

Executing the Navy Energy Vision

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Navy Energy Vision

CNO Guidance: Provide a Navy Energy Strategy that treats energy as a strategic resource

Ends	Ways		Means
Vision	Strategic Imperatives	Targets	Enablers
<ul style="list-style-type: none"> • A Navy that values energy as a strategic resource • A Navy that understands energy security as fundamental to executing the Navy mission afloat and ashore • A Navy resilient to any potential energy future 	<ul style="list-style-type: none"> • Assure Mobility • Protect Critical Infrastructure • Lighten the Load • Expand Tactical Reach • Green Our Footprint 	<ul style="list-style-type: none"> • Increase Efficiency Afloat • Increase Efficiency Ashore • Increase Alternatives Afloat • Sail the Great Green Fleet • Increase Alternative Energy Ashore • Reliable Power for Critical Infrastructure • Reduce Non-Tactical Petroleum Use • Energy Efficient Acquisition 	<ul style="list-style-type: none"> • Leadership • Technology • Policy • Strategic Partnerships • Culture Change

Energy Security is having assured access to reliable and sustainable supplies of energy and the ability to protect and deliver sufficient energy to meet operational needs



Navy Energy Goals



**50% Alternative Energy
by 2020**

Sail the Great Green Fleet



**2012 Green Strike Group Demo
2016 Great Green Fleet Sail**



**50% Net Zero Installations
by 2020**



**50% Less Petroleum in
Commercial Vehicles by 2015**



Energy Efficient Acquisition

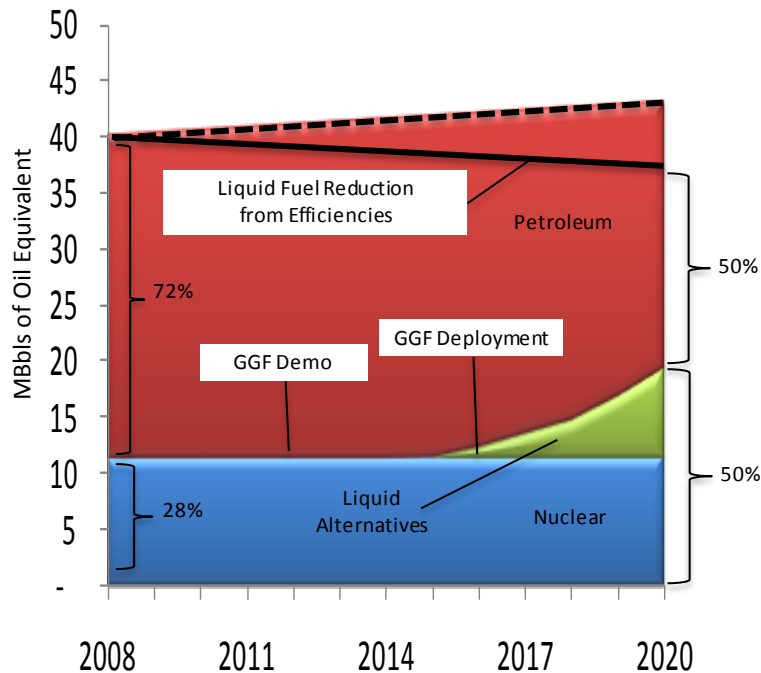


Alternative Fuels for Tactical Platforms

SECNAV Energy Goals

- **Increase Alternatives Afloat**
 - By 2020, 50% of total DON energy consumption will come from alternative sources
- **Sail the “Great Green Fleet”**
 - DON will demonstrate a Green Strike Group in local operations by 2012 and sail it by 2016

Achieving 50% Alternatives Afloat



Alternative Fuel Requirements

- **Drop-in compatibility** with existing platforms, equipment, and infrastructure
- **Ability to support an expeditionary, globally deployed force without degrading readiness**
 - Requires biofuel availability in sufficient quantities
 - 2012 Demo – 8K Bbls
 - 2016 Sail – 80K Bbls
 - 2020 50% Alternatives – 8M Bbls
 - Potential for scale-up to produce at prices competitive with conventional fuels
- **Feedstocks/processes that limit potential upstream and downstream consequences**
 - Maximize energy ROI
 - Minimize inputs such as land, water, and fertilizer
 - Reduce lifecycle greenhouse gas emissions, as required in E.O. 13514 and Sec. 526 of EISA 2007
- **Start with 50/50 blends**
 - Mitigate safety risks of aromatics additive technology
 - Mitigate need to reinvent fuel logistics systems



Maritime & Aviation Initiatives



Efficient Ship Systems
Example: Solid State Lighting



Improved Hydrodynamics
Example: Stern Flaps and Hull Coatings



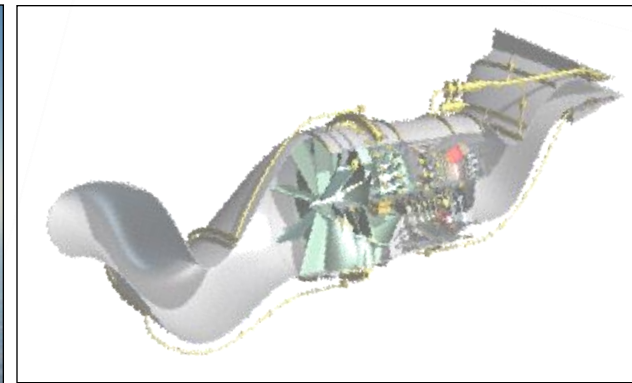
DDG-51 Hybrid Electric Drive
Test Platform: USS TRUXTUN



Operations & Policy
Example: Air Energy Conservation Program



Research & Development
Example: Engine Modifications



Science & Technology
Example: Variable Cycle Engine

Enhance capability by enabling fuel savings and expanding tactical reach



Expeditionary & Shore Initiatives



Efficient Platforms
Example: LCAC, Amphibious Ships



Efficient Power Generation & Use
Example: On-Board Vehicle Power, ECU



Alternative Power Sources
Example: GREENS (Solar-Powered Battery)



Renewable and Sustainability

- New Construction / Major Renovations LEED Silver or Equivalent
- Integrated Technology Strategy: Watch-Partner-Lead



Energy Efficiency First

- Recapitalize Existing Infrastructure with More Energy Efficient Systems
- Annual Energy Audits – Building Level Assessments of Opportunities
- Energy Security



Navy Culture and Behavior

- Increased Transparency at Individual, Command, and Function Levels
- Technology Enabled (Advanced Meters; SmartGrid Pilot)
- Link to Operations



Why Next Generation Biofuels?

1st-Gen Biofuels

- Water seprability
- Stability issues
 - Fuel degrades rapidly in storage, leads to filter plugging
- Material compatibility, corrosion
 - Elastomers & polymers
- Lower energy density



HRJ from Camelina

- Grows on marginal land
- Excellent rotational crop
- 60-85% potential GHG emissions reduction
- Grown in Montana
- Produced by Sustainable Oils



HRD from Algae

- Potential yield: 6,000 gallons/acre
- 60-80% potential greenhouse gas emissions reduction
- Initial 20,000 gallons to be produced by Solazyme



**1st-Gen biofuels unacceptable for tactical systems:
Focused on hydrotreated renewable jet fuel and diesel (HRJ and HRD)**



Test and Certification Milestones



F/A-18 Super Hornet
April 2010



RCB-X
October 2010



MH-60S Seahawk
November 2010



Allison 501k G/T Generator
January 2011

2012 Green Strike Group

- All ships and aircraft in demo certified to run on 50/50 biofuel blend
- CSG will feature fuel saving technologies, e.g. gas turbine improvements, solid state lighting
- CSG will conduct exercise in local operations

2016 Great Green Fleet

- Each ship will contain full load out of 50/50 biofuel for Ship and Aviation use
- GGF will include at least one Destroyer featuring Hybrid Electric Drive
- CSG will feature additional fuel saving technologies

Operational tests demonstrate the viability of biofuel as an off ramp from petroleum while preserving full combat capability of the platform



Changing Paradigms  ***Tactical Advantage***

