

UNCLASSIFIED

FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: June 2001

BUDGET ACTIVITY: 5 PROGRAM ELEMENT: 0604710N
PROGRAM ELEMENT TITLE: Navy Energy Program

A. (U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
R0371 Energy Conservation	5,236	5,480	3,157

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Develop energy-efficient systems and practices for ships, aircraft, and facilities. Resulting energy efficiency gains contribute to fleet sustainability, combat capability (e.g., greater range, time on station), and reduced operating costs. Efforts include fuel use optimization aids for aircraft; existing gas turbine engine efficiency improvements, anti-fouling paints, and air conditioning for ships; and adaptation of renewable/alternative energy technologies to Navy facility needs. Provide engineering development, and test and evaluation support to the companion PE 0603724N Project R0829.

(U) This program and the companion PE 0603724N Navy Energy Program (ADV), support the achievement of Legislated, White House, Department of Defense (DoD), and Navy Energy Management Goals. They also address direction by the Office of the Secretary of Defense, the Secretary of the Navy, and the Chief of Naval Operations to make up-front investment in technologies that reduce future cost of operation and ownership of the fleet and supporting infrastructure. Navy is TRISERVICE lead for the implementation of renewable/alternative energy systems across DoD.

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PROGRAM ELEMENT: 0604710N

PROJECT NUMBER: R0371

PROGRAM ELEMENT TITLE: Navy Energy Program

PROJECT TITLE: Energy Conservation (ENG)

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ENGINEERING & MANUFACTURING DEVELOPMENT because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) (\$1,050) Aircraft: Began conversion of Flight Optimization Routines for Energy Management (FOREM) software to WINDOWS format. FOREM was certified as an alternative to the Navy Flight Manual for the purpose of flight planning for the F/A-18 and EA-6B. Extended FOREM to additional aircraft such as F/A-18E/F. Integrated FOREM software with the WINGS database format, which is more flexible and is common to the Pre-flight Planning System (PFPS) being developed by Tactical Aircraft Mission Planning System (TAMPS). Use of FOREM developed flight data by PFPS, (and vice versa) will save funds and accelerate delivery of products to the fleet. Began FOREM flight performance database development for additional aircraft as a part of the joint program with TAMPS (e.g. S-3B, E-2C, CH-53E). A website was established to disseminate FOREM information and updates.
- (U) (\$906) Ships: Completed pre-installation powering trial of DDG-51 retrofit stern flap device to reduce drag. ShipAlts for retrofit of stern flaps to DD-963, CG-47, and FFG-7 were approved. Monitored ship trials of easy release and ablative copper/cobiocide hull coatings; broadened task to include large-scale tests of copper/-cobiocide self-polishing paints; deleted from further testing those easy release and ablative copper coatings which have performed poorly. Developed shipboard Gas Turbine engine mods which reduce air leakage, and improve water wash procedures. For diesels, evaluated control system mods to manage extensive low load, low efficiency operation.

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- (U) (\$3,280) Alternative and Renewable Energy Systems: Continued support and test & evaluation (T&E) of Photo-Voltaic/Diesel hybrid power systems for off grid applications. Accelerated development of high efficiency, low emissions, power generation system. Designed/installed and initiated T&E on advanced PV module technology in grid connected application. Initiated procurement of flywheel for investigation of advanced energy storage technologies. Provided technical support for site-specific technology selection, system design and T&E support for renewable/alternative power systems as assigned DoD technical lead.

- 2. (U) FY 2001 PLAN:
 - (U) (\$1,050) Aircraft: Complete FOREM conversion to WINDOWS format (updated to WINGS database format). Extend FOREM to additional aircraft, e.g. P-3C, and AV-8B. Respond to Fleet requested enhancements of FOREM and requests for palm-tops. Provide TAMPS program with FOREM data support as requested.
 - (U) (\$1,632) Ships: Complete post-installation powering trial of DDG-51 wedge/flap, and assist development of ShipAlt. Fabricate, install, and conduct before and after powering trials of the LSD 41/49 stern flap. Monitor large-scale tests of advanced hull coatings, including self-polishing reduced copper/cobioicide products. Conduct full-scale shipboard evaluation of gas turbine on-line water-wash system. Procure, test and evaluate motion sensor lighting and remote source lighting for shipboard use.
 - (U) (\$2,723) Alternative and Renewable Energy Systems: Continue site specific design and support of PV/Diesel hybrid power systems for off-grid applications. Continue design and T&E/support of advanced PV module technology (thin film, multi-junction, integrated module/inverter, building integrated, etc) in both off grid and grid connected applications. Design, build and test prototype PV/flywheel hybrid power system to investigate advanced energy storage technologies. Investigate Power Electronics Building Blocks (PEBB) in inverters for power systems. Continue development of high efficiency, low emissions power generation system. As assigned DoD Technical lead,

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PROGRAM ELEMENT TITLE: Navy Energy Program

PROJECT TITLE: Energy Conservation (ENG)

provide all services with site-specific technology selection and systems engineering support to implement zero emission, renewable/alternative power systems.

- (U) (\$75) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:

- (U) (\$550) Distribute FOREM for WINDOWS to Fleet as software is completed and codes are certified. Complete FOREM development for additional aircraft such as MV-22, E-6A and KC-130.
- (U) (\$607) Ships: Complete trials of reduced copper/cobiocide and other advanced technology anti-fouling paints. T&E improved ceramic blade track for 501-K34 turbo generators; and reduced-power cooling fan for LM2500.
- (U) (\$2,000) Alternative and Renewable Energy Systems: Complete site specific design and support of PV/Diesel hybrid power systems for off grid applications, and advanced PV module technology in grid connected applications. Complete T&E of PV/flywheel hybrid power system to investigate advanced energy storage technologies. Complete evaluation of high efficiency, low emissions power generation system. As assigned DoD technical lead, provide all services with site-specific technology selection, and systems engineering support to implement zero emission, renewable/alternative power systems.

B. (U) PROGRAM CHANGE SUMMARY

	<u>FY 2000</u>	<u>FY2001</u>	<u>FY2002</u>
(U) FY 2001 President's Budget:	5,416	5,531	5,748

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PROGRAM ELEMENT TITLE: Navy Energy Program

PROJECT TITLE: Energy Conservation (ENG)

(U) Appropriated Value:

(U) Adjustments from PRESBUDG:

(U) FY 2000 SBIR Adjustment	-53		
(U) PE Rebalance			-7
(U) NWCF Adjustments			-41
(U) Economic Assumptions	-21	-39	
(U) FY 2002 PRESBUD:	5,236	5,480	3,157

(U) CHANGE SUMMARY EXPLANATION:

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0601153N (Defense Research Sciences)

(U) PE 0603513N (Shipboard Systems Component Development)

(U) PE 0603573N (Advanced Surface Machinery Systems)

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- (U) PE 0603721N (Environmental Protection)
- (U) PE 0603724N (Navy Energy Program (ADV))
- (U) PE 0604221N (P-3 Modernization Program)
- (U) PE 0604231N (Tactical Command Systems)

D. (U) SCHEDULE PROFILE: Not applicable.

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FY 2002 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN

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PROGRAM ELEMENT: 0604710N

PROJECT NUMBER: R0371

PROGRAM ELEMENT TITLE: Navy Energy Program (ENG)

PROJECT TITLE: Energy Conservation (ENG)

A. (U) PROJECT COST BREAKDOWN: (\$ in thousands)

Project Cost Categories	<u>FY 2000</u>	<u>FY2001</u>	<u>FY2002</u>
Engineering Development & Testing	5,236	5,480	3,152

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OSD/OMB RDT&E PE/Project Cost Breakdown
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