Minnesota Journal of Law, Science & Technology

Volume 15 | Issue 1 Article 23

2014

Sustainable Communities and Wind Energy Project Acceptance in Massachusetts

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The State of Massachusetts is one of the most progressive U.S. states in advancing sustainability through energy conservation and renewable energy. The Green Communities Act,[1] signed into law by Governor Deval Patrick in 2008, has awarded 110 communities with the title "Green Communities" in the last five years.[2] The title is earned after communities achieve "five clean energy benchmarks,"[3] two of which are the provision of "as-of-right" siting for renewable/alternative energy generation and the adoption of an expedited application

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1. An Act Relative to Green Communities, 2008 Mass. Acts 308–80.

2. Press Release, Mass. Exec. Office of Energy & Envtl. Affairs, Patrick-Murray Administration Energy Officials Present Green Communities Award (Apr. 4, 2013), *available at* www.mass.gov/eea/pr-2013/green-communities-award.html.

3. *Id.*

and permitting process for "as-of-right" energy facilities.[4] The expedited "as-of-right" siting is one of the policy tools designed to encourage communities to speed up the siting of renewable energy projects—particularly wind and solar—as the State has a goal of obtaining 20% of its electricity capacity from renewable energy projects by 2020.[5] Despite the fact that high-ranking energy officials in the State are of the opinion that Massachusetts is able to continue on the path of a "'clean energy revolution . . . in large part because of leadership at the local level,'"[6] the State has had many difficulties implementing renewable energy projects locally, and many projects have met with strong public resistance.[7] This paper examines the relationship between the "Green Community" designation and the level of acceptance of wind energy projects in the State. Results from surveys conducted in Spring 2012 in three Massachusetts towns—one of which is a designated "Green Community"—are used to show how residents' perceptions of the siting process, project familiarity, and opportunities to participate in the siting decision affect project support. The paper also discusses the policy implications for renewable energy facilities.

I. BACKGROUND

Rising costs of energy and greenhouse gas emissions have led the State of Massachusetts on the path of promoting energy efficiency and renewable energy.[8] The State has set a goal of obtaining 20% of its electricity capacity from renewable energy

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4. 2008 Mass. Acts 326–27.

5. 2008 Mass. Acts 379; *see also* IAN A. BOWLES, EXEC. OFFICE OF ENERGY & ENVTL. AFFAIRS, MASSACHUSETTS CLEAN ENERGY AND CLIMATE PLAN FOR 2020, at ES-10 (2010) (noting that Massachusetts' Renewable Portfolio Standard "will require 15 percent of electricity supply to be from renewable sources by 2020").

6. Press Release, Mass. Exec. Office of Energy & Envtl. Affairs, *supra* note 2 (quoting Department of Energy Resources Commissioner Mark Sylvia).

7. *See, e.g.*, *Turbine Flicker, Noise at Center of Kingston Debate*, MYFOXBOSTON.COM (Feb. 6, 2013, 10:47 AM), http://www.myfoxboston.com/story/20967743/turbine-flicker-noise-at-center-of-kingston-debate.

8. *See* COMMONWEALTH OF MASS. EXEC. OFFICE OF ENERGY & ENVTL. AFFAIRS, DEP'T OF ENERGY RES. GREEN CMTY. DIV., ANNUAL REPORT TO THE MASSACHUSETTS GENERAL COURT, APRIL 2013, at 1 (2013) [hereinafter ANNUAL REPORT].

projects by 2020.[9] As part of this goal, 2000 megawatts (MW) of electricity is expected to come from wind energy.[10] Currently, the State has reached only five percent of this goal—wind energy supplies 103 MW.[11] The reasons for this small amount are attributed to the State's high population density—ranked third of the fifty United States[12]—including high land prices, conflicts with other residential and commercial land-uses,[13] high cost of offshore wind installations,[14] and Not-In-My-Back-Yard (NIMBY) sentiments.[15] As a result, onshore wind installations are relatively few and are predominantly small in capacity,[16] while the first proposed offshore wind project in the

9. One of Massachusetts' goals is to "meet at least 20 per cent of the commonwealth's electric load by the year 2020 through new, renewable and alternative energy generation." 2008 Mass. Acts 379.

10. *Renewable Energy Snapshot*, MASS. DEP'T ENERGY RES. (Oct. 1, 2013), http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/renewable-energy-snapshot.html [hereinafter *Snapshot*].

11. *Id.*

12. *United States—Population Per Square Mile, 2010 by State*, INDEX MUNDI, http://www.indexmundi.com/facts/united-states/quick-facts/all-states/population-density#chart (last visited Oct. 20, 2013) (aggregating 2010 U.S. Census data and ranking Massachusetts the state with the third highest population per square mile based on the 2010 census); *see also State and County QuickFacts—Massachusetts*, U.S. CENSUS BUREAU (last updated June 27, 2013, 1:52 PM), http://quickfacts.census.gov/qfd/states/25000.html. In 2010 Massachusetts had an estimated 839.4 persons per square mile. *United States—Population Per Square Mile, 2010 by State*, *supra*.

13. Roopali Phadke, *Steel Forests or Smoke Stacks: The Politics of Visualisation in the Cape Wind Controversy*, 19 ENVTL. POL. 1, 1–3 (2010). Visual competition between existing and proposed wind energy land-uses is a prominent concern. *Id.*

14. Mark J. Kaiser & Brian F. Snyder, *Modeling Offshore Wind Installation Costs on the U.S. Outer Continental Shelf*, 50 RENEWABLE ENERGY 676, 687 (2013) (using an inclusive model to estimate that the "Cape Wind" offshore wind farm project, to place 130 wind turbines off the coast of Cape Cod, will have an expected cost of $120 million).

15. *See* Patrick Devine-Wright, *Beyond NIMBYism: Towards an Integrated Framework for Understanding Public Perceptions of Wind Energy*, 8 WIND ENERGY 125, 126 (2005) (providing that wind energy is differentiated from other forms of energy production by "the juxtaposition of high and stable levels of general public support with frequent local opposition to actual development, a phenomenon that has become known as the NIMBYism (not in my back yard) attitude").

16. *Snapshot*, *supra* note 10.

United States—Cape Wind—has become emblematic of United States opposition at the local level.[17]

To encourage energy efficiency and renewable energy generation, the State has implemented numerous environmental and energy initiatives. Massachusetts is one of the early adopters of electric-utility restructuring legislation—as early as 2002, the State put into effect renewable portfolio standard (RPS) regulations that required all retail electricity providers to utilize new renewable energy sources for at least 1% of their power supply in 2003, increasing to 4% by 2009, and to 15% by 2020.[18] Moreover, "to assist the Commonwealth's municipalities and other local government bodies to: reduce energy consumption and costs, reduce pollution, facilitate the development of renewable and alternative energy resources, and create local jobs related to the building of renewable and alternative energy facilities and the installation of energy-efficient equipment,"[19] Governor Deval Patrick signed into law the Green Communities Act in 2008.[20] The Act was landmark legislation, as it put the power of both decision-making and execution of energy restructuring in the hands of communities. As the Commissioner of the Department of Energy Resources (DOER) stated earlier this year, "Massachusetts' clean energy revolution continues its momentum in large part because of leadership at the local level."[21]

As Massachusetts marks the fifth year of the adoption of the Act, 110 communities have earned the "Green Community" designation.[22] These communities are "diverse geographically, socio-economically, and in size," and represent "more than 45 percent of the Commonwealth's population . . . ."[23] When towns commit themselves and are awarded a Green Community designation, they are eligible to receive grant awards, which

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17. *See* Jennifer Levitz, *Cape Cod Wind Farm Tiptoes Ahead*, WALL ST. J. (Aug. 10, 2012, 6:53 PM), http://online.wsj.com/news/articles/SB10000872396390444900304577581460741815638 (describing local opposition to Cape Wind, the first offshore wind farm in the United States).

18. 1997 Mass. Acts 888–89.

19. ANNUAL REPORT, *supra* note 8, at 1 (quoting 2008 Mass. Acts 326).

20. *Id.*

21. Press Release, Mass. Exec. Office of Energy & Envtl. Affairs, *supra* note 2.

22. *Id.*

23. ANNUAL REPORT, *supra* note 8, at 3.

start at $13,500.[24] These "grants are funded not through taxpayer revenue, but by carbon allowance auction proceeds under the Regional Greenhouse Gas Initiative (RGGI) as well as Alternative Compliance Payments (ACP) made under the Renewable Portfolio Standard."[25] "By statute, up to $10 million annually can be dedicated to the Green Communities program."[26]

To become recognized and designated as a "Green Community," a municipality must meet five clean energy benchmarks.[27] Three of them refer to energy efficiency improvements—of municipal buildings and municipal vehicles.[28] Two of the benchmarks refer to renewable energy implementation and include the provision of "as-of-right" siting in designated locations and the adoption of an "expedited application and permitting process" for "as-of-right" energy facilities.[29] "As-of-right" is defined as siting (of facilities for renewable/alternative energy generation, research and development, or manufacturing facilities) that provides for the allowed use of these facilities and does not unreasonably regulate or require a special permit or variance.[30] "As-of-right" development projects that meet local zoning bylaws, as well as state and federal laws, cannot be prohibited.[31] Communities served by municipal light departments can become eligible to participate in the Green Communities program.[32] The minimum power generation requirement for on-shore wind is 600 kilowatts (kW), and for solar the minimum required is 250 kW of output.[33] Regarding the second benchmark (i.e., expedited permitting), the law stipulates that all permitting

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24. *Id.* at 4.
25. *Id.* at 3.
26. *Id.*
27. MASS. DEP'T OF ENERGY RES. ET AL., CRITERION 1: AS-OF-RIGHT SITING VIA GENERATION, R&D, OR MANUFACTURING 1 (2013) [hereinafter CRITERION 1].
28. *See* 2008 Mass. Acts 327.
29. *Id.* at 326.
30. CRITERION 1, *supra* note 27, at 2.
31. *Id.*
32. 2008 Mass. Acts 334 (providing that municipal light departments are exempted from renewable energy portfolio standards, subject to certain conditions).
33. CRITERION 1, *supra* note 27, at 2.

procedures must be completed within one year.[34] However, some municipalities in Massachusetts that have not been designated as Green Communities and have investor-owned utilities have adopted wind bylaws, which means that the municipalities need a discretionary permit, and the facility's approval may exceed one year from the date of initial application.[35]

II. STUDY CONTEXT

The Commonwealth's community division comprises "351 cities, towns, and other local government bodies . . . ."[36] Of those, close to one-third (110) have received the designation "Green Community."[37] In order to examine the relationship between the "Green Community" designation and the level of acceptance of wind energy projects in the State, three Massachusetts communities were selected for analysis—Hull, Kingston, and Falmouth. A review of legal and municipal literature shows that two of the three towns are not part of the Green Communities framework, while one is—Kingston.[38] Hull, although not a Green Community, has a municipal light plant[39] and is the first town to have a commercial-scale wind turbine operating on the East Coast of the United States.[40] Kingston and Falmouth have investor-owned utility companies[41] that provide electricity to the towns, and both have adopted wind bylaws.[42]

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34. 2008 Mass. Acts 326–27 (expedited permitting and siting "shall not exceed 1 year from the date of initial application to the date of final approval . . . .").

35. *Id.* at 334.

36. ANNUAL REPORT, *supra* note 8, at 4.

37. *Id.* at 3.

38. *Id.* at 11–18 (listing all 110 Green Communities, which does not include Hull nor Falmouth).

39. RENEWABLE ENERGY RES. LAB., UNIV. OF MASS. AT AMHERST, WIND POWER ON THE COMMUNITY SCALE—COMMUNITY WIND CASE STUDY: HULL 1 (2006) [hereinafter HULL I], *available at* http://www.ceere.org/rerl/publications/published/communityWindFactSheets/RERL_Case_Study_Hull_Wind_One.pdf.

40. *Id.*

41. Both Kingston and Falmouth are provided electricity by NSTAR, a division of utility corporation Northeast Utilities. *Communities We Serve*, NSTAR, http://www.nstar.com/about_nstar/communities.asp (last visited Oct.

The town of Kingston started conducting feasibility studies for generating wind power in 2002, when its Energy Committee was established.[43] With leadership provided by local citizen champions (i.e., Energy Committee members) and support from the town government, the town has taken a proactive approach and laid the groundwork for a potential wind project since 2004.[44] A site screening report, presenting suitable resource locations, was prepared in 2007 by a private consulting group with financial assistance from the State.[45] At a Town Meeting in April 2007,[46] an amendment to the Kingston zoning bylaws was passed to include a "Wind Turbine Overlay District."[47] "Due to the proximity of the proposed turbine location to roadways and the Kingston MBTA rail line," additional planning and permitting issues associated with turbine setbacks were also considered.[48] Subsequently, Kingston was designated a "Green Community" on May 25, 2010 and has since received $363,017 for improving the energy efficiency of its municipal buildings—school, library, and fire station.[49]

In June 2006, an article printed in the local newspaper, *The Patriot Ledger*, "introduce[d] the community to the results of the wind speed data" and "described the project's progress."[50] Several meetings were held with residents since 2007 and

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20, 2013); *About NSTAR,* NSTAR, http://www.nstar.com/about_nstar/ (last visited Oct. 20, 2013).

42. TOWN OF FALMOUTH, MASS. CODE § 240-166 (2013), *available at* http://ecode360.com/9076030; TOWN OF KINGSTON, MASS. BY-LAWS § 4.16 (2012), *available at* http://www.kingstonmass.org/vertical/sites/%7B14403534-636B-4C7F-A416-D66D8321CF44%7D/uploads/GBL_as_of_4-6-13_E-Copy.pdf.

43. TOWN OFFICERS OF THE TOWN OF KINGSTON, MASS., ANNUAL REPORT 101 (2002) ("The Kingston Secure Energy Future Committee was formed on a unanimous vote of the Board of Selectmen in the Summer of 2002.").

44. *See* KEMA, INC. & ECOLOGY & ENV'T, INC., TOWN OF KINGSTON COMMUNITY WIND PROJECT SITE SCREENING REPORT 1 (2007).

45. *See id.* at II.

46. TOWN OFFICERS OF THE TOWN OF KINGSTON, MASS., ANNUAL REPORT 39 (2007).

47. *Id.* at 84–93.

48. KEMA, INC. & ECOLOGY & ENV'T, INC., *supra* note 44, at 40.

49. ANNUAL REPORT, *supra* note 8, at 13. Kingston was designated as a Green Community on May 25, 2010 and awarded one Green Communities grant of $163,528 and a Competitive grant of $199,489. *Id.*

50. KEMA, INC. & ECOLOGY & ENV'T, INC., *supra* note 44, at 34.

public opinion was generally positive.[51] Despite the positive opinion, Kingston installed its wind turbines in 2011–2012[52]—somewhat later than Falmouth[53] and much later than Hull.[54] However, the capacity produced and the number of wind turbines installed in Kingston is the highest of the three towns—five turbines with capacity of 8.1 MW in total.[55] The first operating wind turbine, since October 2011, is the smallest of the five, at 100 kW.[56] It is sited at the Kingston layover facility, which belongs to the Massachusetts Bay Transportation Authority (MBTA) and supplies 65% of the commuter rail station's electricity.[57] A second 300-kW wind turbine is also planned.[58] Together, these two wind turbines are expected to save the MBTA $100,000 in electricity costs annually.[59] Kingston, a town of 12,629 inhabitants,[60] also has a municipally owned two-MW turbine, called the Independence.[61]

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51. *See* KINGSTON, MASS., CHRONOLOGY OF WIND TURBINES IN TOWN OF KINGSTON (2012), *available at* http://www.kingstonmass.org/vertical/sites/%7B14403534-636B-4C7F-A416-D66D8321CF44%7D/uploads/wind_turbine_chronology.pdf.

52. *Id.* at 2–3.

53. On April 6, 2010 the Wind I wind turbine facility began operation in Falmouth. KAREN CARDEIRA, FALMOUTH WIND ENERGY—TIME LINE 2 (2013) [hereinafter FALMOUTH TIME LINE], *available at* http://www.cbuilding.org/sites/cbi.drupalconnect.com/files/8.2.7.13%20WTOP_Falmouth%20Wind%20Energy%20Time%20Line.pdf.

54. The "Hull Wind One" facility was installed in 2001. HULL I, *supra* note 39, at 1.

55. *See* malcolm109, *Is Scituate Wind Outproducing Hullwind?*, HULLWIND BLOG (July 23, 2012), http://hullwind.com/2012/07/23/is-scituate-wind-outproducing-hullwind/ (comparing the capacity and actual performance of Falmouth, Kingston, and Hull turbines).

56. Press Release, Mass. Bay Transp. Auth., Patrick-Murray Administration Breaks Ground on Kingston Wind Turbine Program to Boost State's Energy Efficiency (Oct. 25, 2011), *available at* http://mbta.com/about_the_mbta/news_events/?id=22919&month=&year=.

57. *Id.*

58. *Id.*

59. *Id.*

60. Kingston's 2013 Town Census reported a population of 12,629. *About Kingston*, KINGSTON, MASS., http://www.kingstonmass.org/index.asp?SEC=0ED6A637-D0E2-478F-9489-F4524FA8ADBD&Type=B_BASIC (last visited Oct. 20, 2013).

61. KINGSTON, MASS., FREQUENTLY ASKED QUESTIONS—KINGSTON WIND INDEPENDENCE 3 (2012), *available at* http://www.kingstonmass.org/vertical/sites/%7B14403534-636B-4C7F-A416-D66D8321CF44%7D/uploads/FAQWindIndependence.pdf.

It was the last one to start operating, in May 2012.[62] A few months prior (January 2012) three privately owned two-MW Gamesa turbines were installed and started operating on privately held gravel pit grounds in Kingston.[63] Both the municipal and the privately owned turbines have received complaints from nearby residents regarding flicker and noise.[64]

The other two towns also have wind turbines built in residential areas. Hull, a town of 10,293 inhabitants,[65] has two wind turbines: Hull Wind I, installed in 2001, and Hull Wind II, installed in 2006.[66] Both are owned and operated by the Hull Municipal Light Plant (HMLP).[67] Hull Wind I is a 660-kW turbine and it was the first "suburban-sited" turbine in North America.[68] Hull Wind II is much larger than Hull Wind I—1.8 MW.[69] It is located on the town landfill.[70] Together, both turbines supply energy to homes along with the town's traffic and street lights, totaling roughly 12% of Hull's total power needs.[71]

The idea to install wind turbines in Falmouth came around 2002—at the same time as in Kingston—in response to the

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62. Kathryn Gallerani, *Kingston Independence Commissioning Still Set for Mid-May*, WICKED LOCAL KINGSTON, http://www.wickedlocal.com/kingston/news/x1942560429/Kingstons-Independence-commissioning-still-set-for-mid-May (last updated Apr. 30, 2012, 1:06 PM).

63. *Kingston Wind Is Operational*, NO FOSSIL FUEL (Jan. 25, 2012, 12:00 PM), http://nofossilfuel.com.s3-website-us-east-1.amazonaws.com/news/files/77801f9f8402f5489f820f41ea661984-1.html; *see also No Fossil Fuel—Kingston Wind (NFF-KW): 6MW AC*, NO FOSSIL FUEL, http://nofossilfuel.com.s3-website-us-east-1.amazonaws.com/wind/ (last visited Oct. 20, 2013).

64. *See Turbine Flicker, Noise at Center of Kingston Debate*, *supra* note 7.

65. *State & County QuickFacts—Hull CDP, Massachusetts*, U.S. CENSUS BUREAU (June 27, 2013, 1:52 PM), http://quickfacts.census.gov/qfd/states/25/2531680.html.

66. JAMES F. MANWELL ET AL., HULL WIND II: A CASE STUDY OF THE DEVELOPMENT OF A SECOND LARGE WIND TURBINE INSTALLATION IN THE TOWN OF HULL, MA 1 (2006) [hereinafter HULL II], *available at* http://www.ceere.org/rerl/publications/published/2006/AWEA%202006%20Hull%20II.pdf.

67. *Id.* at 2.

68. HULL I, *supra* note 39, at 1.

69. HULL II, *supra* note 66, at 1.

70. *Id.*

71. *Id.* at 2.

RPS introduced that year in the State.[72] The Board of Selectmen in Falmouth, as in Kingston, established an Energy Committee and tasked it with investigating the possibility of installing wind turbines on town-owned land.[73] A few years later, private developers started looking into siting wind turbines as well, but on privately owned land.[74]

After feasibility studies were completed and necessary permits obtained, the town of Falmouth, with a population of 31,531 inhabitants,[75] installed two 1.65-MW Vestas, called Wind I and Wind II, at the wastewater treatment plant in town.[76] Wind I began operation in March 2010,[77] but because of noise and health concerns, was shut down in November 2011.[78] Wind II was kept offline until February 2012 when it received approval to begin operation.[79] However, because of neighbors' concerns about negative impacts of the turbines on their health, well-being, property values, and safety, both turbines were allowed to operate at their full capacity only from 7 AM to 7 PM; they do not function from 7 PM to 7 AM.[80] The same year Wind I became operational, a private developer installed a 1.65-MW Vestas turbine, which began operation in the summer

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72. TOWN OF FALMOUTH, MASS., ANNUAL REPORTS 167 (2004) (reporting that "[t]he Energy Committee was formed in 2002" to explore energy conservation "and the viability of renewable energy sources," including turbines, in collaboration with other Massachusetts towns).

73. *See id.* In 2002 the Energy Committee contacted other municipalities and agencies about energy solutions and in 2004 "began the evaluation of erecting a wind turbine at the wastewater treatment plant . . . ." *Id.*

74. *See* Heather Goldstone, *New Report on Wind Turbine Sound Provides Suspect but No Smoking Gun*, CLIMATIDE (Jan. 17, 2012), http://climatide.wgbh.org/2012/01/new-report-on-wind-turbine-sound-provides-suspect-but-no-smoking-gun/.

75. *United States Census 2010—Barnstable County*, SECRETARY COMMONWEALTH MASS., http://www.sec.state.ma.us/census/barnstable.htm (last visited Oct. 20, 2013).

76. *See* Sean F. Driscoll, *Falmouth Wind Turbines Under Review*, S. COAST TODAY (July 2, 2013, 9:09 AM), http://www.southcoasttoday.com/apps/pbcs.dll/article?AID=/20130702/NEWS/130709978 (describing wattage and location of the Falmouth turbines).

77. FALMOUTH TIME LINE, *supra* note 53, at 2.

78. *Id.* at 4.

79. *Id.* at 5.

80. The Falmouth Board of Selectmen made this change in April 2012. *Id.* at 5.

of 2010.[81] Named the Notus, the turbine was sited in an industrial location—the Falmouth Technology Park.[82] After starting operation, it has not raised as many complaints as the two municipal turbines.[83]

III. LITERATURE REVIEW AND RESEARCH QUESTIONS

The purpose of the present Article is to examine the factors that influence residents' attitudes toward wind energy and analyze how their level of support for onshore wind facility siting differs based on perceptions of the siting process, project familiarity, and opportunities to participate in the siting decision.

Numerous articles that investigate public acceptance of wind energy make the point that the majority of citizens in the United States and around the world exhibit high approval of wind energy as an alternative to fossil fuels and other traditionally used fuels for the production of electricity, while objecting to local projects.[84] In the United States, for example, one national poll revealed that 87% of respondents believed "using renewable energy sources, like solar and wind power, to generate electricity is a good idea because they are readily available and better for the environment."[85] A 2010 survey indicated a majority of the American public "favor setting limits on carbon dioxide emissions and making companies pay

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81. NOTUS CLEAN ENERGY, LLC, http://www.notuscleanenergy.com/ (last visited Oct. 20, 2013).

82. *Id.*

83. *See* WIND TURBINE OPTIONS ANALYSIS PROCESS, FINAL REPORT TO THE FALMOUTH BOARD OF SELECTMENT, FALMOUTH, MA 1, 17–18 (2013), *available at* http://www.falmouthmass.us/energy/wtopreport.pdf. *But see* Susan Donaldson James, *'Wind Turbine Syndrome' Blamed for Mysterious Symptoms in Cape Cod Town*, GOOD MORNING AM. (Oct. 21, 2013, 4:30 PM), http://gma.yahoo.com/wind-turbine-syndrome-blamed-mysterious-symptoms-cape-cod-112835454—abc-news-wellness.html (reporting on a current nuisance suit against the Notus turbine).

84. *E.g.*, Charles R. Warren et al., *'Green On Green': Public Perceptions of Wind Power in Scotland and Ireland*, 48 J. ENVTL. PLAN. & MGMT. 853, 872 (2005) ("Large majorities of people are strongly in favour of their local windfarm, their personal experience having engendered positive attitudes.").

85. *CBS News/New York Times Poll, April 20–24, 2007 Poll*, N.Y. TIMES, 12 (Apr. 24, 2007), http://graphics8.nytimes.com/packages/pdf/national/20070424_poll.pdf.

for their emissions, even if it may mean higher energy prices."[86] The support at the national level, however, does not automatically translate into successful project implementation. On the contrary, many projects encounter resistance at the local level and fail due to strong vocal objections.[87]

The explanation provided in the literature for the "gap" between the high level of public support for renewable energy technologies and opposition to siting specific projects at the local level is that people support renewable energy technologies in principle, but when they are faced with a decision for local siting, they start thinking about the inconveniences projects may bring to them. For example, these inconveniences can be mostly from construction, the negative impacts projects may have on them personally (destroy the view or decrease property values), or on the surrounding environment (harm birds and animals).[88]

Two ways have been suggested for addressing this "qualified support," defined as support for wind development while believing "there are general limits and controls that should be placed on its development"[89]—changing people's minds or changing key features of wind projects so that they meet the criteria for support. In terms of changing people's minds, Derek Bell et al. discuss misinformation on a macro scale (being uninformed about the potential of wind energy for better environmental results) and on a project scale (thinking that a certain project will be dangerous for local birds), and posit that information should always be "accessible and comprehensible" in order to overcome these problems.[90] Policy makers and developers should not assume that people holding

86. *Support for Alternative Energy and Offshore Drilling*, PEW RESEARCH, CTR. PEOPLE & PRESS (Mar. 2, 2010), http://www.people-press.org/2010/03/02/support-for-alternative-energy-and-offshore-drilling.

87. *See, e.g.*, Dan van der Horst, *NIMBY or Not? Exploring the Relevance of Location and the Politics of Voice Opinions in Renewable Energy Siting Controversies*, 35 ENERGY POL'Y 2705, 2705 (2007) (describing "not in my backyard" opposition to energy projects by local residents).

88. Derek Bell et al., *The 'Social Gap' in Wind Farm Siting Decisions: Explanations and Policy Responses*, 14 ENVTL. POL. 460, 460 (2005) (comparing "behaviour motivated by 'self-interest'" and "by concern for the 'common good'").

89. *Id.* at 463.

90. *Id.* at 469.

negative opinions are "ignorant"[91] or misinformed[92] but that they may have other concerns, including risk or safety.[93] Since dissipating such concerns is contingent upon trust, additional "information will always be negotiated by the public,"[94] and considered distorted or unreliable in situations where the public does not trust politicians, developers, or experts.[95] Lack of trust (trust is defined as a belief or feeling that a person or an organization will act in one's best interest) in many aspects of the siting process or project outcome is expected to increase the odds of lower satisfaction.[96]

Often, the "speed, scale, and uncoordinated nature of wind farm 'gold rush,'" which leaves local residents with the impression of complete transformation and industrialization of cherished landscapes, are established as major reasons for protest.[97] In many instances, the siting of new technologies can alter perceptions of "place" identity, which causes residents to object to having projects sited nearby.[98] Developments sited in public places have not always been perceived as improvements in everyday practices and people's lives, but rather as a reflection of political choices.[99] As one historian notes, "[c]learly

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91. Susan Owens, *'Engaging the Public': Information and Deliberation in Environmental Policy*, 32 ENV'T & PLAN. A, 1141, 1141–42 (2000).

92. Judith M. Parks & Kate S. Theobald, *Public Engagement with Information on Renewable Energy Developments: The Case of Single, Semi-Urban Wind Turbines*, 22 PUB. UNDERSTANDING SCI. 49, 52 (2013), *available at* http://pus.sagepub.com/content/22/1/49.full.pdf. Here, misinformation is essentially incorrect information due to context or subjectivity. *Id.*

93. *See* Jeremy Firestone & Willett Kempton, *Public Opinion About Large Offshore Wind Power: Underlying Factors*, 35 ENERGY POL'Y 1584, 1589 (2007).

94. Bell et al., *supra* note 88, at 469.

95. *Id.* at 470.

96. Jeremy Firestone et al., *Public Acceptance of Offshore Wind Power: Does Perceived Fairness of Process Matter?*, 55 J. ENVTL. PLAN. & MGMT. 1377, 1399 (2012) ("[T]he models are inconclusive on which direction causation runs . . . [but] provid[e] some support for the theory that, when individuals are given voice and developer and government agency actions are seen as just (reasonable and fair), outcomes may be produced that feel more satisfying . . . .").

97. Warren et al., *supra* note 84, at 872.

98. Devine-Wright, *supra* note 15, at 134 (providing multiple factors contributing to conception of "place").

99. Phadke, *supra* note 13, at 10–11 (discussing visual perceptions and symbolic meanings).

many Americans feel at least ambivalent about how technological development has impacted, indeed dominated, the land and nature."[100] By involving citizens in all phases of the siting process—from planning to project management and maintenance—community participation has the potential to "alter[ ] the value ascribed to the wind farm through a valorization of the local citizen's role in the decision-making process."[101]

In principle, when towns are awarded the "Green Community" designation and adopt "as-of-right" siting procedures and efficiency measures for their municipal buildings and transportation fleet, their residents—either through the local media or town meetings and communication materials—should be more exposed to discussions about the energy needs of their town, energy conservation, and the benefits of renewable energy facilities, and will be more aware and understanding of the need for renewables. They will be more supportive of having local projects sited in their community than will be residents from towns that have not been officially designated as "Green Communities." It is, therefore, expected that Kingston residents will be more supportive of wind energy projects than residents from Hull and Falmouth.

Moreover, as one of the main purposes of the "Green Community" designation is for towns to collect baseline energy-use data in order to stimulate energy conservation and adoption of renewables at the municipal and private household level,[102] it is hypothesized that the residents from towns designated as Green Communities, such as Kingston, will be better informed about wind energy in general. They will also be more familiar with the local project in particular than the residents from Hull and Falmouth—both towns that do not have the designation.[103] Being better informed would include

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100. ROBERT W. RIGHTER, WINDFALL: WIND ENERGY IN AMERICA TODAY 115 (2011).

101. Marc Poumadère et al., *Public Perceptions and Governance of Controversial Technologies to Tackle Climate Change: Nuclear Power, Carbon Capture and Storage, Wind, and Geoengineering*, 2 WILEY INTERDISC. REV.: CLIMATE CHANGE 712, 718 (2011).

102. ANNUAL REPORT, *supra* note 8, at 4.

103. *See id.* at 11–18 (reporting that Kingston is a Green Community, while Hull and Falmouth are not).

factors such as receiving timely and adequate project information from official sources, as opposed to sources of information that are biased and known for not always providing complete and accurate information, such as the media, friends, relatives, or word of mouth.[104]

IV. METHODS

In order to examine the differences between residents' support for wind energy facility siting and their perceptions about wind energy in towns that have been designated as "Green Communities," the Massachusetts Wind Energy Survey was administered in Spring 2012. The sampling frame for the survey consisted of Massachusetts residents living in one of the three towns—Hull, Kingston, or Falmouth. Addresses for the survey were purchased from Survey Sampling Inc.

The survey was mailed to 3600 randomly selected households from Hull, Kingston, and Falmouth. There were no restrictions as to the type of participant based on gender, income, level of education, or residence type. The only restriction on participation was age—only residents eighteen and older were allowed to participate. The average response rate was 33%.[105]

Table 1. Response rate to the surveys administered in the three Massachusetts towns in Spring 2012.

	Total sent	Undeliverable-wrong address (No Mail Receptacle)	Total delivered	Received filled out	Received blank	Response rate %
Hull	1200	83 (2)	1117	345	16	31%
Kingston	1200	31 (6)	1169	350	22	30%
Falmouth	1200	271 (113)	929	356	50	38%

Note: the average response rate for the three towns is 33%.

104. Parks & Theobald, *supra* note 92, at 61 (concluding that although "local people tended to trust information coming from informal sources" rather than developers, there was a simultaneous need for additional "objective" and "trustworthy" "independent 'expert[s]' on specific proposals, preferably someone familiar with the local area").

105. *Infra* Table 1.

The thirty-four survey questions were divided into three sections. The first section examined residents' wind energy attitudes, reasons for support and opposition, and other specific questions regarding residents' knowledge and opinions of the development of the wind energy projects in town. The second section included questions regarding climate change, environmental preferences, and political orientations, and the third section collected geodemographic data. Responses were coded, entered in a database, and prepared for analysis, using a statistical package called SPSS.[106] The five open-ended questions were coded and entered into a Microsoft Excel spreadsheet.

V. RESULTS

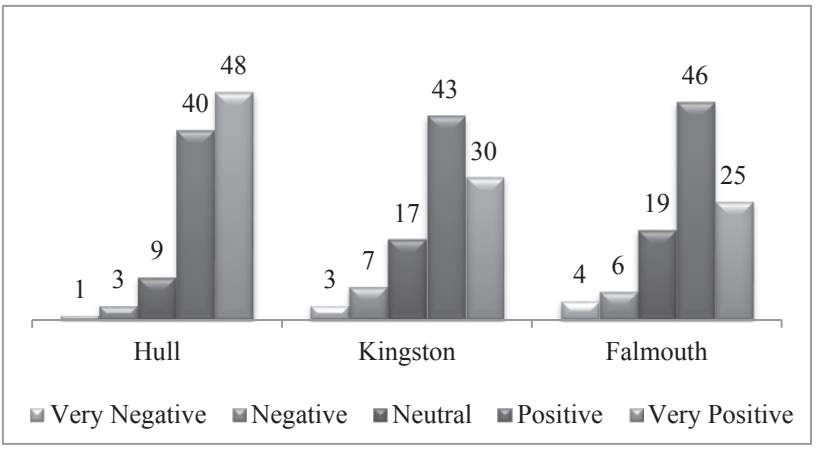
The survey asked respondents about their general attitude toward wind energy. Figure 1 shows that the majority of respondents from the three towns have positive attitudes toward wind energy—88% in Hull, 73% in Kingston, and 71% in Falmouth.[107] These percentages are in line with results from other surveys examining attitudes toward renewable energy technologies.[108] To find whether there is a "gap" between positive attitudes toward wind energy in general and support for building wind energy turbines locally, respondents were asked to directly rate their level of support or opposition for building wind turbines in their communities.

106. *SPSS Software Predictive Analytics Software and Solutions*, IBM, http://www-01.ibm.com/software/analytics/spss/ (last visited Oct. 20, 2013).

107. *See infra* Figure 1.

108. *E.g.*, *Support for Alternative Energy and Offshore Drilling*, *supra* note 86.

Figure 1. General attitude toward wind energy (percent).

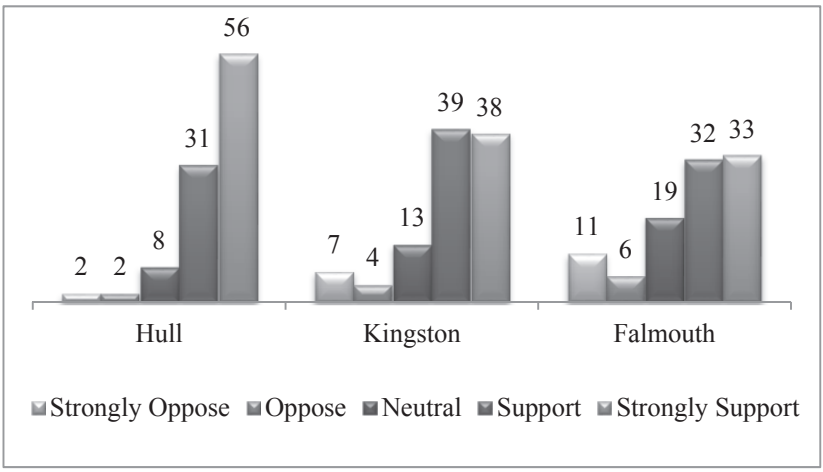


Respondents from the three towns gave predominantly positive responses. The level of support for building wind energy projects within one's community—87% in Hull, 77% in Kingston, and 65% in Falmouth[109]—largely mimics the positive attitudes to wind energy in general.[110] It is interesting to note that for Hull, there are only small percentage changes in the positive and negative responses to wind energy development in general, and to support for building wind energy projects in one's community.[111] For Kingston, although there are no significant changes in the negative opinions between the general attitude and the level of opposition for building wind energy turbines within one's community, there is an increase from the percent expressing positive opinions to wind energy in general (73%) and the level of support for building wind energy within one's community (77%).[112] For Falmouth, on the other hand, the opposite observation can be made—the percentage of positive attitudes (71%) is higher than the percentage of support expressed for building wind energy turbines locally (65%).[113] It is also notable that the percentage of negative

109. *See infra* Figure 2.
110. *Compare supra* Figure 1, *with infra* Figure 2.
111. *See infra* Figure 2.
112. *See infra* Figure 2.
113. *See infra* Figure 2.

answers increases for Falmouth from 10% to 17%, while it remains the same for Hull and Kingston.[114]

Figure 2. Support for building wind turbines in one's community (percent).



An examination of the frequency distributions in each figure—of the general attitudes and the level of support in one's community—reveals an emerging pattern: respondents from Hull tend to express the highest level of support and the strongest agreement with the positive impacts of the wind turbines operating in their community.[115] They also express the strongest disagreement with the negative impacts of wind energy.[116] The opposite relationship describes the responses from Falmouth.[117] The responses from Kingston almost always fall in the middle.[118]

Next, respondents' familiarity with the wind energy projects in the three towns was examined by asking respondents to directly rate the level of their familiarity. We expected residents from Kingston to be more informed about

114. *See infra* Figure 2.
115. *See supra* Figure 2.
116. *See supra* Figure 2.
117. *See supra* Figure 2.
118. *See supra* Figure 2.

the wind energy projects in their town because Kingston has been designated as a "Green Community" while the other two towns have not. The results showed this was not the case.[119] Respondents from Kingston exhibit a level of familiarity that is the same as the level of familiarity of respondents from Hull and substantially lower than Falmouth respondents' level of familiarity.[120] Respondents from Falmouth rate their level of familiarity higher—the percentage of "familiar" and "very familiar" responses is 56%, compared to 36% for Hull and Kingston.[121] The implications of this finding are discussed in the next section.[122]

Table 2. Respondents' familiarity with the project at the time the survey was conducted (Spring 2012).

	Hull (%)	Kingston (%)	Falmouth (%)	χ^2	p-value	Effect size (*V*)
Familiarity with the project				63.72	<.001	.17
Not familiar	18	17	5			
Somewhat familiar	47	48	39			
Familiar	27	26	34			
Very familiar	9	10	22			

Several other questions pertaining to respondents' level of familiarity were also included in the survey and deserve comment. One asked respondents about the first time they learned about the project. The answers produce significant differences. While the majority (74%) of Hull respondents found out about their project during planning, less than 50% of respondents from both Falmouth and Kingston heard about the project during the planning stage.[123] In addition, almost half of Kingston respondents (43%) say they found out during construction.[124] While a relatively small percentage of Hull and

119. *See infra* Table 2.
120. *Infra* Table 2.
121. *Infra* Table 2.
122. *See infra* Part VI.
123. *See infra* Table 3.
124. *Infra* Table 3. This is a substantially higher percentage than reported in the other towns.

Kingston respondents (13% and 11% respectively) found out about the project during operation, a quarter of Falmouth respondents found out about the project after the planning and construction phases were completed.[125]

The answers to the question regarding the sources of information used for learning about the wind energy projects in town also produce substantial differences in responses.[126] While 37% of Hull respondents say they found out about the project in their town from an official source—27% from a town hall meeting or notice, 2% from the developer, and 8% from the town's energy committee—that percentage is lower for Kingston (22%) and substantially lower for Falmouth (12%).[127] The effect size indices for the last two questions (Cramer's ***V***) are .24 to .26, correspondingly, suggesting weak to medium[128] or minimal to typical differences among responses from the three towns.[129]

125. *Infra* Table 3.

126. *Infra* Table 3.

127. *Infra* Table 3.

128. *See* JACOB COHEN, STATISTICAL POWER ANALYSIS FOR THE BEHAVIORAL SCIENCES 224–25 (1988).

129. *See* Jerry J. Vaske et al., *Communicating Judgements About Practical Significance: Effect Size, Confidence Intervals and Odds Ratios*, 7 HUM. DIMENSIONS WILDLIFE 287, 290–92, 291 tbl.1 (2002) (differentiating between minimal and typical effect size relationships in Table 1).

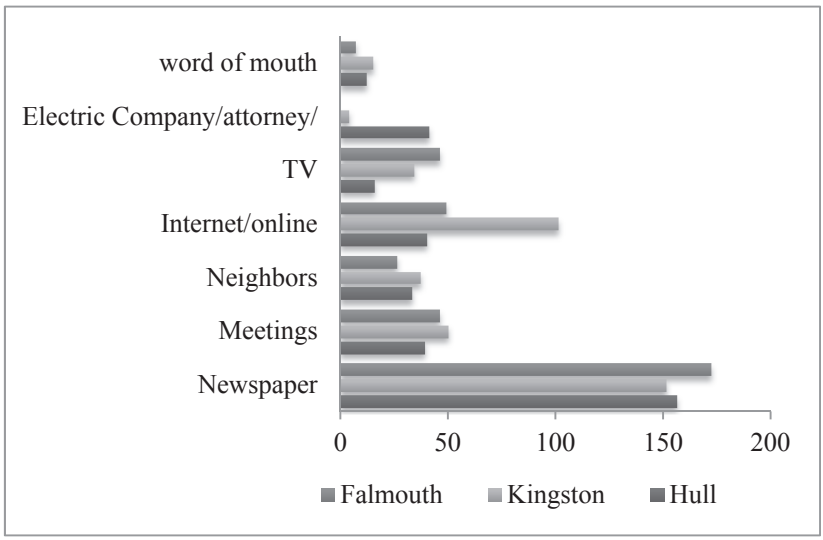
Table 3. Differences in respondents' perceptions of the permitting process from the three towns.

Questions regarding respondents' perceptions of the permitting process:	Hull (%)	Kingston (%)	Falmouth (%)	χ^2	p-value	Effect size (*V*)
First heard about the project – when?				112.21	<.001	.24
During planning	74	46	49			
During construction	12	43	26			
During operation	13	11	25			
First heard about the project – how?				143.10	<.001	.26
From the developer	2	1	2			
From a town hall meeting/notice	27	17	10			
From the energy committee	8	4	0			
From a friend/neighbor/ relative	13	15	12			
From the media	36	36	67			
Other	14	27	10			
Attended public meetings						
Yes	17	11	16	35.79	<.001	.14
No, I wasn't informed	28	48	30			
No, my schedule didn't allow it	56	41	55			
Adequacy of efforts to be informed						
Superb	11	4	2	84.77	<.001	.21
Adequate	50	32	39			
Below my expectations	24	34	42			
No efforts were made	15	30	17			

It should also be noted that one of the available choices to the question about the sources of information was "other." There, respondents were given the opportunity to self-specify the source of information most relevant to them. Surprisingly, over one hundred Kingston respondents say they found out about their project from the Internet.[130] Figure 3 portrays the stark contrast among the answers of respondents from the three towns regarding the sources of information residents used to first find out about the project in their town.[131]

130. *Infra* Figure 3.
131. *See infra* Figure 3.

Figure 3. Sources of information residents used to learn about their project for the first time.



Note: the responses add up to over 100, as they represent number of responses rather than percentages.

Two other questions that refer to respondents' level of familiarity with the projects deserve attention: whether respondents attended any public meetings and the adequacy of efforts by project developers and town officials to keep residents informed. As the results in Table 3 show, residents' responses from the three towns produce significant differences again.[132] It is interesting to note that respondents from Kingston not only attended public meetings the least, but also that 48% of them attribute the low attendance to lack of information about meetings rather than lack of time.[133] In contrast, the majority of respondents from both Hull and Falmouth did not attend any public meetings because "their schedule did not allow it."[134] Moreover, only 32% of Kingston respondents rate the efforts of the responsible parties to keep residents informed about the local wind energy project as

132. *See supra* Table 3.
133. *Supra* Table 3.
134. *Supra* Table 3.

"adequate," compared to 39% of Falmouth and 50% of Hull. About one-third of Kingston residents say "no efforts were made" to keep them informed, compared to 17% of respondents from Falmouth and 15% from Hull.[135]

VI. DISCUSSION AND CONCLUSION

As electricity procurement shifts from coal and oil to alternatives that produce less CO_2 (including gas, nuclear, and renewables), states like Massachusetts shift their attention to more locally generated electricity for both economic and security reasons while facing similar circumstances:

> Massachusetts sits at the end of energy pipelines and imports all of its fossil-fuel based energy sources—some from areas that are unstable or hostile to the U.S. Of the billions of dollars Massachusetts spends annually to buy the energy that runs its power plants, buildings, and vehicles, much of it flows to other states and places like South America, Canada, and the Middle East. That is lost economic opportunity that Massachusetts stands poised to reclaim through investments in home-grown renewable energy and energy efficiency projects such as those supported by Green Communities grants.[136]

The Massachusetts Green Communities Act is an example of cornerstone legislation that gives the power of making renewable energy siting decisions to towns and local communities. As it becomes increasingly more difficult to site wind energy projects in close proximity to residential areas, policy makers and state officials need policies that give communities more autonomy to decide what their renewable energy future should be. By adopting "as-of-right" siting and expedited rules for siting, towns are "inviting" developers to build renewable energy facilities and site projects. It was, therefore, hypothesized that residents from designated "Green Communities" (e.g., Kingston) will be better informed about and more supportive of the wind energy projects in their towns than residents from towns that do not have the designation, like Hull and Falmouth.

The pattern that emerged from the responses to most questions here—residents from Hull showing most positive attitudes, residents from Falmouth the most negative, and

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135. *Supra* Table 3.

136. Press Release, Mass. Exec. Office of Energy & Envtl. Affairs, *supra* note 2.

residents from Kingston in-between the two towns—indicates that residents from Green Communities are not necessarily more supportive of wind energy in general or of building wind energy projects in their communities than are residents from other towns, and that there are other factors that influence attitudes and level of support besides the fact that a community has received the "Green Community" designation.[137] It is interesting to note that respondents from Kingston support the building of wind energy turbines locally more than they support wind energy in general.[138] This could be an indication that they understand the benefits of wind energy for the community better than they understand the need for renewables. Whether or not the higher local support can be attributed to the fact that a community is a designated "Green Community" is not clear. More in-depth analysis is needed to understand if respondents from Kingston express stronger support for building wind turbines locally than residents from the other two towns.

One of the indicators for higher local support, according to the literature on public acceptance of renewable energy technologies, is the level of residents' familiarity.[139] Here, however, the results show that residents from Kingston do not show a higher level of familiarity with the local wind energy project in town than residents from Hull. On the other hand, although the level of familiarity in Kingston and Hull is lower than the level of familiarity in Falmouth, the level of support for wind energy in general and for building wind energy turbines locally is higher in those two towns.[140] One of the explanations could be attributed to the dynamic nature of attitudes—initial opinions and concerns change as a result of the discourse of the siting process—people acquiring new information, receiving input from local meetings, friends, and the media, and exchanging views. In other words, people often have different points of view pre-proposal; they may be supportive of the technology, against it, or support it to appear "green."[141]

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137. *Supra* Figure 1; *supra* Figure 2.
138. *Supra* Figure 2.
139. *E.g.*, Parks & Theobald, *supra* note 92, at 61.
140. *Compare supra* Table 2, *with supra* Figure 2.
141. Van der Horst, *supra* note 87, at 2712.

The disparity between the level of support for the local project and respondents' familiarity leads to important research questions: Why does higher level of familiarity not lead to higher level of support and vice versa? Why are residents from Falmouth more familiar and less supportive? What role does the timing of information provision—early in the process—play for increased level of support? When and what kind of information should be provided in the permitting process? Is the expressed higher familiarity with the project in Falmouth an indicator that people get more familiar when they feel personally affected rather than because they are a part of a Green Community?

The residential areas in which wind energy projects have been sited in Massachusetts are significantly informative examples of the energy transition from a centralized generation and storage system to a community-scale, on-demand, close-to-the-resource-and-customer energy system.[142] Unlike traditional energy facilities built away from urban establishments, which minimize the visual "disruption" effect, wind turbines are sited within sight and reach of everyday life. This new "energy landscape," in which wind energy turbines are seen almost everywhere, creates the need for new "planning paradigms," setting the overall visibility, density, and distances to nearest residences in order to decrease the possibility for more polarization and opposition.[143]

142. *See* Martin J. Pasqualetti, *Morality, Space, and the Power of Wind-Energy Landscapes*, 90 GEOGRAPHICAL REV. 381, 389–90 (2000) (describing this shift as "threatening" to some consumers).

143. Bernd Möller, *Spatial Analyses of Emerging and Fading Wind Energy Landscapes in Denmark,* 27 LAND USE POL'Y 233, 240 (2010) (noting how wind turbines interact with their surroundings and are perceived as a function of various factors).

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