

United States Department of Defense: Sustainability and Water Resilience



**SLIDES ONLY
NO SCRIPT PROVIDED**

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Agenda

- Sustainability at DoD
- Water Resilience at DoD
- Military Department Initiatives
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 - Air Force
 - Navy
- Groundwater Research at DoD
 - SERDP & ESTCP
- Other Sustainability Opportunities
- Closing and Q&A



Sustainability at DoD



What DoD Supports – the Big Picture



667,760 facilities at 4,686 sites worldwide valued at \$1.8 trillion



284,856 buildings, covering 2.31 billion square feet, 32% of DoD's total energy use



26 M acres of land with nearly 500 threatened/ endangered species



Over 134,000 recorded archaeological sites and over 20,000 historic assets



Annual facility water consumption is approximately 80 billion gallons



97% of new building designs since FY 2007 are 30% more energy-efficient



Climate Assessment Tool to improve climate adaptation and resilience



244 Restoration Advisory Boards at 39,600 environmental cleanup sites



574 Federally-recognized Tribes affiliated with 300+ installations



DoD and Sustainability

- To successfully execute the Department of Defense (DoD) mission, our Military Departments must have the energy, land, air, and water resources necessary to train and operate in a world where there is increasing competition for resources
- The Department pursues sustainability opportunities based on data that make the most compelling case in terms of mission, productivity, and long-term cost performance

DoD's Sustainability Vision

To maintain the ability to operate into the future without decline either in mission or in the natural and man-made systems that support it.



Sustainability Offers Solutions to DoD's Mission Challenges

Energy and Reliance on Fossil Fuels

- Risk to forces delivering fuel
- Insecurity and volatility in supply and price
- Vulnerability of electrical grid

Toxic and Hazardous Materials

- Harms human health and ecosystems
- Impairs readiness and impacts training areas
- Increases cleanup and handling costs
- Additional operational restrictions
- Hampers the continued availability of mission critical chemicals

Water Resilience

- Risk to forces delivering water
- Reliability can affect base operations and fielding choices
- Regional water scarcity
- Water infrastructure
- Groundwater cleanup

Other Vulnerabilities

- Can limit outdoor training
- Reduces fresh water supply
- Sea level rise affects infrastructure and diversity of training habitats
- Strains electricity supply
- Increases frequency and intensity of wildfires
- Facilitates spread of vector borne diseases



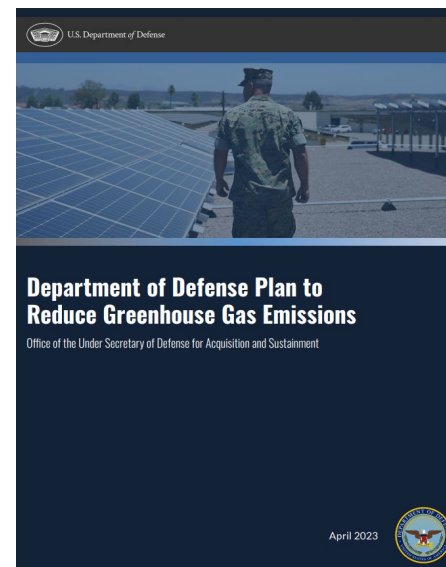
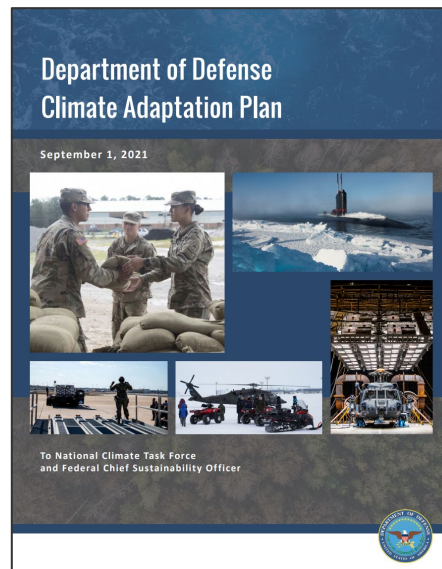
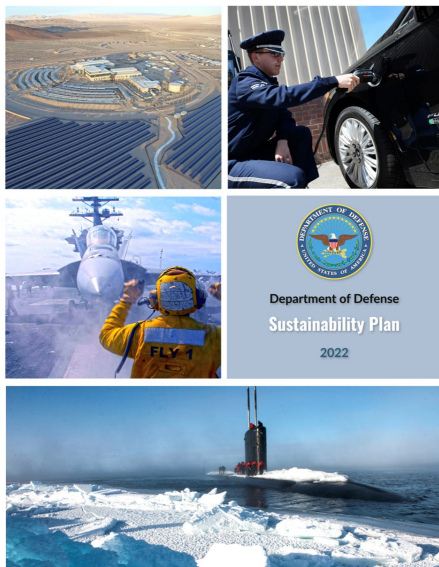
Relevant Plans and Strategies

The 2022 National Defense Strategy (NDS).

The 2022 DoD Sustainability Plan.

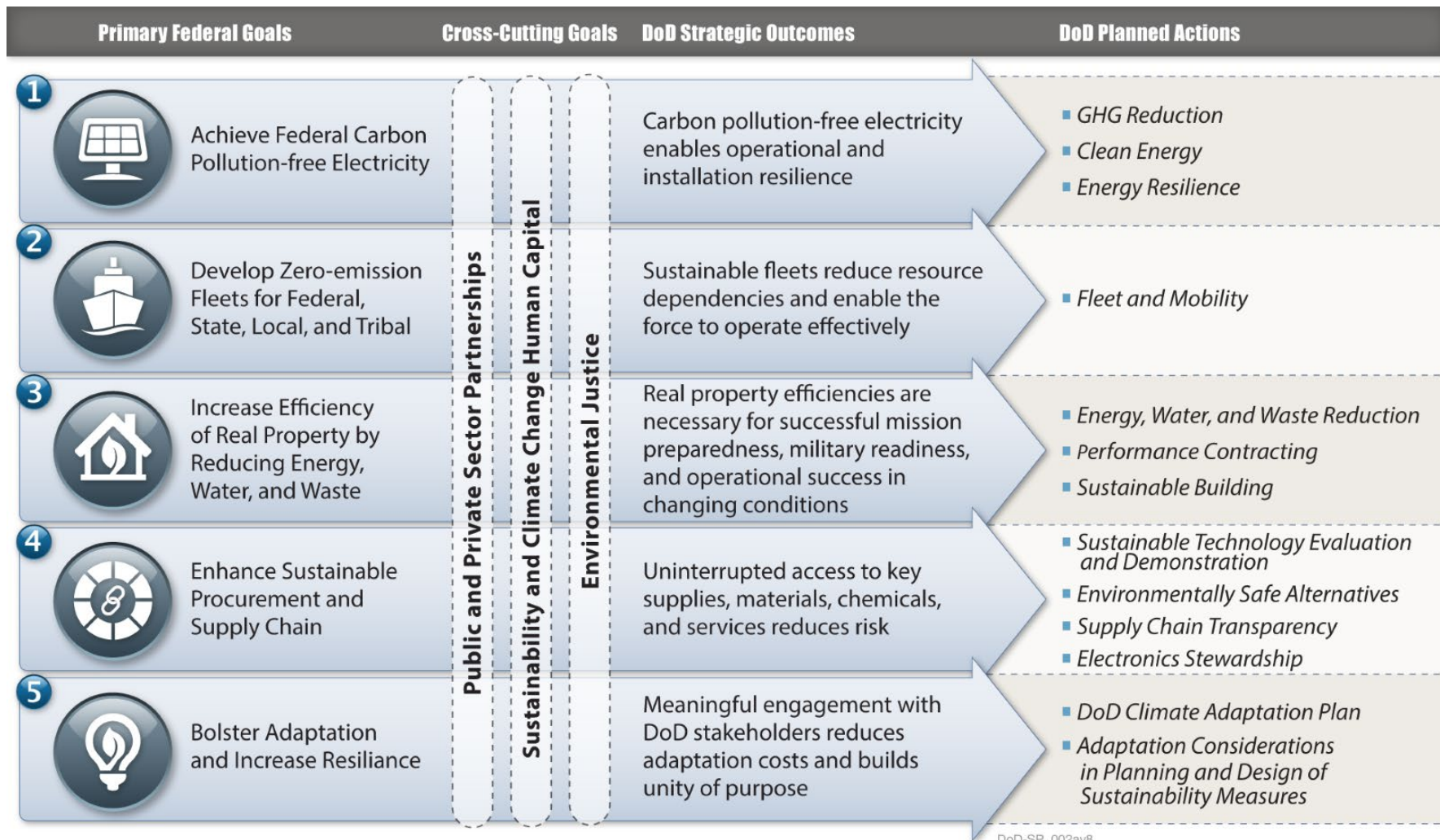
The 2021 Climate Adaptation Plan (CAP).

The 2023 Greenhouse Gas Emissions Reduction Plan.





Sustainability Goals, Strategic Outcomes, and Planned Actions



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Water Resilience at DoD



DoD and Water Resilience

- Drought, extreme weather events, malevolent acts, and other disruptive incidents threaten water availability and security for military installations world-wide
- Water resilience is important for DoD:
 - Enable and accelerate comprehensive, consistent, and forward-thinking decision making
 - Ensure mission preparedness, military readiness, and operational success

DoD Definition: Water resilience is “the ability to avoid, prepare for, minimize, adapt to, and recover from anticipated and unanticipated loss of mission-essential functions and degradations to mission assurance as a result of disruptions to built and natural water sources, infrastructure, and systems, inside and outside the fence line, as authorized by law, to provide for mission assurance and readiness.”



DoD Water Resilience Highlights

- DoD provides drinking water to approximately 2 million people on its installations worldwide
- DoD uses innovative approaches to conserve water, save costs, and assure access to an adequate water supply for mission success
- DoD Services are emphasizing the growing importance of water in their efficiency and resilience policies and planning activities





Water Resilience Planning

- FY21 NDAA Section 2827 “Water Management and Security on Military Installations” requested DoD installations develop a joint methodology to evaluate water risk associated with:
 - Water sources
 - Aging infrastructure
 - Drought impacts
 - Evaluation of existing water metering and consumption at the military installations
- The DoD uses a variety of methods to improve water efficiency and security:
 - Planning
 - Land management changes
 - Public outreach
 - Privatizing water utilities
 - Third-party financed projects



Water Resilience Planning

- DoD and the MILDEPs developed the *DoD Water Management and Security Assessment Methodology*
 - Screening-level assessments that generate consistent and comparable information across MILDEPs and FYs
- DoD uses this information to inform water management decisions and assess water risk
- 164 installation assessments completed between FY 2022 and FY 2023 and DoD is working on an additional 88 assessments in FY 2024

DOD Water Management and Security Assessment Methodology Framework



Exposure Assessment

- Water Competition
- Current Robustness of Water Sources
- Future Robustness of Water Sources



Installation Context Assessment

- Infrastructure
- Water Use
- Water Metering
- Fluctuation in Water Use



Response Assessment

- Water Quality
- Water Rights
- Physical Backup
- Response to Water Shortage



Military Department Initiatives



Army Initiatives

- Multiple policies which direct installations to pursue water efficiency, conservation, and resilience outcomes
- Requires its installations to create and implement Installation Energy and Water Plans (IEWPs)
- Most Army installations have completed a self-evaluation of their water resilience posture



Army National Guard Sgt. 1st Class Jason Richards sets up a tactical water purification system in Mountain City, Tenn



Air Force Initiatives

- Long-standing water efficiency improvements and water use reduction initiatives
- Collaborates with federal, state, and research partners to identify compelling solutions that address the unique water challenges of each installation
- Building a decision support tool to help planners determine which installations are best suited to secure groundwater resources for long term mission assurance



Water covers one-third of Offutt Air Force Base, Nebraska, after the Missouri River flooded in March 2019.



Navy Initiatives

- Ensure sufficient availability of potable and non-potable water supply
 - Sustain critical mission(s) during an extended utility outage for a minimum of 14 days
- Incorporate water resilience analysis and mitigation into annual programs and plans
- Reduce potable water consumption by 15%
- Conserve water through initiatives that positively impact groundwater recharge, stormwater retention, and sustainable land management
- Ensure water resources stewardship by training, hiring, and retaining expertise in water resilience, water rights, and water resources management



Naval Facilities Engineering Systems Command contractors drill a new groundwater monitoring well located near the Red Hill Shaft.



Groundwater Research at DoD



SERDP & ESTCP Program Overview

- The Strategic Environmental Research and Development Program (**SERDP**) and the Environmental Security Technology Certification Program (**ESTCP**) are the DoD's environmental, resilience, and installation energy and water research programs
- Harnessing the latest science and technology to improve DoD's environmental performance, reduce costs, and enhance and sustain mission capabilities





SERDP & ESTCP Investments

- Improve water security
- Improve cleanup practices
- Reduce waste and ensure sufficient quantity and quality of water to support DoD missions
- Improve the treatment of wastewater and drinking water
- Maximize the potential for water reuse at both fixed installations and forward operating bases
- Reduce life-cycle costs on sites requiring remediation and monitoring

SERDP & ESTCP Webinar Series

Innovative Tools for Characterizing
PFAS Distribution and Mass
Discharge in Groundwater

September 7, 2023



SERDP & ESTCP Webinar Series

In Situ and Ex Situ Approaches
for Treating PFAS-Impacted
Groundwater

April 6, 2023



The webinar series aims to promote the transfer of innovative, cost-effective, and sustainable solutions developed by SERDP and ESTCP.



SERDP & ESTCP Project Highlight

- Incorporating Contextual Water Security Planning for Improved DoD Installation Resilience
 - PI: Engineer Research and Development Center - Construction Engineering Research Laboratory
- Develop a process to assist installation planners in assessing the contextual water security of a military installation and to develop solutions to address risks.
- Draw on current industry standard methods used by federal, state, regional, and local governments, along with private entities.
- Team interfaces with leadership across DoD to incorporate these practices into the current planning and infrastructure frameworks.



SERDP & ESTCP Project Highlight

- Integrated Assessment of Climate Change Impacts to Groundwater, Stormwater, and Wastewater Infrastructure at Coastal Military Facilities
 - PI: University of Delaware
- Integrated suite of models to analyze the impacts of climate change and extreme weather on groundwater, stormwater, and wastewater infrastructure
- Modeling toolbox uses site-specific predictions of changing rainfall patterns and rising water levels as inputs to an integrated model
 - Simulates groundwater flow and salt transport
 - Stormwater and sanitary sewer flow
 - Stormwater best management practices



SERDP & ESTCP Project Highlight

- Electrocatalytic Reduction of PFAS in Groundwater and Aqueous Concentrates
 - PI: University of Illinois at Chicago
- Develop efficient electrocatalysts for the reductive defluorination of PFAS that are present in groundwater and aqueous concentrates
- The main tasks of this research include the following:
 - Electrocatalyst synthesis and characterization
 - Bench-scale catalyst screening studies
 - Study of the effects of non-target water constituents
 - Longevity studies
 - Cost analyses
- The work is projected to end with proof-of-concept data that indicates the system is ready for scale-up to pilot testing at a groundwater site and/or for PFAS concentrate management

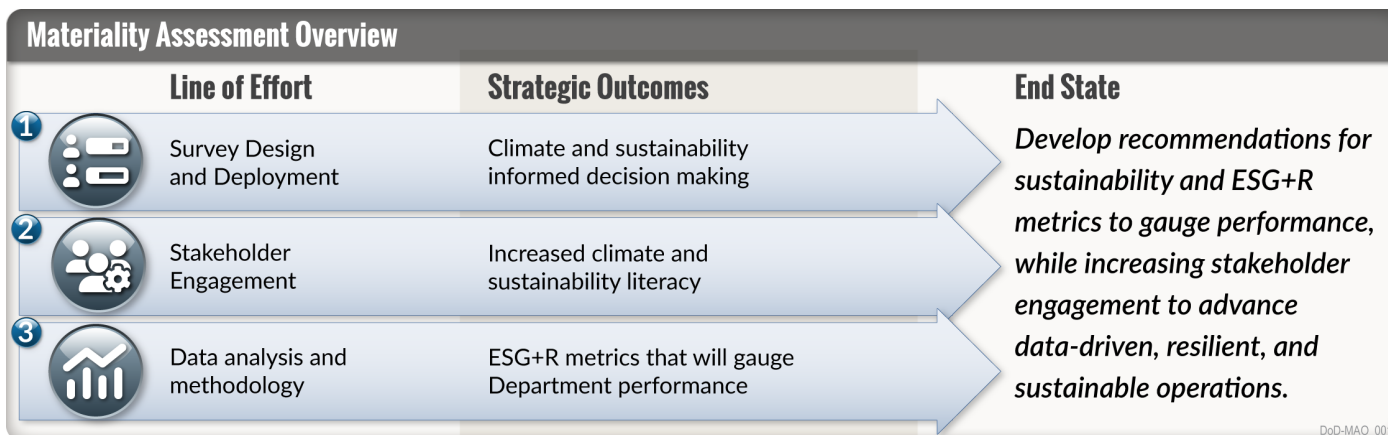


Other Sustainability Opportunities



Materiality Assessment

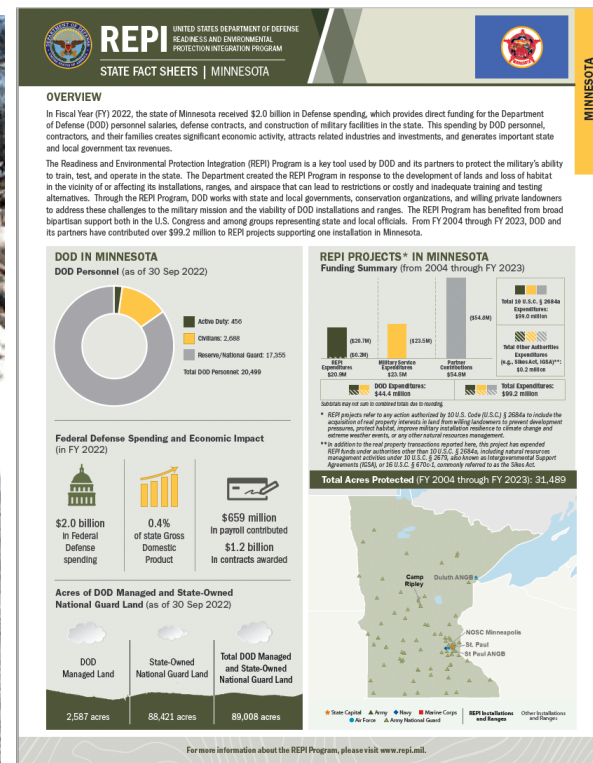
- Environmental, Social, Governance and Resilience
 - A framework that helps stakeholders understand how an organization is managing risks and opportunities related to environmental, sustainability, social, governance, and resilience criteria
- A materiality assessment helps to prioritize enterprise sustainability issues
- An exercise in stakeholder engagement via a structured survey and interview process
 - Assesses relative potential impact on DoD and importance to stakeholders





Partnerships

- Readiness and Environmental Protection Integration (REPI) Program
- Defense International Environmental Program
- Office of Local Defense Community Cooperation (OLDCC)
- Technology Programs
 - Strategic Environmental Research and Development Program (SERDP)
 - Environmental Security Technology Certification Program (ESTCP)
 - Sustainable Technology Evaluation and Demonstration (STED) Program
- Interstate Technology Regulatory Council (ITRC)
- Environmental Council of States (ECOS)
- Administrative Agreements
- Industry



DoD focusing actions around sustainability are interconnected with the interests of neighboring communities, states, fellow agencies, partners, and allies.

Closing/Questions



Thank you! Questions?

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