Department of Defense Alternative Fuels Policy, Initiatives, and Opportunities

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Dec. 5, 2017

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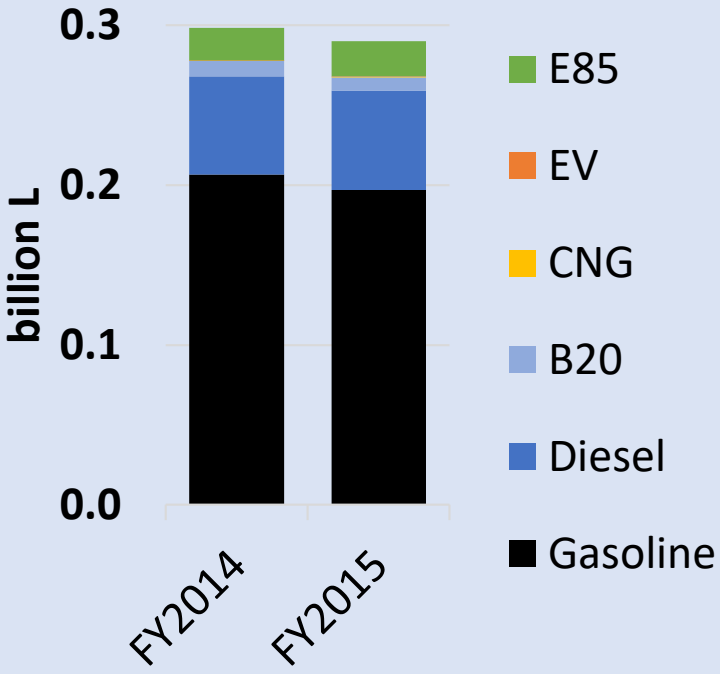
ISCC Regional Stakeholder Committee North America

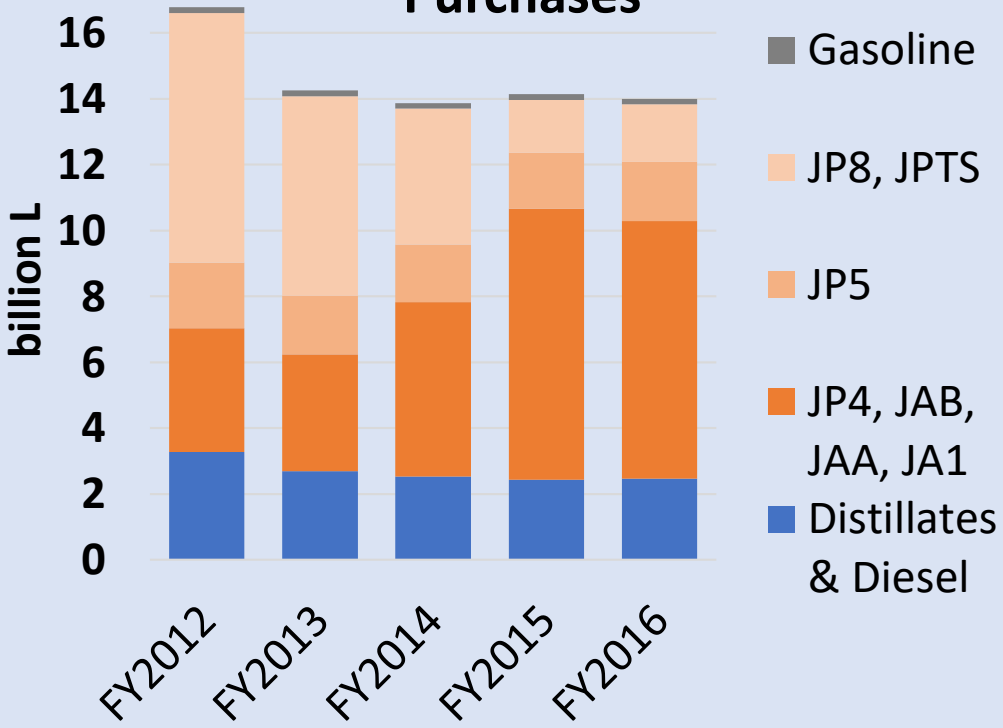
Key points

- DoD alt fuel policy is driven by broad strategic goals, split between installation and operational “markets”
- Installation vehicles: 2% of fuel energy, primarily gasoline, with initiatives guided by petroleum and GHG reduction goals
- Operations: 98% of fuel energy, primarily jet fuel, with initiatives guided by substitutability and feedstock diversification
- Current programs include support for biofuel production facility construction and drop-in biofuel subsidies
    - Plus alternative fuel and vehicle initiatives at individual domestic installations
- Ongoing work links jet fuel → climate change → human health

Gasoline Dominates Installation Purchases



Jet Fuel Dominates Operations Purchases



Federal Fleet Open Data Sets https://www.gsa.gov/policy-regulations/policy/vehicle-management-policy/vehicle-management-library

Defense Logistics Agency FY 2015 Energy Fact Book www.energy.dla.mil

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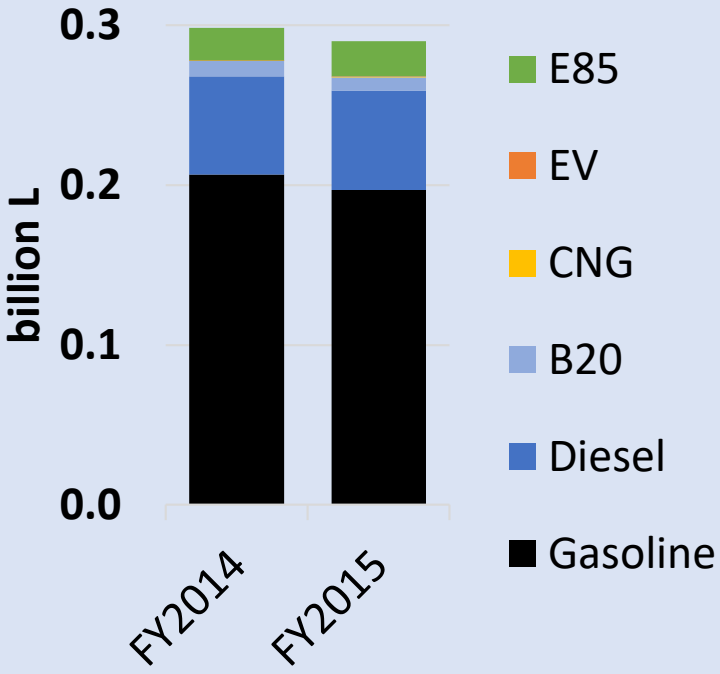

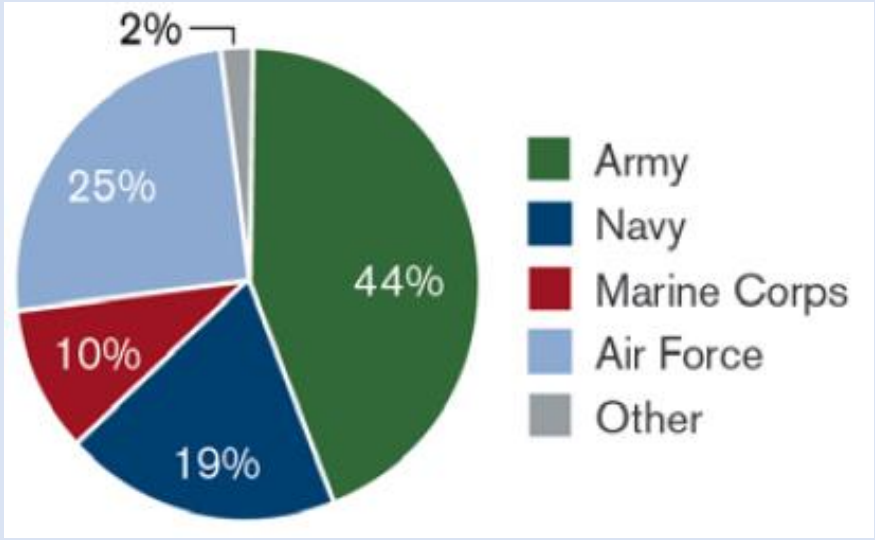

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DOD 2017. Department of Defense Annual Energy Management and Resilience (AEMR) Report Fiscal Year 2016.

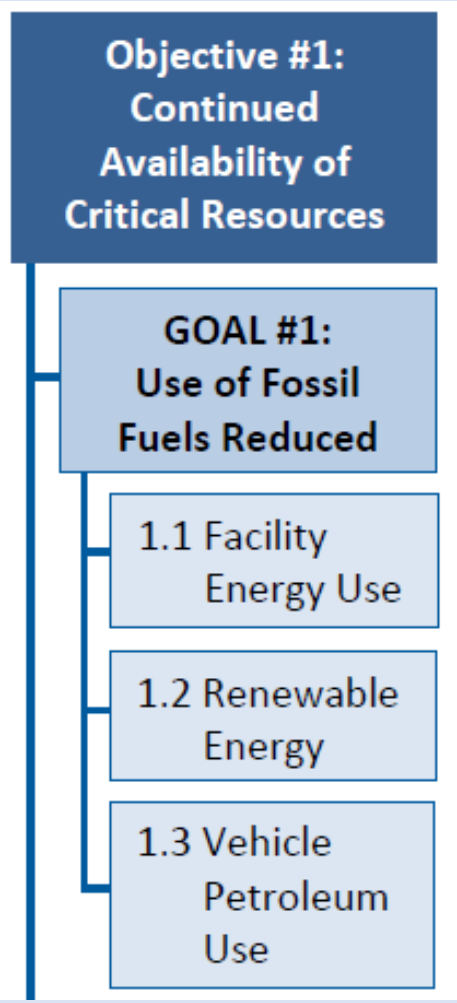
Example Fleet: Wright-Patterson Air Force Base

Fuel	Vehicles	L (or kWh)
Gasoline (E10)	108	39,000
Hybrid EVs (E10)	4	
Ethanol (E85)	247	60,000
Diesel	37	75,000
Biodiesel (B20)	118	130,000
Electric Vehicles	26	130,000

Data from FY2014

Emery, I, E Mbonimpa and AE Thal. Climate-based policies may increase life-cycle social costs of vehicle fleet operation. Energy Policy 101: 1-9, 2017

Fuels Policy: Installations



FY 2017: 4% reduction in GHG emissions per mile

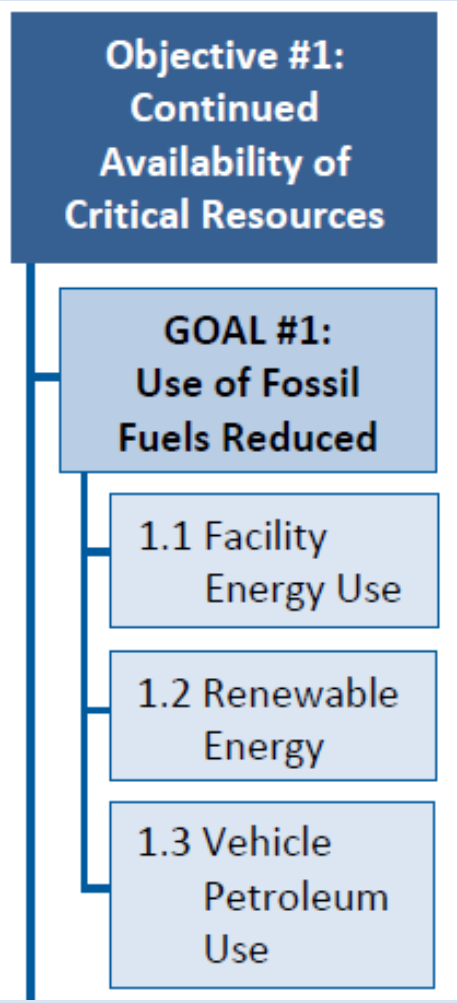
FY 2010 – 2015: 30% reduction in petroleum use

- Navy: 25%
- Marine Corps: 45%
- Air Force: 16%
- Army: 41%

Strategies:

- Fleet downsizing
- Electric vehicles
- Flex-fuel vehicles (E85 capable)
- Biodiesel blends (B20)

Fuels Policy: Installations

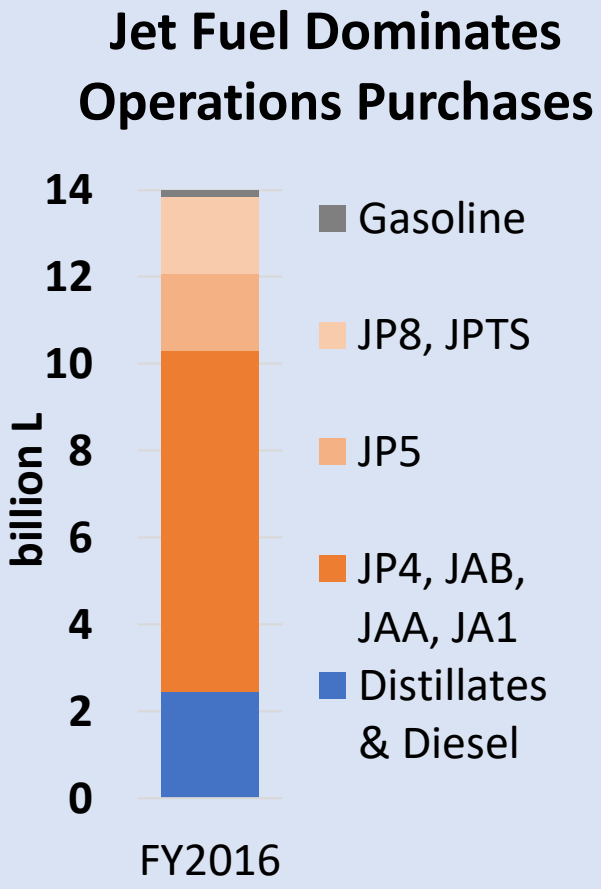


FY 2017: 4% reduction in GHG emissions per mile

"A major factor driving performance on the new metric is the extent to which a Component's fleet has been electrified."

DOD FY 2016 SSPP

Fuels Policy: Operational Energy

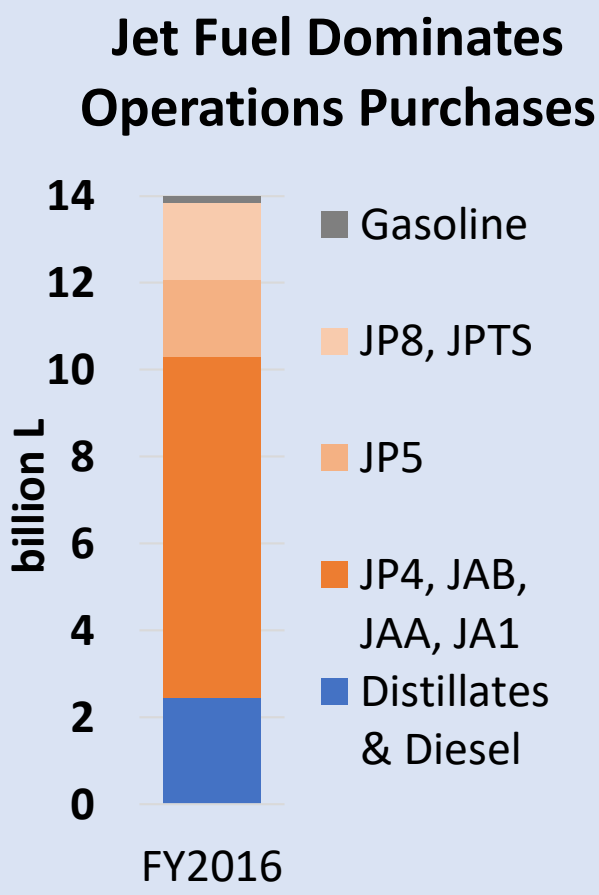


"Alternative fuel investments will be targeted to ensure forces are able to carry out operations using alternative sources of fuel that improve the **reliability of our overall fuel supply**.

Alternative fuels can be a means to ensure combat effectiveness, **logistical flexibility** and to mitigate Anti-Access/Area Denial (A2AD) effects."

DOD Alternative Fuels Policy for Operational Platforms

Fuels Policy: Operational Energy



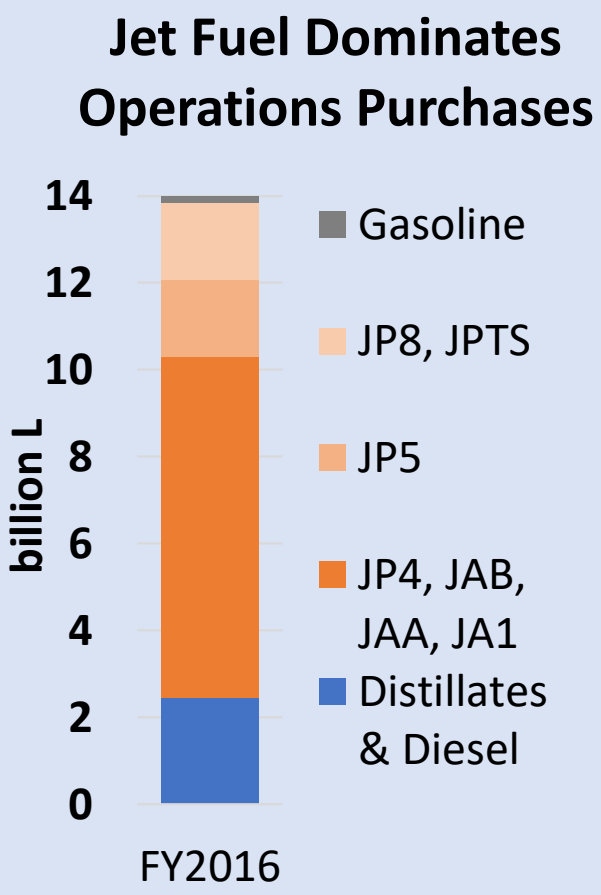
USAF Energy Strategic Goals:

3.1: Increase use of **cost-competitive** drop-in alternative aviation fuel blends for non-contingency operations by FY2025

3.3: Increase use of alternative fuels in ground vehicles and equipment by FY2020

USAF Energy Flight Plan 2017 –2036

Fuels Policy: Operational Energy



2007 – 2014:

8 million L alternative fuel (JP8, JP5, naval distillate) purchased for combined $58.6 million

Bulk alternative fuel purchases "will compete with petroleum products… to meet requirements at the best value to the government, including cost."

DOD Alternative Fuels Policy for Operational Platforms, 2012

Drop-in Fuels Development

- DOD-DOE-USDA Biofuels Partnership ($510M):

  "to assist the development and support of a sustainable commercial biofuels industry."

- Supply side: Support production capacity via Defense Production Act Title III biofuels program (DOD & DOE)

- Demand side: Support purchase of biofuels by Navy via "Farm-to-Fleet" program (USDA)

https://www.energy.gov/eere/bioenergy/downloads/memorandum-understanding-between-department-navy-and-department-energy-and

Supply side: Support production capacity

- DPA Title III – Advance Drop-in Biofuel Production Project (ADBPP):

  Funding "…to support the design, construction, validation, qualification, and operation of domestic commercial-scale facilities capable of producing at least 10 million gallons per year neat biofuel" (drop-in jet and/or diesel).

- Design phase (2013-2015)
- Construction phase(2015-2017)
  - 3 awards, $210M USG funds
  - >50% private cost share

https://www.energy.gov/eere/bioenergy/downloads/memorandum-understanding-between-department-navy-and-department-energy-and

Demand Side: Alternative Fuel Procurement

- Farm-to-Feet Program (Navy-USDA Partnership)
  - USDA Commodity Credit Corporation (CCC) funds for purchase of F-76, JP-5
  - up to $0.25/gallon of blended fuels containing 10% – 50% biofuel

- Previous success:
  - Great Green Fleet initiative during Rim of the Pacific Exercise June-Aug 2016 used 77.6 million gallons F-76 containing 10% biofuel from HEFA-processed beef tallow (hydro processed esters and fatty acids)

Notice of Funds Availability (NOFA); Farm-to-Fleet Feedstock Program Biofuel Production Incentive (BPI), Federal Register 81(250) 95956-8, Dec 29 2016

Qualifying drop-in technologies

- Based on ASTM International approved pathways for commercial aviation fuel (F-T, HEFA, SIP)

- Fuel blends for DOD Operations must also be tested to match all existing military specifications
  - High altitude / low temperature
  - Ballistic tolerant materials
  - Non-aviation applications (e.g., JP-8 in ground vehicles)

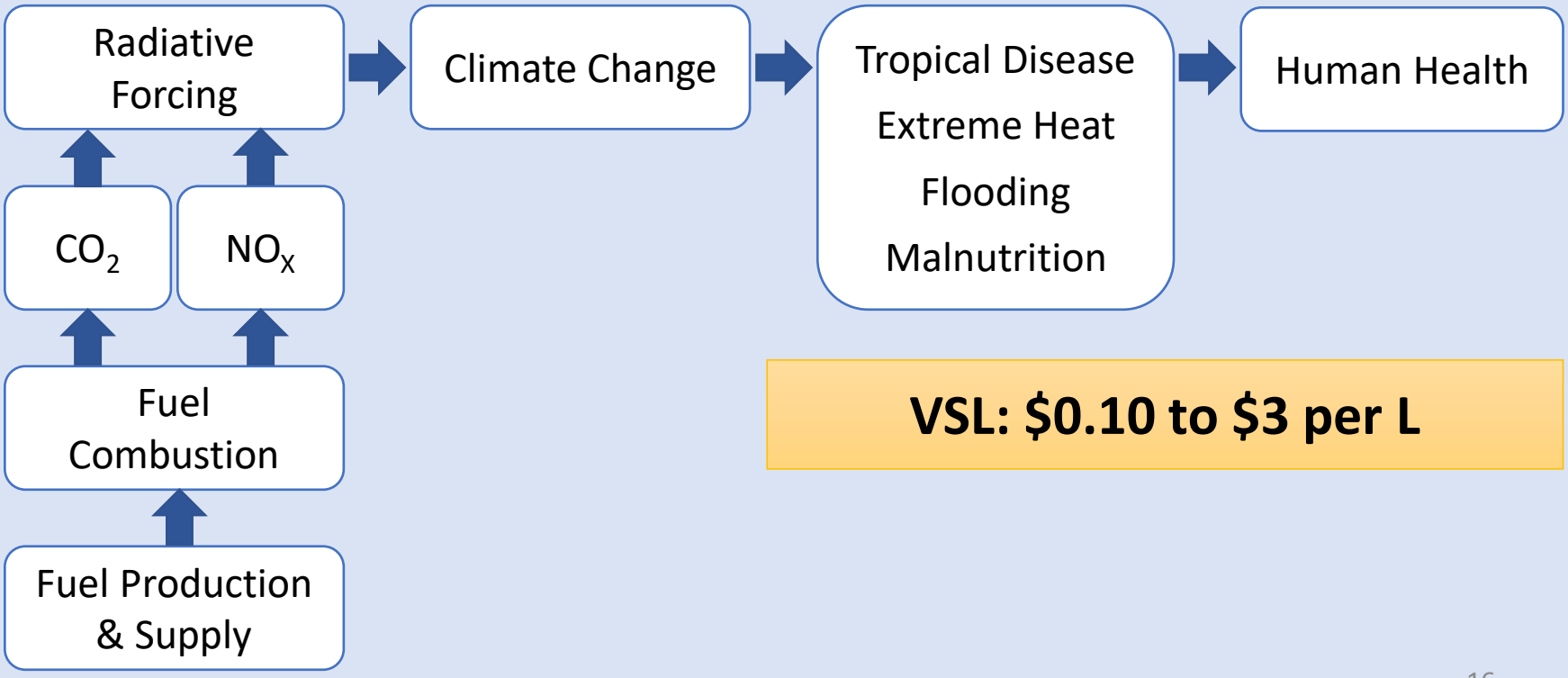
- F-T & HEFA drop-in fuels tested & approved for:
  - Navy aviation and ship platforms
  - Air Force aviation assets
  - Army ground vehicles

Summary

	Installation	Operational
Market	0.3 billion L; Gasoline substitution; US Domestic	14 billion L; Jet fuel substitution; Global
Opportunities	Fleet diversification; Installation financial flexibility	Certified conversion pathways; Commercial airline connections; Producer loans
Guidance	Per-mile GHG reductions	Performance requirements
Challenges	Competition with EVs; Fuel availability at volume	Cost competitive; Fuel availability at volume; Performance certification

Ongoing Research: CO_2 Harms Human Health

6 to 34 million L per life; 1 to 5 minutes of life per L



VSL: $0.10 to $3 per L

Resources

- DoD Strategic Sustainability Performance Plans: http://www.denix.osd.mil/sustainability/dod-sspp/
- DLA Energy Publications: http://www.dla.mil/Energy/About/Library/Publications.aspx
- GSA Federal Fleet Reports: https://www.gsa.gov/policy-regulations/policy/vehicle-management-policy/vehicle-management-library
- GAO report: Observations on DOD's Investments in Alternative Fuels: https://www.gao.gov/products/GAO-15-674
- DOD Alternative Fuels Policy for Operational Platforms: https://www.acq.osd.mil/EIE/Downloads/OE/Alternative_Fuels_Policy_for_Operational_Platforms%2020120705.pdf
- USDA/US Navy Biofuel Incentive Program: https://www.fsa.usda.gov/programs-and-services/energy-programs/farm-to-fleet/index
- USAF Strategic Master Plan:
- USAF Energy Flight Plan 2017 – 2036: http://www.safie.hq.af.mil/Portals/78/AFEnergyFlightPlan2017.pdf?ver=2017-01-13-133958-503
- Social cost analysis of a USAF installation vehicle fleet: http://www.sciencedirect.com/science/article/pii/S0301421516306139

Comments & Questions

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