Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Office of the Secretary Of Defense	Date: March 2023
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement (OECI)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	78.099	107.989	199.142	171.668	-	171.668	176.399	178.782	187.755	191.702	-	-
455: *Operational Energy Capability Improvement*	78.099	24.746	199.142	171.668	-	171.668	176.399	178.782	187.755	191.702	-	-
456: *Commanding Energy*	0.000	35.950	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
457: *Powering the Force*	0.000	18.744	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
458: *Electrifying the Battlespace*	0.000	28.549	0.000	-	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

New Start (Y/N): No

A. Mission Description and Budget Item Justification

The Operational Energy Capability Improvement (OECI) program matures and demonstrates advanced technologies in operational energy across warfighting platforms and domains.

This program supports the Department's initiatives to Build Sustainable and Long-Term Advantage and a Resilient Joint Force. OECIF supports the Department's strategic goals to deter aggression and strategic attacks against the United States, allies, and partners, while being prepared to prevail in conflict when necessary, prioritizing the People's Republic of China (PRC) challenge in the Indo-Pacific and the Russia challenge in Europe. The OECI is the Department's dedicated investment in Operational Energy Advanced Technology Development to address joint operational energy requirements. Investments in OECI support current policy objectives and inform future policy goals.

In FY 2024, OECI will continue and complete projects started in FY 2022 and FY 2023 and will continue to initiate new projects in the following areas: 1) Powering the Force, 2) Electrifying the Battlespace, 3) Commanding Energy, and 4) Nuclear. Competitively awarded projects will continue to focus on multi-year technology maturation efforts. New focused Science and Technology (S&T) efforts will be started to specifically address operational energy challenges faced by space systems, ground vehicles, aviation systems, and the Department's commanding energy challenges. All OECI investments address high priority joint operational energy requirements to ensure best use of operational energy on the battlefield. Projects will increase the joint force's lethality and agility and reduce logistical burdens. New capabilities are required to address threats from near peer enemies across the globe and provide asymmetric advantage including better planning and use of power and fuel to achieve operational objectives while minimizing risk under contested logistics.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Office of the Secretary Of Defense	Date: March 2023
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0604055D8Z *I Operational Energy Capability Improvement (OECI)*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	108.482	180.170	170.703	-	170.703
Current President's Budget	107.989	199.142	171.668	-	171.668
Total Adjustments	-0.493	18.972	0.965	-	0.965
• Congressional General Reductions	-0.418	-0.028			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	19.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.075	-			
• Program Adjustments	-	-	0.965	-	0.965

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 455: *Operational Energy Capability Improvement*		
Congressional Add: *Operational Energy Capability Improvement Program Increase*	21.600	37.000
Congressional Add Subtotals for Project: 455	21.600	37.000
Congressional Add Totals for all Projects	21.600	37.000

Change Summary Explanation

FY 2024 minimal increase due to programmatic adjustments.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense			Date: March 2023
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0604055D8Z / *Operational Energy Capability Improvement (OECI)*	Project (Number/Name) 455 / *Operational Energy Capability Improvement*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
455: *Operational Energy Capability Improvement*	78.099	24.746	199.142	171.668	-	171.668	176.399	178.782	187.755	191.702	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The mission of the OECI is to fund innovation that will improve DoD operational effectiveness via targeted S&T investments. The program incentivizes S&T to promote long term change in DoD capabilities, so they are better aligned with the Operational Energy Strategy. The OECI fosters innovation to improve operational energy performance and has two key mission aspects. First, to develop, demonstrate, and transition into use operational energy technologies and practices that will improve DoD military capabilities and/or reduce costs. Second, to establish within the military Services and OSD, sustainable, institutional capability to continue to research, develop and adopt operational energy innovations. The OECI funds serve as “seed money” to start or consolidate promising operational energy programs to be sustained by the Services; accordingly, the OECI generally emphasizes supporting or establishing programs, rather than one-off projects.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Operational Energy Capability Improvement (OECI)	3.146	162.142	171.668
FY 2023 Plans: In FY 2023, OECI will continue and complete projects started in FY 2022 and support new projects in DoD Science and Technology Energy Strategy Focus areas of 1) Powering the Force, 2) Electrifying the Battlespace, 3) Commanding Energy, and 4) Nuclear. Two thirds of the FY 2022 projects will continue their multi-year development. Example deliverables include better energy collection, awareness, connectivity, and education with a focus on positively impacting climate change. In addition, focused S&T efforts will be initiated to specially address operational energy challenges faced by ground vehicles, aviation systems, and space systems. Technology development to support electrified/hybridized power architectures for existing crewed/uncrewed vehicles are starting and enhanced efficiency power/energy architectures for crewed/uncrewed air vehicles are being developed. Space systems that improve the efficiency of photovoltaics are maturing along with advances in energy storage, power beaming, and nuclear power systems. With additional funding, investments in expanding Hydrogen’s role in battlespace operations; improvements to batteries for arctic environments; exploring underwater power stations for land, surface, and sub-surface operations; hybrid airship operations with industry, high-altitude renewable energy aviation, and additional space energy investments would have been awarded.			
FY 2024 Plans: In FY 2024, OECI will continue and complete projects started in FY 2022 and FY 2023 and support new projects in DoD Science and Technology Energy Strategy Focus areas of 1) Powering the Force, 2) Electrifying the Battlespace, 3) Commanding Energy, and 4) Nuclear. Two thirds of previous year projects will continue their multi-year development. New focused S&T efforts will be initiated to specially address operational energy challenges faced by space systems, ground vehicles, and aviation systems.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement (OECI)*	**Project (Number/Name)** 455 / *Operational Energy Capability Improvement*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Technology development to support electrified/hybridized power architectures for existing crewed/uncrewed vehicles will continue and enhanced efficiency power/energy architectures for crewed/uncrewed air vehicles will continue development. Space technologies that improve the efficiency of photovoltaics will be matured as well as energy storage, power beaming, and nuclear power systems. OECI is partnering with industry to advance waste-to-energy and ensure all DOD burn-pit permanent closures. OECI is also solving some of the most stressing climate demands with energy investment for Arctic energy solutions. Awards will also address 200+ needs / gap references under commanding energy including investment in energy-informed mission planning, command and control for energy, operational energy data collection and distribution, modeling and simulation, and training and education. Investments will leverage commercial and cyber investments to significantly improve energy data awareness and enable combatting of carbon emissions. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** OECI competitively awards joint service-nominated projects that best provide operational advantage to combat forces with an emphasis on 1) the deployment of more mobile and distributed operations systems, 2) reduced and more agile logistics, and 3) reduced risk especially within contested environments. An increase of funding of $9.546 million from the FY 2023 appropriation is planned to account for maturation and transition of technologies to support underwater power distribution for ashore, afloat, and underwater electric capabilities along with ensuring continued maturation for precision aerial delivery (long, medium, and short range) for power and energy across the battlespace.			
Accomplishments/Planned Programs Subtotals	3.146	162.142	171.668

	FY 2022	FY 2023
Congressional Add: Operational Energy Capability Improvement Program Increase	21.600	37.000
FY 2022 Accomplishments: $10 million to support TRISO nuclear fuel cores for Project Pele (production began Dec. 7, 2023) and $11.6 million for Power and Thermal Management of Directed Energy Systems. Both contracts are performing with expected on-time delivery. This OECI success resulted in stand-up of the first commercial-scale TRISO fuel line in the U.S. and it will continue to support NASA development of fuel for space reactors and meet emerging industry demands.		
FY 2023 Plans: $8 million to support a program increases allowed competitive funding for projects in AI to support Energy Command & Control; Supply chain understanding for Chinese-dominated graphene for batteries; advances in relays for power beaming with Defense Advanced Research Projects Agency (DARPA); and prioritization of energy technology maturation opportunities across DoD; $5 million to support adaptive aerodynamic surfaces technology, $2 million to support distributed maritime energy research, $5 million to		

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense		Date: March 2023
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0604055D8Z / *Operational Energy Capability Improvement (OECI)*	**Project (Number/Name)** 455 / *Operational Energy Capability Improvement*

	FY 2022	FY 2023
support laser wireless power transfer, $10 million to support TRISO advanced fuel, and $7 million to support power and thermal management subsystem technologies for high energy laser activities.		
Congressional Adds Subtotals	21.600	37.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense			Date: March 2023
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0604055D8Z / *Operational Energy Capability Improvement (OECI)*	Project (Number/Name) 456 / *Commanding Energy*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
456: *Commanding Energy*	0.000	35.950	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Commanding Energy S&T efforts harness energy data and information to better battlespace decision making as part of Joint All-Domain Command and Control (JADC2). Specific technology advances: 1) Improve mission-planning tools and analytics; 2) Increase operational control and decision making for power and energy at all warfighting echelons; 3) Provide pioneering metering and monitoring of platform / system capabilities to ensure optimal use of energy and improve predictive maintenance; 4) Enable transition of platforms and systems through continued support and development of foundational modeling and simulation tools that include future energy concepts and innovation; 5) Bring power and energy-innovation knowledge and analytics to warfighters and senior leaders to inform future acquisition, sustainment, and budget decision making; and 6) Deliver foundational training and education on power and energy-innovation across the military and S&T communities

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Commanding Energy	35.950	-	-
Accomplishments/Planned Programs Subtotals	35.950	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense			Date: March 2023
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0604055D8Z / *Operational Energy Capability Improvement (OECI)*	Project (Number/Name) 457 / *Powering the Force*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
457: *Powering the Force*	0.000	18.744	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Powering the Force technology investments improve the energy security of military missions through innovation that save lives, lower costs, increase resilience, and strengthen warfighting capabilities while lowering carbon emissions. Specific technology innovations 1) Expand energy sources creating energy-at-the-edge through innovative synfuel production and providing power, fuel, and heat from waste; 2) Increase efficiencies of aviation platforms through novel engine/propulsion advances and alternate fuel use; 3) Deliver on the promise of tactical microgrid savings with energy storage and standardization for interoperability across US and coalition forces; 4) transition real cold-weather and energy storage solutions for hard to reach locations; and 6) Diversify, and harden for military use, distribution options and that increase operational reach and resilience

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Powering the Force	18.744	-	-
Accomplishments/Planned Programs Subtotals	18.744	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Office of the Secretary Of Defense			Date: March 2023
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0604055D8Z / *Operational Energy Capability Improvement (OECI)*	Project (Number/Name) 458 / *Electrifying the Battlespace*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
458: *Electrifying the Battlespace*	0.000	28.549	0.000	-	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Enabling the electrification of weapons, platforms, uncrewed systems and dismounted warfighters to field new offensive capabilities including sensing, active defense, and other technologies. Specific technology innovations 1) Enable Directed Energy Weapons and High Energy Lasers through novel mechanical power and thermal management innovation; 2) Electrify tactical vehicles and military platforms delivering signature management, silent watch capabilities, and increased and extended performance with decreased maintenance; 3) Provide US leadership in wireless power delivery ahead of (near)peer competitors; and 4) Deliver on innovations that enable space solar use for terrestrial and space applications, including space testing, while driving down future production costs

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Electrifying the Battlespace	28.549	-	-
Accomplishments/Planned Programs Subtotals	28.549	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A