

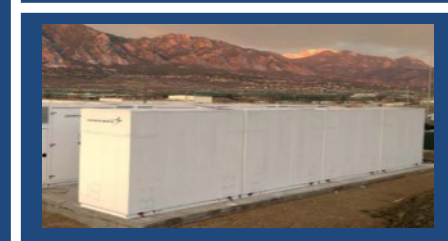
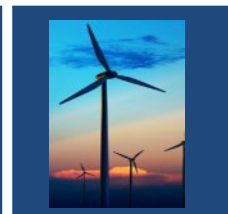


## Clean Energy and Renewables Innovation Overview

*Ms. Susan Call*  
*Director, Installation Clean Energy & Energy Efficiency*

*Office of the Deputy Assistant Secretary of Defense for Energy Resilience & Optimization (ODASD(ER&O))*

*April 23, 2024*





# Ensures Resilience

Energy, Installations, and Environment



*Congressional authorizing legislation  
directs the DoD to prioritize energy  
resilience of installations and operations*





# Supports Energy Transition

Energy, Installations, and Environment

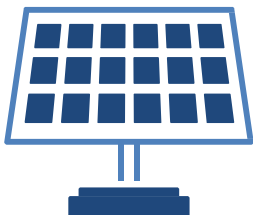


*Executive Order 14057 directs the Department and other agencies to lead by example in achieving a net zero emissions economy.*



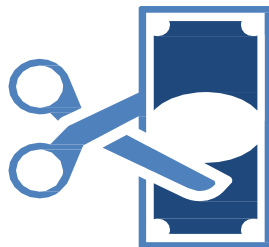
# DoD considers core criteria to evaluate CFE options

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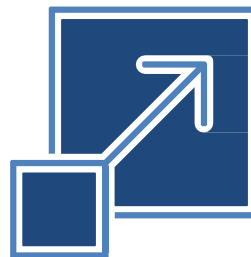
## EO-compliance

Promote energy resilience and accelerate decarbonization of the US grid



## Cost

Secure fair and reasonable pricing;  
Minimize cost impact to installations



## Scalability

Can cover 100% of CFE need across installations



## Speed

CFE capacity is available for enrollment as soon as possible



# ***DoD intends to pursue innovative CFE solutions that stimulate new CFE development***

*Energy, Installations, and Environment*

*CFE solutions that drive decarbonization and improve resilience*



New onsite CFE generation



Aggregating load across installations and whole-of-government (WOG) sites for CFE acquisitions where applicable



Pioneering deployment of emerging, resilient CFE technologies at scale (e.g., next-gen geothermal, small modular nuclear reactors (SMRs), CFE-powered microgrids, etc.)



# DoD is pioneering emerging, resilient CFE technologies at scale

Energy, Installations, and Environment

More  
mature



**Onsite CFE** can bolster installation resilience using clean firm resources, microgrid functionality, and battery storage and in larger scale, utility facing deployments.



**Enhanced geothermal** can provide installations with true resilient, clean energy that is fueled by natural heat within the earth's crust.



**Small modular reactors (SMRs)** is next-generation clean energy technology that can operate independently from the commercial grid.



**Long duration energy storage (LDES)** can address intermittency of CFE sources due to ability to store and discharge electricity for 8+ hours at a time.

More  
nascent

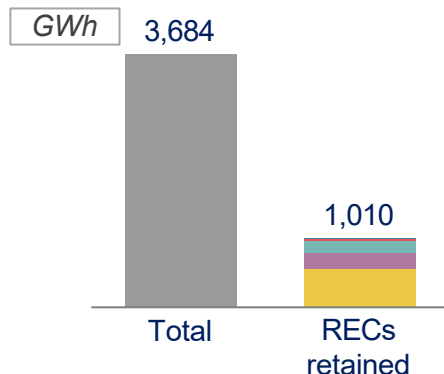


# DoD is actively deploying CFE onsite

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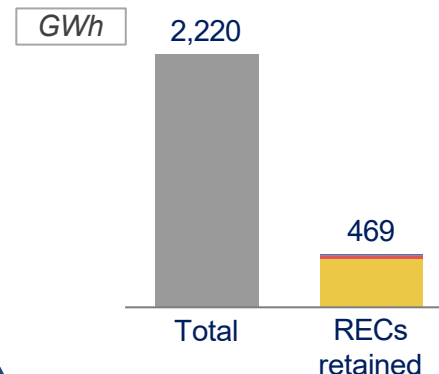
Solar Geo Wind Hydro Other

## Current Portfolio



- ~1 TWh of CFE generation contributing to EO targets
- Mainly **solar**, followed by **wind**

## Planned projects *(reported July 2023)*



- ~0.5 TWh incremental generation expected to contribute to EO targets
- Mainly **solar (90%)**



- Solar development increasing (from **55%** of current portfolio to **90%** in planned projects), and projects increasing in size (**2.2 MW average** planned project, up from **0.4 MW** average in operation)
- However, DoD is retaining fewer EACs in recent development (**28%** of CFE generation has retained EACs historically; planned generational only retains **20%** of EACs)
- DoD investigating use of **ESPC Energy Sales Agreements** (ESAs) to support onsite generation and CFE goals
- DoD exploring **contract innovation** in larger projects using DoD lands

Source: AEPRR data, 2023 Services data tasker, EO 14057, BCG analysis

Note: Planned projects generation does not include Emergency generation except for DLA sites Defense Distribution Depot Susquehanna and Defense Supply Center Columbus as these projects report planned CFE generation; Current Portfolio subject to EPA 7.5% constraint





# DoD is actively deploying new CFE technologies

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*Joint Base San Antonio onsite solar*



*Mountain Home Air Force Base*



*Eielson Air Force Base (AFB)*

## Onsite CFE

- DoD developed a central database of onsite CFE development through 2030, with current onsite plans totaling ~500 GWh of CFE, or ~5% of DoD's total CFE need (net grid-supplied and legacy CFE)

## Enhanced geothermal

- Pilot geothermal projects for 10 MWs geothermal at Joint Base San Antonio and Mountain Home AFB
- All military services are evaluating potential of geothermal sites across locations

## Small modular reactors

- Eielson AFB micro-reactor pilot: expected to be ~5 MW, anticipated commercial operation date of 2027





## Onsite example: Fort Cavazos, Texas (formerly Fort Hood)

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- Fully Operational in April 2017
- The Army's first hybrid solar and wind energy project and the first to include both onsite and offsite generation.
- 63,000 solar panels situated on 132 acres of land providing 15 MWs of power. 60,000 panels make up the West Fort Hood (Now designated Fort Cavazos) Solar Farm.
  - Microgrid compatible to enhance energy security.
- 21 wind turbines provide 50 MWs of power. Approximately 65MW AC capacity, enough to power about 21,000 homes
- Energy purchased from the onsite solar system is combined with 50MW AC offsite wind facility.





## Onsite example: Joint Forces Training Base, Los Alamitos, CA

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- Lease with 30-year max up to 100 acres.
- Provides “islandable” capability to power the bases critical missions for a minimum of 14 days during a grid outage.
- Expected to include up to 20MW of solar photovoltaics and a 20MW/80MWh batter energy storage system.
- Will provide power for critical JFTB-LA missions during a grid outage, enhancing energy resilience.
- May enhance grid reliability by alleviating transmission line congestion or providing other electrical grid quality enhancing





## Onsite example: Edwards AFB, CA

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- Fully operational Feb. 2, 2023
- A 2,600-acre solar enhanced use lease project can potentially earn up to \$75.8 million throughout the 35 year lease period.
- It is the largest ground-mounted solar array project constructed on an Air Force installation and the fifth largest solar EUL project in the Air Force.
- The new 464-megawatt capacity solar array, with an approximate 3,287 megawatt-hours of battery energy storage, is part of a larger \$2 billion development called the Edwards Sanborn Solar Storage Project.
- The Edwards Sanborn Solar Storage Project includes another 2,000 acres of private land, altogether will generate enough energy to power more than 164,000 homes and displace more than 320,000 tons of carbon emissions annually.

***“The Edwards Air Force Base Solar Project is a triple win—it’s good for resilience, it’s good for energy security, and it’s good for the economy.”***

***- Andrew Mayock  
White House Federal Chief Sustainability Officer***



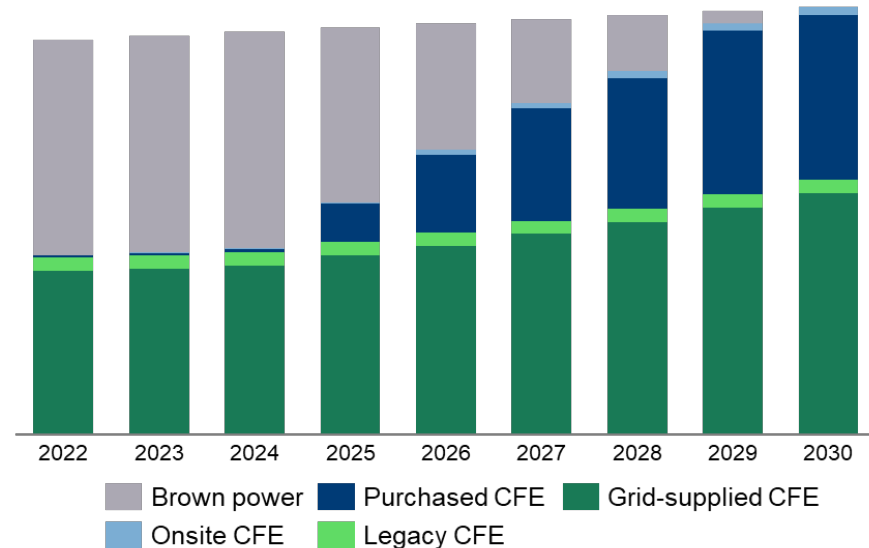


# DoD is committed to help drive the energy transition across U.S. markets

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- Piloting **innovative** CFE technology
- Utilizing **federal land** for grid-facing CFE development (e.g., utility-scale solar, utility batteries)
- Being a **first mover** in CFE supply-constrained markets, spurring new CFE development
- Partnering with utilities to design **new tariffs** and processes

Estimated CFE delivery per year (*Illustrative Only*)  
Total projected electricity usage per year (FY), TWh





## Susan Call

*Director, Installation Clean Energy & Energy Efficiency*

*Office of the Deputy Assistant Secretary of Defense for Energy  
Resilience and Optimization (ER&O)*

[Susan.o.call.civ@mail.mil](mailto:Susan.o.call.civ@mail.mil)

<https://www.acq.osd.mil/eie/>