency computers and imaging equipment; measure and report compliance.</p> <p>Ensure environmentally sound disposition of all agency excess and surplus electronics, consistent with Federal policies on disposal of electronic assets, and measure and report compliance.</p> <p>Improve tracking and reporting systems for electronics stewardship requirements through the lifecycle.</p> <p>The data center owners and cloud contract holders will identify opportunities for cost savings.</p>

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		<p>Consolidate data centers that no longer adequately support the mission.</p> <p>Evaluate NBS cloud solution.</p> <p>Start education campaign to help Intramural, Extramural and Administrative organizations better understand how cloud computing can support their missions.</p> <p>Evaluate the tiered NIH data centers for their ability to meet OMB efficiency targets and invest in the necessary facility upgrades.</p> <p>Evaluate tiered and non-tiered NIH locations and develop a plan to distribute the servers and storage from the closing locations to either a suitable cloud environment or to remaining tiered data centers.</p> <p>The data center owners work with facility managers to identify and mitigate deficiencies.</p> <p>Data Center Optimization Initiative (DCOI) requires that a Data Center Energy Practitioner (DCEP) be assigned to each Tiered Data center. NIH will recruit, train and assign a DCEP to each Tiered data center.</p>
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GREENHOUSE GAS EMISSIONS

Status FY 2017: 39.8% Scope 1 and 2 reductions compared to FY 2008)

<i>Implementation Status</i>	<i>Operational Context</i>	<i>Priority Strategies & Planned Actions</i>
<p>The NIH goal is to reduce Scope 1 & 2 GHG 43% by FY2025 from the FY2008 baseline. In FY2017 NIH had a total GHG reduction of 39.8% from the FY2008 Baseline. NIH is on track to meet and exceed the 2025 goal.</p>	<p>The NIH Scope 1 & 2 GHG increased approximately 10% from FY2016 to FY2017. The increase is due to a change in how reductions from purchased renewable energy are calculated in the Department Of Energy</p>	<p>The CUP has a monitoring system that identifies and displays real time operational recommendations. This allows the CUP to be proactive with maintenance rather than reactive.</p> <p>Analyze and improve building operations and maintenance to optimize energy efficiency.</p>

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<p>NIH continues to utilize UESC and ESPC vehicles to reduce energy consumption and the associated GHG. NIH completed \$19M ESPC at Ft. Detrick and completed \$9M UESC at Bethesda. It is anticipated that the Ft. Detrick ESPC will further reduce the GHG approximately 3.4%.</p>	<p>Federal Energy Management Program reporting tool for energy and GHG.</p>	<p>NIH will continue to focus on reducing plug loads through ULT freezer management and “The Unplug and Turn-Off” campaign.</p> <p>NIH will update the ULT freezer management policy to expand the policy to lab grade freezers and lab grade refrigerators to reduce electricity consumption from this equipment. NIH will continue to conduct ULT freezer inspections to identify opportunities for energy conservation and help freezer owners implement initiatives.</p> <p>NIH will continue to monitor the Scope 1 and 2 GHG reduction. Once NIH has achieved a 43% reduction, personnel will meet and identify whether there should be a new target and, if so, the new target number.</p>
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4. Agency-Specific Priorities:

Incorporate net-zero Energy, Waste and Water into future projects by including net-zero requirements in updates of facility Master Plans.

Currently working on an assessment tool to determine the health and wellness of NIH buildings and to identify candidate buildings for possible Fitwel certification.

Notable Projects and Highlights

NIH completed construction of the first NIH Net Zero Energy Building, a 26,613 square foot warehouse, on the National Institute of Environmental Health Sciences (NIEHS) campus in Research Triangle Park (RTP), NC. The building will use natural gas and imported electricity along with 382 photovoltaic solar panels, with an estimated production of 182 MWh per year, to offset source energy consumption. The building is slated to be a LEED Platinum facility. Other features include: precast concrete insulated

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panels; low-e window glazing; exterior window shading; daylight harvesting for occupied spaces; and variable refrigerant flow for HVAC. The project is also expected to be awarded a LEED Platinum certification.

NIH implemented the following initiatives to reduce electricity consumed by ULT freezers throughout FY17.

- Updated NIH ULT freezer purchasing policy under which all new ULT freezers purchased at NIH must be Energy Star Certified.
- Held a ULT freezer show where manufacturers displayed Energy Star Certified freezers.
- Distributed flyers detailing how to conserve energy from ULT freezers at festivals and new hire orientations.

- Completed inspections to determine the baseline percentages of freezers that are being maintained and managed properly. Worked with the freezer owners to correct deficiencies identified in the inspections.

The NIH Bethesda Campus CUP focused on reducing electricity and or natural gas fuel consumption by completing the following projects in FY17:

- Steam Condensing Turbines 21, 22, and 23 operational.
- Added side stream filtration on Cooling Towers 17, 18, 19.
- Re-bedded side stream filtration on Cooling Towers 20 and 21.
- Replaced Cogeneration Combustion Turbine.

NIH supported the HHS plug load reduction campaign to reduce electricity consumption.

- Unplug and power down posters were posted throughout each NIH campus.
- Plug load reduction presentations were given to multiple working groups including the NIH Sustainability Management Team (SMT), Green Team Leads Council and Sustainable Laboratory Practices Working Group.