The Military-Environmental Complex

By Sarah E. Light[1]

Abstract

Two competing theories vie for dominance regarding the relationship between the United States military and the natural environment. Because legal rules permit the military to disregard environmental laws when they conflict with the military's national security mission, one might be left with the impression that the military always stands opposed to environmental protection. Yet the military is currently engaged in an extensive undertaking to improve its sustainable energy use by reducing demand and developing renewables in its roles as a war fighter, a landlord, a first user of pre-commercial technologies and as a potential high-demand consumer. The military is undertaking such actions not only in response to Congressional directives and Presidential Executive Orders, but also voluntarily in response to its internal battlefield and national security needs. In some cases, the military is leveraging private financing rather than taxpayer funds to drive innovation. Such public-private partnerships among the military, private financiers and technology firms are an essential form of collaboration with the potential to transform for the better not only our nation's energy profile, but also the military-industrial complex. This collaboration represents a new Military-Environmental Complex.

Introduction

On January 17, 1961, President Dwight D. Eisenhower delivered his farewell address to the nation. That speech is most famous for the President's caution:

> In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist. We must never let the weight of this combination endanger our liberties or democratic processes. We should take nothing for granted.[2]

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[1] Assistant Professor of Legal Studies and Business Ethics, Wharton School of Business, University of Pennsylvania. A.B., Harvard College; M. Phil., Oxford University; J.D., Yale Law School. Thanks to the Sabin Colloquium on Innovative Environmental Law Scholarship at Columbia Law School for support, and to the participants in the Colloquium for their helpful comments. Special thanks to Ann Carlson, Cary Coglianese, Holly Doremus, Stephen Dycus, Jody Freeman, Michael Gerrard, Gregg Macey, Eric Orts, Christopher Serkin, G. Richard Shell, Nelson Tebbe, Michael Vandenbergh and David Zaring. Thanks also to Michael Knauss, Lennie Zhu and David Britto for excellent research assistance.

[2] President Dwight D. Eisenhower, Farewell Radio and Television Address to the American People (January 17, 1961), in U.S. Presidents, Public Papers of the President of the United States: Dwight D. Eisenhower, 1960-61 (Washington, D.C.: Government Printing Office, 1961), pp. 1035-40; *see also* JAMES LEDBETTER, UNWARRANTED INFLUENCE: DWIGHT D. EISENHOWER AND THE MILITARY INDUSTRIAL COMPLEX 5-6 (2011) (defining the military-industrial complex as "a network of public and private forces that combine a profit motive with the planning and implementation of strategic policy. The overlap between private military contractors and the federal government is

President Eisenhower's counsel was as prescient as it was wise. The military-industrial complex of which he spoke has deep historical roots[3] and largely pejorative connotations.[4] Cooperation among the military, the private sector, and universities, with the blessings of government institutions like Congress and the President, led to concerns about the entanglement of a profit motive with strategic decision making about whether to go to war.[5]

Like this negative story of the military's entanglement with the private sector to develop warfighting technologies, the military and its mission to "provide the military forces needed to deter war and protect the security of our country"[6] are often perceived to be inherently at odds with environmental protection.[7] Legal doctrine supports this view. The military is largely exempt from environmental laws and regulations covering such broad areas as habitat conservation and information disclosure rules about toxic chemicals when those laws conflict with the military's mission to protect national security.[8]

In the particular environmental arena of energy use and climate change, the military hardly appears to be the environment's friend. The military has an enormous carbon footprint

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usually presumed to include, in addition to the military itself, areas of both the executive branch (Defense Department contracts and appointments of military contractors to government positions) and the legislative branch (lobbying by military contractors, campaign contributions, and the desire of members of Congress to protect and expand military spending that benefits their districts.").

[3] *See, e.g.*, PAUL A.C. KOSTINEN, THE MILITARY-INDUSTRIAL COMPLEX: A HISTORICAL PERSPECTIVE, 14 (1980) (describing historical roots of military relationship with private industry); BENJAMIN FRANKLIN COOLING, ED., WAR, BUSINESS, AND AMERICAN SOCIETY: HISTORICAL PERSPECTIVES ON THE MILITARY-INDUSTRIAL COMPLEX (1977) (describing military-industrial cooperation in armaments and naval shipbuilding going back to the War of 1812).

[4] Ledbetter, *supra* note 2, at 6.

[5] Ledbetter, *supra* note 2, at 7-12 (describing the connotations after Eisenhower's speech of the "military-industrial complex" to include that it "creates wasteful military spending . . . takes away from spending on social needs. . . distorts the American economy . . . has institutionalized an outsized role for the military in American safety, even during peacetime . . . creates and extends a culture of secrecy . . . [and] leads to suppression of individual liberty"); H.C. ENGELBRECHT & F.C. HANIGHEN, THE MERCHANTS OF DEATH: A STUDY OF THE INTERNATIONAL ARMAMENTS INDUSTRY (1934) (describing role of private armaments suppliers and banks in driving the country to war); *cf.* C. WRIGHT MILLS, THE POWER ELITE (1956) (describing military officers as part of social elite with access to power).

[6] Department of Defense, *Strategic Sustainability Performance Plan* (Aug. 26, 2010) [hereinafter SSSP].

[7] *See infra* Part I.A.

[8] *See infra* Part I.A.

and vast energy needs. The Department of Defense (DoD) is the largest single consumer of energy in the nation, as well as the single largest emitter of greenhouse gases.[9] While some might view this fact as yet more evidence of the military's ongoing conflict with the environment, it is more properly viewed as an exceptional opportunity for innovation in energy efficiency and development of new technologies with potential for widespread crossover to and from the civilian realm.

Although the military-industrial complex has largely pejorative connotations, scholars have recognized a more positive dimension to the cooperation it engendered between the military and the private sector.[10] At its height during the twentieth century, the military-industrial complex led to the development of new technologies such as semiconductors, microwave ovens, the global positioning system, the Internet, and computers that not only transformed war fighting, but the civilian realm as well.[11] Similarly, the military's current relationship to the environment

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[9] Environmental and Energy Study Institute, Fact Sheet: DoD's Energy Efficiency and Renewable Energy Initiatives (July 2011). In Fiscal Year 2012, Federal agencies emitted approximately 107 million metric tons of CO_2-equivalent; the Department of Defense emitted 72% of that total (approximately 77 million metric tons of CO_2-equivalente including all emissions that both were and were not subject to reduction targets). *See* GHG Inventory for Federal Agencies, Fiscal Year 2012, *available at* http://www1.eere.energy.gov/femp/program/greenhousegases_inventories.html. In 2011, the DoD was responsible for approximately 83 million metric tons, or 72 percent of all Federal agency emissions of approximately 115 million metric tons. *See id*. According to the U.S. Energy Information Administration, in 2011, the last year for which data is available, the United States as a whole was responsible for emissions of 5,409.631 million metric tons of CO_2-equivalent. *See* http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=90&pid=44&aid=8 (country data). For 2011, then, Federal agencies were responsible for 2 percent of overall U.S. emissions, and the DoD was responsible for 1.5 percent of overall U.S. emissions.

[10][10] *See infra*, Part I.C.

[11] Ledbetter, *supra* note 2, at 12. *See also e.g.*, Stuart Leslie, THE COLD WAR AND AMERICAN SCIENCE: THE MILITARY-INDUSTRIAL-ACADEMIC COMPLEX AT MIT AND STANFORD (1994) (describing how military needs drove technological innovation in fields of engineering and computing); David C. Mowery, *Federal Policy and the Development of Semiconductors, Computer Hardware, and Computer Software: A Policy Model for Climate Change R&D? in* Acceleration Energy Innovation: Insights from Multiple Sectors, at 163-66 (Rebecca M. Henderson & Richard G. Newell, eds.); Jennifer S. Light, FROM WARFARE TO WELFARE: DEFENSE INTELLECTUALS AND URBAN PROBLEMS IN COLD WAR AMERICA (2003); Paul Edwards, THE CLOSED WORLD: COMPUTERS AND THE POLITICS OF DISCOURSE IN COLD WAR AMERICA (1997); 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 (2012) (mentioning military's role in technology innovation); *cf.* Stowsky, J., *From spin-off to spin-on: redefining the military's role in American technology developmen*t. In: Sandholtz, W., Borrus, M., Zysman, J., Conca, K., Stowsky, J., Vogel, S., Weber, S. (Eds.), The Highest Stakes. Oxford University Press, New York, 1992. pp. 114–

and its interaction with the private sector – particularly in the area of sustainable energy use, demand reduction and pursuit of renewable energy sources – is far more complex than legal exemptions or statistics about the DoD's greenhouse gas emissions might lead one to believe. A more nuanced understanding of the relationship between the military and the environment in this exceptional area of sustainable energy use and climate change is both warranted and timely.

The debate over how to combat climate change, including by reducing energy demand and promoting the development of renewable energy sources, provides an especially important context in which to assess what role the military can play a role in advancing solutions to a major environmental problem. This debate has long since shifted from one about whether climate change exists to what regulatory tools are best employed to address the problem, and at what level of government.[12] There is a growing consensus that a multi-faceted approach to climate change, including efforts to reduce energy demand and switch to renewable sources of energy, is essential in light of the practical reality that a single, global regulatory program is unlikely to materialize.[13] This Article reinforces the notion that heterogeneity is essential, and that no single perfect solution to the climate change problem exists.

140, at 114 (describing successful diffusion of semiconductors from military origins, but noting lack of similar success in the development of computer control technology for machine tools, and suggesting that other countries, including Japan, relied more effectively on the commercial sector to innovate more efficiently and cost-effectively in a form of "spin on"); *The Military-Consumer Complex: Military Technology Used to Filter Down to Consumers. Now It's Going the Other Way*, The Economist (Dec. 10, 2009); *Military Inventions Hit the Civilian Market*, Christian Science Monitor (June 19, 2008).

[12] Jody Freeman & Daniel A. Farber, *Modular Environmental Regulation*, 54 Duke L.J. 795, 797 (2005).

[13] S. Pacala & R. Socolow, *Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies*, 305 Science 968-972 (2004) (arguing that multiple existing technologies should be employed to stabilize the atmospheric concentration of greenhouse gases below climate tipping points); Elinor Ostrom, *Nested Externalities and Polycentric Institutions: must we wait for global solutions to climate change before taking action at other scales?*, Econ Theory 49:353–369 (2012); Eric Orts, *Climate Contracts*, 29 U. VA. ENVTL. L. REV. 197, 199, 205 & n.22 (2011) (arguing that decentralized approaches including "national and regional regulations, public-private partnerships brokered by non-governmental organizations, various organizational alliances, and everyday transactions for goods and services". . . are "likely to provide effective and efficient responses to climate change in the long run") (citing Lori Snyder Bennear & Robert Stavins, *Second-Best Theory and the Use of Multiple Policy Instruments*, 37 ENVTL. RESOURCE ECON. 111 (2007). *Cf.* R. G. Lipsey & Kelvin Lancaster, *The General Theory of Second Best*, 24 REV. ECON. STUD. 11 (1956)); Jody Freeman, *The Private Role in Public Governance*, 75 N.Y.U. L.

In the vast legal literature addressing climate change, however, scholars and policymakers tend to view the government largely as a regulator[14] or a source of funding to drive

REV. 543, 547 (2000) (noting that non-governmental organizations, corporations, public interest groups, private standard setting entities, professional associations and other private organizations play an essential role in environmental governance when they "implement, monitor, and enforce compliance with regulations"); Michael Vandenbergh, *The Private Life of Public Law*, 105 COLUM. L. REV. 2029, 2029, 2040-41 (2005) (arguing that "private actors play an increasing role in traditional and government standard setting, implementation and enforcement functions" including by entering into private contractual agreements "in the shadow of public regulations . . . [that] may have far more influence on the accountability and efficacy of the regulatory state than do public/private hybrids"); Michael P. Vandenbergh, *The New Wal-Mart Effect: The Role of Private Contracting in Global Governance*, 54 U.C.L.A. L. REV. 913, 913 (2007) (private contracting "reduces externalities by translating a complex mix of social, economic, and legal incentives for environmental protection into private contractual requirements"); Howard C. Kunreuther & Erwann O. Michel-Kerjan, *Climate Change, Insurance of Large-Scale Disasters, and the Emerging Liability Challenge*, 155 U. Pa. L. Rev. 1795 (2007) (addressing insurance's role in driving individual behavior in the climate change context); Jonathan M. Gilligan & Michael P. Vandenbergh, *Accounting for Political Feasibility in Climate Instrument Choice*, *available at* http://ssrn.com/abstract=2220788 (2013) (arguing that the advantages of a second-best, yet politically feasible policy or set of policies to combat climate change are preferable to waiting for an optimal policy solution).

[14] *See, e.g.*, Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333 (1985) (advocating market approaches to force firms to reduce emissions); Gilbert E. Metcalf & David Weisbach, *The Design of a Carbon Tax*, 33 HARV. ENVTL. L. REV. 499, 502 & n.11 (2009) (proposing a carbon tax); Richard B. Stewart, *A New Generation of Environmental Regulation?* 29 CAP. U. L. REV. 21, 22 n.1 (2001) (advocating market approaches); Reuven S. Avi-Yonah, David M. Uhlmann, *Combating Global Climate Change: Why a Carbon Tax is a Better Response to Global Warming Than Cap and Trade*, 28 STAN. ENVTL. L.J. 3, 6-9 (2009); Robert N. Stavins, *A Meaningful Cap-and-Trade System to Address Climate Change*, 32 HARV. ENVTL. L. REV. 293 (2008); Nathaniel O. Keohane, Richard L. Revesz & Robert N. Stavins, *The Choice of Regulatory Instruments in Environmental Policy*, 22 HARV. ENVTL. L. REV. 313 (1998); *cf.* David Weisbach, *Instrument Choice is Instrument Design*, *in* U.S. ENERGY TAX POLICY 113 (G. Metcalf, ed. 2011); Jason Bordoff, Manasi Deshpande & Pascal Noel, *Understanding the Interaction between Energy Security and Climate Change Policy*, Ch. 9, pp. 209-48, at 217-18, in ENERGY SECURITY: ECONOMICS, POLITICS, STRATEGIES AND IMPLICATIONS (Carlos Pascual & Jonathan Elkind, eds.) (2010).

private innovation,[15] rather than as a consumer of energy or a polluter.[16] This perspective misses a crucial piece not only of the underlying story, but of a potential solution.[17]

While the military is not likely to become the environment's greatest advocate overnight, in this specific area of climate change policy, including how to stimulate strategies to reduce energy demand and encourage the development of renewables, the military has the potential to make an enormous impact. Policymakers need to think carefully about how to harness the exceptional alignment between the military's mission and its needs to reduce energy demand and develop renewables, and how cooperation between the military and the private sector can advance these ends. What I call the Military-Environmental Complex has the potential to become one important tool in the regulatory toolkit to combat climate change.

The Military-Environmental Complex is the military's extensive undertaking to improve its sustainable energy use and reduce demand for conventional energy sources both on the

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[15] Allison S. Clements & Douglas D. Sims, *A Clean Energy Deployment Administration: The Right Policy for Emerging Renewable Technologies*, 31 ENERGY L.J. 397, 398 (2010) (favoring government financial support to "create a level playing field" for emerging clean technologies); Jonathan H. Adler, 35 HARV. ENVTL. L. REV. 1, 1 (2011) (proposing government-sponsored technology inducement prizes to "accelerate the rate of technological innovation in the energy sector").

[16] *But see* Sarah E. Light, *NEPA's Footprint: Information Disclosure as a Quasi-Carbon Tax on Agencies*, 87 TUL. L. REV. 511 (2013) (advocating information disclosure for federal agencies in climate change context to reduce agency emissions); Amy Stein, *Renewable Energy through Agency Action*, 84 U. COLO. L. REV. 651 (2013) (arguing that federal agencies should be enlisted to support the shift to renewable energy). One notable exception to this focus on private actors has been in the NEPA context. *See, e.g.*, Madeline J. Kass, *A NEPA Climate Paradox: Take Greenhouse Gases into Account in Threshold Significance Determinations*, 42 Ind. L. Rev. 47 (2009); Matthew P. Reinhart, *The National Environmental Policy Act: What Constitutes an Adequate Cumulative Environmental Impacts Analysis and Should It Require an Evaluation of Greenhouse Gas Emissions?* 17 U. Balt. J. Envtl. L. 145 (2010); Amy L. Stein, *Climate Change Under NEPA: Avoiding Cursory Consideration of Greenhouse Gases*, 81 U. Colo. L. Rev. 473, 531-32 (2010). Despite the title suggesting government-sponsored innovation in J. Michaelson, *Geoengineering: a climate change Manhattan Project*, 17 STAN. ENVTL. L.J. 73 (1998) (advocating a coordinated effort to promote geoengineering, either top-down through governmental support or through "exo-national actors"), Michaelson believes that his proposal will use less governmental action and more private action. *See id*. at 119. *See also infra*, Part I.C.

[17] Environmental law and scholarship has not always focused on private firms as polluters. *See, e.g.*, Robert V. Percival, *Symposium, Environmental Federalism: Historical Roots and Contemporary Models*, 54 Md. L. Rev. 1141, 1158 (1995) ("To the extent that federal law was regulatory in character prior to 1970, the primary targets of environmental regulation were federal agencies rather than private industry."); Stein, *Agency Action*, *supra* note 16, at 683.

battlefield and in permanent installations, in which the DoD's interests are intertwined with shared and competing interests of members of Congress, the President, and the private sector.[18] The Military-Environmental Complex has the potential to be a crucial policy tool in the regulatory toolkit to address climate change and energy policy. The Military-Environmental Complex also has the potential to transform some of the negative aspects of the historic military-industrial complex into positives for the environment and sustainability.

The military's motivations to pursue energy efficiency are complex and multi-dimensional, though always in service of the military's primary interest to protect national security and the DoD's mission, rather than out of an abstract desire to protect the environment.[19] Whether to maximize the DoD's discretionary budget,[20] to protect soldiers' lives,[21] to protect

[18] Michael C. Dorf and Charles F. Sabel have briefly highlighted the "irony in the observation that the military-industrial complex – symbol to many of government as an instrument of self-dealing, and to others of a suspect connection between official power and violence – may well have been a pioneer in the use of methods that we would associate with a new form of democracy" that they call "democratic experimentalism, in which power is decentralized to enable citizens and other actors to utilize their local knowledge to fit solutions to their individual circumstances, but in which regional and national coordinating bodies require actors to share their knowledge with others facing similar problems." Michael C. Dorf & Charles F. Sabel, *A Constitution of Democratic Experimentalism*, 98 COLUM. L. REV. 267, 336 (1998). I note that the term the "Military-Environmental Complex" has appeared in a non-academic context, as the title of two separate blog posts reporting on the military's desire to seek exemptions from mandates to clean up polluted sites, http://www.salon.com/2005/05/13/dod_pollutes/, and in reporting of discussions about whether to change a provision of the Energy Independence and Security Act of 2007 that aims to reduce greenhouse gas emissions, http://www.nesea.org/uncategorized/the-military-environmental-complex/. In this article, however, I define the term in terms of the academic literature on the military-industrial complex and the legal institutions and values that shape the military's relationship to the environment to drive technological innovation and reduce energy demand.

[19] Dep't of Defense, Quadrennial Defense Review Report iii, 84-85 (February 2010) [hereinafter QDR 2010], *available at* http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf.

[20] *See* WILLIAM A. NISKANEN, JR. BUREAUCRACY AND REPRESENTATIVE GOVERNMENT 36-42 (Aldine 1971) (agencies seek to maximize their budgets), The difference between an agency with a large budget and one with a small budget in absolute terms may be less important than the idea of the "discretionary budget" – *i.e.*, the "the difference between the total budget and the minimum costs of producing the agency's outputs." *See* Daryl J. Levinson, *Empire-Building Government In Constitutional Law*, 118 HARV. L. REV. 915, 933 (2005).

[21] Colonel Peter Newell, Director of the Army's Rapid Equipping Force, explains, "It's not about reducing energy usage and the overall bills, but about saving lives."(quoted in Amy Westervelt, H*ow the Military Uses Green Tech to Save Soldiers' Lives*, Forbes (Feb. 14, 2012), http://www.forbes.com/sites/amywestervelt/2012/02/14/how-the-military-uses-green-tech-to-save-soldiers-lives/).

national security in the face of new risks from climate change,[22] or to win a "green arms race,"[23] the military is driven by unique incentives that position it to be a first mover on both the development and the pre-commercial adoption of new technologies.[24] These incentives arise out of the military's many roles as a war fighter, landlord and land manager, and a validator of climate science. In the military context, climate change is a "threat multiplier," and energy efficiency is a "force multiplier."[25] Because of this exceptional alignment between the military mission and the need to conserve energy, address climate change and develop renewables, the Military-Environmental Complex has the potential to stimulate the development of new technologies through genuine demand for innovation, to provide large-scale commercial support for existing technologies and to drive behavioral changes.[26]

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[22] *See* Stephen Dycus, *Responses to the Ten Questions*, 35 WM. MITCHELL L. REV. 5031, 5037-38 (2010) (arguing that climate change is creating new conflicts over new shipping routes through the Arctic, the loss of island nations, and coastal communities as well as other resources) (citing Joshua W. Busby, *Climate Change and National Security: An Agenda for Action* (2007), *available at* http:// www.cfr.org/publication/14862/climate_change_and_national_security.html; Kurt M. Campbell et al., *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change* (2007), *available at* http:// www.csis.org/media/csis/pubs/071105_ageofconsequences.pdf; CNA Corp., *National Security and the Threat of Climate Change* (2007), *available at* http://securityandclimate.cna.org/report; Nat'l Intelligence Council, *Global Trends 2025: A Transformed World* 53-57 (2008), *available at* http://www.acus.org/files/publication_pdfs/3/Global-Trends-2025.pdf; Jürgen Scheffran, *Climate Change and Security*, *Bull. of the Atomic Scientists*, May-June 2008, at 19; James Stuhltrager, *Global Climate Change and National Security*, 22 NAT. RESOURCES & ENV'T 36 (2008)). *See generally* STEPHEN DYCUS, NATIONAL DEFENSE AND THE ENVIRONMENT (1996).

[23] 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 (2012).

[24] QDR 2010, *supra* note 19, at 87 ("DoD will conduct a coordinated energy assessment, prioritize critical assets, and promote investments in energy efficiency to ensure that critical installations are adequately prepared for prolonged outages caused by natural disasters, accidents, or attacks.").

[25] Thanks to Jody Freeman for raising this point. CNA Corp., *National Security and the Threat of Climate Change* at 1 ("Climate change can act as a *threat multiplier* for instability in some of the most volatile regions of the world, and it presents significant national security challenges for the United States.") (emphasis added); Memorandum of Understanding Between the Department of Energy and the Department of Defense at 2 (July 2010) ("Energy efficiency can serve as a *force multiplier*, increasing the range and endurance of forces in the field while reducing the number of combat forces diverted to protect energy supply lines, as well as reducing long-term energy costs") (emphasis added), *available at* http://energy.gov/sites/prod/files/edg/media/Enhance-Energy-Security-MOU.pdf.

[26] The Military-Environmental Complex may also lead to the creation not only of new technologies, but also new metrics of sustainability. I explore these issues, which are beyond the scope of this paper, in Sarah E. Light, *New Metrics in the Military-Environmental Complex: Valuing National Security*, 61 U.C.L.A. L. Rev. (forthcoming July 2014) (work in progress). For example, some within the military are exploring how to account for intangible benefits to the military's mission in decision making, such as the value of improved national security, increased

The Military-Environmental Complex is not without its challenges, however. It may be difficult to change long-held beliefs about energy use both within the military and of those to whom the military is accountable. And while the DoD is expending resources on this project, energy efficiency remains a small part of the military's overall budget.[27] There is also the concern that interest groups, private firms, or individual members of Congress could use the Military-Environmental Complex as an opportunity for rent-seeking.[28] But these limitations should not obscure the transformative potential of these relationships among the military, Congress, the President and the private sector in the clean energy arena.

This Article proceeds in four Parts. Part I of this Article explains that the traditional doctrinal story in administrative and environmental law suggesting that the military's mission is incompatible with environmental protection, is incomplete at best and misleading at worst. In fact, the DoD's exceptional energy use aligns its mission with the goal of sustainable energy use, creating an opportunity to harness the power of the DoD to stimulate innovation in the clean energy arena. While some scholars argue that military support for Research and Development as well as military procurement, are not the most efficient means to stimulate such new

range and endurance, and a quieter or less visible profile, from the development or use of renewable energy – what some have termed the "mission return on investment." Goldberg Productions, Marstel Day & Darden School of Business, *The Business Case for Sustainability in the U.S. Army*, at 8 (March 2013) (proposing sustainability best practices from private sector that military could adopt); *see also* Salvation Army, Money and Mission, *available at* http://salvationist.ca/wp-content/uploads/2009/02/Money-Mission-May-25-2011.pdf; Mission Investing, *available at* http://www.philanthropyjournal.org/resources/fundraisinggiving/case-mission-investing.

[27] For Fiscal Year 2013, in addition to any use of ordinary operation and maintenance or military construction (MILCON) funds to upgrade facilities, the Army has budgeted $562.4 million for operational energy initiatives; the Navy has budgeted $402.1 million (including for the Marine Corps) and the Air Force has budgeted $573.5 million, with approximately 90 percent of those funds going to demand reduction efforts. The "Defense Logistics Agency (DLA), Defense Advanced Research Projects Agency (DARPA), and Office of Secretary of Defense (OSD) provide an additional $102.2M in FY 2013." Report on Operational Energy Budget Certification for Fiscal Year 2013 at 7-9, http://energy.defense.gov/FY13_OE_Budget_Cert_Report.pdf.

[28] *See, e.g.*, JAMES Q. WILSON, POLITICAL ORGANIZATIONS (1973); Theodore Lowi, *American Business, Public Policy, Case-Studies and Political Theory*, 16 World Pol. 677, 688 (1964); MANCUR OLSON, THE LOGIC OF COLLECTIVE ACTION (1965) (arguing that rational people will free-ride on the efforts of others when public goods are at stake, and that groups are more likely to form when small groups may benefit).

technological innovation, these scholars fail both to note the exceptional alignment between the military mission and the need to reduce reliance on fossil fuels, as well as the fact that, as I demonstrate in Part II, the military is already undertaking and supporting crucial innovation in the energy sector, including in its operations. Part II examines the values, and legal, economic, and political incentives that are driving the military to reduce its conventional energy use, including in military operations, and how those values interact with the governmental institutions shaping the Military-Environmental Complex.

Part III analyzes the key role that the private sector plays in the Military-Environmental Complex, and argues that the Military-Environmental Complex grows out of and depends upon the previous interrelationships among the military, other government institutions and the private sector. The Conclusion in Part IV argues that the Military-Environmental Complex can substantially benefit the environment by stimulating investment in and demand for renewable energy technology, and should become an important factor in the debate over regulatory instruments to combat climate change. Finally, I will offer some recommendations for how to ensure that the Military-Environmental Complex serves as a force for good, rather than an opportunity for rent-seeking.

I. Military Exceptionalism

A. Exceptional Exemptions

Environmental law doctrine tells us that the military is exceptional; when needs of national security and preparation for war conflict with environmental goals, environmental goals must bend. Indeed, most federal statutes not only acknowledge but support the idea that there is an enduring conflict between the environment and national security. Yet in reality, that relationship is far more complex. While the law suggests that the military may disregard environmental priorities if they conflict with its national security mission, the military has political and economic incentives that prompt it to do more than the law requires in the area of sustainable energy use.

Under virtually all federal environmental laws, the President may grant time-limited, renewable waivers from environmental obligations for specific agency activities if such waivers are "in the paramount interest of the United States," or in the interest of national security. [29] In some cases, the agency head (*i.e.*, the Secretary of Defense), rather than the President, may make

[29] *See, e.g.*, the Clean Air Act, 42 U.S.C. § 7418(b); the Clean Water Act, 33 U.S.C. §§ 1323(a); the Coastal Zone Management Act, 16 U.S.C. § 1456(c)(1)(B); the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. 9620(j); the Endangered Species Act, 16 U.S.C. § 1536(j) (permitting Secretary of Defense's own determination of the national security interest under the ESA); the Marine Mammal Protection Act, 16 U.S.C. § 1371(5)(A)(i) & (ii); the Migratory Bird Treaty Act, *see* The Bob Stump National Defense Authorization Act for FY 2003, Pub. L. No. 107-314, 116 Stat. 2458, § 315 (2002); Migratory Bird Take Permits; Take of Migratory Birds by Department of Defense, 69 Fed. Reg. 31,076-78 (June 2, 2004); the National Historic Preservation Act, 36 C.F.R. § 78.3(a); 16 U.S.C. § 470h-2(j); the Resource Conservation and Recovery Act, 42 U.S.C. § 6961(a); the Safe Drinking Water Act, 42 U.S.C. § 300h-7(h); the Toxic Substances Control Act, 15 U.S.C. § 2621. The Executive Orders extending reporting requirements under the Toxics Release Inventory (TRI) program of the Emergency Preparedness and Community Right-to-Know Act include a national security exemption. *See* Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, Exec. Order No. 12,856, 58 FR 41,981 (Aug. 3, 1993), *superseded by* Greening the Government through Environmental Leadership in Environmental Management, Exec. Order No. 13,148, 65 FR 24595 (Apr. 21, 2000), *superseded by* Strengthening Federal Environmental, Energy, and Transportation Management, Exec. Order. No. 13,423, 72 FR 3919 (Jan. 24, 2007); Instructions for Implementing Exec. Order No. 13,423 at 22. *See also* Federal Leadership in Environmental, Energy, and Economic Performance, Exec. Order 13514, Section 1, 74 Fed. Reg. 52117, 52117 (Oct. 5, 2009) (extending TRI reporting requirements for federal agencies). For a detailed discussion of the waiver provisions in environmental laws, *see* Hope Babcock, *National Security and Environmental Laws: A Clear and Present Danger?*, 25 VA. ENVTL. L.J. 105, 110-20 (2007).

that determination without further executive review. In addition, in a time of national emergency or after a declaration of War, Congress has provided a blanket exemption for military construction projects that are "not otherwise authorized by law that are necessary to support such use of the armed forces.[30]

Administrative law likewise tells us that the military is exceptional, and plays by a different set of rules – at least when combat operations are concerned. The Administrative Procedure Act (APA) exempts from its definition of agency "military authority exercised in the field in time of war or in occupied territory," and likewise exempts such authority from the APA's provisions for judicial review.[31] The rulemaking and adjudication provisions of the APA contain even broader exemptions for "a military or foreign affairs function of the United States" and "the conduct of military or foreign affairs functions," respectively, regardless of which agency exercises such functions.[32] Enacted after World War II, and reflecting a compromise between the desire to rein in agency discretion and the recognition that the military should be left to protect national security without the threat of constant litigation, the APA expressly, if not unambiguously, set the military apart. [33]

The National Environmental Policy Act (NEPA) [34] contains no express statutory exemption for military actions,[35] but NEPA's regulations create an "emergency circumstances"

[30] 10 U.S.C. § 2808; Babcock, *supra* note 29, at 116.
[31] 5 U.S.C. §§551(1)(G), 701(b)(1)(G) (2006). For an in-depth discussion of the history of this language and an argument that it applies beyond the battlefield, *see* Kathryn E. Kovacs, *A History of the Military Authority Exception in the Administrative Procedure Act*, 62 ADMIN. L. REV. 673 (2010).
[32] 5 U.S.C. § 553(a)(1).
[33] Kovacs, *supra* note 31, at 705 (noting that APA reflected a compromise) (citing Wong Yang Sun v. McGrath, 339 U.S. 33, 40-41 (1950), and 712-20 (discussing various interpretations of "time of war" and "in the field" and arguing that courts and commentators have read the language too narrowly)).
[34] 42 U.S.C. §§ 4321-35.
[35] *See* Concerned About Trident v. Rumsfeld, 555 F.2d 8179 (D.C. Cir. 1976); Weinberger v Catholic Action of Hawaii/Peace Education Project 454 U.S. 139 (1981) (holding that the Navy was not required to prepare and release a "hypothetical Environmental Impact Statement," under 42 U.S.C.A. § 4332(2)(C), regarding operation of facilities capable of storing nuclear weapons).

exception.[36] An Executive Order clarifies that extraterritorial environmental impacts of agency actions in the case of armed conflict need not be assessed.[37] Finally, because NEPA incorporates the APA's waiver of sovereign immunity, the APA's exceptions for military authority apply.[38]

Finally, Executive Order 12,866, which subjects certain major agency regulations to White House review by the Office of Information and Regulatory Affairs (OIRA) within the Office of Management and Budget (OMB), likewise exempts "[r]egulations or rules that pertain to a military or foreign affairs function of the United States, other than procurement regulations and regulations involving the import or export of non-defense articles and services."[39]

Environmental organizations and scholars decry these exemptions as allowing vast environmental degradation under elusive standards.[40] In contrast, some within the military have argued that environmental laws remain a major source of "encroachment" on military readiness and prerogatives, and that military exemptions should be drawn even more broadly.[41]

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[36] 40 C.F.R. § 1506.11 (requiring consultation with the White House Council on Environmental Quality); Winter v. Natural Resources Defense Council Inc., 555 U.S. 7, 18-19 (2008).

[37] Executive Order No. 12,114, 44 Fed. Reg. 1957 (Jan. 4, 1979). The DoD has issued NEPA regulations adopting this position, *see* 32 C.F.R. § 187.4(e). NEPA also permits the use of a classified appendix in which classified disclosures can be made for purposes of judicial review. 40 C.F.R. § 1507.3(c).

[38] *See also* Winter, 555 U.S. at 18-19 (vacating injunction that had prohibited the Navy's use of sonar during training exercises off the coast of California, notwithstanding the effects of that sonar use on marine species, where the President, the White House Council on Environmental Quality and the Secretary of the Navy had determined that exemptions or waivers were appropriate from governing environmental rules in the national interest).

[39] Executive Order 12,866 § 3(d)(2), 58 Fed. Reg. 190 (Oct. 4, 1993).

[40] *See, e.g.*, Babcock, *supra* note 29, at 110-20 (describing the military's efforts to obtain permanent exemptions, rather than temporary waivers, and arguing that these exemptions are "troubling"); *but cf.* DYCUS, NATIONAL DEFENSE AND THE ENVIRONMENT, *supra* note 22, at 7-10 (noting that the exemptions for national security are rarely invoked).

[41] Col. E.G. Willard, Lt. Col. Tom Zimmerman, Lt. Col. Eric Bee, *Environmental Law and National Security: Can Existing Exemptions in Environmental Laws Preserve DoD Training and Operational Prerogatives Without New Legislation?*, 54 A.F. L. Rev. 65, 65, 87-88 (2004) (arguing that environmental laws are a source of "encroachment" on military readiness and that "the bottom line is that we must be able to train the way we fight" and that existing exemptions are insufficient); Babcock, *supra* note 29, at 126 (citing Encroachment: Hearings Before the H. Gov't Affairs Comm., 10th Cong. 2001); Letter from Ten Members of the House of Representatives to Donald Rumsfeld, Sec'y of Def. (Oct. 5, 2001); U.S. Army Legal Services Agency, Environmental Law Division Notes: Pending Legislation Targets Military Environmental Compliance, 2001 ARMY L. 30 n.17 (2001) (discussing "encroachment" on military readiness by environmental laws). This conflict came to a head after September 11, 2001, when the military sought – and Congress granted – broader exemptions to certain environmental laws. Babcock, *supra* note

Regardless of precisely where the doctrinal line is drawn, this legal backdrop sets up a conflict between preservation of the environment and the national security interest of the United States. Indeed, Congress and the President have incorporated a similar set of exemptions for military combat operations and national security in more recent statutes and executive orders in the energy sector. Yet that conflict is not inexorable. Despite these exemptions, the DoD itself has demonstrated that national security and the military's mission are deeply intertwined with the need to reduce energy use and develop alternative and renewable fuel sources.

B. Exceptional Mission Alignment

While it may in fact be true that the military's mission conflicts at times with environmental protection in some arenas, such as habitat conservation or wildlife protection, the DoD's exceptional energy use creates a unique synergy between the military mission and goals of energy sustainability. The DoD is the largest single consumer of energy in the nation, as well as the single largest emitter of greenhouse gases.[42] The military's total energy costs in fiscal year 2011 were $19.3 billion, of which facility energy costs were $4.1 billion, and operational energy costs were $15.2 billion.[43] The DoD is also the nation's largest landlord; it manages more than 500 installations in the United States and overseas, covering approximately 2.3 billion square feet of building space.[44] This physical footprint is three times the size of Wal-Mart's, and six

29, at 126-36 (discussing changes to environmental laws including ESA, the MMPA and the Migratory Bird Treaty Act after 9/11).

[42] *See supra* note 9.

[43] Department of Defense Annual Energy Management Report for Fiscal Year 2011, 1 & n.2, 14 (Sept. 2012), http://www.acq.osd.mil/ie/energy/library/FY.2011.AEMR.PDF [hereinafter AEMR FY 2011]. Facility energy "includes energy needed to power fixed installations and non-tactical vehicles," while operational energy is "the energy required for training, moving, and sustaining military forces and weapons platforms for military operations. The term includes energy used by tactical power systems and generators and weapons platforms." 10 U.S.C. § 2924(5).

[44] *Id*. at 4. The AEMR FY 2011 notes that this facility energy use constitutes only "1.1 percent of the total U.S. commercial sector's energy consumption." *Id*. at 15 (citing Energy Information Administration (EIA), Annual Energy Review 2010: Energy Consumption by Sector and Source [online source] (Washington, D.C. , 2011, accessed February 1, 2012), *available at*

times that of the General Services Administration (GSA).[45] The DoD manages approximately 28 million acres of land in the United States.[46] Each service within the military – the Army, Navy and Air Force – has a different energy-use profile and different energy needs.[47] For example, the Army's permanent bases are its largest energy consumer, while the Air Force and Navy have higher energy use from transportation fuels, with lower consumption for facilities.[48] Thus, the military's energy needs are not only deep but broad, covering facilities and operations, with transportation needs that span both sectors.

In the energy arena, the military's mission aligns with the goals of reducing energy demand, increasing energy efficiency and increasing renewables. The DoD's mission is "to provide the military forces needed to deter war and protect the security of our country."[49] Indeed, the primary value driving the DoD's role to reduce energy consumption and explore renewables in the Military-Environmental Complex is the military's goal to enhance its mission

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http://www.eia.gov/oiaf/aeo/tablebrowser/#release=EARLY2012&subject=0-EARLY2012&table=2-EARLY2012&region=1-0&cases=full2011-d020911a,early2012-d121011b). Such "one percent" arguments can obscure the significance of these emissions, and the importance of reducing all sources of greenhouse gasses in the atmosphere. *See* Kevin M. Stack & Michael P. Vandenbergh, *The One Percent Problem*, 111 COLUM. L. REV. 1385 (2011) (climate change can only be solved through regulation of small contributions to global GHG emissions, but biases lead individuals to discount or ignore small values); Garrett Hardin, *Tragedy of the Commons*, 162 SCIENCE 1243 (Dec. 1968).

[45] AEMR FY 2011 at 4.

[46] Press Release, U.S. Dep't of Interior, Interior and Defense Departments Join Forces to Promote Renewable Energy on Federal Lands (Aug. 6, 2012), *available at* http://www.defense.gov/releases/release.aspx?releaseid=15498 ("DoD installations encompass roughly 28 million acres in the United States, of which 16 million acres previously managed by Interior's Bureau of Land Management (BLM) were withdrawn for military use by executive order, congressional legislation or departmental regulations. About 13 million acres of these withdrawn lands are located in the west and are high in wind, solar and geothermal resources."); Stein, *Agency Action*, *supra* note 16, at 708.

[47] The U.S. Marine Corps is an operating unit within the U.S. Navy. *See* http://www.navy.mil/navydata/organization/org-over.asp.

[48] PEW PROJECT ON NAT'L. SEC., ENERGY & CLIMATE, REENERGIZING AMERICA'S DEFENSE at 12-17 (Apr. 20, 2010), *available at:* http://www.pewtrusts.org/our_work_report_detail.aspx?id=58542.

[49] SSSP, *supra* note 6, at i. One commentator has been particularly optimistic about the military's role in this regard: "The progeny of the Green Arms Race, rather than a strategy of mutually assured destruction, will be a more efficient fighting force[], a reduction [of] the worldwide reliance on fossil fuels, new spinoff green energy technologies, and the creation of a new, more stable world order – a mutually assured sustenance. The once disparate approaches to address climate change, energy dependence, and national security become one and the same: initiate and win the Green Arms Race." Velandy, *supra* note 11, at 311-12.

to provide trained and ready soldiers for combat and to promote national security.[50] The military has recognized not only that it faces security threats, such as the cost in lives of protecting fuel convoys en route to the battlefield, but also that increasingly scarce natural resources will lead to further geo-political instability.[51] As Assistant Secretary of Defense for Operational Energy Plans and Programs, Sharon Burke, explains:

> The key end goal is the mission – you have to be able to explain that we won't succeed in the mission if we don't reduce demand. This is not about energy efficiency in the abstract. We are a place with a job to do. If you are a business, you are trying to sell a product or make a profit. Here, we have the mission. Our goal is to lower the threat by reducing demand. Lower cost is important, but it's not enough.[52]

From 2003 to 2007 in Iraq and Afghanistan, more than 3,000 Army personnel and Army contractors were wounded or killed in action as a result of attacks on fuel and water resupply convoys.[53] In 2010, ground convoys were attacked 1,100 times.[54] These numbers do not even reflect all efforts to move "fuel at the tactical level, from forward operating bases to patrol bases."[55] Flying in fuel may reduce these casualties, but can increase costs by a factor of ten.[56] In both Iraq and Afghanistan, the challenges of securing fuel convoys has thus made the need reduce petroleum consumption paramount.[57] Energy costs – both economic and political –are

[50] U.S. Dept. of Defense, 2010 Quadrennial Defense Review (QDR) Fact Sheet, Feb. 1, 2010, at 2. In the National Defense Authorization Act for Fiscal Year 2008, Congress amended legislation to require the DoD in the 2010 QDR to "examine capabilities of armed forces to respond to climate change." U.S. Dept. of Defense, *QDR 101: What You Should Know* (citing NDAA 2008, Subtitle F, Sec. 951).
[51] QDR 2010 at 84-87.
[52] Notes of interview with Assistant Secretary of Defense for Operational Energy Plans and Programs, Sharon Burke, (May 22, 2013) (on file with author).
[53] Energy for the Warfighter at 4-5 (citing Army Environmental Policy Institute, *Sustain the Mission Project: Casualty Factors for Fuel and Water Resupply Convoys Final Technical Report,* September 2009, www.aepi.army.mil; General Duncan McNabb, Commander, U.S. Transportation Command, remarks at the Center for Strategic and International Studies, February 7, 2011).
[54] *Id.*
[55] *Id.*
[56] *Id.* at 5.
[57] *Greenery on the March: Clean Technology: Finding Alternative Sources of Energy is Becoming a Pressing Military Necessity for America's Armed Forces*, The Economist (Dec. 10, 2009) (noting that 40% of fuel used by the military in Iraq and Afghanistan was used to run electricity generators, and that the military is seeking to reduce

high, and perhaps unlike for other agencies, DoD's costs can be measured not in dollars, but in lives. These battlefield needs are driving the military to use new or existing technologies and better informational analysis to address the underlying problem by reducing demand and changing behavior.[58]

The same mission objective drives the military to ensure that its installations and facilities are protected from disruptions to the electric grid, whether as a result of climate-change related natural disasters or cyber-attack.[59] Likewise, in training in domestic installations, soldiers must learn to reduce demand if they are to do so on the battlefield. Marc Kodack of the Office of the Assistant Secretary of the Army for Energy and Sustainability, said of the Army's Net Zero project, a joint initiative with the DoD and the DOE to make the participating Army pilot installations net zero in water, energy and/or waste:[60]

> Unless the concepts of "sustainability" or "Net Zero" allow the Army to do its mission better, I don't care. The question is how do I create a narrative that allows me to do more – the Army to enhance its mission.[61]

National security as a goal has the ability to stimulate innovation through specific demand that broader and more abstract concerns over the environment or energy independence may not create. "There is an innovation pull," says ASD Burke. "We need to fight a war – the question is how do we do that. This is more likely to stimulate innovation than in a vacuum or for the abstract goal of energy efficiency – we have a specific problem to solve."[62]

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energy consumption by adopting "smart grid" technology, using insulation on military tents to reduce HVAC demand and converting trash into electricity through the Tactical Garbage to Energy Refinery (TGER)).

[58] *See* Amy Westervelt, *Why the Military Hates Fossil Fuels*, FORBES Feb. 2, 2012.

[59] Notes of interview with John Lushetsky, Energy Initiatives Task Force (May 14, 2013) (on file with author).

[60] AEMR FY 2011 at 46 (describing Net Zero Energy Installation (NZEI)).

[61] Notes of interview with Marc Kodack, Office of the Assistant Secretary of the Army for Energy and Sustainability, April 5, 2013 (notes on file with author). *See also* http://army-energy.hqda.pentagon.mil/netzero/.

[62] Notes of interview with Sharon Burke, (May 22, 2013) (on file with author).

C. Exceptional Opportunities: Lessons from the Military-Industrial Complex

The military's role in supporting technological innovation that has spilled over into the civilian realm is a familiar phenomenon. Technological advances originally created for military needs have widely been appropriated for civilian use, including computers, satellites for aerial reconnaissance, certain kinds of aircraft, the internet, semiconductors, and the global positioning system (GPS).[63] Although perhaps most well-known for this explosion of scientific growth in the twentieth century, military leadership in stimulating technological innovation has deep historical roots. For example, although the military originally produced its armaments in national armories, beginning in the early nineteenth century, the army began to rely on private firms to increase the supply.[64] Because the quality was poor, the army imposed certain requirements on gun manufacturers, including uniformity and manufacture with interchangeable parts.[65] This led not only to development of new guns, but also new "machine tools and precision instruments" which were subsequently adapted to manufacture civilian goods such as sewing machines.[66]

[63] Mowery, *supra* note 11, at 163-66 (describing the role of the federal government in financing and as a customer for new technological developments, and arguing that federal support, as well as weak intellectual property protections and strong anti-trust laws supported R&D of certain industries; noting that in 1959 the majority of federal spending went to "established producers of electronic components," that "new" firms received only 22% of federal money in 1959, for example, and that most of the "new" firms were founded by former employees of established firms, but also that this was technology-specific, as "the role of new firms grew in importance with the development of the integrated circuit"). *See also* Velandy, *supra* note 11, at 309; *The Military-Consumer Complex: Military Technology Used to Filter Down to Consumers. Now It's Going the Other Way*, The Economist (Dec. 10, 2009); *Military Inventions Hit the Civilian Market*, Christian Science Monitor (June 19, 2008). *See also* sources cited *supra* note 11.

[64] Merrit Roe Smith, *Military Arsenals and Industry Before World War I*, 24, 32, in WAR, BUSINESS, AND AMERICAN SOCIETY: HISTORICAL PERSPECTIVES ON THE MILITARY-INDUSTRIAL COMPLEX (Benjamin Franklin Cooling ed.) (1977).

[65] *Id*. at 31 (noting that as a result of new requirements, many of the old gun manufacturers went out of business and were replaced by new upstarts "headed by younger, more aggressive businessmen" (such as Colt and Remington, among others)).

[66] *Id*. at 32.

The key to military funding has always been to articulate how the technological innovation is in the military's interest, or more broadly, the nation's interest in national security. Civilian spinoffs have largely been a secondary benefit.[67] In some cases, direct federal research and development (R&D) funding was not necessary to stimulate the development these new technologies. Instead, the "prospect of large procurement contracts appears to have operated similarly to a prize, leading [one firm] to invest its own funds in the development of a product that met military requirements."[68] For example, David Mowery explains that government procurement was "crucial" in the development of the IBM 650 computer: "[T]he projected sale of 50 machines to the federal government (a substantial portion of the total forecast sales of 250 machines) influenced IBM's decision to move the computer into full-scale development."[69] But different technologies followed different paths of military funding and support.

Some now argue that the military's "golden age" as lead innovator has ended, with changes in federal acquisition rules. Now, rather than contracting for new, DoD-specific products, the military prefers to adopt preexisting civilian technologies – what at least one scholar has called "spin-on" to the military from the private sector, rather than "spin-off."[70] And

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[67] *Cf.* Timothy Simcoe and Michael Toffel, *Public Procurement and the Private Supply of Green Buildings* (Sept. 5, 2012) (working paper), *available at* http://hbswk.hbs.edu/item/7112.html (arguing that "government procurement policies can accelerate the diffusion of new environmental standards that require coordinated complementary investments by various types of private adopters").

[68] Mowery, *supra* note 63, at 165.

[69] *Id*. at 174 (noting that the IBM 650 was "the most commercially successful machine" of the 1950s, with total sales of 1,800 units).

[70] Stowsky, J., 1992. *From spin-off to spin-on: redefining the military's role in American technology development*. In: Sandholtz, W., Borrus, M., Zysman, J., Conca, K., Stowsky, J., Vogel, S., Weber, S. (Eds.), The Highest Stakes. Oxford University Press, New York, pp. 114–140, at 114-15 (describing the shift in directional development of innovative technology from military spin-offs to spin-ons to the military from the private sector); *The Military-Consumer Complex*, *supra* note 63, at 2, 18 ("Among the policies the new directives established [in 1994] was a move away from the historically based DOD reliance on contracting with segments of the US technology and industrial base dedicated to DOD requirements, moving instead by statutory preference toward the acquisition of commercial items, components, processes and practices. In the new mandated hierarchy of procurement acquisition, commercially available alternatives are to be considered first, while choice of a service-unique development program has the lowest priority in the hierarchy) (citing 10 U.S.C. § 2304 and DOD Directives 5000.1 and 5000.2). *See also, e.g.*, Tim Lenoire and Henry Lowood, *Theaters of War: The Military-Entertainment Complex* (Stanford

sometimes, technology in the military-industrial complex took hybrid forms – neither completely "spin-off" nor "spin-on."[71] For example, after World War II, the Army Signal Corps sought to reduce the size and weight of its early walkie-talkies by developing miniature components.[72] Bell Labs was simultaneously working to develop new transistor technology "to replace mechanical relays in telephone exchanges."[73] In 1948, Bell Labs waited until one week before making a public announcement about its innovation to brief the military.[74] Its leaders were concerned that the military, learning of the new transistor technology, would seek to impose secrecy on the basis of protecting national security.[75] After the private briefing, the Army Signal Corps signed a contract with Bell Labs to conduct additional general research, followed by a second contract to devote time to military-specific interests.[76] Stowsky notes that while the technology initially came from the civilian sector, military procurement and interest were crucial in promoting its development and diffusion.[77] Bell Labs was unable to introduce the new transistors on a widespread scale in the civilian telephone system in the absence of large-scale replacement of existing infrastructure.[78] But the military financed the construction of a Western Electric transistor plant in Pennsylvania, and entered into contracts for the production of more than ten times the military's projected needs for transistors in order to have "surge capability" in case of emergency.[79] In addition, the military essentially "subsidized" research and production

Univ.) (noting post-war trend of military adoption of consumer and civilian technologies, especially in war games and simulations); Mowery, *supra* note 63, at 169 ("As nondefense demand for semiconductor components grew and came to dominate industry demand, defense-to-civilian technology 'spillovers' declined in significance and actually reversed in direction.").

[71] Stowsky, *supra* note 11, at 118.

[72] *Id*.

[73] *Id*. at 117.

[74] *Id*.

[75] *Id*. at 117-18.

[76] *Id*. at 118.

[77] *Id*.

[78] *Id*.

[79] *Id*. at 118. Western Electric was AT&T's manufacturing component. *Id*. at 119.

costs to bring down the ultimate cost to civilian consumers of the technology.[80] Finally, the military contributed to the diffusion and dissemination of information about transistor technology by requiring Bells Labs to hold conferences for representatives of the electronics industry, academics and the military regarding the technology.[81]

Given these historical roots, the literature on technological innovation has been attuned to the role that the federal government in general, and the military specifically, may play in stimulating technological innovation in the energy sector to combat climate change.[82] This literature recognizes the importance of government funding to address the so-called "Commercialization Valley of Death" – the period in between when venture capital financing is available for "early stage, potentially high-risk/high-return technologies" and bank financing for "late-stage, potentially low-risk/low-return technologies in the form of project financing."[83]

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[80] *Id*. at 119, 121.
[81] *Id*. at 119.
[82] *See, e.g*., David C. Mowery, Richard R. Nelson, Ben R. Martin, *Technology Policy and Global Warming: Why new policy models are needed (or why putting new wine in old bottles won't work)*, Research Policy 39 (2010) 1011-1023; Hoffert et al., *Energy implications of future stabilization of atmospheric CO2 content*, Nature 395, 881-884, 882 (1998) ("The magnitude of the implied infrastructure transition suggests the need for massive investments in innovative energy Research" on the order of a Manhattan project to develop transformative technologies); J.M. Amidon, *America's Strategic Imperative: a 'Manhattan Project' for energy*, Joint Forces Quarterly (39) 68-77 (2005) (advocating a Manhattan Project to achieve energy independence); P. Read and J. Lermit, *Bio-energy with carbon storage (BECS): a sequential decision approach to the threat of abrupt climate change*, Energy 30, 2654-2671 (2005) (arguing that the risk of Abrupt Climate Change requires intensive efforts to innovate in negative-emissions energy systems); C. Somerville, *The billion-ton biofuels vision*, Science 312, 1277 (2006) (advocating Manhattan-project on biofuels); S. Dunn, *Hydrogen futures: towards a sustainable energy system*, International Journal of Hydrogen Energy 27, 235-264 (2001) (advocating Manhattan-project to study and develop hydrogen-based energy economy); D. Talbot, *Needed: an 'Apollo Program' for energy*, Technology Review (April 2006), *available at* http://www.technologyreview.com/news/405681/needed-an-apollo-program-for-energy/) ("Since World War II, the development of everything from gas turbines to integrated circuits to the Internet were all devised by R&D paid for by the government. We should target the R&D we need to make the energy system sustainable."). It is important to note that a "Manhattan Project" or "Apollo Program" approach is not synonymous with the Military-Environmental Complex – to the contrary, the Military-Environmental Complex is not about developing a single "magic bullet" technology, but rather describes a web of interaction among different institutional actors working toward a multitude of technologies that reduce energy demand and develop or promote alternative energy-generation technologies. Sometimes these authors use the term "Apollo Program" or "Manhattan Project" without intending massive, exclusive governmental support for the innovation programs.
[83] Bloomberg New Energy Finance, *Crossing the Valley of Death: Solutions to the Next Generation Clean Energy Project Financing Gap*, § 1 at 1 (June 21, 2010). *See generally* Part III, *infra*.

Little private financing exists in this stage to support "potentially lower-cost breakthrough technologies that have advanced out of the laboratory but still require extensive and expensive field-testing and trial installations before being deployed at scale."[84]

In some respects, this innovation literature constitutes a modern-day effort to draw historical lessons from the military-industrial complex.[85] One common suggestion has been advocacy of an initiative along the lines of a Manhattan Project or the Apollo Program to support technological innovation on the scale and at the pace necessary to solve the climate change problem.[86] For some, this so-called "Manhattan Project" approach simply signifies an overwhelming investment of societal resources to develop transformational or disruptive technological solutions – and not necessarily government funds.[87] Yet, despite borrowing the well-known terminology of these two historical programs, there is a widespread failure to acknowledge the role of the government (particularly the military) as polluter, or the exceptional alignment between the military's mission and the need to reduce energy demand and find renewable energy sources.[88]

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[84] *Id.*

[85] *See, e.g.* Mowery et al., *supra* note 82, at 1012, 1016; David C. Mowery, *Defense-related R&D as a model for "Grand Challenges" technology policies*, Research Policy 41 (2012) 1703-1715, at 1704 [hereinafter Grand Challenges] (noting military technology innovation success stories going back to Henry VIII, the race for armor, the naval arms race between Britain and Germany in the 19th century, and the U.S. transition from public armories to private sources of armaments) (**citing Lundvall, B.-A., Borras, S., 2004. Science, technology and innovation policy. In: Fagerberg, J., Mowery, D.C., Nelson, R.R. (Eds.), The Oxford Handbook of Innovation. Oxford University Press, Oxford, pp. 599–631;** Trebilcock, C., *British armaments and European industrialization, 1890–1914*. Economic History Review 26, 254–272 (1973), at 254 (noting that multiple types of "spin-offs" from military technology both domestically and abroad, particularly in the "developing" nations of Russia and Spain, among others, occurred not only in the 20th century, but with some frequency between 1760-1914 as well); LESLIE, S.W., 1993. THE COLD WAR AND AMERICAN SCIENCE. Columbia University Press, New York; Lichtenberg, F.R., 1987. *The effect of government funding on private industrial research and development: a re-assessment*. Journal of Industrial Economics 36, 97–104 (arguing that prior studies of the impact of government-funded R&D significantly overstated the positive impact on private funding of R&D).

[86] *See, e.g.*, sources cited *supra* note 82.

[87] *See, e.g.*, Michaelson, *supra* note 16, at 119 (suggesting that private investment will displace government investment in his proposed Manhattan Project on geoengineering).

[88] Some scholars recognize the geo-political instability that may result from climate change, but there is little focus on the aspects of the military's mission described above, such as the fact that reducing demand for fossil fuels may

Others reject this Manhattan-Project approach to government-centric R&D investment.[89] For example, Mowery, Nelson and Martin contend that while a "strong, well-resourced government technology policy" is a necessary component of addressing climate change, the Manhattan Project or Apollo Program models are inapposite.[90] They contend that such an analogy is "wrongheaded" and has the potential to "waste resources" while ultimately being unsuccessful.[91] Those 20th century programs, these scholars argue, involved the quest for a single, precise technological innovation for which the government was the "sole customer."[92] In contrast, in the climate change context, there is a different need to engage multiple stakeholders, including the private sector, state, local and federal government, and individuals not only to adopt new technologies, but also to change behavior on a vast, decentralized scale.[93] Other critics of a Manhattan-project approach contend that the analogy is inapt because the government has historically proven ineffective at "picking winners" untethered from actual demand.[94] Even the critics fail to appreciate that the military demand for this technology is high.

This debate over the utility of a Manhattan project, however, does not exhaust the field of potential government roles to support technological innovation, including models that draw lessons from the military-industrial complex. Other historical models include government-supported research and development (R&D) into information technology, including military

result in fewer lives lost guarding convoys, or that generating renewable energy on military lands may insulate the military from disruptions to the public grid.

[89] *See, e.g.*, Mowery, *supra* note 82; Chi-Jen Yang & Michael Oppenheimer, *A "Manhattan Project" for Climate Change?* 80 CLIMATIC CHANGE 199, 202 (2007) (arguing against a Manhattan-project approach).

[90] Mowery et al., *supra* note 82, at 1012.

[91] *Id.*

[92] *Id.*

[93] *Id.*

[94] Yang & Oppenheimer, *supra* note 89 (noting that government intervention to support technology development has been successful only if (a) the government itself has a procurement interest, (b) the government has supported "generic" research, or (c) in decentralized systems of R&D support; but that the government's efforts to "pick winners" in commercial markets have failed).

R&D, government procurement, or a combination of both.[95] For example, Mowery, Nelson and Martin recognize that military R&D programs were essential in the development of semiconductors, computer hardware and computer software during the Cold War, which ultimately gave "birth to the Internet."[96] These scholars recognize that the military's national security mission motivated this military investment, and that military procurement "dominated early markets" for new products using these technologies.[97] Other federal agencies, academic institutions and private industry worked together with the military to provide "pluralistic" support for innovation in information technology.[98] Because this innovation supported the military mission, R&D and military procurement were mutually reinforcing.[99] The military's status as first user of the new technologies "enhanced their reliability and ease of use, while reducing their costs."[100] Finally, this military-supported innovation led to significant civilian "spillover" which ultimately overtook military sales and funding for R&D.[101]

Despite these successes of combined military R&D and procurement in stimulating the growth of the information technology sector, Mowery, Nelson and Martin remain pessimistic about the potential for this model to stimulate technological innovation in the climate change context. They argue that while government R&D and procurement can promote "certain

[95] Mowery et al., *supra* note 82, at 1012. The role of "government" is not confined to the military in this literature. To the contrary, there is discussion of other potential successful analogies from the past, including programs in which U.S. technology policy has been effective, as in public health and agricultural innovation programs. *See id*. at 1014.
[96] *Id*.
[97] *Id*. At the same time, Mowery notes that as the military mission shifted, so too did the military's approach to technology. Mowery, *Grand Challenges*, *supra* note 85, at 1705. During wartime, immediate goals dominated, while during the Cold War, the national defense mission shifted to developing new and more complex weapons systems, as well as addressing other threats. *Id*.
[98] *Id*.
[99] *Id*. at 1017.
[100] *Id*. at 1017-18.
[101] *Id*. at 1017-18. Mowery notes that the scale of government procurement and R&D in the Cold War permitted greater experimentation, diversity and competition among industrial partners in technology development. Mowery, Grand Challenges, *supra* note 85, at 1709.

technologies or applications," in contrast, the *widespread diffusion* of new energy technology will require other policies, including a reflection of the true social costs of carbon.[102] Any public spending must be accompanied by significant private spending on technological innovation, and significant participation by industry in "prototype development and testing."[103] The government may play an important role in "field trials" of new technology as it did in the information technology context,[104] yet when government is involved, there is always the possibility of "capture."[105] If the ultimate goal is to create technology that will be used in a decentralized way by both private and public actors, they contend that the utility of defense R&D may be "limited," as "[c]ivilian technological 'spinoffs' were never a central goal of the postwar defense-related R&D spending" by the United States.[106] The military, Mowery argues, does not generally support diffusion of technology and innovation learning.[107] Indeed, Mowery expressly argues that procurement will play a smaller role in the climate change context than in the Cold War defense-related technological innovation, as compared to R&D.[108] Ultimately, Mowery and his

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[102] *Id*. at 1020.
[103] *Id*.
[104] *Id*. at 1021.
[105] *Id*. at 1021. Mowery offers the example of the difficulty in terminating the Air Force C-17 transport plane, as a result of major military contractors carefully distributing the subcontracts and component contracts among all 50 states, most importantly those of key committee leaders. See Mowery, Grand Challenges, *supra* note 85, at 1708-09.
[106] Mowery, Grand Challenges, *supra* note 85, at 1704. Indeed, Mowery contends that because the military's role in Cold War technological innovation was largely "sui generis," it is not a good analogy to extend to other grand challenges. *Id*. at 1709.
[107] *Id*. at 1710. *This is not entirely true in the Military-Environmental Complex, where the military is actively promoting its mission and its partners in websites etc.* **[what about patents/secrecy about the technology itself?]** Mowery also argues that technological innovations often need to be significantly modified to have civilian application. *Id.*
[108] Mowery, Grand Challenges, *supra* note 85, at 1705. Mowery does recognize three pathways through which military R&D and procurement can stimulate innovation in civilian technologies. First, if the military supports broad research (rather than seeks to procure a specific weapon system) this can contribute to "general knowledge." Second, military R&D can lead to the development of civilian "spinoffs, such as in information technology." Third, military procurement played a positive role, as the military's focus on performance, and ability to serve as a first customer enabled industry to improve performance and reduce prices. *Id*. at 1711. *See also* Mazzoleni, R., 1999. *Innovation in the machine tool industry: a historical perspective on the dynamics of comparative advantage*. In: Mowery, D.C., Nelson, R.R. (Eds.), The Sources of Industrial Leadership. Cambridge University Press, New York, pp. 169–216, at 176 (noting that while the U.S. machine tool industry developed in part from the army's interest in

colleagues' argument appears primarily to be a critique of the *efficiency* of relying on military R&D and procurement, as opposed to other forms of spending that could more directly support technological innovation. Similarly, from Stowsky's perspective, the key question is which method – spin-off (from the military to the private sector) or spin-on (from the private sector to the military) – is "faster."[109]

The question of which approach is "faster" or "more efficient" may be a good one if we lived in a world of central planning or a clean slate. By focusing on what institutional arrangement would best stimulate technological innovation to combat climate change globally, however, this innovation scholarship is failing to recognize that the U.S. government, and in particular, the DoD, is *already actively stimulating such technological development* in the energy sector. Despite recognizing the potential analogy to the military-industrial complex of the past, and in particular, how military procurement (demand pull) was driven largely by the military's mission in the 20th century development of information technology, these scholars fail to point out that the military's mission *currently* dovetails in an exceptional way with the need to reduce energy demand and develop renewable energy sources.

Thus, this innovation literature – despite its apparent heritage in history and theory of the military-industrial complex – is asking the wrong question. Rather than asking what *in theory* is the most efficient way to stimulate technological innovation which must then be diffused

armaments with interchangeable parts, other technologies, namely numerical control methods in aircraft manufacture, were slow to be adopted outside of the military context). *But see* Stowsky, J., 1992. *From spin-off to spin-on: redefining the military's role in American technology development*. In: Sandholtz, W., Borrus, M., Zysman, J., Conca, K., Stowsky, J., Vogel, S., Weber, S. (Eds.), The Highest Stakes. Oxford University Press, New York, pp. 114–140, at 114-15 (noting heterogeneity in the success of spin-offs from military technology, including success stories such as semiconductors, and failures, such as "Air-Force-sponsored computer control technology for machine tools"). Stowsky argues that firms whose "antennae" were too attuned to military procurement needs failed to appreciate civilian demand and innovation, and that "spin on" should be more widely recognized as an alternative to "spin off" for the development of new technology. *Id*. at 115.

[109] *Id*. at 137.

globally, scholars and policymakers should ask a different question. The real question is: Given that the DoD is already actively pursuing both technological innovation to military specifications (through R&D) and is expressing vast, mission-driven demand for commercial off-the-shelf technologies (through procurement and creative arrangements like long-term Power Purchase Agreements), how should we craft political and other institutions both to make this government-sponsored innovation more successful and to guard against abuses such as rent-seeking, cost overruns and delays, and the lack of diffusion of knowledge that may have plagued government-supported innovation in the past. It is these questions I seek to address here.

D. Advantages of the Military-Environmental Complex

There are certain unique advantages to military participation in this technological innovation process. In some cases, the mere fact that the project supports military interests – rather than general commercial interests – may drive support among other institutional players who may feel more strongly connected to the value of protecting national security than other values such as supporting commerce or protecting the environment.[110] The construction of roads in nineteenth century America provides an example of how an engineering project with both

[110] *See e.g.*, Dena M. Gromet, Howard Kunreuther, and Richard P. Larrick, *Political ideology affects energy-efficiency attitudes and choices*, Proceedings of the National Academy of Science (2013) (individuals with conservative ideologies were less likely to purchase energy-efficient light bulbs when light bulb was affixed with sticker saying "Protect the Environment" than absent such a sticker); Edward W. Maibach, Connie Roser-Renouf & Anthony Leiserowitz, *Communication and Marketing As Climate Change–Intervention Assets: A Public Health Perspective*, 35 Am. J. Preventative Medicine, 488-500, 497 (2008) (noting that "[a]udiences are most receptive to content that is consistent with their existing attitudes and beliefs," and suggesting wisdom of selecting messages about climate change for target audiences based on values, including messages about the economic, energy independence, legacy, stewardship, religious or nationalistic benefits of conservation based on target audience); Dan Kahan et al., *Cultural Cognition of Scientific Consensus*, 14 Journal of Risk Research 147-74, 169 (Feb. 2011) ("When shown risk information (e.g., global temperatures are increasing) that [people] associate with a conclusion threatening to their cultural values (commerce must be constrained), individuals tend to react dismissively toward that information; however, when shown that the information in fact supports or is consistent with a conclusion that affirms their cultural values (society should rely more on nuclear power), such individuals are more likely to consider the information open-mindedly.") (internal citations omitted). This suggests that the ability to link reducing demand for fossil fuels and promoting alternative sources of energy with advancing national security goals may have implications for support not only among key players in Congress, but also the public. This point is worthy of further empirical research.

civilian and military application obtained congressional funding and Presidential support largely because of its alignment with the military mission. The original thirteen colonies had few roads, except those "constructed by the army fighting [Native Americans] on the frontier and for the Lancaster-Philadelphia Turnpike . . ."[111] In the War of 1812, the nation faced challenges in moving soldiers and supplies that led to a rethinking of the military's needs for roads, and what role the federal, as opposed to state, government should play in financing and constructing them.[112] "As long as a road could be termed a military road, [President] Madison and the Congress would approve its construction. . . . When road construction was labeled an internal improvement . . . Madison vetoed the measure even though Congress had passed it."[113] President Monroe followed the same path, and also "approved only those roads which were described as strictly military" even after Secretary of War John C. Calhoun, in an 1819 report to Congress wrote, "A judicious system of roads and canals, constructed for the convenience of commerce and the transportation of the mail only, without any reference to the military operations is itself among the most efficient means for 'the more complete defense of the United States,'" because "the roads and canals which such a system would require are precisely those which would be required for the operations of war."[114] The role of the military in stimulating technological innovation as well as in unlocking financing, has thus been exceptional. But at a deeper level, to extrapolate to the clean energy context from the experience of nineteenth-century road building, reliance on the synergy between the military's interests and energy conservation

[111] Thomas E. Kelly, *The Concrete Road to MIC; National Defense and Federal Highways* 133, 134, in WAR, BUSINESS, AND AMERICAN SOCIETY: HISTORICAL PERSPECTIVES ON THE MILITARY-INDUSTRIAL COMPLEX (ed. Benjamin Franklin Cooling) (1977).
[112] *Id*. at 134.
[113] *Id*. at 135.
[114] *Id*. at 135.

may provide political cover for those who otherwise might not support investment in clean energy technology solely for civilian purposes.[115]

Second, the DoD's exceptional hierarchical nature allows its leadership to consider the importance of changing norms and behavior in ways that might be unthinkable in the private sector. In the military context, behavioral changes are within the realm of possibility in ways that might be hard to fathom in the civilian world. One well known historical example is the integration of the military long before parts of the civilian world in the United States. For example, President Truman issued Executive Order 9981 on July 26, 1948, formally abolishing segregation in the military even while so-called "Jim Crow" laws were still widely in force in parts of America. By issuing an Executive Order and exploiting the hierarchical nature of his relationship with the military as Commander-in-Chief, Truman was not obligated to obtain the approval of Congress, which would likely have failed to enact such a measure.[116] Though this formal document in no way actually ended segregation overnight, the military was certainly a norm-leader in the integration of public life in the United States in ways that had a positive impact on the civilian world.

More recent studies have demonstrated that government adoption of "green" standards may spill over into the civilian realm even in the absence of mandates on private firms. For example, Timonthy Simcoe and Michael Toffel found that the U.S. Green Building Council's LEED Standard (Leadership in Energy and Environmental Design) for Green Buildings diffused more rapidly among *private* developers in municipalities that adopt green procurement policies that *apply only to the government* than in municipalities without such procurement policies, and

[115] A second, more recent example of how a dual-use project was "sold" by the Defense Advanced Research Projects Agency (DARPA) during Reagan's Presidency as a purely military initiative was the Strategic Computing Program. See generally, Stowsky, *supra* note 11, at 134.
[116] Executive Order 9981 (July 26, 1948).

that such policies also spilled over into neighboring communities.[117] They conclude that "government purchasing policies can break deadlocks that emerge when coordinated investments are required to adopt a common standard and that this stimulates the private-sector market for the goods and services targeted by government green procurement policies."[118]

In the clean energy context, such exceptional behavioral changes may also be possible. As ASD Burke explains, "The civilian world is different – it is hard to talk about reorganizing society – to tell people you can't live so far away from work because you use too much fuel. In the military you can talk about this. Changing behavior is all about having a tool, explaining why it matters, and taking the lesson with you." ASD Burke tells the story of a Senior Officer who was field testing energy equipment at a Marine Corps base in southern California. He was explaining to the Marines involved how to use a new electricity meter to measure their energy use: "He said to them, do what you have to do, use the energy you need to get the job done, but if you stay below that red line, you won't turn on the generator. No noise, no fumes, no fuel truck coming by to refill it. And they get that – many of them have been deployed before and had to live next to a generator. The Marines stayed below the line. . . . People talk about culture change, but it's not enough to tell people to do better; you have to give them the tools and the rationale."[119] According to Burke, "U.S. forces are very, very good at the logistics of fuel, of moving what we need to operate from place to place. We also have a great deal of experience in managing energy use in our fixed facilities, and in fact, we are often compelled to do so by laws and regulations. But we didn't have much experience managing energy as a military capability,

[117] Simcoe and Toffel, *supra* note 67, at 2.
[118] *Id*. at 3.
[119] Notes of interview with Sharon Burke, (May 22, 2013) (on file with author).

enabler, or input."[120] A key element of the Military-Environmental Complex is about developing tools to allow management of energy as an input.

The military's ability to reduce energy use, particularly from conventional sources such as petroleum in the theater of war and existing electricity grids at military installations, is vital to our national security, at least in the short run. In the long run, the Military-Environmental Complex may have important consequences for development and commercialization of clean energy technology and practices with widespread civilian application.[121] The challenge is to recognize this military exceptionalism and to ask whether and how it can be harnessed.

II. Institutions and Values Driving the Military-Environmental Complex

The DoD is actively engaged in reducing its energy consumption, increasing efficiency, and promoting renewables in order to support its mission.[122] This Part assesses the governmental institutions and values driving the Military-Environmental Complex.

A. Government Institutions Driving the Military-Environmental Complex

Congress, the President and the DoD all play significant roles in the Military-Environmental Complex. These institutions are deeply engaged in a debate over the values that should be driving the Military-Environmental Complex: national security, energy independence, cost or protecting the environment.

a. Congressional Mandates

[120] Notes of interview with Sharon Burke, (May 22, 2013) (on file with author). As Burke points out, "In World War II, fuel supplies were a target at all levels - strategic, operational, and tactical - for both the Axis and the Allies. The Allies were much more successful at protecting access to fuel, while, by the end of the War, the Germans were brewing fuel from coal and the Japanese from pine roots and tires." *See generally* DANIEL YERGIN, THE PRIZE: THE EPIC QUEST FOR OIL, MONEY AND POWER at 363 (2008 ed.) (describing the desperation of Japan's pine root campaign).

[121] This Article does not claim that military leadership is the sole solution to the problem of climate change. Rather, there is a story here to tell about the importance of taking a pluralistic approach without awaiting a first-best global solution. *Cf.* Orts, *supra* note 13, at 199, 205 & n.22.

[122] 10 U.S.C. §§ 2911-2925.

Despite its inability to pass comprehensive climate-change legislation governing the private sector,[123] Congress has played a key role in the Military-Environmental Complex, both in directing the military to meet substantive conservation and sustainability goals, and procedurally, by strengthening the institutions within the DoD itself that can make those goals self-reinforcing. Congress has imposed a number of mandates on all federal agencies to promote conservation, efficiency, and the development of renewable energy sources. The National Energy Conservation Policy Act of 1978 ("NECPA"),[124] as amended by the Energy Policy Act (EPAct) of 2005,[125] and the Energy Independence and Security Act (EISA) of 2007,[126] provides the underlying framework and authority for energy conservation and efficiency by federal agencies.[127] Noting that the federal government is the nation's "largest single energy consumer," NECPA requires all federal agencies, including the military, to conserve energy and water in federal facilities; creates a federal energy efficiency fund to provide grants to agencies for such projects; establishes an Interagency Energy Management Task Force to assist in implementation; requires Federal agencies to procure Energy Star products or Federal Energy Management Program ("FEMP")-designated products; and establishes government contract incentives to encourage contractor-operated government facilities to reduce federal energy costs.[128] The EPAct of 2005 set a requirement that the government's electricity should be generated with

[123] For example, H.R. 2454, the American Clean Energy and Security Act of 2009, also known as the Waxman-Markey cap-and-trade bill, passed in the House but was defeated on the Senate floor. *See* http://www.govtrack.us/congress/bills/111/hr2454. Other efforts to address climate change at the federal level have come largely as a result of Presidential and agency action by the EPA under the existing Clean Air Act, rather than through new legislation. *See generally* http://www.epa.gov/climatechange/EPAactivities/regulatory-initiatives.html (describing EPA's recent regulatory initiatives to address climate change).
[124] 42 U.S.C. §§ 8251-8262k.
[125] Pub. L. 109-58, 109th Cong. (Aug. 8, 2005).
[126] Pub. L. 110-140, 110th Cong. (Dec. 19, 2007).
[127] 42 U.S.C. §§ 8251-8262k (Ch. 91, Subch. III., Part B).
[128] 42 U.S.C. §§ 8251-8262k.

increasing levels of new renewable energy sources.[129] Other examples of general directives to federal agencies include the requirement for agencies to reduce non-tactical fleet vehicle petroleum use by 30 percent by 2020,[130] and the requirement in Section 431 of EISA that federal buildings reduce energy intensity by 30 percent by FY 2015 compared to a baseline of FY 2003 emissions.[131]

In addition to Congressional directives that apply broadly to all federal agencies, Congress has directed the DoD alone to reduce energy demand and develop alternative renewable energy sources, primarily in its facilities. For example, Congress has required the DoD "to produce or procure not less than 25 percent of the total quantity of facility energy it consumes within its facilities during fiscal year 2025 and each fiscal year thereafter from renewable energy sources."[132] Congress has directed the DoD to consider using solar or other forms of renewable energy for facilities construction projects (including housing), to use energy-efficient (Energy Star/FEMP) products in such housing, and to prefer energy-efficient equipment generally.[133] Congress has mandated that the DoD prefer hybrid, electric or plug-in vehicles that are of reasonable cost and meet Departmental needs.[134]

Congress has provided financial incentives for the DoD to meet these goals and requires reporting of annual progress as well as the development of a master plan, but does not otherwise

[129] Energy Policy Act of 2005 § 203, Pub. L. No. 109-58 (2005), 42 U.S.C. § 15852 ("to the extent economically feasible and technically practicable, of the total amount of electric energy the Federal Government consumes during any fiscal year" the government must consume not less than 3 percent renewable energy in fiscal years 2007 through 2009, not less than 5 percent in fiscal years 2010 through 2012, and not less than 7.5 percent in fiscal year 2013 and each fiscal year thereafter). *See also* Jeremy S. Scholtes, *On Point for the Nation: Army and Renewable Energy*, 34 Energy L.J. 55, 63 (2013) (describing history of mandates for renewables).
[130] AEMR FY 2011, at 27; 42 U.S.C. § 6374e.
[131] SSPP. While Congressional mandates set the floor, notably the DoD has sought to exceed that floor. The DoD Strategic Sustainability Performance Plan raises the bar, requiring the DoD to reduce energy intensity by 37.5 percent.
[132] 10 U.S.C. § 2911(e).
[133] 10 U.S.C. § 2915; 10 U.S.C. § 2922b; 10 U.S.C. § 2922f.
[134] 10 U.S.C. § 2922g (this preference does not apply to "tactical vehicles designed for use in combat.").

spell out what the enforcement mechanisms are.[135] For example, to the extent that the DoD realizes energy cost savings from the measures it implements, the DoD may reinvest half of those cost savings into additional conservation measures without further congressional appropriations, and half of the cost savings into location-specific improvements for service members.[136] In addition, the DoD is permitted to sell to a utility company the electricity it produces from alternative or cogeneration facilities under the DoD's jurisdiction, and to credit any proceeds to the appropriation account for the supply of electricity.[137]

Perhaps most importantly for the DoD's ability to utilize private financing for major renewable energy projects, Congress has authorized the DoD – alone among federal agencies – to enter into 30-year Power Purchase Agreements with private developers and financiers to promote the development of alternative energy generation on military lands.[138] These Agreements are contracts for the "provision and operation of energy production facilities on real property under the Secretary's jurisdiction or on private property and the purchase of energy produced from such facilities."[139] The DoD is unique among federal agencies in this ability to enter into such long-term Power Purchase Agreements. Other agencies, in contrast, are limited to shorter contracts, which have not provided the necessary incentives for private financiers to

[135] 10 U.S.C. § 2911. Lacking a clear enforcement mechanism, the DoD is instead required to submit to Congress annual energy performance goals and develop a master plan to achieve those goals. Congress requires the DoD to consider a number of special factors in formulating the master plan, including reducing consumption, reducing demand, implementing conservation measures, using alternative energy sources and fuels as well as hybrid and electric vehicles, managing and constructing facilities to conserve energy, reducing costs and achieving economies of scale, providing incentives to service members and civilians to reduce energy consumption, and increasing energy security. 10 U.S.C. § 2911(c).
[136] 10 U.S.C. § 2912.
[137] 10 U.S.C. § 2916.
[138] 10 U.S.C. § 2922a.
[139] 10 U.S.C. § 2922a. This specific authorization by Congress is necessary to avoid violating the Anti-Deficiency Act, which prohibits the obligation of funds in excess of an appropriation without authorization. *See* 31 U.S.C. § 1341. Geraldine E. Edens, Peter L. Gray, and Stephen Ruscus, *Government Purchasing of Efficient Products and Renewable Energy*, in THE LAW OF CLEAN ENERGY: EFFICIENCY AND RENEWABLES 123 (Michael Gerrard, ed.).

invest in these projects, where initial investments can only be recouped on a longer time horizon.[140]

These congressional mandates echo the exemptions in the environmental laws noted above, in that they do not apply to the military's use of operational energy (when the military is acting as a warfighter); rather they apply only to the military's use of energy to power its facilities in a non-combat capacity. At first glance, one might think that this reflects an opposition between the military mission and clean energy goals. In order to understand why this picture is not fully accurate, it is important to understand the distinction between operational energy and facilities energy.[141] Operational energy is:

> energy required for training, moving, and sustaining military forces and weapons platforms for military operations. The term includes energy used by tactical power systems and generators and weapons platforms.[142]

The DoD has explained that "[i]n practice, the Department considers operational energy to be the energy used in "[m]ilitary deployments, across the full spectrum of missions; [d]irect support of military deployments; and [t]raining in support of unit readiness for military deployments.[143] In contrast, facilities energy, which accounts for 25 percent of DoD energy use, "includes energy needed to power fixed installations and non-tactical vehicles."[144] Operational energy accounts for approximately 75 percent of DoD energy use, while facilities energy accounts for the remaining 25 percent.[145] The line between facilities energy and operational energy can be blurry. For example, the military employs unmanned aerial vehicles, commonly known as "drones," which

[140] *See infra*, Part III.
[141] Not only do congressional mandates differ based upon the type of energy used, but each type of energy is managed out of a different office within the DoD.
[142] 10 U.S.C. § 183c; 10 U.S.C. § 2924(5).
[143] *Id*. at 3.
[144] 10 U.S.C. § 2924(5).
[145] Energy for the Warfighter at 3.

may be remotely piloted by personnel sitting in a facility within the United States.[146] While a domestic military installation's energy use might normally be considered facilities energy, if the facility is engaged in a national security function or military operations (such as piloting a drone), such engagement could arguably transform the energy use into operational energy.

To highlight some examples of how Congress has exempted operational energy from its mandates, federal buildings are exempt from energy conservation and efficiency requirements if the "[f]ederal building or collection of Federal buildings is used in the performance of a national security function,"[147] an exemption that dovetails with the facilities/operations distinction, though in different language. Congress' goal that the DoD produce or procure 25 percent of its energy from renewable sources by 2025 applies only to military facilities, not operations.[148] While Federal agencies are required by statute to procure Energy Star or FEMP-designated products unless the agency head determines in writing that a statutory exception applies;[149] yet in defining "product" for purposes of the Energy Star program, Congress excluded "any energy consuming product or system designed or procured for combat or combat-related missions."[150] Other similar exemptions are widespread.

b. Presidential Directives

Congress is not the only political institution shaping the Military-Environmental Complex. The President has likewise directed all federal agencies, including the DoD to

[146] Strategic Sustainability Performance Plan at I-2; Notes of Interview with John Lushetsky, Executive Director of the Army's Energy Initiatives Task Force (EITF), May 14, 2013 (on file with author) ("The lines have become blurred, but there is a critical role for installations to fulfill – it's not just about keeping guys in barracks in peacetime.").
[147] 42 U.S.C. § 8253(c)(1)(B)(ii).
[148] 10 U.S.C. § 2911(e).
[149] Energy Policy Act of 2005, Pub. L. 109-58 (Aug. 8, 2005), 42 U.S.C. § 8259b(b); *see also* 42 U.S.C. § 6294a-b (EPAct of 2005). Section 553 further directs the Department of Energy (DOE) to promulgate regulations carrying out the statute, which the DOE finalized on March 13, 2009. 10 C.F.R. Part 436, 74 Fed. Reg. 10830 (Mar. 13, 2009); the Energy Policy and Conservation Act (EPCA), Pub. L. 94-163 (1975).
[150] 42 U.S.C. § 8259b(1)(5).

improve their energy profile to lead the nation by example. For example, in 2009, President Obama signed Executive Order 13,514, which requires all Federal government agencies to disclose greenhouse gas emissions information annually from their direct and indirect activities.[151] The Order also directs each agency to propose to the White House agency-wide greenhouse gas reduction targets to reach by 2020 as compared to a 2008 baseline.[152] However, the Executive Order includes a number of exemptions from these reduction targets for national security and military operations, including for military tactical vehicle fleets,[153] vehicles used in combat support, combat service support, tactical or relief operations, or training for such operations . . . ,"[154] and particular facilities "in the interest of national security."[155]

Executive Order 13,423, signed by President Bush in 2007, similarly directed Federal agencies to improve energy efficiency and reduce greenhouse gas emissions and water consumption, to require acquisition of sustainable goods, and mandates sustainable federal vehicle fleets.[156] That Executive Order also built on the EPAct of 2005's requirement that federal agencies consume certain set percentages of energy from renewable sources by requiring that at least half of the renewable energy come from "new" renewable sources, defined as "sources of renewable energy placed into service after January 1, 1999."[157] However, that Order

[151] Federal Leadership in Environmental, Energy, and Economic Performance, Exec. Order 13514, Section 1, 74 Fed. Reg. 52117, 52117 (Oct. 5, 2009) [hereinafter "Executive Order on Sustainability"].
[152] *Id*. §§ 2, 5.
[153] 74 Fed. Reg. at 52125.
[154] 74 Fed. Reg. at 52120, 52126.
[155] 74 Fed. Reg. at 52125 ("To the maximum extent practicable, and *without compromising national security*, each agency shall strive to comply with the purposes, goals, and implementation steps in this order.") (emphasis added).
[156] Strengthening Federal Environmental, Energy, and Transportation Management, Exec. Order 13423, 72 Fed. Reg. 3913 (Jan. 26, 2007).
[157] *Id*. § 2(b) (stating "(i) at least half of the statutorily required renewable energy consumed by the agency in a fiscal year comes from new renewable sources, and (ii) to the extent feasible, the agency implements renewable energy generation projects on agency property for agency use"); § 9(h) (defining "new renewable sources"); Scholtes, *supra* note 129, at 63 (describing the Army's response to these legal changes).

expressly excludes activities and resources outside the United States,[158] and permits the head of an agency to "exempt . . . military tactical vehicle fleets of that agency" from its requirements.[159]

If one were to look only at the story revealed in these statutes, regulations and executive orders, one would imagine the DoD to be an institution that is only obligated to conserve and reduce its energy use outside of operations. It obscures the military's significant initiatives to reduce its energy use, render energy use more efficient, to change behavior and to stimulate innovation and development of clean technology not only in its facilities, but in operations as well. This facet of the Military-Environmental Complex is driven in large part by the DoD's own mission, not solely by external legal mandate.[160]

c. Operational Energy

Indeed, while Congress and the President largely exempted operational energy from *substantive* mandates to reduce energy intensity, develop renewable fuel sources and reduce greenhouse gas emissions, Congress took a *procedural* tack to encourage the military to reduce operational energy use. In the National Defense Authorization Act (NDAA) for Fiscal Year 2009, Congress created a new Office of Operational Energy Plans and Programs within the DoD.[161] This Office serves as a mechanism to render the goals of reducing demand and pursuing alternative energy sources self-sustaining within the agency, even if Congress does not or cannot

[158] *Id*. at 3921.
[159] *Id*. at 3922.
[160] This is not to say that the Military-Environmental Complex represents an argument for non-regulation of polluters outside of the military context. In this case, the military's interest in national security dovetail with environmental goals of conservation. The same may or may not be true in other contexts, particularly with respect to private firms. In addition, though Congressional mandate is not substantive (*i.e*., reduction targets), Congress has used both procedural approaches (creating the Officer of Operational Energy Plans and Programs), and informational regulation (requiring reports on operational energy) to provide incentives to the DoD to act. In this case, as the narrative above demonstrates, Congress has acted largely in response to DoD demand.
[161] Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, Public Law 110-417, § 902 (2009), 122 Stat. 4654- 4566.

mandate reductions in the operational sphere, which consumes three quarters of the DoD's energy.[162]

Congress tasked the Director of the Office with the mission to "provide leadership and facilitate communication regarding, and conduct oversight to manage and be accountable for, operational energy plans and programs within the Department of Defense and the Army, Navy, Air Force, and Marine Corps," and to "establish the operational energy strategy" for the DoD.[163] Congress further directed each service within the military to appoint a senior official responsible for operational energy matters within that service to report to the new Director.[164] Finally, Congress directed the DoD to prepare an annual report on operational energy to Congress, detailing "statistical information on operational energy demands," "[a]n estimate of operational energy demands for the current fiscal year and next fiscal year," descriptions of any initiatives taken pursuant to the operational energy strategy and funding for those initiatives, an "evaluation of progress" made by the DoD in implementation and scientific development," and any recommendations of the Director.[165]

In the NDAA for Fiscal Year 2010, Congress reported its "sense" that:

> The demand for operational energy within the Department of Defense imposes significant logistical burdens and operational vulnerabilities on the warfighter and increases force protection requirements.[166]

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[162] *See* Mathew D. McCubbins, Roger G. Noll & Barry R. Weingast, *Structure and Process, Policies and Policy: Administrative Arrangements and the Political Control of Agencies*, 75 VA. L. REV. 431, 435-45 (1989) (legislature can influence policy by structuring agency processes). In the National Defense Authorization Act for Fiscal Year 2011, Congress renamed the Director position the Assistant Secretary of Defense for Operational Energy Plans and Programs. Ike Skelton National Defense Authorization Act for Fiscal Year 2011 § 901, Pub. L. No. 111-383 (Jan 7, 2011).

[163] Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, Public Law 110-417, § 902.

[164] *Id*.

[165] NDAA 2009, § 331, 122 Stat. 4419.

[166] National Defense Authorization Act for Fiscal Year 2010, § 903(a)(1), Public Law 111-84, 111th Congress, 123 STAT. 2190 (Oct. 28, 2009).

> In March 2008, the Comptroller General of the United States found that responsibilities for operational energy strategy, management, and oversight within the Department are diffused throughout various offices and working groups [within the DoD].[167]

Congress cited the Defense Science Board's 2008 report titled "More Fight - Less Fuel," which stated that:

> Decisions that create energy demand are dispersed organizationally across the Department and throughout the Services. There is no unifying vision, strategy, metrics or governance structure with enterprise-wide energy in its portfolio. . . . There are currently few efforts to manage energy demand by operational forces, which consume about three quarters of DoD energy, perhaps because no one is in charge. [168]

Thus, Congress created the Office to consolidate these strategic concerns and decision making in one office, and to report directly to the Secretary of Defense.[169] Yet this push to promote the focus on operational energy through procedural mechanisms like creating a special office and requiring information disclosure in the form of reporting did not come from Congress – it came largely from within the military itself.

d. The DoD's Role as Self-Driver

The roles of Congress and the President as institutional drivers have been crucial to the Military-Environmental Complex; however, as described above, the DoD itself has internal incentives to reduce energy demand, increase efficiency and explore alternative sources of fuel. Long before Congress created the Office of Operational Energy Plans and Programs or required reporting on operational energy use, military commanders serving in both Iraq and Afghanistan

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[167] *Id*. at § 903(a)(2).
[168] *Id*. at § 903(a)(3); Defense Science Board, *Report of the Defense Science Board Task Force on DoD Energy Strategy: More Fight – Less Fuel* (Feb. 2008), *available at* http://www.acq.osd.mil/dsb/reports/ADA477619.pdf.
[169] *Id*. at §§ 903(a)(4)-(5), (b). In contrast, the DoD's policy for facilities energy is carried out through the Office of the Deputy Under Secretary of Defense for Installations and Environment, currently headed by Acting DUSD John Conger. *See* http://www.dtic.mil/whs/directives/corres/pdf/417011p.pdf; http://www.acq.osd.mil/ie/energy/about.shtml; http://www.acq.osd.mil/ie/energy/library/espc_memo012408.pdf (re: ESPCs and EULs 10 U.S.C. § 2667); http://www.acq.osd.mil/ie/energy/library/Policy_Financing%20of%20Energy%20Projects%209Nov2012.pdf (financing of renewable energy projects memo). http://www.acq.osd.mil/dsb/reports/ADA477619.pdf Report of Defense Science Board Task Force.

sought to decrease reliance on fuels out of a concern for soldiers' lives and the mission. In 2003, James Mattis, who served as Marine Corps Commanding General, 1st Marine Division, Operation Iraqi Freedom, declared that the DoD must "unleash us from the tether of fuel."[170] In July, 2006, Marine Corps General Major Richard Zilmer, who at the time was the Commander of Multinational Force West in Iraq, sent the Pentagon a "Priority 1" rapid resource response request, requesting a "renewable and self-sustainable energy solution . . . to augment our use of fossil fuels with renewable energy, such as photovoltaic solar panels and wind turbines" so that fewer troops would die guarding fuel convoys in the theater.[171] Then, in 2008, oil prices spiked to a high of $145 per barrel.[172] This brought the cost issue to a head. In 2008, Congress responded to these requests from the DoD in the annual National Defense Authorization Act (NDAA), directing the creation of the Office of Operational Energy Plans and Programs to focus on ways to reduce and improve operational energy use, largely in response to these concerns that soldiers were dying in Iraq and Afghanistan.[173] In 2010, President Obama formally established the Office, and named Sharon Burke as its inaugural head.[174]

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[170] *More Fight—Less Fuel*, *supra* note 168, at cover letter 1, http://www.acq.osd.mil/dsb/reports/ADA477619.pdf; Chief Warrant Officer 2 Kenneth Hudak, *Lengthening the Tether of Fuel in Afghanistan*, Army Sustainment Magazine (Mar. 6, 2013), *available at* http://www.army.mil/article/97879/Lengthening_the_Tether_of_Fuel_in_Afghanistan/; http://e360.yale.edu/feature/new_mission_for_us_military_breaking_its_dependence_on_oil/2348/ (2003) (interview with Sharon Burke in Yale 2010 environment 360); http://www.whitehouse.gov/blog/2011/06/14/energy-war-fighter-department-defense-operational-energy-strategy (2004).

[171] http://www.worldwatersolar.com/company-news/army-and-marines-go-fossil-fuel-free/; Executive Agent Office of the Assistant Secretary of the Army for Installations, Energy and Environment, SMP: Developing Casualty Factors for Fuel and Water Resupply Convoys (Task N.0545) (Sept. 2009) ("MG Zilmer's request was to reduce the amount of fuel needed in order to save lives; in effect, he asked that DoD measure the cost of fuel in blood, not dollars.").

[172] Energy Information Administration, Cushing OK WTI Spot Price (Crude Oil), *available at* http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D.

[173] *See* Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, § 902, Pub. L. No. 110–417 (Oct. 14 2008) (creating the Office of Operational Energy Plans and Programs, with a Director under original 10 U.S.C. § 139b); as amended by Section 901 of the Ike Skelton National Defense Authorization Act for Fiscal Year 2011, 10 U.S.C. § 138c (renaming Director the Assistant Secretary of Defense and recodifying section as 10 U.S.C. § 138c).

[174] http://energy.defense.gov/Burke_Testimony_FY13_Investments.pdf (testimony of Sharon Burke before Congress); http://energy.defense.gov/FY2011OperationalEnergyAnnualReport.pdf.

The DoD has also responded to the institutional prodding from the President and Congress. For example, in response to the President's Executive Order on Sustainability, in August, 2010, the DoD prepared the Department of Defense Strategic Sustainability Performance Plan, which explicitly incorporates these underlying values:

> Freeing warfighters from the tether of fuel will significantly improve our mission effectiveness, as will reducing our installations' dependence on costly fossil fuels and a potentially fragile power grid.[175]

In June 2011, the DoD set forth its Operational Energy Strategy, consistent with the mandate Congress set forth in 10 U.S.C. § 138c, which was aptly titled *Energy for the Warfighter*.[176] That strategy lays out three primary goals, with the overarching aim of achieving greater "energy security for the warfighter through improved information about actual energy use, as well as programs to reduce energy consumption and increase efficiency; the development of alternative fuel sources and infrastructure protection at key military installations; and incorporation of operational energy issues into DoD-wide planning, requisitioning and procurement.[177] The DoD's Operational Energy Strategy identifies key challenges that the DoD faces with respect to operational energy needs. One challenge is the exponential rise in demand for energy in the theater of war in light of the use of new technology, including significant increases in the number and weight of batteries.[178]

In March, 2012, the DoD published its *Operational Energy Strategy Implementation Plan*, which outlined in greater detail how the DoD intended to accomplish these three broad

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[175] SSSP, *supra* note 6, at i.
[176] DoD, *Energy for the Warfighter: Operational Energy Strategy* (June 14, 2011), *available at* http://energy.defense.gov/OES_report_to_congress.pdf.
[177] *Id*. at 1.
[178] *Id*. at 4 (citing "Rifle Company Power Demands for 72 hours Operation" from Fort Benning Maneuver Center of Excellence, January 4, 2011).

objectives.[179] In order to achieve its goals, the DoD has committed to data gathering about energy use; increasing efficiency in operations; promoting operational energy innovation through science and technology to reduce demand, improve efficiency and or develop alternative sources of energy; improving energy security at fixed installations; promoting alternative fuels;[180] incorporating energy security into planning, requirements and acquisition; and adopting policy and educational initiatives to achieve these goals.[181]

e. Other Agencies

The DoD has committed to working in concert with other agencies to promote the development of new technologies to reduce energy demand and intensity, to make use of military lands for large-scale renewable energy projects, and otherwise to promote national energy security. To date, the DoD has entered into three Memoranda of Understanding ("MOUs") with other agencies: the Department of Energy (DOE), [182] the Department of the Interior (DOI), [183] and EPA.[184] The MOU with DOE aims to strengthen coordination efforts in areas such as "energy efficiency, renewable energy, water efficiency, fossil fuels, alternative fuels, efficient transportation technologies and fueling infrastructure, grid security, smart grid, storage, waste-to-energy, basic science research, mobile/deployable power, small modular reactor nuclear energy, and related areas."[185] This includes using military installations as a "test bed to demonstrate and

[179] DoD, *Operational Energy Strategy* (Mar. 6, 2012), *available at* http://energy.defense.gov/Operational_Energy_Strategy_Implementation_Plan.pdf.
[180] Notably, with respect to alternative fuels, the DoD requires the fuels to be "'drop in' (*i.e.*, compatible with current equipment, platforms, and infrastructure; . . . able to support an expeditionary, globally deployed force;" in addition, there "must be consideration of potential upstream and downstream consequences, such as higher food prices;" and "Lifecycle greenhouse gas emissions must be less than or equal to such emissions from conventional fuel." *Id*. at 9 (citing Section 526 the Energy Independence and Security Act of 2007, 42 U.S.C. § 17142).
[181] Implementation Plan at 3-7.
[182] http://energy.gov/sites/prod/files/edg/media/Enhance-Energy-Security-MOU.pdf.
[183] http://www.defense.gov/news/d20120806idmou.pdf.
[184] http://www.epa.gov/ORD/memo_of_understanding.pdf at1.
[185] http://energy.gov/sites/prod/files/edg/media/Enhance-Energy-Security-MOU.pdf at 1.

create a market for innovative energy efficiency and renewable energy technologies coming out of DOE laboratories" and other sources.[186] The partnership permits the DOE to "accelerate the deployment" of new technologies through the DoD's pilot testing, collaboration and deployment of these technologies.[187] In recognizing the importance of energy security, the MOU expressly relies on the Military-Environmental Complex, noting that energy efficiency can "serve as a force multiplier, increasing the range and endurance of forces in the field while reducing the number of combat forces diverted to protect energy supply lines. . . . Solving military challenges through innovation has the potential to yield spin-off technologies that benefit the civilian community as well."[188]

The MOU with the DOI provides that the two agencies will cooperate to "facilitate appropriate, mission-compatible renewable energy development on public lands withdrawn for defense-related purposes . . . and other onshore and offshore areas near or adjacent to DoD military installations."[189] In particular, the DoD has committed to work with the Bureau of Land Management to develop a pilot project for authorizing solar projects on military installations in California and Arizona,[190] as well as other types of renewable energy projects including solar, wind, geothermal and biomass.[191] The MOU parties recognize that a contract with the military could "mitigate some financial risk to a project by providing a significant customer whose energy needs are predictable and consistent."[192] Finally, the DoD's MOU with the EPA focuses

[186] *Id*. at 1. There are 17 DOE research laboratories, including Lawrence Berkeley National Laboratory and Fermi National Accelerator Laboratory. *See* http://science.energy.gov/laboratories/.
[187] *Id*. at 2-3.
[188] *Id*. at 2.
[189] *Id*. at 1. *See also* Ucilla Wang, *U.S. Military's Big Plan for Renewable Energy Projects*, FORBES, Aug. 6, 2012; DoD Press Release, Aug. 6, 2012, http://www.defense.gov/releases/release.aspx?releaseid=15498.
[190] *Id*.
[191] *Id*. at 2-3.
[192] http://www.defense.gov/news/d20120806idmou.pdf. at 2.

on using the DoD's installations as "test beds for innovative technologies and approaches" to support the development of sustainable infrastructure.[193]

B. Values Driving the Military-Environmental Complex: "Unleash Us From the Tether of Fuel"

The values driving these different governmental actors to pursue policies that encourage and reinforce the Military-Environmental Complex are both complementary and in conflict. While the DoD' primary driver is its mission, including climate-change-related risks, other players in the Military-Environmental Complex may care more about other values, such as energy independence or cost. This conflict over values came to a head in debates over a controversial provision of the EISA of 2007 that prohibited federal agencies from purchasing petroleum from any source that emits more greenhouse gases over its lifecycle than conventional petroleum.[194] Evidencing the DoD's primary motivation of mission, rather than energy independence or cost, the DoD advocated retaining the provision. Repeal of the provision would have permitted the DoD to procure petroleum from Canadian tar sands, which would have advanced the goal of energy independence but with negative consequences for greenhouse gas emissions and climate change. In response to a House Bill proposing to revoke the ban (or bar the use of funding to implement it), the DoD explained its position:

> Repeal or exemption could hamper the department's efforts to provide better energy options to our warfighters and further increase America's reliance on non-renewable fuels. Our dependence on those types of fuels degrades our national security, negatively impacts our economy, and harms the environment.[195]

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[193] http://www.epa.gov/ORD/memo_of_understanding.pdf at1.

[194] EISA § 526, 42 U.S.C. § 17142 ("No Federal agency shall enter into a contract for procurement of an alternative or synthetic fuel, including fuel produced from nonconventional petroleum sources, for any mobility-related use, other than for research or testing, unless the contract specifies that the lifecycle greenhouse gas emissions associated with production and combustion of the fuel supplied under the contract must, on an ongoing basis, be less than or equal to such emissions from the equivalent conventional fuel produced from conventional petroleum sources.").

[195] Letter from Elizabeth King, Assistant Secretary of Defense for Legislative Affairs, to Jeff Bingham, Chairman, Senate Energy and Natural Resources Committee (July 12, 2011), *available at* http://www.energy.senate.gov/public/index.cfm/2011/7/press-473d1eab-d00f-42ba-939d-02a0989b536a; Elizabeth McGowan, *Congress Trying Again to Repeal Ban on Carbon-Heavy Fuels for Military*, Inside Climate News

For the DoD, climate change is a source of geo-political instability that affects the military's mission. Thus the DoD has played a key role in the Military-Environmental Complex as a validator of climate science, which has also created conflict over values. In February, 2010, the DoD issued its Quadrennial Defense Review Report, in which it concluded that:

> climate change will shape the operating environment, roles, and missions that we undertake. . . . Assessments conducted by the intelligence community indicate that climate change could have significant geopolitical impacts around the world, contributing to poverty, environmental degradation, and the further weakening of fragile governments. Climate change will contribute to food and water scarcity, will increase the spread of disease, and may spur or exacerbate mass migration. While climate change alone does not cause conflict, it may act as an accelerant of instability or conflict, placing a burden to respond on civilian institutions and militaries around the world. . . .
>
> Second, DoD will need to adjust to the impacts of climate change on our facilities and military capabilities. . . . DoD's operational readiness hinges on continued access to land, air, and sea training and test space.[196]

The DoD thus recognizes that climate change acts as a "threat multiplier."[197] Recent news reports about the Russian Navy patrolling newly opened shipping lanes in the Arctic Ocean underscore the impact of climate change on potential new areas of conflict.[198] The solution, from the DoD's perspective, is to reduce demand for energy, to increase energy efficiency, and to use renewable fuels that do not require the same long "tail" to bring to the theater of war. Energy efficiency and reduced use in this way can act as a "force multiplier" – missions can go father without refueling, running generators, or bringing fuel convoys to the battlefield.[199]

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http://insideclimatenews.org/news/20110725/section-526-unconventional-carbon-fuels-oil-sands-pentagon; Comm. On Armed Services, National Defense Authorization Act for Fiscal Year 2012, H.R. Rep. No. 112-78, at 175-76 (1st Sess. 2012), *available at* http://. *See also* Stein, *Agency Action*, *supra* note 16, at 693.

[196] Quadrennial Defense Review Report 2010 at 84-85, *available at* http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf .

[197] *See supra* note 25.

[198] Andrew Kramer, *Russia Preparing Patrols of Arctic Shipping Lanes*, *NY Times* (Sept. 16, 2013).

[199] *See supra* note 25. As General John Allen explained in December of 2011, "Operational energy . . . is about improving combat effectiveness. It's about increasing our forces' endurance, being more lethal, and reducing the number of men and women risking their lives moving fuel." http://energy.defense.gov/FY13_OE_Budget_Cert_Report.pdf.

Unlike players who may stand to lose from greater energy efficiency or reduced petroleum use, or who have questioned the existence of climate change, the DoD does not hedge in this regard. This role as a validator of climate science is not without its critics.[200] To a large extent this dispute reflects a difference in which underlying values are more important – energy independence and cost, or national security and the DoD's mission. For example, in May, 2012, Oklahoma Republican Sen. James Inhofe, ranking member of the Senate Committee on Environment and Public Works and a senior member of the Senate Armed Services Committee, presented a report of the Congressional Research Service on the Senate floor stating that from fiscal years 2008 to 2012, the federal government as a whole had spent approximately $68.4 billion dollars to "combat climate change."[201] Conflating these expenditures of all federal agencies with those of the Department of Defense, Inhofe stated, "As President Obama's war on affordable energy wages on there are real threats out there, and, contrary to Secretary [of Defense Leon] Panetta's remarks, man-made catastrophic global warming isn't one of them."[202] Inhofe continued:

> Which would you rather have? Would you rather spend $4 billion on Air Force Base solar panels, or would you rather have 28 new F-22s or 30 F-25s or modernized C-130s . . . Would you rather have $64.8 billion spent on pointless global warming efforts or would you rather have more funds put towards modernizing our fleet of ships, aircraft

[200] http://www.washingtontimes.com/news/2012/may/7/panettas-next-war/.
[201] The Congressional Research Service Report clarifies that the Department of Defense expended approximately $776 million on the four climate change-related programs reported therein. *See* Congressional Research Service, *Memorandum: Funding for Federal Climate Change Activities, FY2008 to FY2012* (April 26, 2012), *available at* http://www.givewell.org/files/labs/climate%20change/CRS,%20Funding%20for%20Climate%20Change.pdf; http://dailycaller.com/2012/05/17/federal-government-spent-nearly-70-billion-on-climate-change-activities-since-2008/; http://www.humanevents.com/2012/05/18/inhofe-delivers-senate-floor-takedown-of-military-green-agenda/; http://news.investors.com/ibd-editorials/051812-612092-defense-billions-to-fight-climate-change-.htm#ixzz2UDoHggEi; http://www.americanthinker.com/blog/2012/05/panetta_uses_military_budget_to_prop_up_green_energy_firms.html#ixzz2UDlyMWYv.
[202] http://dailycaller.com/2012/05/17/federal-government-spent-nearly-70-billion-on-climate-change-activities-since-2008/.

> and ground vehicles to improve the safety of our troops and help defend our nation against the legitimate threats that we face?[203]

Instead of focusing on the DoD's own interpretation of its mission and national security, Inhofe argued that the government should support energy independence, for example, by approving the Keystone XL pipeline to bring Canadian tar sands oil to the United States, promoting domestic hydraulic fracturing, and permitting federal agencies to purchase petroleum products that have a greenhouse gas footprint exceeding that of crude oil."[204] To a certain extent, this exchange represents a conflict between supporters of the historic Military-Industrial Complex and those of the new Military-Environmental Complex, which represents a transformation of the older relationships into ones focused on renewable energy development and demand reduction because it is in the interest of national security.

The critique of the DoD's role as a validator of climate science and promoter of energy conservation is more widespread than a single Senator. For example, various news media outlets have questioned the DoD's priorities in the Military-Environmental Complex:

> We wonder if the environment is the uppermost thing on the minds of soldiers being shot at by the Taliban and avoiding being blown up by IEDs. . . . Certainly fuel and energy costs have risen for the military as for the rest of us. But wouldn't we be better served by tapping into the 200-year supply of oil under our feet and within our borders?[205]

To a large extent, these critics miss the mark – at least according to the DoD itself – focusing on the cost of fuel or energy independence for the United States, rather than the national security implications of transporting fuel to forward operating bases, the importance of reducing deaths by reducing the number of fuel convoys, or the importance of reducing greenhouse gas emissions

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[203] Quoted in http://www.americanthinker.com/blog/2012/05/panetta_uses_military_budget_to_prop_up_green_energy_firms.html#ixzz2UDlyMWYv.
[204] http://www.humanevents.com/2012/05/18/inhofe-delivers-senate-floor-takedown-of-military-green-agenda/.
[205] http://news.investors.com/ibd-editorials/051812-612092-defense-billions-to-fight-climate-change-.htm#ixzz2UDoHggEi.

to avoid increased geo-political instability caused by climate change. These conflicts over values are deeply intertwined with the institutions that interact within the Military-Environmental Complex.

III. The Private Sector

A focus on governmental institutional drivers should not obscure the significant role that the private sector plays in driving the Military-Environmental Complex. The Military-Environmental Complex is characterized by a deep level of interconnectedness between the military and the private sector. The military is employing creative financing arrangements to leverage private finance for major renewable energy infrastructure projects on permanent installations. In this interconnectedness lies an important lesson; the potential of the Military-Environmental Complex lies not only in the ability of the military support the development of new technologies with potential spillover *into* the private sector, but also to draw lessons and experience *from* the experience of the private sector.[206] The money involved in these projects creates incentives like those in the Military-Industrial Complex for private firms to lobby both Congress and the DoD to adopt certain technologies and enter into lucrative contracts – regardless of the connection to the DoD's mission. In some cases that might represent a negative for the environment, for example, if the DoD is being asked to study coal-to-liquid fuels as an alternative energy source on the battlefield. However, in other cases, the environment stands to benefit from this new focus on renewable energy and demand reduction. If the traditional "merchants of death" – firms that have made billions manufacturing weapons systems – can

[206]Center for Strategic Leadership, United States Army War College, *Sustainability and National Security* at vii (2012) ("Many of the sustainable practices the military is either currently applying or seeking to institutionalize are modeled after a growing number of corporations that aim for continual improvement, to gain a competitive edge in globalized markets, and ultimately long term success."); *see generally* Business Case for Sustainability, *supra* note 26 (proposing sustainability best practices from private sector that military could adopt); Stowsky, *supra* note 11 (describing spin-on technology as an important component of government innovation).

become "merchants of microgrids," not only does the environment potentially benefit, but the firms themselves may be transformed in ways that benefit the environment.

In the Military-Environmental Complex, the private sector plays several key roles. First, banks and private developers are paying significant upfront costs for major energy infrastructure projects on military installations in light of the DoD's specific statutory authority to leverage private financing. Second, the DoD, at times in cooperation with other agencies, is providing funding to private sector firms – both large and small – to finance the development of new technologies in incubator and test bed initiatives that may ultimately have civilian spinoff potential in the energy sector. Third, the private sector is educating the DoD about lessons that private firms have already learned in the area of energy conservation. Finally, the DoD may be able to educate the private sector about its demand-reduction strategies and new technologies in the future. These various relationships create a multi-dimensional conversation between government and the private sector that has the potential to affect, shape and transform all parties.

A. The Commercialization Valley of Death: Private Demand for Government Financing

Part of the reason why government financing for new technology is so important lies in the so-called "Commercialization Valley of Death."[207] Virtually all renewable energy technologies are currently more expensive per kilowatt/hour than conventional petroleum and fossil-fuel based energy, in the absence of a carbon tax on externalities or other equivalent

[207] Bloomberg New Energy Finance (BNEF), *Crossing the Valley of Death: Solutions to the Next Generation Clean Energy Project Financing Gap*, at § 4 (June 21, 2010); CalCF Innovations, *From Innovation to Infrastructure: Financing First Commercial Clean Energy Projects*, at 1 (June 2010) ("VC investment (combined with government grants and other non-dilutive funding sources) can fund a clean energy technology company to the point of initial pilot projects at a small scale (e.g. hundreds of kilowatts or a few megawatts for renewable electric generation, or tens of thousands of gallons of production for next-generation biofuels). Yet, in order to compete in state-driven auctions for renewable energy generation or meaningfully impact the fuels marketplace, clean energy companies must be able to rapidly structure and execute deployments at the utility or refinery scale (on the order of hundreds of megawatts, or hundreds of millions of gallons per year of capacity). For many clean energy companies, the struggle to find a source of project finance for early commercial scale projects has proven, and will continue to prove, to be the proverbial 'valley of death.'").

regulation.[208] Experts in new energy finance have identified two locations where a "shortfall of capital" arises: the first is "early in a technology's development, just as it is ready to exit the lab," just after the so-called "Technology Creation stage," in which universities or national laboratories fund technology development, but before venture capital becomes available.[209] The second valley, or absence of financing, arises at the stage of "Diffusion/Commercialization" when "companies seek scale-up capital to finance a major new manufacturing plant or power generating project."[210] The second valley occurs after venture-capital financing but before "full-scale commercial roll-out," and before technology is proven on a widespread enough scale that banks will be willing to lend capital for large projects.[211] As a recent Bloomberg New Energy Finance report explained:

> Venture capital firms have high technology risk tolerance but relatively limited capital, and they demand short-to-medium returns. Project finance funders and bank lenders typically have high levels of capital and can commit to longer-term investments, but they have little or no technology risk tolerance. *No existing class of financing institutions is effectively positioned to address this particular risk/return category*.[212]

Thus some commentators contend that "only with the public sector's help" can this Commercialization Valley of Death be surmounted.[213] For example, one organization has argued that overcoming the Valley of Death will require "direct funding solutions, such as revolving government loan funds, public leverage of private equity, and retail bond offerings; guarantee and insurance products, such as government re-insurance, third-party performance guarantees, and public loan guarantee pools; alternative project delivery approaches, including public-private

[208] BNEF, *supra* note 207, at § 4.
[209] *Id*.
[210] *Id*.
[211] *Id*.
[212] *Id*. (emphasis added). BNEF notes, for example, that there is a large pool of capital available for "projects that deploy commercially proven equipment such as GE 1.5 MW wind turbines or SunPower PV modules." *Id*.
[213] *Id*.

partnerships and targeted risk-sharing of specific engineering challenges; and procurement and offtake solutions, including supportive power purchase agreements and dedicated locations for new technology deployment."[214] Thus, the Military-Environmental Complex lies at the crossroads of the private sector's need for government financing support and the government's demand for new infrastructure, new technology and existing technology at a large scale. It is no wonder that the private sector is trying to obtain DoD support for new technologies, given the need for non-venture capital and non-bank financing, and given the DoD's past track record in helping to support the development of new technologies. If such new energy technology and sustainable methods are a social good, this demand for DoD financial and demand support may be of great social benefit.

Notably, the military's more recent track record of adopting off-the-shelf technologies, rather than solely creating military-specific new technologies, has been a key part of the Military-Environmental Complex. For example, the DoD's budget for fiscal year 2013 authorizes the DoD to expend more than $1.1 billion on energy conservation and efficiency in existing buildings, but these efforts largely use existing commercial technology and methods rather than technological innovation, such as lighting retrofits, more efficient heating and cooling systems, and such low-hanging fruit as "double-pane windows, energy management control systems, and new roofs."[215]

B. Government Financing for New Technology Development

The DoD recognizes its essential role in supporting the development and commercialization of renewable energy technology to serve DoD's needs – that "[a]bsent outside

[214] CalCF Report, *supra* note 207, at 2.
[215] AEMR FY 2011, at 14.

validation . . . these new technologies will not be widely deployed in time to meet our requirements." [216] There are significant disincentives to be a first-user of new technology, as first-time users bear the largest costs on which others can free ride.[217] Thus the DoD can serve two important roles – as a first user to evaluate the new "pre-commercial" technology, and an early customer "thereby helping create a market, as it did with aircraft, electronics, and the internet."[218]

Congress has supported this interaction between the military and the private sector explicitly, by providing funding sources and other vehicles for cooperation. For example, in 1990, Congress created the Strategic Environmental Research and Development Program (SERDP), whose purposes are (among other things) to address environmental issues of concern to DoD and the Department of Energy (DOE) "through support for basic and applied research and development of technologies that can enhance the capabilities of the departments to meet their environmental obligations"[219] and to "identify technologies developed by the private sector that are useful" for the departments.[220] Under the auspices of SERDP, the DoD created the Environmental Security Technology Certification Program (ESTCP) in 1995, to address the Commercialization Valley of Death and "to promote the transfer of innovative technologies that have successfully established proof of concept to field or production use."[221] In 2009, under the auspices of the ESTCP and SERDP, the DoD's Installation Energy Test Bed Initiative began annually awarding funding to projects to manage installation (facility) energy submitted by private firms, universities, national laboratories, and other organizations on a competitive

[216] *Id*.
[217] *Id*.
[218] *Id*.
[219] 10 U.S.C. § 2901(b)(1).
[220] 10 U.S.C. § 2901(b)(4).
[221] http://www.serdp.org/About-SERDP-and-ESTCP/About-ESTCP.

basis.[222] Recent projects funded in 2013 included: a battery energy storage system and microgrid control system, a data-center liquid-cooling system, high-concentration photovoltaics, a waste gasification system, technology that can reduce air-conditioner energy use through measuring operational energy efficiency, and a roof asset management system.[223] Smart microgrids, which have the ability to reduce cost, increase use of renewables, and offer energy security, have been a particular emphasis of the Test Bed Initiative.[224]

But DoD financing of new technology development is not the only face of the Military-Environmental Complex. Rather, the DoD is making a mark by leveraging private finance to adopt existing commercial technologies to reduce demand and generate renewable energy.

C. Government Demand for Private Financing of Energy Infrastructure

On the flip side of the private sector's demand for government financing lies the DoD's active quest for private financing as it seeks energy security for its facilities. Key statutory authority enables the DoD to leverage private financing, including the ability to enter into 30-year Power Purchase Agreements for renewable energy,[225] enhanced-use leases, [226] and energy-savings performance contracts.[227] Congressional authorization for these unique financing partnerships has been crucial.

a. 30-year Power Purchase Agreements

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[222] http://www.serdp.org/News-and-Events/News-Announcements/Program-News/New-installation-energy-and-water-technology-demonstrations-announced-for-FY-2013; http://www.serdp.org/Featured-Initiatives/Installation-Energy.
[223] http://www.serdp.org/News-and-Events/News-Announcements/Program-News/New-installation-energy-and-water-technology-demonstrations-announced-for-FY-2013,
[224] AEMR FY 2011 at 49-50 (noting existence of demonstration projects at Fort Bliss, TX (Lockheed Martin); Twentynine Palms, CA (General Electric's advanced microgrid system); Los Angeles Air Force Base (Lawrence Berkeley National Laboratory); and elsewhere). *See also* http://www.serdp.org/News-and-Events/News-Announcements/Program-News/DoD-study-finds-microgrids-offer-improved-energy-security-for-DoD-installations.
[225] 10 U.S.C. 2922a.
[226] 10 U.S.C. §§ 2667(a), (b)(4).
[227] 42 U.S.C. §§ 8287, 8251-8261; 10 U.S.C. § 2913.

Under 10 U.S.C. § 2922a, the DoD has unique statutory authority among federal agencies to enter into Power Purchase Agreements (PPAs) of up to 30 years "for the provision and operation of energy production facilities on real property under the Secretary's jurisdiction or on private property and the purchase of energy produced from such facilities."[228] According to the House Report from 1982, when Congress enacted the provision:

> The use of the authority of this section is not intended to enable a military department to compete with a public or private utility. It is intended to permit the exploration of a wide range of co-generation possibilities so that the conservation of scarce resources may be maximized.[229]

Pursuant to other authority under 10 U.S.C. § 2916, the military may sell to a utility company all of the electricity generated by the production facility produced on land under the DoD's jurisdiction, and the proceeds of such sales may be used to purchase electricity and carry out military construction projects under the DoD's energy performance master plan.[230]

In contrast, other federal agency Power Purchase Agreements are governed by the Federal Acquisition Regulation, Part 41, and the relevant statutory authority, 40 U.S.C. § 501, which govern the purchase of utility services by federal agencies.[231] The General Services Administration procures utility services on behalf of other agencies,[232] but is only permitted to enter in contracts with a term of 10 years or less.[233] This time line has a profound impact on the willingness of private firms to finance the development of renewable technology infrastructure,

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[228] 10 U.S.C. 2922a. *See also* Dep't of Defense, *Guidance on Financing of Energy Projects* at 1 (Nov. 9, 2012) (referring to the authority in 10 U.S.C. § 2922a as "special agreement authority"), *available at* http://www.acq.osd.mil/ie/energy/library/Policy_Financing%20of%20Energy%20Projects%209Nov2012.pdf.
[229] H.R. Rep. 97-612, 97th Cong., 2nd Sess. 1982, 1982 U.S.C.C.A.N. 441, 1982 WL 25036.
[230] 10 U.S.C. § 2916.
[231] FAR Part 41.100.
[232] 40 U.S.C. § 501(b)(1)(A).
[233] 40 U.S.C. § 501(b)(1)(B); FAR Part 41.103(a)(1).

as renewables do not return sufficient payback within the ten-year timeframe; a longer time horizon is required.

b. Enhanced-Use Leases

The DoD can also lease property for large-scale renewable energy generation projects under its so-called "enhanced use lease" authority. Upon a determination by the Secretary of Defense that it will "promote the national defense or to be in the public interest," Congress has authorized the Department of Defense to lease certain real or personal property that is not needed for public use for either cash or in-kind consideration at fair market value.[234] These leases are often called "Enhanced-Use Leases," though they are not named as such by statute.[235] The statute expressly contemplates that in-kind consideration may include "[c]onstruction of new facilities by the Secretary concerned," "[p]rovision of facilities for use by the Secretary concerned," or "[p]rovision or payment of utility services for the Secretary concerned."[236] Installations using Enhanced-Use Lease authority can accept in-kind consideration in the form of a discount on the DoD's electric bill or as infrastructure that will enhance energy security.[237] Such leases may be for a term of 5 years, unless the Secretary determines that a longer lease "will promote the national defense or be in the public interest."[238] Under such an Enhanced-Use Lease, a private developer may enter into an agreement with the Secretary of Defense to lease DoD land to construct a renewable energy generation facility (among other things), but "shall be limited in term to the useful life of the energy production facility," because long-term leases of

[234] 10 U.S.C. §§ 2667(a), (b)(4).
[235] DoD Guidance on Financing of Energy Projects at 3 (Nov. 2012), *available at* http://www.acq.osd.mil/ie/energy/library/Policy_Financing%20of%20Energy%20Projects%209Nov2012.pdf.
[236] 10 U.S.C. § 2667(c).
[237] Notes of Interview with John Lushetsky, Executive Director of the Army's Energy Initiatives Task Force (EITF) (May 14, 2013) (on file with author).
[238] 10 U.S.C. § 2667(b)(1).

DoD land can be "detrimental to the long-term ability of the DoD to manage its property portfolio."[239]

c. Energy-Savings Performance Contracts and Utility Energy Service Contracts

In broad terms, an Energy Savings Performance Contract (ESPC) is a mechanism whereby a private entity "evaluates, designs, finances, acquires, installs and maintains energy saving equipment for a client, and receives compensation based on the performance of that equipment."[240] Under an ESPC, the Energy Service Company (ESCO) "incurs the costs of project implementation, including audits, acquiring and installing equipment, and training personnel, in exchange for a predetermined price. Payment to the ESCO is contingent upon realizing a guaranteed stream of future savings, with excess savings accruing to the Federal Government."[241] Congress has authorized federal agencies generally, and the military specifically, to enter into such contracts, for period of up to 25 years.[242] In addition, as early as 1991, the President encouraged the military to enter into such shared energy savings contracts in Executive Order 12,759.[243]

Utility Energy Service Contracts (UESCs) involve mixed public and private financing. They are a means by which an agency enters into a contract with a utility, which agrees to pay certain capital costs upfront to implement selected energy conservation measures. The agency

[239] DoD Guidance, *supra* note 235, at 4.
[240] Defense Energy Program Policy Memorandum (DEPPM) 94-2, *available at* http://www1.eere.energy.gov/femp/financing/superespcs_deppm942.html.
[241] Presidential Memorandum -- Implementation of Energy Savings Projects and Performance-Based Contracting for Energy Savings, § 6(b) (Dec. 2, 2011), *available at* http://www.whitehouse.gov/the-press-office/2011/12/02/presidential-memorandum-implementation-energy-savings-projects-and-perfo.
[242] *See* 42 U.S.C. §§ 8287, 8251-8261; 10 U.S.C. § 2913.
[243] Exec. Order. No. 12,579, Federal Energy Management, §4 (April 17, 1991). Note that the Executive Order contains a national security exemption in section 4(b).

can repay the utility from "avoided cost savings" accrued over the life of the project, over time if utility or other private financing is part of the transaction, or from appropriations.[244]

The military has entered into several such UESCs and ESPCs. For example, the Air Force entered into an ESPC at Dyess Air Force Base in Texas, through which it now procures 100% of its energy through wind power.[245] At Marine Corps Base Camp Pendleton, using both ESPCs and Utility Energy Service Contracts, the Marines achieved a 44% reduction in energy use despite an increase in the footprint of its facility of 2 million square feet.[246] Energy retrofits included decommissioning a steam plant, incorporating photovoltaic arrays, changing fixtures and using daylighting technology.[247] At Hill Air Force Base, Utah, the military and the ESCO entered into an ESPC for an 18-year term to upgrade energy systems in 940 buildings.[248] The ESCO is providing $2.5 million in up-front costs; Utah Power & Light is providing $8 million in financial support; and the DoD will finance the remaining costs through its energy savings.[249] Thus, Congress has provided the DoD a number of key legal authorities that allow it to leverage private financing to incorporate energy-savings measures at its installations.

D. Taking Advantage of Private Financing: The Energy Initiatives Task Force (EITF)

The DoD is taking advantage of its special agreement PPA authority in the EITF program. The Army created the EITF in September 2011, with the explicit goal of "collaborating with the private sector to invest in cost-effective, large scale (10 MW+) renewable energy projects" on Army installations, including solar, wind, biomass and geothermal in order

[244] 42 U.S.C. § 8256; 10 U.S.C. § 2913; http://www1.eere.energy.gov/femp/pdfs/uesc_enabling_documents09.pdf; http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/ConferenceNashville2011/Tuesday/JuliaKelley-NASA_UESC_04-28-11.pdf.
[245] http://www1.eere.energy.gov/femp/pdfs/espc_ss_dyess.pdf.
[246] http://www1.eere.energy.gov/femp/pdfs/espc_ss_pendleton.pdf.
[247] Daylighting involves the use of opaque walls and roofs to transmit more daylight into interior spaces. *See, e.g.*, http://www.amerienergygroup.com/index.php/en/daylighting-technology.
[248] http://www1.eere.energy.gov/femp/financing/superespcs_hill_afb.html.
[249] *Id*.

to promote "energy security and sustainability."[250] Congress has mandated that the DoD "produce or procure" not less than 25 percent of its energy on installations from renewable sources by 2025, which the military has translated into 1 GW each for the Army, Navy and Air Force.[251] The EITF is the Army's central management office to execute due diligence for potential projects, as well as to initiate permitting and other legal obligations like environmental impact assessment.[252] To date, the EITF has issued Requests for Proposals (RFPs) for a solar project at Fort Detrick in Maryland, and a biomass generation facility at Fort Drum in New York, and at Fort Irwin, California.[253] In addition, the EITF anticipates developing renewable projects at Fort Bliss, Texas, and Schofield Barracks, Hawaii, though both such projects will be in connection with existing utilities and subject to public utility commission approval, in part due to the regulatory environment in those states.[254] While the Army neither finances nor owns the energy-generating equipment, it will contract for the power through its authority to enter into Power Purchase Agreements and Enhanced Use Leases.[255] The Army has established a contract vehicle that allows for up to $7 billion to be spent on these types of contracts.[256]

The EITF is not about developing new technology or surmounting the Commercialization Valley of Death; it is about leveraging private financing for commercially proven, off-the-shelf technologies on a large scale. Lushetsky explains why the EITF uses proven commercial

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[250] *Id*.
[251] 10 U.S.C. § 2911(e).
[252] Notes of Interview with John Lushetsky, April 12, 2013 (notes on file with author
[253] Lushetsky email, dated July 26, 2013; http://www.armyeitf.com/index.php/opportunities/procurementactions. Under the Requests for Proposal issued by the Defense Logistics Agency (DLA) on behalf of the Army, the "selected contractor will finance, design, build, operate, own and maintain the production facilities." *See, e.g.*, http://www.armyeitf.com/index.php/opportunities/procurementactions (Fort Detrick Solar Electric Power Purchase Agreement Request for Proposal; Fort Drum Biomass Request for Proposal (RFP)).
[254] Lushetsky email, dated July 26, 2013. The Schofield Barracks project will not be a PPA, but rather an Enhanced Use Lease, so that the installation will have guaranteed access to the power only in the event that the grid goes down. Lushetsky email, dated July 26, 2013.
[255] *Id*.
[256] Lushetsky email, dated July 26, 2013.

technologies: "This conservatism is driven by the fact that there is 100% private financing for EITF projects. We need this so Wall Street banks and those in the insurance industry can finance and underwrite the investment. We use very well understood, established technology with a track record."[257]

Lushetsky explains that the DoD's unique authority to enter into 30-year PPAs is "critical for these projects. Other agencies in the Government can buy electricity in a 10 year contract under the Federal Acquisition Regulation. But you can't do renewable energy project financing on a 10-year term. The capital costs are too high – you can't amortize the costs over 10 years and still have the electricity costs be acceptable. If you finance for 30 years but only contract for 10 years, the developer bears the risk that the DoD may not renew the contract, discouraging many developers."[258] Therefore, absent Congressional authority for these long-term PPAs, it is unlikely that the projects would succeed in attracting the necessary private financing.[259]

These privately financed projects are not limited to the Army. In fact, it was the Navy that undertook the first major project under the DoD's statutory Power Purchase Agreement authority at the Naval Air Weapons Station China Lake for a 13.8 megawatt photovoltaic array, which began construction in January 2012. [260] This array will be the Navy's largest, financed through a 20-year Power Purchase Agreement, designed and built by a private solar firm, to be

[257] Notes of Interview with John Lushetsky, April 12, 2013 (notes on file with author).
[258] Notes of Interview with John Lushetsky, April 12, 2013 (notes on file with author
[259] *See, e.g.*, Mindy Lubber, *Investors Are Making Money on Renewable Energy*, *Forbes* (Mar. 20, 2012) (noting that "investors such as Prudential, Google and GE come in when virtually all the risk has been structured out through long-term agreements with large utilities that agree to purchase the power generated by these renewable energy generation projects. These projects offer stable, low double-digit rate[s] of returns (IRRs) while generally paying out an annual yield in the range of 6-8 percent").
[260] DoD SSSP (2012), *available at* http://www.acq.osd.mil/ie/download/green_energy/dod_sustainability/2012/DoD%20SSPP%20FY12-FINAL.PDF at ES- 4.

operated by that private firm, with the facilities owned by a private financier. According to the DoD Strategic Sustainability Performance Plan:

> The role of the installation is to provide the land for the project and purchase electricity from it, at a rate that is locked in for 20 years below the current retail utility rate. The 20-year term for the PPA—the first PPA of this duration with the federal government—gives the Navy a significantly better rate than 10-year PPAs. The Navy incurs no upfront costs. The array is projected to meet approximately 30 percent of the installation's annual energy needs and reduce its energy costs by about $13 million over the 20-year life of the contract.[261]

Lushetsky explains that the EITF program has screened all potential Army and National Guard installation sites for large-scale renewable projects nationwide.[262] Yet there is also a dialogue about potential projects with both installations personnel and industry, where both individual military installations and private developers have proposed projects.[263]

The DoD's main advantage in the renewables market is not that it is the largest customer or the only customer for large-scale renewable projects, but that it is a "relatively concentrated customer. You can go to one building and tap an annual project pipeline of 300 MW. That is not insignificant. We still have to realize that developers have other business opportunities and we need to work to make sure that we are a good partner."[264]

One of the challenges for the EITF program, among others in the clean energy arena, is how to measure success. As Lushetsky explains, there is an objective, easy-to-measure target set by Congress that DoD produce 25 percent of its energy through renewable sources by 2025.[265] But Lushetsky believes that a second question is equally important, if not as easily measured,

[261] DoD SSSP (2012), *available at* http://www.acq.osd.mil/ie/download/green_energy/dod_sustainability/2012/DoD%20SSPP%20FY12-FINAL.PDF at ES- 4.
[262] Notes of Interview with John Lushetsky, (April 12, 2013) (notes on file with author).
[263] Notes of Interview with John Lushetsky, (April 12, 2013) (notes on file with author).
[264] Notes of interview with John Lushetsky (May 14, 2013) (on file with author).
[265] Notes of interview with John Lushetsky (May 14, 2013) (on file with author).

and that is how to measure the impact of a particular project on energy security. "If we are providing energy security, then maybe the Army should be willing to pay more. The Army is currently working to define the premium and under what conditions it would be justified."[266] This suggests that an effort to quantify the return to the mission from investment in renewable energy and demand reduction is a goal worth pursuing.[267]

E. Dialogue with the Private Sector

There is an ongoing dialogue between the DoD and the private sector in the Military-Environmental Complex. For example, Marc Kodack of the Office of the Assistant Secretary of the Army for Energy and Sustainability described an active back-and-forth between the DoD and private firms in the context of the Army's Net Zero project. Net Zero is a program that aims to "direct Army installations to make every fiscally prudent effort to reduce their installation's overall consumption of energy and water resources and disposal of solid waste in landfills to an effective rate of zero."[268] In early 2011, Kodack's office canvassed all Army installations if they wanted to be Net Zero pilot installations in energy, water or waste. More than one hundred facilities applied to be Net Zero pilot installations in one of the three, and the Army ultimately selected 17 pilot installations.[269] The Net Zero initiative has brought together representatives of those pilot installations with representatives from the private sector to discuss lessons learned in sustainable facilities. For example, in June 2011, at Fort Dietrick, Maryland, the Net Zero program held its first conference for representatives from each pilot, and invited a speaker from Wal-Mart to discuss Wal-Mart's experience trying to reduce its water use through waterless

[266] *Id*.
[267] *See* Light, *Valuing National Security* (work in progress), *supra* note 26.
[268] U.S. Army, *Programmatic Environmental Assessment, Army NetZero Installations*, at 1-1 (July 2012).
[269] Notes of Interview with Marc Kodack (April 5, 2013) (on file with author).

urinals.[270] Kodack explained that the Wal-Mart participant emphasized "systems thinking, that you need to look at the facility as a whole. If you have a waterless urinal, that has an effect on your waste treatment system. In the end, Wal-Mart used pint-flow (reduced flow) urinals so that the system can work."[271] The Net Zero program thus learned valuable lessons from the private sector's experience. In addition, in a second conference for the Net Zero pilot installations in January 2012 in Chicago, a sustainability officer from the University of Chicago spoke to discuss efforts to promote sustainability on campus.[272] In other contexts, representatives of the DoD have met with representatives of the airline industry to discuss how the private airlines account for and consider fuel conservation. In the other direction, Katherine Hammack, the Assistant Secretary of the Army for Installations, Energy & Environment, has spoken to industry representatives about the Net Zero program and its lessons learned to date.[273] Other senior defense officials have done the same to share lessons learned by the military.

F. Echoes of the Past

In some ways, the Military-Environmental Complex depends upon relationships developed in the military-industrial complex. Recognizing this linkage is essential to understanding that some caution is appropriate to avoid rent-seeking behavior. At the same time, the Military-Environmental Complex may have the potential to transform some of these past relationships for the good.

A review of the National Defense Authorization Acts from 2008 to 2013 – the annual DoD budgets – reveals many provisions promoting both the DoD's national security mission and the goals of reducing demand and promoting renewables. But there are also provisions in the

[270] *Id*.
[271] *Id*.
[272] *Id*.
[273] *Id*.

annual budget authorizations suggesting that members of Congress have inserted requirements for the DoD to invest in or study projects that might, at first glance seem to promote reduced energy demand or alternative renewable fuel sources, but instead may actually simply benefit specific firms or geographic districts.[274] For example, in the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, Section 334 requires the Secretary of Defense to conduct a study on "alternatives to reduce the life cycle emissions of alternative and synthetic fuels (*including coal-to-liquid fuels*)."[275] Despite the unlikelihood that warfighters would want to transport coal to the theater of war as a fuel source, this provision requires the DoD to study the "military utility of domestically-produced alternative and synthetic fuels for military operations and for use by expeditionary forces compared with the military utility and life cycle emissions of mobile, in-theater synthetic fuel processes."[276] Congress has likewise mandated that the "Secretary of Defense shall develop a strategy to use fuel produced, in whole or in part, from coal, oil shale, and tar sands (referred to in this section as a "covered fuel") that are extracted by either mining or in-situ methods and refined or otherwise processed in the United States in order to assist in meeting the fuel requirements of the Department of Defense when the Secretary determines that it is in the national interest."[277]

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[274] In 2011, both the House Republicans and both Republicans and Democrats in the Senate supported voluntary resolutions to ban earmarks. *See generally* http://abcnews.go.com/Politics/earmark-moratorium-republicans-poised-ban-pork-barrel-spending/story?id=12155964; http://abcnews.go.com/Politics/earmark-moratorium-republicans-poised-ban-pork-barrel-spending/story?id=12155964; http://www.defensenews.com/article/20120705/DEFREG02/307050003/Congressional-Earmark-Ban-Changes-Business-Capitol-Hill (arguing that the voluntary 2011 earmark moratorium has not abolished the practice, but simply driven it into the shadows and made it more difficult to trace in the DoD's budget).

[275] NDAA for Fiscal Year 2009, §334(a) (emphasis added), 10 U.S.C. § 2918. In addition, § 2918 of 10 U.S.C. prohibits the Defense Department from converting "a heating facility at a United States military installation in Europe from a coal-fired facility to an oil-fired facility, or to any other energy source facility, unless the Secretary determines that the conversion--
(1) is required by the government of the country in which the facility is located; or
(2) is cost-effective over the life cycle of the facility."

[276] *Id*. at § 334(a)(3).

[277] 10 U.S.C. § 2922d(a).

Protecting the domestic coal industry has not been the only thing on Congress's mind. The timber industry has supporters as well. In the NDAA for Fiscal Year 2012, and then again in the NDAA for FY 2013, Congress prohibited the DoD from using appropriated funds to obtain Leadership in Energy and Environmental Design (LEED) gold or platinum certification, unless waived by the Secretary of Defense based on a finding of no additional cost.[278] Apparently, despite the military's longstanding support for LEED certification to ensure that new facilities incorporated sustainable energy use and design,[279] several members of Congress were concerned that LEED certification would have a negative impact on the U.S. timber industry which was not privileged over foreign sources in LEED's scoring system, and thus sought to remove funding for the highest levels of LEED certification.[280]

In 2012, the National Defense Authorization Act contained three provisions for $40 million each for alternative energy research, specifically geared toward biofuels. As reported by the Citizens Against Government Waste annual *Congressional Pig Book*, "According to Sen. McCain, the Navy has spent in excess of $400 per gallon for approximately 20,000 gallons of algae-based biofuel. In a February 2011 hearing, House Armed Services Readiness Subcommittee Chairman Randy Forbes (R-Va.) fired a shot across the Navy's bow, telling Navy Secretary Ray Mabus, 'You're not the secretary of Energy. You're the secretary of the Navy.'"[281] While biofuels, which have been strongly encouraged in legislation, are technically

[278] LEED, or Leadership in Energy & Environmental Design, is a "program that provides third-party verification of green buildings" (http://www.usgbc.org/leed); National Defense Authorization Act for Fiscal Year 2012, 112th Cong., 1st Sess., § 2830 (Dec. 31, 2011); National Defense Authorization Act for Fiscal Year 2013, 112th Cong., 2d Sess. § 2823 (Jan. 3, 2012).
[279] *See, e.g.*, http://www2.buildinggreen.com/blogs/army-congress-leed-doesnt-cost-more.
[280] *See, e.g.*, http://urbanland.uli.org/Articles/2012/Feb/SpivakLEED; http://www.federaltimes.com/article/20120107/FACILITIES02/201070302/Industry-objects-green-gov-standards.
[281] CITIZENS AGAINST GOVERNMENT WASTE, CONGRESSIONAL PIG BOOK at 6 (2012)

renewable, they have been criticized for contributing negatively to the food-energy-water nexus.[282]

Another project that has received significant attention from the military, but raises other environmental concerns is the use of polyurethane spray foam, which has been used to insulate tents in Iraq and Afghanistan.[283] While the spray foam reduces the need for air conditioning (and thus energy use and fuel convoys) by lowering the temperature inside tents at forward operating bases, the spray foam reduces indoor air quality such that additional ventilation measures are required, renders the tents "unrecoverable" – meaning that they cannot be moved and reused after being treated with spray foam, and potentially creates waste materials that must be flown home to the United States for disposal.[284] Notably, the only approved types of spray-foam insulation are offered by one corporation in Baghdad, Iraq, and Honeywell International, which in 2012 was the military contractor with the 28th largest volume of contracts by dollar figure, topping $2.4 billion.[285] Other examples of projects that may be questionable in whether they advance the DoD mission include a requirement to study small modular nuclear reactors as a source of alternative energy for military installations and forward operating bases, when such reactors have far more energy-generation capacity than the installations need and would raise

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[282] *See, e.g.*, http://cowles.econ.yale.edu/conferences/2012/sum12/ma_steinbuks.pdf. From a White House blog 6/5/13: "Finally, last week, as part of the Department of Defense's Advanced Drop-In Biofuels Production Project, the Department issued $16 million in contracts to biofuel plants to supply fuel for fighter jets and destroyers by 2016."

[283] *See, e.g.*, www.honeywell-terrastrong.com (describing Honeywell's polyurethane spray foam as a "force multiplier"). *See also* http://e360.yale.edu/feature/new_mission_for_us_military_breaking_its_dependence_on_oil/2348/ (2003) (interview with Sharon Burke in environment 360 (Yale 2010)) ("The Army has actually sprayed foam insulation on the outside of tents in both Iraq and Afghanistan. Those get about a 50-percent cut in their energy consumption. It's not necessarily optimal, because then the tent is not mobile any more — and you have to dispose of it. However, for tents you had in place, it was a good solution. We took [fuel] trucks off the road with that.").

[284] *See, e.g.*, Dep't of the Air Force, HQ Air Force Civil Engineer Support Agency, Engineering Technical Letter (ETL) 10-6 (Change 2): External Foam Insulation of Temporary Structures at 6 (Feb. 22, 2010) (noting foam insulation renders structure "unrecoverable," "reduces indoor air quality (IAQ) below minimum standards unless modifications are made to provide fresh-air ventilation," and that additional costs must be incurred for disposal).

[285] https://www.fpds.gov/fpdsng_cms/index.php/reports.

both safety and feasibility concerns if they were to be shipped to forward operating bases, despite their other potential for civilian energy generation uses.[286]

In addition, some of the players in the Military-Environmental Complex are the same as historical and current players in the Military-Industrial Complex. For example, of the projects that received funding as ESTCP Installation Energy and Water Technology Demonstrations in 2012 and 2013, several of the firms receiving this funding are among the top 100 military contractors by dollar value of contracts.[287] These include the Boeing Corporation for "optimized decision support technology" (#2);[288] Raytheon Integrated Defense Systems (#3) for a "Zinc Bromide Flow Battery Installation for Islanding and Backup Power");[289] United Technologies Research Center (#6) for "energy performance analysis methodology";[290] Pratt & Whitney Rocketdyne (#6) for "high concentration photovoltaics (HCPV) with a total electrical generation capacity of 200kW"; [291] Honeywell International, Inc. (#28) for (a) a "Central Plant Optimization for Waste Energy Reduction (CPOWER) . . . a model-based tool that can transform the management of control plants by automating and optimizing the operation of all central plant equipment to minimize energy consumption and cost," (b) an "Open Automated Demand Response communications and control technology" and (c) a building information model designed to identify "chronic and recurring operating efficiencies," and Honeywell Defense and

[286] *See* NDAA for Fiscal Year 2010, § 2845.
[287] https://www.fpds.gov/fpdsng_cms/index.php/reports (listing top 100 DoD contractors by dollar figure in 2012).
[288] Boeing receives over $29 billion in annual contracts with the DoD. *See* https://www.fpds.gov/fpdsng_cms/index.php/reports.
[289] Raytheon receives over $15 billion in annual contracts with the DoD. *See id*.
[290] United Technologies receives over $15 billion in annual contracts with the DoD. *See id*.
[291] Pratt & Whitney Rocketdyne receives over $8 billion in annual contracts with the DoD. *See id*. Pratt & Whitney Rocketdyne was a subsidiary of United Technologies until its sale to GenCorp in July 2012, becoming part of Aerojet Rocketdyne. http://biz.yahoo.com/e/130408/gy10-q.html; http://articles.latimes.com/2012/jul/24/business/la-fi-rocketdyne-sale-20120724. Rocketdyne is the "the largest liquid rocket propulsion designer, developer, and manufacturer in the U.S." http://biz.yahoo.com/e/130408/gy10-q.html.

Space for a "full-scale microgrid system."[292] In addition, microgrid demonstrations at Fort Bliss, TX (Lockheed Martin -- #1)[293] and at Twentynine Palms, CA (General Electric's advanced microgrid system – #24) are also relying on established contractors from the Military-Industrial Complex.[294]

The story that one can weave from these facts depends largely on one's view of the DoD's mission. Some of the projects may appear to be simply "pork" projects, placed into the DoD budget at the behest of particular members of Congress seeking lucrative contracts on behalf of their district or a particular firm. For example, the requirement to study coal-to-liquid fuels or the LEED prohibition arguably fall into this category. Other projects may be less black-and-white. If one believes that the DoD should exclusively pursue its primary mission to protect national security, then being required to support or study something like small modular nuclear reactors may be problematic, because such reactors may not necessarily directly support the mission and can raise safety and feasibility concerns if one tried to bring them to forward operating bases. If, on the other hand, agencies have an obligation to consider the larger public interest, including the environment, then perhaps the support for small modular nuclear reactors is less problematic if one considers that they may have a lower impact on climate change than conventional sources of fuel.[295]

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[292] Honeywell International, Inc. receives over $2 billion in annual contracts with the DoD. *See id.* http://www.serdp.org/News-and-Events/News-Announcements/Program-News/New-installation-energy-and-water-technology-demonstrations-announced-for-FY-2013; http://www.serdp.org/News-and-Events/News-Announcements/Program-News/Department-of-Defense-announces-new-installation-energy-technology-demonstrations-for-FY-2012.

[293] Lockheed Martin receives over $36 billion in annual contracts with the DoD. *See id*.

[294] General Electric receives over $2.6 billion in annual contracts with the DoD. *See id.* http://www.serdp.org/News-and-Events/News-Announcements/Program-News/DoD-study-finds-microgrids-offer-improved-energy-security-for-DoD-installations.

[295] The same argument cannot easily be made for coal-to-liquid fuels, unless one believes solely in the value of energy independence absent any consideration of the military mission, the environment or climate change. A fuller discussion of whether agencies should be obligated to consider the broader public interest, rather than solely their primary missions, is beyond the scope of this paper and would benefit from additional study. *See, e.g.*, Eric Biber,

Similarly, the fact that established firms from the military-industrial complex are now building microgrids in the Military-Environmental Complex can be interpreted in two ways. On the one hand, this suggests more continuity than innovation. The pessimistic interpretation is that these major players – the so-called merchants of death[296] – are potentially lobbying for and winning lucrative military contracts under a new name of sustainability, requiring some caution to ensure that these contracts are really in the public interest, not merely the pecuniary interest of the firms. On the other hand, however, a more positive reaction would be that the Military-Environmental Complex has the potential to influence some of these industrial giants to turn more "green." If their profit motive dovetails with the military's desire to reduce energy consumption and promote renewables, then this alignment may have the potential to transform the military-industrial complex, at least in part. Ultimately, the most important spillover from the Military-Environmental Complex's mission toward greater sustainability may not only be new technologies and new metrics, but also the values that drive large private firms and government contractors to seek new contracts.

IV. A Conclusion and Some Modest Recommendations

The military is currently one of the most important domestic players in the development and adoption of new and existing technologies to reduce energy use and promote renewables. It is crucial to get this story right because it allows policymakers to recognize that there are potentially substantial benefits for the environment to the large-scale investments made in sustainable practices and technologies by the U.S. military. To the extent that Congressional or Presidential mandates or procedural mechanisms support the DoD's drive to sustainable energy

Too Many Things to Do: How to Deal with the Dysfunctions of Multiple-Goal Agencies, 33 HARV. ENVTL. L. REV. 1 (2009).

[296] *See* Ledbetter, *supra* note 2, at 16-17.

use, such legal action should be encouraged. But a deeper understanding of the DoD's own incentives must underlie any legislation or Presidential action. The DoD is focused first and foremost on its mission, and not simply an abstract desire to protect the environment, or to promote energy independence.

Recognizing the roots of the Military-Environmental Complex in the military-industrial complex identified by Eisenhower (and scholars writing in this vein both before and after his famous speech) is likewise essential for both policymakers and scholars. Problems of undue political influence have the potential to arise again in the environmental context discussed here. Instead of focusing on energy security, military contractors and members of Congress may be seeking contracts and partnerships that either do not support the military mission or harm the environment by exacerbating the problems of climate change in the name of energy independence. Some caution is warranted to guard against this potential for harm.

But the Military-Environmental Complex also reveals a more positive dimension to the interconnectedness between the public and private sectors. Firms participating in the Military-Environmental Complex are providing financing to reduce reliance on fossil fuels by the single largest consumer of energy in the United States. In addition, and perhaps more importantly, these firms are being forced to reconsider the war motive as the sole driver of military contracts, and replace it (or at least supplement it) with a sustainability motive. Profitable military contracts now come not only from war, but from technologies that reduce energy demand and promote alternative fuels. If the traditional "merchants of death" – firms that have made billions manufacturing weapons systems for the DoD – can become "merchants of microgrids," not only does the environment potentially benefit, but the firms themselves may be transformed. It is possible, and worthy of further empirical study, that spin-offs of best practices and technological

innovation will occur as a result of the greening of the U.S. military. To the extent that there may also be a spillover in the *values* driving the Military-Environmental Complex – in particular, a recognition that climate change has negative consequences for the national interest – the environment wins. Finally, successful examples of greening the military can provide potential models and sustainability success stories that may be transferred to more general applications through legal policies and business practices. At a minimum, the dramatic scale at which the Military-Environmental Complex can address environmental problems such as climate change and sustainability will demand greater attention from scholars and policymakers going forward, to ensure both that the private sector and the DoD learn from each other's example, and that undue influence does not threaten to corrupt the value for the environment of this enterprise.

A second and perhaps equally important conclusion is that the Military-Environmental Complex should play a crucial role in the debate over regulatory instruments in the legal and policy literature on climate change. Scholars and policymakers have advocated various regulatory options to address climate change, including market approaches like carbon taxes or cap-and-trade systems, imposition of technology standards, information disclosure and carbon footprint labeling.[297] Others focus on climate finance, favoring government subsidies for green technology development, the creation of a governmental "green bank" to support emerging green technologies,[298] or government-funded technology-inducement prizes.[299] Some expressly prefer a pluralist, multi-faceted, decentralized approach in light of the practical reality that a single, global regulatory program to combat climate change is unlikely to materialize.[300]

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[297] *See supra notes* 13-16, and sources cited therein.
[298] Allison S. Clements & Douglas D. Sims, *A Clean Energy Deployment Administration: The Right Policy for Emerging Renewable Technologies*, 31 ENERGY L.J. 397, 398 (2010).
[299] Jonathan H. Adler, *Eyes on a Climate Prize: Rewarding Energy Innovation to Achieve Climate Stabilization*, 35 HARV. ENVTL. L. REV. 1, 1 (2011).
[300] *See supra notes* 13-16, and sources cited therein.

The example of the Military-Environmental Complex is important because it demonstrates that despite the lack of explicit Congressional and Presidential substantive mandates to the DoD to reduce its energy use in the *operational* energy sector, the DoD is nonetheless undertaking serious efforts to reduce that energy use and explore alternative energy sources because its internal incentives have forced it to do so. An assumption that the military is indifferent to the environment may obscure the essential role that internal incentives, rather than outside mandates, play. The military's story is similar to that of Wal-Mart's efforts to green its supply chain, for example by reducing packaging.[301] Wal-Mart did not undertake this effort in response to legal mandate, but because internal incentives to reduce shipping costs aligned with environmental goals.[302] This is not to say that the Military-Environmental Complex therefore represents support for self-regulation by private firms in the environmental arena. To the contrary, even in the absence of direct substantive regulations, both Congress and the President have required the military to reduce facilities energy use and encouraged the military to address operational energy use through such measures as requiring reporting of greenhouse gas emissions and the creation of an Office of Operational Energy Plans and Programs to centralize focus on the subject. Moreover, it is not at all clear that all private firms currently face the same internal drivers toward sustainability that the DoD faces on the battlefield in light of attacks on fuel convoys. What the Military-Environmental Complex demonstrates instead is that a combination of approaches – directive, informational, behavioral, and self-initiated – are likely to provide the best opportunity to address climate change at a global level.

A. Serving Positive Ends

[301] http://corporate.walmart.com/global-responsibility/environment-sustainability/packaging.
[302] http://corporate.walmart.com/global-responsibility/environment-sustainability. CHARLES FISCHMAN, THE WAL-MART EFFECT (2006).

To ensure that the Military-Environmental Complex serves positive ends, rather than negative ones, this final Part offers several modest proposals for Congress, the President, the DoD and the private sector to take in this regard. Before addressing the concrete proposals, it is worthwhile to address the underlying question of what are the "positive ends" that the Military-Environmental Complex should serve. In the political science literature, particularly in the area of public choice theory, scholars argue that interest groups competing within the legislative process tend to demand legislation providing concentrated benefits while spreading out costs, and legislators seek to supply legislation that will ensure their reelection.[303] One study of Congress's role in authorizing defense spending suggests a dichotomy between two competing visions of "effective" policy.[304] The first vision is based on furthering "national defense," and holds that military expenditures are "distributed effectively if they go to places that are best able to transform military procurement dollars into the goods and services deemed necessary to provide for the national defense."[305] In contrast, the "congressional distributive politics perspective" holds that military expenditures are distributed effectively if they benefit constituents "who will in turn vote for the incumbent" or a member of the incumbent's party – that is, if they support the representative's ultimate goal of being reelected.[306] In the Military-Environmental Complex, perhaps there is a third axis along which to measure effectiveness – whether a particular action, project or policy benefits the environment, for example by increasing sustainability or minimizing impact on the climate. One can ask whether the action, project or policy is providing the maximum possible benefit to the environment as compared to

[303] *See* sources cited *supra* note 28.
[304] BARRY S. RUNDQUIST AND THOMAS M. CARSEY, CONGRESS AND DEFENSE SPENDING: THE DISTRIBUTIVE POLITICS OF MILITARY PROCUREMENT (2002).
[305] *Id*. at 18.
[306] *Id*. at 18.

alternatives. To take the analogy from the military spending context into the context of military actions more broadly – whether financed through taxpayer dollars or private funds, this Article takes the position that "effective" policies are those that encourage actions that support the military's overall mission to protect national security, with a secondary goal to increase sustainability and reduce the threat of climate change – whether because of its national security implications or for environmental reasons – rather than policies that merely support reelection of particular members of Congress. Therefore, in making the proposals below, the ultimate goal is to encourage those actions that support the military's mission to reduce energy demand, increase the use of renewables, to increase private financing opportunities, and to reduce the possibility that parochial interests of particular private firms or members of Congress will lead the DoD astray from these important goals. The key question therefore, is how not only to promote policies that can protect national security and the environment, but also to improve and strengthen institutional structures that can avoid the pitfalls of interest group politics and rent-seeking by private firms that plagued the Military-Industrial Complex. The next Section offers three modest proposals in this regard.

B. Three Modest Proposals

First, Congress and the President should take steps both to encourage further efforts by the DoD to reduce energy demand and encourage investment by private firms in renewable energy supply to benefit the military. Such steps would include expanding the financial incentives that encourage the military to reduce demand and invest in renewables,[307] and by increasing or expanding the mandatory renewable portfolio requirements of 25 gigawatts by 2025 into the future beyond 2025 to ensure that all players – both within the DoD and the private

[307] *See, e.g.*, note 68, *supra*, and accompanying text.

sector – understand that these investments in renewables are long-term investments.[308] While the above analysis demonstrates that the DoD itself has been the key underlying driver of the push to reduce energy demand and increase the development of alternative fuels because these actions support the mission, the legal rules – both statutory and in Executive Orders – have undoubtedly shaped the DoD's actions and timing in the Military-Environmental Complex. To the extent that Congress can incorporate into such legislation additional incentives for private firms to continue to finance these major renewables generation projects, whether through the tax code or other incentive programs, this could also save taxpayer dollars in the long run.

A second substantive recommendation would help to promote the dissemination of success stories from the Military-Environmental Complex into other contexts. Specifically, Congress should extend to agencies other than the DoD – most importantly the General Services Administration, which purchases energy on behalf of other agencies – the ability to use 30-year Power Purchase Agreements under 10 U.S.C. § 2922a.[309] Congress should learn from the inchoate success of the Energy Initiatives Task Force program to make universally available to agencies this provision that has, according to the Director of the EITF, been essential in attracting private capital to finance the development and construction of large-scale renewable energy facilities that benefit both the military and the private sector. Other agencies should be permitted to share in this potential for public-private partnerships.

[308] Long-term instruments are necessary not only to provide the rights incentives to private financiers to invest in the upfront capital costs in order to recover long-term gains, but also because individuals tend to be "myopic" about the risks of climate change, focusing more readily on the short-term. Cf., e.g., Howard Kunreuther & Erwann Michel-Kerjann, *Market and Government Failure in Insuring and Mitigating Natural Catastrophes: How Long-Term Contracts Can Help*, 13, in Public Insurance and Private Markets, Jeffrey R, Brown, (ed.) AEI Press (2010) (advocating a switch from single-year insurance contracts to long-term insurance contracts to counteract "myopia" regarding natural disasters and encourage individuals to invest in appropriate mitigation measures).

[309] *See, e.g.*, Part III *supra*.

Successful dissemination beyond government agencies also requires openness, rather than secrecy about technological innovation.[310] Thus, to the extent that the military is driving innovation, it should promote diffusion regarding technologies that can reduce conventional energy demand and develop renewables, rather than holding such technology close to the vest in the name of national security. Given the military's role as a validator of climate science, and its recognition that climate change has the potential to increase violent conflict in the world, diffusion is likely to be in the military's interests in this context.

Third, the DoD and the private sector should voluntarily create more mechanisms for interaction to share best practices, experience with new technology, and behavioral approaches.[311] In the 20th century, one of the more controversial features of the Military-Industrial Complex was the War Industries Board (WIB), which incorporated members of industry and government representatives to tackle jointly the complex questions of how industry could be mobilized quickly in the event of war. In 1916, Congress created a "Council of National Defense," staffed by six members of the cabinet, to advise the President on the critical issue of industrial mobilization.[312] In addition, so-called "dollar-a-year" men, businessmen who earned only a dollar each year for their service on the National Defense Advisory Commission (NDAC) while retaining their positions and salaries in private firms, aided the CND in advising the President on this issue.[313] Upon a declaration of war, it was the NDAC – staffed largely by private businessmen – that "assumed responsibility for mobilizing the economy."[314]

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[310] Mowery, *supra* note 11 (noting the importance of second-source requirements and potential concern over military imposition of secrecy to protect national security).
[311] *Cf. Business Case for Sustainability*, *supra* note 26, at 23 (noting that private firms benefit by collaborating through business associations and attending conferences where best practices are shared, and recommending that the Army join the U.S. Business Council for Sustainable Development or other similar organizations).
[312] PAUL A. C. KOSTINEN, THE MILITARY-INDUSTRIAL COMPLEX: A HISTORICAL PERSPECTIVE 48 (1980).
[313] *Id*. at 48.
[314] *Id*. at 48.

Subsequently, in 1917, the War Industries Board (WIB) was created to take over the NDAC's functions, and remained in the hands of businessmen; however it was "subordinate to the Council of National Defense" and "could only advise the president."[315] The WIB "[a]nalyzed the industrial requirements and capacities of the United States and the other Allies[; i]ssued clearances on government orders[; s]et priorities in commodity production and delivery[; a]rranged price-fixing agreements for raw materials; [e]ncouraged resource conservation and development[; and s]upervised Allied purchasing in the United States."[316] Criticisms abounded that these private firms had too much power. Likewise, the War Department was "unwilling and unable to cooperate with WIB" out of concern that its authority was being superseded by civilian control and the War Department's own disorganized procurement systems.[317] As a result of this lack of cooperation between industry and the military, "industrial plants in the Northeast were overloaded with contracts; prices skyrocketed; critical shortages of fuel, power and raw materials developed; and the railway and shipping systems became hopelessly congested."[318] Mobilizing industry for war in a time when the military requires private industrial aid to produce armaments and other needed supplies may be an imperfect analogy to the drive to develop clean energy

[315] *Id*. at 48.

[316] Records of the War Industries Board, 61.1 (Administrative History), *available at* http://www.archives.gov/research/guide-fed-records/groups/061.html. Kostinen rejects the notion that the WIB conflict represented a struggle over civilian versus military control over economic mobilization, arguing instead that both institutions were "adjusting to modern warfare where economically the rigid lines of demarcation between them were no longer possible." Kostinen, *supra*. at 40.

[317] *Id*. at 49.

[318] *Id*. at 49. By 1918, President Wilson removed the WIB from its advisory role to the Council of National Defense and placed it "directly under his control." *Id*. at 50. In addition, the War Department reorganized its procurement systems to be more compatible with those of the WIB. *Id*. Although the WIB had no statutory authority, the WIB had "Wilson's full backing, the nearly complete support of business," and in light of the critical wartime needs facing the nation, the WIB was able to act effectively. *Id*. at 36. Kostinen contends that the military's failure to recognize that "supply and procurement set limits for tactics and strategy; and the General Staff's war plans provided for raising and fielding an army at rates that exceeded the economy's capacity." *Id*. at 52. Such claims are not unlike those in the Military-Environmental Complex, where the ability to fight wars depends now – and will depend in the future – on the available energy capacity – capacity that may be increased by cooperation between the public and private sectors.

technology and processes to reduce demand because the sense of urgency may be different. Yet the need to ensure cooperation between the military and the private sector is paramount, especially in light of the apparent success stories of programs in which the military is relying on private financing and existing commercial technology.

While the creation of a formal advisory committee staffed by members of both the private sector and the military seems ill-advised in light of past experience with the WIB, it is nonetheless worthwhile to encourage and routinize regular communication between business and the DoD to promote sharing of best practices in the clean energy arena. Universities could play an important role in this arena, and should recognize that this area is one that may prove fruitful for innovation. As centers of innovation both in technology and ideas, universities, and more specifically, business schools, with their focus on promoting innovation in the private sector as well as investment and finance – should invite leaders from business and the DoD together on a regular basis. Such conferences can ensure that representatives of both the private sector and the military share best practices, brief one another on the newest technological innovations and behavioral success stories, and share information regarding potential opportunities for private firms to invest in innovation. Of course, the military and private sector can do this on their own initiative as well.

Finally, it is essential to be aware of the potential for the Military-Environmental Complex to lead to rent-seeking. Any time government funds are available, fraud, waste and abuse are always a risk. Existing laws regulating lobbying and disclosure of contacts between the private sector and both Congress and the Executive branch, including the Lobbying Disclosure Act of 1995,[319] as amended by the Honest Leadership and Open Government Act of

[319] Pub. L. 104-65, 109 Stat. 691; *codified as amended at* 2 U.S.C. §§ 1601-1607 (1995).

2007,[320] go a long way to ensuring that contacts between industry and government are transparent. In addition, the *qui tam* provisions of the False Claims Act protect whistleblowers who report on fraud in government contracting.[321] Because the Military-Environmental Complex is new and developing, more empirical research is warranted as to whether and in what circumstances there may be "undue influence" as opposed to normal political lobbying activity, and whether any more must be done to prevent rent-seeking and fraud. Such research might include, for example, determining which interest groups are contacting members of Congress and the military to seek support for particular projects, which geographic areas of the country stand to benefit, whether those projects are in the interest of national security and reducing climate change-related risks, or whether they are trying to promote values other than the DoD's core mission, and what impact such contacts have as to whether particular projects are funded.

The Military-Environmental Complex has already gone a long way to encouraging a dialogue between government and the private sector, and among government institutions, about the goals of sustainability. If it continues to do so, the Military-Environmental Complex may secure its place within the regulatory toolkit as a way to foster energy sustainability in the long term.

[320] Pub. L. 110-81, 121 Stat. 735 (2007).
[321] 31 U.S.C. §§ 3729–3733.