

APPENDIX E: BNL SITE SUSTAINABILITY PLAN:
STATUS SUMMARY FOR FISCAL YEAR 2021

Prior Department of Energy Goal	Current Performance Status	Planned Actions & Contributions
Energy Management		
Reduce energy use intensity (Btu per gross square foot) in goal-subject buildings.	FY21 energy intensity was nearly identical to the base year of 2015: 243,174 Btu/GSF vs. 243,031, respectively.	A second Utility Energy Services Contract-II (or self-funded) effort focused on Building HVAC controls, temperature set-back, re-heat minimization, and lighting. Increased emphasis on temperature set-back policy.
EISA Section 432 continuous (four-year cycle) energy and water evaluations.	269,325 sq. ft. were audited in FY21.	Continue audits meeting the four-year cycle.
Meter individual buildings for electricity, natural gas, steam, and water, where cost-effective and appropriate.	Twelve new smart meters were added in FY21. Ninety-nine percent of electricity, 100 percent of natural gas, and 90-plus percent of steam are metered. Most potable water is used for cooling tower make-up. Metering was about 30 percent of cooling tower make-up and adding meters regularly.	Continue maintaining and expanding metering installations, with an emphasis on potable water make-up for cooling towers.
Water Management		
Reduce potable water use intensity (gallons per gross square foot).	Potable-water usage fell from 931 million gallons/year in FY99 to about 304 million gallons/year in FY21, a reduction of 67.4 percent. BNL's annual water use intensity has decreased from 101 gallons per square foot to 63.2 gallons per square foot, a 37.5 percent water usage reduction since base-year.	<ul style="list-style-type: none"> • Commissioning of Well No. 12 in early FY22 • BNL will continue to implement BNL's Water Management Plan and reduce water usage by implementing best-management practices. • BNL will continue to utilize water-efficient processes and plumbing fixtures to conserve water in new construction buildings and renovations.
Reduce non-potable freshwater consumption (Gal) for industrial, landscaping, and agricultural.	BNL does not have any industrial landscaping.	N/A
Waste Management		
Reduce non-hazardous solid waste sent to treatment and disposal facilities.	BNL continues its successful waste diversion program, exceeding the DOE goal by continuing to divert more than 50 percent of material from the municipal solid waste stream for recycling or reuse during FY21. BNL continued its Pollution Prevention Opportunity Program for FY21 to identify and promote new ideas for waste reduction, recycling, and reuse.	<ul style="list-style-type: none"> • BNL will open discussions with the site's current waste hauler regarding options for transfer of municipal solid waste (MSW) from landfills to a Waste-to-Energy facility in order to evaluate the feasibility of the change. Diversion of this waste stream would make BNL a net-zero site. • EPD will refocus the Pollution Prevention Program towards ideas that divert MSW and/or otherwise directly contribute to any of the SSP goals and will capture the contributions from these projects in future Site Sustainability Plan reporting. • BNL's internal procedure (SBMS subject area Pollution Prevention) and the associated website will be revised in FY22 to better reflect the current direction of the applicable executive orders.

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Waste Management (Continued)		
Reduce construction and demolition (C&D) materials and debris sent to treatment and disposal facilities.	<ul style="list-style-type: none"> Demolition of Building 650 (Former Hot Laundry) and Building 421 (Structural Biology Office) included contracts for offsite crushing and reuse of concrete, as well as collection of uncontaminated metal for recycling. Most of the Building 650 waste was handled as low-level radioactive waste. The project also generated unrecyclable waste that was landfilled. BNL has better defined its C&D baseline and can now identify areas for improvement. 	<ul style="list-style-type: none"> Reduction efforts will be challenging as site expansion will increase overall generation rates. BNL will look for opportunities to increase the percentage of C&D recycled but may not be able to reduce the total amount generated. BNL will assess how effectively Facilities & Operations C&D debris dumpsters are managed to determine if efforts to improve segregation of recyclables is justified. Numerical improvement goals will be developed if deemed worthwhile.
Fleet Management		
Reduce petroleum consumption.	Flex Fuel vehicles will only be assigned E-85.	Order more alternative fuel vehicle (AFVs) as they become available.
Increase alternative fuel consumption.	Flex Fuel vehicles will only be assigned E-85.	Order more AFVs as they become available.
Acquire alternative fuel and electric vehicles.	Order more AFVs when they are available for the type of vehicle needed.	Order more AFVs as they are available for the type of vehicle needed.
Clean & Renewable Energy		
Increase consumption of clean and renewable electric energy.	<ul style="list-style-type: none"> Purchased 24,000,000 kWh of renewable energy certificates (REC) for FY21. Northeast Solar Energy Research Center (NSERC) Solar PV array produced 605,125 kWh. 	<ul style="list-style-type: none"> Increase purchase of REC's. Maintain and improve NSERC output. Look for additional opportunities locally and on-site.
Increase consumption of clean and renewable non-electric thermal energy.	Biofuel use in off-road utility vehicles	Increase biofuel use, potentially in satellite hot water or steam heating systems on site.
Sustainable Buildings		
Increase the number of owned buildings that are compliant with the Guiding Principles (GP) for Sustainable Buildings.	Currently eight buildings have achieved 100 percent of the 2008 GP's and an additional nine buildings are considered meeting them as they have achieved LEED Gold or higher status. This represents 15.3 percent of non-excluded buildings.	As BNL constructs new buildings and demolishes old non-compliant buildings, this percentage will increase.
Acquisitions and Procurement		
Promote sustainable acquisition and procurement to the maximum extent practicable, ensuring all sustainability clauses are included as appropriate.	BNL fully assessed its sustainability program during 2021 with a focus on identifying weakness and areas for improvement. The resulting corrective actions set the stage for program improvements during 2022. The types of improvements identified mainly include the development of better tools for requisitioners.	During 2022, BNL will continue to develop the Commonly Ordered Items page, provide E- Buy training specific to Environmentally Preferable Purchasing (EPP) requirements, and provide support to requisitioners with questions. BNL will also review and rewrite the Pollution Prevention (P2) Subject Area and Environmental Protection Division (EPD) P2 webpage, incorporating the improvements identified during the 2021 Sustainability Assessment. Specific actions are tracked with BNL's Integrated Operational Performance System and are designed to provide requisitioners improved tools for EPP conformance.

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Efficiency & Conservation Measure Investments		
Implement life-cycle cost effective efficiency and conservation measures with appropriated funds and/or performance contracts.	Internally funded energy conservation and sustainability related initiatives include a continuation of best practices, with continued emphasis on temperature setback during unoccupied periods.	Re-evaluate the UESC II project and other potential initiatives using updated energy cost escalation factors. BNL will also revisit the UESC II scope to aggressively address energy and greenhouse gas (GHG) savings.
Electronic Stewardship		
Electronics stewardship from acquisition, operations, to end of life	The Lab will continue to require that all printers, laptops, and desktop computers ordered through the E-Pro system have an Electronic Product Environmental Assessment Tool (EPEAT) "Gold" certification as well as internal reuse efforts.	<ul style="list-style-type: none"> • Maintain the current, successful program and reestablish Home Electronics Collection Days when COVID staffing restrictions are lifted and personnel can return to the BNL site. • Investigate cause of EPEAT conformance decrease during 2021 and correct for 2022. • BNL has plans to increase communication around the Environmental Management System (EMS) in general during 2022. Those communications will focus on general sustainability topics, including messages to staff about purchasing EPEAT conforming electronics.
Increase energy and water efficiency in high-performance computing and data centers.	Additional metering was installed in some of the existing data centers. The new data center in Building 725 was essentially complete in 2021. The design is expected to result in PUE of less than 1.3.	<p>Meeting the power usage effectiveness (PUE) of 1.5 for the existing data centers will likely require a significant investment. Four of the eight existing data centers require the installation of new metering, which is in progress. BNL will work to determine the best approach, including consolidation of data centers.</p> <p>Evaluate the new data center performance.</p>
Organizational Resilience		
Implement climate adaptation and resilience measures. Ensure BNL's Mission Essential Function # 13 is included in the COOP Plan.	Continue to implement resiliency measures as part of DOE Order 150.1A.	<p>Current planning efforts include:</p> <ul style="list-style-type: none"> • Development of a Continuity of Operations (COOP) Plan template for the six BNL Mission Essential Functions to utilize and develop their programmatic COOP Plans. Develop and implement Senior Leadership Delegation of Authority training. • Create COOP event matrix for declaring a COOP event. • Develop COOP Coordinators notification list. • Develop, implement, and update current COOP Plan to comply with the new DOE Continuity of Operations Order 150.1B.

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Multiple Categories		
Reduce Scope 1 & 2 greenhouse gas emissions.	<p>According to the Department of Energy Sustainability Dashboard, BNL's Scope 1 & 2 emissions for FY21 were 167,520 MtCO₂e, less than 18.5 percent relative to the 2008 baseline.</p> <p>BNL's electricity purchases included 45 percent clean hydropower for FY21, as well as 22 million kWh of REC's.</p>	<p>Continued efforts for Energy Intensity Reductions through UESC's, Energy Savings Performance Contracts (ESPC's), and other methods including self-funding. Continued hydropower allocation, REC purchases for the operation of the NSERC Solar photovoltaic (PV) array.</p> <p>Meeting the goal may be difficult in the near-term (2028– 2030+) due to increased electrical load associated with Electron Ion Collider and the new data center.</p> <p>However, New York State's aggressive energy goals as part of the Climate Leadership and Community Protection Act (CLCPA) will result in dramatic reductions of BNL's Scope 2 emissions, and to a lesser extent Scope 1.</p>
Reduce Scope 3 greenhouse gas emissions.	<p>COVID-19 restrictions that limited domestic and foreign air travel trips to those which were mission critical, and the fact that 67 percent of employees teleworked over the course of the year, are the primary reasons for the 26.1 percent drop in the Laboratory's Scope 3 GHG emissions.</p>	<p>The Laboratory's "New Telework and Remote Work Policy," announced on October 25, will affect reductions in commuting GHGs in FY22 and beyond. Since Laboratory use of Microsoft Teams and Zoom virtual communication tools during the pandemic has shown they can serve as effective alternatives to travelling to meetings, seminars, and conferences, EPD plans to work with the subject matter expert for the Domestic Travel and Foreign Travel subject areas on possible revisions to the guidelines that Department Chairs and Division Managers use to determine if travel requests are appropriate and feasible.</p>