
NASA AMES RESEARCH CENTER



Five-Year Sustainability Plan

FY 2022-2026



FIVE-YEAR SUSTAINABILITY PLAN

Approval:

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FIVE-YEAR SUSTAINABILITY PLAN



NASA Ames Research Center



FISCAL YEAR

2022-2026



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Executive Summary

Ames Research Center (ARC) created the Center's first Five-Year Sustainability Plan in order to better comply with Executive Order (EO) 13834 and the Sustainability Report and Implementation Plan (SRIP) produced by NASA HQ. The regulations that guide sustainability at federal facilities call on each federal agency to “prioritize actions that reduce waste, cut costs, enhance the resilience of Federal infrastructure and operations, and enable more effective accomplishment of its mission.” This plan covers eight focus areas to best help us address all of the areas covered in these regulations.

NASA’s sustainability policy is to execute NASA’s mission without compromising our planet’s resources so that future generations can meet their needs. In NASA's SRIP, NASA makes the commitment to advancing efficiency and sustainability in Agency operations, meeting or exceeding goals and requirements, and achieving cost savings. NASA seeks to be at the forefront of the integration of sustainability and sustainable practices by addressing existing management systems, decision making, and the overall process.

ARC aims to meet all of the goals set forth in the EO and SRIP, and in some cases go above and beyond what is required. Sustainability is a guiding principle at ARC and it is ingrained in all the research that we do. By implementing sustainability practices, ARC uses proactive measures to reduce the possibility of environmental, operational, institutional and programmatic risks. ARC is continuously improving on the efficiency of facility operations and aims to reduce our impact on the environment, while creating long-term cost savings.

ARC's Five-Year Sustainability Plan serves as the Center’s roadmap to achieve all goals outlined in the NASA SRIP and to hold the center accountable for reducing environmental impact. The center plans to produce an annual sustainability report that covers the 8 focus areas outlined in this plan and reports on how the center is doing in comparison with its goals.





Federal sustainability goals are mandated by EO 13834. This EO affirms that it is the policy of the United States that agencies meet energy and environmental performance statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. In implementing this policy, agencies are tasked to prioritize actions that reduce waste, cut costs, enhance the resilience of Federal infrastructure and operations, and enable more effective accomplishment of its mission.

In line with the EO, NASA's sustainability policy is to "execute NASA's mission without compromising our planet's resources so that future generations can meet their needs". NASA's strategic priorities and objectives for FY 2021-2022 are to advance efficiency and sustainability in Agency operations, meet or exceed goals and requirements, and achieve cost savings.

ARC, one of ten NASA field centers, is in the heart of California's Silicon Valley. It is only 40 miles south of San Francisco and 12 miles north of San Jose, between Mountain View and Sunnyvale.

NASA's strategic priorities and objectives for FY 2021-2022 are to advance efficiency and sustainability in Agency operations, meet or exceed goals and requirements, and achieve cost savings.

For more than 75 years, ARC has led NASA in conducting world-class research and development in aeronautics, exploration technology and science aligned with the center's core capabilities.

ARC's focus is on creating a more sustainable environment by supporting the eight sustainability goals- facility energy efficiency, identification of efficiency measurements or investments, water efficiency, high-performance sustainable buildings, fleet management, sustainable acquisition, waste reduction and diversion, and greenhouse gas reduction. The Center Sustainability Officer (CSO) oversees the report's eight goal subject areas. This position is held by the Director of the Center Operations.



Ames Research Center Sustainability Goals

Goal 1 – Facility Energy Efficiency

Goal 2 – Identification of Efficiency Measures/Investments

Goal 3 – Water Efficiency

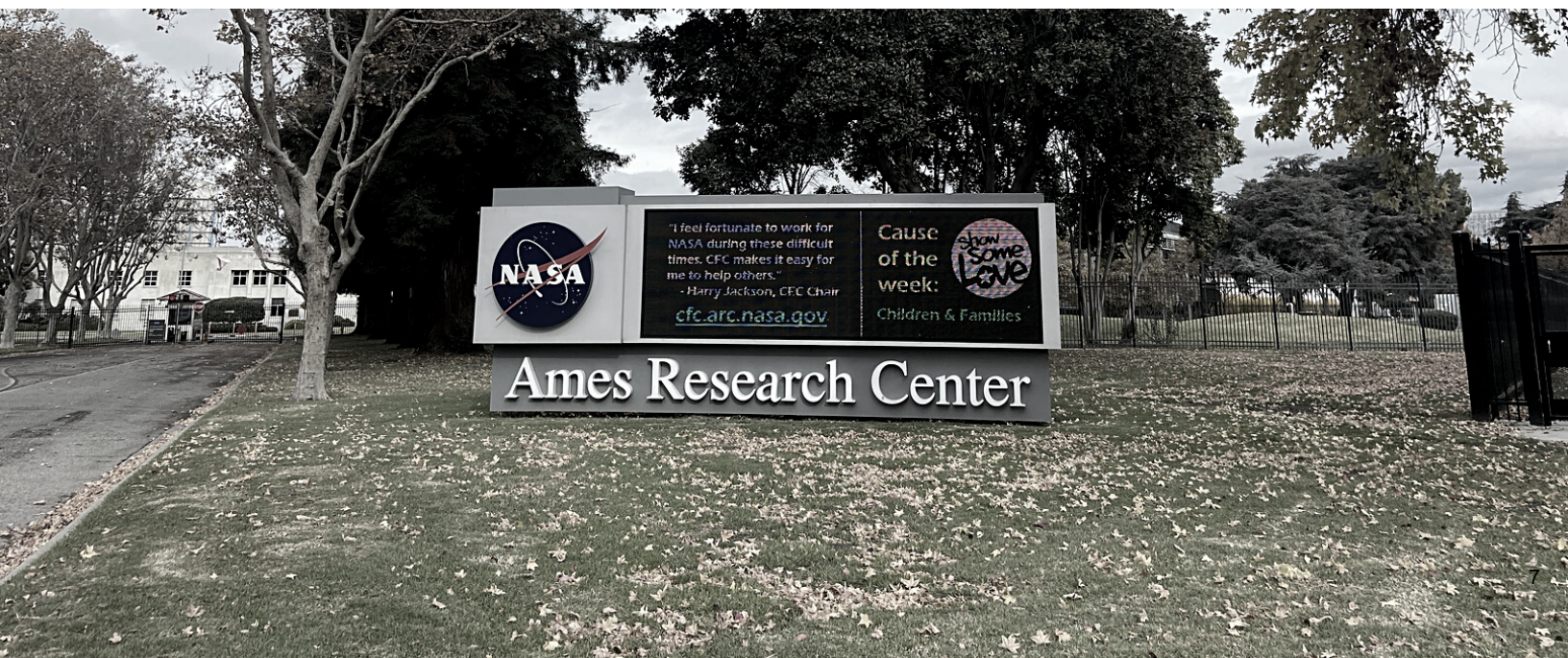
Goal 4 – Sustainable Buildings

Goal 5 - Fleet Management

Goal 6 - Sustainable Acquisition

Goal 7 - Waste Diversion

Goal 8 - GHG Reduction





Goal 1 – Facility Energy Efficiency

EO 13834 Minimum Target:

Achieve 30 percent reduction in Btu/GSF for goal-subject facilities relative to fiscal year (FY) 2003 and demonstrate annual progress for each fiscal year.

Agency Annual Reduction Target:

Reduce energy intensity for goal-subject facilities by 1 percent in FY 2020, compared to FY 2019; and 0.5 percent in FY 2021, compared to FY 2020.

ARC Annual Reduction Target:

ARC has an annual reduction target of 1 percent.

Goal 1 – Facility Energy Efficiency Reduction Strategies

ARC purchases electricity from Western Area Power Authority (WAPA), the majority of which is supplied by large scale hydroelectric dams. WAPA power is delivered to ARC over Pacific Gas & Electric (PG&E) power lines.

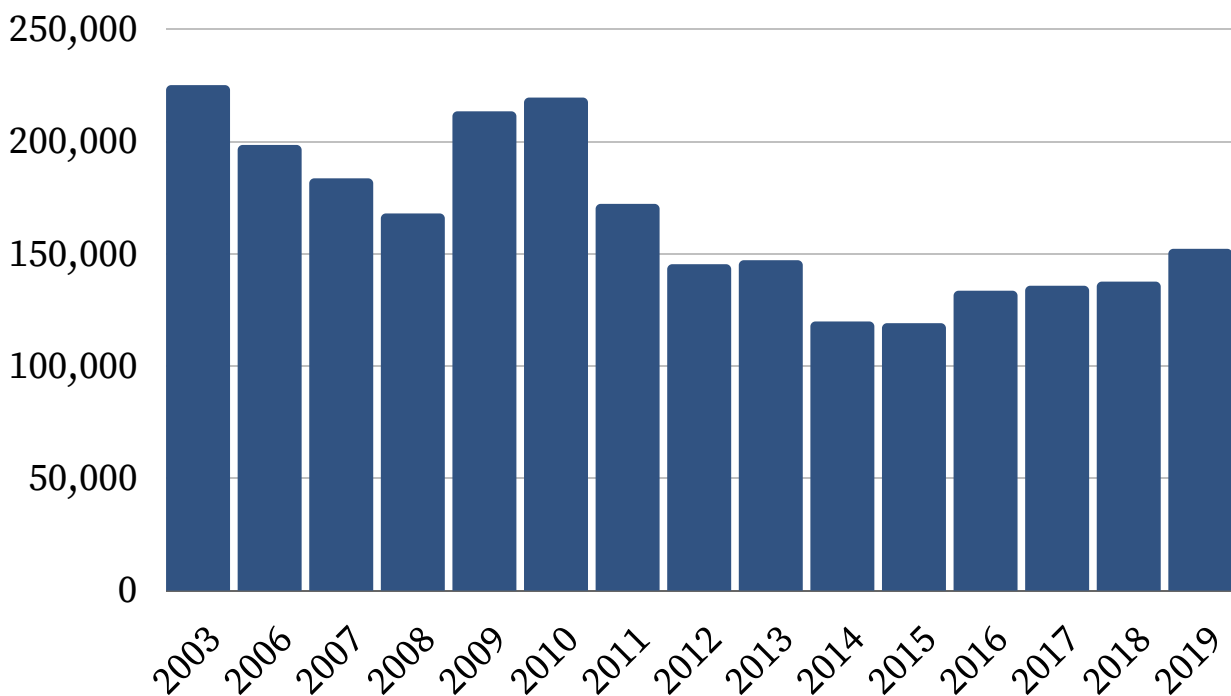
Until FY 2020, Ames was demonstrating an increase in energy use every fiscal year since 2015. The cause of this energy increase has been relatively unknown by the facilities and energy staff.

In order to help address this problem, Ames created the Energy and Water Efficiency Team in FY 2019. This team helps to ensure the functionality of daily operations while also upholding the environmental and sustainability standards. The Energy and Water Team discusses issues pertaining to energy use on center, and how to best address the problems affecting the metrics. ARC plans to use this team to disseminate information and collaborate to meet our metric goals.

Over the next five years, ARC aims to replace incandescents with LED lights and install motion detectors to cut back on unnecessary lighting.

ARC plans to meet energy reduction targets through the implementation of the UESC audit of building operations, lighting retrofits in older buildings, prioritizing the removal of less efficient buildings, and generating more renewable energy onsite. Additionally, it is recommended that the packaged ac units be replaced with newer more efficient units. It is best practice to replace aging equipment before they fail and lead to significant issues.

Finally, it would be a no-cost improvement to adjust the HVAC set point be optimized to more reasonable values. Each building's HVAC has a specific recommendation outlined in the Energy Audit conducted in September 2017.



Graph 1: Facility Energy Intensity Metric (BTU/GSF) at ARC from FY 2003-2019



Goal 2 – Identification of Efficiency Measures/Investments

EO 13834 Minimum Target:

Facility evaluations (thresholds are >75% or >90%) completed/updated within last four years and identify and meet planned investment level for performance contracting

Agency Annual Reduction Target:

\$21.2 million dollars awarded towards Energy Savings Performance Contracts (ESPCs) and Utility Energy Service Contracts (UESCs) in concert with other mechanisms to improve systems efficiencies in FY 2020; and \$19.1 million awarded in FY 2021

ARC Annual Reduction Target:

ARC plans to meet the target set forth by EO 13834, and has completed evaluations in FY 2018

Goal 2 – Identification of Efficiency Measures/Investments Strategy

NASA Ames uses Utility Energy Service Contracts (UESCs) and Energy Saving Performance Contracts (ESPCs) together with other programs to improve the efficiency of different systems and to increase the overall sustainability of NASA's various missions.

At ARC, there have been facility evaluations (thresholds >75% or > 90%) that have been recorded or updated within the last four years. The center has a goal of identifying and meeting the planned investment level for performance contracting. Within the last four years, all buildings at Ames have been evaluated by an independent team.

Between August 14 and September 22, 2017, the team assessed 42 goal-subject buildings at NASA Ames Research Center for lighting and HVAC energy efficiency opportunities. The 42 buildings evaluated were:

M003 N204 N221 N232 N240 N255
N144 N207 N221A N233 N242 N260
N200 N210 N226 N233A N245 N261
N201 N211 N229 N234 N246 N262
N202 N212 N229A N235 N247 N263
N202A N219 N230 N237 N250 N269
N203 N220 N231 N238 N251 N270

ARC is in the planning stages of budgeting for the next assessment that will take place in FY 2022.

Other Efficiency Measures and Investments include efforts by goal-excluded facilities that use a large amount of energy and water and are critical to the mission. The Advanced Supercomputing Division has built and installed a Modular Supercomputing Facility that consumes less than 10% of the energy needed for cooling the traditional computer floor. There is expected expansion of this facility and the use of high efficiency technology has minimized the overall increase on energy and water use at Ames. Additionally, the Unitary Wind Tunnel has proposed upgrades to their speed controller that could save 14,500 MWH a year in addition to GHG reduction.



in photo: Modular computing environment that houses Aitken Supercomputer



Goal 3 – Water Efficiency

EO 13834 Minimum Target:

Achieve 20 percent reduction relative to FY 2007 and demonstrate annual progress for each fiscal year.

Agency Annual Reduction Target:

Reduce potable water intensity by 0.5 percent in FY 2020, compared to FY 2019; and 0.5 percent in FY 2021, compared to FY 2020.

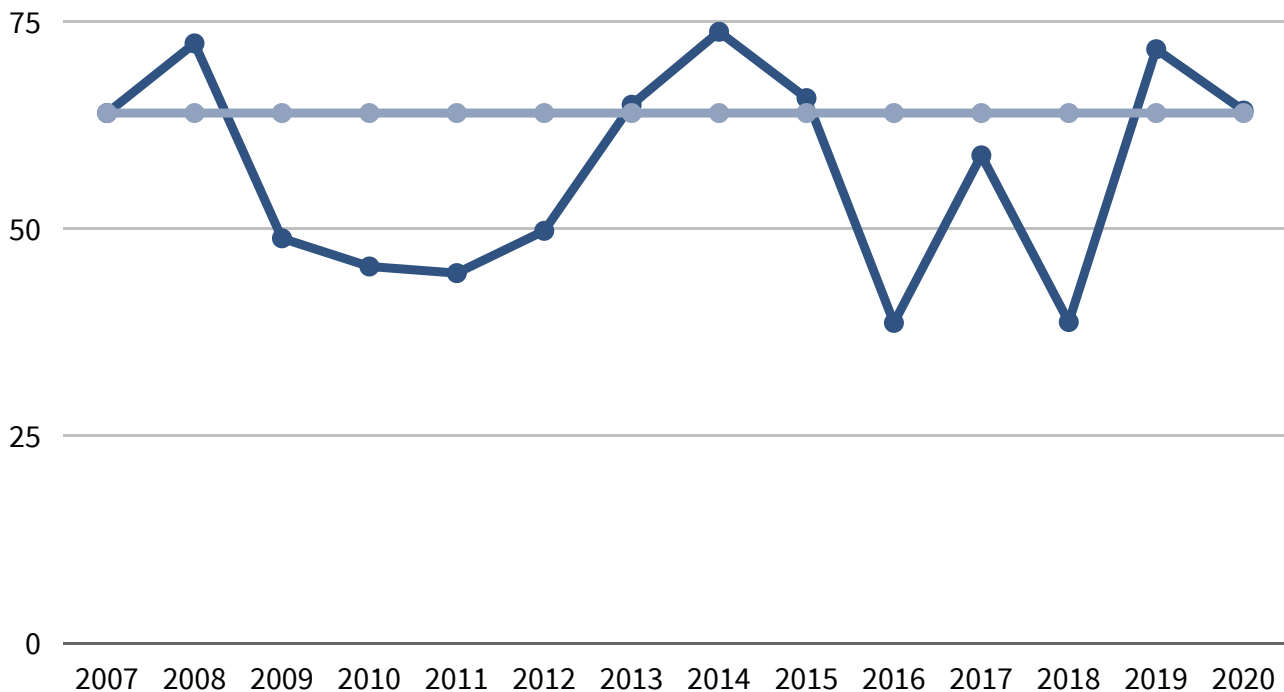
ARC Annual Reduction Target:

ARC plans to meet the sustainability reduction goal set forth by the Agency and try to exceed the goal if possible.

Goal 3 – Water Reduction Strategies

Over the next five years, ARC will utilize a variety of different approaches to improve the water efficiency metric such as upgrading infrastructure, installing metering, and reducing water waste through low-cost or no-cost measures. It is imperative that a research facility such as ARC has an efficient water reduction strategy. Historically, one of the main factors that has hindered ARC's sustainable water goals is the lack of proper water meters and equipment. Meters are essential in the data collection and improvement of the water intensity metric. Further installations and implementations of new water meters at ARC would greatly improve water reduction on Center. In addition to adding water meters, ARC staff submitted two requests to HQ for funding aimed at reducing the overall water usage at ARC.

It is recommended that ARC implement one of the following proposals in the next five years. The first request that was submitted focuses on treated groundwater utilization. If the first request is fulfilled, ARC would be able to utilize the existing stream of treated groundwater for boiler feed, cooling tower make-up, and irrigation that would otherwise end up as discharge into the creek. The second request that was submitted focuses on water pipe replacements and the possibility of a reclaimed water line. This project if approved would focus on replacing the broken pipes that are at the end of life cycle and installing a new water line for non-potable reclaimed water. By implementing either or both requests ARC would be able to lower the water usage by a dramatic rate. New infrastructure development is essential for ARC to reach it's goals.



Graph 2: Water Intensity Metric (Million Gallons/GSF) vs 2007 Baseline

Goal 3 – Water Proposals

Proposal 1: Treated Ground Water Utilization Economic Analysis

Cost: \$8.5 million

Water saved: 100.5 million gallons annually

Overview: This project provides an innovative method of utilizing an existing stream of treated groundwater for boiler feed, cooling tower make-up, and irrigation that would otherwise end up as discharge into the creek.

Cost benefit analysis: The Treated Ground Water Utilization has a Net Present Value (NPV) of \$65.3M with the Discount Payback Period (DPP) of 11.3 years and the Saving to Investment Ratio (SIR) of 3.11 and Return of Investment (ROI) of 211 percent.

As the results indicate above, the Treated Ground Water Utilization has the lowest net present value, the highest saving to investment ratio and a reasonable discount payback period. This Life Cycle Cost Analysis shows the Treated Ground Water Utilization is the most cost effective alternate to achieve the project objective.

Proposal 2: Water Pipe Replacement and Reclaimed water Line Economic Analysis

Cost: 1. Water Main Runs Replacement Cost is estimated at \$17.5M

2. Parallel Reclaimed Water Line Cost is estimated at \$2.1M

Savings: When reclaimed water lines are installed there is an estimate cost saving of \$97,000 per year. These savings come from having access to reclaimed water.

Overview: Replacement of main runs of the Ames water system that encompasses line segments inside Ames Campus and Shenandoah Plaza. The intent of this project is to be implemented in sections, one segment at a time in order to reduce Center operation disruption impact, manage resources and have proper safe and environmental guards. Part of the reliable water system is installing a parallel reclaimed water line.

Cost benefit analysis: The Water System Main Runs Replacement with a parallel Reclaimed Water Line has a Net Present Value (NPV) of \$116.5M with the discount Payback Period (DPP) of 9.1 years and the Saving to Investment Ratio (SIR) of 3.47 and Return of Investment (ROI) of 247 percent.



Goal 4 – Sustainable Buildings

EO 13834 Minimum Target:

At least 15 percent of buildings or GSF qualifying as sustainable; and Annual progress (either buildings or GSF).

Agency Annual Reduction Target:

At least 25 percent of GSF meets the sustainable building criteria in FY 2020; and 26 percent in FY 2021.

ARC Annual Reduction Target:

ARC plans to meet the sustainability reduction goal set forth by the Agency and try to exceed the goal if possible.

Goal 4 – Sustainable Buildings Strategies

ARC is currently at 17 percent of the overall GSF that meets the sustainable building criteria. All new construction at ARC requires that buildings meet the Federal Guiding Principles. It is also required that these buildings are built to meet a LEED Silver standard by the U.S. Green Building Council (USGBC).

At ARC, the focus is on not only making sure that new construction is built to a LEED certified standard, but also to examine older infrastructure on center and evaluate the sustainability of the buildings. To reduce utility usage for existing buildings, NASA uses other funding opportunities including energy saving performance contracts (ESPCs) to implement existing building commissioning strategies. The last time that there was an energy assessment performed at ARC was in September of 2017. These evaluations provide many recommendations for how to reduce energy use on site.

Over the next five years, environmental staff will continue to work with the Real Property Manager to gain more insight on how to improve this metric and locate what target areas we are missing. The primary factor in the low percentage of sustainable buildings is the lack of water meters at the building level. The Federal Guiding Principles require old buildings to have water meters to meet the criteria. ARC will explore the possibility of taking certain buildings offline with the new telework system in place. This change could positively impact the sustainable building criteria metric if the buildings that are taken offline are some of the older and less sustainable buildings on site. ARC staff is also exploring the possibility for funding building level water meters in some of the larger impact buildings.



in photo: Outside of the Sustainability Base at NASA Ames



Goal 5 - Fleet Management

EO 13834 Minimum Target:

Achieve 20 percent petroleum reduction relative to FY 2005 and demonstrate annual progress each fiscal year.

Agency Annual Reduction Target:

Reduce petroleum use by 10 percent in FY 2020, compared to FY 2019; and 0 percent in FY 2021, compared to FY 2020.

ARC Annual Reduction Target:

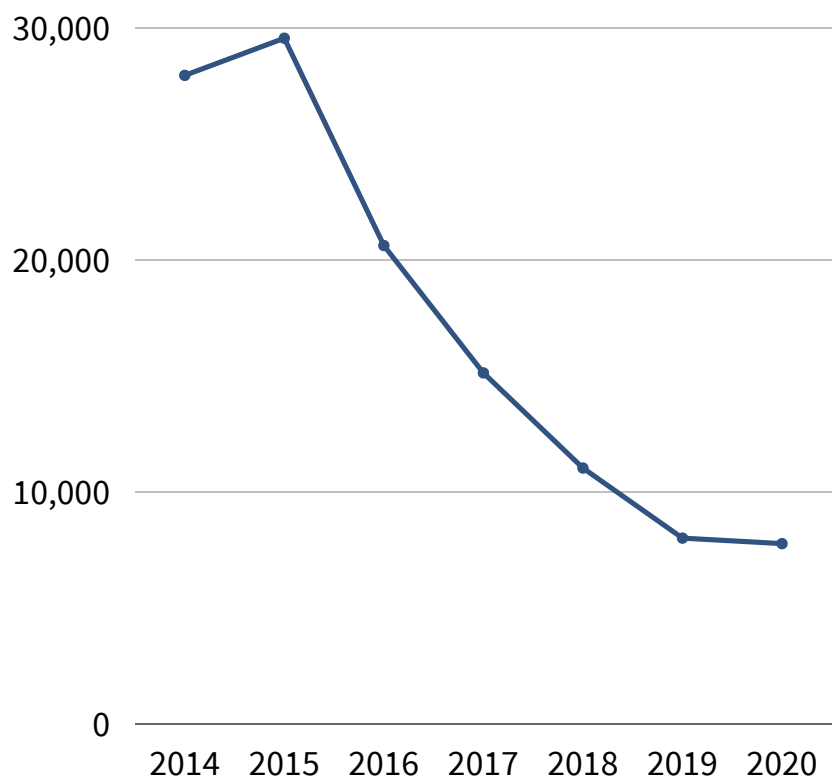
ARC plans to meet the sustainability reduction goal set forth by the Agency and try to exceed the goal if possible.

Goal 5 – Fleet Management Strategies



ARC's Fleet Management Plan uses different strategies to improve fleet efficiency. At Ames, fleet management is mostly notably maintained by having the right sized fleets and acquiring specialized vehicles during end-of-life cycle replacements.

The strategies that ARC will use over the next five years to help reduce petroleum use on site are replacing GSA leased vehicles with more fuel-efficient models, removing underutilized NASA vehicles from the fleet, placing underutilized vehicles into the motor pool for availability across the Center, and preferably acquire or lease from GSA vehicles that use alternative fuels and increase usage of these fuels. ARC plans to continue with these reduction methods and reduce petroleum use on an annual basis.



Graph 3: Fuel Usage, Gasoline Gallon Equivalent (GGE) at Ames Research Center FY 2014 – FY 2020



Goal 6 - Sustainable Acquisition

EO 13834 Minimum Target:

Increase in the percentage of contract actions and increase in percentage of obligations (in dollars) containing statutory environmental requirements, as compared to the previous fiscal year.

Agency Annual Reduction Target:

17 percent of contract actions and 19 percent of obligations (in dollars)

18 percent of contract actions and 20 percent of obligations (in dollars)

ARC Annual Reduction Target:

Purchase at least 50 percent biobased items and 50 percent recycled content items and demonstrate annual increase of compliant purchases in these categories.

Goal 6 – Sustainable Acquisition Strategies

In FY19, ARC changed the collection method for the Recycling and Sustainable Acquisition (RSA) data call. Previously, EMD staff would send out customized spreadsheets to civil servants on site to collect their individual purchases from the previous FY. The new data collection method is pioneered by the CSO, which is held by the Director of Center Operations. The CSO sends out a standardized spreadsheet to all of the CORs and COs. The spreadsheet asks for all of the purchases made in the previous FY and whether or not they met biobased or recycled content criteria. This collection process has increased the accuracy of ARC's data and will continue into the next five years. All purchases must be inputted into NASA's Environmental Tracking System (NETS) annually.

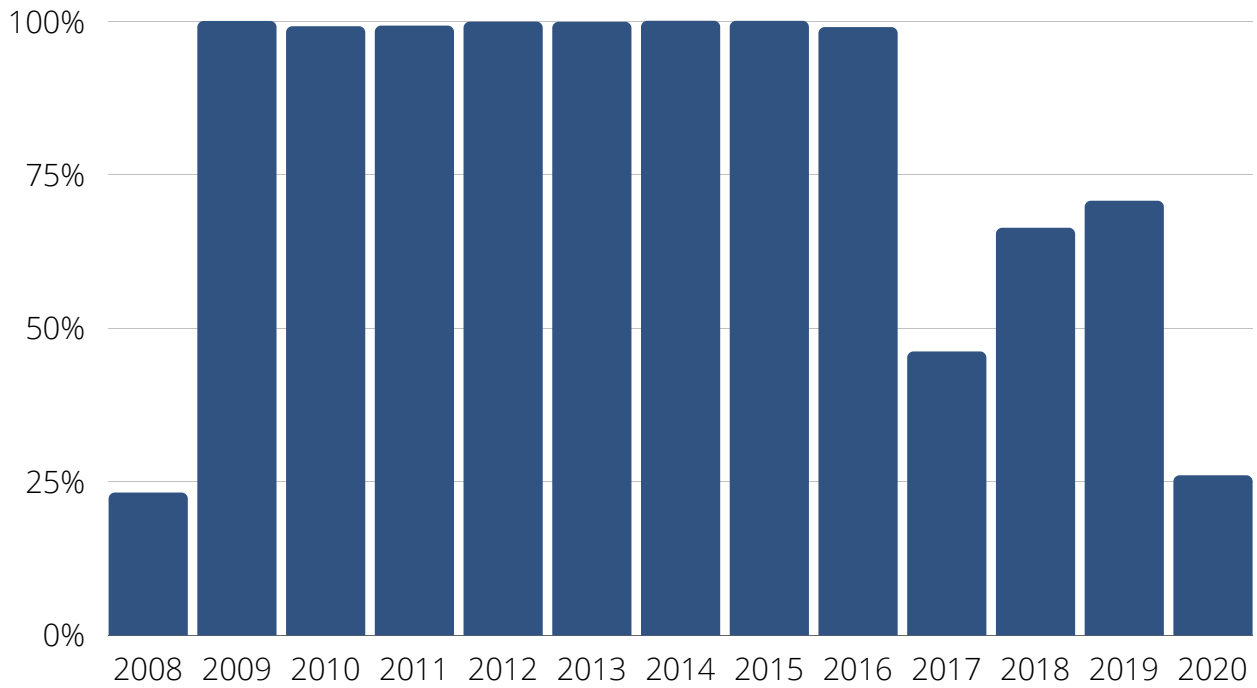
In FY 2020, ARC created a Microsoft Teams Sustainability Page that includes links to helpful information and resources regarding purchasing on center. This site will be continually updated as new resources become available.

Additionally, the EMD is currently working on updating the sustainable acquisition training. This training course will be available to all employees and include all of the applicable federal and state regulations. ARC will require this training for all p-card holders in order to increase compliant purchases. Finally, ARC staff will create a simple tipsheet that can be found on the sustainability site that includes all applicable information regarding biobased and recycled content material .

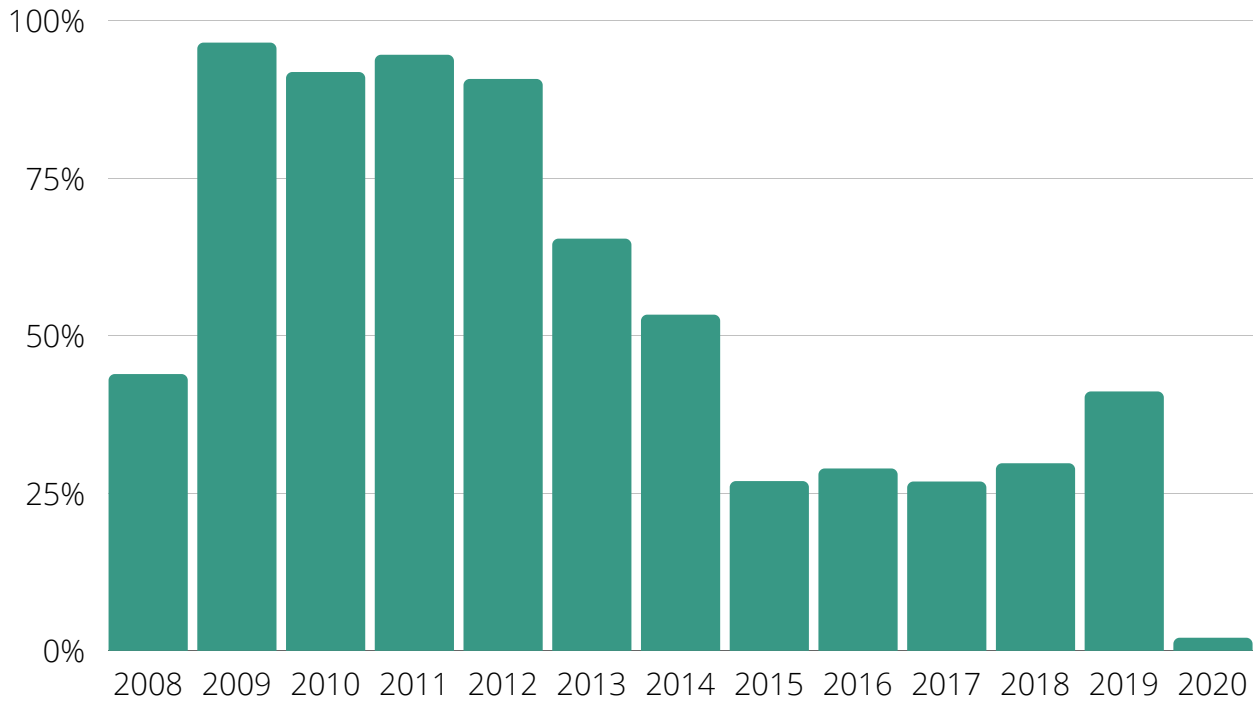


in photo: Recycled content printer cartridges purchased at ARC

Goal 6 – Sustainable Acquisition Data



Graph 3: Recycled Content Purchases at ARC as a Percent of the Total FY08 – FY20



Graph 4: Biobased Purchases at ARC as a Percent of the Total FY08 – FY20



Goal 7 - Waste Diversion

EO 13834 Minimum Target:

Agencies will identify target for percentage reduction in non-hazardous solid waste and percentage reduction sent to treatment and disposal facilities in annual Sustainability Plans.

Agency Annual Reduction Target:

Divert at least 50 percent of solid waste sent to landfill and reduce non-hazardous solid waste generated by 1 percent in FY 2020, compared to FY 2019; and 1 percent in FY 2021, compared to FY 2020.

ARC Annual Reduction Target:

ARC plans to meet the sustainability reduction goal set forth by the Agency and try to exceed the goal if possible.

Goal 7 – Waste Diversion Strategies

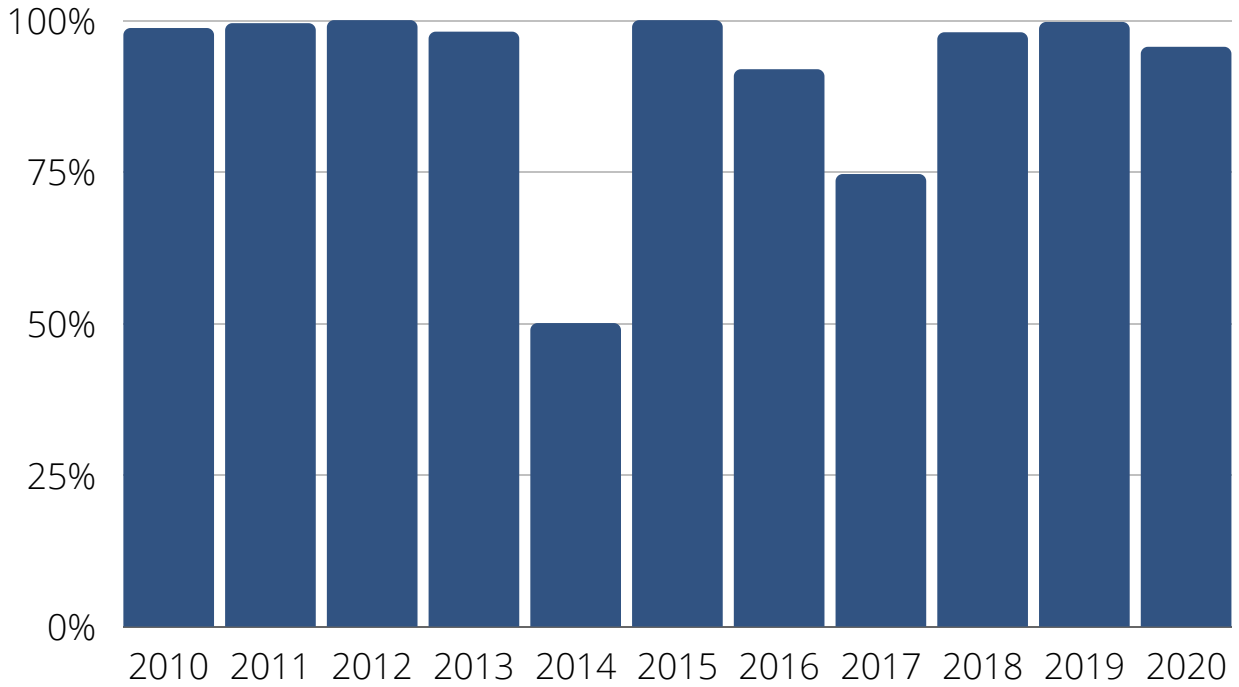
ARC aims to divert as much construction and demolition (C&D) waste and non- construction and demolition (non-C&D) waste as possible. Historically, C&D waste has always been diverted at a higher rate than the non-C&D waste stream. This is primarily because the materials coming from construction projects are easier to recycle and they tend to weigh more, which sways the metric. C&D waste, although it is already being diverted at a very high rate, can improve in a variety of ways. EMD staff intends to work with the construction contractors to collect a standardized waste management plan. This waste data will be reported to EMD staff on an ongoing basis for each construction project on site. This will ensure accurate data collection and increase communication on all applicable regulations.

Another way that ARC intends to improve the C&D metric is to collect the waste tickets directly from the contractor. This strategy will enable environmental staff to collect direct metrics from the waste hauler. The primary focus for increasing the non-C&D diversion rate is to expand the center compost collection program. ARC currently has compost collection in the cafeterias, but it is missing from the rest of the campus. In order to capture all organic material, ARC will aim to expand this program across the center to sort out all of the applicable organic material and increase diversion. Having a proper waste disposal system is essential in having a high waste diversion rate.

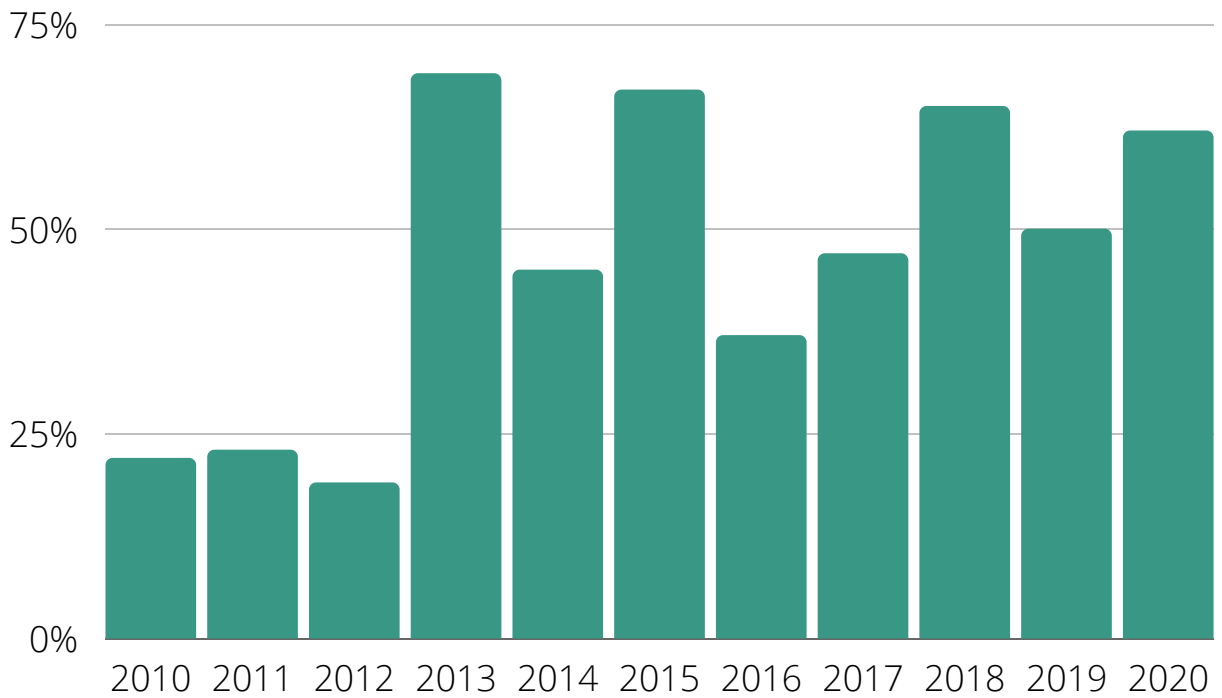


in photo: Megabites Cafeteria Sign, Operated by Ames Exchange

Goal 7 – Waste Diversion Data



Graph 4: Construction and Demolition Diversion Rate at ARC FY 2010-FY 2020



Graph 5: Non-Construction and Demolition Diversion Rate at ARC FY 2010-FY 2020



Goal 8 - GHG Reduction

EO 13834 Minimum Target:

Reduction in Scope 1 and 2 GHG emissions from FY 2008 baseline will be reported annually.

Agency Annual Reduction Target:

Manage GHG emissions through cost-effective strategies in line with other Sustainability Plan goals to support the mission.

ARC Annual Reduction Target:

ARC plans to meet the sustainability reduction goal set forth by the Agency and try to exceed the goal if possible.

Goal 8 – GHG Reduction Strategies

ARC currently reports data to the California Air Resource Board (CARB). ARC submits an abbreviated emissions data report per CCR 95103 (a) since emissions are below 25,000 metric tons of CO₂e. This report accounts for the emissions released from facility operations, and covers all of the Scope 1 emissions that ARC is directly responsible for. In calendar year (CY) 2019, Ames reported 13,397.87 metric tons of CO₂ emissions and in CY2018 ARC reported 16,216.44 metric tons of CO₂e. This is the closest thing that ARC currently has to a comprehensive GHG report.

ARC environmental staff intend to create a GHG inventory that accounts for the fleet, facility operations, and any other Scope 2 or 3 emissions that are quantifiable.

Some of the strategies that ARC is using to reduce emissions are to increase the telework capacity after staff returns to work, monitoring construction, demolition or recommissioning projects to consider energy efficient methods that could be implemented, and continue to manage the vehicle fleet size and aim to acquire alternative fuel vehicles whenever possible.



In photo: Electric fleet vehicle at ARC

Risk Management Matrix

A Risk Management Plan has been created to help address possible risks associated with meeting the goals outlined in the Five-Year Sustainability Plan. There are eight goal areas in the Five-Year Sustainability Plan, and the Risk Management Plan goes through and addresses possible risks for each of these specific goal areas. The top three highest risk areas are discussed in the paragraphs below. The table on the bottom left outlines the risk matrix, and the table on the right lists each of the correlating risks.

Goal 3- Water Efficiency

Water Use is the third goal area outlined in the Five-Year Sustainability Plan and has one of the highest risks of not meeting its goals. Ames continues to have high water use and unreliable water use metrics due to a variety of reasons such as old infrastructure, line breaks, and inadequate water metering equipment and reporting. If water use remains high, then Ames will continue to fail to meet both NASA's goals and the Federal energy efficiency goals.

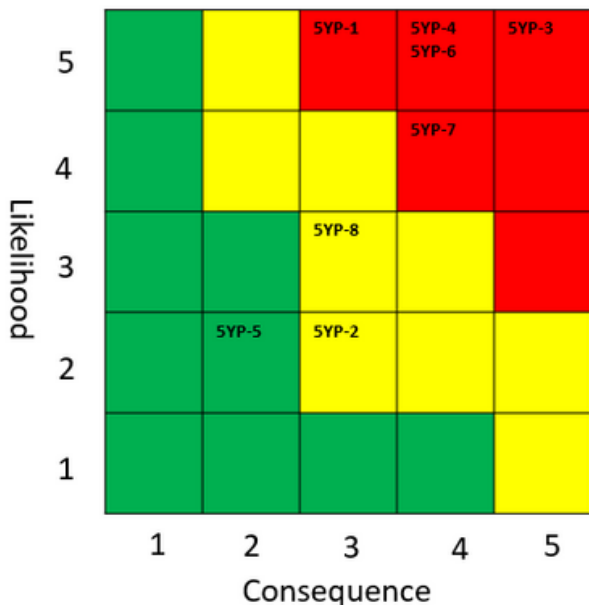
Goal 4- Sustainable Buildings

Sustainable Buildings is the fourth goal area in the Five-Year Sustainability Plan. The agency annual reduction target was 25 percent in FY 2020 and 26 percent in FY 2021 and will continue to increase 1 percent for each FY. In FY 2020 Ames only reached 17 percent of buildings that qualify as sustainable. One of the requirements to be considered a sustainable building is that each building must have its own water meter. Ames has been missing this metric mainly due to the lack of water metering on the building level.

Goal 6- Sustainable Acquisition

The sixth goal area outlined in the Five-Year Sustainability Plan is Sustainable Acquisition. This goal area focuses on all purchases made for the Center and if they are sourced from environmentally preferable materials. The proposed risk handling steps to mitigate these risks are to create an updated Green Purchasing Training that the staff is required to take as well as improving the enforcement of the training requirement. It is also recommended to have a consolidated recycling and sustainable acquisition data collecting and tracking system.

Risk Score Matrix



Number	ID	Title	LXC
1	5YP-1	Not Meeting Facility Efficiency Strategy Goals	5x3
2	5YP-2	Not Meeting Energy Measure Goals	2x3
3	5YP-3	Not Meeting Water Efficiency Goals	5x5
4	5YP-4	Not Meeting Sustainable Building Criteria	5x4
5	5YP-5	Not Meeting Fleet Management Goals	2x2
6	5YP-6	Not Meeting Sustainable Acquisition Goals	5x4
7	5YP-7	Not Meeting Waste Diversion Goals	4x4
8	5YP-8	Not Meeting GHG Reduction Goals	3x3

Sustainability Teams on Site

Green Council

This council will meet quarterly to establish environmental objectives, targets, and Environmental Management Plans, indicating milestones, resource requirements, and responsible organizations, for addressing the environmental aspects. The Ames Green Council mandated through APR 8553.1 to be composed of Division and Branch Chiefs, and CORs, will provide input and identify objectives and targets for targeted environmental projects.

Energy and Water Efficiency Team

A team primarily focused on the reduction of energy and water use, cost and environmental impact at Ames and supporting Ames immediate and long-term Mission goals efficiently and effectively. This is a forum for Ames employees and contractors to communicate and collaborate on energy projects within and between the mission and operations directorates. This group reviews and make recommendations for achieving mandated energy goals as well as other measures deemed appropriate by the Ames Energy and Water Conservation Officer, Center Management or the Committee.

Green Team

A voluntary program that facilitates ongoing monthly lunch and learns with different speakers from green or sustainable companies in the area. This team aims to expand education among staff at the NASA Ames Research Center in a fun way as well as supporting and raising awareness about the featured green speakers and companies.



ACRONYM LISTING

- **APR:** Ames Procedural Requirement
- **ARC:** Ames Research Center
- **C&D:** Construction and Demolition
- **CARB:** California Air Resource Board
- **CSO:** Center Sustainability Officer
- **CY:** Calendar Year
- **EMD:** Environmental Management Division
- **EO:** Executive Order
- **ESPs:** Energy Savings Performance
- **FY:** Fiscal Year
- **GHG:** Greenhouse Gas
- **GSF:** Gross Square Foot
- **NASA:** National Aeronautics and Space Administration
- **NETS:** NASA Environmental Tracking System
- **Non-C&D:** Non Construction and Demolition
- **NPR:** NASA Procedural Requirement
- **NPV:** Net Present Value
- **PG&E:** Pacific Gas & Electric
- **ROI:** Return of Investment
- **SIR:** Saving to Investment Ratio
- **SRIP:** Sustainability Report and Implementation Plan
- **UESCs:** Utility Energy Service Contracts
- **USBGC:** U.S. Green Building Council
- **WAPA:** Western Area Power Authority



- a. Executive Order (EO) 13834 of May 17, 2018, Efficient Federal Operations.
- b. Federal Acquisition Regulation (FAR), Part 23- Environment, Energy, and Water Efficiency, Renewable Energy Technologies, Occupational Safety and Drug- Free Workplace.
- c. 81 FR 30429, Federal Acquisition Regulation: High Global Warming Potential Hydrofluorocarbons
- d. Farm Security and Rural Investment Act of 2002, Section 9002.
- e. Pollution Prevention Act of 1990 (42 United States Code (U.S.C.) 14101 et. Seq.).
- f. Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA) - Public Law 99-499: Superfund Amendments and Reauthorization Act (SARA), Title III, Section 313.
- g. Resource Conservation and Recovery Act of 1976, as amended by Hazardous and Solid Waste Amendments of 1984 (42 U.S.C. 6002).
- h. NASA Procedural Requirement (NPR) 8530.1B, NASA Sustainable Acquisition.
- j. Clean Air Act of 1970 (42 U.S.C. 7671k) Non-ozone-depleting Substances Safe Alternatives Policy.
- k. EPA Comprehensive Procurement Guidelines (CPG) (Includes links to Safer Choice, Water Sense, USDA BioPreferred) <https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program>
- l. SmartWay: <https://www.epa.gov/smartway>
- m. Energy Policy Act of 2005 (42 U.S.C. 13201 et. seq.).
- n. Energy Independence and Security Act (EISA) of 2007 (Public Law 110-140).
- o. Energy Star Program: <https://www.energystar.gov/>
- p. NASA HQ Sustainability Report and Implementation Plan (SRIP)
- q. NASA Form 1707, Special Approvals and Affirmations of Requisitions
- r. NPR 8530.1, NASA Sustainable Acquisition