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The Military-Environmental Complex

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THE MILITARY-ENVIRONMENTAL COMPLEX

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Abstract: Two competing theories vie for dominance regarding the relationship between the U.S. military and the natural environment. On the one hand, 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 multiple roles as a war fighter, a landlord, a first user of precommercial technologies, and 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. At the same time, however, these relationships warrant some caution to prevent rent-seeking. This collaboration represents a new Military-Environmental Complex.

INTRODUCTION

On January 17, 1961, President Dwight D. Eisenhower delivered his farewell address to the nation.[1] That speech is famous for the President's caution:

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[1] Dwight D. Eisenhower, Farewell Radio and Television Address to the American People (Jan. 17, 1961), *in* PUBLIC PAPERS OF THE PRESIDENT OF THE UNITED STATES: DWIGHT D. EISENHOWER 1960–61, at 1035 (1961).

> 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]

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 private profit motive with the government's strategic decision making about whether to go to war.[5]

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 entangled with the military-environmental complex, and thus, inherently at odds with environmental protection.[7] Legal doctrine reinforces this view. The military is largely exempt from environmental laws and regulations covering such broad areas as habitat conservation and information disclo-

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[2] *Id.* at 1038; *see* JAMES LEDBETTER, UNWARRANTED INFLUENCE: DWIGHT D. EISENHOWER AND THE MILITARY-INDUSTRIAL COMPLEX 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 term military-industrial complex is generally understood to include the web of interaction among the executive and legislative branches, and the private sector. LEDBETTER, *supra* (describing "Defense Department contracts and appointments of military contractors to government positions" as well as "lobbying by military contractors, campaign contributions, and the desire of members of Congress to protect and expand military spending that benefits their districts" as part of the military-industrial complex).

[3] *See generally* PAUL A.C. KOISTINEN, THE MILITARY-INDUSTRIAL COMPLEX: A HISTORICAL PERSPECTIVE (1980) (describing the historical roots of the military's relationship with private industry); WAR, BUSINESS, AND AMERICAN SOCIETY: HISTORICAL PERSPECTIVES ON THE MILITARY-INDUSTRIAL COMPLEX (Benjamin Franklin Cooling ed., 1977) [hereinafter WAR, BUSINESS, AND AMERICAN SOCIETY] (describing military-industrial cooperation in armaments and naval shipbuilding going back to the War of 1812).

[4] *See* LEDBETTER, *supra* note 2, at 6–12 (describing criticisms of the military-industrial complex including 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 society, even during peacetime"; "creates and extends a culture of secrecy"; and "leads to the suppression of individual liberty").

[5] *See* H.C. ENGELBRECHT & F.C. HANIGHEN, MERCHANTS OF DEATH: A STUDY OF THE INTERNATIONAL ARMAMENT INDUSTRY 140–54, 173–89 (1934) (describing the role of private armament suppliers and banks in driving the United States to war); *cf.* C. WRIGHT MILLS, THE POWER ELITE 198–224 (1956) (describing military officers as part of the social elite with access to power and influence).

[6] U.S. DEP'T OF DEF., STRATEGIC SUSTAINABILITY PERFORMANCE PLAN: FY 2010, at i (2010) [hereinafter SSPP FY 2010].

[7] *See infra* notes 37–51 and accompanying text.

sure rules concerning toxic chemicals—at least when those laws conflict with the military's mission to protect national security.[8]

In the arena of energy use—with its concomitant impact on climate change—the military hardly appears to be the environment's friend. The military has an enormous carbon footprint and vast energy needs.[9] The Department of Defense (DoD) is the largest single consumer of energy in the nation.[10] Although some might view this fact as yet more evidence of the military's ongoing conflict with the environment, it should more properly be viewed as an exceptional opportunity for innovation in energy efficiency and the development of new technologies—both of which could have the 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.[11] At its height during the twentieth century, the military-industrial complex led to the development of new technologies such as semiconductors, the global positioning system (GPS), the internet, and computers, inventions that transformed both war fighting and the civilian realm.[12] In addition to these "spin-offs"

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[8] *See, e.g.*, 15 U.S.C. § 2621 (2012) (waiving provisions governing control of toxic substances upon "a request and determination by the President that the requested waiver is necessary in the interest of national defense"); 16 U.S.C. § 1536(j) (2012) (exempting agency actions from provisions protecting endangered species "if the Secretary of Defense finds that such exemption is necessary for reasons of national security").

[9] *See infra* notes 51–58 and accompanying text; *see also* Siddhartha M. Velandy, *The Green Arms Race: Reorienting the Discussions on Climate Change, Energy Policy, and National Security*, 3 HARV. NAT'L SECURITY J. 309, 310–11 (2012).

[10] ENVTL. & ENERGY STUDY INST., FACT SHEET: DOD'S ENERGY EFFICIENCY AND RENEWABLE ENERGY INITIATIVES 1 (2011), *available at* http://files.eesi.org/dod_eere_factsheet_072711.pdf, *archived at* http://perma.cc/6U7Z-HUCY. In fiscal year 2012, federal agencies emitted approximately 107 million metric tons of CO_2-equivalent, including emissions that both were and were not subject to reduction targets; the DoD emitted 72% of that total, or approximately 77 million metric tons of CO_2-equivalent. *See FY 2012 Greenhouse Gas Inventory: Government Totals 2012*, U.S. DEP'T OF ENERGY (June 14, 2013), http://energy.gov/eere/femp/downloads/fy-2012-greenhouse-gas-inventory-government-totals-2012, *archived at* http://perma.cc/T72J-BSBU. In fiscal year 2011, the DoD was responsible for approximately 83 million metric tons, or 72% of all federal agency emissions of approximately 115 million metric tons. *See FY 2011 Greenhouse Gas Inventory: Government Totals 2011*, U.S. DEP'T OF ENERGY (June 14, 2013), http://energy.gov/eere/femp/downloads/fy-2011-greenhouse-gas-inventory-government-totals-2011, *archived at* http://perma.cc/Q367-39W6. 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 International Energy Statistics*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=90&pid=44&aid=8, *archived at* http://perma.cc/3D37-VCFG (last visited Apr. 2, 2014) (country data). For 2011, then, federal agencies were responsible for approximately 2% of overall U.S. emissions, and the DoD was responsible for approximately 1.5% of overall U.S. emissions.

[11] *See infra* notes 74–122 and accompanying text.

[12] *See, e.g.*, PAUL N. EDWARDS, THE CLOSED WORLD: COMPUTERS AND THE POLITICS OF DISCOURSE IN COLD WAR AMERICA 43–74 (1996); David C. Mowery, *Federal Policy and the*

from the military into the private sector, military procurement of commercially developed technologies stimulated industrial development by "spin-ons" from the private sector to the military.[13] Like this history of technological innovation, the military's current relationship to the environment and its interaction with the private sector—particularly in the areas of sustainable energy use, demand reduction, and pursuit of renewable energy sources—are 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—focusing, for instance, on efforts to reduce energy demand and promote the development of renewable energy sources—provides an especially important context in which to assess what role the military can play in advancing solutions to a major environmental problem. The primary questions in this law and policy debate center on the types of regulatory tools that best address the problem and the level of government at which those tools are best employed.[14] There is a growing consensus among scholars that a multi-faceted approach to climate change—including efforts to reduce energy demand and switch to renewable sources of energy that incorporate both public and private action—is essential in light of the practical reality that a single, global regula-

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Development of Semiconductors, Computer Hardware, and Computer Software: A Policy Model for Climate Change R&D?, *in* ACCELERATION ENERGY INNOVATION: INSIGHTS FROM MULTIPLE SECTORS 163–66 (Rebecca M. Henderson & Richard G. Newell eds., 2011); LEDBETTER, *supra* note 2, at 12. *See generally* STUART W. LESLIE, THE COLD WAR AND AMERICAN SCIENCE: THE MILITARY-INDUSTRIAL-ACADEMIC COMPLEX AT MIT AND STANFORD (1993) (describing how military needs drove technological innovation in the fields of engineering and computing); JENNIFER S. LIGHT, FROM WARFARE TO WELFARE: DEFENSE INTELLECTUALS AND URBAN PROBLEMS IN COLD WAR AMERICA (2003) (describing how twentieth-century city planners and managers implemented technologies originally developed for the Cold War); Velandy, *supra* note 9 (noting the military's role in technological innovation).

[13] Jay Stowsky, *From Spin-Off to Spin-On: Redefining the Military's Role in American Technology Developmen*t, *in* THE HIGHEST STAKES: THE ECONOMIC FOUNDATIONS OF THE NEXT SECURITY SYSTEM 114–40 (Wayne Sandholtz et al. eds., 1992) (describing the successful diffusion of semiconductors from military origins, but noting the 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 efficiently and cost-effectively in a form of "spin-on"); *see The Military-Consumer Complex*, ECONOMIST, Dec. 12, 2009, at 16, 16; Tom A. Peter, *Military Inventions Hit the Civilian Market*, CHRISTIAN SCI. MONITOR (June 19, 2008), http://www.csmonitor.com/Innovation/Tech-Culture/2008/0619/built-for-battle-but-perfect-in-peacetime, *archived at* http://perma.cc/6K5E-GPXV.

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

tory program is unlikely to materialize.[15] This Article reinforces the notion that heterogeneity is essential, and that no single perfect solution to the climate change problem exists.

In the vast legal literature addressing climate change, however, scholars tend to view the government largely as a regulator[16] or a source of fund-

[15] *See, e.g.*, Jody Freeman, *The Private Role in Public Governance*, 75 N.Y.U. L. REV. 543, 547 (2000) (noting that "nongovernmental actors, including corporations, public interest organizations, private standard setting bodies, professional associations, and nonprofit groups" play an essential role in governance when they "implement, monitor, and enforce compliance with regulations"); Jonathan M. Gilligan & Michael P. Vandenbergh, *Accounting for Political Feasibility in Climate Instrument Choice*, 32 VA. ENVTL. L.J. 1, 1–6 (2014) (arguing that a second-best yet politically feasible policy or set of policies to combat climate change is preferable to waiting for an optimal policy solution); 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, 1795–1842 (2007) (addressing insurance's role in driving individual behavior in the climate change context); Eric Orts, *Climate Contracts*, 29 VA. ENVTL. L.J. 197, 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 R.G. Lipsey & Kelvin Lancaster, *The General Theory of Second Best*, 24 REV. ECON. STUD. 11 (1956); Lori Snyder Bennear & Robert Stavins, *Second-Best Theory and the Use of Multiple Policy Instruments*, 37 ENVTL. RESOURCE ECON. 111 (2007))); Elinor Ostrom, *Nested Externalities and Polycentric Institutions: Must We Wait for Global Solutions to Climate Change Before Taking Action at Other Scales?*, 49 ECON. THEORY 354, 354–56 (2012); S. Pacala & R. Socolow, *Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies*, 305 SCIENCE 968, 968–72 (2004) (arguing that multiple existing approaches should be employed to stabilize the atmospheric concentration of greenhouse gases below climate tipping points); Michael P. 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 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 UCLA L. REV. 913, 914–15 (2007) (describing private contracting as environmental governance).

[16] *See, e.g.*, Nathaniel O. Keohane et al., *The Choice of Regulatory Instruments in Environmental Policy*, 22 HARV. ENVTL. L. REV. 313, 325–46 (1998) (proposing a framework for understanding how Congress chooses environmental policy instruments); Richard B. Stewart, *A New Generation of Environmental Regulation?*, 29 CAP. U. L. REV. 21, 22 n.1 (2001) (citing sources containing both defenses and criticisms of the current U.S. system of environmental regulation). Even advocates of market approaches see the essential role of government as regulator. *See, e.g.*, David Weisbach, *Instrument Choice Is Instrument Design*, *in* U.S. ENERGY TAX POLICY 113, 113–58 (Gilbert E. Metcalf ed., 2011) (discussing the choice between government-created taxes and cap-and-trade systems as ways to reduce emissions); Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333, 1334, 1341–51 (1985) (advocating government-sponsored market approaches to force firms to reduce emissions); 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) (advocating a carbon tax to reduce emissions); Gilbert E. Metcalf & David Weisbach, *The Design of a Carbon Tax*, 33 HARV. ENVTL. L. REV. 499, 502 & n.11 (2009) (noting the advantages of a carbon tax over a cap-and-trade system); Robert N. Stavins, *A Meaningful U.S. Cap-and-Trade System to Address*

ing to drive private innovation,[17] rather than as a consumer of energy or a polluter.[18] This perspective misses a crucial piece, not only of the underlying story, but of a potential solution.

The military has the potential to make an enormous impact on climate change policy, especially in its stimulation of strategies to reduce energy demand and encourage the development of renewables. Scholars and policymakers should think carefully about how to harness the exceptional alignment between the military's mission and its need to reduce energy demand and develop renewables, and more specifically, how cooperation between the military and the private sector could advance these ends. What this Article calls the "Military-Environmental Complex" has the potential to become one important tool in the regulatory toolkit to combat climate change. The Military-Environmental Complex also has the potential to transform some of the negatives of the historic military-industrial complex into positives for the environment and sustainability.

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

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Climate Change, 32 HARV. ENVTL. L. REV. 293, 296 (2008) (advocating a cap-and-trade system to reduce emissions in the short to medium term).

[17] *See, e.g.*, Jonathan H. Adler, *Eyes on a Climate Prize: Rewarding Energy Innovation to Achieve Climate Stabilization*, 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"); Allison S. Clements & Douglass 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). Nevertheless, both Congress and the White House have imposed rules encouraging federal agencies to be leaders in efforts to reduce greenhouse gas emissions and energy use. *See infra* notes 138–236 and accompanying text.

[18] But environmental law and scholarship has not always focused primarily on private firms, rather than government agencies, as polluters. *See* Sarah E. Light, *NEPA's Footprint: Information Disclosure as a Quasi-Carbon Tax on Agencies*, 87 TUL. L. REV. 511, 572 (2013) (advocating information disclosure for federal agencies in the climate change context to reduce agency emissions); Amy L. Stein, *Renewable Energy Through Agency Action*, 84 U. COLO. L. REV. 651, 683 (2013) [hereinafter Stein, *Agency Action*] (arguing that federal agencies should be enlisted to support the shift to renewable energy); *see also* Robert V. Percival, *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."). One recent and notable exception to this focus on private actors has been in the context of the National Environmental Policy Act ("NEPA"). *See, e.g.*, Madeline June Kass, *A NEPA Climate Paradox: Take Greenhouse Gases into Account in Threshold Significance Determinations*, 42 IND. L. REV. 47, 49–55 (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, 145–47 (2010); Amy L. Stein, *Climate Change Under NEPA: Avoiding Cursory Consideration of Greenhouse Gases*, 81 U. COLO. L. REV. 473, 531–32 (2010) [hereinafter Stein, *The National Environmental Policy Act*].

sil-fuel-derived energy—both on the battlefield and in its installations.[19] Under this view of the military, the DoD's interests are intertwined with the interests of members of Congress, the President, and the private sector. The military's motivations to pursue energy efficiency are complex and multi-dimensional—though always in service of the DoD's primary mission to protect national security rather than out of an abstract desire to protect the environment.[20] Whether to maximize the DoD's discretionary budget,[21] defend soldiers' lives,[22] protect national security in the face of new risks from climate change,[23] or win a "Green Arms Race,"[24] the military is driven by

[19] 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, Julia Scott, *The Military Environmental Complex*, SALON (May 13, 2005, 1:50 PM), http://www.salon.com/2005/05/13/dod_pollutes/, *archived at* http://perma.cc/BR92-KN6R, 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, Roger Sorkin, *The Military Environmental Complex?*, NORTHEAST SUSTAINABLE ENERGY ASS'N (Sept. 6, 2011), http://www.nesea.org/uncategorized/the-military-environmental-complex/, *archived at* http://perma.cc/PS3Y-KKTZ. In this Article, however, I define the term in regard to 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. Other scholars have noted the important role that the military can play in hybrid forms of governance. *Cf.* Michael C. Dorf & Charles F. Sabel, *A Constitution of Democratic Experimentalism*, 98 COLUM. L. REV. 267, 267, 336 (1998) (highlighting how "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" where "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").

[20] *See* U.S. DEP'T OF DEF., QUADRENNIAL DEFENSE REVIEW REPORT, at vi (2014) [hereinafter QDR 2014], *available at* http://www.defense.gov/pubs/2014_Quadrennial_Defense_Review.pdf, *archived at* http://perma.cc/4JV8-TKER; U.S. DEP'T OF DEF., QUADRENNIAL DEFENSE REVIEW REPORT, at iii, 84–88 (2010) [hereinafter QDR 2010], *available at* http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf, *archived at* http://perma.cc/DLM6-474Z.

[21] *See* WILLIAM A. NISKANEN, JR., BUREAUCRACY AND REPRESENTATIVE GOVERNMENT 36–42 (1971) (arguing that bureaucrats seek to maximize their agency budgets). The "discretionary budget" is "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).

[22] Colonel Peter Newell, Director of the Army's Rapid Equipping Force, explained: "It's not about reducing energy usage and the overall bills, but about saving lives." Amy Westervelt, *How the Military Uses Green Tech to Save Soldiers' Lives*, FORBES (Feb. 14, 2012, 2:43 PM), http://www.forbes.com/sites/amywestervelt/2012/02/14/how-the-military-uses-green-tech-to-save-soldiers-lives/, *archived at* http://perma.cc/W9AS-X2X2.

[23] *See* Stephen Dycus, *Responses to the Ten Questions*, 35 WM. MITCHELL L. REV. 5031, 5037 & n.33, 5038–39 (2009) (arguing that climate change is creating new conflicts over shipping routes through the Arctic, promoting the loss of island nations and coastal communities, and depleting 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, *archived at* http://perma.cc/H2A7-SXJ2; KURT M. CAMPBELL ET AL.,

unique incentives that position it as a first mover in both the development and the pre-commercial adoption of new technologies.[25] These incentives arise out of the military's many roles as a war fighter, landlord, and land manager. In the military context, climate change is a "threat multiplier," creating instability in light of changing environmental realities, and energy efficiency is a "force multiplier," increasing the capacity of the military to achieve its mission.[26] 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, provide large-scale commercial support for existing technologies, and drive behavioral changes.[27]

The Military-Environmental Complex, however, is not without its challenges. It may be difficult to change long-held beliefs about energy use, including the views of both those within the military and those to whom the military is accountable. And although the DoD is expending resources on this

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CTR. FOR STRATEGIC & INT'L SEC., 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, *archived at* http://perma.cc/SHK9-SAS2; CNA CORP., NATIONAL SECURITY AND THE THREAT OF CLIMATE CHANGE (2007), *available at* https://www.cna.org/sites/default/files/National%20Security%20and%20the%20Threat%20of%20Climate%20Change%20-%20Print.pdf, *archived at* http://perma.cc/Z86D-2V63; NAT'L INTELLIGENCE COUNCIL, GLOBAL TRENDS 2025: A TRANSFORMED WORLD 53–57 (2008), *available at* http://www.aicpa.org/research/cpahorizons2025/globalforces/downloadabledocuments/globaltrends.pdf, *archived at* http://perma.cc/894T-JBUV; 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) (exploring the relationship between national defense and environmental issues).

[24] *See* Velandy, *supra* note 9, at 309.

[25] *See* QDR 2010, *supra* note 20, at 88 ("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.").

[26] *See* QDR 2014, *supra* note 20, at 8 (describing the effects of climate change on resource scarcity as "threat multipliers"); CNA CORP., *supra* note 23, 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 U.S. Dep't of Energy and the U.S. Dep't of Def. 1 (July 22, 2010) [hereinafter DOE MOU], *available at* http://energy.gov/sites/prod/files/edg/media/Enhance-Energy-Security-MOU.pdf, *archived at* http://perma.cc/9R2Z-KTPU ("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)). Thanks to Jody Freeman for raising this point.

[27] The Military-Environmental Complex may not only lead to the creation of new technologies, but also may affect *values*, *behavior*, *and attitudes* in the climate change context. I explore these issues, which are beyond the scope of this Article, in Sarah E. Light, *Valuing National Security: Climate Change, the Military, and Society*, 61 UCLA L. REV. (forthcoming July 2014).

project, energy efficiency remains a small part of the military's overall budget.[28] 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.[29] It is important to be cautious and consider carefully whether new safeguards are appropriate to guard against such risks in this context.

This Article proceeds in four Parts. Part I explains that the traditional doctrinal story in administrative and environmental law, which suggests that the military's mission is incompatible with environmental protection, is incomplete at best and misleading at worst.[30] 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.[31] Although some scholars argue that military procurement and military support for research and development ("R&D") are not the most efficient means to stimulate such new technological innovation, these scholars fail to note the exceptional alignment between the military's mission and the need to reduce reliance on fossil fuels, as well as the fact that the military is already undertaking and supporting crucial innovation in the energy sector.[32]

Part II examines the values that are driving the military to reduce its conventional energy use—even in military operations—and how those values

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[28] For fiscal year 2013, in addition to any use of operation and maintenance or military construction ("MILCON") funds to upgrade facilities, the Army budgeted $562.4 million for operational energy initiatives, the Navy (including the Marine Corps) budgeted $402.1 million, and the Air Force budgeted $573.5 million. U.S. DEP'T OF DEF., ENERGY INVESTMENTS FOR MILITARY OPERATIONS FOR FISCAL YEAR 2013, at 7–9 (2012) [hereinafter ENERGY INVESTMENTS], *available at* http://energy.defense.gov/Portals/25/Documents/Reports/20120815_FY13_OE_Budget_Cert_Report.pdf, *archived at* http://perma.cc/W2PD-6ZZN. Approximately 90% of those funds were designated for demand reduction efforts. *See id.* In addition, the Defense Logistics Agency, the Defense Advanced Research Projects Agency, and the Office of Secretary of Defense provided $102.2 million in funding for the 2013 fiscal year. *Id.* at 8. To put these numbers in perspective, however, the sum of the Army, Navy, and Air Force budget for these initiatives—about $1.54 billion—signifies merely 0.25% of the $613.9 billion the DoD requested for its 2013 fiscal year budget. *See* ENERGY INVESTMENTS, *supra*; U.S. DEP'T OF DEF., FISCAL YEAR 2013 BUDGET REQUEST 1-1 (2012), *available at* http://dcmo.defense.gov/publications/documents/FY2013_Budget_Request_Overview_Book.pdf, *archived at* http://perma.cc/48WJ-FVMQ.

[29] *See, e.g.*, MANCUR OLSON, JR., THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS 36, 62–63 (1965) (arguing that interest groups are more likely to form when small groups may benefit); JAMES Q. WILSON, POLITICAL ORGANIZATIONS 333–34 (1973) (discussing the development of interest groups when there are concentrated benefits and distributed costs); Theodore J. Lowi, *American Business, Public Policy, Case-Studies, and Political Theory*, 16 WORLD POL. 677, 688 (1964) (book review) (exploring the power dynamics of political relationships); *supra* notes 3–5 (citing sources on this point).

[30] *See infra* notes 37–137 and accompanying text.

[31] *See infra* notes 51–73 and accompanying text.

[32] *See infra* notes 74–137 and accompanying text.

interact with the governmental institutions shaping the Military-Environmental Complex.[33] Part III then analyzes the key role that the private sector plays in the Military-Environmental Complex, arguing that the Military-Environmental Complex both grows out of and depends upon the previous interrelationships among the military, other government institutions, and the private sector.[34] Finally, Part IV argues that the Military-Environmental Complex can substantially benefit the environment by stimulating investment in and demand for renewable energy technology, and that it should become an important factor in the debate over regulatory instruments to combat climate change.[35] Part IV also offers some recommendations for ensuring that the Military-Environmental Complex serves as a force for good, rather than an opportunity for rent-seeking.[36]

I. MILITARY EXCEPTIONALISM

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, many federal statutes not only acknowledge but support the idea that the environment and national security are in conflict. In reality, that relationship is far more complex. Although 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. This alignment—informed by the lessons of the military-industrial complex—provides the military with the opportunity to make major advances in sustainable energy policy.

A. Exceptional Exemptions

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.[37] In some cases, the

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[33] *See infra* notes 138–236 and accompanying text.

[34] *See infra* notes 237–353 and accompanying text.

[35] *See infra* notes 354–382 and accompanying text.

[36] *See infra* notes 383–385 and accompanying text.

[37] *See, e.g.*, Toxic Substances Control Act, 15 U.S.C. § 2621 (2012); Coastal Zone Management Act, 16 U.S.C. § 1456(c)(1)(B) (2012); Clean Water Act, 33 U.S.C. § 1323(a) (2006 & Supp. V); Safe Drinking Water Act, 42 U.S.C. § 300h-7(h) (2006 & Supp. V); Resource Conservation and Recovery Act, 42 U.S.C. § 6961(a); Clean Air Act, 42 U.S.C. § 7418(b) (2006 & Supp. V); Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9620(j) (2006 & Supp. V). The executive orders extending reporting requirements under the Toxics Release Inventory ("TRI") program of the Emergency Preparedness and Community Right-to-Know

agency head—for example, the Secretary of Defense—rather than the President, may make that determination without further executive review.[38] In addition, in a time of national emergency or after a declaration of war, Congress has provided a blanket exemption for military construction projects "not otherwise authorized by law that are necessary to support such use of the armed forces."[39]

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.[40] 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

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Act also included national security exemptions. *See* Strengthening Federal Environmental, Energy, and Transportation Management, Exec. Order No. 13,423, 3 C.F.R. 193 (2007) (revoking Exec. Order No. 13,148 (2000)); Greening the Government Through Leadership in Environmental Management, Exec. Order No. 13,148, 3 C.F.R. 241 (2001) (revoking Exec. Order No. 12,856 (1993)); Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, Exec. Order No. 12,856, 3 C.F.R. 616 (1994); CHAIRMAN OF THE COUNCIL ON ENVTL. QUALITY, INSTRUCTIONS FOR IMPLEMENTING EXEC. ORDER 13423, at 27 (2007); *see also* Federal Leadership in Environmental, Energy, and Economic Performance, Exec. Order No. 13,514, 3 C.F.R. 248 (2010) [hereinafter Executive Order on Sustainability] (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).

[38] *See* National Historic Preservation Act, 16 U.S.C. § 470h-2(j) (2012) (authorizing the Secretary of the Interior to promulgate regulations exempting agencies from certain provisions "in the event of a major natural disaster or an imminent threat to the national security"); Marine Mammal Protection Act, 16 U.S.C. § 1371(f)(1) (permitting the Secretary of Defense's own determination of what is "necessary for national defense"); Endangered Species Act, 16 U.S.C. § 1536(j) (2012) (permitting the Secretary of Defense's own determination of the national security interest); Bob Stump National Defense Authorization Act for Fiscal Year 2003, Pub. L. No. 107-314, § 315, 116 Stat. 2458, 2509–10 (2002) (authorizing the Secretary of the Interior to promulgate regulations providing for a military exception to the Migratory Bird Treaty Act); Federal Agency Decision to Waive Responsibilities, 36 C.F.R. § 78.3(a) (2013) (permitting the agency head to reach his or her own determination of whether "there is an imminent threat . . . to the national security such that an emergency action is necessary to the preservation of human life or property" so as to exempt the agency from provisions of the National Preservation Act); Authorization of Take Incidental to Military Readiness Activities, 50 C.F.R. § 21.15 (2013) (providing for an exception to the Migratory Bird Treaty Act for the taking of migratory birds incidental to military readiness activities).

[39] 10 U.S.C. § 2808 (2012); *see* Babcock, *supra* note 37, at 116.

[40] 5 U.S.C. §§ 551(1)(G), 701(b)(1)(G) (2012). For an in-depth discussion of the history of this language and an argument that it applies beyond the battlefield, see generally Kathryn E. Kovacs, *A History of the Military Authority Exception in the Administrative Procedure Act*, 62 ADMIN. L. REV. 673 (2010).

functions.[41] 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, sets the military apart.[42]

Moreover, although the National Environmental Policy Act ("NEPA") contains no express statutory exemption for military actions,[43] NEPA's regulations create an "emergency circumstances" exception.[44] An executive order clarifies that extraterritorial environmental impacts of agency actions in the case of armed conflict need not be assessed.[45] Additionally, because NEPA incorporates the APA's waiver of sovereign immunity, the APA's exceptions for military authority apply to NEPA as well.[46]

Finally, Executive Order 12,866 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).[47] It 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 . . . ."[48]

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[41] 5 U.S.C. §§ 553(a)(1), 554(a)(4).

[42] *See* Kovacs, *supra* note 40, at 696–705 (citing Wong Yang Sun v. McGrath, 339 U.S. 33, 40–41 (1950)) (discussing the APA's enactment); *id.* at 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).

[43] *See* 42 U.S.C. §§ 4321–4370f (2006 & Supp. V); Concerned About Trident v. Rumsfeld, 555 F.2d 817, 823 (D.C. Cir. 1976) (holding that the Navy is not exempt from NEPA). *But see* Weinberger v. Catholic Action of Hawaii/Peace Educ. Project, 454 U.S. 139, 140–41, 146 (1981) (holding that while the Navy was not exempt from NEPA, it was not required to prepare and release a "Hypothetical Environmental Impact Statement," under 42 U.S.C. § 4332(2)(C), regarding the operation of a facility capable of storing nuclear weapons).

[44] Emergencies, 40 C.F.R. § 1506.11 (2013) (requiring federal agencies to consult with the White House Council on Environmental Quality when "emergency circumstances make it necessary to take an action with significant environmental impact without observing the provisions of these regulations"); *see* Winter v. Natural Res. Def. Council, Inc., 555 U.S. 7, 18–19 (2008) (noting that the Council on Environmental Quality had authorized the Navy to implement "alternative arrangements" to NEPA compliance in light of "emergency circumstances").

[45] Exec. Order No. 12,114, 3 C.F.R. 356 (1979). The DoD has issued NEPA regulations adopting this position. *See* Policy, 32 C.F.R. § 187.4(e) (2013). NEPA also permits the use of a classified appendix in which classified disclosures can be made for purposes of judicial review. Agency Procedures, 40 C.F.R. § 1507.3(c) (2013).

[46] *See* 5 U.S.C. § 702 (2012); *see also Winter*, 555 U.S. at 12–13, 18–19 (vacating an 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 from governing environmental rules were in the national interest).

[47] Exec. Order No. 12,866, 3 C.F.R. 58093 (1993).

[48] *Id.*

Environmental organizations and scholars decry these exemptions as allowing vast environmental degradation under elusive standards.[49] 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.[50] Regardless of precisely where the doctrinal line is drawn, this legal backdrop sets up a conflict between the preservation of the environment and the national security interest of the United States. 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

Although the military's mission may conflict with environmental goals 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 the need for energy sustainability. The DoD is the largest single consumer of energy in the nation.[51] The military's total energy costs in fiscal year 2012 were $20.4 billion, approximately $4 billion of which were facility energy costs and $16.4 billion of which were operational energy costs.[52] The DoD is also the nation's largest landlord;[53] it manages more

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[49] *See* Babcock, *supra* note 37, at 131, 146 (describing the military's efforts to obtain permanent exemptions, rather than temporary waivers, and arguing that these exemptions are "troubling"). *But cf.* DYCUS, *supra* note 23, at 8 (noting that the exemptions for national security are rarely invoked).

[50] *See, e.g.*, Babcock, *supra* note 37, at 126 n.106 (citing *Encroachment: Hearings Before the H. Gov't Affairs Comm.*, 107th Cong. (2001); U.S. Army Legal Services Agency, *Environmental Law Division Notes: Pending Legislation Targets Military Environmental Compliance*, ARMY LAW., Dec. 2001, at 29, 30 n.17; Letter from Ten Members of the House of Representatives to Donald Rumsfeld, Sec'y of Def. (Oct. 5, 2001)); E.G. Willard (Col.), Tom Zimmerman (Lt. Col.), & Eric Bee (Lt. Col.), *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, that "the bottom line is that we must be able to train the way we fight," and that existing exemptions are insufficiently narrow). This conflict came to a head after September 11, 2001, when the military sought—and Congress granted—broader exemptions to certain environmental laws. *See* Babcock, *supra* note 37, at 125–36 (discussing changes to environmental laws, including the Endangered Species Act, Marine Mammal Protection Act, and Migratory Bird Treaty Act, after 9/11).

[51] *See supra* notes 9–10 and accompanying text (providing statistics on this point).

[52] OFFICE OF THE DEPUTY UNDER SEC'Y OF DEF. FOR INSTALLATIONS AND ENV'T, DEPARTMENT OF DEFENSE ANNUAL ENERGY MANAGEMENT REPORT: FISCAL YEAR 2012, at 16 (2013), http://www.acq.osd.mil/ie/energy/energymgmt_report/FY%202012%20AEMR.pdf, *archived at* http://perma.cc/8ERM-2RAP [hereinafter AEMR FY 2012]; *cf.* OFFICE OF THE DEPUTY UNDER SEC'Y OF DEF. FOR INSTALLATIONS AND ENV'T, DEPARTMENT OF DEFENSE ANNUAL ENERGY MANAGEMENT REPORT: FISCAL YEAR 2011, at 14 (2012), *available at* http://www.acq.osd.mil/ie/

than 500 installations in the United States and overseas, covering approximately 2.3 billion square feet of building space.[54] This physical footprint is three times the size of Wal-Mart's, and six times that of the General Services Administration ("GSA").[55] The DoD manages approximately 28 million acres of land in the United States.[56] Each service within the military—the Army, Navy, and Air Force—has a different energy-use profile and different energy needs.[57] 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 and lower consumption for facilities.[58] Thus, the military's energy needs are not only deep but broad, covering facilities and operations as well as the transportation needs spanning both sectors.

The military's mission aligns with the goals of reducing energy demand, increasing energy efficiency, and increasing renewables. The DoD's

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energy/library/FY.2011.AEMR.PDF, *archived at* http://perma.cc/8HVW-9P3Q [hereinafter AEMR FY 2011]. Facility energy "includes energy needed to power fixed installations and non-tactical vehicles." AEMR FY 2012, *supra*, at 15. 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) (2012). The Annual Energy Management Report for fiscal year 2012 notes that this facility energy use constitutes only "1 percent of the total U.S. commercial sector's energy consumption." AEMR FY 2012, *supra*, at 15 (citing *Energy Consumption by Sector and Source, United States*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/oiaf/aeo/tablebrowser/#release=EARLY2012&subject=0-EARLY2012&table=2-EARLY2012&region=1-0&cases=full2011-d020911a,early2012-d121011b (last visited Apr. 2, 2014)). Such "one percent" arguments, however, can obscure the significance of these emissions and the importance of reducing all sources of greenhouse gases in the atmosphere. Kevin M. Stack & Michael P. Vandenbergh, *The One Percent Problem*, 111 COLUM. L. REV. 1385, 1386–88, 1398–1402 (2011) (arguing that although climate change can only be solved through regulation of small contributions to global greenhouse gas emissions, biases lead individuals to discount or ignore small values); *see* Garrett Hardin, *The Tragedy of the Commons*, 162 SCI. 1243, 1244 (1968) (arguing that individuals are not motivated to protect resources when their impact from resource use is small but personal gains are large).

[53] *See Fostering a Federal Community of Green Building Leaders*, CLOSING THE CIRCLE NEWS, Spring 2008, at 2, 2, *available at* http://www1.eere.energy.gov/femp/pdfs/ctcspr08.pdf, *archived at* http://perma.cc/B8YX-SYYM.

[54] AEMR FY 2011, *supra* note 52, at 4.

[55] *Id.*

[56] Stein, *Agency Action*, *supra* note 18, at 708; Press Release, U.S. Dep't of Def., 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, *archived at* http://perma.cc/CS7K-NBT8 (noting that approximately 13 million acres of the DoD's 28 million acres of land contain significant wind, solar, or geothermal energy resources).

[57] The U.S. Marine Corps is an operating unit within the U.S. Navy. *See U.S. Navy Organization—An Overview*, U.S. NAVY, http://www.navy.mil/navydata/organization/org-over.asp, *archived at* http://perma.cc/Z4CN-CMML (last updated Nov. 28, 2006).

[58] PEW PROJECT ON NAT'L. SEC., ENERGY & CLIMATE, REENERGIZING AMERICA'S DEFENSE: HOW THE ARMED FORCES ARE STEPPING FORWARD TO COMBAT CLIMATE CHANGE AND IMPROVE THE U.S. ENERGY POSTURE 12–17 (2010), *available at* http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Global_warming/Pew_Reenergizing20Americas20Defense20Report.pdf, *archived at* http://perma.cc/5E4-C74M.

mission is "to provide the military forces needed to deter war and protect the security of our country."[59] Indeed, the primary value driving the DoD's role of reducing energy consumption and developing renewables in the Military-Environmental Complex is the military's goal of enhancing its mission to provide trained and ready soldiers for combat and to promote national security.[60] The military has recognized not only that dependence on fossil fuels on the battlefield increasingly fosters security threats—such as the cost in lives of protecting fuel convoys supporting combat missions—but also that climate change caused in part by fossil fuel consumption will lead to further geopolitical instability.[61] As Assistant Secretary of Defense for Operational Energy Plans and Programs Sharon Burke explained:

> 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.[62]

From fiscal year 2003 to fiscal year 2007 in Iraq and Afghanistan, more than 3000 Army personnel and Army contractors were wounded or killed in action as a result of attacks on fuel and water resupply convoys.[63] In 2010,

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[59] SSPP FY 2010, *supra* note 6, at i. One commentator has been particularly optimistic about the military's role in this regard, stating that:

> The progeny of the Green Arms Race, rather than a strategy of mutually assured destruction, will be a more efficient fighting forces [sic], 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 9, at 311–12.

[60] OFFICE OF PUB. AFFAIRS, U.S. DEP'T OF DEF., 2010 QUADRENNIAL DEFENSE REVIEW (QDR) FACT SHEET 2 (2010) ("Years of war have demanded that America's Armed Forces rapidly innovate and adapt[,] . . . [in part by d]eveloping enterprise-wide climate change and energy strategies."). In the National Defense Authorization Act for Fiscal Year 2008, Congress amended legislation to require the DoD in the 2010 Quadrennial Defense Review to "examine the capabilities of the armed forces to respond to the consequences of climate change . . . ." National Defense Authorization Act for Fiscal Year 2008, Pub. L. No. 110-181, § 951, 122 Stat. 3, 290–91 (2008); *see* QDR 2014, *supra* note 20, at 8, 25; OFFICE OF PUB. AFFAIRS, U.S. DEP'T OF DEF., QDR 101: WHAT YOU SHOULD KNOW 1 (2010).

[61] *See* QDR 2010, *supra* note 20, at 84–87.

[62] Interview with Sharon Burke, Assistant Sec'y of Def. for Operational Energy Plans and Programs (May 22, 2013).

[63] DEP'T OF DEFENSE, ENERGY FOR THE WARFIGHTER: OPERATIONAL ENERGY STRATEGY 4–5 (2011) [hereinafter ENERGY FOR THE WARFIGHTER] (citing ARMY ENVTL. POLICY INST., SUS-

ground convoys were attacked 1100 times.[64] These numbers may not even reflect all efforts to transfer fuel from forward operating bases to patrol bases.[65] Although flying in fuel may reduce these casualties, it can increase costs by a factor of ten and uses a great deal more fuel in the process.[66] In both Iraq and Afghanistan, the challenges of securing fuel convoys thus made the need to reduce petroleum consumption paramount.[67] Energy costs—both economic and political—are high, and perhaps unlike for other agencies, the 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.[68]

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.[69] When training in domestic installations, soldiers must learn to reduce demand if they are to do so on the battlefield. In speaking about the Army's Net Zero Energy Installation ("NZEI") initiative—a joint initiative with the DoD and the Department of Energy ("DOE") to make participating Army pilot installations net zero in water, energy, or waste[70]—Marc Kodack of the Office of the Assistant Secretary of the Army for Energy and Sustainability said that "[u]nless 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."[71]

TAIN THE MISSION PROJECT: CASUALTY FACTORS FOR FUEL AND WATER RESUPPLY CONVOYS, FINAL TECHNICAL REPORT (2009)), *available at* http://energy.defense.gov/Portals/25/Documents/Reports/20110614_Operational_Energy_Strategy.pdf, *archived at* http://perma.cc/S3G7-E3J2.

[64] *Id.* at 5 (citing Gen. Duncan McNabb, Commander, U.S. Transp. Command, Address at the Military Strategy Forum at the Center for Strategic and International Studies (Feb. 7, 2011)).

[65] *Id.*

[66] *Id.*

[67] *Greenery on the March*, ECONOMIST, Dec. 10, 2009, at 3, 3–4 (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 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).

[68] *See* Amy Westervelt, *Why the Military Hates Fossil Fuels*, FORBES (Feb. 2, 2012, 4:52 PM), http://www.forbes.com/sites/amywestervelt/2012/02/02/why-the-military-hates-fossil-fuels-and-you-should-too-part-one-inefficiency/, *archived at* http://perma.cc/EM9P-ZLDD.

[69] Interview with John Lushetsky, Former Exec. Dir., Army Energy Initiatives Task Force (May 14, 2013).

[70] *See* AEMR FY 2012, *supra* note 52, at 50 (describing the NZEI).

[71] Telephone Interview with Marc Kodack, Office of the Assistant Sec'y of the Army for Energy and Sustainability (Apr. 5, 2013); *see Army Vision for Net Zero*, ARMY ENERGY PROGRAM, http://army-energy.hqda.pentagon.mil/netzero/, *archived at* http://perma.cc/97P5-NMGH (last updated Jan. 28, 2014) (describing the Army's goals for net zero installations).

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," said Assistant Secretary of Defense Sharon Burke.[72] "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."[73]

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 transferred into civilian use—including computers, satellites for aerial reconnaissance, certain kinds of aircraft, the internet, semiconductors, and GPS.[74] Although perhaps most well-known for this explosion of scientific growth in the twentieth century, military stimulation of technological innovation has deep historical roots. For example, although the military originally produced its own armaments in national armories, beginning in the early nineteenth century, the Army began to rely on private firms to increase the supply.[75] Because the quality of produced armaments was poor, the Army imposed certain requirements on manufacturers, including uniformity and the use of interchangeable parts.[76] This led not only to the development of new guns, but also to new "machine tools and precision instruments" which were subsequently adapted to manufacture civilian goods such as sewing machines.[77]

The key to obtaining military funding has always been the articulation of how the technological innovation is in the military's interest—or, more broadly, in the nation's interest in national security. Civilian spin-offs have

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[72] Interview with Sharon Burke, *supra* note 62.

[73] *Id.*

[74] *See, e.g.*, Mowery, *supra* note 12, at 160, 163–66 (describing the role of the federal government in the financing of, and as a customer for, new technological developments, and arguing that federal support, as well as weak intellectual property protections and strong antitrust laws, supported R&D in certain industries); *The Military-Consumer Complex*, *supra* note 13, at 16; Velandy, *supra* note 9, at 309; Tom A. Peter, *Military Inventions Hit the Civilian Market*, CHRISTIAN SCI. MONITOR (June 19, 2008), http://www.csmonitor.com/Innovation/Tech-Culture/2008/0619/built-for-battle-but-perfect-in-peacetime, *archived at* http://perma.cc/FF62-HPBD; *see also supra* note 11 (citing sources on this point).

[75] *See* Merritt Roe Smith, *Military Arsenals and Industry Before World War I*, *in* WAR, BUSINESS, AND AMERICAN SOCIETY, *supra* note 3, at 24, 24–32.

[76] *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 Samuel Colt and Epiphalet Remington).

[77] *Id*. at 32.

largely been a secondary benefit.[78] In some cases, direct federal R&D funding was not necessary to stimulate the development of these new technologies.[79] 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."[80] For example, one scholar has explained that government procurement was "crucial" in the development of the IBM 650 computer, noting that the federal government agreed to purchase 50 of the 250 machines IBM hoped to sell.[81] But different technologies followed different paths of military funding and support.

Some now argue that the military's golden age as lead innovator ended with changes in federal acquisition rules.[82] Today, rather than contracting for new, DoD-specific products, the military prefers to adopt preexisting civilian technologies—a process that at least one scholar has called "spin-on" to the military from the private sector, rather than "spin-off" to the private sector from the military.[83] And sometimes, technology in the military-industrial complex took hybrid forms—neither completely "spin-off" nor "spin-on."[84]

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[78] *Cf.* Timothy Simcoe and Michael W. Toffel, *Government Green Procurement Spillovers: Evidence from Municipal Building Policies in California* 30–32 (Harvard Bus. Sch., Working Paper No. 13-030, 2013), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2142085, *archived at* http://perma.cc/V4AP-EU3T (arguing that government procurement policies may stimulate the private sector's adoption of environmental standards). It is worth noting that climate change mitigation may be less aptly characterized as a secondary benefit if the military is itself concerned about reducing climate-change-induced conflict.

[79] *See* Mowery, *supra* note 12, at 165.

[80] *Id.*

[81] *Id.* at 174 (noting that the IBM 650 was "the most commercially successful machine" of the 1950s, with total sales of 1800 units).

[82] *See* Stowsky, *supra* note 13, at 115 (noting the "divergence in performance requirements for military and civilian products" by the late 1970s); Tim Lenoir, *All but War Is Simulation: The Military-Entertainment Complex*, 8 CONFIGURATIONS 289, 314–15, 322–23 (2000) (noting a post-Cold War trend of military adoption of consumer and civilian technologies, especially in war games and simulations); David C. Mowery et al., *Technology Policy and Global Warming: Why New Policy Models Are Needed (Or Why Putting New Wine in Old Bottles Won't Work)*, 39 RES. POL'Y 1011, 1017 (2010) (describing the R&D programs of the twentieth century as inapt in the climate change context).

[83] Stowsky, *supra* note 13, at 114–16 (describing the shift in the directional development of innovative technology from spin-offs to spin-ons); *see* Lenoir, *supra* note 82, at 314 (citing 10 U.S.C. § 2304 (2012); DEP'T OF DEF., DIRECTIVE No. 5000.1 (2000); DEP'T OF DEF., DIRECTIVE No. 5000.2 (2000)) (noting the DoD's shift away from contracting with segments of the U.S. industrial sector towards the acquisition of commercially available products); Mowery, *supra* note 12, 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.").

[84] *See* Stowsky, *supra* note 13, at 118.

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.[85] Bell Labs was simultaneously working to develop new transistor technology "to replace mechanical relays in telephone exchanges."[86] In 1948, Bell Labs briefed the military regarding this new technology.[87] Subsequently, 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.[88] One scholar has noted that while the technology initially came from the civilian sector, military procurement and interest were crucial to its development and diffusion.[89] Bell Labs was unable to introduce the new transistors on a widespread scale in the civilian telephone system in the absence of demand for large-scale replacement of existing infrastructure.[90] But the military financed the construction of the Western Electric transistor plant in Pennsylvania and persuaded the industry to increase its production capacity to more than ten times the military's existing needs for transistors in order to have "surge capability" in case of emergency.[91] In addition, the military essentially subsidized research and production costs to bring down the ultimate cost to civilian consumers of the technology.[92] Finally, the military contributed to the diffusion and dissemination of information about transistor technology by requiring Bell Labs to hold conferences for representatives of the electronics industry, academics, and the military regarding the technology.[93]

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.[94] This literature recognizes the

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[85] *Id*.
[86] *Id*. at 117.
[87] *Id*. at 118.
[88] *Id*.
[89] *See id*.
[90] *See id.*
[91] *Id*. Western Electric was AT&T's manufacturing component. *Id*. at 119.
[92] *Id*. at 119, 121.
[93] *Id*. at 119. Bell Labs had initially been concerned about military-imposed secrecy on this technology, waiting until one week before a public announcement about its technology development to brief the military. *Id*. at 118.
[94] *See, e.g.*, John M. Amidon, *America's Strategic Imperative: A "Manhattan Project" for Energy*, JOINT FORCES Q., Fourth Quarter 2005, at 68, 69 (advocating a Manhattan Project to achieve energy independence); Seth Dunn, *Hydrogen Futures: Toward a Sustainable Energy System*, 27 INT'L J. HYDROGEN ENERGY 235, 238 (2002) (advocating a "catalytic leadership role" for the government in studying and developing a hydrogen-based energy economy); Martin I. Hoffert et al., *Energy Implications of Future Stabilization of Atmospheric CO_2 Content*, 395 NATURE 881, 882, 884 (1998) (arguing that "[t]he magnitude of the implied infrastructure transition suggests the need for massive investments in innovative energy research" on the order of a Manhattan project

importance of government funding to address the so-called "Commercialization Valley of Death": the period between the availability of venture capital financing for "early stage, potentially high-risk/high-return technologies" and the availability of bank financing for "late-stage, potentially low-risk/low-return technologies in the form of project financing."[95] Little private financing exists in this period 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."[96]

In some respects, this innovation literature constitutes a modern-day effort to draw historical lessons from the military-industrial complex and apply them to the problems of climate change.[97] One common suggestion has been the advocacy of an initiative along the lines of the Manhattan Project or Apollo Program to support technological innovation on the scale and at the pace necessary to solve the climate change problem.[98] For some, this

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to develop transformative technologies); Peter Read and Jonathan Lermit, *Bio-Energy with Carbon Storage (BECS): A Sequential Decision Approach to the Threat of Abrupt Climate Change*, 30 ENERGY 2654, 2654–71 (2005) (modeling a Manhattan Project style response to abrupt climate change); Chris Somerville, *The Billion-Ton Biofuels Vision*, 312 SCIENCE 1277, 1277 (2006) (suggesting a Manhattan Project for biofuels); David Talbot, *Needed: An 'Apollo Program' for Energy*, MIT TECH. REV. (Apr. 20, 2006), http://www.technologyreview.com/news/405681/needed-an-apollo-program-for-energy/, *archived at* http://perma.cc/E34T-5QT4 ("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."). *But see* Mowery et al., *supra* note 82, at 1019–23 (arguing that a Manhattan Project or Apollo Program model is inappropriate for confronting climate change). 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," but rather describes a web of interaction among different institutional actors working together to develop multiple technologies that reduce energy demand and develop or promote alternative energy generation.

[95] BLOOMBERG NEW ENERGY FIN., CROSSING THE VALLEY OF DEATH: SOLUTIONS TO THE NEXT GENERATION CLEAN ENERGY PROJECT FINANCING GAP 1 (2010). *See generally infra* notes 237–353 and accompanying text (exploring the role of the private sector in the Military-Environmental Complex).

[96] BLOOMBERG NEW ENERGY FIN., *supra* note 95, at 1.

[97] For one example of this literature, see David C. Mowery, *Defense-Related R&D as a Model for "Grand Challenges" Technology Policies*, 41 RES. POL'Y 1703, 1704, 1706, 1711 (2012), who highlights military technology innovation success stories going back to Henry VIII, the race for armor, the naval arms race between Britain and Germany in the late nineteenth and early twentieth centuries, and the U.S. transition from public armories to private sources of armaments.

[98] *See supra* note 94 (citing sources on this point); *see also* TED NORDHAUS & MICHAEL SHELLENBERGER, BREAK THROUGH: FROM THE DEATH OF ENVIRONMENTALISM TO THE POLITICS OF POSSIBILITY 8 (2007) (noting the authors' support in 2003 for a "new Apollo project . . . [incorporating] major investment in clean-energy jobs, research and development, infrastructure, and transit, with the goal of achieving energy independence"). Ted Nordhaus and Michael Shellenberger had believed that this approach would win over "blue collar swing voters and Reagan

so-called "Manhattan Project" approach simply signifies an overwhelming investment of societal resources to develop transformational or disruptive technological solutions, not necessarily involving government funds.[99] Yet despite borrowing the well-known terminology of these two historical programs, these advocates often fail to acknowledge both the role of the government—particularly the military—as a polluter, and the exceptional alignment between the military's mission and the need to reduce energy demand and find renewable energy sources in the climate change context.[100]

Others reject this Manhattan Project approach to government R&D investment.[101] For example, some scholars 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.[102] They contend that such models are "wrongheaded" and have the potential to "waste resources" while ultimately being unsuccessful.[103] Those twentieth-century programs, these scholars argue, involved the quest for a single, precise technological innovation for which the government was the "sole customer."[104] In contrast, in the climate change context, there is a different need to engage multiple stakeholders, including the private sector, state, local, and federal governments, and individuals—not only to adopt new technologies, but also to change behavior on a vast, decentralized scale.[105] Other critics of a Manhattan Project approach contend that the analogy is inapt because the government has historically proven ineffective at "pick[ing] winners" untethered from actual demand.[106] Arguably, these

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Democrats" in battleground states while "excit[ing] the high-tech creative class at the same time." NORDHAUS & SHELLENBERGER, *supra*.

[99] *See* Jay Michaelson, *Geoengineering: A Climate Change Manhattan Project*, 17 STAN. ENVTL. L.J. 73, 119 (1998) (suggesting that private investment will displace government investment in his proposed Manhattan Project on geoengineering).

[100] Some scholars recognize the geopolitical instability that may result from climate change. *See, e.g.*, Jody Freeman & Andrew Guzman, *Climate Change and U.S. Interests*, 109 COLUM. L. REV. 1531, 1576–77 (2009); Jeffrey Thaler, *Fiddling as the World Floods and Burns: How Climate Change Urgently Requires a Paradigm Shift in the Permitting of Renewable Energy Projects*, 42 ENVTL. L. 1101, 1117–18 (2012).

[101] *See, e.g.*, Mowery et al., *supra* note 82, at 1019–23; Chi-Jen Yang & Michael Oppenheimer, *A "Manhattan Project" for Climate Change?*, 80 CLIMATIC CHANGE 199, 200 (2007) (rejecting a Manhattan Project approach).

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

[103] *Id.*

[104] *Id.*

[105] *See id.*

[106] Yang & Oppenheimer, *supra* note 101, at 202 (noting that many of the government's efforts to "pick winners" in commercial markets have failed, but that government intervention to support technology development has generally been successful in three situations: "(1) government R&D support for technologies in which the government has a strong and direct procurement interest; (2) decentralized systems of government-sponsored research in the 'generic' area between the basic and applied; (3) a decentralized system of clientele-oriented support for applied R&D").

critics fail to appreciate the military's genuine underlying demand for such technology.

This debate over the utility of a Manhattan Project approach, 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 public-private interactions, such as government intervention in the development of information technology, including military R&D, government procurement, and a combination of both.[107] For example, scholars have recognized that military R&D programs were essential in the development of semiconductors, computer hardware, and computer software during the Cold War, which ultimately led to the creation of the internet.[108] These scholars understood that the military's national security mission motivated this military investment, and that military procurement "dominated early markets" for new products using these technologies.[109] Other federal agencies, academic institutions, and private industry worked together with the military to provide "pluralistic" support for innovation in information technology.[110] Because these innovations supported the military mission, R&D and military procurement were mutually reinforcing.[111] The military's status as first user of the new technologies "enhanced their reliability and ease of use, while reducing their costs."[112] Finally, this military-supported innovation led to significant civilian "spillover" which ultimately overtook military sales and funding for R&D.[113]

Despite these successes of combined military R&D and procurement in stimulating the growth of the information technology sector, these scholars remain pessimistic about the potential for this model to stimulate technological innovation in the climate change context.[114] They argue that while government R&D and procurement can accelerate the development of some

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[107] *See* Mowery et al., *supra* note 82, at 1016–18. 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, such as in public health and agricultural innovation programs. *See id*. at 1014–16.

[108] *Id.* at 1016.

[109] *See id.* at 1017. David Mowery has noted that as the military mission shifted, so too did the military's approach to technology. Mowery, *supra* note 97, 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. *See id*.

[110] Mowery et al., *supra* note 82, at 1017.

[111] *See id.*

[112] *Id.*

[113] *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. *See* Mowery, *supra* note 97, at 1709.

[114] *See* Mowery et al., *supra* note 82, at 1020.

technologies, the widespread diffusion of new energy technology will require other policies reflecting the true social costs of carbon.[115] Any public spending, they argue, must be accompanied by significant private spending on technological innovation, and significant participation by industry in "prototype development and testing."[116] The government may play an important role in field trials of new technology as it did in the information technology context,[117] yet when the government is involved, there is always the possibility of capture.[118] If the ultimate goal is to create technology that will be used in a decentralized way by both private and public actors, one scholar contends 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.[119] The military, this scholar argues, does not generally support diffusion of technology and innovation learning.[120] Indeed, this scholar expressly argues that procurement will play a smaller role in the climate change context than it did in the context of Cold War defense-related technological innovation.[121] Ultimately, these arguments appear primarily to be a critique of the *efficiency* of relying

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[115] *Id.*

[116] *Id.*

[117] *Id.* at 1021.

[118] *Id.* 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 fifty states, most importantly those of key committee leaders. *See* Mowery, *supra* note 97, at 1708–09.

[119] Mowery, *supra* note 97, at 1703, 1714. 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. *See id*. at 1709, 1714.

[120] *See id.* at 1710, 1714. Mowery also argues that technological innovations often need to be significantly modified to have civilian application. *Id.* at 1710.

[121] *Id.* at 1705. Mowery does recognize three pathways through which military R&D and procurement can stimulate innovation in civilian technologies. *Id.* at 1711. First, if the military supports broad research—rather than seeking to procure a specific weapon system—this can contribute to "general knowledge." *Id.* Second, military R&D can lead to the development of civilian "spin-offs," such as in information technology. *Id. But see* Roberto Mazzoleni, *Innovation in the Machine Tool Industry: A Historical Perspective on the Dynamics of Comparative Advantage*, *in* SOURCES OF INDUSTRIAL LEADERSHIP: STUDIES OF SEVEN INDUSTRIES 169, 176, 180–88 (David C. Mowery & Richard R. Nelson eds., 1999) (noting that while the U.S. machine tool industry developed in part from the Army's interest in armaments with interchangeable parts, other technologies, namely numerical control methods in aircraft manufacture, were slow to be adopted outside of the military context); Stowsky, *supra* note 13, 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"). Third, military procurement enabled industry to improve performance and reduce prices, considering the military's focus on performance and its ability to serve as a first customer. Mowery, *supra* note 97, at 1711. Jay Stowsky argues that firms that 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. Stowsky, *supra* note 13, at 115–16.

on military R&D and procurement, as opposed to other forms of spending that could more directly support technological innovation with civilian implications. Similarly, from one critic's perspective, the key question is which method—spin-off or spin-on—is faster.[122]

The question of which approach is "faster" or "more efficient" would be a good one if we lived in a world of central planning or a clean slate. But by focusing on what institutional arrangement would best stimulate technological innovation to combat climate change globally, this innovation scholarship fails to recognize that the U.S. government, particularly 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, especially the extent to which military procurement was driven largely by the military's mission in the twentieth-century development of information technology, these scholars fail to realize 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 that must then be diffused globally, scholars and policymakers should ask different questions. The real question is: Given that the DoD is already both actively pursuing technological innovation to military specifications through R&D and exhibiting vast, mission-driven demand for commercial off-the-shelf technologies through procurement and creative arrangements like long-term Power Purchase Agreements ("PPAs"), how should policymakers craft institutions and rules to make this government-sponsored innovation more successful? And how can policymakers 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? This Article seeks to address these questions here.

D. Advantages of the Military-Environmental Complex

There are certain unique advantages to military participation in this technological innovation process. First, the mere fact that a project supports military interests—rather than general commercial interests—may drive support among key institutional players who feel more strongly connected to the value of protecting national security than other values such as supporting commerce or protecting the environment.[123] The construction of roads

[122] Stowsky, *supra* note 13, at 137.

[123] For a further discussion of this issue, see generally Light, *supra* note 27. *See also* Dena M. Gromet, Howard Kunreuther, & Richard P. Larrick, *Political Ideology Affects Energy-Efficiency*

in nineteenth-century America provides an example of how an engineering project with both civilian and military applications obtained congressional funding and presidential support largely because of its alignment with the military's mission.[124] The original thirteen colonies constructed few roads, except those built by the military and for the Lancaster-Philadelphia Turnpike.[125] As a result, during the War of 1812, the nation faced challenges in moving soldiers and supplies. This difficulty led to a rethinking of the military's need for roads and a reconsideration of the role the federal—as opposed to state—government should play in financing and constructing them.[126] According to one scholar, "As long as a road could be termed a military road, [President James] 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."[127] President James Monroe followed the same path, approving "only those roads which were described as strictly military,"[128] 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." . . . [T]he roads and canals which such a system

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Attitudes and Choices, 110 PROC. NAT'L ACAD. OF SCI. 9314, 9314–17 (2013) (finding that individuals with conservative ideologies were less likely to purchase energy-efficient light bulbs when the light bulbs were affixed with a sticker stating "Protect the Environment" than when no sticker was present); Dan M. Kahan et al., *Cultural Cognition of Scientific Consensus*, 14 J. RISK RES. 147, 169 (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." (citations omitted)); Edward W. Maibach et al., *Communication and Marketing as Climate Change–Intervention Assets: A Public Health Perspective*, 35 AM. J. PREVENTIVE MED. 488, 497 (2008) (noting that "[a]udiences are most receptive to content that is consistent with their existing attitudes and beliefs," and suggesting the wisdom of selecting messages about climate change based on the values of the target audience, including values concerning economics, energy independence, legacy, stewardship, religion, and nationalism). In *Valuing National Security,* I hypothesize that the ability to link reducing demand for fossil fuels and promoting alternative sources of energy with advancing national security goals may affect support for climate change mitigation policies and behaviors not only among key players in Congress, but also among members of the public. *See generally* Light, *supra* note 27.

[124] Thomas E. Kelly, *The Concrete Road to MIC; National Defense and Federal Highways*, *in* WAR, BUSINESS, AND AMERICAN SOCIETY, *supra* note 3, at 133, 134–35.

[125] *Id.* at 134.

[126] *See id.* at 134–35.

[127] *Id*. at 135.

[128] *Id.*

> would require are precisely those which would be required for the operations of war.[129]

The role of the military in stimulating technological innovation, as well as in unlocking financing, has thus been exceptional. But on 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 may provide political cover for those who otherwise might not support investment in clean energy technology solely for civilian purposes or environmental reasons.

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 Harry 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.[130] By issuing an executive order and exploiting the hierarchical nature of his relationship with the military as Commander-in-Chief, Truman was able to have an impact on behavior and attitudes toward racial integration that, some scholars argue, spilled over into the civilian realm.[131]

Though this formal document in no way actually ended segregation overnight, the military acted as a norm-leader in the integration of public life in the United States in ways that arguably had a positive impact on the civilian world. More recent studies have demonstrated that adoption of "green" standards that apply only to government may spill over into the

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[129] *Id.*

[130] Exec. Order No. 9981, 3 C.F.R. 722 (1943–1948); *see* MICHAEL R. GARDNER, HARRY TRUMAN AND CIVIL RIGHTS: MORAL COURAGE AND POLITICAL RISKS 105–21 (2002) (exploring the impetus for, and consequences of, President Truman's executive order); KEVIN J. MCMAHON, RECONSIDERING ROOSEVELT ON RACE: HOW THE PRESIDENCY PAVED THE ROAD TO *BROWN* 177–202 (2004) (exploring President Truman's civil rights legacy).

[131] *Cf.* SAMUEL A. STOUFFER ET AL., THE AMERICAN SOLDIER: ADJUSTMENT DURING ARMY LIFE 594–95 (1949) (finding that greater levels of contact between white and black soldiers in the U.S. military correlated with greater support for racial integration); John Sibley Butler & Kenneth L. Wilson, The American Soldier *Revisited: Race Relations and the Military*, 59 SOC. SCI. Q. 451, 465 (1975) (reaffirming the "contact thesis" by which integration within the military among people of different races, but equal rank and status, reduced negative racial attitudes prior to the U.S. Supreme Court's 1954 *Brown v. Board of Education* decision); Charles C. Moskos, Jr., *Racial Integration in the Armed Forces*, 72 AM. J. SOC. 132, 139–40 (1966) (noting a significant increase in support for integration among both whites and African Americans in the U.S. military between 1943 and 1951, and suggesting that this radical shift was a precipitating factor in the civil rights movement in the United States).

civilian realm even in the absence of mandates on private firms. For example, two researchers found that the U.S. Green Building Council's Leadership in Energy and Environmental Design ("LEED") Standard for Green Buildings diffused more rapidly among *private* developers in municipalities that adopted green procurement policies that *applied only to the government* than in municipalities without such procurement policies, and that these policies also spilled over into neighboring communities.[132] They concluded that "government purchasing policies can break deadlocks that emerge when coordinated investments are required to adopt a common standard and that adoption stimulates the private-sector market for the goods and services targeted by those policies."[133]

In the clean energy context, exceptional behavioral changes may likewise be possible. As Sharon Burke explained:

> 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.[134]

To illustrate this principle, Burke told the story of a Senior Officer who was field-testing energy equipment at a Marine Corps base in southern California.[135] The Senior Officer 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. . . . 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

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[132] Simcoe & Toffel, *supra* note 78, at 1–2. *See generally LEED*, U.S. GREEN BUILDING COUNCIL, http://www.usgbc.org/leed, *archived at* http://perma.cc/NPY5-8SD5 (last visited Apr. 3, 2014).

[133] *Id*. at 3.

[134] Interview with Sharon Burke, *supra* note 62.

[135] *Id.*

> have much experience managing energy as a military capability, enabler, or input.[136]

As this example makes clear, a key element of the Military-Environmental Complex is about developing tools to encourage management of energy as an input.

The military's ability to reduce energy use, particularly from conventional sources such as petroleum in combat operations and existing electricity grids at military installations, is vital to 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.[137] The challenge is to recognize this military exceptionalism and to ask whether and how it can be harnessed.

II. GOVERNMENTAL 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. This Part assesses the governmental institutions and values driving the Military-Environmental Complex.

A. Government Institutions

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 drive the DoD's actions within the Military-Environmental Complex: national security, energy independence, cost, or environmental protection.

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[136] *Id.* Burke pointed out that the protection of fuel lines was an important concern for both the Axis and Allied powers in World War II; the Allies were much more successful at protecting access to fuel, whereas by the end of the war, the Germans were brewing fuel from coal and the Japanese from pine roots and tires. *Id.*; *see also* DANIEL YERGIN, THE PRIZE: THE EPIC QUEST FOR OIL, MONEY & POWER 345–46, 348 (2009) (describing the desperation of Japan's pine root campaign).

[137] 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 15, at 199, 205 & n.22.

1. Congressional Mandates

Despite its inability to pass comprehensive climate-change legislation governing the private sector,[138] Congress has played a key role in the Military-Environmental Complex, both substantively—in directing the military to meet conservation and sustainability goals—and procedurally—by strengthening the institutions within the DoD 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,[139] as amended by, inter alia, the Federal Energy Management Improvement Act of 1988,[140] the Energy Policy Act of 2005 ("EPAct"),[141] and the Energy Independence and Security Act of 2007 ("EISA"),[142] provides the underlying framework and authority for energy conservation and efficiency by federal agencies.[143] Noting that the federal government is the nation's "largest energy consumer,"[144] these statutes require all federal agencies, including the military, to conserve energy and water in federal facilities;[145] create a federal energy efficiency fund to provide grants to agencies for such projects;[146] establish an Interagency Energy Management Task Force to assist in implementation;[147] procure Energy Star products or Federal Energy Management Program ("FEMP")-designated products;[148] and establish government contract incentives to encourage contractor-operated government facilities to reduce federal

[138] For example, 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. H.R. 2454, 111th Cong. (2009); *see American Clean Energy and Security Act of 2009*, GOVTRACK.US, http://www.govtrack.us/congress/bills/111/hr2454, *archived at* http://perma.cc/CTQ4-HHPV (last visited Apr. 3, 2014). Other efforts to address climate change at the federal level have come largely as a result of presidential and Environmental Protection Agency (EPA) action under the existing Clean Air Act, rather than through new legislation. *See Regulatory Initiatives*, EPA, http://www.epa.gov/climatechange/EPAactivities/regulatory-initiatives.html, *archived at* http://perma.cc/G6XD-E9W8 (last updated Sept. 24, 2013) (describing the EPA's recent regulatory initiatives to address climate change).

[139] National Energy Conservation Policy Act of 1978, Pub. L. No. 95-619, §§ 541–551, 92 Stat. 3206, 3277–80 (1978) (codified as amended at 42 U.S.C. §§ 8251–8261 (2006 & Supp. V)).

[140] Federal Energy Management Improvement Act of 1988, Pub. L. No. 100-615, § 2(a), 102 Stat. 3185, 3185–89 (1988) (codified as amended at 42 U.S.C. §§ 8251–8261).

[141] Energy Policy Act of 2005, Pub. L. No. 109-58, §§ 101–105, 119 Stat. 594, 605–11 (2005) (codified as amended at 42 U.S.C. §§ 8253–8259b).

[142] Energy Independence and Security Act of 2007, Pub. L. No. 110-140, §§ 431, 432, 434, 441, 511, 516, 524, 525, 121 Stat. 1492, 1607–11, 1614–15, 1623, 1658, 1659, 1662–63 (2007) (codified as amended at 42 U.S.C. §§ 8253–8259b).

[143] *See* 42 U.S.C. §§ 8251–8261.

[144] *Id.* § 8251(1).

[145] *Id.* § 8253.

[146] *Id.* § 8256(b).

[147] *Id.* § 8257.

[148] *Id.* § 8259b.

energy costs.[149] The EPAct of 2005 also requires the government to generate or purchase its electricity with increasing levels of new renewable energy sources.[150] Other examples of general directives to federal agencies include the requirement for agencies to reduce non-tactical fleet vehicle petroleum use by 20% by fiscal year 2015,[151] and the requirement in Section 431 of EISA that federal buildings reduce energy intensity by 30% by fiscal year 2015 compared to a baseline of fiscal year 2003 emissions.[152]

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 directed 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 . . . ."[153] Congress directed the DoD to consider using solar or other forms of renewable energy for facilities construction projects, including housing;[154] to use energy-efficient (Energy Star/FEMP) products in such housing;[155] and to prefer energy-efficient equipment generally.[156] Congress also mandated that the DoD prefer hybrid, electric, or plug-in vehicles that are of reasonable cost and meet departmental needs.[157]

Congress has provided financial incentives for the DoD to meet these goals[158] and requires annual progress reports[159] as well as the development

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[149] *Id.* § 8256(a).

[150] Energy Policy Act of 2005, Pub. L. No. 109-58, § 203, 119 Stat. 594, 652–53 (2005) (codified as amended at 42 U.S.C. § 15852 (2006)) (requiring that, "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% renewable energy in fiscal years 2007 through 2009, not less than 5% in fiscal years 2010 through 2012, and not less than 7.5% 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, 62–63 (2013) (describing the history of mandates for renewables).

[151] 42 U.S.C. § 6374e (2006).

[152] Energy Independence and Security Act of 2007, Pub. L. No. 110-140, § 431, 121 Stat. 1492, 1607 (2007) (codified as amended at 42 U.S.C. § 8253(a)(1) (2006 & Supp. V)). Although 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. *See* SSPP FY 2010, *supra* note 6, at II-7.

[153] 10 U.S.C. § 2911(e) (2012).

[154] *Id.* § 2915(a); *see also id.* § 2922f (governing the procurement of energy systems using renewable forms of energy).

[155] *Id.* § 2915(e).

[156] *Id.* § 2922b.

[157] *Id.* § 2922g (providing that this preference does not apply to "tactical vehicles designed for use in combat").

[158] *Id.* §§ 2912, 2916.

[159] *Id.* § 2911(a).

of an energy master plan,[160] but it has not otherwise spelled out any enforcement mechanisms.[161] 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.[162] 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.[163]

Perhaps most importantly for the DoD's ability to utilize private financing for major renewable energy projects, Congress has authorized the DoD to enter into thirty-year Power Purchase Agreements ("PPAs") with private developers to promote the development of alternative energy generation on military lands.[164] 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."[165] The DoD is unique among federal agencies in its ability to enter into such long-term PPAs. Other agencies, in contrast, are limited to shorter contracts, which have not provided the necessary incentives for private financiers to invest in these projects because initial investments can only be recouped on a longer time horizon.[166]

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 (the energy used 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 noncombat capacity.[167] At first glance, one might think that this reflects tension between the military's mission and clean energy goals. To under-

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[160] *Id.* § 2911(b).

[161] 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. *Id.* § 2911(c).

[162] *Id.* § 2912.

[163] *Id.* § 2916.

[164] *Id.* § 2922a.

[165] *Id.* This specific authorization by Congress is necessary to avoid violating the Antideficiency Act, which prohibits the obligation of funds in excess of an appropriation without authorization. 31 U.S.C. § 1341 (2012); *see* Geraldine E. Edens et al., *Government Purchasing of Efficient Products and Renewable Energy*, *in* THE LAW OF CLEAN ENERGY: EFFICIENCY AND RENEWABLES 123 (Michael B. Gerrard ed., 2011).

[166] *See infra* notes 260–289 and accompanying text.

[167] *See, e.g.*, 10 U.S.C. § 2911(e) (governing reduction in facility energy use); 42 U.S.C. § 8253(a) (2006 & Supp. V) (governing energy performance requirements for federal buildings).

stand why this picture is not fully accurate, it is important to appreciate the distinction between operational energy and facilities energy.[168] 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."[169] 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."[170] In contrast, facilities energy "includes energy needed to power fixed installations and non-tactical vehicles."[171] Operational energy accounts for approximately 75% of DoD energy use, while facilities energy accounts for the remaining 25%.[172]

The line between facilities energy and operational energy can be blurry. For example, the military employs unmanned aerial vehicles, commonly known as "drones," which may be remotely piloted by personnel sitting in a facility within the United States.[173] Although 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.

Another way that Congress has treated operational energy differently is through rules regarding federal buildings, which are exempt from energy conservation and efficiency requirements if they are used in the performance of a national security function,[174] an exemption that dovetails with the facilities/operations distinction, though in different language. In addition, Congress's goal that the DoD produce or procure 25% of its energy from renewable sources by 2025 applies only to energy that powers military facilities, not operations.[175] Furthermore, federal agencies are required by statute to procure Energy Star or FEMP-designated products unless the agen-

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[168] 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. *See infra* notes 186–194 and accompanying text.

[169] 10 U.S.C. §§ 138c(h)(1), 2924(5).

[170] ENERGY FOR THE WARFIGHTER, *supra* note 63, at 3.

[171] AEMR FY 2012, *supra* note 52, at 15 n.2.

[172] ENERGY FOR THE WARFIGHTER, *supra* note 63, at 3.

[173] *See* SSPP FY 2010, *supra* note 6, at I-2; Interview with John Lushetsky, *supra* note 69 ("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.").

[174] 42 U.S.C. § 8253(c)(1)(B)(ii) (2006 & Supp. V).

[175] *See* 10 U.S.C. § 2911(e) (2012).

cy head determines in writing that a statutory exception applies.[176] 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."[177] Other similar exemptions for operational energy use are widespread.

2. Presidential Directives

Congress is not the only political institution shaping the Military-Environmental Complex. The President has likewise played a role, directing all federal agencies, including the DoD, to improve their energy profiles and thereby lead the nation by example. For example, in 2009, President Barack Obama signed Executive Order 13,514, which requires all federal agencies to disclose greenhouse gas emissions information annually from their direct and indirect activities.[178] The order also directs each agency to propose to the White House agency-wide greenhouse gas emissions reduction targets to reach by fiscal year 2020 as compared to a fiscal year 2008 baseline.[179] The executive order, however, includes a number of exemptions from these reduction targets for national security and military operations, including for particular facilities and for military tactical vehicle fleets,[180] where the exemption would be "in the interest of national security."[181]

Executive Order 13,423, signed by President George W. Bush in 2007, similarly directed federal agencies to improve energy efficiency, reduce greenhouse gas emissions and water consumption, acquire sustainable goods, and maintain sustainable federal vehicle fleets.[182] That executive order also expanded the requirement in the EPAct of 2005 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 ser-

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[176] 42 U.S.C. § 8259b(b); *see also* 42 U.S.C. § 6294a (Energy Star program). Section 104 of the EPAct of 2005 further directed the DOE to promulgate regulations carrying out the statute, which the DOE finalized on March 13, 2009. *See* Energy Policy Act of 2005, Pub. L. No. 109-58, § 104, 119 Stat. 594, 609–11 (2005) (codified as amended at 42 U.S.C. § 8259b); Federal Procurement of Energy Efficient Products, 74 Fed. Reg. 10,830 (Mar. 13, 2009) (codified at 10 C.F.R. pt. 436).

[177] 42 U.S.C. § 8259b(a)(5).

[178] Executive Order on Sustainability, *supra* note 37.

[179] *Id*.

[180] Exempted vehicles are "vehicles used in combat support, combat service support, tactical or relief operations, or training for such operations." *Id.*

[181] *Id.* ("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)).

[182] Strengthening Federal Environmental, Energy, and Transportation Management, Exec. Order No. 13,423, 3 C.F.R. 193 (2008).

vice after January 1, 1999."[183] That order, however, expressly excludes activities and resources outside the United States and permits the head of an agency to exempt military tactical vehicle fleets from its requirements.[184]

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. Such a view obscures the military's significant internal initiatives to reduce its energy use, render energy use more efficient, change behavior, and 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.[185]

3. Operational Energy

Indeed, although 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 ("OEPP") within the DoD.[186] OEPP 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 mandate reductions in the operational sphere.[187]

Congress tasked OEPP Director to "provide leadership and facilitate communication regarding, and conduct oversight to manage and be accountable for, operational energy plans and programs within the Department

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[183] *Id.*; *see* Scholtes, *supra* note 150, at 62–63 (describing the Army's response to these legal changes).

[184] Strengthening Federal Environmental, Energy, and Transportation Management, Exec. Order No. 13,423, 3 C.F.R. 193 (2008).

[185] 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 dovetails with environmental goals of conservation. The same may or may not be true in other contexts, such as with respect to private firms.

[186] Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, Pub. L. No. 110-417, § 902, 122 Stat. 4356, 4564–66 (2008).

[187] *Cf.* Matthew D. McCubbins, Roger G. Noll, & Barry R. Weingast, *Structure and Process, Politics and Policy: Administrative Arrangements and the Political Control of Agencies*, 75 VA. L. REV. 431, 435–45 (1989) (arguing that the legislature can best control agencies by creating structural and procedural constraints). In the National Defense Authorization Act for Fiscal Year 2011, Congress redesignated the Director as the Assistant Secretary of Defense for Operational Energy Plans and Programs. Ike Skelton National Defense Authorization Act for Fiscal Year 2011, Pub. L. No. 111-383, § 901(a)(1)(B), 124 Stat. 4137, 4317 (2011).

of Defense and the Army, Navy, Air Force, and the Marine Corps," and to "establish the operational energy strategy" for the DoD.[188] Congress further directed each service within the military to designate a senior official responsible for operational energy matters within that service to report to the new Director.[189] Finally, Congress directed the DoD to prepare an annual report on operational energy to Congress, detailing "[s]tatistical 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 of funding for those initiatives, an "evaluation of progress" made by the DoD in implementation and scientific development, and any recommendations of the OEPP Director.[190]

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. . . . 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.[191]

In support of this "sense," Congress cited the Defense Science Board's 2008 report titled "More Fight—Less Fuel,"[192] 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.[193]

Thus, Congress created OEPP to consolidate these strategic concerns and decision making in one office and to report directly to the Secretary of De-

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[188] Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 § 902(a).

[189] *Id*.

[190] *Id.* § 331.

[191] National Defense Authorization Act for Fiscal Year 2010, Pub. L. No. 111-84, § 903(a), 123 Stat. 2190, 2423–24 (2009).

[192] *Id*. § 903(a)(3).

[193] *See* DEF. SCI. BD., REPORT OF THE DEFENSE SCIENCE BOARD TASK FORCE ON DOD ENERGY STRATEGY: MORE FIGHT—LESS FUEL 4 (2008), *available at* http://www.acq.osd.mil/dsb/reports/ADA477619.pdf, *archived at* http://perma.cc/8ZH5-DK44.

fense.[194] Yet this push to promote the focus on operational energy through procedural mechanisms, such as the creation of a special office and the requirement of information disclosure in the form of reporting, did not come from Congress—it came largely from within the military itself.

4. 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. As noted above, however, the DoD itself has internal incentives to reduce energy demand, increase efficiency, and explore alternative sources of fuel. Long before Congress created the OEPP or required reporting on operational energy use, military commanders serving in both Iraq and Afghanistan 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, First Marine Division, Operation Iraqi Freedom, declared that the DoD must "unleash us from the tether of fuel."[195] 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, asking for 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 of war.[196] In 2008, oil prices

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[194] *See* National Defense Authorization Act for Fiscal Year 2010 §§ 903(a)(4)–(5), 903(b). In contrast, the DoD's policy for facilities energy is carried out through the Office of the Deputy Under Secretary of Defense ("DUSD") for Installations and Environment, currently headed by Acting DUSD John Conger. *See* DEP'T OF DEF., INSTRUCTION 4170.11, at 6 (Dec. 11, 2009), *available at* http://www.dtic.mil/whs/directives/corres/pdf/417011p.pdf, *archived at* http://perma.cc/TNE6-X3GT (describing the responsibilities of the DUSD for Installations and Environment); *Facilities Energy Policy and Program Guidance*, OFF. OF THE DEPUTY UNDER SECRETARY OF DEF., INSTALLATIONS AND ENV'T., http://www.acq.osd.mil/ie/energy/about.shtml, *archived at* http://perma.cc/M6MQ-QYSB (last updated Dec. 20, 2012) (listing key statutes, executive orders, reports, DoD Instructions, and other sources guiding the activities of the Office of the DUSD for Installations and Environment).

[195] *See* DEF. SCI. BD., *supra* note 193; Kenneth Hudak, *Lengthening the Tether of Fuel in Afghanistan*, ARMY SUSTAINMENT MAG., Mar.–Apr. 2013, at 24, 24; Bill Lynn, *Energy for the War Fighter: The Department of Defense Operational Energy Strategy*, WHITE HOUSE BLOG (June 14, 2011, 3:15 PM), http://www.whitehouse.gov/blog/2011/06/14/energy-war-fighter-department-defense-operational-energy-strategy, *archived at* http://perma.cc/45U7-GBMT; Louis Peck, *New Mission for U.S. Military: Breaking Its Dependence on Oil*, YALE ENV'T 360 (Dec. 8, 2010), http://e360.yale.edu/feature/new_mission_for_us_military_breaking_its_dependence_on_oil/2348/, *archived at* http://perma.cc/KR5V-MFNV.

[196] Paul McLeary, *Army and Marines Go Fossil Fuel-Free*, WORLDWATERSOLAR.COM (May 24, 2011), http://www.worldwatersolar.com/wp-content/uploads/2011/08/PEAK-Army-And-Marines-Go-Fossil-Fuel-Free-May-24-2011-Aviation-Week.pdf, *archived at* http://perma.cc/6N6S-6LDN; *see* ARMY ENVTL. POLICY INST., *supra* note 63, at 1 ("MG Zilmer's request was to reduce the amount of fuel

spiked to a high of $145 per barrel.[197] This brought the cost issue to a head. In 2008, Congress responded to these requests from the DoD in the annual NDAA, directing the creation of OEPP to focus on ways to reduce and improve operational energy use.[198] In 2010, President Obama formally established OEPP, naming Sharon Burke as its inaugural head.[199]

The DoD has also responded to this institutional prodding from the President and Congress. For example, in August 2010, in response to the President's Executive Order on Sustainability, the DoD prepared the Department of Defense's first 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."[200] In June 2011, consistent with the mandate Congress set forth in 10 U.S.C. § 138c,[201] the DoD set forth its Operational Energy Strategy, which was aptly titled "Energy for the Warfighter."[202] That strategy lays out the overarching aim of achieving greater energy security in operations through improved information about actual energy use; programs to reduce energy consumption and increase efficiency; the development of alternative fuel sources and infrastructure protection at key military installations; and the incorporation of operational energy issues into DoD-wide planning, requisitioning, and procurement.[203] The DoD's Operational Energy Strategy identifies key challenges that the DoD faces with respect to operational energy needs.[204] One challenge is the exponential rise in demand for energy in the theater of war resulting from the use of new technology, including significant increases in the number and weight of batteries.[205]

In March 2012, the DoD published its Operational Energy Strategy Implementation Plan, which outlined in greater detail how the DoD intend-

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needed in order to save lives; in effect, he asked that DoD measure the cost of fuel in blood, not dollars.").

[197] *Cushing, OK WTI Spot Price FOB (Dollars Per Barrel)*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RWTC&f=D, *archived at* http://perma.cc/B7YZ-6S7A (last updated Feb. 12, 2014).

[198] *See supra* notes 186–194 and accompanying text.

[199] *See* U.S. DEP'T OF DEF., FISCAL YEAR 2011 OPERATIONAL ENERGY ANNUAL REPORT 2 (2013), *available at* http://energy.defense.gov//Portals/25/Documents/Reports/20130311_FY2011OperationalEnergyAnnualReport.pdf, *archived at* http://perma.cc/L9JS-7LHA; *What Is the Price of Energy Security: From Battlefields to Bases: Hearing Before the Subcomm. on Readiness of the H. Comm. on Armed Servs.*, 112th Cong. 6–11 (2012) (Statement of Sharon Burke, Assistant Sec'y of Def. for Operational Energy, U.S. Dep't of Def.).

[200] SSPP FY 2010, *supra* note 6, at i.

[201] *See* 10 U.S.C. § 138c(d) (2012).

[202] *See* ENERGY FOR THE WARFIGHTER, *supra* note 63, at 4.

[203] *See id*. at 1–10.

[204] *See id.*

[205] *See id*. at 4.

ed to accomplish these three broad objectives.[206] In order to achieve its goals, the DoD committed to gathering data about energy use; increasing efficiency in operations; promoting operational energy innovation through science and technology to reduce demand, improve efficiency, and develop alternative sources of energy; improving energy security at fixed installations; promoting alternative fuels;[207] incorporating energy security into planning, requirements, and acquisition; and adopting policy and educational initiatives.[208]

5. Coordination with Other Agencies

The DoD has committed to working in concert with other federal 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. Most important in this regard, the DoD has entered into three Memoranda of Understanding ("MOUs") with other agencies: the Department of Energy ("DOE"),[209] the Department of the Interior ("DOI"),[210] and the Environmental Protection Agency (EPA).[211]

The MOU with the 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."[212] This includes using military installations as a "test bed to demonstrate and create a market for innovative energy efficiency and renewable energy technologies coming out of DOE laboratories" and

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[206] DEP'T OF DEF., OPERATIONAL ENERGY STRATEGY: IMPLEMENTATION PLAN 1–7 (2012) [hereinafter IMPLEMENTATION PLAN].

[207] Notably, the DoD requires alternative fuels to be "'drop in' (i.e., compatible with current equipment, platforms, and infrastructure . . . [and] 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 "[l]ifecycle greenhouse gas emissions must be less than or equal to such emissions from conventional fuel." ENERGY FOR THE WARFIGHTER, *supra* note 63, at 9 (citing Energy Independence and Security Act of 2007, Pub. L. No. 110-140, § 526, 121 Stat. 1492, 1663 (2007) (codified as amended at 42 U.S.C. § 17142 (2006 & Supp. V))).

[208] IMPLEMENTATION PLAN, *supra* note 206, at 3–7.

[209] DOE MOU, *supra* note 26, at 1.

[210] Memorandum of Understanding Between the Dep't of Def. and the Dep't of the Interior 1 (July 20, 2012) [hereinafter DOI MOU], *available at* http://www.defense.gov/news/d20120806idmou.pdf, *archived at* http://perma.cc/RPD2-5J2N.

[211] Memorandum of Understanding Between the U.S. Envtl. Prot. Agency Office of Research and Dev. and the Office of the Deputy Under Sec'y of Def. for Installations and Env't 1 (Feb. 7, 2012) [hereinafter EPA MOU], *available at* http://www.epa.gov/ORD/memo_of_understanding.pdf, *archived at* http://perma.cc/XC3Y-82FE.

[212] DOE MOU, *supra* note 26, at 1.

other sources.[213] The partnership permits the DOE to hasten the development of new technologies through the DoD's pilot testing, collaboration, and deployment of these technologies.[214] 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."[215]

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."[216] 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,[217] as well as other types of renewable energy projects harnessing solar, wind, geothermal, and biomass energy.[218] 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."[219] Finally, the DoD's MOU with the EPA focuses on using the DoD's installations as "test beds for innovative technologies and approaches" to support the development of sustainable infrastructure.[220]

B. Values: "Unleash Us From the Tether of Fuel"

The values driving these governmental actors to pursue policies that reinforce the Military-Environmental Complex are both complementary and in conflict. Although the DoD's primary driver is its mission, including risks to national security arising from climate change, other players in the

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[213] *Id*. There are seventeen DOE research laboratories, including Lawrence Berkeley National Laboratory and Fermi National Accelerator Laboratory. *Office of Science Laboratories*, U.S. DEP'T OF ENERGY, http://science.energy.gov/laboratories/, *archived at* http://perma.cc/TSM6-TVHQ (last updated Dec. 20, 2013).

[214] *See* DOE MOU, *supra* note 26, at 2–3.

[215] *Id*. at 2.

[216] DOI MOU, *supra* note 210, at 1; *see* Press Release, *supra* note 56; Ucilia Wang, *U.S. Military's Big Plan for Renewable Energy Projects*, FORBES (Aug. 6, 2012, 2:01 PM), http://www.forbes.com/sites/uciliawang/2012/08/06/u-s-military-opens-up-16m-acres-for-renewable-energy-projects/, *archived at* http://perma.cc/Z8S9-HDWT.

[217] DOI MOU, *supra* note 210, at 3.

[218] *Id*. at 2–3.

[219] *Id.* at 2.

[220] EPA MOU, *supra* note 211, at 1.

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 EISA that prohibited federal agencies from purchasing petroleum from any source that emitted more greenhouse gases over its lifecycle than conventional petroleum.[221] Evidencing the DoD's primary motivation of mission, rather than energy independence or cost, the DoD advocated retaining the provision.[222] 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 perpetuated reliance on fossil fuels. 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."[223]

For the DoD, climate change is a source of geopolitical instability that affects the military's mission.[224] The DoD has played a key role in the Military-Environmental Complex as a validator of climate science. In February 2010, for instance, the DoD issued its Quadrennial Defense Review Report, which concluded:

> First, 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

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[221] *See* Energy Independence and Security Act of 2007, Pub. L. No. 110-140, § 526, 121 Stat. 1492, 1663 (2007) (codified as amended at 42 U.S.C. § 17142 (2006 & Supp. V)).

[222] *See* Stein, *Agency Action*, *supra* note 18, at 693.

[223] Letter from Elizabeth King, Assistant Sec'y of Def. for Legislative Affairs, to Jeff Bingaman, Chairman, U.S. Senate Energy and Natural Res. Comm. (July 12, 2011), *available at* http://www.energy.senate.gov/public/index.cfm/2011/7/press-473d1eab-d00f-42ba-939d-02a0989b536a, *archived at* http://perma.cc/U7WZ-BHFV; *see* Elizabeth McGowan, *Congress Trying Again to Repeal Ban on Carbon-Heavy Fuels for Military*, INSIDECLIMATE NEWS (July 25, 2011), http://insideclimatenews.org/news/20110725/section-526-unconventional-carbon-fuels-oil-sands-pentagon, *archived at* http://perma.cc/PY2N-N74H; *see also* H.R. REP. NO. 112-78, at 175–76 (2011) (proposing to exempt the DoD from Section 526 of EISA).

[224] *See* Freeman & Guzman, *supra* note 100, at 1576–77; Thaler, *supra* note 100, at 1117–18.

> 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.[225]

The DoD thus recognizes that climate change can accelerate conflict in ways that affect the national security of the United States.[226] 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.[227] 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.[228] Energy efficiency and reduced use in this way can act as a "force multiplier" —missions can go farther without refueling, running generators, or bringing fuel convoys to the battlefield.[229]

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.[230] This role as a validator of climate science is not without its critics.[231] To a large extent, this dispute reflects a difference as to 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 Senator 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 on "climate change activities."[232] Conflating these expenditures of all federal agencies with those of

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[225] QDR 2010, *supra* note 20, at 84–85; *see also* QDR 2014, *supra* note 20, at 8.

[226] *See supra* note 26 and accompanying text.

[227] *See* Andrew E. Kramer, *Russia Preparing Patrols of Arctic Shipping Lanes*, N.Y. TIMES, Sept. 15, 2013, at A8, *available at* http://www.nytimes.com/2013/09/15/world/europe/russia-preparing-patrols-of-arctic-shipping-lanes.html, *archived at* http://perma.cc/9X5P-X85T.

[228] *See supra* note 203 and accompanying text.

[229] *See supra* note 26 and accompanying text. As General John Allen explained in December 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." ENERGY INVESTMENTS, *supra* note 28, at 3.

[230] *See* OFFICE OF PUB. AFFAIRS, *supra* note 60, at 2 ("Years of war have demanded that America's Armed Forces rapidly innovate and adapt[,] . . . [in part by] [d]eveloping enterprise-wide climate change and energy strategies.").

[231] *See* Editorial, *Panetta's Next War*, WASH. TIMES, May 8, 2012, at B2.

[232] 158 CONG. REC. S3266–67 (daily ed. May 17, 2012) (statement of Sen. James Inhofe); Memorandum from Jane A. Leggett, Specialist in Envtl. and Energy Policy, Cong. Research Serv., to Senator James M. Inhofe 7 (Apr. 26, 2012) [hereinafter CRC Report], *available at* http://

the DoD, Inhofe stated, "In reality, it is President Obama's war on affordable energy that is having a dramatic impact on our national security, a war that is further depleting an already stretched military budget and putting our troops at risk."[233] Using the military budget to fund unproven climate change technologies, according to Senator Inhofe, is

> not only wrong . . . it is reckless. [The money that the] DoD has spent . . . on climate change and energy-efficient activities . . . could have been used to purchase 30 brandnew [sic] F-35 Joint Strike Fighters, 28 new F-22 Raptors, or completely pay for the C-130 Aviation Modernization Program that we have been working on for a long period of time.[234]

Instead of focusing on the DoD's own interpretation of its mission and national security, Inhofe has also 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 greater greenhouse gas footprint than crude oil.[235] 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.

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, one news media outlet has 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

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www.givewell.org/files/labs/climate%20change/CRS,%20Funding%20for%20Climate%20Change.pdf, *archived at* http://perma.cc/8RMY-GN3A. The Congressional Research Service report clarifies that the DoD expended approximately $776 million on the four climate-change-related programs reported therein. CRC Report, *supra*; *see* Richard Butrick, *Panetta Uses Military Budget to Prop Up Green Energy Firms*, AM. THINKER (May 21, 2012), http://www.americanthinker.com/blog/2012/05/panetta_uses_military_budget_to_prop_up_green_energy_firms.html#ixzz2UDlyMWYv, *archived at* http://perma.cc/RWW4-DHKM; Hope Hodge, *Inhofe Delivers Senate Floor Takedown of Military 'Green' Agenda*, HUMAN EVENTS (May 18, 2012, 6:20 AM), http://www.humanevents.com/2012/05/18/inhofe-delivers-senate-floor-takedown-of-military-green-agenda/, *archived at* http://perma.cc/KX9C-JXNH; Caroline May, *Federal Government Spent Nearly $70 Billion on 'Climate Change Activities' Since 2008*, DAILY CALLER (May 17, 2012, 6:13 PM), http://dailycaller.com/2012/05/17/federal-government-spent-nearly-70-billion-on-climate-change-activities-since-2008/, *archived at* http://perma.cc/E6Z-SWWN.

[233] 158 CONG. REC. S3267 (daily ed. May 17, 2012) (statement of Sen. James Inhofe).

[234] *Id.*

[235] *See* Hodge, *supra* note 232.

> 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?[236]

To a large extent, these critics miss the mark—at least according to the DoD itself—by 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 to avoid increased geopolitical 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 institutions 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 leveraging private financing for major renewable energy infrastructure projects on military lands to power its installations.[237] In this interconnectedness is an important lesson: the potential of the Military-Environmental Complex lies not only in the ability of the military to support the development of new technologies with potential spillover *into* the private sector, but also to draw lessons and experience *from* the private sector.[238]

The money involved in these projects creates incentives for private firms to lobby both Congress and the DoD to adopt certain technologies and enter into lucrative contracts. The risk echoes that of the military-industrial complex – that there may be only slim connections between these technologies and contracts and the DoD's mission. In some cases, these projects might harm the environment. For example, Congress has directed the DoD to study coal-to-liquid fuels as an alternative energy source on the battle-

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[236] *Billions for Climate, Not One More Cent for Defense*, INVESTOR'S BUS. DAILY (May 18, 2012, 7:00 PM), http://news.investors.com/ibd-editorials/051812-612092-defense-billions-to-fight-climate-change-.htm#ixzz2UDoHggEi, *archived at* http://perma.cc/HK6T-5NVB.

[237] *See supra* notes 164–165 and accompanying text.

[238] *See* CTR. FOR STRATEGIC LEADERSHIP, U.S. ARMY WAR COLL., SUSTAINABILITY AND NATIONAL SECURITY, at vii (2012) (noting that the military often models its sustainable energy policies on the practices of private industry). *See generally* Goldberg Prods., Marstel Day & Darden Sch. of Bus., The Business Case for Sustainability in the U.S. Army (Mar. 2013) (on file with author) [hereinafter Business Case for Sustainability] (proposing sustainability best practices from the private sector that the military could adopt); Stowsky, *supra* note 13 (describing spin-on technology as an important component of government-supported innovation).

field.[239] In other cases, however, 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 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 pay significant upfront costs for major energy infrastructure projects on military lands to power its installations. Second, the DoD, at times in cooperation with other agencies, provides funding to private sector firms to finance the development of new technologies in test bed initiatives that may ultimately have civilian spin-off potential. Third, the private sector educates 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 as well. This Part explores how these various relationships create a multi-dimensional conversation between government and the private sector that has the potential to affect 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."[240] With nearly all renewable energy technologies currently more expensive per kilowatt-hour than conventional petroleum and fossil-fuel based energy,[241] demand and private investment in renewable energy generation is limited due to the longer time horizon that is required to recoup capital investments. In particular, experts in new energy finance have identified two locations of insufficient capital.[242] The first is "early in a technology's development, just as it is ready to exit the lab" —immediately after the so-called "Technology Creation stage" in which universities or national laboratories fund technol-

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[239] *See infra* notes 326–328 and accompanying text.

[240] *See* BLOOMBERG NEW ENERGY FIN., *supra* note 95, at 3–7 (describing the need for capital investment in clean energy technologies); ELIOT JAMISON, CALCEF INNOVATIONS, FROM INNOVATION TO INFRASTRUCTURE: FINANCING FIRST COMMERCIAL CLEAN ENERGY PROJECTS 1 (2010) ("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.'"); *supra* note 95 and accompanying text (describing this term).

[241] *See* BLOOMBERG NEW ENERGY FIN., *supra* note 95, at 4. This assumes, of course, that there is no carbon tax on externalities or other equivalent regulation that would reduce the difference in cost between renewable and fossil-fuel based energy.

[242] *Id.* at 5.

ogy development, but before venture capital becomes available.[243] The second valley occurs after venture-capital financing but before the technology becomes commercially available and before the technology is proven on a widespread-enough scale that banks will be willing to lend capital for large projects.[244] 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*.[245]

Thus, some commentators contend that "only with the public sector's help" can this Commercialization Valley of Death be surmounted.[246] One organization, for example, has called for a variety of funding sources to overcome the Valley of Death, ranging from direct government funding and insurance products to public-private risk sharing and procurement solutions.[247]

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 on 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 track record in helping to support the development of new technologies. If such new energy technology and

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[243] *Id*.

[244] *Id*. at 5–6.

[245] *Id*. at 6. Bloomberg New Energy Finance 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*.

[246] BLOOMBERG NEW ENERGY FIN., *supra* note 95, at 6; *see also* Erin Dewey, Note, *Sundown and You Better Take Care: Why Sunset Provisions Harm the Renewable Energy Industry and Violate Tax Principles*, 52 B.C. L. REV. 1105, 1111–12 (2011) (arguing that "[hi]gh costs and high risks chill investment in renewable energy, creating a need for government incentives").

[247] JAMISON, *supra* note 240, at 2. In particular, the proposal calls for

> 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 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.

Id.

sustainable methods are a social good, this demand for DoD support may be of great social benefit.

Notably, the military's more recent track record of adopting off-the-shelf technologies, rather than creating military-specific new technologies, has been a key part of the Military-Environmental Complex. The DoD's budget for fiscal year 2013 authorizes the DoD to expend more than $1.1 billion on energy conservation and efficiency—primarily in existing buildings—but these efforts largely use existing commercial technology and methods rather than technological innovation.[248] For instance, they often involve lighting retrofits, more efficient heating and cooling systems, and such low-hanging fruit as "double-pane windows, energy management control systems, and new roofs."[249]

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. DoD leadership understands that, "[a]bsent outside validation . . . these new technologies will not be widely deployed in time to meet our requirements."[250] 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.[251] Thus, the DoD can serve two important roles: as a first-user to evaluate the new "precommercial" technology, and as an early customer "thereby helping create a market, as it did with aircraft, electronics, and the internet."[252]

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").[253] Among other purposes, the SERDP is designed to address environmental issues of concern to the DoD and the 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"[254] and to "identify technologies developed by the private sector that are useful" for the de-

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[248] *See* AEMR FY 2012, *supra* note 52, at 71–74.

[249] *Id.*

[250] *Installation Energy Test Bed*, SERDP, http://www.serdp.org/Featured-Initiatives/Installation-Energy, *archived at* http://perma.cc/5PP7-7T98 (last visited Apr. 3, 2014).

[251] *Id*.

[252] *Id*.

[253] National Defense Authorization Act for Fiscal Year 1991, Pub. L. No. 101-510, § 1801(a), 104 Stat. 1485, 1750–57 (1990) (codified as amended at 10 U.S.C. § 2901–04 (2012)).

[254] 10 U.S.C. § 2901(b)(1).

partments.[255] Under the auspices of the 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."[256]

In 2009, under the auspices of the ESTCP and SERDP, the DoD's Installation Energy Test Bed Initiative began annually awarding funding to installation (facility) energy management projects submitted by private firms, universities, national laboratories, and other organizations on a competitive basis.[257] Recent projects funded in 2013 include 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.[258] 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.[259]

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 financing to adopt existing commercial technologies that 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 secu-

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[255] *Id.* § 2901(b)(4).

[256] *About ESTCP*, SERDP, http://www.serdp.org/About-SERDP-and-ESTCP/About-ESTCP, *archived at* http://perma.cc/M4CS-YM9U (last visited Apr. 3, 2014).

[257] *See Installation Energy Test Bed*, *supra* note 250; *New Installation Energy and Water Technology Demonstrations Announced for FY 2013*, SERDP (Dec. 13, 2012), http://www.serdp.org/News-and-Events/News-Announcements/Program-News/New-installation-energy-and-water-technology-demonstrations-announced-for-FY-2013, *archived at* http://perma.cc/8WSB-2WMZ [hereinafter *FY 2013 Demonstrations*].

[258] *FY 2013 Demonstrations*, *supra* note 257.

[259] *See* AEMR FY 2011, *supra* note 52, at 49–50 (noting the existence of microgrid and advanced installation management technology demonstration projects at Fort Bliss, Texas (Lockheed Martin), Twentynine Palms, California (General Electric), Los Angeles Air Force Base (Lawrence Berkeley National Laboratory), and elsewhere); *see also DoD Study Finds Microgrids Offer Improved Energy Security for DoD Installations*, SERDP (July 10, 2012), http://www.serdp.org/News-and-Events/News-Announcements/Program-News/DoD-study-finds-microgrids-offer-improved-energy-security-for-DoD-installations, *archived at* http://perma.cc/922X-8K5W (reviewing a study examining the cost-effectiveness of advanced microgrids). Microgrids involve the interconnection of "multiple [energy] sources and loads into an integrated system that can then be optimized for reliability, efficiency, and/or cost." LINCOLN LAB., MASS. INST. OF TECH., MICROGRID STUDY: ENERGY SECURITY FOR DOD INSTALLATIONS, at iii (2012).

rity for its facilities. Key statutory authority enables the DoD to leverage private financing by, for instance, entering into thirty-year PPAs for renewable energy,[260] enhanced-use leases,[261] and energy-savings performance contracts.[262] Congressional authorization for these unique financing partnerships has been crucial.

1. Thirty-Year Power Purchase Agreements

Under 10 U.S.C. § 2922a, the DoD has unique statutory authority among federal agencies to enter into PPAs of up to thirty 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."[263] According to the House Report from 1982, when Congress enacted the provision, "[t]he 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."[264] Pursuant to other authority under Section 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.[265]

In contrast, other federal agency PPAs for the purchase of utility services are governed by the Federal Acquisition Regulation, Part 41,[266] and the relevant statutory authority, 40 U.S.C. § 501.[267] The GSA procures utility services on behalf of other agencies,[268] but it is only permitted to enter into contracts with terms of ten years or less.[269] This timeline has a profound impact on the willingness of private firms to finance the development of renewable technology infrastructure, as renewables often do not return sufficient payback within the ten-year timeframe.

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[260] 10 U.S.C. § 2922a (2012).

[261] *Id.* § 2667.

[262] *Id.* § 2913; 42 U.S.C. § 8287 (2006 & Supp. V).

[263] 10 U.S.C. § 2922a(a); *see also* DoD Financing Guidance, *supra* note 194, at 1 (referring to the authority in 10 U.S.C. § 2922a as a "special agreement authority").

[264] H.R. REP. NO. 97-612, at 30 (1982), *reprinted in* 1982 U.S.C.C.A.N. 441, 470.

[265] 10 U.S.C. § 2916.

[266] FAR pt. 41 (2012).

[267] 40 U.S.C. § 501 (2006 & Supp. V).

[268] *Id.* § 501(b)(1)(A).

[269] *Id.* § 501(b)(1)(B); FAR 41.103(a)(1).

2. Enhanced-Use Leases

The DoD can also lease property for large-scale renewable energy generation projects under its so-called "enhanced-use lease" authority.[270] Upon a determination by the Secretary of Defense that such a lease will "promote the national defense or . . . be in the public interest," the DoD may lease certain real or personal property that is not needed for public use, receiving in return either cash or in-kind consideration at fair market value.[271] These leases are often called "enhanced-use leases," though they are not named as such by statute.[272] The authorizing statute expressly contemplates that in-kind consideration may include the construction of new facilities, the provision of facilities for use, or the provision or payment of utility services.[273] Installations using enhanced-use lease authority can accept in-kind consideration in the form of a discount on the DoD's electric bill or in the form of infrastructure that will enhance energy security.[274] Such leases may be for a term of five years, unless the Secretary determines that a longer lease "will promote the national defense or be in the public interest."[275] 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 (among other things) a renewable energy generation facility, but the agreement "shall be limited in term to the useful life of the energy production facility" because long-term leases of DoD land can be "detrimental to the long-term ability of the DoD to manage its property portfolio."[276]

3. 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."[277] 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

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[270] *See* 10 U.S.C. § 2667.
[271] *Id.* § 2667(a), (b)(4).
[272] *See* DoD Financing Guidance, *supra* note 194, at 3.
[273] 10 U.S.C. § 2667(c).
[274] Interview with John Lushetsky, *supra* note 69.
[275] 10 U.S.C. § 2667(b)(1).
[276] DoD Financing Guidance, *supra* note 194, at 4.
[277] Memorandum on the Defense Energy Program Policy (DEPPM) from the Office of the Undersecretary of Def., U.S. Dep't of Def. (Jan. 12, 1994), *available at* http://www.wbdg.org/ccb/DEP/dep94_2.pdf, *archived at* http://perma.cc/6QQD-UDDP.

ESCO is contingent upon realizing a guaranteed stream of future savings, with excess savings accruing to the Federal Government."[278] Congress has authorized federal agencies generally, and the military specifically, to enter into such contracts for periods of up to twenty-five years.[279] In addition, as early as 1991, the President encouraged the military to enter into such shared energy savings contracts in Executive Order 12,759.[280]

Alternatively, utility energy service contracts ("UESCs") involve mixed public and private financing.[281] An agency may enter into a UESC with a utility, which agrees to pay certain capital costs upfront to implement selected energy conservation measures.[282] The agency can repay the utility from avoided cost savings accrued over the life of the project or from appropriations.[283] These payments may be made over time if utility or other private financing is part of the transaction.[284]

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.[285] At Marine Corps Base Camp Pendleton, using both ESPCs and UESCs, the Marines achieved a 44% reduction in energy use despite an increase in the footprint of its facility of 2 million square feet.[286] Energy retrofits included decommissioning a steam plant, incorporating photovoltaic arrays, changing

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[278] BARACK OBAMA, MEMORANDUM ON THE IMPLEMENTATION OF ENERGY SAVINGS PROJECTS AND PERFORMANCE-BASED CONTRACTING FOR ENERGY SAVINGS § 6(b) (2011), *available at* http://www.gpo.gov/fdsys/pkg/DCPD-201100920/pdf/DCPD-201100920.pdf, *archived at* http://perma.cc/8Z6L-8URC.

[279] *See* 10 U.S.C. § 2913; 42 U.S.C. § 8287 (2006 & Supp. V); *see also id.* § 8253(f)(10)(B)(i)(II) ("To carry out this subsection, a Federal agency may use any combination of . . . private financing otherwise authorized under Federal law, including financing available through energy savings performance contracts or utility energy service contracts.").

[280] Exec. Order No. 12,759, 3 C.F.R. 326 (1991).

[281] *See* 10 U.S.C. § 2913; 42 U.S.C. § 8256; FED. ENERGY MGMT. PROGRAM, U.S. DEP'T OF ENERGY, UTILITY ENERGY SERVICES CONTRACTS: ENABLING DOCUMENTS 9 (2013), *available at* http://www1.eere.energy.gov/femp/pdfs/uesc_enabling_documents09.pdf, *archived at* http://perma.cc/NS2D-75FK.

[282] *See* FED. ENERGY MGMT. PROGRAM, *supra* note 281, at 9; JULIA KELLEY, OAK RIDGE NAT'L LAB., INTRODUCTION TO UTILITY ENERGY SERVICE CONTRACTS 5 (2011), *available at* http://www.hq.nasa.gov/office/codej/codejx/Assets/Docs/ConferenceNashville2011/Tuesday/JuliaKelley-NASA_UESC_04-28-11.pdf, *archived at* http://perma.cc/VN7W-FZNC.

[283] *See* FED. ENERGY MGMT. PROGRAM, *supra* note 281, at 9; KELLEY, *supra* note 282, at 5.

[284] *See* KELLEY, *supra* note 282, at 5.

[285] FED. ENERGY MGMT. PROGRAM, U.S. DEP'T OF ENERGY, ESPC SUCCESS STORY: DYESS AIR FORCE BASE 1 (2009), *available at* http://www1.eere.energy.gov/femp/pdfs/espc_ss_dyess.pdf, *archived at* http://perma.cc/C4EU-BJVR.

[286] FED. ENERGY MGMT. PROGRAM, U.S. DEP'T OF ENERGY, ESPC SUCCESS STORIES: MARINE CORPS BASE CAMP PENDLETON 1, *available at* http://www1.eere.energy.gov/femp/pdfs/espc_ss_pendleton.pdf, *archived at* http://perma.cc/9WJH-9NYX.

fixtures, and using daylighting technology.[287] At Hill Air Force Base in Utah, the military and the ESCO entered into an ESPC for an eighteen-year term to upgrade energy systems in 940 buildings.[288] 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.[289] Thus, Congress has provided the DoD with 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

The DoD is taking advantage of private financing in the Energy Initiatives Task Force ("EITF") program.[290] 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.[291] These projects, which include solar, wind, biomass, and geothermal projects, are designed to promote "energy security and sustainability."[292] Congress has mandated that the DoD produce or procure not less than 25% of its energy on installations from renewable sources by 2025,[293] which the military has translated into one gigawatt each for the Army, Navy and Air Force.[294] The EITF is the Army's central management office for the execution of due diligence for potential projects, as well as for the initiation of permitting and other legal obligations like environmental impact assessments.[295] On November 22, 2013, the EITF issued a Notice of Intent to Award letter to Ameresco, Inc., for the construction of an 18.6 megawatt solar project at Fort Detrick in Maryland.[296] In February, 2014,

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[287] *Id.* Daylighting involves the use of opaque walls and roofs to transmit more daylight into interior spaces. *See Daylighting Technology*, AMERI ENERGY GROUP, http://www.amerienergygroup.com/index.php/en/daylighting-technology, *archived at* http://perma.cc/SLQ2-9W34 (last visited Apr. 3, 2014).

[288] *Case Study—Hill Air Force Base, Utah*, U.S. DEP'T OF ENERGY (Oct. 7, 2013, 2:00 PM), http://www1.eere.energy.gov/femp/financing/superespcs_hill_afb.html, *archived at* http://perma.cc/KH9B-XTLW.

[289] *Id*.

[290] *See* AEMR FY 2011, *supra* note 52, at 34; *see also* AEMR FY 2012, *supra* note 52, at 36.

[291] *Id.*

[292] *Id*.

[293] 10 U.S.C. § 2911(e) (2012).

[294] *See* AEMR FY 2011, *supra* note 52, at C-12.

[295] Telephone Interview with John Lushetsky, Former Exec. Dir., Army Energy Initiatives Task Force (Apr. 12, 2013).

[296] ENERGY INITIATIVES TASK FORCE, FORT DETRICK, MARYLAND 1 (2013), *available at* http://armyeitf.com/downloads/Fort%20Detrick_EITF%20Fact%20Sheet.pdf, *archived at* http://perma.cc/X88K-A56C.

the DoD issued a Notice of Intent to Award to ReEnergy Holdings for the purchase of up to 28 megawatts (MW) of electricity from a renewable energy biomass facility at Fort Drum in New York[297]; and the EITF has issued a Request for Proposals (RFP) for a biomass generation facility at Fort Irwin in California.[298]

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.[299] Although the Army neither finances nor owns the energy-generating equipment, it will contract for the power through its authority to enter into PPAs and enhanced-use leases.[300] The Army has established a contract vehicle that allows for up to $7 billion dollars to be spent on these types of contracts.[301]

The EITF does not focus on 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. John Lushetsky, the former Executive Director of the EITF, explained why the EITF uses proven commercial technologies: "This conservatism is driven by the fact that there is one hundred percent 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."[302]

Lushetsky explained that the DoD's unique authority to enter into thirty-year PPAs is "critical for these projects"[303]:

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[297] ENERGY INITIATIVES TASK FORCE, FORT DRUM, NEW YORK, *available at* http://www.armyeitf.com/downloads/Fort%20Drum_EITF%20Fact%20Sheet.pdf, *archived at* http://perma.cc/QA4Y-Y38S.

[298] E-mail from John Lushetsky, former Exec. Dir., Army Energy Initiatives Task Force, to author (July 26, 2013) (on file with author); *Army EITF Makes Major Energy Announcement at New York Power & Finance Forum—Fort Drum Moves Closer to Achieving Energy Security & Sustainability*, ENERGY INITIATIVES TASK FORCE (Feb. 19, 2014), http://www.armyeitf.com/index.php/component/content/article/67-news/procurement/20-ft-drum-nyp, *archived at* http://perma.cc/4W3N-MRFH; DEF. LOGISTICS AGENCY, DEP'T OF DEF., FORT IRWIN SOLAR ELECTRIC PURCHASE POWER AGREEMENT 9 (2013), *available at* https://www.fbo.gov/index?s=opportunity&mode=form&id=b1082115a9b4aad84d4311d0fc7dd13c&tab=core&_cview=1, *archived at* http://perma.cc/U7FH-3H3R.

[299] E-mail from John Lushetsky, *supra* note 298. 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. *Id.*

[300] *Id*.

[301] E-mail from John Lushetsky, *supra* note 298.

[302] Telephone Interview with John Lushetsky, *supra* note 295.

[303] *Id.*

> Other agencies in the Government can buy electricity in a ten-year contract under the Federal Acquisition Regulation. But you can't do renewable energy project financing on a ten-year term. The capital costs are too high—you can't amortize the costs over ten years and still have the electricity costs be acceptable. If you finance for thirty years but only contract for ten years, the developer bears the risk that the DoD may not renew the contract, discouraging many developers.[304]

Therefore, absent Congressional authority for these long-term PPAs, it is unlikely that the projects would succeed in attracting the necessary private financing.[305] 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."[306]

These privately financed projects are not limited to the Army. It was the Navy that undertook the first major project under the DoD's statutory PPA authority at the Naval Air Weapons Station China Lake, authorizing the construction of a 13.8 megawatt photovoltaic array that began in January 2012.[307] This array will be the Navy's largest, financed through a twenty-year PPA.[308] It will be designed, built, and operated by a private solar firm, with the facilities owned by a private financier.[309] 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

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[304] *Id.*

[305] *See* Mindy Lubber, *Investors Are Making Money on Renewable Energy*, FORBES (Mar. 20, 2012, 9:46 AM), http://www.forbes.com/sites/mindylubber/2012/03/20/investors-are-making-money-on-renewable-energy/, *archived at* http://perma.cc/CEV7-7H3A (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").

[306] Telephone Interview with John Lushetsky, *supra* note 295 ("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.").

[307] U.S. DEP'T OF DEF., STRATEGIC SUSTAINABILITY PERFORMANCE PLAN: FY 2012, at ES-4 (2012) [hereinafter SSPP FY 2012], *available at* http://www.acq.osd.mil/ie/download/green_energy/dod_sustainability/2012/DoD%20SSPP%20FY12-FINAL.PDF, *archived at* http://perma.cc/E8QS-KVJ6.

[308] *Id.*

[309] *Id.*

> 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.[310]

The EITF program has screened all potential Army and National Guard installation sites for large-scale renewable projects nationwide.[311] In addition, both specific military installations and private developers have proposed potential projects.[312]

One of the challenges for the EITF program centers on how to measure success. As Lushetsky explained, there is an objective, easy-to-measure target set by Congress that DoD produce 25% of its energy through renewable sources by 2025.[313] But a second question is equally important, if not as easily measured: how does one measure the impact of a particular project on energy security? "If we are providing energy security," stated Lushetsky, "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."[314] 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.[315]

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 initiative.[316] 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."[317] In early 2011, the Office of the Assistant Secretary of the Army for Energy and Sustainability canvassed all Army installations to ask if they wanted to be Net Zero pilot installations in energy, water, or waste.[318] More than one hundred

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[310] *Id.*

[311] Telephone Interview with John Lushetsky, *supra* note 295.

[312] *Id.*

[313] *Id.*

[314] *Id*.

[315] *See* Light, *supra* note 27.

[316] Telephone Interview with Marc Kodack, *supra* note 71.

[317] U.S. ARMY, PROGRAMMATIC ENVIRONMENTAL ASSESSMENT: ARMY NET ZERO INSTALLATIONS 1-1 (2012).

[318] Telephone Interview with Marc Kodack, *supra* note 71.

installations applied, and the Army ultimately selected seventeen pilot installations.[319]

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 instance, in June 2011, at Fort Dietrick, Maryland, the Net Zero program held its first conference for representatives from each pilot installation, inviting a speaker from Wal-Mart to discuss Wal-Mart's experience trying to reduce its water use through waterless urinals.[320] 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."[321] 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 about efforts to promote sustainability on campus.[322] 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 initiative and its lessons learned to date.[323] 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 necessary 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 better.

A review of the NDAAs—the annual DoD budgets—from fiscal years 2008 to 2013 reveals many provisions promoting both the DoD's national security mission and the goals of reducing demand and promoting renewables.[324] But there are also provisions in the annual budget authorizations

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[319] *Id.*
[320] *Id.*
[321] *Id.*
[322] *Id.*
[323] *Id.*
[324] *See* National Defense Authorization Act for Fiscal Year 2013, Pub. L. No. 112-239, 126 Stat. 1632 (2012); National Defense Authorization Act for Fiscal Year 2012, Pub. L. No. 112-81, 125 Stat. 1298 (2011); Ike Skelton National Defense Authorization Act for Fiscal Year 2011, Pub. L. No. 111-383, 124 Stat. 4137 (2011); National Defense Authorization Act for Fiscal Year 2010, Pub. L. No. 111-84, 123 Stat. 2190 (2009); Duncan Hunter National Defense Authorization Act for Fiscal Year 2009, Pub. L. No. 110-417, 122 Stat. 4356 (2008); National Defense Authorization Act for Fiscal Year 2008, Pub. L. No. 110-181, 122 Stat. 3 (2008).

suggesting that members of Congress have inserted requirements for the DoD that, although at first glance seem to promote reduced energy demand or the development of alternative renewable fuel sources, instead may actually simply benefit specific firms or geographic districts.[325]

For example, Section 334 of the Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 required 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)."[326] Despite the unlikelihood that warfighters would want to transport coal to forward operating bases 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."[327] 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.[328]

In 2008, the Defense Science Board Task Force on DoD Energy Security issued a report entitled "More Fight—Less Fuel" that specifically recommended against pursuing coal-to-liquid fuel strategies in light of highly uncertain costs, high water consumption, high levels of wastewater, and lim-

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[325] By 2011, the Republicans in the House and both the Republicans and the Democrats in the Senate supported voluntary resolutions to ban earmarks. *See* Devin Dwyer & Matthew Jaffe, *Senate Republicans Ban Earmarks; Will Democrats Follow?*, ABC NEWS (Nov. 16, 2010), http://abcnews.go.com/Politics/earmark-moratorium-republicans-poised-ban-pork-barrel-spending/story?id=12155964, *archived at* http://perma.cc/LVK-8TMV. *But see* Kate Brannen, *Congressional Earmark Ban Changes Business on Capitol Hill*, DEF. NEWS (July 5, 2012, 2:35 PM), http://www.defensenews.com/article/20120705/DEFREG02/307050003/Congressional-Earmark-Ban-Changes-Business-Capitol-Hill, *archived at* http://perma.cc/FY6L-5DDE (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).

[326] Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 § 334(a). In addition, 10 U.S.C. § 2918 prohibits the Defense Department from converting a coal-fired heating facility at a U.S. military installation in Europe 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." 10 U.S.C. § 2918 (2012).

[327] Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 § 334(b)(3).

[328] 10 U.S.C. § 2922d(a).

ited supplies of coal.[329] The report suggested that money would be better spent on other technologies.[330]

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 Fiscal Year 2013, Congress prohibited the DoD from using appropriated funds to obtain LEED gold or platinum certification, unless waived by the Secretary of Defense based on a finding of no additional cost.[331] Apparently, despite the military's longstanding support for LEED certification to ensure that new facilities incorporate sustainable features,[332] 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.[333] These members of Congress thus sought to remove funding for the highest levels of LEED certification.[334]

Another project that has received significant attention from the military but which raises environmental risk tradeoffs is the use of polyurethane spray foam, which has been used to insulate tents in Iraq and Afghanistan.[335] Although 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.[336] Another example of a

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[329] DEF. SCI. BD., *supra* note 193, at 50–51.

[330] *Id.* at 51.

[331] National Defense Authorization Act for Fiscal Year 2013 § 2823; National Defense Authorization Act for Fiscal Year 2012 § 2830.

[332] *See* Paula Melton, *Army to Congress: LEED Doesn't Cost More*, BUILDING GREEN (Feb. 2, 2002, 7:02 PM), http://www2.buildinggreen.com/blogs/army-congress-leed-doesnt-cost-more, *archived at* http://perma.cc/562Q-SWLY.

[333] *See, e.g.*, Andy Medici, *Industry Objects to Green-Gov Standards*, FED. TIMES (Jan. 7, 2012, 6:00 AM), http://www.federaltimes.com/article/20120107/FACILITIES02/201070302/Industry-objects-green-gov-standards, *archived at* http://perma.cc/3WUY-VN8S; Jeffrey Spivak, *LEED Backlash*, URBAN LAND (Feb. 22, 2012), http://urbanland.uli.org/Articles/2012/Feb/SpivakLEED, *archived at* http://perma.cc/8X8-UQBK.

[334] *See, e.g.*, Medici, *supra* note 333; Spivak, *supra* note 333.

[335] *See* Peck, *supra* note 195 (quoting Sharon Burke's observation that although the insulation cut the tents' energy consumption by 50% "[i]t'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.").

[336] HEADQUARTERS AIR FORCE CIVIL ENG'R SUPPORT AGENCY, DEP'T OF THE AIR FORCE, ENGINEERING TECHNICAL LETTER (ETL) 10-6 (CHANGE 2): EXTERNAL FOAM INSULATION OF TEMPORARY STRUCTURES 6 (2010) (adding that besides rendering a structure "unrecoverable," foam insulation "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).

project with unclear benefits to the DoD's mission is the requirement to study small modular nuclear reactors as a source of alternative energy for military installations and forward operating bases.[337] Despite the potential these reactors may hold for civilian energy generation uses, they could raise both safety and feasibility concerns if they were to be shipped to forward operating bases.[338]

In addition, some of the players in the Military-Environmental Complex were—or are—players in the military-industrial complex. For example, several of the firms receiving funding for ESTCP Installation Energy and Water Technology Demonstrations in 2012 and 2013 are among the top one hundred military contractors by dollar value of contracts awarded.[339] These firms include the Boeing Corporation (second by dollar value of contracts),[340] which received funding for "optimized decision support technology";[341] Raytheon Integrated Defense Systems (third by dollar value of contracts),[342] which received funding for a "Zinc Bromide Flow Battery Installation for Islanding and Backup Power";[343] and United Technologies Research Center (sixth by dollar value of contracts),[344] which received funding for "energy performance analysis methodology."[345] These firms also include Honeywell International,

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Notably, the only approved types of spray-foam insulation are offered by two firms—a corporation in Baghdad, Iraq, and Honeywell International, which in 2012 was the military contractor with the twenty-eighth largest volume of contracts by dollar figure, topping $2.4 billion. *See id.* at 6–8; *Federal Procurement Report*, U.S. GEN. SERVS. ADMIN., https://www.fpds.gov/fpdsng_cms/index.php/reports, *archived at* http://perma.cc/TL99-L7KP (last visited Apr. 3, 2014).

[337] *See* National Defense Authorization Act for Fiscal Year 2010, Pub. L. No. 111-84, § 2845, 123 Stat. 2190, 2683 (2009).

[338] *See id.*; *cf.* RICHARD B. ANDRES & HANNA L. BREETZ, NAT'L DEF. UNIV., SMALL NUCLEAR REACTORS FOR MILITARY INSTALLATIONS: CAPABILITIES, COSTS, AND TECHNOLOGICAL IMPLICATIONS 5–7 (2011), *available at* www.ndu.edu/press/lib/pdf/StrForum/SF-262.pdf (describing the potential of small modular nuclear reactors).

[339] *See Department of Defense Announces New Installation Energy Technology Demonstrations for FY 2012*, SERDP (Nov. 18, 2011), http://www.serdp.org/News-and-Events/News-Announcements/Program-News/Department-of-Defense-announces-new-installation-energy-technology-demonstrations-for-FY-2012, *archived at* http://perma.cc/5ZFX-MWW2 [hereinafter *FY 2012 Demonstrations*]; *FY 2013 Demonstrations*, *supra* note 257; *Top 100 Contractors Report*, U.S. GEN. SERVS. ADMIN., https://www.fpds.gov/fpdsng_cms/index.php/reports/62-top-100-contractors-report, *archived at* http://perma.cc/6V4C-T7EE (last visited Feb. 19, 2014) [hereinafter *Top 100 Contractors*] (listing top 100 DoD contractors by dollar figure in 2012).

[340] *Top 100 Contractors*, *supra* note 339. Boeing receives over $29 billion in annual contracts with the DoD. *See id.*

[341] *FY 2013 Demonstrations*, *supra* note 257.

[342] *Top 100 Contractors*, *supra* note 339. Raytheon receives over $15 billion in annual contracts with the DoD. *See id*.

[343] *FY 2012 Demonstrations*, *supra* note 339.

[344] *Top 100 Contractors*, *supra* note 339. United Technologies receives over $8 billion in annual contracts with the DoD. *See id*.

[345] *FY 2012 Demonstrations*, *supra* note 339. In addition, Pratt & Whitney Rocketdyne received fiscal year 2013 funding for "high concentration photovoltaics (HCPV) with a total electrical generation capacity of 200kW." *FY 2013 Demonstrations*, *supra* note 257. Pratt & Whitney

Inc. (twenty-eighth by dollar value of contracts),[346] which received funding for numerous projects, including (1) 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";[347] (2) "Open Automated Demand Response communications and control technology";[348] and (3) a building information model designed to identify "chronic and recurring operating efficiencies."[349] In addition, microgrid demonstrations at Fort Bliss, Texas (awarded to Lockheed Martin, first by dollar value of contracts)[350] and at Twentynine Palms, California (awarded to General Electric, twenty-fourth by dollar value of contracts,[351] for an advanced microgrid system) are also relying on established contractors from the military-industrial complex.[352]

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 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, requirements to support or study technologies such as small modular nuclear reactors may be problematic. These reactors may not necessarily directly support the mission, and they could raise safety and feasibility concerns if they were brought to forward operating bases. If, on the other hand, agencies have an obligation to consider the larger public interest, including reducing the overall severity of climate change, then perhaps the support for small modular nuclear reactors is less

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Rocketdyne was a subsidiary of United Technologies until its sale to GenCorp in July 2012, becoming part of Aerojet Rocketdyne. *See* GenCorp Inc., Quarterly Report (Form 10-Q) (Apr. 8, 2013), *available at* http://www.sec.gov/Archives/edgar/data/40888/000119312513144561/d497039d10q.htm, *archived at* http://perma.cc/E82M-DBVF; W.J. Hennigan, *Rocketdyne Sold to GenCorp for $550 Million*, L.A. TIMES (July 24, 2012), http://articles.latimes.com/2012/jul/24/business/la-fi-rocketdyne-sale-20120724, *archived at* http://perma.cc/V6Y8-4JQW. Rocketdyne is "the largest liquid rocket propulsion designer, developer, and manufacturer in the U.S." GenCorp Inc., Quarterly Report, *supra*.

[346] *Top 100 Contractors*, *supra* note 339. Honeywell International, Inc. receives over $2.4 billion in annual contracts with the DoD. *See id.*

[347] *FY 2013 Demonstrations*, *supra* note 257.

[348] *FY 2012 Demonstrations*, *supra* note 339.

[349] *Id.* Honeywell Defense and Space also received funding for a "full-scale microgrid system." *FY 2013 Demonstrations*, *supra* note 257.

[350] *Top 100 Contractors*, *supra* note 339. Lockheed Martin receives over $36 billion in annual contracts with the DoD. *See id.*

[351] *Id.* General Electric receives over $2.6 billion in annual contracts with the DoD. *See id*.

[352] *See* AEMR FY 2011, *supra* note 52, at 49–50.

problematic, especially if one considers that they may have a lower impact on climate change than conventional sources of fuel.[353]

Similarly, the fact that established firms from the military-industrial complex are now building microgrids and other technologies in the Military-Environmental Complex can be interpreted in several ways. On the one hand, this might suggest more continuity than innovation. A pessimistic interpretation is that these major players 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 and not merely in the pecuniary interest of the firms. More optimistically, the Military-Environmental Complex might have 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, 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. 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 use, such legal rules 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, not simply on 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 President Eisenhower (and by schol-

[353] 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 Article. *See generally* Eric Biber, *Too Many Things to Do: How to Deal with the Dysfunctions of Multiple-Goal Agencies*, 33 Harv. Envtl. L. Rev. 1 (2009) (exploring various ways to address the problems of multiple-goal agencies).

ars 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 seek contracts and partnerships that either do not support the military's mission, or harm the environment by exacerbating the problems of climate change in the name of energy independence or cost reduction. 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 provide financing to reduce reliance on fossil fuels by the single largest consumer of energy in the United States.[354] In addition, and perhaps more importantly, these firms are forced to reconsider the war motive as the sole driver of military contracts, replacing it (or at least supplementing it) with a sustainability motive. Profitable military contracts now come not only from war, but also from technologies that reduce energy demand and promote alternative fuels. If the traditional "merchants of death" 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 both spin-ons and spin-offs of best practices and technological innovation will occur as a part of the Military-Environmental Complex. To the extent that there may also be a spillover in the values and beliefs driving the Military-Environmental Complex—in particular, the recognition that climate change has negative consequences for national security—the environment wins. 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.

An additional 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.[355] Others have focused on climate fi-

[354] *See supra* note 10 and accompanying text (describing the energy uses of the DoD and of the federal agency regime as a whole).

[355] *See supra* notes 15–18 (citing sources on this point).

nance, favoring government subsidies for green technology development,[356] the creation of a governmental "green bank" to support emerging green technologies,[357] or government-funded technology inducement prizes.[358] 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.[359]

The example of the Military-Environmental Complex is also important because it demonstrates that despite the lack of explicit substantive laws directing 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 by, for example, reducing packaging.[360] Wal-Mart did not undertake this effort in response to a legal mandate.[361] Rather, it acted because internal incentives to reduce shipping costs aligned with environmental goals.[362]

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 procedural measures as requiring reporting of greenhouse gas emissions and creating OEPP to centralize focus on the subject.[363] Moreover, it is not at all clear that all private firms currently face—with a sense of life-or-death urgency—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

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[356] *See* Clements & Sims, *supra* note 17, at 398.

[357] *See id.* at 399–400.

[358] *See* Adler, *supra* note 17, at 1.

[359] *See supra* note 15 and accompanying text.

[360] *See Packaging*, WALMART, http://corporate.walmart.com/global-responsibility/environment-sustainability/packaging, *archived at* http://perma.cc/8YUZ-VVNX (last visited Apr. 3, 2014).

[361] *See* CHARLES FISHMAN, THE WAL-MART EFFECT, at xxvii–xxx (2011).

[362] *See id.*; *see also Environmental Sustainability*, WALMART, http://corporate.walmart.com/global-responsibility/environment-sustainability, *archived at* http://perma.cc/TR82-L587 (last visited Apr. 3, 2014) (noting Walmart's "three aspirational sustainability goals": (1) "[t]o be supplied 100% by renewable energy"; (2) "[t]o create zero waste"; and (3) "[t]o sell products that sustain people and the environment").

[363] *See supra* notes 138–286 and accompanying text.

self-initiated—will likely provide the best opportunity to address climate change on a global level.

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.

A. Serving Positive Ends

In the political science literature, particularly in the area of public choice theory, some scholars argue that interest groups competing within the legislative sphere tend to demand legislation that provides concentrated benefits while spreading out costs, and that legislators seek to supply legislation that will ensure their reelection.[364] Accordingly, one study of Congress's role in authorizing defense spending suggests a dichotomy between two competing visions of "effective" policy.[365] The first vision is based on furthering "national defense," holding 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."[366] 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.[367]

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. One can ask whether the action, project, or policy is providing the maximum possible benefit to the environment—for example, by increasing sustainable energy use or minimizing impacts on the climate—as compared to alternatives.[368] To take the analogy from the military spending context into the context of military actions more broadly, this Article takes the position that "effective" policies, whether financed through taxpayer dollars or private funds, are those that support the military's overall mission to protect national security, with the secondary goal

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[364] *See supra* note 29 (citing sources on this point).

[365] *See* BARRY S. RUNDQUIST & THOMAS M. CARSEY, CONGRESS AND DEFENSE SPENDING: THE DISTRIBUTIVE POLITICS OF MILITARY PROCUREMENT 17–18 (2002).

[366] *Id*. at 18.

[367] *Id*.

[368] This approach raises questions regarding risk-risk tradeoffs that are outside the scope of this paper.

of increasing sustainable energy use and reducing the threat of climate change. Effective policies are those adopted because of national security implications or for environmental reasons, but they do not include policies that merely support the 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, increase private financing opportunities, and 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 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 have plagued the military-industrial complex. The next Section offers four modest proposals in this regard and suggests that further empirical research is warranted.

B. Four Modest Proposals and a Research Agenda

First, Congress and the President should take steps to encourage both further efforts by the DoD to reduce energy demand and investment by private firms in the generation of renewable energy that benefits the military. Such steps would include expanding the financial incentives that encourage the military to reduce demand and invest in renewables. They would also include expanding the federal requirement that the DoD obtain 25% of its energy from renewable energy sources by 2025 to ensure that all players, both within the DoD and in the private sector, understand that these investments in renewables are long-term investments.[369] Although the above analysis demonstrates that the DoD's military goals have been the key underlying driver of the push to reduce energy demand and increase the development of alternative fuels, the legal rules have undoubtedly shaped the DoD's actions and priorities in the Military-Environmental Complex. They have also ensured a greater degree of continuity across administrations in ways that can encourage more stability in private investment. To the extent that Congress can incorporate into legislation additional incentives for pri-

[369] Long-term instruments are necessary not only to provide the right 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.* Howard C. Kunreuther & Erwann O. Michel-Kerjan, *Market and Government Failure in Insuring and Mitigating Natural Catastrophes: How Long-Term Contracts Can Help*, *in* PUBLIC INSURANCE AND PRIVATE MARKETS 115, 117 (Jeffrey R. Brown ed., 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).

vate firms to continue to finance these major renewables generation projects, either through the tax code or other programs, taxpayers could save dollars in the long run.

A second substantive recommendation would extend success stories from the Military-Environmental Complex into other contexts. Specifically, Congress should extend to agencies other than the DoD—most importantly, the GSA, which purchases energy on behalf of other agencies—the ability to use thirty-year PPAs as under 10 U.S.C. § 2922a.[370] Congress should make universally available to agencies this provision that, according to the Director of the EITF, has 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.[371] Other agencies should be permitted to share in this potential for public-private partnerships.

Third, successful dissemination of information about technological innovation beyond government agencies requires openness rather than secrecy.[372] Thus, to the extent that the military is driving innovation, it should promote the diffusion of technologies that can reduce conventional energy demand and develop renewables into the civilian world, 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.

Relatedly, the DoD and the private sector should voluntarily create more mechanisms for interaction to share best practices, experiences with new technology, and behavioral approaches.[373] Again, an understanding of the military-industrial complex is helpful here. In 1916, Congress created a Council of National Defense ("CND"), staffed by six members of the cabinet, to advise the President on the critical issue of industrial mobilization.[374] So-called "dollar-a-year" men—executives from the private sector 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.[375] Upon a dec-

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[370] 10 U.S.C. § 2922a (2012); *see supra* notes 263–269 and accompanying text.

[371] *See* Telephone Interview with John Lushetsky, *supra* note 295.

[372] Mowery, *supra* note 12, at 162 n.2, 167 (noting the importance of second-source requirements and potential concern over military imposition of secrecy to protect national security).

[373] *Cf.* Business Case for Sustainability, *supra* note 238, 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).

[374] KOISTINEN, *supra* note 3, at 48.

[375] *See id*.

laration of war, it was the NDAC—staffed largely by these private executives—that "assumed responsibility for mobilizing the economy."[376] But in 1917, the NDAC's functions were assumed by the War Industries Board ("WIB"), a government agency that united members of industry and government representatives to tackle jointly the complex questions of how industry could be mobilized quickly for the war.[377] The WIB was "subordinate to the Council of National Defense" and "could only advise the president."[378] 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."[379]

Criticisms abounded that these private executives had too much power.[380] Likewise, the U.S. 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.[381] 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."[382] Mobilizing industry for war in a time when the military required private industrial aid to produce armaments and other needed supplies may be an imperfect analogy to the drive to develop clean energy technology and processes to reduce demand because the sense of urgency

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[376] *Id*.

[377] *See id.* at 48–49.

[378] *Id*. at 48.

[379] *Records of the War Industries Board*, NAT'L ARCHIVES, http://www.archives.gov/research/guide-fed-records/groups/061.html, *archived at* http://perma.cc/5TYH-EQ7E (last visited Apr. 3, 2014). Paul Koistinen 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." KOISTINEN, *supra* note 3, at 40.

[380] *See* KOISTINEN, *supra* note 3, at 49.

[381] *Id*.

[382] *Id*. By 1918, President Woodrow Wilson removed the WIB from its advisory role to the CND 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, [and] 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. Koistinen contends that the military failed 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.

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 relies on private financing and existing commercial technology.

Although 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 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 they should recognize that this area 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—could bring 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.

Fourth, 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,[383] as amended by the Honest Leadership and Open Government Act of 2007,[384] 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.[385]

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

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[383] Lobbying Disclosure Act of 1995, Pub. L. No. 104-65, 109 Stat. 691 (1995) (codified as amended at 2 U.S.C. §§ 1601–1611 (2012) and in scattered sections of 2, 15, 18, 22, 31, and 42 U.S.C.).

[384] Honest Leadership and Open Government Act of 2007, Pub. L. No. 110-81, §§ 201–215, 121 Stat. 735, 741–51 (2007) (codified as amended at 2 U.S.C. §§ 1601–1611 (2012) and in scattered sections of 2 and 22 U.S.C.).

[385] *See* 31 U.S.C. §§ 3729–3733 (2012).

contact 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, whether the projects promote values other than the DoD's core mission, and the impact such contacts have as to whether particular projects are funded. Thus, this Article proposes a research agenda to understand precisely the impact military R&D funding and procurement have on the development and diffusion of new technologies in the clean energy sector. This research must also assess, based on past experience from the military-industrial complex, whether military domination of technical specifications leads to technologies that are ill-adapted to commercial needs.

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. Properly regulated, the Military-Environmental Complex may secure its place within the regulatory toolkit as a way to foster energy sustainability in the long term.

CONCLUSION

Properly understood, the military's roles as a war fighter, a landlord, a first-user of precommercial technologies, and a potential high-demand consumer provide it with the opportunity to lead the way in sustainable energy use and development of technologies. The DoD has already taken important steps to reduce energy use, especially through partnering with the private sector. With reference to the lessons of the military-industrial complex—and with controls to limit fraud, abuse, and rent-seeking behavior—these efforts should be expanded in the new Military-Environmental Complex.