

Green Boats and Ports for Blue Waters

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Energy - Why is it Important?

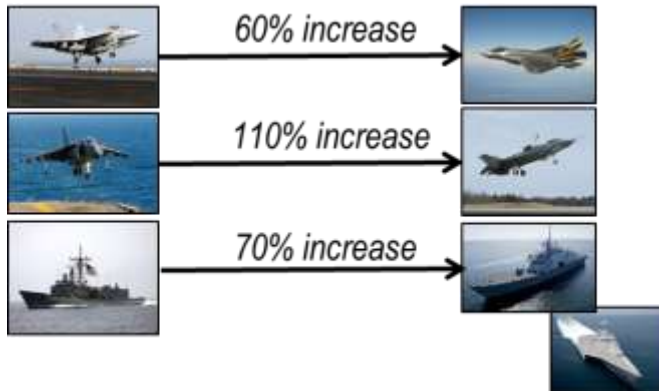
Operating forward requires vast amounts of fuel



Supply chain is vulnerable



Increasing energy demand to support new platforms



Future Fleet will employ high energy systems



Energy is Navy's most vital resource



Navy Energy Goals

SECNAV Goals

Increased Alternatives
Afloat
2020

50% of total DON
energy consumption
from alternative
sources

Increased Alternatives
Ashore
2020

At least 50% of shore-based
energy from alternative
sources; 50% of
installations net-zero

Sail the "Great Green
Fleet"
2012/2016

Green Strike Group:
local operations/sail

Reduce Non-Tactical
Vehicle Petroleum Use
2015

Reduce petroleum use
in commercial vehicle
fleet by 50%

Energy Efficiency
Acquisition

Evaluation of energy factors
mandatory when awarding
systems/buildings contracts

CNO Targets

Reduce
Consumption
Afloat
2020

Navy will increase
efficiency and
reduce
consumption afloat
by 15%

Reduce
Consumption
Ashore
2020

Navy will increase
efficiency and
reduce
consumption
ashore by 50%

Protect Critical
Infrastructure
2020

Navy's critical
infrastructure will
have reliable
backup/redundant
power systems
where viable

Purpose is to demonstrate fuel saving technologies and alternative energy

Technology Initiatives

- **Passive:** Technology that is always working to reduce consumption
- **Active:** Options to engage technology for improved efficiency
- **Actionable:** Will save fuel when information is analyzed and utilized

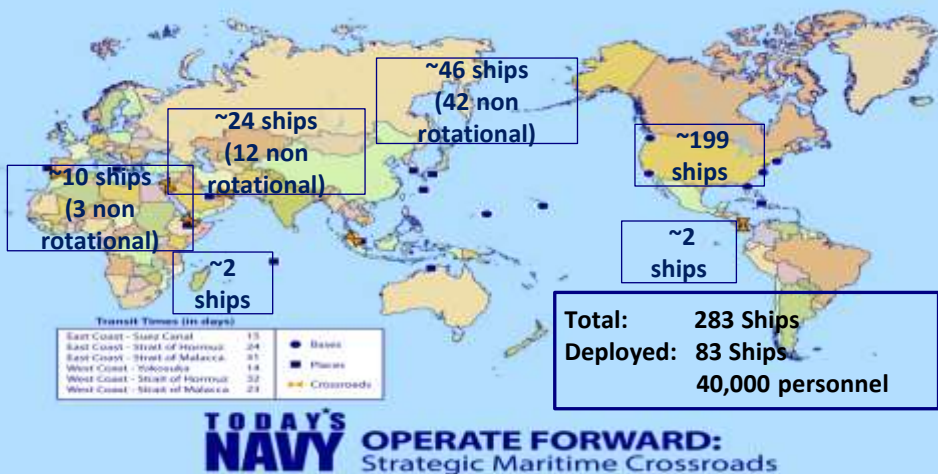
Alternative Fuel Requirements

- **Drop-in compatibility** with existing platforms and infrastructure
- **Price competitive** with fossil fuel
- **Energy density** comparable to fossil fuel

Participants



Use Existing Distributed Maritime Operations

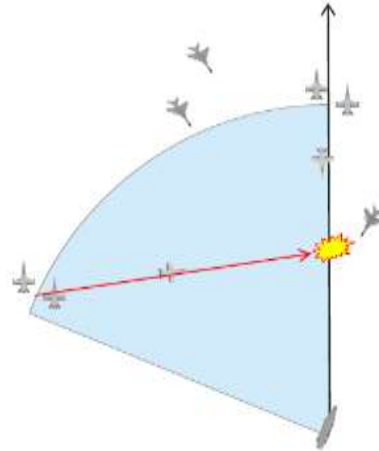


2016 Great Green Fleet (GGF)

- Like the Great White Fleet, the GGF will highlight new capabilities from innovative fuel saving technologies, changes in procedures, and alternative fuels
- Will use existing global distributed maritime operations - logistics and schedule still being developed
- Fuel will not be purchased at a premium price

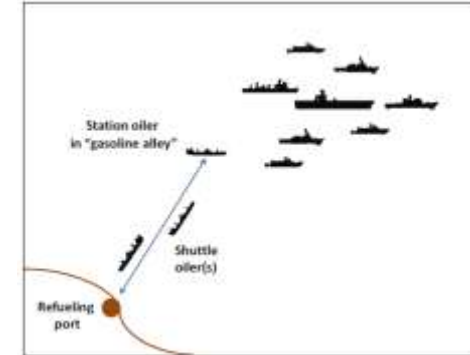


Air Operations



- Time at max power
- Range and endurance
- Reduces required number of F-18E tankers
- More F-18E available for other missions

Surface Operations



- Operational flexibility
- More time on station and energy for advanced systems
- Increased time/distance between refuelings

Expeditionary Operations



- Reduced convoys to Forward Operating Bases
- Extended range and endurance

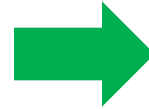


Less time refueling... more time in the fight

Navy Alternative Fuel Program

Alternative fuel must be a **drop-in replacement, operationally transparent to the operator**

- ✓ Meets current fuel performance requirements
- ✓ Can be mixed or alternated with petroleum fuel



- ✓ NO change to aircraft or ship configuration
- ✓ NO change to transport/storage infrastructure

Past

First Gen biofuels not fit for operational use

- Water separability
- Stability issues
- Material compatibility, corrosion
- Lower energy density



Current

Hydrotreated Renewables
Test & Certification

- Chemical & Physical Properties
- Component Performance
- Platform Performance
- Long-term Operability



Near-Term Future

Process Validation

Alcohol to Jet

Direct Sugar to Hydrocarbon

Hydroprocessed Depolymerized Cellulosics

Catalytic Hydrothermal Conversion

Longer-term Biofuel Solution

Integrated Alternatives



Multiple Feedstocks

Increased Production



Decreased Cost



Engineer the fuel not the platform

International Engagement in Alternative Fuel

- Collaborate to expedite testing and adoption of new fuel standards
- Preserve interoperability



- Biofuel development discussions with...
 - Royal **Australian** Navy
 - **Brazilian** Navy
 - **Chilean** Navy
 - **Israeli** Navy
 - **Italian** Navy
 - **UK** Royal Navy



Navy's At-Sea Environmental Initiatives

Compliance to support readiness



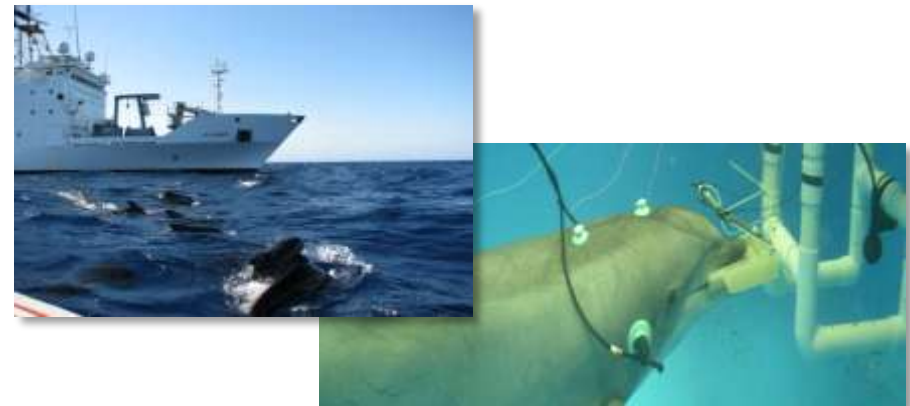
At-sea training and testing



Science-based modeling



Research and stewardship



Stewardship and compliance are complimentary

For More Information:

Please visit our Energy, Environment and Climate Change website at
<http://greenfleet.dodlive.mil/>

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