

Department of the Air Force

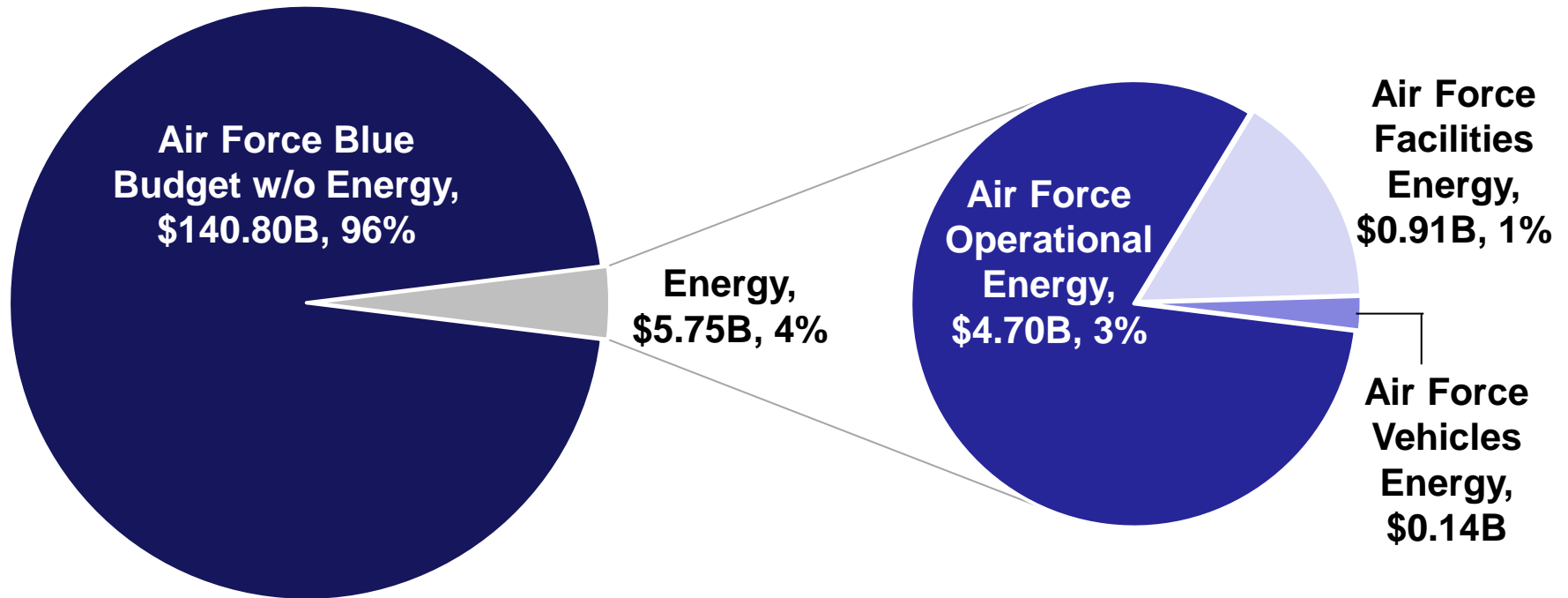
Innovative Energy Solutions for an Optimized Air Force



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Deputy Assistant Secretary of the Air Force
Operational Energy
04 NOV 2020**



Air Force Consumption



Air Force uses ~ 2B gallons annually on ~800K sorties



Office of Air Force Operational Energy

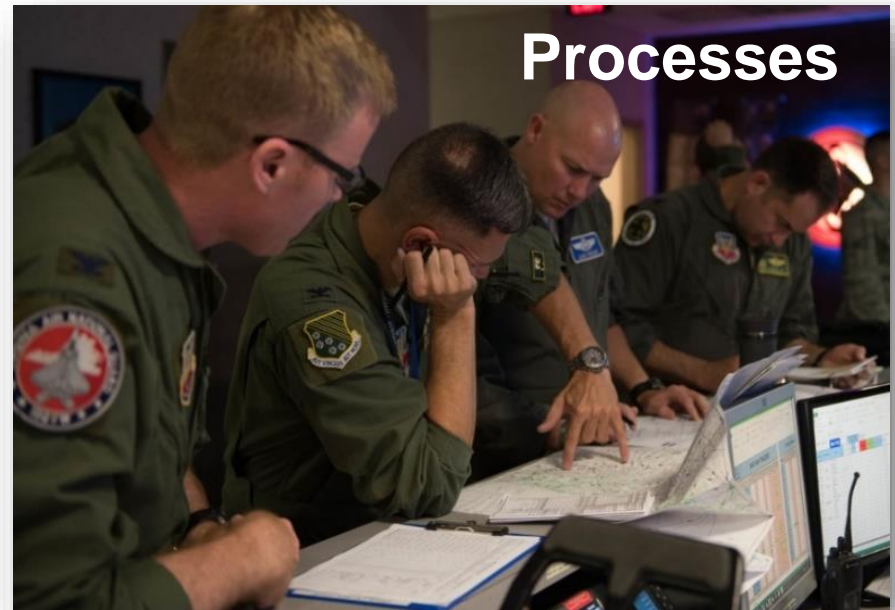
Our Vision:

Create an **energy optimized** Air Force that
maximizes combat capability for the warfighter

Engineering

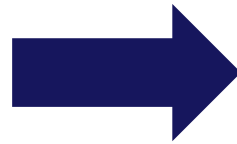


Processes





Optimization Modules for Scheduling

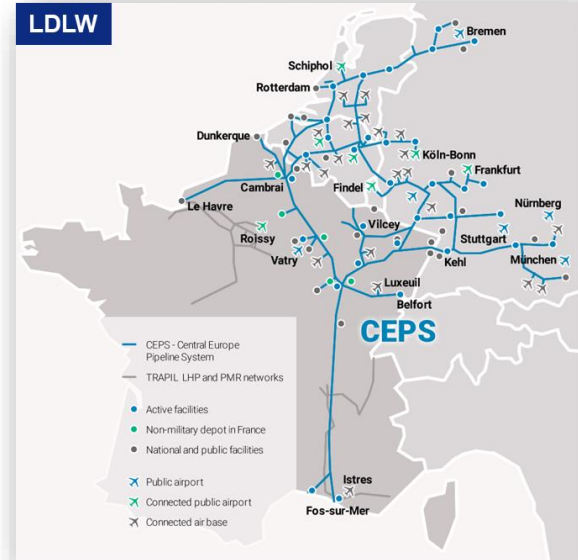




Logistics, Wargaming, Sustainment



NDS Priority: Supply and Distribution

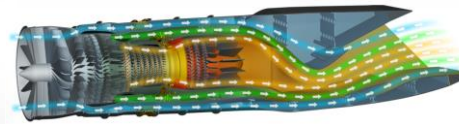
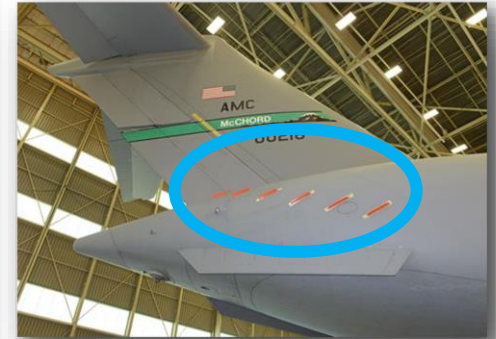
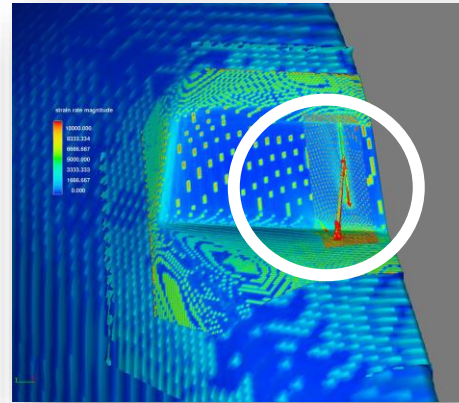


NDS Priority: Reach and Supportability





Aircraft Modernization





Alternative Energy Congressional Interest Item

■ Hydrogen Refueling Station – Joint Base Pearl Harbor-Hickam, HI



■ Utilizes H₂ Proton Exchange Membrane (PEM) Electrolyzer

- Tied to 146 kW PV array and base utility grid
- Dispensed over 1,100 kg since 2014





Aerospace Ground Support Equipment

- **Hydrogen Heavy-Aircraft Tug**
 - Standard diesel U-30 Tow Tractor converted to H₂ fuel cell electric hybrid
 - US Hybrid
 - Eliminates noise/fumes
 - Runs on hydrogen or grid power (battery range is limited)
- **Hybrid F-22 weapons loader**
 - MJ-1E electric aerial stores lift converted to a H₂ fuel cell electric hybrid by US Hybrid
 - H₂ Fuel Cell Range Extender





Other Ground Support Equipment

- **Hydrogen multi-passenger vehicle**

- **Designed/built by US Hybrid**
- **30 kW Hydrogenics Fuel Cell**
- **5th year of operations**



- **Hydrogen drive maintenance van**

- **35 kW H₂ fuel cell mobile generator**
- **Onboard battery energy storage**
- **16 configurable modes**
- **Emergency response exercise-capable**





Closing

NO FUEL.  NO FIGHT.



Are you **energy** aware?
#EnergyAbleMissionCapable

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