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A Review of the Department of Defense's Energy Conservation Investment Program

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A REVIEW OF THE DEPARTMENT OF DEFENSE'S ENERGY CONSERVATION INVESTMENT PROGRAM

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I. Introduction

The United States Department of Defense ("DoD") is easily the world's largest consumer of energy when you consider its day-to-day operations.[1] To the extent the United States ("US") demands a robust defense structure, the US, by proxy, will remain the leading consumer of energy. Although our Nation's national defense structure plays an integral role in the application of new, innovative energy-efficient technologies, the DoD can play a larger role by promoting energy conservation and promoting new energy conservation technologies. In effect, the DoD and its leaders continuously seek new and innovative measures that will lead to cleaner and more efficient energy. The DoD can model efficient energy use for private entities. The following proposition accurately captures the mentality of the DoD as it relates to energy consumption: remain ahead of all potential foes. Although justified (and in no way misplaced) this mindset often results in the private sector developing more efficient and cost-

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1. Jerry Warner & P.W. Singer, *Fueling the "Balance" — A Defense Energy Strategy Primer*, The Brooking Institution (2009), http://www.brookings.edu/wp-content/uploads/2016/06/08_defense_strategy_singer.pdf ("The U.S. Department of Defense is the world's single largest consumer of energy, using more energy [during] its daily operations than any other private or public organization, as well as more than 100 nations.").

effective energy consuming technologies due to the emphasis from the DoD on creating more efficient energy technologies and uses.

The Army and other DoD agencies can reduce their current energy bill—valued at $19.4 billion—by promoting and utilizing energy-efficient technologies and practices.[2] Because the DoD thought that relying on one form of energy could potentially undermine its effectiveness, it created a special program—the Energy Conservation Investment Program ("ECIP").[3] The ECIP's primary objective is to fund annual construction projects through defense-wide military construction appropriation.[4] This Comment will examine the approval, funding, and subsequent reporting requirements of the ECIP and the ECIP's progress toward developing new energy-efficient technologies and practices. Projects the ECIP approves or sponsors tend to serve the following three purposes: (1) energy or water conservation; (2) renewable electricity generation; or (3) energy security promotion.[5] Integrating new, more efficient technologies may help the DoD reduce its energy footprint and perhaps optimize its existing energy resources in local military installations—domestic and abroad. But when it comes to new and innovative energy uses, the DoD and its predecessor agencies have a history of self-entity introspection.[6] The history of the agencies within the DoD has provided a framework for the department to utilize new alternative energy forms. The switch from coal-powered ships to fuel-oil-powered ships is an example of this kind of innovation.[7] Advances in new energy-efficient uses and technology could spill into the private sector, providing better and more reliable energy use and consumption.

At the turn of the nineteenth century, Great Britain's navy had a world-changing decision to make. By that time, those enlisted in the British Navy

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2. *See* Jeremy S. Scholtes, *On Point for the Nation: Army and Renewable Energy*, 34 ENERGY L.J. 55, 60 (2013) ("If the Army can reduce energy use in general, through efficiency upgrades and better user practices, then it can reduce its overall consumption. Reduction in consumption . . . reduces the Army's portion of the $19.4 billion energy bill . . . .").

3. U.S. GOV'T ACCOUNTABILITY OFF., GAO-16-162, Defense Infrastructure Energy Conservation Investment Program Needs Improved Reporting, Measurement, and Guidance 1 (2016).

4. *Id.*

5. *Id.*

6. The DoD officially established the ECIP during fiscal year 1976. *Id.*

7. F. William Engdahl, *Oil and the origins of the 'War to make the world safe for Democracy'* (June 22, 2007), http://www.engdahl.oilgeopolitics.net/History/Oil_and_the_Origins_of_World_W/oil_and_the_origins_of_world_w.HTM (last visited May 17, 2017).

could hardly have fathomed that their service would have a lasting effect on global politics and subsequently the world's transition to an alternate energy source that would eventually drive global economies. But the foregoing occurred after the British Navy converted its fleet from coal-based to oil-based equipment:

> After the 1890's, though little publicized, the search for secure energy in the form of petroleum would become of paramount importance to Her Majesty's Navy and Her Majesty's government. A global war for control of oil was shaping up, one few were even aware of outside select policy circles.[8]

Necessity breeds innovation. Looking through the lens of world history, the English saw its empire slipping from its fingertips. The reason: The cost in both human and traditional forms of capital to maintain coal-powered ships around the world was a great expense. This high expense needed review if the British Navy was to maintain its prestige as one of the world's then most powerful naval forces.[9]

To keep pace with rivaling empires, the British made the strategic decision to switch its naval forces from coal to oil.[10] Lord Admiral Fisher, a well-known figure in British naval history and then merely a captain, argued for the switch.[11] His rationale: A ship with an oil-based combustion system did not leave the same trail of smoke visible for miles.[12] The work required to make a coal-based ship operational ranged from four to nine hours; comparatively, a ship with an oil-based combustion system could be operational within thirty minutes and reach its top speed within five minutes while at sea.[13] The on-loading of fuel for oil-based ships required the work of twelve men working twelve-hour shifts.[14] Even so, reaching equal propulsion capacity with a coal-powered ship required a workforce of 500 men working 5 non-stop days; moreover, ships fueled by oil could travel four times the distance. Yet with a fuel oil ship being able to travel

8. *Id*.

9. The British Navy earned its reputation from fierce sea battles such as the Battle of Trafalgar, where the British Navy defeated the combined forces of both French and Spanish armadas. *See* Stephen Paul Coolbaugh, *Raiders of the Lost . . . Sub? The Potential for Private Claims of Ownership to Military Shipwrecks in International Waters: The Case of Japanese Submarine I-52*, 49 BUFF. L. REV. 929, 930 n.2 (2001).

10. Engdahl, *supra* note 7.

11. *Id*.

12. *Id*.

13. *Id.* at n.13 (citations omitted).

14. *Id*.

four times the distance of a coal-powered ship, the additional labor was a fair trade-off since for a coal-power ship to reach equal propulsion capacity, a navy had to commit a workforce of 500 men working at five non-stop days.[15] But by the turn of the twentieth century, the Anglo-Persian Oil Company gained access to ancient Mesopotamia from the Persian Shah.[16] These events marked the shift to oil-powered naval warships, prompting the US Navy to switch from coal to fuel oil and later capitalize on the energy and cost savings.

By promoting ECIP, the DoD has the potential to cause the next paradigm shift like the British Navy when it transitioned from coal to fuel oil. The DoD created ECIP to be this proving ground. But for ECIP to realize this potential, the DoD needs two things: additional oversight and more implementations to prove its ultimate worth. This Comment will examine the policies and instructions that created ECIP and discuss how the DoD can improve the program to provide a greater example of efficient energy use. The DoD intended to use the ECIP to meet then-President Obama's expectation of it adding three gigawatts of renewable energy to its energy portfolio.[17]

Part II examines the statutory guidelines that created ECIP and ensure its continued existence. Part III describes three examples of litigation that may result from the execution and implementation of an ECIP project. Part IV explores the Government Accountability Office report and its findings on the ECIP project. Part V discusses how the DoD's vision to promote and create more efficient energy technologies and practices is not proving to be demonstrably effective. Finally, Part VI reviews the need for the DoD to be energy independent in the interest of national security and how the DoD can achieve this goal through more efficient energy use.

II. Statutory Guidelines

At an unfathomable rate, the DoD's electricity use exceeds 30,000,000 Mega Watt Hours ("MWH") per year—this translates to $2 billion per year.[18] Remarkably, nearly all the electricity supplied to DoD installations comes from the civilian energy market.[19]

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15. *Id*.
16. *Id*.
17. *See* The White House, *President Obama's Climate Action Plan, Second Anniversary Progress Report* (June 2015), http://obamawhitehouse.archives.gov/sites/default/files/docs/cap_progress_report_final_w_cover.pdf.
18. Warner, *supra* note 1.
19. *Id*.

Title 10 § 2924 of the United States Code provides the following: For an energy resource to be defined as renewable, the energy resource must emanate from solar, wind, biomass, landfill gas, ocean tides or currents, geothermal, municipal solid waste, hydroelectric generation built after 1998, or any thermal energy created from the aforementioned sources.[20]

A great deal of the DoD's innovation around renewable and efficient energy resources consists of its installation infrastructure.[21] To improve its energy efficiency and maximize the utilization of its installations, the DoD established ECIP. ECIP provides funding for construction projects within the DoD and aims to create energy efficiency through new innovative designs.[22]

Another statute—10 USC § 2914—authorizes the Secretary of Defense ("SECDEF") to approve military construction projects for energy conservation not previously authorized and to use money specially allocated for energy conservation construction projects.[23] Once the SECDEF authorizes the military construction project under ECIP, the SECDEF then must notify Congress of the approval and the project may commence after a fourteen or twenty-one day waiting period.[24] ECIP's goals are as follows:

> a) Dramatically reduce energy consumed at an individual installation or joint base;
>
> b) Integrate multiple energy savings, monitoring, or renewable energy technologies to realize synergistic benefits;
>
> c) Implement a documented energy plan for a given installation, region, department or Component. Special consideration will be given to projects that are part of an installation energy master plan; and
>
> d) Implement a technology validated in a demonstration program . . . or an innovative technology that represents

20. 10 U.S.C.A. § 2924 (7) (A-I) (West).
21. Warner, *supra* note 1.
22. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 3, at 1.
23. 10 U.S.C.A. § 2914(a) (West 2016).
24. *Id*. § 2914(b).

> a potentially significant improvement over existing technology.[25]

There are two categories of ECIP funds. The first category is for construction funds. These are appropriated for the construction of approved ECIP projects and can be obligated for four years after initial approval. The construction funds are usually obligated through design/bid/build contracts with the base installation.[26] The second category is for planning a design. These funds are set aside for the initial design and planning by architects and engineering firms; these funds may be rolled over into subsequent years, but only if the funds were originally obligated for that purpose.[27]

The DoD uses several different programs to provide for energy conservation. As a result, other DoD construction projects may also use technology to provide for energy conservation.[28] The DoD budgeted $500 million for investments in conservation and promotion of energy efficiency.[29] This was mostly to fund improvements geared toward increasing energy efficiency for legacy buildings and structures.[30] For fiscal year 2015, ECIP funded $160 million for construction projects and $10 million for planning and design—the total military construction budget authority totaled roughly $6.5 billion.[31] Unfortunately, the ECIP encompasses only a small portion of the total construction budget for the DoD.[32] These funds are competitively sought throughout the agency. Each defense component must submit plans to the Office of the Deputy Assistant Secretary of Defense for Installation Energy ("IE") for evaluation and final approval.[33]

The IE ranks, prioritizes, and approves the submissions based on three factors or areas of energy conservation: renewable energy, energy efficiency, and water conservation. For fiscal year 2017, the funding

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25. Memorandum from the Office of the Under Sec'y Def. on FY 18 Energy Conservation Investment Program (ECIP) and Plans for the Remainder of the Future Years Defense Program (Aug. 30, 2016), http://www.acq.osd.mil/eie/Downloads/IE/FY2018%20ECIP%20Guidance%20Memo%20and%20Attachment%20A.PDF.

26. *Id*.

27. *Id*.

28. *See* U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 3, at 8.

29. *Id*.

30. *Id*.

31. *Id*. at 1-2.

32. *Id*.

33. Memorandum from the Office of the Under Sec'y Def. on FY 18 Energy Conservation Investment Program (ECIP) and Plans for the Remainder of the Future Years Defense Program.

allocation for these areas is twenty-five percent renewable energy, sixty-five percent energy efficiency, and ten percent water conservation.[34] The IE further scrutinizes the ECIP proposals using a holistic approach based on the following factors:

> a) Net Present Value - based on project provided savings to investment ratio ([“]SIR[”]), economic life, investment value and annual savings values;
>
> b) Service Priority;
>
> c) The degree to which projects are part of a documented installation, region, department or component energy plan. Special consideration will be given to projects that are part of an installation energy master plan;
>
> d) The degree to which projects implement a demonstrated test bed technology or other innovative technology . . .;
>
> e) The degree to which projects integrate multiple technologies to realize synergistic benefits; and
>
> f) The degree to which projects contribute to annual energy efficiency, renewable energy and water conservation goals . . . .[35]

The IE ensures a net benefit to the defense component installation by relying on the factors above. However, a project may not receive approval even if it could have great benefit to the installation. The project may not obtain approval if it does not fall within the parameters listed, or simply because one installation has a greater need than another, such that it receives priority funding. After approval by the SECDEF, the IE is responsible for notifying Congress of the approval. The IE operates as the central hub for the management of the program and is responsible for reporting back to Congress on the important milestones and status of the ECIP projects. The IE is also responsible for all record keeping of the ECIP projects.[36]

Because ECIP is a program within the DoD, the program falls under DoD instruction 4170.11 (“DoDI 4170.11”), which states that the DoD is “to provide leadership to promote energy efficiency, water conservation,

34. *Id*. at 2.
35. *Id*. at 3.
36. *Id.*

the use of renewable energy, and help to foster markets for emerging technologies."[37] This instruction applies to all entities within the DoD and "[p]ertains to all phases of administration, planning, programming, budgeting, operations, maintenance, training, and materiel acquisition activities that affect the supply, reliability, and consumption of facility energy."[38] The instruction creates a policy for the DoD to use utility commodities efficiently and directs the DoD to maximize water conservation efforts. The instruction specifically directs DoD entities to monetarily promote and fund cost-effective renewable energy sources and energy-efficient facility designs.[39] ECIP provides many opportunities for the DoD to invest in cost-effective renewable energy sources through the planning and design of their facilities.

Additionally, this instruction specifically mentions ECIP in that the instruction directs the Assistant Secretary of Defense for Energy and Installations, and Environment ("EI&E") to provide oversight in the administration of the Energy Conservation Investment Program.[40] The instruction orders the heads of DoD components to report execution of ECIP projects.[41] The ECIP reporting requirements state that the different components are to provide quarterly project status updates for active ECIP construction projects within thirty days of the end of each fiscal quarter.[42] The instruction states that Congress appropriates the funding for ECIP projects and those funds will be distributed on a fair share basis between the DoD components as reported by installation energy use for the previous five years.[43] The instruction also directs that ECIP funding be applied to projects which produce energy savings or cost reduction, and the potential savings must be identified in the proposal stage and then audited after approval and implementation.[44] The instruction emphasizes the importance of the ECIP program, its funding, and subsequent completions and energy conservation reports.

DoDI 4170.11 states that DoD entities must comply with the Energy Independence and Security Act of 2007, Energy Policy Act of 2005, and

37. Dep't of Def. Instruction 4170.11, *Installation Energy Management* (Dec. 11, 2009) at 9, http://www.dtic.mil/whs/directives/corres/pdf/417011p.pdf.

38. *Id.* at 1.

39. *Id*. at 2.

40. *Id*. at 6.

41. *See id*. at 7.

42. *Id.* at 11.

43. *Id.* at 13.

44. *Id.*

Executive Order 13693.[45] The Energy Independence and Security Act of 2007 ("EISA") amended an energy-usage goal of reduction by thirty percent by fiscal year 2015 in federal buildings[46] and required that a percentage of the new energy used be obtained by new renewable resources.[47] The Energy Policy Act of 2005 requires the Secretary of Energy, acting on behalf of the President, to ensure as far as possible that the federal government electrical energy consumption provided by renewable energy is not less than seven-and-a-half percent after 2013.[48] This legislation did not detail how each federal agency was to make up their part of the renewable energy plan but stated that later legislation would create the detailed directives. Executive Order 13423,[49] sought to reduce greenhouse gas emissions and water consumption within the federal government.[50] The order was enacted to (1) reduce 40% of the federal government's greenhouse gas emissions by 2025 and (2) "[t]o improve environmental performance and Federal sustainability, priority should first be placed on reducing energy use and cost, then on finding renewable or alternative energy solutions."[51] The underlying objective of the order was fourfold: (1) increase the DoD's renewable energy portfolio; (2) increase water security; (3) ensure that Federal facilities continue to meet mission requirements; and (4) enable the DoD to lead by example.[52]

III. Selection and Contractual Issues Resulting from Approval of an ECIP Project

Because ECIP projects require closely tracked metrics, problems can easily arise at the early stages once the DoD approves a construction or

45. *See* 42 U.S.C.A. § 15852 (West 2005); 42 U.S.C.A. § 8253 (West 2012); *see, e.g.*, Energy Independence and Security Act of 2007, Pub. L. No. 110-140, § 431, 121 Stat. 1492 (2007); Pub. L. No. 109-58, § 203, 119 Stat. 594 (2005); Dep't of Def. Instruction 4170.11, *supra* note 37, at 10.

46. *See* Pub. L. No. 110-140, § 431; 42 U.S.C.A. § 8253 (West).

47. Scholtes, *supra* note 2, at 63.

48. *See* Pub. L. No. 109-58, § 203.

49. On March 25, 2015, Executive Order 13,693 revoked the mandates of "E.O. 13423." *See* The Federal Register, The Daily Journal of the United States Government, *Strengthening Federal Environmental, Energy, and Transportation Management*, http://www.federalregister.gov/documents/2007/01/26/07-374/strengthening-federal-environmental-energy-and-transportation-management (last visited May 18, 2017).

50. Proclamation No. 13,423, 72 Fed. Reg. 3919 (Jan. 26, 2007).

51. Proclamation No. 13,393, 80 Fed. Reg. 15,871 (Mar. 19, 2015).

52. *Id*.

refurbishment project under the program. The cases that follow illustrate problems that may occur during an ECIP project.

A. The QES Dispute

Once a project is selected for approval under the ECIP program, and becomes a designated "ECIP project," some impediments may cause the project never to come to fruition. A dispute from the Armed Services Board of Contract Appeals, between the federal government (the "government") and Quality Environmental Systems, Inc. ("QES"), illustrates such impediments.[53] There, the government sought to terminate a contract with QES because QES breached its contractual obligations.[54] Organized in 1974 by professional engineer P. Richard Boone, QES formed to engage in a new concept of "Socio-Technology."[55] Although QES aimed to unite engineers and scientists together in an effort to solve complex technical problems that occur during construction projects, its primary objective centered on maintaining and improving the environment when solving these technical issues.[56] QES developed an analysis referred to as a "quality audit," which was an in-depth evaluation of the information concerning a construction project or the functions of an existing facility.[57]

Through contracts awarded by the Army Corps of Engineers Savannah District, QES applied the "quality audit" to Army installations in Georgia and surrounding areas to determine how the DoD could conserve energy.[58] This contract required QES to perform quality audits on wastewater disposal and utility plant operations at Fort Benning, Georgia.[59] In addition, the contract required QES to design an energy conservation system for the base installation, containing an automated central control system for all systems and facilities on the base creating or using energy.[60] This project was part of the ECIP.[61] The Army Corps of Engineers wanted QES to build one central control room for the base and three remote control centers allowing the base to monitor its utility energy usage.[62] Doing so required the installation of many sensors and alarm devices that relayed information

53. QES, Inc., ASBCA No. 22178, 78-2 BCA ¶ 13,512.
54. *Id*.
55. *Id*.
56. *Id*.
57. *Id*.
58. *Id*.
59. *Id*.
60. *Id*.
61. *Id*.
62. *Id*.

back to the central control room.[63] The government was paying for this project either by recovery or amortization over the span of 2.8 years through the utility and workforce savings created as a result of the energy conservation project.[64] But because the project was a part of the ECIP, the contract required a detailed study on energy consumption, applications, and a cost justification based on proposed energy savings.[65]

Since the project at Fort Benning was part of the ECIP program, it had an ECIP contract. The dispute turned on the interpretation of two clauses. The first clause stated that the government would not be liable for any costs incurred by QES outside of the original contract without prior approval from the government contracting official.[66] The other clause gave the government contracting official exclusive authority to terminate the contract in the event QES breached any of its contractual obligations.[67] As a qualification for any project within the ECIP program, this made the contractual requirements in this instance different from contracts previously awarded to QES because of the special reporting requirements for an ECIP project.[68] This meant that including the project in the ECIP program became a major dispute.[69] At one review meeting, the government asked QES to resubmit a fee proposal because the savings costs on manpower could not be paid by the government.[70] Rather, the savings costs must come from reduced energy consumption since the project received approval based on a cost savings benefit.[71] The result: the contract was modified and QES received a higher fee once the project was complete.[72] But QES did not leave the dispute without new obligations: it had to supply the government with more detail about the projected energy savings.[73]

Negotiations began in 1976, and the project received authorization in the 1977 fiscal year.[74] However, by 1977, the government moved to terminate the contract because QES failed to provide detailed reports that justified its

63. *Id*.
64. *Id*.
65. *Id*.
66. *Id*.
67. *Id*.
68. *Id*.
69. *Id*.
70. *Id*.
71. *Id*.
72. *Id*.
73. *Id*.
74. *Id*.

cost and savings as required by the construction project.[75] Rebutting this claim of incompliance, QES argued that (1) they performed some of the services and alterations requested in the contract for the installation and (2) presented enough detailed data of the proposed cost savings from the project.[76] Ultimately, the court held that the requirement for a detailed cost justification in the design submission was plainly evident in the contract.[77] This meant that the government had appropriate grounds to terminate the contract because of the absence of a detailed cost justification.[78] The court found evidence that the government emphasized the importance of this requirement on several occasions and that QES even acknowledged the need of such data for the project's design.[79] In the end, the court held the government was justified in terminating the contract.[80]

B. The SACS Dispute

A contractual dispute at Kelly Air Force Base provides another example of potential issues in an ECIP project.[81] The dispute arose from yet another ECIP project requiring a detailed set of drawings and specifications of the air conditioning system to be modified at the awarding of the contract. When taking bids from private entities about proposed government construction projects, the government is required to have a reasonable amount of detail in the submitted drawings for the project.[82] DEW, Inc. and its subcontractor, San Antonio Control Systems, Inc. ("SACS"), received a fixed price construction contract for $615,000.[83] The contract concerned the installation of an air conditioning system on a building on the base.[84] SACS submitted diagrams depicting a set point adjustment ("SPA") in the mechanical room of the building.[85] An SPA is a device that receives data from sensors located throughout the building, including the exterior of the building about air temperature.[86] Based on the data received, an SPA allows an installation manager to remotely adjust fans, dampers, and valves to

75. *Id*.
76. *Id*.
77. *Id*.
78. *Id*.
79. *Id*.
80. *Id*.
81. D.E.W., Inc., ASBCA No. 28304, 83-2 BCA ¶ 16,914.
82. *Id.*
83. *Id*.
84. *Id*.
85. *Id*.
86. *Id*.

meets the climate needs of each building.[87] Essentially, "[t]he contract drawings provide for tubing running between the SPA controls in the main mechanical room and the controls and the [thirty-eight] individual air handling units to provide the means for transmitting remote control signals."[88] And the diagram's specifications indicated that the lines, if not made of metal tubing, must be coated in metallic tubing.[89]

Rather than use the required material, SACS used a flame-retardant polyethylene tube covered by polyethylene tubing.[90] The government did not approve of the plastic tubing because it did not conform to the original diagrams as set out in the contract.[91] SACS then requested a deviation from specification, which the government also rejected.[92] After these two rejections, SACS stated that neither the SPA nor the tubing coming out of the SPA was specified in the contract—it sought relief from this obligation.[93]

The court held that the diagrams submitted by SACS clearly depicted a SPA.[94] Moreover, the court determined that the diagrams SACS initially submitted—which aided SACS in securing the contract at the outset—had enough specificity to give the contracting officer grounds for rejecting SACS's request to deviate from its design specifications.[95] In sum, the contractual agreement between SACS and the government "adequately delineated" that there existed a "requirement to furnish [SPA] controls in the main mechanical room together with associate lines."[96]

C. The Sealtite Dispute

The Sealtite case is yet another illustration of contractual problems created by a ECIP construction projects.[97] This ECIP project concerned the awarding of a contract with Sealtite Corporation to install insulation in two aircraft hangars at the Randolf Air Force Base in San Antonio, Texas for $136,000.[98] Although the language in the contract suggested that the

87. *Id*.
88. *Id*.
89. *Id*.
90. *Id*.
91. *Id*.
92. *Id*.
93. *Id*.
94. *Id*.
95. *Id*.
96. *Id*.
97. Sealtite Corp., ASBCA No. 26209, 83-2 BCA ¶ 16,792.
98. *Id*.

bidders would visit the hangars in which it would install insulation for a visual inspection, Sealtite did not do so.[99] Sealtite's proposal for the bid was based on Sealtite using its own brand of spray-on insulation—called "Sealspray"—that the company had used for over thirty years.[100] Because of World War II specifications, the hangars had roof decks made of metal edged gypsum planks that only increased energy consumption.[101] Overall, the Air Force wanted its hangars insulated to minimize energy consumptions and prevent heat loss.[102]

Sealtite's plans originally required the use of spray-on insulation on the hangars.[103] But after inspection, Sealtite representatives realized that the sheer weight of the total insulation required to complete the project would cause the insulation to fail within two years and compromise the integrity of the hangar's ceilings.[104] As an alternative, Sealtite proposed "to install fiberglass blanket insulation with reinforced aluminum backing at an additional cost of $26,340."[105] The government complied, and after installation of the fiberglass insulation, Sealtite submitted an invoice requesting an additional $26,000 in expenses incurred for installing the fiberglass alternative.[106] The contracting officer denied Sealtite's request.[107] Sealtite appealed, arguing that it could not possibly perform its contractual obligations within the contracted price because of the hangar's conditions.[108]

The court held that there was commercially available spray-on insulation from other manufacturers that Sealtite could have used that would not have damaged the roof of the hangars.[109] The court stated the following:

> It is a well-established rule that where the government issues design specifications of a detailed nature, it warrants the adequacy, sufficiency, and efficacy of such specifications, and the event that they prove defective or impossible to perform, it

99. *Id.*
100. *Id.*
101. *Id.*
102. *Id.*
103. *Id*.
104. *Id*.
105. *Id*.
106. *Id*.
107. *Id*.
108. *Id*.
109. *Id*.

> must compensate the contractor for the additional costs in attempting performance.[110]

The court held there was no change in the scope of the contract and would not allow Sealtite to receive additional money because Sealtite could have followed the contract's specifications without incurring additional costs.[111]

These three cases—QES, SACS, and Sealtite—provide examples of how closely the courts construe contract terms in ECIP projects. There is a great need for specificity in ECIP contract drafting before an approval will be granted from the DoD. Most of the necessary specificity comes from the requirement to show the process, in dollar amounts, by which the ECIP project will save DoD installations money on its energy consumption. It is possible the strict construction view on the contracts might deter contractors and corporations from ECIP projects in favor of more traditional construction plans. But it is imperative that the developers and innovators behind the ECIP projects provide enough specificity in the contract for it be awarded and successfully meet the requirements of the ECIP program. The more ECIP projects approved—and finished—the more experience government contractors will have in constructing or modifying existing installations. This could potentially lead to the contractors submitting more bids on future ECIP projects.

A project at Fort Hunter Liggett provides an example. During the summer of 2015, Fort Hunter Liggett began an ECIP project valued at $22 million, with the goal of bringing the installation's net energy use to zero.[112] The goal of Fort Hunter Liggett is to have a net zero effect on its security and sustainability needs because a net zero energy installation produces as much energy as it expels in any given year.[113] The Fort Hunter Liggett project will be first ECIP project to achieve net zero energy use, and the Army Corps of Engineers hopes to use the project as a model for future projects.[114] The key cog in the Fort Hunter Liggett plan is to place photovoltaic solar panels on fifty buildings. The project's goal is for the installation to generate as much energy as it expands. Other parts of the plan called for more efficient lighting in buildings, new meters to record the

110. *Id*.

111. *Id*.

112. Julia Bobick, U.S. Army Engineering and Support Center, Huntsville, *ECIP projects inching Fort Hunter Liggett toward Net Zero*, http://www.army.mil/article/148115/ECIP_projects_inching_Fort_Hunter_Liggett_toward_Net_Zero (last visited May 18, 2017).

113. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 3, at 20.

114. Bobick, *supra* note 112.

energy consumption, and even new microgrid control systems for heating and cooling buildings on the installation.[115] As the project at Fort Hunter Liggett continues, it is imperative the Army Corps of Engineers monitor the private contractors making the additions to the installation. This will ensure the private contractors adhere to the contract specifications and then the Army Corps of Engineers can accurately report the energy savings up their chain of command, thus fulfilling the design of ECIP.

IV. Government Accountability Office Report on ECIP Projects

All government employees—and the projects endorsed by various government agencies—need to be good stewards of taxpayer money. ECIP need even more oversight because the cost savings and lowered energy use must be observed and reported. By properly reporting the energy and cost conservation, the ECIP will have greater success at implanting ECIP projects in other DoD installations—both foreign and domestic.

Although its intent is not to undermine the executive branch's continued endorsement of renewable energy use and energy conservation in the DoD, Congress has offered its own interpretation on ECIP question and oversight. In May 2014, Congress voted to give the program oversight in Senate Report 113-174.[116]

> Projects such as energy security microgrids, net-zero facilities and renewable energy projects have the potential to offer long term pay-back that far exceeds initial investment, while concurrently driving innovation. In an environment of heightened security risks and growing concern over carbon emissions, it is more important than ever for D[o]D to maintain robust investment in ECIP to reduce installation energy expenses, limits carbon emissions, and enhance installation energy security.[117]

In its report, the Senate praised ECIP but thought the program warranted an audit to determine the exact value DoD was bringing to bear. The Senate Committee appointed the Comptroller General of the Government Accountability Office ("GAO") to review the funding of ECIP projects and then determine how much money the projects had actually saved the

115. *Id*.
116. S. REP. NO.113-174, at 16-17 (2014).
117. *Id.*

DoD.[118] The Senate Report noted the DoD had previously reported the ECIP projects caused savings of two billion dollars since 2001.[119] The Senate wanted verification of the reduction in energy use by specifically examining how much ECIP saved the DoD in energy costs and consumption.[120] Congress wanted to know how the projected rates of reduction in costs and use compare with actual costs and reduction.[121]

The GAO report dated January 29, 2016, examined the annual notifications of the 441 ECIP projects that the DoD provided to Congress from 2009 through the end of 2015.[122] The report found the DoD did report annually to congressional committees about ECIP projects concerning the location and cost of the individual projects.[123] The DoD had an obligation to comment on any changes to ECIP projects in its annual reports to Congress.[124] However, during one instance, Congress learned that the DoD was not reporting certain information about return investments, energy conservation, and water conservation in some ECIP projects.[125] The report noted that of the 441 projects reviewed in the report over the five-year period, the DoD only reported on seventy-nine percent of the projects' anticipated returns on investment.[126] Concurrently, none of the reports given to Congress stated any information concerning energy, or water savings or about the status of renewable energy production.[127]

The report discussed how the DoD mandated the anticipated rate of return on investment, energy, and water conservation in an ECIP project submittal, but failed to report this information after commencement of a project. This is vital information because it is used during the ECIP selection process to determine which projects will receive ECIP funding and subject to special ECIP progress reports. The GAO report stated the DoD did not communicate return on investment or water conservation to Congress because of the absence of law and DoD guidance that obligated the DoD to report this information.[128] The report also noted how the DoD

118. *Id*
119. *Id*
120. *Id* at 17.
121. *Id.*
122. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 3, at 2.
123. *Id*. at 10.
124. *Id*.
125. *Id*.
126. *Id*.
127. *Id*.
128. *Id.* at 12.

did not have any reporting requirement whatsoever for the component entities to report to Congress about anticipated water or energy conservation.[129] Essentially, if there is nothing requiring the DoD to report anticipated energy or water conservation, then the installations will not report on the return rate unless required.

The GAO found no established authority directing DoD component entities to report to Congress on changes in anticipated return on investment brought on by significant changes in the project.[130] In its report, GAO investigated the complete absence of anticipatory information in previous reports to Congress.[131] However, in a report that directly dealt with ECIP programs, GAO acknowledged the existence of a statutory requirement that detailed the need for this kind of information.[132] In pertinent part, the report points outs that "the Standards for Internal Control in the Federal Government provide guidance for communicating with external stakeholders information that may have a significant effect on an agency achieving its goals."[133] GAO concluded that the different DoD components should have included the same information it used for anticipating rates of return in the selection of project in the reports sent to Congress because this is information that satisfies the rules in the Standards for Internal Control.[134]

DoD component officials circulated internal reports on returns on investments and energy and water conservation on ECIP projects, but did not provide Congress with these reports.[135] When asked why it withheld the internal reports, the DoD components responded that if it provided this kind of information, then in the future the DoD may be required to provide even more detailed reports, which could compromise security. Despite withholding this information, the DoD components stated that had Congress initially asked for such information, it would have provided it.[136]

Inadequate communication will only harm the ECIP program. For money to be allocated to the program, Congressional committees require evidence

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129. *Id*.
130. *Id*.
131. *Id*.
132. *Id*. at 13.
133. *Id*.; U.S. GOV'T ACCOUNTABILITY OFF., GAO-14-704G, Standards for Internal Control in the Federal Government (2014) ("The standards provide criteria for assessing the design, implementation, and operating effectiveness of internal control in federal government entities to determine if an internal control system is effective.").
134. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 3, at 13.
135. *Id*.
136. *Id*.

of a firmly established energy conservation program. The personnel appointed with proper authority must be given highly detailed information—both supportive and contrary—on ECIP matters. Thus, the ECIP can be tailored into a program that positively affects energy conservation within the DoD.[137] DoD guidance requires each agency to have at least a 1.25 return on investment for each ECIP project and collectively for the projects to average a 2.0 return on investment.[138] If each component can meet the 2.0 average, this means that for every dollar spent on a completed project, the component receives two dollars in savings for energy consumption.[139]

Additional GAO findings suggest that the DoD has not, on a consistent basis, reported that ECIP projects have energy reduction or saving in federal money spent on energy consumption.[140] The GAO report looked at thirty-five continental ECIP projects that DoD components designated to be "complete" after 2011.[141] Eight of the thirty-five projects provided information exhibiting a cost savings and/or a reduction in energy consumption.[142] Two of the remaining twenty-seven projects were no longer operational—for the remaining twenty-five, there were no reports of either cost savings in energy consumption or a lower consumption rate of energy because of the ECIP project.[143] Twelve of the remaining twenty-five projects after initial projects decreased in scale but nonetheless provided no evidence of any cost savings for the scale back.[144]

For example, one of the ECIP projects contained a proposal for the collection of solar energy by a photovoltaic array.[145] The purpose of the photovoltaic array was to reduce three on-base buildings' reliance on traditional energy consumption while simultaneously lowering the utility cost of the buildings.[146] These buildings also contained traditional heating and air conditioning systems, but the purpose of the photovoltaic array was to reduce energy consumption of these large consumer systems.[147] The

137. *Id*.
138. *Id*.
139. *Id*.
140. *Id*.
141. *Id*. at 14.
142. *Id*. at 13.
143. *Id.* at 14.
144. *Id*.
145. A photovoltaic array is a collection solar panels. *Id*. at 15.
146. *Id*.
147. *Id*.

GAO report stated that the photovoltaic array was never purchased because the bids for the installation of the photovoltaic system were substantially higher than expected.[148] Thus, the three on-base buildings were constructed without the photovoltaic array.[149] And to pile even more criticism on the ECIP project, the GAO report stated that the final cost of these buildings—without the photovoltaic array—was even higher than originally projected.[150]

Another example involves the installation of a photovoltaic array and daylighting systems.[151] The daylighting systems consisted of skylights installed on the roof of the buildings, use of fluorescent lights, and a lighting system that adjusted the amount of artificial light based on the amount of natural light being provided.[152] The report noted existing systems that recorded the amount of energy reduced or conserved by the photovoltaic array; however, no system was in place for staff members to compute the amount of energy conserved when supplemented with natural light.[153] The staff told the GAO that did not collect this data because it had neither the sufficient workforce nor resources to devote to the data recordation.[154]

The GAO provided another example in which measurements were not recorded and energy conservation and cost savings were not verified.[155] This ECIP project centered on the installation of energy efficient lights—solar daylighting tubes to increase the use of natural lighting and solar energy throughout building. The use of solar energy throughout the building required the use of a solar wall that "preheats colder outside air above 70 degrees and feeds it into a building that reduces the amount of energy needed to heat the building."[156] Now, in the northern quadrant of the building, the wall is built facing the south to facilitate the most exposure to the sun throughout the year.[157] Unfortunately, the buildings on the installation that relied on this energy conservation project were part of secret activities that prevented energy savings recordation personnel from

148. *Id*.
149. *Id*.
150. *Id*.
151. *Id*. at 16.
152. *Id*.
153. *Id*.
154. *Id*.
155. *Id*.
156. *Id*.
157. *Id*.

obtaining access to the building.[158] Because of the absence of appropriate security clearance, these recordation personnel could not perform even a baseline study to see what the potential energy conservation efforts might have materialized.[159]

The GAO report provided examples that the ECIP project was fully realized and recorded. These reports made up eight of the twenty-one completed ECIP projects since 2011.[160] A positive example was the use of a photovoltaic array and energy-efficient lighting used on the exterior of fourteen buildings, the interior of one building, and around the outside of an installation. Here, the energy manager reported that the use of the ECIP project met projected savings and provided data and metrics to validate both the lower energy consumption and costs of energy to the oversight committee.[161] In another positive example, the ECIP project used a ground-source heat pump to provide heating to a building.[162] The energy manager reported that not only did the ECIP project meet the project's energy savings level, but also that the level of energy costs saved had already paid for the project.[163]

The GAO report found other problems in the data collection that supported a suspicion that certain ECIP projects did not reflects the goals outlined in original project proposals. The report found the military components and its installation managers had not included personnel to track and record whether the ECIP project was meeting energy conservation goals.[164] As a result, many DoD installations have not been able to find a sufficient workforce or satisfactory resources to record the data necessary to verify and document the energy conservation.[165] One reason for the absence of this action is due to personnel involved in these projects having the improper meters for measuring and recording such data; another is that the installations simply are not equipped with the necessary workforce to accurately record, verify, and report the data.[166]

The GAO report noted the Navy is the only service branch before October 2015 that has issued guidance on reporting requirements for ECIP

158. *Id*.
159. *Id*.
160. *Id*.
161. *Id*. at 17.
162. *Id*.
163. *Id*.
164. *Id*.
165. *Id*.
166. *Id.*

projects.[167] The Commander, Navy Installations Command ("CNIC") issued the policy in March 2015.[168] The policy states it directly applies to investments that use funds through ECIP.[169] The Navy guidance requires energy consumption be reported to the CNIC before the start of an ECIP project at the contract award for a baseline of energy consumption be determined.[170] This policy requires that any funds that were awarded under an ECIP project must report at its inception the amount of energy used. This is a very important step because, without a baseline data report, there is no way for energy managers to accurately report on energy conservation or cost savings. The guidance requires that an annual report on the energy conservation for each project be submitted in January.[171] The instruction provides a detailed information sheet which must be submitted yearly.[172] Required fields include:

> (1) planning costs,
>
> (2) environment costs,
>
> (3) development costs,
>
> (4) annual electricity supply-side savings, efficiency in megawatt hours,
>
> (5) annual electricity supply-side savings, renewable in megawatt hours,
>
> (6) annual consumption savings per commodity (i.e. natural gas, water, steam, coal, distillate oil, residual oil, gasoline, chilled water, steam and sewage measured in MBTU/kGal
>
> (7) Annual Savings
>
> (8) Renewable power generated.[173]

The Navy instruction provides installation and energy managers with clear guidance on the details that must be reported to ensure ECIP project

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167. *Id.*

168. *See* Command Instruction 4101.2 from Commander, Navy Installation Command on Evaluation of Energy Project Investment Performance (Mar. 16, 2015), http://cnic.navy.mil/content/dam/cnic/hq/pdfs/Instructions/.../CNICINST%204101.2.pdf.

169. *Id*.

170. *Id*.

171. *Id*.

172. *Id*.

173. *Id*.

compliance. The instruction provides specific dates for the information to be delivered and does not allow for ambiguity of what is expected from the submitted reports. The reporting requirement concerning the baseline energy consumption is the most vital because it acts as the keystone against which all subsequent data reports can be measured. The baseline energy report sent to the CNIC ensures ECIP projects are properly being evaluated and measured. This documentation provides proof to congressional oversight that there is a legitimate need for the allocation of additional funds to continue and expand current and future ECIP projects within the DoD.

In addition, the GAO report points to a Department of Energy instruction that also serves as an outline for reporting energy savings, energy costs, and energy consumption in relation to ECIP projects.[174] This instruction provides examples of energy conservation metrics for the private contractor to use when seeking a project with the ECIP.[175] The GAO report on ECIP projects is quick to note the guidance put forth by the Department of Energy is primarily used for much larger projects than are proposed through ECIP, but the guidelines can aid in providing a rubric for reporting requirements for energy installation managers.[176]

Again, for the ECIP program to receive additional funding and serve as a centerpiece for other agencies in both the DoD and the federal government, accurate reporting must be submitted for review. At current levels of reporting by managers of the ECIP projects, a third-party reviewing the reports might question why any money was invested in a program that reported only limited data and metrics on energy conservation and energy savings. The same independent reviewer might even be repulsed by the complete dearth of information available on the projects, giving more credence to someone entertaining ideas of shutting down the program and transitioning to a different energy conservation and cost savings plan. Guidance requires that ECIP funding exist only for projects that lower energy costs or result in energy savings.[177] The lack of reporting hurts the projects that have proved beneficial. The greater amount of reporting can only help to highlight the projects that have substantially met or gone beyond the anticipated energy savings and cost reduction. This allows reviewers to commit to a thorough study and implement the same kind of

174. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 3, at 17-18.

175. *Id*.; U.S. GOV'T ACCOUNTABILITY OFF., GAO-15-432, Energy Savings Performance Contracts (2015).

176. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 3, at 17.

177. Dep't of Def. Instruction 4170.11, *supra* note 37, at 13.

processes and projects that enabled successful projects to meet its energy conservation goals projected at the outset of the ECIP project.

V. DoD's Strategic Vision for Energy Conservation Not Bearing Out Results

Keeping energy conservation in mind when creating construction projects and remodeling existing DoD installations is more difficult in actual practice than originally conceptualized—even if Congress clearly displays confidence in the DoD's ability to reach certain energy conservation goals.[178] The GAO report notes that the DoD has implemented a policy with goals of creating and sustaining far-reaching energy results:

> We reviewed the 102 projects funded by the military services since DoD's guidance was issued in fiscal year 2011, and found that about 10 percent of ECIP project proposals anticipated significant benefits in energy consumption, costs or security, while about 80 percent of projects anticipated traditional benefits such as the installation of energy-efficient equipment.[179]

The GAO report found seven projects that were funded by the ECIP program and could have used money already dedicated to maintenance and repairs.[180] These seven projects represented misallocations of funds, substantiating calls for greater scrutiny in the allocation of funds for projects within ECIP.

The policy guidance issued in 2011 outlined the following six areas where ECIP projects should be focused on "(1) performance improvement, (2) implementation of new technologies, (3) integration of multiple technologies, (4) incorporation of renewable energy with storage, (5) implementation of an energy security plan, and (6) meeting energy goals."[181]

The GAO report found ten ECIP projects containing three elements that improved efficiency in energy consumption, costs, and improvements to installation security.[182] One of those projects is a Marine Corps project that uses methane gas from an onsite landfill to provide the prime mover for a

178. Cameron E. Tommey, *Moving Military Energy "Behind the Fence:" Renewable Energy Generation on U.S*, 6 WASH. & LEE J. ENERGY, CLIMATE & ENV'T 592, 612 (2015).

179. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 3, at 19.

180. *Id*.

181. *Id*. at 20.

182. *Id*.

turbine which generates electricity for Marine Corps Air Station in Miramar, California.[183] Using methane gas generated from inside the perimeter of the installation served as a secondary power supply in the event of a failure to the civilian power grid.[184] This kind of ingenuity is sound for redundancy planning, but if the project proves to be successful, the same plan could be implemented on a larger scale.

As the GAO report noted, the use of a primary energy mover completely within the Marine Corps installation addresses two potential security threats to the DoD and goals of ECIP.[185] First, it slows the reliance on more traditional modes of energy consumption and puts the energy generation completely within an area where a DoD entity can protect, secure, and manage the energy product. Second, it reduces the pull on the American taxpayer by relieving the installation of having to pay for utility costs. If there is human activity on the base, waste very likely will be generated. Using methane gas from the waste in the landfill for power generation falls in line with the Marines making use of every asset given to them to execute a plan.

The GAO report lists an Army project which also meets the two elements of improving energy consumption: (1) lowering costs associated with energy consumption and (2) providing for improvement in the Army installations security apparatus.[186] The Army Depot in Toole, Utah, has awarded a contract to build a 1,500-kilowatt wind turbine.[187] Along with being an ECIP project, the wind turbine concurrently fulfills the need of a DoD installation to meet the renewable energy plan detailed by the Energy Policy Act of 2005.[188] According to the GAO report, this wind turbine will be the installation's second wind turbine.[189] And two wind-powered turbines can provide enough energy to meet up to sixty percent of the installation's energy needs.[190] The windmills are also part of the Army's Net Zero plan, which aims to lower its energy consumption rate to a "net" of zero. Similar to the previously mentioned methane powered turbine at Miramar, the Toole, Utah ECIP project meets the two elements outlined in the aforementioned GAO report. The energy production lowers the need for

183. *Id*.
184. *Id*.
185. *Id*.
186. *Id*.
187. *Id*. at 20-21, 39.
188. *Id*.
189. *Id*. at 20.
190. *Id*.

the depot to depend on outside civilian energy producers, in turn lowering the amount of money paid out for energy needs. From a security perspective, the two windmills are completely contained within the base-installation, such that reducing the workforce needed to guard the energy infrastructure in the event of a threat is a viable option. This ECIP project is tailored to fit the DoD's needs.

With modern technological advancements, the DoD can embrace new, emerging technologies to reduce the workforce typically required to maintain old power grids. The GAO report discusses a Navy ECIP project at Joint Base Pearl in Harbor-Hickam, Hawaii, that focuses on improving three key areas: (1) establishing energy consumption standards; (2) reducing energy costs; and (3) providing greater security to naval facilities through advancements in cyber networks.[191] This particular naval project effectively connects a cyber-secured microgrid to a wastewater treatment plant, current traditional and renewable power generation operations, and a hydrogen fuel cell.[192] The project monitors the various self-contained power generators to ensure that the wastewater treatment plant remains online in the event the civilian utilities from which it receives most of its power fails, causing a power outage.[193] In other words, the microgrid monitors the power to the waste water treatment plant, relieving the need for actual personnel to spend hours meticulously monitoring for power failure.[194] However, this also creates another problem: ensuring the micro-grid is secure from cyber-attacks. Addressing such topics is beyond the scope of this article, but these projects provide examples of the appropriate ingenuity of an ECIP project that drives the very notion of energy conservation.

The Navy has other areas within its department where an ECIP project might advance energy conservation, e.g. improving steam plants on large amphibious land ships. The steam plant on LHD's[195] involves miles of tubing that transit through all levels of the ship. Thus, there are many areas where the boiler and piping for this system may lose thermal energy. This increases energy consumption, giving rise to the legitimate belief that these systems can benefit from improvements under an ECIP project. Applying new innovations that prevent heat loss are worth considering in these areas. That is not to say that the Navy has yet to implement new, innovated

191. *Id*. at 20-21.
192. *Id*. at 21.
193. *Id*.
194. *Id*.
195. "LHD" stands for "Landing Helicopter Dock" and is an amphibious assault ship used by the United States Navy.

technologies into its operations. For example, the Navy's reliance on non-traditional energy sources, such as nuclear power, to propel submarines and aircraft carriers predates ECIP.[196] The US Navy has used nuclear power for its ships for over fifty years.[197] The DoD's new guidance on energy conservation through ECIP programs can establish the same long-standing energy result produced by the Navy's nuclear power program in the years leading to ECIP adoption.

The Dugway Proving Ground in Utah provides an example of the DoD's implementing energy conservation technology. At Dugway, the plan involved installing a two-megawatt solar photovoltaic array, integrated with energy storage and microgrid control systems, and other advanced metric reading technologies that promote effective management of this new energy system.[198] Dugway illustrates the integration of energy conservation plans into numerous DoD installations that exist for the sole purpose of meeting the requirements to receive ECIP project approval.[199] In sum, the photovoltaic array exists to unite various buildings and energy consumers at Dugway, thereby streamlining use and management of on-base energy. Again, the array provides an avenue for energy production that is "organic" and powers a comprehensive system that monitors and records the energy consumption generated by the solar array. If the Dugway ECIP project is successful, it will increase the likelihood that similar ECIP projects emphasizing solar photovoltaic arrays can be approved across other DoD installations.

The ECIP project at Fort Bliss, Texas, is another example of renewable energy integrated with energy-storage technologies. The Fort Bliss project has 500-kilowatt photovoltaic array and a 1-megawatt storage battery that supplies backup power to 2 mission essential buildings in the event of a long power outage.[200] Both the Fort Bliss ECIP project and the project at Dugway are examples listed by the GAO report as "game-changing" projects.[201] But these kinds of large scale projects are less likely to be

196. Shinri Kamei, Dartmouth Undergraduate Journal of Science, *Nuclear Marine Propulsion: The History of Nuclear Technology* (Mar. 12, 2013), http://dujs.dartmouth.edu/2013/03/nuclear-marine-propulsion-the-history-of-nuclear-technology/#.WI_4RmczXGg (last visited May 18, 2017).

197. *Id*.

198. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 3, at 39.

199. *Id*.

200. *Id*.

201. *Id*. at 22-23, 39.

funded because of the low return on investment ratio.[202] The GAO report refers to ten game-changing projects that save an average of $7.3 million and have a ratio of return of 1.1.[203] However, the GAO report outlined ECIP projects that yielded a low return and were consequently countered with more traditional projects because of the higher return-yield ratio.[204]

Although some examples of ECIP projects containing more traditional scope and benefits may include photovoltaic systems, these projects are much smaller in scale. These smaller systems might include a photovoltaic array that is dedicated to one building on a DoD installation or even installing skylights to increase natural lighting and thus reducing the need for electrical lighting during daylight hours.[205]

Another example of traditional landmarks observable at many DoD installations: steam-lining pipelines that crisscross different installations. But replacing and/or removing the steam lines and old heating systems with modern, energy efficient electric heaters in a singular building are typically those "traditional" funded projects.[206]

The removal of the steam lines nullifies the need to use energy as a means to propel thermal energy through miles of piping within an installation. Furthermore, traditional projects receive a higher approval rate because they are easier to illustrate and more convincing to authorities than ECIP projects. In general, traditional "non-game-changing" ECIP projects usually provide a larger cost reduction on energy consumption. The GAO report supports this contention by noting that Acquisition, Technology, and Logistics officials are more likely to award a traditional ECIP project for two reasons: (1) the investment return for traditional ECIP projects are generally higher; and (2) even if newer, non-traditional ECIP projects further a greater energy conservation purpose, the mere difficulty that accompanies energy conservation metric documentation is itself dissuading.[207] The bottom line: Officials with the authority to approve ECIP projects want to approve something they know will directly benefit the DoD by reducing energy consumption and the costs incurred because of its consumption.

When examining traditional ECIP projects that promote energy savings, the approving agency typically looks for benefits in the form of an

202. *Id*. at 22-23.
203. *Id.*
204. *Id.*
205. *Id*.
206. *Id*.
207. *Id*.

investment return with a ratio of 2.0.[208] or better. This means for every dollar spent on the ECIP project, the project should return two dollars in savings. Traditional projects often receive more funding than intricate, complex, and expensive ECIP projects. But more expensive ECIP projects typically have a lower return on investment. Because of the lower return on investment ratio, the viability of these projects is usually not selected. Thus, limiting the possibility that more complex ECIP projects might generate the greatest benefits. Like the Navy using nuclear power as its primary propulsion source in its submarines, the more expensive ECIP projects might integrate a technology that could drastically reduce energy consumption over the next fifty years.

VI. Need for Energy Conservation Further Stressed by Homeland Security Threats

The private, civilian marketplace supplies DoD installations with nearly ninety-eight percent of all their energy.[209] As a result, domestic DoD installations are terribly susceptible to energy outages due to severe weather events, increased energy demand from civilian consumers, occasional accidents at power generation facilities, and—new to the scene—cyber-attacks.[210] This dependency, in turn, creates an unacceptable risk to homeland defense security for both foreign and domestic DoD installations.[211] Because the DoD's energy footprint is four times that of leading retail franchises like Wal-Mart—and ten times that of the General Services Administration—relying on energy from the civilian marketplace puts the DoD's energy infrastructure in a particularly vulnerable position.[212]

But since the discovery of oil in the Middle East and well-established infrastructure favoring fossil fuels, the US has a legitimate interest in ensuring the steady flow of oil into the global energy market. The US and its allies, who depend on the DoD's strength to provide protection in times of need, rely on the DoD to ensure it protects collective economic and energy needs. This extreme interest has deep meaning: the DoD has engaged in armed conflict to ensure that energy needs of the country and its allies have been satiated. In other words, the purpose of armed conflict in the world's massive oil producing regions transpire to ensure oil prices

208. *Id*.
209. Warner *supra* note 1, at 3.
210. Tommey, *supra* note 178, at 596.
211. *Id*. at 597.
212. *Id.*

remain at a level that does not burden consumers—this includes average Americans and the DoD.

This dependence on oil is even more glaring when you consider the entire cost of oil-based fuel as the prime mover in a conflict. The cost of fuel is not limited to the price per barrel—it also includes the cost transporting fuel to the battlefield and the approximate need for fuel at any given instance.[213] This raises a question: Is the cost of fuel or energy much higher because the military had to bring the fuel from a foreign country where supply is comparatively limited?

> A relatively straightforward example involves looking at an ordinary $15,000 tent used in the deserts of Iraq or Afghanistan. To beat the 120 degree heat, the thin-walled, uninsulated tents must be air-conditioned. With the air-conditioners kept on at all times and cool air leaking out of the tents, massive amounts of fuel must be trucked into camps. The true cost of that $15,000 tent jumps to $40,000, accounting for the $25,000 worth of air conditioning.[214]

The dollars spent on energy produced from fossil fuels, in terms of cost, is more valuable during an armed conflict because of the added expense of moving the fuel to the conflict and the cost of keeping DoD personnel available to manage and subsequently use the fuel energy.[215] The need to conserve and make the most efficient use of such energy is important to the DoD given the significant energy it consumes merely to maintain operations.

There is another important consideration: the vulnerabilities and threats inherent in dependence on one energy source, such as fossil fuels. General James Amos once stated that the goal of the DoD is to create a more energy efficient force—one capable of using less energy and able to achieve greater results with far less consumption.[216] An example of operational energy costs is the Second Afghan War, in which the British incurred costs

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213. Jennifer Huang, *Energy Security Green Fleets, and Green Warriors*, 8 FLA. A & M U. L. REV. 263, 274 (2012).

214. *Id*. at 274.

215. *Id*. at 274-75.

216. Siddhartha M. Velandy, *The Green Arms Race: Reorienting the Discussions on Climate Change, Energy Policy, and National Security*, 3 HARV. NAT'L SEC. J. 309, 314 (2012); William T. Eliason, *Interview with General James F. Amos, Commandant, United States Marine Corps*, JOINT FORCES Q. 12, 16 (2012) ("The goal is to create a more capable force: lighter than today, less dependent on liquid and battery logistics, with greater operational reach at less risk.").

while fighting between 1878 and 1880.[217] At this time in history, there was a potential conflict brewing in the region between England and Russia. The English and Indian troops pushed through the Khyber Pass into Afghanistan. The energy required to keep the army moving—their "supply lines"—stretched all the way back to India. Thus, as the supply chain moved through the mountains, the supply chain became vulnerable to attacks from local Afghan forces. The English had to commit more troops to protect their supply line.[218] In time, the Afghans completely intercepted the English supply train and forced the English to consolidate in Kandahar where the Afghans surrounded the British forces.[219]

Another British force in Kabul—12,000 men led by General Roberts—was tasked with rescuing the besieged force in Kandahar.[220]

> In order to make the march from Kabul to Kandahar, he planned for and used a long and robust supply train that included 8,500 mules, donkeys, and camels, accompanied by thousands of servants and transport material. General Roberts required and purchased 5,000 sheep to feed his men and 15-30 days of essential supplies including vegetables, bread, rum, sugar and other spices . . . . A reliable source of energy is critical to mission accomplishment.[221]

Becoming less dependent on overseas oil and focusing on oil produced domestically has a twofold benefit. First, it will either limit or completely eliminate the DoD's involvement in global conflicts in oil producing regions. Second, it promotes greater energy conservation by creating a demand for alternate means of energy production within the US.[222] Cultivating and using domestically-produced energy will provide DoD installations with greater flexibility in the event of domestic terrorist operations. This cultivation allows each DoD installation to have its own power grid and thus produce its own energy for use in such contingency situations.

It is important to understand that the ECIP and its projects were developed to promote both energy independence and energy conservation

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217. *See* Velandy, *supra* note 216, at 322.

218. *See generally* J.H. Anderson, THE AFGHAN WAR: 1878-1880 5 (R J Leach Mil. Publishers 1991).

219. Velandy, *supra* note 216, at 323-24.

220. *Id*.

221. *Id*.

222. *See* Tommey, *supra* note 178, at 609.

in the DoD. The ECIP's projects that have proven beneficial go to the essence of superior tactical, operational, and strategic goals that the DoD aims to provide through its in-depth security defense structure, while also maximizing its use of its energy resources—renewables and non-renewables alike. If truly successful, the new energy resources and technology will be used to ensure the DoD maintains its hegemony of power. New and innovative power sources can flow into the civilian market to decrease energy costs for both the DoD and the consumer.

For example, the Department of Energy used one of its laboratories to study areas in the continental US to realize a plan focused primarily on renewable energy resources. One example of using purely local means of creating energy is in the Vermont timber market.[223] Due to many local mills and manufacturing plants closing, the area was left with an abundance of wood biomass.[224] The end of operations of the timber industry and manufacturing left large areas of timber untouched in Vermont.[225] The laboratory examined the timber industry, ranging from Maine to Florida, as potential channels to provide fuel sources for generating both heat and electricity.[226] Because the timber industry already existed in Vermont, the cost of bringing the industry back online would not be too costly—and the cost of transporting the biomass would be minimal if sent to a local power generation facility.[227] The National Renewable Energy Laboratory study reflects how the former timber industry can be reallocated for energy consumption and conservation needs through the use of the timber for electrical power generation.[228] Since DoD installations rely in large part on private companies to satisfy their energy needs, installations on the eastern coast of the US could potentially use energy created from the biomass fuel.

Another Department of Energy study considered Fort Hood as a viable candidate for future placement of photovoltaic cells for electricity generation.[229] The study focused on areas of the country with large tracts of land where solar cells could be sited.[230] Other factors included the amount of time the sun was clearly visible for optimum use of solar energy; the distance from solar cells to electrical power lines for transmission; and the

223. *Id*. at 616.
224. *Id*. at 617.
225. *Id*.
226. *Id*.
227. *Id*.
228. *Id*.
229. Tommey, *supra* note 178, at 618.
230. *Id*. at 619.

proximity of serviceable roads to service the solar cells.[231] Fort Hood appeared to be a viable candidate in which the installation could begin investing in solar energy projects. Although the study concluded that the land available was insufficient to site the solar arrays, it did propose placing fifty acres of arrays on buildings on Fort Hood.[232] Indeed, another factor contributing to the installation's decision not to plant the solar arrays was that the electricity supplied to the area was sold at a low rate.[233] Fort Hood had to ensure that investing in solar arrays would foster some economic benefit to the installation as a whole. But because of the prevailing utility rates in the area, the momentum to realize a project of this magnitude did not exist.[234] This is further evidence of the hurdles confronting ECIP projects at DoD installations. Despite the small scope of the ECIP compared to the rest of the DoD, the ECIP provides the DoD with many opportunities to upgrade its installations and take steps toward maximizing energy conservation.

Fort Bragg, North Carolina, illustrates one final example where both the DoD and US Army attempted to implement energy conservation efforts. If these efforts had come to fruition, the result would have substantially strengthened the installation's security. North Carolina makes up about three percent of all the electricity consumption in the US.[235] But the State does not generate enough electricity on its own to meet the needs of its consumers.[236] The electricity generated in North Carolina is primarily dependent on fossil fuels.[237] Although North Carolina is home to four of the largest coal-fired power plants in the country,[238] most of the coal used in these plants is imported from Kentucky and West Virginia.[239] Compared to North Carolina's massive non-renewable portfolio, its renewable energy portfolio is a mere three percent of the state's total electricity generation.[240]

Fort Bragg used approximately 599,374 megawatt-hours of electricity, accounting for fifty-nine percent of the installation's total energy

231. *Id*.
232. *Id*. at 619-22.
233. *Id*. at 619.
234. *Id*. at 619-22.
235. Peter H. Ledford, *Practical Considerations in Implementing Renewable Energy: A Case Study of Fort Bragg, North Carolina*, 2 WAKE FOREST J.L. & POL'Y 533, 534 (2012).
236. *Id*.
237. *Id*.
238. *Id*.
239. *Id.* at 535.
240. *Id*.

consumption in 2008.[241] But most of the energy it consumed was for heating and cooling numerous on-base buildings.[242] The DoD's ECIP program exists to find ways to move away from the total reliance on energy or supply chain of energy from civilian utility. The ECIP's ingenuity could even be applied to installations like Fort Bragg in North Carolina that could, in turn, provide energy to civilian entities near the installations. Because electricity costs are cheap in North Carolina—that is, until technology or practices come along to make energy consumption even cheaper—replacing the dependency on prevailing energy infrastructures like fossil fuels will be more difficult.[243]

Where ECIP promotes energy conservation through proper stewardship and continual efforts to apply new energy conservation technologies, there are other ways to implement energy conservation. Of course, in achieving this goal the DoD will reach its primary objective of protecting the nation. It is apparent that national security and energy conservation are two concepts that work in tandem.

Is it even possible to provide a monetary incentive to DoD installations and commands? After action reports from the Navy's Naval Sea Systems Command ("NAVSEA") from the 1980s provided evidence that giving incentives to the crews of Navy ships for lowering energy consumption can be worthwhile.[244] In this program, NAVSEA assembled a team made up of their Energy office to examine the fleet's fuel oil consumption on board steam, gas turbine, and diesel powered ships.[245] The NAVSEA teams examined over 100 ships and observed a ten to fifteen percent fuel savings on gas turbine and diesel powered ships.[246] The team found a fuel cost savings of up to thirty percent on steam powered ships.[247]

Just before the first Gulf War began, the NAVSEA program was disestablished. After a series of unfortunate occurrences and the advent of the first Gulf War, the domestic United States saw higher gas prices. In response to these events, the Navy chose to reintroduce its NAVSEA program.[248] Through the program, the Chief of Naval Operations authorized

241. *Id*. at 536.
242. *See id*. at 535-36.
243. *Id*. at 534-35.
244. *See* H. Pehlivan. *Want Energy Conservation? Try Incentive.*, NAVAL ENGINEERS J. 193 (2000).
245. *Id*.
246. *Id*.
247. *Id*.
248. *Id*.

an instruction for a ship to receive cash awards of up to forty percent of the fuel expenditure saved.[249] The rest of the fuel savings money would then go to facilitate other repairs on ships throughout the CNIC.[250]

During the 1999 fiscal year, US Navy ships used over $600 million of fuel. But the NAVSEA program rendered savings of around $26 million.[251] Along with the benefit of saved money, restricting lower fuel consumption allows the fleet to travel greater ranges because the slower a ship runs, the less fuel it expends. If ships are using less fuel, then they do not need to be refueled at sea as often, which also lowers the amount of fuel needed for refueling ships to rendezvous with at-sea combatants. The extra fuel allows for crews to embrace a more rigorous training regime since it is vital to keep a standing naval force ready for conflict at any time. More efficient crews create a better security apparatus for the US and for the sea lanes of the world. This lowers transportation costs and directly benefits consumers.

The lower the fuel consumption, the less stress the machine will experience. If well-maintained, this allows the ship to be in service longer. Expending less fuel helps the environment because the ship will have a much smaller carbon footprint. Navy ships use various seawater suction pumps to help cool the ship and the ship's machinery, but lower fuel consumption decreases the need for such cooling. This will also reduce the detrimental effects that generally occur in oceanic environments. Other tertiary effects of using less fuel bolster the argument for conserving energy, but the most compelling reason for commanding officers of ships is that their command gets to keep a part of the money saved on fuel costs.[252]

An excellent example comes from one ship saving over half-a-million dollars in one fiscal quarter.[253] The ship accomplished this while on a counter-narcotic mission off the west coast of the US and Mexico.[254] The deployment required the ship to be on station in certain areas where the commanding officer ordered for the main engines to be shut off.[255] Then the ship would drift, not expending any fuel. The commanding officer implemented further energy conservation practices as promulgated by the Chief of Naval Operations.[256] Other DoD installation commanders can take

249. *Id*.
250. *Id*.
251. *Id*. at 194.
252. *Id*. at 193-94.
253. *Id*. at 194.
254. *Id*.
255. *Id*.
256. *Id*.

the same kind of approach; even in small steps, and lessen the energy consumption of the DoD and its agencies.

To determine how much fuel the individual ships were saving, NAVSEA conducted a study to determine a baseline for fuel consumption.[257] Energy conservation teams boarded different ships while they were out to sea.[258] The ships would then align their propulsion and electricity generation plants in certain configurations and travel at different speeds to determine the most fuel-efficient equipment configuration. NAVSEA developed different energy conservation plans based on the size of the ship, number of shafts, engines, and generators on board.[259] The energy conservation teams learned that the ships were the most fuel efficient when they traveled under 14-16 nautical miles per hour and had only one main engine and shaft online.[260] After the diagnostic test, the ship would then report quarterly—this was the existing reporting requirement—the fuel consumption of the ship.[261] The energy conservation teams then looked at the ship's historic fuel consumption over the past three years when the ship was out to sea to determine how much fuel a ship conserved and then make a monetary award back to the ship.[262]

This sort of baseline energy conservation is needed for ECIP projects. The Navy had pre-existing reports in place for fuel consumption and could determine what affect the incentive program had by merely examining a then-existing reporting system. ECIP projects can use existing energy consumption reports to easily reflect the benefits of an ECIP project. Lessening the need for civilian generated energy will make our national security structure more secure and viable. This energy conservation program provides evidence of how DoD commands can use incentives to motivate DoD employees and installations to conserve energy. In the future, the ECIP could incentivize its program by issuing a directive in the program that awards more advanced and complex ECIP projects to bases that have already succeeded in implementing an ECIP project.

257. *Id*. at 194.
258. *Id*. at 194-97.
259. *Id*.
260. *Id*.
261. *Id*.
262. *Id*. at 194-95.

VII. Conclusion

Through its military services, the DoD is seeking ways to use new and alternative means of energy to meet various federal statutes and guidelines. The ECIP identifies several technologies to help further this goal. More time will be needed to fully apprehend the full measure of compliance and eventual benefits or detractions. The immense size and scope of the energy consumption by the DoD create a need for more efficient energy resources. The implementation of the ECIP through DoD installations is a proving ground for developing energy conservation technologies that may benefit not only the DoD but society at large.