Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy											Date: April 2022	
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 0603724N *I Navy Energy Program*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	525.197	54.749	66.824	60.320	-	60.320	58.125	47.125	39.987	38.859	Continuing	Continuing
0829: *ENERGY CONSERVATION (ADV)*	96.969	5.691	9.764	14.056	-	14.056	8.521	6.555	7.156	7.275	Continuing	Continuing
0838: *Mobility Fuels (ADV)*	115.384	7.334	9.232	7.442	-	7.442	7.610	7.700	7.831	7.976	Continuing	Continuing
0928: *Shore Energy Technology*	57.235	1.786	1.917	1.981	-	1.981	2.033	2.073	2.115	2.157	Continuing	Continuing
0996: *Aircraft Energy Conservation*	169.553	8.090	6.998	26.203	-	26.203	30.308	22.757	16.752	16.859	Continuing	Continuing
2566: *Battery Development and Safety*	0.000	0.000	4.413	10.638	-	10.638	9.653	8.040	6.133	4.592	Continuing	Continuing
9999: *Congressional Adds*	86.056	31.848	34.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	152.404

A. Mission Description and Budget Item Justification

This program supports projects to evaluate, adapt, and demonstrate energy related technologies for Navy aircraft and ship operations to: (a) increase fuel-related weapons systems capabilities such as range and time on station; (b) reduce energy costs; (c) apply energy technologies that improve environmental compliance; (d) examine restrictive fuel specification requirements to reduce cost and increase availability worldwide; (e) provide guidance to fleet operators for the safe use of commercial grade or off-specification fuels; and (f) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems. This program supports the achievement of legislated, White House, Department of Defense, and Navy energy management goals.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ADVANCED COMPONENT DEVELOPMENT AND PROTOTYPES because it includes all efforts necessary to evaluate integrated technologies, representative models or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Navy	Date: April 2022
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603724N *I Navy Energy Program*

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	56.389	33.824	0.000	-	0.000
Current President's Budget	54.749	66.824	60.320	-	60.320
Total Adjustments	-1.640	33.000	60.320	-	60.320
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-1.500			
• Congressional Rescissions	-	-			
• Congressional Adds	-	34.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-0.033	0.000			
• SBIR/STTR Transfer	-1.607	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	0.000	-	0.000
• Adjustments to Budget Year	-	-	60.320	-	60.320

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2021	FY 2022
Project: 9999: *Congressional Adds*		
Congressional Add: *Program Increase*	14.472	0.000
Congressional Add: *Natural Gas Technologies*	7.240	0.000
Congressional Add: *Marine energy systems for sensors and microgrids*	0.000	10.500
Congressional Add: *Marine Energy Converters for Sensors and Microgrids*	10.136	0.000
Congressional Add: *Navy energy program*	0.000	15.000
Congressional Add: *Cargo drone family of advanced batteries*	0.000	9.000
Congressional Add Subtotals for Project: 9999	31.848	34.500
Congressional Add Totals for all Projects	31.848	34.500

Change Summary Explanation

The FY 2023 funding request was reduced by $0.300 million to account for the availability of prior year execution balances.

FY 2023 funding increase reflects the fact that the FY 2022 President’s Budget request did not include out-year funding.

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0829 / *ENERGY CONSERVATION (ADV)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
0829: *ENERGY CONSERVATION (ADV)*	96.969	5.691	9.764	14.056	-	14.056	8.521	6.555	7.156	7.275	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Energy Conservation Advanced Project is designed to enhance lethality, resilience, reach, and sustainment of warfare systems through more effective generation, use and distribution of energy on existing and future surface fleet assets, included Unmanned Surface Vessels (USVs), by developing and transitioning energy and maintenance improvements. This project, managed through NAVSEA 05T, will identify mature, promising energy related technologies through involvement with Fleet representatives, Life-Cycle Managers (LCMs), NAVSEA Technical Warrant Holders, In-Service Engineering Agents (ISEAs), PEOs, Industry, and Academia. The project directly supports Department of Navy goals for agility, resilient force posture, and innovation by maximizing energy to increase operational capability (e.g., extend range, increase time on station, enable high power combat systems). Potential technology areas include Power Generation and Storage (PG&S), Hull Hydrodynamics (HH), Underwater Hull Husbandry (UHH), Heating, Ventilation & Air Conditioning (HVAC) Systems, Thermal Management (TM), Main Propulsion Systems (MP), Electrical Systems (EL), Auxiliary Systems (AUX) and Energy Monitoring, Planning, and Assessment (EMP&A). Promising energy related proposals that improve the effective use, conversion, storage, distribution, and control of energy to enable the integration with future weapons and sensors onto platforms are developed each FY for evaluation. Projects are selected based on technical review and business case analysis. Not all proposals are pursued, and funding changes between functional categories or fiscal years may occur based on fleet needs, technology maturity level, ship schedule changes, or other factors.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Power Generation and Storage Sub Project	0.300	2.402	4.050	0.000	4.050
Articles:	-	-	-	-	-
Description: Power Generation & Storage System Sub Project - This project area will accomplish prototype development, laboratory and Fleet testing to determine overall effectiveness of technologies focused on improving efficiency of current power generation & storage methodologies.					
FY 2022 Plans: FY22 funding will support DDG-51 Propulsion Derived Weapons Power (PDWP) Generation Demonstration and prototyping a 1500VA Uninterruptable Power Supply (UPS). The PDWP project examines Hybrid Electric Drive (HED) technology as a potential to enable back fit of Directed Energy on DDG-51 Flt IIA. This system could function as a HED for fuel savings in peacetime and alternatively push power to weapons grade lasers during combat operations. This effort will include collaborating with HED vendor, modifying HED drives and motor to serve as power generation source to provide augmentation of power for directed energy, and demonstrating the capability at a land based test facility. With FY22 funding, prototyping, testing and installation shipboard of					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
the 1500VA Uninterruptable Power Supply (UPS) will begin. The focus is on improved 1500VA UPS Operation using safer LI-ion Batteries. Upon satisfactory testing, the UPS will be integrated into a ship for a long-term at-sea trial. In addition, continue to identify other promising Power Generation & Storage and Energy Storage technologies to support future sensors and weapons. ***FY 2023 Base Plans:*** FY23 funding will continue congressionally funded efforts begun in FY21 to develop a new electronic fuel injection (EFI) system for the Fairbanks Morse PA6B engines installed on the LCS Freedom class, LHA-6 America Class & LHD-8 Makin Island class vessels and include the development and environmental testing of upgraded fuel nozzles for installation on these platforms. Upgrading the fuel delivery system to electronic fuel injection will improve fuel efficiency of the engine by approximately 3-5%, reduce emissions and visible smoke, and reduce maintenance manhours and costs. Funding will also continue prototyping & land based testing a 1500 Volt Amp (VA) Uninterrupted Power Supply (UPS) using Lithium Iron Phosphate batteries, which will offer 2x increase in operational life and reduce life cycle costs on most surface ship applications. This development effort will lead to shipboard installation and test in follow year(s). In addition, continue to identify other energy saving/capability improvement technologies in Power Generation & Storage and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and increase capability through increased time on station and/or enabling future combat system advancements. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $1.648M increase supports shifting efforts from testing of Propulsion Derived Weapons Power (PDWP) to support PA6B electronic fuel injection (EFI) efforts.					
Title: Hull Hydrodynamic Sub Project	0.735	1.274	0.222	0.000	0.222
Articles:	-	-	-	-	-
Description: Hull Hydrodynamic Sub Project - This project area will accomplish prototype development, modeling, laboratory and Fleet testing of ship modifications to propellers and/or hull appendages to determine overall mission, energy, and cost effectiveness of these improvements.					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
FY 2022 Plans: Transition LCS 3 stern flap design efforts begun in FY21 for LCS 3 to PMS505 by supporting the structural design, finite element analysis, and development Ship Change Document as needed. Institutionalize stern flap and bow bulb efforts by developing design guidance for future ship classes. In addition, continue to identify other energy saving/capability improvement technologies in Hull Hydrodynamics and prepare proposals and business case analyses for promising technologies with potential to gain fuel economies and increase capability through increased time on station. ***FY 2023 Base Plans:*** Continue to identify other energy saving/capability improvement technologies in Hull Hydrodynamics and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and increase capability through increased time on station. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $1.052M decrease due to transitioning of LCS 3 stern flap to PMS 505.					
Title: Underwater Hull Husbandry Sub Project	0.000	0.783	0.906	0.000	0.906
Articles:	-	-	-	-	-
Description: Hull Husbandry Sub Project - Project funds will be utilized to identify and evaluate new underwater hull/propeller coating systems and underwater hull cleaning and maintenance techniques to reduce hydrodynamic drag on the hull and thereby increase fuel efficiency. ***FY 2022 Plans:*** Continue earlier efforts to develop a Decision-making Tool for Management of Biofouling on Ship Hulls aimed at evaluating or estimating the effects of hull biofouling on ship powering condition and fuel use. This desk-top tool will employ simple computational approaches combined with ship operational data. Efforts include completing a Computational Fluid Dynamics (CFD) analysis, generating speed / resistance data for validation of calculations and incorporating those data into a Decision-making tool framework to assess hull roughness.					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
In addition, continue to identify other energy saving/capability improvement technologies in Underwater Hull Husbandry and prepare proposals and business case analyses for promising technologies with potential to gain fuel economies and increase capability through increased time on station. ***FY 2023 Base Plans:*** Based on prior year efforts provide final analytics tool, with user interface and manual for evaluating or estimating the effects of hull biofouling on ship powering condition and fuel use. This desktop tool will employ simple computational approaches combined with ship operational data that will allow for decision?making for hull maintenance, evaluation of new biofouling control technologies or strategies, and potentially for ship design, based on expected resistance and fuel use due to the presence of hull biofouling. In addition, continue to identify other energy saving/capability improvement technologies in Underwater Hull Husbandry and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and increase capability through increased time on station. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $0.123M increase supports necessary to completing final analytics tool.					
Title: Heating, Ventilation and Air Conditioning (HVAC) Sub Project	0.000	0.471	0.772	0.000	0.772
Articles:	-	-	-	-	-
Description: HVAC Sub Project - Project funds will be utilized to accomplish prototype development, land and shipboard testing of improvements aimed at more efficient climate control of shipboard spaces. ***FY 2022 Plans:*** Tasking in this research and development effort investigate the topology and associated components of installed shipboard Fan Coil Assemblies (FCA) in order to optimize the airflow path for energy improvement. Although the primary focus will be energy savings, noise and acquisition cost reduction will be secondary goals. Efforts will be conducted using a three-pronged approach incorporating modeling, experimental measurement, and flow visualization techniques to demonstrate that a dramatic energy improvement and qualitative noise reduction are possible for the FCA family. A report will document the study results, and recommended Technical Data Package for the modified design, will be generated.					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
In addition, continue to identify other energy saving/capability improvement technologies in HVAC and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and/or enable future combat system advancements. ***FY 2023 Base Plans:*** The LHD 1 class is currently operating at full available cooling capacity or negative cooling margin using existing 300-ton chillers. FY23 funding will leverage existing Monoshell heat-exchanger High Efficiency Super Capacity (HESC) technology, on both LPD and DDG platforms, and apply it to a Double Barrel heat-exchanger design as a direct upgrade to the existing 300-ton legacy AC Plant currently in-use by the LHD 1 class. The product of this engineering analysis effort will be an HESCDB Conceptual Design and Draft Interface Control Document (ICD). The HESC Double Barrel (HESCDB) technology development will support future development and installation of a modern AC Plant containing both new hardware and software for use onboard any LHD. In addition, continue to identify other energy saving/capability improvement technologies in HVAC and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and increase capability through increased time on station and/or enabling future combat system advancements ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $0.301M increase supports new HESCDB project development.					
Title: Thermal Management Sub Project	0.000	0.296	0.222	0.000	0.222
Articles:	-	-	-	-	-
Description: Thermal Management Sub Project - Project funds will be utilized to identify and evaluate potential uses for Thermal Management techniques designed to reduce overall shipboard heat generation as well as incorporating waste heat recovery techniques to reduce the shipboard electrical demand on HVAC and other systems. ***FY 2022 Plans:*** This project includes development of a shipboard thermal management modeling tool. Many new weapons are under development that could improve the ability of a ship to defend itself but require significant electrical power and cooling. Being able to cost effectively integrate these new high-energy systems on existing and new US Navy platforms is of primary importance for the US to maintain superiority at sea. Being capable of determining actual cooling and electrical power margins is of primary importance. The output of this effort will be					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
a documented, working model enabling ship designers to assess the impact of future cooling system growth on the total ship thermal management system. In addition, continue to identify additional energy saving/capability improvement technologies in Thermal Management that may be applicable to Navy ships and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and/or enable future combat system advancements. ***FY 2023 Base Plans:*** Continue to identify other energy saving/capability improvement technologies in Thermal Management and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and increase capability through increased time on station and/or enabling future combat system advancements ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $0.074M decrease due to completion of prior year efforts but continued investigation of Thermal Management technologies.					
Title: Main Propulsion Systems Sub Project ***Articles:*** ***Description:*** Propulsion Systems Sub Project - Project funds will be utilized to identify requirements and perform land based and at sea testing of surface ship and Unmanned Surface Vessel (USV) propulsion system improvements on Gas Turbine, Steam, and Diesel Engine systems to reduce overall fuel consumption and lower maintenance costs. ***FY 2022 Plans:*** Continue to identify other energy saving/capability improvement technologies in Propulsion Systems and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand. ***FY 2023 Base Plans:*** This funding will support LM2500 Gas Turbine Compressor Blade Polishing Demonstration and Variable Stator Vane Optimization. Gas turbine compressor fouling reduces engine efficiency and increases fuel demand and this project will obtain an engine set of "Super Polished" compressor airfoils to test and document the potential efficiency gains by using highly polished airfoils. Additionally, this funding aims to modify existing engine	0.000 -	0.220 -	5.112 -	0.000 -	5.112 -

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
software to optimize the Variable Stator Vane angles/schedule with engines at steady state conditions in order to improve efficiency across the power range. In addition, continue to identify other energy saving/capability improvement technologies in Propulsion Systems and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and increase capability through increased time on station. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $4.892M increase supports LM2500 Gas Turbine efforts.					
Title: Electrical Systems Sub Project ***Articles:*** ***Description:*** Electrical Systems Sub Project - Project funds will be utilized to identify and perform land based and shipboard testing of ship electrical system improvements to optimize power and energy use. ***FY 2022 Plans:*** Future systems like Surface Electronic Warfare Improvement Program (SEWIP) Block III, Navy Laser programs, and other directed energy applications have unique and challenging power and energy requirements. Ensuring that the Navy has a process that can regularly and routinely gather loading data to help assess use of margin and available power will be paramount to ensuring that ships can be more rapidly modernized. Validating shipboard power via the installed Integrated Condition Assessment System (ICAS) will be examined, the products from which will include the software modifications, the demonstration, data analytics, and a set of recommendations to support transition of this capability to ship programs. The result will be a valuable tangible outcome, usable to inform efforts such as DDG modernization with directed energy weapons, and then ultimately characterize the platforms under operation. In addition, continue to identify other energy saving/capability improvement technologies in Electrical Systems and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and/or enable future combat system enhancements. ***FY 2023 Base Plans:*** Advanced electric plant operations and utilization of energy storage systems on ship platforms require the need for cross-control system coordination. FY23 funding will support development and demonstration of Cross-	0.000 -	0.725 -	0.902 -	0.000 -	0.902 -

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
control system interface which will enable advanced utilization and deployment of Energy Storage, advanced power management, and load shedding techniques to realize efficient operations and fuel savings In addition, continue to identify other energy saving/capability improvement technologies in Electrical Systems and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and increase capability through increased time on station and/or enable future combat system enhancements. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $0.177M increase supports the development and demonstration of Cross Control System Interface efforts.					
Title: Auxiliary Systems Sub Project	0.000	0.221	0.222	0.000	0.222
Articles:	-	-	-	-	-
Description: Auxiliary Systems Sub Project -- Project funds will be utilized to identify, test and evaluate new technologies for shipboard auxiliary systems aimed at reducing fuel consumption. ***FY 2022 Plans:*** Continue to identify additional energy saving/capability improvement technologies in auxiliary systems and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and/or enable future combat system enhancements. ***FY 2023 Base Plans:*** Continue to identify additional energy saving/capability improvement technologies in auxiliary systems and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and increase capability through increased time on station and/or enable future combat system enhancements ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $0.001M increase due to inflation.					
Title: Energy Monitoring, Planning & Assessment	4.656	3.372	1.648	0.000	1.648
Articles:	-	-	-	-	-

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Description: This project area will focus on methods of capturing and displaying energy related data to shipboard personnel as actionable information for ships force to employ energy conservation measures underway and in port as mission requirements permit. Through projects like GENISYS, it also supports Naval Operational Architecture/Joint All-Domain Command and Control. ***FY 2022 Plans:*** GENISYS is set of software applications that provides energy information to the ship's CO and crew to enable more efficient operations. Continue GENISYS development efforts and shipboard evaluation including integration of enterprise Remote Monitoring (eRM) and Navy Energy Usage Reports (NEURS) automation capabilities to support future fleet-wide implementation. Continue security cross-domain solution analysis and interface development with other fuel related navy enterprise applications. Expand GENISYS capability to the LPD17 class ships providing real time energy information to support potential reduction in energy usage and historical energy monitoring. The R&D funds in FY22 include the expansion of capability from DDG-51 class to LPD-17 class. In addition, continue to identify other energy capability improvement technologies and monitoring methodologies and prepare proposals and business case analyses for promising technologies within scope of NAVSEA technology objectives. ***FY 2023 Base Plans:*** Continue GENISYS development efforts and shipboard evaluation including implementation of critical updates based on user feedback and integration with enterprise Remote Monitoring (eRM) and other fuel related navy enterprise applications. Continue expanding GENISYS capability to other ship classes. In addition, continue to identify other energy capability improvement technologies and monitoring methodologies and prepare proposals and business case analyses for promising technologies with potential to reduce fuel demand and increase capability through increased time on station and/or enable future combat system enhancements. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:***					

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
FY23 $1.724M decrease due to winding down of GENISYS development efforts with focus shifting to fielding and sustainment.					
Accomplishments/Planned Programs Subtotals	5.691	9.764	14.056	0.000	14.056

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDT&E Contracts are Competitive Procurements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/CPFF	NAVSEA HQ : Washington, DC	1.310	0.000		0.000		0.000		-		0.000	0.000	1.310	-
Systems Engineering	Grant	NSWC DD : Dahlgren, VA	0.100	0.000		1.112	Dec 2021	0.000		-		0.000	0.000	1.212	-
Systems Engineering	WR	NSWC PHila : Philadelphia, PA	3.162	0.375	Nov 2020	1.297	Dec 2021	0.800	Nov 2022	-		0.800	0.000	5.634	-
Primary Hardware Development	WR	NSWC Carderock : Bethesda, MD	8.983	0.000		0.000		0.612	Dec 2022	-		0.612	0.000	9.595	-
Systems Engineering	WR	NSWC PHD : Port Hueneme, CA	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	-
Systems Engineering	C/CPAF	NSWC Carderock : Bethesda, MD	6.948	0.000		0.000		0.000		-		0.000	0.000	6.948	-
Engineering Development	WR	NSWC Carderock : Bethesda, MD	8.369	0.633	Nov 2020	1.053	Nov 2021	0.000		-		0.000	0.000	10.055	-
Demonstration & Evaluation	WR	NSWC Carderock : Bethesda, MD	8.149	0.000		0.000		0.000		-		0.000	0.000	8.149	-
System Development	C/BOA	NAWC-AD : Lakehurst, NJ	6.238	0.800	Jan 2021	1.940	Dec 2021	0.500	Jan 2023	-		0.500	0.000	9.478	-
Primary Hardware Development	C/CPAF	NSWC Phila : Philadelphia, PA	0.000	0.000		0.000		3.580	Feb 2023	-		3.580	0.000	3.580	-
System Engineering	WR	NSWC CR : Crane, Indiana	0.300	0.000		0.000		0.000		-		0.000	0.000	0.300	-
System Engineering	WR	NUWC NPT : Newport, Rhode Is	0.193	0.000		0.000		0.000		-		0.000	0.000	0.193	-
Primary Hardware Development	WR	NSWC PD : Philadelphia, PA	0.000	0.000		0.000		1.580	Nov 2022	-		1.580	0.000	1.580	-
		Subtotal	43.852	1.808		5.402		7.072		-		7.072	0.000	58.134	N/A

Remarks

Decrease of $0.497M for Systems Engineering NSWC PHILA reflects an adjusted mix of FY23 development projects. An increase of $5.16M in Primary Hardware Development / NSWC PD (C/CPAF & G/WR) reflects increased PB 23 budget to support Gas Turbine initiatives. Increase of $0.612M for Primary Hardware Development / NSWC Carderock reflects new mix of projects for FY23 and associated costs. Decrease of $1.440M in System Development / NAWC-AD reflects a winding down of GENISYS development efforts. Decrease of $1.112M in Systems Engineering / NSWC DD reflects completion of planned FY22 NSWC DD development efforts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	WR	NSWC Carderock : Bethesda, MD	3.404	0.280	Nov 2020	0.000		0.072	Nov 2022	-		0.072	Continuing	Continuing	Continuing
Software Support	WR	NSWC Carderock : Bethesda, MD	0.522	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Integrated Logistics Support	WR	NSWC Carderock : Bethesda, MD	1.200	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Study Anaylsis	WR	NSWC Carderock : Bethesda, MD	1.174	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Development Support	C/CPAF	NSWC SSES : Philadelphia, PA	1.028	0.000		0.100	Dec 2021	0.000		-		0.000	0.000	1.128	-
Development Support	C/CPAF	NAVSEA HQ : Washington, DC	2.465	0.430	Jan 2021	0.123	Jan 2022	0.123	Jan 2023	-		0.123	0.000	3.141	-
Software Support	C/CPAF	NSWC SSES : Philadelphia, PA	0.281	0.000		0.000		0.000		-		0.000	0.000	0.281	-
Software Support	C/CPAF	NAVSEA HQ : Washington, DC	1.200	0.000		0.000		0.000		-		0.000	0.000	1.200	-
Development Support	WR	NSWC PHila : Philadelphia, PA	3.030	0.208	Nov 2020	0.300	Nov 2021	0.000		-		0.000	0.000	3.538	-
Development Support	WR	NSWC DD : Dahlgren, Va	0.050	0.000		0.069	Nov 2021	0.000		-		0.000	0.000	0.119	-
Development Support	WR	NIWC LANT : Charleston, SC	0.000	0.190	Nov 2020	0.000		0.000		-		0.000	0.000	0.190	-
		Subtotal	14.354	1.108		0.592		0.195		-		0.195	Continuing	Continuing	N/A

Remarks

Increase of $0.072M for Development Support / NSWC Carderock reflects engineering support for FY23 projects. Decrease of $0.100M for Development Support (C/CPAF) / NSWC PD reflects change in contract support in FY23. Decrease of $0.300M for Development Support / NSWC PD (G/WR) reflects decreased FY23 adjusted mix of FY23 projects. Decrease of $0.069M for Development Support / NSWC DD reflects decreased support need in FY23 associated with PDWP project.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC Carderock : Bethesda, MD	10.046	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Operational Test & Evaluation	WR	NSWC Carderock : Bethesda, MD	10.645	0.000		0.562	Nov 2021	0.000		-		0.000	Continuing	Continuing	Continuing
LIve Fire Test & Evaluation	WR	NSWC Carderock : Bethesda, MD	0.382	0.000		0.000		0.000		-		0.000	0.000	0.382	-
Developmental Test & Evaluation	C/CPAF	NSWC Philadelphia : Philadelphia, PA	0.383	0.000		0.000		3.482	Jan 2023	-		3.482	0.000	3.865	-
Developmental Test & Evaluation	WR	NSWC SSES : Philadelphia, PA	0.918	0.000		0.662	Nov 2021	0.506	Dec 2022	-		0.506	0.000	2.086	-
Developmental Test & Evaluation	WR	APL : Washington, DC	0.085	0.000		0.000		0.000		-		0.000	0.000	0.085	-
System Development	C/BOA	NAWC-AD : Lakehurst, NJ	1.924	1.595	Dec 2020	0.733	Jan 2022	0.890	Jan 2023	-		0.890	0.000	5.142	-
		Subtotal	24.383	1.595		1.957		4.878		-		4.878	Continuing	Continuing	N/A

Remarks

Decrease of $0.562M in Operational Test & Evaluation / NSWC Carderock reflects reduction of testing requirements in FY23 for Hull Hydrodynamics and Underwater Hull Husbandry areas; Increase of $3.482M for C/CPAF Development Test & Evaluation /NSWC PD and decrease of $0.156M for G/WR reflects new FY23 PA6B EFI, Next Generation Uninterrupted Power Supply and Gas Turbine initiatives funding requirements. Increase of $0.157M for System Development / NAWC-AD reflects testing of GENISYS requirements.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NSWC Philadelphia : Philadelphia, PA	7.100	0.328	Dec 2020	0.158	Nov 2021	0.196	Nov 2022	-		0.196	0.000	7.782	-
Travel	Allot	NAVSEA HQ : Washington, DC	0.216	0.021	Dec 2020	0.015	Dec 2021	0.015	Jan 2023	-		0.015	0.000	0.267	-
Total Assets	WR	NSWC Carderock : Bethesda, MD	0.352	0.000		0.000		0.000		-		0.000	0.000	0.352	-
Program Management Support	C/CPAF	NAVSEA HQ : Washington, DC	5.640	0.729	Jan 2021	1.463	Jan 2022	1.463	Dec 2022	-		1.463	0.000	9.295	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0829 / *ENERGY CONSERVATION (ADV)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NSWC Carderock : Bethesda, MD	1.072	0.102	Oct 2020	0.177	Nov 2021	0.237	Nov 2022	-		0.237	0.000	1.588	-
		Subtotal	14.380	1.180		1.813		1.911		-		1.911	0.000	19.284	N/A

Remarks

Increase of $0.038M for NSWC PD and $0.0150M NSWC CD in Program Management Support reflects program support for new mix of FY23 projects.

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	96.969	5.691		9.764		14.056		-		14.056	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

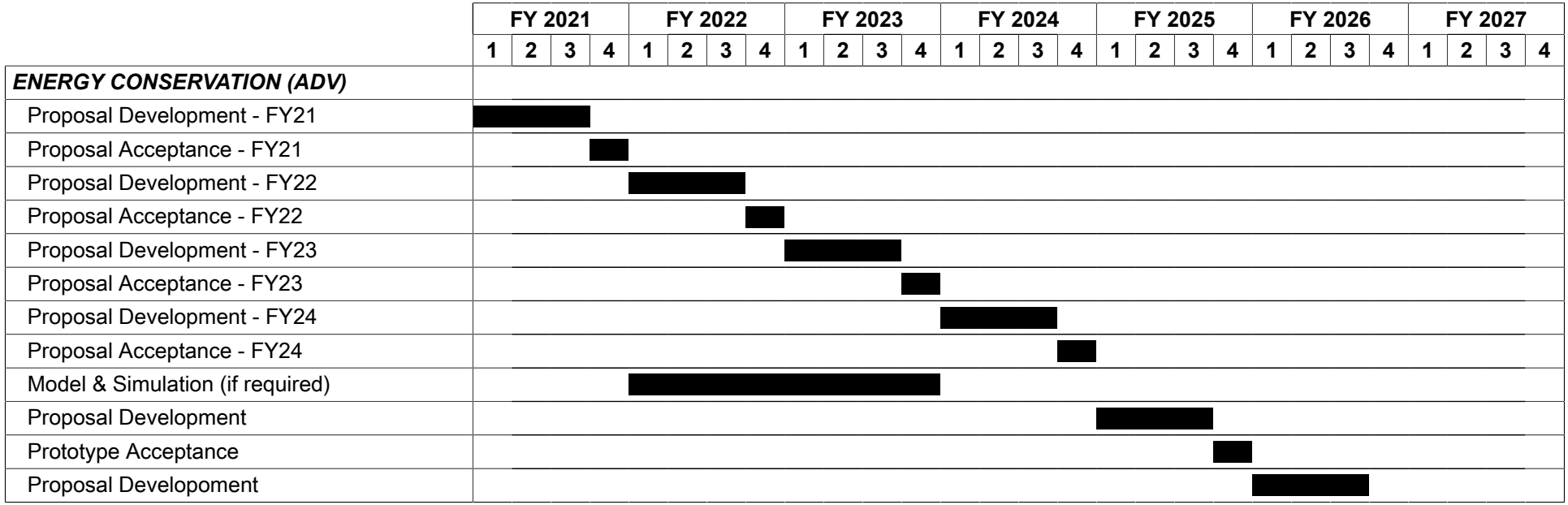


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ENERGY CONSERVATION (ADV)				
Proposal Development - FY21	1	2021	3	2021
Proposal Acceptance - FY21	4	2021	4	2021
Proposal Development - FY22	1	2022	3	2022
Proposal Acceptance - FY22	4	2022	4	2022
Proposal Development - FY23	1	2023	3	2023
Proposal Acceptance - FY23	4	2023	4	2023
Proposal Development - FY24	1	2024	3	2024
Proposal Acceptance - FY24	4	2024	4	2024
Model & Simulation (if required)	1	2022	4	2023
Proposal Development	1	2025	3	2025
Prototype Acceptance	4	2025	4	2025
Proposal Developoment	1	2026	3	2026

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0838 / *Mobility Fuels (ADV)*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
0838: *Mobility Fuels (ADV)*	115.384	7.334	9.232	7.442	-	7.442	7.610	7.700	7.831	7.976	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program represents the Navy's only RDTE investment designed to maintain and enhance its capability to operate as a "smart" customer for aviation and ship tactical fuels that are an operationally critical, single point of failure, $4.0+ billion per year consumable requiring worldwide availability and interoperability.

Recent field problems have demonstrated the adverse effects that fuel-related problems can have on ship and aircraft performance, durability, and readiness. The potential risk and adverse operational impacts from fuel-related problems over the next decade, given the evolving production technologies, changing feedstocks, more stringent environmental regulations and the introduction of new operational requirements and platforms will continue to increase.

This program provides data and enables technology through laboratory, component, fuel system, engine, and platform tests. These evaluations relate the effects of changes in the Navy fuel properties and chemistry to the performance and durability of Naval ship, aircraft, ground and fuel distribution systems. The information is required by technical authorities and decision makers to: (a) assure interoperability with fuel procured from commercial/ international specifications, (b) determine the extent to which unnecessarily restrictive military specification requirements can be relaxed to reduce cost and increase availability worldwide, (c) provide guidance to fleet operators for the safe use of off-specification fuels or emerging CONOPS requiring the use of non-traditional fuels, (d) assure operational interoperability with evolving changes in fuel production technology, feedstocks, environmental regulations and tactical system demands, (e) improve the capability and reduce the cost of field fuel quality surveillance, and (f) facilitate rapid identification and resolution of field identified fuel deficiencies.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Naval Tactical Fuels	7.334	9.232	7.442	0.000	7.442
Articles:	-	-	-	-	-
Description: Perform development, test and evaluation work on Naval tactical fuels to: a) assure interoperability with commercial/international fuel specifications, b) determine the extent to which unnecessarily restrictive military specification features can be relaxed to reduce cost and increase availability worldwide; c) provide guidance to fleet operators for the safe use of off-specification or non-primary fuels , d) validate periodic changes to the Navy tactical fuel specifications to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in the fuel supply industry and e) improve fleet methods to ensure fuel quality and performance.					
FY 2022 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0838 / *Mobility Fuels (ADV)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Conduct lab, rig, component and engine testing to assure fuel interoperability with evolving commercial fuel specifications and emerging operational and platform requirements. Develop advanced algorithms to enable predictive capabilities of rapid data analysis applications. Field trial prototype sensors to increase autonomous quality surveillance. Continue development of advance fuel composition capability. ***FY 2023 Base Plans:*** Continue to conduct lab, rig, component, and engine testing to assure fuel interoperability with evolving commercial fuel specifications and emerging operational and platform requirements. Refine advanced chemical composition measurement capability and enterprise data analytics tools that increase readiness through proactive stock protection and rapid safe-use determinations. Conduct field trials on prototype cost-reducing autonomous quality surveillance and contamination detection sensors. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $1.790M decrease due to on the planned completion of this project and other miscellaneous/rate adjustments.					
Accomplishments/Planned Programs Subtotals	7.334	9.232	7.442	0.000	7.442

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Testing efforts will be competitively contracted, and performed under Cost Plus Fixed Fee and Firm Fixed Price contracts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0838 / *Mobility Fuels (ADV)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NRL : Washington, D.C.	7.952	1.000	Dec 2020	1.214	Nov 2021	1.165	Nov 2022	-		1.165	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCAD : Patuxent River, MD	23.068	2.071	Dec 2020	2.000	Nov 2021	2.000	Nov 2022	-		2.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : Philadelphia, PA	4.881	0.500	Jan 2021	0.450	Nov 2021	0.500	Nov 2022	-		0.500	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : Bethesda, MD	0.462	0.000		0.000		0.000		-		0.000	0.000	0.462	-
Systems Engineering	C/FFP	Various : Various	3.756	1.000	Apr 2021	2.500	Mar 2022	1.200	Jan 2023	-		1.200	0.000	8.456	8.456
Prior year Prod Dev no longer funded in the FYDP	Various	Various : Various	0.161	0.000		0.000		0.000		-		0.000	0.000	0.161	-
Systems Engineering	MIPR	Army Ground Vehicle Systems Center : Warren, MI	0.000	0.000		0.500	Nov 2021	0.000		-		0.000	0.000	0.500	-
Systems Engineering	MIPR	AFRL : Dayton, OH	0.000	0.000		0.221	Nov 2021	0.000		-		0.000	0.000	0.221	-
		Subtotal	40.280	4.571		6.885		4.865		-		4.865	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Testing	WR	NAWCAD : Patuxent River, MD	5.849	0.500	Dec 2020	0.500	Dec 2021	0.600	Nov 2022	-		0.600	Continuing	Continuing	Continuing
Hardware Testing	C/CPFF	Life Cycle Engineering : Charleston, SC	18.923	2.000	Mar 2021	1.500	Apr 2022	1.614	Mar 2023	-		1.614	0.000	24.037	24.073
Hardware Testing	C/CPFF	Univ of Dayton Research Inst : Dayton, OH	1.289	0.000		0.000		0.000		-		0.000	0.000	1.289	1.289
Hardware Testing	WR	US Naval Academy : Annapolis, MD	0.188	0.000		0.040	Apr 2022	0.040	May 2023	-		0.040	0.000	0.268	-
Hardware Testing	C/FFP	Various : Various	7.826	0.000		0.000		0.000		-		0.000	0.000	7.826	7.826

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0838 / *Mobility Fuels (ADV)*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fuel Delivery	MIPR	DLA-Energy : Ft. Belvoir, VA	0.697	0.025	Jan 2021	0.030	Apr 2022	0.038	Mar 2023	-		0.038	0.000	0.790	-
Prior year T & E no longer funded in the FYDP	Various	Various : Various	31.545	0.000		0.000		0.000		-		0.000	0.000	31.545	-
		Subtotal	66.317	2.525		2.070		2.292		-		2.292	Continuing	Continuing	N/A

Remarks

All prior year lines have been consolidated.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NAWCAD : Patuxent River, MD	2.091	0.228	Dec 2020	0.267	Dec 2021	0.270	Nov 2022	-		0.270	Continuing	Continuing	Continuing
Program Management Support	C/FFP	Coord Research Council : Alpharetta, GA	0.080	0.010	Nov 2020	0.010	Nov 2021	0.015	Dec 2022	-		0.015	0.000	0.115	0.115
Prior year Mgmt Supp no longer funded in the FYDP	Various	Various : Various	6.616	0.000		0.000		0.000		-		0.000	0.000	6.616	-
		Subtotal	8.787	0.238		0.277		0.285		-		0.285	Continuing	Continuing	N/A

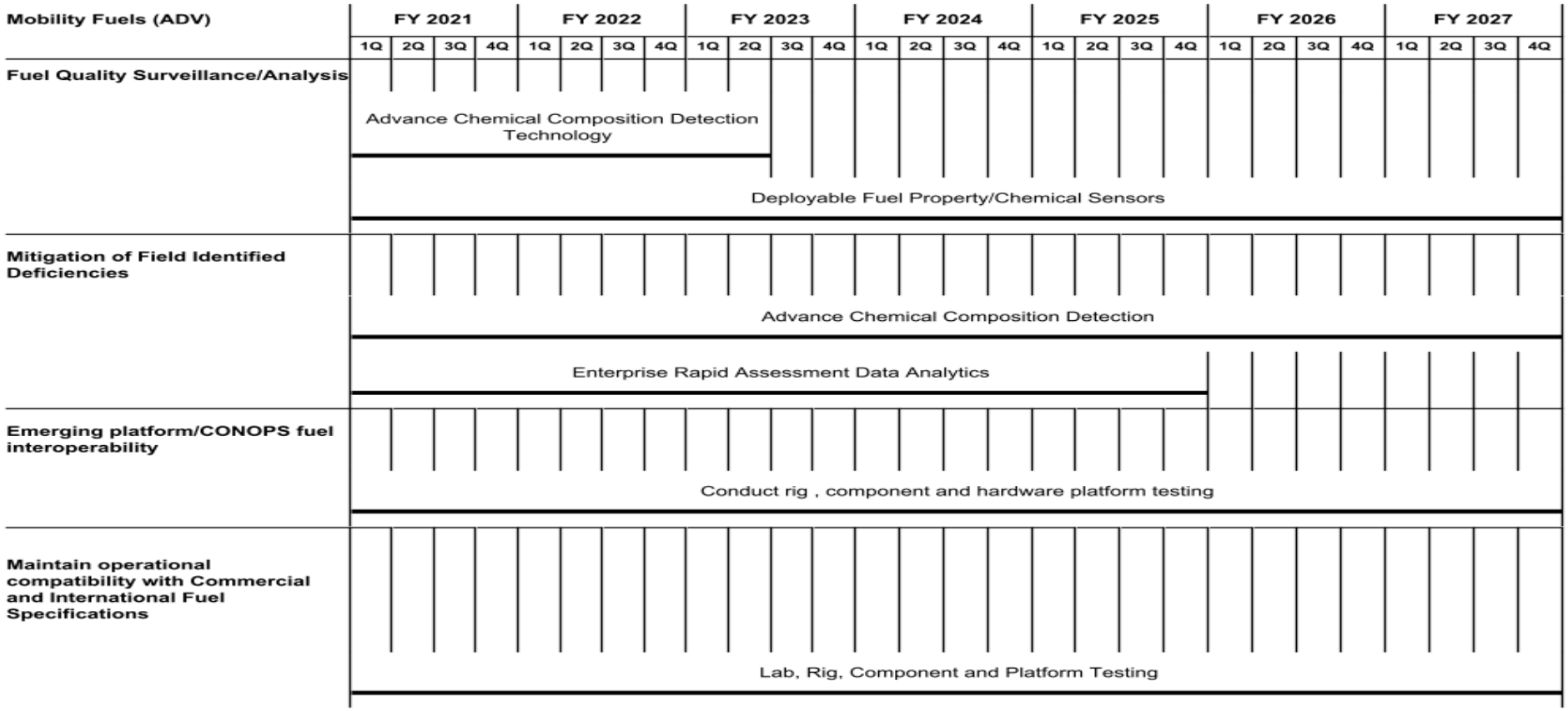
Remarks

1.

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	115.384	7.334		9.232		7.442		-		7.442	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0838 / *Mobility Fuels (ADV)*



2023DON - 0603724N - 0838

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0838 / *Mobility Fuels (ADV)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Mobility Fuels (ADV)				
Fuel Quality Surveillance/Analysis: Advance Chemical Composition Detection Technology	1	2021	2	2023
Fuel Quality Surveillance/Analysis: Deployable Fuel Property/Chemical Sensors	1	2021	4	2027
Mitigation of Field Identified Deficiencies: Advance Chemical Composition Detection	1	2021	4	2027
Mitigation of Field Identified Deficiencies: Enterprise Rapid Assessment Data Analytics	1	2021	4	2025
Emerging platform/CONOPS fuel interoperability: Conduct rig, component and hardware platform testing	1	2021	4	2027
Maintain operational compatibility with Commercial and International Fuel Specifications: Lab, Rig, Component and Platform Testing	1	2021	4	2027

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0928 / *Shore Energy Technology*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
0928: *Shore Energy Technology*	57.235	1.786	1.917	1.981	-	1.981	2.033	2.073	2.115	2.157	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Legislation, Executive Orders (EO), and SECNAV Guidance direct DoN to increase energy security through resiliency, efficiency, reliability, cybersecurity and alternative energy sources. This guidance includes the National Defense Strategy (NDS) of 2018, A Design for Maintaining Maritime Superiority 2.0, and the NAVFAC Strategic Design 2.0. Guidance directs DOD to posture logistics capability (projected from Navy Installations) ashore and at sea in ways that allow the fleet to operate globally, at a pace that can be sustained over time. Improved resilience of our installations (employing key technology focus areas defined in the NDS) will enable platform refueling, re-arming, resupply and repair. Installations shall enable Dynamic Force Employment and Distributed Lethality.

This Energy RDT&E Project will test, evaluate, and validate components as well as demonstrate cost-effective and technical viability of energy security , efficiency, resilience, reliability, and technologies. All efforts will be coordinated across DOD and with other agencies as appropriate. Specifically, this project aims to pursue three areas of development, testing and evaluation: (A) Modeling and possible prototype testing of new energy sources for use at Naval installations with potential for widespread applicability to energy security; (B) It will support demonstration and validation of advanced electric grid management systems, known as "Smart Grid" and "Micro Grid" technology, for use at Naval installations to enable improved energy security; (C) Demonstration and Validation of Alternative Energy, Energy Efficiency, and Resiliency and Smart Energy Management Technology: This project will support the testing, demonstration, validation, and application of innovative facility energy efficiency and alternative energy technology.Cyber Security resilience technology shall align to NIST 800-82 and be interoperable within the NAVFAC cybersecurity enclave.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Shore Energy Technology	1.786	1.917	1.981	0.000	1.981
Articles:	-	-	-	-	-
FY 2022 Plans: -Continue development and demonstration of large-scale energy storage sites to include cyber security measures for execution. -Continue development and demonstration of adaptable microgrids that utilize artificial intelligence and high voltage solid-state power electronics using renewable energy test bed. -Continue development and demonstration of predictive modeling, neural network, and predictive energy tools.					
FY 2023 Base Plans: -Develop and demonstrate of energy storage sites to include cyber security measures. -Develop and demonstrate adaptable microgrids that utilize artificial intelligence and high voltage solid-state power electronics using renewable energy test bed.					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0928 / *Shore Energy Technology*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
-Develop and demonstrate predictive modeling, neural network, and predictive energy tools. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $0.064M increase supports additional investment in demonstration of advanced energy collection technologies					
Accomplishments/Planned Programs Subtotals	1.786	1.917	1.981	0.000	1.981

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Demonstration and validation are conducted for maximum transfer and interaction with industry such as to influence the industry COTS with the results of this demonstration and prototype validation. Acquisition is based on performance specifications enabled by this project.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0928 / *Shore Energy Technology*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Renewable Energy	WR	EXWC : Port Hueneme, CA	42.300	0.027	Mar 2021	0.400	Jan 2022	0.416	Jan 2023	-		0.416	Continuing	Continuing	Continuing
Energy Resiliency and Reliability, Security and Systems (Includes cybersecurity)	Various	EXWC : Port Hueneme, CA	9.158	0.756	Mar 2021	0.730	Dec 2021	0.700	Jan 2023	-		0.700	Continuing	Continuing	Continuing
Energy Storage	WR	EXWC : Port Hueneme, CA	5.777	0.800	Mar 2021	0.515	Dec 2021	0.515	Jan 2023	-		0.515	Continuing	Continuing	Continuing
Renewable Energy (Direct Cite)	Various	EXWC : Port Hueneme, CA	0.000	0.203	Mar 2021	0.272	Dec 2021	0.000		-		0.000	0.000	0.475	-
Energy Resiliency and Reliability, Security and Systems (includes cybersecurity) - Direct Cite	Various	EXWC : Port Hueneme, CA	0.000	0.000		0.000		0.350	Apr 2023	-		0.350	Continuing	Continuing	Continuing
		Subtotal	57.235	1.786		1.917		1.981		-		1.981	Continuing	Continuing	N/A

Remarks

- Renewable Energy & Direct Cite: Decrease in FY 2023 budget due to shift to Energy Resiliency.
- Energy Resiliency: Increase in FY 2023 due to additional investment in cyber security resilience technologies.

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	57.235	1.786		1.917		1.981		-		1.981	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0928 / *Shore Energy Technology*

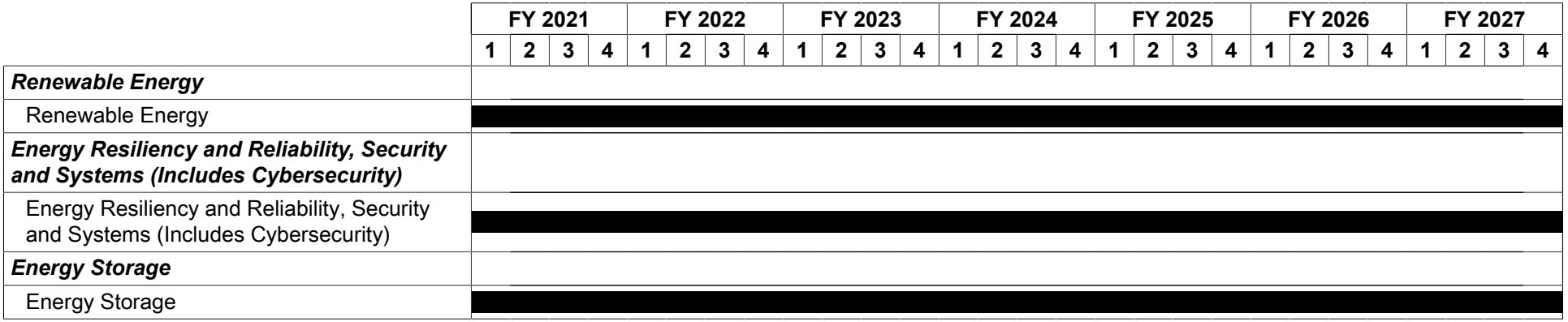


Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0928 / *Shore Energy Technology*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Renewable Energy				
Renewable Energy	1	2021	4	2027
Energy Resiliency and Reliability, Security and Systems (Includes Cybersecurity)				
Energy Resiliency and Reliability, Security and Systems (Includes Cybersecurity)	1	2021	4	2027
Energy Storage				
Energy Storage	1	2021	4	2027

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0996 / *Aircraft Energy Conservation*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
0996: *Aircraft Energy Conservation*	169.553	8.090	6.998	26.203	-	26.203	30.308	22.757	16.752	16.859	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Naval aviation must operate independently worldwide often with limited logistics support. Additionally, legacy and emerging aircraft continually add capability to enhance their lethality and survivability. Improving an aircraft's utilization and management of energy has a direct relationship to enhanced combat capability to meet the challenges of emerging threats. This program engages technical experts from across Naval aviation, industry, and academia to identify best practices and technologies for development, testing and validation to determine technical viability and assess benefit to mission capability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Aircraft Operational Energy	8.090	6.998	26.203	0.000	26.203
Articles:	-	-	-	-	-
FY 2022 Plans: Continue identification, testing and assessment of Operational Energy technologies, best practices and metrics to enhance Naval Aviation operational capability. Build and validate integrated models to identify and support resolution of thermal management challenges. Build and validate common safe and affordable lithium ion battery prototypes. Validate advance aircraft generator technology. Assess engine recuperator technology.					
FY 2023 Base Plans: Continue identification, testing and assessment of Operational Energy technologies, best practices and metrics to enhance Naval Aviation operational capability. Build and validate integrated models to identify and support resolution of legacy aircraft power and thermal management challenges. Conduct certification testing of common safe and affordable lithium ion battery prototypes. Develop/mature advanced aircraft generator technology. Conduct test cell evaluation of engine recuperator technology for UAS applications. Mature and demonstrate operational benefits of finlet and aerial refueling technologies. Assess and mature engine component efficiency technologies					
FY 2023 OCO Plans: N/A					
FY 2022 to FY 2023 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0996 / *Aircraft Energy Conservation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
FY23 $19.205M increase supports maturation and demonstration of aircraft and engine technologies in support of administration climate change mitigation initiatives.					
Accomplishments/Planned Programs Subtotals	8.090	6.998	26.203	0.000	26.203

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This is a non-acquisition program that develops, evaluates, and validates technologies in support of Navy Operational Energy goals for increasing aircraft mission capability.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0996 / *Aircraft Energy Conservation*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCAD : Patuxent River, MD	10.726	2.500	Dec 2020	2.463	Dec 2021	3.600	Dec 2022	-		3.600	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	The Boeing Company : Seattle, WA	2.000	0.000		0.000		0.000		-		0.000	0.000	2.000	2.000
Systems Engineering	C/CPFF	Various : Various	15.136	2.260	Apr 2021	2.884	Apr 2022	17.403	May 2023	-		17.403	0.000	37.683	21.516
Systems Engineering	C/BA	Deloitte Consulting : Alexandria, VA	3.571	1.000	Apr 2021	1.100	Jan 2022	0.000		-		0.000	0.000	5.671	5.671
Systems Engineering-Prior Years	Various	Various : Various	3.612	0.000		0.000		0.000		-		0.000	0.000	3.612	-
Systems Engineering	WR	Naval Research Lab : Washington DC	0.000	0.000		0.000		0.400	Dec 2022	-		0.400	0.000	0.400	-
Systems Engineering	C/CPFF	Air Force Research Lab : Wright Patterson AFB, Ohio	0.000	0.000		0.000		0.250	Dec 2022	-		0.250	0.000	0.250	-
Systems Engineering	C/CPFF	GE Aviation : Cincinnati, Ohio	0.000	0.000		0.000		0.750	Mar 2023	-		0.750	0.000	0.750	-
Systems Engineering	C/CPFF	Creare : Hanover, NH	0.000	0.000		0.000		0.400	Nov 2022	-		0.400	0.000	0.400	-
		Subtotal	35.045	5.760		6.447		22.803		-		22.803	Continuing	Continuing	N/A

Remarks

5. All Prior Year lines have been consolidated.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Testing	WR	NAWCAD : Patuxent River, MD	6.536	1.000	Jan 2021	0.201	Dec 2021	1.500	Dec 2022	-		1.500	Continuing	Continuing	Continuing
Hardware Testing	C/CPFF	Various : Various	3.740	1.000	Mar 2021	0.000		0.000		-		0.000	0.000	4.740	4.740
Prior year T&E no longer funded in the FYDP	Various	Various : Various	117.125	0.000		0.000		0.000		-		0.000	0.000	117.125	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0996 / *Aircraft Energy Conservation*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Testing	WR	NSWC : Crane, IN	0.000	0.000		0.000		0.500	Dec 2022	-		0.500	0.000	0.500	-
Hardware Testing	C/CPFF	EIC Laboratories : Norwood, MA	0.000	0.000		0.000		0.750	Mar 2023	-		0.750	0.000	0.750	-
		Subtotal	127.401	2.000		0.201		2.750		-		2.750	Continuing	Continuing	N/A

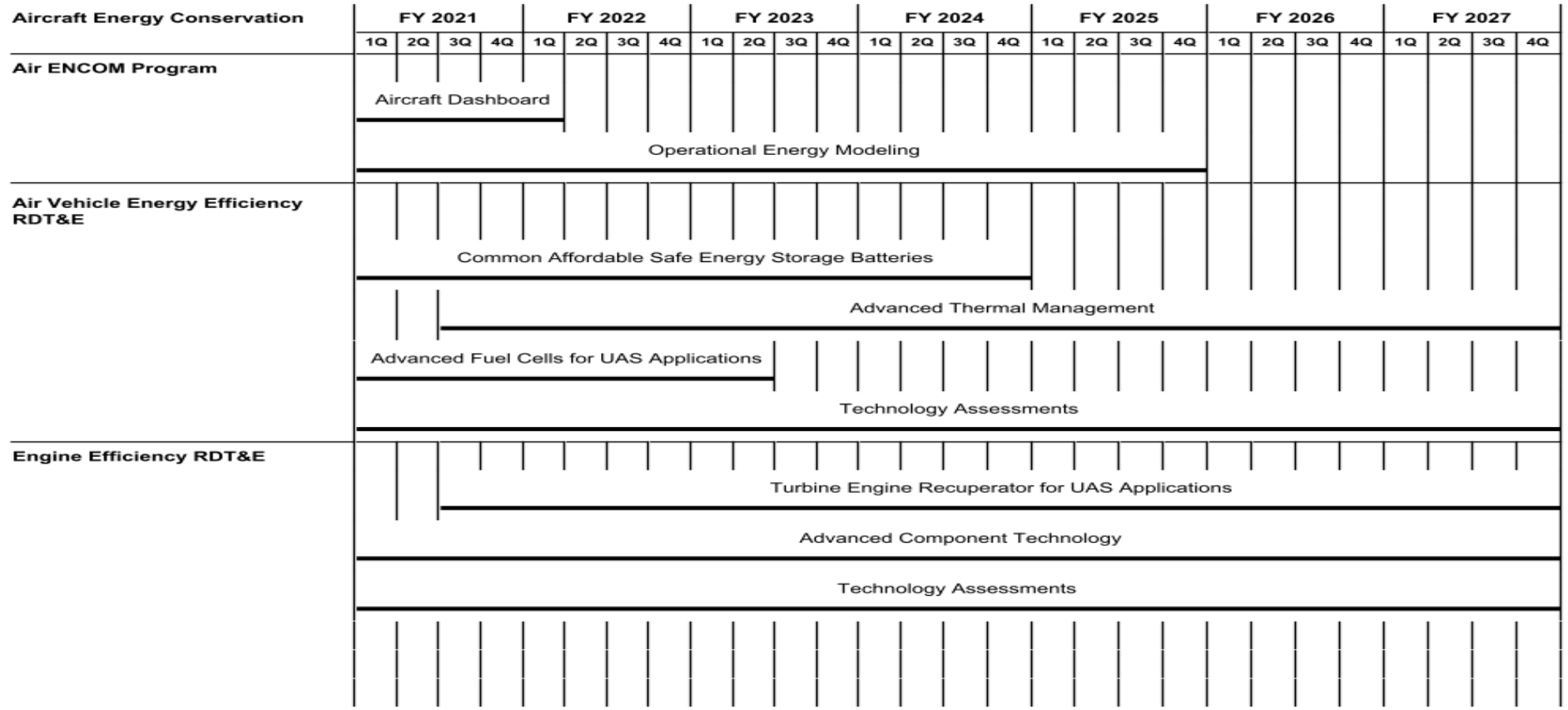
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NAWCAD : Patuxent River, MD	2.595	0.330	Dec 2020	0.350	Dec 2021	0.650	Dec 2022	-		0.650	Continuing	Continuing	Continuing
Prog Mgnt no longer funded in the FYDP	Various	Various : Various	4.512	0.000		0.000		0.000		-		0.000	0.000	4.512	-
		Subtotal	7.107	0.330		0.350		0.650		-		0.650	Continuing	Continuing	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	169.553	8.090		6.998		26.203		-		26.203	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0996 / *Aircraft Energy Conservation*



2023DON - 0603724N - 0996

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0996 / *Aircraft Energy Conservation*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Aircraft Energy Conservation				
Air ENCOM Program: Aircraft Dashboard	1	2021	1	2022
Air ENCOM Program: Operational Energy Modeling	1	2021	4	2025
Air Vehicle Energy Efficiency RDT&E: Common Affordable Safe Energy Storage Batteries	1	2021	4	2024
Air Vehicle Energy Efficiency RDT&E: Advanced Thermal Management	3	2021	4	2027
Air Vehicle Energy Efficiency RDT&E: Advanced Fuel Cells for UAS Applications	1	2021	2	2023
Air Vehicle Energy Efficiency RDT&E: Technology Assessments	1	2021	4	2027
Engine Efficiency RDT&E: Turbine Engine Recuperator for UAS Applications	3	2021	4	2027
Engine Efficiency RDT&E: Advanced Component Technology	1	2021	4	2027
Engine Efficiency RDT&E: Technology Assessments	1	2021	4	2027

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 2566 / *Battery Development and Safety*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
2566: *Battery Development and Safety*	0.000	0.000	4.413	10.638	-	10.638	9.653	8.040	6.133	4.592	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Provide an advanced battery database with standard battery families for program offices to use to allow for selection of batteries early in the design process increasing the likelihood of design and fielding success, 2) leverage the battery database to begin common battery design efforts to save cost, 3) establish common battery standards and design requirements (e.g., propagation resistant designs, standard battery monitoring and casualty detection systems, etc.) to make advanced batteries safer and therefore deployable, 4) develop and test standard battery storage/container systems that can safely house batteries and withstand catastrophic failure (thermal runaway) of the batteries within the container while minimizing damage to surrounding equipment and platforms, 5) streamline the battery safety certification process especially for high energy storage magazines and other large battery designs (lasers) to allow
battery based weapon systems to be fielded in time to support strategic needs, 6) develop hazard mitigation technologies to support rapid safe deployment of advanced batteries to support weapon systems, 7) generate analytics that characterize the Department's current and projected energy/advanced battery needs, 8) establish the Navy's contribution to DoD and cross-service advanced battery supply chain efforts.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Title: Battery Development and Safety	0.000	4.413	10.638	0.000	10.638
Articles:	-	-	-	-	-
FY 2022 Plans: Provide an advanced battery database with standard battery families for program offices to use to allow for selection of batteries early in the design process increasing the likelihood of design and fielding success, 2) leverage the battery database to begin common battery design efforts to save cost, 3) establish common battery standards and design requirements (e.g., propagation resistant designs, standard battery monitoring and casualty detection systems, etc.) to make advanced batteries safer and therefore deployable, 4) develop and test standard battery storage/container systems that can safely house batteries and withstand catastrophic failure (thermal runaway) of the batteries within the container while minimizing damage to surrounding equipment and platforms, 5) streamline the battery safety certification process especially for high energy storage magazines and other large battery designs (lasers) to allow battery based weapon systems to be fielded in time to support strategic needs, 6)					

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 2566 / *Battery Development and Safety*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
develop hazard mitigation technologies to support rapid safe deployment of advanced batteries to support weapon systems. ***FY 2023 Base Plans:*** Provide an advanced battery database with standard battery families for program offices to use to allow for selection of batteries early in the design process increasing the likelihood of design and fielding success, 2) leverage the battery database to begin common battery design efforts to save cost, 3) establish common battery standards and design requirements (e.g., propagation resistant designs, standard battery monitoring and casualty detection systems, etc.) to make advanced batteries safer and therefore deployable, 4) develop and test standard battery storage/container systems that can safely house batteries and withstand catastrophic failure (thermal runaway) of the batteries within the container while minimizing damage to surrounding equipment and platforms, 5) streamline the battery safety certification process especially for high energy storage magazines and other large battery designs (lasers) to allow battery based weapon systems to be fielded in time to support strategic needs, 6) develop hazard mitigation technologies to support rapid safe deployment of advanced batteries to support weapon systems, 7) generate analytics that characterize the Department's current and projected energy/advanced battery needs, 8) establish the Navy's contribution to DoD and cross-service advanced battery supply chain efforts. ***FY 2023 OCO Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY23 $6.225M increase supports the current and projected energy/advanced battery needs. Also addresses the increase in safety testing, certification, and deployment requirements of advanced energy dense batteries (primarily lithium chemistry based) required for weapon systems to keep pace with the needs for high energy dense advanced batteries onboard ships, submarines, and aircraft.					
Accomplishments/Planned Programs Subtotals	0.000	4.413	10.638	0.000	10.638

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDT&E Contracts are Competitive Procurements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 2566 / *Battery Development and Safety*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NSWC PD : Philadelphia, PA	0.000	0.000		0.420	Apr 2022	0.931	Nov 2022	-		0.931	Continuing	Continuing	Continuing
Primary Hardware Development	WR	NSWC CD : Bethesda, MD	0.000	0.000		0.552	Apr 2022	1.005	Nov 2022	-		1.005	Continuing	Continuing	Continuing
Engineering Development	WR	NSWC CD : Bethesda, MD	0.000	0.000		0.120	Apr 2022	0.343	Nov 2022	-		0.343	Continuing	Continuing	Continuing
Demonstration & Evaluation	WR	NSWC CD : Bethesda, MD	0.000	0.000		0.120	Apr 2022	0.343	Nov 2022	-		0.343	Continuing	Continuing	Continuing
System Development	C/BOA	NAWC-AD : Lakehurst, NJ	0.000	0.000		0.220	May 2022	0.539	Nov 2022	-		0.539	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC DD : Dahlgren, VA	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		1.432		3.161		-		3.161	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	WR	NSWC CD : Bethesda, MD	0.000	0.000		0.420	Apr 2022	0.931	Dec 2022	-		0.931	0.000	1.351	-
Study Analysis	WR	NSWC CD : Bethesda, MD	0.000	0.000		0.420	Apr 2022	0.931	Nov 2022	-		0.931	0.000	1.351	-
Development Support	C/CPAF	NSWC PD : Philadelphia, PA	0.000	0.000		0.420	May 2022	0.931	Dec 2022	-		0.931	0.000	1.351	-
Development Support	WR	NSWC PD : Philadelphia, PA	0.000	0.000		0.220	Apr 2022	0.587	Dec 2022	-		0.587	0.000	0.807	-
		Subtotal	0.000	0.000		1.480		3.380		-		3.380	0.000	4.860	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 2566 / *Battery Development and Safety*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC CD : Bethesda, MD	0.000	0.000		0.296	Apr 2022	0.823	Jan 2023	-		0.823	0.000	1.119	-
Operational Test & Evaluation	WR	NSWC CD : Bethesda, MD	0.000	0.000		0.315	Apr 2022	0.823	Jan 2023	-		0.823	0.000	1.138	-
Operational Test & Evaluation	C/CPAF	NAWC-AD : Paxtuxtent, MD	0.000	0.000		0.160	May 2022	0.500	Feb 2023	-		0.500	0.000	0.660	-
Operational Test & Evaluation	WR	NSWC CR : Crane, IN	0.000	0.000		0.160	Apr 2022	0.500	Nov 2022	-		0.500	0.000	0.660	-
Developmental Test & Evaluation	WR	NSWC CR : Crane, IN	0.000	0.000		0.260	Apr 2022	0.686	Nov 2022	-		0.686	0.000	0.946	-
		Subtotal	0.000	0.000		1.191		3.332		-		3.332	0.000	4.523	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NSWC PD : Philadelphia, PA	0.000	0.000		0.100	Apr 2022	0.196	Nov 2022	-		0.196	0.000	0.296	-
Travel	Allot	NAVSEA HQ : Washington, DC	0.000	0.000		0.030	Apr 2022	0.059	Jan 2023	-		0.059	0.000	0.089	-
Total Assets	WR	NSWC CD : Bethesda, MD	0.000	0.000		0.120	Apr 2022	0.392	Feb 2023	-		0.392	0.000	0.512	-
Program Management Support	WR	NSWC CD : Bethesda, MD	0.000	0.000		0.060	Apr 2022	0.118	Dec 2022	-		0.118	0.000	0.178	-
		Subtotal	0.000	0.000		0.310		0.765		-		0.765	0.000	1.075	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		4.413		10.638		-		10.638	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 2566 / *Battery Development and Safety*

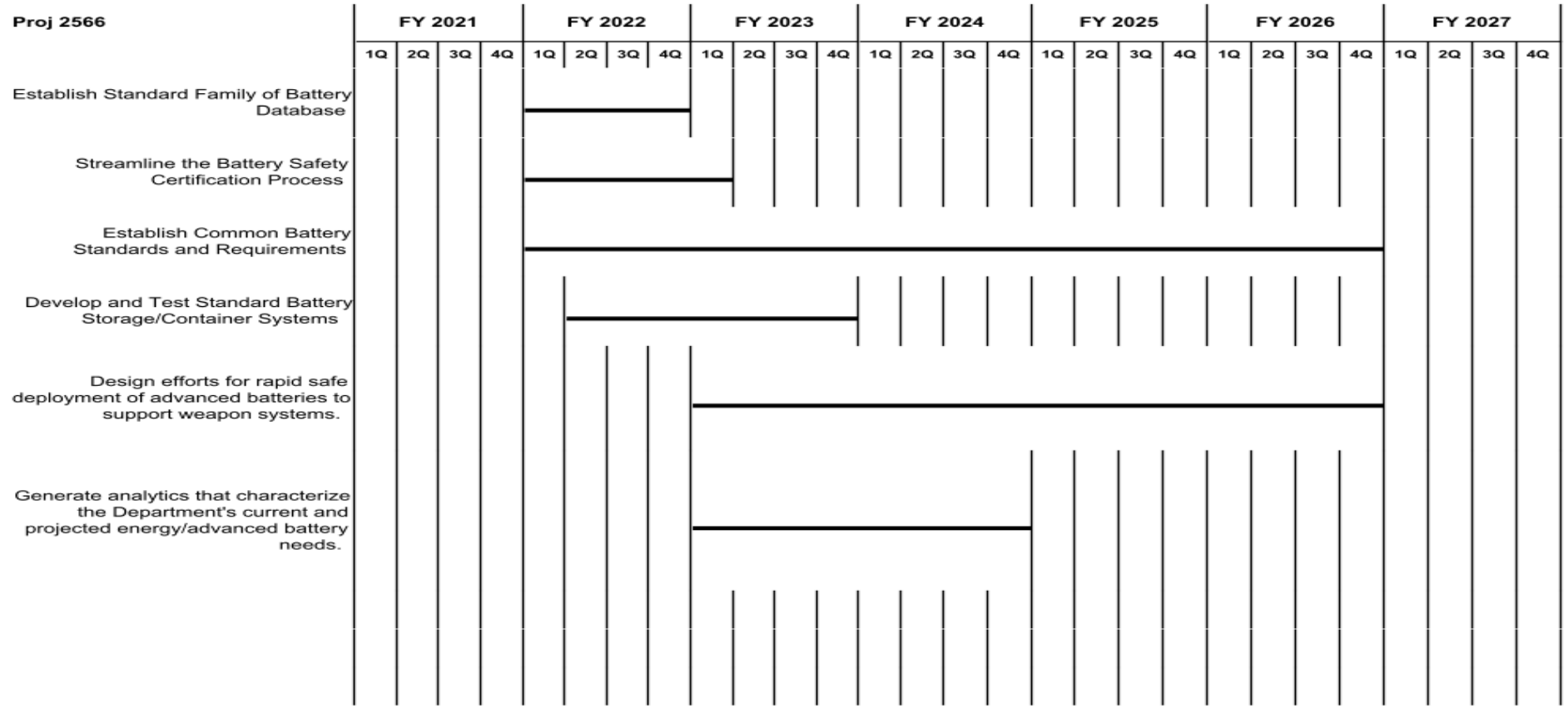


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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 2566 / *Battery Development and Safety*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2566				
Establish Standard Family of Battery Database:	1	2022	4	2022
Streamline the Battery Safety Certification Process:	1	2022	1	2023
Establish Common Battery Standards and Requirements:	1	2022	4	2026
Develop and Test Standard Battery Storage/Container Systems:	2	2022	4	2023
Design efforts for rapid safe deployment of advanced batteries to support weapon systems.:	1	2023	4	2026
Generate analytics that characterize the Department's current and projected energy/ advanced battery needs.:	1	2023	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 9999 / *Congressional Adds*	

COST ($ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
9999: *Congressional Adds*	86.056	31.848	34.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	152.404
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

FY2021 Congressional Add for C492 - Natural Gas Technologies.
FY2021 Congressional Add for C671 - System Sensors Microgrids.
FY2022 Congressional Add for C545 - Marine System Sensors Microgrids.
FY2022 Congressional Add for C782 - Cargo Drone Family of Advanced Batteries.
FY2022 Congressional Add for C758 - Navy Energy Program.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
Congressional Add: Program Increase ***FY 2021 Accomplishments:*** N/A ***FY 2022 Plans:*** N/A	14.472	0.000
Congressional Add: Natural Gas Technologies ***FY 2021 Accomplishments:*** N/A ***FY 2022 Plans:*** N/A	7.240	0.000
Congressional Add: Marine energy systems for sensors and microgrids ***FY 2021 Accomplishments:*** N/A ***FY 2022 Plans:*** Commence work on Marine energy systems for sensors and microgrids Congressional Add.	0.000	10.500
Congressional Add: Marine Energy Converters for Sensors and Microgrids ***FY 2021 Accomplishments:*** N/A ***FY 2022 Plans:*** N/A	10.136	0.000
Congressional Add: Navy energy program	0.000	15.000

Exhibit R-2A, RDT&E Project Justification: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 9999 / *Congressional Adds*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022
FY 2021 Accomplishments: N/A ***FY 2022 Plans:*** NAVY ENERGY PROGRAM increases RDT&E investment to address challenges posed by contested logistics environments and energy supply chains. Including fuels and energy storage, and technologies for energy demand reduction, energy monitoring, and platform reach/endurance.		
Congressional Add: Cargo drone family of advanced batteries ***FY 2021 Accomplishments:*** N/A ***FY 2022 Plans:*** Commence work on Congressional Add for Cargo drone family of advanced batteries.	0.000	9.000
Congressional Adds Subtotals	31.848	34.500

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDTEN Contracts are Competitive Procurements

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 9999 / *Congressional Adds*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prior year Congressional Adds	Various	Various : Various	71.585	0.000		0.000		0.000		-		0.000	0.000	71.585	-
Battery Development and Safety Enterprise	TBD	TBD : TBD	14.471	13.848	Sep 2021	0.000		0.000		-		0.000	0.000	28.319	-
C492 - Natural Gas Technologies	Various	EXWC : Port Hueneme, CA	0.000	7.500	Sep 2021	0.000		0.000		-		0.000	0.000	7.500	-
C671 - System Sensors Microgrids	Various	EXWC : Port Hueneme, CA	0.000	10.500	Sep 2021	0.000		0.000		-		0.000	0.000	10.500	-
C758 - Navy Energy Program	Various	TBD : TBD	0.000	0.000		7.645	Sep 2022	0.000		-		0.000	0.000	7.645	-
C782-Cargo Family Drone Battery	WR	NAWC/AD : Pax River, MD	0.000	0.000		1.500	Apr 2022	0.000		-		0.000	0.000	1.500	-
C545 - Marine Energy Converters	Various	TBD : TBD	0.000	0.000		10.500	Aug 2022	0.000		-		0.000	0.000	10.500	-
C782-Cargo Family Drone Battery	SS/BA	Packet Digital : ND	0.000	0.000		7.500	Jul 2022	0.000		-		0.000	0.000	7.500	-
C758 - Navy Energy Program H2 Stalker Increment	Various	Various : Various	0.000	0.000		2.625	Jul 2022	0.000		-		0.000	0.000	2.625	-
C758- Navy Energy Program CH-53K Hybrid Inlet	Various	various : various	0.000	0.000		2.600	Jun 2022	0.000		-		0.000	0.000	2.600	-
C758 - Navy Energy Program Improved Lith. Battery SOC,SOH	Various	various : various	0.000	0.000		0.260	Aug 2022	0.000		-		0.000	0.000	0.260	-
C758 - Navy Energy Program Drouge Stabilization	Various	various : various	0.000	0.000		1.870	Jul 2022	0.000		-		0.000	0.000	1.870	-
		Subtotal	86.056	31.848		34.500		0.000		-		0.000	0.000	152.404	N/A

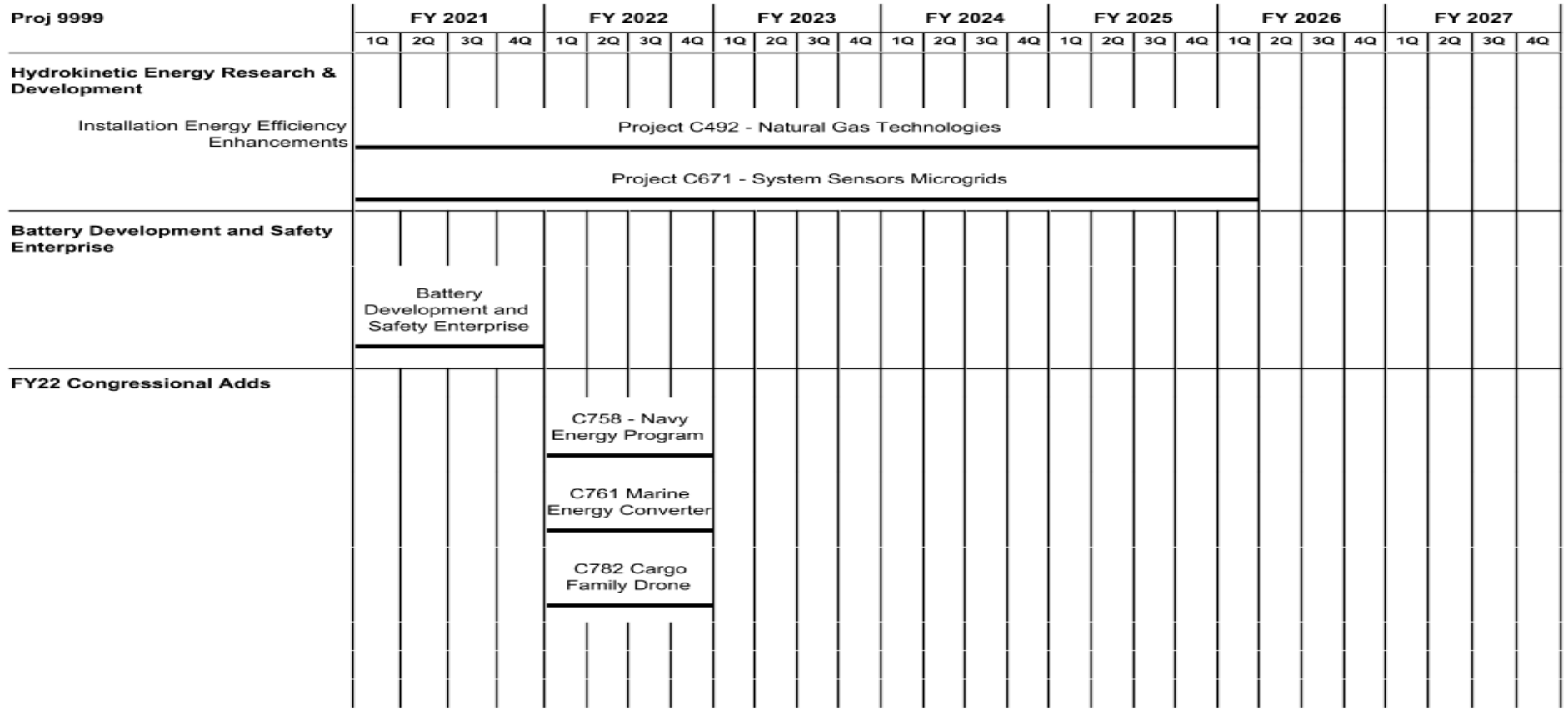
	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	86.056	31.848		34.500		0.000		-		0.000	0.000	152.404	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Navy			Date: April 2022
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 9999 / *Congressional Adds*	

	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 9999 / *Congressional Adds*



2023PB - 0603724N - 9999

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Navy		Date: April 2022
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 9999 / *Congressional Adds*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 9999				
Hydrokinetic Energy Research & Development: Installation Energy Efficiency Enhancements: Project C492 - Natural Gas Technologies	1	2021	1	2026
Hydrokinetic Energy Research & Development: Installation Energy Efficiency Enhancements: Project C671 - System Sensors Microgrids	1	2021	1	2026
Battery Development and Safety Enterprise: Battery Development and Safety Enterprise	1	2021	4	2021
FY22 Congressional Adds: C758 - Navy Energy Program	1	2022	4	2022
FY22 Congressional Adds: C545 Marine Energy Converter	1	2022	4	2022
FY22 Congressional Adds: C782 Cargo Family Drone Battery	1	2022	4	2022