

Naval Energy Forum

Information Exchange

Energy Security Topics



Energy Security

What is Energy Security?

Energy security is ensuring secure, sufficient, reliable and sustainable energy for Navy tactical forces and shore installations.

Energy security is focused on transforming vulnerabilities into strategic and operational advantages by evaluating both the supply and demand for energy to assure mobility.

Why does it matter?

Energy requirements of tactical platforms impose significant risk and constraints associated with the logistics tail, volatile petroleum prices and non-secure supplies of petroleum.

Energy requirements of shore installations are dependent on a vulnerable commercial electrical grid, which is susceptible to physical and cyber attack, natural disaster and malfunction.

What will the Navy do?

Reduce consumption of carbon-based fuels.

Increase use of alternative and renewable energy.

Ensure reliable energy for critical infrastructure.



Ashore Energy Security

Warfighter Benefits

- Renewable Technology and Storage – scalable, reliable and sustainable
- Ability to manage risks and ensure supply while developing breakthrough technologies
- Increased information about infrastructure security and reliability
 - Distribution, generation and metering
 - SCADA , DDT and cyber security

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DoN is protecting against vulnerabilities related to the commercial electrical grid

- Renewable energy sources such as the NAWS China Lake geothermal plant increase independence from the grid
- Smart Grid technology investments improve the infrastructure of existing electricity grids and provide more reliable electricity supply for Navy and the public
- Reducing overall facility consumption decreases energy demands and the need to purchase from the grid

DoN solutions will increase reliability of energy supplies and provide similar public benefits

- Investments in renewable energy solutions create a direct source of energy for naval base operations
- Leading the adoption of renewable energy establishes secure energy sources for the Navy and the public
- Philadelphia Smart Grid project will improve the current electricity grid and supply more reliable energy to the Navy and the surrounding neighborhood

DoN will identify 100% of critical infrastructure and provide reliable energy sources

- 4,112 kWh/per day of electricity are produced by the photovoltaic system installed at Coronado Naval Base
- Guantanamo Bay wind turbines reduced energy consumption from fuel by 650,000 gallons annually
- Navy awarded \$101M for site investigation, design and construction of 9 photovoltaic installation projects

Aviation Energy Security

Warfighter Benefits

- Certified alternative fuels for naval aircraft
- Improved aircraft efficiency via emerging engine technologies, aerodynamics and materials
- Increased simulator capacity, utilization and capabilities

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DoN to qualify domestic, non-petroleum fuel sources for naval aircraft

- Flight test F/A-18 E/F Super Hornet to demonstrate bio-derived fuel compatibility
- Streamline certification protocol for alternative fuels and additives
- Incorporate commercially viable, environmentally compliant candidates into JP-5 specification

DoN to develop technology aimed at increasing aircraft efficiency

- Develop Naval Variable Cycle Engine Technology (NAVCENT) – Proposed FY12 Innovative Naval Prototype
- Develop Versatile Affordable Advanced Turbine Engine (VAATE) technology
- Reduce drag and weight through aerodynamic optimization and advanced materials

DoN to increase simulator capacity, utilization and capabilities

- Improve training capability through technology upgrades
- Increase training and readiness per flight hour
- Transition from sortie-based to capability-based training and readiness model

Environmental Energy Security

Warfighter Benefits

- Increased environmental compliance
- Reduced mission impacts
- Alternative fuels and renewable energy
- Clean energy technologies
- Reliable energy for critical infrastructure

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DoN is reducing its carbon footprint while securing energy resources for naval forces

- DoN's sound environmental practices reduce mission impacts of GHG/carbon footprint regulations
- Policy/doctrine changes are reducing consumption and mitigating possible effects of DoN activities on the climate
- DoN installations and global strategy benefit from the reduction of petroleum-based energy use

DoN is promoting the increased use of alternative fuels

- Reducing reliance on foreign sources of petroleum fuels
- Ensuring alternative fuels have lower Scope 1 (direct) GHG emissions than petroleum fuels
- Maximizing the lifecycle carbon sequestration of alternative fuels

DoN is increasing use of clean energy sources and gaining enhanced control over costs

- Providing installations with direct control over generating equipment and reducing dependence on electricity from the grid
- Reducing treatment processes and costs associated with exhaust and cooling water
- Increasing fuel availability for tactical vehicles by reducing fuel required for power generation

Expeditionary Energy Security

Warfighter Benefits

- Improved energy reliability
- Alternative energy solutions
- Methods to measure and manage base camp, vehicle and man-portable energy consumption

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DoN improvements in fuel economy ensure energy sufficiency for expeditionary forces

- New combat and tactical vehicles feature greater fuel efficiency
- Improved fuel efficiency in new tactical generators powers critical infrastructure
- Power consumption reduced in tactically deployed environmental control systems
- Carbon-based fuel consumption and total ownership cost are considerations for future procurements

DoN is leveraging industrial solutions for alternative sources of tactical power

- Improved electronic control units (ECUs) will reduce fuel convoys
- Alternative energy products reduce dependence on carbon-based fuels and mitigate impact of volatile petroleum prices and resources
- Increased reliance on alternative power sources reduces maintenance manpower burdens

DoN improves support for deployed forces in all operational environments

- Tailoring power solutions to warfighter needs
- Avoiding fuel consumption via training simulator usage
- Leveraging industrial and other service commonalities

Fuels Energy Security

Warfighter Benefits

- Reduced dependence on foreign oil
- Improved price stability
- Increased competition and sources of naval fuels

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DoN is qualifying domestic, non-petroleum fuel sources for tactical systems

- Certifying the most promising candidates for inclusion into aircraft (JP-5) and ship (F-76) fuels specifications
- Establishing test and certification protocols
- Flight testing the F/A-18 E/F using bio-derived JP-5
- Initiating algal-based F-76 testing

DoN is increasing use of fuel from non-petroleum, domestic sources in administrative vehicles and equipment

- Increasing biodiesel (B20) and E-85 usage by 10% annually over FY05
- Installing renewable-fuel station dispensing equipment at all sites that supply more than 100,000 gallons of fuel
- Acquiring plug-in hybrid vehicles when commercially available

DoN is developing technology that increases use of non-petroleum, domestic fuel sources

- Developing models/simulations to reduce certification time and cost
- Characterizing fuel chemistry to identify and mitigate potential operational impacts
- Exploring synthesis of alternative fuels from naval sources

Maritime Energy Security

Warfighter Benefits

- Mission need, rather than fuel budget, is the driver of Military Operations Tempo (OPTEMPO)
- Greater time on-station and between refueling reduces the impact of logistics tail
- Maritime forces are assured sufficient and sustainable energy

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DoN is changing the culture of energy conservation while increasing resource security

- Incentivized Energy Conservation (i-Encon) has changed the way the Navy operates ships for more than 10 years
- San Diego Naval Station In-Port Energy Savings pilot program has reduced utility consumption
- Exploring energy-efficient means by which to perform functions without diminishing mission effectiveness

DoN innovations are improving route planning, ship scheduling and energy sufficiency

- Implementing Smart Voyage Planning on all ships optimizes use of great circle routes, accounting for ship performance, currents, weather and other environmental conditions
- Equipping ship schedulers with a common set of tools enables efficient group transit while permitting required training exercises
- Affording better pre-planning of assets to yield more effective control over fuel demand

DoN is making energy an important element of planning, design and procurement

- Considering energy demand and logistics support in campaign analysis
- Establishing Energy Key Performance Parameters
- Using Fully Burdened Cost of Fuel to increase understanding of the true impact of energy decisions