



# GREAT GREEN FLEET



## Overview

In 2009, Secretary of the Navy (SECNAV) Ray Mabus announced five aggressive energy goals to reduce the Department of Navy's consumption of energy, decrease its reliance on foreign sources of oil, and significantly increase its use of alternative energy. The purpose of these energy goals is to improve our combat capability and to increase our energy security by addressing a significant military vulnerability: dependence on foreign oil.

One of the five energy goals is to demonstrate and then deploy a "Great Green Fleet," a Carrier Strike Group fueled by alternative sources of energy, including nuclear power. The Great Green Fleet is named in honor of President Theodore Roosevelt's Great White Fleet, which helped usher in America as a global power on the world stage at the beginning of the 20th Century.

Prior to deploying the Great Green Fleet in 2016, one of the Navy's interim goals was to conduct a demonstration during the 2012 Rim of the Pacific (RIMPAC) exercise, the world's largest international maritime exercise. The demonstration took place July 19-20, 2012.

Participants in the 2012 Great Green Fleet demonstration were:

- USS NIMITZ (CVN 68) and Carrier Air Wing ELEVEN
- USS CHAFEE (DDG 90)
- USS CHUNG HOON (DDG 93)
- USS PRINCETON (CG 59)
- USNS HENRY J KAISER (T-AO 187)

The demonstration successfully evaluated the performance of "drop in replacement" advanced biofuel blends and certain energy efficient technologies in an operational setting.

## Advanced Biofuel Blends

The ships and aircraft were powered by alternative fuel, either nuclear or advanced biofuel blends. The biofuel blends are 50-50 mixtures of biofuel (made from used cooking oil and algae) and petroleum-based marine diesel or aviation fuel.

Approximately 450,000 gallons of 100% "neat" biofuel were purchased in 2011 in preparation for the Great Green Fleet demonstration.

## Combat Capability

The mobility of our platforms depends on our efficient use of energy. Anything we can do to make our systems more efficient, afloat and ashore, enhances our ability to accomplish our mission.

## Energy Security

Increasing our use of alternative energy will diversify our energy supply and protect us from the volatility of energy prices and disruptions in supply.

## Economy

Our Navy can help develop an alternative energy industry that is competitively priced as compared to traditional energy sources, and which can help drive economic growth.

## For More Information

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- Navy surface ships were powered using 350,000 gallons of hydroprocessed renewable diesel (HRD-76) blended with an equal amount of marine diesel (F-76).
- Navy aircraft burned 100,000 gallons of hydroprocessed renewable jet fuel (HRJ-5) blended with aviation fuel (JP-5).

Investments in an alternative to foreign sources of fuel will help the Navy and the nation become less dependent on foreign oil, and less subject to volatility in oil prices that can directly affect our readiness. Price hikes resulting from last year's instabilities and other market forces left the Department of the Navy this year with an additional \$500 million bill for fuels. To pay this added cost, we transferred funds from our Training and Readiness budget. That means that our Sailors and Marines fly less, steam less, and train less. This is not an insubstantial expense, and we cannot, and should not, keep trading readiness for fuel.

### Energy Efficient Technologies

The Great Green Fleet demonstration also included the following maritime efficiency measures:

- **Solid State Lighting** – Use of light-emitting diodes (LEDs) to save energy, especially when replacing incandescent fixtures or in colored lighting applications. LEDs also last longer than an incandescent or fluorescent fixture, reducing maintenance.
- **Gas Turbine On-Line Water Wash** – Allows compressors to be washed while the engine is running. (Normally, engines are shut down during this activity). This reduces maintenance, improves starter life, and reduces fuel consumption by keeping the compressor section of the gas turbine cleaner.
- **Shipboard Energy Dashboard** – Provides real-time situational awareness of energy demand associated with equipment. This allows the crew to minimize a ship's energy consumption and increase its efficiency while meeting system performance and reliability requirements.
- **Smart Voyage Planning Decision Aid** – A tool that sends messages to ships with optimized routing plans for both ship safety and fuel savings.
- **Stern Flaps** – Modifies the flow field under the hull to reduce drag, turbulence, and thus, reduce overall hull resistance.

### Changing the Way We Think About Energy

As a Navy we are grooming a new generation of 'energy warriors' through incentives and education.

As an example, the **Incentivized Energy Conservation (i-ENCON)** program encourages efficient ship operations during underway missions and supports the Secretary of the Navy's efforts to reduce total energy consumption on Navy ships. In 2011, the i-ENCON program helped achieve over 1.1 million barrels of fuel in underburn, a cost avoidance of over 11% that would pay for an additional 56,500 steaming hours. *The USS PRINCETON, USS CHAFEE, and USS CHUNG HOON underburned enough fuel to win this prestigious award.*

This program was so successful that the Navy recently launched its **Aircraft Energy Conservation (Air-ENCON)** program to optimize fuel consumption by the Navy's 3,700 aircraft.

By changing the way we think about and use energy, we will continue to be the most formidable fighting force the world has ever known.

For more information about the Navy's Energy Program, go to <http://greenfleet.dodlive.mil/energy>.

*The Great  
Green Fleet  
will signal to  
the world  
America's  
continued  
naval  
supremacy,  
unleashed  
from the  
tether of  
foreign oil.*

*-The Honorable  
Ray Mabus,  
Secretary of the Navy*