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A Shift in the Wind: Siting More Wind Power Projects Along Texas' 367-Mile Coast of Gulf Winds, and Mitigating Potential Risk to Migratory Bird Populations

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I. INTRODUCTION

Wind farm development in Texas is surging, making wind power Texas' hottest energy prospect.[1] The State's continuous growth in the wind energy industry has been apparent over the past decade. Texas currently produces more wind power than any other state by a significant margin, and it keeps blowing through major milestones almost every year.[2] Wind power is ideal for Texas, with its ample supply of open land, breezy plains, and a rising demand for electricity as the state's population continues to grow.[3] Furthermore, this thriving industry has brought Texas great economic benefits, while being environmentally friendly.[4]

The resulting positive effects from wind energy have led to alternative energy investments, such as offshore[5] wind energy as a viable alternative, particularly in the Gulf of Mexico.[6] No offshore wind farms currently exist in the Gulf of Mexico, although certain companies have proposed offshore wind projects.[7] The higher cost per kilowatt hour (kWh) of offshore wind, as compared to other technologies, is one of the barriers for its development, according to a report by the Navigant Consortium.[8] In addition, these offshore wind projects face legal challenges from

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1. Daniel Cusick, *Renewable Energy: New power lines will make Texas the world's 5th-largest wind power producer*, E&E PUBLISHING, LLC (Feb. 25, 2014), http://www.eenews.net/stories/1059995041.

2. *See* TEXAS STATE ENERGY CONSERVATION OFFICE, ENERGY EFFICIENCY: TEXAS' NEWEST ENERGY RESOURCE (2015) [hereinafter SECO], http://seco.cpa.state.tx.us/publications/renewenergy/windenergy.php.

3. *Understanding Texas Wind Power: A Policy Guide,* TEXAS COALITION FOR AFFORDABLE POWER (2015) [hereinafter TCAP], http://texaswindenergy.tcaptx.com/.

4. *Id.*; *see also Texas Wind Energy,* AMERICAN WIND ENERGY ASSOCIATION (2014), http://awea.files.cms-plus.com/FileDownloads/pdfs/texas.pdf.

5. For purposes of this paper, offshore shall refer to wind farms geographically located on water, away from land.

6. CHRISTOPHER G. REIN ET AL., OFFSHORE WIND ENERGY DEVELOPMENT SITE ASSESSMENT AND CHARACTERIZATION: EVALUATION OF THE CURRENT STATUS AND EUROPEAN EXPERIENCE, U.S. DEPT. OF THE INTERIOR, BUREAU OF OCEAN ENERGY MANAGEMENT, OFFICE OF RENEWABLE ENERGY PROGRAMS, BOEM 2013-0010 1, 7–8 (2013), *available at* http://www.data.boem.gov/PI/PDFImages/ESPIS/5/5305.pdf.

7. *Id.*; *see also* MEGAN E. HIGGINS & JASON BUSCH, CLIMATE CHANGE IMPACTS ON OCEAN AND COASTAL LAW: U.S. AND INTERNATIONAL PERSPECTIVES 163 (Randall S. Abate ed., 2015).

8. BRUCE HAMILTON ET AL., NAVIGANT, PREPARED FOR THE U.S. DEPARTMENT OF ENERGY, DE-EE0005364, U.S. OFFSHORE WIND MANUFACTURING AND SUPPLY CHAIN DEVELOPMENT 1, 2–3 (Feb. 22, 2013).

local opposition organizations and to a certain extent, the National Environmental Policy Act (NEPA) review process.[9] The ocean renewable energy industry faces a variety of roadblocks, and it is unclear if and when offshore wind energy will become a reality in the Gulf of Mexico. Furthermore, Gulf Coast states have not currently implemented policies that could increase the competitiveness of offshore wind.[10] As the only Gulf Coast state with a Renewable Portfolio Standard (RPS),[11] Texas has been fulfilling its RPS obligations with onshore wind farms.[12]

Texas is a unique case with onshore[13] wind energy development. The wind energy industry in Texas not only benefits from the landscape and wind source, but also Texas' policy framework and business-friendly environment.[14] Texas' unparalleled success is due to a unique combination of minimal siting restrictions, lax environmental regulations, and Competitive Renewable Energy Zones (CREZ), is a state policy that incentivizes and expedites construction of transmission lines for connection to renewable sources.[15]

Despite Texas' current success in the wind energy industry, questions over location efficiency have been raised and criticisms have emerged. Most of Texas' wind farms have been developed in the West and Panhandle.[16] These areas are rural so updated transmission infrastructure is vital for efficient power transmission to Texas' urban areas.[17] Furthermore, wind developers in these areas have come across a wind source flaw; winds in these areas die down in the afternoon, just as temperatures generally peak and power is most needed.[18] In contrast, Texas' coastal region already has a reliable transmission infrastructure and the winds along the State's Gulf of Mexico shores blow more steadily,

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9. VAUGHN NELSON, WIND ENERGY: RENEWABLE ENERGY AND THE ENVIRONMENT 1, 59–61 (Abbas Ghasemmi ed., CRC Press, 2nd ed. 2013).

10. *Id*. at 71.

11. A renewable portfolio standard (RPS) is a regulatory mandate to increase production of energy from renewable sources such as wind, solar, biomass and other alternatives to fossil and nuclear electric generation. It is also known as a renewable electricity standard; *State and Local Governments: Renewable Portfolio Standards,* NREL, (July 7, 2015), http://www.nrel.gov/tech_deployment/state_local_governments/basics_portfolio_standards.html.

12. TCAP, *supra* note 3.

13. For purposes of this paper, onshore shall refer to wind farms geographically located on land, sited either in inland or coastal areas.

14. U.S. ENERGY INFORMATION ADMINISTRATION, TEXAS STATE PROFILE AND ENERGY ESTIMATES [hereinafter EIA], http://www.eia.gov/state/analysis.cfm?sid=TX (last visited Feb. 16, 2015).

15. *See* SECO, *supra* note 2; *see also* Tex. Util. Code. Ann. § 39.904(g)(3) (2009).

16. *See* TCAP, *supra* note 3.

17. *Id*.

18. Mark Chediak, *Gulf Coast Beckons Wind Farms When West Texas Gusts Fade*, BLOOMBERG BUSINESS (Oct. 11, 2013), http://www.bloomberg.com/news/articles/2013-10-10/gulf-coast-beckons-wind-farms-when-west-texas-gusts-fade.

providing power during the time it is most needed.[19] The efficiency and economic viability of coastal wind energy in Texas supports the urgent need to encourage more coastal wind farm development. However, concerns over coastal wind farms' impact on migratory birds have surfaced.[20]

Part II of this paper discusses the relationship between Texas and wind energy, examining the success of onshore wind energy in Texas, the uncertainty and challenges of offshore wind energy in the Gulf of Mexico, and possible room for improvement in Texas' onshore wind farms. Part III analyzes Texas' current legal framework, evaluating key federal involvement within Texas' wind energy industry, and local policy towards onshore wind energy. Part IV proposes more effective use of wind energy in Texas by shifting more wind farm development to coastal areas, while addressing possible strategies to mitigate impacts on migratory birds. Part IV also explores the viability of a transition to an increased concentration of coastal wind farms, and analyzes proper siting management and technologies that can minimize potential risk towards migratory birds.

II. WIND ENERGY IN TEXAS

Overall, Texas has a lucrative and developing relationship with the wind energy industry. Wind energy has become Texas' latest boom, with the Lone Star State now leading the nation in wind turbine proliferation.[21] Heavy inland infrastructure and developing opportunities along its coast guarantee Texas' lead in wind turbine power for years to come. Texas is currently looking to tap into offshore wind energy, but several accompanying challenges exist.[22] Furthermore, Texas' current disproportionate focus on inland sites for wind power has been criticized.[23] In light of the uncertain prospects for Texas' offshore wind energy development and the current criticism of inland wind farm infrastructure, the logical solution is for the state to expand the installation of onshore wind farms with an eye toward more coastal siting.

A. Advantages of Texas' Onshore Wind Energy Production

Fueled by advancements in energy production technology, an exponentially growing population, and a strong interest in reducing green-

19. *Id*.

20. *See* Kate Galbraith, *Gulf Coast Wind Farms Spring Up, as Do Worries*, N.Y. TIMES (Feb. 10, 2011), http://www.nytimes.com/2011/02/11/us/11ttwind.html.

21. *See* EIA, *supra* note 14; *see also* TCAP, *supra* note 3.

22. HAMILTON ET AL., *supra* note 8, at 113–18.

23. *See* Chediak, *supra* note 18.

house gas emissions, local governments have sought out new and profitable forms of energy production.[24] For more than a decade, Texas has aggressively tapped into the wind energy market and set numerous records.[25]

In 2006, Texas surpassed California and became the state with the most cumulative installed renewable capacity in wind energy, and its level of installed capacity has continued to grow.[26] Cumulative installed renewable capacity means renewable energy that is produced by a facility connected to either a distribution or transmission system, by a facility where the owner or controller consumes the energy, or by a facility that within twelve months will be connected and operating as part of a distribution or transmission system.[27] The year 2008 was another impressive year in which the sheer magnitude and rapid growth of wind energy in Texas was demonstrated.[28] In addition to having surpassed all other states in the wind energy market, Texas also surpassed its 2015 goal of 5,880 megawatt (MW) of cumulative installed renewable capacity and possessed a total of 7,118 MW of cumulative installed renewable capacity by the end of 2008.[29]

Texas has continued to build upon its considerable wind energy production capacity. At the end of 2014, Texas had over 7,500 MW of wind energy capacity under construction—including several onshore wind farms with a collective installed capacity of 14,098 MW.[30] This continued growth shows that Texas was again at the forefront of the wind energy boom during 2014, and the State is still the largest wind energy producer in the United States.[31] In addition to leading the United States in installed wind capacity, only five countries (including the United States) surpass Texas in cumulative wind power capacity, placing Texas among the world leaders.[32]

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24. Drew Thornley, *Texas Wind Energy: Past, Present, and Future*, 4 ENVTL. & ENERGY L. POL'Y J. 68, 69–72, 74–79 (2009).

25. *Id*. at 75.

26. *See* SECO, *supra* note 2.

27. 16 TEX. ADMIN. CODE § 25.5(60) (2009); *see also* 16 TEX. ADMIN. CODE § 25.5(107), (111) (2009) (defining "renewable energy" as "energy derived from renewable energy technologies" or technology exclusively relying on energy sources that naturally regenerate over time).

28. Thornley, *supra* note 24, at 69–74.

29. *Id*. (stating that as of September 30, 2008, Texas had 7118 megawatts (MW) of installed wind energy capacity, well in excess of the 2537 MW of installed capacity in California, and representing almost twenty-eight percent of the 25,410 MW of total installed capacity in the United States).

30. AMERICAN WIND ENERGY ASSOCIATION, U.S. WIND INDUSTRY FOURTH QUARTER 2014 MARKET REPORT 3 (January 28, 2015), *available at* http://awea.files.cms-plus.com/4Q2014%20AWEA%20Market%20Report%20Public%20Version.pdf.

31. *See generally* TCAP, *supra* note 3.

32. *Id*.

Texas' dramatic growth in wind energy has yielded several positive outcomes, including lower energy prices, a new source of revenue, and the reduction of greenhouse gases.[33] Texas consumers are insulated from volatile price changes in other energy sources because wind energy increases the diversity of the state's energy market.[34] Natural gas is one of Texas' volatile energy sources and generates almost half of Texas' electricity.[35] Between 1998 and 2006, natural gas prices tripled and exposed the state's vulnerability to the natural gas market.[36] Wind energy lowers overall energy prices because, when available, wind energy must run at capacity, meaning that wind turbines can and will be kept running during times of high electricity demand, and therefore depresses wholesale prices.[37] In other words, wind energy is competing against conventional energy, immediately delivering power when needed, and this ultimately lowers overall energy prices. Furthermore, wind energy often sells at a low price because of the negligible production costs.[38]

Wind energy not only reduces the price of energy, but also produces revenue for Texans, and the State.[39] The United States Department of Energy chose a coalition of Texas universities, state agencies, and private industries to test large turbine blades.[40] Because of the research, the State capitalizes on turbine manufacturers relocating to Texas.[41] For every 100 MW of installed wind capacity, an estimated six to eight permanent operations and maintenance jobs are created.[42]

Texas and the environment also derive benefits from the clean energy wind farms provide. The National Renewable Energy Laboratory estimates that it would cost $43 billion to install enough wind farms for the United States to generate 20% of its energy from wind, but reductions in

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33. *See* Jeff Anthony, *Clearing the Air: Wind Power and Reliability*, RENEWABLEENERGYWORLD.COM (Mar. 25, 2008), http://www.renewableenergyworld.com/articles/2008/03/clearing-the-air-wind-power-and-reliability-51767.html.

34. *Id.*

35. *Id.*

36. Michael Goggin, *Texas Study: Benefits of Wind Transmission Outweigh Costs*, WIND ENERGY WKLY. (Apr. 11, 2008), http://www.renewableenergyworld.com/articles/2008/04/texas-study-benefits-of-wind-transmission-outweigh-costs-52103.html.

37. GOVERNOR'S COMPETITIVENESS COUNCIL, COUNCIL'S REPORT TO THE GOVERNOR 3, 7 (2008), *available at* http://gov.texas.gov/files/gcc/Councils_Report_to_the_Governor.pdf.

38. *See* Goggin, *supra* note 36 (Electric Reliability Council of Texas estimated that upgrading the transmission grid under Plan Two will save $1.7 billion per year in fuel costs).

39. *See generally* SUSAN COMBS, TEXAS COMPTROLLER OF PUBLIC ACCOUNTS, THE ENERGY REPORT 161–175 (2008), http://www.window.state.tx.us/specialrpt/energy/pdf/96-1266EnergyReport.pdf.

40. *Id.*

41. *Id.*

42. *See* National Renewable Energy Laboratory, *Wind Energy Update* (2012), http://www.windpoweringamerica.gov/pdfs/wpa/wpa_update.pdf.

emissions of greenhouse gases and other atmospheric pollutants would create a savings of $98 billion.[43] When combined with an estimated $150 billion saved from reductions in natural gas use and price pressure, the net benefit from moving to 20% wind energy is $205 billion.[44]

Beyond its savings, wind energy in Texas promotes environmental benefits on a statewide and national scale.[45] Fossil fuels have dominated the American energy arena since the Industrial Revolution.[46] Because fossil fuel usage is unlikely to change in the near future, states like Texas are models towards the importance of obtaining clean energy, and energy independence.[47] The significant residual benefits of lower energy prices, reductions in greenhouse gases, and the lessening of our dependence on fossil fuels justify Texas' action to continue increasing its reliance on renewable energy and making sure its relationship with renewable energy is as effective and efficient as possible.

B. Challenges to Offshore Wind Energy Development in the Gulf of Mexico

Developers and investors confront uncertainty and constraints that are commonly found in the offshore wind industry. The Cape Wind Project is a prime example of such challenges.[48]

The procession of legal challenges to the Cape Wind Project filed by local opposition organizations and the NEPA review process have critically hampered the progression of the project.[49] Aside from the multiyear process of completing an environmental assessment, NEPA also is the most readily available legal mechanism to impede projects.[50] The Cape Wind Project provides a ready example of how well-funded adversaries can delay and potentially terminate the project through legal fees.[51] As one of the first offshore wind energy development projects, a lesson

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43. *Id*.

44. *Id*.

45. Dianne Rahm, *Sustainable Energy and the States: Essays on Politics*, MARKETS AND LEADERSHIP 1, 5 (2006).

46. *Id*. at 5–6, 8–9 (showing that approximately 70 percent of the electricity generated in the United States comes from fossil fuels).

47. *See id*. at 5–9, 8–9.

48 Dominic Spinelli, *Historic Preservation & Offshore Wind Energy*: *Lessons Learned from the Cape Wind Saga*, 46 GONZ. L. REV. 741, 743 (2011) (discussing the legal and financial challenges the Cape Wind Project started experiencing).

49. *Id*. at 172–74.

50. *See* Kevin Grandia, *History of the Cape Cod Offshore Wind Energy Project,* HUFFINGTON POST (Apr. 28, 2010), http://www.huffingtonpost.com/kevin-grandia/history-of-the-cape-cod-o_b_555725.html.

51. *Id*.

can certainly be learned from the challenges and limitations that arise from such projects in what seems to be a never ending battle.[52]

The Department of Energy and the Department of the Interior stated in a 2011 report that the biggest challenges facing offshore wind development are "the relatively high cost of energy, technical challenges . . . and permitting challenges related to the lack of . . . experience with permitting processes for projects in both state and federal waters."[53] The report further stated that "offshore wind projects face new and untested permitting processes, which contribute to the uncertainty and risk faced by potential project developers and financiers, in turn potentially impacting investment in both offshore wind power project and development of the supply chain and other supporting infrastructure."[54] One of the biggest reasons investors are faced with uncertainty is the long duration of constructing an offshore wind project.[55] The electricity market can shift during that time, and political policies, like tax credits, can be discontinued.[56] Further, if the process governing offshore wind development is not carefully planned, lawsuits can be waged, causing further delays.[57] For all of these reasons, the offshore regulatory scheme in the United States is a significant obstacle inhibiting offshore wind power development. As one commentator noted, the regulatory framework governing offshore energy "manages to be fragmented and redundant, prescriptive and vague, authoritarian and leaderless."[58]

Environmental opposition, aesthetic opposition, and cost-benefit concerns persist after developers cross the initial regulatory barriers.[59] For example, the expectation that the first offshore project deployed in the United States would be in Texas prompted the Sierra Club to voice

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52. *Id*.

53. U.S. DEPARTMENT OF ENERGY, U.S. DEPARTMENT OF INTERIOR, A NATIONAL OFFSHORE WIND STRATEGY: CREATING AN OFFSHORE WIND ENERGY INDUSTRY IN THE UNITED STATES III (2011), http://www1.eere.energy.gov/wind/pdfs/national_ offshore_wind_strategy.pdf.

54. *Id*.

55. *See* Michael Craig, *Offshore Wind in the United States: The Next Big Thing?,* AM. FOR ENERGY LEADERSHIP (Mar. 2, 2011), http:// leadenergy.org/2011/03/offshore-wind-in-the-united-states-the-next-big-thing/.

56. *Id*.

57. *Id*.

58. Thomas C. Jensen, *Offshore Renewable Energy Development After the Energy Policy Act of 2005* (2007) (unpublished paper presented at the American Bar Association Section of Environment, Energy, and Resources 36th Annual Conference on Environmental Law), *available at* http://www.oceanrenewable.com/wp-content/uploads/2007/03/aba-ocs-paper-final.pdf (discussing the chain of authority governing offshore permitting).

59. Erica Schroeder, *Turning Offshore Wind On*, 98 CALIF. L. REV. 1631, 1640–41 (2010) (discussing how environmentalists remain skeptical that even those projects that meet existing statutory requirements are satisfactory).

its concerns regarding bird deaths throughout the Gulf of Mexico.[60] European scientists generally do not consider the death of birds a significant threat to bird populations due to the low ratio of deaths to number of birds flying through wind farms.[61] Although nuisance claims against the development of wind farms have generally been unsuccessful in the United States, and particularly in Texas,[62] they cause extremely costly delays.[63] Additionally, offshore wind lacks economic independence and is largely reliant upon federal subsidies.[64] The cost of installation and transmission of energy from offshore wind farms is an estimated 50 percent more expensive than their onshore counterparts.[65] Shortly after the passage of the Energy Policy Act in 2005, which only began to clarify the jurisdictional murkiness of offshore development, price—rather than policy—was determined the greatest factor in the speed and scale of development.[66]

C. The Role of Wind Patterns

Wind power is categorized according to Wind Power Class (1-6), which is a measure of average wind speed. In the United States, wind farms are presently built on tracts with winds of Class 5 and higher.[67] Vast areas with the highest wind power class exist in Texas, mainly the Texas Panhandle and in the mountain passes and ridge tops in West Texas.[68] Although Texas currently situates most of its wind farms more inland, coastal locations appear to be viable options.

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60. *Id*. at 1640–42.

61. M.L. Morrison, *Bird Movements and Behaviors in the Gulf Coast Region: Relation to Potential Wind Energy Developments*, NAT'L RENEWABLE ENERGY LAB 2 (2006), http://www.nrel.gov/wind/pdfs/39572.pdf.

62. Stephen Harland Butler, *Headwinds to a Clean Energy Future: Nuisance Suits Against Wind Energy Projects in the United States*, 97 CALIF. L. REV. 1337, 1354–63 (2009).

63. Kristina Culley, *Has Texas Nuisance Law Been Blown Away by the Demand for Wind Power?*, 61 BAYLOR L. REV. 943, 972 (2009).

64. Peter J. Schaumberg & Ami M. Grace-Tardy, *The Dawn of Federal Marine Renewable Energy Development*, 24 NAT. RESOURCES & ENV'T 15, 15 (2010); *see also* Casey O'Brien, *Continuing Controversy over Cape Wind: The Lasting Effects of Legal and Regulatory Hurdles on the Offshore Wind Farm*, 26 GEO. INT'L ENVTL. L. REV. 411, 427 (2014) (discussing the financial burden Cape Wind Project went through along with its unsuccessful dependency on federal subsidies).

65. *See* REIN ET AL., *supra* note 6.

66. Energy Policy Act of 2005, 43 U.S.C. § 1337 (2007); *see also* Schroeder, *supra* note 59.

67. *Wind Maps,* NATIONAL RENEWABLE ENERGY LABORATORY (Sep. 17, 2015) http://www.nrel.gov/gis/wind.html.

68. *See* SECO, *supra* note 2; *see also Texas Environmental Energy Group Inc*., THEBARNETTSHALE.COM, http://www.thebarnettshale.com/windtexas.htm, (last visited Dec. 29, 2015).

1. Locations of Onshore Wind Farms do not Maximize Productivity Potential

Texas utilizes most of its wind source within the Panhandle and West where wind power is measured as a Class 5 or higher.[69] West Texans are cultivating wind farms with each farm consisting of hundreds of 300 to 400 foot tall wind turbines.[70] West Texas is home to some of the nation's largest wind farms, with high renewable wind capacity.[71]

The growing wind industry in the United States plays a valuable role in creating an energy-independent country, but the United States has an inadequate transmission infrastructure, which continues to be a significant barrier towards future wind energy development.[72] West Texas projects have been hindered by a lack of transmission lines to carry the power.[73] Texas has responded by upgrading its transmission infrastructure through the comprehensive Competitive Renewable Energy Zones (CREZ) transmission project, which will be explored further in Part II.[74] Essentially, the CREZ transmission project involves a collection of utility companies selected to build over 2,000 miles of high voltage transmission lines from West Texas to higher populated areas in the eastern portion of the state.[75] The eastern portion of Texas' coastline already has ample transmission infrastructure.[76]

In addition to challenges transmitting power, many have exposed a fundamental wind source flaw in the West. West Texas winds, although more powerful, tend to be unreliable and inconsistent during times when productivity is necessary.[77] Coastal winds are strongest in the afternoons and in the summertime, when energy demand is at its peak.[78]

Wind farm developers rushing to Texas soon found themselves plagued by a fundamental flaw: West Texas breezes die down in the afternoon, just as summer temperatures peak and power is most needed.[79]

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69. *Id*.

70. Eric Rosenbloom, *Size Specifications of Common Industrial Wind Turbines*, AWEO.ORG, http://www.aweo.org/windmodels.html (last visited Nov. 14, 2015).

71. *See generally* TCAP, *supra* note 3.

72. Nicolas Parke, *How Much is Fair? Will Senate Bill 18 Ensure Condemners Pay Just Compensation for Land Taken Due to the CREZ Transmission Lines?*, 44 TEX. TECH L. REV. 1121, 1125–29 (2012).

73. *See id*. at 1129–30.

74. *Id*. at 1131–32.

75. Kathryn B. Daniel, *Winds of Change: Competitive Renewable Energy Zones and the Emerging Regulatory Structure of Texas Wind Energy*, 42 TEX. TECH L. REV. 157, 166 (2009).

76. *See* Ernest E. Smith & Becky H. Diffen, *Winds of Change: The Creation of Wind Law*, 5 TEX. J. OIL GAS & ENERGY L. 165, 172 (2009–2010).

77. *See* Chediak, *supra* note 18.

78. *Id*.

79. *Id*.

As a result, unreliable West Texas breezes pushed wind power generators to the state's 367-mile coast.[80] Overall, Texas continues to pull ahead in the US wind energy development race thanks to its valuable wind source and economic benefits.[81] Currently, Texas is beginning to realize the potential location advantages within its wind industry, and developers are building turbines along its shoreline due to the larger profit yield that results from the steady shoreline air currents.[82]

2. Coastal Wind Farms Farms are Productive Now and have Evolved since their Infancy Domestically and Abroad

Coastal siting of wind farms has been a viable option in the United States and abroad for some time.[83] Coastal positioning of wind farms takes advantage of coastal breezes, while avoiding the exorbitant costs, environmental threats, and energy loss during transmission faced by their on-shore counterparts.[84] An additional advantage is that coastal wind farms often are strategically placed close to clustered populations, where the energy production can power a significant number of homes and businesses within the radius of the farm.[85] In California, for example, certain coastal communities, which were once sites for unsustainable energy sourcing and production, now receive the boon of becoming wind power sites that create jobs and sustainable energy climates for their communities.[86] Many utility conglomerates have found that these farms produce an abundance of electricity and distribute the production to other states and localities for further economic benefit.[87] For instance, The Shiloh Wind Power Plant is located on the hilltops of Rio Vista, just east of the San Francisco Bay, in Solano County.[88] The 100 high efficiency white windmills can generate up to 150 MW of electricity, enough to

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80. *Id*.

81. *See* Roger Real Drouin, *How Conservative Texas Took The Lead in U.S. Wind Power*, YALE ENVIRONMENT 360 (Apr. 09, 2015), http://e360.yale.edu/feature/how_conservative_texas_took_the_lead_in_us_wind_power/2863/.

82. *Id*.

83. *See generally* National Resources Defense Council, *Renewable Energy for America: Harvesting the Benefits of Homegrown, Renewable Energy*, http://www.nrdc.org/energy/renewables/wind.asp (last visited Nov. 26, 2015).

84. *Id*.

85. *See generally* National Resources Defense Council, *American Wind Farms: Breaking Down the Benefits from Planning to Production* (Sep. 2012), http://www.nrdc.org/energy/files/american-wind-farms-IP.pdf.

86. *Id*.

87. *Id*.

88. *See generally* Iberdrola Renewables, *Shiloh Wind Power Project: Fact Sheet* (July 8, 2013), http://iberdrolarenewables.us.files.s3.amazonaws.com/pdf/ShilohFactSheet.pdf.

light 112,500 homes.[89] This new generation of technology for wind power was unveiled in 2006.[90] Each of its turbines can generate the same amount of electricity as 15 older windmills, some of which still dot the same grassy hills.[91]

Solano County is deriving benefits from wind production for its agricultural communities.[92] Although well-accustomed to the vigorous wind patterns on their lands, hay farmers and sheep ranchers in the Montezuma Hills area of Solano County had never considered harvesting this resource.[93] Now, an odd but lucrative juxtaposition of sheep and 30-story wind turbines has transformed the economic landscape of the region.[94] The EDF Renewable Energy Shiloh II wind farm in Solano County provides clean energy to 74,000 Pacific Gas and Electric (PG&E) customers on a yearly basis.[95] Construction of the wind farm in 2008 created 300 construction jobs and injected $50 million into the local economy.[96] The wind farm generates $3 million a year in property tax revenues for the county, and construction of the wind farm paid $27.4 million in wages for 487 jobs.[97]

Neither the landowners nor their sheep seem to mind the imposing stature of these turbines.[98] Although the wind farms in the Montezuma Hills span over 6,000 acres, 98 percent of the land remains untouched.[99] Herds of sheep can safely graze right up to the base of the towers.[100] Landowners have signed 30-year leases with project developers and re-

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89. *Id*.

90. *See* David R. Baker, *Birds Landing, Solano County/ New Windmills near delta fuel state's global warming flight*, San Francisco Gate (Nov. 16, 2006), http://www.sfgate.com/bayarea/article/BIRDS-LANDING-SOLANO-COUNTY-New-windmills-near-2484812.php.

91. *Id*.

92. *See generally* Jason Massad & Staff Writer, *Harvesting the Wind: Montezuma Hills' strong breezes power up turbine farms,* THEREPORTER.COM, http://fromthereporter.com/specials/made/pages/made53.html (last visited Mar. 18, 2015).

93. *Id*.

94. *Id*.

95. *See Shiloh II Wind Project: Project Profile*, EDF RENEWABLE ENERGY (2012), *available at* http://www.edf-re.com/files/uploads/Shiloh_II_Profile_11-2012.pdf.

96. *Id*.

97. *Id*.

98. Next Generation, *California's Wind Economy and the PTC* (Oct. 8, 2012), http://thenextgeneration.org/blog/post/californias-wind-farm-economy-and-the-ptc.

99. *Id*.; *see also* Tom Gray, American Wind Energy Association, Wind Energy and Birds/Bats Workshop: Understanding and Resolving Bird and Bat Impacts 6 (Sep. 2004), http://www.ewashtenaw.org/government/departments/planning_environment/planning/wind_power/Wind%20Energy%20Birds%20and%20Bats%20Workshop.

100. *Id*.

ceive royalties for use of their property without compromising their agricultural activity.[101]

Similar projects around the globe are also proving successful. The Macarthur Wind Farm is located in the Southern Coastal Region of Australia.[102] It is situated just north of the Australian Bite.[103] Comprised of 140 3MW turbines, the 420MW wind farm is the largest of its kind in the Southern Hemisphere and is jointly owned by AGL Energy Limited (AGL) and Malakoff Corporation Berhad.[104] The Australian government has expanded its renewable energy target, aiming to use renewable sources of energy for 20% of electrical demand by 2020.[105] The Macarthur Wind Farm contributes toward this goal, powering 220,000 households.[106]

In Sweden, the government has decided to permit Markbygden Vind AB to develop a series of interconnected wind farms, covering some 450 square kilometers and comprising 1101 wind turbines in the Markbygden area of Piteå Municipality.[107] Andreas Carlgren, Minister for the Environment, has commented that, once completed, the wind farm

> will produce up to 12 terawatt-hours (TWh) of electricity per year, which is four times more than Sweden's present wind power production and equivalent to the average of what two Ringhals nuclear power reactors (R1 +R2) produced in 2005-2008. The Markbygden project is the largest ever wind power project planned in Sweden. When it is realized, the surplus of renewable energy will be equivalent to the domestic consumption of two million households in Sweden per year (not including electrical heating)."[108]

The project has been the focus of environmental concerns over potential negative impacts to the reindeer population.[109] After significant impact

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101. *Id*.

102 *See Macarthur Wind Farm*, AGL.COM, http://www.agl.com.au/about-agl/how-we-source-energy/renewable-energy/macarthur-wind-farm (last visited Nov. 22, 2015).

103. *Id*.

104. *Id*.

105. *See* Oliver Milman, *Australia on course to beat 2020 renewable energy target, says study*, THE GUARDIAN (May 30, 2013), http://www.theguardian.com/world/2013/may/30/australia-2020-renewable-energy-target.

106. *See Macarthur Wind Farm*, *supra* note 102.

107. *See Markbygden,* SVEVIND, http://www.svevind.se/Projects/Project.aspx?projectID=1&lang=en-US (last visited Feb. 16, 2015).

108. Press Release from Regeringskansliet, Ministry of the Environment, Go-head for 1101 wind turbines to produce up to 12 TWh renewable electricity in Markbygden in Piteå (Mar. 04, 2010) (on file with the Gov't Offices of Sweden), *available at* http://www.government.se/contentassets/f4822698191649fa993d478b661dfece/press-releases-2006-2010---andreas-carlgren.

109. *Id*.

studies and identification of protected lands and wetlands, the project is now moving forward.[110]

III. THE LONE STAR ADVANTAGE: TEXAS' ONSHORE REGULATORY FRAMEWORK

The regulatory landscape in Texas has been just as valuable as the natural landscape in cultivating the most successful wind industry in the United States. Texas' streamlined regulatory processes[111] are a key advantage over regulatory schemes in other states. Furthermore, wind developers in Texas exclusively do business and develop wind farms on privately owned farm land, which does not leave much room for regulation.[112] In contrast, "federal policy on transmission is hogtied by regional conflicts over who pays for long-distance transmission lines for renewable energy."[113] The lack of oversight from state and local governments in Texas allows for a greater degree of adaptability for the industry.[114] Wind developers can usually expect much shorter project timelines in Texas, due to the State's permissive regulatory policies and business friendly environment.[115]

A. Federal Involvement

By and large, federal involvement does not have much of a regulatory influence within Texas' wind industry, but federal regulation plays a prominent role in the broader environmental arena. Federal involvement within Texas' wind energy industry predominantly consists of strong government incentives.[116] The federal government does not have a profound regulatory role within the state's wind industry, except when it comes to environmental issues.[117] One of the biggest environmental issues relating to wind energy development in Texas is the protection of migratory birds, which receive federal regulatory protection through the Migratory Bird Treaty Act and Endangered Species Act.[118] The Migrato-

110. *Id.*

111. *See generally* Ophir Stemmer, *Clearing the Air: A Comparison of Regulatory Frameworks for Siting Wind Farms*, 6 GEO. WASH. J. ENERGY & ENVTL. L. 4, 46 (2011).

112. *Id.*

113. *Id.*

114. *See* Ryan Thomas Trahan, *Social and Regulatory Control of Wind Energy: An Empirical Survey of Texas and Kansas*, 4 TEX. J. OIL GAS & ENERGY L. 89 n.36 (2008–2009).

115. *Id.*

116. *See* Drouin, *supra* note 81.

117. *See generally* U.S. DEPARTMENT OF ENERGY, OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY, ENVIRONMENTAL IMPACTS AND SITING OF WIND PROJECTS, http://energy.gov/eere/wind/environmental-impacts-and-siting-wind-projects (last visited Apr. 2, 2015).

118. *See generally* AMERICAN BIRD CONSERVANCY, AMERICAN BIRDS: AN ENDANGERED SPECIES ACT SUCCESS STORY (2006), *available at* http://abcbirds.org/wp-

ry Bird Treaty Act will be the primary focus here due to Texas' coast being a major pathway for migratory birds—not all of which fall under the Endangered Species Act.

1. Energy Promotion

The federal government has established several incentive programs to accomplish its goal of using wind power to produce 20 percent of total energy by the year 2030.[119] The program currently spends in excess of $40 billion per year, an amount that continues to grow, which includes tax credits for wind farm developers, as well as sponsorship of several research projects focused upon improving wind farm technology.[120] In 1992, Congress enacted the Energy Act, a comprehensive energy bill intended to encourage investment in all forms of renewable energy.[121] Specifically, the Energy Act included a provision of the Production Tax Credit (PTC) for renewable energy.[122] The PTC is a federal incentive that provides financial support for the development of renewable energy facilities, such as wind farms.[123] It is a performance-based incentive, providing a 2.1-cent per kilowatt-hour (kWh) incentive for the first ten years of a renewable energy facility's operation.[124] Because of the PTC, the wind energy industry took substantial steps towards providing a competitively priced, renewable energy alternative to traditional forms of electrical production.[125] Investors took advantage of the benefits provided by the PTC and invested in the construction of wind farms.[126] Texas investors used the PTC incentive to fuel wind farm development, increasing wind production in Texas from less than 200 MW of wind generated electricity annually in the early 1990s to approximately 4,296 MW by 2007.[127]

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content/uploads/2015/05/ESA-Report.pdf (although the Migratory Bird Treaty Act is the focus in this article, certain bird populations are also protected through the Endangered Species Act, giving them additional federal protection with more teeth).

119. *See* U.S. DEPARTMENT OF ENERGY, ENERGY EFFICIENCY AND RENEWABLE ENERGY, DO E/GO-102008-2567 (2008), http://www.nrel.gov/docs/fy08osti/41869.pdf (discussing government's overall goal of 20% wind energy by 2030).

120. *Id*.

121. Energy Policy Act of 1992, Pub. L. 102-486, 106 Stat. 2776 (codified in scattered sections of 12, 16, 25, 26, 30 & 42 U.S.C.); *see also* Rahm, *supra* note 45, at 59.

122. U.S. DEPARTMENT OF ENERGY, DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, WIND AND HYDROPOWER TECHNOLOGIES PROGRAM, DOE/GO-102009-2944 (Oct. 2009), http://energy.gov/sites/prod/files/2014/05/f15/federal_incentives_wind_deployment.pdf.

123. *Id*.

124. *Id*.

125. *Id*.

126. Rahm, *supra* note 45, at 59–60.

127. *Id*.

Due to initial uncertainty with the progress of renewable energy, Congress created constant delays in reauthorizing the PTC throughout the course of its existence.[128] Eventually building confidence and realizing the importance of the PTC to the long-term success of wind energy, Congress extended the PTC until 2012 as part of the American Reinvestment and Recovery Act (ARRA).[129] The PTC then expired at the end of 2013. On December 17, 2014, Congress passed a tax extenders bill that retroactively extended the PTC for projects that were under construction by the end of 2014.[130] There has not been word from Congress on whether the PTC is coming back, making the future of the PTC uncertain at this point. With federal incentives helping drive overall energy growth, certain federal environmental regulations became relevant and took focus within the energy industry.

2. Environmental Protection

Originally passed in 1918, the Migratory Bird Treaty Act (MBTA) is the oldest federal law dedicated to the protection of wildlife, making it a crime[131] to "take"[132] a migratory bird or its nest.[133] At that time, since modern wind farms did not exist, its focal point was to curb hunting practices in ways that helped conserve wildlife. The US Fish and Wildlife Service (FWS) has statutory authority to enforce the Act and to amend the list of protected migratory birds.[134] The MBTA criminal provisions are broad, which allows its potential application to actions beyond those of just hunters and poachers.[135] In other words, this broad application is suitable towards current modern threats to birds, such as wind farms.[136] Following the MBTA's plain language, MBTA penalties apply to corporations through section 703(a), which makes it "unlawful at any

128. *Id*.

129. U.S. Dep't. of Energy, *Renewable Electricity Production Tax Credit,* ENERGY.GOV, http://energy.gov/savings/renewable-electricity-production-tax-credit-ptc (last visited Nov. 22, 2015).

130. *Id*.

131. 16 U.S.C. § 707 (2012) (a "knowing" violation of the MBTA is a felony, while other violations, such as incidentals, are misdemeanors).

132. 50 C.F.R. § 10.12 (2015) (FWS's rules define "take" for MBTA purposes to mean to "pursue, hunt, shoot, wound, kill, trap, capture, or collect").

133. Migratory Bird Treaty Act, ch. 128, 40 Stat. 755 (1918).

134. *Birds Protected by the Migratory Bird Treaty Act*, U.S. FISH & WILDLIFE SERVICE (Dec. 5, 2013), www.fws.gov/migratorybirds/regulationspolicies/mbta/mbtintro.html; *see also* 50 C.F.R. § 10.13 (2015) (almost all bird species in the U.S. are covered by the MBTA because FWS regulations include most native birds found in the U.S. as species protected by the MBTA—even species that do not migrate across state lines).

135. *See* Robyn Rose, *A Special Purpose: The Migratory Bird Treaty Act and Wind Energy*, 55 NAT. RESOURCES J. 205, 211–215 (2014).

136. *See id*.

time, by any means or in any manner, to . . . take or . . . kill . . . any migratory bird, any part, nest or eggs of any such bird," included in the list of migratory birds provided by the FWS.[137] The MBTA expressly lists "association, partnership, or corporation" as potentially liable entities, and, on its face, the MBTA is no exception to the typical strict liability nature of federal environmental statutes.[138]

Wind energy companies are subject to the MBTA's jurisdiction because, in some cases, steps are not taken to mitigate risks to species of birds covered by the Act.[139] Birds are at risk by both the direct and indirect impacts of wind energy generation activities.[140] The language of the MBTA provides for incidental impacts of "association, partnerships, and corporations."[141] Despite their considerable environmental and economic advantages, U.S. wind farms incidentally account for approximately 140,000 to 573,000 annual bird deaths.[142] Reports show that turbine-related deaths have increased over the last decade and it is logical that the number of annual deaths will continue to increase as wind farm development continues.[143] In response to this growing problem, the FWS released new federal guidelines in 2012 for land-based wind developers trying to avoid or minimize impacts to birds and their habitats.[144] While the guidelines are voluntary, US wind developers who are interested in a smooth regulatory process and want to avoid legal challenges from environmental groups welcome these guidelines with open arms.[145]

In order to fully understand the influence and enforcement of the MBTA in the wind energy industry, below are two comparative examples from existing wind farms. The Altamont Pass Wind Farm is located in Altamont Pass in Central California and it is one of the earliest wind farms in the United States.[146]Altamont Pass has the highest numbers and

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137. 16 U.S.C. § 703(a) (2004).

138. *Id*. at § 707(a).

139. Thomas R. Lundquist et al., *The Migratory Bird Treaty Act: An Overview* (October 2015), http://www.crowell.com/files/the-migratory-bird-treaty-act-an-overview-crowell-moring.pdf.

140. In context to wind farms, the primary risks to birds are those associated with wind turbines; *see* U.S. FISH AND WILDLIFE SERVICE, OMB 1018-0148, FINAL LAND-BASED WIND ENERGY GUIDELINES (2012), *available at* http://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf (explaining significant direct impacts to include deaths from collisions with rotating turbine blades and sudden changes in air pressure due to wind turbulence).

141. *Id*.

142. *See Impacts of Wind on Wildlife: How to Make Wind Power More Wildlife Friendly,* U.S. FISH & WILDLIFE SERVICE (May 21, 2015), http://www.fws.gov/radar/windpower/index.html.

143. *Id*.

144. *See* Lundquist et al., *supra* note 139.

145. *Id*.

146. *See* California Wind Energy Association, *Fast Facts about California Wind Energy*, CALWEA.ORG, *available at* http://www.calwea.org/bigPicture.html (last visited Nov. 29, 2015).

rates of bird kills of any wind facility in the world.[147] Wind turbines at Altamont Pass kill an estimated 880 to 1,300 birds each year, including up to 116 golden eagles, 300 red tailed hawks, 99 to 380 burrowing owls, and hundreds of other species including falcons, vultures, and other owl species.[148] These facts have created discontent among environmental and animal activists.[149]

Another wind farm developer, Duke Energy, made recent news for pleading guilty to two Class B misdemeanor violations of the MBTA stemming from the discovery of 163 migratory bird carcasses, including 14 golden eagle carcasses, at its Campbell Hill and Top of the World facilities in Wyoming.[150] The Duke case is noteworthy as it is the first wind energy project found liable for violations of the MBTA.[151] As part of its plea agreement, Duke agreed to $400,000 in fines, a five-year probation period, $100,000 in restitution payments, and $500,000 in community service payments to support projects designed to enhance avian rehabilitation and other conservation programs.[152] With the real possibility of MBTA enforcement, as illustrated by Duke's federal prosecution, and due to a history of fines incurred by other developers, wind energy is under intense environmental pressure and increased scrutiny.

South Texas is one of the busiest migratory areas in the US, with millions of long distance avian travelers in the fall voyaging from the arctic in Canada, Alaska, and Western Russia, in-route to Central and South America, and then returning the following spring.[153] The Laguna Madre area of South Texas is one of only six hyper saline bays in the world, supporting a critical habitat for over 300 species of birds and their food supply.[154] Among the species, the region hosts 80% of the world's wintering Redhead Duck population and in some years hosts 50% of the world's breeding population of Reddish Egret, a colonial water bird species of declining population size.[155] These species of birds are considered

147. *See Fact Sheet on Altamont Pass Bird Kills*, CENTER FOR BIOLOGICAL DIVERSITY, *available at* http://www.biologicaldiversity.org/campaigns/protecting_birds_of_prey_at_altamont_pass/pdfs/factsheet.pdf.

148. *Id.*

149. *Id.*

150. *Utility Company Sentenced in Wyoming for Killing Protected Birds at Wind Projects,* U.S. DEPARTMENT OF JUSTICE, OFFICE OF PUBLIC AFFAIRS (Nov. 22, 2013), http://www.justice.gov/opa/pr/utility-company-sentenced-wyoming-killing-protected-birds-wind-projects.

151. *Id.*

152. United States v. Duke Energy Renewables Inc., NO. 2:13-CR-00268, Plea Agreement at 7-10 (D. Wyo. Nov. 22, 2013).

153. *See Migratory Birds Dodge Bullet (or Blade)*, AUDUBON TEXAS (May 29, 2014), http://tx.audubon.org/newsroom/news-stories/2014/migratory-birds-dodge-bullet-or-blade-0.

154. *Id.*

155. *Id.*

threatened and listed as protected migratory birds under the MBTA and ESA, and are therefore a great concern with the growing wind energy industry in Texas.[156] With public scrutiny and legal action-on the rise, wind farm developers face resistance along the Texas coastline.

B. State and Local Involvement

In 1999, Texas facilitated its wind potential by passing Senate Bill 7 (S.B. 7), which created the state's first renewable portfolio standard (RPS).[157] S.B. 7 was Texas' first attempt at an energy policy that embraced renewable sources and set competitive goals for the output of energy.[158] During S.B. 7's enactment, the RPS required that Texas' competitive electricity providers install 2,000 MW of new renewable energy capacity by 2009.[159] Less than seven years later, the RPS requirement was met and in 2005 the legislature passed Senate Bill 20 (S.B. 20), which increased the RPS to 5,880 MW by 2015, and set a non-binding target of 10,000 MW by 2025.[160]

To help fulfill the RPS targets, S.B. 20 created a Renewable Energy Credit (REC) trading program for utility providers that exceed their obligations to utilities who have not met their RPS requirements.[161] One observer commented that there is "no doubt that the combination of Texas' excellent wind resource and a well thought out and implemented RPS/REC system is largely responsible for the rapid growth the Texas wind industry has experienced."[162]

Despite the progress Texas has made in the growth of its wind industry, obstacles still exist. The fact that the majority of the State's population is located far from its wind resources has caused transmission difficulties to arise.[163] In the years immediately following the enactment of the S.B. 7 RPS, it was common for wind turbine operators to shut down turbines when the wind was blowing at its peak because of congestion on

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156. *See* Meredith Blaydes Lilley & Jeremy Firestone, *Wind Power, Wildlife, and the Migratory Bird Treaty Act: A Way Forward,* 38 LEWIS & CLARK ENVTL. L. REV. 101 (2008); *see also* AMERICAN BIRD CONSERVANCY, *supra* note 118.

157. Act of June 18, 1999, 76th Leg., R.S., ch. 405, § 1, 1999 Tex. Gen. Laws 2543.

158. L. Lynne Kiesling & Andrew N. Kleit, *Electricity Restructuring: The Texas Story,* AMERICAN ENTERPRISE INSTITUTE ix, 28–29 (AIE Press 2009), *available at* https://www.aei.org/wp-content/uploads/2014/07/-electricity-restructuring_102315910190.pdf.

159. Act of June 18, 1999, 76th Leg., R.S., ch. 405, § 39, sec. 39.904, 1999 Tex. Gen. Laws 2543, 2598.

160. Thornley, *supra* note 24, at 72–73 (citing Act of Aug. 2, 2005, 79th Leg., 1st C.S., ch. 1, § 3, sec. 39.904, 2005 Tex. Gen. Laws 1, 1).

161. *Id*. at 73.

162. Smith & Diffen, *supra* note 76, at 172.

163. Daniel, *supra* note 75, at 165–66.

the transmission lines connecting the turbines to the grid.[164] The inadequacy of the existing transmission infrastructure prompted S.B. 20 to include provisions to address these flaws.[165]

Under S.B. 20, after consulting with the Electric Regional Council of Texas (ERCOT) and other appropriate regional transmission organizations, the state Public Utility Commission (PUC) was required to designate CREZs in which resources and land area were sufficient to develop renewable generation capacity.[166] In 2008, ERCOT released its Transmission Optimization Study, which "focused on recommendations to determine types of transmission methods that would best transmit wind generation from CREZs in West Texas across the state to East Texas where the power flows would be redistributed to load centers."[167] Transmission optimization was needed because Texas' western region was, and remains, sparsely populated, and a local power infrastructure was never adequately developed.[168]

Even though Texas is aware of the problems that plague the transmission grids, the problems continue to this day because the time it takes to construct transmission lines greatly exceeds the time required to construct wind farms.[169] Unlike wind farms, which can be constructed and operational in less than two years, a transmission line project takes five to ten years to become operational.[170] Furthermore, transmission line projects require an extensive amount of capital, especially when those lines need to travel long distances.[171] The problem of constantly trying to catch up with the rapidly expanding wind energy industry in Texas still exists because of the lack of transmission infrastructure in the West.

While transmission lines are critical to ensure the electricity generated by wind farms is not wasted, transmission projects have negative impacts on landowners because of the easements utility companies are required to obtain on a substantial amount of private property.[172] As a result, landowners are facing condemnation proceedings and are realiz-

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164. *Id*.

165. *Id*.

166. Public Utility Regulatory Act, Tex. Util. Code § 39.904 (2005).

167. ELECTRIC RELIABILITY COUNCIL OF TEXAS, COMPETITIVE RENEWABLE ENERGY ZONES TRANSMISSION OPTIMIZATION STUDY 1, 11 (Apr. 2, 2008), *available at* http://ercot.com/news/presentations/2008 (follow "Competitive Renewable Energy Zones Transmission Optimization Study" hyperlink; file opened with WinZip).

168. *See* Matthew L. Wald, *The Energy Challenge: Wind Energy Bumps into Power Grid's Limits*, N.Y. TIMES (Aug. 26, 2008), www.nytimes.com/2008/08/27/business/27grid.html?pagewanted=all.

169. *See* SECO, *supra* note 2.

170. *Id*.

171. *Id*.

172. *See* TCAP, *supra* note 3.

ing that most of the power lies with the condemning authority.[173] In order to equalize the balance of power, the Texas Legislature spent the past five years focusing on reforming various aspects of the condemnation process to ensure that landowners have a fair chance to fight back against the abuses of utility companies who refuse to justly compensate landowners for their losses.[174]

To this day, a second Transmission Optimization Study has not been published by ERCOT nor has there been an update in the CREZs program.[175] This poses problems because the wind energy industry in Texas is continuously expanding, requiring constant transmission infrastructure updates in order to efficiently get power to areas where it is mostly needed.

IV. PROPOSAL TO OPTIMIZE TEXAS' WIND ENERGY INDUSTRY WITH MORE COASTAL SITING

A great opportunity exists to reduce the proliferation of vast transmission lines to harness energy from remote wind farms by exploring options to site wind energy closer to coastal, more densely populated areas with existing transmission infrastructure. This will result in less waste, faster transmission, and little to no down time, maximizing productivity of wind turbines while minimizing resistance, with little to no impact on private land owners. Texas has developed an impressive onshore wind energy sector, combining both economic and environmental benefits, but evidence suggests that coastal wind farm development could be more effective and efficient. Moreover, many proponents have voiced their support for expanding coastal wind power development. Texas is currently considering offshore wind energy, but it is still unclear how close that is to becoming a reality. With Texas' population and energy demands continuously growing, accompanied with the general responsibility to respond to climate change, it is imperative for Texas to pursue the benefits of coastal placement of coastal wind farms, beyond the existing limited use of this strategy. Texas' current legal framework and policies are able to facilitate a smooth transition towards developing more coastal wind farms. In addition, employing safeguards designed to reduce the adverse impacts that wind farms pose to migratory birds including smarter siting, reducing turbine activity only to times of optimal winds, while incorporating advanced radar techniques will ensure sustainability.

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173. *Id*.
174. *See* Smith & Diffen, *supra* note 76, at 171–172; *see also* SECO, *supra* note 2.
175. *Id*.

A. Harness Texas' Pro-Development Legal Framework to Promote the Viability of Increasing Coastal Wind Farm Development

Texas' coastal region has an optimal natural landscape for wind farms, and developers are catching wind of this reality.[176] Texas is currently inclined to increase wind capacity from existing turbines located along its southern coast and from coastal projects being proposed.[177] Developers are interested in pursuing coastal wind projects because the economics are in their favor.[178] Winds can fade in West Texas just when they are needed most, while along the coast, "the wind peaks when demand peaks," said John Pappas, who is part of a university team advising on an offshore project in the Gulf of Mexico with Baryonyx Corporation.[179] Wind turbines on the coast are subject to something called the sea breeze effect, caused by differences in temperature between the air above the water and the air above the land.[180] In these places, wind production actually peaks on summer afternoons, which fits much better with trends in how people use electricity.[181] Economically, wind farm developers can take advantage of these regional differences by siting wind farms in places where the wind patterns match electricity consumption patterns. This could then help add more coastal wind power to Texas' grid.

As a historical note, the summer of 2011 put the efficiency of coastal wind farms into perspective. Coastal wind turbines generated more electricity than West Texas turbines during peak demand periods on nine of the first 14 days of August, according to data from the Electric Reliability Council of Texas, which manages the grid.[182] This is true despite being far outnumbered by western counterparts; there are two major coastal wind projects in operation versus 14 major wind projects in the West.[183] August 3, 2011 was an especially big day for wind because it performed better than expected when the state set a record for highest electricity demand at 68,294 MW; one MW powers roughly 300

176. *See generally* James Osborne, *Wind Rush: From Panhandle to Gulf Coast, Texas sees surge in wind energy projects*, THE DALLAS MORNING NEWS, http://res.dallasnews.com/interactives/2014_April/windprojects/ (last visited Nov. 27, 2015).

177. *See* Chediack, *supra* note 18.

178. *Id.*

179. *Id.*

180. *See* MAGGIE KOERTH-BAKER, BEFORE THE LIGHTS GO OUT: CONQUERING THE ENERGY CRISIS BEFORE IT CONQUERS US 1, 67–68 (Wiley & Sons, Inc. 2012).

181. *Id.*

182. Press release from Electricity Reliability Council of Texas, ERCOT sets new wind record two consecutive days (Mar. 8, 2012), *available at* http://www.ercot.com/news/press_releases/show/495.

183. *Id.*

homes.[184] The unprecedented consumption triggered warnings of potential rolling power outages, which never happened.[185] On that day's peak, coastal wind generated 42 percent of the state's total wind output, even though West Texas has, at any given time, enough turbines to produce more than six times as much as the coast.[186] This notable efficiency from coastal wind power production is generally attributed to the Peñascal Wind Farm.[187]

The Peñascal Wind Farm was the first coastal wind project in Texas, capitalizing on Texas' valuable coastal wind power.[188] Peñascal is a great example of why Texas continues to be a leader in the world energy markets, and how coastal development emphasizes economic benefits.[189] The power generated at Peñascal gets delivered to customers of City Public Service Energy of San Antonio and the South Texas Energy Cooperative under a 15-year sales contract.[190] According to the American Wind Energy Association's calculation, the Peñascal Wind Farm totals 168 turbines and has an installed power capacity of 404 MW, which meets the electricity consumption requirements of about 150,000 homes.[191] Essentially, this single coastal wind farm is powering large areas of Central and South Texas, drawing attention to the effectiveness of coastal development.

The attention drawn from the Peñascal Wind Farm has not gone without recognition with reputable local leaders and organizations. The Electric Reliability Council of Texas and the Public Utility Commission of Texas have advocated for more coastal wind farm development. The Sierra Club's Austin office issued a statement in 2011 noting that wind energy in the first half of 2011 had supplied 9.9 percent of Texas' elec-

184. *See generally* Denise Bode, *Windpower helped tame the Texas heat of 2011*, AMERICAN WIND ENERGY ASSOCIATION (Oct. 3, 2011), http://www.windpowerengineering.com/construction/projects/windpower-helped-tame-the-texas-heat-of-2011/.

185. *Id.*

186. *Id.*

187. S*ee Iberdrola Opens 404-MW Peñascal Wind Farm*, RENEWABLEENERGYWORLD.COM (June 22, 2010), http://www.renewableenergyworld.com/rea/news/article/2010/06/iberdrola-starts-operations-at-404-mw-penascal-wind-farm?cmpid=rss (noting that the Peñascal wind farm is located in Kennedy County, South Texas, and was completed in April 2010 by the Iberdrola Company).

188. *Newest Texas Wind Farm Cause for Community Celebration, Brings Energy Industry Leaders to Kennedy County on the Gulf Coast*, IBERDROLA RENEWABLES (April 17, 2009), http://iberdrolarenewables.us/rel_09.04.17.html.

189. *See generally id.*

190. *Id.*

191. *See Penascal Wind Farm, United States of America*, POWER-TECHNOLOGY.COM, http://www.power-technology.com/projects/penascalwindfarm/ (last visited Dec. 29, 2015).

tricity, an increase from 7.8 percent the year before, according to ERCOT.[192] The group added:

Coastal wind played a critical role in meeting peak daytime demand during these past few weeks, said Cyrus Reed, Conservation Director for the Lone Star Chapter of the Sierra Club. The data from coastal wind projects indicate that capacity is even greater than previously thought. With exciting new wind projects being considered by Austin Energy for the City of Austin and elsewhere in the state, we think the time is right to build more carefully-sited coastal wind projects.[193]

In 2013, wind generation data again revealed the efficiency and reliability of the existing Texas coastal wind farms. Within that year, non-coastal wind turbines generated only about 20 percent of their installed capacity during summer peak-demand hours, while coastal wind production was more than 50 percent of capacity in 2013.[194] Non-coastal wind represents 85 percent of both total installed wind capacity and annual wind generation in the ERCOT region.[195]

Not only is there data that shows Texas' coast having a lucrative wind source, the coast already has an established transmission infrastructure that will seamlessly carry energy to Texas' populated eastern region. Texas is having challenges along the west due to transmission projects lagging behind the fast paced wind industry. By contrast, developers can take advantage of Texas' coastal winds without heavy dependence on transmission development; securing fast and efficient wind energy development along the coast. Furthermore, like wind development in the west, coastal development is not heavily regulated at the federal, state, or local level.

Federal and state incentives still exist, and wind developers still contract with private farm owners when constructing wind farms. The terms of these contracts are exclusively between wind farm developers and private land owners, resulting in agreements free from government intrusion. Such contracts are valuable, particularly when development along the coast is seen by environmentalists as a more sensitive process due to a higher concentration of threatened species. For instance, contracts between the developers and land owners could essentially be more flexible and negotiable. If developers are uncertain about the viability of coastal wind development, they can come to a mutual understanding with

192. *See Texas' wind industry is praised again for helping state avoid blackouts*, TEXAS CLIMATE NEWS JOURNAL (August 16, 2011), http://texasclimatenews.org/?p=2406.

193. *Id.*

194. *See generally* Susan Combs, *Texas Power Challenge: Getting the Most from Your Energy Dollars*, NATIONAL WIND WATCH (Oct. 2, 2014), https://www.wind-watch.org/documents/texas-power-challenge-getting-the-most-from-your-energy-dollars/.

195. *Id.*

the land owner and set the contract for a specific time period, limiting the existence of a wind farm project. This can be extremely beneficial if and when a coastal developer learns that the project is inefficient, or negatively impacts the environment where it was built.

While Texas has created its wind farm development industry with ease, careless development and profound negative impacts are not anticipated results of the developing industry. Texas will be able to adequately respond to MBTA challenges, focusing on certain safeguards during the necessary expansion of wind farms along its coast.

B. Develop Safeguards to Overcome Obstacles Under the Migratory Bird Treaty Act

With the increase of public scrutiny, federal and local litigation, and hefty fines imposed on developers, there is now considerable pressure on the wind energy companies to reduce bird mortality. This pressure is a primary impediment to developing more wind farms along the Texas coast. Collaboration with wildlife researchers on smarter siting, as well as using technologies and approaches that have already been field-tested, could help reduce bird mortality in the long term. Therefore, research and technology could help create the needed confidence for Texas wind farm developers to aggressively pursue coastal placement.

Location is a key to creating an effective method to preventing bird deaths. There is widespread consensus that the starting point for avoidance and minimization is properly siting projects and "micro-siting" turbines within each project.[196] Hence, FWS encourages wind energy developers to follow a four-tiered decision-making framework, found within the Wind Energy Guidelines: (1) the preliminary site evaluation; (2) site characterization; (3) documentation of site wildlife and habitat to predict impacts; (4) followed up by post-construction monitoring; and (5) other post-construction studies to determine actual impacts and the need for other studies and research.[197] At each tier, the final Wind Energy Guidelines provide: decision points with criteria for determining whether to proceed to the next tier; what additional information may be necessary before proceeding; what actions or combination of actions are indicated as necessary; and whether the risk is determined to be unacceptable resulting in abandonment of the site.[198] The structuring of the framework

196. *Id*.

197. U.S. FISH AND WILDLIFE SERVICE LAND-BASED WIND ENERGY GUIDELINES, U.S. FISH & WILDLIFE SERVICE (Mar. 23, 2012) [hereinafter WIND ENERGY GUIDELINES], *available at* http://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf.

198. *See id*. at 5 (Table 1 presenting a detailed chart suggesting communications protocol within each tier).

allows the tiers to build upon one another, and provides wind energy developers criteria for evaluating risks at their site.

The tiered decision-making approach would be valuable for Texas coastal wind farm development, it focuses on field studies and constant communication with the FWS as each tier is carried out during the development process. This will encourage a more proactive approach, starting with early planning when coastal developers are assessing migratory bird impacts. Comprehensive evaluation during early planning may identify measures that would avoid and minimize the likelihood that a migratory bird taking would occur. The fact that the guidelines are voluntary should not deter Texas wind developers from complying. The guidelines are a great resource towards smarter siting by offering more comprehensive participation between wind developers and the FWS. The guidelines could play a major role with additional coastal development, as many wind developers might be unfamiliar with Texas' coastal environment.

Furthermore, FWS wants to reward voluntary compliance. The Department of Justice prosecutes MBTA violations based on recommendations from the FWS's Chief of Law Enforcement.[199] Given FWS's influence over prosecution, FWS explicitly states in its Wind Energy Guidelines:

> While it is not possible to absolve individuals or companies from MBTA or [Bald and Golden Eagle Protection Act] liability, the Office of Law Enforcement focuses its resources on investigating and prosecuting those who take migratory birds without identifying and implementing reasonable and effective measures to avoid the take. The Service will regard a developer's or operator's adherence to these Guidelines, including communication with the Service, as appropriate means of identifying and implementing reasonable and effective measures to avoid the take of species protected under the MBTA and BGEPA.[200]

As the guidelines express, FWS discretion mitigates the harshness of the MBTA. As long as Texas wind developers demonstrate good faith compliance with the Wind Energy Guidelines, the Department of Justice appears to be willing to mitigate risk for these developers. Therefore, Texas can pursue its commitment to these guidelines, even though they are voluntary.

In addition to the tiered approach for the proper siting of a project, avoidance and mitigation can be achieved through implementing best management practices (BMP) for the siting, construction, operation,

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199. *Id*. at 6.

200. WIND ENERGY GUIDELINES, *supra* note 197, at 6.

monitoring, and decommissioning of wind energy facilities.[201] The Final Wind Energy Guidelines include a number of BMPs, specifically including those applicable to operations and post-construction mitigation.[202] Most of these practices have been field tested and are currently used by many wind farm developers throughout the states, regardless of their commitment to the guidelines.[203] Coastal development in Texas would benefit from certain BMPs following proper siting.

One of these practices is seasonal, daily, or midday shutdowns of wind farms. This is particularly relevant for the Texas coast, where seasonal migratory birds like whooping cranes and song birds exist. Here, turbines can be turned off during months coinciding with peak bird migration.[204] With proper research and analysis, Texas wind energy companies can successfully seek a balance between production and protection. By diligently studying and researching migratory patterns, coastal wind developers can effectively calculate appropriate wind farm shutdowns, and this will help mitigate risk to migratory birds. Ultimately, the question is whether this method is economically feasible for Texas wind developers.[205] For example, this particular method calls for longer periods of shutdowns through which energy production comes to a halt.[206] This is where the collaboration of studying and researching migratory patterns, and evaluating a sound strategy may help manage revenue challenges. Furthermore, Texas' major bird migratory season along its coast runs during winter and early spring, which is a lower energy demand season compared to the summer.[207] Therefore, arguably, a substantial production burden might not be imposed to coastal wind developers when conducting these shutdowns.

Another proposed operational practice is the use of automated detection devices, such as radar or thermal infrared imaging, to control the

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201. *See* AMERICAN BIRD CONSERVANCY'S POLICY STATEMENT ON WIND ENERGY AND BIRD-SMART WIND GUIDELINES, AM. BIRD CONSERVANCY [hereinafter AM. BIRD CONSERVANCY], http://www.abcbirds.org/abcprograms/policy/collisions/wind_policy.html (last visited Apr. 11, 2015).

202. WIND ENERGY GUIDELINES, *supra* note 197, at 49–53.

203. *Id.*

204. *See* U.S. Fish & Wildlife Services, Migratory Birds: Eagle Conservation Plan Guidance, Module 1—Land-based Wind Energy, Version 2, iv, 78–79 (Apr. 2013) [hereinafter Migratory Birds: Eagle Conservation Plan Guidance], *available at* http://www.fws.gov/migratorybirds/Eagle_Conservation_Plan_Guidance-Module%201.pdf.

205. *Id.*

206. *Id.*

207. *See* Clifford E. Shackelford et al., *Migration and The Migratory Birds of Texas: Who They Are and Where They Are Going*, TEX. PARKS AND WILDLIFE 2, 2–3, 10–11 (4th ed. 2005), *available at* http://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_w7000_0511.pdf; *see also When To Shop For Electricity*, TEXASELECTRICITYRATINGS.COM, http://www.texaselectricityratings.com/blog/when-to-shop-for-electricity/ (stating that Texas' lower energy demand season is from winter through early spring).

operation of turbines.[208] This is arguably the more economically feasible practice because unlike seasonal shutdowns, these shutdowns are more precise and short-term. Here, the industry is turning to radar technology that could detect when birds are approaching. Turbines could be slowed or shut down when the radar, along with employees monitoring the horizon, determine that birds are within a certain zone.[209] Improved technology in this field of practice is also working to prevent false alarms, which may be triggered from swarms of insects.[210] Live testing has shown that the more refined radar technology can reduce the risk to migratory bird populations, particularly in heavy migratory pathways, such as along the Texas coast.[211] Currently, this kind of early-warning radar technology is being deployed at the Peñascal wind farm, located in a central flyway and main route for migratory birds in America.[212]

The Peñascal wind farm initially was a major concern for environmentalists since it is situated in the heart of certain precious migratory bird environments.[213] This concern faded once these radar system practices were implemented. Radar systems can detect approaching birds from as far as four miles away, as well as analyze weather conditions, and then determine in real time whether they are in danger of flying into the rotating blades.[214] Peñascal employees are also watching for meteorological conditions that might suggest when songbirds are in migration, and conditions such as low visibility, when the songbirds might fly lower and, thus, closer to the turbines.[215] All of these tactics help the Peñascal wind farm proactively reduce risk to bird populations.

Up and coming coastal developers can see the Peñascal wind farm as a good example that, even in Texas where there are virtually no environmental restrictions on wind farms, wind developers can still make a good faith effort to respond to environmental concerns. The wind farm is

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208. *See* MIGRATORY BIRDS: EAGLE CONSERVATION PLAN GUIDANCE, *supra* note 204.

209. *Id*.

210. *Id*.

211. *See* Roger Drouin, *For the birds (and the bats): 8 ways wind power companies are trying to prevent deadly collisions*, GRIST (Jan. 3, 2014), http://grist.org/climate-energy/for-the-birds-and-the-bats-8-ways-wind-power-companies-are-trying-to-prevent-deadly-collisions/.

212. Suzanne Goldenberg, *Texas wind farm pioneers radar technology to protect migrating birds*, THE GUARDIAN (May 1, 2009), http://www.theguardian.com/environment/2009/may/01/wind-farm-bird-radar.

213. *See Nongame and Rare Species Program: Federal and State Listed Bird Species*, TEXAS PARKS AND WILDLIFE, https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/nongame/listed-species/birds.phtml (last visited Nov. 27, 2015) (listing both MBTA and ESA protected birds in Texas); *see* Suzanne Goldenberg, *supra* note 212.

214. *See id*.; *see also Peñascal Wind Farm, United States of America,* POWER-TECHNOLOGY.COM, http://www.power-technology.com/projects/penascalwindfarm/ (last visited Nov. 27, 2015).

215. *Peñascal Wind Farm*, *supra* note 214.

essentially a model for responsible development with protections for migratory birds. This wind farm furthers the sustainable balance between economic production and risk towards wildlife.

The bottom line with wind energy, particularly along Texas' coast, is that it has great potential, but it must be implemented carefully. A better approach would be siting farms away from migration routes and use the technologies that have proven effective at Peñascal Wind Farm to provide an additional layer of protection. Texas has a vast coastline, making this approach feasible in order to effectively capitalize on prime coastal winds.

V. CONCLUSION

Texas sets the pace for alternative energy production, as it produces more than twice the power via wind energy than the next most productive state for wind energy, California. Although the state is looking into offshore energy production, there are various obstacles holding Texas back from this opportunity. Consequently, Texas realizes the value of expanding its onshore wind energy industry. With much criticism towards onshore wind farm development in West Texas, the state should focus on expanding coastal wind farms. Texas is currently well positioned to transition toward more wind farm development along its coast. The state can easily harness its favorable regulatory and natural landscape to effectively and efficiently power its wind industry along the coast, and continue as a leader in wind energy production.

Locating wind turbines in coastal areas that are populated with migratory birds poses risks, but as this article discusses, Texas can exercise certain safeguards to help mitigate risks to bird populations. Proper siting, together with post-siting best management practices, suggested by The Final Wind Energy Guidelines, would serve Texas wind developers well when mitigating risks to bird populations. Reducing wind development's impact on wildlife would help the industry avoid problems with the federal government, and boost the public's image of wind power. Therefore, not only can Texas' wind industry avoid regulatory problems, it can also model itself as a "green" industry by protecting migratory birds, notably those in coastal areas of proposed wind development.