Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	395.296	42.425	32.656	26.514	-	26.514	26.915	27.465	28.002	28.560	Continuing	Continuing
0829: *ENERGY CONSERVATION (ADV)*	77.280	7.769	5.489	5.607	-	5.607	5.736	5.856	5.971	6.091	Continuing	Continuing
0838: *Mobility Fuels (ADV)*	91.827	7.782	7.921	8.281	-	8.281	8.330	8.505	8.664	8.837	Continuing	Continuing
0928: *Shore Energy Technology*	52.209	1.773	1.704	1.869	-	1.869	1.887	1.924	1.964	2.002	Continuing	Continuing
0996: *Aircraft Energy Conservation*	142.568	7.614	10.542	10.757	-	10.757	10.962	11.180	11.403	11.630	Continuing	Continuing
9999: *Congressional Adds*	31.412	17.487	7.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	55.899

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.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	25.623	25.656	26.452	-	26.452
Current President's Budget	42.425	32.656	26.514	-	26.514
Total Adjustments	16.802	7.000	0.062	-	0.062
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	7.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	3.846	0.000			
• SBIR/STTR Transfer	-1.044	0.000			
• Program Adjustments	0.000	0.000	0.000	-	0.000
• Rate/Misc Adjustments	0.000	0.000	0.062	-	0.062

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy				Date: March 2019
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*		
• Congressional Add Adjustments	14.000	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: 9999: *Congressional Adds*		
Congressional Add: *Program Increase*	3.846	0.000
Congressional Add: *Program Increase: Renewable Energy Development*	9.641	7.000
Congressional Add: *Natural Gas Technologies*	4.000	0.000
Congressional Add Subtotals for Project: 9999	17.487	7.000
Congressional Add Totals for all Projects	17.487	7.000

Change Summary Explanation

Schedule:

0838 - Emerging Platform CONOPS added FY20 1Qtr through 4Qtr FY24 and Maintain Operational Compatibility 1Qtr FY18 through 4Qtr FY24 is to support the increased requirements of emerging systems and operational scenarios placed on tactical fuels and the need to conduct testing to ensure acceptable fuel performance or identify the fuel property and/or chemistry that needs to be modified. Mitigation of Field Fuel Deficiencies and Fuel Quality Surveillance changes are added for clarity.

Technical: Not applicable.

The funding decreases in FY 2018 and FY 2019 reflect a shift in Department of the Navy (DoN) priorities and an urgent requirement to address emergent, critical unfunded requirements in FY 2018. The decrease aligns Energy program funding to the previous amounts executed prior to FY 2011.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
0829: *ENERGY CONSERVATION (ADV)*	77.280	7.769	5.489	5.607	-	5.607	5.736	5.856	5.971	6.091	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Energy Conversation Advanced Project is designed to develop and implement energy and maintenance saving improvements into existing Fleet assets. This energy conservation project, managed through NAVSEA 05T, will identify mature potential energy saving areas, by involvement with Fleet representatives, Life-Cycle Managers (LCMs), NAVSEA Technical Warrant Holders, In-Service Engineering Agents (ISEAs), PEOs, TMA/TMI, Industry, and Academia. The project directly supports SECNAV and CNO goals to reduce energy consumption and increase operational capability (i.e., increase time on station). Current focus is on Energy Monitoring and Assessment Technologies aimed at reducing energy consumption on operation ships with potential technology target areas that include: Power Generation and Storage systems, Hull Hydrodynamics, Underwater Hull Husbandry, Heating, Ventilation & Air Conditioning (HVAC) Systems, Thermal Management, Main Propulsion Systems, Electrical Systems and Auxiliary Systems. Potential energy saving proposals, Energy Conservation Concepts (ECC), are developed each FY for evaluation by functional category. Based on review of a business case and a technical community review projects are selected for development. Not all proposed ECCs are pursued and changes to planned funding between functional categories or fiscal years can occur based on the technology maturity level, ship schedule changes, or other factors affecting the projected development or testing timeline.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Title: Power Generation and Storage Sub Project	0.600	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: (U) 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 2019 Plans:*** N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A					
Title: Hull Hydrodynamic Sub Project	0.277	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Articles:	-	-	-	-	-
Description: (U) 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 and cost effectiveness of these improvements. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A					
Title: Underwater Hull Husbandry Sub Project	0.213	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: (U) 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 2019 Plans:*** N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A					
Title: Electrical Systems Sub Project	0.390	0.000	0.000	0.000	0.000
Articles:	-	-	-	-	-
Description: (U) Electrical Systems Sub Project - Project funds will be utilized to identify and perform land based and shipboard testing of ship electrical system improvements to reduce energy. ***FY 2019 Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A					
Title: Auxiliary Systems Sub Project ***Articles:*** ***Description:*** (U) 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 2019 Plans:*** N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A	0.154 -	0.000 -	0.000 -	0.000 -	0.000 -
Title: Thermal Management Sub Project ***Articles:*** ***Description:*** (U) 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 2019 Plans:*** Continue exploration of waste heat technologies and methods for shipboard application. Provide report of findings with recommendations. Continue to identify additional energy saving/capability improvement technologies in Thermal Management that may be applicable to navy ships. Prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel consumption. ***FY 2020 Base Plans:***	0.372 -	0.413 -	0.000 -	0.000 -	0.000 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY19 funding is an investigative study to identify potential applications for possible waste heat recovery applications. Funding limitations in FY20 with other higher priorities will delay pursuit of shipboard applications for evaluation.					
Title: Main Propulsion Systems Sub Project ***Articles:*** ***Description:*** (U) Propulsion Systems Sub Project - Project funds will be utilized to identify requirements and perform land based and ship board testing of ship propulsion system improvements, on Gas Turbine, Steam, and Diesel Engine systems to reduce overall fuel consumption and lower maintenance costs. ***FY 2019 Plans:*** N/A ***FY 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** N/A	0.350 -	0.000 -	0.000 -	0.000 -	0.000 -
Title: Energy Monitoring & Assessment ***Articles:*** ***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. ***FY 2019 Plans:*** Provide engineering, technical and programmatic support of energy initiatives that put in place shore and shipboard monitoring and assessment tools aimed at optimizing ships' energy profiles and increasing operational capabilities. Continue GENISYS development efforts and shipboard evaluation including integration of GENISYS with enterprise Remote Monitoring (eRM) capabilities to support future fleet-wide implementation. Continue to identify additional energy saving/capability improvement technologies and monitoring methodologies	5.413 -	5.076 -	5.607 -	0.000 -	5.607 -

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel. ***FY 2020 Base Plans:*** Provide engineering, technical and programmatic support of energy initiatives that put in place shore and shipboard monitoring and assessment tools aimed at optimizing ships' energy profiles and increasing operational capabilities. Continue GENISYS development efforts and shipboard evaluation including integration of GENISYS with enterprise Remote Monitoring (eRM) capabilities to support future fleet-wide implementation. Support expanding the use of the data collected by GENISYS to support Maritime Energy Operational Command and Control requirements currently being developed by DASN RD&A and US Fleet Forces Command. Continue to identify additional energy saving/capability improvement technologies and monitoring methodologies and prepare proposals and business case analyses for promising technologies with potential to reduce fossil fuel. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of 0.531M is required to support continuation of high profile GENISYS program management and the transition from development to shipboard test and evaluation phase in FY20.					
Accomplishments/Planned Programs Subtotals	7.769	5.489	5.607	0.000	5.607

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

RDT&E Contracts are Competitive Procurements.

E. Performance Metrics

Quarterly Program Reviews

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0829 / *ENERGY CONSERVATION (ADV)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	C/CPFF	NAVSEA HQ : Washington, DC	0.000	1.110	Jan 2018	0.000		0.200	Jan 2020	-		0.200	0.000	1.310	-
Systems Engineering	WR	NSWC DD : Dahlgren, MD	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	-
Systems Engineering	WR	NSWC PHila : Philadelphia, PA	1.655	1.079	Nov 2017	0.328	Nov 2018	0.100	Nov 2019	-		0.100	0.000	3.162	-
Primary Hardware Development	WR	NSWC Carderock : Bethesda, MD	8.983	0.000		0.000		0.000		-		0.000	0.000	8.983	-
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	6.635	0.313	Nov 2018	0.000		0.000		-		0.000	0.000	6.948	-
Engineering Development	WR	NSWC Carderock : Bethesda, MD	8.369	0.000		0.000		0.000		-		0.000	0.000	8.369	-
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	1.300	1.286	Jan 2018	2.169	Jan 2019	0.883	Jan 2020	-		0.883	0.000	5.638	-
Primary Hardware Development	C/CPAF	NSWC PHila : Philadelphia, PA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
System Engineering	WR	NSWC CR : Crane, Indiana	0.000	0.300	Dec 2018	0.000		0.000		-		0.000	0.000	0.300	-
System Engineering	WR	NUWC NPT : Newport, Rhode Is	0.000	0.193	Dec 2018	0.000		0.000		-		0.000	0.000	0.193	-
		Subtotal	35.291	4.281		2.497		1.183		-		1.183	0.000	43.252	N/A

Remarks

Increase of 0.200M in Systems Engineering (NAVSEA HQ) is for GENISYS product development support and decrease of 0.228M (NSWC PHILA) is due to reduced engineering support required in identifying and design development of new technology initiatives under FY20 budget level. Decrease of 1.286M in System Development (NAWC-AD) reflects transition of GENISYS product development to Test and Evaluation in FY20.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	WR	NSWC Carderock : Bethesda, MD	2.843	0.000	Jan 2018	0.344	Nov 2018	0.217	Nov 2019	-		0.217	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	0.878	0.000		0.100	Jan 2019	0.050	Jan 2020	-		0.050	0.000	1.028	-
Development Support	C/CPFF	NAVSEA HQ : Washington, DC	0.249	1.316	Dec 2018	0.479	Jan 2019	0.421	Jan 2020	-		0.421	0.000	2.465	-
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	2.146	0.150	Dec 2017	0.494	Nov 2018	0.397	Nov 2019	-		0.397	0.000	3.187	-
Development Support	C/CPAF	SUPSHIP : Bath, MA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	-
Development Support	WR	NSWC DD : Dahlgren, Va	0.000	0.050	Dec 2018	0.000		0.000		-		0.000	0.000	0.050	-
		Subtotal	10.493	1.516		1.417		1.085		-		1.085	Continuing	Continuing	N/A

Remarks

Decrease of 0.239M in Development Support (NSWC PHILA and NSWC Carderock) is due to reduction in engineering efforts to investigate and develop designs for new fuel saving technologies under FY20 budget level.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC Carderock : Bethesda, MD	9.961	0.000		0.085	Dec 2018	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operational Test & Evaluation	WR	NSWC Carderock : Bethesda, MD	10.645	0.000		0.000		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		0.000		-		0.000	0.000	0.383	-
Developmental Test & Evaluation	WR	NSWC SSES : Philadelphia, PA	0.549	0.369	Feb 2018	0.000		0.000		-		0.000	0.000	0.918	-
Developmental Test & Evaluation	WR	APL : Washington, DC	0.000	0.000		0.085	Jan 2019	0.000		-		0.000	0.000	0.085	-
System Development	C/BOA	NAWC-AD : Lakehurst, NJ	0.000	0.000		0.000		1.924	Jan 2020	-		1.924	0.000	1.924	-
		Subtotal	21.920	0.369		0.170		1.924		-		1.924	Continuing	Continuing	N/A

Remarks

Increase of 1.755M is due to transition of GENISYS from development to shipboard Test and Evaluation phase and integration with shipboard Consolidated Afloat Networks and Enterprise Services (CANES).

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NSWC Philadelphia : Philadelphia, PA	6.680	0.420	Nov 2017	0.000		0.000		-		0.000	0.000	7.100	-
Travel	Allot	NAVSEA HQ : Washington, DC	0.189	0.013	Dec 2017	0.007	Dec 2018	0.007	Dec 2019	-		0.007	0.000	0.216	-
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/CPFF	NAVSEA HQ : Washington, DC	1.680	0.813	Jan 2018	1.378	Jan 2019	1.388	Jan 2020	-		1.388	0.000	5.259	-
Program Management Support	WR	NSWC Carderock : Bethesda, MD	0.675	0.357	Nov 2017	0.020	Mar 2019	0.020	Mar 2020	-		0.020	0.000	1.072	-
		Subtotal	9.576	1.603		1.405		1.415		-		1.415	0.000	13.999	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 4	R-1 Program Element (Number/Name) PE 0603724N / *Navy Energy Program*	Project (Number/Name) 0829 / *ENERGY CONSERVATION (ADV)*	

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	77.280	7.769		5.489		5.607		-		5.607	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

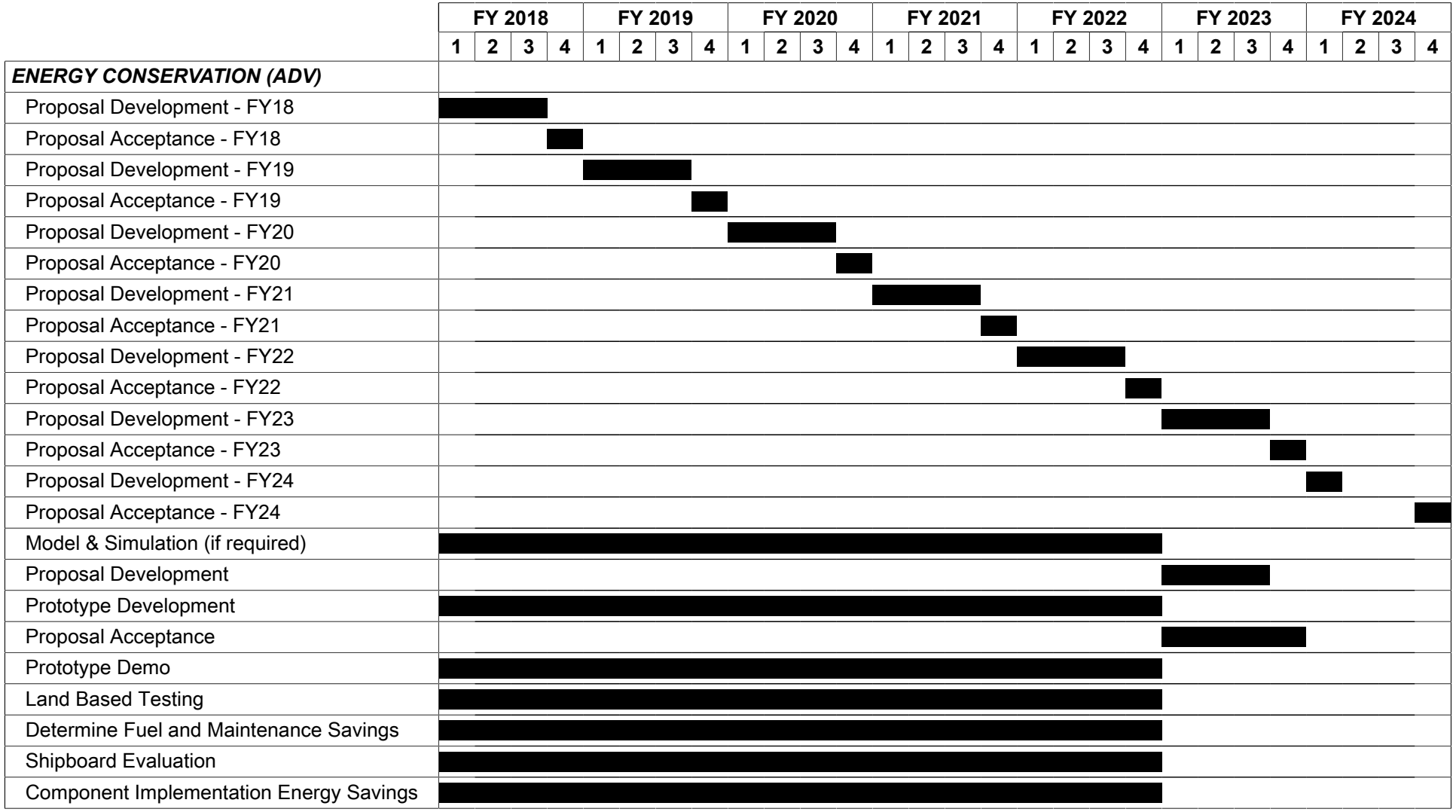

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ENERGY CONSERVATION (ADV)				
Proposal Development - FY18	1	2018	3	2018
Proposal Acceptance - FY18	4	2018	4	2018
Proposal Development - FY19	1	2019	3	2019
Proposal Acceptance - FY19	4	2019	4	2019
Proposal Development - FY20	1	2020	3	2020
Proposal Acceptance - FY20	4	2020	4	2020
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	1	2024
Proposal Acceptance - FY24	4	2024	4	2024
Model & Simulation (if required)	1	2018	4	2022
Proposal Development	1	2023	3	2023
Prototype Development	1	2018	4	2022
Proposal Acceptance	1	2023	4	2023
Prototype Demo	1	2018	4	2022
Land Based Testing	1	2018	4	2022
Determine Fuel and Maintenance Savings	1	2018	4	2022
Shipboard Evaluation	1	2018	4	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0829 / *ENERGY CONSERVATION (ADV)*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Component Implementation Energy Savings	1	2018	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
0838: *Mobility Fuels (ADV)*	91.827	7.782	7.921	8.281	-	8.281	8.330	8.505	8.664	8.837	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project represents the Navy's only RDTE investment designed to maintain 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 of 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 project provides data through laboratory, component, engine, fuel system, and platform tests, which 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 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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Naval Tactical Fuels	7.782	7.921	8.281	0.000	8.281
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 2019 Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Conduct rig and component tests to assure interoperability with changing worldwide commercial aviation fuel specifications. Continue development of analytical tools to facilite rapid mitigation of field-identified aviation and ship propulsion fuel deficiencies. Continue development data analytic techniques to rapidly evaluate fuel chemical composition, performance and field databases. Field trial advance fuel quality surveillance tools . ***FY 2020 Base Plans:*** Develop and evaluate forward-positioned fuel chemistry and property Quality Surveillance sensor systems. Continue development of interactive data visualization and data science tools to rapidly analyze fuel property, composition, performance, and logistics data. Field trial advance fuel contamination quality surveillance technology. Conduct lab, rig and component tests to assure interoperability with evolving commercial specification and platform requirements. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** The $36K increase will support the development of the Fuels Quality Surveillance sensor systems.					
Accomplishments/Planned Programs Subtotals	7.782	7.921	8.281	0.000	8.281

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.

E. Performance Metrics

Program will assess changes and develop data, test methods and hardware performance analysis for all Naval aircraft and ships. Program will evaluate fuel chemistry and properties and develop technologies to identify and assess impact of differences.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NRL : Washington, D.C.	5.052	1.100	Dec 2017	0.800	Dec 2018	1.000	Dec 2019	-		1.000	Continuing	Continuing	Continuing
Systems Engineering	WR	NAWCAD : Patuxent River, MD	16.818	2.297	Dec 2017	2.046	Dec 2018	2.187	Dec 2019	-		2.187	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : Philadelphia, PA	3.778	0.150	Jan 2018	0.500	Jan 2019	0.500	Jan 2020	-		0.500	Continuing	Continuing	Continuing
Systems Engineering	WR	NSWC : Bethesda, MD	0.312	0.050	Feb 2018	0.100	Mar 2019	0.000		-		0.000	0.000	0.462	-
Systems Engineering	C/FFP	Various : Various	0.960	1.123	Mar 2018	0.652	Apr 2019	1.021	Apr 2020	-		1.021	0.000	3.756	3.756
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	-
		Subtotal	27.081	4.720		4.098		4.708		-		4.708	Continuing	Continuing	N/A

Remarks

1. NRL $200K increase due to workload requirement to support FY20 field fuel property and chemistry sensor project
2. NAWC $96K increase due to increase in test consumable costs
6. VARIOUS $369K increase due to increase workload requirement to support FY20 field fuel property and chemistry sensor project.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Fuel	C/FFP	Various : Various	2.000	0.000		0.000		0.000		-		0.000	0.000	2.000	2.000
Test Fuel	C/FFP	Applied Research Associates : Albuquerque, NM	3.858	0.000		0.000		0.000		-		0.000	0.000	3.858	3.858
Hardware Testing	WR	NAWCAD : Patuxent River, MD	4.449	0.200	Dec 2017	0.200	Dec 2018	1.000	Dec 2019	-		1.000	Continuing	Continuing	Continuing
Hardware Testing	C/CPFF	Life Cycle Engineering : Charleston, SC	12.980	2.000	Dec 2017	1.943	Apr 2019	2.000	Mar 2020	-		2.000	0.000	18.923	18.923
Hardware Testing	SS/CPFF	Rolls Royce : Indianapolis, IN	2.912	0.000		0.000		0.000		-		0.000	0.000	2.912	2.912

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Testing	C/CPFF	Univ of Dayton Research Inst : Dayton, OH	0.889	0.000		0.400	Feb 2019	0.000		-		0.000	0.000	1.289	1.289
Hardware Testing	WR	US Naval Academy : Annapolis, MD	0.098	0.050	May 2018	0.050	Apr 2019	0.040	Apr 2020	-		0.040	0.000	0.238	-
Hardware Testing	C/CPFF	General Electric : Lynn, MA	1.237	0.000		0.000		0.000		-		0.000	0.000	1.237	1.237
Hardware Testing	WR	NSWC : Philadelphia, PA	0.080	0.000		0.000		0.000		-		0.000	0.000	0.080	-
Hardware Testing	C/FFP	Various : Various	6.183	0.500	Jan 2018	0.920	Feb 2019	0.223	Mar 2020	-		0.223	0.000	7.826	7.826
Hardware Testing	WR	NSWC : Port Hueneme, CA	0.200	0.000		0.000		0.000		-		0.000	0.000	0.200	-
Hardware Testing	C/CPFF	DL Mgmt Services JT Venture : Plainfield, IL	0.004	0.000		0.000		0.000		-		0.000	0.000	0.004	0.004
Fuel Delivery	MIPR	DLA-Energy : Ft. Belvoir, VA	0.647	0.000		0.000		0.050	Jan 2020	-		0.050	0.000	0.697	-
Fuel Blend Testing	WR	Naval Medical Research Unit : Dayton, OH	0.042	0.000		0.000		0.000		-		0.000	0.000	0.042	-
Prior year T & E no longer funded in the FYDP	Various	Various : Various	21.212	0.000		0.000		0.000		-		0.000	0.000	21.212	-
		Subtotal	56.791	2.750		3.513		3.313		-		3.313	Continuing	Continuing	N/A

Remarks

3. NAWC $800K increase due to transition of testing in house previously performed by contractor and increase requirement to support in house and field fuel property and chemistry sensor project.
4. LCE increase of $57K due to increase test costs
14. DLA increase of $50K due to test fuel transportation costs from Patuxent River storage location to contractor test sites.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0838 / *Mobility Fuels (ADV)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NAWCAD : Patuxent River, MD	1.291	0.300	Dec 2017	0.300	Dec 2018	0.250	Dec 2019	-		0.250	Continuing	Continuing	Continuing
Program Management Support	WR	NAVSUP : San Diego, CA	0.027	0.000		0.000		0.000		-		0.000	0.000	0.027	Continuing
Program Management Support	C/FFP	Coord Research Council : Alpharetta, GA	0.050	0.010	Nov 2017	0.010	Nov 2018	0.010	Nov 2019	-		0.010	0.000	0.080	0.080
Program Management Support	WR	NAVSEA : Washington, DC	0.004	0.002	Nov 2017	0.000		0.000		-		0.000	0.000	0.006	-
Prior year Mgmt Supp no longer funded in the FYDP	Various	Various : Various	6.583	0.000		0.000		0.000		-		0.000	0.000	6.583	-
		Subtotal	7.955	0.312		0.310		0.260		-		0.260	Continuing	Continuing	N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	91.827	7.782		7.921		8.281		-		8.281	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0838 / *Mobility Fuels (ADV)*

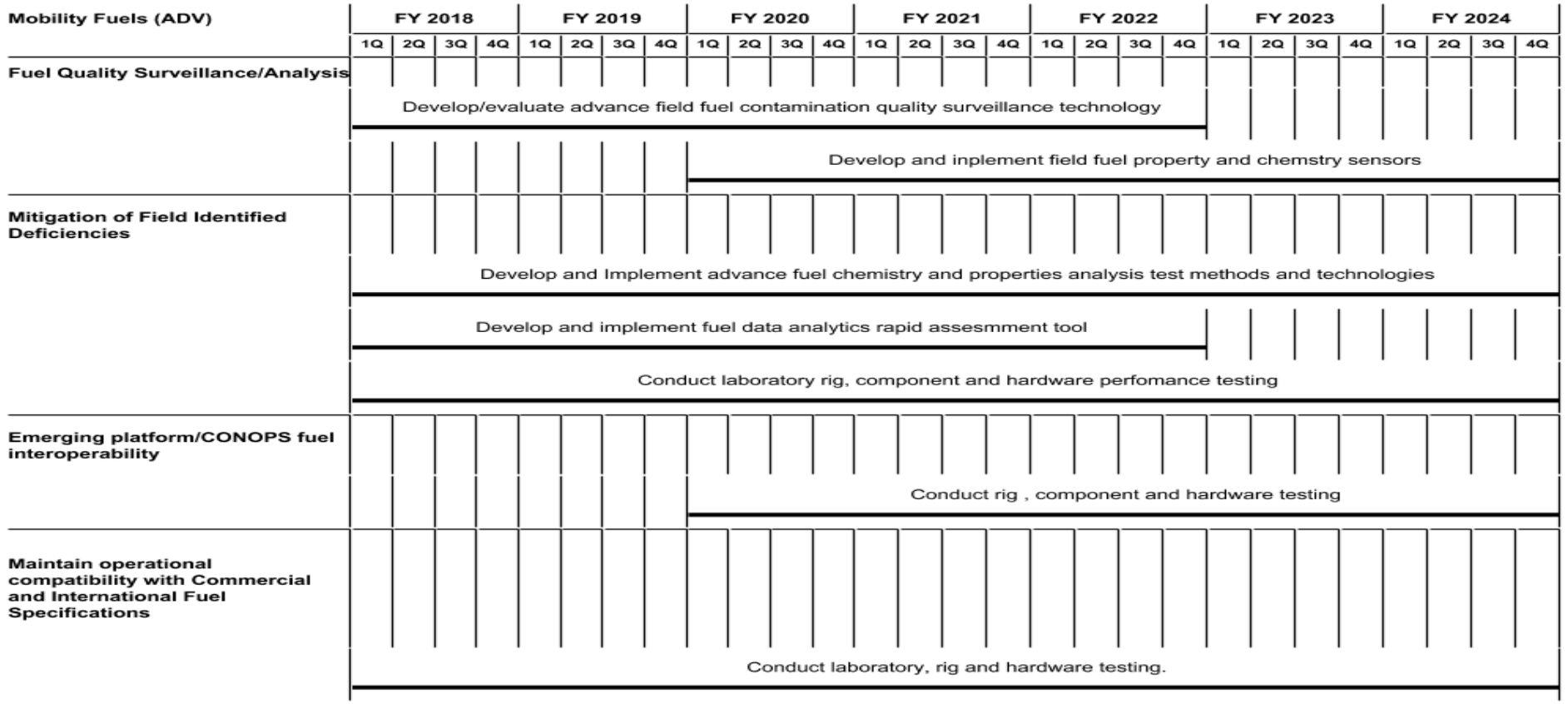

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0838 / *Mobility Fuels (ADV)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Mobility Fuels (ADV)				
Fuel Quality Surveillance/Analysis: Develop/evaluate advance field fuel contamination quality surveillance technology	1	2018	4	2022
Fuel Quality Surveillance/Analysis: Develop and implement field fuel property and chemstry sensors	1	2020	4	2024
Mitigation of Field Identified Deficiencies: Develop and Implement advance fuel chemistry and properties analysis test methods and technologies	1	2018	4	2024
Mitigation of Field Identified Deficiencies: Develop and implement fuel data analytics rapid assesmment tool	1	2018	4	2022
Mitigation of Field Identified Deficiencies: Conduct laboratory rig, component and hardware perfomance testing	1	2018	4	2024
Emerging platform/CONOPS fuel interoperability: Conduct rig, component and hardware testing	1	2020	4	2024
Maintain operational compatibility with Commercial and International Fuel Specifications: Conduct laboratory, rig and hardware testing.	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
0928: *Shore Energy Technology*	52.209	1.773	1.704	1.869	-	1.869	1.887	1.924	1.964	2.002	Continuing	Continuing
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Legislation, Executive Orders (EO), and SECNAV Guidance direct DoN to reduce fossil fuel use and increase energy resiliency through efficiency, reliability, and alternative energy sources. This guidance includes the National Defense Authorization Act of 2010, which directs DOD to source 25% of its energy from renewable sources by 2025, EO13514, which directs DOD to reduce greenhouse gas emissions by 2020, and SECNAV energy goals, which direct that 50% of DoN's energy come from alternative sources by 2020. Further, studies by the Defense Science Board and others have stressed the dangerous reliance of DOD on vulnerable grid power and unreliable imported oil.

This Energy RDT&E Project will test, evaluate, and validate components as well as demonstrate cost-effective and technical viability of energy security and efficiency, 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 Smart Energy Management Technology: This project will support the testing, demonstration, validation, and application of innovative facility energy efficiency and alternative energy technology.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Title: Shore Energy Technology	1.773	1.704	1.869	0.000	1.869
Articles:	-	-	-	-	-
FY 2019 Plans: - Continue demonstration, testing, and evaluation of improved and low cost smart and microgrid energy management technologies to enable energy security. - Continue demonstration of cyber secure technologies utilizing cyber testbed. - Test, validate and demonstrate wireless controls. Obtain Risk Management Framework certification, install, and test in operational environment. - Installation and demonstration of energy efficient wastewater treatment of both mobile and stationary facilities to save energy and water. Test systems in operational environment. - Demonstration and validation of cyber security technologies for energy controls systems in an operational environment to enable a cyber secure environment.					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
- Initiate new projects in energy resiliency including cyber security of energy controls systems. ***FY 2020 Base Plans:*** - Development and demonstration of large scale energy storage sites to include cyber security measures for execution. - Development of adaptable microgrids that utilize artifial intellegence and high voltage solid state power electronics using renewable energy test bed. - Development and demonstration of predictive modeling, neural network, and predictive energy tools. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase of $155K in FY20 budget due to additional investment in the demonstration of large scale energy storage in operational locations.					
Accomplishments/Planned Programs Subtotals	1.773	1.704	1.869	0.000	1.869

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.

E. Performance Metrics

The program will be coordinated across DOD and with other agencies as appropriate.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Renewable Energy	Various	EXWC : Port Hueneme, CA	42.260	0.000	Dec 2017	0.000		0.040	Dec 2019	-		0.040	Continuing	Continuing	Continuing
Energy Efficiency, Security and Systems (Includes cybersecurity)	Various	EXWC : Port Hueneme, CA	4.627	1.773	Oct 2017	1.704	Oct 2018	1.374	Oct 2019	-		1.374	Continuing	Continuing	Continuing
Energy Storage	Various	EXWC : Port Hueneme, CA	5.322	0.000	Dec 2017	0.000		0.455	Dec 2019	-		0.455	Continuing	Continuing	Continuing
		Subtotal	52.209	1.773		1.704		1.869		-		1.869	Continuing	Continuing	N/A

Remarks

-Renewable Energy: ($0.00 FY19-$0.040 in FY20): Increase in FY20 budget due to additional investment in demonstration of advanced large-scale energy collection technologies in operational locations.
-Energy Storage: ($0.00 FY19-$0.455 in FY20): Increase in FY20 budget due to additional investment in the demonstration of large scale energy storage in operational locations.

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	52.209	1.773		1.704		1.869		-		1.869	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0928 / *Shore Energy Technology*

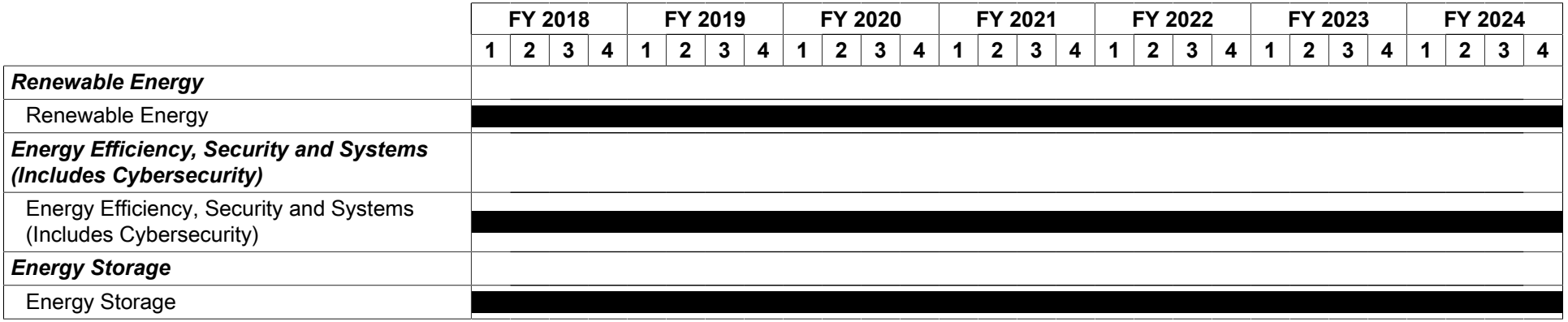


Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0928 / *Shore Energy Technology*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Renewable Energy				
Renewable Energy	1	2018	4	2024
Energy Efficiency, Security and Systems (Includes Cybersecurity)				
Energy Efficiency, Security and Systems (Includes Cybersecurity)	1	2018	4	2024
Energy Storage				
Energy Storage	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
0996: *Aircraft Energy Conservation*	142.568	7.614	10.542	10.757	-	10.757	10.962	11.180	11.403	11.630	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. Improving an aircraft's energy efficiency has a direct relationship to enhanced combat capability in austere operating environments. This program engages technical experts from across Naval aviation, industry, and academia to identify potential energy efficiency best practices and technologies for development, testing and assessment to determine technical viability and potential benefit to mission capability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Aircraft Energy Conservation	7.614	10.542	10.757	0.000	10.757
Articles:	-	-	-	-	-
FY 2019 Plans: Continue identification, validation and implementation of energy conservation/efficiency concepts, best practices and metrics. Field aviation energy fleet dashboard. Initiate fielding of algorithm to optimize trim/reduce drag of F-18 during flight. Continue evaluation of engine technology to improve efficiency of MQ-8C and F-18.					
FY 2020 Base Plans: Continue identification, testing and assessment of energy efficiency best practices, technologies and metrics. Conduct MQ-8C engine efficiency technology air vehicle integration testing. Continue fielding and assessing algorithm to optimize trim/reduce drag of F-18 during flight. Assess potential to expand Naval Aviation Energy Dashboard with maintenance/reliability metrics.					
FY 2020 OCO Plans: N/A					
FY 2019 to FY 2020 Increase/Decrease Statement: The $215k increase will accelerate the testing and validation of energy efficiency best practices and technologies.					
Accomplishments/Planned Programs Subtotals	7.614	10.542	10.757	0.000	10.757

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0996 / *Aircraft Energy Conservation*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

This is a non-acquisition program that develops, evaluates, and validates mature technologies in support of energy efficiency and increased mission capability.

E. Performance Metrics

Actual performance of energy conservation initiatives are measured against initially projected fuel savings measured in barrels of fuel saved based on aircraft demonstration testing.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	NAWCAD : Patuxent River, MD	5.645	1.724	Nov 2017	1.917	Dec 2018	2.257	Dec 2019	-		2.257	Continuing	Continuing	Continuing
Systems Engineering	C/CPFF	Lockheed Martin : Fort Worth, TX	0.684	0.000		0.000		0.000		-		0.000	0.000	0.684	0.684
Systems Engineering	C/FFP	The Boeing Co. : St. Louis, MO	0.400	0.000		0.000		0.000		-		0.000	0.000	0.400	0.400
Systems Engineering	C/CPFF	TBD : TBD	0.064	0.000		0.000		0.000		-		0.000	0.000	0.064	0.064
Systems Engineering	C/CPFF	The Boeing Company : Seattle, WA	1.150	0.000		0.600	Jan 2019	0.000		-		0.000	0.000	1.750	1.750
Systems Engineering	C/CPFF	Various : Various	3.669	4.340	Mar 2018	5.425	Mar 2019	3.100	Mar 2020	-		3.100	0.000	16.534	19.034
Prior year Sys Eng no longer funded in the FYDP	Various	Various : Various	2.464	0.000		0.000		0.000		-		0.000	0.000	2.464	-
Systems Engineering	C/BA	Deloitte Consulting : Alexandria, VA	0.700	0.900	Jan 2018	1.200	Apr 2019	1.000	Apr 2020	-		1.000	0.000	3.800	3.800
		Subtotal	14.776	6.964		9.142		6.357		-		6.357	Continuing	Continuing	N/A

Remarks

NAWC Systems Engineering NAWCAD increase of $344K - Increase due to requirement for additional in-house SME labor to incorporate maintenance/reliability metrics to Naval Aviation Energy dashboard.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hardware Testing	C/CPFF	PWA : Hartford, CT	99.851	0.000		0.000		0.000		-		0.000	0.000	99.851	99.851
Hardware Testing	WR	NAWCAD : Patuxent River, MD	4.585	0.300	Jan 2018	0.000		1.000	Jan 2020	-		1.000	Continuing	Continuing	Continuing
Hardware Testing	C/CPFF	Lockheed : Fort Worth, TX	15.674	0.000		0.000		0.000		-		0.000	0.000	15.674	15.674
Prior year T&E no longer funded in the FYDP	Various	Various : Various	0.100	0.000		0.000		0.000		-		0.000	0.000	0.100	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	C/CPFF	The Boeing Company : Seattle, WA	1.500	0.000		0.000		0.000		-		0.000	0.000	1.500	1.500
Hadware Testing	C/CPFF	Various : Various	0.000	0.000		1.000	Mar 2019	3.000	Mar 2020	-		3.000	0.000	4.000	4.000
		Subtotal	121.710	0.300		1.000		4.000		-		4.000	Continuing	Continuing	N/A

Remarks

Test & Evaluation VARIOUS increase of $2M and NAWC $1M increase due to required support of engine/airframe integration testing

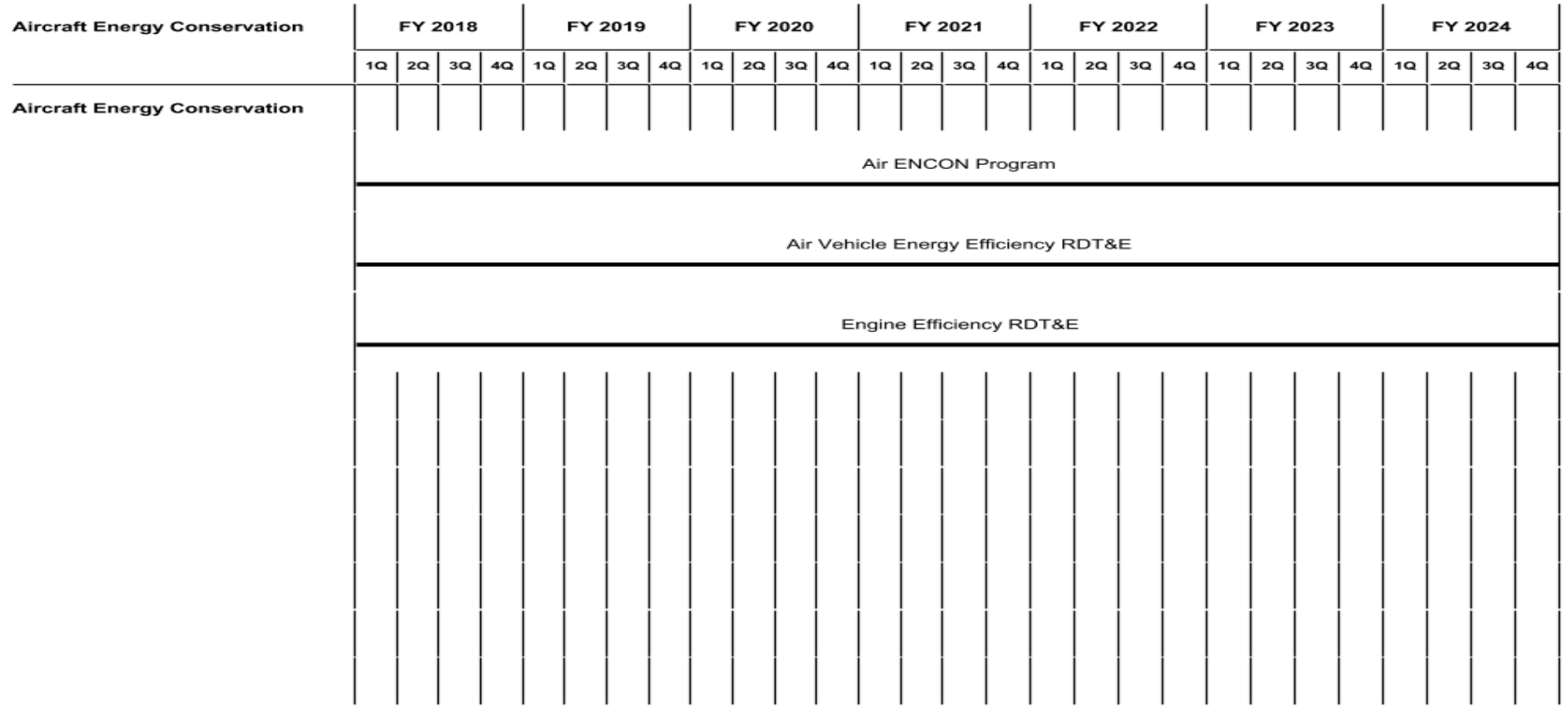
Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	WR	NAWCAD : Patuxent River, MD	1.570	0.350	Nov 2017	0.400	Dec 2018	0.400	Nov 2019	-		0.400	Continuing	Continuing	Continuing
Program Management Support	C/FFP	Deloitte Consulting : Alexandria, VA	2.415	0.000		0.000		0.000		-		0.000	0.000	2.415	2.415
Program Management Support	WR	NAWCWD : China Lake, CA	0.010	0.000		0.000		0.000		-		0.000	0.000	0.010	-
Prog Mgnt no longer funded in the FYDP	Various	Various : Various	2.087	0.000		0.000		0.000		-		0.000	0.000	2.087	-
		Subtotal	6.082	0.350		0.400		0.400		-		0.400	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	142.568	7.614		10.542		10.757		-		10.757	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 0996 / *Aircraft Energy Conservation*



2020DON - 0603724N - 0996

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
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				
Aircraft Energy Conservation: Air ENCON Program	1	2018	4	2024
Aircraft Energy Conservation: Air Vehicle Energy Efficiency RDT&E	1	2018	4	2024
Aircraft Energy Conservation: Engine Efficiency RDT&E	1	2018	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy											Date: March 2019	
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 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
9999: *Congressional Adds*	31.412	17.487	7.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	55.899
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Congressional Add for Hydrokinetic Energy Research

Congressional Add for Natural Gas Technologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019
Congressional Add: Program Increase ***FY 2018 Accomplishments:*** N/A ***FY 2019 Plans:*** N/A	3.846	0.000
Congressional Add: Program Increase: Renewable Energy Development ***FY 2018 Accomplishments:*** NAVFAC will continue to research and develop land- and ocean-based energy generation and energy efficiency technologies, and renewable energy systems, that have the potential to reduce the cost of energy and increase energy security, reliability and resiliency at Department of Defense facilities. NAVFAC will also continue its program of marine and hydrokinetic energy development and demonstration activities in coordination with other Federal agencies and entities. ***FY 2019 Plans:*** NAVFAC will continue to research and develop land- and ocean-based energy generation and energy efficiency technologies, and renewable energy systems, that have the potential to reduce the cost of energy and increase energy security, reliability and resiliency at Department of Defense facilities. NAVFAC will also continue its program of marine and hydrokinetic energy development and demonstration activities in coordination with other Federal agencies and entities.	9.641	7.000
Congressional Add: Natural Gas Technologies ***FY 2018 Accomplishments:*** N/A ***FY 2019 Plans:*** N/A	4.000	0.000
Congressional Adds Subtotals	17.487	7.000

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 9999 / *Congressional Adds*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

RDTEN Contracts are Competitive Procurements

E. Performance Metrics

Quarterly Program Reviews

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 9999 / *Congressional Adds*

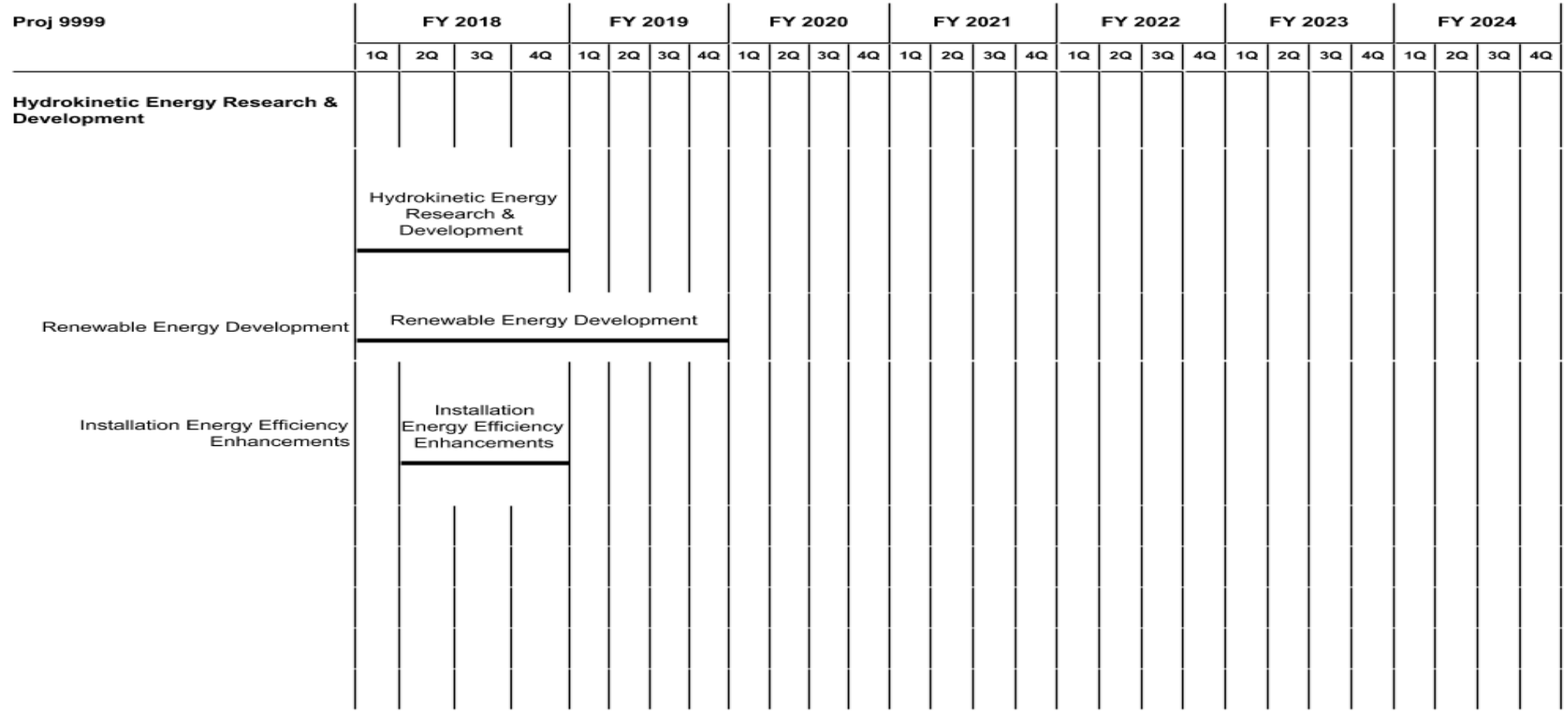
Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hydrokinetic Energy Research & Development	Various	EXWC : Port Hueneme, CA	12.069	3.846	Jan 2019	0.000		0.000		-		0.000	0.000	15.915	-
Renewable Energy Development	Various	EXWC : Port Hueneme, CA	14.507	9.641	Jan 2019	7.000	Jan 2020	0.000		-		0.000	0.000	31.148	-
Installation Energy Efficiency Enhancements	Various	EXWC : Port Hueneme, CA	4.836	0.000		0.000		0.000		-		0.000	0.000	4.836	-
Natural Gas Technology	Various	EXWC : Port Hueneme, CA	0.000	4.000	Jan 2019	0.000		0.000		-		0.000	0.000	4.000	-
		Subtotal	31.412	17.487		7.000		0.000		-		0.000	0.000	55.899	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	31.412	17.487		7.000		0.000		-		0.000	0.000	55.899	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 4	**R-1 Program Element (Number/Name)** PE 0603724N / *Navy Energy Program*	**Project (Number/Name)** 9999 / *Congressional Adds*



2020PB - 0603724N - 9999

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
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: Hydrokinetic Energy Research & Development	1	2018	4	2018
Hydrokinetic Energy Research & Development: Renewable Energy Development: Renewable Energy Development	1	2018	4	2019
Hydrokinetic Energy Research & Development: Installation Energy Efficiency Enhancements: Installation Energy Efficiency Enhancements	2	2018	4	2018