

Increased Resiliency and Lethality through Operational Energy Investment



**Assistant Secretary of Defense
for Sustainment**

January 2022

The estimated cost of this report or study for the Department of Defense is approximately \$22,000 in Fiscal Year 2021 and \$2,000 in Fiscal Year 2022. This includes \$16,000 in expenses and \$8,000 in DoD labor.
Generated on 2021Nov03 RefID: D-E3F6A33

Overview

The Department of Defense (DoD) Increased Resiliency and Lethality through Operational Energy (OE) Investment report satisfies the request in House Report 116-442, page 84, accompanying H.R. 6395, the William M. (Mac) Thornberry National Defense Authorization Act (NDAA) for Fiscal Year 2021.

By statute, operational energy is defined as “energy required for training, moving, and sustaining military forces and weapons platforms for military operations,” and includes energy used by ships, aircraft, combat vehicles, and tactical power generators.¹

The *Operational Energy Strategy* is the Department’s plan for increasing warfighting capabilities and reducing operational risks associated with operational energy.² The strategy’s three objectives support the elements of this report in the following manner:

Reporting Element	Operational Energy Strategy Objective
<ul style="list-style-type: none">Integrating Department of Defense and military department operational energy personnel into planning, posture, and programming entities to ensure fuel consumption, fuel distribution, and logistics are considered across the Department;	Increase future warfighting capability Enhancing mission effectiveness of the current force
<ul style="list-style-type: none">Prioritizing reductions in fuel consumption by current platforms during planned upgrades and depot maintenance	Enhancing mission effectiveness of the current force
<ul style="list-style-type: none">Options for reducing the Department's consumption of fossil fuels by not less than 10 percent in 10 years and 30 percent in 25 years	Increase future warfighting capability
<ul style="list-style-type: none">Options for reducing the number of resupply convoys and oilers required in contested environments	Identify and reduce logistics and operational risks
<ul style="list-style-type: none">Leveraging existing technologies and the Operational Energy Capability Improvement Fund to demonstrate capabilities to achieve the aforementioned goals.	Increase future warfighting capability

As described in this report, the Department is implementing the *Operational Energy Strategy* through initiatives that increase resilience and support enhanced range, endurance, and performance of the Joint Force, while reducing dependence on fossil fuels.

Operational Energy in Planning, Posture, and Programming

The assured provision of operational energy enables the Joint Force to meet emerging requirements at home and abroad. The Department is including operational energy considerations in Planning, Posture, and Programming processes across the components.

Planning

¹ 10 U.S.C. § 2924(4).

² Department of Defense. [2016 Operational Energy Strategy](#). 2016.

As the Department prepares for peer competition where even the homeland is contested, the Department must review the energy supportability of forces across a range of scenarios. To enhance Joint capabilities, the Department is incorporating energy considerations into the planning process, including:

- Global Campaign Plan. OSD is collaborating with the Joint Staff, Combatant Commands, Military Departments, and the Defense Logistics Agency to revise Departmental policy and guidance to align operational energy movements and investments with globally integrated priorities and the Global Campaign Plan.
- Joint Concept for Contested Logistics. In coordination with Army Futures Command, the Joint Staff develops the Joint Concept for Contested Logistics (JCCL), which is one of four supporting concepts to the Joint Warfighting Concept (JWC). The goal is to project power and execute distributed operations against peer adversaries in contested environments across all domains.
- Energy Key Performance Parameter. At the direction of the Deputy Secretary, OSD, Joint Staff and the Services are reviewing the use of the energy key performance parameter in recent programs and improve the alignment of the construct with the challenges of contested logistics.
- Bulk Fuel Management. Pursuant to section 2854, of the William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, (Public Law 116-283), the Department is enhancing its global bulk fuel management construct. Ongoing efforts include preparing a strategy for Bulk Fuel Management in United States Indo-Pacific Area of Responsibility; strengthening bulk fuel command and control framework through operational planning teams and training exercises; developing systems that provide an enhanced common operating picture for bulk fuel; investing in equipment and technology that improve fuel distribution; and revising policies to streamline decision-making process.

Posture

Through exercises, wargames, modeling and simulation, and analyses, the Department evaluates the risks to energy supportability of future posture, Joint concepts, and operational plans. Wargames are designed to evaluate the aggregate capability of joint energy systems, and assess the collective ability of the Services to meet the energy requirements of the joint force. These activities include:

- Global Bulk Fuel Laydown. OASD(S) and the Joint Staff J-4 collaborated on the establishment of a global laydown of bulk fuel infrastructure, and issued guidance in September 2020 that identified specific changes to enhance the global resiliency of bulk fuel infrastructure around the globe.
- Joint Logistics Board (JLB). OASD(S) in coordination with Joint Staff leads the JLB which drives integration and optimization of logistics processes and advocates for logistics capabilities. By ensuring a systematic approach, senior leadership review, and approval of joint logistics requirements, this board guarantees a coordinated approach for fuel distribution and logistics.

- Joint Force Energy Wargame (JFEW). OSD and USINDOPACOM conducted the first Joint wargame in August 2019 focused on identifying energy-based operational risks and seams amongst DoD Components. JFEW II was executed in Fall 2021 and examined energy demand, supply, and distribution in a joint contested environment.
- Advanced Globally Integrated Logistics Effort (AGILE). AGILE is a Joint Staff J-4-led wargame series intended to improve understanding of the capabilities and challenges across the Joint Logistics Enterprise (JLEnt) and provide a venue to test logistics concepts and vet limiting factors. AGILE-21 was completed in May 2021 and provided a venue to consider the supportability of Service operating concepts in support of the Joint Concept for Contested Logistics (JCCL). AGILE-22 is scheduled for Spring of 2022 and will explore the critical command and control requirements for logistics.

Programming

As part of the annual programming and budgeting process, the Department ensures that that fuel consumption, fuel distribution, and logistics are considered in senior leader decisions on resources. During the review of the Department’s budget submission for FY2022, the Department conducted a detailed study of operational energy investments to improve operational energy capability and reduce risk. As a result, the FY2022 President’s Budget request significantly enhanced resources dedicated to reducing operational energy risks and applying energy technologies to improve warfighter capabilities. Relative to the FY2021 President’s Budget request, these operational energy enhancements included:

Operational Energy Enhancement	Amount (millions)
Operational Capability Improvement Fund (OECIF)	+\$74.3
Operational Energy Prototyping Fund (OEPF)	+\$23.2
Alternative Fuels Certification	+\$2
Air Force/Navy Operations and Planning Tools	+\$38.6
Air Force Large Aircraft Drag Reduction	+\$14.1
Navy Platform and Propulsion Upgrades	+\$19.5
Army Tactical Vehicle Electrification	+\$38.7

Pursuant to the budget certification requirement in title 10 U.S.C. §2926, on an annual basis, the Department quantifies operational energy investments across the Military Departments and Defense Agencies and evaluates the alignment of the President’s Budget with the three objectives of the *Operational Energy Strategy*. ASD(Sustainment) judged the FY2022 President’s Budget as sufficient to meet the previous operational energy strategy and provided this assessment by the end of calendar year 2021. Looking ahead, the ASD(Sustainment) will continue to rigorously review the sufficiency and direction of investments in operational energy.

Reducing Fuel Consumption of the Current Fleet The FY2022 President’s Budget included \$1,315 M to improve the use of energy in current platforms. Relative to the previous President’s Budget, the FY2022 budget request included over \$80 million in additional investments for current aircraft and ships.

In support of reducing fuel consumption of existing platforms, the Army invested approximately \$46.0 M in FY2021, and requested \$38.7 M for FY2022 to accelerate the adoption of electric and hybrid-electric technologies for the current and future ground vehicle fleet. These investments will lead to ground vehicles with greater mobility and reliability, while being expected to reduce fuel consumption by at least 25 percent. Additionally, these technologies are expected to provide unique military capabilities, such as silent mobility and extended silent watch, while being positioned to support future capabilities such as directed energy and novel protection systems.

The Air Force is pursuing a more fuel efficient fleet through a variety of programs. The Legacy Aircraft Drag Reduction Program (FY2022, \$15.5M) will prototype, demonstrate, and procure low-risk technologies that improve fuel efficiency of multiple aircraft through the reduction of aerodynamic drag. These technologies include C-17 microvanes, C-130 finlets, KC-135 vertical windshield wipers, C-17 engine pylon fairings, and flight control surface fine-tuning. Efforts to decrease fuel use in engines are also underway. The F108 Engine Detergent Wash program (FY2022, \$600k) has demonstrated that applying engine washes that reach deep into the core of KC-135 engines removes debris and contamination buildup, which improves engine performance, reduces temperatures, and decreases fuel burn. The B-52 Commercial Engine Replacement Program (CERP; FY2022, \$484M) replaces the aging B-52s with a new commercial-based engine that will be 20 percent more efficient, enables upgrades to various mission systems, and yields substantial improvements in both maintainability and readiness.

The Navy is prioritizing reduction of fuel consumption in existing and future systems. The Integrated Power and Energy Systems Program, (FY2022, \$69M) will support the development of Next Generation Integrated Power and Energy System (NGIPES) technology aboard Navy ships to enable current and future weapons and sensor systems. To enhance mission effectiveness and reduce logistics and operational risk, the Navy is continuing its investment in the Platform and Propulsion Upgrades Program (FY2022, \$20M) that will fund improvements to DDG-51, LPD-17, LCS, and TAO-205 surface vessels.

Marine Corps investments to reduce the reliance on fossil fuels of the current force include the Advance Mobile Medium Power Sources Program (FY2022, \$30M). The goal of this program is to continuously procure, update, and replenish approximately 19,000 pieces of Mobile Tactical Power Generation and Distribution Equipment, which is procured and fielded to provide electricity on the battlefield. Combat, combat support, and combat service support units all require tactical power to operate weapons systems, C4I systems, medical and messing facilities, environmental control equipment, and water purification systems. Investment in these systems will eliminate or reduce the need for fuel resupply, reduce weight, and enable silent operations.

Additional details on these investments can be found in Appendix A.

Reducing Department Consumption of Fossil Fuel

The Department is considering a range of options to increase warfighting capability while reducing consumption of energy and mitigating climate risk. Beyond retrofitting current equipment, reducing fossil fuel use in operational platforms by up to 30 percent by 2046 will

require a combination of different options including new equipment, innovative propulsion options, enhanced operational efficiencies, the use of new energy sources, and energy-informed warfighters, planners, and decision-makers.

Propulsion

Exploring new and scalable technologies for aircraft propulsion can vastly change the landscape of future operations and enhance warfighting capabilities, while reducing fuel consumption requirements.

The Air Force is investing in increased efficiency of engines, aircraft design, and operations and planning tools to enhance the range and capability of the force. The Adaptive Engine Transition Program and Next-Generation Adaptive Propulsion Program (AETP and NGAP; FY2022 combined, \$124M) will focus on development and maturation of engines for 5th- and 6th-generation fighter aircraft, respectively. Recent prototype engine tests validated that adaptive engines achieve 10 percent higher thrust response, reduce fuel consumption by 25 percent, increase efficiency during cruise, and significantly enhance power and thermal management capabilities when compared to current 5th-generation fighter engines.

For rotary wing aircraft, the Army is also investing in the Improved Turbine Engine Program (FY2022, \$275M) to improve turbine engine performance by increasing the altitude, lowering the fuel and maintenance requirements, and improving overall reliability. The Army expects 13 to 25 percent reduction in fuel consumption from current Blackhawk and Apache engines.

Future Equipment

Future equipment that reduces fuel requirements or changes the energy the Department needs to execute its missions can reduce warfighter risks in contested operating environments. The ability to operate for extended periods, over longer distances, or with greater speed and payload directly increases capability and reduces the ability of an adversary to disrupt our operations.

The Army is investing in future equipment with improved performance, by replacing the venerable High-Mobility Multipurpose Wheeled Vehicle (HMMWV) with the Joint Light Tactical Vehicle Program (JLTV; FY2022, \$99M) that provides better ton-mile per gallon fuel efficiency with better protection, achieves a 30 percent reduction in fuel consumption at idle compared to legacy HMMWV, and can be outfitted with modular accessory packages to provide power to carried shelters, extend silent watch capabilities, or export power at need.

To improve future equipment performance, Marine Corps is investing in the Fuel Efficient Medium Tactical Vehicle Replacement Program (FE MTRV; FY2022, \$7M) to develop, optimize, integrate, and demonstrate at least 15 percent fuel efficiency improvement across a set of driving cycles representative of likely operational conditions, while maintaining MTRV affordability, current mobility, transportability, and survivability capabilities.

In addition to enhancing current vessels, the NGIPES investments noted earlier also will reduce fuel consumption by future Navy ships.

Additional details on investments in new equipment can be found in Appendix A.

Operational Efficiencies

Through the rapid deployment of technology and a data-driven approach to optimizing energy use in operations, the Department continues to identify and execute operational efficiencies that reduce fuel consumption, while enhancing capability and readiness.

In line with this strategy, the Air Force continued to support automated planning tools for the Combined Air Operations Center (CAOC) in U.S. Central Command. Tools like “Jigsaw” helped increase the effectiveness of each sortie by increasing the average offload per flight hour and enabled the Air Force to meet mission requirements with 180,000 fewer gallons of aviation fuel per week and nine fewer aircrews. In 2020, the Air Force continued development of the tool’s next iteration known as “Pythagoras,” which interfaces with existing air operation center systems to automatically match tankers to receivers. The Air Force estimates these improvements will save an additional 400,000 gallons per week (depending on operations tempo) while reducing scheduling time from hours to minutes, and lowering the number of aircrews, maintenance crews, and support infrastructure required in a theater. The U.S Air Force Air Mobility Command (AMC) invested in the planning software tool Magellan, which provides a universal digital interface to allocate mobility and aerial refueling aircraft. The FY2022 President’s Budget includes enhancements for operations and planning digital tools (FY2022, \$35M) for Air & Space Operations Centers.

The Navy continues investment in energy command and control and planning tools, including the Global Energy Information System (GENISYS) for the Navy’s combatant and expeditionary forces and Replenishment at Sea Planner (RASP) for logistics and fuel distribution planning. The Navy Logistics Enterprise is integrating all Navy LOG IT systems, including GENISYS and RASP, to establish capabilities for optimizing energy and logistics supply and demand for distributed operations in contested environments.

Alternative Energy Sources

New energy sources provide the opportunity to reduce our need for petroleum while increasing mission capability or, at worst, having no effect on mission capability. In response, the Department is exploring the use of alternatives to fossil fuels, including electricity, low carbon fuels, nuclear power, and hybrids.

The use of electricity to power tactical platforms is the primary initiative to use alternatives to petroleum. The Army’s Platform Electrification and Mobility Project (FY2022, \$38.7M) focuses on hybrid-electric powertrains and enhanced vehicle electronics, with the goal of increasing mobility and improving acceleration, thereby extending mission duration and effectiveness, and reducing fuel consumption. In addition, the Army has contracted with six firms to provide design concepts for battlefield charging stations to support future electric

vehicles.

Alongside the shift to electrification, the Department also is postured to procure cost-competitive, drop-in compatible low carbon fuels. DoD testing and certification confirms the drop-in compatibility of commercially available alternative fuels with DoD equipment, enables the Department to purchase compatible fuels throughout existing supply chains, and supports warfighter readiness. To date, DoD has approved the use of two (2) low carbon fuel pathways for use across the entire Department in tactical ground systems and aircraft. Army has approved two additional low carbon fuel pathways for use in Army aircraft and Navy and USMC have approved one additional pathway for their use. In addition, DLA-Energy made three awards in FY15-18 for drop-in compatible, cost competitive alternative marine diesel, blended with Naval Distillate Fuel, for operational use in ships.

The FY2022 President's Budget request proposes an increase in funding (FY2022, \$2M) to certify the use of up to four (4) additional sustainable aviation fuel (SAF) pathways already approved in the commercial market, as well as additional SAF pathways in the American Society for Testing and Materials (ASTM) approval pipeline. While these activities will ensure DoD is ready to use any SAF available on the market, there are price and availability barriers that prevent the Department from purchasing SAF or other lower carbon fuels. For instance, title 10 U.S.C §2922h prohibits DoD from making a bulk purchase of a drop-in fuel for operational purposes unless the fully burdened cost of that drop-in fuel is cost-competitive with the fully burdened cost of a traditional fuel. In addition, title 10 U.S.C. § 2306b, implemented through Federal Acquisition Regulation (FAR) 17.204, limits the length of supply contracts to five years, preventing DoD from entering into long-term commitments needed to incentivize alternative fuels production.

Advanced very Small Modular Reactors (vSMR) have the potential to provide energy resilience through assured access to reliable, quality power in support of critical missions and remote operations. Led by the Strategic Capabilities Office (SCO) in close collaboration with the Department of Energy, Nuclear Regulatory Commission, U.S. Army Corps of Engineers, and industry partners, Project Pele has the objective to design, build, and demonstrate a prototype mobile nuclear reactor within five years. The FY2022 President's Budget requested \$60M for Project Pele, and the Department recently selected two concepts to proceed with development of a final design for a transportable advanced nuclear microreactor prototype.

In collaboration with the Department of Energy (DOE), the Department is also pursuing the demonstration of a stationary, commercially developed, Nuclear Regulatory Commission (NRC) licensed, 2-10 MW vSMR at a DoD installation by 2027. Building on the statutory requirement for resilience in section 2911 of title 10, U.S. Code, the demonstration plan required by Section 327 of the FY 2019 NDAA, and the requirement to implement the demonstration in Executive Order 13972, the Department is planning to use the authority in section 2922h of title 10, U.S. Code, to contract with a commercial entity to site, construct, and operate at least one licensed micro-reactor by December 31, 2027.

Additional details on these investments can be found in Appendix A.

Reducing Energy Demand for Operating in Contested Environments

As part of the broader Joint Warfighting Concept (JWC), the Joint Concept for Contested Logistics (JCCL) is considering demand reduction as a critical attribute of the joint force's ability to sustain distributed operations against near-peer adversaries. Planning or investing in capabilities that may not appear to be energy-related could contribute to that overall reduction. For example, precise lethality with extended reach relieves the burden (and energy cost) of mass munitions and the maneuver needed to bring those weapons within range. Additive manufacturing and small unit water purification allows production at point of need and eliminates the energy needed to distribute supplies over distance. Pre-placed contracts and agreements, and true multi-fuel engines, would provide significantly greater numbers of energy sources closer to point of need.

The Services are exploring opportunities to translate reduced fuel demand in the battlespace to tactical, operational and strategic benefits through new operating concepts that include:

- Air Force – Agile Combat Employment (ACE): ACE leverages networks of well-established and austere air bases, multi-capable airmen, pre-positioned equipment, and airlift to rapidly deploy, disperse and maneuver combat capability throughout a theater. Paired with aircraft fueling, arming and limited maintenance activities, ACE expands the number of bases from which air forces can generate combat sorties.
- Army – Multi Domain Operations (MDO): MDO provides Army commanders numerous options for executing simultaneous and sequential operations using surprise and the rapid and continuous integration of capabilities across all domains to present multiple dilemmas to an adversary in order to gain physical and psychological advantages and influence and control over the operational environment.
- Navy – Distributed Maritime Operations (DMO): DMO intends to enable a force that is capable of winning a fleet-on-fleet engagement through the integration of manned and unmanned systems, execution of deceptive tactics, and emboldening of units to conduct offensive strikes.
- Marine Corps – Expeditionary Advanced Basing Operations (EABO): EABO is a form of expeditionary warfare that involves the employment of mobile, low-signature, operationally relevant, and relatively easy to maintain and sustain naval expeditionary forces from a series of austere, temporary locations ashore or inshore within a contested or potentially contested maritime area in order to conduct sea denial, support sea control, or enable fleet sustainment.

The Role of OECIF/OEPF

The Operational Energy Capability Improvement Fund (**OECIF; FY2022, \$74M**) is an advanced technology development program that matures operational energy technologies from Technology Readiness Level (TRL) 3, characterized by analytical and laboratory studies, to TRL 6, characterized by a model or prototype system tested in a relevant environment. In line with Congressional direction, the Department also established the Operational Energy Prototyping

Fund (OEPF; FY2022, \$23M) to further enhance the transition of operational energy technologies to programs of record through prototyping. OEPF will demonstrate the most promising, innovative, cost-effective joint technologies, with the goal of minimizing the “valley of death” regarding transition to programs of record. The priorities of OECIF and OEPF include:

- Powering the Force. Support the deployment of more mobile and distributed operations with more agile logistics, to reduce the risk of carrying fuel to the fight, especially through contested environments.
- Electrifying the Battlespace, including the Space and Cyber Domain. Enable the electrification of weapons, platforms, unmanned systems, and personnel to field new weapon, sensing, active defense, and other technologies; advance power and thermal management technologies to meet the growing demands of high-power systems; pursue potential game-changing technology that drastically reduces energy resupply risks, costs, and signatures to enable persistent unmanned system and unattended sensors.
- Commanding Energy. Improve understanding of energy operating profiles and transition the Joint Force from a reactive to a predictive posture for energy management and control.

Conclusion

The Department is implementing its *Operational Energy Strategy* through changes in DoD decision-making, upgrades to current equipment, investments in new capabilities, innovative operating concepts, and targeted research and development. Through these efforts, the Department will maintain and increase the dominance of the Joint Force against all potential enemies while reducing dependence on fossil fuels.

Appendix A. Fiscal Year 2022 Operational Energy Initiatives

Due to rounding, investment amounts may differ in the report.

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (SK)
Air Force ³	B-52H Re-Engine	B-52 Commercial Engine Replacement Program (CERP)	This sustainment program will replace the current unsustainable TF33 engine with engines of similar size, weight, and thrust characteristics. The development, production, and installation of new engines and related subsystems will replace legacy equipment on 76 B-52H a/c.	Enhance Mission Effectiveness	Propulsion Upgrades_Air	3600	07	0101113F	484,068
Air Force	Aerospace Propulsion	Adaptive Engine Transition Program (AETP)	Matures adaptive engine technologies through a maturation/risk reduction effort to design, fabricate, and test the first-ever complete, flight-weight adaptive engines in preparation for next-gen propulsion system development for multiple combat aircraft. Drives revolutionary progress necessary to guarantee future U.S. air superiority achieving +25% fuel efficiency, +10% thrust, significantly increased thermal capacity, and maintains full-life durability. **Many of the key component technologies, flow paths, and design parameters are either ITAR controlled or classified.	Increase Warfighter Capability	Propulsion Upgrades_Air	3600	04	0604004F	13,536
Air Force	Aerospace Propulsion	Next Generation Adaptive Propulsion (NGAP)	Like AETP, NGAP matures and demonstrates the scalability of adaptive engine technologies through a maturation/risk reduction effort to design, fabricate, and test flight-weight prototype engines targeted for Next-Generation Air Dominance applications. **Many of the key component technologies, flow paths and design parameters are either ITAR controlled or classified.	Increase Warfighter Capability	Propulsion Upgrades_Air	3600	04	0604004F	110,200
Air Force	Aerospace Propulsion and Power Technology	Megawatt Aircraft Power and Thermal	Integrating new developments in Power and Thermal components to demonstrate advanced architectures to enable high powered mission systems for future Air Superiority platforms while maintaining energy efficiency. Technology maturation in advanced power and thermal architecture, modeling and simulation, and integration. Developing flexible and adaptive Power and Thermal components that allow for synergetic architectures that leverage advanced engine capabilities and energy storage.	Increase Warfighter Capability	Platform Thermal Management	3600	03	0603216F	19,575
Air Force	Aerospace Vehicle Technologies	Low Cost Attributable Aircraft	Develop, prototype and flight-demonstrate a series of low cost attributable aircraft that can be rapidly manufactured, in large or small numbers and on-demand, as-needed, for a base platform	Increase Warfighter Capability	Platform Upgrades_Air	3600	02	0602201F	5,053

³After reviewing previous year's Budget Certification Reports, for FY 2022 the Air Force Operational Energy office reported only those investments with either a primary purpose of optimizing operational energy usage, or those with a significant operational energy impact; investments with either marginal or difficult-to-define impact were excluded. Although this resulted in a significant reduction in the number of programs reported, the Air Force Operational Energy Office believes the FY 2022 report reflects a more accurate representation of the Service's prioritization of and investment in operational energy.

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
			cost NTE \$3M, plus the cost of the mission system/payload. The capability will enable the Air Force to be able to levy a cost-imposing strategy on potential adversaries, near-peer or otherwise, with a focus on the A2AD threat. The capability will be able to operate as needed with fractionated capabilities, limited training, minimal maintenance, certified analytically, and economically produced at very low production quantities.						
Air Force	Aerospace Vehicle Technologies	Low Cost Attributable Aircraft Platform Sharing (LCAAPS)	Develop two variants of a long range attributable UAS for \$3M AUFC. Define aircraft open architecture concept.	Increase Warfighter Capability	Platform Upgrades_Air	3600	03	0603211F	37,995
Air Force	Materials Development	Low-Cost Attributable Structures	This program will provide manufacturing support to the Low Cost Attributable Aircraft Technology (LCAAT) Initiative by investigating and validating low cost manufacturing materials and processes that can be introduced to reduce aerospace vehicle costs and minimize vehicle manufacturing time.	Increase Warfighter Capability	Materials and Design	3600	03	0603680F	2,521
Air Force	Tech Transition Program	Legacy Aircraft Drag Reduction - Prototyping and Demonstration	The Legacy Aircraft Drag Reduction Prototyping and Demonstration program will enable procurement of low-risk technologies that improve fuel efficiency for multiple aircraft by reducing aerodynamic drag. Examples of aircraft drag reduction technologies include: Microvanes, Finlets, vertical windshield wipers, engine pylon fairings, and flight control surface fine-tuning.	Enhance Mission Effectiveness	Platform Upgrades_Air	3600	04	0604858F	15,500
Air Force	Software and Digital Technology Pilot Programs	Air & Space Operations Center (AOC) - Software Pilot Program	This program aims to optimize AOC processes and planning through agile software solutions. One example is KRADOS, the Kessel Run All Domain Operations Suite, a system of applications that address workflows within the Air Operations Center (AOC). Kessel Run has several applications in use at the 609th AOC, including the tanker planning application Jigsaw, and the Master Air Attack Plan (MAAP) application Slapshot. The integrated system allows for accurate and timely data sharing in an adaptable and complete system. KRADOS calculates solutions, offers a network of data delivery options, and provides real-time plans to inform decision-makers. A second example is Pythagoras, which builds on the existing tanker planning tool, Jigsaw, by adding an auto-planning feature to match refueling requests with tankers to optimize tanker utilization. Added capability aims to increase scheduling efficiency through optimization algorithms implemented by Kessel Run. Goal is to provide capability within Jigsaw for planners to quickly develop a feasible, optimized aerial refueling schedule, accounting for a host of constraints and planner judgement.	Increase Warfighter Capability	Current Operations Tools	3600	08	0608410F	12,000
Air Force	Tech Transition Program	Mobility Asset Optimization	This program will enhance the efficiency of Mobility Air Fleet (MAF) operations through tools that optimize processes such as cargo loading, aircrew scheduling, and aircraft allocation. Optimized cargo load plans yield more efficient flight operations, and the possibility to decrease fuel use by	Increase Warfighter Capability	Current Operations Tools	3600	04	0604858F	18,000

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
			maximizing loads and utilizing fewer aircraft. Improved load planning also requires a reassessment of under-loaded long distance flights. Loading techniques range from bi-level aircraft loading system, to dynamic re-planning software, to dual-rail swap and aggregation. For aircrew scheduling, Puckboard is a data-informed software application that plans aircrew flight qualification and ground training events. The tool, developed by and for Airmen, allows schedulers to rapidly match aircraft commanders, pilots, and loadmasters with available flights that complete currency requirements. Digital interface enables planners to visualize flight schedules and generate schedules for aircrew while considering required qualifications, crew rest, and conflicts. Overall increases in operational efficiency are expected. For aircraft allocation, Magellan is Air Mobility Command's readiness-driven allocation process software program to synchronize aircraft and crew data, coordinate allocation cycles, enable real-time changes. These tools allow the force to fly more missions with the same amount of aircraft.						
Air Force	AF Energy Program	Mission Execution Excellence Program (MEEP)	The MEPP program aims to incentivize operational units toward fuel-efficient operations such as: precision fuel planning, engine start technique, cruise altitude selection, descent profile, and reduced engine taxi. Based on historical data analysis, AF planners and operators require incentives to use fuel more efficiently and become an energy-optimized force. SAF/IEN, the AF Operational Energy Office, created a Mission Execution Incentive Strategy to re-align incentives and remove barriers. This strategy includes a competitive, voluntary program to incentivize Airmen to operate with fuel-use optimization in mind. Financial incentives will aim to create future savings and reinvestment in fuel-efficient education, training, and programs.	Enhance Mission Effectiveness	Policy and Oversight	3400	04	0905015F	3,000
Air Force	AF Energy Program	F108 Engine Detergent Wash (KC-135)	Jet engines ingest debris and contaminants during operations that reduces their time-on-wing and decreases engine efficiency and power. This causes increased fuel burn and exhaust gas temperature, leading to higher maintenance costs and decreased aircraft availability. Detergent engine washes reach deep into the engine core and apply full coverage to engine parts, removing build up of contaminants. Detergent washing is expected to improve performance, reduce engine temperatures, and decrease fuel burn. This program focuses on the F108 engine, which is the engine used on the KC-135.	Enhance Mission Effectiveness	Propulsion Upgrades_Air	3400	04	0905015F	600
								Air & Space Forces Total	\$722,048

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Army	Defense Research Sciences	Vehicle Propulsion Power Research - 128	Investigate concepts and theories to provide enhanced tools, methods, and innovative concepts to enable improvements in propulsion power density, energy efficiency, reliability, and lifecycle costs for increased performance and capabilities in future Army systems.	Increase Warfighter Capability	Propulsion Upgrades_Land	2040	01	0601102A	1,394
Army	Defense Research Sciences	Intelligent Systems - 48	Research in autonomous systems that supports and unburdens Soldiers in a flexible, robust, survivable and comprehensive manner. This work addresses the cognitive requirements of humans and (non-human) agents, both hardware and software based, operating individually or in collaboration, on the battlefield.	Increase Warfighter Capability	Platform Upgrades_Land	2040	01	0601102A	6,164
Army	Defense Research Sciences	Reconfigurable Platform Mechanics Propulsion - 146	Reconfigurable platform mechanics and propulsion science investigating technologies to enable subsystem configuration concepts for efficient hover and high-speed/range Vertical Take-Off and Landing (VTOL) aircraft.	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	01	0601102A	981
Army	Defense Research Sciences	Unmanned Air System (UAS) Vehicle Research - 93	Basic research focused on topics that contribute to the body of knowledge required to create future intelligent, unmanned air systems that can effectively team with manned and unmanned aircraft, ground platforms, and human teammates.	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	01	0601102A	3,018
Army	Defense Research Sciences	Autonomous Vehicle Research - 120	Basic research focused on enabling robust autonomous mobility for small and human-scale robotic systems, including autonomous teaming behavior with hybrid human-robotic teams. Enablers for robust autonomous mobility include planning, behaviors, energy efficient maneuver, and the interface of manipulation technologies to support manned-unmanned teaming constructs.	Increase Warfighter Capability	Platform Upgrades_Land	2040	01	0601102A	1,637
Army	Defense Research Sciences	Sol Struct Mech - AMRDEC-AV - 101	Create robust experimental and computational approaches for understanding, modeling, and predicting the complex fluid flow and aerodynamics of next generation rotorcraft concepts.	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	01	0601102A	2,574
Army	Defense Research Sciences	Fundamentals for Alternative Energy Applied Physics Research - 143	Explore novel concepts in energy generation and capture in technologies for efficient conversion of ambient energy to electrical energy for use and storage. Design novel structures to include microscale power devices for multimodal harvesting and efficient distributed power conversion.	Increase Warfighter Capability	Platform Upgrades_Land	2040	01	0601102A	930
Army	Defense Research Sciences	Research In Vehicle Mobility - 151	Research in support of advanced military mobility technologies with emphasis on Terramechanics (vehicle-terrain interaction), and complex vehicle dynamics and simulation.	Increase Warfighter Capability	Platform Upgrades_Land	2040	01	0601102A	741
Army	Defense Research Sciences	Novel multi-fuel tolerant small vehicle power - 92	Basic research to enable highly efficient, multi-fuel conversion in small engines with reduced sensitivity to fuel property variation and extreme ambient conditions.	Increase Warfighter Capability	Platform Upgrades_Land	2040	01	0601102A	3,354
Army	Defense Research Sciences	Chemical Synthesis and Power - 66	Basic research to achieve advanced energy control. Research efforts will lead to light-weight, reliable, and compact power sources.	Increase Warfighter Capability	Propulsion Upgrades_Land	2040	01	0601102A	5,491
Army	Defense Research Sciences	Propulsion Energetics Flight - 97	Basic research for improved understanding of propulsion and combustion for improved efficiency and fuel flexibility and fluid dynamics for rotorcraft.	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	01	0601102A	2,809

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Army	Soldier Lethality Technology	Tactical Power for Soldier Lethality - 938	Designs, and develops innovative power generation and energy storage technologies that support next generation Soldier systems to decrease Soldier load and power burden, and increase power capabilities by providing more energy to prolong mission run-time.	Increase Warfighter Capability	Individual/Warfighter Power	2040	02	0602143A	3,557
Army	Soldier Lethality Technology	Efficient Compact Portable Power - 959	Develop more efficient power and thermal management for small systems and alternative energy technologies to substantially reduce the number of batteries required to accomplish dismounted Soldier/Squad mission objectives.	Increase Warfighter Capability	Individual/Warfighter Power	2040	02	0602143A	910
Army	Ground Technology	Advanced Distributed Power for Autonomous Systems	Research power distribution concepts and architectures for autonomous systems.	Increase Warfighter Capability	Platform Upgrades_Land	2040	02	0602144A	1,423
Army	Ground Technology	Beyond Lithium-Ion Energy Storage 16	Research Lithium-Ion and other battery technologies to increase energy storage density.	Increase Warfighter Capability	Platform Upgrades_Land	2040	02	0602145A	1,121
Army	Ground Technology	Diesel Electric Power Generator 15	Research Diesel Electric Power Generator to enable hybrid powertrains for combat vehicles and silent mobility and watch.	Increase Warfighter Capability	Platform Upgrades_Land	2040	02	0602145A	2,143
Army	Ground Technology	Electric Drive Motors/Power Controllers/Conv 18	Research Electric Drive Motors, Power Controllers, and Converters to enable hybrid powertrains with electric drive for silent mobility and watch and to improve fuel efficiency of manned and unmanned combat vehicles.	Increase Warfighter Capability	Propulsion Upgrades_Land	2040	02	0602145A	2,874
Army	Ground Technology	High Voltage Modular Li-Ion Battery 17	Research High Voltage Modular Li-Ion Battery technologies to increase energy storage density and enable electrification of manned and unmanned combat vehicles.	Increase Warfighter Capability	Platform Upgrades_Land	2040	02	0602145A	2,115
Army	Ground Technology	RCV Silent Watch and Mobility Range Extension	Researches JP8 reformer based silent watch and mobility extension subsystem.	Increase Warfighter Capability	Platform Upgrades_Land	2040	02	0602145A	2,044
Army	Ground Technology	Power Electronic Components and Materials	Research Power Electronic Components and Materials to enable high power electrification of manned and unmanned combat vehicles and other Army systems.	Increase Warfighter Capability	Platform Upgrades_Land	2040	02	0602144A	1,258
Army	Ground Technology	Scalable Electrification & Control Architecture 19	Research Scalable Electrification & Control Architectures to enable electrified and energy efficient manned and unmanned combat vehicles.	Increase Warfighter Capability	Platform Upgrades_Land	2040	02	0602145A	1,430
Army	Ground Technology	Segmented Composite Track and Strut Suspension 12	Research Segmented Composite Track and Strut Suspension systems to improve combat vehicle mobility.	Increase Warfighter Capability	Platform Upgrades_Land	2040	02	0602145A	924
Army	Network C3I Technology	Energy Efficient Devices Technology 84	Develop supply and demand electronics for energy-constrained platforms that will extend mission duration (dismounted Soldier), reduce frequency of battery replacement (unattended Sensors) and increase endurance (Unmanned Aerial Vehicles (UAVs)).	Increase Warfighter Capability	Individual/Warfighter Power	2040	02	0602146A	5,710
Army	Future Vertical Lift Technology	Future UAS Engine Technology 01	Research to enable intelligent and robust propulsion performance and noise signature reduction via multi-fuel and optimized hybrid electric capability for small engines (20-150kW) powering future aerial and ground systems.	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	02	0602148A	3,153

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Army	Future Vertical Lift Technology	High Reduction-Ratio Transmission (HRT) 63	Project develops FVL advanced drive train technologies that increase performance and double current drivetrain life cycles while improving their reliability and maintainability	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	02	0602148A	4,153
Army	Future Vertical Lift Technology	Power & Thermal Management for FVL Tech	Project effort will develop and demonstrate integrated power and thermal management technologies to provide significantly higher electrical power capability for FVL aircraft	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	02	0602148A	7,175
Army	Soldier Lethality Advanced Technology	Dismounted Soldier Power and Energy	Matures, integrates, and demonstrates advanced Soldier Power and Energy (P&E) technologies to power the dismounted Soldier and small unit's command and control, communications, computers, and sensor devices during tactical operations.	Increase Warfighter Capability	Individual/Warfighter Power	2040	03	0603118A	3,184
Army	Ground Advanced Technology	Advanced Tribology Research 58	Mature tribology techniques to evaluate fluids and fuels.	Increase Warfighter Capability	Platform Upgrades_Land	2040	03	0603119A	460
Army	Ground Advanced Technology	Enhanced Jet Fuel for Ground System Durability 56	Evaluate Enhanced Jet Fuel to determine its impact to Ground System Durability.	Increase Warfighter Capability	Platform Upgrades_Land	2040	03	0603119A	522
Army	Ground Advanced Technology	Fuel Contamination Limits for Ground Systems 54	Evaluate Fuel Contamination Limits to establish standards for military Ground Systems based on emerging commercial fluids and standards.	Increase Warfighter Capability	Platform Upgrades_Land	2040	03	0603119A	292
Army	Next Generation Combat Vehicle Advanced Technology	Advanced Mobility Experimental Prototype - 728	Develops advanced powertrain, track and running gear, and unmanned robotic technologies for integration into a ground combat vehicle.	Increase Warfighter Capability	Propulsion Upgrades_Land	2040	03	0603462A	2,819
Army	Next Generation Combat Vehicle Advanced Technology	AVPTA - Electrification Technology 11	Develop Electrification Technology in collaboration with the Department of Energy through the Advanced Vehicle Power Technology Alliance.	Increase Warfighter Capability	Propulsion Upgrades_Land	2040	03	0603462A	2,000
Army	Next Generation Combat Vehicle Advanced Technology	Diesel Electric Power Generator 09	Develop Diesel Electric Power Generator to enable hybrid powertrains for combat vehicles and silent mobility and watch.	Increase Warfighter Capability	Propulsion Upgrades_Land	2040	03	0603462A	1,855
Army	Next Generation Combat Vehicle Advanced Technology	Electric Drive Motors/Power Controllers/Conv 07	Develop Electric Drive Motors, Power Controllers and Converters to enable hybrid powertrains for combat vehicles and silent mobility and watch.	Increase Warfighter Capability	Propulsion Upgrades_Land	2040	03	0603462A	711
Army	Next Generation Combat Vehicle Advanced Technology	High Voltage Modular Li-Ion Battery 10	Develop High Voltage Modular Li-Ion Battery technologies to increase energy storage density and enable electrification of manned and unmanned combat vehicles.	Increase Warfighter Capability	Propulsion Upgrades_Land	2040	03	0603462A	1,072
Army	Next Generation Combat Vehicle Advanced Technology	Highly Electrified and Autonomous Platforms - GVSC/AAL 15	Develop electrification components to enable high power electrification of manned and unmanned combat vehicles.	Increase Warfighter Capability	Platform Upgrades_Land	2040	03	0603462A	3,420
Army	Next Generation Combat Vehicle	Highly Electrified and Autonomous Platforms - GVSC/AAL 16	Demonstrate Highly Electrified Autonomous Platform components and architectures.	Increase Warfighter Capability	Platform Upgrades_Land	2040	03	0603462A	3,965

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
	Advanced Technology								
Army	Next Generation Combat Vehicle Advanced Technology	RCV Silent Watch and Mobility Range Extension Advanced Technology	Matures and integrates JP8 reformer components and sub-systems in order to demonstrate extended silent watch and mobility as part of a modular electrification architecture supporting robotic combat vehicles.	Increase Warfighter Capability	Propulsion Upgrades_Land	2040	03	0603462A	1,462
Army	Next Generation Combat Vehicle Advanced Technology	Scaleable Electrification and Control Architecture - 856	Validates component-level performance and integrates the power distribution and control components to implement a common, scalable, electrified vehicle power architecture on combat platforms from 15 to 50 tons.	Increase Warfighter Capability	Propulsion Upgrades_Land	2040	03	0603462A	1,950
Army	Next Generation Combat Vehicle Advanced Technology	Platform Electrification E-Vectronics	Demonstrate Tactical Vehicle Electronics Architecture	Increase Warfighter Capability	Platform Upgrades_Land	2040	03	0603462A	5,215
Army	Future Vertical Lift Advanced Technology	Alternative Concept Engine Advanced Technology 07	Project develops FVL engine technologies that could significantly improve platform performance (range, speed, payload), durability, and operational capability.	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	03	0603465A	3,828
Army	Future Vertical Lift Advanced Technology	Next Generation Aviation Transmission Adv Tech	Project develops FVL advanced drive train technologies that increase performance and double current drivetrain life cycles while improving their reliability and maintainability.	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	03	0603465A	1,404
Army	Future Vertical Lift Advanced Technology	Power & Thermal Management Tech Demo	Project effort will develop and demonstrate integrated power and thermal management technologies to provide significantly higher electrical power capability for FVL aircraft.	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	03	0603465A	3,402
Army	Generators and Associated Equipment	Power Distribution Illumination Systems Electrical (PDISE) Expansion	Power Distribution Illumination Systems Electrical (PDISE) Expansion	Increase Warfighter Capability	Contingency Basing	2035	03	0216300A	4,338
Army	Generators and Associated Equipment	Small Tactical Electric Power (STEP)	Small Tactical Electric Power (STEP)	Increase Warfighter Capability	Contingency Basing	2035	03	0216300A	1,554
Army	Mobile Soldier Power	Platoon Power Generator (PPG)	Platoon Power Generator (PPG)	Increase Warfighter Capability	Contingency Basing	2035	03	0211700A	5,625
Army	Abrams Upgrade Program	Improved Abrams	Power Initiative for Abrams M1A2SEPV3 (Power ECP) vehicle	Increase Warfighter Capability	Platform Upgrades_Land	2033	01	0211702A	12,633
Army	Abrams Upgrade Program	Improved Abrams	Advance Reliability & Cost Savings (ARCS) for the AGT-1500 Turbine Engine	Enhance Mission Effectiveness	Propulsion Upgrades_Land	2033	01	0211702A	3,200
Army	Armored Multi-Purpose Vehicle (AMPV)	Armored Multi-Purpose Vehicle (AMPV)	N/A	Increase Warfighter Capability	Propulsion Upgrades_Land	2033	01	0211702A	104,727
Army	Improved Turbine Engine	Aviation - Improved Turbine Engine Program (ITEP)	Aviation - Improved Turbine Engine Program (ITEP)	Increase Warfighter Capability	Propulsion Upgrades_Air	2040	07	0607139A	275,024

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Army	Aviation Ground Support Equipment	Next Generation Aviation Ground Power Unit (NGAGPU)	Next Generation Aviation Ground Power Unit (NGAGPU)	Increase Warfighter Capability	Contingency Basing	2040	05	0605830A	1,201
Army	Integrated Soldier Power Data System - Core	Small Unit Tactical Power (ISPDS-C)	Small Unit Tactical Power (ISPDS-C)	Increase Warfighter Capability	Individual/Warfighter Power	2040	05	0604827A	4,322
Army	Universal Battery Charger	Small Unit Tactical Power (ISPDS-C)	Small Unit Tactical Power (ISPDS-C)	Enhance Mission Effectiveness	Individual/Warfighter Power	2040	05	0604827A	987
Army	Mobile Soldier Power	Integrated Soldier Power Data System - Core (ISPDS-C)	ISPDS-C	Enhance Mission Effectiveness	Individual/Warfighter Power	2035	03	0211700A	5,947
Army	Mobile Soldier Power	Universal Battery Charger	UBC	Enhance Mission Effectiveness	Individual/Warfighter Power	2035	03	0211700A	6,243
Army	Ground Soldier System	Small Unit Tactical Power (Nett Warrior)	Small Unit Tactical Power (Nett Warrior)	Enhance Mission Effectiveness	Individual/Warfighter Power	2035	03	0211700A	50,052
Army	Engine-Driven Generators Engineering Development	Large Tactical Power (LTP)	Large Tactical Power (LTP)	Increase Warfighter Capability	Contingency Basing	2040	05	0604804A	4,529
Army	Engine-Driven Generators Engineering Development	Small Tactical Electric Power (STEP)	Small Tactical Electric Power (STEP)	Increase Warfighter Capability	Contingency Basing	2040	05	0604804A	12,688
Army	Combat Vehicle Improvement	Stryker Non-Primary Power Capability Enhancement	Stryker Non-Primary Power Capability Enhancement	Enhance Mission Effectiveness	Metering and Monitoring	2040	07	0203735A	4,250
Army	Water and Petroleum Distribution - ED	Early Entry Fluid Distribution System (E2FDS)	Early Entry Fluid Distribution System (E2FDS)	Reduce Logistics Risks to Mission	Fuel Infrastructure	2040	05	0604804A	150
Army	Distribution Systems, Petroleum & Water	Early Entry Fluid Distribution System (E2FDS)	Early Entry Fluid Distribution System (E2FDS)	Reduce Logistics Risks to Mission	Fuel Infrastructure	2035	03	0216300A	13,763
Army	Water and Petroleum Distribution - ED	Bulk Fuel Distribution System (BFDS)	BFDS - Bulk Fuel Distribution System	Reduce Logistics Risks to Mission	Fuel Infrastructure	2040	05	0604804A	1,075
Army	Distribution Systems, Petroleum & Water	Bulk Fuel Distribution System (BFDS)	BFDS - Bulk Fuel Distribution System	Reduce Logistics Risks to Mission	Fuel Infrastructure	2035	03	0216300A	17,985

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Army	Bradley Program (MOD)	Improved Bradley	Increases mobility with extended life track, and improved shocks, road arms and torsion bars.	Enhance Mission Effectiveness	Platform Upgrades_Land	2033	01	0211702A	75,258
Army	Bradley Program (MOD)	Improved Bradley	More efficient Bradley - The Bradley improved engine and transmission generate an overall fuel reduction of 3%.	Increase Warfighter Capability	Propulsion Upgrades_Land	2033	01	0211702A	30,694
Army	Paladin PIM MOD In Service	M109 Family of Vehicles (FOV) Paladin Integrated Management (PIM)	Powertrain and electrical system upgrades	Enhance Mission Effectiveness	Propulsion Upgrades_Land	2033	01	0210609A	446,430
Army	Stryker Upgrade	Improved Stryker	More efficient Stryker, increased horsepower, electrical output, upgraded suspension, and in-vehicle network.	Enhance Mission Effectiveness	Propulsion Upgrades_Land	2033	01	0202123A	1,885
Army	UH-60 Black Hawk M Models	Black Hawk Aircrew Simulators	Black Hawk Aircrew Simulators	Enhance Mission Effectiveness	Simulators Air	2031	01	0210101A	9,900
Army	UH-60 Black Hawk A and L Models	Black Hawk Aircrew Simulators	Black Hawk Aircrew Simulators	Enhance Mission Effectiveness	Simulators Air	2031	01	0210101A	22,681
Army	Generators and Associated Equipment	Advanced Medium Mobile Power Source	Advanced Medium Mobile Power Sources (AMMPS) Skids	Increase Warfighter Capability	Contingency Basing	2035	03	0216300A	631
Army	Inland Petroleum Distribution System	Fuel Infrastructure	IPDS Fuel Unit COSIS	Reduce Logistics Risks to Mission	Fuel Infrastructure	2020	02	0208031A	12,681
Army	Joint Light Tactical Vehicle	Electrical System Energy Related Improvements - Engine Upgrade	Electrical System Energy Related Improvements - Engine Upgrade	Enhance Mission Effectiveness	Propulsion Upgrades_Land	2035	01	0216300A	90,539
Army	Joint Light Tactical Vehicle	Electrical System Energy Related Improvements - Alternator and Li Battery	Electrical System Energy Related Improvements - Alternator and Li Battery	Enhance Mission Effectiveness	Platform Upgrades_Land	2035	01	0216300A	8,899
Army	Combat Service Support Equipment	Force Provider	Force Provider	Enhance Mission Effectiveness	Contingency Basing	2035	03	0216300A	28,860
Army	Combat Service Support Equipment	Heaters's and ECU's	Improved Environmental Control Units (IECU)	Enhance Mission Effectiveness	Contingency Basing	2035	03	0216300A	7,116
								Total Army	1,372,511

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
DLA	Battery Network (BATTNET)	BATTNET	Battery Network (BATTNET) is one element of DLA's Improving Industrial Base Manufacturing Processes' strategic focus area and will improve the supply and reduce the cost of procured batteries used in fielded weapon systems, such as communication radios and armored vehicles. Batteries exhibit dynamic challenges for military logistics. BATTNET relies on a community of battery supply chain members, engineering support activities, researchers, and users to conduct research and development on sustainment issues or risks, and bridge technical solutions for specific groups of batteries.	Reduce Logistics Risks to Mission	Alternative Power Sources	0400	03	0603680S	2,620
DLA	Energy Readiness Program	ERP	Energy Readiness Program (ERP) addresses current and future issues connected to areas encompassing the Class III Bulk (Petroleum, Oils and Lubrication) fuel supply system in order to maintain and improve current warfighter product requirements.	Reduce Logistics Risks to Mission	Alternative Fuels Certification and Testing	0400	03	0603712S	2,169
OSD	Office Under Secretary of Defense	Operational Energy	OSD Senior Officials for Operational Energy. Tasked to analyze, develop and direct OE's energy strategy.	Enhance Mission Effectiveness	Policy and Oversight	0100	04	0901388D8Z	4,931
OSD	Office Under Secretary of Defense	Operational Energy Capability Improvement	Advance technologies in operational energy across warfighting platforms and domains.	Increase Warfighter Capability	Storage, Power Controls and Distribution	0400	03	060455D8Z	74,300
OSD	Office Under Secretary of Defense	Operational Energy Prototyping	Operational energy prototype and demonstration.	Increase Warfighter Capability	Storage, Power Controls and Distribution	0400	04	0604555D8Z	23,200
								Total DLA and OSD	107,220

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Navy	Unmanned Undersea Vehicle (UUV) Core Technologies	Li-Ion Battery: Propagation Resistant Architecture	Project is focused on the development of a propagation resistant battery architecture including integration and demonstration in a medium sized UUV. Effort also includes modeling and simulation capabilities geared toward predicting the propagation resistance of a battery architecture.	Increase Warfighter Capability	Propulsion Upgrades_Sea	1319	04	0604029N	8,296
Navy	Unmanned Undersea Vehicle (UUV) Core Technologies	Warehousing: Robotic Cell Screening	Development of a robust screening process geared toward discarding battery cell outliers that show signs of internal shorting early in the battery assembly process. The discarded outliers will have the effect of increasing both system reliability and safety by eliminating poorer performing cells and cells with signs of internal shorts. This will also have the effect of reducing the probability of a future latent cell defect and catastrophic battery system failures for UUVs. Program will establish a Quality Assurance protocol and procedure for quality control oversight and documentation of battery assembly and configuration control.	Increase Warfighter Capability	Propulsion Upgrades_Sea	1319	04	0604029N	6,550
Navy	Battery Development and Safety Enterprise	Battery Safety Certification	This project area will accomplish improvements in the battery safety certification process increasing the rapid safe deployment of advanced battery systems to the DoN. Allowing more battery based systems to be deployed more quickly will provide gains in fielding greener energy sources and increasing combat capabilities.	Increase Warfighter Capability	Storage, Power Controls and Distribution	1319	04	0603724N	1,500
Navy	Battery Development and Safety Enterprise	Battery Commonality	This project area will accomplish development of battery commonality efforts. Battery commonality will save DoN money and time when fielding advanced weapon systems.	Enhance Mission Effectiveness	Storage, Power Controls and Distribution	1319	04	0603724N	700
Navy	Battery Development and Safety Enterprise	Battery Hazard Reduction	This project area will reduce the hazard of fielded batteries. Allowing more battery based systems to be deployed more quickly will provide gains in fielding more greener energy sources and increasing combat capabilities.	Enhance Mission Effectiveness	Storage, Power Controls and Distribution	1319	04	0603724N	2,000
Navy	Battery Development and Safety Enterprise	Battery/Fuel Cell Standards	This project area will develop clear battery, battery system, and containment oriented standards and requirements. Allowing more battery/fuel cell based systems to be deployed more quickly will provide gains in fielding greener energy sources and increasing combat capabilities.	Increase Warfighter Capability	Storage, Power Controls and Distribution	1319	04	0603724N	500
Navy	Battery Development and Safety Enterprise	Battery Technology Development	This project area will accomplish development, laboratory, and Fleet testing to determine overall mission and cost effectiveness of improved storage technologies allowing for the transition to more greener energy and power sources.	Increase Warfighter Capability	Storage, Power Controls and Distribution	1319	04	0603724N	1,213

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Navy	Aircraft Energy	High Efficiency Generator	Evaluate and demonstrate alternative aircraft power generation/conversion technologies to provide more efficient power generation to meet legacy platform power deficiencies.	Increase Warfighter Capability	Individual/Warfighter Power	1319	04	0603724N	1,500
Navy	Aircraft Energy	Advanced Fuel Cells for UAS Applications	Design, build, and test a drop-in ready hydrogen fuel cell power and propulsion (P&P) system for the VTOL Stalker to demonstrate improved operational performance.	Increase Warfighter Capability	Platform Upgrades_Air	1319	04	0603724N	300
Navy	Aircraft Energy	Operational Modeling, Simulation and metrics	Leverage modeling, simulation and data sources to develop assessments and tools to support operational capability assessments.	Increase Warfighter Capability	M&S, Studies, and Wargames	1319	04	0603724N	200
Navy	Aircraft Energy	Variable Vapor Cycle Systems	Design, build and demonstrate variable vapor cycle system that provides continuous cold liquid flow and heat rejection at a higher temperatures for greater thermal control on future aircraft applications.	Increase Warfighter Capability	Platform Thermal Management	1319	04	0603724N	100
Navy	Aircraft Energy	On-Board Thermal Management	Demonstrate deoxygenation technology to increase fuel heat sink capability in order to maximize aircraft thermal management and increase engine efficiency.	Increase Warfighter Capability	Platform Thermal Management	1319	04	0603724N	50
Navy	Aircraft Energy	Splittered Rotor Compressor	Development and validation of advance compressor design to increase efficiency and reduce weight.	Increase Warfighter Capability	Propulsion Upgrades_Air	1319	04	0603724N	30
Navy	Aircraft Energy	Opportunity Studies	Provide seed funding to investigate potential aircraft Operational Energy solutions (Power and Thermal) and identify potential candidates to select for detailed projects.	Increase Warfighter Capability	Platform Upgrades_Air	1319	04	0603724N	18
Navy	Mobility Fuels	Deployed Sensor Development and Validation	Develop and validate technology to reduce time and resources necessary to provide fuel quality surveillance in forward deployed environments.	Reduce Logistics Risks to Mission	Metering and Monitoring	1319	04	0603724N	1,017

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Navy	Mobility Fuels	Interoperability with Commercial and Allied forces	Conduct RDTE necessary to assure that Naval tactical forces (air, sea and ground) can operate seamlessly using allied and/or commercially procured fuels.	Enhance Mission Effectiveness	Conventional Fuels Testing	1319	04	0603724N	800
Navy	Mobility Fuels	Rapid fuel analysis and impact assessment	Develop test methods, fuel-hardware interaction correlations and analytic tools to reduce operational impacts from field identified deficiencies.	Reduce Logistics Risks to Mission	Conventional Fuels Testing	1319	04	0603724N	3,100
Navy	Mobility Fuels	Fuel Hardware Impact analysis	Conduct RDTE necessary to allow operational and/or technical decision makers the ability to assess risk of fuel properties/chemistry on current and emerging operational or platform requirements.	Enhance Mission Effectiveness	Conventional Fuels Testing	1319	04	0603724N	2,315
Navy	OPLOG IPT Development	Seabased Petroleum Distribution System (SPDS)	Development of an offshore bulk fuel cache storage and over the shore transfer system. Replaces and improves on legacy OPDS systems.	Reduce Logistics Risks to Mission	Fuel Infrastructure	1319	04	0603564N	9,600
Navy	OPLOG IPT Development	Joint Offshore Fuel Farm (JOFF)	Development of an open ocean bulk fuel cache storage and transfer system to refuel oilers and combatants at sea.	Reduce Logistics Risks to Mission	Fuel Infrastructure	1319	04	0603564N	169
Navy	Energy Conservation	Power Generation and Storage	This project area will accomplish development, laboratory and Fleet testing to determine overall mission and cost effectiveness of improved power generation and storage technologies.	Increase Warfighter Capability	Platform Upgrades_Sea	1319	04	0603724N	2,440
Navy	Energy Conservation	Hull Husbandry	This project will be utilized to identify and evaluate new underwater hull coating systems and underwater hull cleaning and maintenance techniques to reduce hydrodynamic drag on the hull and thereby increase fuel efficiency.	Increase Warfighter Capability	Platform Upgrades_Sea	1319	04	0603724N	1,024
Navy	Energy Conservation	Hull Hydrodynamics	This project area will accomplish development, modeling, laboratory and Fleet testing of ship modifications to propellers such as fouling release coatings and/or hull appendages to determine overall mission and cost effectiveness of these improvements.	Increase Warfighter Capability	Platform Upgrades_Sea	1319	04	0603724N	827

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (SK)
Navy	Energy Conservation	HVAC	This project will be utilized to accomplish prototype development, land and shipboard testing to determine cost effectiveness of improvements aimed at more efficient climate control of shipboard spaces.	Increase Warfighter Capability	Platform Upgrades_Sea	1319	04	0603724N	737
Navy	Energy Conservation	Thermal Management	This project will be utilized to identify and evaluate potential uses for Thermal Management techniques designed to reduce or dissipate overall shipboard heat generation and reduce the shipboard electrical demand on HVAC systems.	Increase Warfighter Capability	Platform Upgrades_Sea	1319	04	0603724N	567
Navy	Energy Conservation	Propulsion Systems	This project will be utilized to identify requirements and perform land based and shipboard testing of ship propulsion system improvements on Gas Turbine, Steam, and Diesel Engine systems to reduce overall fuel consumption and lower maintenance costs.	Increase Warfighter Capability	Propulsion Upgrades_Sea	1319	04	0603724N	237
Navy	Energy Conservation	Electrical Systems	This project will be utilized to identify and perform land based and shipboard testing of ship electrical system improvements to reduce energy consumption.	Increase Warfighter Capability	Platform Upgrades_Sea	1319	04	0603724N	587
Navy	Energy Conservation	Auxiliary Systems	This project will be utilized to identify, test, and evaluate new technologies for shipboard auxiliary systems aimed at reducing fuel consumption.	Increase Warfighter Capability	Platform Upgrades_Sea	1319	04	0603724N	237
Navy	Energy Conservation	Energy Monitoring & Assessment	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.	Increase Warfighter Capability	Metering and Monitoring	1319	04	0603724N	3,108
Navy	MQ-25	MQ-25 Development	Development of first CVN-based organic mission and recovery tanker. MQ-25 will extend the range and increase lethality of the CSG's CVW, and will contribute to F/A-18EF shortfall by relieving tanker duties and returning a/c to the strike fighter role. MQ-25 will also have a secondary ISR capability. IOC 4QFY24.	Increase Warfighter Capability	Mobile Fuel Assets	1319	05	0605414N	222,373
Navy	Defense Research Sciences	NRL - Energy	Long term Basic and Applied research into phenomena and mechanisms allowing for more efficient conversion of power; generation of power from solar illumination; from hydrogen conversion in fuel cells; storage of energy in improved battery technologies; augmentation of liquid fuels for greater energy density and exploitation of biological mechanisms for long-duration energy sources.	Increase Warfighter Capability	Alternative Fuels Production	1319	01	0601153N	3,921

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Navy	Defense Research Sciences	NRL - Energy	Long term Basic and Applied research into phenomena and mechanisms allowing for more efficient conversion of power; generation of power from solar illumination; from hydrogen conversion in fuel cells; storage of energy in improved battery technologies; augmentation of liquid fuels for greater energy density and exploitation of biological mechanisms for long-duration energy sources.	Increase Warfighter Capability	Alternative Power Sources	1319	01	0601153N	2,423
Navy	Defense Research Sciences	NRL - Energy	Long term Basic and Applied research into phenomena and mechanisms allowing for more efficient conversion of power; generation of power from solar illumination; from hydrogen conversion in fuel cells; storage of energy in improved battery technologies; augmentation of liquid fuels for greater energy density and exploitation of biological mechanisms for long-duration energy sources.	Increase Warfighter Capability	Storage, Power Controls and Distribution	1319	01	0601153N	862
Navy	Defense Research Sciences	Sea Based Aviation Propulsion Basic Research	This Program provides long-term basic research that discovers new phenomena related power propulsion and thermal management, with the intent that they mature to provide transition opportunities for the associated applied research program. This Program also supports university research in these areas and the associated graduate student support to help build the number and quality of Scientists and Engineers with relevant skills to help further develop power and propulsion systems for future Sea Based Aviation platforms and weapon systems.	Increase Warfighter Capability	Propulsion Upgrades_Air	1319	01	0601153N	2,761
Navy	Defense Research Sciences	Energy Materials Research	Energy storage and power generation materials basic research.	Increase Warfighter Capability	Materials and Design	1319	01	0601153N	8,880
Navy	Defense Research Sciences	Power, Energy, and Propulsion Research	Advancing power and energy science through fundamental research in the areas of conductor and permanent magnet materials, energy conversion, combustion, and cyber physical system modeling. Advancing thermal science and technology through fundamental studies of multi-phase heat transfer, fluid dynamics, and nanostructured materials to efficiently acquire, transport, and reject heat and enable higher power density electronic systems. Fulfill the power and energy needs of the Navy's next-generation weapons and platforms by improving (1) Education, (2) Reliability of power electronic devices, (3) Power density of power systems, and (4) Power Electronics Manufacturing costs.	Increase Warfighter Capability	Platform Upgrades_Sea	1319	01	0601153N	7,900
Navy	Defense Research Sciences	Naval Biosciences - Microbial Fuel Cells	Microbial fuel cells (MFC) provide electricity harvested from specialized natural bacteria that use non-hazardous organic compounds as fuel, and then provide electrical current to an electrode. Can be used to sustainably power seafloor sensors/systems in place of batteries. Program focuses on	Increase Warfighter Capability	Alternative Power Sources	1319	01	0601153N	657

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
			study of fundamental mechanisms used for extracellular electron transport.						
Navy	Defense Research Sciences	Bioengineering and Life Sciences (Energy)	Basic research exploring biofabrication for generation of inorganic energy harvesting/conversion materials; bacterial-inorganic hybrid materials for fuel cells; nano-biomaterials for generating high intensity light sources; silk composites for energy harvesting and energy sources; and novel humidity responsive materials for harnessing energy for natural evaporation.	Increase Warfighter Capability	Materials and Design	1319	01	0601153N	606
Navy	Defense Research Sciences	Bioengineering and Life Sciences (Energy)	Basic research exploring the fundamental mechanism of bacterial spores' water-responsive behaviors in order to develop practical applications using the evaporation energy harvesting technique, and next generation actuators.	Increase Warfighter Capability	Alternative Power Sources	1319	01	0601153N	144
Navy	Defense Research Sciences	ONRG International Research	Basic research with international principle investigators doing collaborative and cooperative research with the Naval research enterprise.	Increase Warfighter Capability	Alternative Power Sources	1319	01	0601153N	199
Navy	Power Projection Applied Research	NRL - Energy	Long term Basic and Applied research into phenomena and mechanisms allowing for more efficient conversion of power; generation of power from solar illumination; from hydrogen conversion in fuel cells; storage of energy in improved battery technologies; augmentation of liquid fuels for greater energy density and exploitation of biological mechanisms for long-duration energy sources.	Increase Warfighter Capability	Storage, Power Controls and Distribution	1319	02	0602123N	2,374
Navy	Power Projection Applied Research	Propulsion Task Force Energy (TFE)	This Program, in partnership with the Variable Cycle Advance Technology (VCAT) program, has the objective to develop variable geometry and adaptive cycle gas turbine engine technology for next generation air dominance aircraft. The benefits of these technologies are anticipated to be reduced fuel consumption and hence greater operational range and reduced logistics tail, mostly by reducing the demand for deployed fuel and tanker aircraft support.	Increase Warfighter Capability	Propulsion Upgrades_Air	1319	02	0602123N	8,833
Navy	Power Projection Applied Research	Sea Based Aviation Propulsion Applied Research	This Program provides medium-term, applied research to demonstrate advanced engine technologies applicable to engine components for naval aviation platforms in propulsion-related technology areas. The specific areas addressed in this program are: (1) Propulsion Cycles, Subsystems, and Engine-Airframe Integration (2) High Stage-Loading, Variable-Geometry, and Enhanced Durability Turbomachinery (3) Jet Noise Reduction for tactical aircraft (4) Hot Section Materials and Coatings, (5) Higher Power Density and Stability Combustion Systems, and (6) Small Propulsion Engine Technology for Autonomous Air Vehicles.	Increase Warfighter Capability	Propulsion Upgrades_Air	1319	02	0602123N	3,676

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Navy	Power Projection Applied Research	Power, Energy, and Propulsion Research	Technology programs focused on providing technologically superior warfighting capabilities at reduced total ownership costs for surface and subsurface platforms through investments in applied research of programs such as the Electric Ship Research and Development Consortium (ESRDC). ESRDC is composed of eight leading universities and is focused on afloat power systems, and leads efforts to address a national shortage of electric power engineers, and ensure U.S. superiority in electric systems; activities linked with newly established Combat Power and Energy Systems (CPES); and activities in support of digital twin, heat transfer/thermal management, distribution/control of power and energy storage and power management.	Increase Warfighter Capability	Platform Upgrades_Sea	1319	02	0602123N	28,930
Navy	Warfighter Sustainment Applied Research	Biocentric Technology (Energy)	Program focuses on microbes that produce electricity from organic matter found in sediment or wastewater, and is targeting two distinct naval applications: (1) Powering of undersea devices and sensors for environmental monitoring, and (2) shipboard/submarine wastewater degradation.	Reduce Logistics Risks to Mission	Alternative Power Sources	1319	02	0602236N	685
Navy	Warfighter Sustainment Applied Research	ONRG International Research	Early applied research with international principle investigators doing collaborative and cooperative research with the Naval research enterprise.	Increase Warfighter Capability	Alternative Power Sources	1319	02	0602236N	150
Navy	Ocean Warfighting Environment Applied Research	Integrated Climate Weather and Ocean Decision Support	Applied research for multi-objective planning and asset routing to adjust planned logistics routes to account for factors like hazardous and extreme weather and ocean conditions to increase operational logistics effectiveness, fuel efficiency, and reduce platform lifecycle costs from damage and fatigue.	Reduce Logistics Risks to Mission	Storage, Power Controls and Distribution	1319	02	0602435N	3,643
Navy	Undersea Warfare Applied Research	NRL - Energy	Long term Basic and Applied research into phenomena and mechanisms allowing for more efficient conversion of power; generation of power from solar illumination; from hydrogen conversion in fuel cells; storage of energy in improved battery technologies; augmentation of liquid fuels for greater energy density and exploitation of biological mechanisms for long-duration energy sources.	Increase Warfighter Capability	Alternative Power Sources	1319	02	0602747N	733
Navy	Undersea Warfare Applied Research	Undersea Weaponry (USW) - Power & Energy	Applied research to develop component, subsystem and system technologies that are the critical building blocks for advanced high-energy-density and power-density propulsion systems, enabling increased endurance (days/weeks/months) and reliability in an air-independent environment. Approaches include modeling and simulation, fuel cells, engines, novel fuels/oxidizers and reactant storage/delivery systems.	Increase Warfighter Capability	Propulsion Upgrades_Sea	1319	02	0602747N	1,197

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Navy	Future Naval Capabilities Applied Research	SW-FY21-02 Robust Combat Power Control (RCPC)	Develop Combat Power and Energy Control System to anticipate, align and configure shipboard resources based on system state and mission context.	Increase Warfighter Capability	Storage, Power Controls and Distribution	1319	03	0603673N	7,735
Navy	Aircraft Energy	Common Affordable Safe Energy Storage	Optimize aircraft battery performance, safety and cost through development of a common, scalable Li ion battery.	Increase Warfighter Capability	Individual/Warfighter Power	1319	04	0603724N	1,400
Navy	Aircraft Energy	Aircraft Turbine Engine Recuperator	Demonstrate using M250 engine utilizing an advanced recuperator design enabling 25% reduced specific fuel consumption (SFC). Reduced SFC would provide extended time on station improvement of 25 - 35%, critical to ISR mission.	Increase Warfighter Capability	Propulsion Upgrades_Air	1319	04	0603724N	1,500
Navy	Aircraft Energy	Integrated Thermal and Power Management Modelling	Development and validation of Integrated Power and thermal management models to develop integrated solutions in legacy and emerging platforms.	Increase Warfighter Capability	Platform Thermal Management	1319	04	0603724N	1,900
Navy	Advance Surface Machinery Sys	Integrated Power & Energy Systems	Development of Next Generation Integrated Power and Energy System (NGIPES) technology aboard Navy Ships to enable current and future weapons and sensor systems.	Increase Warfighter Capability	Storage, Power Controls and Distribution	1319	04	0603573N	69,324
Navy	ICAS/eRM	Condition Assessment System	Supports Installation and Procurement of ICAS (Integrated Condition Assessment System) and eRM (Enterprise Remote Monitoring). These systems enables remote monitoring and real time health assessments of shipboard equipment.	Enhance Mission Effectiveness	Platform Upgrades_Sea	1810	01	0204228N	827
Navy	MUSE Program	Mobile Utility Support Equipment	The Mobile Utility Support Equipment (MUSE) Program is recapitalizing end-of-life electrical generation assets providing efficient electrical power generation, reduced air pollutants via air permitting requirements, and reduced carbon emissions offsetting the effects of climate change.	Enhance Mission Effectiveness	Contingency Basing	1810	05	0708012N	8728
Navy	LCS In-Service Modernization	LCS Stern Flap	Complete engineering for stern flap installations on LCS.	Increase Warfighter Capability	Platform Upgrades_Sea	1810	01	0204230N	850

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
Navy	TAO Fleet Oiler	T-AO 205 Efficient Replacement Engines	SCN supporting energy efficient engines for T-AO Class ships.	Reduce Logistics Risks to Mission	Propulsion Upgrades_Sea	1611	05	0204441N	11,470
Navy	Mobility Fuels	Tri-Service Harmonized Synthetic Fuel Qualification	Conduct analytic assessment of the synthetic fuel processes currently approved by the commercial specification to provide assessment and recommendations to Service Air Worthiness authorities for approval or not. Identify testing required to obtain approval for those process not recommended for approval.	Reduce Logistics Risks to Mission	Alternative Fuels Certification and Testing	1319	04	0603724N	2,000
								Total Navy	456,403

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (\$K)
USMC	Mobile Power Equipment	Advance Mobile Medium Power Sources	The Family of Mobile Power Equipment is a family-of-systems to continuously procure, update, and replenish approximately 19,000 items of Mobile Tactical Power Generation & Distribution Equipment to include the AMMPS system, and 22 different TAMCNs. The Family of Mobile Electric Power Equipment consists of skid & trailer mounted tactical generators ranging from 2 to 200 kilowatts, Mobile Electric Power Distribution Systems, Floodlight Sets, Load Banks & Electricians Tool Kits. This equipment is procured & fielded to provide electricity on the battlefield. Combat, combat support & combat service support units all require tactical power to operate weapons systems, C4I systems, medical & messing facilities, environmental control equipment, & water purification systems.	Enhance Mission Effectiveness	Contingency Basing	1106	01	0206624M	857
USMC	Mobile Power Equipment	Advance Mobile Medium Power Sources	The Family of Mobile Power Equipment is a family-of-systems to continuously procure, update, and replenish approximately 19,000 items of Mobile Tactical Power Generation & Distribution Equipment to include the AMMPS system, and 22 different TAMCNs. The Family of Mobile Electric Power Equipment consists of skid & trailer mounted tactical generators ranging from 2 to 200 kilowatts, Mobile Electric Power Distribution Systems, Floodlight Sets, Load Banks & Electricians Tool Kits. This equipment is procured & fielded to provide electricity on the battlefield. Combat, combat support & combat service support units all require	Enhance Mission Effectiveness	Contingency Basing	1109	06	0206211M	21,467

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (SK)
			tactical power to operate weapons systems, C4I systems, medical & messing facilities, environmental control equipment, & water purification systems.						
USMC	Mobile Power Equipment	Advance Mobile Medium Power Sources	The Family of Mobile Power Equipment is a family-of-systems to continuously procure, update, and replenish approximately 19,000 items of Mobile Tactical Power Generation & Distribution Equipment to include the AMMPS system, and 22 different TAMCNs. The Family of Mobile Electric Power Equipment consists of skid & trailer mounted tactical generators ranging from 2 to 200 kilowatts, Mobile Electric Power Distribution Systems, Floodlight Sets, Load Banks & Electricians Tool Kits. This equipment is procured & fielded to provide electricity on the battlefield. Combat, combat support & combat service support units all require tactical power to operate weapons systems, C4I systems, medical & messing facilities, environmental control equipment, & water purification systems.	Enhance Mission Effectiveness	Contingency Basing	1109	06	0502511M	1,895
USMC	Mobile Power Equipment	Advance Mobile Medium Power Sources	The Family of Mobile Power Equipment is a family-of-systems to continuously procure, update, and replenish approximately 19,000 items of Mobile Tactical Power Generation & Distribution Equipment to include the AMMPS system, and 22 different TAMCNs. The Family of Mobile Electric Power Equipment consists of skid & trailer mounted tactical generators ranging from 2 to 200 kilowatts, Mobile Electric Power Distribution Systems, Floodlight Sets, Load Banks & Electricians Tool Kits. This equipment is procured & fielded to provide electricity on the battlefield. Combat, combat support & combat service support units all require tactical power to operate weapons systems, C4I systems, medical & messing facilities, environmental control equipment, & water purification systems.	Enhance Mission Effectiveness	Contingency Basing	1109	06	0502514M	2,885
USMC	Mobile Power Equipment	Advance Mobile Medium Power Sources	The Family of Mobile Power Equipment is a family-of-systems to continuously procure, update, and replenish approximately 19,000 items of Mobile Tactical Power Generation & Distribution Equipment to include the AMMPS system, and 22 different TAMCNs. The Family of Mobile Electric Power Equipment consists of skid & trailer mounted tactical generators ranging from 2 to 200 kilowatts, Mobile Electric Power Distribution Systems, Floodlight Sets, Load Banks & Electricians Tool Kits. This equipment is procured & fielded to provide electricity on the battlefield. Combat, combat support & combat service support units all require tactical power to operate weapons systems, C4I systems, medical & messing facilities, environmental control equipment, & water purification systems.	Enhance Mission Effectiveness	Contingency Basing	1319	07	0206624M	3,109

ORG	OE Program Title	OE Initiative Title	OE Project Description	OE Strategy Objectives	OE Activity Classification	Treasury Code	BA Code	Program Element	FY2022 (SK)
USMC	Family of Shelters and Shelter Equipment	Shelters, Shelter Liners, Lighting upgrades	R&D for future shelter systems and USMC lighting solution of the future.	Increase Warfighter Capability	Contingency Basing	1319	07	0206623M	174
USMC	Medium Tactical Vehicle Replacement (MTVR)	Fuel Efficient MTVR FNC Transition	Through analysis, modeling and simulation, hardware development, integration, test, and evaluation, the Fuel Efficient Medium Tactical Vehicle Replacement (MTVR) FNC program will select, bench test, and integrate a suite of affordable fuel efficiency enablers.	Increase Warfighter Capability	Platform Upgrades_Land	1106	01	0702808M	189
USMC	Medium Tactical Vehicle Replacement (MTVR)	Fuel Efficient MTVR FNC Transition	Through analysis, modeling and simulation, hardware development, integration, test, and evaluation, the Fuel Efficient Medium Tactical Vehicle Replacement (MTVR) FNC program will select, bench test, and integrate a suite of affordable fuel efficiency enablers.	Increase Warfighter Capability	Platform Upgrades_Land	1109	05	0206315M	6,935
USMC	Expeditionary Energy Office	Expeditionary Energy Concepts (E2C, formally ExFOB)	Annual process to evaluate and deploy technologies to support Marine Corps Expeditionary Energy Strategy goals of increased combat effectiveness and reduced dependence on liquid logistics on the battlefield.	Increase Warfighter Capability	Individual/Warfighter Power	1106	04	0903798M	3,032
USMC	Expeditionary Energy Office	Expeditionary Energy Concepts (E2C, formally ExFOB)	Annual process to evaluate and deploy technologies to support Marine Corps Expeditionary Energy Strategy goals of increased combat effectiveness and reduced dependence on liquid logistics on the battlefield.	Increase Warfighter Capability	Individual/Warfighter Power	1319	07	0206313M	1,290
USMC	MCWL/Futures Directorate	Hybrid Electric ITV Trailer (HEIT)	Combining proven technologies in a novel way, program seeks to provide an ITV-towable, V-22/CH-53/C130 transportable, Mobile Hybrid Power source that can use multiple fuel types to provide quiet sustained power.	Increase Warfighter Capability	Contingency Basing	1319	03	0603640M	713
USMC	Applied Research	Marine Corps Operational Energy: Energy Efficiency and Demand Reduction	Applied Research to increase energy efficiency in weapons systems, platforms, vehicles and equipment and extend tactical range/operational reach. Develop, optimize, integrate, and demonstrate at least 15% fuel efficiency improvement over the existing MTVR.	Increase Warfighter Capability	Individual/Warfighter Power	1319	02	0602131M	1,960
USMC	Advanced Technology Demo	Marine Corps Operational Energy: Energy Optimization and Logistic Burden Reduction	Advanced Technology Demonstration research to optimize energy usage and/or meet operational energy demand with renewable energy sources and reduce excess capacity or reduce logistic footprint/burden energy sources. Develop, optimize, integrate, and demonstrate at least 15% fuel efficiency improvement over the existing MTVR.	Increase Warfighter Capability	Individual/Warfighter Power	1319	03	0603640M	5,323
USMC	Medium Tactical Vehicle Replacement (MTVR)	Fuel Efficient MTVR FNC Transition	Through analysis, modeling and simulation, hardware development, integration, test, and evaluation, the Fuel Efficient Medium Tactical Vehicle Replacement (MTVR) FNC program will select, bench test, and integrate a suite of affordable fuel efficiency enablers.	Increase Warfighter Capability	Platform Upgrades_Land	1319	07	0206624M	35
								USMC Total	49,864