DOE/ID-11383
Revision 14
INL/RPT-22-66637

U.S. Department of Energy
Idaho Operations Office

FY 2023 Idaho National Laboratory Site Sustainability Plan

December 2022

Idaho National Laboratory

INTENTIONALLY BLANK

DOE/ID-11383
Revision 14

FY 2023 Idaho National Laboratory Site Sustainability Plan

December 2022

Prepared for the
U.S. Department of Energy
DOE Idaho Operations Office

INTENTIONALLY BLANK

FY 2023 Idaho National Laboratory Site Sustainability Plan

DOE/ID-11383
Revision 14

December 2022

Approved By:

Robert Boston
Manager, Idaho Operations Office

11/30/2022
Date

Approved By:

Maria M. Mitchell-Williams
Digitally signed by Maria M. Mitchell-Williams
Date: 2022.11.30 12:55:40 -07'00'

Connie M. Flohr, Manager
Idaho Cleanup Project

Date

Approved By:

John C. Wagner, Ph.D.
Director, Idaho National Laboratory
and President, Battelle Energy Alliance, LLC

11/28/22
Date

Approved By:

L. Ty Blackford
President/Program Manager
Idaho Environmental Coalition, LLC - ICP

11/28/2022
Date

INTENTIONALLY BLANK

EXECUTIVE SUMMARY

The mission of the U.S. Department of Energy (DOE) is to ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions. This fiscal year (*FY) 2023 Idaho National Laboratory Site Sustainability Plan* (SSP) was developed to enable and sustain Idaho National Laboratory's (INL's) mission to discover, demonstrate, and secure innovative nuclear solutions, clean energy options, and critical infrastructure.

DOE Order 436.1, *Departmental Sustainability*, provides requirements and assigns responsibilities for managing sustainability within DOE to ensure that DOE missions are carried out in a sustainable manner, to institute wholesale cultural change to factor sustainability into all DOE decisions, and to ensure DOE achieves sustainability goals. DOE Order 436.1 also requires DOE sites to commit appropriate personnel resources, establish a financing plan that prioritizes the use of life-cycle cost-effective private-sector financing, optimize the application of appropriations and budgeted funds, and establish specific performance measures and deliverables designed to achieve the listed requirements.

The SSP was developed according to the narrative requirements from the *FY 2023 DOE Site Sustainability Plan Guidance* document issued in September 2022. The SSP contains strategies and activities that will lead to continual energy, water, and waste reductions that move the INL site toward meeting DOE sustainability goals and requirements. The SSP summarizes energy and available fuel use reporting requirements and references criteria for instituting sustainable design. SSP requirements are integrated into each INL site contractor's Integrated Safety Management System and Environmental Management System (EMS). Finally, the Sustainability Program directives, based on this SSP, are integrated into INL/RPT-22-66853, *Annual Laboratory Plan 2022*, and operations and acquisition systems.

For the purposes of this document, the INL site consists of those facilities operated by Battelle Energy Alliance, LLC (BEA), the Idaho Environmental Coalition, LLC (IEC), and the DOE Idaho Operations Office (DOE-ID). This SSP encompasses all contractors and activities at the INL site under the control of DOE-ID. The operations and activities of the Naval Reactors Facility are specifically excluded from this SSP.

This document serves as the overall SSP for the INL site. It is supplemented by individual contractor plans and strategies as needed. Updates to the SSP are anticipated annually with added specificity as projects are developed and requirements change.

The DOE Office of Environmental Management (EM) assumptions for this SSP include the successful completion of the Idaho Cleanup Project (ICP) Core mission and that the capability to certify, package, assemble, and complete Waste Isolation Pilot Plant shipments will continue until the contact-handled transuranic waste is shipped.

The intent of this SSP is to provide the overall sustainability strategy for the INL site during FY 2023 and provide a status of FY 2022 performance to the DOE goals. The FY 2022 performance status is derived from data input to the DOE Sustainability Dashboard (Dashboard).

The INL site spent $18.3M in FY 2022 for building, process, and equipment energy. Of this total, $15.1M was spent for building energy, $2.0M was spent for process energy, and $1.3M was spent on equipment fuel. Total utility and fuel costs in FY 2022 increased by approximately 18% compared to FY 2021. The INL site used 858.8 billion British thermal unit (Btu) for building energy, 111.0 billion Btu for process energy, 271 thousand gallons of equipment fuel, and 723 million gallons of water.

Total energy intensity through FY 2022 increased 2.9% from FY 2021, decreased 5.4% from the FY 2015 baseline, and decreased by 20.2% when compared to the FY 2003 statute goal baseline. Water consumption was 31.2% lower in FY 2022 as compared to the FY 2007 baseline due in part to reduced cooling tower water use during core internal change out of the Advanced Test Reactor.

In FY 2022 transportation petroleum-based fuels use achieved a 22.7% reduction compared to the FY 2005 baseline. Alternative fuel use showed a decrease of 7.9% compared to FY 2005. INL reestablished the use of renewable diesel in the bus fleet which helped improve both metrics from FY 2021.Scope 1 & 2 greenhouse gas emissions in FY 2022 were reduced by 45.2% compared to the FY 2008 baseline and Scope 3 emissions were reduced by 42.2% compared to the baseline.

Table ES-1 summarizes the FY 2022 performance status. A complete discussion of the FY 2022 status and planned FY 2023 actions toward meeting the goals and requirements are found in the body of this SSP.

Table ES-1. Executive Summary table of DOE sustainability goals.

DOE Goal	Current FY Status	Planned Efforts	Overall Risk of Non-Attainment
Energy Management			
Reduce energy-use intensity (Btu per gross square foot) in goal-subject buildings.	Energy-use intensity (EUI) was 146,033.7 Btu/gross square feet (GSF) for FY 2022, a decrease of 5.4% from FY 2015 and an increase of 2.9% from FY 2021.	Twenty light emitting diode (LED) lighting and other projects are planned for FY 2023, providing an estimated $72K (1,160 megawatt hours [MWh]) in energy savings at total costs of $772K. Investigate feasibility of a large energy-reduction performance contract project from the compiled results of the energy and water audits.	**Medium/Financial** Low cost of energy and water make project payback difficult to justify on a life-cycle basis.
Energy Independence and Security Act (EISA) Section 432 continuous (4-year cycle) energy and water evaluations.	Energy and water evaluations were completed in 16 covered buildings in FY 2022. These audits represent 15% of the current covered buildings for the second year of the third 4-year audit cycle (June 1, 2020, through May 31, 2024). INL is on track with its planned and scheduled audits.	Complete annual energy audits for approximately 25% of the 105 covered buildings each year of the third 4-year audit cycle (June 1, 2020, through May 31, 2024). INL plans to audit 23 buildings in FY 2023. IEC plans to audit 35 buildings in FY 2023, ensuring all IEC covered buildings will be evaluated.	**Low/None** INL's building audit program is fully established.
Meter individual buildings for electricity, natural gas, steam, and water, where cost effective and appropriate.	Idaho Falls: 42 buildings metered for electricity with either standard or advanced metering. 25 buildings use and are metered for natural gas with standard meters. 21 buildings are metered for water with standard meters. The research and industrial complexes: 87 buildings with electric meters, 65 of which have advanced meters.	Two new INL buildings planned for completion in FY 2023 will have advanced metering. Advanced electric and natural gas meters are planned in INL Idaho Falls buildings (approximately 44 meters) to connect to SkySpark energy management system. This activity is planned for FY 2023 and FY 2024.	**Low/None** New INL buildings are specified for advanced metering and selected appropriate buildings are specified for sub-metering.

Table ES-1. (continued).

DOE Goal	Current FY Status	Planned Efforts	Overall Risk of Non-Attainment
Water Management			
Reduce potable water-use intensity (Gal per gross square foot).	Water intensity was 119.7 gal/GSF in FY 2022, a decrease of 31.2% from FY 2007 and 14.6% from FY 2021. Updated water balance and identified high water use intensity processes and buildings.	Prepare and implement a more detailed water balance evaluation. Implement audit-identified low and moderate cost water conservation measures, including high-efficiency water technologies.	**Medium** Water usage is highly dependent upon process water consumption at the Advanced Test Reactor (ATR) Complex and Idaho Nuclear Technology and Engineering Center (INTEC).
Reduce non-potable freshwater consumption (Gal) for industrial, landscaping, and agricultural.	Not Applicable. Water obtained from the Snake River Plain Aquifer and is considered potable.	Industrial, Landscape, and Agricultural (ILA) water is not applicable.	**Low/None** ILA water is not used.
Waste Management			
Reduce non-hazardous solid waste sent to treatment and disposal facilities.	Generated 2,748,832.5 lb (1,246.9 metric tons [MT) of non-hazardous Municipal Solid Waste (MSW) in FY 2022. In FY 2021, 2,695,757.0 lb (1,222.8 MT) was generated, resulting in an increase of MSW generated of 2.0% year-over-year (YOY). Diverted 53.8% of non-hazardous solid waste in FY 2022 by recycling 1,478,831.6 lb (670.8 MT) of materials.	Continue to educate personnel emphasizing the priority of waste reduction from the previous year. Continue to evaluate potential outlets and expansion of recyclable waste. Explore glass recycle partnership with the City of Idaho Falls. Investigate and develop regional composting facility based on West Yellowstone pilot project.	**Medium** Fluctuations in building use including classified spaces, employee engagement, and market forces greatly affect this goal.
Reduce construction and demolition materials and debris sent to treatment and disposal facilities.	Generated 11,794.4 MT of construction and demolition (C&D) waste in FY 2022, compared to 23,184.3 MT in FY 2021, resulting in a decrease of 49.13% of C&D waste generated YOY. Diverted 28.1% (7,304,071.1 lb or 3,313.1 MT) of its C&D waste in FY 2022.	Continue employee education and contract language inclusion and incorporate additional materials into current C&D waste diversion processes. Work with regional industrial recycle entities and develop strategy to recycle two construction wastes streams: concrete and gypsum.	**Medium** Construction continues to increase while markets accepting construction debris are limited. Cost of transporting to acceptable recycler is a major factor in the decision process.

Table ES-1. (continued).

DOE Goal	Current FY Status	Planned Efforts	Overall Risk of Non-Attainment
Fleet Management			
Reduce petroleum consumption.	Fuel usage data indicate 725,392 gasoline-gallon equivalents of petroleum-based fuels were used in FY 2022, which is a 22.7% reduction from FY 2005 and a 9.4% reduction from FY 2021. INL resumed its use of R99 renewable diesel as a sustainable alternative to aid INL in reaching its zero emission goals.	As INL implements its Net-Zero Plan, a greater emphasis will be placed on acquiring electric buses and heavy equipment along with electrifying its light-duty fleet and installing supporting charging stations. Hydrogen powered vehicles are also being considered. Optimize and right-size fleet composition by reducing vehicle size, eliminating underutilized vehicles, and acquiring vehicles to match local fuel infrastructure.	**Medium** The petroleum reduction goal will be challenging due to the cost and availability of electric motor coaches and heavy equipment.
Increase alternative fuel consumption.	Data indicate 70,426 gasoline-gallon equivalents of alternative fuels were used in FY 2022, which is a 7.9% reduction from FY 2005 and a 97.5% increase from FY 2021. INL installed three electric vehicle charging stations for a total of 23. Installed one electric bus charging station.	Determine less-costly sources of R99 for the interim while electric buses are being evaluated and procured.	**Medium** The alternative fuel increase goal will be challenging due to cost and availability of electric vehicles (EVs) and the excessive cost of renewable diesel.
Acquire alternative fuel and electric vehicles.	Acquired 29 new light-duty vehicles in FY 2022, five of which were alternative fuel vehicles (AFVs) or EVs.	Identify the next group of petroleum-fueled vehicles for replacement with AFVs or EVs and ensure that all existing AFVs are replaced EVs when available. Work with General Services Administration (GSA) to achieve 75% or greater AFV and EV light-duty acquisitions.	**Medium** This goal has historically been met but may be difficult to meet in the future due to the availability of appropriate EV light-duty vehicle (LDV) fuel types supplied by GSA.

Table ES-1. (continued).

DOE Goal	Current FY Status	Planned Efforts	Overall Risk of Non-Attainment
Clean and Renewable Energy			
Increase consumption of clean and renewable electric energy.	Procured 16,488 MWh of Renewable Energy Credits (REC) from Idaho Falls Power at a total cost of $90,684. This purchase of new renewable energy RECs, in addition to the 78.1 MWh of onsite generation (microgrid, and small photovoltaic) plus bonuses totals 17,274 MWh (7.9%) of renewable energy for FY 2022.	As INL implements its Net-Zero Plan, a greater emphasis will be placed on internal applications of renewable energy generation to meet this goal. Incremental increases of purchased RECs will continue to be made along with onsite generation to meet a minimum of the 7.5% goal each year YOY.	**Low** Established process for procuring RECs.
Increase consumption of clean and renewable non-electric thermal energy.	Two buildings with solar transpired walls to provide make-up air preheating.	Investigate the additional use of solar water heating, make-up air preheating, or ground source heat pumps in select locations.	**Medium** Due to the low cost of electric energy, it is challenging to justify the installation of thermal renewable.
Sustainable Buildings			
Increase the number of owned buildings that are compliant with the Guiding Principles for Sustainable Buildings.	At the end of FY 2022, 26 DOE-owned buildings were compliant with the Guiding Principles for Sustainable Federal Buildings (Guiding Principles), which represents 40.63% of applicable buildings. This includes 21 buildings less than 25,000 GSF. Completed update to *INL High Performance and Sustainable Building Strategy*.	Document Guiding Principles compliance on two new construction (NC) buildings in FY 2023 and four additional NC buildings by the end of FY 2024. Implement a program to reassess buildings on a four-year cycle per the 2020 Guiding Principles.	**Low** The 15% goal was achieved.
Acquisition and Procurement			
Promote sustainable acquisition and procurement to the maximum extent practicable, ensuring all sustainability clauses are included as appropriate.	97.8% of the contracts in FY 2022 contained applicable clauses.	Achieve 100% compliance. Continue to incorporate improvements to the Sustainable Acquisition Program, including procedures, policies, and enhanced work processes that increase visibility, availability, and use of sustainable products.	**Low** The goal continues to be achieved.

Table ES-1. (continued).

DOE Goal	Current FY Status	Planned Efforts	Overall Risk of Non-Attainment
Efficiency and Conservation Measure Investments			
Implement life-cycle cost-effective efficiency and conservation measures with appropriated funds and/or performance contracts.	Fifteen energy-reduction projects were completed in FY 2022 providing $45K in energy cost savings. No additional Energy Savings Performance Contract (ESPC) projects were developed in FY 2022.	LED lighting and other projects are planned for 20 buildings. Continue to evaluate cost-effectiveness of ESPC options.	**Low** While there are no current plans for an additional ESPC project, the INL site does have established plans and goals for projects awarded and targeted in FY 2023.
Electronic Stewardship and Data Centers			
Electronics stewardship from acquisition, operations, to end of life.	In FY 2022, 100% of electronic devices were reused or recycled; however, only 96.4% were recycled with a certified recycler, by weight.	100% of electronics are reused or recycled unless federal requirements dictate otherwise. Continue to partner with Information Management (IM) and Property Disposal Services to improve electronics end-of-life disposition.	**Low** This goal continues to be achieved.
Increase energy and water efficiency in high-performance computing and data centers.	Continued consolidating server infrastructure in the old High-Performance Computing (HPC) data center by virtualizing physical machines and taking advantage of cloud and container hosting options.	Install and monitor advanced energy meters in all data centers and accurately quantify Power Usage Effectiveness (PUE).	**Medium** Low energy costs and long construction times may prohibit major investments in updated resiliency measures.
Organizational Resilience			
Implement climate adaptation and resilience measures.	Completed a comprehensive Vulnerability Assessment and Resiliency Planning (VARP) initiative that identified nearly 300 opportunities for resiliency action. INL emergency plans and emergency plan implementing procedures (EPIs) were reviewed and revised, as necessary. Operating policies and procedures were evaluated to determine whether they should be modified to consider organizational risks.	Initiate detailed analysis (e.g., cost estimates and schedules) for projects identified in the VARP process. Emergency response, workplace safety and health, and updated scientific knowledge will be incorporated into all facets of organizational resilience, procedures, and protocols. Pursue life-cycle cost-effective energy resilience solutions that provide the most reliable energy to critical mission operations.	**Low to Medium** Investment upgrades in existing buildings are a long-term process. New buildings are being built to include resiliency measures.

Table ES-1. (continued).

DOE Goal	Current FY Status	Planned Efforts	Overall Risk of Non-Attainment
Multiple Categories			
Reduce Scope 1 & 2 greenhouse gas emissions.	Scope 1 & 2 emissions were 77,267.1 metric tons of carbon dioxide equivalent (MT CO2e) compared to 89,391.4 MT CO2e in FY 2021, for a YOY reduction of 13.6% and a 45.2% reduction from the FY 2008 baseline. Emissions decreased due to a slight decrease in facility energy use and the reduced eGRID emission factors.	Refine targeted list of high-value, low-cost ECMs with a focus on projects that reduce total emissions by 45% by the end of FY 2024. Reduce or minimize the quantity of toxic and hazardous chemicals acquired, used, or disposed that will assist INL in pursuing agency greenhouse gas (GHG) reduction targets.	**Medium** INL has committed to be carbon net-zero by the end of FY 2031. Significant progress was made toward exceeding the overall goal, but YOY Scope 1 and 2GHG emissions may continue to vary.
Reduce Scope 3 greenhouse gas emissions.	FY 2022 Scope 3 emissions were 20,366.8 metric tons of carbon dioxide equivalent (MT CO_2e) compared to 15,586.6 MT CO_2e in FY 2021, for a YOY increase of 30.7% and a 42.2% reduction from the FY 2008 baseline. The increase from previous year is due mainly to lifting of restrictions on business travel.	Continue to encourage teleworking, video conferencing, and carpooling as effective ways to reduce the amount of air and ground travel, including employee commuting. Achieve a YOY 2% annual reduction for 5 years for a total 10% reduction.	**Medium** Significant progress was made toward exceeding the overall goal, primarily due to ongoing telework and travel restrictions. YOY Scope 3 GHG emissions may continue to vary.

INTENTIONALLY BLANK

CONTENTS

FIGURES

TABLES

ACRONYMS

AFV	alternative fuel vehicle
AMWTP	Advanced Mixed Waste Treatment Project
ARP	Accelerated Retrieval Project
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ATR	Advanced Test Reactor
BEA	Battelle Energy Alliance, LLC
Btu	British thermal unit
C3	Collaborative Computing Center
C&D	construction and demolition
CARP	Climate Adaptation and Resilience Plan
CAS	condition assessment survey
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFE	carbon-pollution free electricity
CPP	Chemical Processing Plant
D&D	decontamination and dismantlement
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
E85	ethanol 85
EAC	Energy Attribute Credit
EAct 2020	Energy Act of 2020
EB	existing building
EBR-I	Experimental Breeder Reactor I
ECM	energy conservation measure
eGRID	Emissions & Generation Resource Integrated Database
EISA	Energy Independence and Security Act
EM	Office of Environmental Management
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPEAT	Electronic Product Environmental Assessment Tool
EPI	emergency plan implementing procedure
EROB	Engineering Research Office Building
ESL	Energy Systems Laboratory
ESPC	Energy Savings Performance Contract
EUI	energy-use intensity
EV	electric vehicle
EVSE	electric vehicle supply equipment
FAST	Federal Automotive Statistical Tool
FEMP	Federal Energy Management Program
FIMS	Facilities Information Management System
FMIS	Fleet Management Information System
FY	fiscal year
GGE	gasoline-gallon equivalent
GHG	greenhouse gas
GSA	General Services Administration
GSF	gross square feet
HEMSF	high energy mission specific facilities
HPC	high-performance computing
HPSB	INL High Performance and Sustainable Building Strategy

HVAC	heating, ventilating, and air conditioning
ICP	Idaho Cleanup Project
IEC	Idaho Environmental Coalition
ILA	industrial, landscaping, and agricultural
IM	Information Management
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IRC	INL Research Center
ISO	International Organization for Standardization
IWTU	Integrated Waste Treatment Unit
kW	kilowatt
kWh	kilowatt hours
LED	light emitting diode
MCI	Motor Coach Industries
MFC	Materials and Fuels Complex
MSW	Municipal Solid Waste
MT	metric tons
MW	megawatt
MWh	megawatt hours
MT CO_2e	metric tons of carbon dioxide equivalent
NC	new construction
NRC	U.S. Nuclear Regulatory Commission
NE	Office of Nuclear Energy
PC	personal computer
PLN	plan
PPA	Power Purchase Agreement
PUE	power utilization effectiveness
R99	renewable diesel
R&D	research and development
RCP	Representative Concentration Pathway
RCRA	Resource Conservation and Recovery Act
REC	Renewable Energy Credit
RWMC	Radioactive Waste Management Complex
SA	sustainable acquisition
SMC	Specific Manufacturing Capability
SSP	Site Sustainability Plan
STD	standard
STEM	science, technology, engineering, and mathematics
TAN	Test Area North
TRN	Technical Resilience Navigator
U.S.	United States
UCS	Utilities Control System
UESC	Utility Energy Service Contract
UTV	utility task vehicle
VARP	Vulnerability Assessment and Resilience Planning
VDI	virtual desktop infrastructure
WMF	Waste Management Facility
YOY	year-over-year
ZEV	zero emission vehicle

OVERVIEW

The Idaho National Laboratory site (INL site) consists of all operating contractors along with the U.S. Department of Energy (DOE) Idaho Operations Office (DOE-ID), and includes the Idaho Falls campus, as well as the research and industrial complexes located 50 miles west of Idaho Falls, as observed in Figure 1. Idaho National Laboratory (INL) consists of those facilities operated by Battelle Energy Alliance, LLC (BEA). The Idaho Cleanup Project (ICP) consists of those facilities operated by the Idaho Environmental Coalition, LLC (IEC). BEA and IEC include all facilities under their individual responsibility.

Figure 1. INL site map.

The assumptions made by the DOE Office of Environmental Management (EM) for this Site Sustainability Plan (SSP) include the successful completion of the Idaho Cleanup Project mission operated by IEC. In particular, the Advanced Mixed Waste Treatment Project (AMWTP) began closure actions in fiscal year (FY) 2020 and will continue those actions through FY 2028. During that time, storage facilities will remain operational while existing inventory is shipped for disposal.

Non-enduring buildings at AMWTP, Idaho Nuclear Technology and Engineering Center (INTEC), and Radioactive Waste Management Complex (RWMC) will transition to a cold, dark, and dry status as the cleanup mission progresses over the next five to ten years, reducing energy use. Decontamination and decommissioning (D&D) will follow as funding allows.

The work scope planned to be performed by the ICP in the next five to ten years includes treating sodium-bearing waste, closing the INTEC Tank Farm, preparing and packaging of calcined waste, closing Accelerated Retrieval Project (ARP) facilities at RWMC with the placement of a final engineered barrier on the Subsurface Disposal Area, and completing the treatment and shipment of mixed transuranic wastes. The trend is for reducing energy use after waste treatment—specifically, sodium-bearing waste and transuranic waste treatment completion.

INL is planning for moderate growth to further its missions with additional research laboratories and office buildings. The *INL Annual Laboratory Plan Fiscal Year 2022* provides an overview and details of conceptual laboratory growth. These growth areas include research programs related to nuclear reactor sustainment and expanded deployment, integrated fuel cycle solutions, integrated energy systems, advanced materials and manufacturing for extreme environments, and secure and resilient cyber-physical systems. Accordingly, INL facilities are expected to increase electric energy demand based on numerous new buildings and processes being designed and constructed.

The Naval Reactors Facility commenced operation of the Spent Fuel Handling Recapitalization Project in FY 2015, with significant construction occurring between 2019 and 2025. This large project will not impact the INL site directly but will impact the electric distribution system that INL manages.

INL site growth is likely to increase energy use but will be balanced to some extent with decommissioning and renovation of older buildings and processes.

1. ENERGY MANAGEMENT

1.1 Energy Usage and Intensity

Energy sources at the INL site affected by this goal include electricity, natural gas, fuel oil, liquefied natural gas, and propane. Methods to reduce energy usage include capital project upgrades, alternative financing projects, operational modifications, and workforce behavior changes.

Many factors influence energy use, including numerous energy-intensive processes and inefficient buildings built before the current standards for energy efficiency and high-performance design. Due to the nature of the various INL site missions, many operations can be cyclical and result in a year-over-year (YOY) variance in energy consumption. As buildings are removed or processes are modified, INL site energy usage intensity can vary seemingly unrelated to the actual overall reduction efforts.

The INL site typically uses energy audits and retro-commissioning to evaluate existing buildings for energy-reduction opportunities. These opportunities are developed into projects with the most cost-effective projects or projects that improve operating conditions being pursued for funding and implementation.

Energy data are routinely input into the U.S. Environmental Protection Agency (EPA) Portfolio Manager for metered buildings to analyze and identify energy-use trends and anomalies. These trends and anomalies are discussed with facility managers and often result in the identification of low or no-cost modifications that reduce energy usage.

Since mission-specific energy-intensive loads are excluded from the goal according to the *Guidelines Establishing Criteria for Excluded Buildings* published by the Federal Energy Management Program (FEMP) on January 27, 2006, the Advanced Test Reactor (ATR) and its support buildings, the Engineering Research Office Building (EROB) data center, the Collaborative Computing Center (C3) supercomputer, and two processes at the Energy Systems Laboratory (ESL) are currently excluded from this reporting goal but are not excluded from the responsibility to reduce energy use and greenhouse gases (GHGs) where practicable. These buildings are shown in the Facilities Information Management System (FIMS) as excluded facilities and/or processes. The excluded square footage of these buildings appears on the excluded facilities list in Appendix A.

Inexpensive electric rates impact the cost-effectiveness of energy-saving projects. While the INL site strives to implement energy-reduction projects, especially to meet sustainable buildings requirements, this goal continues to be a significant challenge.

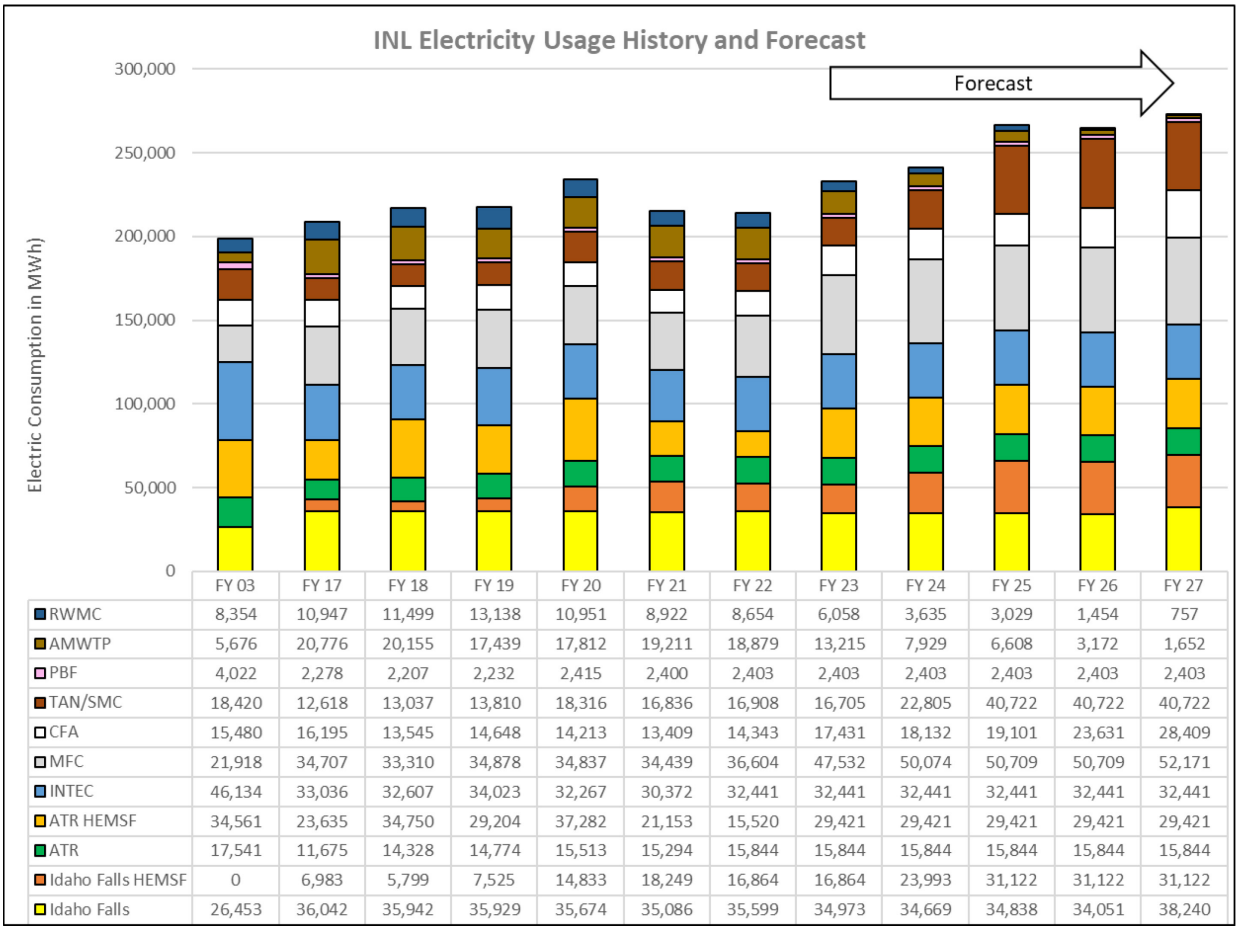
1.1.1 Performance Status

As demonstrated through data calculated by the Dashboard, the energy-use intensity (EUI) for FY 2022 was 146,033.7 British thermal units (Btu)/gross square feet (GSF). When compared to the FY 2015 baseline of 154,357.7 Btu/GSF, a decrease of 5.4% was observed along with a 2.9% increase from FY 2021. However, using the statute baseline for FY 2003 of 182,979 Btu/GSF, a reduction of 20.2% has been achieved.

In FY 2022, INL and IEC completed fifteen energy-efficient light-emitting diode (LED) lighting upgrades at a cost of $464.1K. Energy savings of 358.4 megawatt hours (MWh) were achieved with an annual cost savings totaling $45.4K. Additionally, roofs on two buildings were replaced at the end of their useful life with additional insulation added as part of the replacement.

Figure 2. INL site electricity usage history and forecast. illustrates historic and projected electric consumption—goal subject and excluded—for the INL site's major campus areas. Electricity consumption is expected to increase as new building construction and electrification projects are completed. Electric consumption may increase significantly in future years for the construction and operation of potential nuclear reactor demonstrations being considered.

However, some areas of the site are expected to have a decreasing trend, such as RWMC and AMWTP processes as they are shut down and buildings begin D&D.



	FY 03	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27
RWMC	8,354	10,947	11,499	13,138	10,951	8,922	8,654	6,058	3,635	3,029	1,454	757
AMWTP	5,676	20,776	20,155	17,439	17,812	19,211	18,879	13,215	7,929	6,608	3,172	1,652
PBF	4,022	2,278	2,207	2,232	2,415	2,400	2,403	2,403	2,403	2,403	2,403	2,403
TAN/SMC	18,420	12,618	13,037	13,810	18,316	16,836	16,908	16,705	22,805	40,722	40,722	40,722
CFA	15,480	16,195	13,545	14,648	14,213	13,409	14,343	17,431	18,132	19,101	23,631	28,409
MFC	21,918	34,707	33,310	34,878	34,837	34,439	36,604	47,532	50,074	50,709	50,709	52,171
INTEC	46,134	33,036	32,607	34,023	32,267	30,372	32,441	32,441	32,441	32,441	32,441	32,441
ATR HEMSF	34,561	23,635	34,750	29,204	37,282	21,153	15,520	29,421	29,421	29,421	29,421	29,421
ATR	17,541	11,675	14,328	14,774	15,513	15,294	15,844	15,844	15,844	15,844	15,844	15,844
Idaho Falls HEMSF	0	6,983	5,799	7,525	14,833	18,249	16,864	16,864	23,993	31,122	31,122	31,122
Idaho Falls	26,453	36,042	35,942	35,929	35,674	35,086	35,599	34,973	34,669	34,838	34,051	38,240

Figure 2. INL site electricity usage history and forecast.

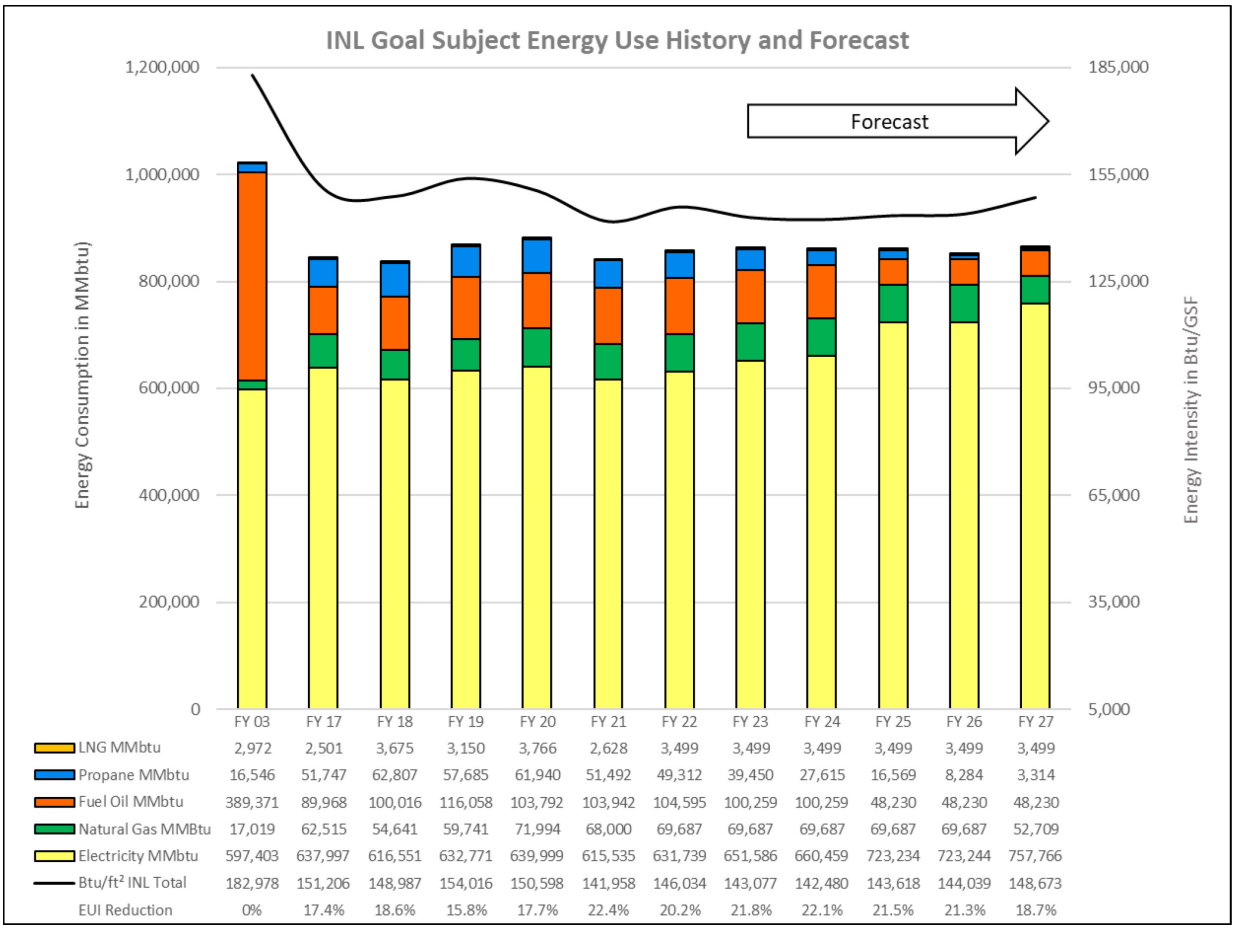
The Collaborative Computing Center (C3) supercomputer data center in Idaho Falls, which, along with the ATR Reactor, are high-energy mission-specific facilities excluded from the goal-subject energy-use reporting requirements.

Figure 3 outlines the total goal-subject energy used by fuel type and provides the current and forecasted EUI for goal-subject buildings. Fuel oil usage decreased significantly since base-year FY 2003 due to the ATR backup generator set being replaced with a large uninterrupted power supply system.

Goal-subject electric energy and propane are projected to decrease for the AMWTP and RWMC areas as these areas begin a transition of shut down and D&D. During that period, the energy use for these buildings, along with the square footage, will be excluded under Part E of the Excluded Building guidance as they transition out of the building inventory.

NOTE: *Due to the large building area associated with AMWTP/RWMC, the total EUI is expected to increase slightly as this building area is excluded from the Goal-Subject EUI calculation.*

The EUI is forecast to slowly decrease from FY 2022 through FY 2024 due to the increased efficiency of new buildings under construction along with LED lighting upgrade projects planned for implementation. Beyond FY 2024, new growth and electrification projects have been identified and a modest increase is projected in EUI for FY 2025 and beyond.



	FY 03	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27
LNG MMbtu	2,972	2,501	3,675	3,150	3,766	2,628	3,499	3,499	3,499	3,499	3,499	3,499
Propane MMbtu	16,546	51,747	62,807	57,685	61,940	51,492	49,312	39,450	27,615	16,569	8,284	3,314
Fuel Oil MMbtu	389,371	89,968	100,016	116,058	103,792	103,942	104,595	100,259	100,259	48,230	48,230	48,230
Natural Gas MMBtu	17,019	62,515	54,641	59,741	71,994	68,000	69,687	69,687	69,687	69,687	69,687	52,709
Electricity MMbtu	597,403	637,997	616,551	632,771	639,999	615,535	631,739	651,586	660,459	723,234	723,244	757,766
Btu/ft² INL Total	182,978	151,206	148,987	154,016	150,598	141,958	146,034	143,077	142,480	143,618	144,039	148,673
EUI Reduction	0%	17.4%	18.6%	15.8%	17.7%	22.4%	20.2%	21.8%	22.1%	21.5%	21.3%	18.7%

Figure 3. Goal-subject energy use and EUI history and forecast.

INL completed an energy balance update in FY 2022 by evaluating emerging energy-use trends at each of the campuses. The energy balance update confirmed the causal relationship with outside temperatures and building energy-use intensity.

INL completed an engineering study to investigate the electrification of eight buildings in the Idaho Falls campus and installation of a centralized ground source heat pump system to serve eight building at the Central Facilities Area (CFA) campus. Four of the Idaho Falls buildings contain laboratory space, while the remaining four are considered office buildings. The Idaho Falls study considered the cost to upgrade electrical distribution as well as several electrification technologies options. Several of the buildings are leased and would require building owner approval. Another challenge to implementing the Idaho Falls electrification plan is the cost of a required new substation to serve the increased electrical load at the campus. The CFA campus ground source heat pump study considered two different types of low temperature geothermal heating and cooling systems each with two options. The payback for the four options ranged from 35 years to 14 years.

1.1.2 Plans and Projected Performance

INL is planning for moderate growth to further its missions with six additional support, laboratory, and office buildings through FY 2024. The *INL Annual Laboratory Plan* provides an overview and details of conceptual laboratory growth.

Energy-related capital project upgrades are strategically funded primarily through the following funding sources:

- Direct and indirect funding and reinvesting cost savings from sustainable actions
- Special funding requests (e.g., third-party, DOE-based funding, line-item)
- Utility incentive programs
- Integration of sustainability into new infrastructure, major renovations, and maintenance activities.

The use of available utility incentive programs will be maximized along with the INL energy savings reinvestment program to help fund additional projects and/or reduce the cost to implement alternatively funded projects.

INL has fifteen projects underway for completion in FY 2023 with a focus on LED lighting to reduce energy usage while significantly improving the indoor work environment. Retro-commissioning projects, heating, ventilating, and air conditioning (HVAC) upgrades, and building envelope improvements constitute the other projects in progress. IEC has an additional five LED lighting projects planned or in progress for FY 2023. These projects in total are estimated to cost $772K and will reduce annual energy use by an estimated 1,160 MWh and provide savings of $72K. In addition, as funding becomes available during FY 2023, INL will continue to focus on projects that directly influence the efficiency of buildings to reduce EUI.

Further energy intensity reductions will continue to be pursued though multiple strategies:

- Performing energy auditing on all covered buildings and implementing cost-effective recommendations from these audits.
- Continuing to evaluate high EUI buildings and determining best candidates for more thorough energy auditing and/or retro-commissioning and implementing cost-effective retrofit projects.
- Satisfying sustainable acquisition requirements to purchase ENERGY STAR and FEMP-recommended devices.
- Meeting federal energy efficiency and sustainable building requirements.
- Continuing educational campaigns to change employee behaviors (turn off lights and computers when leaving at the end of shifts, utilize power management when available, and avoid using space heaters, personal refrigerators, etc.).

IEC completed construction of the Integrated Waste Treatment Unit (IWTU) in FY 2011 to allow treatment of the remaining wastes at the INTEC Tank Farm facility. Systems testing has resulted in various facility modifications since construction completion. As such, multiple test runs with surrogate wastes in FY 2015, 2016, 2017, 2018, 2019, 2021, and 2022 were conducted. Mixed waste treatment operations are anticipated to begin in FY 2023, and it is anticipated that the IWTU will require five to seven years of operations to treat the remaining wastes at the INTEC Tank Farm facility. An increase in INTEC energy use is expected to occur during the treatment process. After the IWTU processing is complete, the Calcine Disposition Project may use a portion of the IWTU facility. The Calcine Disposition Project is also expected to be an energy-intensive treatment process.

IEC's planned actions for energy reduction include discontinuing processes as the cleanup mission and continuing D&D scope are completed. For selected enduring buildings, LED upgrade projects will continue as funds become available. Building modification currently underway at Chemical Processing Plant (CPP)-691 have resulted in an LED lighting upgrade in the main access area. Additional building lighting upgrades will be implemented as funding is available. While significant portions of the cleanup mission are complete, EM operations will continue limited cleanup mission activities, processing wastes, and inactivating buildings and processes that are no longer needed.

Determining if the IEC operated Integrated Waste Treatment Unit should be exempted from the energy goal.

Regarding the approach to converting buildings to have net-zero emissions, INL is investigating building electrification, procurement of carbon-pollution free electricity (CFE), and microgrids as building net-zero emissions strategies.

Regarding high energy mission specific facilities (HEMSF) impacts on sustainability and proposed investments, additional supercomputing is planned for the C3 building at the Idaho Falls campus. The cooling plant for the building will also be expanded to support the new supercomputing load with plans to use waste heat as preheat for the office areas of the building.

1.2 EISA Section 432 Benchmarking and Evaluations

The INL site's goal for the Energy Independence and Security Act (EISA) Section 432 energy and water evaluations is to assess approximately 25% of covered buildings each year to meet the requirement. Covered buildings are defined as those buildings that constitute at least 75% of facility energy use at each agency (42 U.S.C. 8253 (f)(2)(B)). The list of INL and IEC Idaho covered buildings is updated annually in the Dashboard.

INL will complete Level 1 or Level 2 energy audits as follows:

- **Level 1 Audit:** This is the standard energy audit that is recommended for most of INL's covered buildings. The Level 1 Audit, sometimes called a 'walk-through audit,' involves minimal interviews with operating personnel, a brief review of facility utility bills and other operating data, and a walk-through of the facility, all geared toward the identification of glaring areas of energy waste or inefficiency. The compiled data is then used for the preliminary energy use analysis and report detailing low-cost/no-cost measures and potential capital improvements for further study. Typically, a Level 1 audit will only uncover major problem areas. Corrective measures identified are briefly described and include estimates of implementation costs, potential operating cost savings, and simple payback calculations.
- **Level 2 Audit:** The Level 2 Audit is the audit level recommended for INL's more complex buildings. A Level 2 audit includes the preliminary Level 1 analysis, but also includes more detailed energy calculations and financial analysis of proposed energy efficiency measures. The financial, or life-cycle cost, analysis provides the facility owner with a comprehensive understanding of the financial benefits of implementing specific energy efficiency measures. Utility bills are collected for a 36- to 48-month period to allow the auditor to evaluate the facility's energy/demand rate structures and energy usage profiles.

  From the results of the Level 2 audit, a recommendation may be made to conduct a more detailed RCx evaluation in the next audit cycle to further evaluate and model building operational deficiencies and recommended improvements.

The ENERGY STAR Portfolio Manager is the tool used for energy benchmarking of buildings.

1.2.1 Performance Status

A total of 99 buildings have monthly energy data entered into Portfolio Manager for benchmarking purposes. This data is used for evaluating progress in building energy and water consumption reduction, as well as tracking overall trends. For the FY 2022 reporting period, 88 buildings are expected to have sufficient monthly energy data available for the annual Compliance Tracking System upload.

There are 105 covered buildings that require energy audits. A total of 16 energy audits were completed in FY 2022; INL performed all 16 energy audits, while IEC did not perform any audits.

In FY 2022, INL initiated a subcontract through JGMS Government Service, LLC to perform energy and water evaluations in conjunction with condition assessment survey (CAS) inspections. ICP has subcontracted kW Engineering to perform energy and water evaluations in the past. However, because the

ICP contractor transitioned from Fluor Idaho to IEC in January 2022, preparation of a new subcontract to perform the building energy and water evaluations has been initiated. Consequently, IEC did not perform any audits in FY 2022, but will resume auditing in FY 2023 once a new subcontract is in place.

Benchmarking data from Portfolio Manager was analyzed and buildings were binned into six categories (e.g., laboratory, manufacturing, office, technology/science, warehouse, other) to compare the EUI amount buildings in each category. EUI by building type for 69 metered INL buildings with respect to the target energy intensity reduction goal is shown in Figure 4. Buildings that are higher than the EUI goal are mainly in the categories of laboratory and technology/science. To help reduce EUI, INL plans to identify buildings with high EUI as candidates for energy retrofit upgrades and commissioning.

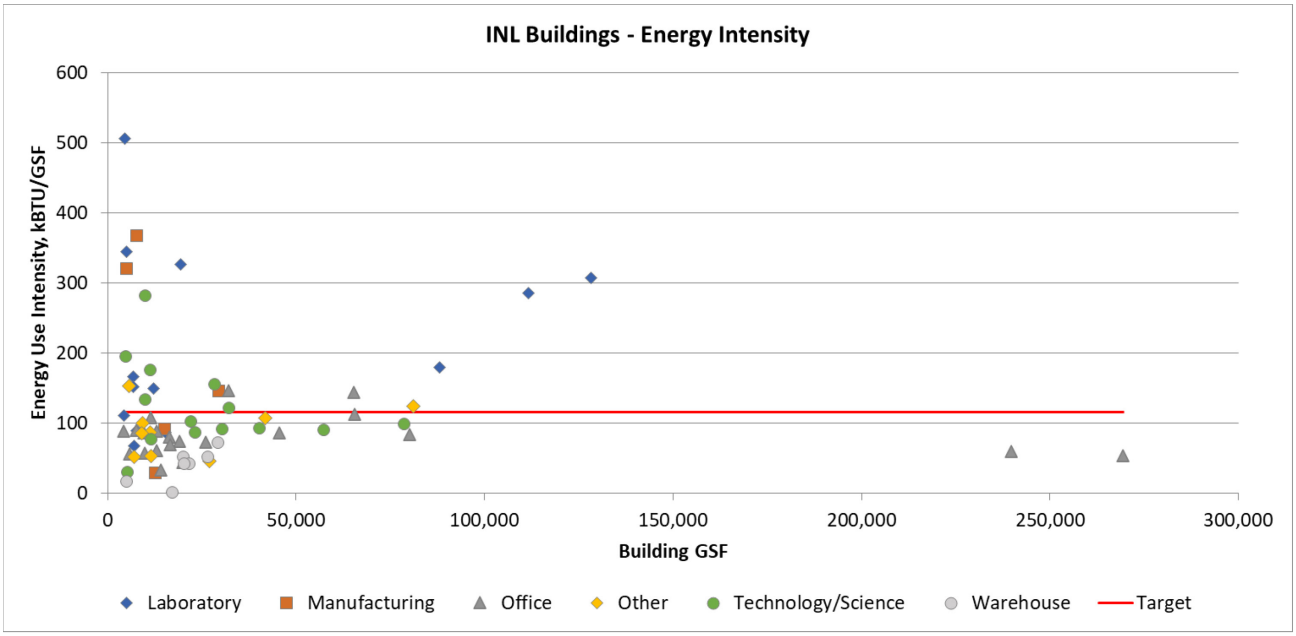


Figure 4. Building EUI relative to goal.

1.2.2 Plans and Projected Performance

INL will complete the FY 2023 energy and water evaluations in conjunction with CAS inspections by a common subcontractor to reduce the individual costs of both tasks. The order of buildings to be evaluated will consider the date of past audits and the schedule of needed CAS inspections with the intent that all covered INL buildings are to be evaluated over a four-year period. ICP plans to complete future walk-through and Level 1 energy and water audits by working with a qualified subcontractor.

The energy conservation measures (ECMs) identified by these evaluations are prioritized by payback period, potential energy savings, and the level of urgency or need of upgrades. As funding is available, these ECMs will be selected for implementation by a combination of priority and overall cost.

INL has developed the EISA Section 432 Covered Building and Energy Audit Schedule for the third energy audit four-year cycle. Due to changes in INL's building inventory, this new four-year schedule includes 105 covered buildings. INL plans to perform evaluations on 23 buildings in FY 2023 and will continue to prepare project implementation plans for the most cost-effective ECMs identified.

Due to COVID 19 restrictions, and contract transition to IEC from Fluor Idaho, building energy and water audits have not been conducted by the ICP since November 2019. Consequently, IEC will complete the energy and water evaluations at 35 buildings in FY 2023. That will ensure that all covered buildings on the IEC building list will be evaluated within the current four-year cycle which ends in May 2024. IEC will continue to prepare project implementation plans for the most cost-effective ECMs identified.

Portfolio Manager will continue to be used as the energy and water consumption data warehouse and benchmarking tool to assist with overall consumption tracking. As new meters are installed on existing and new buildings, these buildings and the respective metered data will be entered into Portfolio Manager for benchmarking.

1.3 Facility Metering and Energy Management Strategies

The October 2022 *Federal Metering Guidance* document outlines the federal building metering verification process as follows:

> Start with a comprehensive list for each energy utility (e.g., electric, natural gas, steam) and perform the following steps to create a list of buildings that are appropriate to meter:
>
> - Flag buildings with an existing advanced energy meter or with a utility-installed advanced energy meter. Buildings that meet at least one of these conditions are considered to meet the statutory metering requirement. Remove these buildings from the list.
> - Of the remaining buildings, flag which buildings are not metered and which buildings have standard energy meters installed.
> - From this list, exclude buildings that meet one or more of the criteria described below; the remaining buildings are considered appropriate for metering.
>   - Buildings with a planned sale or D&D date within the next five years.
>   - Leased or owned buildings where the agency either does not pay the energy/water utility bills or does not pay the lessor for utilities based on actual consumption.
>   - Buildings without an energy-consuming heating/cooling system or without significant process loads.
>   - Buildings less than the minimum thresholds:
>   - Energy-intensive buildings less than 1,000 GSF.
>   - All other building types less than 25,000 GSF.
>
> Buildings not meeting any of the exclusion criteria enumerated above are considered appropriate for energy metering.

In addition to providing a means of trending and validating energy savings, metering also provides proactive space management opportunities. Building energy and water usage information assists with benchmarking facility performance in Portfolio Manager, maintenance scheduling, enhanced resource utilization, and accurate space charge-back to building tenants. Advanced metering provides a method to encourage and validate employee behavior change and provides a dependable tool for facility managers to tune building systems and controls.

INL does not currently use ISO 50001 or participate in DOE's 50001 Ready Program. SkySpark and iVu are the platforms INL uses for building energy management. Electric and water meters installed by INL are connected to these systems to enable data collection and analysis. Utility bills are manually processed including the assembly of quarterly energy consumption reporting. ENERGY STAR Portfolio Manager is used to benchmark building energy.

INL recognizes the need to expand efforts on re-/retro-commissioning and continuous commissioning—particularly for Idaho Falls buildings. A study is underway to look at the sequence of operations and controls upgrades to the EROB data center to save energy and make the center more robust. Findings from the study may lead to projects in FY 2023 with pending funding.

INL facility managers are responsible for control of building operations and implementation of setbacks is being done in some facilities. The INL Campus Planning office is continuously working on

space optimization and footprint reduction efforts. The INL Information Management (IM) organization is responsible for all cybersecurity policies and procedures including those for energy management systems.

1.3.1 Performance Status

There are 42 owned and leased buildings in Idaho Falls. Of these, all 42 are metered for electricity on a building level basis with either standard or advanced metering. Two buildings have full-serviced leases. A total of 25 owned or leased buildings in Idaho Falls use and are metered for natural gas. Each are metered with standard gas meters. Of the 42 buildings in Idaho Falls, 21 are metered for water along with one building that is billed through water-use calculations. There are also 14 buildings at the INL Research Center (IRC) Complex that are metered at a campus level by a single water meter. The research and industrial complexes currently have electric meters installed at 87 buildings, 65 of which have advanced meters and the remaining 23 have standard meters.

Two buildings at CFA share one liquefied natural gas storage tank and share the resultant natural gas for heating purposes: the CFA Dispensary and the CFA Fire Station. Both buildings have standard meters for natural gas, which are read manually.

As part of the MFC Energy Savings Performance Contract (ESPC) project that upgraded and consolidated the MFC central steam system, steam metering was installed on five buildings. There are several other steam systems in the remainder of the research and industrial complexes that may be further evaluated for applicability and cost-effectiveness of steam metering.

All water that is pumped from the Snake River Plain Aquifer for the research and industrial complexes through deep wells is metered and the data compiled monthly for quarterly and annual reporting. There are 12 buildings located in the research and industrial complexes with building level water meters.

Eight buildings at the ATR Complex are metered together as a process and are shown in FIMS as excluded buildings from the energy efficiency goals. The EROB Data Center and two processes at ESL are also shown in FIMS as excluded facilities and/or processes. Similar to the EROB data center, the new C3's data center is separately metered from the building and is excluded from FY 2022 goal-subject energy reporting. The description and square footage of these buildings appears on the FY 2022 excluded facilities list in Appendix A.

INL commenced a 'virtual metering' effort in FY 2022 to evaluate, install, and program virtual meters on systems and equipment deemed to be 'high energy consumers' (air handling unit, roof top units, process pumps, etc.) The project was completed for INL buildings with existing energy management systems at Idaho Falls and CFA campuses. This project was performed by INL staff, as well as subcontracted facility automation specialists, and supports enhanced tracking and trending of equipment performance, energy consumption, and GHG emissions data.

The INTEC Utilities Control System (UCS) allows for remote and automatic operation of the electrical distribution system from the control console located in CPP-1673. In FY 2021, a major upgrade was initiated to allow for improved monitoring and control of substations, power controls centers, and load centers. The project recently completed a major hardware upgrade to replace most of INTEC's control system equipment for the substations, power controls centers, and load centers. Part of this upgrade included the installation of new UCS software, which will enhance metering capability across INTEC, and provide the capability for power consumption to be recorded at one of two personal computers (PCs) within the INTEC control room (CPP-1673).

This successful modification has given INTEC the capability for power measurement at several of INTEC's 82 buildings and 12 trailers, including 19 covered buildings. In addition, IEC continues to monthly monitor the advanced electrical meters installed in CPP-652, CPP-663, CPP-1604, CPP-1606, and CPP-1650 and the standard electrical and steam meters at CPP-1696. Data is entered into the EPA Energy Star Portfolio Manager.

Most of the AMWTP buildings do not have utility meters installed. Waste Management Facility (WMF)-676 and WMF-635 have standard electricity and propane meters, and monthly consumption data is recorded into Portfolio Manager. WMF-636 has one electric meter that is tracked in Portfolio Manager. There are no plans to install any additional meters at AMWTP because it is scheduled to be shut down.

1.3.2 Plans and Projected Performance

INL will continue to evaluate and develop metering plans for additional buildings greater than 5,000 GSF, all new construction projects, and any other buildings that would benefit from metering on a case-by-case basis. Advanced electric and natural gas meters are planned in INL Idaho Falls buildings (approximately 44 meters) connected to SkySpark to enable collection of interval data. This work is planned for FY 2023 and FY 2024.

The INL Energy Manager and Senior Sustainability Analyst continue to track and evaluate all metered buildings for energy-use anomalies and efficiency improvements. Portfolio Manager is used for benchmarking of metered buildings. All energy and water reports are published in .pdf format on the internal Sustainability website.

Discussions continue on the development of energy consumption dashboards to support the INL Net-Zero program. Projects may be developed in FY 2023, pending funding, from the findings of the EROB data center study to look at the sequence of operations and controls upgrades. The possible project includes reconfiguration of the data center cooling system to allow for all cooling to be provided by cooling towers rather than chillers.

1.4 Non-Fleet Vehicle and Equipment Energy Use

Equipment usage is heavily dependent upon construction and building projects, repair and renewing of existing infrastructure and structures, and for seasonal needs such as dust mitigation and fire suppression.

1.4.1 Performance Status

Non-fleet vehicle energy use consists of gasoline, diesel, renewable diesel (R99), and propane fuels. In FY 2022, 270,940 gallons of these fuels was used in non-fleet vehicles and equipment. INL has started exploring replacing diesel with R99 in non-fleet vehicles as part of its net-zero initiative. INL utilized low-speed electric vehicles in place of diesel-powered utility task vehicles (UTVs). Due to supply chain issues in FY 2022, receipt of these types of vehicles was limited.

1.4.2 Plans and Projected Performance

INL plans to progress with evaluations of electric equipment and small transport and utility vehicles to ensure they meet INL demands year-round. Accordingly, INL will increase usage of electrical equipment instead of diesel equipment, where it can still meet user's needs.

1.5 Carbon Free Electricity

The DOE Office of Nuclear Energy's (NE) strategy was written to develop and deploy carbon-pollution free electricity (CFE) at INL, which is necessary to achieve 100 percent CFE on a net annual basis by 2030, including 50 percent 24/7 CFE, in accordance with Executive Order (EO) 14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*. The plan was established in coordination with the INL site tenants—including ICP, and the Naval Reactors Facility.

1.5.1 Performance Status

In FY 2022 INL implemented the following strategies to support CFE:

- Collaboration: Collaborated with DOE-ID to complete the *DOE Office of Nuclear Energy Carbon Pollution-Free Electricity Implementation Plan*.

- Electrification: In FY 2022 INL completed electrification studies for the CFA area and a series of collocated leased buildings in Idaho Falls. The CFA study investigated the feasibility of a centralized ground source heat pump system to serve multiple buildings.
- Building energy efficiency standards: Updates to internal engineering references.
- Efforts to increase efficiency: The CFA campus completed lighting retrofits from fluorescent to LED.

As the existing local utilities have the exclusive rights to supply electricity to the INL site, the CFE plan includes efforts to partner with those utilities to improve transmission infrastructure and purchase CFE at a scale that would support the CFE goal and provide for an expected increase in electricity demand due to mission growth. The purchased CFE will be supplemented by onsite generation. The existing utilities' exclusive right to provide electric service to the INL does not preclude DOE from owning onsite generation for its own use, but it precludes onsite commercial entities from selling the output of their electricity generation directly to INL (e.g., U.S. Nuclear Regulatory Commission [NRC] regulated nuclear reactor owners).

INL currently purchases power from two different power providers. Power for the INL site is purchased from Idaho Power Company. To meet EO 14057 Section 203, NE is negotiating with Idaho Power Company to enhance the existing Power Purchase Agreement (PPA) to provide for a minimum of 30 megawatts (MW) from any CFE source located in the Idaho Power Company service area beginning in 2023 and ramping up to 100 MW by 2030. Government-sourced generation onsite may replace some of this demand, which may be satisfied through Energy Attribute Credits (EACs) that certify clean energy supply. In addition, contract provisions have been put in place through a Memorandum of Understanding (MOU) to acquire nuclear-energy generated loads at the earliest date available.

Idaho Falls facilities currently utilize power from Idaho Falls Power. Idaho Falls building electricity use is currently 6.1 average MW and is anticipated to increase to 12.5 average MW by 2030. To ensure 100% CFE by 2030, INL is engaging with Idaho Falls Power and other trans-federal projects to procure EACs and encourage the inclusion of non-fossil fuel resources. Since EACs will likely result in a higher cost per kWh, the ability to achieve 100 percent CFE will be dependent upon adequate Congressional appropriations.

1.5.2 Plans and Projected Performance

The large land area occupied by INL is well suited to research and demonstrate CFE generation—including solar, wind, geothermal, and nuclear. In accordance with the NE mission to advance nuclear energy, the envisioned onsite CFE generation includes nuclear energy generation from microreactors connected to a microgrid. Developing and deploying nuclear-generated CFE is integral to achieving the nation's goal of 100% CFE by 2050.

Table 1. CFE baseline and performance targets.

Fiscal Year	Annual CFE Performance Target	Total INL Site Electricity Consumption (Average MW)
Baseline	*58.9%*	25.1
2023	*60%*	26.8
2024	*61%*	29.6
2025	*63%*	32.3
2026	*70%*	41.3
2027	*85%*	44.8
2028	*98%*	44.6
2029	*99%*	44.1
2030	*100%*	63.6

With adequate Congressional appropriations received in line with the milestones in the CFE plan, INL can demonstrate how nuclear integrates with and complements existing renewables such as wind, solar, hydroelectric, and geothermal to meet the growing demand in the United States (U.S.) for clean energy. If granted sufficient funding, INL will be able to execute its roadmap to CFE by 2030, using nuclear energy as a centerpiece for the decarbonization effort.

Hourly facility consumption profiles will be created using existing building management system capabilities as well as by working with electric utilities to obtain time-stamped smart meter facility load data. This will allow for tracking, trending, and establishment of facility electricity profiles to determine loads on an hourly, daily, monthly, and annual basis. DOE will collaborate with Idaho Power Company and Idaho Falls Power to understand the future availability of 24/7 CFE as each utility implements their announced transition to clean power. DOE will collaborate with Idaho Power Company, which currently does not utilize nuclear CFE, to demonstrate the role nuclear energy could play in reaching the utility's goal of 100% CFE by 2045. INL is working with Idaho Falls Power to determine the feasibility of transitioning to hydrogen-based generation capabilities. The ability to achieve these milestones will be dependent upon adequate Congressional appropriations.

2. WATER MANAGEMENT

Potable water is provided to all Idaho Falls building locations through the City of Idaho Falls municipal water system. Almost all water use for these locations is metered with billing for both water supply and sewage treatment. Irrigation and water use for several small buildings is calculated on building square footage and building function. All water at the research and industrial complexes is pumped from an underground aquifer and treated onsite. Each of the major areas at the research and industrial complexes have their own water pumping, treatment, and disposal facilities. All water at the INL site is considered potable and there are no alternate non-potable sources such as lakes, rivers, or streams. Therefore, industrial, landscape, and agricultural (ILA) water use is not applicable to the INL site.

There are several large process users of potable and raw water, including the ATR Reactor cooling system, the INTEC fuel storage pools, an industrial/construction tank filling system at CFA, the bus wash at CFA, and numerous HVAC and compressor cooling systems.

Due to the nature of the various INL site missions, many of these industrial operations and processes can be cyclical and result in varying usages of water throughout the year, as well as from year to year. In addition, as buildings are removed and processes are shut down, the lower square footage can result in an increase in water use intensity even as overall water usage is reduced.

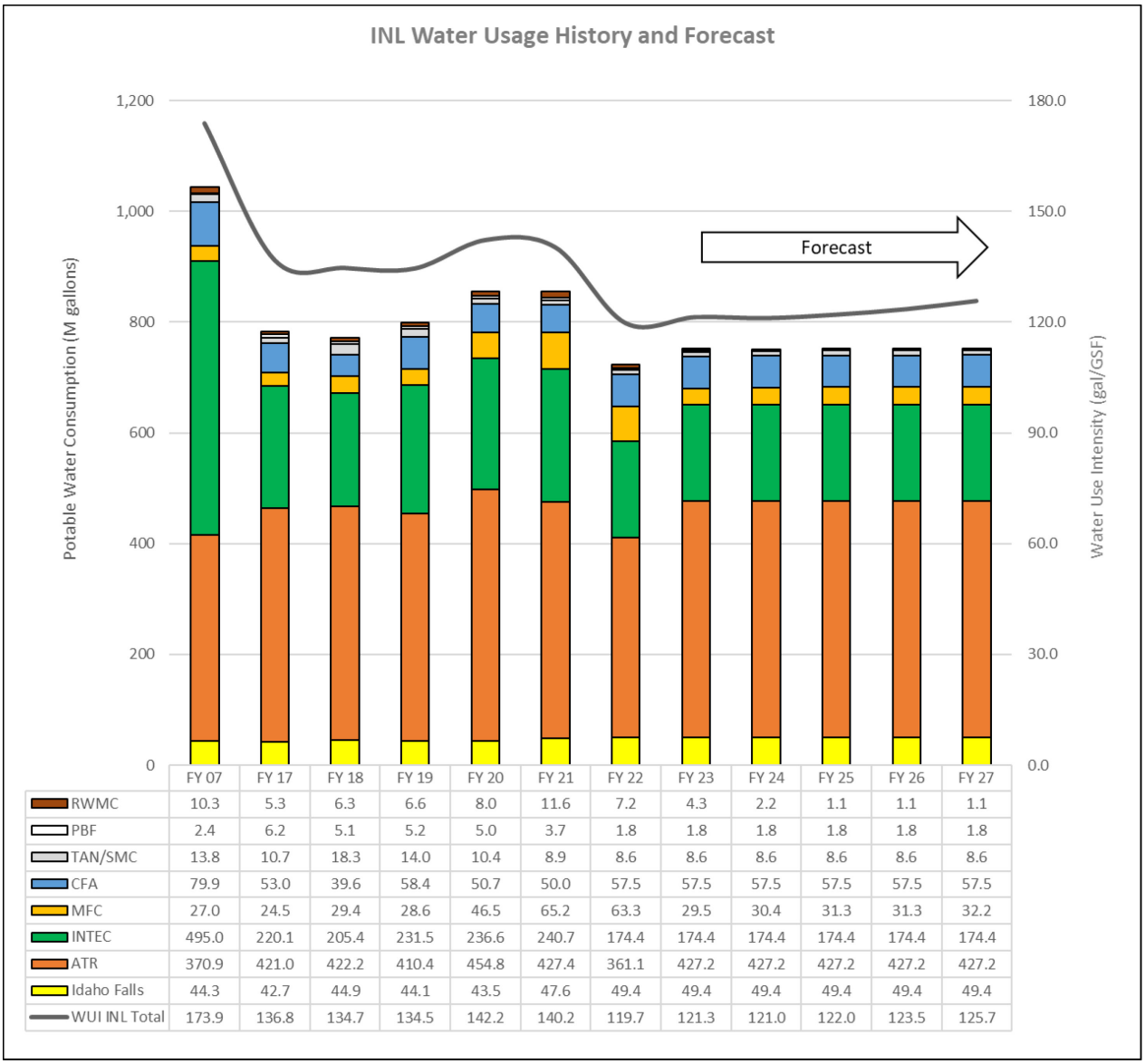
Due to the age of many buildings and utility systems, water leaks of varying degrees are common. The soil in the Snake River Plain is very porous, so most of these leaks are never seen on the surface and need special sonic instrumentation to identify and locate. As many areas have significant underground utilities and have the potential for soil contamination, it is very costly and time consuming to excavate to repair leaks. In several cases, core samples have been taken where leaks were identified only to find no evidence of the leaks themselves.

Inexpensive water and electric rates impact the cost-effectiveness of water saving projects. While strides are made to implement water-reduction projects, water consumption is heavily dependent upon process usage and events or activities, such as wildfires, D&D, and construction work, so this goal will be somewhat of a challenge to maintain consistently.

The INTEC facility separates its potable and raw water systems. Although they both are supplied by the Snake River Plain Aquifer, they have their own separate wells, storage tanks, distribution pumps, and piping. The INTEC potable water system supplies restrooms, drinking fountains, personnel showers, safety showers, and eyewash stations. Some additional uses of potable water include a supply to a demineralized water system for process use at the IWTU facility. The INTEC raw water system supplies the INTEC fire water system, treated water system, and demineralized water system. When water losses from these piping systems occur, they are investigated to find and eliminate the leaks. The Environmental Restoration program is conducted in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). INTEC has successfully located and eliminated numerous pipeline leaks over the past several years as part of a program to help dry up the perched water vadose zone to reduce the mobilization and transport of contaminants.

2.1 Performance Status

A total of 723.3 million gallons of water was used in FY 2022, resulting in a water usage intensity of 119.7 gallons/GSF, a decrease of 31.2% compared to the FY 2007 baseline (173.9 gallons/GSF) and a 14.6% decrease from FY 2021. Water usage history and forecast is shown in Figure 5.



	FY 07	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24	FY 25	FY 26	FY 27
RWMC	10.3	5.3	6.3	6.6	8.0	11.6	7.2	4.3	2.2	1.1	1.1	1.1
PBF	2.4	6.2	5.1	5.2	5.0	3.7	1.8	1.8	1.8	1.8	1.8	1.8
TAN/SMC	13.8	10.7	18.3	14.0	10.4	8.9	8.6	8.6	8.6	8.6	8.6	8.6
CFA	79.9	53.0	39.6	58.4	50.7	50.0	57.5	57.5	57.5	57.5	57.5	57.5
MFC	27.0	24.5	29.4	28.6	46.5	65.2	63.3	29.5	30.4	31.3	31.3	32.2
INTEC	495.0	220.1	205.4	231.5	236.6	240.7	174.4	174.4	174.4	174.4	174.4	174.4
ATR	370.9	421.0	422.2	410.4	454.8	427.4	361.1	427.2	427.2	427.2	427.2	427.2
Idaho Falls	44.3	42.7	44.9	44.1	43.5	47.6	49.4	49.4	49.4	49.4	49.4	49.4
WUI INL Total	173.9	136.8	134.7	134.5	142.2	140.2	119.7	121.3	121.0	122.0	123.5	125.7

Figure 5. INL site water usage history and forecast.

The ATR reactor was offline in FY 2022 while undergoing core internal change out. Decreased water consumption for the ATR campus is attributed to less water used for cooling towers due to the reactor being out of service. The MFC campus continues to have issues with aging water infrastructure that resulted in water loss due to leaks.

As further discussed in Section 2.2, water use intensity is expected to increase in FY 2023 with the ATR Reactor coming online again and trending slightly upward in the future as the AMWTP and RWMC areas begin a transition of shut down and removal.

INL completed an initial water balance in FY 2021 on heavy process water loads and has continued to update the report annually. The FY 2022 data showed the ATR Reactor remains the major water user and was responsible for approximately 39% of the total water use at the INL site with INTEC as the second highest user at 24%, as observed in Figure 6.

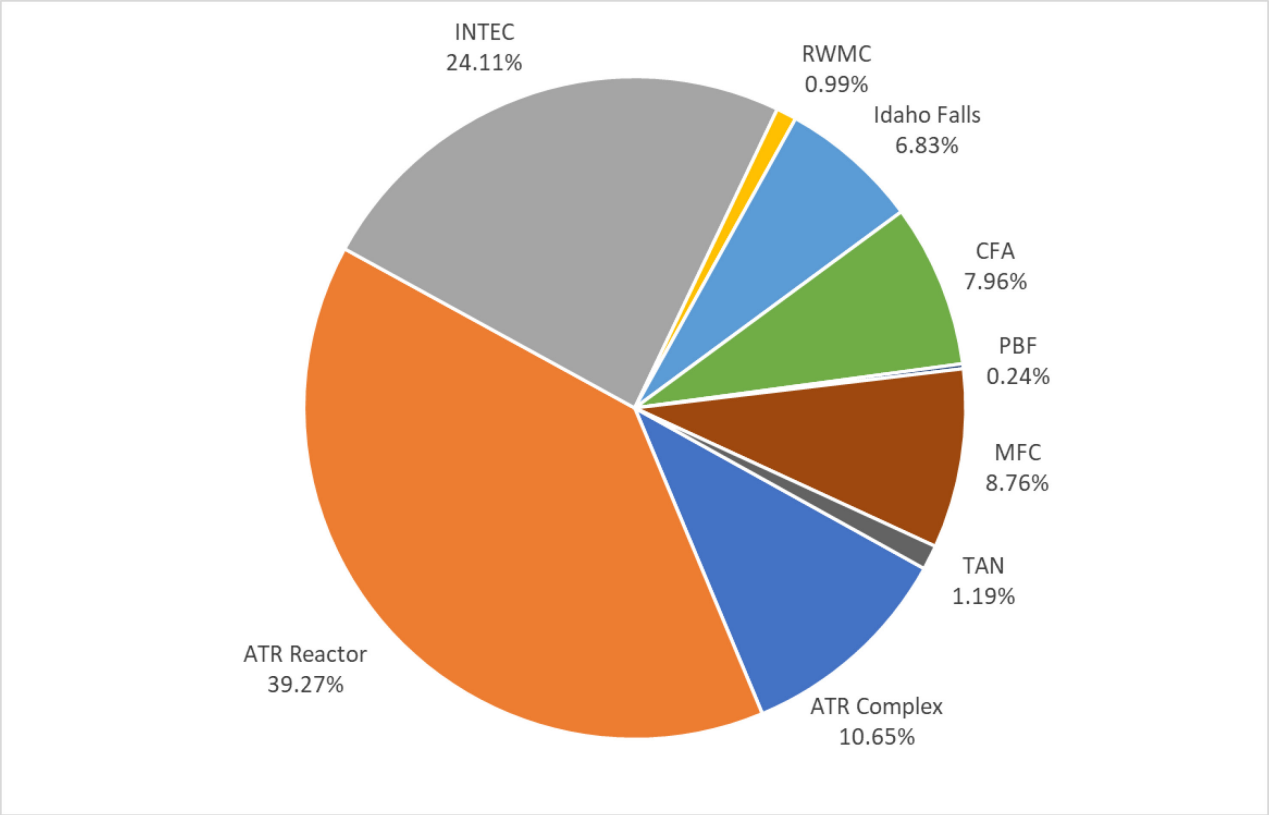


Figure 6. Water-use allocation by area and major process.

The ATR reactor uses water to flow through the heat exchanger for cooling the storage canal and for the reactor cooling tower evaporation and make-up. This heavy process water use is shown in comparison to the water used for potable water in buildings and irrigation for the remainder of the ATR Complex.

With its location in the high desert of Eastern Idaho, the INL site has little rainwater available for use as an alternative water resource, as shown in Figure 7 from the FEMP website (https://www.energy.gov/eere/femp/rainwater-availability-map). Efforts have focused on reducing landscape water use by replacing turfgrass with xeriscape landscaping at existing buildings. One new construction building came online in FY 2022 and was designed and built with low-water restroom fixtures and no landscaping.

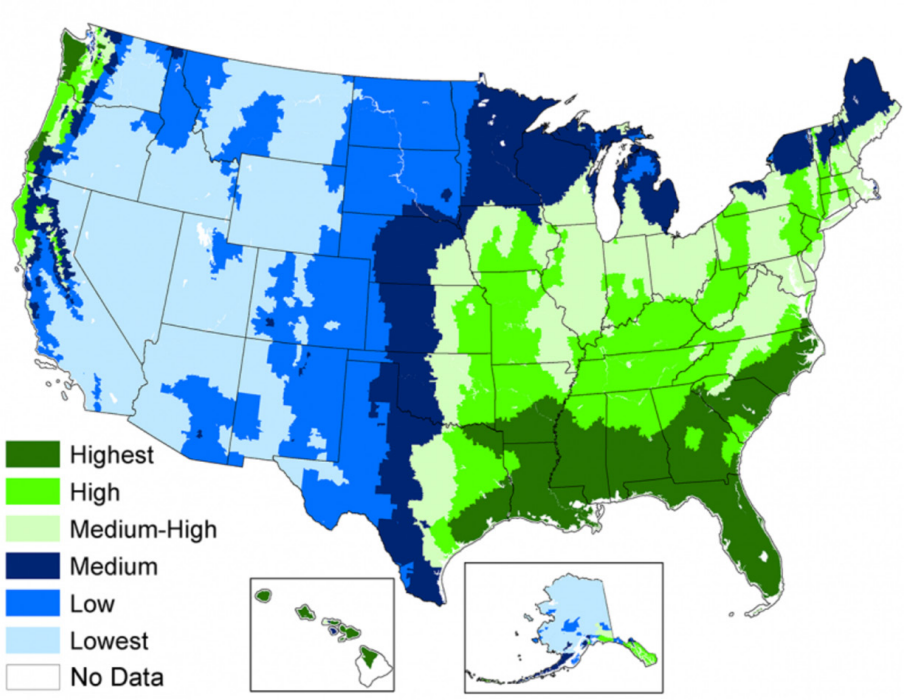


Figure 7. Rainwater availability map

2.2 Plans and Projected Performance

It is expected that ATR water use will return to the level seen in previous years as the reactor is back in operation in FY 2023; thus, water use intensity is expected to increase in FY 2023 as compared with FY 2022. The MFC campus has planned construction activities that include the repair of a leaking section of underground water pipe.

Per the Energy Act of 2020 (EAct 2020), should DOE implement guidance to exclude water from high energy mission specific facilities then INL would prepare a white paper to support the exclusion of water consumption from the ATR reactor from the water performance requirements.

Activities and projects that will continue to contribute to water use reductions including the following ongoing tasks:

- Water meters are planned for installation on all new buildings to monitor and trend water consumption and savings.
- Sustainable INL will perform an update to the Water Balance evaluation concurrently with the annual update to the Energy Balance. The Water Balance update will include recommendations for additional building water meters to be installed per EAct 2020.
- Water-reduction opportunities identified by annual energy audits will be prioritized and implemented if cost-effective.
- INL will continue purchasing EPA WaterSense or other water-efficient products, which will be documented by sustainable procurement processes.
- As EM missions are completed, they also will contribute to a reduction in water use. These include the transition of AMWTP buildings to a shut down and D&D state. However, AMWTP capabilities will continue to be maintained and operated until designated transuranic waste is treated and shipped for disposal.

The remaining D&D building closure actions for IEC building reductions project a modest reduction in water use with a significant decrease in building square footage, thus resulting in a projected slight increase of the water use intensity ratio. The scope of projected operation/building closures at INTEC, with minimal building footage reduction from D&D, would not significantly impact those activities involving most of the water usage. The potential change in water intensity contributions from INTEC would not significantly affect water intensity.

INTENTIONALLY BLANK

3. WASTE MANAGEMENT

Many factors influence the INL site's waste streams, including a fluctuating employee population, changes in mission direction, and the large land area on which facilities are located. The INL site will continue to implement projects that reduce waste generation, work with recycling coordinators to identify waste reduction opportunities, increase the types and quantities of items sent for recycling, and evaluate implementing a composting pilot program. While significant portions of the cleanup mission are complete, EM operations will continue limited cleanup mission activities, including processing and disposal of wastes.

The recycling program continues to educate employees to help change behaviors and increase participation in the recycling program. Similarly, the recycling coordinator continues to work with program personnel to identify waste minimization opportunities.

Contracted (offsite) Wastewater Treatment and Municipal Waste Disposal strategies:

- Encourage the reduction of wastewater generation (implementation/usage of low-flow sanitary systems)
- Encourage pollution prevention opportunity assessments for new applicable research and development (R&D) and campus activities.

3.1 Municipal Solid Waste Recycling and Waste Diversion

3.1.1 Performance Status

A total of 2,748,832.5 lb (1,246.9 metric tons [MT]) of non-hazardous Municipal Solid Waste (MSW) was generated in FY 2022. In FY 2021, 2,562,397.5 lb (1,222.8 MT) was generated, resulting in an increase of MSW generated of 2.0% YOY. A diversion rate of 53.8% for non-hazardous solid waste in FY 2022 was accomplished by recycling 1,478,831.6 lb (670.8 MT) of materials, including co-mingled materials, office paper, cardboard, scrap metal, wood, cooking oil, toner cartridges, plant mail, and wood pallets. A total of 576.1 MT of non-hazardous MSW generated was landfilled in FY 2022 and 493.8 MT in FY 2021, resulting in an increase of 16.7% of materials sent to landfill.

DOE/ID-10333, *INL Site Pollution Prevention Plan*, describes the pollution prevention practices.

INL continued the co-mingled recycling and paper shredding programs at CFA, Materials and Fuels Complex (MFC), the ATR Complex, and Idaho Falls during FY 2022. All INL employees can participate in the co-mingled recycling program, which allows a variety of recyclable materials to be placed in one collection bin. With the exception of the Specific Manufacturing Capability (SMC), due to security constraints, all INL employees have the responsibility to participate in the paper shredding recycling program, which includes regular office paper and controlled unclassified information materials.

IEC continues a comprehensive co-mingled recycling and paper shredding program. Reminders on recycling programs available to employees at work and at home are provided routinely in the iConnect Notes along with changes in the company, and home programs. The iConnect Notes "Household Hazardous Waste Collection Days" and "Make it A Less Wasteful Holiday" provided information for use at home. The CORE Note: "*Be Mindful of Waste this Holiday Season"* provided tips for wrapping gifts in environmentally friendly supplies for reuse or recycling. The iConnect Note "What Goes In Those Recycling Bins?" reminded employees what is recyclable and what is not at IEC facilities, and to recycle what is recyclable.

INL continues to utilize several processes to reduce the quantity and toxicity of hazardous chemicals. The processes follow the simple reduce, reuse, and recycle steps to help achieve the overall goal. INL uses chemical coordinators and environmental personnel to help ensure that requested materials are needed, that they are not available through an exchange/sharing program, and that the smallest/most appropriate quantity is being ordered. INL also stipulates the use of the EPA's Green Chemistry Tools

(Green Chemistry Resources | US EPA) to help chemical coordinators identify greener alternatives to requested chemicals.

Researchers at Idaho Falls facilities such as IRC, ESL, and the Energy Innovation Laboratory (EIL) are networked by chemical coordinators who can identify any existing chemical stock should a researcher need a small quantity of a particular chemical that already exists at INL. This program helps to ensure that the chemicals are used for their intended purpose and have a continuous turnover of inventory. The program also reduces the time to acquire needed chemicals without having to purchase new chemicals as chemical coordinators actively search for existing inventory to preclude new purchases.

Chemical coordinators purchase acceptable chemicals with their own chemical purchase cards, increasing traceability and improving efficiency for the requestor. The INL Procurement organization and chemical coordinators screen subcontractor procurement requirements, ensuring that less-hazardous chemicals are used when available. INL integrated environmental, waste management, and industrial hygiene functions maintain chemical reviews and evaluations to identify existing product inventory and less-toxic substitutions prior to purchase. INL is working actively and continually toward a reduction of inventories through the avenues of acquisition, use, and disposal.

INL continues to purchase additional four-wheeled paper shredding bins and dual-bin recycling stations to better promote and equip facilities to participate in the recycling program. In the third quarter of FY 2018, restrictions were put in place that limited plastics eligible for recycle due to a lack of domestic and international plastic recycling facilities. Existing image-based recycling station signage was revised to indicate which plastic materials are no longer accepted in the co-mingled recycling stream.

The INL Hazardous Waste Management Act/Resource Conservation and Recovery Act (RCRA) Permit requires that all operating contractors conduct and complete a source reduction evaluation review and written plan in accordance with the procedures and format provided in EPA/625/7-88/003, the *EPA Waste Minimization Opportunity Assessment Manual*. This review and plan are submitted to the Idaho Department of Environmental Quality every four years, the latest on March 25, 2019, which must include detailed descriptions of any programs for contractors to assist generators of hazardous and mixed waste in reducing the volume (quantity) and toxicity of wastes produced. The next plan is due to the Idaho Department of Environmental Quality on March 31, 2023.

The AMWTP facility continues to use soft-sided over-pack containers, soil sacks, and macro bags in lieu of corrugated steel ‘cake boxes’ for containment of degraded waste boxes. These containers are less expensive, weigh less, and require less material to manufacture. As a result, less fuel is required for transportation and the volume of radioactive waste destined for land disposal is reduced. In addition, six drum overpacks made of plywood are utilized to get six drums of waste into the box line troughs for processing more efficiently. AMWTP continues to investigate additional opportunities to use less packaging and lighter, more reusable containers to fulfill its missions. Efforts to improve packaging efficiency will be pursued if a better alternative is discovered for packing materials that will reduce waste. However, packaging waste will naturally decrease as RWMC-AMWTP as well as RWMC-ARP facilities that no longer serve the RWMC facility mission are being compliantly closed and undergoing D&D.

INL incorporates a Sustainability review of new activities as well as pollution prevention reviews through the Environmental Compliance Permit process, allowing waste diversion activities to be identified earlier in the project life-cycle and implementation costs to be built into project budget estimates. IEC incorporates reviews of chemical use and storage, use, reuse, and recycling of resources and waste generation and the management of new activities through the Environmental Checklist process. These environmental aspects are reviewed by the Pollution Prevention coordinator to identify waste reduction or waste diversion opportunities early in the project.

INL landscaping contractors use mulching mowers at Idaho Falls buildings to return grass clippings to the lawn rather than taking them to a landfill. In FY 2022, approximately 190,000 lb. of grass clippings were diverted from the landfill.

INL cafeteria contractors continued to recycle their used cooking oil through a contracted vendor, while IEC cafeterias are extending their frying oil life by using a double filtration system and putting filter pod fryer oil extenders in the oil. The pods are left in the oil overnight to help absorb impurities, which allow for extended oil life.

INL advertised through iNotes reminders on how to participate in the co-mingled and paper recycling programs when workers returned to work in March 2022.

3.1.2 Plans and Projected Performance

Plans and projected performance for FY 2022 will continue to:

- Educate and encourage employees to reduce their waste generation and participate in the recycling and paper shredding programs.
- Implement a new "Craigslist" -style application to allow the sharing/transferring of unneeded chemicals.
- Evaluate potential outlets and the expansion of recyclable waste streams, such as food wastes, glass, and biomass waste.
- Reduce the use of printing paper through a campaign for users to ensure printers and copiers are set to duplex printing. Printing paper with at least 30% post-consumer fiber is required.
- Meet or exceed this goal as funding is allocated to further optimize the current waste diversion systems and modify contracts, as well as to divert selected waste streams if markets are available.

3.2 Construction and Demolition Recycling and Waste Diversion

3.2.1 Performance Status

A total of 11,794.4 MT of construction and demolition (C&D) waste was generated in FY 2022, as compared to 23,184.3 MT in FY 2021, which resulted in a decrease of 49.13% of C&D waste generated YOY. A diversion rate of 28.1% (7,304,071.1 lb or 3,313.1 MT) of C&D waste was accomplished in FY 2022. The decrease in the diversion rate of C&D materials is directly correlated to the significant decrease in the amount of materials generated. Much of INL's C&D diversion comes from reuse of soil as daily landfill cover materials.

The CFA landfill continued diverting asphalt removed from paved surfaces and stockpiling for future reuse on resurfacing projects.

INL continued a volumetric measurement for recycled metals and facility C&D materials generated during construction activities. Both materials are excessed and, as a result, are diverted from the landfill.

IEC's diversion of C&D waste in FY 2022 was limited to non-radiological scrap metal and recycled universal waste from limited D&D activities. Due to the radiological potential of most of IEC's C&D waste from D&D waste management activities, most of IEC's C&D waste continued to be landfilled.

Two IEC employees developed the Automated Inspection Process, an application for a computer tablet that converted a paper process to an electronic process. The Environmental Restoration program monitors approximately 122 institutional control and operations and maintenance sites across the entire 890-square-mile INL Site that must be physically inspected annually and photographed. The process requires filling out paper forms, taking photographs with a digital camera, physically scanning the forms, and downloading and sorting images of each site. In addition to eliminating the paper waste, the data is also quickly and easily available to personnel from the Idaho Department of Environmental Quality and the EPA who monitor the site Federal Facility Agreement and Consent Order.

3.2.2 Plans and Projected Performance

INL intends to perform the following actions to enhance the C&D waste diversion process:

- Incorporate standard instructions on management (diversion) of asphalt wastes for subcontractors performing paving work in the Environmental Compliance Permit process
- Engage construction subcontractors to solicit best practice ideas relative to INL logistics and market potential, especially during the design and construction process of new buildings.
- INL incorporates metals recycling into D&D tasks when allowed under the current DOE policy for recycling metals. IEC will incorporate metals recycling into D&D tasks when feasible but anticipates continuance of existing metals recycling practices as part of ongoing D&D operations in general. IEC currently excesses existing metals, where the Property Disposal Office bids out the scrap to vendors who recycle.

INL is currently monitoring and assessing landfill gas emissions from the CFA Landfill to better inform INL on future opportunities to capture or reuse landfill gas emissions.

4. FLEET MANAGEMENT

4.1 Fleet Management Program Overview

The large land area on which INL site facilities are located requires long commutes that are typically over 50 miles each way to the research and industrial complexes. An extensive fleet is needed to provide transportation and equipment for operations. INL operates and maintains a large bus fleet with 86 over-the-road motor coaches to provide daily commute services for nearly 1,800 workers at the research and industrial complexes. Operation of the INL and IEC subcontracted bus fleets helps to improve overall safety on the roads while reducing GHG emissions from both government- and privately owned vehicles. As the only remaining large bus fleet in the DOE complex, INL continues to use this fleet as a test bed for the advancement of fuel efficiency, real-world transportation, and transportation fuels R&D.

The INL Fleet Management Organization is part of the Mission Support Services Directorate, reporting directly to the Facility and Site Services Director. Both Transportation Services and Fleet and Supply Operations report to the Fleet Management Division Director.

The Federal fleet management staff include:

- DOE-HQ Federal Fleet Manager: Ben Robles
- DOE-ID Fleet Manager: Scott Hobbs
- Budget Officer: Martin Badrov

Mission changes impacting INL's fleet: INL expects the site employee numbers to increase as missions expand. The need for additional transportation vehicles and service vehicles is anticipated. INL is committed to net-zero emissions by 2031 as well as federal Zero Emission Vehicle (ZEV) fleet policy. Additionally, the INL fleet is impacted by programs requesting additional vehicles to support increased mission and the increased request for tours from outside organizations.

Vehicle policies and procedures: INL Fleet Management policies and procedures are located on an internal Fleet Management website including a safety video, tutorial and instructions for motor pool rental, and motor pool vehicle options. Laboratory Wide Procedure (LWP)-14111, *Motorized and Non-Motorized Vehicle Safety* is the key controlling document for INL vehicles. The Fleet Management internal website provides maps to traditional and EV refueling/recharging stations, as well as instructions for refueling of vehicles. Government vehicles are expected to be used only for official use by INL employees and are not intended to be used as transportation to employee work locations.

Telematics: Generally, the INL-managed fleet, including buses, trucks, and light-duty vehicles (LDVs), are fitted with Zonar telematics equipment such as global positioning systems, electronic-verified inspection report hardware and software, and ZPass asset tracking for riders. This equipment tracks vehicle location, mileage, speed, and other diagnostic data; upgrades and automates vehicle inspections; and electronically logs bus riders. Use of the telematic devices improves safety and efficiency of INL-managed fleet vehicles; enhances bus routing, lot use, and ridership data; and streamlines vehicle pre-trip safety/maintenance checks.

Vehicle Allocation Methodology: Processes are in place at INL to review vehicle acquisition requests and efforts are underway to maintain rather than increase fleet numbers. INL has made progress towards the General Services Administration (GSA) recommended fleet profile yet remains under the recommended levels.

Site ZEV and Electric Vehicle Supply Equipment (EVSE): INL has 23 level 2 electric vehicle charging stations. In FY 2022, INL purchased and was instrumental in installing an electric bus charger at CFA-696, the 'Big Shop'. Materials were purchased to install two additional electric bus chargers for EROB and MFC. An engineering study and initial design was completed for additional EVSE. Challenges continue to be manufacturers having available vehicles, limited capability of current options for heavy-duty fleet, and vehicle type needed to fulfill project and lab missions.

Fleet management information system (FMIS): INL uses and off-the-shelf FMIS that offers equipment tracking, automated motor pool rentals, maintenance records and billing, and extensive reporting abilities allowing custom reports.

4.2 Fleet Petroleum Consumption

Continued implementation of diversified strategies for reducing fossil fuel use and carbon emissions associated with light-, medium-, and heavy-duty vehicles. These strategies affect DOE's petroleum fuel usage through fuel usage reduction and fuel switching activities.

4.2.1 Performance Status

In FY 2022 fleet fuel data show 725,392 gasoline-gallon equivalents (GGE) of petroleum-based fuel was used, a 22.7% reduction from 938,197 GGE in base-year FY 2005, and a 9.4% reduction from 800,420 GGE in FY 2021. The petroleum usage is a compilation of all the INL site contractors, and the total of unleaded gasoline and diesel fuels as reported into the Fleet Automotive Statistical Tool (FAST) database. In the latter portion of FY 2022, INL resumed its use of R99 renewable diesel as a sustainable alternative to aid INL in reaching its zero emission goals.

In FY 2022, INL purchased and was instrumental in installing an electric bus charger at the CFA-696, the 'Big Shop'. Additionally, materials were purchased to install two additional electric bus chargers for EROB and MFC.

INL continues to perform the following activities as funding permits:

- The installation of solar panels on all regular run buses to help keep the batteries charged while the buses sit idle over the weekends. This helps reduce the load on the charging systems and ensures that the buses start during cold temperatures.
- The utilization of low-speed EVs in place of diesel-powered UTVs. Due to supply chain issues in FY 2022, receipt of these types of vehicles was limited.

4.2.2 Plans and Projected Performance

Additional reductions in petroleum-based transportation fuels will be obtained through numerous identified projects and activities as funding allows:

- Institute the INL net-zero plan to use renewable diesel in FY 2023 as an interim step prior to complete elimination of petroleum-based fuels in the fleet.
- Continue efforts to build and install no-idle solar-powered HVAC systems on additional buses.
- Partner with INL research teams for alternative fuel and infrastructure development, such as hydrogen.
- IEC will continue to evaluate its use of LDVs and bus commuting methods.

4.3 Fleet Alternative Fuels Consumption

Continued development of diversified strategies for increasing alternative fuel consumption and reducing carbon emissions associated with the operation of light- and heavy-duty vehicles. These strategies affect DOE's alternative fuel consumption primarily through fuel-switching activities.

4.3.1 Performance Status

In FY 2022, data show 70,426 GGE used of alternative fuels—a decrease of 7.9% from 76,436 GGE in base-year FY 2005, and an increase of 97.5% from 35,657 GGE in FY 2021. This usage is a compilation of all INL site contractors and the total of each of the various alternative fuels as reported into the FAST database.

In FY 2022, INL continued to encourage alternative fuel usage by:

- Completing the installation of three two-port electric vehicle (EV) charging stations for fleet vehicles. A total of 23 level 2 EV charging stations with 46 ports are available for the INL fleet.
- Continuing to increase the number of electric UTVs.
- Participating in a Yellowstone-Teton Clean Cities Coalition forum to encourage and cooperate with commercial trucking companies and state agencies on alternative fuel use such as biodiesel and R99.
- Right sizing the fleet with more flex-fuel vehicles capable of using E85 and diesel vehicles capable of using R99 renewable diesel to maximize alternative fuel use.
- Hosting two fully electric buses from VanHool and Motor Coach Industries (MCI) J Coach for future use consideration at INL.
- Resumed used of R99 to aid in reaching INL's emission goals.

4.3.2 Plans and Projected Performance

Plans for FY 2023 include:

- Increasing the number of EVs in the light-duty fleet in conjunction with the increase of EV infrastructure Sitewide.
- Continue to partner with Ballard and INL hydrogen subject matter experts to develop a hydrogen fuel cell system to charge the batteries on a fully electric motor coach, which would extend the range of current coaches.
- Evaluating electric equipment, such as hybrid diesel/electric bucket trucks and additional electric-only vehicles, to ensure they can meet the demands of work crews year-round. Accordingly, INL will increase usage of electric-powered equipment instead of diesel equipment where it can be utilized and still meet the needs of the users.

4.4 Light-Duty Vehicle Acquisition

LDVs are procured almost exclusively through the GSA vehicle-leasing program. A rotation schedule based on vehicle age and mileage determines when vehicles are returned to and subsequently replaced by GSA. Working closely with GSA on the light-duty fleet replacement schedule has historically allowed the INL site to favor the replacement of petroleum-fueled vehicles with alternative fuel vehicles (AFVs).

4.4.1 Performance Status

Acquired 29 new LDVs in FY 2022.

Working with GSA, INL LDV acquisitions totaled 27 new vehicles in FY 2022, consisting of three electric, seven diesel, and 17 gasoline-only vehicles. Whenever possible, INL will request replacements to be E85-capable. Currently, INL has 354 vehicles in its LDV fleet, 232 of which are AFVs. The remaining 122 vehicles consist of: nine electric, 107 gasoline, four gas-hybrid and two diesel vehicles. The current mix of AFVs in INL's LDV fleet is 65%.

In FY 2022 the ICP received two additional leased vehicles from GSA, both of which were plug-in hybrid EVs. Currently, IEC has 105 LDVs, 101 of which are AFV E85/unleaded flex-fuel, seven are regular unleaded, and two are plug-in hybrid electric/gas.

4.4.2 Plans and Projected Performance

Future plans include a continued focus on LDV fleet conversion to EV and AFVs when available.

As GSA identifies vehicles for replacement, the INL fleet manager will request AFVs and EVs for replacements, when available, and when they will meet work requirements. INL will continue to leverage vehicle telematics to track fuel usage.

ICP will continue to replace aging LDVs with AFVs as they are available, as mission requires, and as directed by the Contracting Office.

5. CLEAN AND RENEWABLE ENERGY

As outlined in the INL Net-Zero Plan, the envisioned onsite carbon-free electric generation includes advanced planning and conceptual design for nuclear energy generation from small modular reactors supplying electricity through the grid, and from microreactors connected to a micro grid. Consideration will be given to more traditional renewable generation sources, such as wind and solar from private energy developers and will be supplemented with carbon-free energy generation from servicing utilities.

The INL site is served by the following electric utilities: Idaho Power supplies 74% of electrical load, while Idaho Falls Power provides 24%. Two other utilities—Fall River Electric and Rocky Mountain Power—provide very incidental loads under 2%. The electric energy source mix as determined from the most recent utility generation mix data and the FY 2022 electric consumption is illustrated in Figure 8.

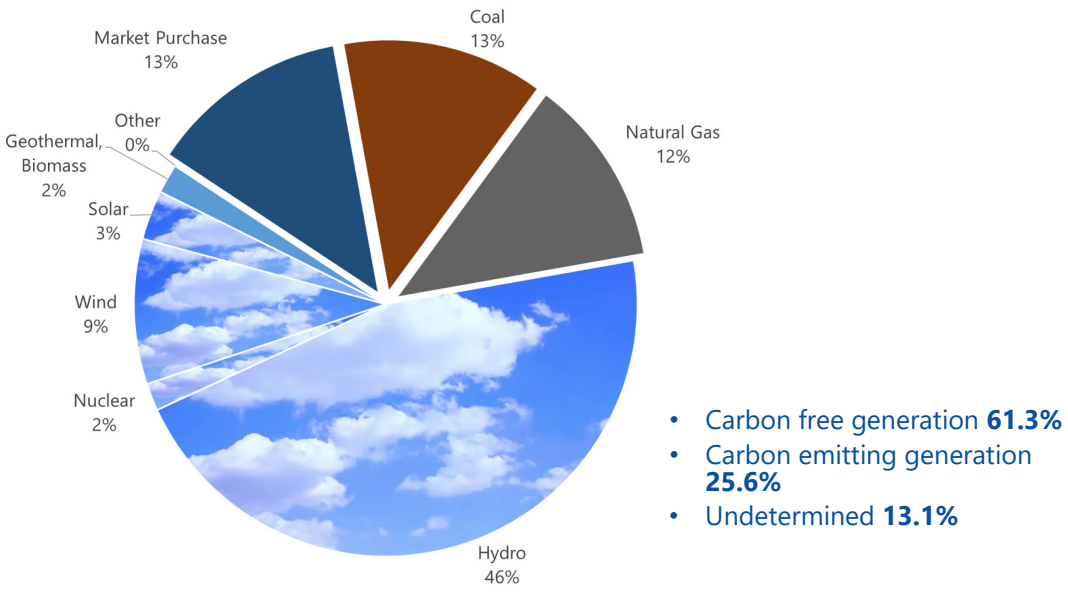


Figure 8. INL site electricity source mix.

The current generation mix from the local utility providers is dominated by abundant older hydroelectric and limited availability of new renewable electricity. However, the INL site's primary electrical supplier, Idaho Power, currently owns interests in three coal generation plants, with plans to eliminate interests in two of them by 2025 and evaluate options for continued emissions reductions from the third plant. Idaho Power is committed to its goal of 100% clean energy generation by 2045 and Idaho Falls Power is almost 100% clean electricity generation.

The current renewable energy credit (REC) purchase goal is outlined in the Energy Act of 2005 (EPAct 2005), Section 203 (42 USC 15852), which requires that renewable energy consumption is "not less than 7.5%" in FY 2013 and each fiscal year thereafter. INL calculates the number of RECs to purchase based on the total amount of electricity used in the previous year.

Purchased RECs meet all Western Renewable Energy Generation Information System requirements, are Green-e Energy Eligible, are retired on behalf of the INL site, and the generation sources were placed into service within 15 years prior to the beginning of this fiscal year as required. RECs purchased from Idaho Falls Power satisfy the third-level priority of renewable energy purchases as the INL site is using the energy produced from the purchased RECs.

During annual retro-commissioning, energy audits, existing lease updates, and new lease negotiations, the installation of renewable energy generation is considered, and the payback evaluated. INL R&D continues to investigate the potential installation of numerous renewable energy technologies that can assist INL to meet its net-zero and onsite renewable energy generation goals.

5.1 Performance Status

INL has one solar transpired wall on the IRC Records Storage Facility at the Idaho Falls campus and one other transpired solar wall at MFC. These two solar walls provide a combined total of 92,302 kWh equivalents of renewable thermal energy.

INL maintains numerous small photovoltaic systems of 1,200 watts or less for applications, such as remote air monitoring, environmental monitoring, well instrumentation, evaporative pond circulation, signage lighting, and a solar walkway light. These small onsite photovoltaic systems generated a calculated 220 kWh.

INL continued to develop the Renewable Energy Microgrid research project at ESL IF-685. This project capacity is currently at 73kilowatts (kW) from predominately solar renewable sources. A new solar array was connected to the microgrid during FY 2022. The energy generated from this project is used to offset the energy used in the ESL's west high bay. In FY 2022, the microgrid produced 77,834 kWh of renewable electricity for total INL onsite generation of 78,054 kWh.

In addition to the onsite generation from the microgrid, two solar transpired walls, and small photovoltaic systems, INL procured 16,488 MWh of blended source RECs from Idaho Falls Power at a total cost of $90,684. REC costs continue to increase nationwide based on demand and INL continues to use a local supplier of RECs to satisfy the third-level priority as described earlier. When energy for the solar transpired walls and bonuses are included, the total renewable energy for INL was 17,274 MWh (7.9%) for FY 2022. Table 2 summarizes the renewable energy consumption and RECs purchased in FY 2022.

Table 2. Renewable energy consumption for FY 2022.

Total Electricity Consumption (MWh)	FY 2022 Onsite Generation (MWh)	FY 2022 Purchased Renewable Energy (MWh)	FY 2022 Purchased RECs (MWh)	Total Renewable Energy with Bonuses (MWh)
217,930	78.1	0	16,488	**17,274**
Percentage				**7.9%**

The *INL High-Performance and Sustainable Building Strategy* was updated in FY 2022 and included an expanded section on renewable energy including solar hot water heating.

5.2 Plans and Projected Performance

In FY 2023, INL plans to purchase RECs from Idaho Falls Power and/or generate renewable energy from the microgrid or other research projects at a minimum of 7.5% of the total electric energy consumption. A 15kW wind turbine for the microgrid is planned for next year.

As INL's Net-Zero Plan is implemented over the next 10 years, INL will work with utilities to procure clean electricity to supplement growing internal generation. As an interim step, REC purchases support INL net-zero goals by providing the green attributes of locally generated and consumed renewable energy from the Horse Butte Wind Farm and other sources. Over the next five years, INL will explore and develop renewable onsite electricity generation as part of the net-zero initiative to achieve the long-term goal of all generation onsite or grid-purchased being clean and renewable. In addition to onsite renewable energy generation and utility provided clean energy, locally generated RECs will be purchased as needed to reach the goal with a minimum annual purchase of 7.5% as currently required by EPAct 2005. INL has engaged in discussions to identify new sources of renewable generation for purchased RECs and clean generation for EACs. INL will pursue EACs that have been placed in service since October 2021 and are located within the same grid region.

6. SUSTAINABLE BUILDINGS

INL has incorporated the Guiding Principles for Sustainable Federal Buildings (Guiding Principles) into appropriate management documents and sustainability concepts in general are interwoven into 13 separate INL policies, plans, and execution documents. IEC has incorporated the Guiding Principles into IEC documents, including engineering standards, and they are interwoven into separate policies, plans, and execution documents.

6.1 Guiding Principles

6.1.1 Performance Status

One new construction Guiding Principle compliant building was added in FY 2022. There are 43 buildings greater than 25,000 GSF that are applicable to Guiding Principles requirements under federal guidelines. At the end of FY 2022, 26 DOE-owned buildings were compliant with the Guiding Principles, 21 of which are less than 25,000 GSF as shown in Table 3. Including the 21 small buildings, a total of 64 buildings are applicable for Guiding Principles.

Table 3. Buildings meeting the Guiding Principles (DOE-owned).

Building Name	Building Number	GSF	New Construction (NC) or Existing Building (EB)	GP Achieved Fiscal Year
ATR Technical Support Building	TRA-1608	16,567	NC	2011
Radiological & Envir. Sciences Lab	IF-683	13,383	NC	2013
Health Physics Instrument Lab	CF-1618	15,484	EB	2013
Irradiated Materials Characterization Lab	MFC-1729	12,147	NC	2013
Radiological & Envir. Sciences Office	IF-601	20,078	EB	2014
Records Storage Facility	IF-663	21,716	EB	2014
CFA Medical Facility	CF-1612	22,417	EB	2014
Machine Shop Building	MFC-782	5,096	EB	2015
IRC Office Building	IF-602	45,619	EB	2016
CFA Transportation Complex	CF-696	81,102	EB	2016
Engineering Office Building	MFC-710	11,418	EB	2016
Office/Three Labs	CF-612	9,872	EB	2016
ATR Test Train Assembly Facility	TRA-1626	4,483	EB	2016
Security Building	MFC-701	5,825	EB	2016
ATR Simulator Training Facility	TRA-679	10,114	EB	2017
CFA Fire Station	CF-1611	29,099	EB	2017
Instrument & Maintenance Facility	MFC-791	16,332	EB	2017
Office Building	CF-615	9,685	EB	2017
Reactor Building & Annex	EBR-I-601	27,152	EB	2017
RHLLW - Administration Building	B21-631	3,947	NC	2017
MFC Research Collaboration Facility	MFC-1742	12,956	NC	2020
SMC Warehouse	TAN-1617	17,176	NC	2020
ATR Complex Security Building	TRA-1644	11,367	NC	2021
ATR Maintenance Support Building	TRA-1643	33,023	NC	2021
MFC Administration Building	MFC-1747	18,901	NC	2021
TAN Vehicle Maintenance Building	TAN-691	11,050	NC	2022

INL has documented the Guiding Principles for an additional 10 buildings, which are leased buildings.

Table 4 shows the achievement of Guiding Principles by the number of buildings and building GSF. With the addition of the one new building in FY 2022, the 15% target was exceeded for Guiding Principles by both building count and square footage, when bonus credit for buildings less than 25,000 GSF is included. The right-hand column of Table 4 includes the 21 buildings less than 25,000 GSF in the 'Applicable Buildings' count and square foot per the *Implementing Instructions for EO 14057*. The Total Applicable building count (39) and performance metrics in the Dashboard are incorrect due to a data error flagging WMF-1612, WMF-1614, WMF-1615, and WMF-1617 incorrectly based on the Excess Date.

Table 4. Guiding Principles achievement.

Guiding Principles Metric	**>25,000 GSF Goal**		**With Bonus Credit for Buildings <25,000 GSF**	
	Count	GSF	Count	GSF
Total Applicable Buildings	43	2,899,619	64	3,169,633
Total Guiding Principles Buildings	5	215,995	26	486,009
Percent Guiding Principles Achieved	11.63%	7.45%	40.63%	15.33%

INL incorporated sustainable, healthy, and climate-resilient building practices into the following institutional documents, procedures, and processes in FY 2022:

- An updated version of the *INL High Performance and Sustainable Building Strategy* (HPSB) was completed that incorporated the 2020 version of the Guiding Principles, EO 14057, and the updated American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) 90.1 requirements.
- INL Engineering Standard STD-139 was updated to include ASHRAE 90.1-2019 effective for projects beginning April 2023.

SPC-3036, the INL *Leased Building Performance Specification & Standardization* document was developed to guide the efforts to improve the energy performance of leased buildings with the inclusion of following requirements:

> *Achieve an ENERGY STAR rating of 75 and maintain the rating for the duration of the lease term. If an ENERGY STAR rating of 75 or greater is not achievable, the lessor must demonstrate that all cost-effective energy upgrades are implemented. Cost effective is defined as payback within the lease term. All energy-using system upgrades will conform to ASHRAE 90.1.*

The new leased building sustainability performance standard was implemented into the negotiation of one building lease in FY 2022. The building owner's sustainability investments are anticipated to greatly enhance the energy performance. Upon review of the lease contract, the DOE Office of Asset Management suggested that the sustainability standard should be adopted by all DOE contractors.

6.1.2 Plans and Projected Performance

INL has six additional DOE Office of Nuclear Energy new buildings that are planned to implement the Guiding Principles. These buildings are shown in Table 5. INL will continue to evaluate the existing building stock for existing building candidates.

Two significant barriers to documenting the Guiding Principles in existing building are the older building stock and the challenge of cost effectively implementing the modifications needed to meet the energy and water-reduction goals. Energy and water upgrade opportunities can be modeled to reach the reduction goals, but due to high local construction costs and relatively inexpensive power and water rates, the payback periods of these projects often exceed the life expectancy of the equipment and the remaining

life of the building. INL will continue to encourage all building modification projects to meet the 30% better than ASHRAE requirement from the Guiding Principles.

Table 5. New buildings targeted to meet the Guiding Principles (FY 2023–FY 2024).

Building Name	Building Number	GSF	New Construction (NC) or Existing Building (EB)	Target Year
ATR Reactor Support Building	TRA-1649	19,000	NC	2023
Sample Preparation Laboratory	MFC-1743	42,000	NC	2023
MFC Security Building	MFC-1748	14,400	NC	2024
TAN Production Support Building	TAN-1619	18,064	NC	2024
CFA Power Utility Operations Bldg	CFA-1628	18,300	NC	2024
MFC West Campus Office Building	MFC-1758	20,000	NC	2024
Totals	**6 buildings**	**131,764**		

A roadmap will be developed in FY 2023 for the plan to reassess the current compliant Guiding Principles buildings. The roadmap will provide milestones for reassessing 20 buildings grandfathered under the 2008 and 2016 versions of the Guiding Principles prior to the end of FY 2025. Additionally, a roadmap and milestones will be developed for a four-year cycle of reassessment for all current and future Guiding Principles buildings.

The INL site buildings targeted to meet the Guiding Principles do not include buildings owned by EM. Since the EM mission is to reduce footprint and complete cleanup, the existing building life is either too short or too uncertain to invest in upgrades for most EM buildings.

Plans to ensure capital asset construction, renovation, and modernization projects with an anticipated total project cost of $50 million or more at CD-1 integrate sustainability and resiliency measures per the Deputy Secretary's Memorandum on *Climate Adaptation, Resilience and Sustainability in Project Management*, April 5, 2022, include:

- INL will continue to pursue Guiding Principles and ASHRAE 90.1 efficiency standards for all new construction projects as are cost effective and appropriate.
- Fossil fuel reduction in design was included in the previous revision of the INL HPSB. INL's net-zero efforts for INL include plans to reduce fossil fuel use.
- New construction projects will continue to be guided by STD-139 *INL Engineering Standards* and the INL HPSB. Both documents were updated in FY 2022 at which time the energy efficiency requirements of 30% better than ASHRAE 90.1-2019 were incorporated.
- Highly energy-efficient lighting, roofing, and automation systems continue to be installed in new buildings and during retrofit activities. The result is not just an increase in the resilience of the building, but of the surrounding community, by decreasing demand on available resources and infrastructure.

6.2 Net-Zero Emissions

At INL, the driving force behind our nuclear and other clean energy research and development is creating secure, clean, scalable, and sustainable energy solutions to address national and global needs while reducing environmental impacts.

INL will lead by example, committing to becoming a national carbon-neutral prototype and achieving net-zero emissions in INL operations by 2031. Achieving net-zero means drastically reducing onsite emissions and offsetting the limited residual emissions from activities that are impossible to decarbonize.

This is a substantial and long-term commitment. INL will use technology innovations and partnerships, increased efficiencies, and novel approaches to demonstrate the path forward for establishing a clean energy economy.

INL's net-zero focus includes building electrification, clean fleet options such as electric and hydrogen vehicles, working with utilities to secure CFE including nuclear power.

Although the net-zero goal is exclusive to INL operations at this time, IEC, operating under EM funding, has received approval to install electric vehicle charge stations at the Sawtelle Street Facility in Idaho Falls, as well as at the INTEC Facility, thereby helping to contribute to the net-zero goal.

6.2.1 Performance Status

As one member of the DOE Net-Zero Four Lab Pilot, INL developed an initial net-zero plan. INL/EXT-21-61673, *INL Net-Zero: The Path Forward* Plan was published in August 2021. This plan outlined INL's approach to a secure, sustainable, equitable, and resilient climate future. A refresh occurred in FY 2022 to align the net-zero plan with the nuclear INL mission.

Secretary Granholm officially announced the Net-Zero Four Lab Pilot in Boulder, CO. INL was named as one of the four national labs to lead the charge to Net-Zero by 2031. The Net-Zero Four Lab Pilot workshop was successfully held in October 2021 with representatives from 17 national labs in attendance. At one point, over 150 people were online watching the virtual event. INL had the lead, and the workshop completed a directive outlined in the charge letter received from DOE in the spring of 2021.

The following activities provide major highlights of the Net-Zero Program in FY 2022:

- INL hosted the first ever Net-Zero Fair in April 2022 with over 400 employees attending. This was INL's first in-person employee event since the return-to-work program was implemented following the COVID remote work initiative. The fair included a Net-Zero VIP event with local government, utilities, non-profits, DOE and Lab leaders.
- The Net-Zero Program hosted a Collaboration Challenge as part of Innovation Week 2022. The winners are developing a Bike Commuter Resource Center for INL employees to connect them with the resources they need to become net zero commuters.
- INL conducted preliminary testing to determine energy savings potential at its Idaho Falls campus with simple building operation schedule changes. Additionally, INL began using R99 in its motorcoach fleet.
- The Net-Zero program convened industry, government, utilities, and non-profits to develop a roadmap to nuclear energy deployment in Washington, DC.
- The CFE Plan was submitted to DOE outlining plans to achieve 24/7 carbon-pollution free electricity by 2030.
- Preference for non-fossil fuel heating technologies, per 42 USC 6834, was incorporated into the INL FY 2022 HPSB strategy document for new construction and retrofits.

INL completed an engineering study to investigate the electrification of eight buildings on the Idaho Falls campus and the installation of a centralized ground source heat pump system to serve eight buildings at the CFA campus. Four of the Idaho Falls buildings contain laboratory space, while four are considered office buildings. The Idaho Falls study considered the cost to upgrade electrical distribution as well as several electrification technologies options. Several of the buildings are leased and would require building owner approval. Another challenge to implementing the Idaho Falls electrification plan is the cost of a required new substation to serve the increased electrical load on the Idaho Falls campus. The ground source heat pump study for the CFA campus considered two different types of low temperature geothermal heating and cooling systems each with two options. The payback for the four options ranged from 35 years to 14 years.

The Vulnerability Assessment and Resilience Planning (VARP) document was finalized and outlined the projects and steps needed to lessen the impact of climate change on INL operations and vulnerable energy supply sources.

6.2.2 Plans and Projected Performance

Making INL a demonstration platform will require a holistic approach, from changing the daily behaviors of individual staff to incorporating clean energy technologies into INL's extensive infrastructure.

INL advances a secure, clean energy future through innovative research and technology solutions to integrate low-carbon energy options and improve water and energy efficiency. INL addresses materials challenges unique to harsh and extreme environments such as nuclear and other energy systems, as well as aerospace, transportation, and defense systems.

Sustainable design principles are incorporated and applied to the operations, siting, design, and construction of buildings, primarily though the environmental checklist process and design reviews. Using the projects identified during the required EISA audits, projects are developed, vetted, and considered for internal and external funding opportunities. Projects with the best payback, ease of implementation, and greatest carbon reduction are considered first. Long-range projects that require major construction or retrofit steps, are sent to engineering and cost estimating for further development.

Engineering staff develop specifications for operations that can easily be replaced with non-fossil fuel using equipment. Over the next five years, the more challenging systems such as safety basis equipment, will be researched and acceptable alternatives developed and implemented.

INL is taking a campus approach to net-zero building emissions with efforts focused on electrification and procurement of CFE for the INL site. Design standards were updated in FY 2022. INL engineering and project management staff will be trained on the new requirements. As this effort evolves, INL will leverage successes from other national laboratories and federal agencies to implement best practices.

INL will develop accountability models for each campus and program area. GHG emission heat maps will be posted, and quarterly organizational accountability meetings will be held.

INL procurement contract standard clauses currently include language that requires the procurement of sustainable acquisition products and services when available. In the future, INL will develop a process to track and trend these items and require contractor accountability. As guidance is promulgated and requirements defined, ongoing updates and enhancements will be incorporated into sub tier contracts.

INL has an established process that is used during C&D activities. Program enhancements continue and markets will be researched over the next two fiscal years, including the potential use of the EPA's Deconstruction Rapid Assessment Tool to assist in prioritizing structures for deconstruction and salvage.

INL has a robust EV charging program infrastructure and implementation plan. Phase 1 is complete and phase 2 will commence in FY 2023. INL anticipated phase 2 of the EV infrastructure implementing plan will be completed over the next five fiscal years, based on fleet electric vehicle availability from GSA. A standard design package and EV charging station model was chosen to simplify the process.

INL has one process load powered by fossil fuel that is separately metered and excluded from the energy intensity goal. The challenge is to grow the laboratory while eliminating the emission, particularly when the process load is part of a nuclear or other safety basis.

INTENTIONALLY BLANK

7. ACQUISITION AND PROCUREMENT

7.1 Performance Status

Reports indicate 97.8% of the contracts in FY 2022 contained applicable sustainable acquisition (SA) clauses. Because of the mid-year ICP contract change from Fluor Idaho to IEC, the information in Table 6 is for INL, IEC and Fluor Idaho. DOE information was assumed to be included in the Federal Procurement Data System and reported separately.

Table 6. FY 2022 sustainable acquisition progress.

FY 2022 Sustainable Acquisition (SA) Progress	
Metric	**Total**
Number of Eligible Contract Actions	229
Number of Contract Actions w/SA Clauses	224
Percent of Contract Actions w/SA Clauses	97.8%
Total Eligible Contract Dollars ($)	$272,537,017
Total Contract Dollars ($) w/SA Clauses	$267,183,376
Percent of Contract Dollars w/SA Clauses	98.8%

INL maintains SA language in contracts and requires suppliers of standard desktop computers to provide items designated as Electronic Product Environmental Assessment Tool (EPEAT) Silver or better. In May 2020, INL updated the standard terms and conditions to incorporate the SA clauses.

INL subcontractor requisitions are routed through a review process that includes a check for potential SA products. Documentation of the manufacturer's literature on the product's attributes are electronically attached to the requisition and maintained as part of the procurement record. Products are suggested, if not already specified, and the supplier is required to provide a listing and quantity of the SA products upon completion of the project. Both Fluor Idaho and IEC subcontract requisitions were also routed through a review process that includes a check for potential SA products.

In FY 2021, INL introduced an online, web-based query function to allow easier access to the biobased purchase data; however, the tracking of these products is still only available by verifying each product individually, outside of the procurement system. This method was used for biobased reporting in FY 2022.

INL continues to use category IDs (CATIDs) related to SA products to enhance automated tracking and reporting of individual product purchases within the current system. A new procurement system was launched in June 2022, called Ariba. The new system is not equipped to 'flag' products meeting SA attributes, so data collection is still limited to responses from vendors and contract reviews.

- Preference Program: INL's automatic document generation system was used to further incorporate SA language. For example, INL requires its supplier of standard desktop computers to provide items designated as EPEAT Silver or better.
- Estimation, Certification, and Verification: INL requires certain suppliers (e.g., construction services, office products, paper products) to deliver spend reports listing the designated product versus the preferred purchases. In addition, INL has developed standard reports that provide the summary data necessary for reporting spending for recycled content products.
- Annual Review and Monitoring: INL conducts an annual assessment of the SA program to ensure that the appropriate clauses are in place.
- Hazardous Chemicals and Materials: IEC reduces and minimizes the quantity and toxicity of hazardous chemicals and materials through a procurement process that encourages

environmentally preferable purchases. One of the objectives stated in the IEC management procedure for the acquisition of material and services is to utilize products and materials that contain recycled and biobased content when practical. Purchase requisitions are screened by an assigned procurement specialist for environmentally preferable materials.

INL does not have a reliable or automated method for tracking only biobased purchases. INL developed a review and tracking process to identify the purchased biobased products, as well as a list of CATIDs to be maintained to make review of purchase records better. In FY 2022, the INL site purchased six biobased product types and spent $23,173 on biobased products, with INL purchasing three product types totaling $3.6k and IEC purchasing the remainder. INL anticipates a similar or slight increase in the biobased products purchased for FY 2023.

7.2 Plans and Projected Performance

As regulations and reporting increase, many changes and additions continue to be in SA requirements. INL plans to continue the following actions to improve their SA programs:

- Develop better resources for subcontractors to incorporate SA and biobased product purchases into their projects and improve reporting process to INL. Work with the Ariba team to utilize a 'green' flag in the procurement system to help track appropriate products and their sustainable attributes.
- Develop a supply chain risk assessment per forthcoming guidance.
- Enhance the current ordering system to increase SA and biobased product visibility to the laboratory community.
- Conduct a campaign to increase the education and awareness of SAs and biobased products and their effect on performance requirements.
- Ensure personnel resources are adequate and aligned in accordance with the proper organizational roles and responsibilities.
- Enhance appropriate mechanisms to augment the existing reporting requirements and track compliance with this goal. INL Procurement has purchased new acquisition software and anticipates increased functionality in tracking purchases that meet the SA attributes when the program is implemented.
- Due to the EM cleanup mission, the incorporation of additional SA contract clauses into IEC subcontracts, including reporting requirements, will be considered, if feasible. IEC assisted DOE through compliance with DOE Acquisition Regulation 953.22378, *Sustainable Acquisition Program*, as required by the IEC contract.

8. INVESTMENTS: IMPROVEMENT MEASURES, WORKFORCE, AND COMMUNITY

8.1 Performance Status

8.1.1 Efficiency and Conservation Measures

Fifteen energy conservation projects were implemented in FY 2022 and an additional twenty projects are planned in FY 2023. These projects are summarized in Table 7.

Table 7. FY 2022 and FY 2023 sustainability projects summary.

Project	Cost ($)	Energy Savings (kWh)	Energy Cost Savings	Project Status
Completed in FY 2022				
INL - CFA exterior LED lighting in 5 buildings	$35,080	28,766	$3,669	Operational
INL - CFA interior LED lighting in 6 buildings	$329,312	145,507	$24,450	Operational
INL – IF-670 LED lighting	$56,970	4,827	$3,319	Operational
INL – IF-603 LED lighting	$9,460	10,070	$923	Operational
INL – IF-693 LED lighting	$33,263	169,242	$12,993	Operational
IEC – CPP-1688 LED lighting	N/A	N/A	N/A	Operational
FY 2022 TOTAL	**$464,085**	**358,412**	**$45,354**	
To be Completed in FY 2023				
INL – LED lighting in 3 Idaho Falls buildings	$26,544	5,621	$1,611	In Progress
INL – CFA LED lighting in 3 buildings	$4,440	3,343	$492	In Progress
INL – CFA retro-commissioning in 3 buildings	$106,062	247,701	$17,204	In Progress
INL – CFA 3 HVAC upgrades	$23,538	13,851	$689	In Progress
INL – CFA envelope improvements	$3,585	26,143	$1,965	In Progress
INL – LED lighting in 2 buildings	$16,327	13,097	$1,710	Planned
IEC – CPP-659 LED lighting	$326,000	170,000	$10,200	In Progress
IEC – LED lighting in 4 buildings	$266,000	680,000	$38,300	Planned
FY 2023 TOTAL	**$772,496**	**1,159,756**	**$72,171**	

8.1.2 Performance Contracts

INL has one active ESPC project in the maintenance stage at MFC. This project has provided consistent and defendable energy reduction as documented from annual measurement and verification reports developed by the Energy Services Contractor (ESCo) and reviewed, validated, and approved by DOE-ID. This project has struggled to provide energy cost savings as the actual unit costs for fuel oil and electricity have not escalated as estimated by the original project development.

The MFC ESPC Project included boiler and compressor replacements, lighting and HVAC upgrades, and solar thermal wall installations at the MFC Complex for an installed cost of $33M. The project was completed in 2010 and is in Year 12 (maintenance stage) of a 16-year contract term.

INL has compiled the cost-effective ECMs developed by the energy audit and retro-commissioning activities completed from FY 2014 through FY 2022, into a comprehensive project opportunity that would upgrade specific technologies across INL. This project has a rough order of magnitude cost estimate of over $2.6M and may make an acceptable alternatively funded project, possibly using the ENABLE ESPC funding mechanism. INL will continue to evaluate this opportunity in FY 2023 to determine whether it, or a larger project, is a good candidate for an ESPC or if it can and should be funded, in whole or in part, internal to INL.

The primary challenge to implementing alternatively funded projects continues to be the low-cost of electricity already used as a major energy source. Inexpensive water and long payback periods also affect performance contract viability.

8.1.3 Appropriations/Direct Obligations

As a government entity, there are limited funding acquisition pathways. There is no standard formula for funding sustainability initiatives. However, potential funding strategies reflect five main sources:

- Direct and indirect funding and reinvesting cost savings from sustainable actions
- Special funding requests (e.g., third-party, DOE base funding, line item)
- Utility incentive programs
- Integration of sustainability into new infrastructure, major renovations, and maintenance activities
- ESPCs and Utility Energy Service Contracts (UESCs).

In FY 2022, $464,085 was spent on various energy-related upgrade projects, while also spending $79,518 on energy auditing activities for a total of $543,603. Spending levels for continued efficiency upgrade projects and audits for future years are $871,824 planned for FY 2023 and $500,000 estimated for FY 2024.

The base Sustainable INL Program is managed with indirect funding. However, because indirect budgets are typically constrained, it is difficult to fund many of the planned potential sustainability projects. INL can use utility incentives and internal energy savings reinvestment funding to implement additional facility energy upgrades. Strategic investment dollars are prioritized at a senior leadership level and balanced against laboratory needs.

In January 2022, the IEC contract was enacted. The conditions of the contract allow IEC the opportunity to submit funding requests for work activities as they become known. This process will allow IEC more latitude to request funding for ECMs, and other sustainability projects as they are identified and determined to be feasible.

8.1.4 Workforce and Community

The *Federal Buildings Personnel Training Act of 2010* has been reviewed and determined that current INL energy manager training meets the requirements of this Act. INL recently hired a new energy manager in August 2022, who is currently pursuing certification as an Energy Management Professional through the Energy Management Association. Additionally, proficiencies are being identified, tracked, and developed through the GSA Accelerate FM tool. The INL energy manager along with a senior energy analyst, engineers, facility managers, and project managers continue to attend and use specialized training to identify, develop, and implement energy-reduction projects based on all available energy-use data and trends, mission criteria, and FIMS.

INL held the first Net-Zero Fair featuring exhibits and information on INL's Net-Zero program, updated an internal mapping tool to include locations of bike racks, carpool parking, EV charging

stations, and park and ride lots. Additionally, a staff survey was conducted to determine interest in and barriers to biking to work.

Section 8.3 outlines actions taken or planned to incorporate and/or expand environmental justice into operations, planning, decision making, and procurement activities. This includes Tribal and stakeholder engagement initiatives and approaches. Over the next 2 years, INL will continue to evaluate options to enhance, develop, and integrate policies that ensure equitable development that promotes environmental justice and spurs economic activity in disadvantaged communities. Additional information on efforts to ensure sustainable and equitable siting that promotes conservation of natural resources, reduces emissions, increases resilience to climate change, integrates use of local infrastructure, expands use and access to public transportation, is also found in Section 8.3.

IEC has evaluated job functions and determined that Energy Manager Training and Certification are applicable to IEC operations and will continue to evaluate them for implementation.

8.2 Plans and Projected Performance

The focus will continue on individual cost-effective projects that lead to overall energy and water reductions in targeted buildings. Seven LED lighting retrofit, three retro-commissioning, one envelope improvement, and three HVAC upgrade projects are fully developed and in progress for completion in FY 2023, as listed in Table 7. An additional six LED lighting retrofit projects have also been planned for FY 2023. Ongoing material supply issues continue to create a potential barrier for completing these projects by fiscal year end. INL will continue to leverage indirect and direct funding along with utility incentives and funding in the INL reinvestment program to develop and implement additional small retrofit projects.

INL has numerous potential ECMs developed from the results of the energy audits completed during FY 2014 through FY 2022. INL evaluated and prioritized 789 ECMs by technology and cost effectiveness and has completed 75 of the ECMs to date. These 789 ECMs range from relatively inexpensive control system schedule modifications to more complex and costly capital projects. INL will continue to streamline the remaining ECMs in a comprehensive project opportunity and identify potential funding for completion.

Training opportunities such as Energy Exchange, utility energy efficiency seminars, and online training will be used to keep staff educated and up to date on certification requirements.

INL prepared an Implementation Approach white paper in FY 2021 to further evaluate various funding options and project approaches to implement the remaining ECMs identified by the completed energy audits. This white paper focuses on the options to explore for at least 50% of the ECMs being constructed through performance contracting as required to meet EAct 2020 Section 1002. INL will use this white paper, net-zero initiatives, and FY 2022 EISA audits to evaluate the cost effectiveness and practicality of using the ENABLE ESPC process to implement ECMs. Every effort will be made to bundle like project technologies into an alternatively funded project and expedite the development and approval lead time. Technologies that might be bundled into an ESPC project for INL include:

- Exterior lighting upgrades for all Idaho Falls buildings and parking lots
- Chiller, heat pump, and air conditioning system and controls upgrades
- Interior LED lighting
- Motor retrofits.

8.3 Regional and Local Planning

8.3.1 Performance Status

As the INL site's primary contractor responsible for land management and Sitewide transportation, INL maintains excellent relationships with local community planning groups and government entities—including the cities of Idaho Falls, Blackfoot, Arco, Rexburg, and Pocatello, as well as the Idaho counties of Bonneville, Butte, Bingham, and Bannock. Interactions include transportation infrastructure and maintenance, facility planning locations, traffic patterns, and future infrastructure needs.

Although limited, existing public transportation infrastructure usage is encouraged. INL works with local and state agencies on transportation planning by providing input and sponsoring awareness events to promote employee-commuting ridership.

Bicycling remains a seasonal method of commuting to the Idaho Falls campus with increasing awareness of personal fitness and energy conservation. Several buildings have changing rooms and showers available for bicycle commuters. Nearly all Idaho Falls buildings have designated bicycle spaces and INL continues to explore the possibility of covered parking for cycling and motorcycle commuters, in addition to bicycle repair stations located at strategic locations in Idaho Falls. INL encourages walking and bicycling as a means of travel within campus boundaries. Long-range development envisions continuous improvement of a bicycle and pedestrian-friendly environment.

Along with community partners, a series of virtual and live activities were created to celebrate Earth Week in Idaho Falls. Activities included plogging (collecting trash while running) on favorite walking/running routes, a community bike ride, a virtual art contest, live events at an urban farm with several classes to choose from, and a food drive. The combination of virtual and in-person events allowed community members to participate in activities at their pace. DOE laboratories presented a day of coast-to-coast programming about Earth Day including a segment hosted by INL's K-12 education and cultural resource departments called, "Honoring Mother Earth," with traditional dance and drum performances and remarks by special guests from the Shoshone-Bannock Tribes. Information was sent across several media platforms, including iNotes, Facebook, Twitter, and the City of Idaho Falls Earth Day website.

INL continues to work with the following state and local planning organizations:

- American Bus Association
- Idaho Strategic Energy Alliance
- Yellowstone-Teton Clean Cities Coalition
- Greater Idaho Falls Transit
- Pocatello Regional Transit
- Idaho Transportation Department.

IEC played a key role through leadership, as well as by providing social media and management of the virtual Earth Day event. IEC's Calcine Retrieval Project employees educated participants on cleanup efforts to protect the Snake River Aquifer through hands-on demonstrations showing the heat transfer process, and the operation of a vacuum crawler, and residual retrieval equipment. In addition, IEC provided "What is an Aquifer?' activity page in support of the Wonder of Water theme for the Newspaper in Education insert to the Idaho Falls Post Register.

8.3.2 Plans and Projected Performance

Involving the community, stakeholders and subcontractors is vital to promoting sustainability and climate literacy, awareness, and action. Further expanding environmental justice into operations, planning, decision making, and procurement activities can ensure sustainable and equitable siting. Central to achieving sustainability goals is energy efficiency. The net-zero program objectives encompasses efficiency by championing and growing a zero-carbon local, state, and regional community that benefits

all citizens. Planned engagement with the community to harness sustainability and Net-Zero initiatives are to be conducted through:

- Town halls/community discussions: INL will hold town hall-style meetings in communities across the state to discuss the net-zero goal and have open conversations on INL's actions, as well as what communities and citizens can do in this area.
- Articles: INL will craft a series of articles and op-eds (both INL-authored and ghost-written or written in partnership with external partners) for state-wide visibility of the net-zero focus.
- Business and community-leader events/meetings: INL's net-zero team will establish regular meetings to discuss steps with business and community leaders that are taken towards a reduced carbon footprint and actions that others can take in support of this goal for both INL and the community.
- Non-profit community and economic development organizations: Steps will be taken to familiarize these areas in INL actions. Non-profit and economic development support will focus, in part, on organizations that have a net-zero or reduced carbon focus.
- Scholarships and outreach: Scholarships and outreach to schools and universities will increase its messaging on net-zero rationale, as well as strategies and opportunities, in addition to looking at partnerships for possible scholarships supporting students studying related fields.
- Social media campaigns: INL will implement a series of social media campaigns focusing on net-zero and related activities and technologies. This will target areas and regional audiences with a focus on generating conversations.
- Regional ad campaigns: Regional ad campaigns will highlight INL's net-zero actions to raise awareness and help spur community conversations on the topic.

The innovation at the heart of our success is only possible through the fusion of inclusively diverse people and perspectives in every stakeholder engagement. For this reason, INL has integrated and operationalized inclusion and equity into the core functions of all Laboratory operations to:

- Build an inclusive workforce where we leverage diverse talents to create next-generation scientific excellence.
- Accelerate initiatives to enhance equity and address the life cycle of an inclusively diverse, multigenerational community for our organization, contractors, suppliers, industry partners, and academic relationships.
- Harness resources and unique facilities to develop future Science, Technology, Engineering, and Mathematics (STEM) talent vital to the achievement of our net-zero objectives through partnerships with minority-serving universities, community colleges, trade schools, investments in K-12 education, and support for regional economic development.
- Empower employees, suppliers, and community partners to build, facilitate, and sustain equity in every aspect of our net-zero program.

The conservation of natural resources is an integral part of achieving sustainability at INL. Proactive land stewardship is an important component of supporting continued mission-critical activities and future development with minimal disruption. The Natural Resources Group outlined eight solution categories throughout the Vulnerability Assessment and Resilience Planning (VARP) process to support sustainability initiatives by:

- Adaptive Landscape Management using Ecological Monitoring Data
- Inventory Sensitives Species Vulnerable to Climate Change
- Update/Develop Biological/Ecological Resource Planning Documents

- Reduce Wildland Fire Risk and Enhance Natural Resource Recovery Strategies
- Update Restoration/Revegetation Guidance Documents
- Develop and Implement Integrated Pest Management System
- Manage Wildlife/Human Interactions and Reduce Conflicts
- Engage Agency Stakeholders for Developing Best Management Practices (BMPs)

Sustainable development encompasses an integrated approach during the refurbishment and planning of future facilities and infrastructure, which is consistent with the *INL Annual Laboratory Plan Fiscal Year 2022*. INL site land, campus, and space planning is a critical element in transforming INL to meet DOE national nuclear R&D goals. The major objective for land, campus, and space utilization is to consolidate and co-locate like activities, and plan and prepare to support future mission needs. INL capabilities are consolidated around the three main campuses (the ATR Complex, MFC, and Idaho Falls campus) with each campus supporting specific missions based on capabilities and functions.

9. INDIRECT EMISSIONS

9.1 Scope 3 Tracking and Applicability

INL has assessed the applicability of Scope 3 GHG emissions across the entire value chain. Although subject to change and enhancement, the following applicability list will be used as a framework for future evaluations, potential measuring, and reporting. As with any new initiative, a fully scoped understating of what is required to trend and track these data elements will be needed. Increased funding, unavailable and unplanned in FY 2023, will be required.

INL has identified categories 9, 10, 11, 12, and 13 as potentially applicable and will be evaluated in FY 2023, denoted as TBE (to be evaluated) in Table 8.

Table 8. Scope 3 category applicability

Scope 3 Category	Applicable to INL?	Currently Reported?
1. Purchased Goods and Services	Yes	No
2. Capital Goods	Yes	No
3. Fuel and Energy Related Activities	Yes	Yes (Shared electricity T&D losses)
4. Upstream Transportation and Distribution	Yes	No
5. Waste Generated in Operations	Yes	Yes
6. Business Travel	Yes	Yes
7. Employee Commuting	Yes	Yes
8. Upstream Leased Assets	TBE - Full service leases in very small square footage space	No
9. Downstream Transportation and Distribution	TBE	No
10. Processing of Sold Products	TBE	No
11. Use of Sold Products	TBE	No
12. End-of-Life Treatment of Sold Products	TBE	No
13. Downstream Leased Assets	TBE	No
14. Franchises	No	No
15. Investments	No	No

The INL site contractors' Environmental Management System (EMS) provides the framework and process for evaluating and monitoring emissions and related reduction activities. On an annual basis, appropriate sustainability targets are developed and monitored through the EMS to support the overall reduction in emissions. As EM programs complete projects, resource, and space management optimization results in reductions in energy and water consumption. Fugitive emission reduction is managed through ongoing waste and resource reductions.

9.2 Air Travel, Ground Travel, and Commute Data

9.2.1 Performance Status

In FY 2022, employees flew 16,735,469 airlines miles, which was an increase of 382.3% from the FY 2021 total of 3,469,989 miles. Employees also drove 1,833,403 business-related miles in rental cars and personal vehicles, which represented an increase of 99.0% from the FY 2021 total of 937,190 miles. These increases are attributed to lifting the severely restricted business travel ban due to the impacts and protective measures implemented during the pandemic for much of FY 2022.

In FY 2022, the INL site conducted an employee commute survey to estimate the total number of miles driven by employees either to/from work locations or bus stops. The commute survey gathered data on the work schedule, work locations, number of days buses are used, number of days that are teleworked, and number of weeks away from work (sick days, holiday, personal leave, etc.). Employee responses are computed and extrapolated to determine total miles traveled for input into the Dashboard. Commute miles were extrapolated and factored based on the average number of employees working at each facility location, the number of employees teleworking or working a hybrid schedule and reported response rates.

In FY 2022, employees were estimated to have commuted 33,607,450 miles to/from their work location, which represented an increase of 22.2% over the number of miles commuted in FY 2021. A total of 142,618 miles were attributed to human-powered transportation, such as walking and biking. This increase in commuter miles was expected since employees were teleworking for all of FY 2021 and returned to work locations throughout FY 2022. If compared to FY 2019, the last full year of limited telework, the total miles commuted decreased by 10.6% on a total mile basis, but if factored at current staffing levels (~1,500 more employees in 2022 than in 2019), the realized reduction is 27.8%.

INL continues to reduce employee commute by transporting employees with a modernized bus transportation system, taking nearly 1,800 cars off the road per day. By streamlining the INL mass transit system that provides safe, efficient, and sustainable transportation to work for INL employees throughout the eastern Idaho region, INL encourages travel behavior changes to reduce fossil fuel consumption and increase highway safety. In doing so, INL models future trends in mass transit to local government planning across the region. Other actions include instituting a park and ride system, eliminating the cost to INL employees for using the bus system, adding additional buses to accommodate increased ridership, and relocating employees to Idaho Falls offices.

INL has installed 23 Level 2 EV charging stations since 2018. A total of 46 charging ports are available primarily for INL fleet operations, and a program was established in FY 2019 to allow employees to use the EV chargers on a cost recovery basis. Usage data and fee collection are completely automated and tracked monthly. An information website was created for ease of use, including safety, EV charging program sign-up, maps, and program rates.

9.2.2 Plans and Projected Performance

The implementation of projects that reduce employee commuting will continue by encouraging the use of the bus system and reducing unneeded travel. As these projects and activities are implemented, corresponding commute mile reductions will occur. INL and IEC are increasing the number of employees while DOE-ID staffing is remaining stable; therefore, the INL site will likely experience an increase in employee commuting miles and travel. EV station installation is planned for one major campus area in FY 2023, commencing Phase 2 of the EV charging program installation. As electric vehicles are procured for fleet use, additional areas will be considered for installation and existing areas expanded.

Employee commute reduction tactics:

- Change commuting habits by encouraging carpooling and increased INL bus use
- Promote strategies to optimize fuel efficiency throughout seasons and idling reduction

- Increase telework and create telework centers, based on the success shown during the pandemic and maximum telework practices which resulted in approximate 28% reduction in commuting miles over pre-pandemic commuting miles
- Promote the use of emission free commute transportation sources such as walking and biking and provide bike-friendly building enhancements, such as secure bike storage/lockers or bike racks.

Employee travel reduction strategies:

- Continue to use video and web conferencing to hold virtual meetings to avoid travel when possible
- Reduce air travel, particularly short-range (<300 miles) air travel, except when required for the INL site mission
- Choose low-emissions providers and nonstop flights when air travel is required
- Reduce car rentals by promoting carpooling and public or group transportation modes at conferences and other meetings while on business travel.

INTENTIONALLY BLANK

10. FUGITIVES AND REFRIGERANTS

10.1 Performance Status

The fugitive and refrigerant emissions are from emissions generated from 24 fugitives and refrigerants used in INL site operations. The total fugitive and refrigerant emissions for FY 2021 are 37.9 MT compared to 137.1 MT in FY 2021. There were no releases of sulfur hexafluoride in FY 2022.

The INL site maintains preventive maintenance schedules for all refrigerant equipment, conducts repairs, and removes and replaces refrigerants with certified refrigerant technicians. INL chemical coordinators and environmental personnel conduct reviews of chemicals and projects to identify ozone depleting chemicals and refrigerants that have high global warming potentials and ensure restricted chemicals are not being procured.

10.2 Plans and Projected Performance

The INL site will continue to look for ways to minimize usage through practicing timely preventive maintenance repairs and will continue to work with facilities personnel to find appropriate substitutes that could have a lower global warming potential, especially in cases where projects are proposing to use sulfur hexafluoride or other high global warming potential chemicals.

INTENTIONALLY BLANK

11. ELECTRONIC STEWARDSHIP AND DATA CENTERS

11.1 Purchase of EPEAT-Registered Products

11.1.1 Performance Status

The standard for the procurement of desktop computers, workstations, laptops, tablets, and computer displays is to meet or exceed EPEAT Silver standards—and wherever possible, EPEAT Gold standards. In FY 2022, 97.8% of eligible electronics acquisitions met the applicable EPEAT standards.

FY 2022 achievements:

- INL was one of 75 winners nationwide of the 2022 EPEAT Purchaser Award, as observed in Figure 9, thus achieving the 4-Star Award level.
- INL promoted the standard for new electronic equipment and hardware to be a minimum of the ENERGY STAR 5.0 Category B rating and wherever possible, the Category A Energy Rating. Dell™ Energy Smart is enabled from the manufacturer. Dell eSMART settings are used wherever possible.
- INL IM continued to promote and maintain up to 600 virtual desktop infrastructure (VDI) thin client computers in FY 2022. There was an active VDI increase of 254 VDIs just in FY 2022. IM will continue to provide VDIs for users who are working remotely and no longer need a physical on-premise desktop computer.
- IEC continued to procure ENERGY STAR monitors and computers that are registered as EPEAT when applicable to the procurement.

Figure 9. 2022 EPEAT Purchaser Award.

11.1.2 Plans and Projected Performance

INL will continue to evaluate electronics acquisition requests to ensure that non-standard electronics are registered with Gold or Silver EPEAT over Bronze wherever possible.

Additional expansion of VDI computers will be considered wherever it makes sense and budget allows. VDIs are offered to remote workers who no longer need a physical desktop computer.

11.2 Power Management

11.2.1 Performance Status

Power management controls are in place on all eligible computer systems. In FY 2022, 100% of eligible PCs, laptops, and monitors have power management controls. Power Management settings are configured when the computers are imaged for the first time. This is done by imaging with the PowerCfg.exe executable with all computers receiving a ‘Balanced’ power plan. Power management policy requires the considerations of teleworking restraints and issues (e.g., remote personal computers

that go to sleep cannot be accessed remotely); therefore, the computers will need to have some of their power management settings configured on a case-by-case basis.

INL currently has both a policy and procedure that covers the responsibility and directions for implementing and maintaining power management on PCs and monitors to shut down PCs and peripherals when not in use. The laboratory-wide procedure covers 100% of INL IM-managed systems and excludes sensitive and mission-critical equipment. It also calls for owners of self-managed systems to implement the 'company-standard' power management settings. Administrators of self-managed computers are given instructions on how to set the power management settings on their computers. The number of variances was reduced to improve the end user's experience.

INL's written guidance contains instructions for both power management and configuration management software deployed on all INL computers, ensuring that 100% of the eligible monitors and computers on INL-managed systems have ENERGY STAR power management settings in place.

Power management default settings are on all eligible IEC computer systems. Desktop configuration hardware complies with ENERGY STAR and DOE standby power requirements. However, certain production and plant operations systems were not configured to automatically conserve energy (i.e., control room systems and camera monitors, as those systems are safety and operations related and must remain in the 'on' position). IEC employees are prevented from making changes to conservation settings by IEC cybersecurity policies.

11.2.2 Plans and Projected Performance

Focus will continue on improved power management efforts that are cost-effective and least disruptive to performers and will continue to work with IM to improve power management.

To support remote work, INL IM will expand the use of VDI to replace traditional desktop computers in INL facilities. These VDIs will require less power and require no physical space, giving users the choice of a physical onsite office space—a traditional office versus a temporary 'hoteling space' while onsite.

11.3 Automatic Duplexing

11.3.1 Performance Status

At the end of FY 2022, 100% of managed equipment has duplex printing enabled, where possible.

The INL site manages print services for all networked printers and multifunction devices. This includes setting all managed printers to automatically duplex print with the ability for individuals to select single-sided printing on a per-job basis. Additional non-networked copiers are enabled to duplex print where applicable.

Additionally, instructions for individual printers are posted on the internal INL Sustainability–Electronic Stewardship website with directions to have INL Operations Center assist in setting their printers to default duplex print, where available.

11.3.2 Plans and Projected Performance

Efforts will continue to encourage and enable duplex printing on all printers, copiers, and multifunction devices while assessing new opportunities to improve sustainability of printing operations and continue to reduce the number of personal printers.

Additionally, INL IM will require business justification for purchasing smaller, stand-alone printers versus using larger group or department-wide enterprise printers.

11.4 Electronics End of Life

11.4.1 Performance Status

In FY 2022, 100% of electronic devices were reused or recycled. Of that total, 58.6% was sent to a certified recycler—Technology Conservation Group of Portland, Oregon—that was certified under the Responsible Recycling (R2) Certification and Recycling Industry Operating Standard (RIOS^{TM}), 37.9% was donated or reused, and 3.6% was recycled through a local non-certified recycler. Sending electronic devices for reuse or recycle meets the GSA definition for recycling electronics.

The INL site provides an effective electronics disposition program for reusable equipment, which is just one aspect of the overall Property Management System that is requirements driven and flows down from federal requirements to a comprehensive set of procedures. The system utilizes transfer provisions for onsite use and GSA electronic screening provisions to promote reuse by other federal and state agencies, and offers reuse programs, including donations and sales, following GSA requirements for disposition.

INL maintains procedures through a series of controlling documents, including, but not limited to, LWP-8000, *Environmental Instructions for Facilities, Processes, Materials, and Equipment*, PDD-2000, *Property Management System Description*; and iQ-Work Smart process flows. These procedures outline the procedural steps required when materials and equipment require disposition for both users/generators and disposal personnel. Specifically, in LWP-8000, Section 4.8, there are requirements for reuse and/or donation of working electronic products and for use of a certified recycler should the materials not be reusable.

Disposition of IEC electronic equipment is managed by controlling documents, such as MCP-3480 *Environmental Instructions for Facilities Processes Materials, and Equipment*; MCP-3689 *Material Exchange Program*; and MCP-454 *INL Recycling*. In accordance with procedural requirements, IEC reuses computer equipment when applicable. IEC sells un-reusable computer equipment to electronics recyclers that use environmentally sound management practices. IEC complies with applicable federal, state, and local laws, and regulations, and implement the following instructions:

- Send all computer equipment received for recycling at the end of its useful life, including those that are broken and obsolete, to electronics recyclers that use environmentally sound management practices.
- Perform due diligence when selecting an electronics recycler to verify that the recycler will handle and process electronic equipment consistent with all federal, state, and local regulations, as well as in an environmentally sound manner.

INL PC redistribution collected electronics, shredded hard drives, and recycled these materials through a certified recycler. In FY 2022, INL recycled approximately 35.4 MT of electronics through a certified recycler.

As an alternative to traditional recycling through multiple transfer/donation programs (e.g., other Federal Agency transfer, State Agencies for Surplus property, Education and Research Transfer Program, Laboratory Equipment Donation Program, and Computers for Learning), INL was able to transfer 685 computers and other various electronic laboratory equipment to local high schools and universities and other Federal and local government agencies. These transfers were beneficial to DOE and local schools. They prevented the destruction of the equipment, diverted the equipment from disposal in landfills, and allowed the schools to increase their laboratory capabilities along with various STEM programs and activities with little-to-no expense and extend the life of over $5.1 M worth of equipment.

11.4.2 Plans and Projected Performance

Continued focus on efforts that are cost-effective and least disruptive to performers. Work will continue with IM and Property Disposal Services to improve electronics end-of-life disposition.

11.5 Data Center Efficiency

11.5.1 Performance Status

Efforts to consolidate data centers for greater efficiency continued throughout FY 2022. Completed or ongoing actions include:

- Continuing to improve the cooling efficiency for the consolidated data center located in the EROB—formerly high-performance computing (HPC)—data center
- Continuing improvement of hot-cold aisle containment to decrease system loads and increase the effectiveness of heat transfer
- Orienting servers and racks to achieve better efficiency
- Shutting down and eliminating unneeded servers
- Raising supply water temperature to minimize energy use and maximize potential free-cooling time
- Installing modern and efficient HVAC units in the Willow Creek Building server room, ensuring connectivity to the facility management control system for optimal performance.

11.5.2 Plans and Projected Performance

INL will continue consolidating server infrastructure in the old HPC data center by virtualizing physical machines and taking advantage of cloud and container hosting options. This will reduce overall power and cooling needs.

Complete replacement of the 30-ton computer room air condition (CRAC) unit with a 20-ton unit at the EROB data center.

DOE Headquarters (DOE-HQ) purchased licenses for a data center infrastructure management tool called Nlyte. INL has reserved licenses for INL use but has not initiated implementation. Plans to secure funding to implement Nlyte are being developed while INL continues to focus on server consolidations.

INL anticipates Nlyte's Data Center Infrastructure Management (DCIM) software solution will help automates the management of INL assets, resources, processes, and people throughout the entire life cycle of the computer infrastructure. The software provides full visibility of all assets in a data center, allowing IM teams to monitor energy usage and receive alerts when thresholds are exceeded.

DCIM software also helps with data center design and infrastructure planning, by assisting with determining the optimum placement of new hardware. This translates to more efficient data centers, lower operating costs, and increased productivity.

In the future, Power Usage Effectiveness (PUE) calculations will include the performance of our entire fleet of data centers around the laboratory—not just our newest and best facilities. INL will also continuously measure throughout the year—not just during cooler seasons.

12. ADAPTATION AND RESILIENCE

Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents. Energy resiliency is the ability to prepare, prevent, and recover from energy and water disruptions that impact mission assurance on federal installations. This means providing reliable power under routine and off-normal conditions, including those caused from extreme weather events. Adaptation refers to actions taken to reduce risks from changed climate conditions and to prepare for expected future changes. Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*; the DOE Climate Adaptation and Resilience Plan (CARP) issued in August of 2021; and the Climate Adaptation Policy Statement each build on prior DOE actions taken to bolster adaptation and increase the resilience of DOE facilities and operations. These values and ideals are paired well with the INL site mission.

12.1 Performance Status

INL completed the Climate VARP to enable and sustain the mission while ensuring the viability of operations considering expected climate change impacts. The prescribed process outlined in the *Vulnerability Assessment and Resilience Planning Guidance, Version 1.2* was used to identify mission-critical systems and components, determine historical and expected climate impacts, and develop resilient solutions. Utilizing climate modeling sources revealed that under scenarios of higher and lower GHG emissions— Representative Concentration Pathway (RCP) 4.5 and RCP 8.5—INL anticipates an increase in climate hazards, including drought, heat waves, wildfire, and precipitation. Utilizing the VARP Risk Assessment Tool, the increased frequency and duration of climatic hazards forecasts high impacts on certain mission critical asset and infrastructure types including energy generation and distribution systems, site buildings, specialized or mission-critical equipment, and transportation and fleet infrastructure. INL identified close to 300 resilient solutions to be tracked in the DOE Sustainability Dashboard that were consolidated into 11 solution categories to secure additional adaptive capacity for assets of high impact. These identified solutions are intended to inform decision makers on climate issues and potential solutions across INL and associated communities.

Resiliency gaps identified in the VARP highlighted INL's interdependencies on local energy suppliers. INL depends on two main local electric energy suppliers and one natural gas supplier. Compounding effects of climate hazards on energy generation and distribution systems, including drought, is likely to have secondary impacts on the electric utilities energy source mix impacting INL's net-zero GHG reduction initiatives. Energy vulnerabilities were addressed by resilience solutions to reduce probabilities of loss of power across the site. Two of the 11 solutions to be tracked in the Sustainability Dashboard to address vulnerabilities of energy interdependencies include: (1) hardening energy supply and infrastructure—including modular reactor installation, electric distribution and system upgrades, and installing a second point of interconnect to utility; and (2) installing additional backup power for vulnerable critical buildings and operations.

INL utilized the Technical Resilience Navigator (TRN) to identify anticipated annual frequency for specific hazards, and frequency category to display the range of possible hazards and how frequent they may impact the INL site—specifically Bonneville County Site locations. In general, predictive climate models do not differentiate small geographic areas as weather patterns affect larger areas, such as all of southeastern Idaho, rather than a county-by-county basis. Additionally, predictive models are limited to specified algorithms, often using a national data set. Hence, even though INL has seen an increase in wildfire severity, the TRN predicts a decrease frequency.

INL is actively integrating climate resilience into its larger risk management processes. Comprehensive emergency response procedures are in place that cover all INL site facilities:

- INL procedures include PLN-114, *Idaho National Laboratory (INL) Emergency Plan/Resource Conservation and Recovery Act (RCRA) Contingency Plan*, which addresses the elements of—and is the primary component in—defining and directing the INL Emergency Management Program. The plan implements DOE policy and requirements for an EMS and a RCRA

contingency plan specified in LRD16100, *Emergency Management System*, which includes citations to DOE O 151.1D, *Comprehensive Emergency Management System*, and other DOE requirements. The plan was updated in FY 2022.

- Additional procedures include PLN-14401, *Idaho National Laboratory Wildland Fire Management Plan*, which provides general wildland fire management information and practices to those organizations directly involved in the preparedness for, prevention of, response to, and recovery from wildland fires on the INL site.
- IEC procedures include PLN2012, *ICP Core Emergency Plan/RCRA Contingency Plan*, and the emergency response elements that are required in DOE O 151.1D, *Comprehensive Emergency Management System*, for INTEC, RWMC (AMWTP and ARP), and the IEC operated buildings in Idaho Falls.
- The IEC ISO 14001:2015 certification surveillance audit performed in August 2022 resulted in continued certification. The next IEC surveillance is tentatively scheduled for March 2023.
- The INL ISO 14001:2015 certification surveillance audit performed in July 2022 resulted in continued certification. The next INL surveillance is tentatively scheduled for July 2023.

All sustainable activities support energy resiliency, and by default, make the INL site a more resilient institution. Sustainable activities include:

- The largest sagebrush planting effort on the INL site was completed. In October 2021, 83,750 Artemisia Tridentata seedlings were planted in remote areas on the INL site. The areas included land burned in 2010 during the Jefferson Fire and in 2019 by the Sheep Fire. FY 2022 planting is a huge step forward in balancing the INL ecosystem and facilitating the re-establishment of sagebrush into the ecosystem for sagebrush obligates including the greater sage grouse. Funding for this sagebrush project came from INL and the Idaho Department of Fish and Game.
- Replaced an aged underground diesel storage tank with an above ground version, increasing environmental protection and lessoning the impact on the environment, which is an interim step as INL moves toward net-zero emissions.
- Incorporating the Sustainable Acquisition clauses into INL electronics acquisition blanket purchase orders. As noted in the INL Green Purchaser award, using EPEAT products reduces energy use, helping reduce electric load and demand.
- Ensuring INL procurement requirements lend preference to use local suppliers and manufacturers, shortening the supply chain and reducing the chances of delivery disruptors.
- Completing the annual update of operational procedures and processes to address sustainability, emergency planning, and operational resiliency.
- Completing numerous energy and water reduction projects resulting in lower energy use and load demands on the servicing utilities.
- Continued evaluating and considering alternative energy solutions ranging in scope from microgrid renewable generation to potential small modular reactor projects capable of providing local CFE.

Several INL Emergency Management procedures were updated to better prepare the INL site for naturally occurring phenomenon, including PLN-4267, *INL Continuity of Operations Plan*. INL's emergency plans and emergency plan implementing procedures (EPIs) are reviewed at least annually and revised if necessary. The plans and EPIs may be revised based on:

- Changes in emergency planning or company operations, policy, concept of operations, procedures, organization and staffing, and facility operations and/or mission
- Direction of the DOE-ID Emergency Management Program administrator

- Failure of emergency plan implementing procedures during drills, exercises, and real events
- Results of audits, evaluations, appraisals, and self-assessments
- New facility information.

12.2 Plans and Projected Performance

The concept of resiliency is evolving in real-time. The Net-Zero era will require professionals to be strategic overseers with a lens for long-term outcomes. In this season of change, all built environments will require careful reconsideration, and it will fall to facility management to promote a building culture that stands on the pillars of safety, quality, and efficiency.

INL will be guided by science to build resilience into DOE-ID-managed lands, facilities, and equipment. A general framework used in resiliency planning includes identifying exposure, translating that exposure into potential impacts, prioritizing risk, devising solutions, and securing funding. INL will work with internal and external stakeholders to address threats to missions and programs. Priority actions include:

- Further developing the resilient actions identified during the VARP process:
    1. Upgrading or replacing older, inefficient HVAC systems.
    2. Upgrading INL site drainage plan and systems.
    3. Hardening energy supply and infrastructure, including modular reactor installation, electric distribution and system upgrades, and install a second point of interconnect to utility.
    4. Hardening/stabilizing road infrastructure.
    5. Enhancing fire-safe protective design (i.e., enhance firebreaks around structures, such as parking lots or landscaping).
    6. Fortifying critical infrastructure and supply chains (i.e., develop a next generation continuity of operations program [COOP], identify vendors of critical supplies within a 500-mile radius).
    7. Installing additional backup power for vulnerable critical buildings and operations.
    8. Supporting the study, development, and installation of microgrid infrastructure systems.
    9. Updating existing underperforming infrastructure and implement adaptable infrastructure strategies (e.g., upgrading building envelope, installing efficient lighting and controls, implementing energy and water efficiency measures).
    10. Improving human capital systems that contribute to increasing human resilience.
    11. Implementing processes that allow for a healthy and robust ecosystem that sustains sagebrush-dependent species.
- Investing in research and supplying critical data and information.
- Implementing actions that highlight benefits of new technologies, innovative resource management, and infrastructure improvements that will improve the resiliency of DOE-ID's operating footprint.

INL continues the process of incorporating resilient design into new and existing buildings. Program leads and engineers are well versed on the trends associated with resilient design. As this field emerges and expertise becomes more refined, controlling documents will be targeted for incorporating resiliency tactics. A fully mature program is still being defined.

Highly energy-efficient lighting, roofing, and automation systems continue to be installed in new buildings and during retrofit activities. The result is not just an increase in the resilience of the building, but of the surrounding community, by decreasing demand on available resources and infrastructure.

Processes and actions for future activities include the following (for both new and existing buildings):

- Incorporating resilient design and management into the INL facilities planning process
- Identifying and evaluating vulnerabilities to natural hazard risks (e.g., storm events, localized flooding, extreme temperatures, wildfires)
- Considering enhanced fire-proofing strategies and designs
- Considering designs for enhanced drought tolerance
- Ensuring continuity of operations and access to electricity in the event of an extended power outage
- Improving energy performance of building envelopes, such as new compressors to increase reliability and efficiency at INTEC and IWTU
- As appropriate, using information modeling to assess design options and to improve decisions based on life-cycle analysis
- When cost-effective, adopting passive and natural design strategies to mechanical systems.

The INL site is well positioned to address the need for organizational resilience elements in future plans. With leadership commitment, the INL site will continue to ensure that the appropriate events and risk elements are considered as part of the INL site programs and planning activities. Policies and procedures will be evaluated to determine whether they should be modified to consider organizational risks. Emergency response, workplace safety and health, and the most updated scientific knowledge will continue to be incorporated into all facets of organizational resilience.

Appendix A

Excluded Buildings Self-Certification

INTENTIONALLY BLANK

Appendix A
Excluded Buildings Self-Certification

DOE BUILDING EXCLUSION
SELF-CERTIFICATION FORM

FROM: Name of DOE Site
Program Office Landlord

TO: Sustainability Performance Office

DATE: **11/10/2022**

SUBJECT: SELF-CERTIFICATION FORM FOR THE ENERGY INTENSITY GOAL OF EISA 2007

Each buildings or group of buildings excluded under the criteria for a Part G or Part H exclusion is/are metered for energy consumption and their consumption is reported annually.

If any building has been excluded under the criteria for Part H for impracticability then all practicable energy and water conservation measures with a payback of less than 10 years have been installed. A justification statement that explains why process-dedicated energy in the facility may impact the ability to meet the goal has been provided in the Dashboard Energy Exclusions Report.

I certify that the buildings listed on the Excluded Buildings List produced by the Dashboard as dated (Insert Date) for (Name of DOE Site) meet the exclusion criteria in *Guidelines Establishing Criteria for Excluding Buildings* published by FEMP on January 27, 2006.

Doug Herzog
DOE Site Office Official – printed name

DOE Site Office Official – signature

11/10/2022
Date

Contact Information:

Herzog, R. Doug
Title: Physical Scientist, DOE Idaho Operations Office
Phone: (208) 526-7103
Email Address: herzogrd@id.doe.gov

Or:

Ischay, Christopher P.
Title: INL Sustainability Program Manager
Phone: (208) 351-5245
Email Address: Christopher.Ischay@inl.gov

INTENTIONALLY BLANK

U.S. Department of Energy
DOE Sustainability Dashboard
Energy Consuming Excluded Facilities List in Accordance with
Section 543(c)(3) of the National Energy Conservation Policy Act as amended by the Energy Policy Act of 2005
Year FY 2022

Property Program Office	Site	Property Name	Property ID	Real Property Unique ID	Property Type	Ownership	Gross SqFt	Excluded Facilities SqFt	Exclusion Part	Exclusion Justification Comment
EM	Idaho National Laboratory - Idaho Falls	Idaho Falls ICP Training Center	IF-661	219136	Building	Contractor Leased (C)	4650	4650	C - Fully Serviced Lease	Receive no energy bills
NE	Idaho National Laboratory - Idaho Falls	Boise Outreach Office #2	B60-606	205829	Building	Contractor Leased (C)	1520	1520	C - Fully Serviced Lease	Receive no energy bills
NE	Idaho National Laboratory - Idaho Falls	Collaborative Computing Center	IF-692	219285	Building	Contractor Leased (C)	65336	13647	G - Separately Metered Intensive Load(s)	High performance computing center
NE	Idaho National Laboratory - Idaho Falls	Engineering Research Office Bldg	IF-654	96845	Building	Contractor Leased (C)	239746	5285	G - Separately Metered Intensive Load(s)	INL is excluding the EROB High Performance Computing (HPC) data center due to its significant use of energy that is not impacted by traditional building level energy efficiency improvements. The EROB HPC uses 5,285 ft² in EROB and is separately metered
NE	Idaho National Laboratory - Idaho Falls	EROB Mechanical Building Annex	IF-654A	205463	Building	Contractor Leased (C)	1083	1083	G - Separately Metered Intensive Load(s)	INL is excluding the EROB High Performance Computing (HPC) data center due to its significant use of energy that is not impacted by traditional building level energy efficiency improvements. IF-654A is solely responsible for cooling of the HPC servers and associated equipment.
NE	Idaho National Laboratory - Idaho Falls	N&HS Laboratory & Training Facility	IF-694	218732	Building	Contractor Leased (C)	23610	23610	C - Fully Serviced Lease	Receive no energy bills
NE	Idaho National Laboratory - Idaho Falls	University of Utah Research Park	B60-607	218017	Building	Contractor Leased (C)	3869	3869	C - Fully Serviced Lease	Receive no energy bills

U.S. Department of Energy
DOE Sustainability Dashboard
Energy Consuming Excluded Facilities List in Accordance with
Section 543(c)(3) of the National Energy Conservation Policy Act as amended by the Energy Policy Act of 2005
Year FY 2022

Property Program Office	Site	Property Name	Property ID	Real Property Unique ID	Property Type	Ownership	Gross SqFt	Excluded Facilities SqFt	Exclusion Part	Exclusion Justification Comment
NE	Idaho National Laboratory - Scoville	ATR Cooling Tower Pumphouse	TRA-671	96139	Building	DOE Owned (O)	3568	3568	G - Separately Metered Intensive Load(s)	Advanced Test Reactor (ATR) process energy use. The ATR and its three support facilities use 62% of the total Electricity consumed at the ATR Complex area. This building is one of the four primary ATR Buildings. Energy use for these buildings is separate.
NE	Idaho National Laboratory - Scoville	ATR Fitness Center	TRA-676	92397	Building	DOE Owned (O)	2146	2146	G - Separately Metered Intensive Load(s)	The ATR and its three support facilities use 62% of the total Electricity consumed at the ATR Complex area. This building is one of four small incidental buildings that are metered with the four primary ATR Buildings. Energy use for these buildings is separate.
NE	Idaho National Laboratory - Scoville	ATR Reactor Building	TRA-670	96138	Building	DOE Owned (O)	127989	127989	G - Separately Metered Intensive Load(s)	Advanced Test Reactor (ATR) process energy use. The ATR and its three support facilities use 62% of the total Electricity consumed at the ATR Complex area. This building is one of the four primary ATR Buildings. Energy use for these buildings is separate.
NE	Idaho National Laboratory - Scoville	Diesel Generator Bldg	TRA-674	96652	Building	DOE Owned (O)	704	704	G - Separately Metered Intensive Load(s)	Advanced Test Reactor (ATR) process energy use. The ATR and its three support facilities use 62% of the total Electricity consumed at the ATR Complex area. This building is one of the four primary ATR Buildings. Energy use for these buildings is separate.

U.S. Department of Energy
DOE Sustainability Dashboard
Energy Consuming Excluded Facilities List in Accordance with
Section 543(c)(3) of the National Energy Conservation Policy Act as amended by the Energy Policy Act of 2005
Year FY 2022

Property Program Office	Site	Property Name	Property ID	Real Property Unique ID	Property Type	Ownership	Gross SqFt	Excluded Facilities SqFt	Exclusion Part	Exclusion Justification Comment
NE	Idaho National Laboratory - Scoville	Dynamic Learning Facility	TRA-689	131170	Building	DOE Owned (O)	5359	5359	G - Separately Metered Intensive Load(s)	The ATR and its three support facilities use 62% of the total Electricity consumed at the ATR Complex area. This building is one of four small incidental buildings that are metered with the four primary ATR Buildings. Energy use for these buildings is separate.
NE	Idaho National Laboratory - Scoville	Hazardous Chem Storage Bldg	TRA-640	96650	Building	DOE Owned (O)	1891	1891	G - Separately Metered Intensive Load(s)	The ATR and its three support facilities use 62% of the total Electricity consumed at the ATR Complex area. This building is one of four small incidental buildings that are metered with the four primary ATR Buildings. Energy use for these buildings is separate.
NE	Idaho National Laboratory - Scoville	Pump House & Well #4	TRA-672	96140	Building	DOE Owned (O)	404	404	G - Separately Metered Intensive Load(s)	Advanced Test Reactor (ATR) process energy use. The ATR and its three support facilities use 62% of the total Electricity consumed at the ATR Complex area. This building is one of the four primary ATR Buildings. Energy use for these buildings is separate.

INTENTIONALLY BLANK

Appendix B

DOE FY 2022 Sustainability Dashboard Summary Report

INTENTIONALLY BLANK

Appendix B

DOE FY 2022 Sustainability Dashboard Summary Report

INL Site FY 2022 Comprehensive Scorecard Summary					
Facility Management					
	Energy Intensity	**FY 2003 (baseline)**	**FY 2022**	**% Change**	
	Energy Intensity (Btu/GSF)	182,978.6	146,033.7	**-20.2%**	
	Energy Intensity	**FY 2015 (baseline)**	**FY 2022**	**% Change**	
	Energy Intensity (Btu/GSF)	154,357.7	146,033.7	**-5.4%**	
	Renewable Electricity	**FY 2022 Electricity Consumption**	**FY 2022 Renewable Electricity w/ Bonuses**	**% of Total**	
	Total (MWh)	217,930	17,274	**7.9%**	
	Clean Energy	**FY 2022 Total Energy Consumed (MMBtu)**	**FY 2022 Renewable Energy w/ Bonuses**	**% of Total**	
	Total (MMBtu)	969,813	64,521	**6.7%**	
	Potable Water Intensity	**FY 2007 (baseline)**	**FY 2022**	**% Change**	
	Water Intensity (Gal/GSF)	173.9	119.7	**-31.2%**	
	Non-Potable Water Consumption	**FY 2010 (baseline)**	**FY 2022**	**% Change**	
	Total ILA Water (million gal)	0.0	0.0	**N/A**	
	Sustainable Buildings	**>25,000 GSF Building Count Total Applicable**	**FY 2022 >25,000 GSF Guiding Principles Certified**	**% of Buildings**	
	Performance (%)	43	5	**11.6%**	
	Sustainable Buildings	**Building Count Total Applicable + Bonus for Small Bldgs**	**FY 2022 Guiding Principles Certified + Bonus for Small Bldgs**	**% of Buildings**	
	Performance (%)	64	26	**40.6%**	
Fleet Management					
	Fleet Petroleum	**FY 2005 (baseline)**	**FY 2022**	**% Change**	
	Total Petroleum (GGE)	938,197	725,392	**-22.7%**	
	Fleet Alternative Fuel	**FY 2005 (baseline)**	**FY 2022**	**% Change**	
	Total Alternative (GGE)	76,436	70,426	**-7.9%**	
Waste Management					
	Municipal Solid Waste		**FY 2022**	**%**	
	Non-diverted Waste		576.1	**46.2%**	
	Total Diverted Waste		670.8	**53.8%**	
	Total Waste (metric tons)		1,246.9	100.0%	
	Construction & Demolition		**FY 2022**	**%**	
	Landfilled C&D Waste		8,481.3	**71.9%**	
	Diverted C&D Waste		3,313.1	**28.1%**	
	Total C&D Waste (metric tons)		11,794.4	100.0%	
Electronics Stewardship					
	Electronics Acquisition	**EPEAT Acquired**	**Total Acquired**	**%**	
	Total Acquired	5,081	5,195	**97.8%**	
	Electronics Recycling	**Transferred / Recycled**	**Non-Certified Recycler**	**Amount Disposed**	**%**
	Total Electronics Waste (metric tons)	59.101	2.191	0.000	**96.4%**
	Power Management (PM)	**Total Owned**	**PM Enabled**	**Exempt**	**%**
	Total Items	47,907	45,765	2,142	**100.0%**
	Duplex Printing	**Total Owned**	**Duplex Enabled**	**Incapable**	**%**
	Total Printers	781	483	298	**100.0%**
Acquisition					
	Sustainable Acquisition (SA)	**Contract Reviewed**	**Contracts Actions with SA Clauses**	**Total Contract Dollars with SA Clauses**	**Percent of Contract Actions w/SA Clauses**
	Number of Contracts and $	229	224	$267,183,376	**97.8%**
Greenhouse Gas Management					
	Scope 1 & 2 Greenhouse Gas Emissions	**FY 2008 (baseline)**	**FY 2022**	**% Change**	
	Total (MtCO2e)	141,005.1	77,267.1	**-45.2%**	
	Scope 3 Greenhouse Gas Emissions	**FY 2008 (baseline)**	**FY 2022**	**% Change**	
	Total (MtCO2e)	35,252.5	20,366.8	**-42.2%**	