EMPIRICAL STUDY

PRACTICAL CONSIDERATIONS IN IMPLEMENTING RENEWABLE ENERGY: A CASE STUDY OF FORT BRAGG, NORTH CAROLINA

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INTRODUCTION

Americans are beginning to recognize the importance of electricity generated from renewable sources. Disasters such as the 2010 British Petroleum oil spill in the Gulf of Mexico have demonstrated the importance of utilizing energy sources that have minimal environmental hazards. Nevertheless, the United States remains heavily dependent on fossil fuels to generate its electricity. Coal and natural gas fuel most of our power plants nationwide. However, this may change in the upcoming years as the government imposes mandates to increase the use of renewable energy sources and popular opinion shifts toward supporting such projects.

The federal government has recently begun requiring that its agencies purchase renewable energy. At the same time, numerous states have passed laws requiring electricity producers to obtain certain percentages of their power from renewable sources. While these two goals may seem complementary, they can actually conflict. This Study will look at the example of Fort Bragg,

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a large United States Army base in the southeastern region of North Carolina. This Study will also take a close look at the regulations affecting the sale of electricity and their requirements and will also examine available technologies and economic realities in this context. Finally, this Study will propose two simple changes that could harmonize the two goals mentioned above: deregulating electricity sales and repealing Section 8093 of the 1998 Defense Authorization Act.

I. WHY IS RENEWABLE ENERGY IN NORTH CAROLINA IMPORTANT?

Renewable energy offers both environmental and economic benefits.[1] The environmental benefits are fairly clear—renewable energy sources reduce society's greenhouse gas emissions and other pollutants.[2] Renewable energy provides economic benefits as well. For example, it promotes in-state economic development and hedges against rising fuel prices.[3]

A. North Carolina as a Consumer of Electricity

North Carolina consumes roughly 3 percent of the nation's electricity.[4] In 2008, the state consumed a total of 130,054 gigawatt-hours ("GWh") of electricity, while producing only 125,239 GWh,[5] and spent $14 billion purchasing electricity from other states to make up for this difference.[6] Electricity generated in the state relies heavily on fossil fuels.[7] Of North Carolina's ten largest power plants, four are coal-fired and three use natural gas.[8] Because North Carolina does not have many coal reserves, most of

1. LACAPRA ASSOCIATES, ANALYSIS OF A RENEWABLE PORTFOLIO STANDARD FOR THE STATE OF NORTH CAROLINA, at iv (2006) [hereinafter LACAPRA STUDY].

2. *Id.*

3. *Id.*

4. AM. COUNCIL FOR AN ENERGY EFFICIENT ECON., NORTH CAROLINA'S ENERGY FUTURE: ELECTRICITY, WATER, AND TRANSPORTATION EFFICIENCY 5 (2010) [hereinafter NORTH CAROLINA'S ENERGY FUTURE].

5. OFF. OF COAL, NUCLEAR, ELECTRIC AND ALTERNATIVE FUELS, U.S. ENERGY INFO. ADMIN., DOE/EIA-0348(01)/2, STATE ELECTRICITY PROFILES 2008, at 199 (2010) [hereinafter STATE ELECTRICITY PROFILES 2008].

6. Michael Hewlett, *Solar Farm Lights Way*, WINSTON-SALEM J., Apr. 6, 2009, at A9 (noting the amount spent purchasing electricity generated in other states).

7. STATE ELECTRICITY PROFILES 2008, *supra* note 5, at 198 (highlighting the fact that seven of the ten largest power plants are coal or natural gas).

8. *Id.* at 199. The remaining three largest power plants are nuclear-powered. *Id.*

the coal consumed is imported from West Virginia and Kentucky, sending even more money out of state.[9]

Electricity is relatively inexpensive in North Carolina, with a cost below the national average.[10] In part due to its low cost, North Carolina has the ninth highest retail electricity sales in the country.[11] As a consequence, North Carolina's "energy intensity"[12] exceeds the national average, with the sixteenth greatest energy intensity in the nation. Renewable sources account for only 3 percent of North Carolina's electricity generation.[13] Most of the in-state renewable energy comes from hydropower, primarily from large generating dams in the mountainous western part of the state.[14] All other renewable electricity sources combined to produce 1.2 percent of the total electricity generated in-state.[15]

B. The Department of Defense as a Consumer of Electricity

The United States Department of Defense ("DOD") is a massive consumer of electricity in our nation.[16] In 2009, the DOD consumed more than 209 trillion British Thermal Units ("BTUs") of energy.[17] Seventy-nine percent of the energy was in the form of electricity or natural gas, and 94 percent of this energy went to the military.[18] All told, in 2009 the DOD spent $3.6 billion on energy for its facilities.[19]

9. U.S. ENERGY INFO. ADMIN., STATE ENERGY CONSUMPTION ESTIMATES: 1960 THROUGH 2008, at 16 (2010); *see also North Carolina Energy Fact Sheet*, U.S. ENERGY INFO. ADMIN. (Jan. 20, 2010), http://www.eia.gov/state/state-energy-profiles-print.cfm?sid=NC (*Analysis*, last updated Oct. 2009; last visited Mar. 28, 2012).

10. Diane Cherry & Shubhayu Saha, *Renewable Energy in North Carolina*, POPULAR GOV'T, Spring/Summer 2008, at 14.

11. U.S. ENERGY INFO. ADMIN., *supra* note 9, at 16. Retail electricity sales are electricity sales to end-users. *Id.*

12. "Energy intensity" is defined here as megawatt-hours consumed per one million dollars of Gross Domestic Product. *See* Cherry & Saha, *supra* note 10, at 15.

13. NORTH CAROLINA'S ENERGY FUTURE, *supra* note 4, at 7.

14. STATE ELECTRICITY PROFILES 2008, *supra* note 5, at 200.

15. *Id.*

16. *DOD Gives High Priority to Saving Energy*, AIR FORCE PRINT NEWS TODAY (Oct. 4, 2011), http://www.afdw.af.mil/news/story_print.asp?id=123274690.

17. DEP'T OF DEF. OFF. OF THE DEPUTY UNDERSECRETARY FOR DEF. FOR INSTALLATIONS AND ENV'T, DEPARTMENT OF DEFENSE ANNUAL ENERGY MANAGEMENT REPORT: FISCAL YEAR 2009, at 3 (2011) [hereinafter DOD ANNUAL ENERGY MANAGEMENT REPORT].

18. *Id.*

19. *Id.* at 2.

Renewable resources produce 3.6 percent of electricity consumed by the DOD.[20] The Army operates sixty-seven renewable energy projects, but these projects combined only account for 2.1 percent of the Army's electricity consumption.[21] The United States Air Force has purchased Renewable Energy Certificates, discussed *infra* in Section V(A)(3), to offset its energy consumption, resulting in 5.8 percent of its electricity coming from renewable sources.[22] In comparison, only 0.6 percent of the United States Navy's electricity is produced by renewable sources.[23]

C. Fort Bragg as a Consumer of Electricity

Within the state of North Carolina, Fort Bragg consumes an enormous amount of electricity.[24] In 2008, Fort Bragg used approximately 599,374 megawatt-hours ("MWh") of electricity, which accounts for 59 percent of the base's total energy consumption.[25] Heating and cooling the base's 33.8 million square feet of building space uses 60 percent of the energy and costs $32 million per year.[26] All told, Fort Bragg consumes 4.2 percent of the Army's total energy budget of $1.3 billion.[27]

It is common for military bases to purchase their electricity from local utilities, and Fort Bragg is no exception.[28] Where states regulate the sale of electricity, retail customers must purchase their electricity from the company holding the service franchise in their geographic area.[29] For instance, the North Carolina Utilities Commission regulates and oversees the sale of electricity in North Carolina.[30] Progress Energy holds the service franchise for the area that includes Fort Bragg.[31] Thus, when the base purchases electricity, it does so from Progress Energy.[32]

20. *Id.* at 5.
21. *Id.* at 6.
22. *Id.*
23. *Id.*
24. FORT BRAGG ENERGY FACT SHEET, FY 2008, at 1 (2009) [hereinafter FORT BRAGG ENERGY FACT SHEET].
25. *Id.*
26. *Id.*
27. *Id.*
28. Christopher J. Aluotto, *Privatizing and Combining Electricity and Energy Conservation Requirements on Military Installations*, 30 PUB. CONT. L.J. 723, 731(2001).
29. *Id.*
30. NORTH CAROLINA UTILITIES COMMISSION, http://www.ncuc.net (last visited Mar. 28, 2012).
31. *See* N.C. UTILS. COMM'N, NORTH CAROLINA'S PUBLIC UTILITY INFRASTRUCTURE & REGULATORY CLIMATE 20 (2011) (indicating that Progress Energy controls the Eastern

II. WHAT LAWS AND REGULATIONS APPLY?

The procurement of electricity by military bases like Fort Bragg is governed by a wide-reaching array of state and federal laws and regulations.[33] Most military installations are federal enclaves that, in theory, are not subject to state laws and regulations.[34] However, when it comes to electricity sales, the DOD requires military installations to purchase electricity in a manner consistent with state law.[35] Thus, federal and state laws and regulations are relevant to both electricity generated by renewable sources and electricity sales at Fort Bragg.

A. Federal Enclave Status

The United States Constitution states that: "Congress shall have power to . . . exercise exclusive legislation . . . over all places purchased by the consent of the legislature of the state in which the same shall be, for the erection of forts, magazines, arsenals, dockyards, and other needful buildings . . . ."[36] Areas covered by this clause are commonly referred to as "federal enclaves."[37] North Carolina has recognized the status of Fort Bragg as a federal enclave.[38] The acquiescence of the state includes giving the federal government exclusive jurisdiction for most purposes.[39]

Because of the jurisdictional oddities of federal enclaves, both federal and state laws can overlap, causing choice-of-law issues not typically encountered within the boundaries of a single state.[40] State law will still control where the state has reserved

Region of North Carolina).

32. FORT BRAGG ENERGY FACT SHEET, *supra* note 24, at 2.

33. N.C. GEN. STAT. § 104-7(a) (2011); Energy Policy Act of 2005, Pub. L. No. 109-58, § 203(a), 119 Stat. 652 (2005) [hereinafter Energy Policy Act].

34. Philip D. Morrison, *State Property Tax Implication for Military Privatized Family Housing Program*, 56 A.F. L. REV. 261, 271 (2005).

35. 40 U.S.C. § 591(a)(2006) ("A department, agency, or instrumentality of the Federal Government may not use amounts appropriated or made available by any law to purchase electricity in a manner inconsistent with state law governing the provision of electric utility service . . . .").

36. U.S. CONST. art. I, § 8, cl. 17.

37. Susan L. Smith, *Shields for the King's Men: Official Immunity and Other Obstacles to Effective Prosecution of Federal Officials for Environmental Crimes*, 16 COLUM. J. ENVTL. L. 1, 23–24 (1991).

38. N.C. GEN. STAT. § 104-7(a) (2011).

39. *Id.* § 104-7(b).

40. Marla E. Mansfield, *A Primer on Public Land Law*, 68 WASH. L. REV. 801, 813

powers, and the body of state law in place at the time jurisdiction was ceded will continue to be binding so long as it does not conflict with federal laws or policies.[41] New state laws only take effect in the enclave by congressional action.[42] North Carolina has reserved relatively few powers, primarily those concerning judicial processes, criminal laws, public health laws, and family laws.[43]

B. Federal Laws

The federal government has enacted numerous laws and regulations that affect the purchase of electricity by a federal agency.[44] Two of the most important laws that affect Fort Bragg are the Energy Policy Act of 2005[45] and the 2007 Defense Authorization Act.[46] Layered on top of these pieces of legislation are several regulations that have a major impact on how the DOD purchases its electricity. In addition, the federal government subsidizes renewable energy installations by offering various tax credits and other incentives to spur development.[47]

1. Energy Policy Act of 2005

While fundamentally overhauling many aspects of energy consumption by federal agencies, the Energy Policy Act of 2005[48] includes several provisions related to renewable energy that are applicable in this scenario. Most importantly, the Act includes a goal that, "to the extent economically feasible and technically practicable," the federal government should obtain 5 percent of its electricity from renewable energy sources by 2010, increasing to 7.5 percent from 2013 onward.[49] The Act also requires that federal

(1993); Morrison, *supra* note 34, at 270.

41. Smith, *supra* note 37, at 50; Mansfield, *supra* note 40, at 805; *see also* U.S. CONST. art. VI, cl. 2 ("This Constitution, and the Laws of the United States which shall be made in Pursuance thereof; and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any State to the Contrary notwithstanding.").

42. Smith, *supra* note 37, at 50.

43. N.C. GEN. STAT. § 104-7(b).

44. Energy Policy Act § 203(a); John Warner National Defense Authorization Act for Fiscal Year 2007, Pub. L. No. 109-364, § 2852, 120 Stat. 2083, 2496 (2006).

45. Energy Policy Act § 203(a).

46. John Warner National Defense Authorization Act for Fiscal Year 2007 § 2852.

47. *See, e.g.*, 26 U.S.C. § 40A (2006).

48. Energy Policy Act § 203(a).

49. *Id.*

agencies reduce energy consumption by reducing the "energy intensity" of their buildings by 20 percent from 2003 levels by 2015.[50] Relevant to this Study, the Energy Policy Act of 2005 also extended the sunset date of renewable energy tax credits to October 1, 2016.[51]

2. 2007 Defense Authorization Act

The John Warner National Defense Authorization Act for Fiscal Year 2007 ("2007 Defense Authorization Act") included a relatively minor provision that is very important to this Study. The Act included a goal for the DOD "to produce or procure not less than 25 percent of the total quantity of facility energy it consumes within its facilities during fiscal year 2025 and each fiscal year thereafter from renewable energy sources."[52] Subject to the Act, the DOD set specific milestones for purchasing electricity generated by renewable energy sources.[53] For 2009, the goal was to obtain 3 percent of all electricity from renewable sources.[54] The DOD exceeded its goal, obtaining 3.6 percent of electricity from renewable sources.[55] In contrast, the Army fell short of its 3 percent goal, obtaining only 2.1 percent of its electricity from renewable sources; however, this is a marked increase over 2008 when the Army obtained only 1.1 percent of electricity from renewable sources.[56] Due to the peculiarities of the calculations, the DOD obtained 6.8 percent of its electricity from renewable sources in 2009, well on its way to its goal of 25 percent.[57]

3. 1998 Defense Authorization Act

Despite the federal jurisdiction established by federal enclave status, Section 8093 of the DOD Authorization Act of 1998 requires that military installations comply with state laws when

50. Energy Policy Act § 102(a)(1). "Energy intensity" is defined here as energy use per square foot. *Id.*

51. Energy Policy Act § 202(c).

52. John Warner National Defense Authorization Act for Fiscal Year 2007 § 2852.

53. DOD ANNUAL ENERGY MANAGEMENT REPORT, *supra* note 17, at 5.

54. *Id.* at 19.

55. *Id.*

56. *Id.* at 20.

57. *Id.* at 19–20. Note that the calculating metric changed from FY2008 to FY2009, and, thus, while the FY2009 figures show a decrease in performance, there was little actual change. *Id.* at 20.

purchasing electricity.[58] Since North Carolina regulates the sale of electricity, Fort Bragg must purchase its electricity pursuant to the rules of the Utilities Commission, discussed *infra* in Section II(C)(1), just like any other consumer in the state. These rules require that Fort Bragg purchase electricity from the regulated utility company in whose territory the base is located—in this case Progress Energy.[59] Because of the interplay between federal and state regulations, the purchase of electricity by military bases is not a simple transaction; it can be extraordinarily complex.[60]

4. Financing Incentives and Tax Credits

The federal government offers grants, tax credits, and loan guarantee programs that assist in financing the construction of renewable energy projects.[61] For renewable energy projects, there are two main grant programs: Treasury Renewable Energy Grants and grants through the Rural Energy for America Program. The Treasury Renewable Energy Grants program applies to nearly all renewable energy sources.[62] The grants are for 30 percent of the property that is part of a qualified facility and 10 percent of all other property.[63] To have been eligible, construction must have begun by December 31, 2011.[64] The United States Department of Agriculture ("USDA") also provides grants through the Rural Energy for America Program ("REAP").[65] To be eligible, the

58. 40 U.S.C. § 591(a) (2006) (originally enacted as the Continuing Appropriations Act of Fiscal Year 1998, Pub. L. No. 100–202, § 8093, 101 Stat. 1329, 1329–79); *see also* Jeffrey A. Renshaw, *Utility Privatization in the Military Services: Issues, Problems, and Potential Solutions*, 53 A.F. L. REV. 55 (2002).

59. Renshaw, *supra* note 58, at 61.

60. Aluotto, *supra* note 28, at 733.

61. As with most programs that provide tax credits and incentives, these programs rely on congressional appropriations and may be modified, either through defunding or changes in the underlying laws. The federal programs listed in this section and the state programs listed *infra* in Section II(C) were current as of March 15, 2011. *See* SOLAR ENERGY INDUSTRIES ASSOCIATION, EXTEND THE TREASURY GRANT PROGRAM FOR RENEWABLE ENERGY 1 (2010); *U.S. Department of Treasury—Renewable Energy Grants*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US53F&re=1&ee=1 (last visited Mar. 28, 2012).

62. *Id.*

63. *Id.*

64. *Id.*

65. *USDA—Rural Energy for America Program (REAP) Grants*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US05F&re=1&ee=1 (last visited Mar. 28, 2012).

business must be rural and classified as a small business.[66] In this context, a business is considered small if it generates 4,000,000 MWh or less per year.[67] The maximum incentive is 25 percent of the project cost, up to $500,000.[68]

There are also two primary loan guarantee programs. The first is the Department of Energy Loan Guarantee Program, which focuses on projects with total costs exceeding $25 million.[69] The program is available to many, but not all, technologies.[70] The loans must be repaid within either thirty years or 90 percent of the project's useful life, whichever is earlier.[71] To be eligible, construction must have begun by September 30, 2011.[72] The second is the USDA's REAP Loan Guarantee program.[73] Through this program, developers work with local lenders, who in turn receive a financial guarantee from the USDA.[74] The program offers loan guarantees for up to 70 percent of the cost for projects costing between $5 and $10 million, or 60 percent for projects costing between $10 million and $25 million.[75] As with the REAP Grants, the business must be small and rural.[76]

There are two principal federal tax benefits available for renewable energy projects: the Business Energy Investment Tax Credit ("ITC")[77] and the Renewable Energy Production Tax

66. *Section 9007 Rural Energy for America Program Grants/Renewable Energy Systems/Energy Efficiency Improvement Program (REAP/RES/EEI)*, U.S. DEP'T OF AGRIC., http://www.rurdev.usda.gov/rbs/busp/9006grant.htm (last updated Mar. 28, 2012).

67. U.S. SMALL BUS. ADMIN., TABLE OF SMALL BUSINESS SIZE STANDARDS MATCHED TO NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM CODES 39 n.1 (2010), http://www.sba.gov/sites/default/files/Size_Standards_Table.pdf ("A firm is small if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.").

68. *USDA—Rural Energy for America Program (REAP) Grants*, *supra* note 65; *Section 9007 Rural Energy for America Program Grants/Renewable Energy Systems/Energy Efficiency Improvement Program (REAP/RES/EEI)*, *supra* note 66.

69. *U.S. Department of Energy—Loan Guarantee Program*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US48F&re=1&ee=1 (last updated Mar. 28, 2012).

70. *Id.*

71. *Id.*

72. *DOE-Loan Programs Office—1705*, U.S. DEP'T OF ENERGY LOAN PROGRAMS OFFICE, http://lpo.energy.gov/?page_id=41 (last updated Mar. 28, 2012).

73. *USDA—Rural Energy for America Program (REAP) Grants*, *supra* note 65.

74. *Rural Energy for America Program Guaranteed Loan Program (REAP LOAN)*, U.S. DEP'T OF AGRIC., http://www.rurdev.usda.gov/rbs/busp/9006loan.htm (last updated Mar. 28, 2012).

75. *Id.*

76. *Id.*

77. *Business Energy Investment Tax Credit (ITC)*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://www.dsireusa.org/incentives/incentive.cfm?

Credit ("PTC").[78] The ITC is available for most renewable energy sources; it is not, however, available for landfill gas.[79] The program allows businesses to receive a tax credit of 30 percent of their costs for solar, wind, and biomass power, and 10 percent for geothermal and cogeneration.[80] The projects must be placed into service before December 31, 2016.[81] The second program, the PTC, applies to most renewable energy sources other than solar.[82] The program gives a tax credit of between 1.1 and 2.1 cents per kilowatt-hour ("kWh") generated, depending on the technology.[83] The tax credits generally apply to the first ten years of operation.[84] To be eligible for the credits, projects must be or have been in service by December 31, 2013, or by December 31, 2012, respectively, for wind projects.[85] Corporations may opt to participate in either the ITC or the PTC, but may not participate in both.[86] Under the American Recovery and Reinvestment Act of 2009, not all of these programs are available for a single project.[87] The standard assumption is that businesses will take the ITC.[88] However, in lieu of the ITC, a business may opt to take either the PTC or the Treasury Renewable Energy Grant.[89]

Incentive_Code=US02F&re=1&ee=1 (last updated Mar. 28, 2012).

78. *Renewable Electricity Production Tax Credit (PTC)*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US13F&re=1&ee=1 (last updated Mar. 28, 2012).

79. *Business Energy Investment Tax Credit (ITC)*, *supra* note 77.

80. *Id.*

81. *Id.*

82. *Renewable Electricity Production Tax Credit (PTC)*, *supra* note 78.

83. *Id.*

84. *Id.*

85. *Id.*

86. *Id.*; *see also Business Energy Investment Tax Credit (ITC)*, *supra* note 77; INTERNAL REVENUE SERVICE, NOTICE 2009-52 (2009), *available at* http://www.irs.gov/pub/irs-drop/n-09-52.pdf; INTERNAL REVENUE SERV., INTERNAL REVENUE BULLETIN 2009–25 (2009), at 1, *available at* http://www.irs.gov/pub/irs-utl/irb09-25.pdf.

87. *Renewable Electricity Production Tax Credit (PTC)*, *supra* note 78 (explaining that a project may take the ITC or the PTC, but not both).

88. *Compare Renewable Electricity Production Tax Credit (PTC)*, *supra* note 78 (granting a maximum of 2.2 cents per kilowatt-hour of electricity generated), *with Business Energy Investment Tax Credit (ITC)*, *supra* note 77 (granting a tax credit of up to 30 percent of the amount expended in constructing green energy facilities).

89. *1603 Program: Payments for Specified Energy Property in Lieu of Tax Credits*, U.S. DEP'T OF THE TREASURY, http://www.treasury.gov/initiatives/recovery/Pages/1603.aspx (last updated Jan. 18, 2012, 1:43 PM).

C. State

North Carolina regulates the sale of electricity through its Utilities Commission.[90] In 2006, the General Assembly decided to require utilities to produce set percentages of their electricity from renewable sources by enacting the state's Renewable Energy Portfolio Standard.[91] Thus, much like the federal government, the state offers numerous incentives and tax breaks to encourage the development of renewable electricity sources.[92]

1. Utilities Commission

The North Carolina Utilities Commission regulates electricity sales in North Carolina.[93] The Commission has the power to regulate all aspects of public utilities, including rates, services, and operations.[94] The Commission grants certain electricity providers an exclusive monopoly over a particular franchise area and ensures that those providers generate adequate and reliable electricity service.[95] The Commission also oversees the development of new electricity sources.[96] Before a new electricity generation facility can be built, however, a utility must receive a "Certificate of Convenience and Necessity" from the Utilities Commission.[97]

The United States gradually obtained exclusive jurisdiction over Fort Bragg during the period of 1919 to 1943.[98] The present Utilities Commission has evolved from the North Carolina Railroad Commission, which was originally formed in 1891.[99] The Utilities Commission was originally granted control over electricity

90. *North Carolina Utilities Commission, History and Description*, N.C. UTILS. COMM'N, http://www.ncuc.commerce.state.nc.us/overview/ucdesc.htm (last visited Mar. 28, 2012).

91. 2007 N.C. Sess. Laws 1184–85.

92. *See* discussion *infra* Part II(C)(3).

93. N.C. GEN. STAT. ANN. § 62-2(b) (2011) ("To these ends, therefore, authority shall be vested in the North Carolina Utilities Commission to regulate public utilities generally, their rates, services and operations, and their expansion in relation to long-term energy conservation and management policies and statewide development requirements . . . .").

94. 29 N.C. INDEX 4TH *Utilities* § 13 (2008).

95. *Id.*

96. *Id.*

97. N.C. GEN. STAT. ANN. § 62-110.

98. *See* Comment, *Who Polices Child Abuse and Neglect on Military Enclaves Over Which the Federal Government Exercises Exclusive Jurisdiction?*, 8 N.C. CENT. L.J. 261, 263 (1977).

99. *North Carolina Utilities Commission, History and Description*, *supra* note 90.

in 1913.[100] However, the Public Utilities Act of 1963 fundamentally overhauled the Utilities Commission, including giving it the power to regulate electricity generation starting in 1965.[101] Since Fort Bragg has been a federal enclave since 1943,[102] it predates the North Carolina Utilities Commission's current governing law, which was promulgated in 1963.[103] Thus, in theory, Fort Bragg does not need to comply with the regulations of the Utilities Commission. In practice, as discussed *infra* Section VI(A), this is not necessarily the case.

2. Renewable Portfolio Standard

In 2007, North Carolina enacted its Renewable Energy and Energy Efficiency Portfolio Standard.[104] This standard "ensures that a minimum amount of renewable energy is included in the portfolio of electricity resources serving a state."[105] Twenty-eight states have renewable energy portfolio standards, but North Carolina is the only southeastern state with such a program.[106] The law requires that public utility companies meet progressively increasing milestones whereby renewable electricity accounts for some minimum percentage of their electricity sales, peaking at 12.5 percent of their sales for 2012 and beyond.[107]

The requirements of the Renewable Energy and Energy Efficiency Portfolio Standard can be achieved in three different ways. The first is through utilizing electricity generated by renewable energy, which includes "[generating] electric power at a new renewable energy facility" as well as "[purchasing] electric power from a new renewable energy facility" owned by a third party.[108] The second is by "[reducing] energy consumption through the implementation of an energy efficiency measure."[109] However, energy efficiency may only be used to meet 25 percent of the requirements, increasing to 40 percent after 2020.[110]

100. N.C. UTILS. COMM'N, *supra* note 31, at 5.
101. *Id.*; *see also* N.C. GEN. STAT. ANN. § 62-1 *et seq.*
102. Comment, *supra* note 98, at 263.
103. N.C. GEN. STAT. ANN. § 62-1 *et seq.*
104. 2007 N.C. Sess. Laws 1184–85.
105. *Renewables Portfolio Standard Overview*, U.S. DEP'T OF ENERGY, 1 (2005), http://www.windpoweringamerica.gov/pdfs/wpa/37627_rps.pdf.
106. Hewlett, *supra* note 6.
107. 2007 N.C. Sess. Laws 1187.
108. *Id.*
109. *Id.*
110. *Id.*

Thirdly, public utilities can also "[p]urchase renewable energy certificates derived from in-State or out-of-state new renewable energy facilities," although renewable energy certificates purchased from out-of-state facilities may meet only 25 percent of the requirement.[111] There are also requirements for specific renewable energy sources.[112] North Carolina includes specific requirements for solar energy, swine waste, and poultry waste.[113]

3. Financing Incentives and Tax Credits

There are three state level incentive programs worth noting. The first is the Revolving Loan Program, which can be used with nearly any renewable energy technology.[114] Through the program, local governmental units make loans to project developers for a term of up to twenty years at an interest rate not to exceed 8 percent.[115] The program has no expiration date.[116] The second available option is Property-Assessed Clean Energy Financing, also known as PACE Financing.[117] Under this program, a property owner borrows money from the local government.[118] That money is then repaid through a special assessment on the property over a set period of years.[119] However, as of January 2010, no cities or counties had enacted a PACE program, and a July 2010 statement from the Federal Housing Financing Agency has cast doubt on whether such programs will be offered in the future.[120] Thirdly, funding is available through the North Carolina Green Business Fund.[121] The fund provides grants of up to

111. *Id.* A "renewable energy certificate" is a tradable representation that one megawatt-hour of electricity generated from renewable sources has been fed into the grid. *Renewable Energy Certificates (RECs)*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/greenpower/gpmarket/rec.htm (last updated Mar. 21, 2012).

112. 2007 N.C. Sess. Laws 1188–89.

113. *Id.*

114. *Local Option—Financing Program for Renewable Energy and Energy Efficiency*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NC76F&re=1&ee=1 (last visited Mar. 28, 2012).

115. *Id.*

116. *Id.*

117. *Local Option—Clean Energy Financing*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NC75F&re=1&ee=1 (last visited Mar. 28, 2012).

118. *Id.*

119. *Id.*

120. *Id.*

121. *North Carolina Green Business Fund*, U.S. DEP'T OF ENERGY, http://www.doe.gov/savings/north-carolina-green-business-fund (last visited Mar. 28, 2012).

$500,000 to small and mid-size businesses "to encourage the development and commercialization of 'promising' renewable energy and green building technologies."[122] To be eligible, businesses must have fewer than one hundred employees.[123]

North Carolina also has two tax benefits available for renewable energy projects. The first is the Renewable Energy Corporate Tax Credit, which applies to nearly all possible renewable energy projects.[124] The credit is for 35 percent of the installed cost of the project, up to $2.5 million per installation.[125] The credit must be taken in five equal installments and cannot exceed 50 percent of the taxpayer's state tax liability for that year.[126] The credit is set to expire on December 31, 2015.[127] The second tax benefit is a property tax abatement for photovoltaic systems.[128] It exempts 80 percent of the appraised value of a photovoltaic system from property tax.[129] There are no size or equipment restrictions.[130] It should be noted, however, that any project situated within Fort Bragg's federal enclave would likely be exempt from state property taxes.[131]

III. IS THE ENACTMENT OF A RENEWABLE PORTFOLIO STANDARD TECHNOLOGICALLY POSSIBLE?

In early 2006, the North Carolina General Assembly's Environmental Review Commission requested that the Utilities Commission review the costs and benefits of enacting a renewable portfolio standard.[132] The study concluded that North Carolina could obtain up to 10 percent of its electricity from renewable sources within ten years for only modest increases in retail

122. *Id.*

123. *Id.*

124. *Renewable Energy Tax Credit (Corporate)*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NC19F&re=1&ee=1 (last visited Mar. 28, 2012).

125. *Id.*

126. *Id.*

127. *Id.*

128. *North Carolina Property Tax Abatement for Solar Electric Systems*, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY (DSIRE), http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NC51F&re=1&ee=1. (last visited Mar. 28, 2012).

129. *Id.*

130. *Id.*

131. Stephen E. Castlen & Gregory O. Block, *Exclusive Federal Legislative Jurisdiction: Get Rid of It!*, 154 MIL. L. REV. 113, 116 (1997).

132. LACAPRA STUDY, *supra* note 1, at ii.

prices.[133] To reach this conclusion, the study evaluated a large portfolio of possible renewable energy sources and technologies.[134]

A. Which Technologies Are Allowed Under These Laws

The pieces of legislation introduced in Section III all have different definitions of what constitutes a renewable energy source. While some sources are universally accepted, such as wind and solar power, others, like landfill gas and hydrogen, are more disputed.[135]

Which Technologies Are Allowed?

	Energy Policy Act of 2005[136]	2007 Defense Authorization Act[137]	N.C. Renewable Portfolio Standard[138]
Biomass	✓	✓	✓
Geothermal	✓	✓	✓
Hydroelectric	✓ (*limited to new electricity generation capacity at existing facilities*)	✓ (*limited to new electricity generation capacity at existing facilities*)	✓ (*limited to new sources generating 10 MW or less*)
Hydrogen	–	–	✓ (*limited to hydrogen derived from renewable resources*)
Landfill Gas	✓	✓	✓ (*included as a form of biomass*)
Livestock Methane	✓ (*included as a form of biomass*)	✓ (*included as a form of biomass*)	✓
Municipal Solid Waste	✓	✓	–

133. *Id.*
134. *Id.* at v–vi.
135. *See infra* Section III(A)(4), (5).
136. Energy Policy Act § 203(b).
137. The John Warner National Defense Authorization Act for Fiscal Year 2007 incorporates the same energy sources as the Energy Policy Act of 2005. *See* John Warner National Defense Authorization Act for Fiscal Year 2007 § 2852.
138. N.C. GEN. STAT. § 62-133.8(a)(5)(c).

Ocean – Current	✓	✓	✓
Ocean – Thermal	✓	✓	–
Ocean – Tidal	✓	✓	–
Ocean – Wave	✓	✓	✓
Solar Electric	✓	✓	✓
Solar Thermal	–	–	✓
Thermal Cogeneration	–	–	✓ (*limited to energy derived from electricity generation by the listed renewable sources*)
Wind	✓	✓	✓

1. Solar

There are three systems commonly used to convert solar energy into usable energy: (1) photovoltaic systems,[139] (2) solar thermal systems,[140] and (3) the process of concentrating solar power.[141] Photovoltaic systems work by having sunlight strike semiconductors, traditionally made from silicon, which release electrons and thus produce an electrical current.[142] Electrical output peaks when the sunlight is most intense, which is mid-day (the point when the sun is highest in the sky).[143] In order to increase efficiency, a tracking system may be used to adjust the solar panels to track the sun during the day and from season to

139. Alexandra B. Klass, *Property Rights on the New Frontier: Climate Change, Natural Resource Development, and Renewable Energy*, 38 ECOLOGY L.Q. 63, 96 (2011).

140. Benjamin K. Sovacool & Christopher Cooper, *Nuclear Nonsense: Why Nuclear Power Is No Answer to Climate Change and the World's Post-Kyoto Energy Challenges*, 33 WM. & MARY ENVTL. L. & POL'Y REV. 1, 87 (2008).

141. Klass, *supra* note 139, at 96.

142. Solar Energy Industries Ass'n (SEIA), *Photovoltaic Solar Technology: Creating Electricity from Sunlight*, SEIA.ORG (Feb. 4, 2010), http://www.seia.org/galleries/pdf/SEIA_PV_Factsheet.pdf [hereinafter *Photovoltaic Solar Technology*]; Solar Energy Industries Ass'n (SEIA), *Solar Technology and Solar Products—Photovoltaic*, SEIA.ORG, http://www.seia.org/cs/solar_technology_and_products/solar_electric_photovoltaic (last visited Mar. 28, 2012).

143. *Photovoltaic Solar Technology*, *supra* note 142, at 1.

season.[144] A tracking system can be single-axis or dual-axis, and can increase electrical output by up to 25 percent.[145] The second system that converts solar energy into usable energy is a solar thermal system. Solar thermal systems are typically used to heat water and swimming pools, but can also be used to heat and cool buildings.[146] Solar thermal systems, while not generating electricity, reduce electrical demand by providing hot water and heating and cooling buildings.[147] Solar thermal technology has many applications in North Carolina, although none are viable on an industrial scale.[148] The third system is solar thermal electric, also known as "concentrating" solar power.[149] There are three main types of concentrating solar power and each uses mirrors to concentrate the sun's energy on a specific location.[150] Concentrating solar power systems are not as popular in the United States as photovoltaics.[151] In 2008, nearly 19,000 photovoltaic systems were added, but no new solar thermal electric plants were built.[152] There are no concentrating solar power systems in North Carolina.[153]

2. Wind

Wind turbines are typically large towers, between 200 and 345 feet tall, with two or three blades between 115 and 150 feet long.[154] Each turbine requires between one-half and two acres of land to operate, but its footprint will only cover between 1 percent and 3 percent of that land, allowing a majority of the land to

144. *Id.* at 2.

145. *Id.* at 2.

146. LARRY SHERWOOD, INTERSTATE RENEWABLE ENERGY COUNCIL, U.S. SOLAR MARKET TRENDS 2008, at 2 (2009), http://www.irecusa.org/fileadmin/user_upload/NationalOutreachDocs/SolarTrendsReports/IREC_Solar_Market_Trends_Report_2008.pdf.

147. *Id.*

148. *Clean Energy Resources*, PROGRESS ENERGY, https://www.progress-energy.com/commitment/environment/what-we-are-doing/cleanenergyresources.page (last visited Mar. 28, 2012).

149. SHERWOOD, *supra* note 146, at 2.

150. Nat'l Renewable Energy Lab., *Learning About Renewable Energy: Concentrating Solar Power* (July 11, 2011), http://www.nrel.gov/learning/re_csp.html.

151. *See* SHERWOOD, *supra* note 146, at 2.

152. *Id.* at 1, 6.

153. *See* U.S. DEP'T OF ENERGY, NREL'S CLEAN ENERGY POLICY ANALYSES PROJECT: 2009 U.S. STATE CLEAN ENERGY DATA BOOK 15 (2010).

154. PowerPoint Presentation, Brian Miles, N.C. Solar Ctr., Wind Energy Systems and Personal Property Tax, 13–14, http://www.powershow.com/view/27b5b0-MzhhY/Wind_Energy_Systems_and_Personal_Property_Tax_flash_ppt_presentation (last visited Mar. 28, 2012).

continue to be used for farming or other purposes.[155] The turbines generally have motors that aim the blades into the wind in order to increase electricity production.[156] The turbines employ brakes or directional devices to turn the blades away from the wind to prevent their spinning at unsafe speeds.[157] The energy available in wind is directly proportional to the cube of the wind speed, so "a slight increase in wind speed results in a large increase in electricity generation."[158] Complaints about wind power typically revolve around three concerns: bird safety, noise, and shadow flicker. Birds may occasionally collide with wind turbines, as they do with other tall structures, such as buildings.[159] Noise was a concern with early wind turbines, but the issue has largely been addressed.[160] Finally, shadow flicker is caused when the turbine blades cast a moving shadow on the ground, which can be an annoyance in residential areas.[161] Shadow flicker problems can be resolved by the proper placement of wind turbines away from residential areas.[162]

3. Biomass

Biomass generates energy when burned in power plants.[163] The fire heats water to produce steam that drives a turbine, just as in traditional power plants.[164] While still emitting carbon dioxide, biomass emissions "are balanced by the uptake of atmospheric CO_2 during the growth of the crop."[165] Biomass used for electricity generation can come from many different sources. One of the primary sources is from wood and wood products.[166] This includes

155. *Id.* at 15.
156. *Id.* at 13.
157. *Id.*
158. Am. Wind Energy Ass'n (AWEA), *The Economics of Wind Energy*, (Feb. 2005), http://www.fishermensenergy.com/dms/showfile.php?id=44.
159. Am. Wind Energy Ass'n (AWEA), *Wind Energy and the Environment*, AWEA.ORG, http://archive.awea.org/faq/wwt_environment.html (last visited Mar. 28, 2012).
160. *Id.*
161. *Id.*
162. *Id.*
163. RUBEN CARBONELL & RAJ NARAYAN, N.C. STATE UNIV. INST. FOR EMERGING ISSUES, ENERGY TECHNOLOGY ISSUES IN NORTH CAROLINA 3 (2007), http://www.ncsu.edu/iei/programs/energy-environment/resources/documents/energy-technologies.pdf.
164. Nat'l Renewable Energy Lab. (NREL), *Learning About Renewable Energy: Biopower*, NREL.ORG, http://www.nrel.gov/learning/re_biopower.html (last updated Feb. 2, 2010) [hereinafter NREL, *Biopower*].
165. CARBONELL & NARAYAN, *supra* note 163, at 4.
166. Christopher S. Galik et. al, *Forest Biomass Supply in the Southeastern United States—Implications for Industrial Roundwood and Bioenergy Production*, 109 J. FORESTRY 69, 69 (2009).

forest biomass, such as merchantable and non-merchantable wood, waste residue from logging operations, residue from paper and lumber mills, and urban wood waste that would otherwise end up in landfills.[167] Animal waste is also considered biomass.[168] Animal waste can either be burned directly or allowed to decompose and naturally produce methane, which can then be burned for electricity.[169]

4. Landfill Gas and Municipal Solid Waste

Landfill gas results from the decomposition of waste and is collected from wells imbedded into landfills.[170] The gas is approximately 50 percent methane and 50 percent carbon dioxide, mixed with a small amount of other gases.[171] Its properties are very similar to natural gas, since both are primarily composed of methane; its price, however, is not as volatile.[172] Wells can be drilled into landfills to capture the methane, which can then be burned to create electricity.[173] This has the dual purpose of producing electricity and reducing the emissions of methane, a potent greenhouse gas.[174] Municipal solid waste is processed in a manner similar to biomass.[175] It is collected and burned to produce thermal energy.[176] That thermal energy produces steam which spins a turbine to generate electricity.[177]

5. Hydroelectric

Hydroelectric power is usually generated at dams when water is released from a greater height to a lower height, spinning turbines that power generators.[178] The basic technology of

167. *Id.* at 69–70; *see also* LACAPRA STUDY, *supra* note 1, at 16–18; NREL, *Biopower*, *supra* note 164.

168. LACAPRA STUDY, *supra* note 1, at 25.

169. NREL, *Biopower*, *supra* note 164.

170. N.C. SOLAR CENTER, DEVELOPING LANDFILL GAS TO ENERGY CAPACITY IN NORTH CAROLINA 1.

171. *Id.*

172. *Id.*

173. NREL, *Biopower*, *supra* note 164.

174. *Id.*

175. *See* EPA, *Clean Energy: Municipal Solid Waste*, EPA.ORG (Mar. 17, 2010), http://www.epa.gov/cleanenergy/energy-and-you/affect/municipal-sw.html.

176. *Id.*

177. *Id.*

178. BUREAU OF RECLAMATION, U.S. DEP'T OF THE INTERIOR, HYDROELECTRIC POWER 2 (2005), http://www.usbr.gov/power/edu/pamphlet.pdf.

hydroelectric turbines has not changed in decades.[179] Most of the potential is in the Yadkin/Pee Dee River Basin, with additional large amounts in the Cape Fear River Basin and Santee River Basin.[180] The potential is largely in the western part of the state, where the mountains create large height differentials along rivers.[181] The eastern part of the state is relatively flat, rendering hydroelectric power a less than ideal renewable energy source for Fort Bragg.[182]

6. Other Technologies

One of the most common technologies not discussed is geothermal energy. While geothermal energy can be used for heating and cooling purposes nationwide,[183] the geothermal resources in North Carolina would not support electricity generation.[184] While it may still be an excellent tool for increasing energy efficiency,[185] this Study focuses on electricity generation and thus does not consider geothermal energy.

All of the pieces of legislation under review include some form of energy generated from oceans as a renewable resource.[186] However, because Fort Bragg is located inland,[187] these technologies were not considered. The North Carolina Renewable Energy and Energy Efficiency Portfolio Standard and the 2007 Defense Authorization Act both include thermal energy or thermal cogeneration as a renewable resource.[188] Thermal cogeneration utilizes waste heat from any process to produce electricity or thermal energy.[189] Because thermal cogeneration

179. CARBONELL & NARAYAN, *supra* note 163, at 7.

180. LACAPRA STUDY, *supra* note 1, at 35.

181. RICH CROWLEY & PAUL QUINLAN, N.C. SUSTAINABLE ENERGY ASS'N, 2011 NORTH CAROLINA CLEAN ENERGY DATA BOOK 11 (2011), http://energync.org/assets/files/NCSEA%20_2011_CEDB_COMPRESSED_FOR_WEB_low_res.pdf.

182. *See id.*

183. Nat'l Renewable Energy Lab. (NREL), *Learning About Renewable Energy: Geothermal Heat Pumps*, (Mar. 8, 2011), http://www.nrel.gov/learning/re_geo_heat_pumps.html [hereinafter NREL, *Geothermal Heat Pumps*].

184. CROWLEY & QUINLAN, *supra* note 181.

185. *See, e.g.*, NREL, *Geothermal Heat Pumps*, *supra* note 183.

186. Energy Policy Act of 2005 § 203(b)(2); John Warner National Defense Authorization Act for Fiscal Year 2007 § 2852; N.C. GEN. STAT. § 62-133.7(a)(8) (2011).

187. U.S. Dep't of the Interior, *North Carolina: Federal Lands and Indian Reservations*, NATIONALATLAS.GOV (2003), http://nationalatlas.gov/printable/images/pdf/fedlands/NC.pdf.

188. N.C. GEN. STAT. § 62-133.7(a)(8); John Warner National Defense Authorization Act for Fiscal Year 2007 § 2852.

189. N.C. GEN. STAT. § 62-133.7(a)(8); John Warner National Defense Authorization

requires detailed individual investigations of industrial operations,[190] it was not considered for the purposes of this Study.

B. What Is Their Electricity Generation Potential?

Given the wide variety of sources allowed under these laws, North Carolina has excellent potential for developing renewable energy. Prior to enacting the Renewable Energy and Energy Efficiency Portfolio Standard, the North Carolina General Assembly commissioned an extensive study on the subject, which concluded that the state has the practical potential to generate 16,700 GWh annually from renewable sources.[191]

1. Solar

North Carolina receives a great deal of solar energy.[192] The average annual energy production of a photovoltaic panel fixed due south in North Carolina is 19 percent.[193] This means that a 1 kW photovoltaic panel produces about 1690 kWh per year.[194] Solar electricity production is limited only by the amount of space that can be dedicated to solar panels.[195] In North Carolina, a 1 megawatt ("MW") solar farm would cover approximately one acre.[196]

2. Wind

North Carolina is also home to an enormous amount of wind energy.[197] After reducing total capacity for incompatible land uses and other exclusions, there is an estimated 2,250 MW of available wind power on-shore in North Carolina.[198] Most of the

Act for Fiscal Year 2007 § 2852.

190. *See* NREL, *Biopower*, *supra* note 164.

191. LACAPRA STUDY, *supra* note 1, at vi.

192. *Id.* at 35.

193. *Id.* at 36.

194. *Id.*

195. *See id.* at 35–36.

196. E-mail from Bob Leker, Renewables Program Manager, State Energy Office, N.C. Dep't of Commerce, to author (Apr. 23, 2010, 12:50 PM EST) (on file with author).

197. *See generally* LACAPRA STUDY, *supra* note 1, at 29–30 (estimating about 2,800 MW of Class 4 and above on-shore wind energy potential and about 6,800 MW of Class 3 wind energy potential in North Carolina).

198. *Id.* at 31.

wind is concentrated along the coast and in the mountains.[199] However, the Mountain Ridge Protection Act of 1983, which prohibits building on mountain ridges where the strongest winds are located, hinders the development of wind energy in western North Carolina.[200] As impressive as the numbers are for on-shore wind, they are even more impressive for offshore wind located in the sounds of North Carolina and in the Atlantic Ocean. Some estimates believe that there are 2,000 MW of useable energy per one hundred square miles.[201] However, due to the added complexity of building wind farms at sea, the costs rise.[202] A University of North Carolina study investigated a potential 1,620 MW installation with 450 different 3.6 MW turbines in the Atlantic Ocean.[203] The study calculated a total installed cost of $5.4 billion, or approximately $3,360 per kW.[204]

3. Biomass

Researchers estimate that North Carolina has the potential to produce up to 1,440 MW of energy from biomass, much of which would come from waste resources that currently are not otherwise utilized.[205] North Carolina has the potential to create a large amount of energy from forest residues. North Carolina has between approximately 2.8 and 4 million dry tons of forest residue, which is enough to create 3,666 GWh of electricity.[206] Additionally, crops such as corn stover, wheat stover, and other

199. *Id.* at 30.

200. The MRPA specifically exempts "windmills," but North Carolina Attorney General Roy Cooper has written an opinion letter that the exemption would not apply to wind farms. While the opinion letter is not binding law, it has halted wind energy in the western part of the state for fear of legal repercussions. The General Assembly could act to clarify the MRPA by either overturning the opinion letter or codifying it. *Id.* at xiv, 111–113; N.C. GEN. STAT. § 113A-206(3)(b) (2011); John Murawski, *Trying to Catch the Wind*, NEWS & OBSERVER (Raleigh, NC) (posted June 26, 2006, 12:30 AM, modified July 1, 2006, 8:58 AM) (explaining the impact of the MPRA on the development of wind power in the mountains of North Carolina).

201. LACAPRA STUDY, *supra* note 1, at 33.

202. *Id.*

203. THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL, COASTAL WIND: ENERGY FOR NORTH CAROLINA'S FUTURE 340 (2009), *available at* http://www.climate.unc.edu/coastal-wind.

204. *Id.*

205. BEN RICH, NORTH CAROLINA BIOMASS COUNCIL, THE NORTH CAROLINA BIOMASS ROADMAP: RECOMMENDATIONS FOR FOSSIL FUEL DISPLACEMENT THROUGH BIOMASS UTILIZATION 9, 12 (2007), *available at* http://events.energetics.com/NYBiofuelsVision09/pdfs/NC_Biomass_Roadmap.pdf.

206. Galik et. al, *supra* note 166, at 69, 75; LACAPRA STUDY, *supra* note 1, at 19.

grasses can be grown especially for electricity generation.[207] Methane from swine waste has the capacity to create between 93 and 116 MW of electricity, or 766,000 MWh per year.[208] Poultry litter could produce an additional 105 MW, even after using some of the poultry litter as fertilizer.[209]

4. Landfill Gas and Municipal Solid Waste

North Carolina has the technical potential to produce up to 240 MW of electricity from landfill gas.[210] However, after deducting for incompatible landfills and other technical issues, there is a practical potential of 150 MW coming from thirty landfills.[211] These are primarily larger, newer landfills that were built to certain technical requirements.[212] Because municipal solid waste is not considered a renewable energy source under the North Carolina REPS,[213] it has not been extensively studied, despite the fact that it is allowed under federal law.

5. Hydroelectric

Because the laws in question restrict the availability of hydropower as a renewable electricity source,[214] it has less potential to be a large resource. Because of the restrictive definitions and the fact that the resource has already been extensively developed in the state, as discussed in Section IV(A)(5) *infra*, North Carolina only has the potential to create an additional 410 MW of electricity from hydropower.[215]

207. LACAPRA STUDY, *supra* note 1, at 19.
208. *Id.* at 27.
209. *Id.* at 29. "Poultry litter" is poultry manure mixed with bedding (wood shavings, rice hulls, etc.). Eddie Funderburg, *Poultry Litter for Fertilizer*, Samuel Robert Noble Foundation, http://www.noble.org/ag/Soils/PoultryLitter/index.html (last visited Apr. 4, 2012).
210. LACAPRA STUDY, *supra* note 1, at 16.
211. *Id.*
212. *Id.* at 15.
213. *Id.* at 20.
214. *Id.* at 34.
215. *Id.*

C. What Has Already Been Done?

Both North Carolina and Fort Bragg have already taken steps to implement renewable energy sources.[216] North Carolina relies heavily on electricity generated by hydropower,[217] and Fort Bragg has explored various options that can be used on the base.[218]

1. North Carolina

In 2008, North Carolina generated 4,956 MWh from renewable energy sources.[219] The vast majority of this (3,034 MWh) comes from existing hydroelectric facilities.[220] These existing facilities are primarily large dams.[221] Biomass generates 1,920 MWh of electricity, which is 1.2 percent of the state's total electricity.[222] North Carolina ranks eighth nationally for biomass utilization.[223] Landfill gas and municipal solid waste generated 102 MWh in 2008, which is included in the total numbers for biomass.[224] North Carolina is home to several large-scale photovoltaic installations.[225] Despite these installations, North Carolina generated only 1.8 MWh from solar installations in 2008, not even ranking in the top ten nationally.[226] However, the industry is growing in the state. North Carolina added 4.0 MW of

216. RICH, *supra* note 205 at 3.

217. N.C. SOLAR CTR., EDUCATIONAL OVERVIEW: WATER—HYDROELECTRIC ENERGY 1 (undated) (on file with author).

218. FORT BRAGG FY09 ANNUAL PLAN EXECUTIVE SUMMARY 47 (2009).

219. OFFICE OF COAL, NUCLEAR, ELECTRIC AND ALTERNATIVE FUELS, U.S. ENERGY INFORMATION ADMINISTRATION, RENEWABLE ENERGY ANNUAL 2008, at 32 (2010), http://www.eia.gov/renewable/annual/archive/rea2008.pdf [hereinafter RENEWABLE ENERGY ANNUAL 2008].

220. *Id.*

221. N.C. SOLAR CTR., *supra* note 217.

222. RENEWABLE ENERGY ANNUAL 2008, *supra* note 219, at 32; ENERGY INFO. ADMIN., NORTH CAROLINA RENEWABLE ENERGY PROFILE 2009, at 1 (2011).

223. RICH, *supra* note 205, at 1; RENEWABLE ENERGY ANNUAL 2008, *supra* note 219, at 32.

224. RENEWABLE ENERGY ANNUAL 2008, *supra* note 219, at 32.

225. A photovoltaic array located in Davidson County generates approximately 21.5 MW, which is sold to Duke Energy. *See* Hewlett, *supra* note 6. The same owner also owns a 1.2 MW facility outside Wilmington, North Carolina that sells electricity to Progress Energy. There is also a 1.0 MW facility in Haywood County, North Carolina that also sells electricity to Progress Energy. *See generally* Eric Seeger, *Evergreen Solar Farm*, WNC MAG., http://www.wncmagazine.com/feature/sustainability/evergreen_solar_farm (last visited Mar. 28, 2012).

226. RENEWABLE ENERGY ANNUAL 2008, *supra* note 219, at 32; SHERWOOD, *supra* note 146, at 7.

photovoltaic capacity in 2008, the tenth most in the nation.[227] North Carolina does not have any industrial-scale wind installations.[228] The Mountain Ridge Protection Act has hampered wind power in North Carolina.[229]

2. Fort Bragg

Fort Bragg has also begun taking steps to meet the DOD guidelines for renewable energy and energy efficiency. In 2008, Fort Bragg conducted a Renewable Energy Study for fiscal year 2009.[230] The study made numerous recommendations, which the base is now in the process of implementing. The base is installing a new Utilities Monitoring and Control System as well as new "smart" electric meters on every building.[231] The study also recommended installing occupancy lighting sensors that automatically turn off lights when people leave rooms as well as reducing exterior lighting to prevent light pollution and excessive energy consumption.[232] Finally, the study also recommended installing ground-source heat pumps for heating and air conditioning, as well as installing micro-turbines in an on-base dam to produce hydropower.[233]

IV. IS IT POSSIBLE TO MAKE A PROFIT?—A PROPOSED MODEL

In 2008, Fort Bragg consumed approximately 600,000 MWh of electricity.[234] However, by 2025, Fort Bragg—like all federal installations—is required to reduce its energy consumption by 25 percent.[235] Meeting this requirement would lower Fort Bragg's electricity consumption to approximately 450,000 MWh. Further, under the 2007 Defense Authorization Act, the base would need to obtain 112,500 MWh of electricity

227. SHERWOOD, *supra* note 146, at 7.

228. RENEWABLE ENERGY ANNUAL 2008, *supra* note 219, at 32; LACAPRA STUDY, *supra* note 1, at 29.

229. *See* LACAPRA STUDY, *supra* note 1, at 32.

230. FORT BRAGG FY09 ANNUAL PLAN EXECUTIVE SUMMARY, *supra* note 218, at 47.

231. *Id.* at 42, 44.

232. *Id.* at 43, 45.

233. *Id.* at 45, 47.

234. FORT BRAGG ENERGY FACT SHEET, *supra* note 24, at 1.

235. Exec. Order No. 13,423, Strengthening Federal Environmental, Energy, and Transportation Management, 72 Fed. Reg. 3919 (Jan. 24, 2007), *available at* http://www.gpo.gov/fdsys/pkg/FR-2007-01-26/pdf/07-374.pdf.

from renewable energy sources.[236] This section examines a spectrum of diverse renewable energy sources that would amount to approximately 125,768 MWh of electricity per year.

A. Solar

Solar energy, specifically solar photovoltaics, would be an appropriate renewable energy source for Fort Bragg. Solar photovoltaic technology provides electricity during the daytime when demand is greatest.[237] As such, it is excellent for providing supplemental power for things such as air conditioning and office lights.[238] For instance, the Sandhills region of North Carolina receives a significant amount of sunshine.[239] Its solar resources are similar to those in Spain, where utilities get a much larger share of their electricity from solar energy.[240] At Fort Bragg, a 1 MW solar array, using a two-axis tracking system, could produce approximately 1,700 MWh per year and would require approximately five acres of land.[241] Because solar photovoltaics are an intermittent electricity source, they are best utilized as one element in a comprehensive system of renewable energy sources.[242] As such, this Study calculated the effects of a 25 MW solar array that could be used in conjunction with other technologies. A 25 MW solar array could produce approximately 42,500 MWh per year and would require approximately 125 acres.[243] The size is relatively small, considering that Fort Bragg covers 152,843 acres over four counties.[244]

236. John Warner National Defense Authorization Act for Fiscal Year 2007 § 2852; Exec. Order No. 13,423, Strengthening Federal Environmental, Energy, and Transportation Management, 72 Fed. Reg. 3919. It should be noted that this figure does not take into account any growth that may occur between the present and 2025. Executive Order 13,423 requires that energy consumption be reduced on a per-square-foot basis; thus, if new buildings are constructed, total energy consumption could increase.

237. *Photovoltaic Solar Technology*, *supra* note 142, at 1.

238. *Id.*

239. *See, e.g.*, *Pinehurst, NC*, CITY-DATA.COM, http://www.city-data.com/city/Pinehurst-North-Carolina.html (last visited Feb. 29, 2012) (showing annual sunshine averages between 50 percent and 70 percent in North Carolina's Sandhills region).

240. Billy J. Roberts, *Photovoltaic Solar Resource: The U.S., Spain, and Germany*, NAT'L RENEWABLE ENERGY LAB., http://nreldev.nrel.gov/gis/images/us_germany_spain/pvmap_usgermanyspain%20poster-01.jpg (last visited Mar. 28, 2012).

241. E-mail from Bob Leker, *supra* note 196; Nat'l Renewable Energy Lab., *PV Watts Version 2 Calculator*, NREL.GOV, http://mapserve3.nrel.gov/PVWatts_Viewer/index.html (calculated for zip code 28310; click "Send to PV Watts") (last visited Mar. 28, 2012).

242. PAUL DENHOLM ET AL., NATIONAL RENEWABLE ENERGY LABORATORY, THE ROLE OF ENERGY STORAGE WITH RENEWABLE ELECTRICITY GENERATION 1 (2010).

243. E-mail from Bob Leker, *supra* note 196; PV WATTS VERSION 2 CALCULATOR,

The National Renewable Energy Laboratory's Jobs and Economic Development Impact ("JEDI") model estimated that a 25 MW solar installation would cost $186.1 million to construct.[245] Four programs could be used to lower this cost. First, the Treasury Renewable Energy Grants Program could provide a grant of $55.83 million.[246] Second, the USDA Rural Energy for America program could provide a grant of $500,000.[247] Third, the federal Business Energy Investment Tax Credit could provide a tax credit of $55.83 million.[248] Finally, North Carolina's Renewable Energy Corporate Tax Credit could provide an additional tax credit of $2.5 million.[249]

After accounting for grants and tax credits, however, the project would still need $77.44 million for construction costs that would likely require financing. The JEDI model calculated that the solar installation would generate $2,776,390 in electricity sales.[250] Assuming a 3 percent rate of inflation, the installation would generate approximately $132.1 million over its anticipated thirty-year lifespan. Given its anticipated income, obtaining financing would not likely be difficult, especially considering the various government-backed loan guarantee programs. The best program appears to be the Department of Energy's Loan Guarantee Program.[251] Because the solar installation would have a thirty-year lifespan, the project would be eligible for financing over a twenty-five-year period.[252] Thus, the $74.44 million could be financed over twenty-five years, with the income from electricity sales covering those costs.

supra note 241.

244. INSTALLATION DESIGN GUIDE FOR A SUSTAINABLE FORT BRAGG, *ch.1.2 Installation Profile*, ARMYSOLUTIONS.NET, http://armysolutions.net/IDG/html/document.htm (last visited Mar. 28, 2012).

245. Nat'l Renewable Energy Lab., *PV Model*, JOBS & ECON. DEV. IMPACT MODELS, http://www.nrel.gov/analysis/jedi/download.html (last updated Dec. 2, 2011).

246. *U.S. Department of Treasury—Renewable Energy Grants*, *supra* note 61.

247. *USDA—Rural Energy for America Program (REAP) Grants*, *supra* note 65; *Section 9007 Rural Energy for America Program Grants/Renewable Energy Systems/Energy Efficiency Improvement Program (REAP/RES/EEI)*, *supra* note 66.

248. *Business Energy Investment Tax Credit (ITC)*, *supra* note 77.

249. *Renewable Energy Tax Credit (Corporate)*, *supra* note 124.

250. Nat'l Renewable Energy Lab., *supra* note 245.

251. *U.S. Dep't of Energy—Loan Guarantee Program*, *supra* note 69.

252. *Id.*

B. Biomass

Biomass is an extremely abundant resource in the southeastern region of North Carolina.[253] Scientists estimate that forest residues alone could provide 60 percent of the requirements of the North Carolina REPS.[254] Cumberland County, where Fort Bragg is primarily located, has between 120,000 and 240,000 dry tons of biomass, and the surrounding counties all contain similar amounts.[255] Biomass installations cost between $2,800 and $3,900 per kW, depending on the technology used.[256] Stoker technology is the cheapest and has already been implemented in North Carolina.[257] However, fluidized bed technology is newer, more efficient, and allows a wider range of biomass types to be consumed while producing lower emissions. A 10 MW fluidized bed plant would cost approximately $31.5 million.[258] With a capacity factor of 90 percent, a 10 MW plant would generate approximately 78,800 MWh of electricity per year.[259]

Thus, a 10 MW fluidized bed biomass facility will cost roughly $31.5 million and generate approximately 78,800 MWh per year.[260] As with the solar installation, the biomass project would be eligible for numerous grants and tax credits. First, the project would be eligible for a $9.45 million grant under the Treasury Renewable Energy Grant Program.[261] Second, the project would be eligible for a $500,000 grant under the Rural Energy for America Program.[262] Finally, the project would also be eligible for a $2.5 million tax credit under North Carolina's Renewable Energy Corporate Tax Credit program.[263]

After grants and tax credits, the project would still require $19.5 million in financing. Assuming a useful lifespan of thirty

253. Cherry & Saha, *supra* note 10, at 17.

254. DENNIS HAZEL & ALEX HOBBS, NC STATE UNIV., THE NORTH CAROLINA RENEWABLE ENERGY PORTFOLIO STANDARD 2 (2008).

255. Cherry & Saha, *supra* note 10, at 17.

256. LACAPRA STUDY, *supra* note 1, at 117.

257. *Id.* at 23.

258. *Id.* at 23, 117.

259. *Id.* at 117.

260. *Id.* at 23, 117.

261. *U.S. Department of Treasury—Renewable Energy Grants*, *supra* note 61.

262. *USDA—Rural Energy for America Program (REAP) Grants*, *supra* note 65; *Section 9007 Rural Energy for America Program Grants/Renewable Energy Systems/Energy Efficiency Improvement Program (REAP/RES/EEI)*, *supra* note 66.

263. *Renewable Energy Tax Credit (Corporate)*, *supra* note 124.

years, electricity sales of 6.5 cents per kWh, and inflation of 3 percent, the plant would generate roughly $243.7 million over its lifespan. While there are numerous loan guarantee programs available, the project can be financed through the Department of Agriculture's REAP Loan Guarantee program.[264] On a loan of $19.5 million, the program would guarantee 60 percent, or $11.7 million.[265] This would require the facility to receive $7.8 million in financing on the open market, a much more plausible amount given the returns the facility would generate over its lifespan.

C. Landfill Gas

Landfill gas provides a consistent power source that is similar to natural gas.[266] Cumberland County is home to nineteen active and inactive landfills.[267] Fort Bragg itself houses a landfill containing approximately 763,800 tons of waste that would be a candidate for a landfill gas installation.[268] A landfill of this size would support a 0.6 MW facility that would generate 4,468 MWh per year.[269] Including the collection system and installation, landfill gas power plants cost approximately $1,523 per kW.[270] Thus, a 0.6 MW landfill gas facility would cost approximately $913,800.

As with the other installations, the landfill gas projects would be eligible for numerous grants and tax credits. Because of its relatively low cost, however, it would not reach the maximum ceilings set for some of the incentives.[271] The project would still be eligible for a Renewable Energy Grant of $274,140,[272] a Rural Energy for America Program grant of $228,450,[273] and a tax credit

264. *Rural Energy for America Program Guaranteed Loan Program (REAP LOAN)*, *supra* note 74.

265. *Id.*

266. LACAPRA STUDY, *supra* note 1, at 15–16.

267. *Solid Waste Facility List*, N.C. DIV. OF WASTE MGMT., http://portal.ncdenr.org/web/wm/sw/facilitylist (last visited Mar. 28, 2012).

268. *Energy Projects and Candidate Landfills*, U.S. ENVTL. PROT. AGENCY LANDFILL METHANE OUTREACH PROGRAM, http://www.epa.gov/lmop/projects-candidates/index.html (last updated Mar. 28, 2012).

269. *Id.*

270. LACAPRA STUDY, *supra* note 1, at 117.

271. *Id.* at 39–40; *see also Production Tax Credit for Renewable Energy*, UNION OF CONCERNED SCIENTISTS (Mar. 9, 2012), http://www.ucsusa.org/clean_energy/solutions/big_picture_solutions/production-tax-credit-for.html.

272. *U.S. Department of Treasury—Renewable Energy Grants*, *supra* note 61.

273. *USDA—Rural Energy for America Program (REAP) Grants*, *supra* note 65; *Section 9007 Rural Energy for America Program Grants/Renewable Energy Systems/Energy Efficiency*

of $319,830 through the North Carolina Renewable Energy Corporate Tax Credit.[274] Thus, the project would require only $91,380 in financing. Because of the relatively small amount of necessary financing, the North Carolina Revolving Loan Program would be the best financing source for the landfill gas installation.[275] Because landfill gas is not eligible for the Business Energy Investment Tax Credit, the project would take the Renewable Energy Production Tax Credit of 1.1 cents per kWh for ten years.[276] Over ten years, this would generate $491,480. In addition, selling electricity to Fort Bragg would generate $13.8 million over thirty years.

V. IS IT FEASIBLE UNDER THESE LAWS?

As Section IV established, under the current laws and incentives it is economically possible to make an enormous profit by selling renewable energy to Fort Bragg. There are problems, however, when it comes to the legal and regulatory structure governing the sale. Working through the North Carolina's Utilities Commission is not as easy as entering into a simple contract of sale.

A. Methods of Making a Profit

There are numerous ways an investor could make profits selling electricity. However, due to the fact that the sale of electricity is regulated in North Carolina,[277] the options are actually much more limited.

1. Power Purchase Agreements

The easiest way to make a profit would be for the generator to sell electricity directly to the base via a power purchase agreement. Under this agreement, the generator enters into a

Improvement Program (REAP/RES/EEI), *supra* note 66.

274. *Renewable Energy Tax Credit (Corporate)*, *supra* note 124. For the purposes of the state tax credit, landfill gas is considered a form of biomass, which is eligible for the tax credit. N.C. GEN. STAT. § 105-129.15(6) (2011).

275. *Local Option—Financing Program for Renewable Energy and Energy Efficiency*, *supra* note 114.

276. *Business Energy Investment Tax Credit (ITC)*, *supra* note 77; *Renewable Electricity Production Tax Credit (PTC)*, *supra* note 78.

277. N.C. GEN. STAT. § 62-2(b) (2011).

long-term contract to sell the electricity it generates to Fort Bragg. However, under North Carolina law, a generator cannot sell electricity directly to a consumer without being regulated by the Utilities Commission.[278] Given the requirements necessary to become a regulated utility,[279] this is not a feasible option for most electricity generators.

2. Local Utilities

The next available option would be for the generator to sell electricity to the local utility, which would in turn sell it to Fort Bragg. However, it is doubtful whether Progress Energy, Fort Bragg's electricity supplier,[280] would be interested in purchasing the generated electricity. Progress Energy has spoken out against proposed legislation that would allow renewable energy producers to use their transmission.[281] The company has also announced plans to build five new natural gas power plants, which is a major capital cost.[282] Furthermore, Progress Energy and Duke Energy have announced that they plan to merge in the near future, and Duke has been an outspoken critic of renewable electricity requirements.[283]

3. Renewable Energy Credits

The final way to make a profit would be for the facility to sell renewable energy certificates ("RECs") on the open market. RECs represent "environmental and other non-power attributes of

278. N.C. GEN. STAT. § 62-2(a).

279. N.C. GEN. STAT. § 62-133.8(b).

280. LOGANENERGY CORP., ENVIRONMENTAL CENTER PEM DEMONSTRATION PROGRAM FORT BRAGG ARMY BASE: FINAL REPORT 6 (2004), *available at* http://dod fuelcell.cecer.army.mil/res/Project_Reports/Fort_Bragg_Final_Report.pdf.

281. Peter Behr, *Battle Lines Harden over New Transmission Policy for Renewables*, N.Y. TIMES (Feb. 26, 2010), http://www.nytimes.com/cwire/2010/02/26/26climatewire-battle-lines-harden-over-new-transmission-po-77427.html?pagewanted=all (noting that Progress Energy signed a letter to Senate leaders opposing federal regulations that would allow renewable energy producers access to transmission facilities).

282. Matthew L. Wald, *Twilight of the Coal Era?*, N.Y. TIMES (June 14, 2010, 8:03 AM), http://green.blogs.nytimes.com/2010/06/14/twilight-of-the-coal-era (explaining the plans of Progress Energy to replace six coal power plants in North Carolina with five new natural gas plants).

283. Katherine Ling, *Duke, Progress Energy Merger Provides Bigger Clout to Energy Efficiency, Nuclear*, N.Y. TIMES (Jan. 13, 2011), http://www.nytimes.com/gwire/2011/01/13/13greenwire-duke-progress-energy-merger-provides-bigger-cl-28069.html (noting that Duke Energy has opposed federal regulations regarding renewable energy and has pursued energy efficiency as opposed to renewable energy).

renewable electricity generation."[284] RECs are measured in 1 MWh increments.[285] RECs can be sold to utilities on an open market, and the utilities can then use them to help meet Renewable Energy and Energy Efficiency Portfolio Standard mandates.[286] Currently, the North Carolina Utilities Commission is establishing standards for the state's REC market.[287] RECs generally sell for ten to twenty-five dollars to residential and small customers, although large customers can negotiate lower rates.[288] There is also a secondary market for Solar Renewable Energy Credits ("SRECs"). SERCs are currently selling for $176 to $181.[289] Since the solar installation would generate 42,500 MWh annually, the SREC market could be a huge moneymaker. However, the market is still emerging and at this point it cannot be relied upon as a guaranteed source of income.

B. North Carolina Utilities Commission

Clearly, one of the largest problems facing the implementation of renewable electricity in North Carolina is the North Carolina Utilities Commission. Under the rules of the Commission,[290] the only viable option for a renewable electricity generator is to sell its power to the local utility company. Even the federal enclave status of Fort Bragg cannot allow it to escape the regulations of the Utilities Commission.[291] However, there may be alternative options available to avoid the Utilities Commission's regulations.

284. U.S. ENVTL. PROT. AGENCY, EPA'S GREEN POWER PARTNERSHIP: RENEWABLE ENERGY CERTIFICATES 1 (2008).

285. *Id.*

286. *See id.*

287. *See* N.C. UTILS. COMM'N, *supra* note 31, at 4.

288. LORI BIRD, CLAIRE KREYCIK & BARRY FRIENDMAN, GREEN POWER MARKETING IN THE UNITED STATES: A STATUS REPORT 15–16 (2009).

289. *See* SRECTRADE, http://www.srectrade.com (last visited Mar. 28, 2012). Renewable energy certificates generated in North Carolina are eligible in Pennsylvania and the District of Columbia. *North Carolina SREC Market*, SRECTRADE, http://www.srectrade.com/north_carolina_srec.php (last visited Mar. 28, 2012). In March 2011, SRECTrade conducted an auction for Pennsylvania, but not for the District of Columbia. Thus, the Pennsylvania sale prices are noted. SRECTRADE, http://www.srectrade.com (last visited Mar. 28, 2012).

290. *See generally* N.C. UTILS. COMM'N, http://www.ncuc.net (last visited Mar. 28, 2012).

291. *See North Carolina Utilities Commission, History and Description*, *supra* note 90.

1. Ownership

One way to bypass the Utilities Commission is for Fort Bragg to generate electricity directly. The Utilities Commission does not regulate power generated and consumed by an individual or business.[292] However, this is not a viable option for two reasons.

The first is funding. Army funding for renewable energy projects can come from multiple places, but it primarily comes from the base's annual operating budget or the DOD's Energy Conservation Investment Program ("ECIP").[293] Given the scope of activities the annual budget must fund,[294] finding money to pay for these facilities would be exceedingly difficult. The second option is for the base to compete for ECIP funding.[295] This source is typically reserved for larger projects costing $500,000 or more.[296] However, even if Fort Bragg were awarded funding from the ECIP, it would not necessarily resolve the issue.

A second problem arises because Fort Bragg cannot take advantage of tax credits and incentives because it is an arm of the federal government. Because the financing of these projects rely heavily on governmental incentives, all renewable energy facilities need to be privately held.[297] Thus, even if Fort Bragg was able to find the funding, the costs would be exceptionally higher than those calculated in Section IV.

2. Wholesalers

Under federal law, wholesalers of electricity are exempt from regulation by state utility commissions and are instead regulated by federal law.[298] Thus, some commentators argue that using electricity wholesalers as an intermediary could eliminate the issues outlined above.[299] In 1996, the Federal Energy Regulatory Commission, the body governing wholesale electricity

292. N.C. UTILS. COMM'N, *supra* note 31, at 16–17.

293. *See* FORT BRAGG FY09 ANNUAL PLAN EXECUTIVE SUMMARY, *supra* note 218, at 42, 44.

294. *See id.* at 8–48.

295. DOD ANNUAL ENERGY MANAGEMENT REPORT, *supra* note 17, at D-11.

296. *See* Memorandum from the Office of the Assistant Secretary of Defense for Production and Logistics on Energy Conservation Investment Program Guidance (Mar. 17, 1993), *available at* http://www.acq.osd.mil/ie/energy/library/ECIPINST.pdf.

297. *See* Aluotto, *supra* note 28, at 727–28.

298. *Id.* at 737.

299. *Id.* at 736, 750.

sales, issued an order "requiring utility companies to provide access to transmission lines for parties engaging in wholesale electric transactions."[300] Thus, a wholesale purchaser can dictate the sources from which electricity is produced.[301] Furthermore, electricity purchased at wholesale is typically cheaper than electricity purchased from retail utilities.[302] The question that emerges is who is eligible to be a wholesaler of electricity. Because of the privatization of utilities that occurred on military bases in the 1990s, the companies owning electricity distribution systems on base could also serve as electricity wholesalers.[303] In the instance of Fort Bragg, that company is Sandhills Utility Services.[304]

Wholesalers are not completely exempt from the regulations of the Utilities Commission,[305] but their situation is markedly improved when compared to a generator attempting to sell electricity directly to consumers. The Utilities Commission retains its authority to ensure that local electricity supply is appropriate and reliable.[306] While wholesalers are exempt, the line between a wholesaler regulated by FERC and a public utility regulated by NCUC is extremely blurry.[307] Furthermore, while this is a novel solution to an extraordinarily complex problem, the question remains whether using a wholesaler as an intermediary would run afoul of the Section 8093 of the DOD Appropriations Act of 1998.[308] As of yet, these questions have not been answered.

300. *Id.* at 737.

301. *Id.* at 750–51.

302. *Id.* at 737.

303. *Id.*

304. *See* SANDHILLS UTILITY SERVICES, http://www.sandhillsutility.com/ (last visited Mar. 28, 2012).

305. *See* Aluotto, *supra* note 28, at 736–37.

306. State *ex rel.* Utils. Comm'n v. Carolina Power & Light Co., 614 S.E.2d 281, 287 (N.C. 2005) ("[W]hile Congress granted FERC exclusive jurisdiction over the wholesale sale of electricity in interstate commerce, it nevertheless intended that the states and their utilities commissions retain their traditional authority over generating facilities and local supply adequacy and reliability.").

307. *See* N.C. GEN. STAT. § 62-3(23) ("'Public utility' means a person, whether organized under the laws of this State or under the laws of any other state or country, now or hereafter owning or operating in this State equipment of facilities for: 1. Producing, generating, *transmitting, delivering or furnishing electricity* . . . to or for the public for compensation . . . ;") (emphasis added).

308. Aluotto, *supra* note 28, at 736.

VI. SOLUTIONS

Given these issues, the question that arises is what could be changed to facilitate both the production of electricity from renewable sources and its eventual sale.

A. Deregulate Electricity Sales

If electricity sales were deregulated in North Carolina then Fort Bragg could purchase its electricity on the open market.[309] In practical terms, this means that the base could purchase electricity directly from the generator, rather than from Progress Energy. This would also eliminate the need for the regulatory wrangling involving wholesalers as intermediaries.

While this idea is not unheard of, it is unlikely to occur. In 1997, the North Carolina Senate established the Study Commission on the Future of Electric Service in North Carolina.[310] The commission ultimately recommended deregulation, at least to a certain extent.[311] However, the North Carolina General Assembly never acted on its recommendations.[312] Given the current economic crisis[313] and other problems facing our state, it seems highly unlikely that the General Assembly will direct much attention towards this topic in the near future.

B. Repeal Section 8093

Ultimately, Section 8093 of the 1998 Defense Authorization Act is the only thing keeping military bases from using their federal enclave status to circumvent state utility regulations.[314] Several commentators have called for the repeal of Section 8093.[315] While repealing the section would certainly fix the problem, repeal may not even be necessary. Section 8093 was

309. Renshaw, *supra* note 58, at 61.

310. *Electric Industry Restructuring*, N.C. UTILS. COMM'N, http://www.ncuc.commerce.state.nc.us/electric/elecrest.htm (last visited Feb. 29, 2012).

311. *Id.*

312. *Id.*

313. OFFICE OF STATE BUDGET & MGMT., OFFICE OF THE GOVERNOR, THE N.C. STATE BUDGET: SUMMARY OF RECOMMENDATIONS, 2009–2011, at iii (2009), *available at* http://www.osbm.state.nc.us/files/pdf_files/bgt0911summary.pdf.

314. *See supra* text accompanying footnotes 58–60.

315. Frank D. Hollifield, *Yet Another Industry on the Taxpayer-Subsidized Dole: Why Section 8093 of the Continuing Authorization Act of 1988 (40 U.S.C. § 591) Should Be Repealed*, 65 A.F. L. REV. 187, 191 (2010).

limited by an opinion written by the General Counsel of the DOD to apply only to the purchase of electricity.[316] However, the language of Section 8093 itself may provide an escape. Section 8093 states:

> [N]othing in this section shall preclude . . . the Secretary of a military department . . . [from] purchasing electricity from any provider when the utility or utilities having applicable State-approved franchise or other service authorizations are found by the Secretary to be unwilling or unable to meet unusual standards for service reliability that are necessary for purposes of national defense.[317]

Thus, Section 8093 does not require the DOD to comply with state laws for the purchase of electricity if the utilities are "unwilling or unable to meet unusual standards for service reliability."[318] Therefore one could argue that failure of the North Carolina Utilities Commission or Progress Energy to meet Fort Bragg's renewable energy requirements does not comply with reliability requirements.

CONCLUSION

Despite the reality that Fort Bragg requires a massive amount of electricity,[319] it is not unreasonable to require the base to obtain 25 percent of its electricity from renewable sources by 2025. Such a requirement can be met with ease using a diverse array of resources. Fort Bragg is uniquely situated to take advantage of solar, biomass, and landfill gas resources. Furthermore, the requirement creates lucrative business opportunities for entrepreneurs in the area. The data presented here has shown that these installations have the potential to be highly profitable. Problems arise not with the technology or generating capacity, but rather with the regulations affecting the sale of electricity. North Carolina's draconian Utilities

316. Renshaw, *supra* note 58, at 72–73.

317. Continuing Appropriations Act § 591(a).

318. *Id.*

319. Paul Hora, *Energy Specifications—A Document That Will Change Everything*, J. INSTALLATION MGMT.—J. PLUS (Spring 2001), http://www.imcom.army.mil/hq/publications/journal/journal_plus_spring_2011/braggenergy/ (last visited Mar. 1, 2012).

Commission causes some of this difficulty. Military bases located in states that have deregulated the sale of electricity will not face as many problems as Fort Bragg will.[320] Another factor is the reality that federal and state laws conflict with each other. Politicians on both levels have created a framework of regulations that do not complement each other and can actually harm the development of renewable energy.

Given the benefits that projects such as this one would provide, our state needs to do whatever it can to make this a reality. Researchers estimate that renewable energy could generate between 28,000 and 38,000 new jobs in all of North Carolina.[321] The construction of the solar array described in Section IV(A) would create 1,713.9 job-years paying a combined $78.8 million in wages.[322] Its operation would create 6.4 permanent positions with $312,500 in annual earnings.[323] Furthermore, it would induce an additional 2.9 permanent jobs in the local economy with $95,600 in annual wages.[324] All told, the construction and installation of the facility would generate $192.1 million for the local economy, and contribute an additional $596,600 annually during its operation.[325] The biomass facility would create a minimum of forty permanent jobs, in operations, fuel collection, and transportation.[326] In a time of strained governmental budgets,[327] it must be noted that installations of this magnitude can generate large amounts of income for local governments through property taxes. With installations valued at $31.5 million and $913,800 respectively, the biomass and landfill gas installations would generate $376,740 and $10,930 in property taxes each year.[328]

320. Renshaw, *supra* note 58, at 61.

321. BLUEGREEN ALLIANCE, NORTH CAROLINA'S ROAD TO ENERGY INDEPENDENCE 2 (2007); NORTH CAROLINA'S ENERGY FUTURE, *supra* note 4, at 70.

322. Nat'l Renewable Energy Lab., *supra* note 245. A job-year is defined as "one job sustained for one year." Bay Area Climate Collaborative (BACC), *EPA Weighs In on the Jobs Impact of Clean Energy*, BACLIMATE.ORG (Sept. 7, 2011, 7:29 PM), http://baclimate.org/bay-area-climate-collaborative-blog/epa-weighs-in-on-the-jobs-impact-of-clean-energy.html. It should be noted, however, that multiple job-years "can either be calculated as multiple jobs per year or one job sustained through multiple years." *Id.*

323. Nat'l Renewable Energy Lab., *supra* note 245.

324. *Id.*

325. *Id.*

326. SOUTHEAST BIOMASS STATE & REGIONAL PARTNERSHIP, ECONOMIC IMPACTS OF BIOENERGY PRODUCTION AND USE 2 (2006), *available at* http://rmportal.net/library/content/a/economics.pdf/at_download/file.

327. OFFICE OF STATE BUDGET & MGMT., OFFICE OF THE GOVERNOR, *supra* note 313, at iii.

328. The combined Fayetteville and Cumberland County property tax rate equals 1.296 cents per one hundred dollars in property value. *Ad Valorem Tax Rates*, CUMBERLAND

Solar installations, however, receive a property tax abatement of 80 percent of their appraised value.[329] Even so, with a value of $186.1 million, the solar installation would generate $556,440 in property taxes annually.

Given the fact that scientists have brought us to the point where the large-scale use of renewable energy is economically and technologically feasible, it is time for attorneys and legislators to go one step further and change the legal and regulatory framework so that it is actually possible.

COUNTY, N.C., http://www.co.cumberland.nc.us/tax/tax_rates.aspx (last visited Mar. 28, 2012).

329. *North Carolina Property Tax Abatement for Solar Electric Systems*, *supra* note 128.