National Security and Wind Farms: Can They Co-Exist?

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Abstract

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In 2010, President Barack Obama developed his National Security Strategy (NSS), which included the goal of developing clean energy resources for both environmental and national security reasons. As a result of this objective and supporting federal initiatives, wind energy projects such as wind farms are on the rise. While the switch to alternative wind energy stands to improve the nation's energy security, it has the potential of adversely affecting another national security aspect - military security. Wind farms create electromagnetic fields that interfere with military radar systems. Similarly, they are physical obstacles on military training routes. This threat presents a dilemma – a clash between two national security interests.

Although the DOD has attempted to mitigate these problems on its own, two high profile wind energy projects resulted in congressional involvement. Notwithstanding legislation passed by Congress, there are still no federal mandates that insure against wind farms adversely impacting military security.

This paper outlines the two national security interests and the impact that wind turbines have on military security. It will provide an argument for a federal mandate that ensures that national security is not impaired by the increase in wind farms and conclude with a model for such legislation.

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I. INTRODUCTION

The United States currently relies heavily on fossil fuels[1] to generate its electricity.[2] Fossil fuels such as coal or crude oil are burned to produce steam, which electric utilities use to generate electricity.[3] Burning fossil fuel is the largest source of emissions of carbon dioxide, which is one of the greenhouse gases that contribute to global warming.[4] Burning coal also has health impacts due to sulfur dioxide, nitrogen oxide, particulates, and mercury emissions. In addition, fossil fuels are non-renewable sources of these fuels are depleting.[5] Finally, the United States does not have an abundant domestic source of crude oil; therefore, we depend on foreign oil to generate electricity.[6] In recent years significant impacts on our nation's economy as a result of fluctuations in oil prices, as well as the harmful environmental effects of fossil fuel consumption has led to concerted efforts to seek cleaner, renewable alternatives. As part of his 2010 National Security Strategy (NSS), President Obama set a goal to develop

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[1] Fossil fuels are created by the anaerobic decomposition of the remains of prehistoric organisms (plants and animals). *Fossil Fuel*, ScienceDaily.com, http://www.sciencedaily.com/articles/f/fossil_fuel.htm (last visited June 1, 2013). Burning fossil fuels allow them to be converted to energy (e.g., crude oil, coal, natural gas, or heavy oils), *id*.

[2] Donald Zillman, Mary E. Walta & Inigo del Guayo Castiella, *More than Tilting at Windmills*, 49 WASHBURN L.J., Fall 2009, at 1.

[3] American Petroleum Institute, *Facts About Fossil Fuels*, http://www.api.org/oil-and-natural-gas-overview/classroom-tools/teaching-tools/facts-fossil-fuels (last visited June 12, 2013).

[4] *Fossil Fuel*, supra note 1.

[5] Zillman et al., supra note 2, at 3.

[6] *Id*. Wind is primarily used to replace coal and natural gas for electricity generation since most of the oil is used for gasoline for automobiles rather than electricity generation. However, as the nation turns to a more electrified vehicle fleet, wind will increasingly be used to displace oil as a transportation fuel. There also may be other places where wind will displace oil including some small scale electric generation that currently uses oil.

clean, renewable energy that can unbind us from foreign oil and preserve our planet.[7]

Renewable energy sources replace fossil fuels with energy from on-going natural processes, such as sunshine, wind, flowing water, biological processes, and geothermal heat flows.[8] Renewable energy is better for the environment since the process for converting these sources into energy do not create many of the harmful emissions that result from converting fossil fuels.[9] Lastly, there is an abundant domestic source of renewable energy within the United States.[10] Wind power is one of the most promising new renewable energy sources that can replace fossil fuel-generated electricity.[11]

Wind is a form of solar energy.[12] The heating of the atmosphere by the sun, the rotation of the earth, and the earth's surface irregularities cause winds.[13] The process by which the wind is used to generate mechanical power or electricity is called wind energy or wind power.[14] Wind power is generated by using the naturally occurring energy of the wind for practical purposes like generating electricity. [15]

Wind turbines capture the kinetic energy in the wind, converting it into electrical

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[7] The White House, *National Security Strategy 19* (2010) [hereinafter *2010 National Security Strategy*], available at www.whitehouse.gov/sites/default/files/rss_viewer/national_security_ strategy.pdf.
[8] *Renewable Energy*, ScienceDaily.com, http://www.sciencedaily.com/articles/r/renewable_energy.html (last visited June 12, 2013).
[9] *Id*.
[10] *Id*.
[11] *Id*.
[12] U.S. Department of Energy [hereinafter DOE], *Energy Efficiency & Renewable Energy*, http://www.eere.energy.gov/wind/wind_how.html (last visited June 12, 2013).
[13] *Id*.
[14] *Id*.
[15] U.S. Department of the Interior Bureau of Land Management [hereinafter BLM], *Wind Energy* http://www.blm.gov/wo/st/en/prog/energy/wind_energy.html (last visited June 12, 2013).

energy.[16] Wind turbines consist of a tower with either two or three wind blades.[17] They are usually located 300 feet or more above the earth's surface, where wind is faster and less turbulent.[18] Wind turbines in the United States are typically the horizontal-axis variety with three blades. (See Figure #1).

Figure 1: Wind turbine and blades[19]

Turbines come in three sizes: small, medium, and large.[20] Large wind turbines are grouped together into wind farms to provide bulk power to consumers.[21] Wind farms can consist of anywhere from five[22] to over a thousand turbines connected to the utility

[16] DOE, supra note 12. The wind turns the blades, which spin a shaft, which connects to a generator and makes electricity, *id*.
[17] BLM, supra note 15.
[18] *Id*.
[19] Rich Eldred, *Barnstable wins lawsuit: FAA Cape Wind Approval Overturned*, The Register (October 28, 2011), http://www.wickedlocal.com/brewster/news/x1138511864/Barnstable-wins-lawsuit-and-overturns-FAA-Cape-Wind-approval-ck-Cape-Wind#axzz2UtSH8Zy8.
[20] DOE, supra note 12. Turbines are measured by their level of electricity output. Small turbines generate below 100 kilowatts (kW), utility-scale turbines generate from 100 kW to as large as several megawatts, *id*.
[21] *Id*. Wind turbines are connected to utility grids to distribute electricity to consumers, *id*.
[22] Alliant Energy Kids, *Wind Power*, http://www.alliantenergykids.com/EnergyandTheEnvironment/RenewableEnergy/022397 (last visited June 26, 2013).

grid, providing electricity when the wind blows.[23] (See Figure 2).

Figure 2: Shepherds Flat wind farm[24]

Wind turbines can be sited on land or placed offshore in large bodies of water like oceans and lakes.[25] The process of determining where to construct a wind farm is known as the wind farm siting process. First, developers construct meteorological towers or "met towers," which are wind measurement systems, on prospective sites to measure wind velocity.[26] The data collected allows the developer to determine whether the site is viable for a wind turbine farm.[27] Once a site is determined to be viable for a wind turbine farm, a developer will begin the process of constructing a wind farm. The siting process also requires the developer to obtain zoning authorizations and permits from various governmental entities, as I will explain in Part III.

Wind power is one of the most promising new energy sources capable of

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[23] *Id*.
[24] Wikepedia, http://en.wikipedia.org/wiki/Shepherds_Flat_Wind_Farm (last visited June 9, 2013).
[25] DOE, supra note 12.
[26] American Wind Energy Association [hereinafter AWEA], *AWEA Wind Energy Siting Handbook*, (Feb. 2008), http://www.awea.org/sitinghandbook/downloads/awea_siting_handbook_feb2008.pdf, at 2-7.
[27] *Id*.

replacing fossil fuel-generated electricity.[28] For over a decade, wind energy has been the fastest growing energy technology worldwide.[29] In the United States, wind-generated electricity grew by 400% from 2000-2009.[30] In 2012, wind energy was the number one source of new U.S. electricity generating-capacity for the first time.[31] Wind energy has engendered interest due to its many benefits. Supporters of wind energy claim numerous advantages of wind compared to fossil fuels, including environmental, economic, and national security benefits.[32]

Wind's environmental benefits are derived from the fact that it is a clean, renewable fuel source.[33] Still, wind energy only accounts for 2.3 percent of total U.S. electricity supply.[34] The American Wind Energy Association (AWEA) predicts that if we increase our nation's wind energy capacity to 20 percent by 2030, it would reduce greenhouse gas emissions, conserve water, lower natural gas prices, expand manufacturing, and generate local revenues.[35]

Economically, wind energy is one of the lowest-priced renewable energy technologies available today.[36] Thanks to new advances in technology aimed at improving wind turbine performance, wind energy's costs have been cut down by more

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[28] Elizabeth Burleson, *Wind Power, National Security, and Sound Energy Policy*, 17 PENN. ST. ENVTL. L. REV. 137, 139 (2009).
[29] AWEA, *U.S. Wind Industry Fourth Quarter 2012 Market Report*, (January 30, 2012), http://www.awea.org/learnabout/industry_stats/index.cfm (last visited February 24, 2013).
[30] Burleson, supra note 28, at 137.
[31] AWEA, supra note 29.
[32] Patricia E. Salkin & Ashira Pelman Ostrow, *Cooperative Federalism and Wind: A New Framework for Achieving Sustainability*, 37 HOFSTRA L. REV. 1049,1056 (2009).
[33] DOE, supra note 12.
[34] BLM, supra note 15.
[35] AWEA, *20 Percent Wind Energy by 2030* (May 2008), http://www.awea.org/learnabout/publications/upload/20percent_Wind_factsheet.pdf.
[36] DOE, supra note 12.

than 80 percent during the last 20 years.[37] In 1980, wind energy costs average over 55 cents (current dollars) per kilowatt-hour (kWh).[38] Today, wind energy projects cost between 4 and 6 cents per kilowatt-hour, depending upon the wind resource and project financing of the particular project.[39]

Wind energy also stands to improve energy security. Since the 1970s, the United States' dependence on foreign oil increased.[40] In 1980, the price of oil skyrocketed to $105.84 per barrel.[41] The price decreased over the subsequent years, averaging $25.00 per barrel until 2008 when the price of oil shot up to $98.58 per barrel.[42] The price of oil currently averages $80.00 per barrel.[43] In fact, the nation's recent economic downturn is attributed in part to the 2008 oil price increase.[44] This impact to our nation's economy not only revealed that our nation did not produce nearly enough oil and gas to meet its consumptive needs, but it also demonstrated how vulnerable the U.S. economy and way of life were to the whims of those who control world oil supplies and its prices.[45] On the other hand, wind is a domestic source of energy in abundant supply in the United States.[46] Indeed, recent studies show that the central United States is home to the greatest

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[37] BLM, supra note 15.
[38] Department of Energy, *Large Wind Technology,* http://www.eere.energy.gov/wind/large_wind_tech.html (last visited June 12, 2013).
[39] *Id*. See also AWEA, *Wind Power is Good for America*, http://www.awea.org/learnabout/publications/upload/AmericanWindpowerBrochure.pdf (last visited June 1, 2013).
[40] Salkin et al., supra note 32, at 1061.
[41] Tim McMahon, *Historical Crude Oil Prices (Table)*, InflationData.com (April 16, 2013), http://inflationdata.com/Inflation/Inflation_Rate/Historical_Oil_Prices_Table.asp.
[42] *Id*.
[43] *Id*.
[44] Zillman et al., supra note 2, at 3.
[45] *Id.*
[46] DOE, supra note 12.

wind energy potential in the world.[47]

To understand the nature of the competing national security interest, Part II of this thesis provides background on the National Security Policy and how President Obama's National Security Strategy incorporates both the development of clean renewable energy and military security. Part III outlines the current process for siting wind farms, highlighting the limited consideration that the regulatory process gives toward preserving military security. Although military security encompasses all of the DOD components, this thesis focuses primarily on the Air Force, NORTHCOM and NORAD. To illustrate the impact that wind turbines have on military security, Part IV discusses three situations wherein wind farm projects interfered with DOD activities. Part V, describe Section 358 of the Ike Skelton National Defense Authorization Act (NDAA), which revamped the DOD's process for reviewing renewable energy projects. Finally, Part VI presents the argument for federal law that will centralize the wind farm siting process that guarantees consideration of both energy and military security and proposes a model for such legislation.

II. U.S. NATIONAL SECURITY POLICY

In order to understand the relevance of national security in relation to wind farms, it is important to understand our nation's security policy and the role that wind farms play in that policy. This paper will start with a brief discussion on how national security policy is developed and then I will outline the current policy in relation to military and energy security.

The Executive Branch formulates the United States' National Security Policy. At

[47] Zillman et al., supra note 2, at 4.

the pinnacle of this system is the president[48] who is assisted by relevant executive branch agencies.[49] The president articulates his top security concerns in his National Security Strategy (NSS). As part of his 2010 National Security Strategy, President Obama announced both military and environmental goals for achieving national security.[50]

A. Military Security

The NSS recognizes the Armed Forces as the cornerstone of our nation's security.[51] As the principal defense policy advisor to the President of the United States, the Secretary of Defense is responsible for executing the President's military security goals.[52] In turn, the mission of the DOD is to provide military forces to deter war and protect the security of our country.[53] The DOD equips and trains its forces through its military branches: Air Force, Army, Navy, Marine Corps, and Coast Guard.[54] The primary job of the five Services is to train and equip their personnel to perform warfighting, peacekeeping and humanitarian/disaster assistance tasks.[55]

The DOD also consists of unified combatant commands that are the direct link from military forces to the President and the Secretary of Defense.[56] The Secretary of Defense deploys troops and exercises military power through his unified combatant

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[48] Dennis M. Drew and Donald M. Snow, *Grand Strategy Actors and Institutions*, in Air Command and Staff College Distance Learning Version 5.1, National Security 192, 193 (AU Press 2008). The president's authority to formulate such policy is both constitutional, as stated in in article II, section 2 of the Constitution, and political, *id*.
[49] *Id*. These executive agencies are organized around but not limited to those advisors and agencies named by the National Security Act of 1947, *id*.
[50] The White House, supra note 7.
[51] *Id.*
[52] U.S. Department of Defense, www.defense.gov (last visited on June 12, 2013).
[53] *Id*.
[54] *Id*. *See also*, 10 U.S.C. §101(a)(4) (2013) (lists the branches of the military).
[55] *Id*.
[56] *Id*.

commands.[57] This paper will limit discussion to the Northern Command or NORTHCOM. NORTHCOM oversees the homeland defense of the continental United States.[58] NORTHCOM often works with the North American Aerospace Defense Command (NORAD) to fulfill their homeland security mission. NORAD is a U.S.-Canada bi-national command charged with the mission of aerospace warning and aerospace control for North America. [59]

The Services fulfill their "train and equip" mission in part through the use of radar and designated military training areas. To illustrate how the Services accomplish their mission using radar and military training areas, I will discuss the environment at Seymour Johnson Air Force Base (AFB) in North Carolina.[60] Seymour Johnson AFB is home to the F-15E Strike Eagle. The F-15E Strike Eagle is an all-weather, multi-role strike fighter jet[61] which is equipped with the APG-70 radar system.[62]

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[57] *Id*.
[58] *Id*.
[59] North American Aerospace Defense Command [hereinafter NORAD], www.norad.mil (last visited June 12, 2013).
[60] Note that Part IV will provide a comprehensive discussion of military radars and training routes and the impacts that wind turbines have upon them.
[61] Lieutenant Colonel David Evans, *Assessment of Wind Turbine Impacts on 4th Fighter Wing F-15E Low-Altitude Training* (2012), available at http://www.seymourjohnson.af.mil/shared/media/document/AFD-120911-075.pdf. The F-15E is the only remaining fighter within the DOD that is required to maintain a low-altitude combat capability, i*d*.
[62] *Id*.

Figure 3: The APG-70 radar in the F-15E Strike Eagle[63]

This radar system is a terrain following (TF) radar that enables low-altitude, high-speed penetration and precision attack day or night, and in all weather conditions.[64] The APG-70 radar system allows aircrews to detect ground targets from long ranges.[65] During combat, the radar system allows the pilot to detect, target and engage air targets while the weapons system officer designates the ground target.[66]

[63] United States Air Force [hereinafter USAF], *Factsheet: F-15E Strike Eagle*, http://www.af.mil/information/factsheets/factsheet.asp?id=102 (last visited June 12, 2013).

[64] Evans, supra note 61. The F-15E is the only remaining fighter utilizing TF radar in this capacity, *id.*

[65] *Id*.

[66] *Id*. In 2012, Seymour Johnson AFB opposed a plan to construct 49 wind turbines 498 feet above ground level within 15 nautical miles of military training routes designated for F-15E Strike Fighter training. Part of the reason is that the proximity of the proposed wind farms threatened to interfere with the radar used to track the F-15E Strike Fighter's practice run. The main reason for the objection was because these wind turbines posed serious obstacles to these high-speed fighters due to their height and proximity to military training routes, *id*.

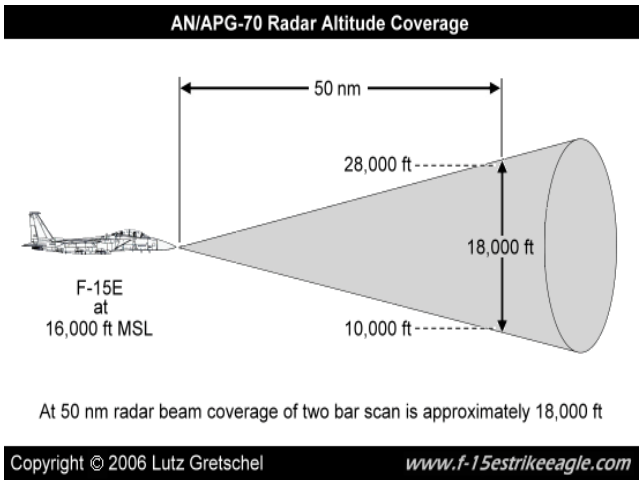

Figure 4: An illustration of the APG-70 radar beam from the F-15E Strike Eagle[67]

Seymour Johnson AFB is also home to the only F-15E Strike Eagle training unit in the U.S. Air Force.[68] Due to the aircraft's unique capability and mission, the training squadron conducts low-altitude training at 500 feet above ground level, both day and night.[69] In order to accomplish its training, Seymour Johnson AFB requires a unique combination of low-altitude airspace, which consists of several areas that are designated as restricted areas, military training routes (MTRs), and military operation areas (MOAs).[70] This dedicated airspace ensures optimal training conditions.[71]

NORTHCOM and NORAD also use radar to complete their missions. Both organizations are responsible for defending the United States' borders by detecting threats that enter our airspace, including aircraft, missiles, etc.[72] Long-range radar systems are used to fulfill this task. These radars must rapidly discriminate among

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[67] *Id*.
[68] *Id*.
[69] *Id*.
[70] *Id*. Seymour Johnson AFB maintains and manages Restricted Area R-5314, 13 MTRs, and 4 MOAs, *id*.
[71] *Id*.
[72] NORAD, supra note 59.

targets, calculate their launch and impact points, validate targets and perform other requirements to protect our borders.[73]

B. Energy Security

Prior to taking office in 2009, President Obama made it clear that increased use of renewable energy was a high priority.[74] Then President-elect Obama proposed the "Top 10 Energy and Environment Priorities for the Obama Administration and the 111th Congress."[75] This was later dubbed the New Energy for America plan.[76] This progressive agenda included investing in clean energy as part of an economic recovery plan, establishing a national renewable electricity program, establishing federal energy-efficiency resources standards, and investing in clean-energy research, development and deployment.[77] The President's plan established national goals of producing 10 percent of the nation's electricity from renewable sources by 2012 and 25 percent by 2025.[78]

This energy policy recognizes the importance of creating a clean energy economy to achieve several objectives: increase our nation's prosperity, promote energy security (or energy independence), and slow the pace of global warming.[79] As discussed above, the nation's economy has been adversely impacted by drastic fluctuations in oil prices. Achieving independence from foreign oil would eliminate the negative impacts to our

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[73] *Id*.
[74] Daniel J. Weiss, *President Obama's Clean Energy Progress: How the Top 10 Energy Priorities Fared During His First Term*, Center for American Progress (January 9, 2013), http://www.americanprogress.org/issues/green/report/2013/01/09/49187/president-obamas-clean-energy-progress-how-the-top-10-energy-priorities-fared-during-his-first-term.
[75] *Id*.
[76] *Id*.
[77] *Id*.
[78] The Office of the President-Elect, *The Obama-Biden Plan*, http://change.gov/agenda/energy_and_environment_agenda (last visited June 13, 2013).
[79] Salkin et al., supra note 32, at 1056.

nation's economy by adverse changes in the oil industry; thereby increasing our Nation's prosperity and promoting energy security."[80]

The Obama administration advanced its energy agenda through various executive initiatives. One of his most significant achievements came on February 13, 2009 when Congress passed the American Recovery and Reinvestment Act (Recovery Act). The Recovery Act included unprecedented investments in clean energy, providing $90 billion in grants, tax incentives, and loan guarantees to stimulate clean energy development.[81]

The Recovery Act also extended the Renewable Electricity Production Tax Credit (PTC) for three years.[82] The PTC was introduced in the Energy Policy Act of 1992 as a corporate tax credit for several renewable sources including wind.[83] Since its inception, the PTC was expanded and extended several times through many different laws. The Recovery Act's extension of the PTC was renewed for another year as part of the 2013 fiscal cliff deal.[84] This was an important provision since this incentive was a significant driving force in wind development in the United States.[85] Data indicates that wind development remained highest while the PTC was in place prior to expiration, and lowest

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[80] In his inaugural speech, President Obama reinforced his commitment to clean energy. The President called upon Americans to "confront our dependence on foreign oil, address the moral, economic and environmental challenge of global climate change, and build a clean energy future. The White House, *Fact Sheet: President Obama's Blueprint to Make the Most of America's Energy Resources,* (2012), http://www.whitehouse.gov; *See* Salkin et al., supra note 32, at 1056.

[81] Weiss, supra note 74.

[82] *Id*.

[83] Union of Concerned Scientists, *Production Tax Credit for Renewable Energy*, http://www.ucsusa.org/clean_energy/smart-energy-solutions/increase-renewables/production-tax-credit-for.html (last visited June 12, 2013).

[84] *Id*.

[85] *Id*.

when it was allowed to lapse.[86]

President Obama officially made the pursuit of clean, renewable energy alternatives a national security concern in 2010. The President stated that our nation's dependence on fossil fuels would continue to undermine our security and prosperity by leaving our nation vulnerable to energy supply disruptions and manipulations.[87] His goal is to transform our energy economy by developing clean energy technology, enacting policies that encourage the private sector to accelerate development of clean energy technology, and investing in research of next-generation technology.[88] The President's security strategy views energy security as an important instrument of power that complements the use of military security.[89]

State and federal policies reflect support of the President's national energy policy. Many states adopted standards[90] that require a certain percentage of the energy purchased in the state to be from renewable energy sources.[91] Regulated utilities focused primarily on wind energy to meet such requirements.[92]

The President called upon federal agencies to lead by example when he signed an

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[86] *Id*.
[87] The White House, supra note 7.
[88] *Id*.
[89] *Id*.
[90] These standards are called Renewable Portfolio Standards (RPS) or Renewable Energy Standards (RES). Salkin et al., supra note 32, at 8.
[91] *Id*. President Obama has also pushed for a federal standard of at least 25% renewable energy systems furnishing American energy needs by 2025. Although Congress has yet to pass such a standard, President Obama was successful in including $14.5 billion in efficiency investments in the Recovery Act and issuing Executive orders requiring more federal energy efficiency. Wendie L. Kellington, *Federal Laws Affecting Local Land Use Decision Making*, SS001 ALI-ABA 541, 550. See also Department of the Interior, *Secretarial Order 3285 Renewable Energy Development by the Department of Interior*, (March 11, 2009), http://www.blm.gov/or/energy/opportunity/files/order_3285.pdf.
[92] Salkin et al., supra note 32, at 8.

Executive Order encouraging federal agencies to increase use of renewable energy and establish clean energy goals.[93] This included concerted efforts to site wind projects on appropriate public lands.[94] Although DOD is the single largest consumer of energy in the nation and the Air Force consumes more energy than any other service, it has been forward leaning in its efforts to "go green."[95] For example, in 2011, six percent of Air Force energy consumption was from renewable sources, which surpassed federal goals.[96] In addition, the Air Force is attempting to increase this goal to 25 percent by 2025 through the more than 180 renewable projects ongoing or under construction as of 2012.[97]

Federal agencies involved in the wind siting process either developed or are in the process of developing policies in line with the national energy policy. On March 11, 2009, the Secretary of the Department of Interior signed Secretarial Order 3285 (SO 3285), which declared the development of renewable energy as a priority for the Department of Interior.[98] The Order supports President Obama's goal of utilizing public lands for renewable energy projects.[99] As a result of the National Energy Policy and SO

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[93] This Order does not contain a number. The White House, *Executive Order: Federal Leadership in Environmental, Energy and Economic Performance* (October 5, 2009), http://www.whitehouse.gov/assets/documents/2009fedleader_eo_rel.pdf.

[94] In his State of the Union address in 2012, the President laid out a Blueprint for an America Built to Last. Under this Blueprint, the Department of Interior was committed to issuing permits for 10 gigawatts of renewable generation capacity – enough to power 3 million homes – from new projects on our public lands by the end of 2012. The White House, supra note 79.

[95] TSgt. Shad Eidson, *SecAF Shares AF, DOD Energy Goals at Summit* (Auguast 2012), www.af.mil.

[96] *Id*.

[97] *Id*.

[98] Kellington, supra note 91, at 550.

[99] *Id.* In 2012, the President set a goal to issue permits for 10 gigawatts of renewables on public lands by the end of the year. See The Executive Office of the President, *The*

3285, the Bureau of Land Management (BLM)[100] undertook efforts to evaluate additional wind energy development on public lands and established the Wind Energy Development Program.[101] By 2011 the BLM approved 198 right-of-way projects for the use of public lands authorizing wind energy site testing or development.[102]

III. THE CURRENT WIND FARM SITING PROCESS & NATIONAL SECURITY CONSIDERATIONS

This section will discuss the current wind farm siting process relevant to potential impacts on military readiness, illustrating the limited consideration given to military security concerns. This discussion will outline the siting process at the state and federal levels, but will be limited to only those agencies involved when there is potential impact to the military. The siting process is different for on-shore (land-based) and off-shore wind farms. Since the United States has yet to construct its first off-shore wind farm, this section will focus on the siting process for on-shore wind farms.[103]

The wind farm siting process is not centrally regulated. When Congress enacted the Energy Act of 2005, which preempts the local siting process of some transmission

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President's Climate Action Plan (2013) [hereinafter *2013 President's Climate Action Plan*], available at www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf, at 7.

[100] The Bureau of Land Management (BLM) is under the Department of Interior (DOI). BLM, *New Energy for America*, http://www.blm.gov/wo/st/en/prog/energy.html (last visited June 13, 2013). This agency manages more federal land than any other federal agency that have significant alternative energy potential, *id*. This gives the BLM a leading role in fulfilling the Administration's goals for a new energy economy based on a rapid and responsible move to large-scale production of solar, wind, geothermal, and biomass energy, *id*.

[101] Kellington, supra note 91, at 550.

[102] *Id*. Of these, 29 authorizations have a total installed capacity of 437 megawatts, *id*.

[103] This paper includes a discussion of Cape Wind, a proposed off-shore wind farm that will be the first of its kind in the United States once it is constructed.

lines[104] and all natural gas pipelines and terminals by granting the Federal Energy Regulatory Commission (FERC)[105] exclusive authority, it left the siting of energy generating facilities, such as wind farms, at the local government level.[106] In addition to the local government, the state and/or one or more federal agencies may be involved in the siting process, depending on the circumstances.[107]

A. State Process

In the United States, land use regulation has traditionally been a function of local governments.[108] Wind farms constructed on land are typically subject to local zoning rules and policies.[109] Thus in many states, local zoning authorities are primarily responsible for approving the siting of wind farms.[110] Consequently, the process for obtaining a permit varies widely not only among states, but also within each state.[111] This is because most states delegated responsibility in some manner[112] for siting wind farms to local governments (cities, towns, or counties).[113]

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[104] Salkin et al., supra note 32, at 1053. *See also* 16 U.S.C. §824p(a) (2005).
[105] FERC "is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil." Federal Energy Regulatory Commission [hereinafter FERC], *What FERC Does*, www.ferc.gov (last visited June 4, 2013).
[106] Salkin et al., supra note 32, at 1053. *See also*15 U.S.C. §717b-1(c) (2005).
[107] Salkin et al., supra note 32, at 1065.
[108] *Id*.
[109] *Id.*
[110] *Id*.
[111] *Id*.
[112] Some states delegate complete responsibility while other states delegate partial responsibility by establishing voluntary guidelines or model ordinances for use by local governments or splitting responsibility based on size of the project, with a state agency in charge of siting larger scale wind energy facilities, and local zoning authorities charged with siting smaller scale projects, *id*. at 1066.
[113] *Id.*

However, some states have limited local government authority to unreasonably limit wind farm development by excluding wind farms from a municipality.[114]

B. Federal Process

Whether a wind farm project is located on privately, locally, or state-owned land, the potential impacts to resources such as wildlife, water, and aviation may also trigger a federal approval process.[115] For example, a wind farm that would have an adverse effect on endangered species may result in federal review under the Endangered Species Act. Additional requirements apply when a wind farm project is located on federally managed lands.[116] When wind developers erect wind farms on federally managed lands, several agencies may have jurisdiction.[117] This paper focuses on those federal agencies that may be involved when there is potential impact on military readiness: the Bureau of Land Management (BLM) and the Federal Aviation Administration (FAA).

1. BLM

The Bureau of Land Management, an agency within the Department of Interior (DOI) manages approximately 262 million acres of public lands in the United States and is responsible for the development of wind energy resources on BLM-administered lands.[118] Developers who plan to construct wind farms on BLM-administered lands must obtain a right-of-way (ROW) from the BLM. This grant is required for meteorological

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[114] *Id.,* at 1067.
[115] AWEA, supra note 26, at 4-2.
[116] *Id*.
[117] There are seven agencies that exercise jurisdiction over federally managed lands: the Bureau of Land Management (BLM), Bureau of Reclamation, Bureau of Indian Affairs, the Forest Service (FS), Department of Defense (DOD), and Fish and Wildlife Service (FWS), *id*. Of these seven agencies, only one agency has a wind siting policy (the BLM), *id*.
[118] AWEA, supra note 26, at 4-23.

towers as well as wind turbines.[119]

Since BLM is a federal agency considering whether to approve actions that may impact the environment, ROW grants are subject to review under the National Environment Policy Act (NEPA).[120] Pursuant to NEPA, the BLM is required to prepare statements that assess the environmental effects of the grant for the proposed wind energy project.[121]

In July 2008, DOI, BLM and DOD signed the Wind Energy Protocol[122] (hereinafter Protocol) to facilitate compatible land use through cooperative planning of

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[119] *Id*., at 4-24.

[120] The National Environmental Policy Act (NEPA) requires federal agencies to consider environmental impacts of their proposed actions and reasonable alternatives to those actions in their decision-making process. For regulatory agencies, this typically involves considering environmental impacts that would occur from granting an application. National Environmental Policy Act of 1969 §102, 42 U.S.C. §4332 (2006). *See also* EPA, *National Environmental Policy Act (NEPA)*, www.epa.gov (last visited June 18, 2013).

[121] To meet NEPA requirements federal agencies prepare a detailed statement known as an Environmental Impact Statement (EIS). Zillman et al., supra note 2, at 11. BLM prepared a Programmatic Environmental Impact Statement (PEIS) and Record of Decision (ROD) for its Wind Energy Development Program, *id*. The PEIS assesses the environmental, social, and economic impacts associated with wind energy development on BLM-administered land, and the ROD establishes polices and best management practices for the administration of wind energy development activities as well as minimum requirements for mitigation measures, *id*. To the extent that the PEIS addresses anticipated issues and concerns associated with an individual wind energy project, BLM will "tier off" the analysis in the PEIS and limit the scope of additional, project specific NEPA analyses, *id*. Although this review is required for all ROW grants, including grants for the construction of meteorological towers, the scope of review is broader for the construction of wind turbines than it is for the construction of meteorological towers, *id*.

[122] BLM, *Wind Energy Protocol Between the Department of Defense and the Bureau of Land Management Concerning Consultation on Development of Wind Energy Projects and Turbine Siting on Public Lands Administered by the Bureau of Land Management to Ensure Compatibility with Military Activities* [hereinafter *Wind Energy Protocol*] (July 2008), available at http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/energy/solar_and_wind.Par.75725.File.dat/Final_DOD_BLM_Protocol_080708.pdf.

wind energy projects on BLM-administered lands.[123] The Protocol was then incorporated into the BLM Wind Energy Policy.[124] Pursuant to the Protocol, DOD identified military sensitive areas that are administered by the BLM.[125] When BLM receives a wind energy ROW application for an area previously identified by DOD, BLM will initiate consultation with the DOD within 30 days.[126] DOD has the opportunity to evaluate the applications for adverse effects on military activities, decide whether those effects can be mitigated, and if so, recommend mitigation measures.[127] After receiving DOD's recommendation, BLM will make a final decision whether to grant the ROW.[128] If BLM decides to grant the ROW contrary to DOD's recommendation, DOD's only recourse is to appeal the decision to the Interior Board of Land Appeals (IBLA).[129] An applicant may also appeal the BLM's decision if the BLM denies the ROW based on DOD's recommendation.[130]

2. FAA

Under the Federal Aviation Act of 1958 (hereinafter the 1958 Act), Congress granted the Federal Aviation Administration (FAA) paramount authority in issues of aviation safety.[131] The FAA is part of the Department of Transportation and is

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[123] Zillman et al., supra note 2, at 12.
[124] *Id*.
[125] *Id. See* BLM, supra note 15.
[126] BLM, supra note 122, at 4.
[127] Zillman et al., supra note 2, at 13.
[128] BLM, supra note 122, at 3.
[129] *Id*.
[130] *Id*.
[131] Prior to the 1958 Federal Aviation Act, the responsibility for controlling and apportioning the nation's airspace was divided between the DOD, the Department of Commerce (where the FAA's predecessor was located), the Civil Aeronautics Board and the President. Further, the military air traffic control (ATC) system operated independently from the civilian system. Colonel Felix A. Losco and Major Thomas F.

responsible for identifying structures that could adversely affect navigable airspace or communications or navigation technology for aviation for both civilian and military systems.[132] Under Section 40103 of the 1958 Act, the FAA administrator is required to enact regulations for (a) navigating, protecting, and identifying aircraft; (b) protecting individuals and property on the ground; (c) using the navigable airspace efficiently; and (d) preventing collisions between aircraft, between aircraft and land or water vehicles, and between aircraft and airborne objects.[133] Section 44718 requires the owners of objects tall enough to impact air safety, like wind turbines, to notify the FAA prior to construction.[134] If the structure could obstruct navigable airspace or interfere with navigation facilities, the Act requires an "aeronautical study" to determine "the extent of any adverse impact on the safe and efficient use of the airspace."[135] In conducting the

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Collick, *When Wind, Wind Turbines, and Radar Mix – A Case Study*, 68 A.F.L. REV. 235, 244 (2012). Communication between them was not automatic, which led to accidents, *id*. After two mid-air collisions between military planes and civilian airliners, President Dwight D. Eisenhower and Congress determined that the aviation systems needed to be centralized, *id*. President Eisenhower pressed for a unified federal agency charged with aviation facilities and air traffic management, *id*. He wanted the agency to have "paramount authority" over U.S. airspace, *id*.

[132] Kellington, supra note 91, at 547. The Act created a legislative and regulatory scheme requiring the FAA to draft regulations pertaining to navigation and to assess the impact tall structures may have on air safety, *id*.

[133] Losco et al, supra note 131, at 245. *See also* 49 U.S.C. §40103(b)(2)(A) – (D) (2011).

[134] Losco et al, supra note 131, at 245. *See also* 49 U.S.C. § 44718(a) (2011).
(a) Notice.--By regulation or by order when necessary, the Secretary of Transportation shall require a person to give adequate public notice, in the form and way the Secretary prescribes, of the construction, alteration, establishment, or expansion, or the proposed construction, alteration, establishment, or expansion, of a structure or sanitary landfill when the notice will promote-- (1) safety in air commerce; and (2) the efficient use and preservation of the navigable airspace and of airport traffic capacity at public-use airports.

[135] Losco et al, supra note 131, at 245. *See also* 49 U.S.C. §44718(a) and (b)(1). Studies.--(1) Under regulations prescribed by the Secretary, if the Secretary decides that constructing or altering a structure may result in an obstruction of the navigable airspace or an interference with air navigation facilities and equipment or the navigable airspace,

study, the FAA must consider, among other things, the cumulative impact resulting from the proposed construction or alteration of a structure when combined with the impact of other existing or proposed structures.[136] Pursuant to these statutes, the FAA drafted detailed regulations and published a handbook for accomplishing these legislative goals.[137]

The FAA designated the Office of Obstruction Evaluation and Airport Airspace Analysis (OE/AAA) as the organization responsible for determining whether a construction project will obstruct air navigation. This is known as the hazard determination process.[138] A wind developer must file a Notice of Proposed Construction (NPC) for any structure greater than 200 feet above ground level.[139] Most modern

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the Secretary shall conduct an aeronautical study to decide the extent of any adverse impact on the safe and efficient use of the airspace, facilities, or equipment. In conducting the study, the Secretary shall consider factors relevant to the efficient and effective use of the navigable airspace, including-- (A) the impact on arrival, departure, and en route procedures for aircraft operating under visual flight rules; (B) the impact on arrival, departure, and en route procedures for aircraft operating under instrument flight rules; (C) the impact on existing public-use airports and aeronautical facilities; (D) the impact on planned public-use airports and aeronautical facilities; and
(E) the cumulative impact resulting from the proposed construction or alteration of a structure when combined with the impact of other existing or proposed structures.

[136] Losco et al., supra note 131, at 245. *See* 49 U.S.C. §44718(b)(1)(E).

[137] Losco et al., supra note 131, at 246. The most current version of this handbook is JO 7400.2J, *Objects Affecting Navigable Airspace*, dated February 9, 2012.

[138] Losco et al, supra note 131, at 248.

[139] 14 C.F.R. §77.5(a). Applicability. If you propose any construction or alteration described in § 77.9, you must provide adequate notice to the FAA of that construction or alteration. *See also* 14 C.F.R. §77.9. Construction or Alteration Notice. If requested by the FAA, or if you propose any of the following types of construction or alteration, you must file notice with the FAA of: (a) Any construction or alteration that is more than 200 ft. AGL at its site.
See also 14 C.F.R. § 77.17(a)(2). Obstruction Standards. An existing object, including a mobile object, is, and a future object would be an obstruction to air navigation if it is of greater height than any of the following heights or surfaces…A height that is 200 feet AGL, or above the established airport elevation, whichever is higher, within 3 nautical miles of the established reference point of an airport, excluding heliports, with its longest

turbines exceed the height standard.[140] Developers are required to provide this notice 45 days[141] before the start of construction[142] (though the FAA's website suggests that developers provide an 8-12 month notice for wind turbine projects).[143] This notice requirement applies to both meteorological towers and wind turbines.[144] Upon receipt of the notice, FAA conducts a study to determine whether the proposed action will create a hazard to navigable airspace.[145] Because modern turbines exceed the height standard, the FAA presumes the turbines to be a hazard unless this study proves otherwise.[146] At the end of the process, the FAA issues either a Determination of No Hazard (DNH) or a

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runway more than 3,200 feet in actual length, and that height increases in the proportion of 100 feet for each additional nautical mile from the airport up to a maximum of 499 feet. A nautical mile is a unit of distance formerly used in the U.S. for navigation; equal to 1.15078 miles. The Free Dictionary, www.thefreedictionary.com (last visited June 20, 2013).

[140] Losco et al., supra note 131, at 247.

[141] Prior to 2011, developers were required to give a 30-day notice. Losco et al., supra note 131, at 247.

[142] 14 C.F.R. §77.7. Form and time of notice. (a) If you are required to file notice under § 77.9, you must submit to the FAA a completed FAA Form 7460–1, Notice of Proposed Construction or Alteration. FAA Form 7460–1 is available at FAA regional offices and on the Internet. (b) You must submit this form at least 45 days before the start date of the proposed construction or alteration or the date an application for a construction permit is filed, whichever is earliest.

[143] FAA, *Wind Turbine FAQs*, www.faa.gov (last visited June 20, 2013).

[144] Notice may also be required for a structure less than 200 feet above ground level depending on the distinction and length of nearby runway. 14 C.F.R. §77.9.

[145] 14 C.F.R. §77.5(c). Notice received by the FAA under this subpart is used to: (1) Evaluate the effect of the proposed construction or alteration on safety in air commerce and the efficient use and preservation of the navigable airspace and of airport traffic capacity at public use airports; (2) Determine whether the effect of proposed construction or alteration is a hazard to air navigation; (3) Determine appropriate marking and lighting recommendations, using FAA Advisory Circular 70/7460–1, Obstruction Marking and Lighting; (4) Determine other appropriate measures to be applied for continued safety of air navigation; and (5) Notify the aviation community of the construction or alteration of objects that affect the navigable airspace, including the revision of charts, when necessary.

[146] Losco et al., supra note 131, at 247.

Notice of Presumed Hazard (NPH).[147]

A Determination of No Hazard to Air Navigation will be issued when the aeronautical study concludes that the proposed construction or alteration will exceed an obstruction standard but would not have a substantial aeronautical impact.[148] The FAA may also issue a DNH when a proposed structure does not exceed any of the obstruction standards and would not be a hazard to air navigation.[149] A Notice of Presumed Hazard or Determination of Hazard (DOH) to Air Navigation will be issued when the aeronautical study concludes that the proposed construction or alteration will exceed an obstruction standard and would have a substantial aeronautical impact. [150]

The FAA will only issue hazard notifications if the interference demonstrates a "substantial physical or electromagnetic adverse effect" on navigable airspace or navigation facilities.[151] A proposed wind farm may receive this determination when it "causes electromagnetic interference to the operation of an air navigation facility or the signal used by an aircraft" or when the "adverse effects" impact a "significant volume" of aeronautical activity.[152]

As part of its hazard determination process, the FAA will issue a public notice (the FAA refers to this process as "circulization") to interested parties. This step includes

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[147] Also called a Determination of Hazard (DOH). 14 C.F.R. §77.31.
[148] 14 C.F.R. §77.31(d). A Determination of No Hazard to Air Navigation may include the following: 1) Conditional provisions of a determination; 2) Limitations necessary to minimize potential problems, such as the use of temporary construction equipment; 3) Supplemental notice requirements, when required; 4) Marking and lighting recommendations, as appropriate.
[149] 14 C.F.R. §77.31(e).
[150] 14 C.F.R. §77.31(c).
[151] Losco et al., supra note 131, at 246. *See also* JO 7400.2J, para. 6-3-3 and 6-3-5.
[152] *Id*.

notices to agencies with radar assets, such as the DOD.[153] The DOD is able to provide comments at this point, which may include an objection based on potential impact on military security. Since the FAA is the final arbiter, it will make the final decision as to whether a hazard exists.[154] If the FAA issues a NPH, the applicant may appeal the decision with the FAA. If the FAA maintains its decision, the applicant may appeal the decision in federal court.[155] The DOD may also appeal to the FAA if it issues a DNH in spite of DOD's objection to the proposed project.

IV. IMPACT ON MILITARY READINESS

Wind turbines can impact military readiness primarily by interfering with the effectiveness of radar systems and other electromagnetic systems that are critical to national security.[156] In addition, wind turbines can affect DOD's test and training missions.[157] This part will explain how military radars work and how wind turbines affect those radars. This section will also describe actual impacts that wind turbines have had on military readiness by discussing three situations where military security was ignored in the wind farm siting process. Last, this discussion will depict how Congress became involved in this process and what it did to revamp DOD's renewable review

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[153] JO 7400.2J, para. 6-3-17.c.2. Other agencies that may be affected include the Department of Homeland Security (DHS) and the National Oceanic and Atmospheric Administration (NOAA). *See* AWEA, *Airspace, Radar and Wind Energy: Wind Turbines and Radar Can Coexist*, www.awea.org (last visited March 10, 2013).

[154] AWEA, supra note 153.

[155] 14 C.F.R. §77.37.

[156] *Impact of Wind Farms on Military Readiness: Hearings Before the Subcomm. on Readiness of the H. Comm. on Armed Servs.* [hereinafter *Impact of Wind Farms* hearing], 111th Cong., at 43 (2010) (statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense for Installations and Environment), *available at* http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg61770/pdf/CHRG-111hhrg61770.pdf, at 44.

[157] *Id*. at 45. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness).

process.

The Air Force utilizes various radar systems to protect our borders, conduct air traffic surveillance, weather surveillance, and other activities. I will discuss three types of radar systems that have been impacted by wind turbines: primary surveillance radar (PSR), secondary surveillance radar (SSR), and long-range radars.[158]

The PSR works by transmitting high-frequency radio waves that bounce off or "illuminate" the target and returns to the radar.[159] By interpreting returns from successive pulses (known as primary returns), the radar is able to determine the range, bearing and altitude of objects in the radar's beam.[160] Return pulses are much weaker than the initial energy beams.[161] The low-energy returns are susceptible to interference caused by ground objects (clutter), which can degrade the PSR's ability to provide location and altitude information.[162]

[158] *Id*. at 17.
[159] Losco et al., supra note 131, at 236.
[160] *Id*.
[161] *Id*.
[162] *Id*.

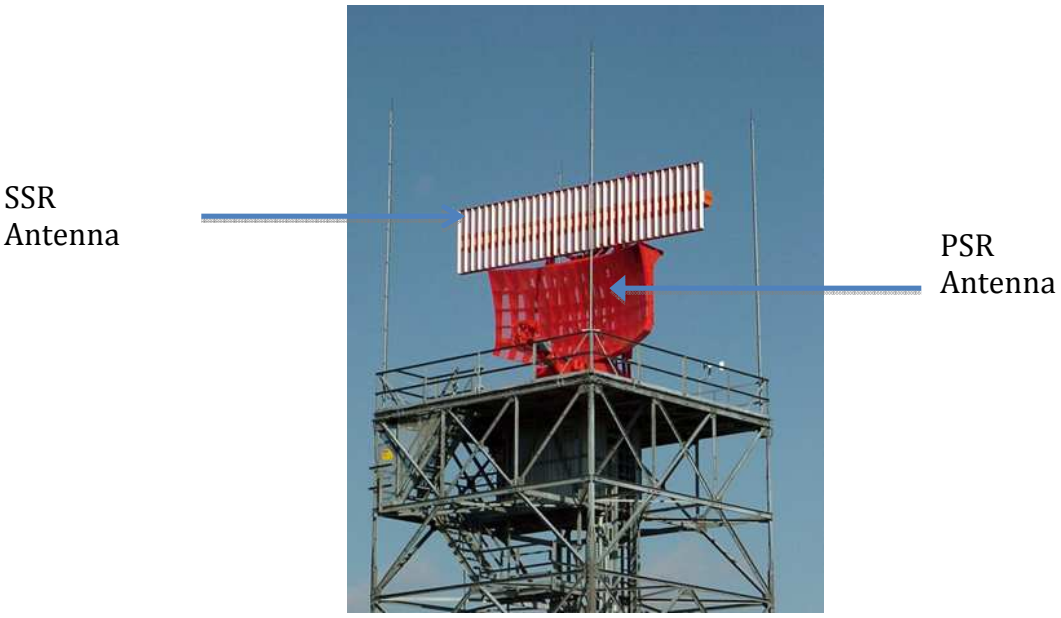

Figure 5: PSR and SSR antennas of the ASR-11 radar[163]

SSR is considered an "interactive" radar system.[164] An SSR operates by sending out a coded signal (called an "interrogation") that is received by a transponder system on an aircraft.[165] The airplane's transponder system translates the interrogation and responds by transmitting a coded signal back to the radar.[166] The frequencies of the interrogation and response are different, and both are different from the primary radar frequency so that the signals do not interfere with each other.[167] A major advantage of the SSR is that the return from the aircraft transponder is much stronger than the typical primary radar return and is generally unaffected by interference that can affect the primary radar

[163] Available at www.raytheon.com. Last visited May 31, 2013.
[164] Report to the Congressional Defense Committees, *The Effect of Windmill Farms on Military Readiness* [hereinafter *The Effect of Windmill Farms on Military Readiness*], at 18 (2006), available at http://www.eere.energy.gov/windandhydro/federalwindsiting/pdfs/dod_windfarms.pdf.
[165] *Id*. Transponder is short for transmitter-responder, *id*.
[166] *Id*.
[167] *Id*.

return.[168] This is because the SSR system does not depend upon the "reflection" of its interrogation message.[169] Instead it receives a different signal actually broadcast by the aircraft.[170] Thus transmission losses in each direction are minimized.[171] A disadvantage of the SSR is that aircraft must have a functioning transponder to communicate with the radar and not all aircraft are required to have transponders.[172] Additionally, even for transponder-equipped airplanes, if the transponder fails or is turned off the SSR will not be able to track the airplane.[173] Under these circumstances, only a primary surveillance radar will be able to detect or track the aircraft.[174] Terrain-following (TF) radar systems (such as those used on the F-15E Strike Eagle) and air traffic control (ATC) radar systems (such as the radars at Travis AFB, typically use a combination of PSR and SSR. [175]

Long-range radars are used to detect, identify, track, and report air threats from a long distance.[176] These radars can be ground-based, sea-based or even airborne. For the purpose of this paper, we will discuss ground-based long-range radars. The U.S. utilizes several long-range radar systems to protect our borders. For instance, early warning radars (EWR) are utilized for long distance detection of aircraft and missiles entering our airspace early enough to be able to provide an

[168] *Id*.
[169] *Id*.
[170] *Id*.
[171] *Id*.
[172] *Id*.
[173] *Id*.
[174] *Id*.
[175] *The Effect of Windmill Farms on Military Readiness*, supra note 164, at 17.
[176] *The Effect of Windmill Farms on Military Readiness*, supra note 164, at 19.

alert before the threat reaches its target.[177] The Air Force operates the Pave Phased Array Warning System or Pave PAWS. There are three fixed-site EWRs within the continental United States, located at Cape Cod Air Force Station (AFS), Massachusetts, Beale AFB, California, and Clear AFS, Alaska.[178] These ground-based radars are large phased-array systems that are housed in three-sided, 32-meter high buildings.[179] Pave PAWS radar beams have an outward and upward range of nearly 3,000 nautical miles in a 240-degree sweep.[180] This radar has the ability to detect an object as small as a compact car at its extreme range.[181] It can detect smaller objects at closer range.[182]

This capability comes from its three-dimensional structure in which hundreds to thousands of small transmitters and receivers make up the face of the antenna.[183] Radar beam patterns are formed by precisely adjusting the phase angle of the signal sent to each transmit element.[184] The receive beam can also be adjusted over an area to cover a specific volume of airspace.[185] The radar beam can also be shifted to increase the focus point.[186]

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[177] Air Force Space Command [hereinafter AFSPC], *Pave PAWS Fact Sheet*, http://www.afspc.af.mil/library/factsheets/factsheet.asp?id=3656 (last visited June 12, 2013).
[178] *Id*.
[179] *Id*.
[180] Peterson AFB, *Pave PAWS Fact Sheet*, http://www.peterson.af.mil/library/factsheets/factsheet.asp?id=10506 (last visited June 12, 2013).
[181] *Id*.
[182] *Id*.
[183] *Id*.
[184] *Id*.
[185] *Id*.
[186] *Id*.

Figure 6: Early Warning Radar at Beale AFB, CA[187]

The DOD also uses other long-range radars to provide air defense. One such system is the Joint Surveillance System (JSS), which is comprised of both Air Route Surveillance Routers (ARSR) and legacy radars and is used in conjunction with the FAA. There were approximately 43 JSS radars located throughout the United States as of 2000 and they have a range beyond 290 nautical miles. [188]

Wind turbines interfere with radar in two ways: blockage (also called shadowing), which results when wind turbines keep the radar system's microwave signals from reaching their intended targets; and clutter, which is created by unwanted reflections of the radar signals from wind turbine towers and their moving blades.[189] The blockage and clutter that turbines create reduce the sensitivity and performance of the radar, producing

[187] *The Effect of Windmill Farms on Military Readiness*, supra note 164, at 20. The early warning radars also have side lobes. The first side lobe forms a concentric circle about the main beam. The second and higher side lobes are similar in character to the main beam and arranged about that beam. The first and second lobes intercept the ground in front of the array.
[188] Federation of American Society, http://www.fas.org/nuke/guide/usa/airdef/arsr-4.htm (last visited June 20, 2013).
[189] *Impact of Wind Farms* hearing, supra note 156, at 44. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness).

shadowed areas and false targets that make it difficult or impossible for the radar operator to see an actual target.[190]

In addition, when DOD tests a new weapon system, it must have an electromagnetically pristine environment in which to collect baseline data about the performance and characteristics of the weapon.[191] Interference from nearby wind farms can compromise the telemetry, tracking radar and other electromagnetic systems used to conduct these tests. Likewise, the DOD's training mission can suffer when air traffic control radars used to train pilots and track aircraft are degraded by wind turbine clutter and shadowing. Military training missions can also be impacted by the mere presence of the turbines.

The following section describes the different ways wind turbines may impact military readiness by discussing three situations where this has occurred. The first discussion centers around the Cape Wind project, the only off-shore wind farm currently pending in the U.S. The Cape Wind project is important since it is the first time that the potential impact that wind farms have on military readiness received national congressional attention and was seriously analyzed. The second situation occurred at Travis AFB in California. The numerous wind turbines near Travis AFB interfered with the air traffic control system, posing a threat to the Air Force's ability to maintain air safety. This situation also illustrates the deficiencies in the wind farm siting process with regard to military security. The last situation is the Shepherds Flat wind farm project in northern Oregon. The controversy surrounding this project once again highlighted the flaws in the wind farm siting process and prompted congressional action.

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[190] *Id.*, at 45.
[191] *Id.*

A. Cape Wind

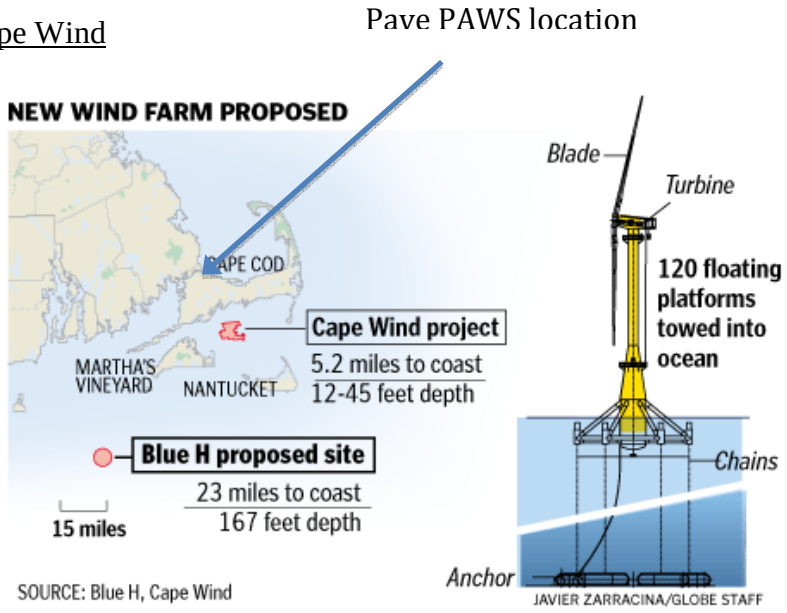

Figure 7: Cape Wind project[192]

In 2001, Cape Wind Associates submitted a proposal to construct the United States' first off-shore wind farm that would consist of 130 wind turbines in Nantucket Sound, off the coast of Cape Cod, Massachusetts.[193] Cape Code is also the home of one of three fixed-site missile Early Warning Radars (EWR) within the United States, the Pave Phased Array Warning System or Pave PAWS.[194] Pave PAWS is a long-range radar system tasked with detecting and targeting threats to the United States via missiles or other air or surface targets.[195] NORAD and NORTHCOM rely on this system to fulfill its homeland defense mission. Pave PAWS has the ability to detect and track stealth

[192] BostonGlobe.com, www.boston.com (last visited May 31, 2013).
[193] Cape Wind, www.capewind.org (last visited June 20, 2013).
[194] *The Effect of Windmill Farms on Military Readiness*, supra note 164, at 19. The other two systems are located on Beale AFB, California and Clear Air Force Station, Alaska. The latter radar system came online in 2012. AFSPC, supra note 174.
[195] While providing surveillance, it is capable of detecting and tracking missiles that enter its field of view. AFSPC, supra note 174. After detection, the objects are continuously tracked, *id*. The second mission is to support the Space Surveillance Network, which involves the surveillance and tracking of earth satellites and identification of other space objects, *id*.

objects, such as missiles, with high confidence and accuracy.[196] PAVE PAWS must be able to accurately discriminate between closely spaced objects to determine whether countermeasures need to be deployed.[197] Due to the 27.3 km distance between the proposed Cape Wind project to the Pave PAWS radar system, there was a concern that the wind turbines could interfere with this radar's capabilities.[198]

Consequently, in 2004 Air Force officials conducted an investigation to whether the proposed Cape Wind project would interfere with the Pave PAWS radar operations.[199] The study concluded that the proposed turbines would not have an effect on the radar system.[200] However, due to growing public and private sector concern, Congress requested another study on the effect of wind turbines on military readiness as part of the 2006 Defense Authorization Act.[201] Congress felt that this particular problem was indicative of a bigger issue that could impact other defense radar systems. Thus, Congress requested that the DOD prepare "an assessment of the effects on the operations of military radar installations of the proximity of windmill farms to such installations and of technologies that could mitigate any adverse effects on military operations

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[196] *The Effect of Windmill Farms on Military Readiness*, supra note 164, at 20.
[197] *Id*.
[198] *Id*. The Cape Wind project is over 11 years in the making. It has faced significant opposition from private citizen groups, which has resulted in its delay. Private citizen opposition has resulted in numerous lawsuits based on national security, environmental, and tribal concerns.
[199] *Air Force: Cape Wind farm would have no impact on radar station; Falmouth wind bill passes House*, capecodtoday (November 17, 2007), http://www.capecodtoday.com/article/2007/11/17/12030-air-force-cape-wind-farm-would-have-no-impact-radar-station-falmouth-wind-b.
[200] *Id*.
[201] *The Effect of Windmill Farms on Military Readiness*, supra note 164, at 2.

identified."[202]

The DOD concluded that wind farms located within radar line of sight of an air defense radar facility do, in fact, have the potential to degrade the ability of the radar to perform its intended function. The report explained that potential degradation of the ability of the radar's performance was essentially due to "blockage" or "shadowing" and increased "clutter" caused by the mere presence of the turbine structures and the rotational movement of the turbine blades.[203] The report stated that wind turbines could block the transmission of radar waves in a manner similar to tall buildings.[204] This effect becomes more prominent when multiple turbines are grouped together on a wind farm.[205] As a result, it would be difficult for radar systems to detect and track targets flying at low altitude in the immediate vicinity of the wind turbines and could also create false returns.[206]

The report also found that the fact that the combination of wind turbines being geographically stationary and near the surface of the earth could cause them to appear as "clutter" to an air defense radar.[207] The amount of clutter produced increases in direct proportion to the number of turbines within the line of sight of the air defense radar.[208] The report further noted that a large number of wind turbines spread over a wide sector of coverage for that radar (e.g., wind farms) will significantly degrade the ability of that

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[202] *The Effect of Windmill Farms on Military Readiness*, supra note 164, at 2. *See* Eric Lindeman, *Radar: A Dilemma for DOD and the Wind Power Industry*, Defense Daily, (May 28, 2010), Vol. 246 Issue 42, at 7-7, 1.
[203] *The Effect of Windmill Farms on Military Readiness*, supra note 164, at 21.
[204] *Id*.
[205] *Id.* at 52.
[206] *Id*.
[207] *Id.*, at 53.
[208] *Id*.

radar to perform its mission.[209] As such, the report indicated that the only proven way to prevent degradation was to avoid placing wind turbines within radar line of site (line of sight mitigation).[210]

Contrary to how it sounds, radar lines of sight are not simply based on the whether the turbines can be viewed from the location of DOD activities.[211] Instead, radar lines of sight are "functions of the height of the radar focal point, the height of the wind turbine, the distance between them, the curvature of the earth and atmospheric refraction."[212] For example, a 397-foot turbine more than 35 nautical miles (NM)[213] from a long-range radar system would be out of the line-of-sight. If, however, the long-range radar is only 30 NM from the wind farm, then the potential for an electromagnetic interference problem exists. (See Figure 8).

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[209] *Id*. In addition to effecting radar systems, the report identified other potential impacts on DOD readiness: 1) flight safety due to the height of the wind turbines and their proximity to military flying routes; 2) security concerns due to additional personnel present during construction, as well as the potential for wind turbines to provide increased visual and sensor access to sensitive DOD areas and activities; and 3) electromagnetic interference with electronic systems routinely employed in military missions.

[210] *Id*.

[211] Aviation Systems, Inc., *Airspace Obstruction and Electromagnetic Interference Considerations for Wind Power Projects*, at 22 (January 2007).

[212] *Id*. at 23

[213] A nautical mile is a unit of distance formerly used in the U.S. for navigation; equal to 1.15078 miles. The Free Dictionary, www.thefreedictionary.com (last visited June 20, 2013).

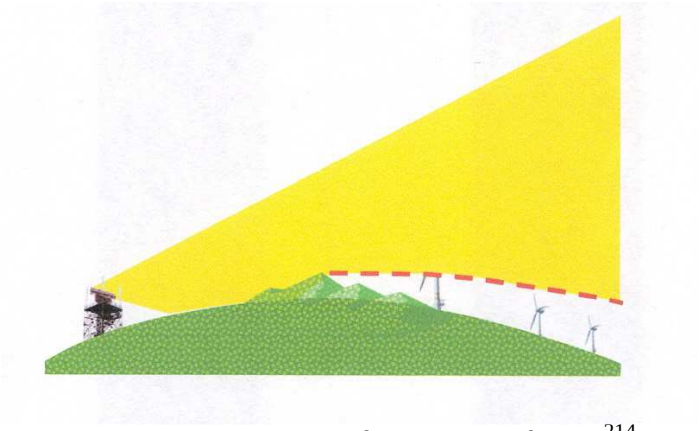

Figure 8: Illustration of radar line of sight[214]

Notwithstanding its findings of impact, the study was unable to determine the magnitude of the impact with certainty. Instead, it stated that the magnitude of the impact depended upon the number and location of the turbines.[215]

The report also addressed the Cape Wind project. The DOD determined that the previous Air Force study in 2004 was oversimplified and technically flawed and recommended a more comprehensive analysis of the potential impact that Cape Wind could have on Pave PAWS.[216] As a result, Air Force officials contracted the MITRE Corporation to perform a comprehensive study on the possible effects of the Cape Wind Project on the Pave PAWS radar.[217] MITRE conducted a more comprehensive study, yet found no evidence that the proposed wind turbines would have an adverse impact.[218]

Although the Cape Wind situation highlighted a serious national security issue, technology at the time was not capable of determining the magnitude of the impact that

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[214] Aviation Systems, Inc., supra note 211, at 23.
[215] *Id*.
[216] *Id*.
[217] *Air Force: Cape Wind Farm Would Have No Impact On Radar Station; Falmouth Wind Bill Passes House* (November 17, 2007), www.capecodtoday.com.
[218] *Id*. The Cape Wind project has been approved at local, state and federal levels. Construction plans were approved and the project is currently securing finance. Cape Wind, www.capewind.org (last visited June 20, 2013).

wind turbines had on defense radars. In light of the findings in the 2006 Congressional Report, DOD and the Department of Homeland Security (DHS) Long Range Radar Joint Program Office adopted an Interim Policy to contest any proposed wind farms "within radar line of site of the National Air Defense and Homeland Security Radars."[219] Accordingly, FAA began issuing Notices of Presumed Hazard to wind projects located within 60 nautical miles of long-range radar installations.[220] However, as demonstrated in the discussion regarding the Shepherds Flat wind farm project, this policy of contesting such wind farms will come into direct conflict with the nation's security strategy.

B. Travis AFB

Wind energy projects began in Solano County near Travis Air Force Base (AFB), California in 1985.[221] In 1987, less than 20 miles from the Air Force base, county officials designated a 68-square mile area as a Wind Resource Area (WRA). This area developed into an important renewable energy resource for the citizens of Solano, neighboring counties and the state of California.[222] By December 2006, the area included over 700 wind turbines.[223]

Travis AFB is home to the largest air mobility organization in the Air Force with a versatile fleet of passenger, cargo and refueling aircraft.[224] The installation handles more cargo and passengers than any other military air terminal in the United States.[225] Due to its mobility mission, Travis AFB utilizes air traffic control (ATC) radar to track its

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[219] *The Effect of Windmill Farms on Military Readiness*, supra note 164, at 62.
[220] Aviation Systems, Inc., supra note 211, at 17.
[221] Losco et al., supra note 131, at 236.
[222] *Id*.
[223] *Id*.
[224] Travis AFB, http://www.travis.af.mil/main/welcome.asp (last visited May 22, 2013).
[225] *Id*.

aircraft. In addition, the airspace near Travis AFB includes military training areas, two civilian airports and a high-level transit route between San Francisco and Sacramento.[226] As a result, the number of general aviation flights through the area averaged between thirty and sixty per day.[227]

In 2006, Travis AFB digitized their older ATC, Air Surveillance Radar 8 (ASR-8), system. This upgrade was a temporary measure to enhance compatibility until the more modern digital ASR-11 radar system replaced the ASR-8.[228] The digitization would allow data to be fed from a digital radar system located in nearby Mill Valley, CA.[229] When they switched on the upgraded system, air traffic controllers at Travis AFB noticed unusual readings: planes were dropping off the radar, flight tracks on the radar were different from actual tracks, and the radar showed planes that were not actually there (false targets).[230] The base officials determined that the wind turbines in the WRA were causing "clutter."[231] The ASR-8 and ASR-11 radar systems are a combination of the PSR and SSR radar systems.[232] As explained above, the PSR radar system is susceptible to interference caused by clutter; yet, the SSR system is less susceptible.[233] However, aircraft were not required to be equipped with a transponder in order to enter the airspace near Travis AFB, forcing air traffic controllers to rely on the PSR, which generated false

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[226] Losco et al., supra note 131, at 238.
[227] *Id.*
[228] *Id*. at 236.
[229] *Id*. Mill Valley AFS is a JSS site that houses an ASRS Model 4 long-range radar. It is operated by the FAA and utilized by the Air Force. See also www.radomes.org. Last visited June 12, 2013.
[230] Losco et al., supra note 131, at 240.
[231] *Id.* at 239.
[232] *Id.* at 237.
[233] *Id*.

targets because of the turbines.[234] As a result, the wind turbines in the WRA posed a threat to air safety.[235] Given the airspace environment in the area, base authorities promptly issued warnings to pilots traversing in the area that Travis AFB's ability to provide air traffic control over the WRA was limited.[236] Travis AFB officials also notified the county with the hope of forestalling additional wind turbine construction in the WRA until they were able to resolve the matter.[237]

At the time this problem was discovered, three of the largest wind farm developer in the area had pending wind turbine projects: enXco, FPL, and SMUD.[238] As Travis officials were dealing with this matter, the FAA issued determination of no hazard (DNH) findings for two of the wind energy projects.[239] The DOD and the Air Force were consulted in both instances and did not object to the projects.[240] But neither the DOD nor the Air Force took the ATC radars into account.[241] At the time, the Air Force evaluated a

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[234] *Id*.
[235] *Id*. at 239.
[236] *Id*.
[237] *Id*.
[238] *Id*. at 240.
[239] *Id*. at 248. On May 4, 2009 FAA issued DNH findings for SMUD's 49-turbine project, *id*.
[240] *Id*. at 240. The first wind farm developer, enXco, received a DNH from the FAA after it consulted with base officials on November 9, 2006, *id*. at 248. Base officials responded that it had no comment and the project would have an unknown impact on the planned ASR-11 radar system, *id*. At the time of this response, the Mill Valley radar feed to the ASR-8 did not exist, *id*. Developers SMUD and FPL also planned to pursue new turbine projects in 2009, *id*.
[241] *Id*. at 247. When the FAA contacts the Air Force for its evaluation of the proposed projects, the Air Force's program manager for OE/AAA forwards the FAA's request for information to functional experts for their input, *id*. In the case of the FPL development, the FAA's request for input to the 84th Radar Evaluation Squadron (84 RADES) at Hill AFB, Utah, and AMC's Terminal Instrument Procedures (TERPS) branch of its Operations Division (AMC/A3AT), *id*. at 248. The 84 RADES evaluates a structure's potential for electromagnetic interference with radars that are monitored by NORAD, *id*.

proposed structure's potential for physical obstruction and its impact based only on long-range radars, such as the Pave PAWS radar system.[242] Base officials attempted to rectify the situation by raising their concerns to the permitting officials in Solano County, as well as to the developers and the FAA.[243] Despite the concerns raised by Travis AFB officials and Solano County's request for reconsideration, the FAA issued a DNH determination to FPL on August 7, 2009 regarding the ASR-11.[244] The FAA, relying on the results of the aeronautical study that concluded that there was "no significant impact" to the airspace and air traffic control radar in the vicinity of the WRA, claimed that potential impacts to military missions were considered and dismissed Travis AFB's concerns.[245] The FAA also noted that coordination with the Air Force was accomplished with no objection.[246]

The local base officials then asked for reconsideration of the DNH determination in light of the absence of an assessment of the impact that future turbine construction could have on the Travis AFB radar.[247] The FAA's aeronautical study included the Radar Support System (RSS), a system that goes beyond "the line of sight" screening and can evaluate the effect of both existing and proposed structures like buildings and chimneys, yet local Air Force officials were skeptical of the ability of the RSS to accurately predict the impact, if any, of additional wind turbines on the ASR-11.[248]

TERPS addresses issues of physical obstruction – whether the turbines would intrude or come close to intruding on flight paths near Travis, *id.*

[242] *Id.* at 247.
[243] *Id.* at 248.
[244] *Id.* at 250.
[245] Id. at 249.
[246] *Id*.
[247] Id. at 250.
[248] *Id*. at 243. By 2009, the area contained 815 turbines. *Id.* at 251.

There was a lack of a widely accepted and validated method to accurately determine the cumulative impact that additional turbines would have on Travis AFB's digital radar (ASR-11).[249] As a result, base officials objected to the project. On October 15, 2009, the FAA denied the reconsideration request.[250] While the FAA acknowledged that the turbines would impact the ASR-11, the agency found "no substantial adverse impact" and no hazard to navigation.[251] The FAA again noted the fact that the Air Force was involved in the determination of hazard process and did not object to the project.[252]

The Travis AFB situation demonstrated how wind turbines interfered with military radar and, in turn, military readiness. In addition, it exposed deficiencies in how the Air Force responded to the FAA's requests for input for proposed wind farms. It also highlighted the absence of a validated tool to assess the cumulative impact future turbines could have on defense radar systems.[253] The situation at Travis AFB also demonstrated the FAA's disregard for the Air Force's concerns for military security. Although the Air Force initially failed to object to the project and provided inconsistent responses, it subsequently raised valid concerns; however, the FAA chose to ignore these warnings.

The base officials eventually resolved the matter by creating a cooperative agreement with the developers, county officials and FAA officials. However, this was a temporary solution. There was still a need for a comprehensive solution to ensure that military security is considered when determining where to locate wind farms. This became evident when another wind farm threatened military security in northern Oregon

[249] *Id*. at 243.
[250] *Id*. at 250.
[251] *Id*. at 251.
[252] *Id.*
[253] *Id*.

– this time, gaining the attention of Congress.

C. Shepherds Flat

Shepherds Flat wind farm is a 338-wind turbine farm that stretches across 30 square miles in north-central Oregon near Fossil, Oregon.[254] The wind farm promised to be the world's largest land-based wind energy project at the time.[255] The proposed project was due to be constructed in an area that already had 1800 wind turbines and other turbines already approved for construction.[256] The developer only notified Air Force officials at nearby Mountain Home AFB, Idaho[257] who did not object to the proposed project.[258] The developer interpreted that response to be the DOD-wide position and continued expensive site preparation believing that it would have no problems from the DOD.[259] When the developer was close to the construction phase of the project, it gave the FAA the required pre-construction notice.[260] When the FAA requested DOD's response via the hazard determination process, DOD objected to the project.[261]

The DOD's objection was based on concerns from NORAD and NORTHCOM. Experts worried that the cumulative impact of the proposed project, the 1800 existing

[254] Lindeman, supra note 202, at 1.
[255] Lindeman, supra note 202, at 1.
[256] *Impact of Wind Farms* hearing, supra note 156, at 43. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness).
[257] Mountain Home AFB is located over 300 miles from Shepherds Flat wind farm. Google Maps, www.maps.google.com.
[258] Losco et al., supra note 131, at 258.
[259] *Impact of Wind Farms* hearing, supra note 156, at 43. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness). *See* Losco et al., supra note 131, at 258.
[260] Losco et al., supra note 128, at 258. Prior to 2011, the FAA only required 30 days notice, *id*.
[261] *Impact of Wind Farms* hearing, supra note 156, at 43. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness).

turbines and additional turbines that were approved for construction would create electromagnetic interference sufficient to impair the effectiveness of the long-range surveillance radar near Fossil, Oregon – approximately 57 miles from the proposed wind farm.[262] This radar was decades old and still used analog signal processors, which are inherently less effective at removing wind turbine clutter.[263] However, the radar provides the important function of monitoring the U.S. border for threats to homeland security.[264] Based on DOD's response, the FAA denied the developer's permit to construct the 338 wind turbines.[265]

This denial was a major setback for the developer. The project was nine years and $2 million into development when the FAA issued the NPH on March 1, 2010.[266] The funding for the project was placed at risk since the project had to be finished by the end of 2012 to remain eligible for Recovery Act stimulus funding.[267] To add to the developer's financial situation, the Department of Energy (DOE) stopped working on a loan-guarantee application for the project.[268] The developer was not the only one affected by the FAA's actions. General Electric (GE) was contracted to supply the turbines for Shepherds Flat – its largest renewable energy contract that year and the first

[262] *Id*. This radar is also part of the JSS. Radomes, Inc., www.radomes.org (last visited June 12, 2013). The site houses an ASRS Model 3 long-range radar, *id*.
[263] *Id*. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness).
[264] Losco et al., supra note 131, at 258.
[265] Lindeman, supra note 202, at 1. *See Impact of Wind Farms* hearing, supra note 156, at 44. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness).
[266] Lindeman, supra note 202, at 2.
[267] *Id*.
[268] *Id*.

for its advanced machines.[269] The FAA's denial placed GE in a manufacturing limbo.[270] Southern California Edison (SCE) was scheduled to begin taking power from the project toward the end of 2011 under the first of three 20-year power purchase agreements and Shepherds Flat represented about 10 percent of the utility's contracted renewable electricity.[271]

On April 30, 2010, the DOD withdrew its objections after conducting an internal DOD analysis that indicated that the impact of the additional turbines would not be as severe as initially thought. The DOD also commissioned an external study by the Massachusetts Institute of Technology's (MIT) Laboratory to identify mitigation measures. [272] Although the MIT study was still pending at the time DOD withdrew its objection, the DOD was confident that the lab would identify such measures and that they could be implemented before construction was complete.[273]

Although the DOD withdrew its objection and the FAA approved the project, the situation had already attracted congressional attention. The impacts of FAA's denial motivated congressional intervention led by Oregon Senator Ron Wyden. Senator Wyden warned that blocking Shepherds Flat would undermine the Obama administration's entire renewable energy program.[274] The Shepherds Flat situation highlighted several problems with the wind farm siting process, but the spotlight was on

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[269] *Id.*
[270] *Id*.
[271] *Id*. Like all large California utilities, SCE was required to meet an ambitious renewable portfolio standard of getting 20 percent of its electricity from renewable sources by 2010, *id*.
[272] *Impact of Wind Farms* hearing, supra note 156, at 43. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness).
[273] *Id*.
[274] Lindeman, supra note 202, at 2.

the DOD. Specifically, Congress focused on the lack of a single voice for the DOD regarding renewable projects, the absence of a comprehensive review process for determining whether proposed projects pose a threat to national security, DOD's late involvement in the process, and DOD's inability to assess the impact that the additional turbines would have, if any, upon their radar systems.

On June 29, 2010, the Readiness Subcommittee of the House Armed Services Committee held a hearing to address these concerns. Dr. Dorothy Robyn, Deputy Undersecretary of Defense for Installations and Environment, testified before the committee and described the problem that wind turbines have on national security. More significantly, Dr. Robyn also raised concerns with the entire process for siting wind farms. Specifically, she noted that the DOD relies primarily on the OE/AAA process to identify and prevent potential interference problems.[275] Further, the 30-day notice requirement was insufficient.[276] Dr. Robyn suggested that the timing reflected the FAA's principle concern with conflicts that are not known until close to the start of construction and are easily resolved.[277] On the contrary, when DOD raises a concern at this late stage, it can create serious challenges for the developer as evidenced by the Shepherds Flat project.[278] In addition to the timing issue, the underlying statutory and regulatory language of the FAA's process may not be sufficiently broad or explicit enough to handle concerns related to the DOD's test and training mission.[279] Finally, Dr. Robyn indicated

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[275] *Impact of Wind Farms* hearing, supra note 156, at 45. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness).
[276] *Id*.
[277] *Id*.
[278] *Id*.
[279] *Impact of Wind Farms* hearing, supra note 156, at 46. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness).

that the current siting process is even less effective when the project is not built on public land since the developer is not required to obtain permits that trigger notice to the DOD until shortly before groundbreaking.[280]

Dr. Robyn made three recommendations to resolve the problems evident in the Shepherds Flat situation: 1) federal government improvement of the process for reviewing renewable energy projects so that potential interference can be identified early and mitigated more easily; 2) research and development to address modeling tools to estimate the impact of proposed structures as well as mitigation technology itself; and 3) upgrading the older surveillance radar.[281] As part of improving the review process, Dr. Robyn suggested a mechanism for early and confidential consultation between individual energy developers and the DOD, creating a single DOD point of contact on renewable energy siting, and expanding the OE/AAA process to address national security concerns that are not currently covered.[282] The representative for wind energy developers[283] and the witness from the FAA supported Dr. Robyn's recommendations.[284]

V. SECTION 358 OF THE IKE SKELTON NDAA[285]

As a result of this hearing, Congress passed legislation in section 358 of the Ike Skelton NDAA.[286] The statute required the DOD to establish a single point of contact

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[280] *Id*.
[281] *Id.*at 47.
[282] *Id*.
[283] *Id*. *at* 56. Statement of Mr. Stu S. Webster, Director of Wind Development Permitting and Environmental, Iberdrola Renewables.
[284] *Id*. at 49. Statement of Ms. Nancy Kalinowski, Vice President, Systems Operations Services, Air Traffic Organization, Federal Aviation Administration.
[285] Ike Skelton National Defense Authorization Act for Fiscal Year 2011, PL 111-383, §358 (Jan. 7, 2011).
[286] SEC. 358. STUDY OF EFFECTS OF NEW CONSTRUCTION OF OBSTRUCTIONS ON MILITARY INSTALLATIONS AND OPERATIONS.

and a lead organization to review wind farm proposals for possible impact on military readiness, imposed several requirements to be implemented within 180 and 270 days, satisfy additional requirements before objecting to a project, and authorized the Secretary of Defense to accept a voluntary contribution of funds from a wind energy developer to offset the cost of measures undertaken to mitigate adverse impacts of such project on military operations and readiness. The NDAA did not address the timing of the notification that developers must provide the FAA. I will discuss each aspect below.

A. A Single Voice For the DOD

The NDAA required the Secretary of Defense to designate a senior official to carry out renewable energy reviews and a lead organization to serve as a clearinghouse to coordinate DOD review of applications for renewable energy projects.[287] Pursuant to the legislation, the Secretary of Defense established a siting clearinghouse for renewable

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(a) OBJECTIVE.--It shall be an objective of the Department of Defense to ensure that the robust development of renewable energy sources and the increased resiliency of the commercial electrical grid may move forward in the United States, while minimizing or mitigating any adverse impacts on military operations and readiness.

[287] §358(b) DESIGNATION OF SENIOR OFFICIAL AND LEAD ORGANIZATION.--
(1) DESIGNATION.--Not later than 30 days after the date of the enactment of this Act, the Secretary of Defense shall designate a senior official of the Department of Defense, and a lead organization of the Department of Defense, to--
(A) serve as the executive agent to carry out the review required by subsection (d);
(B) serve as a clearinghouse to coordinate Department of Defense review of applications for projects filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code, and received by the Department of Defense from the Secretary of Transportation; and
(C) accelerate the development of planning tools necessary to determine the acceptability to the Department of Defense of proposals included in an application for a project submitted pursuant to such section.
(2) RESOURCES.--The Secretary shall ensure that the senior official and lead organization designated under paragraph (1) are assigned such personnel and resources as the Secretary considers appropriate to carry out this section.

energy projects headed by an executive director.[288] The executive director's role is to oversee and coordinate DOD review of renewable energy projects' effect on military capability.[289] The three main areas the clearinghouse staff studies are the impacts of proposed projects on military readiness and training, test and evaluation capabilities, and homeland defense.[290] The new law explicitly makes the executive director the single DOD point of contact to speak to the FAA on behalf of the Air Force and the DOD on wind turbine and other renewable energy issues.[291]

B. Requirements Within 180 After Enactment

Within 180 days from the enactment, the statute requires the executive agent to review OE/AAA applications received from the FAA that could adversely impact military operations or readiness, develop an integrated review process with other federal agencies, establish procedures within DOD for reviewing renewable energy projects, and develop procedures for engaging in early outreach with developers.[292]

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[288] Losco et al., supra note 131, at 261.
[289] *Id.*
[290] Karen Parrish, *Pentagon Streamlines Approval for Energy Projects*, Am. Forces Press Service (July 26, 2011), www.defense.gov/newsarticle.aspx?id=64814.
[291] Losco et al., supra note 131, at 261.
[292] §358(c) INITIAL ACTIONS.--Not later than 180 days after the date of the enactment of this Act, the Secretary of Defense, acting through the senior official and lead organization designated pursuant to subsection (b), shall--
(1) conduct a preliminary review of each application for a project filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code, that may have an adverse impact on military operations and readiness, unless such project has been granted a determination of no hazard. Such review shall, at a minimum, for each such project--
(A) assess the likely scope and duration of any adverse impact of such project on military operations and readiness; and
(B) identify any feasible and affordable actions that could be taken in the immediate future by the Department, the developer of such project, or others to mitigate such adverse impact and to minimize risks to national security while allowing such project to proceed with development;

1. Preliminary Review

The preliminary review must include an assessment of the likely scope and duration of any adverse impact on military operations and readiness as well as identification of any feasible and affordable mitigation measures.[293] By late May 2011, the DOD siting clearinghouse identified 249 projects that were pending at the time and completed initial assessment of the projects.[294]

2. Integrated and Joint Review Process

The NDAA also calls on various integrated and joint efforts among the appropriate departments and agencies of the federal government.[295] Prior to the Act, the DOD planned to approach Congress jointly with other federal agencies, military services, wind energy proponents[296], and nongovernmental environmental organizations to set

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(2) develop, in coordination with other departments and agencies of the Federal Government, an integrated review process to ensure timely notification and consideration of projects filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code, that may have an adverse impact on military operations and readiness;
(3) establish procedures for the Department of Defense for the coordinated consideration of and response to a request for a review received from State and local officials or the developer of a renewable energy development or other energy project, including guidance to personnel at each military installation in the United States on how to initiate such procedures and ensure a coordinated Department response while seeking to fulfill the objective under subsection (a); and
(4) develop procedures for conducting early outreach to parties carrying out projects filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code, that could have an adverse impact on military operations and readiness, and to the general public, to clearly communicate notice on actions being taken by the Department of Defense under this section and to receive comments from such parties and the general public on such actions.

[293] §358(c)(1).
[294] Parrish, supra note 290.
[295] §358(c)(2) – (4).
[296] The term "proponent" is used in the NDAA. In the context of wind energy projects, this typically refers to wind energy developers.

review guidelines.[297] This was superseded by the passage of the Act and replaced by the establishment of the clearinghouse, which work jointly with all branches of the military services, the FAA and the BLM in identifying and assessing the pending projects.[298] Thanks to the joint efforts of the DOD and other federal agencies, the clearinghouse approved 229 out of the 249 projects.[299] The clearinghouse continues to work with other agencies to review renewable energy projects.[300]

3. DOD Renewable Energy Review Process

Pursuant to the Act, the Secretary of Defense established the Mission Compatibility Evaluation Process to ensure coordinated DOD review and response for renewable energy projects.[301] The new procedures allow for a formal review process of projects after the filing of OE/AAA requests as well as an informal review process for renewable energy projects in advance of filing the OE/AAA request.[302] The informal review satisfies the Act's requirement for the DOD's early involvement in wind energy projects. This review is triggered when the clearinghouse receives a request from a project proponent.[303] The proponent must supply as much information about the project

[297] Parrish, supra note 290.
[298] Losco et al., supra note 131, at 263.
[299] *Id*.
[300] *Id*.
[301] §358(e)(1) PRELIMINARY ASSESSMENT.--The procedures established pursuant to subsection (c) shall ensure that not later than 30 days after receiving a proper application for a project filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code, the Secretary of Defense shall review the project and provide a preliminary assessment of the level of risk of adverse impact on military operations and readiness that would arise from the project and the extent of mitigation that may be needed to address such risk.
[302] 32 CFR Part 211 (2011).
[303] Losco et al., supra note 131, at 263. *See also* 32 CFR § 211.7 (2011). Initiating an Informal DOD Review of a Proposed Project.

as possible, including the geographic location, the nature of the project and any other information that would assist the clearinghouse to accurately and reliably review the

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(a) An informal review of a project begins with the receipt from a requester by the Clearinghouse of a request for an informal review. In seeking an informal review, the requester shall provide the following information to the Clearinghouse:
(1) The geographic location of the project including its latitude and longitude; and
(2) The nature of the project.
(3) The requester is encouraged to provide as much additional information as is available. The more information provided by the requester, the greater will be the accuracy and reliability of the resulting DOD review.
(b) The Clearinghouse shall, within five days of receiving the information provided by the requestor, convey that information to those DOD Components it believes may have an interest in reviewing the request.
(1) The DOD Components that receive the request from the Clearinghouse shall provide their comments and recommendations on the request to the Clearinghouse no later than 30 days after they receive the request.
(2) Not later than 50 days after receiving the request from the requester, the Clearinghouse shall evaluate all comments and recommendations received and take one of two actions:
(i) Determine that the project will not have an adverse impact on military operations and readiness, in which case it shall notify the requester of such determination. In doing so, the Clearinghouse shall also advise the requester that the informal review by the DOD does not constitute an action under 49 U.S.C. 44718 and that neither the DOD nor the Secretary of Transportation are bound by the determination made under the informal review.
(ii) Determine that the project will have an adverse impact on military operations and readiness.
(A) When the requester is the project proponent and the Clearinghouse makes such a determination, the Clearinghouse shall immediately--
(1) Notify the requester of the determination and the reasons for the conclusion of the Clearinghouse and advise the requester that the DOD would like to discuss the possibility of mitigation to reduce any adverse impact; and
(2) Designate one or more DOD Components to engage in discussions with the requester to attempt to mitigate the adverse impact.
(B) When the requester is a state or local official, notify the requester of the determination of the Clearinghouse and the reasons for that conclusion.
(c) If the requester is the project proponent and agrees to enter into discussions with the DOD to seek to mitigate an adverse impact, the designated DOD Components shall engage in discussions with the requester in an attempt to reach agreement on measures that would mitigate the adverse impact of the project on military operations and readiness.

proposed project.[304] Within five days, the clearinghouse is to coordinate the information with the appropriate DOD components for comments and recommendations.[305] The clearinghouse will evaluate the comments and recommendations received and determine whether the project will have an adverse impact on military operations and readiness and respond to the requestor.[306] If so, the DOD will attempt to engage with the proponent to attempt to mitigate the adverse impact. The informal process takes up to 50 days.[307] Further, those proponents who file an OE/AAA request will also go through the formal review process;[308] however, going through the informal process will assist in identifying and mitigating issues early.

The formal review process[309] under subsection (a)(3) of the NDAA; which, unlike

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[304] *Id*.
[305] *Id*.
[306] *Id*.
[307] *Id*.
[308] *Id*.
[309] 32 C.F.R. §211.6 (2011). Initiating a Formal DOD Review of a Proposed Project.
(a) A formal review of a proposed project begins with the receipt from the Secretary of Transportation by the Clearinghouse of a proper application filed with the Secretary of Transportation pursuant to 49 U.S.C. §44718.
(1) The Clearinghouse will convey the application as received to those DOD Components it believes may have an interest in reviewing the application.
(2) The DOD Components that receive the application shall provide their comments and recommendations on the application to the Clearinghouse no later than 20 days after they receive the application.
(3) Not later than 30 days after receiving the application from the Secretary of Transportation, the Clearinghouse shall evaluate all comments and recommendations received and take one of two actions:
(i) Determine that the proposed project will not have an adverse impact on military operations and readiness, in which case it shall notify the Secretary of Transportation of such determination.
(ii) Determine that the proposed project may have an adverse impact on military operations and readiness. When the Clearinghouse makes such a determination it shall immediately--
(A) Notify the applicant of the determination of the Clearinghouse and offer to discuss mitigation with the applicant to reduce the adverse impact;

(B) Designate one or more DOD Components to engage in discussions with the applicant to attempt to mitigate the adverse impact;
(C) Notify the Secretary of Transportation that the Department of Defense has determined that the proposed project may have an adverse impact on military operations and readiness, and, if the cause of the adverse impact is due to the proposed project exceeding an obstruction standard set forth in subpart C of part 77 of title 14 of the Code of Federal Regulations, identify the specific standard and how it would be exceeded; and
(D) Notify the Secretary of Transportation and the Secretary of Homeland Security that the Clearinghouse has offered to engage in mitigation discussions with the applicant.
(4) The applicant must provide to the Clearinghouse its agreement to discuss the possibility of mitigation within five days of receipt of the notification from the Clearinghouse.
(b) If the applicant agrees to enter into discussions with the DOD to seek to mitigate an adverse impact, the designated DOD Components shall engage in discussions with the applicant to attempt to reach agreement on measures that would mitigate the adverse impact of the proposed project on military operations and readiness. The Clearinghouse shall invite the Administrator of the Federal Aviation Administration and the Secretary of Homeland Security to participate in such discussions.
(1) Such discussions shall not extend more than 90 days beyond the initial notification to the applicant, unless both the designated DOD Components and the applicant agree, in writing, to an extension of a specific period of time.
(i) If agreement between the applicant and the designated DOD Components has not been reached on mitigation measures by that time and no extension has been mutually agreed to, the designated DOD Components shall notify the Clearinghouse of the results of the discussions and the analysis and recommendations of the Components with regard to the proposed project as it is proposed after discussions.
(ii) If agreement between the applicant and the designated DOD Components has been reached on mitigation measures that remove the adverse impact of the proposed project on military operations and readiness, the DOD Components shall notify the Clearinghouse of the agreement and the applicant shall notify the Secretary of Transportation of such agreement and amend its application accordingly.
(2) If the applicant and the designated DOD Components are unable to reach agreement on mitigation, the Clearinghouse shall review the analysis and recommendations of the DOD Components and determine if the proposed project as it may have been modified by the applicant after discussions would result in an unacceptable risk to the national security of the United States.
(i) If the Clearinghouse determines that the proposed project as it may have been modified by the applicant after discussions would result in an unacceptable risk to the national security of the United States, it shall make a recommendation to the senior official to that effect. If the Clearinghouse determines, contrary to the recommendations of the DOD Components, that the proposed project as it may have been modified by the applicant after discussions would not result in an unacceptable risk to the national security of the United States, it shall make a recommendation to the senior official to that effect.

the informal review process, allots only 30 days for completion. This process begins

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(ii) If the senior official concurs with the recommendation of the Clearinghouse, the senior official shall make a recommendation to the senior officer that is consistent with the recommendation of the Clearinghouse. If the senior official does not agree with the recommendation of the Clearinghouse, the senior official may make a recommendation to the senior officer to that effect.

(iii) The senior officer shall consider the recommendation of the senior official, and, after giving full consideration to mitigation actions available to the DOD and those agreed to by the applicant, determine whether the proposed project as it may have been modified by the applicant would result in an unacceptable risk to the national security of the United States. If the senior officer makes such a determination, the senior officer shall convey that determination to the Secretary of Transportation, identifying which of the three criteria in section 211.3(l) creates the unacceptable risk to the national security of the United States.

(iv) Any mitigation discussions engaged in by the Department of Defense pursuant to this part shall not be binding upon any other Federal agency, nor waive required compliance with any other law or regulation.

(c)(1) If the applicant does not agree to enter into discussions with the DOD to seek to mitigate an adverse impact, the Clearinghouse shall review the analysis and recommendations of the designated DOD Components and determine if the proposed project would result in an unacceptable risk to the national security of the United States. If the Clearinghouse determines that the proposed project would result in an unacceptable risk to the national security of the United States, it shall make a recommendation to the senior official to that effect. If the Clearinghouse determines, contrary to the recommendations of the DOD Components, that the proposed project would not result in an unacceptable risk to the national security of the United States, it shall make a recommendation to the senior official to that effect.

(2) If the senior official concurs with the recommendation of the Clearinghouse, the senior official shall make a recommendation to the senior officer that is consistent with the recommendation of the Clearinghouse. If the senior official does not agree with the recommendation of the Clearinghouse, the senior official may make a recommendation to the senior officer to that effect.

(3) The senior officer shall consider the recommendation of the senior official, and, after giving full consideration to mitigation actions available to the DOD and those agreed to by the applicant, determine whether the proposed project would result in an unacceptable risk to the national security of the United States. If the senior officer makes such a determination, the senior officer shall convey that determination to the Secretary of Transportation, identifying which of the three criteria in section 211.3(l) creates the unacceptable risk to the national security of the United States.

(d) The Clearinghouse may, on behalf of itself, the senior official, or the senior officer, seek an extension of time from the Secretary of Transportation for consideration of the application.

when the DOD receives an OE/AAA request for input.[310] The process is similar to the informal process in that the clearinghouse will forward the request to interested DOD components for comments and recommendations. DOD offices responsible for the installations and environment, readiness and operational test and evaluation are tasked with the duty of conducting a preliminary assessment of the level of risk to operations and readiness and the extent mitigation may be needed.[311] Under the Mission Compatibility Evaluation Process, the clearinghouse must seek discussions regarding project mitigation and designate a DOD component to serve as an agent for these discussions.[312] Further, the clearinghouse must notify the Secretaries of Transportation and Homeland Defense and invite the administrator of the FAA and the Secretary of Homeland Security to the discussions.[313]

4. Early Involvement with Wind Farm Developers

Prior to the Act, DOD and the Air Force already began partnering with wind energy developers, as well as local and federal regulatory agencies to promote involvement as early as possible. At Travis Air Force Base, Air Force officials used a cooperative solution to resolve their issue with the wind turbines. Wind-farm developers, Solano County, and Air Force officials, with the assistance of the U.S. Transportation Command (USTRANSCOM) formally invited developers to help the Air Force find a solution to the radar issue by participating in a Cooperative Research and Development Agreement (CRADA).[314] A CRADA permits the federal government to collaborate with

[310] Losco et al., supra note 131, at 264. *See* 32 CFR §211.6.
[311] Losco et al., supra note 131, at 264.
[312] *Id*.
[313] *Id*.
[314] Losco et al., supra note 131, at 254.

nonfederal entities on research projects of mutual interest.[315] As a result of their joint efforts, the participants determined that the three pending wind energy projects would not significantly degrade the ASR-11's performance nor would they impact their safety or flight operations.[316] Thereafter, the Air Force withdrew its objections to the projects.[317] With the creation of the DOD clearinghouse, these types of cooperative partnerships were elevated to the DOD level. The clearinghouse also accepts request from the wind energy industry for early consultation through its informal review process.[318]

C. Requirements Within 270 Days After Enactment

Not later than 270 days after enactment, the executive agent was required to develop a "comprehensive strategy for addressing the military impacts of projects requiring OE/AAA analysis.[319] The strategy was to include an assessment of the

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[315] *Id*.
[316] *Id.* at 256.
[317] *Id*.
[318] Parrish, supra note 290.
[319] §358(d) COMPREHENSIVE REVIEW.—
(1) STRATEGY REQUIRED.--Not later than 270 days after the date of the enactment of this Act, the Secretary of Defense, acting through the senior official and lead organization designated pursuant to subsection (b), shall develop a comprehensive strategy for addressing the military impacts of projects filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code.
(2) ELEMENTS.--In developing the strategy required by paragraph (1), the Secretary of Defense shall--
(A) assess of the magnitude of interference posed by projects filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code;
(B) identify geographic areas selected as proposed locations for projects filed, or which may be filed in the future, with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code, where such projects could have an adverse impact on military operations and readiness and categorize the risk of adverse impact in such areas as high, medium, or low for the purpose of informing early outreach efforts under subsection (c)(4) and preliminary assessments under subsection (e); and
(C) specifically identify feasible and affordable long–term actions that may be taken to mitigate adverse impacts of projects filed, or which may be filed in the future, with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code, on

"magnitude of interference" created by wind projects, identify geographic areas that are or may become likely sites for wind turbine projects, and identify reasonable, long-term mitigation measures.[320]

1. Assess Magnitude of Interference

Consistent with the Act, where projects could have an adverse impact on military operations and readiness, the executive agent will assess the threat and assign a magnitude of interference.[321] The clearinghouse currently uses a color code system to accomplish this. Projects with no significant risk of military mission failure are rated green; projects with some risk but with logical mitigating strategies are rated yellow; and red projects are those with significant risk of mission failure and no apparent mitigating strategies.[322]

2. Identify Military Sensitive Locations

Under the new process, the executive agent will identify geographic areas that are prime for renewable energy projects where such projects could have an adverse impact on military security and categorize the area as high risk, medium risk, or low risk.[323] In November 2011, the DOD partnered with the National Resources Defense Council to

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military operations and readiness, including--
(i) investment priorities of the Department of Defense with respect to research and development;
(ii) modifications to military operations to accommodate applications for such projects;
(iii) recommended upgrades or modifications to existing systems or procedures by the Department of Defense;
(iv) acquisition of new systems by the Department and other departments and agencies of the Federal Government and timelines for fielding such new systems; and
(v) modifications to the projects for which such applications are filed, including changes in size, location, or technology.

[320] Losco et al., supra note 131, at at 262.
[321] *Id*.
[322] Parrish, supra note 290.
[323] Losco et al., supra note 131, at 262. Ike Skelton §358(d)(2)(B).

release a new mapping tool to help steer renewable energy projects away from areas where they would interfere with military activities or environmentally sensitive areas.[324] The Renewable Energy and Defense Database (READ) uses geospatial data to show if a potential site conflicts with flight training routes, testing and training ranges or other military activities, including sites where projects such as wind turbines could interfere with technical radar systems.[325] The database allows developers to enter geographic coordinates for potential projects early in the planning process.[326] Perhaps the hope is that this information early in the planning process will alert developers to potential problems and cause them to either reconsider the location or initiate discussion with DOD to determine alternatives or other mitigation measures.

3. Identify Mitigation Measures

The executive agent shares the assessment with interested parties and will also identify "feasible and affordable long-term actions" to mitigate the adverse impacts of these projects.[327] One suggestion for mitigation was to upgrade the aging radars. As a result, the FAA is engaging in a modernization initiative that includes overhauling radar surveillance, called the Next Generation Air Transportation System (NextGen).[328] NextGen proposes to modernize the current air traffic control system by replacing the SSR ground-based radar systems with a satellite-based system. [329] This technology involves airborne Global Positioning System (GPS) receivers transmitting location and

[324] Losco et al., supra note 131, at 265.
[325] *Id.*
[326] *Id*.
[327] *Id.* at 262.
[328] *Id*. at 266.
[329] Federal Aviation Authority, *Factsheet: NextGen* (February 14, 2007), http://www.faa.gov/nextgen (last visited June 12, 2013.)

altitude to other nearby aircraft and air traffic controllers.[330] This upgrade offers a potential long-term solution for some ATC radar problems, but it works only with aircraft equipped with transponders; therefore, it has the same drawbacks as the SSR.[331]

D. New Stringent Requirements for DOD Objections

The legislation also applied more stringent requirements that the Secretary of Defense must follow prior to objecting to a renewable energy project. The Secretary of Defense may not object to a renewable energy project until, after full consideration of mitigation actions, the Secretary determines that the project would still result in an "unacceptable risk to the national security of the United States."[332] Further, the Secretary

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[330] *Id*.

[331] *Id*.

[332] §358 (e) DEPARTMENT OF DEFENSE HAZARD ASSESSMENT.--
(2) DETERMINATION OF UNACCEPTABLE RISK.--The procedures established pursuant to subsection (c) shall ensure that the Secretary of Defense does not object to a project filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code, except in a case in which the Secretary of Defense determines, after giving full consideration to mitigation actions identified pursuant to this section, that such project would result in an unacceptable risk to the national security of the United States.
(3) CONGRESSIONAL NOTICE REQUIREMENT.--Not later than 30 days after making a determination of unacceptable risk under paragraph (2), the Secretary of Defense shall submit to the congressional defense committees a report on such determination and the basis for such determination. Such a report shall include an explanation of the operational impact that led to the determination, a discussion of the mitigation options considered, and an explanation of why the mitigation options were not feasible or did not resolve the conflict.
(4) NON–DELEGATION OF DETERMINATIONS.--The responsibility for making a determination of unacceptable risk under paragraph (2) may only be delegated to an appropriate senior officer of the Department of Defense, on the recommendation of the senior official designated pursuant to subsection (b). The following individuals are appropriate senior officers of the Department of Defense for the purposes of this paragraph:
(A) The Deputy Secretary of Defense.
(B) The Under Secretary of Defense for Acquisition, Technology, and Logistics.
(C) The Principal Deputy Under Secretary of Defense for Acquisition, Technology, and Logistics.
(f) REPORTS.--

of Defense must submit a report to congressional defense committees within 30 days of making a determination of unacceptable risk.[333] The report must include a basis for such determination, an explanation of the operational impact that led to the determination, a discussion of the mitigation options considered, and an explanation of why the mitigation

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(1) REPORT TO CONGRESS.--Not later than March 15 each year from 2011 through 2015, the Secretary of Defense shall submit to the congressional defense committees a report on the actions taken by the Department of Defense during the preceding year to implement this section and the comprehensive strategy developed pursuant to this section.
(2) CONTENTS OF REPORT.--Each report submitted under paragraph (1) shall include--
(A) the results of a review carried out by the Secretary of Defense of any projects filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code--
(i) that the Secretary of Defense has determined would result in an unacceptable risk to the national security; and
(ii) for which the Secretary of Defense has recommended to the Secretary of Transportation that a hazard determination be issued;
(B) an assessment of the risk associated with the loss or modifications of military training routes and a quantification of such risk;
(C) an assessment of the risk associated with solar power and similar systems as to the effects of glint on military readiness;
(D) an assessment of the risk associated with electromagnetic interference on military readiness, including the effects of testing and evaluation ranges;
(E) an assessment of any risks posed by the development of projects filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code, to the prevention of threats and aggression directed toward the United States and its territories; and
(F) a description of the distance from a military installation that the Department of Defense will use to prescreen applicants under section 44718 of title 49, United States Code.
(j) DEFINITIONS.--In this section:
(1) The term "military training route" means a training route developed as part of the Military Training Route Program, carried out jointly by the Federal Aviation Administration and the Secretary of Defense, for use by the Armed Forces for the purpose of conducting low-altitude, high-speed military training.
(2) The term "military installation" has the meaning given that term in section 2801(c)(4) of title 10, United States Code.
(3) The term "military readiness" includes any training or operation that could be related to combat readiness, including testing and evaluation activities.

[333] §358(e)(3).

options were not feasible or did not resolve the conflict.[334]

E. Authorization to Accept Funds for Mitigation Measures

Finally, the Act authorizes the Secretary of Defense to accept a voluntary contribution of funds from a developer to offset the cost of mitigation measures.[335] This was perhaps included to address Dr. Robyn's recommendation to upgrade the aging radars to resolve the electromagnetic interference problem.[336]

F. Notification Requirement

The Act did not address the timing of the filing of the OE/AAA request. However, prior to the Act's enactment, the FAA amended its rules to increase the time for notification from 30 days to 45 days before construction may begin.[337] It appears that the amendment had no connection with the NDAA. In fact, the rule was initially proposed in 2006 and was finalized less than a month after the congressional hearing.[338]

While the new statute helped the DOD and the Air Force hone their response procedures, it only focuses on the DOD, yet the problem is much greater.[339] Despite Dr. Robyn's recommendations, Congress did not improve the overall siting process so that military security concerns can be highlighted early and in a manner that will allow for

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[334] §358(f)(2).

[335] §358(g) AUTHORITY TO ACCEPT CONTRIBUTIONS OF FUNDS.--The Secretary of Defense is authorized to accept a voluntary contribution of funds from an applicant for a project filed with the Secretary of Transportation pursuant to section 44718 of title 49, United States Code. Amounts so accepted shall be available for the purpose of offsetting the cost of measures undertaken by the Secretary of Defense to mitigate adverse impacts of such project on military operations and readiness.

[336] *Impact of Wind Farms* hearing, supra note 156, at 44. Statement of Dr. Dorothy Robyn, Deputy Under Secretary of Defense (Installations and Readiness). It is worth noting that the DOD must reconcile this authorization with existing fiscal laws regarding the acceptance of funds from non-federal entities.

[337] 14 CFR Part 77 (2011).

[338] *Id*.

[339] Losco et al., supra note 131, at 265.

careful consideration.

VI. FEDERAL REFORM

The current wind farm siting process does not insure a balance between the two national security concerns – energy and military security. If the United States is serious about promoting renewable energy projects while maintaining sufficient military security, Congress needs to advance reform. This section will first present the case for federal reform, then offer a model for such reform.

A. The Case for Federal Reform

By enacting the NDAA, Congress required the DOD to create a single voice for reviewing renewable energy projects. Likewise, Congress should create a single voice for the entire wind energy siting process. In addition, Congress must give the DOD a stronger position in voicing concerns regarding wind energy projects. The DOD should not be providing mere recommendations that can be ignored – their interests should carry more weight. Finally, Congress needs to extend the notice requirement to give the regulatory agencies ample time to review the projects and engage in mitigation discussions. Further, this time extension will benefit developers so that they are not put in a situation similar to the Shepherds Flat developer if their project has the potential to negatively impact military security.

First, Congress should mandate a "single voice" for the siting of wind energy projects at the federal level, just as Congress created a single voice for the DOD. The current process involves various regulatory agencies at local, state, and federal levels. As such, the DOD must navigate through these various agencies to try to raise military security concerns. While the DOD has made great strides in creating partnerships with

local, state and other federal agencies; however, it is an onerous task and certainly does not provide adequate assurance that military concerns will be heard. However, if Congress passed legislation, as it did for the DOD, to create a single entity for wind energy projects to coordinate with the DOD, this would help ensure that both environmental and military security concerns are addressed.

While federalizing the wind farm siting process will likely invoke significant state opposition, it supports national security objectives. In the past, Congress has enacted legislation that constrains local siting authority to further national goals.[340] As discussed earlier in this paper, the Energy Act of 2005 allows FERC to preempt[341] local zoning of some electric lines and all liquid natural gas terminals to facilitate national energy goals.[342] In addition, Congress enacted the Telecommunications Act of 1996, which partially preempts local authority to site cellular communication towers, to facilitate the siting cellular communication towers.[343] Similarly, Congress needs to constrain local siting authority to promote national security goals of ensuring that military readiness is not adversely impacted by wind farm development.

Second, Congress needs to empower the DOD to suspend wind energy projects

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340 Salkin et al., supra note 32, at 1053.

341 See AES Sparrows Point LNG LLC v. Smith, 470 F. Supp. 2d 586, 598 (D. Md. 2007) (finding that the Energy Act expressly preempts state and local action that would approve or deny siting liquefied natural gas terminals); see also Jacob Dweck et al., Liquefied Natural Gas (LNG) Litigation After the Energy Policy Act of 2005: State Powers in LNG Terminal Siting, 27 Energy L.J. 473, 481 (2006) ("Although the FERC generally conditions authorization on cooperation with state and local agencies, state and local laws that 'prohibit or unreasonably delay' the project are preempted."); Kenneth T. Kristl, Renewable Energy and Preemption: Lessons from Siting LNG Terminals, Nat. Resources & Env't, Winter 2009, at 58, 58-60 (describing how FERC preempts local law), *id.*

342 *Id.*

343 *Id.*

that threaten military security until a solution can be found to diminish the negative impacts and cancel those projects that cannot be mitigated. Again, a stronger voice for the DOD is required to ensure national security goals may be satisfied. Though the DOD has an agreement with both the BLM and the FAA to be involved in their wind farm siting review process, this is not an absolute safeguard. Both BLM and FAA have discretionary authority to grant a wind developer's request in spite of DOD's objections. The Travis AFB situation is a prime example of this occurrence. When base officials raised their concerns that the proposed wind turbines posed a threat to air safety, the FAA disregarded their concerns due to a conflicting recommendation from higher-level Air Force officials. Based on the FAA's comments, they were more persuaded by the recommendation from the higher-level Air Force officials than from the base officials even though the former recommendation did not consider the type of radar at issue. Although inconsistent responses from the DOD should be a thing of the past due to the NDAA, the fact still remains that DOD lacks the ability to protect its military security in the face of renewable energy projects.

Moreover, even if BLM or FAA denies a developer's request based on DOD's objections, the developer has the ability to appeal the denial. Recently, the IBLA[344] set aside a decision wherein the BLM denied an application to construct two meteorological towers on public lands in Riverside County, California.[345] The denial was based, in part, on concerns from DOD that the request to build meteorological towers would eventually

[344] Interior Board of Land Appeals. BLM, supra note 122.
[345] Graham Pass LLC and U.S. Mainstream Renewable Power LLC, 182 Interior Dec. 93 (IBLA 2012).

lead to a request to construct wind turbines.[346] DOD had no objection to the met towers; instead, DOD was concerned that wind turbines in that area would interfere with military flight zones[347] although the applicant had not applied for a ROW for a wind energy project.[348] At the time, BLM had a policy that it would deny applications for meteorological towers if DOD determined that a resulting wind farm development could affect military readiness. The Board's decision changed that policy. The Board determined that the denial was premature and that BLM was required to focus solely on the environmental impacts of the two specific met towers and any other reasonable foreseeable future activity. Since there was no application for a wind energy project, the Board determined that it was not a reasonably foreseeable future activity.[349]

FAA decisions may be appealed as well. In 2011, opponents of the Cape Wind project appealed the FAA's no-hazard determination (DNH).[350] The FAA argued that the petitioners lacked standing since the DNH was an advisory opinion; therefore, they have no enforceable legal effect.[351] The court agreed that the DOI was the final arbiter for the project since the construction of the wind turbines would occur on BLM-administered lands.[352] However, given the importance with which the DOI views the FAA's DNHs, the petitioners had standing based on the likelihood that the DOI would reconsider a wind energy project if faced with a "FAA determination that the project posed an unmitigable

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[346] *Id*. at 85.
[347] *Id*.
[348] *Id*. at 83.
[349] *Id*. at 91.
[350] Town of Barnstable v. FAA, 659 F.3d 28 (D.C. Cir. 2011).
[351] *Id*. at 31.
[352] *Id*. The location of Cape Wind project falls within both state and federal jurisdiction. The wind turbines themselves will be located in federal waters, while the electric cables that transmit the electricity to the mainland will lie in the seabed of state waters.

hazard."[353] Moreover, the court vacated the FAA's determination, holding that the FAA failed to follow its own procedure in making its decision.[354] The Court found the FAA, "misread its regulations, leaving the challenged determinations inadequately justified."[355] The Court vacated the FAA's decision and remanded the matter back to the FAA.[356] The FAA ultimately maintained its no-hazard determination; however, this case set the precedence of allowing developers to appeal FAA decisions and the potential for having that decision vacated. Therefore, it is apparent that the current wind farm siting process does not adequately consider valid threats to military security. Thus, Congress must enable the DOD to advance these concerns more effectively.

Finally, developers should be required to notify the DOD of their proposed project well before 45 days before construction begins. Although the FAA increased the timeframe for developers to provide notification that they propose to construct wind turbines from 30 days to 45 days, it is evident that this 15-day extension is insufficient in the wind farm siting context. The DOD takes up to 50 days to evaluate a project and determine whether it will have an adverse impact on military operations.[357] This does not take into account the time needed to engage in discussions with the applicant to attempt to mitigate the adverse impact. Indeed, the FAA advises wind farm developers to provide notification 8-12 months before construction.[358] In addition, as was evident in the

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[353] *Id*. at 32. *See* Jennifer E. Trock and Kenneth P. Quinn, *DC Circuit Vacates Crucial FAA Determinations for Cape Wind*, http://www.pillsburylaw.com/sitefiles/publications/aviationenergyelunralert10312011.pdf (last visited May 31, 2013).
[354] Town of Barnstable, supra note 350, at 36.
[355] Eldred, supra note 19.
[356] *Id*.
[357] 32 C.F.R. §§211.6 and 211.7.
[358] FAA, supra note 143.

Shepherds Flat scenario, by the time developers are ready to begin construction, they already secured financing, set up agreements for electricity distribution, etc., before obtaining the appropriate permits to start constructing the wind turbines. It makes more sense for the developer to obtain these permits well before it has invested so much time and resources into the project.

B. A Model for Federal Reform

A model for the reform that I propose can be found in both the Energy Act of 2005 and the §358 Ike Skelton NDAA. Specifically, I propose that Congress combine provisions from the Energy Act and the NDAA to form a new process that will guarantee a balance between military and energy security.

First, Congress would start by passing legislation to expand FERC's authority to siting energy generating facilities.[359] Then, the Chairman of FERC would be required to designate a senior official and lead organization similar to the DOD clearinghouse to coordinate the review of renewable energy projects. Although FERC would be the single voice for siting wind farms, it would be required to develop the siting process in coordination with other departments and agencies of the local, state, and federal governments. This collaboration should be similar to the CRADA that was set up at Travis AFB, which is discussed earlier in this paper. This integrated review process will ensure careful consideration of projects that may have an adverse impact on military operations and readiness. Further, the participation of various agencies at all three governmental levels will go further to lessen opposition than if FERC were given sole authority to develop policy. Finally, this will give FERC the ability to draw on the

[359] Salkin et al., supra note 131, at footnotes 21 and 23.

expertise of the other agencies.

To ensure that projects are given adequate consideration, FERC would require developers to submit notification of proposed projects as soon as the geographic location is known and certainly prior to the developer investing significant time and resources into the project. FERC could follow a process similar to the DOD's informal review process in that it could require the developer to submit the geographic location of the project, the nature of the project and all other relevant information that is available.[360]

Congress should also ensure that objections raised by the DOD hold considerable weight in the new process. Therefore, FERC would not be allowed to disregard an objection raised by the DOD without careful consideration and congressional notice. Congress could implement certain criteria that FERC must satisfy prior to disregarding a DOD objection, as it did for the DOD's denial of proposed projects in the NDAA. Likewise, FERC should be required to submit a report to congressional defense committees, which will include the basis for such determination, a discussion of the mitigation options considered, and an explanation of why the mitigation options were not feasible or did not resolve the conflict.[361]

VII. CONCLUSION

On June 25, 2013, President Obama issued his Climate Action Plan, which reaffirms his commitment to reduce greenhouse gas emissions by doubling America's use of wind, solar, and geothermal energy.[362] To accomplish this goal, the President's plan calls for a goal to double renewable electricity generation once again by 2020 in order to

[360] 32 C.F.R. §211.7(a).
[361] §358(e)(2) and (3).
[362] *2013 President's Climate Action Plan,* supra note 99, at 4.

cut carbon pollution in America.[363] As a result, the Department of Interior has been directed to permit an additional 10 gigawatts by 2020.[364] Also, the DOD is committed to deploying 3 gigawatts of renewable energy on military installations, including wind, by 2025.[365] Federal agencies are also setting a new goal of reaching 100 megawatts of installed renewable capacity across the federally subsidized housing stock by 2020.[366] The plan also continues the concept of federal government being a leader in clean energy and energy efficiency.[367] Overall, the plan demonstrates that renewable energy development will continue at a faster pace than it has in the past. As a result, our nation needs to ensure that another aspect of national security – military readiness – is not lost in the way of new development.

Notwithstanding the equal importance of military and energy security, the siting process fails to ensure that both interests are being met. Although the President's Climate Action Plan directs the DOI to permit additional renewable energy projects by 2020, there is no directive to streamline the wind farm siting process.[368] The current process lacks a single procedure for reviewing wind energy projects. Instead, various

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363 *Id.* at 5-6.
364 *Id.* at 6.
365 *Id.*
366 *Id.*
367 *Id.* at 11.
368 The plan references a presidential memorandum that "directs federal agencies to streamline the siting, permitting and review process for transmission projects across federal, state, and tribal governments," *id.* at 7. This memorandum focuses on modernizing the Nation's electric transmission grid, which could indirectly impact the wind farm siting process; however, this executive memorandum does not specifically direct the streamlining of the wind farm siting process. 78 Fed. Reg. 35, 539-43; See also The White House, *Presidential Memorandum: Transforming our Nation's Electric Grid Through Improved Siting, Permitting, and Review* (2013), available at http://www.whitehouse.gov/the-press-office/2013/06/07/presidential-memorandum-transforming-our-nations-electric-grid-through-I (last visited July 22, 2013).

agencies at the local, state, and federal levels regulate wind farm siting. Moreover, none of these agencies are required to consider adverse impacts that wind turbines could have on nearby military activities. Even in cases where agencies agreed to consider such impacts, this is not a guarantee that DOD objections to projects will be followed. As a result, the DOD has encountered numerous situations, as described in this paper, where wind turbines have had an adverse effect on military security without a streamlined solution.

Although the DOD and wind energy proponents have their differences, both agree that there is a solution. There is a way that these two national security aspects can exist together, but Congress needs to lead the way through federal reform that will streamline the process and give the DOD a stronger voice. There is no question whether Congress is capable of doing so. As illustrated in this paper, Congress has successfully streamlined the siting of certain electronic transmission lines as well as natural gas pipelines and terminals and fine-tuned the DOD's renewable energy review process. If Congress is serious about maintaining military security while also satisfying renewable energy goals, Congress must enact federal legislation.