

# ***Navy Energy Strategy***

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**OPNAV N43E**

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# Energy consumption growing



**today**

... to unprecedented demands



**2030**



# We all deal with pain & uncertainty at the pump

## Today

\$2.05/gallon

Cost to fill up: **\$24.60**

## *Hybrid Car*

Fuel tank: 12 gallons



## Last Summer (& the Future?)

\$4.11/gallon

Cost to fill up: **\$49.32**

Distance on a tank: 612 miles

Assume 51 MPG Highway

## *SUV*

Fuel tank: 26 gallons



Cost to fill up: **\$53.30**

Cost to fill up: **\$106.86**

Distance on a tank: 494 miles

Assume 19 MPG Highway

\$1.65/gallon  
(F-76 DESC Price)

Cost to fill up:  
**\$742,500**

## *Navy DDG-51*

Fuel tank: 450,000 gallons



\$4.06/gallon  
(F-76 DESC Price)

Cost to fill up:  
**\$1,827,000**

Distance on a tank: 5060 (statute) miles

**Navy's fuel costs can range from \$1 billion to over \$5 billion due to volatile oil prices**

# Energy is at the core of the Navy...

Navy video  
(click to play)

“How inappropriate to call this planet  
Earth when it is quite clearly Ocean”  
- Arthur C. Clarke

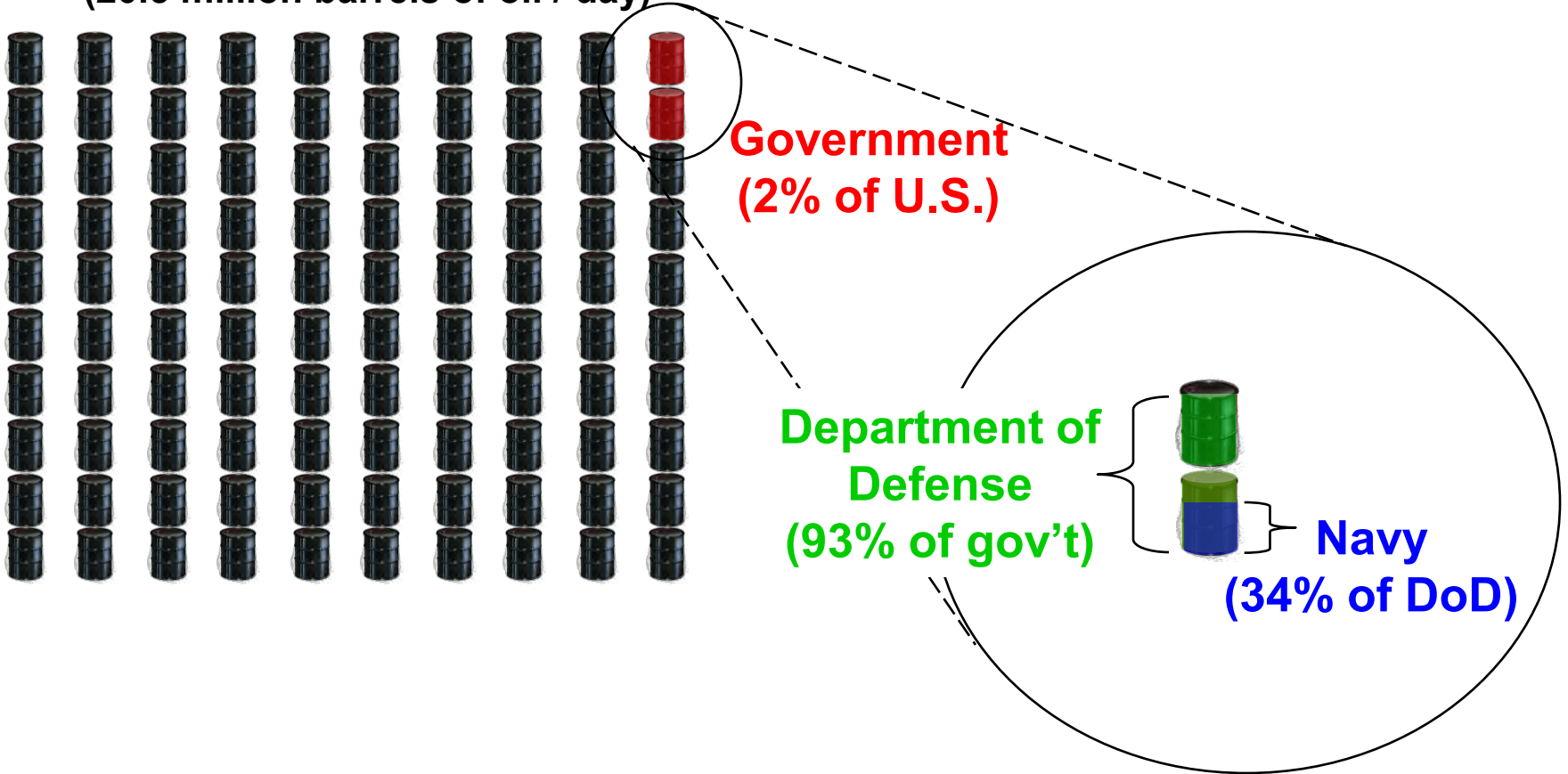


Global Fuels shipments by ocean are approximately  
66 M bbl/day (almost 80% of the world's fuel trade)



# U.S. Petroleum Consumption

**Total U.S. Petroleum Consumption**  
(20.5 million barrels of oil / day)



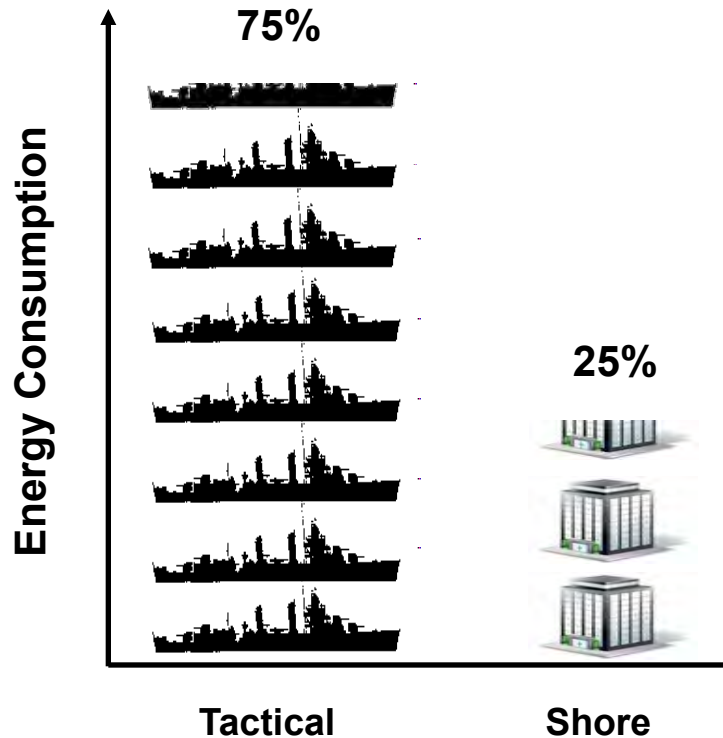
*DoD is not a market maker, but it is the largest government and individual consumer and can serve as a technology leader*



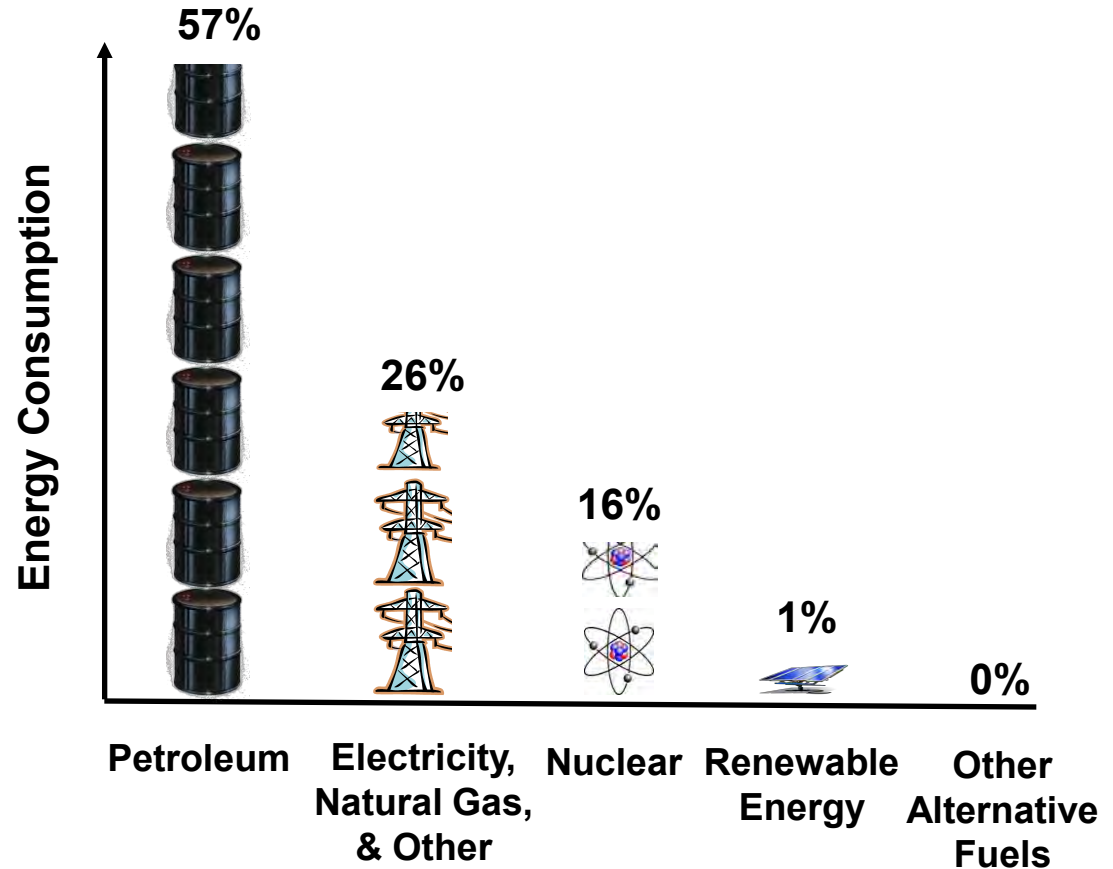


# 2008 Navy Energy Consumption & Sources

## Consumption



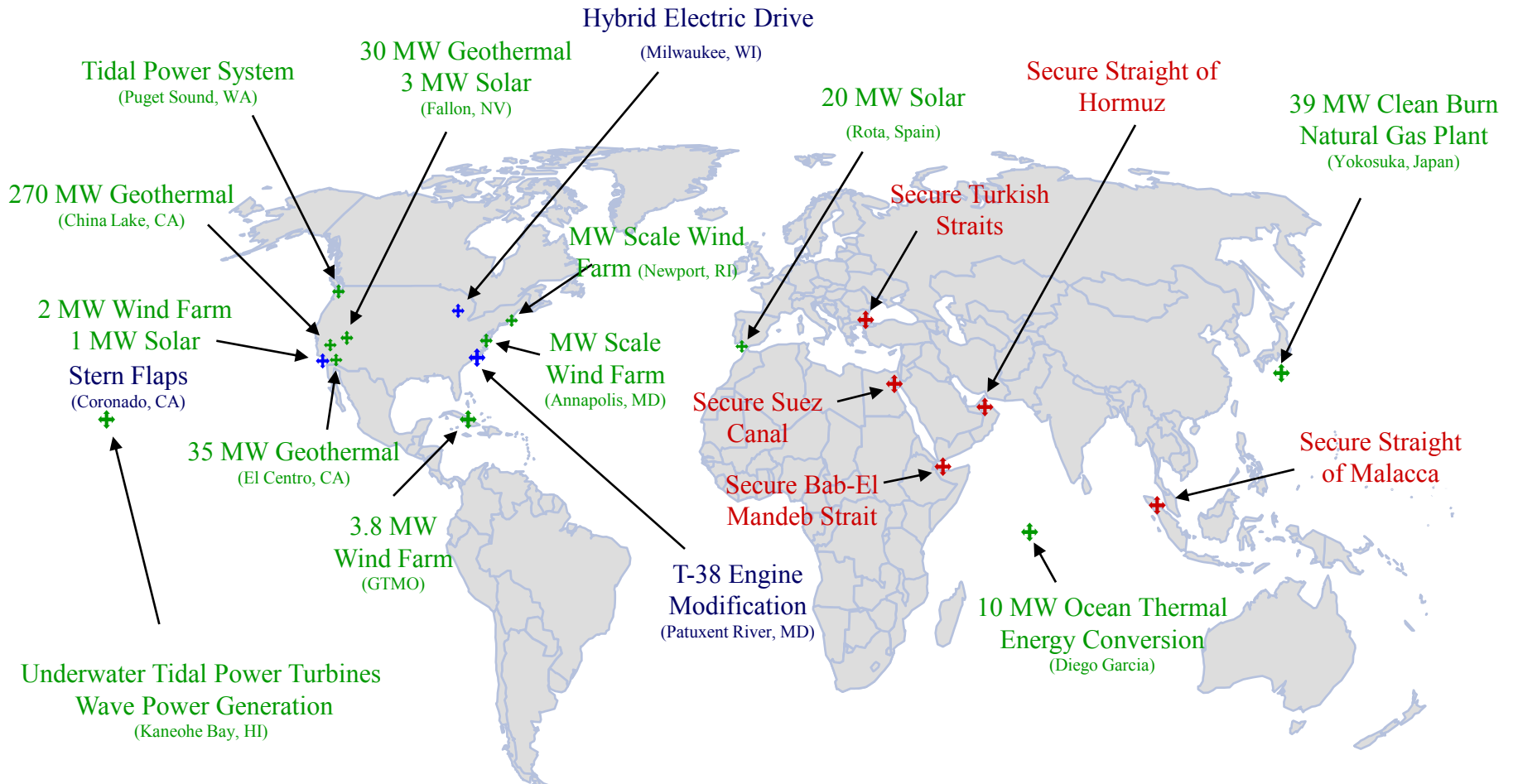
## Sources



*Navy energy use is dominated by petroleum from its tactical operations*



# Navy Energy Activities Span the Globe



Shore = green text      Tactical = blue text      Maritime Energy Security = red text

**Saved over 5 M barrels of oil equivalent in 2008**



# Shore Successes



**China Lake Geothermal Power Plant, 270 MW, since 1987**



**North Island Solar Power array on parking garage, 1 MW**



**Guantanamo Bay Wind Farm, 3.8 MW**



# Shore Successes



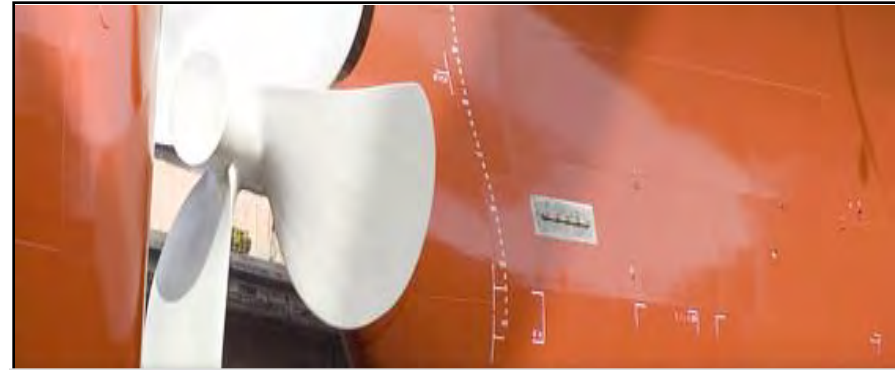
Camp Pendleton, CA GM Equinox Fuel Cell Test Vehicles



# Maritime Successes



**Incentivized Energy Conservation Program (i-ENCON)**



**Advanced Hull Coatings**



**Stern Flaps**



**Propeller Pitch Control**



# Aviation Successes



Efficient GE-38 Engine for CH-53K Helicopter



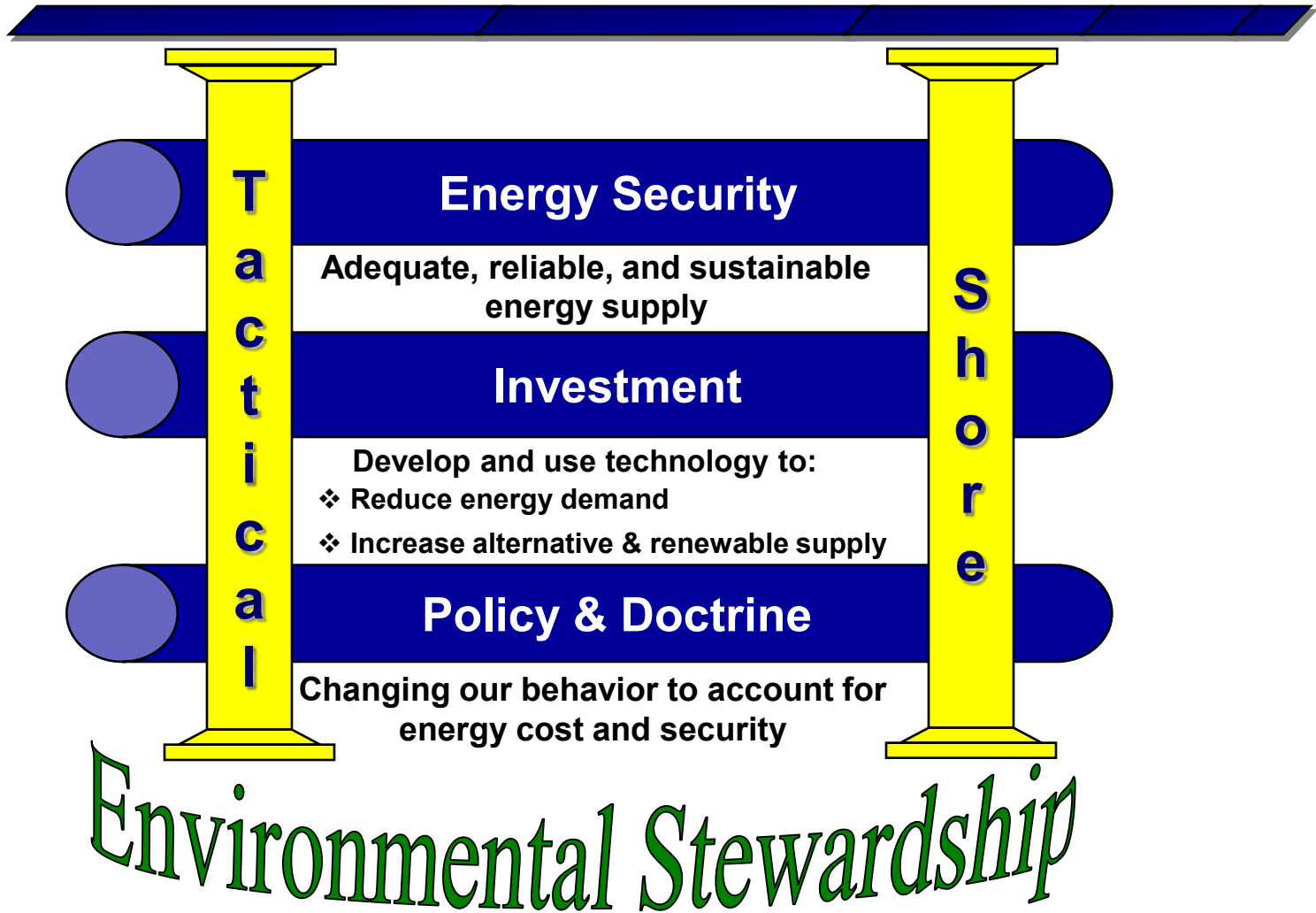
Training Simulators



Truck Refueling vice Hot Pit Refueling








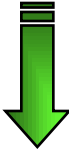
# Navy Energy Strategy



*Navy developing holistic energy strategy to turn energy from a liability into an operational advantage*



# Navy Energy Strategy - Goals for 2020

Shore	Tactical	Environmental Stewardship
  Shore Energy Independence  up to 60%	  Tactical Energy Independence  up to 20%	  CO <sub>2</sub> Emissions  up to 20%
<p><i>“Shore energy reduction is an opportunity not only for the Navy, but it can also demonstrate to the Nation what is truly possible.”</i> (Flag Officer)</p>	<p><i>“Energy will be seen as a Tactical Advantage...”</i> (Flag Officer)</p>	<p><i>“Carbon footprint reduction and environmental stewardship will be the way of the future Navy”</i> (Flag Officer)</p>

**Mission First, Energy Always**

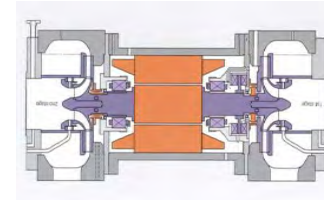
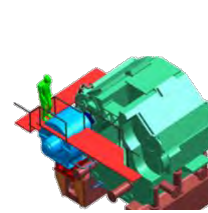




# American Recovery and Reinvestment Act of 2009

## Navy Energy Investment Areas

- ▶ Fuel Optimization for Mobility Platforms
- ▶ Operational Efficiencies / Commercial Practices
- ▶ Facility Energy Initiatives
- ▶ Domestic Energy Supply / Distribution
- ▶ Tactical Power Systems / Generators



***Total of \$450 M for Navy energy***

<http://www.defenselink.mil/recovery>



# American Recovery and Reinvestment Act of 2009

## Aviation Investment Areas



**Biofuels Test & Certification**



**Aircraft Engine Efficiency**

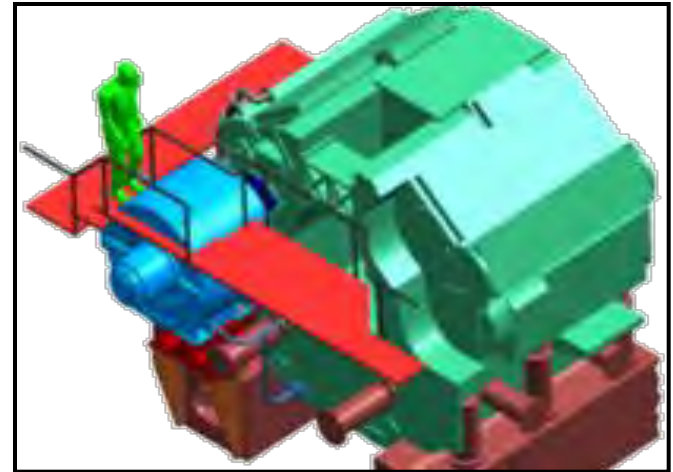


# American Recovery and Reinvestment Act of 2009

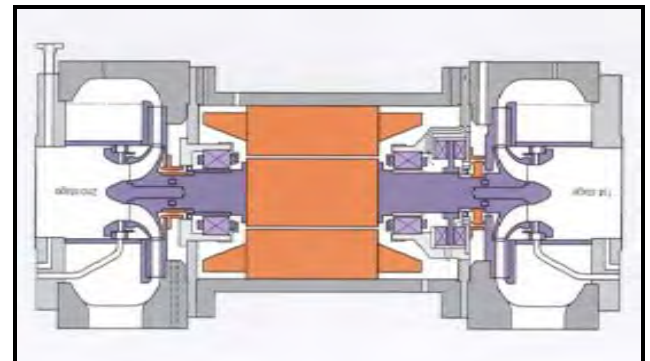
## Maritime Investment Areas



**Shipboard Stability Control**



**Hybrid Electric Drive System**



**Efficient Shipboard HVAC**

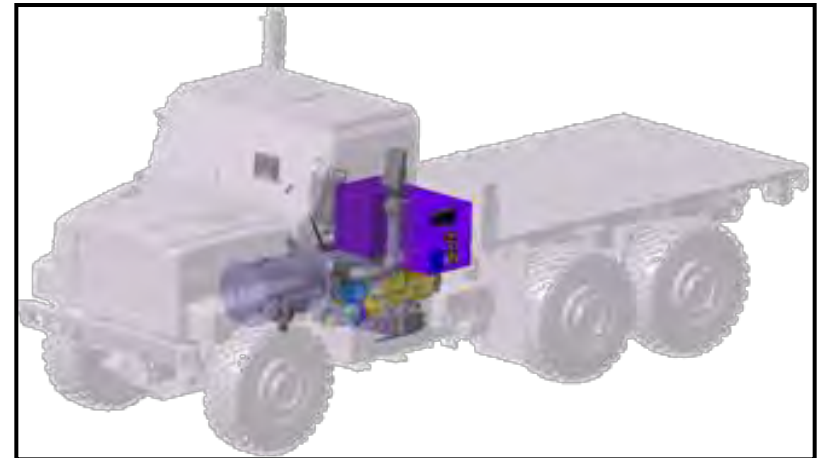


# American Recovery and Reinvestment Act of 2009

## Shore & Expeditionary Investment Areas



**Ocean Thermal Energy Conversion and  
Wave Energy Utilization**



**On-Board Vehicle Power Generation**



**Energy Efficient HVAC Systems**



# Facilities Energy Investment: Advanced Metering Infrastructure (AMI)



**Smart Meters**



**Wireless Energy Consoles**

***Gearing up for the future Smart Grid***



# Other Public Engagements

- **Navy & Industry Energy Summit**  
*In partnership with Office of Naval Research (October 2009)*
- **Navy Week, St. Louis**  
*April 22 public event*



**NAVY WEEK**  
**St. Louis**  
**April 22, 2009**

- **Other Academic, Professional, and Public Events**

*Partnering with you is key to our success and will lead to energy advancements that will benefit us all*



# Summary

- As the world's energy needs increase, the Navy will do its part to secure the flow of energy and to reduce its own energy use
- The Navy has been an early adopter of energy technologies for its shore installations and will leverage its energy experience to be at the forefront of America's renewed push for energy independence and sustainable clean energy
- As it formalizes its energy strategy, the Navy looks forward to working with other government agencies, academia, industry, and other stakeholders as we tackle America's energy challenges together