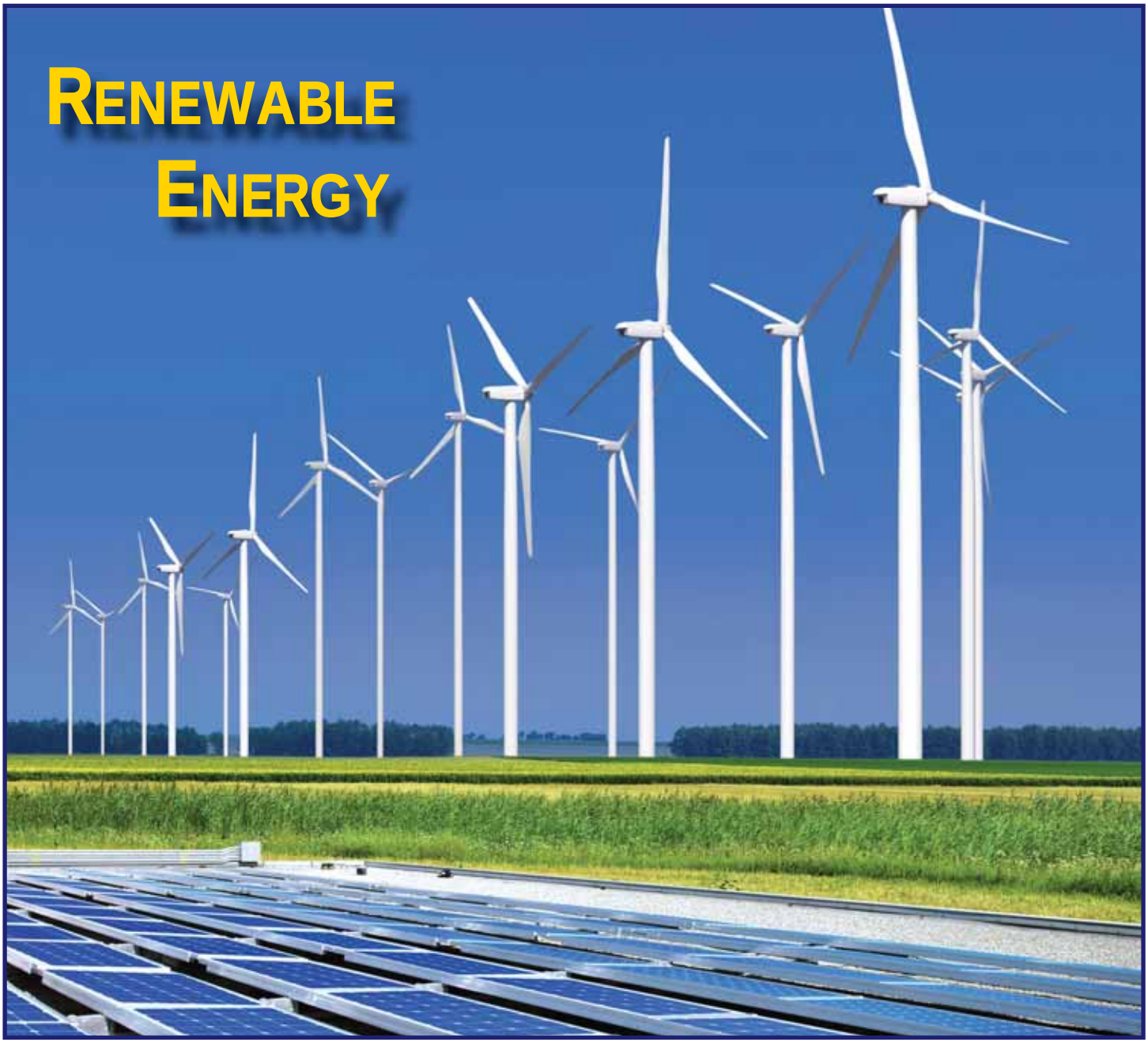
NYSBA SUMMER 2013 | VOL. 15 | NO. 1

Government, Law and Policy Journal

A Publication of the New York State Bar Association
Committee on Attorneys in Public Service, produced in cooperation with the
Government Law Center at Albany Law School



SUMMER 2013 | VOL. 15 | NO. 1

NYSBA
Government, Law and Policy Journal

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GLP Journal
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Message from the Chair

By Catherine A. Christian

I am honored to serve as Chair of CAPS as we continue to serve public sector attorneys by promoting the highest standards of professional conduct and competence, providing a network system to further their common interests, and highlighting their exceptional work.

The Committee has been working on a number of initiatives and programs that will interest public service attorneys for 2013. In January our Annual Meeting program began in the morning with a panel of distinguished constitutional law professors from Brooklyn Law School who summarized the biggest decisions of the 2011-2012 United States Supreme Court term. The afternoon panel on *Social Media and Legal Ethics* explored the most common uses of social media by lawyers in both the private and public sector and examined the legal and ethical issues that are implicated by those uses. The day was capped by a well-received reception honoring the 2013 Award for Excellence in Public Service recipients: former New York State Court of Appeals Justice Carmen Ciparick, Hon. Judy Harris Kluger and Deborah Liebman, Deputy Counsel for the New York State Department of Taxation and Finance. The awards subcommittee is now reviewing nominations for the 2013 Citation for Special Achievement in Public Service which will be presented in September 2013.

On May 16, we co-sponsored with the Albany County Bar Association's Attorneys in the Public Service Committee an informal meet and greet social event at Provence Restaurant in Albany. Special guest, Third Department Presiding Justice Karen K. Peters, delivered uplifting remarks about bar association service and how public sector attorneys are a much needed voice within the membership.

Please join CAPS during 2013 at one or more of our events and meet other public sector attorneys and other members of the bar represented in NYSBA Committees and Sections.

We have assembled a stellar group of authors and informative articles for this issue dedicated to renewable energy. Once again, a big thank you to Rose Mary Bailly for her continued dedication and tireless work as editor–in-chief of the *Government, Law and Policy Journal.*

CAPS Blog for and by Public Service Attorneys

NYSBA's Committee on Attorneys in Public Service ("CAPS") has a blog highlighting interesting cases, legal trends and commentary from around New York State, and beyond, for attorneys practicing law in the public sector context. The CAPS blog addresses legal issues ranging from government practice and public service law, social justice, professional competence and civility in the legal profession generally.

Entries on the CAPS Blog are generally authored by CAPS members, with selected guest bloggers providing articles from time to time as well. Comments and tips may be sent to caps@nysba.org.

To view the CAPS Blog, you can visit http://nysbar.com/blogs/CAPS. You can bookmark the site, or subscribe to the RSS feed for easy monitoring of regular updates by clicking on the RSS icon on the home page of the CAPS blog.

Editor's Foreword

By Rose Mary K. Bailly

Charlie Gottlieb, Esq., a staff attorney at the Government Law Center and my colleague, graciously agreed to be the Guest Editor for this issue of the *Government, Law and Policy Journal* devoted to renewable energy. Charlie is passionate about environmental issues so we are grateful to him and the authors he has assembled to discuss the emerging issues in this field.

The topic of renewable energy is regularly in the news these days, whether it be about alternative forms of clean energy, economic innovation and investment opportunities, clean energy jobs, or promising renewable energy resources from "the windy shores off Long Island to sun-exposed rooftops upstate."[1]

The authors of this issue of the *Journal* provide us with the context for the daily news and broaden our understanding of this cutting-edge issue.

I would like to especially thank our Executive Editor for 2012-2013, Stefen Short, Albany Law School, Class of 2013 for his professionalism and enthusiasm and ready response to last-minute editing requests. He and his Albany Law School colleagues, Laura Bomyea, Edward DeLauter, Katharine Fina, Evamaria Kartzian, Craig Mackey, Dave Schreiber, and Katie Valder, all members

of the Class of 2013, once again worked extremely hard to help create this issue. My thanks also to the staff of the New York State Bar Association, Pat Wood, Megan O'Toole, Wendy Harbour, and Lyn Curtis, for their help, expertise and most especially their patience. And last, my thanks to Patty Salkin, now Dean of Touro Law Center, for her inspiration.

Finally, I take full responsibility for any flaws, mistakes, oversights or shortcomings in these pages. The errors are entirely my own. Your comments and suggestions are always welcome at rbail@albanylaw.edu or at Government Law Center, 80 New Scotland Avenue, Albany, New York 12208.

Endnote

1. Michael Hill, *NY Renewable Energy Study Finds New York Could Soon Be Powered By Wind, Water And Sunlight*, The Huffington Post (April 7, 2013), available at http://www.huffingtonpost.com/2013/04/07/ny-renewable-energy-study_n_3032873.html.

Guest Editor's Foreword

By Charles Gottlieb

Renewable energy is at the forefront of most all policy discussions in New York and around the United States. Global climate change is hurrying these policy discussions forward at an unprecedented rate, especially after both Hurricanes Sandy and Irene devastated New York's population and landscape. This edition of the New York State Bar Association's *Government, Law and Policy Journal* analyzes renewable energy polices in New York, and provides readers with an understanding of the law surrounding energy policies which set the stage for future renewable energy development in New York. The articles are diverse in their concepts. Each analyzes a specific aspect of the renewable energy conversation adding to the scholarship on the topic.

Recently the State of New York has focused its laws and policies on facilitating energy production and transfer, including net metering, the Power NY Act of 2011, and more recently the State Energy Highway. In the first article, Keri Vanderwarker, a member of Albany Law School's Class of 2014, puts these recent developments in context by tracing New York's energy policies with an eye on renewable energy from past to present. By examining New York's energy policies throughout recent administrations it becomes clear that a focus on renewable energy is growing, and the state has set guidelines to govern renewable energy production well into the future.

Paul Agresta, an Administrative Law Judge at the New York State Department of Public Service, authors a fascinating article on the Power NY Act of 2011 (also known as Article 10). Mr. Agresta brings expertise to this subject as he was an advisor to the New York State Board on Electric Generation Siting and the Environment, and played a key role in developing Article 10's implementing regulations. His article breaks down the provisions of Article 10 and provides attorneys with a comprehensive description of how the state siting process for large scale energy facilities will be employed.

On a different note, Emily Ekland, a post graduate Fellow at the Government Law Center of Albany Law School, examines local land use laws in New York and how they may facilitate or obstruct the siting of small-scale renewable energy systems. These small-scale systems, rooftop solar panels and turbines, are not governed by Article 10 but instead by the local land use process. In the growing age of renewable energy the financial constraints associated with installing small-scale systems are disappearing. However, local permitting may complicate matters and act as a barrier to the installation of small-scale renewable systems. Recently, property owners are recognizing the benefits of installing small-scale systems in their yards. As a result local governments should reexamine their local codes to reflect this societal change.

Recognizing that the State of New York has native tribal lands within its jurisdiction, Laura Bomyea, a member of Albany Law School's Class of 2013, discusses the legal regime behind leasing native lands for commercial renewable energy development. Understanding the legal relationship between the tribes, the state, and the federal government is critical in New York as native tribes are inclined to seek renewable energy development.

Adam Blair, Rod Howe, and David Kaye of the Community and Regional Development Institute (CaRDI) of Cornell University examine how the progression of renewable energy in New York will impact rural communities. Their article, *Transitioning to Renewable Energy: Development Opportunities and Concerns for Rural New York,* seeks to facilitate proper community and regional development that will result from an increase in renewable energy systems. Such development will ensure that the transition to renewables is successful and sustainable.

Focusing on the local level, Elisabeth Radow Esq., managing attorney of Radow Law PLLC, president of the Larchmont / Mamaroneck League of Women Voters, and Chair of the Committee on Energy, Agriculture and the Environment of the New York State League of Women Voters, takes an in-depth look into the process of societal change and how grassroots initiatives can educate the public through active participation to promote conservation and renewable energy practices. Her article outlines the current political landscape surrounding renewable energy and draws from the notions of social innovation and community involvement to suggest community-based solutions to the obstacles that prevent change. The article sets forth best practices for social innovation at the community level, which will shift the way community members view the need for renewable energy, conservation, and sustainability.

A journal on renewable energy would not be complete without an article from the New York State Energy Research and Development Authority (NYSERDA), which is tasked with helping New York to meet its energy goals, reduce consumption, promote renewable sources of energy, and protect the environment. John Williams, NYSERDA Policy Director, Carl Mas, NYSERDA Senior

Project Manager, and Dr. Sean Ferguson, NYSERDA Policy Analysis Intern, have provided an excellent article discussing the renewable energy opportunities in New York. These opportunities, which include wind, solar, hydro and biomass, will ensure that New York maintains its reputation as a leader in the field of renewable energy. The article describes New York's emerging clean energy economy and how renewable energy can spark environmentally sustainable economic activity in New York.

This issue explores the role that renewable energy has played in New York from past to present and beyond. It is important to understand the legal context surrounding renewable energy policies including federal, state and local laws that may have an impact on the evolution of renewable energy in New York. This issue of the *Government, Law and Policy Journal* will provide public service attorneys, at all levels of government, with the information they need to further promote the use of large- and small scale renewable energy systems in New York.

Charles Gottlieb, Esq. is a Staff Attorney at the Government Law Center of Albany Law School, where he focuses his research on environmental and land use law. At the Center he conducts legal research and produces scholarship and reports on a broad range of governmental law and policy issues including environmental, energy, land use, racing and gaming, and municipal law.

Renewable Energy in New York: Past, Present and Future

By Keri Vanderwarker

New York ranks among the nation's top ten states in total renewable energy generation when measured both by total megawatt hours generated and by the percentage of total state electricity generation.[1] New York's success in incorporating renewables into state energy policy is in large part due to the plethora of resources utilized and explored by the state over the past few decades. This article provides a brief overview of some of New York's more notable renewable energy initiatives, highlights the State's major on-going renewable energy policies, and briefly examines where New York's renewable energy future is heading.

I. Renewable Portfolio Standard

Of all New York's renewable energy initiatives, the Renewable Portfolio Standard ("RPS") is arguably the program with the broadest impact on New York's renewable energy efforts. The RPS, which requires increased production of energy from renewable sources, has been in existence for slightly over a decade and continues today to guide New York to achieve an "innovative clean energy economy" in a "cost-effective and sustainable manner."[2]

Recognizing New York's reliance on fossil fuels, the 2002 State Energy Plan required the New York State Energy Research and Development Authority ("NYSERDA") to explore the feasibility of a state RPS.[3] NYSERDA's initial report found that the implementation of "an RPS ha[d] the potential to improve energy security in New York[,]…[to] help diversify the state's electricity generation mix [,]…[to] spur increased economic development opportunities in the renewables industry" and "[to] lower air emissions and increase system reliability."[4] Noting these significant economic, environmental, and energy benefits, the Public Service Commission ("PSC" or "the Commission") instituted a public proceeding to develop and implement an RPS in New York in 2003.[5] Following an extensive statewide development process, the PSC established New York's RPS on September 22, 2004.[6]

The purpose of the RPS is to increase the proportion of renewable electricity used by retail customers. To achieve this goal, the RPS targets three energy sources: large scale generators ("main tier"), small scale generators ("customer-sited tier"), and other market activities that support or are required to purchase renewable energy.[7] At the onset of the RPS, renewable resources—mainly hydroelectric facilities—provided 19.3% of New York State's retail electricity.[8] Initially, the policy sought to increase the percentage of renewable energy purchased by consumers to 25 percent by 2013, with a mid-term review of the program's progress to be performed by NYSERDA in 2009.[9]

The 2009 evaluation detailed the progress achieved by the RPS and summarized the intervening orders and activities resulting in changes made to the RPS up to that point.[10] By 2009, twenty-eight Main Tier renewable energy projects were under contract and expected to produce 2.9 MWh annually.[11] In the Customer-Sited Tier program, installations, contracts, and applications for energy production were expected to total 73,000 MWh annually. The program had thus far achieved cost effective new renewable energy capacity in the State, suppressed electricity prices, contributed to the development and advancement of renewable energy businesses, and reduced air pollution emissions.[12] However, certain limitations and opportunities for improvement were also highlighted, including limited renewable resource diversity due to competitive restrictions imposed on RPS funds, equipment cost fluctuations, and physical limitations on transmission capabilities, to name a few.[13]

At the same time as RPS progress was being assessed, additional energy initiatives were being introduced in New York. Most significantly, in 2007, the Energy Efficiency Portfolio Standard ("EEPS") was implemented to reduce electricity use in New York State by 15 percent below that projected for 2015.[14] In accordance with that goal, a reduced MWh electricity target was to be established which would result in significant reduction in the amount of renewable resources required to achieve the 2013 RPS goal of 25 percent.[15] In response to EEPS and the 2009 mid-term report, the RPS goal was revised, aiming to increase the proportion of electricity attributable to renewable resources in New York State to at least 30 percent by 2015.[16] The Commission made evident that energy, economic, and environmental considerations continued to fuel the evolving RPS policy. The RPS was noted to be "the key driver of renewable energy development in New York," accounting for an estimated $4.2 billion in economic benefits over the life of the generating facilities, as well as achieving price suppression, avoiding substantial particulate emissions, and reducing New York's dependence on fossil fuels.[17]

New York's RPS continues to expand and change in furtherance of the state's renewable energy goals, but these changes are not without limit. In 2010, biomass material sorted at material reclamation facilities was approved for use as a biomass fuel and additional main tier solicitation was authorized in order to award 10-year contracts to renewable generation facilities that commenced operation on or after January 1, 2003.[18] In 2011, however, the Commission declined to add regenerative drive generation

as an RPS eligible technology.[19] In 2012, the Commission expanded programs within the Customer-Sited Tier in response to the new NY-Sun Initiative (discussed *infra*).[20] Further, at the end of 2012, New York made available an additional $250 million for renewable energy generation projects as a component of the Energy Highway (also discussed *infra*).[21]

The progress of the RPS is scheduled to be further evaluated this year as part of the Commission's review of New York's energy programs.[22] Further, the State Energy Planning Board is tasked with the issuance of the final version of the first State Energy Plan, which will analyze New York's energy needs and resources and provide recommendations for the State's energy future.[23]

II. Renewable Energy Task Force

As part of New York's ongoing commitment to renewables, the Renewable Energy Task Force was created in June 2007 to provide recommendations for New York's renewable energy future.[24] Noting that "[i]ncreasing the use of clean renewable energy is good for the economy, the environment and public health" and that "renewable energy sources, such as wind, solar, hydroelectric and fuel cells, can help to re-charge our Upstate economy while reducing greenhouse gas emissions,"[25] the Task Force was charged with three primary goals. These goals, premised on environmental, economic, and energy considerations, were to:

> 1) Identify barriers in New York State to wider deployment and installation of renewable energy; 2) Recommend policies, including financial incentives to overcome those barriers to attract clean industries to economically depressed regions of the state; and, 3) Identify future market areas where additional research and development investment is necessary.[26]

The Task Force identified five central recommendations for New York's Renewable Energy future.[27] First and foremost, the Task Force urged continued support of the Renewable Portfolio Standard, noting that "New York's RPS is the State's largest and most significant policy for supporting increased renewable energy."[28] The other major recommendations included enhancing and expanding the state's existing net metering law, investing in clean energy business to foster economic growth, building a sustainable market for solar energy in New York state, and developing a strategy to reap the benefits of New York's wind energy potential.[29]

As discussed below, New York has made significant progress toward achievement of these goals since the Task Force issued its report in 2008.

III. Powering New York State

A. Net Metering

New York's initial Net Metering Law was enacted in 1997 and applied only to residential photovoltaic systems up to 10 kilowatts (kW).[30] Expansions to the law in 2002 and 2004 extended new metering to include farm-based biogas (farm waste) systems of up to 400 kW, residential wind turbines up to 25kW, and farm-based wind turbines up to 125 kW.[31]

In 2008, additional changes were made to New York's net metering laws to "open up net metering to more electricity customers."[32] Net-metering for solar was expanded to include non-residential solar electric generating systems and to increase the size of the farm waste electric systems that can be net-metered to 800kW.[33] Net-metering for wind was modified for wind electric generating systems to include commercial customer generators and to expand net-metering for residential and customer generators.[34] The changes were effected to achieve widespread economic, environmental and energy goals including: increasing generation of renewable energy, spurring development of renewable energy facilities, reducing greenhouse gas emissions associated with fossil fuel electricity generation, stabilizing and reducing the stress on New York's electric grid, and creating green collar jobs in New York State.[35]

The net metering laws were amended again in 2010, a result of the 2009 Net Metering Summit organized by Governor Paterson to "facilitate an agreement between renewable energy installers and New York State's major utilities."[36] These amendments, geared toward achievement of the "45 by 15" program, made important changes to the net-metering law for non-residential customers.[37] The changes eliminated the peak load limitation on the size of non-residential solar and wind systems eligible to participate in net-metering, allowed for non-residential solar and wind systems up to 25 kW, and capped interconnection charges at $350 for solar and $750 for wind.[38]

In 2012, additional amendments to the net metering law were made bringing remote net metering law for micro-hydroelectric systems in line with that for solar, wind, and farm waste energy generating equipment owned by farm operations and nonresidential customers.[39] By "expanding remote net metering to include agricultural and non-residential micro-hydroelectric systems," these customers can now "apply credit received for power delivered to the grid to any of customer's meters rather than only to a single, directly connected meters as long as the meters are located on the customer's property and within the same utility territory."[40]

The various amendments made to New York's net metering laws over the past fifteen years have expanded the access to net metering for a variety of customers, the size of allowable systems, and the meters to which a single generator can apply credits.[41] Recognizing that these efforts have increased the demand for new metering in New York, legislation was proposed in January 2013 in both the Senate[42] and Assembly[43] to increase the statutory caps on net metering, noting the effectiveness of net metering in encouraging residences and small business to invest in on-site generation of renewable energy. By increasing the

caps, the goals of net metering will be further advanced by "expanding renewable energy generation, reducing emissions[,] and decreasing consumer's utility bills."[44]

B. Power NY Act of 2011

The Power NY Act, passed and signed into law in 2011,[45] added yet another feather to New York's rich renewable energy cap. The Power NY energy package replaced the previously sunset Public Service Law Article X, establishing a new process for the siting of electric generating facilities, including giving community members a voice in the process, and encouraged investment in clean power plants.[46] The Act increased the jurisdiction of the state siting board—by allowing for smaller generating facilities to be governed by state siting laws—and transitioned siting decisions from local zoning boards to the state for projects of 25MW or more (prior law allowed state siting jurisdiction for projects of 80 MW or more).[47] By "preempt[ing] local laws that would otherwise prevent or delay new power plant construction, including zoning[,]"[48] these changes have essentially streamlined the siting process to ease development of new, smaller power plants.[49]

In addition, among other things, the Act also created a statewide "on-bill" recovery program to encourage home and business owners in New York state to invest in energy efficiency measures, to be paid back on their utility bills.[50] This element of the bill has been applauded as being "the nation's first energy efficiency law that will make it easy and affordable for middle and low income residents to retrofit their homes"[51] with the potential of "creating thousands of construction jobs [in New York]."[52]

Overall, the Power NY Act has been applauded by various public officials and industry representatives as a program that "reinvigorates the energy industry" while also incorporating community involvement, environmental safeguards, job creation, and clean and reliable energy for residents and businesses in New York state.[53]

C. The New York State Energy Highway

Soon after the passage of Power NY, Governor Andrew Cuomo announced the need for an energy highway to improve New York's energy infrastructure and to power New York's economic growth.[54] Recognizing the potential and types of renewable energy that can be generated in New York varies widely across the state, the energy highway was proposed as a means to apportion energy from these fragmented energy sources to meet each area's unique energy needs.

The "Energy Highway" was announced as a means for New York to ensure that a cost-efficient and reliable power supply was available to fuel New York's economic growth.[55] In October 2012, the Energy Highway Task Force released a blueprint for the plan, including thirteen specific actions to achieve the Highway's objectives. One major initiative is the support of clean energy, calling for $250 million in new contracts with renewable energy developers within the next year, $35 million in transmission upgrades to facilitate clean energy development, up to $2 billion invested to repower inefficient plants, and for studies to examine opportunities for offshore wind development in the Atlantic Ocean.[56]

IV. Affording Renewable Energy

Tax credits, rebates, and savings are other vehicles by which New York has sought to encourage and promote renewable energy to achieve its clean energy goals. New York has a variety of both residential and commercial incentives, aimed at increasing the installation of renewable energy systems in the state and expanding the utilization of such equipment.

For example, New York enacted legislation in 2005 exempting the sales and installation of residential solar energy systems equipment from state sales and compensating use tax, supplementing the existing Energy $mart Initiatives incentivizing homeowners to purchase and install solar energy equipment.[57] Municipalities were also given the option of granting a local exemption.[58] Effective January 1, 2013, this exemption has been extended to commercial solar energy systems.[59] Similarly, beginning in 2005, New York has offered various residential solar tax credits for expenditures on solar-electric equipment, solar-thermal equipment, and for systems installed under lease or power purchase agreements that meet certain criteria.[60] Another incentive, if permitted by a local government, creates a 15-year real property tax exemption for solar, wind energy, and farm waste energy systems constructed in New York State.[61] Such incentives encourage residential and commercial installation of renewable energy systems by reducing or eliminating the tax burden that might be associated with purchasing, installing, and maintaining these systems.

In addition to the credits and exemptions, New York has also paired other financial incentives with energy laws to facilitate clean energy and energy efficiency. For instance, in 2010, the state energy law was amended to authorize the Secretary of State to establish energy efficiency performance standards for certain residential and commercial devices and fixtures.[62] A related bill amended the public service law to encourage investment in energy efficiency measures by allowing consumers to invest in such measures and repay associated loans through their utility bills.[63]

These incentives, savings, and credits reflect only the tip of the iceberg of the initiatives New York has implemented to promote and develop renewable energy. This plethora of incentives offered by the state work together to encourage investment and acceptance of renewable energy sources, furthering New York's clean energy goals.

V. Renewable Energy in New York

A. Hydropower

Hydropower is arguably New York's oldest renewable energy initiative and continues to be a significant source of

renewable energy in New York State today. Since the completion of the hydroelectric generating facility at Niagara Falls in 1886, New York has been "deriv[ing] [power] from the energy embedded in moving water."[64] The Niagara Falls facility was the first American hydroelectric power site developed for major generation,[65] and today New York is fourth in the nation in generation of electricity from hydropower, and the largest hydroelectric power producer east of the Rocky Mountains.[66]

Over 300 hydroelectric generating stations connect to New York's power grid, supplying 17 percent of the state's total electricity demand and nearly nine-tenths of all the renewable energy produced in New York.[67] While hydroelectric power has continued to be a substantial part of New York's renewable energy portfolio, it has been tempered with environmental and economic considerations. For instance, Governor Mario Cuomo focused on economic concerns in cancelling a major contract sourcing hydroelectric power from Canada in 1992, as it was determined that conservation and alternative energy sources would better meet New York's power needs in a less expensive way.[68] But, to the environmentalists who had vehemently opposed the project because it would involve destruction of thousands of acres of wilderness, Cuomo's actions were indicative of his recognition of these environmental consequences.[69]

Such economic and environmental considerations remain significant factors for this energy source, and in some way have shaped the evolution of hydroelectricity in New York. In 2011, the Recharge New York program was launched, allowing businesses to buy low-cost power in exchange for a commitment to create and retain jobs in New York State.[70] Hydropower provides a full one-half of the power supporting the program and, in turn, the program provides "predictability and stability in hydropower for economic development in New York for years to come."[71]

Improvements in technology that carefully consider environmental impacts are also shaping New York's hydropower future. Ocean-based hydropower plants and hydrokinetic (in-stream) systems are both newer hydropower options being explored in New York as environmentally friendly and highly effective electricity generating systems.[72] Similarly, improvements in technology allow for smaller-scale projects to be implemented serving rural areas, expanding the reach and reliability of renewable energy in New York while minimizing harm to local fish and wildlife populations.[73] In addition, increased public participation has led to negotiated licenses that take into account energy production, environmental protection, economic benefits, and recreational amenities.[74]

As part of the Renewable Portfolio Standard and as an integral building block for New York's Energy Highway,[75] hydropower will continue play a central role in New York's continuous quest for renewable energy self-sufficiency.

B. Wind Power

New York did not have any installed wind capacity until 2000, when 18 Megawatts were installed.[76] Growth was initially slow, but by 2012 New York reached a total installed wind capacity of 1,418 Megawatts.[77] At present, wind power supplies only about 2 percent of all electric power in New York through eighteen wind energy projects.[78] However, as the fifteenth windiest state in the nation, New York's wind energy future is promising.

Significant economic and environmental concerns associated with wind power may, in part, explain the slow growth of this renewable energy resource. Wind power proposals are subject to stringent reviews by the New York State Department of Environmental Conservation that considers, among other items, the effect of wind projects on local noise and aesthetics, impacts on wildlife, and impacts on local ecosystems and waterways.[79] One interesting illustration of how these economic and environmental concerns may affect wind power is the New York Power Authority's (NYPA) now defunct Great Lakes Offshore Wind project (GLOW).

GLOW was launched by NYPA in 2009, in an effort to construct offshore wind projects that would generate renewable power and create clean energy jobs.[80] NYPA received and began an extensive review of five project proposals in mid-2010, noting that the project would contribute to New York's renewable energy goals.[81] However, in 2011, NYPA ended the program without awarding a contract, citing higher-than-expected annual costs and unfavorable economic conditions as the reasons for the decision.[82] The project had also been met with significant public backlash, with many Ontario and Erie lakeshore counties declaring opposition to the project.[83] This opposition was based in part on local economic concerns about the project's effects on tourism, boating, fishing, as well as environmental concerns about the unknown effect turbines would have on lake ecosystems.[84]

Despite certain obstacles, wind power continues to be a significant renewable energy option for New York State. In 2012, NYSERDA awarded a London-based company $4.2 million to open the Wind Turbine Blade Testing Lab at Clarkson University in Potsdam, New York.[85] The lab, and the associated Center for Evaluation of Clean Energy Technology, will ideally ease the process for manufacturers of renewable technology to obtain certification and market-readiness of products.[86]

Initiatives such as the Testing Lab will further the development of wind power in New York State. Moreover, possible wind projects as part of the NY Energy Highway (discussed *supra*) and additional growth in this renewable resource are expected to contribute to New York's achievement.

C. The NY-Sun Initiative

The NY-Sun Initiative was announced to expand solar energy production while protecting ratepayers in New

York State.[87] The Initiative, announced in April 2012, seeks to quadruple the amount of customer-sited solar power systems installed in New York by 2013.[88] This collaborative effort by NYSERDA, the Long Island Power Authority (LIPA), and the New York Power Authority (NYPA), seeks to expand the production of solar energy in New York by investing $800 million in solar energy expansion through 2015.[89] In the fall of 2012, major steps toward this goal were already being taken—efforts included $30 million awarded in August 2012 to sixteen large-scale solar developments to finance projects in New York City and the lower Hudson region;[90] $107 million made available for 2012 and 2013, to support installation of photovoltaic systems (PV) for businesses, factories, municipal buildings, and other commercial and industrial consumers;[91] and the reallocation by NYSERDA of $25 million to support energy programs including reduction of system costs for solar photovoltaic installations and supporting PV technology development. The NY-Sun Initiative also sparked legislation to make solar energy more affordable, with Governor Cuomo signing bills in August 2012 to allow tax credits for homeowners who acquire solar equipment through a lease or a power purchase agreement,[92] exempting the sale and installation of commercial solar energy equipment from sales tax,[93] and allowing property tax abatements to be available for solar energy generating systems in New York City for 2013 and 2014.[94]

In response to the goals of the NY-Sun Initiative, the New York Power Authority has developed the Solar Market Acceleration Program ("Solar MAP").[95] To allow state incentive programs to be more cost effective, the program is aimed at reducing solar costs by supporting research for innovative solar technology, demonstration projects, and soft-cost reduction strategies. As part of the NY-Sun Initiative, the Solar MAP program and expansion of other renewable energy initiatives such as the RPS, New York aims to quadruple the installed solar capacity in the state by 2013.[96]

VI. 2013 and Beyond

Most recently, in his 2013 State of the State Address, Governor Cuomo expressed his continued commitment to New York's energy future and to establishing New York as a leader in the clean tech economy.[97] Cuomo's plan to meet this goal includes four initiatives with two focusing directly on renewable energy. The first is the establishment of a $1 billion "Green Bank" which will fund clean energy projects by leveraging public dollars with a private sector match.[98] Cuomo proposes that the establishment of the Green Bank will spur the clean economy by providing funding beyond the limited subsidies currently offered, as well as resulting in increased employment, stabilized financial resources, and greater connectivity between green projects and investors and capital.[99] Second, to increase solar panel installations for homes and businesses, Cuomo proposes to expand the NY-Sun program by $150 million annually for 10 years, extending the annual existing funding until 2023.[100] The program will be aimed at supporting a diverse set of residential and commercial projects, while encouraging installers to support in-state suppliers, and to address problem areas in the grid that could "benefit the most from distributed solar generation."[101] These two programs envision a state commitment to renewable energy programs far into the future. The third initiative, the "Charge NY Program," will increase the number of electric car charging stations throughout New York State.[102] Finally, Richard Kauffman was named as the state "Energy Czar," tasked with coordinating and overseeing these programs, as well as the state's clean-tech agenda and energy portfolio.[103] Cuomo's leadership and innovation in energy policy and finance are already receiving national praise from the energy industry.[104]

Ultimately, New York has an impressive renewable energy history and a progressive renewable energy outlook. The state's efforts in renewables have already resulted in significant energy, economic, and environmental benefits.[105] With continued commitment to renewable initiatives, New York will continue to reap these benefits, and more, well into the future.

Endnotes

1. *See State Rankings By Total Renewable Electricity Generation*, NAT'L RENEWABLE ENERGY LAB., http://www.nrel.gov/tech_deployment/state_local_activities/rankings_by_total_generation.html (last visited Mar. 7, 2013) (listing New York on the 2009 NREL rankings as 4th highest for total renewable energy generation and 8th highest for renewable energy generated as total of state electricity generation).
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Article 10 and the Siting of Major Electric Generating Facilities in New York State

By Paul Agresta

I. Introduction

"Siting" is a process consisting of a series of steps conducted by a regulatory agency in determining whether to allow a facility to be located and operated on a site. Since 1970, New York's laws have provided for major power lines to be sited by the Public Service Commission instead of by multiple state agencies and local governments.[1] Similarly, as a result of Governor Andrew M. Cuomo's Power NY Act of 2011,[2] major power plants will now be sited by a statewide Board on Electric Generation Siting and the Environment (the "Siting Board"). The new law is set forth in a portion of the New York Public Service Law designated "Article 10."[3] It is a general state law that is applicable in all of New York State.[4] Article 10 empowers the Siting Board to issue Certificates of Environmental Compatibility and Public Need ("certificates") authorizing the construction and operation of major electric generating facilities. An electric generating facility is deemed to be "major" if it has the capacity to generate 25 megawatts or more of electricity.[5] Article 10 supplants the need to obtain most other state and local approvals.

New York has a history of several different power plant siting laws, going back to the early 1970s. The last such law expired in 2002. The Power NY Act re-establishes the State's role of siting power plants on a coordinated basis.

II. Historical Antecedents

On the edge of the Hudson Highlands, Buckberg Mountain overlooks the Hudson River's Haverstraw Bay. It was used as an observation point by George Washington and General "Mad" Anthony Wayne to plan a surprise attack on British troops in the Battle of Stony Point.[6] Approximately 200 years later, Buckberg Mountain was the site of a battle of a different sort that ultimately resulted in New York's adoption of statewide siting processes for major power lines and power plants.

In the aftermath of the Great Northeast Blackout of 1965, Orange and Rockland Utilities, Inc. ("O&R") wanted to construct a new power line to tie the New York Power Pool electric system grid into the neighboring grids served by the New England (NEPOOL) and the Pennsylvania / New Jersey / Maryland (PJM) power pools. The interconnection of these three systems was part of an overall regional plan to give each system wider capability to absorb equipment failures without destabilizing the necessary continuous balance between generation and consumption of electricity on the electric grid. Minor unexpected equipment failures that cause instantaneous losses of either generation or consumption can cause other equipment to trip off-line to try to match the loss and return the grid to a state of equilibrium. In some instances, shedding of unequal equipment causes the instability to grow and cascade across the grid, in the worst case resulting in wide-scale blackouts.

To achieve the interconnection, it was going to be necessary to build a major power line across the Hudson River. The path chosen by O&R for the new power line went up and over the top of Buckberg Mountain and down its side to the western shore of the Hudson. The many towers to be constructed along the path to be cleared down the wooded slope were to be approximately 125 feet in height. The adverse visual impact of the project was considered significant by many.

The Hudson River Valley Commission objected to the proposal. Governor Nelson A. Rockefeller had used his executive powers in 1965 to create the Commission to provide for the "best protection and preservation of the resources of the Hudson River" such that our society may grow "in an environment rich in natural beauty, historic ties and aesthetic values."[7] The Hudson River Valley Commission found that "'[t]he benefits of the project, though substantial in terms of reducing the possibility of a power blackout, are not sufficient to justify constructing the project, which will have a permanent effect on the scenic resources of the valley.'"[8] O&R sought rehearing; protests against the project intensified.[9]

What happened after that was significant when compared to the famous 17-year legal dispute over Consolidated Edison's failed plan to embed a large pumped storage hydroelectric plant into the face of Storm King Mountain only a few miles upriver. Enlightened Rockland County officials worked with the Hudson River Valley Commission, utility experts, state experts, local governments and local citizen groups to fashion a compromise solution that everyone could accept.[10] As a result, the line was rerouted around the base of Buckberg Mountain. According to the Hudson River Valley Commission, "[t]he line was kept off the mountain, the valley was not marred by a new slash across a prominent scenic resource, and the utility company was able to thus avoid a long and costly legal battle with area citizens."[11]

The Federal Power Commission cited the negotiated resolution "as the best case history in the United States

of how the power-ecology dilemma can most sensibly be resolved."[12] It also separately noted that:

> utilities serving major load centers in which restrictions to the construction of new facilities are mounting rapidly, must present [their] expansion programs individually to a multitude of regulatory, licensing, and approving authorities. These extend from local bodies, counties and municipal authorities, up through the echelons of agencies operating under State and Federal authority. Many of these entities have a single interest or responsibility, act unilaterally and with a minimum of interagency coordination. To say the least, the process of securing approvals is time consuming and often frustrating. The greater concern is a break-down in the ability of these utilities to provide facilities on a schedule that will assure the adequacy and reliability of the power supply. A few States have recognized the need to establish some form of coordinating mechanisms to assist utilities in more constructive review of utility proposals. These first attempts at coordination are still in the trial stage but participants have expressed confidence they will be beneficial.[13]

Governor Rockefeller praised the "very thorough job well done" while learning that single-focus agencies like the Hudson River Valley Commission he had created to make scenic values paramount in the Hudson Valley were just as one-sided as the traditional agencies that only considered economic factors and ignored environmental impact. What was needed was a "consultative process"[14] where power needs and the environment could be considered together.

Shortly thereafter, Governor Rockefeller obtained the adoption in New York of a siting law for major power lines[15] that requires the Public Service Commission to "protect environmental values, and take into account the total cost to society of such facilities"[16] in addition to having to find need for the facility. The introduced concept of "environmental compatibility and public need"[17] requires that the facility be needed to serve electric and economic needs, but that it will only be approved if it is to be constructed in a manner that is found to be compatible with the environment. At the time the power line siting law was enacted, a temporary state commission was also formed whose recommendations ultimately resulted in the adoption of the first New York power plant siting law, which reflected similar principles regarding environmental compatibility and public need.[18]

Other historical antecedents having an influence on the ultimate fashioning of the New York siting laws include the 1965 "Storm King / Scenic Hudson" decision that established the principle that conservation groups have "standing" to sue to protect against injury to aesthetic or recreational values,[19] a 1966 N.Y. Court of Appeals decision that affirmed the right of a municipality on Long Island to require that power lines be constructed underground to preserve aesthetic values,[20] and the enactment of the National Environmental Policy Act of 1969 (NEPA) that requires Federal agencies to consider environmental impacts in their decision-making processes by preparing environmental assessments and environmental impact statements.[21]

The new Article 10 law builds upon these antecedents, but is notably different from past siting laws in that, among other things, it is permanent, it provides for enhanced public participation, and it requires the Siting Board to determine whether a proposed facility will create a disproportionate environmental impact in a community and, if so, requires the applicant to minimize, avoid or offset those impacts.

III. Implementing Regulations

The Siting Board has adopted comprehensive regulations to implement the new Article 10 law.[22] The regulations require applicants to provide a robust body of information up front in the process, thereby enabling parties and the public to effectively and promptly engage in the Article 10 hearing process, while not unduly burdening applicants that bear the cost of preparing applications. It was important to require enough information in applications to allow the Siting Board to make the findings and determinations required by the statute, recognizing that additional information will be provided as the record of the certification proceeding is developed and also that final construction-type details are unnecessary and costly to provide prior to a determination by the Siting Board. Many of the provisions in the regulations were tailored to accommodate the unique needs of wind projects, from both the perspective of the developer and the host community.

IV. The Article 10 Process

An applicant that wants to build a major electric generating facility, such as a wind farm, needs to obtain a certificate authorizing construction and operation from the Siting Board. The Siting Board is a governmental entity of New York State organized within the Department of Public Service ("DPS"). When the Siting Board is reviewing an application for a certificate, it consists of five permanent members and two ad hoc public members appointed to provide a local perspective.[23] The five permanent members of the Siting Board are the Chairman of DPS who serves as chairperson of the Siting Board, the Commissioner of the Department of Environmental Conservation, the Commissioner of the Department of Health, the Chairperson of the New York State Energy Research and Development Authority, and the Commissioner of Eco-

nomic Development.[24] The two ad hoc public members must be residents of the affected municipality and may not hold another state or local office or hold any official relation to the applicant or the parties that may appear before the Siting Board.[25] The ad hoc public members are appointed, one each, by the President Pro Tem (Majority Leader) of the State Senate and the Speaker of the State Assembly, from a list of candidates submitted to them by the chief executive officers of the affected county and city, town and/or village.[26]

A. Public Involvement Program[27]

There are several important pre-application procedures that must be completed before an application may be submitted. The first is submission of a Public Involvement Program ("PIP") plan.[28] "Public involvement" is the process of enabling the public to participate in decisions that may affect public health, safety and the environment.[29] It is the Siting Board's policy to encourage public involvement in the review of the applicant's proposal at the earliest opportunity so that public input can be considered.[30] In addition, to ensure that the public and interested parties are fully assisted and advised in participating in the Article 10 process, an Office of Public Information Coordinator has been created within DPS.[31]

The PIP plan must include:

(1) consultation with the affected agencies and other stakeholders;[32]

(2) pre-application activities to encourage stakeholders to participate at the earliest opportunity;[33]

(3) activities designed to educate the public as to the specific proposal and the Article 10 review process, including the availability of funding for municipal and local parties;[34] the establishment of a website to disseminate information to the public;

(4) notifications; and

(5) activities designed to encourage participation by stakeholders in the certification and compliance process.[35]

In addition, an applicant is expected to communicate with the public early in the pre-application process through the use of various means such as media coverage, direct mailings, fliers or newsletters, and the applicant is expected to hold public meetings, offer presentations to individual groups and organizations, and establish a community presence. Establishing a local office, a toll-free telephone number, Internet website, and a community advisory group are among the actions an applicant may take to establish its presence in the community.

"Applicants [must] submit…proposed [PIP] plan[s] in writing to DPS for review as to their adequacy at least 150 days prior to the submittal of any preliminary scoping statement[.]"[36] DPS has 30 days to make written comments on the adequacy of the PIP plan, and if the plan is deemed inadequate, DPS will make specific written recommendations as to what measures are necessary to make it adequate.[37] Thereafter, the applicant has 30 days to consider the measures recommended by DPS and, in a final written PIP plan filed with the Secretary, must as to each specific measure either revise the PIP plan to incorporate the DPS recommendation, or provide a written explanation as to why the applicant is not incorporating it.[38]

B. Preliminary Scoping Statement[39]

A Preliminary Scoping Statement ("PSS") is a written document to inform the Siting Board, other agencies, and the public that the applicant is contemplating making an Article 10 application. It is prepared by an applicant after consulting with the public, affected agencies, and other stakeholders. The term "consulting" in this context means providing information to and effective opportunities for input from the public, affected agencies, and other stakeholders, concerning the proposal.

The information that must be included in a PSS falls into two major categories. The first category is a description of the proposed facility and its environmental setting. Among other things, the information provided must include the description of potential environmental and health impacts resulting from the construction and operation of the proposed facility; measures proposed to minimize environmental impacts; reasonable alternatives to the facility; and the identification of all other state and federal permits, certifications, or other authorizations needed for construction, operation or maintenance of the proposed facility. The second category is a description of the proposed studies or program of studies designed to evaluate potential environmental and health impacts that the applicant intends to include in its application for an Article 10 certificate. The description of the studies must include the extent and quality of information needed for the application to adequately address and evaluate each potentially significant adverse environmental and health impact, including existing and new information where required, and the methodologies and procedures for obtaining the new information. The PSS must also include an identification of any other material issues raised by the public and affected agencies during any consultation and the response of the applicant to those issues.

The PSS must be filed no less than 90 days before the date on which the applicant files its application for an Article 10 certificate. In addition, at least three days before the PSS is filed, the applicant must publish a public notice and summary of the PSS in local newspapers in the affected area and serve a copy of the notice and summary upon public officials and all persons who requested to receive such notices. Within 21 days after the filing of the PSS, any person, agency or municipality may submit comments on the PSS by serving such comments on the applicant and filing a copy with the secretary. Within 21 days after the closing of the comment period, the applicant must

prepare a summary of the material comments and the applicant's reply thereto, and file and serve its summary of comments and its reply in the same manner as it files and serves the PSS. Thereafter, it is expected that the applicant will work with interested parties to resolve any disagreements about the sufficiency of the planned scope and methodology of studies to be included in the application.

C. Pre-application Fund for Municipal and Local Participants[40]

When submitting a PSS, applicants are assessed a fee equal to $350 for each megawatt of generating capacity of the proposed facility, but no more than $200,000. For example, for a 100 megawatt wind farm, the fee would be $35,000 (100 x $350). If the PSS is later substantially modified or revised, the Siting Board may require an additional fee in an amount not to exceed $25,000. The funds collected are to be used to defray expenses for expert witnesses, consultants, administrative costs (*e.g.,* document preparation and duplication costs) and legal fees incurred by municipal and local participants in the pre-application process. The funds may not be used to pay for judicial review or litigation costs. The presiding examiner must reserve at least 50 percent of the pre-application funds for potential awards to municipalities.

A notice of availability of the funds will be issued providing a schedule and related information describing how interested members of the public may apply for pre-application funds. Requests for pre-application funds must be submitted to the presiding examiner not later than 30 days after the issuance of the notice of availability. An initial pre-application meeting to consider fund requests will be convened within no less than 45 days but no more than 60 days of the filing of a PSS. The presiding examiner is required to provide for an expedited pre-application funding award schedule to assure early and meaningful public involvement. Funds will be awarded to participants on an equitable basis to be used during the pre-application phase to make an effective contribution to review of the PSS.

D. Pre-application Stipulations[41]

"Stipulations" are agreements among the participants designed to simplify or shorten administrative litigation and save costs. Any participants can enter into a stipulation setting forth an agreement on any aspect of the PSS and the scope of studies or program of studies to be conducted. It is often in the interests of applicants and other participants to agree in advance to the content and methodology for conducting studies that will be submitted as part of the application. So that all parties will have an opportunity to participate, the applicant may not commence consultations or seek agreements on proposed stipulations until the pre-application fund for municipal and local parties has been allocated by the presiding examiner. Within 60 days of the filing of a PSS, the presiding examiner will convene a meeting of interested parties in order to initiate the stipulation process. The presiding examiner will also oversee the pre-application process and mediate any issue relating to any aspect of the PSS and the methodology and scope of any such studies or programs of study in order to attempt to resolve any questions that may arise.

Before a stipulation may be executed, notice of the proposed stipulation must be provided and the public and other participants must be afforded a reasonable opportunity to submit comments on the proposed stipulation before it is executed by the signatories. A signatory to the stipulation is not barred from timely raising objections to any aspect of the PSS or the methodology and scope of any stipulated studies or program of studies. A signatory to a stipulation, however, may not object to any aspect of the PSS and the methodology and scope of any stipulated studies or program of studies covered in the stipulation, unless the applicant fails to comply with the stipulation.

E. Submission of an Application[42]

Upon receipt of an Article 10 application, the Chairperson of the Siting Board has 60 days to determine whether the documents submitted comply with the requirements of the law, regulations and stipulations. The Department of Environmental Conservation also advises within the 60-day period whether the documents submitted contain sufficient information. If the documents submitted are insufficient, the Chairperson will issue a letter advising the applicant of the deficiencies that must be corrected before the documents can be deemed a complying application. The Chairperson may also require the filing of any additional information needed to supplement an application before or during the hearings. If the documents submitted are sufficient, the Chairperson will issue a letter advising the applicant that the documents submitted constitute a complying application. The Chairperson will also fix the date for the commencement of a public hearing and the Department of Environmental Conservation will initiate its review pursuant to federally delegated or approved environmental permitting authority of air and water permit applications. Within a reasonable time, the presiding examiner will hold a prehearing conference to expedite the orderly conduct and completion of the hearing, to specify the issues, to obtain stipulations as to matters not disputed, and to deal with other matters deemed appropriate. The presiding examiner will then issue an order identifying the issues to be addressed by the parties. Additional issues may be added later in the proceeding if they warrant consideration in order to develop an adequate record.

F. Designation of Parties[43]

There are three kinds of parties to an Article 10 proceeding: automatic statutory parties; parties that have a right to be a party merely by giving notice; and parties that may be permitted to join. The automatic statutory parties include the applicant; DPS Staff; the Departments

of Environmental Conservation, Economic Development, Health, Agriculture and Markets, and State; the New York State Energy Research and Development Authority; the Office of Parks, Recreation and Historic Preservation; and in certain instances, the Adirondack Park Agency. Provided they file an appropriate notice within 45 days of the date of the filing of the application, the following have a right to be a party: the affected municipality; any individual resident of an affected municipality; any non-profit corporation or association, formed in whole or in part to promote conservation or natural beauty, to protect the environment, personal health or other biological values, to preserve historical sites, to promote consumer interests, to represent commercial and industrial groups or to promote the orderly development of any area in which the facility is to be located; and any other municipality or resident of such municipality located within a five-mile radius of such proposed facility (their notice of intent must include an explanation of the potential environmental effects on such municipality or person). In addition, the presiding officer may for good cause shown permit a municipality or other person to become a party and to participate in all subsequent stages of the proceeding, and such other persons or entities as the Siting Board may at any time deem appropriate may be permitted to participate in all subsequent stages of the proceeding.

A notice of intent to be a party must be filed with the Secretary to the Siting Board. A form for that purpose is available for download on the Siting Board website.

G. Fund for Municipal and Local Parties[44]

When submitting an application, applicants are assessed a fee equal to $1,000 for each megawatt of generating capacity of the proposed facility, but no more than $400,000. For example, for a 100 megawatt wind farm, the fee would be $100,000 (100 x $1,000). In addition, for facilities that will require storage or disposal of fuel waste byproduct, an additional fee will be assessed of $500 for each megawatt of capacity, but no more than an additional $50,000. If an application is later amended and the amendment is deemed a revision requiring substantial additional scrutiny, the applicant will be assessed an additional fee equal to $1,000 for each megawatt of capacity of the proposed project, as amended, but no more than $75,000. The presiding examiner may increase the level of the additional fee up to a maximum level of $75,000 if the presiding examiner finds circumstances require a higher level of funding in order to ensure an adequate record. The funds collected are to be used to defray expenses for expert witnesses, consultants, administrative costs (*e.g.*, document preparation and duplication costs) and legal fees incurred by municipal and local parties in the proceeding. The funds may not be used to pay for judicial review or litigation costs. The presiding examiner must reserve at least 50 percent of the funds for potential awards to municipalities.

A notice of availability of the funds will be issued providing a schedule and related information describing how municipal and local parties to the proceeding may apply for funds. Requests for funds must be submitted to the presiding examiner not later than 30 days after the issuance of the notice of availability. Funds will be awarded to parties on an equitable basis to be used during the proceeding to contribute to a complete record leading to an informed decision as to the appropriateness of the site and the facility.

H. Hearings[45]

Both public statement hearings and trial-type evidentiary hearings will be held. Public statement hearings are designed to obtain input from the general public. The format is designed for the taking of unsworn oral statements, although written statements ordinarily may also be submitted. Parties to the proceeding are not permitted to cross-examine the persons making such statements. Any person may make a limited appearance in the proceeding by filing a statement of his or her intent to limit his or her appearance in writing at any time prior to the commencement of the hearing. All papers and matters filed by a person making a limited appearance shall become part of the record. No person making a limited appearance shall be a party or shall have the right to present testimony or cross-examine witnesses or parties. The trial-type evidentiary hearings are designed to obtain sworn testimony from witnesses (usually expert witnesses) that are subject to cross-examination by the parties to the proceeding. The format is designed like a trial and it is recommended that the participants be assisted by legal counsel, although the assistance of legal counsel is not mandatory. The usual practice is for written direct and rebuttal testimony to be circulated to the parties in advance so that the hearings can focus on the cross-examination of witnesses. Any party to a proceeding is also subject to the pre-trial discovery process used by parties to obtain facts and information about the case from other parties. The most common discovery device is the written information request, but oral depositions and other devices are also available.

The hearings will be conducted by a presiding examiner designated by DPS. An associate examiner will also be designated by the Department of Environmental Conservation. A written transcript record is made of the hearings and of all testimony taken and the cross-examinations thereon. After the parties present post-trial legal briefs to the examiners, a recommended decision will be presented to the Siting Board by the examiners. The parties will then have one last opportunity to present additional legal briefs to the Siting Board addressing the recommended decision.

I. Timing of the Decision[46]

All proceedings on an application, including a final decision by the Siting Board, must be completed within 12 months from the date of the determination by the Chairperson that an application complies, except that the Siting Board may extend the deadline in extraordinary cir-

cumstances by no more than six months in order to give consideration to specific issues necessary to develop an adequate record. The board must render a final decision on the application by the aforementioned deadlines unless the deadlines are waived by the applicant. If during the proceeding there is a material and substantial amendment to the application, the deadlines may be extended by no more than six months to consider such amendment, unless the deadline is waived by the applicant.[47]

J. Substance of the Decision[48]

The Siting Board can grant a certificate in the manner requested by the applicant, it can grant a certificate subject to modifications and or conditions, or it may deny the application. In rendering a decision on an application for a certificate, the Siting Board must issue a written opinion stating its reasons for the action taken. The Siting Board is required to make certain statutory findings and determinations, and the required determinations can only be made after considering certain required factors.

The Siting Board must make explicit findings regarding the nature of the probable environmental impacts of the construction and operation of the facility, including the cumulative environmental impacts of the construction and operation of related facilities such as electric lines, gas lines, water supply lines, waste water or other sewage treatment facilities, communications and relay facilities, access roads, rail facilities, or steam lines. The findings must include impacts on ecology, air, ground and surface water, wildlife, and habitat; public health and safety; cultural, historic, and recreational resources, including aesthetics and scenic values; and transportation, communication, utilities and other infrastructure. The findings must also include the cumulative impact of emissions on the local community including whether the construction and operation of the facility results in a significant and adverse disproportionate environmental impact, in accordance with regulations promulgated by the Department of Environmental Conservation regarding environmental justice.[49]

The Siting Board must also make explicit determinations that the facility is a beneficial addition to or substitution for the electric generation capacity of the state; that the construction and operation of the facility will serve the public interest; and that the adverse environmental effects of the construction and operation of the facility will be minimized or avoided to the maximum extent practicable. If the Siting Board finds that the facility results in or contributes to a significant and adverse disproportionate environmental impact in the community in which the facility would be located, the Siting Board must make an explicit determination that the applicant will avoid, offset or minimize the impacts caused by the facility upon the local community for the duration that the certificate is issued to the maximum extent practicable using verifiable measures. The Siting Board must make an explicit determination that the facility is designed to operate in compliance with applicable state and local laws and regulations concerning, among other matters, the environment, public health and safety, all of which shall be binding upon the applicant, except that the Siting Board may elect not to apply, in whole or in part, any local ordinance, law, resolution or other action or any regulation or any local standard or requirement, including, but not limited to, those relating to the interconnection to and use of water, electric, sewer, telecommunication, fuel and steam lines in public rights of way, which would be otherwise applicable if it finds that, as applied to the proposed facility, such is unreasonably burdensome in view of the existing technology or the needs of or costs to ratepayers whether located inside or outside of such municipality. The Siting Board must first have provided the municipality an opportunity to present evidence in support of such ordinance, law, resolution, regulation or other local action.

In making the required determinations, the Siting Board must consider the state of available technology; the nature and economics of reasonable alternatives; the environmental impacts found; the impact of construction and operation of related facilities, such as electric lines, gas lines, water supply lines, waste water or other sewage treatment facilities, communications and relay facilities, access roads, rail facilities, or steam lines; the consistency of the construction and operation of the facility with the energy policies and long-range energy planning objectives and strategies contained in the most recent state energy plan; the impact on community character; whether the facility would affect communities that are disproportionately impacted by cumulative levels of pollutants; and such additional social, economic, visual or other aesthetic, environmental and other considerations deemed pertinent by the Siting Board.

K. Compliance and Enforcement[50]

Following any rehearing and any judicial review of the decision, the Siting Board's jurisdiction over an application ceases, except that the permanent board[51] retains jurisdiction with respect to the amendment, suspension or revocation of a certificate. DPS or the Public Service Commission monitors, enforces and administers compliance with any terms and conditions set forth in the Siting Board's order granting a certificate.

L. Wind Issues Framed by the Stakeholders

Based on comments made by stakeholders during the outreach process conducted for the Siting Board in promulgating the implementing regulations, there are likely to be a robust number of issues to resolve in relation to Article 10 wind farm applications. The site-specific nature of environmental impacts unfortunately makes it difficult and inadvisable to try to resolve wind issues on a generic basis. In particular, applicants proposing wind farms should be prepared to address noise levels and impacts, including low-frequency sound and vibrations; the application of minimum setback distances between wind

turbines and streets, property lines, homes and other facilities; turbine heights; visual and community character impacts; the appropriate scope of the study area; local law applicability and reasonableness; real property ownership and access issues; wildlife issues, including impacts on bats, raptors and migratory birds; and mechanisms to ensure the building of safe structures, site restoration and decommissioning.

V. Conclusion

The key to Article 10 is to understand that the concept of "environmental compatibility and public need" requires that the facility be needed to serve electric and economic needs, but that it will only be approved if it is to be constructed in a manner that is found to be compatible with the environment.

Endnotes

1. N.Y. Public Service Law §§ 120–130 (Pub. Serv. Law).
2. 2011 N.Y. Laws ch. 388.
3. Pub. Serv. Law §§ 160–173.
4. A "general law" is a law enacted by the State Legislature which its terms and effect applies alike to all counties, cities, towns, or villages. Because it is a general law, Article 10 is not in conflict with the New York State Constitution or the home rule powers granted to New York local governments. *See* N.Y. Municipal Home Rule Law § 10(1)(a)(14); N.Y. State Local Governments §10(6),(7); N.Y. Const. art. IX, § 3.
5. The 25 megawatt threshold is roughly equivalent to the average electric power needs of 30,000 households in New York State.
6. The spot where they stood is protected within the Washington-Wayne Lookout, a 5.2-acre historic site purchased by a consortium led by the Open Space Institute, with funds provided by the Lila Acheson and DeWitt Wallace Fund for the Hudson Highlands.
7. Public Papers of Nelson A. Rockefeller 1965, pp. 1265-1266.
8. NELSON A. ROCKEFELLER, OUR ENVIRONMENT *CAN* BE SAVED 88 (1970).
9. *Id.*
10. *Id.*
11. *Id.* at 89.
12. *Id.*
13. Federal Power Commission, Bureau of Power, *A Review of Consolidated Edison Company: 1969 Power Supply Problems and Ten-year Expansion Plans*, December 1969, p. 69.
14. *Id.*
15. 1970 N.Y. Laws ch. 272.
16. *Id.* § 1.
17. Pub. Serv. Law § 121.
18. 1972 N.Y. Laws ch. 385 (Article VIII of the Public Service Law). Later iterations were enacted by 1978 N.Y. Laws ch. 708 (Article VIII) and 1992 N.Y. Laws ch. 516 (Article X).
19. *Scenic Hudson Preservation Conference v. Federal Power Commission*, 354 F.2d 608, 616 (2d Cir. 1965).
20. *Long Island Lighting Co. v. Horn*, 49 Misc.2d 717, 268 N.Y.S.2d 366 (Sup. Ct., Suffolk Co. 1964), *aff'd*, 17 N.Y.2d 652, 269 N.Y.S.2d 432 (1966).
21. 42 U.S.C. § 4321. New York's enhanced version of NEPA, the State Environmental Quality Review Act (SEQRA), did not become law until 1975. *See* N.Y. Comp. Codes R. & Regs. tit. 6, § 617 (N.Y.C.R.R.).
22. 16 N.Y.C.R.R. §§ 1000–1003.
23. Pub. Serv. Law § 160(4); *see also* Pub. Serv. Law § 161 (describing the "[g]eneral provisions relating to the board").
24. Pub. Serv. Law § 160(4).
25. *Id.*
26. Pub. Serv. Law § 161(2). In the City of New York, the chairperson of the community board, the borough president, and the mayor shall each nominate four candidates for consideration. Id.
27. Pub. Serv. Law § 163(3); 16 N.Y.C.R.R. § 1000.4.
28. 16 N.Y.C.R.R. § 1000.4(c).
29. 16 N.Y.C.R.R. § 1000.2(ah).
30. Pub. Serv. Law § 163.
31. 16 N.Y.C.R.R. § 1000.4(b).
32. 16 N.Y.C.R.R. § 1000.4(c)(1).
33. *Id.* at (c)(2).
34. *Id.* at (c)(3).
35. 16 N.Y.C.R.R. § 1000.4(c).
36. 16 N.Y.C.R.R. § 1000.4(d).
37. 16 N.Y.C.R.R. § 1000.4(e).
38. *Id.*
39. Pub. Serv. Law § 163(3); 16 N.Y.C.R.R. § 1000.5.
40. Pub. Serv. Law § 163(4); 16 N.Y.C.R.R. § 1000.10.
41. Pub. Serv. Law § 163(5).
42. Pub. Serv. Law §§ 164(1), (2), 165; 16 N.Y.C.R.R. §§ 1001, 1000.6.
43. Pub. Serv. Law § 166.
44. Pub. Serv. Law § 164(6); 16 N.Y.C.R.R. § 1000.10.
45. Pub. Serv. Law §§ 166(3), 167.
46. Pub. Serv. Law § 165(4).
47. For certain qualifying applications by an owner of an existing major electric generating facility to modify that facility or to site a new major electric generating facility adjacent or contiguous to the existing facility, the deadlines are different such that the final decision by the Siting Board must be completed within six months, the extension permitted in extraordinary circumstances is three months, and the extension permitted to consider a material and substantial amendment to the application is three months, unless the deadlines are waived by the applicant.
48. Pub. Serv. Law §§ 168, 169.
49. See 6 N.Y.C.R.R. § 487. "Environmental justice" means the fair treatment and meaningful involvement of all people regardless of race, color, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
50. Pub. Serv. Law § 168(5); 16 N.Y.C.R.R. § 1002.
51. Ad hoc public members do not serve on the Siting Board when it acts as the permanent board. The permanent board has jurisdiction with respect to the promulgation of regulations for the implementation of Article 10 and with respect to the amendment, suspension or revocation of a certificate.

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Feasibility of Backyard Alternative Energy Systems under Different Zoning Schemes

By Emily Ekland

I. Introduction

New York is encouraging the use of alternative energy systems. In 2012 alone, New York created multiple renewable energy incentives and made them available to the general public.[1] These incentives make alternative energy systems financially more feasible, yet there are still many obstacles to becoming a renewable energy efficient household in this state.

As financial burdens begin to lift, the land use process for installing these systems remains complicated. Land use law is regulated on a local level, and as such municipalities have the right to regulate the use of land through zoning regulations.[2] The problem many alternative energy seekers are running into is regulatory obstacles that make it difficult to establish backyard alternative energy systems. This article is an overview of common land use regulatory schemes and how zoning trends affect the installation of alternative energy systems.

II. Different Zoning Schemes

For traditional residential plots there are three main schemes to regulating land use: comprehensive plans, accessory use regulation, and special use permits.[3] In general, a comprehensive plan maneuvers future zoning regulation, pointing it in a specific direction. Accessory uses create a certain level of expectation amongst homeowners to be able to use their land in certain ways without municipal interference. Special use permits designate certain uses as harmonious with the general zoning structure. These three items offer distinctive benefits and burdens to the feasibility of alternative energy systems.

A. Comprehensive Plans

Sometimes called master plans, land use plans, local land development plans, general plans, or some combination thereof, comprehensive plans outline the structure of development and preservation of the community.[4] Any sort of zoning regulation that takes place in a municipality cannot contradict the comprehensive plan.[5] Municipalities that have not drafted a formal comprehensive plan must still comply with the common law scheme developed in the province.[6] When faced with determining the common law scheme, courts will look at the "reasonable relation between the end sought to be achieved…and the means used to achieve that end."[7] Thus, if a person is denied the right to manipulate the use of his or her land, the court will assess whether that denial was rational within the general scheme of regulation.

As far as alternative energy systems go, including alternative energy use in a comprehensive plan would ensure that the right to install alternative energy systems on one's property could not be arbitrarily denied. Simply encouraging the use of alternative energy in a comprehensive plan, however, is not enough. Municipalities must further develop alternative energy system rights in the zoning code because the comprehensive plan only creates a burden of proof for denying such a use. Disqualifying ordinances such as height requirements or historical facade conformity could legitimately prevent a property owner from installing alternative energy systems despite the master plan to support alternative energy use. Acknowledging and encouraging the use of alternative energy systems in a comprehensive plan does make it easier to amend previously enacted ordinances that prevent those systems' installation because the comprehensive plan sets the tone for the whole land-use regulation scheme. Contradicting ordinances can be updated; the issue is usually that those ordinances are not found until a homeowner is trying to install a system and is blocked by the current code.

Amending comprehensive plans to include clean energy is not difficult to accomplish. Under the State Environmental Quality Review Act (SEQRA), comprehensive plans cannot regulate land use that affects the environment without first evaluating the environmental impacts a particular regulation would have on the surrounding environment.[8] This opens the drafting process up to a thorough analysis of alternative energy strategies and their impacts, positive and negative, upon the community. This evaluation could assess the potential for alternative energy systems or determine if alternative energy is even feasible in the community, and if so, which form of alternative energy is most appropriate.

Some municipalities have already addressed alternative energy systems in their comprehensive plans. The Town of Dickinson specifies "the purposes of promoting and protecting the public health, safety and general welfare and providing for *solar access*."[9] The code defines solar access as street and lot orientation to maximize use of solar energy systems on individual properties.[10] The City of Kingston also accommodates solar energy systems in its comprehensive plan.[11] Both municipalities are prime

examples of the emerging push towards clean energy. Including alternative energy in the comprehensive plan is ideal because subsequent ordinances cannot contradict the right granted in the plan to implement those particular alternative energy systems.

a. Accessory Uses

An accessory use of property is a use that is incidental, subordinate, and customarily connected to the primary use of the property.[12] The common example of an accessory use is a car garage on a residential plot because 1) parking one's car in a garage is incidental to owning the home, one can own a home without a garage, but one does not own a garage without possessing the home, 2) a car garage is, usually, smaller than the home so it is a subordinate use, and 3) it is common for homeowners to use a garage for their cars.[13] Homeowners who wish to add to their property, for example by building a garage, must get a permit to build and follow the accessory use permit process. Accessory use permits are hardly ever denied because the addition is incidental, subordinate, and customary to homeowners in the area. What is important about accessory uses is the expectation the label creates. When something is categorized as an accessory use, there is a reasonable expectation that a homeowner has a right to that use because it is common to all homeowners in the area.[14] Municipalities have the option of prohibiting certain uses in specific districts, but if they choose to do so it must be limited in the zoning code.[15]

Some accessory uses are articulated in the zoning code.[16] If a particular use is not labeled "accessory" in the zoning code, the use is reviewed objectively to determine whether it is incidental, subordinate, and customarily connected to the primary use of the property.[17] Municipalities, however, have the option of creating their own standards of review instead of using a blanket objective standard.[18] Usually, a use that is incidental, subordinate and customary is accessory and therefore almost always permitted.

If municipalities begin granting alternative energy systems accessory use status, the zoning code becomes considerably more alternative-energy friendly. This action would create an expectation that homeowners are able to take advantage of alternative energy system incentive programs and install these systems on residential property. Unlike incorporating the systems in a comprehensive plan, labeling alternative energy systems as an accessory use would increase the feasibility of installing these systems on their own because of the expectation that results from an accessory use label. Of course, updating comprehensive plans and accessory use definitions to include alternative energy would increase the likelihood of homeowners investing in alternative energy because the zoning scheme encourages its use and the accessory label instills an expectation to be able to explore that option, but if amending both items is time-consuming because of the evaluation requirements under SEQRA, adding alternative energy in the accessory use definitions is a great alternative.

Alternative energy systems are already labeled accessory uses in the Town of Islip and Sylvan Beach.[19] The Town of Islip specifies the accessory use of wind turbines and limits the use to stand-alone or roof-mounted turbines that are used to replace existing power supplies.[20] Property owners who wish to install wind energy systems on their land must still apply to build such a system, but because it has been labeled accessory, the zoning board cannot arbitrarily deny the permit—it must follow the standard of review set out in the municipal code for permit applications. Solar energy systems are permitted as backyard detached structures in Sylvan Beach.[21] Because these systems are designated as permissible backyard structures, a permit to install one cannot be denied simply because it is a solar energy system; the zoning board must objectively deny the permit based on the factors limiting permit grants in the zoning code, such as backyard space requirements, or height limitations, etc.

b. Special Use Permit

Special use permits are granted by the municipal zoning or planning board. Any grant of a special use permit signifies that the use is in harmony with the municipal zoning code and neighborhood scheme.[22] Generally, the zoning code requires special use permits for uses that are permitted in the code under specified circumstances.[23] When this type of permit is not granted, it is because the municipality has determined the use would negatively impact surrounding areas.[24] As with accessory uses, the ordinance should articulate any standard of review or factors to consider for permit applications. If standards and / or factors are articulated, the zoning board cannot deny a permit on any ground not listed in the ordinance.[25]

Whether a particular use is in harmony with the surrounding neighborhood must be based on some objective standard and not a "general community opposition."[26] If the particular use is already listed as a permissible land use in the zoning ordinance, that evidence is "tantamount to a legislative finding that the permitted use is in harmony with the general zoning plan and will not adversely affect the neighborhood."[27] Thus, if a comprehensive plan or accessory use list identified alternative energy systems as permissible uses of residential property, it would be difficult to deny a special use permit to install such a system because it is already considered to be in harmony with the municipal code and surrounding neighborhood.

When assessing a special use permit application, the reviewing board must articulate sufficient evidence for its finding. For example, if a special use permit is denied because granting the permit would corrupt the current building height uniformity promoted by the code, the review board must describe in its decision the current

building height plan and how the permit would displace the desired conformity.[28] Or, if a permit is denied because the board believes it contradicts the town's master plan, the board must specifically include the master plan as evidence in the application review hearing.[29] In short, a permit cannot be denied for general reasons; the denial must be accompanied by specific evidence supporting the decision.

This type of zoning scheme presents a couple of obstacles for the feasibility of installing alternative energy systems. The fact that the application must be reviewed by the zoning board presents obvious and latent obstacles. Even though the application must be reviewed objectively and any denial must be accompanied by articulated evidence, there still is the fact that applications to install alternative energy systems are left in the hands of individuals, and while alternative energy systems have still not reached the point of common acceptance, it is very possible the application will be reviewed by biased board members. This presents an initial problem for gaining approval.

Also, if a special use permit is granted to install an alternative energy system, how will that affect the rest of the code, especially a municipal code that does not reference alternative energy anywhere? Does the grant informally change the purpose of the municipal zoning ordinance to include advancing alternative energy systems? Once a special use permit is granted, the grant itself provides a strong presumption that the use is permissible.[30] This makes it more difficult to deny future applications for the same use, but it might latently and unintentionally contradict the municipal direction.

On the other hand, this type of zoning scheme makes installing alternative energy systems more feasible because as soon as one permit is granted, it truly does open the doors for other permits to be granted as well. If installing one alternative energy system is in harmony with the community's scheme, it should not be difficult for another homeowner to get a permit to install his / her own system. As more permits are granted, the use of alternative energy systems would most likely become part of the neighborhood scheme itself with or without incorporation through the comprehensive plan or adding it to the code as an accessory use.

The City of Oneida requires a special use permit to install backyard alternative energy systems.[31] Whether someone is granted the permit depends only on the solar access of surrounding properties.[32] Because the code articulates surrounding solar access as the qualifying factor, a permit may only be denied if it negatively impacts the solar access of surrounding properties. The Town of Bativia requires applicants to acquire a special use permit in order to install a wind energy system.[33] The Bativia code lists fourteen factors to consider in assessing the application.[34] This list makes it difficult to predict whether one is going to get a permit, but, on the bright side, because there are so many factors, when a permit is granted, there is an even stronger presumption that the installation of a wind turbine conforms to the community scheme because despite all the factors affecting the turbines feasibility, installation was still permitted.

B. Closing Thoughts

Municipal zoning is more complicated than these three items, but generally comprehensive plans, accessory uses, and special use permits are the most commonly implemented zoning tools with respect to renewable energy systems. When comparing the three items, it is evidence that identifying alternative energy systems as an accessory use would most improve the feasibility of installing these systems under current zoning schemes because the systems would then be deemed incidental, subordinate, and customary to residential properties in the same community. Once the use is customary, it would not require the objective or factual considerations necessary in special use permit applications. Likewise, its installation would not be as easily hindered by other areas of the code that comply with the comprehensive plan, but do not permit the system's installation. Further, instead of having to show that numerous factors would not be ill-affected by the system's installation, such as with special use permits, the board would have to find a reason not to permit the accessory use. The reviewing board would be starting with the assumption that the use should be permitted because it is accessory, instead of the permitting process starting out on neutral territory and being pulled in either direction by the reviewing factors.

Because accessory uses offer firmer ground for property owners to stand on when manipulating their residential plots, categorizing alternative energy systems as accessory uses is the best way to increase the quantity of these systems' presence in New York. Many municipalities already follow this approach, so it is adaptable across the state. Municipalities reacting to the growing Clean Tech movement should consider these approaches in their zoning ordinances to best accommodate the movement in their counties, towns, and cities.

Endnotes

1. *See, e.g.*, NYSERDA, *Renewable Energy*, http: / / www.nyserda.ny.gov / renewable (last visited Oct. 22, 2012) (listing several different state incentives).
2. N.Y. Mun. Home Rule § 10(4)(a) (2010).
3. Please note that municipalities have numerous ways to regulate land use within their jurisdiction. The following schemes are the most common or most discussed in land-use discourse.
4. JOHN R. NOLON & PATRICIA E. SALKIN, LAND USE IN A NUTSHELL (2006).
5. Peck Slip Associates, LLC v. City of New York, 789 N.Y.S.2d 806, 811 (Sup. Ct. 2004), *aff'd* 809 N.Y.S.2d 56 (App. Div 2006).
6. *Fred F. French Investing Co., Inc. v. City of New York*, 39 N.Y.2d 587, 596 (1976).

7. *Id.*
8. N.Y. Comp. Codes R. & Regs. tit. 8, § 617 (N.Y.C.R.R.). *See* New York State Department of State, James A. Coon Local Government Technical Series: Zoning and the Comprehensive Plan, at 4 (2009), http://www.dos.ny.gov/lg/publications/Zoning_and_the_Comprehensive_Plan.pdf.
9. Town of Dickinson Code § 600-1 (1986) (emphasis added).
10. *Id.* at § 600-2.
11. City of Kingston Code § 405-1.
12. JOHN R. NOLON & PATRICIA E. SALKIN, LAND USE IN A NUTSHELL 99 (2006).
13. *Id.* at 100.
14. *Id.*
15. *Id.* at 101.
16. *See, e.g.*, Town of Islip Code § 68-3.
17. *Ronning v. Thompson*, 483 N.Y.S.2d 949, 952 (Supreme Ct., Warren Co. 1985).
18. JOHN R. NOLON, PATRICIA E. SALKIN & MORTON GITELMAN, LAND USE AND COMMUNITY DEVELOPMENT 259-260 (7th ed. 2008).
19. Town of Islip Code § 68-3; Sylvan Beach Code § 136-28.
20. Town of Islip Code § 68-420.9.
21. Sylvan Beach Code § 136-28.
22. JOHN R. NOLON & PATRICIA E. SALKIN, LAND USE IN A NUTSHELL 86 (2006); N.Y. TOWN LAW § 274-b.
23. JOHN R. NOLON & PATRICIA E. SALKIN, LAND USE IN A NUTSHELL 87 (2006).
24. *Id.*
25. *Id.* at 88.
26. *Caspian Realty, Inc. v. Zoning Bd. of Appeals*, 68 A.D.3d 62, 67, 886 N.Y.S.2d 442 (2d. Dep't 2009) (citing *Ifrah v. Utschig*, 98 N.Y.2d 304, 746 N.Y.S.2d 667 (2002)).
27. *North Shore Steak House, Inc. v. Board of Appeals*, 30 N.Y.2d 238, 331 N.Y.S.2d 645 (1972).
28. *See PDH Properties, LLC v. Planning Board*, 298 A.D.2d 684, 687, 748 N.Y.2d 193 (3d. Dep't 2002) (overturning the Boards permit denial because the Board failed to give specific evidence as to why the proposed permit would offend current building height such as the height of surrounding buildings).
29. *Dan Gernatt Gravel Producers, Inc. v. Town of Collins*, 105 A.D.2d 1057, 1059, 482 N.Y.S.2d 587 (4th Dep't 1984).
30. *Inland Western Coram Plaza, LLC v. Town of Brookhaven*, 14 Misc.3d 1225(A), 836 N.Y.S.2d 493 (Supreme Ct., Suffolk Co. 2007).
31. City of Oneida Code § 190-26.
32. *Id.*
33. Town of Bativia Code § 235-38.1.
34. *Id.* § 235-38.1(I). The fourteenth factor is a catch-all provision which gives the granting authority broad discretion to grant or deny the permit. *Id.*

Tribes Get a New Lease on Renewable Energy Development: Regulatory Reform in Surface Leases for Indian Trust Lands

By Laura Bomyea

New federal regulations on the leasing of Indian lands may pave the way for commercial renewable energy development in Indian Country.[1] These new rules, promulgated by the U.S. Department of Interior's Bureau of Indian Affairs (BIA), are designed in part to facilitate wind and solar development on tribal lands. If the rules work as they are intended to, American Indian tribes may soon be able to play a more substantial role in the national effort to reduce carbon emissions and increase domestic production of renewable energy, and in turn strengthen their own financial security and tribal sovereignty.[2] While these rules will not apply to tribes in New York, where title to Indian lands is held by the state, a trustee, or the tribes themselves,[3] the regulatory changes may create an opportunity for similar reform at the state level, and increased interest in renewable energy development on Indian lands generally could create new opportunities for New York-area tribes as well.

Over 50 million acres of land comprise what is known as "Indian Country."[4] These vast expanses of land have the potential to yield over 530 billion kilowatts per year in wind energy and another 17,600 billion kilowatts per year in solar energy in the contiguous 48 states, according to projections made by the U.S. Department of Energy's National Renewable Energy Laboratory.[5] According to the BIA, "of the 326 American Indian reservations, more than 150 have the resource capacity needed to sustain a 1 to 25 megawatt (MW) natural gas and / or renewable power generation facility."[6] These resources could provide significant economic development opportunities for tribes seeking to produce their own energy or develop renewable power for commercial sale.

Recognizing this tremendous potential, tribes themselves are pursuing their own small- and commercial-scale wind, solar, biomass, geothermal, and mixed-source energy generation projects in the hopes of strengthening tribal sovereignty, increasing sustainability, and furthering economic development goals.[7]

> Tribes are beginning to perceive renewable energy development in a positive light, as something that is consistent with tribal culture and values. Many tribal leaders now see renewable energy as a vehicle for economic development in areas that may no longer be (or never were) suitable for agricultural development. Some also see this as a way for tribes to play a positive role in the nation's energy future.[8]

The U.S. Department of Energy's Tribal Energy Program funded 93 tribal energy projects between 2002 and 2008 and continues to solicit applications for grants to study, develop, or construct such projects.[9] Some tribes have also pursued their own utility-scale projects, providing energy to tribal businesses and residences, while others have explored commercial energy production for sale to specific non-tribal industrial or commercial users, or to supply wholesale electricity to the market.[10]

Yet tribal renewable energy development, in general, lags far behind its potential, and experts say existing statutory schemes serve as major barriers to real renewables development on tribal lands.[11] Under prior federal regulations, tribes encountered difficulty when they chose to partner with private developers or investors on these projects, particularly where the private developer sought to lease Indian lands held in trust by the government or where lands were otherwise subject to restrictions on their sale or lease.[12] Tribal communities complained of onerous federal requirements, long delays, and other disadvantages when looking to attract interest commercial renewable energy development on their lands.[13] One culprit: the BIA's regulations on Indian trust land leasing. Federal regulators themselves called the 50-year-old lease regulations "antiquated"[14] and "ill-suited to the modern needs of Indian tribes and individual Indians in using their lands for housing, economic, and wind & solar energy development."[15] Experts point out that these trust land leasing requirements are disadvantageous for tribes because they require the approval of the Secretary of the Interior on each individual lease agreement, and because they generally "restrict Indian tribes to a passive role in the development of tribal renewable resources."[16]

To solve this problem, Congress and the BIA took two important steps toward opening Indian Country to renewable development—passage of the Helping Expedite and Advance Responsible Tribal Homeownership (HEARTH) Act, signed into law in July 2012, and substantial revision of the BIA's Indian trust land leasing regulations, finalized in late November 2012.[17] In effect, these

changes should give tribes greater control over leases of their lands and, ultimately, a greater role in drawing commercial renewable energy investment to Indian Country. And while these changes do not directly affect tribal lands in New York State, they may be an opportunity for New York tribes to reevaluate leasing requirements for their lands, and to take advantage of any growth in renewable energy opportunities resulting from these reforms.

This article will discuss the changing landscape of renewable energy development in Indian Country, first examining this new legal framework, including the prior and updated Indian trust land leasing regulations; briefly outlining leasing restrictions in New York; then discussing funding opportunities and financing issues unique to tribal projects in all states; and finally reviewing tribal experiences with renewable energy development, on the small and large scale.

I. The Legal Landscape in Indian Country (Outside of New York State)

When compared with off-reservation development, one of the most unique challenges presented by renewable energy development on Indian lands is the question of land ownership.[18] Fee title to the lands of most federally recognized Indian tribes is held not by those who live there, but rather in perpetual trust by the federal government, and the transfer or grant of use of those lands is strictly regulated by, in most cases, federal law.[19] Other lands are considered restricted fee lands, which are also subject to limitations on alienation. For a developer, this often means obtaining federal permission to lease and build on Indian land, a process which is notoriously lengthy and onerous.[20] Leases of Indian trust lands "can easily take as many as two to three years longer than the comparable processes for projects outside of reservations, even in comparison with projects on Federal lands."[21] Further, no matter how much money a developer invests in a renewable facility on Indian lands, that developer will likely never own fee title to the land, and will be required to periodically renew leases to continue operations there.[22] The lack of commercial renewable development on tribal lands, many of which are acknowledged to have abundant potential for such development, is likely attributable at least in part to these challenges—the experience or perception of long delays and onerous federal review processes, a guaranteed lack of control over land, as well as a general unfamiliarity with how to do business in Indian Country.[23]

Prior to 2012, any tribe, Indian allottee, or owner of restricted Indian trust lands had to obtain the approval of the Secretary of the Interior before entering into a lease of that land for "public, religious, educational, recreational, residential, or business purposes, including the development or utilization of natural resources…for grazing purposes, and for [certain] farming purposes."[24] Such leases were, by law, restricted to 25 years and subject to review or cancellation by the BIA at any time.[25] The terms of the leases, as well as any renewals or extensions, had to be approved by the BIA after a review of various considerations dictated by statute, including environmental impacts, effect on nearby properties, the nature of installed structures, and the availability of judicial forums to settle legal disputes.[26]

When changes were first proposed to these regulations in November 2011, the Department of the Interior itself called the existing 1960s-vintage regulations "an antiquated, 'one-size fits all' approach to processing all surface leases" noting that "[u]nder the current system, which lacks a defined process or deadlines, it is not uncommon for a simple mortgage application to languish for several years waiting approval from the federal government."[27] In late 2011, the Interior Department outlined its plans to create separate lease rules for residential, commercial, and renewable energy development which would be clearer and faster than the existing regulations, and would shift significant control back to tribes.[28] At that time, groups such as the National Congress of American Indians praised the change as removing troublesome and outdated obstructions in order to "streamline the leasing process on tribal lands and clear the way for tribally driven renewable solar and wind energy projects."[29] Some in the Indian community, including Assistant Secretary for Indian Affairs Larry Echo Hawk, have criticized this framework "paternalistic,"[30] and have praised the move to relocate authority to tribal governments.

While the BIA pursued regulatory reforms, and engaged substantial tribal consultation on those revisions,[31] Capitol Hill was also working on a solution to the Indian trust land leasing issue. On July 30, 2012, President Obama signed into law the Helping Expedite and Advance Responsible Tribal Homeownership (HEARTH) Act, which allows tribes to make leases for residential, commercial, educational, religious, recreational, or public purposes without the Secretary of Interior's approval.[32] When the bill was signed, officials at the U.S. Department of Interior explained that the legislation was a parallel action designed to create authority for some of the regulatory revisions under way at the BIA, particularly the authority to shift control of leasing decisions to the tribes themselves.[33]

The HEARTH Act sets up the groundwork for the BIA's new regulations by adding a subsection to the Indian trust land leasing laws. Whereas 25 U.S.C. § 415(a) had previously required the Secretary of Interior's approval on any leases of Indian lands, the HEARTH Act's addition of § 415(h) creates a method of tribal lease approval which avoids the requirement in § 415(a).[34] Under this amendment, tribes wishing to create their own lease review process and, ultimately, to assume local authority over lease approval, may draft their own tribal leasing regulations, and submit those regulations to the BIA for approval.[35]

Tribal leasing regulations cannot be used to approve leases on individually owned allotted land.[36] If a tribal energy project receives federal money, the federal agency funding the project will still need to perform any necessary environmental review of the project under the National Environmental Policy Act (NEPA).[37] Where a tribe executes a lease pursuant to BIA-approved tribal leasing regulations, documentation of the lease and information on lease payments must be provided to the BIA, and the tribe must provide proof that the lease payments are sufficient to meet the federal government's trust responsibilities.[38] Finally, the bill contains provisions for violations,[39] including a provision which allows the Interior Secretary to enforce or cancel a lease at the request of the Indian tribe that made the lease.[40]

On November 27, 2012, the BIA released its final rules substantially revising the Indian trust land leasing regulations.[41] Interior Secretary Ken Salazar called the changes "the most comprehensive reforms of Indian land leasing regulations in more than 50 years."[42] While BIA regulations had traditionally treated all non-agricultural land leases in the same manner under 25 C.F.R. § 162, the new regulations contain provisions which pertain specifically to residential, commercial, and wind and solar leases.[43] Two types of renewable leases are contemplated by the new regulations—Wind Energy Evaluation Leases and Wind and Solar Resource Leases.[44] A Wind Energy Evaluation Lease is a short-term lease agreement granted for the purpose of evaluating wind resources on a given parcel of trust land.[45] Wind and Solar Resource Leases are meant to "authorize[] a lessee to possess Indian land to conduct activities related to the installation, operation, and maintenance of wind and/or solar energy resource development projects. Activities include installing instrumentation facilities and infrastructure associated with the generation, transmission, and storage of electricity and other related activities."[46] Biomass and waste-to-energy development projects are not exempted from the new regulations—the BIA final rule states that leases for those technologies will proceed under Subpart D, the general rules for business leases.[47]

Prior to these amendments, BIA review of non-agricultural leases was not required to follow any specific process or adhere to any set deadlines.[48] The BIA had broad authority to turn down such leases, even for short-term use, and to approve or deny all assignments or other transactions, even if the landowner wished to consent to them.[49] Prior rules were also strict about the fair market value of rents, appraisal of lands to be leased, and periodic reviews to determine whether rental amounts were still fair.[50] Lessees were also required to post performance bonds, and the BIA was required to consult with landowners only prior to terminating the lease.[51]

Under the new requirements, a rubric for obtaining BIA approval is provided by regulation,[52] as is a detailed list of documentation required in order for a lease approval application to be deemed complete.[53] The tribal lease regulations provisions created by the HEARTH Act are not specifically codified in these regulations, but the BIA notes that it is statutorily required to complete lease review unless other conditions are present—approved tribal leasing regulations—which relieve the federal agency of its statutory obligations.[54] Presumably, then, the BIA intends the substance of these regulations to apply only where tribal leasing regulations do not exist.

If tribes do not take over leasing authority, or if their leasing regulations are pending or denied, the new regulations also establish deadlines for BIA review of leases. BIA review of a proposed lease is meant to take place during the NEPA process, and deadlines for a BIA decision are imposed.[55] In the case of a Wind Energy Evaluation Lease, the BIA has 20 days to make a decision; if it fails to do so, parties may take action under the new regulations by filing written notice on the appropriate BIA regional director to force a decision.[56] Similar provisions are available for business or Wind and Solar Resource Leases, except that the BIA has 60 days, plus an additional 30 days if needed, to make a decision before parties gain a right to petition the BIA Regional Director for action on the lease application.[57] If the action contemplated is the amendment of an existing wind and solar resource or wind energy evaluation lease, the BIA has 30 days, plus another 30-day extension if needed, to make a decision or the proposed action is deemed approved by default.[58] Deadlines for other actions, such as assignment or leasehold mortgages, are also outlined in the new rules.[59] Lastly, the regulations require that the BIA must approve leases unless it "finds a compelling reason not to, based on certain specified findings."[60]

The BIA's final rules took effect in late December 2012 and were codified in 25 C.F.R. Part 162.

Even with the new leasing rules, there are still a number of important legal and financial issues unique to Indian Country that developers should be aware of, including local requirements binding the project. While state energy and utility regulations are unlikely to apply on most tribal lands, tribes themselves may have local laws, land use controls, utility regulations, or zoning ordinances governing development on reservation or other trust lands.[61] A tribe may also have an environmental review process unique to that community,[62] or may possess some environmental regulatory powers normally reserved for state or federal agencies.[63] Many actions taken by a tribe or the BIA, such as the creation of a new utility right-of-way or other necessary infrastructure improvements,[64] may also be subject to the National Environmental Policy Act (NEPA) and the Endangered Species Act (ECA), review processes which would be familiar territory for developers with previous experience on non-Indian lands.

If a renewable project in Indian Country requires extensive transmission upgrades, the construction of new transmission lines which cross over reservation boundar-

ies, or the sale or transmission of power to off-reservation customers, state jurisdiction over those portions of the project may be triggered. In that instance, the state public service commission or utility-regulating agency may have jurisdiction, though the law is by no means clear on how far that jurisdiction would extend.

Finally, in the case of joint partnerships between tribes and private entities, developers should be aware that there is extensive federal law governing civil relationships between Indian and non-Indian actors. For example, tribes themselves retain the same sort of sovereign immunity afforded to state governments, immunity which must be waived by the tribe in order for private actors to bring a claim against a tribe in court. If contracts are involved, developers should also be cognizant of any choice of law and venue provisions governing which law (tribal law, the law of a certain state, etc.) will apply, and where any claims under the contract must be litigated. Non-Indian companies unfamiliar with the unique legal issues inherent in conducting business in Indian Country should consult counsel familiar with these issues.

II. Indian Land Leases in New York: Possible Opportunities for Change

New York tribes, as members of the Iroquois Confederacy, have a long and unique history with the United States.[65] The federal government has recognized seven Indian tribes within the borders of New York State—the Seneca, Tuscarora, Cayuga, Onondaga, and Oneida Nations, the St. Regis Mohawk Tribe, and the Tonawanda Band of Senecas.[66] In 2010, the federal government also recognized the Shinnecock Nation on Long Island. A ninth tribe, the Unkechaug on Long Island, is recognized by New York State, but not by the federal government.[67] Through a series of treaties, the tribes of the Iroquois Confederacy were guaranteed the right to occupy their lands, while title to the land was held either by the state of New York,[68] or later, in some cases by a trustee or by the tribe itself.

The ownership of fee title in Indian lands matters here, because it determines what rights or restrictions regarding sale and lease of lands to which a specific tribe may be subject. Because tribes in New York have varying degrees of land ownership—from rights only to occupy and use land, with fee title in the State of New York (an arrangement commonly called "Indian title") to full tribal ownership of fee title—the extent to which the state exercises control over leasing and use of Indian lands varies dramatically. In some cases, there are simply no statutes or case law which speak directly to the leasing restrictions on some Indian lands. The downside to this silence is that certain provisions of state law—namely, NY Indian Law § 8—govern "intrusions" onto Indian lands, and provide for punishment of intruders and voiding of invalid lease or contracts. For developers who are unfamiliar with doing business in Indian Country, this lack of clear authority, and provisions for punishments, may be perceived as risky or confusing, and could dissuade an otherwise interested investor from attempting a renewable project on tribal lands. For tribes looking to encourage this type of development, passage of a state law specifically authorizing tribes to make leasing decisions on their own could go a long way in encouraging renewable development, reassuring private investors, and empowering tribal governments to assume decision-making authority in these matters.

State statute regulates the sale and use of Indian lands in general terms and, in some cases, on a tribe-specific basis.[69] NY Indian Law § 7 provides very specific restrictions on the division of Indian lands, which may be made only among "individuals and families of [that] nation, tribe or band," and limiting the subsequent sale of divided land to "any person other than the occupant or his family." Similarly, NY Indian Law § 7-a provides that "[n]o purchase for the sale of lands of Indians in this state shall be valid unless made under the authority and with the consent of the legislature."[70] Further provisions state that "no person shall settle or reside, or conduct a business" on Indian lands "except the members of such nation, tribe or band" unless otherwise permitted by law.[71] The law further provides that "[a]ny lease, contract or agreement in violation of [this law] shall be void."[72] Taken together, these statutes seem to place significant limitations on the sale or lease of Indian land to non-Indians, and seem to require that tribes seek permission of the legislature to modify these restrictions.

In some cases, modifications of these requirements have been made for specific tribes. For example, the sections of state statute covering the Onondaga Nation include special leasing provisions which give the Onondaga tribe the authority to approve leases without state intervention.[73] Under that provision,

> [a]n Indian residing on the Onondaga reservation and a member of the Onondaga tribe, owning or possessed of improved lands therein, may lease such lands to white persons, for a term not to exceed ten years; but no individual Indian shall have the right to lease any lands to be used as a stone quarry or for commercial purposes.[74]

The Seneca Tribe is similarly authorized to grant leases of tribal lands under NY Indian Law § 78, which states that

> the Seneca nation of Indians, acting by and through the Seneca council, is authorized to lease, or grant rights of way over, tribal lands, including the tribal interest in lands possessed by individual Indians, within the Allegany, Cattaraugus and Oil

> Springs reservations for any purpose for such term and on such conditions as the Seneca council may determine.[75]

Under another provision, leases of Indian lands on the Tonawanda Reservation may be issued by the tribe for oil, mineral, or natural gas exploration or extraction purposes.[76] State law also provides special provisions for leases in portions of the Allegany Reservation which are located in certain villages in Cattaraugus County.[77]

One principal difference between provisions covering Seneca Nation lands and the lands of other NY tribes is the fact that state law specifically requires that title to lands on the Allegany, Cattaraugus, and Tonawanda Reservations are held in common by the Seneca and Tonawanda Nations.[78] Courts have consistently confirmed that the Seneca Nation retains the power to determine who may retain and use Indian lands,[79] and how to dispose of oil and gas rights.[80]

By contrast, other tribal lands seem to be subject to greater control by New York State. For example, courts[81] and the New York State Attorney General[82] have confirmed that fee title to lands belonging to the St. Regis Mohawk Tribe is vested in the State of New York, with the Mohawks retaining only the power to use the land and divide it among themselves, but not to sell it to non-Indians. It is not clear from the state statutes covering the St. Regis Mohawk Reservation whether the state actually exercises any control over leasing of Indian lands there.[83] However, unlike the law for the Senecas and the Onondagas, there is no state statute explicitly giving the Mohawk Tribe authority over leases to non-Indians.

Similar provisions restrict the sale or lease of lands by the Shinnecock Nation. On the one hand, NY Indian Law § 122 appears to indicate that a majority vote of the tribe's trustees can authorize a non-member to use or occupy tribal lands; that provision makes it a fineable offense for a person who is not a member of the tribe, who has not obtained permission of tribal authorities, to use or occupy tribal lands.[84] Further, NY Indian Law § 121 provides that the trustees of the tribe "may lease…[tribal] lands as they may deem for the benefit of the tribe, for a term not longer than three years."[85] However, an opinion of the Attorney General indicates that the Shinnecock Nation trustees cannot sell or lease tribal lands to persons other than tribal members for longer than three years, in that instance where the tribe contemplated building and partially leasing a golf course as a tribal-private economic development project.[86] While the Shinnecock Nation can lease its lands for up to three years without requiring approval from the state legislature, this short time period may deter renewable developers, who may be hesitant to invest substantial sums in a project whose lease could expire before construction had been completed, or before the project began producing energy.

The Tuscarora Nation has owned fee title to its lands since receiving a conveyance in 1809 from the Secretary of War.[87] State statute provides an allotment procedure for these lands,[88] but is silent on the question of whether the Tuscarora Nation is still subject to the same generic restrictions on freely selling or leasing Indian lands to non-Indians.

In some cases, tribes have obtained significant tracts of non-Indian lands, which are presumably freely alienable, unless they are then taken by the state into trust as Indian lands subject to sale and lease restrictions. Aside from its 32-acre reservation, which is held in fee by New York State, the Oneida Nation has purchased nearly 13,000 acres of land in Madison and Oneida Counties in recent years; the tribe owns this land in fee title, and presumably may sell or lease it as any other landowner could.[89]

Based on the above, it appears that only the Seneca Nation is fully empowered to make land leasing decisions, including the terms and limits of the leases, based on the tribe's own judgment.[90] Some tribes have the explicit authority to enter into leases, albeit in some cases only for a limited number of years—no longer than ten years in the case of the Onondagas,[91] and no longer than three years for Shinnecock lands[92]—which may open up opportunities for renewable energy exploration and development. However, these term limitations on leases may be inhibiting renewable development and might be reconsidered, especially in light of the fact that federal leases through the BIA process, even under the old rules, were subject to a 25-year limitation. Other tribes, such as the St. Regis Mohawk Tribe and the Oneida Nation (at least as it relates to their reservation lands), are not given any express authority to lease their lands, fee title to which is retained by New York State, and thus may encounter difficulty in trying to attract renewable development to their lands. If any of these tribes wish to spur private renewable energy development on their lands, revision of existing state statutes, or the passage of a law authorizing tribes to enter into renewable energy leases, may be required. The discussion in Section I above regarding changes in the federal Indian land leasing regime may be helpful to tribes looking to push the New York State Legislature to enact similar changes in this state.

III. Financing Renewables in Indian Country

There are several financing methods available for tribal renewable energy projects' many stages, including pre-construction development, capital financing, and startup costs, regardless of who holds title to the land.[93] These projects may simply be paid for outright, through borrowing or equity financing, or a combination of methods.[94] Tribes may be able to obtain Tribal Economic Development (TED) Bonds to reissue as tax-exempt debt through a program originally created by the American Recovery and Reinvestment Act of 2009 and renewed by

the Department of the Treasury in July 2012.[95] When the TED program was renewed, the Obama Administration explained that "[b]y providing tribes with the ability to issue tax-exempt debt in a manner similar to that available to state and local governments, tribes can lower their borrowing costs and more easily engage in new economic development projects."[96] At the time of renewal, $1.8 billion was available for TED bonds.

Depending on project size and complexity, considerable expertise and financing may be required, from engineering, legal, and planning services, to permitting and construction expenses, and grant funding may be available for those expenses.[97] Some tribal governments may not have the resources or experts on staff to perform these services, creating a need for outside contractors or counsel. Experts have identified the following as essential areas of expertise in renewable energy development on tribal lands:

> project development skills (including the ability to perform the initial research and analysis, determine the type of project, prepare the business case for developing it and secure financing necessary to construct the project); legal (project contracts, permits and transaction structuring, regulatory proceedings and process); land use (permits, threatened and endangered plants and animals); environmental (air emission restrictions and project mitigation, Endangered Species Act consultation, water quality and water rights); engineering (design project and manage construction); project management (both during construction and operation); contract management (construction agreements, equipment procurement, power sales agreement, transmission agreement and agreements with land owners); government relations (appropriations, grants and public support).[98]

While it is possible that a commercial developer may be willing or able to provide some or all of these services, some level of tribal involvement will be required for such measures as local approvals or the execution of lease agreements, for which the BIA will require tribal support. For that reason, private developers seeking to locate renewable energy projects on tribal lands must work with the tribe on some level, regardless of whether the arrangement is a joint venture, a tribally led initiative, or a purely commercial undertaking.[99]

Tribes qualify for a number of grant programs and opportunities, some of which may not be available to commercial developers, which can be used to cover the myriad development costs involved in a renewable project. The DOE's Tribal Energy Program provides its own grant funding,[100] as do agencies such as the Departments of Energy, Commerce, and Agriculture, and the EPA,[101] to tribes or municipalities pursuing renewable development. Conversely, some tax credits and financial incentives for renewable development are available only to private enterprise, not to tax-exempt entities such as tribes.[102] Projects can receive production tax credits for the sale of renewable energy, which offset federal income taxes for the project owner, as well as investment tax credits, sometimes called "energy credits," grants in lieu of tax credits, or bonus depreciation incentives.[103] Before deciding whether to pursue a tribal project or bring in private investors, tribes should consult with counsel and/or a financial professional to determine what incentives will be available based on the business arrangement selected for the project. Where a tribe and a private investor or investors intend to pursue a joint project, tribal officials should consult grant guidelines to determine whether public or private funding must comprise a certain percentage of investment in order for a project to be eligible. Tribes and developers may also choose to pursue special deal structures in order to maximize the financial benefits available for the project.[104]

Additional technical and planning expertise is also available to tribes through a number of federal programs. At the request of a tribe, the U.S. Department of Energy's Tribal Energy Program will provide the following technical assistance, typically limited to about 40 hours, through its agency laboratories: "renewable energy technology information, renewable resource information, energy efficiency techniques, project support, system performance modeling, policy information, design review, special studies, strategic energy planning, training."[105] The BIA also assists tribes with soliciting and securing private investment in renewable projects;[106] provides additional publicity and information to tribes and developers in support of renewable energy development in Indian Country;[107] and, in some instances, assists with tribal energy development projects.[108] In addition, the BIA administers an Energy and Mineral Development Program which "provides financial assistance to Tribes and Indian allottees in evaluating their energy (conventional and renewable), and mineral resource potential on their lands."[109] Ultimately, this program is intended to assist tribes and allottees by providing the information needed to make informed decisions on developing and promoting resources, pursuing additional grant funding, and negotiating agreements with private developers or investors.[110]

Some experts believe that the current financing regime for renewable energy projects puts tribes at a distinct disadvantage, because as tax-exempt entities, they are generally unable to take advantage of the many tax incentives which generally make renewables cost-effective.[111] This forces tribes to either partner with a private company who will be eligible for the tax incentives, or else limit the size and scope of the project to something the tribe could

afford on its own, or with the assistance of grant funding.[112] Federal officials have praised public-private renewable development agreements between tribes and non-Indian development corporations;[113] it is unclear whether tribes themselves see the tendency of the market to favor such partnerships as a disadvantage or an opportunity.

IV. Tribal Voices: Attempts to Bring Renewable Development on Indian Lands

To date, there have been two major utility-scale renewable projects pursued on Indian Lands—a 350-megawatt solar facility on the Moapa River Indian Reservation in Clark County, Nevada, and a 50-megawatt wind project on the Campo Reservation in California.[114] The Moapa River Project, whose leases were approved by the Interior Department in June 2012, involved a partnership between the Maopa Band of Paiutes and a private developer, K Road Power, collectively called K Road Maopa Solar LLC.[115] BIA-guided federal review of the project spanned 14 months.[116] The Campo Reservation project, made possible in part by DOE grant funding, was spearheaded by a tribally created corporation, Muht-Hei, Inc., which was able to obtain transmission to connect the project to commercial service soon after it was built.[117] Officials note the Campo project was conceived and developed through traditional tribal consensus-building and has consistently stressed social and cultural values important to tribal members.[118]

While large-scale development in Indian Country has been scarce, the Department of Energy's Tribal Energy Program has helped fund nearly 200 feasibility studies, project planning and development, demonstrations, and project first steps for tribes across the country.[119] These projects vary widely, from waste-to-energy demonstration projects on Oneida lands in Wisconsin[120] and a biomass/biogas feasibility study on the White Earth Reservation in Minnesota,[121] to preconstruction work on a 30 megawatt wind facility pursued by the Northern Cheyenne Tribe in Montana[122] and the Hoopa Valley Tribe's installation of solar panels on a community pool.[123] Small-scale installations and pilot projects have tended to be more popular, and extensive information on those projects is available through the DOE.[124] The Navajo Nation in particular has invested heavily in solar systems to power individual homes on reservation lands, and has added wind turbines to supplement solar power when sunlight is unavailable.[125] The Blackfeet Nation has also installed small-scale wind power, starting with a pilot turbine in 1996, which was considered a successful test of wind energy feasibility near Glacier National Park.[126]

Tribes with significant experience attempting to bring renewable development to their communities have said their projects simply would not have been feasible without significant federal grants, largely because of disparities between how projects are financed on non-Indian versus Indian lands, and because of the costs associated with lengthy federal review processes for projects in Indian Country.[127] The post-2009 economic downturn has also helped to put a damper on all renewable development nationwide, including in Indian Country.[128]

A number of tribal consortia have been created to encourage tribe-to-tribe cooperation, information-sharing, and assistance in renewable energy development.[129] The Department of Interior maintains a Tribal Energy and Environmental Information Clearinghouse with a range of resources, links, funding announcements, and other information.[130] The Department of Energy maintains a Tribal Energy Program website with similar resources and information, including detailed data on tribal energy projects.[131]

V. Conclusion

Relatively little large-scale private renewable energy development has made its way into Indian Country to date, and it is too soon to tell whether new Indian trust land leasing rules will change the game. Tribes will still have to develop and gain BIA approval of tribal leasing regulations under 25 U.S.C. § 415(h), and the BIA will still have the authority to review leases, so long as it acts within established deadlines. The nation's renewable energy industry will need to recover from the recession and begin investing in new development projects again. The federal government will need to decide whether to continue tax incentives and grant programs for renewable development—crucial financial incentives without which renewable development in Indian Country may be infeasible.

What the changes will do is afford tribes greater control over leasing decisions on their own lands and will give all parties to a proposed lease grounds to hold the BIA to its self-imposed deadlines and rules. Hopefully, this greater measure of tribal control is not a mere gesture. Much will depend on whether tribes are willing and able to draft their own Indian trust land leasing regulations, or whether that process itself proves too onerous to escape BIA control of lease approvals.[132]

Tribes in New York may also have the opportunity to push for similarly relaxed requirements, particularly if they have experienced similar challenges in developing renewable projects. In particular, the requirement that the state legislature must vote to approve the sale or lease of any tribal lands, except where other leasing provisions have been enacted, may be ripe for review. Individual tribes, for whom no provision appears to have been made for tribal control of renewable energy leasing decisions, could point to the relaxation of federal leasing controls as a basis for allowing similar relaxation in New York, and a similar shifting of decision-making powers in leasing matters from the state to tribal authorities.

If the HEARTH Act and the BIA's regulatory reform are successful in what they aim to do, Indian tribes will finally be able to reap the benefits of significant renewable

resources available on their lands. For tribal communities looking to solve their own economic development needs, as well as address the pressing global problems of climate change and energy market volatility, this change may well be a promising opportunity for real, tribally driven progress.

Endnotes

1. *See infra* Section I.
2. *See Building Green Economies on Tribal Lands: Using Renewable Resources to Create Sustainable Economies*, BUREAU INDIAN AFF., <http://www.bia.gov/cs/groups/xieed/documents/text/idc010168.pdf>.
3. *See infra* Section II.
4. According to the U.S. Department of the Interior Bureau of Indian Affairs, the U.S. government holds 55 million acres of land in trust for Indian tribes. *See What We Do*, BUREAU INDIAN AFF., <http://www.bia.gov/WhatWeDo/index.htm>. An additional 44 million acres for Alaska Natives were set aside pursuant to the Alaska Native Claims Settlement Act, but these lands are not considered part of "Indian Country" and do not carry the same federal trust relationship as other Indian lands.
5. DOUGLAS C. MACCOURT ET AL., RENEWABLE ENERGY DEVELOPMENT IN INDIAN COUNTRY: A HANDBOOK FOR TRIBES, 1–2 (2010), <http://apps1.eere.energy.gov/tribalenergy/pdfs/indian_energy_legal_handbook.pdf> (this handbook was sponsored by the National Renewable Energy Laboratory, a laboratory of the U.S. Department of Energy, in consultation with tribes).
6. *Building Green Economies on Tribal Lands: Using Renewable Resources to Create Sustainable Economies*, BUREAU INDIAN AFF.,<http://www.bia.gov/cs/groups/xieed/documents/text/idc010168.pdf>.
7. DOUGLAS C. MACCOURT ET AL., RENEWABLE ENERGY DEVELOPMENT IN INDIAN COUNTRY: A HANDBOOK FOR TRIBES 2 (2010).
8. Elizabeth Ann Kronk, *Tribal Energy Resource Agreements: The Unintended "Great Mischief for Indian Energy Development" and the Resulting Need for Reform*, 29 PACE ENVTL. L. REV. 811, 815–16 (2012).
9. DOUGLAS C. MACCOURT ET AL., RENEWABLE ENERGY DEVELOPMENT IN INDIAN COUNTRY: A HANDBOOK FOR TRIBES 2 (2010). *See also, Tribal Energy Program*, U.S. Dep't Energy, <http://apps1.eere.energy.gov/tribalenergy/>.
10. *See infra* Section IV.
11. *See, e.g.*, Judith V. Royster, *Tribal Energy Development: Renewables and the Problem of the Current Statutory Structures*, 31 STAN. ENVTL. L. J. 91 (2012) (conducting a comprehensive review of statutory options available to tribes for renewable development, and concluding that such options are inadequate to meet the needs of tribes who wish to pursue such development).
12. *See infra* Section I.
13. *See, e.g.*, Justin Gerdes, *Obama Administration Clears Barriers Holding Up Tribal Renewable Energy*, FORBES (Nov. 29, 2012, 12:49 PM), http://www.forbes.com/sites/justingerdes/2012/11/29/obama-administration-clears-barriers-holding-up-tribal-renewable-energy/ (quoting Jose Aguto, a former policy advisor with the National Congress of American Indians, saying the following about the "bureaucratic obstacles slowing tribal renewable energy projects": "As [former U.S.] Senator [Byron] Dorgan was wont to say, '49 steps and two to three years in Indian Country, seven steps, two to three weeks, just outside Indian Country for similarly situated land'—that's the broad-brush inequity that we're talking about"). *See also* Press Release, National Congress of American Indians, NCAI Expresses Support for Interior's Proposed Leasing Reforms for Tribal Lands and Renewable Energy Development (Nov. 29, 2011), <http://www.ncai.org/news/articles/2011/11/29/ncai-expresses-support-for-interior-s-proposed-leasing-reforms-for-tribal-lands-and-renewable-energy-development> (noting that "[a]lthough great potential exists, very few tribally owned renewable energy projects have moved forward because of the disproportionate review processes tribes are subject to").
14. *See infra* Section I.
15. *Q&A: Department of the Interior's Final Leasing Reform*, BUREAU INDIAN AFF., <http://www.bia.gov/cs/groups/public/documents/text/idc-037327.pdf>.
16. Judith V. Royster, *Tribal Energy Development: Renewables and the Problem of the Current Statutory Structures*, 31 STAN. ENVTL. L. J. 91, 112–13 (2012) .
17. *See infra* Section I.
18. For a clear and succinct explanation of commonly used terminology related to Indian lands and energy development, *see Tribal and Indian Land*, TRIBAL ENERGY & ENVTL. INFO. CLEARINGHOUSE, <http://teeic.anl.gov/triballand/index.cfm>.
19. *See* 18 U.S.C. § 1151 (defining "Indian Country"); 43 U.S.C. §§ 1603 *et seq.* (codifying the Alaska Native Claims Settlement Act, reserving 44 million acres of land for Alaska Natives, lands which are do not fall under the banner of "Indian Country" according to the U.S. Supreme Court); 25 U.S.C. § 465 (authorizing the Secretary of Interior to acquire additional Indian lands, the title of which would vest in the United States, to be held in trust for Indians); 25 U.S.C. § 415 (requiring that lease of *any restricted Indian lands* be approved by the Secretary of Interior), the Indian trust land leasing regulations to be discussed *infra*.
20. 25 C.F.R. §§ 162.102 (cataloguing the lands subject to BIA leasing regulations) *et seq.*
21. Elizabeth Ann Kronk, *Alternative Energy Development in Indian Country: Lighting the Way for the Seventh Generation*, 46 IDAHO L. REV. 449, 468 (2010).
22. 25 C.F.R. §§ 162.100 *et seq.*; 25 U.S.C. § 415(a).
23. *See* Kronk, *supra* note 21. There are undoubtedly other factors at play as well, including an abundance of possible development sites in states whose review processes are familiar to renewable developers, possible unsuitability of certain tribal lands for such development, a lack of electrical transmission lines or other infrastructure sufficient to support such a project, or possibly tribal opposition to such development in certain communities. *See also* Martin LaMonica, *Indian Country Welcomes Renewable Energy*, CNET (Dec. 4, 2011), <http://news.cnet.com/8301-11128_3-57335065-54/indian-country-welcomes-renewable-energy/>.
24. 25 U.S.C. § 415(a).
25. 25 U.S.C. §§ 415(a) et seq. (version effective January 4, 2011 to July 29, 2012).
26. 25 U.S.C. § 415(a).
27. Press Release, U.S. Department of the Interior, Significant Leasing Reform will Spur Commercial, Residential and Renewable Energy Development on Indian Lands (Nov. 28, 2011), <http://www.doi.gov/news/pressreleases/Significant-Leasing-Reform-will-Spur-Commercial-Residential-and-Renewable-Energy-Development-on-Indian-Lands.cfm>.
28. *Id.*
29. Press Release, National Congress of American Indians, NCAI Expresses Support for Interior's Proposed Leasing Reforms for Tribal Lands and Renewable Energy Development (Nov. 29, 2011), <http://www.ncai.org/news/articles/2011/11/29/ncai-expresses-support-for-interior-s-proposed-leasing-reforms-for-tribal-lands-and-renewable-energy-development>.
30. Rob Capriccioso, *Easing Federal Paternalism over Indian Land Leasing*, INDIAN COUNTY TODAY (Nov. 30, 2011), <http://indiancountrytodaymedianetwork.com/article/easing-federal-paternalism-over-indian-land-leasing-65148>.
31. The BIA's website includes extensive documentation of tribal consultation sessions and response to comments on the proposed

rule. *See Tribal Consultations: Proposed Revisions to the Leasing Regulations to 25 CFR 162*, Bureau Indian Aff., <http://www.bia.gov/WhoWeAre/AS-IA/Consultation/index.htm>. Consultation with tribes included meetings and sessions in California, Minnesota, New Mexico, Nevada, South Dakota, and Washington, as well as correspondence and information distributed to impacted tribes. Review of these documents provides an overview of tribal positions on leasing reform and the need for the revised regulations, a picture which is more comprehensive than this paper can provide.

32. Press Release, White House, Strengthening Tribal Communities through the HEARTH Act (July 30, 2012), <http://www.whitehouse.gov/blog/2012/07/30/strengthening-tribal-communities-through-hearth-act>.

33. Press Release, U.S. Department of Interior, Salazar, Laverdure Praise President Obama's Signing of HEARTH Act to Restore Tribal Control of Land Leasing (July 30, 2012), <http://www.doi.gov/news/pressreleases/Salazar-Laverdure-Praise-President-Obamas-Signing-of-HEARTH-Act-to-Restore-Tribal-Control-of-Land-Leasing.cfm>.

34. Helping Expedite and Advance Responsible Tribal Homeownership (HEARTH) Act of 2012, H.R. 205, 112th Cong. (2012), *available at* <http://www.gpo.gov/fdsys/pkg/BILLS-112hr205enr/pdf/BILLS-112hr205enr.pdf>.

35. 25 U.S.C. § 415(h).

36. 25 U.C.C. § 415(h)(2).

37. 25 U.S.C. § 415(h)(5).

38. 25 U.S.C. § 415(h)(6).

39. 25 U.S.C. § 415(h)(8).

40. 25 U.S.C. § 415(h)(7)(B).

41. Press Release, U.S. Department of Interior, Salazar Finalizes Reforms to Streamline Leasing, Spur Economic Development on 56 Million Acres of American Indian Trust Land (Nov. 27, 2012), <http://www.doi.gov/news/pressreleases/salazar-finalizes-reforms-to-streamline-leasing-spur-economic-development-on-56-million-acres-of-american-indian-trust-land.cfm>. A copy of the extensive final rules, which were not codified as of this writing, is available at <http://www.bia.gov/cs/groups/mywcsp/documents/text/idc-037326.pdf>.

42. Press Release, U.S. Department of Interior, Salazar, Laverdure Praise President Obama's Signing of HEARTH Act to Restore Tribal Control of Land Leasing (July 30, 2012), <http://www.doi.gov/news/pressreleases/Salazar-Laverdure-Praise-President-Obamas-Signing-of-HEARTH-Act-to-Restore-Tribal-Control-of-Land-Leasing.cfm>.

43. Residential, Business, and Wind and Solar Resource Leases on Indian Land, 77 Fed. Reg. 72440 (Dec. 5, 2012) (to be codified at 25 C.F.R. pt. 162).

44. *Id. See* specifically, 77 Fed. Reg. at 72495 (to be codified at 25 C.F.R. §§ 162.511–162.537) for provisions governing Wind Energy Evaluation Leases; 77 Fed. Reg. at 72499 (to be codified at 25 C.F.R. §§ 162.538 to 162.599 for provisions governing Wind and Solar Development Leases.

45. 77 Fed. Reg. at 72496 (to be codified at 25 C.F.R. § 162.511).

46. 77 Fed. Reg. at 72499 (to be codified at 25 C.F.R. § 162.538).

47. *Id.*

48. Bureau of Indian Affairs, Comparison of Current Leasing Rule to Final Leasing Rule, <http://www.bia.gov/cs/groups/public/documents/text/idc-037329.pdf>.

49. *Id.*

50. *Id.*

51. *Id.*

52. 77 Fed. Reg. at 72473 (to be codified at 25 C.F.R. § 162.021).

53. 77 Fed. Reg. at 72473 (to be codified at 25 C.F.R. § 162.027).

54. 77 Fed. Reg. at 72463.

55. Bureau of Indian Affairs, Final Rule Fact Sheet, <http://www.bia.gov/cs/groups/public/documents/text/idc-037328.pdf>.

56. *Id.* 77 Fed. Reg. at 72498 (to be codified at 25 C.F.R. § 162.530) will govern BIA inaction in a Wind Energy Evaluation Lease, enabling parties to take action under 77 Fed. Reg. at 72507 (to be codified at 25 C.F.R. § 162.588) to appeal the inaction to the BIA Regional Director.

57. Bureau of Indian Affairs, Final Rule Fact Sheet, <http://www.bia.gov/cs/groups/public/documents/text/idc-037328.pdf>. 77 Fed. Reg. at 72503 (to be codified at 25 C.F.R. § 162.565) will govern BIA inaction in a wind and solar resource lease.

58. Bureau of Indian Affairs, Final Rule Fact Sheet, <http://www.bia.gov/cs/groups/public/documents/text/idc-037328.pdf>. 77 Fed. Reg. at 72504 (to be codified at 25 C.F.R. § 162.572) will govern amendments to wind and solar resource leases or wind energy evaluation leases, and 77 Fed. Reg. at 72505 (to be codified at 25 C.F.R. § 162.580) will govern subleases.

59. 77 Fed. Reg. at 72505 (to be codified at 25 C.F.R. § 162.576) for assignments and 77 Fed. Reg. at 72506 (to be codified at 25 C.F.R. § 162.584) for leasehold mortgages.

60. Bureau of Indian Affairs, Final Rule Fact Sheet, at 2, <http://www.bia.gov/cs/groups/public/documents/text/idc-037328.pdf>.

61. For more information on tribal land use and zoning codes, and how they may differ from their non-tribal municipal counterparts, *see Tribal Legal Code Project*, Tribal L. & Pol'y Inst., <http://www.tribal-institute.org/codes/overview.htm>. Part Four contains information on Land Use and Planning issues. Part Five contains information on Tribal Zoning Codes. Part Nine discusses Tribal Environmental Codes.

62. *Id.*

63. The U.S. EPA is authorized under several federal environmental statutes to treat tribes in the same manner as a state for purposes of implementing the regulatory schemes contained therein. *See Treatment in the Same Manner as a State*, Am. Indian Envtl. Off., <http://www.epa.gov/tp/laws/tas.htm>. For example, a number of tribes are authorized to issue their own Water Quality Certifications under the Clean Water Act § 402; the EPA maintains a list of such tribes, *see Water: State, Tribal and Territorial Standards*, U.S. Envtl. Protection Agency,<http://water.epa.gov/scitech/swguidance/standards/wqslibrary/approvtable.cfm>. While many renewable projects will not require such permits, projects involving significant construction, requiring the use of substantial amounts of water, or, in the case of biomass, producing considerable emissions, may require compliance with federal environmental statutes. In that instance, the EPA's regional offices can be contacted to determine whether tribal, state, or federal approval is needed, and tribal officials should be consulted to determine whether tribal law contains any additional environmental review.

64. Douglas C. MacCourt et al., Renewable Energy Development in Indian Country: A Handbook for Tribes 23 (2010).

65. *See* Felix Cohen, Handbook of Federal Indian Law 417–18 (1st ed. 1942).

66. Presently, the Cayuga Nation does not possess any tribal lands, thus they are not included in this discussion.

67. Currently, the Unkechaug, or Poosepatuck, Nation retains a right to occupy its lands—roughly 55 acres—subject to preemption by the successors of Col. William Tangier Smith, who had originally set aside 175 acres of land for the tribe, in exchange for an annual rent of two ears of corn. *See Long Island Indians and the Early Settlers—The Poosepatuck Tribe of Mastic*, <http://longislandgenealogy.com/indians.html>. Because this tribe's unique land arrangements include preemption rights by white settlers, and not the state itself, they are not included in the present

discussion. These sources were culled from Robert Batson, *Status of Indian Land in New York* (on file with author).

68. *See* Treaty of Fort Stanwix, U.S.-Six Nations, Oct. 22, 1794, 7 Stat. 15 (establishing peace between the Iroquois and the United States; relinquishing Iroquois claims to lands west and south of New York, in exchange for rights to inhabit New York lands on which tribes resided); Treaty of Fort Harmar, U.S.-Six Nations, Jan. 9, 1789, 7 Stat. 33; Treaty of Canadaigua, U.S.-Six Nations, Nov. 11, 1794, 7 Stat. 44 (collectively guaranteeing the Iroquois Confederacy the right to occupy their lands within New York State). *Author's Note:* For the purposes of this article, this history has been greatly condensed, simplified and generalized. This is by no means to suggest that land ownership and possession of Indian lands in New York is a simple matter—decades-long land claim litigation indicate that it is not—but for purposes of this article, a brief paragraph and explanatory footnote will have to suffice. For further reading, see FELIX COHEN, HANDBOOK OF FEDERAL INDIAN LAW (1ST ed. 1942).
69. *See* N.Y. INDIAN LAW §§ 7, 7-a, 8, 9, 10, 11, 11-a, 24, 55, 71, 78, 84, 95, 102, 122 (McKinney 2013).
70. This provision used to be part of the New York State Constitution (formerly Art. I § 13), but it was repealed in the 1960s and relocated to the sections of state statute regulating Indian matters.
71. N.Y. INDIAN LAW § 8 (McKinney 2013).
72. *Id.*
73. N.Y. INDIAN LAW § 24 (McKinney 2013).
74. *Id.*
75. N.Y. INDIAN LAW § 78 (McKinney 2013).
76. N.Y. INDIAN LAW § 84 (McKinney 2013). Stating that

> [t]he council of the Tonawanda nation, with the approval of the attorney for the nation, may by lease give the right to explore land located upon the Tonawanda reservation and extract minerals, oil or natural gas therefrom by means other than those commonly known as surface, open pit, or strip mining. No lease shall be for a term in excess of twenty years.

This provision also provides for the compensation of individual landowners whose use or enjoyment of their property is disrupted by oil and gas exploration, to be paid from lease-related revenues.

77. N.Y. INDIAN LAW § 71 (McKinney 2013).
78. NY INDIAN LAW § 55 (McKinney 2013).
79. *See* Woodin v. Seeley, 252 N.Y.S. 818 (1931).
80. *See* Reservation Gas Co. v. Snyder, 150 N.Y.S. 216 (1914).
81. Terrance v. Crowley, 116 N.Y.S. 417 (N.Y. Sup. 1909) (stating that Mohawk lands "belong to the State of New York").
82. 1957 N.Y. Op. Atty. Gen. 18, 1957 WL 86830 (1957) (finding that fee title to Mohawk lands is held by New York State).
83. For the sections of state law specifically covering the St. Regis Mohawk Tribe, see N.Y. INDIAN LAW §§ 100-114 (McKinney 2013).
84. N.Y. INDIAN LAW § 122 (McKinney 2013).
85. N.Y. INDIAN LAW § 121 (McKinney 2013).
86. 1961 N.Y. Op. Atty. Gen. 197, 1961 WL 101360 (1961).
87. Federal Power Commission v. Tuscarora Indian Nation, 362 U.S. 99, fn 10 (1960).
88. N.Y. INDIAN LAW § 95 (McKinney 2013).
89. According to Professor Robert Batson, the Madison County Planning Department reported that the Oneida Nation owned 12,803.6 acres of land in the two counties as of October 2000. Robert Batson, *Status of Indian Land in New York* (on file with author).
90. N.Y. INDIAN LAW § 78 (McKinney 2013).
91. N.Y. INDIAN LAW § 24 (McKinney 2013).
92. N.Y. INDIAN LAW § 121 (McKinney 2013).
93. DOUGLAS C. MACCOURT ET AL., RENEWABLE ENERGY DEVELOPMENT IN INDIAN COUNTRY: A HANDBOOK FOR TRIBES 65–74 (2010).
94. *Id.*
95. Press Release, White House, Strengthening Tribal Communities through the HEARTH Act (July 30, 2012), <http://www.whitehouse.gov/blog/2012/07/30/strengthening-tribal-communities-through-hearth-act>. *See also* Press Release, Internal Revenue Service, IRS Announces New Tribal Economic Development Bond Allocation Guidance (July 18, 2012), <http://energy.gov/indianenergy/articles/irs-announces-new-tribal-economic-development-bond-allocation-guidance>.
96. Press Release, White House, Strengthening Tribal Communities through the HEARTH Act (July 30, 2012), <http://www.whitehouse.gov/blog/2012/07/30/strengthening-tribal-communities-through-hearth-act>.
97. DOUGLAS C. MACCOURT ET AL., RENEWABLE ENERGY DEVELOPMENT IN INDIAN COUNTRY: A HANDBOOK FOR TRIBES 24 (2010).
98. *Id.* at 24–25.
99. *See* DOUGLAS C. MACCOURT ET AL., RENEWABLE ENERGY DEVELOPMENT IN INDIAN COUNTRY: A HANDBOOK FOR TRIBES 27–50 (2010) for an extensive analysis of the range of roles tribes can play in renewable energy development projects and the approaches tribes may take to protect their interests.
100. *Tribal Energy Program: Financial Opportunities*, U.S. DEP'T OF ENERGY, <http://apps1.eere.energy.gov/tribalenergy/financial_opportunities.cfm>.
101. *Tribal Energy Program: Related Financial Opportunities*, U.S. DEP'T OF ENERGY, <http://apps1.eere.energy.gov/tribalenergy/related_opportunities.cfm>. *See also Funding Opportunities: A Directory of Energy Efficiency, Renewable Energy, Environmental Protection Assistance Programs*, U.S. ENVTL. PROTECTION AGENCY, <http://apps1.eere.energy.gov/tribalenergy/pdfs/funding_opps_epa0609.pdf> (comprehensively cataloging current funding opportunities for all state and local governments, including tribes, school districts, nonprofits, and government agencies).
102. Douglas C. MacCourt et al., RENEWABLE ENERGY DEVELOPMENT IN INDIAN COUNTRY: A HANDBOOK FOR TRIBES 75–79 (2010).
103. *Id.*
104. *Id.* at 80–87.
105. *Tribal Energy Program: Technical Assistance*, U.S. Dep't of Energy, <http://apps1.eere.energy.gov/tribalenergy/technical_assistance.cfm>.
106. *Renewable Energy Opportunities*, Bureau Indian Aff., <http://www.bia.gov/WhoWeAre/AS-IA/IEED/DEMD/RO/index.htm>. As of this writing, the BIA site sought investors for wind development projects proposed by the Apsaalooke, Blackfoot, and Crow Nations. *Id.*
107. *See, e.g., Building Green Economies on Tribal Lands: Using Renewable Resources to Create Sustainable Economies*, BUREAU INDIAN AFF., <http://www.bia.gov/cs/groups/xieed/documents/text/idc010168.pdf>; *Native American Wind Resource Atlas*, Bureau Indian aff., <http://www.bia.gov/cs/groups/xieed/documents/text/idc013229.pdf>.
108. The BIA lists a sampling of the tribal energy projects with which they are involved at *Who We Are—How We Can Help*, BUREAU INDIAN AFF., <http://www.bia.gov/WhoWeAre/AS-IA/IEED/DEMD/TT/DEMDPlan/index.htm> (Note: as of this writing, many of these projects were traditional mineral and fossil-fuel based projects, but at least one geothermal project was highlighted. In fact, most of the energy information available on the BIA site involved mineral leases, oil and natural gas drilling, and other fossil-fuel based projects.).

109. *Tribal Grant Program for Evaluating Energy and Mineral Potential on Indian Lands*, BUREAU INDIAN AFF., <http://www.bia.gov/WhoWeAre/AS-IA/IEED/DEMD/TT/TF/index.htm>.

110. *Id.*

111. Elizabeth Ann Kronk, *Alternative Energy Development in Indian Country: Lighting the Way for the Seventh Generation*, 46 IDAHO L. REV. 449, 468–471 (2010).

112. *Id.*

113. *See, e.g.*, Press Release, U.S. Department of Interior, Salazar Approves First-Ever Commercial Solar Energy Project on American Indian Trust Lands (June 21, 2012), <http://www.doi.gov/news/pressreleases/Salazar-Approves-First-Ever-Commercial-Solar-Energy-Project-on-American-Indian-Trust-Lands.cfm>.

114. Press Release, U.S. Department of Interior, Interior Department Helps Indian Country Go Green (June 22, 2012), <http://www.doi.gov/news/doinews/Interior-Department-Helps-Indian-Country-Go-Green.cfm>.

115. Press Release, U.S. Department of Interior, Salazar Approves First-Ever Commercial Solar Energy Project on American Indian Trust Lands (June 21, 2012), <http://www.doi.gov/news/pressreleases/Salazar-Approves-First-Ever-Commercial-Solar-Energy-Project-on-American-Indian-Trust-Lands.cfm>.

116. Press Release, U.S. Department of Interior, Interior Department Helps Indian Country Go Green (June 22, 2012), <http://www.doi.gov/news/doinews/Interior-Department-Helps-Indian-Country-Go-Green.cfm>.

117. *Tribal Energy Program: Campo Band of Mission Indians 2010 Project*, U.S. DEP'T ENERGY, <http://apps1.eere.energy.gov/tribalenergy/projects_detail.cfm/project_id=136>.

118. *Id.*

119. *Tribal Energy Program: Projects on Tribal Lands*, U.S. DEP'T ENERGY, <http://apps1.eere.energy.gov/tribalenergy/projects.cfm>.

120. *Tribal Energy Program: Oneida Seven Generations Corp. 2012 Project*, U.S. DEP'T ENERGY, <http://apps1.eere.energy.gov/tribalenergy/projects_detail.cfm/project_id=219>.

121. *Tribal Energy Project: White Earth Reservation Tribal Council 2012 Project*, U.S. DEP'T ENERGY, <http://apps1.eere.energy.gov/tribalenergy/projects_detail.cfm/project_id=215>.

122. *Tribal Energy Project: Northern Cheyenne Tribe 2003 Project*, U.S. DEP'T ENERGY, <http://apps1.eere.energy.gov/tribalenergy/projects_detail.cfm/project_id=46>.

123. *Tribal Energy Project: Hoopa Valley Tribe 1994 Project*, U.S. DEP'T ENERGY, <http://apps1.eere.energy.gov/tribalenergy/projects_detail.cfm/project_id=7>.

124. *Tribal Energy Program: Projects by Type of Technology*, U.S. DEP'T ENERGY, <http://apps1.eere.energy.gov/tribalenergy/projects_technology.cfm>.

125. Elizabeth Ann Kronk, *Alternative Energy Development in Indian Country: Lighting the Way for the Seventh Generation*, 46 IDAHO L. REV. 449, 464 (2010).

126. *Id.* at 466–67.

127. Martin LaMonica, *Indian Country Welcomes Renewable Energy*, CNET (Dec. 4, 2011), <http://news.cnet.com/8301-11128_3-57335065-54/indian-country-welcomes-renewable-energy/>.

128. *See, e.g.*, Heather Scofield, *S. Ute, Shoshone to Develop Wind Power; Joint Energy Project Could Lead To Wind Mills Going Up in Idaho*, DURANGO HERALD (Sept. 19, 2010), *available at* <http://www.ienearth.org/news/Southern-Ute-Shoshone-to-develop-wind-power.html>.

129. For example, the Southwest Tribal Energy Consortium received DOE funding for a collaborative effort probing the feasibility of renewable projects combining resources from tribes throughout the region;3 *see Tribal Energy Program: Morongo Band of Cahuilla Mission Indians: Southwest Tribal Energy Consortium—2006 Project*, U.S. DEP'T ENERGY, <http://apps1.eere.energy.gov/tribalenergy/projects_detail.cfm/project_id=107>. The Indian Country Renewable Energy Consortium is another example; *see* Press Release, Indian Country Renewable Energy Consortium, Tribal Leaders Launch Organization to Support Growth of Tribal Green Economy (July 31, 2009), <http://www.tribesandclimatechange.org/docs/tribes_134.pdf>.

130. *About Us*, ENERGY & ENVTL. INFO. CLEARINGHOUSE, <http://teeic.anl.gov/aboutus/index.cfm>.

131. *Tribal Energy Program*, U.S. DEP'T ENERGY, <http://apps1.eere.energy.gov/tribalenergy/index.cfm>.

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Transitioning to Renewable Energy: Development Opportunities and Concerns for Rural New York

By Adam Blair, Rod Howe and David Kay

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I. Introduction[1]

Rural America has long provided the bulk of food and energy, including oil, consumed by U.S. residents. While the broad stability of this relationship will not change any time soon, emerging energy trends herald a shifting landscape. In light of this, New York residents and policymakers, both rural and urban, must grapple seriously with the prospect of rebalancing our enormous collective appetite for affordable energy against many competing goals and concerns.

Many environmental, economic, and policy signals point to the desirability of a shift away from fossil fuels. Rural New York communities especially can anticipate the increasing need to integrate new forms and scales of renewable energy production into familiar landscapes: biomass energy where farm and forest land has predominated, wind energy atop the state's mostly wooded hills and breezy skylines, small scale hydropower throughout the valleys, scattered solar even in our seasonally variable climate, and more.

The export of renewable energy from rural places, once in decline, is already resurgent. With vision, planning, and policy change, rural communities could supplement a growing renewable energy export economy with new systems of locally generated and distributed energy. They could graft sensible "local energy" policies onto "local food" policies, lessening the need for the costly transmission and transportation of electricity and other fuels.

The prospect of renewable energy development represents a beacon of hope for many rural residents, and is frequently though not always less divisive in New York communities than are fossil fuel alternatives like natural gas. Policymakers would be remiss, however, to ignore the challenges and concerns associated with a full-fledged energy transition of any kind, which by definition involves major change. Rapid renewable energy development, as with nearly every other growth industry, has at a minimum the potential to generate significant changes in community character.

Rural communities in New York and many other states have at their disposal a variety of policies and programs that have begun to be used to foster local renewable energy development while addressing inherent challenges. New York's Cleaner Greener Program, one example, is now the key vehicle for competitively funding energy projects and regional sustainability plans throughout the state. Any transition to renewable energy should encompass strategies that adapt to local circumstances, an outcome best achieved through broad community participation.

II. Energy Systems Today

An energy system can be thought of as a constellation of dispersed energy resources that are connected to end users through transmission and distribution networks. The process by which raw forms of energy are transformed and then consumed involves six phases: exploration, extraction, processing, distribution, storage, and end use.[2] Throughout this process, the most notable environmental impacts for rural places occur at the exploration, extraction, and processing phases, as they typically involve great effort and expenditure to locate the resource, retrieve it from the earth, and distill or mechanically transform it into a usable energy commodity.[3]

III. Energy Conservation and Efficiency

At every stage of an energy system—from exploration to end use—work must be done and energy expended. During the energy conversion process, some of the energy content of a raw energy source is unavoidably (but some avoidably) consumed or lost as waste heat or light.[4] In fact, only about two-fifths of the energy that is converted from primary sources in the U.S. actually provides useful energy services. Most of the lost energy involves heat wasted during electricity generation and in automobile engines.[5]

This highlights the critical importance of targeted conservation and efficiency measures in the production of energy. For example, in conventional electricity generating plants,[6] about two-thirds of the energy is lost as heat at the power plant.[7] Alternative systems (*e.g.*, combined cycle and combined heat and power, or CHP) reuse some of their waste heat for additional electricity production and are often able to capture residual heat for process or space heating in nearby facilities. Conservation and efficiency measures are therefore critical to consider in the development of future technology, regardless of the fuel used.

Though ahead of many others, New Yorkers can also reduce household energy consumption through improved energy efficiency measures and "lifestyle" choices.[8] These involve the use of energy-efficient technologies, more efficient land use planning and building design, and more sustainable transport. Rural places face distinctive efficiency challenges and opportunities with each.[9]

IV. Energy Transmission, Distribution, and Management

The closer the source of energy production to the point of consumption, the lower the investment needed in transmission and distribution. Energy produced close to market, then, generally earns a corresponding value premium. Most energy supplies—renewable and otherwise—are remote from urban consumers, however, and large scale generation facilities are seldom compatible with urban land uses. Consequently, an enormous infrastructure investment has been made in transmission and distribution systems to connect generators with consumers.[10] Though electricity can be economically moved long distances through the electric grid, it is not efficient to move heat for more than short distances. Thus, usable heat is generated (or captured / converted in the cases of solar and geothermal heating systems or lakewater cooling systems, for example) at or near the point of use, regardless of fuel source.

In the case of electricity in particular, extensive networks of transmission and distribution lines are required before most electricity can be used, in addition to a host of converters (*i.e.*, lights, appliances, electric motors) ready to use the delivered energy.[11] Historically, the costs derived from installing, operating, and maintaining the transmission and distribution system comprised about two-thirds of the total costs of producing and delivering electricity to residential-commercial customers, and over one third of the total costs of supplying electricity to large industrial customers.[12] A regional, more recent estimate suggests a more even split.[13]

Because concentrations of renewable energy resources tend, like nonrenewable resources, to be distributed across rural areas in parts of the country that are distant from urban centers of demand, transmission issues are central to future renewable energy development and to both rural and urban areas. A seminal U.S. Department of Energy (2008) report showing that wind energy could provide 20 percent of the nation's electricity needs by 2030 serves as a good case in point.[14] In order for large-scale wind generation to be successful, the report identified as a primary barrier the development of transmission infrastructure. The power industry has argued that the current transmission and permitting system is too balkanized, instead needing reform and centralization to foster "planning for an electric transmission system with the needs of the entire country in mind rather than the local fixes that compose the patchwork of today's transmission system."[15] Similar arguments, focused more on plant siting than transmission, motivated passage of New York's Power NY Act of 2011.[16] The political ramifications of these kinds of shifts in authority are highly charged.

The compatibility of renewable energy with small scale distributed generation systems offers a promising alternative to producing and distributing renewable energy within rural communities themselves. Distributed electric generation systems[17] differ from conventional centralized systems by generating electricity and / or heat from many small energy sources at or near the point of use. Distributed generation is most frequently considered in the context of electricity production, but need not be restricted to that form of energy. Combined heat and power (CHP) systems are also compatible with renewables. Such distributed generation can be designed to employ multiple fuels, either alone or in combination.

V. Renewable New York

New York State meets nearly 12 percent of its primary energy needs with renewables, mostly from hydroelectric power and biomass.[18] The State's most recent State Energy Plan foresees a "technical" potential of meeting up to about 40 percent of total demand before the end of this decade, with the greatest growth from forestry / agricultural biomass, wind, and solar photovoltaic (PV). This growth comes with a caveat, however: "achieving the full potential in the near-term given current economic and technical realities would come at an extraordinary cost," including an estimated $300 billion just for solar / wind installations.[19]

The Energy Plan mentions but does not evaluate the significance of renewables, and especially biofuels, for rural communities. The plan notes, "[b]iofuels may also play a more significant role in rural communities, and by creating distribution systems for local use of fuels, farms may play a key role in growing suitable energy crops, aid[ing] in the conversion of such crops into usable fuels, and then hav[ing] local communities and on-farm use of such fuels serve as primary markets."[20] A supplemental "Biofuels Roadmap" further suggests biomass's potential to create new jobs, "especially in rural areas."[21] However, the report most significantly includes the recommendation for more analysis and information on economic, environmental, and "rural sociological impacts" of proposed policy options.[22]

VI. Rural Opportunities and Concerns

Given its abundance of energy resources and open space, rural America has the opportunity to lead the next energy transition. Renewable energy potential from rural places far outstrips that of urban places in nearly every category.[23] Replacing fossil fuels requires shifting to less energy-dense sources. These require by nature more space per unit of energy collected, handled, and stored.[24] Renewable energy sources as a rule yield less energy per unit of land area by an order of magnitude or more in comparison to fossil fuels. Though lower pollution at the site of generation presents many new urban opportunities for renewables, siting considerations mostly point to less developed landscapes as preferable.

Table 1 shows the number of acres typically required per megawatt of generating capacity for different kinds of renewable and nonrenewable electricity generating technologies. Fthenakis and Kim have shown that energy dense fossil fuels tend to economize on land "transformation" per unit of electric output.[25] Among the renewable sites studied in that article, photovoltaic installations were among the most "land efficient" (roughly comparable to natural gas), and biomass among the least. Importantly, characteristics of the land transformation or utilization for energy production are very different for each of the generation processes. For example, photovoltaics and wind turbines may be located on low-quality lands or lands used for multiple purposes (*e.g.*, grazing, shading). Moreover, because the energy is not depletable, no new land is required to continually renew the feedstock as is the case for fossil fuels. On the other hand, in order to continue supplying energy over time, renewable energy installations require some permanent disturbance of the landscape.

Table 1. Electricity Generation Footprints[26]

Wind farms	40-60 acres per megawatt
Geothermal	1 acre per megawatt
Solar photovoltaic	10 acres per megawatt
Solar thermal	6 acres per megawatt
Gas turbines	0.4-2 acres per megawatt
Coal (including mine)	0.4-20 acres per megawatt

VII. New Approaches to Economic Development

Aside from its physical impact and contribution to New York State's energy portfolio, renewable energy also represents an important economic development opportunity for rural communities. With regard to rural implications in particular, scholars have noted the evolution of economic development theory and practice over the years away from "smokestack chasing" and toward more complex, place-based "*community* economic development" approaches.[27] Traditional policies have focused on export markets and basic advantages in land, labor, and capital resources, while research on rural economic development has long highlighted the importance of the interplay of three determinative "facts of life": (1) natural resource advantages or endowments, (2) economies of concentration or agglomeration, and (3) costs of transport and communication.[28] Community economic development approaches add an emphasis on the role of institutions, social and cultural factors, and governance and decision-making capacities. These added emphases open the door to more strategies for economic development in rural areas, but they also draw attention to challenges in rural institutional and governance capacity which often parallel their lack of critical mass in economic arenas (*e.g.*, skilled labor force, industry clustering, marketing potential).

This evolution in economic development theory and practice has been summarized in one recent review as a shift away from "the pursuit of mobile capital to cultivation of local economic assets," with increasing attention being given to the economic, environmental, and equitable "triple bottom line" concepts undergirding sustainable development.[29] Significantly, Carley et al. argue further that the context of intensifying national concern about climate change, energy price volatility, and insecure foreign energy supplies has set the political and economic stage for a converging relationship between energy and economic development policy.[30] Their exposition of "energy based economic development" enumerates several specific goals:

- Increased energy self sufficiency,
- Increased energy diversification,
- Energy focused economic growth, and
- Development more broadly conceptualized as enhanced collective well-being.[31]

The emphasis on the "cultivation of local economic assets" is highly compatible with the distributed energy generation systems discussed previously. Also notable are the parallels of several if not all of these goals with those underpinning the growing support for local and regional food systems.[32] Jensen highlights as motivating tenets of the local and regional food movement concerns about community based *economic development* ("buy local"), *food security* and its relation to social justice, *food safety* and its relation to the "shorter supply chains of regional production systems," and enhanced *environmental sustainability* and *sense of community* through increased localization.[33] Carley et al.'s energy-based economic development goals cannot be mapped precisely onto these terms, but it is not a stretch to see support for local and regional energy systems increasingly based on motivations to "buy local"; improve energy security and social justice regarding a volatile and essential commodity; shorten "supply chains of regional production systems"; and enhance environmental sustainability and sense of community through increased localization.[34]

Johnson has suggested that rural America will benefit from a renewable, especially biofuel, based economy

because of "the double dividend of distributed energy… [that] turns remoteness on its head."[35] The double dividend is earned because rural fuel producers can avoid the extra costs of transporting refined fossil fuels into their area and then (assuming a relative cost advantage for locally produced renewable transportation fuels) reduce the costs of shipping all rural goods and services elsewhere. Rural production of distributed energy, especially if it meets local needs first, also has the potential to loosen some of the links that tether rural places to the vagaries of footloose multinational energy corporations and foreign governments. Distributed generation can be an important ally of relocalization.

VIII. Challenges and Concerns of Rural Energy Development

The challenges involved in transitioning to renewable energy are considerable, and they require unique approaches and solutions in rural areas. Broader concerns policymakers will confront include unstable economic growth; those related to the preservation of social ties and effective community development; and issues related to the interaction between water and energy.

A. Volatility and Change

As energy transitions take place, rural communities must be prepared for the economic volatility associated with possible energy development scenarios. While energy development is often celebrated for its job creation and economic development potential, there are less well-considered concerns that communities must address related to rapid population growth and increased employment. Rapid change of any kind, especially if it is not under the control of those affected by it, has been understood to be a mixed community blessing by sociologists from at least the time of Durkheim in the late 19th Century.

Though most research into the well-known rural boom / bust phenomenon has looked at the cycles associated with depletable resources where there is an inevitable eventual bust, renewable energy development is not exempt from significant ups and downs. The energy sector overall exhibits at the very least the volatility of overall economic growth, and the renewables sector in particular is vulnerable to the political tug of war over energy policy. Other factors familiar to farmers, such as weather and land and food policy, can cause additional variance in renewables markets. It is also noteworthy that oil prices and crop (including many biofuel crops) prices tend to be correlated to no small degree because of the extensive fossil fuel inputs involved in modern agriculture.

In any event, rural communities are not always ready to handle influxes of people and economic activity, and "booms" can potentially result in negative effects to society and local economies.[36] Furthermore, small towns and rural areas may be more likely to experience consequences of economic impacts that would be less noticed in a large, metropolitan area.[37] Despite these challenges, small town and rural municipalities may have a more comprehensive understanding of the local ramifications of economic booms, given their relative smaller size and lower level of complexity.[38]

B. Regional Economic Stability and Diversity

In preparing for local economic development generated by energy transitions, it is also important to consider the relationship between economic stability and diversity. Stability can be defined as the absence of variation in economic activity over time. Diversity, however, refers to differences in economic structure, or variety of economic activity.[39] Economists have hypothesized that more industrially diverse areas should experience more stable economic growth and lower rates of unemployment than less diverse economies. This can essentially be explained by the notion that a diverse economy has a wide variety of industries that help to smooth out macro-level fluctuations experienced by any individual industry. Employment gains in some industries, in other words, mitigate employment losses in other industries, effectively lowering region wide unemployment.

In terms of the actual effects economic diversity has on growth and stability, results are mixed. Some researchers[40] find no correlation between economic instability and diversity, while others[41] observe a positive relationship between diversity and stability. Wagner and Deller suggest further that there is a theoretical inconsistency of jointly pursuing economic growth (typically dependent on specialization), and diversity.[42]

The most convincing research concludes logically that the most stable economies are based on the most stable employers. Diversity only helps if the mix of sectors includes stable sectors, or as noted above in some cases if additional sectors balance each other counter-cyclically. The web of economic diversity in predominately rural regions is almost by definition likely to be thinner than in areas with greater population concentration. In the context of this article, the most important stability question is likely to be whether or not renewable energy production in rural New York complements or competes with other rural economic mainstays such as tourism, agriculture, and public sector employment.

C. Water and Energy

The relationship between water and energy is intimate, multifaceted, and important. It is of special significance in rural areas, which serve as sources / sinks / regeneration sites for many kinds of water and energy resources. Insofar as fossil fuel consumption contributes to greenhouse gas emissions, any changes in climate, weather patterns, and precipitation are causally linked to energy consumption.

Similarly, energy extraction practices that alter forestation or land use practices can have feedbacks that affect precipitation patterns and water supplies regionally. In addition, significant amounts of energy can be consumed

simply in moving or treating water for irrigation, household use, and sewage and wastewater treatment. Here, however, our attention is focused more on the extent to which the demand for energy leads to the demand for water in energy production. In some locations, energy and water development can provide complementary resources to support the nation's needs while stimulating economic development. In other parts of the country where water is scarce and water-intensive energy resources are abundant, conflicts will inevitably arise.

Indeed, various elements of the energy production process affect both water quantity *and* quality. Oil and gas exploration and production, for instance, not only use water-intensive drilling and fracturing processes, but can potentially impact surface and groundwater as well. The transport of energy through pipelines, similarly, can affect groundwater quality as pipes are buried beneath the earth's surface.

The production of renewable energy can also leave its mark on water usage. Crops used for producing biofuels and ethanol require water for growing and refining, while water is subsequently needed in the treatment of refinery wastewater. The amount of water used or affected by the production of solar and wind power is relatively small; a nominal amount is used for cleaning solar panels and windmill blades.

Connections between water and energy production are particularly important to rural America, given the geographic diversity of energy production potential (*i.e.*, solar in the U.S. Southwest and biomass in the Northwest). The likelihood and extent of future water shortages is also regionally specific, and New York's relative abundance of water will undoubtedly factor into energy development scenario planning.

IX. Summary and Outstanding Issues

The premise of this article is that a transition to renewable energy is inevitable if on an uncertain timeline, and that there is a unique set of possibilities for rural New York during this transition. These possibilities, unique though they may be, also present many important questions to be addressed.

A. Building Sustainable Wealth

As noted, both food and energy are primarily produced for domestic if not international export. This opens the door to wealth-creation in rural communities, but does not guarantee that the wealth will stay there. Will increased land-energy rents be invested locally or fund landowner retirements to other states? What financial, regulatory and regional economic development mechanisms can most effectively help rural communities keep a fair share of the wealth "down on the farm?" Are the State's rural financial and economic development institutions, governments, and utilities prepared?

Different forms of renewable energy have significantly different wealth and job creation profiles. Many are capital intensive; only biomass requires a significant amount of local enterprise to provide a feedstock. How significant then is the potential for the "local" manufacture of energy capital? Will rural areas benefit from lower cost access to the energy they produce? To what extent can rural enterprises add value beyond raw energy exports to local products? Will rural workers be qualified for new jobs, or will they go primarily to in-migrants? Will the people who take the jobs, regardless of their origin, be long-term or short-term residents of rural communities?

Questions about entrepreneurship and innovation are pressing. How can policymakers and communities encourage entrepreneurship within local and regional food systems in rural regions, paying particular attention the potential for distributed energy and district energy systems? Can rural entrepreneurs benefit from participating in and promoting climate change mitigation and ecosystem services through diversity and new technologies on their land?

B. Social Equity: Who Will Benefit and Who Will Lose?

This topic has equity dimensions that involve the impacts of change among people currently living in rural places and those who will likely move both to and away from them because of energy transition effects. It has regional implications that will be related to the uneven distribution of both renewable and nonrenewable energy resources around the country and state. It focuses attention on minority, Native American, and low-income rural populations—with vastly different access to rural land resources—asking how they can more fully participate in and benefit from renewable energy development.

This topic also involves questions of the way the relationship between rural and urban places will change. Because food and energy systems have been increasingly internationalized for commodities produced in rural places, it also involves international equity issues, just as farm policy does. The old question of who owns, and will in the future, own and control rural land is relevant. Both economic theory and history suggest that owners of land suitable for renewable energy production are likely to be the first-ring beneficiaries of this transition. What will landowners who gain windfalls do with their gains? Will they spend them quickly on consumer goods or invest? Will they use the land as before, or change the use of land? Will they keep their money in the region or spend nearly all of it elsewhere? Will they continue to live locally or themselves move elsewhere?

C. Regional Collaboration and Urban-Rural Interdependence

Rural and urban energy systems are and will remain interdependent, though in a renewably fueled society not in the same way and to the same degree. Among questions that remain: How do regional energy systems contribute to

or detract from economic development and environmental quality in rural—and quality of life and public health outcomes in urban—places? Will local and regional energy systems increasingly focused on renewables help protect farmland from "development?"

Moreover, how will rural places currently supported by the tourism sector be affected, and how will urban people relate to a countryside that is reverting from an amenity landscape back to a production landscape? Will renewable energy policies to supply the urban population provide further incentives for farm consolidation, or will they open new doors for medium and small scale agriculture? How does energy-driven relocalization interact with existing policy supporting more energy efficient and compact development patterns, with its focus on more dense settlement of pre-existing urban communities while protecting farm and open space?

D. How Can Rural Communities Prepare for the Changes That Will Affect Them?

Most people have chosen to live where they do. Although some change is often welcome, dramatic change is normally not. During the transition to renewable energy, there will be dramatic, even transformational change in many rural communities as landscapes are converted from their current uses. Much of this change will in effect be part of a deal rural places make with urban places to exchange money and jobs for energy.

Even if a rural majority favors more wind and solar and more intensive use of crop- and forestland, some will dissent. Even communities that are not home to an intensive energy industry are likely to be affected as the need to dramatically expand the electricity grid, while simultaneously making it "smarter," will intrude upon their backyards.

These changes will not simply pass over parts of rural America that have increasingly been valued for their beauty and amenity value and the tourism economy. Some do not agree that a wind turbine is a grand addition to the skyline. Even the wealth and prosperity that may come to many communities will likely bring change, division, and newcomers. Conflict is inevitable. But communities with the proper governance infrastructure, consensus building skills, land use planning capacity, and financial and capital planning tools to deal with change will be the best prepared for the future opportunities this transition will bring.

Endnotes

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20. *See* STATE ENERGY PLANNING BOARD, 2009 STATE ENERGY PLAN, VOLUME 1 http://www.nysenergyplan.com/final/New_York_State_Energy_Plan_VolumeI.pdf at 43.

21. *See* NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY, RESEARCH AND DEVELOPMENT TECHNICAL REPORTS, BIOMASS, SOLAR, WIND, REPORTS, RENEWABLE FUELS ROADMAP, http://www.nyserda.ny.gov//Publications/Research-and-Development-Technical-Reports/Biomass-Solar-Wind-Reports/Renewable-Fuels-Roadmap.aspx 3-7.

22. *See* NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY, RESEARCH AND DEVELOPMENT TECHNICAL REPORTS, BIOMASS, SOLAR, WIND, REPORTS, RENEWABLE FUELS ROADMAP, http://www.nyserda.ny.gov//Publications/Research-and-Development-Technical-Reports/Biomass-Solar-Wind-Reports/Renewable-Fuels-Roadmap.aspx 5-18.

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The Road to Energy Conservation: Climate Smart Steps Which Begin at Home

By Elisabeth N. Radow

Everything we do involves energy consumption. Every breath we take, every move we make. Under current conditions, nearly every daily activity involves the direct or indirect use of a fossil fuel, all of which contributes to global warming: taking a shower, preparing a meal, using a computer, commuting to work or school, to name a few. The United States of America has a current estimated population of 317,788,919 comprising approximately 4.5% of the world's 7,109,521,525 population;[1] yet, as of 2008, the United States ranked second, behind China, by contributing 19% to our planet's greenhouse emissions.[2] The U.S. Environmental Protection Agency (EPA) reports, based upon 2010 statistics, "the primary sources of greenhouse gas emissions in the United States are[:]" electricity at 34%, transportation at 27%, industry at 21%, commercial and residential at 11%, and agriculture at 7%.[3]

America, indeed our planet, is in the midst of an energy revolution. Caught amidst a warming climate, established fossil fuel interests and consumer habits, America has one foot still firmly entrenched in the use of fossil fuel and a second foot with a directed, but nascent, toehold on use of renewable energy derived from wind, water and the sun. Accessing fossil fuel for mass consumption involves first obtaining long-term property rights to target, extract, store, and sell the minerals, oil or gas. It represents a proprietary approach to energy. Renewable energy, in contrast, involves a democratic approach to energy. While situating windmills and solar panels may involve entering into a lease or license agreement, no one owns the source of energy itself, namely, the wind or the sun.[4] To the extent it is embraced as the energy source of choice, renewable energy, particularly if it is decentralized, will result in a loss of control by a relative few of the billions of dollars currently earned annually from the mining, processing, storage and sale of fossil fuel.

Fossil fuel has become harder and more expensive to access and more destructive of the environment, whether it be from strip-mining for coal, mining for tar sands, or use of high volume slick water hydraulic fracturing combined with horizontal drilling to extract mile or more deep natural (methane) gas. Yet, incorporating renewable energy options into mainstream use presents a variety of challenges; primary among them are established federal subsidies to the fossil fuel industries. Between 1950 and 2003 the United States government granted $470 billion in subsidies to the fossil fuel industry compared to $23 billion granted to renewable energy firms.[5] The oil and gas industry-related lobbying efforts and campaign contributions represent a formidable presence in federal and state government; the effect of this presence can influence which bills survive the legislative process and actually become enacted into law.

Currently, the House of Representatives is controlled by the Republican Party, the majority of whom favor the continued use of fossil fuel. It is therefore unlikely that President Barack Obama will be able to advance a renewable energy agenda through Congress, although President Obama did make such an appeal during his 2012 State of the Union address when expressing the intention of his office to address the urgency of climate change.[6] Change from Washington is more likely to come through administrative regulation from the Environmental Protection Agency (EPA), a point the President referred to as his alternate route if Congress fails to cooperate. The stimulus money previously provided by the federal government to encourage growth in the renewable energy sector is currently unavailable. Yet, as part of the so-called "fiscal cliff [legislation], Congress [did] authorize a one-year extension for the wind protection tax credit."[7] However, experts speculate that such a short renewal term will limit the wind industry's ability to innovate beyond current technology and recommend instead a multi-year extension to inspire advancement in the technology, while simultaneously phasing out the tax credit component as cost and performance parity develops between wind technology and other energy sources.[8] Even assuming the expanded opportunity to develop wind technology, human nature in the form of NIMBYism (not in my backyard)[9] militates against a swift shift toward this renewable energy option. However, educating and involving public participation from the inception of the planning and siting process, instead of after-the-fact rubber stamping, present a more viable approach toward community buy-in, and could help facilitate government benchmarks for reducing greenhouse gas impacts.[10]

Other suggestions for meaningful advancement in the energy shift away from fossil fuels and toward solar or other intermittent sources involve developing "innovations in energy storage or in smart-grid technologies that make it easier for utilities to deal with fluctuations in power."[11] Further, consideration should be given to avoid replacing one industrial-scale option with another even when the energy involves a renewable source such as wind or sun.

Current Government Action

The Obama administration is taking steps to curb greenhouse gas emissions. First ushered in under the Carter administration in 1975 following the 1973 oil embargo, in August of 2012, the Obama administration issued the final

version of new rules for the so-called Corporate Average Fuel Economy (CAFE).[12] CAFE was enacted to reduce greenhouse gas pollution from new cars and light trucks by requiring automakers to increase the average fuel efficiency of trucks and cars to 35.5 miles per gallon for the 2017 model year and 54.5 miles per gallon for the 2025 model year.[13] Another example of the President's effort is the Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units, including new fossil-fuel power plants, proposed by the EPA on March 27, 2012.[14] The rule would set national limits on the amount of carbon pollution that new fossil-fuel-fired electric utility generating power plants can emit and in effect would ban new coal-fired power plants that do not capture carbon dioxide emissions.[15] A third example is the Renewable Fuel Standard Program pursuant to which the EPA is "developing and implementing regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel."[16] EPA projects that, "[b]y 2022, the Renewable Fuel Standard (RFS) program will reduce greenhouse gas emissions by 138 million metric tons, about the annual emissions of 27 million passenger vehicles, replacing about seven percent of expected annual diesel consumption and decreasing oil imports by $41.5 billion."[17]

Americans consume greenhouse gases at a rate which is grossly disproportionate to our presence on the planet. While the Obama administration takes steps, as indicated above, given an intractable Congress, legislative action to further curb greenhouse gas emissions is unlikely to occur in the current term. While limitations imposed through federal regulations can be expected to continue, in the immediate term, they are likely to target industry and commerce, not the individual American citizen. New York's plan for addressing climate change is more targeted toward the individual. In his State of the State Address, Governor Andrew Cuomo announced the intention to create the:

> New York Greenbank, which is a $1 billion bank to leverage public dollars with private sector matched money to spur the clean economy. We want to extend New York's sun solar jobs program at $150 million annually for 10 years to increase solar panel installation for homes and business…and we want to invest in an electric car network to reduce reliance on fossil fuels, installing a statewide network of charging stations and have New York be one of the forerunners in this race all across the country.[18]

America's greenhouse gas emissions from non-industrial activities of daily living, such as home energy consumption and transportation choices, contribute to the compromised air we breathe**.** Once we assert control over the sources and amounts of energy we consume in our immediate environment, we can improve air quality conditions for our personal health. Currently, the New York State Energy Research and Development Authority (NYSERDA) encourages New Yorkers to make their homes more energy efficient through systemic upgrades. On a cumulative basis, these energy upgrades can substantially reduce demand on the utility to burn the coal or natural gas which fuels the utility's generation of the heat and electricity we consume. From the consumer's perspective, the process toward residential energy efficiency involves a qualified contractor performing a visual inspection, health and safety testing of appliances that use oil or gas, such as furnaces, boilers, hot water heaters and stoves; energy efficiency tests to identify air leaks and the quality of home insulation; analyzing the findings, proposing energy efficiency upgrades; and installing recommended measures. Grants and low interest loans are available for qualifying homeowners. Federal tax credits may also be available for qualifying upgrades.[19] In addition to improving air quality, these upgrades provide added comfort to a residence, long-term reduced monthly maintenance costs and can potentially result in the increased resale value of the home. While utilities are required to offer these programs, consumers are not obligated to take advantage of them. Even with long-term cost savings as a carrot, barriers such as funding and amortizing the cost of the work, unfamiliarity with the process and consumer inertia appear to interfere with a more robust outcome. An example of local government asserting control over energy consumption involves local laws which prohibit cars and buses from idling.[20] This has the effect of eliminating emissions of tons of unnecessary carbon dioxide into the local atmosphere. This inures to the health benefit of school children, adults and older adults who would otherwise inhale the poisonous fumes.[21]

Given the complex current political climate coupled with American's dependence on fossil fuel, the transition to renewable energy can be expected to take many decades. Revolution by definition involves evolution. Evolution for purposes of this discussion involves some shifts and some changes. The energy conservation examples given above do not involve giving up consumption of fossil fuel; they involve shifts in overall consumption. While government plays a role in the evolution of energy shifts and changes, human adaption to these shifts and changes plays a formidable role which is not often discussed and is the focus of this article. Both shifts and outright changes are required to make the transition less abrupt and more sustainable. Education provides a basic tool for facilitating a shift in understanding; change can follow**.**

Currently, consumers gravitate toward the cheap price of natural gas through the pull of brilliant advertising. Popular slogans such as "clean fuel" and "energy independence" use sound bites to create a "feel good" perception of a product without the Talmudic commentary which would be likely to sour the purchase. While natural gas burns clean, the multi-step heavy industrial gas extraction lifecycle may be as deleterious, or more so, to the environment than the carbon dioxide which results from burning coal, as discussed more fully below. While typical Ameri-

cans may not be able to control which proposed legislation becomes considered in the U.S. Congress, as consumers we can take notice of the hidden costs associated with what we consume, and adjust our purchases or not purchase at all. According to a recent report, when including externalized costs associated with fossil fuel consumption, renewables are getting cheaper and fossil fuels are becoming more expensive.[22] When one reads about the cheap cost of fuel, what gets reported omits the "U.S. prices account for the externalities associated with fossil fuels like pollution, cancers, military protection, or global warming."[23] In America, those externalities are paid for by the consumer / taxpayer, not by the coal and gas energy producers.[24]

> The fossil fuel industry doesn't pay a penny of the cost of rapidly accelerating climate change. Or the healthcare costs from exhaust- and refinery-driven diseases and deaths from air, water, and other pollution. Not to mention the community costs of decreasing property values when a coal plant is put in your backyard. Nor do they put a cent toward the cost of our Navy keeping the oil shipping lanes open or our soldiers "protecting" the countries that "produce" all that oil.
>
> All of these externalities come with fossil fuel production, but pretty much don't exist with renewable energy production. And those externality costs are not only not paid for by the fossil fuel industry—they're never even mentioned in the corporate-run "news" media in America.
>
> Research from the Annals of the New York Academy of Sciences concludes that the total cost of these externalities, if paid by the polluters themselves, would raise US fossil fuel prices by as much as nearly $3/MWh. And that's an extremely conservative estimate. Which puts wind power on parity with coal in America.[25]

Public policy and rules of law play a central role in the energy choices available to Americans. As environmental, economic and political conditions change, so will the manner in which our elected officials determine their support. This will not occur in a vacuum. Abraham Lincoln was quoted to say, "[t]he best way to predict your future is to create it." A primary force for influencing legislative change involves voting representatives into and out of elected office. In addition, population growth and expansion of populations into the middle class will place ever increasing demand on finite natural resources such as the water we drink, the soil which grows our crops and the trees which provide our oxygen and shade. The growing impact of a warming climate as reflected in the draft National Climate Assessment presents a serious picture evidenced by serial flooding on the one hand and prolonged droughts on the other, which stifle water supply and the resulting agricultural economy.[26] These forces will combine over time to make change. Likewise, the professed commitment from President Obama to tackle climate change could carry weight if it is met with the respect of members of Congress, as could the intended state programs supported by Governor Cuomo. Yet, while legislative action at the federal, state and local level matter, we can neither wait for the government to solve all of our energy problems, nor can we expect a quick fix. Even assuming Americans have legislative support to prioritize renewable energy projects, will we, as citizens-consumers, follow in our daily behavior to do what is in our own individual and societal best interest, for the short-term and the long term? Or will the need for immediate gratification cloud our decisions? The American consumer, separate and apart from the government, must decide to change. Thus, while Washington and Albany provide the level of governance possible given current political realities, presented here is basic information for making shifts and changes at the local level and in our personal lives.

This article begins by defining basic terms, such as greenhouse gases, consumption, and waste. The role of human nature is next considered, since our behavior figures prominently into the evolutionary equation of our energy shifts. Finally, methods for adapting to change in a natural and respectful way are identified for use at the community level and on a personal basis.

The Basics

A greenhouse gas is any gas that absorbs and releases radiation in the atmosphere. Greenhouse gases include carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, hydrochlorofluorocarbons, halons, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.[27] "While greenhouse gases allow the sun's energy to enter the earth's atmosphere, instead of letting it re-radiate [the gases] back into space as infrared radiation, these gases absorb [the] infrared radiation and trap it in the [Earth's] atmosphere."[28] Daily human activity is a primary driver of this phenomenon, known as the greenhouse effect, which is contributing to climate change and the impacts of climate change, such as extreme and destructive weather patterns. "Greenhouse gas emissions occur naturally through biogenic processes such as the decomposition of biological materials, forest fires, and fermentation."[29] Greenhouse gases also occur through anthropogenic (human) sources.[30] The primary greenhouse gases that are emitted into the atmosphere by human activities include carbon dioxide (CO2) and methane (CH4).

Carbon dioxide is a naturally occurring greenhouse gas that enters the atmosphere when fossil fuels and biomass are burned, solid waste rots, through deforestation, certain chemical reactions and land use changes, and other industrial processes.[31] Natural gas is derived from **"[**u] nderground deposits of gases consisting of 50 to 90 percent methane (CH4) and small amounts of heavier gaseous

hydrocarbon compounds such as propane (C3H8) and butane (C4H10)."[32] According to the EPA, methane is "a hydrocarbon that is a greenhouse gas with a global warming potential most recently estimated at 25 times that of carbon dioxide (CO2)."[33] "Methane's lifetime in the atmosphere is much shorter than carbon dioxide (CO2), but [methane] is more efficient at trapping radiation than [carbon dioxide]. Pound for pound, the comparative impact of [methane] on climate change is over 20 times greater than [carbon dioxide] over a 100-year period…. Globally, over 60% of total [methane] emissions come from human activities."[34]

The important fact to keep in mind is that energy conservation efforts require we focus on our "greenhouse gas" footprint, not singly on carbon dioxide, methane, nitrous oxide, the flourinated gases, or ozone. For example, by reducing the emissions of carbon dioxide through regulating coal fired energy plants we succeed by reducing CO2 emissions; however, if in so doing we escalate the use of natural (methane) gas, we then have to contend with the effects of a "greenhouse gas with a global warming potential most recently estimated at 25 times that of carbon dioxide." It is for reasons such as this that electing to simply consume less avoids trading one energy source with baggage for another.

Consumption and Waste, Defined

"Consumption" can be defined as "the direct use of energy and use of energy-intensive goods and services. Energy-intensive goods and services include food, clothing, transportation, heating, cooling and electricity. Consumers make purchases based upon a real need (hunger, physical comfort) or a perceived need (keeping up with the Jones). Environmental forces which influence consumer purchases come from cultural cues, targeted marketing, a person's friends, family and colleagues. In addition, social media and the Internet facilitate one's ability to translate an impulse into an immediate purchase. This has the potential to contribute to waste. "Waste" in this context involves any consumer-good or service which is purchased or otherwise obtained but not fully consumed. Examples abound. Waste includes such practices as sending uneaten food to the landfill, discarding a plastic bag after a single use, opening a window in an inefficiently over-heated home, leaving on lights throughout a vacant building, and idling vehicles.

Consumption and use of energy and energy-intensive goods and services are optimally understood and can be more efficiently controlled if viewed not simply in a linear way, but as linked to and intertwined with fundamental aspects of our activities of daily living. Consider, for example, "Energy is required to treat wastewater and transport drinking water; water is required to make electricity and produce transportation fuels, energy and water are required to grow food; an increasing portion of certain crops is being used for fuel instead of food; and water quality can be adversely impacted by food and energy production."[35]

In a joint report between the McKinsey Global Institute and McKinsey's Sustainability & Resource Productivity Practice, entitled, *Resource revolution: Meeting the world's energy, materials, food and water needs*,[36] the authors state

> [i]n just the past ten years, demand from emerging markets, particularly Asia, has erased all of the price declines [for natural resources] of the previous 100. A number of factors are conspiring to create a risk that we might be entering a new era of volatile prices over the next two decades. Up to three billion people could join the middle-class, boosting demand at a time when obtaining new resources could become more difficult and costly. The stress on the resource system is likely to be compounded by increasing links between resources that mean that price shocks in one can swiftly transmit to others. In addition, environmental deterioration, driven by higher consumption, is making the supply of resources—particularly food—more vulnerable.[37]

Juxtaposed against this global perspective is a Natural Resources Defense Council (NRDC) report entitled, *Wasted: How America is Losing up to 40 Percent of its Food from Farm to Fork to Landfill*,[38] revealing that Americans annually throw away 40% of the food we produce valued at approximately $165 million, with the average family responsible for an annual average of 20 pounds a month or two-thirds of a pound per person each day, which translates into annual, per family, waste totaling $2,275.[39] Reducing our annual food loss by 15% would save enough food to feed 25 million Americans for one year. Food retailers lose approximately $15 billion annually in perishable food such as fruit and vegetables, with approximately one-half of the nation's supply not eaten; some of this is due to overstocking. Retail food waste also results from consumer misunderstanding over the "use-by" and "best-by" labeling of such items as milk, bread and cheese to mean the product is no longer edible instead of still edible although not its freshest. Likewise, bruised fruit or vegetables may be overlooked for purchase based on their outward appearance, even though they maintain their flavor and nutritional value.

According to the NRDC report, the majority of food loss occurs in restaurants and in America's home kitchens; the reasons are larger portions, between 2 and 8 times larger than the government-recommended serving, and uneaten leftovers. Food waste extends beyond the food itself to include the energy and water used to grow, transport and store the food. Approximately 25% of the freshwater consumed in this country goes to food that is not eaten. Approximately 2.5% of America's energy budget, or the equivalent of hundreds of millions of barrels of oil, is thrown away each year as food waste.[40] The uneaten food further accounts "for conversion from forests, grasslands and wetlands to agriculture," which if left undisturbed would "potentially reduce our adverse impact on biodiversity."[41]

In America, food waste has increased by 50% since the 1970s and currently constitutes the single largest component of solid waste sent to America's landfills and incinerators.[42] Americans pay for garbage pick-up on property tax bills or through private carting contracts. Thus, to the extent we discard what we don't eat, we are paying twice. Waste pick-up constitutes a line item on municipal budgets which can be reduced through local law and self-imposed behavior. Examples of local action to address waste include: community composting and using the compost as fertilizer to grow crops; and sending excess home-grown food to food banks.[43] Food Shift, established in Oakland California in 2011, raises awareness about food waste and provides tips, tools and resources to businesses and the community to change food waste behavior.[44] In addition**,** municipalities such as the City of Santa Monica, California and Charleston County, South Carolina are adopting food waste collection and composting programs.[45]

How can we Americans incorporate information about energy conservation into our own daily activities to accomplish the shifts needed to make change? It depends upon the individual. A person's world view will inform how he or she perceives data and how he or she acts on it. Age, socio-economic class, gender, life experience and other criteria will add to the mix. While no silver bullet or singular approach exists to facilitate change, an understanding of what motivates people and what inhibits people from taking action can inform how government shapes public policy and how people in their own right, without governmental intervention, can initiate and effect meaningful change. Once the motivations and inhibitors are identified, the secondary consideration involves addressing the goal to make focused consumer choices while navigating a multi-tasking culture and tempering our penchant for instant gratification with deliberative delay in our consumer choices to avoid unnecessary purchases that lead to unnecessary consumption and unnecessary waste. The challenge requires *mindful* consumption. How can this be accomplished? One step at a time. What follows is some insight into familiar human emotions: guilt and happiness and how they apply to making sustainable consumption choices.

The Role of Guilt

A recent Eco Pulse survey conducted on "green guilt" found that 39% of Americans experience guilt from wasting food.[46] According to the survey results, "women outpaced men [by experiencing guilt] about wasting food, using paper towels, buying cleaning supplies with strong chemicals, eating meat and other behaviors. Consumers who earn $75,000–$99,000 per year felt more guilt than others about wasting food, whereas those earning $100,000 or more were more likely to say they felt no guilt at all. In her book, *Big Green Purse*, author Diane MacEachern points out that women control 85 cents of every consumer dollar. Thus, educating women, in particular, about the impacts of consumer waste holds great potential for success. The Eco-Pulse survey, which polled 1,013 people, also found 27% of those surveyed felt guilt about leaving lights on when leaving a room, 27% for wasting water, 22% for failing to unplug chargers for electronics and 21% for not recycling. In addition, 20% of those surveyed experienced guilt over forgetting to bring a reusable bag to the store, 9% for not purchasing energy efficient bulbs, 7% for not sticking to an energy-efficient thermostat setting, 6% for not being careful about how long and when they water the lawn, and 6% for using chemical lawn or plant fertilizers. Survey results reveal that certain of these behaviors, which result in minimal guilt, such as light bulb purchases, are the types of consumer choices which can yield sizable energy efficiency and costs savings. This suggests a need to redouble efforts to educate consumers about their choices since easy shifts can result in significant environmental and economic benefits. While guilt presents an emotion people seek to avoid, happiness represents an emotion we gravitate toward; both emotions have their role in energy conservation.

The Role of Happiness

"Happiness has three separate aspects: a person's judgment about how life is going overall, the presence of positive feelings like joy and the absence of negative feelings like sadness or depression."[47] These dynamic aspects coincide with a person's overall satisfaction with life. Consumption correlates with producing an immediate "experience of pleasure or eliminating discomfort."[48]

Neither material consumption nor production is central to happiness.

> On the whole, the most pleasurable experiences do not derive from work—people get the most satisfaction from social activities, even though having a job may be important for their self-esteem. Interestingly, the happiest people tend not to be superachievers; apparently, whatever drives people to the highest levels of achievement does not sit well with personal satisfaction. In general, materialism is not conducive to well-being. Thus, most of what determines happiness is noneconomic. This helps explain the weak, inconsistent evidence linking income and consumption, because some activities that promote happiness may not be readily affected by wealth, and others may compete for personal time and energy with wealth-seeking activities. In short, according to the research, neither production nor consumption has an intrinsic connection with personal satisfaction.[49]

A point worthy of attention is that "all measures of social connection are significantly correlated with life satisfaction."[50] This observation has relevance in approaching how to develop programs which seek to affect consumer behavior, as more particularly described below. This observation suggests the benefits of community events as teaching tools, opportunities for achieving a shared goal through collaboration and opportunities to share successes and seek

support when intermittent failure occurs along the road to developing energy efficient habits.

As indicated earlier, consumption is typically centered around immediate gratification or the elimination of negative feelings. The good news is that most energy conservation measures have a short payback period. Examples of this include shifting consumer purchases such as meat and dairy to foods using less water and fuel to produce and which cost less on the grocery bill; and from incandescent bulbs to LED lighting, which may cost more at the checkout counter but result in measurable savings in utility bills. Reducing the thermostat in a well-insulated home and doing laundry with cold water can result in a lower utility bill. Carpooling and increased walking can result in saving a tank of gas each one to two months; at $60 a tank, this can add up to saving $720 annually in fuel.[51]

Methods Toward Change

Communities typically have a culture or groups of cultures which define them and make them distinctive from communities situated elsewhere. A local focus using community-based social marketing can address and resolve barriers to energy conservation at a group level. Applying methodologies of social innovation, with its entrepreneurial yet collaborative approach to a given goal, may prove successful to harness change by putting the individual in control of selecting among comparably beneficial energy conservation choices.

Community-Based Social Marketing

Community-based social marketing (CBSM) uses social marketing techniques to make change at a group or community level. According to a white paper published by the American Council for an Energy-Efficient Economy, entitled *Reaching the "High-Hanging Fruit" through Behavioral Change: How Community-Based Social Marketing Puts Energy Savings within Reach*, behavioral changes in sustainable behavior can be targeted at the community level by "[i]dentifying barriers and benefits, using local research when possible; developing strategies, drawing from social science tools to address barriers; piloting the strategies, ensuring the effectiveness of strategies; broad scale implementation and evaluation, utilizing direct and observational measurement when possible"[52] Dr. Douglas McKenzie published *Promoting a Sustainable Future: An Introduction to Community-Based Social Marketing*, which first introduced CBSM in 1996 as a methodology to lower barriers to sustainable behavior.[53] According to its authors, CBSM is especially useful when implementing energy efficiency measures has a high financial cost and non-financial barriers, such as complex decisions-making and coordination of multiple stakeholders learning how to program new devices,[54] adopting new habits and making the long-term investment itself.[55]

In circumstances such as this, where impulse purchasing should take a back-seat to a more deliberative approach, CBSM "applies social marketing tools around researched and identified barriers and benefits as experienced by a local and specific audience." CBSM focuses on creating programs with a measurable outcome that can be accomplished by a particular action; the program is then narrowly designed around that specific behavior to result in a targeted outcome. Tools employed in CBSM include, (i) social commitment to invite a change in self-image and therefore behavior when self-motivation is lacking; (ii) social diffusion which involves modeling behavior of trusted peers when lack of motivation is due to lack of trust or lack of trusted information; (iii) social norms demonstrating that a practice is widespread when lack of motivation is due to uncertainty about fitting in; (iv) prompts such as signage or reminders help when motivation lacks because of forgetfulness or lack of instant cues; (v) communication with a relevant message in a "vivid and personal" way when an important message needs to be conveyed to and remembered by the audience; (vi) incentives when the actual or perceived cost presents a barrier to taking action; and (vii) addressing barriers in the built environment, institutions, processes or other infrastructure to facilitate the targeted but impeded action.[56]

Tools For Change is an example of a resource-based Internet website which incorporates CBSM. Using food waste as a model, *Tools For Change* lists "waste" among its categories under the *Waste Resources* banner. From there a municipal planner can scroll through and read case studies of projects and programs that address issues of personal relevance. With respect to residential waste pick-up, *Tools For Change* links to *User Pay for Residential Waste Pickup in Ontario (Research Alert)* reporting that there are now over 200 user-pay programs, with numbers continuing to grow following a 1996 public survey on the topic. According to this research alert, user-pay programs make residents more aware of the costs associated with waste management, can cover all or a portion of the waste management cost of operations and can also result in reduced amounts of waste being thrown away. "In addition to traditional 'bag tag' user-pay programs, municipalities are introducing many variations on the user-pay theme, from flat fees that cover part of the municipal waste service to the outright removal of certain services (in particular bulky goods collection) from the tax base. Bulky goods are handled for a separate fee in many jurisdictions or people are simply given a list of contractors who will remove the material for a fee."[57]

Continuing on the topic of food waste, *Tools For Changes* links to the case study of a City of Portland, Oregon program called *Fork it Over!* which links food businesses in Portland, Oregon with perishable food surplus to local food banks serving the region's hungry population. To inaugurate the program, the following goals were established: "Decrease the amount of food disposed in the Metro region; Maximize the amount of nutritious, edible, perishable foods diverted to food banks and, ultimately, the hungry; Increase awareness of both hunger and waste; and Provide the tools necessary for businesses to make positive change. No quantified targets were set."[58]

Studies were performed to focus on gathering information and practices in the "target audiences", in this case, the food industry and the food rescue agencies. In addition, a so-called barrier-benefit identification study was likewise performed to identify the perceived barriers to program success from the perspective of the food industry donors and the food bank recipients. The results showed, for example, that one of the key barriers to accepting more food was the food banks' limited equipment for recovering, transporting, storing and distributing perishable foods safely. "Safety and liability were of top concern and second was ease of implementation in a busy industry. Surprisingly the biggest benefit to food donation was not tax write-offs, savings on garbage fees or other financial benefit as assumed by both Metro and food banks; it was simply the right thing to do."[59]

Social Innovation Defined, The Role of Social Innovation

"Social Innovation focuses attention on the ideas and solutions that create social value, as well as the processes through which they are generated, not just the individuals and organizations."[60] The following three key, interacting mechanisms drive contemporary social innovation "(i) exchanges of ideas and values; (ii) shifts in roles and relationships; and (iii) the integration of private capital with public and philanthropic support. Ultimately, the most difficult and important problems cannot be understood, let alone solved, without involving the nonprofit, public, and private sectors."[61] According to the World Economic Forum

> social innovation refers to the application of innovative, practical, sustainable, market-based approaches that achieve transformative social and / or environmental change, with an emphasis on under-served populations. Social innovation is becoming a priority for decision-makers at the most senior levels. In this new age of austerity, as governments search for guidance and inspiration on scaling cost-effective solutions to social problems, social entrepreneurship has taken centre stage. Social enterprises balance a social mission with financial viability and sustainability, existing between the public sector and private markets in both the developed and developing world.[62]

Energy Conservation on Your Own Terms

Social innovation has the potential to fill the gap between legal mandates and private enterprise where energy conservation is concerned. How the gap gets fill will depend upon the consumer profile and the goal at hand. Each person has individual strengths, weaknesses and a unique world view. Using this as a context for adapting social innovation, assume that consumption can be characterized as a discipline with a stated goal; and interim consumption benchmarks can be effectively designated over staggered time periods, such as a week, a month and a year. Using this model, the citizen-consumer can relearn how to purchase, how to consume and how to eliminate waste in a way that works best for the individual. For example, the goal may be to reduce the family's annual carbon and methane emissions by 30%. How one initiates change in activities of daily living will vary from individual to individual, and from family to family. For obvious reasons, it makes sense to begin by shifting habits which are most easily achieved. For certain individuals, walking more and driving less may be the easiest point of entry into a sustainable lifestyle; to others, shifting food consumption to reduce waste may be the easiest route, while for others, switching to LED lighting and washing laundry with cold water will represent the easiest way to begin. Much like a food diet, a crash energy diet won't work as effectively as one that evolves over time. Success breeds success. Tracking shifts in consumption can be accomplished in journal entries which compare utility bills and grocery and gas receipts on a monthly basis. As success is achieved in one area, additional changes in habits can be incorporated into the individual or family routine. Charting progress in energy and financial savings as a family unit can be used as an opportunity to save toward a common goal. For example, money saved through eliminating consumption of fuel, food and clothing can be applied toward purchases of more impactful energy upgrades such as home weatherization, an Energy Star rated refrigerator, stove or dryer or a hybrid vehicle. One thing to avoid is the so-called "rebound effect," where energy savings derived from consuming less in one area is spent on a good or service which results in consuming more fossil fuel (directly or indirectly) than what was saved through the initial conservation effort.

Social Innovation at the Community Level

For individuals who are not prone to initiate change involving their conservation habits, initiatives which enlist the involvement of all sectors of the community toward achieving a common goal may be a more productive approach. Just such an initiative is currently under way in the Larchmont / Mamaroneck, New York community. This is a Westchester County suburb of Manhattan situated along the Long Island Sound with a population of approximately 29,000. The local chapter of the League of Women Voters has spearheaded a year-long community conservation civics initiative aimed to engage all sectors of the community to conserve on consumption. Individual savings resulting from energy conservation strategies and 100% of the proceeds earned from League-sponsored conservation-themed events throughout the year are being donated to a tax deductible fund that will benefit energy improvements and renovations to the Town-owned ice rink. The ice rink is currently the largest Town-owned energy consumer and is also a valuable source of revenue. The League of Women Voters, which is a 92-year-old national grassroots organization devoted to transparent and effective government and citizen action, embraces a nationwide position on curbing global warming and preserving natural resources. Cognizant of

the potential limitations of government's role in energy conservation on the one hand and the role of personal liberties and human nature on the other, the civics initiative was devised to provide education about the nexus between energy consumption and sustainable solutions to encourage voluntary shifts and changes in consumer habits. The initiative aims to engage all sectors of the community: families, students, local businesses, the schools and houses of worship, in the learning and *doing* process. The initiative recognizes that citizens can and do, unilaterally, effect change. Every person makes a difference. One method involves citizen action with one's vote; another with one's pocketbook.

To launch the conservation civics initiative, energy conservation experts convened for a televised forum to educate residents about home energy audits and food waste. All sectors of the community were encouraged to audit their home and business energy consumption. In addition, through public participation in community events, the civics initiative aims to translate action into savings which simultaneously benefits the individual and the community-at-large. Inspired by the social innovation model, the League is collaborating with local environmental groups and local businesses to make this an all-inclusive process and to optimize community participation. In addition, all local clergy were requested to consider delivering a sermon on the day before Earth Day addressing whether people have a moral obligation to be "*mindful* consumers." Later the same day, residents participated in a community yard sale, silent auction and sustainability fair at which approximately 40 families and some businesses rented space in a Town parking lot to sell items they no longer need; and people donated and bid on unused gifts at the silent auction. Local musicians performed. Not-for profit organizations focused on the climate, environmental impacts on human health, conservation and food composting were on hand to educate and answer questions, as was a solar energy provider, a wind energy provider, an electric car dealer and an energy efficiency audit and weatherization company. Town officials had a table too. The combination of participants and visitors in a relaxed setting opened up dialog among the public, private and not-for-profit sectors thereby planting seeds for future shifts toward a more sustainable community.

At a separate taped and televised event focused on waste management, viewers will learn about new twists on trash, such as Paraguay's Landfill Harmonic, where teens play beautiful music using orchestral instruments created from landfill debris. State and local officials will discuss what is being done by New York government to manage and minimize waste. They will then judge "best outfits" in the Town's first *trashion* show featuring high school and middle school students modeling fashions they created out of recycled materials which would typically go to the landfill. A high school jazz band will play music using instruments it adapts from everyday items. Tips for waste management will be woven into the show for each viewer to consider and adapt into his or her daily routine.

The ice rink energy improvements and renovations are estimated to cost $ 2.8 million. The Town rink upgrade will be funded, in part, through these community-focused events; events that introduce new approaches to daily activities which foster elimination of unwanted greenhouse gas emissions. These programs reflect the types of events which people associate with happiness; thus, the hope is for a shift in practices happening more naturally and permanently because they are associated with what people value most. If each person in the community were to save on what he or she consumes and contribute $100 a year, or $8.33 a month over 12 months, the initiative would raise $2.9 million, more than the estimated cost of the energy upgrade. This translates to three Starbucks coffees a month, or 1.7 tanks of gas a year. To the extent successful, this approach would eliminate what will otherwise become a tax obligation.

The timing of the conservation civics initiative is fortuitous. Sixty percent of this community lost electricity as a result of super-storm Sandy which swept through the East Coast on October 29, 2012. The impacts of climate change were experienced first-hand by everyone who lives in the community and will not be soon forgotten. The Town government is currently engaged in a sustainability collaborative involving volunteer-professionals whose goal is to make the Town owned buildings as energy efficient as possible. In addition, the Mamaroneck School District has undergone an energy audit of all of its schools buildings which will result in more energy efficient buildings and potential tax savings to property owners. The two local villages enacted plastic bag bans which will take effect during the year. The League has co-sponsored with the not-for-profit, Save the Sound, a lecture focused on restoring the health and sustainability of the Long-Island Sound, the region's multi-billion dollar treasure. The League also plans to collaborate with Sheldrake Environmental Center to host an Eco-House tour at a fall festival where children and their parents will learn the elements of energy conservation in a simulated home environment. At Halloween, local businesses will be invited to sponsor young trick-or-treaters who create their costumes out of recycled materials. In addition, an "open house" weekend event is planned for later in the year when people who have installed energy upgrades and renewable energy alternatives (such as solar panels) will welcome others in the community to learn and see first-hand what was involved. The goal is to demystify the energy upgrade process and eliminate existing barriers to these energy-saving options. Additional community events will be developed as the year evolves and new ideas are presented. An alumni hockey game benefiting the ice rink upgrade is on the list.

Other shifts are in process, as well. The middle school cafeteria, which feeds 1,200 students, will audit its food waste and if determined to be economically beneficial and affordable, will incorporate into the cafeteria operations a food composter called the "Rocket" to reduce the cost of uneaten food which otherwise would get carted from students' plates to the county waste treatment facility. The

compost would be sold or used for a community garden or other similar energy-practical use which addresses the lessons learned from the food-water-energy nexus.

To chart the evolution of the year-long initiative itself and leave open the possibility that the initiative could provide guidance to other communities wishing to adapt this effort to suit its particular local culture, all contacts are being chronicled, and all related events are being filmed.

The success of this community conservation civics initiative has been recognized already through connecting the ongoing efforts of various sectors of the community into a collaborative effort. Social innovation in this context appears to work. The importance of face-to-face conversation in this initiative cannot be overstated. While the benefits of the Internet serve well to communicate plans once they are formulated, it is the face-to-face conversations that are causing this initiative to take hold and develop. It appears that basic lessons learned from public participation theory (and, more simply, the sandbox), namely, involving people in a dialog, favoring inclusion rather than exclusion and inviting ongoing feedback and collaboration, will make the evolutionary process toward community-wide sustainability more lasting and meaningful.

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    Landfills represent a major source of methane emissions in the United States that can be captured and used to fuel power plants, manufacturing facilities, vehicles, homes, and more.

    > Because CH_4 emissions from landfill gas are a major source of CH_4 emissions in the United States, emission controls that capture landfill CH_4 are an effective reduction strategy. The U.S. Environmental Protection Agency's Landfill Methane Outreach Program (LMOP) is a voluntary assistance program that helps to reduce methane emissions from landfills by encouraging the recovery and beneficial use of landfill gas (LFG) as an energy resource. By joining LMOP, companies, state agencies, organizations, landfills, and communities gain access to a vast network of industry experts and practitioners, as well as to various technical and marketing resources that can help with LFG energy project development."

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Introduction to Renewable Resources

By John Williams, Carl Mas and Sean Ferguson[1]

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New York State is a leader in the development and production of renewable energy, and there are several reasons why New York will continue to expand use of renewable resources. When compared with carbon-intensive fossil fuel resources, the use of renewable resources can significantly reduce public health and environmental impacts associated with energy production. As commonly defined, most renewable resources are carbon-free and emit little to no particulate matter, nitrogen oxides, sulfur dioxide, or mercury. Further, New York State has been a national leader in advancing innovation in renewable technology and support for a diverse portfolio of clean energy resources. Governor Cuomo's new Energy Highway initiative recognizes the opportunity to reduce emissions of greenhouse gases (GHGs) and other pollutants while expanding renewable energy within a more advanced energy system.

Deployment of renewables has indicated potential positive impacts on price volatility and long-term wholesale energy prices. Because the production cost for renewable energy remains stable throughout unpredictable fossil fuel price fluctuations, renewable resources can provide options for managing the financial risks associated with fossil fuel use. Analysis has shown that renewable electricity resources also cause downward pressure on wholesale market electricity prices by displacing some of the most expensive generation units required during periods of peak demand. Finally, development of New York's renewable resources offers opportunities to spur economic growth and substantial private investment in new sectors of the economy.

Despite these public benefits, renewable energy technologies have been only slowly adopted by energy markets. While the total cost of renewable technologies varies considerably, the levelized cost of energy for most renewable technologies is generally higher than that of fossil fuel technologies. Fossil fuel technologies and resources are more mature, and have achieved larger scales of production, which reduces overall costs. Furthermore, large-scale renewable energy development is slowing due to a number of factors, such as low natural gas prices, which reduce wholesale electricity prices and the revenue that renewable generators receive for their energy.

It can be argued that the price disparity between renewable resources and fossil-fuel resources exists in part because the full cost of fossil fuel use is not built into its price. These "external" costs include the negative public health and environmental impacts that result from the combustion of fossil fuels. This, coupled with the uncertainty regarding long-term federal supports for renewable energy development, makes project financing more difficult. At the same time, upfront equipment costs remain high and siting difficulties are increasing development costs. Within this context, there will be continued need for public sector financial and programmatic support for renewable energy generation into the future.

I. Use of Renewable Resources in New York

In a recent U.S. Department of Energy report, New York ranked fifth in the nation for the amount of installed renewable energy capacity providing electricity to the state. New York was the only state east of the Mississippi River named in the top five states, and the only Northeast state placing in the top ten.[2] As of 2010, New York has developed more than 1,800 MW of renewable energy—excluding large-scale hydropower. Additionally, when hydropower capacity is included, New York's renewable energy capacity is comparable to the entire renewable capacity of the other eight states in the Northeast.

New York has unique characteristics of renewable energy use based on several factors compared to surrounding states. Abundant water resources have been utilized for over a hundred years to generate hydropower electricity. Significant wind resources, distributed in multiple

geographic regions, have allowed for the development of large wind farms in recent years. Compared to other areas of the country, there are also challenges that have prompted policy makers and utilities to invest in renewables. Given that New York imports all its required distillate fuel, the state economy is vulnerable to fuel shortages and price spikes. This challenge encourages some use of locally sourced biomass resources for home heating in upstate communities. In the New York City metropolitan area, energy infrastructure bottlenecks create pockets of high electricity prices, which can encourage the use of distributed renewable energy generation using solar energy.

II. Electricity Generation

In 2010, 10 percent of the primary energy used by all sectors in New York came from renewable resources.[3] This represented a 26 percent increase in renewable energy use since 2001. Approximately 69 percent of New York's 2010 renewable resource use was in the electric generation sector, of which 87 percent was conventional hydroelectric generation and 9 percent is wind generation. New York produced 27,833 gigawatt hours (GWh) from renewable resources in 2010, representing 17 percent of the State's total electricity requirement. Conventional hydropower provided 87 percent of the State's renewable electricity, followed by wind (9 percent) and biogas and biomass (combined total of 4 percent).

Estimates for 2011 include total GWh of 31,372, representing 19.2 percent of the State's electricity requirements. Conventional hydropower contributes 88 percent of the renewable electricity (27.634 GWh), followed by wind (9 percent at 2,787 GWh) and biogas and biomass (3 percent at 945 GWh). The New York solar-PV market has grown from less than 1 MW in 2002 to a 60 MW market in 2011. The cumulative installed capacity by the end of 2012 was approximately 161 MW.[4] Much of the capacity is installed on Long Island in large systems, including a 32 MW solar farm installed at Brookhaven National Laboratory. Initiated in 2012, Governor Cuomo's NY-Sun Initiative[5] has led to the development of 242 MW of PV, which is more activity than in the entire prior decade combined.[6]

III. Non-electricity Energy Generation

The remaining 31 percent of the State's renewable energy use came from ethanol (12 percent of total renewable energy use) and biomass (19 percent of total renewable energy use), which consisted largely of wood used by the residential sector for heating. Biomass has been the leading in-state renewable resource consumed in the residential, commercial, and industrial sectors as measured by primary energy input. It is typically used in these sectors as a heating fuel in the form of wood. Currently the State uses 99 trillion Btus (TBtu) of wood and 13 TBtu of biogenic waste annually (eight percent of primary energy demand for these sectors, excluding electricity use).

Solar thermal systems are less common despite significant energy savings to New York's homes and businesses that install these units. Upfront costs and limited experience with financing and installing pose barriers to adoption. Currently, NYSERDA is operating a 5-year, $25 million program for eligible single- and multi-family residences and commercial and nonprofit customers who currently use electricity to produce hot water.[7]

In New York, geothermal heat pump installations are limited, but have ranged from single-family homes to hotels and 500,000-square-foot office buildings. Geothermal heating and cooling systems can provide significant energy savings—tens of thousands of dollars in operating costs for larger buildings. However, as seen with other renewable resources, initial equipment and installation costs can pose a barrier for many consumers.

IV. Renewable Energy Opportunities

New York's renewable resource potential exists in all energy-consuming sectors of the economy. Potential studies indicate that there may be significant additional opportunities for new investment in renewable technologies, particularly solar-PV, biomass, and offshore wind. If fully developed, these renewable resources could meet nearly of 40 percent of New York's projected primary energy needs in 2018, which are estimated to be approximately 3,900 trillion British thermal units (TBtu).[8]

Wind and solar resources provide the greatest potential for growth with hydro and biomass providing significant incremental resources, but lower growth. Over the past four years wind power capacity additions have been substantial, where annual energy production has more than tripled over this time period. Declining costs in solar PV modules have increased demand for both utility and small-scale consumers.

Biomass has been the leading in-state renewable resource consumed in the residential, commercial, and industrial sectors as measured by primary energy input. The State has the potential to develop 350 TBtu of heating from wood and 14 TBtu of heating from biogenic waste annually by 2018.[9]

By 2030, renewable energy supplies could be more evenly distributed across the four major resource categories. Comparing current market penetration of renewable energy sources with the bounded technical potential indicates that in-state renewable energy sources have the potential to increase almost five-fold over the next twenty years. The following sections detail resource specific potentials that could contribute to renewable energy production in New York State.[10]

A. Wind

The State ranks eleventh in the nation in terms of existing wind capacity and fifteenth in potential wind capacity.[11] In a New York State Renewable Portfolio Stan-

dard (RPS) Main Tier Cost Study assessment, New York's onshore and offshore wind resource potential was determined to be 8,527 MW by 2015. This development would represent substantial growth in wind energy production within the State, harnessing on the order of 30 percent of New York's bounded potential for wind energy.[12] Wind power is the predominant generating technology in the RPS Program, representing 1,654 MW of new renewable capacity under contract, of which 1,326 MW was in operation at the end of 2011, up from just 48 MW in 2001.[13] Compared with central electric generation, customer-sited wind generation has experienced more modest growth.

Offshore wind has considerable potential to expand wind based electricity generation within New York. The Long Island–New York City Offshore Wind Collaborative, which includes the New York Power Authority (NYPA), Long Island Power Authority (LIPA), and Consolidated Edison, is evaluating the potential to develop between 350 and 700 MW of offshore wind capacity situated approximately 15 miles off the south shore of the Rockaway Peninsula in the Atlantic Ocean. Transmission cost is generally expected to be more expensive than from land-based transmission despite the resource proximity to the highest load centers—the coastal populations of New York City and Long Island. New York's offshore Atlantic wind resources are more synchronous with load and tend to be stronger and less intermittent than onshore resources.

B. Solar

The global solar PV market has grown substantially over the last decade, led by several European Union (EU) countries with well-funded solar PV incentive programs and aggressive solar PV targets. As the global solar PV market supply chain has expanded and solar PV technology has improved, the costs have decreased significantly over the past few decades. New York has benefited from this long-term global downward price trend. Supported by stable state-level incentives and comprehensive ancillary policies,[14] installed costs for solar PV systems in the NYSERDA incentive program have declined more than 40 percent since 2008.[15] This decrease has been led by substantial decreases in solar PV module costs in the past two years.

Governor Cuomo recently called for the expansion of New York State's solar PV programs through the NY-Sun Initiative, with the goal of quadrupling installed solar capacity in the State by 2013.[16] NY-Sun is expected to be developed through an expansion of New York's existing solar energy incentive programs. The diverse suite of solar PV policies embodied in the NY-Sun Initiative has already created a stable and growing solar PV market in New York with a growing PV installer base. By developing a comprehensive and steady PV incentive funding strategy, New York has avoided the boom and bust market cycles that have created uncertainty in a number of East Coast markets in recent years. These funding programs have also led a number of national PV development firms to enter the New York market. Additionally, New York has a history of using complementary policies and programs to support the industry, including those in the areas of workforce development, implementing a way to reduce the balance of system costs, and technology and business development.

C. Hydro

A 2012 U.S. Department of Energy study estimated that New York State hydropower potential from non-powered dams is approximately 295 MW.[17] There is also considerable potential to increase small hydropower generation and hydrokinetic technologies. In 2006, the DOE estimated that 428 MW of "small" and 329 MW of "low power" hydro potential could be achieved in New York State.[18] Wave and tidal energy technologies are still under development with limited commercial operation in the field; however, theoretical resource potentials for each are significant. A 2011 Georgia Tech study on tidal energy potential estimated the theoretical resource potential from hydrokinetic tidal energy in New York State to be as high as 280 MW.[19] Very high levels of "technically recoverable" potential from wave energy in New York State have been reported, ranging from approximately 9.3 to 11.7 TWh per year along the outer continental shelf and 7.6 to 9.5 TWh per year along the inner continental shelf.[20]

D. Biomass

The largest biomass potential within the State can be found in the forest and agriculture products sector, with an estimated 280 TBtu of primary energy available.[21] In 2007, New York used approximately 28 percent of the in-state potential for agriculture and forest products. Approximately 40 percent of New York's total biomass consumption was in the form of the biofuel ethanol, which was made from out of-state biomass. A detailed analysis of the available potential of sustainably harvested resources was conducted as part of the 2010 Renewable Fuels Roadmap and Sustainable Biomass Fee*dstock Supply for New York (the "Biofuels Roadmap").[22] Agricultural land potential, which includes feedstocks of corn stover, straw, and dedicated energy crops such as grass or willow, amounts to 5-million dry tons of biomass. Forest land potential, which includes mill residues, logging residue, and available timber, amounts to 5.6 to 15 million dry tons of biomass. In combination, these feedstocks could provide approximately 250 TBtu of primary energy to New York's energy mix. In one scenario analyzed within the Biofuels Roadmap's preliminary analysis, approximately 1.2 billion gallons of ethanol could be produced from sustainably harvested biomass from within the State. This would replace approximately 20 percent of the gasoline forecasted to be used in 2018.[23] Agricultural oil, yellow oil, and brown grease can supply 3.5 TBtu. Energy from organic waste recovered from food waste, farms, wastewater plants, and landfills adds up to another 31 TBtu.[24]

New York is supporting the development of next generation clean-burning wood boiler systems, with four manufacturers currently located upstate, and expansion of the industry within New York is anticipated. The State also has a significant wood pellet manufacturing industry, including two of the region's largest manufacturers. Expansion within the State's wood pellet industry is also expected, as New York currently has a capacity of 350,000 tons per year of pellets and an additional 200,000 tons of capacity is planned to become available within the next two years.

V. Advancing Renewable Resources in a Clean Energy Economy

Renewable energy development is a significant emerging sector in New York's economy. In addition to creating a market in which startup companies can thrive, renewable energy holds enormous potential for New York's established manufacturers to use their expertise and ingenuity to produce components used in clean energy solutions. Developing New York's renewable energy resources offers significant opportunity to help meet our future energy needs in ways that stimulate environmentally sustainable economic activity.

New York State fosters private sector demand for clean energy technologies and services through resource acquisition programs, market transformation initiatives, and clean energy goals and procurement requirements at State agencies. These programs help to support nascent renewable energy and energy efficiency technologies as they are vetted by the market and as successful technologies gain market acceptance. Key to growing this clean energy economy has been New York's consistent support of the renewable energy sector, which has given private industry the confidence to make long-term investment decisions to grow their businesses in New York. The State also provides direct support in order to retain existing firms and to attract the most promising new technologies and businesses that will compete in a carbon-constrained global economy. A highlight of these programs is the State's new "Green Bank" which is envisioned to leverage $1 billion of public dollars with private-sector funds to spur investments in energy efficiency and renewable resources.

New York has two unique strengths from which to draw in the development of a clean energy economy. First, New York is home to a mix of higher education institutions—including seven members of the elite Association of American Universities (AAU) and over 20 major research institutions—and a number of firms in the private sector that are leaders in energy innovation. Second, the State has established public institutions, in particular NYSERDA and NYSTAR, which directly facilitate collaboration between industry and innovators located on college campuses and at research laboratories located throughout the State. NYSERDA and NYSTAR, in conjunction with other government partners, are well-positioned to structure an economic development framework that taps into the State's academic and industrial resources and promotes commercial investment in clean energy enterprises that will serve markets in New York and around the world.

Numerous studies have cited that job growth can occur more quickly and comprehensively in regional industry clusters. Examples of emerging clean energy clusters across the state include energy storage and smart grid on Long Island, energy information technology in New York City, nanotechnology and energy storage in the Capital Region, building systems in Central New York, energy storage and fuel cells in the Finger Lakes and Western New York, and biomass in the Mohawk Valley, North Country, and Southern Tier. New York also is home to a wealth of public and private research institutions. These include publicly supported Centers of Excellence and Centers for Advanced Technology, five U.S. Department of Energy-designated Energy Frontier Research Centers, high-performance computing assets, and Brookhaven National Laboratory. Key university-led research efforts are under way throughout the State, including nanotechnology at the College of Nanoscale Science and Engineering (University at Albany), energy storage and smart grid technologies at Stony Brook University / Brookhaven National Lab, environmental and biomass research at SUNY College of Environmental Science and Forestry, and energy systems at Binghamton University. In addition, robust corporate research exists with world research facilities at GE, Corning, Bausch & Lomb, Xerox, IBM, Phillips and others, as well as at smaller and mid-sized companies throughout the State.

VI. Renewable Portfolio Standard and Renewable Energy Credits

The Renewable Portfolio Standard (RPS) program is the primary driver of renewable resources in New York State. The expanded RPS, adopted in 2010, is administered by NYSERDA and contains two program tiers to procure new resources. The "Main Tier" consists primarily of medium- to large-scale electric generation facilities that deliver electrical output into the wholesale power market. The "Customer-Sited Tier" consists of smaller, "behind-the-meter" end-use technologies that generate power used primarily at the site where the technology is installed. The Main Tier currently supports a variety of resources, including large wind farms, the biomass portion of co-fired coal plants, and repowered hydropower plants.[25] Wind comprises the majority of the capacity, and this is expected to continue into the future. Customer-Sited Tier (CST) solicitations have been issued for five technologies (solar-PV, solar thermal, fuel cells, anaerobic digester generators, and small wind), offering funding support through a combination of capacity "buy-down" and energy production incentives.[26]

Market certainty and expansion of renewable market opportunities can also be realized by providing a system in which developers can sell Renewable Energy Credits (RECs) in the voluntary market, which, like other commodities, requires using modern technologies to track and account for transactions.[27] In order to support the growth of the voluntary market for renewable energy and minimize the administrative cost and effort of transacting renewable energy, New York passed legislation in Chapter 436 of the Laws of 2012, authorizing NYSERDA to develop an electronic REC system that is designed to, among other items, facilitate the participation and use of New York-derived RECs in markets for such commodities

VII. Improving Integration of Renewable Resources

New York's massive energy infrastructure is in constant need of maintenance and repair to keep the State's high standards of service reliability. Infrastructure investments are also necessary to support the State's transition to a clean energy economy and will be driven by strategic longer term needs, including a reduction in GHG emissions. The key will be to guide infrastructure investment in a manner that is responsive to both environmental concerns and the economic welfare of the State's residents and businesses while preserving efficient markets. Replacement and improvement of existing aging infrastructure are critical, as system failures not only raise safety and reliability concerns but can also lead to increased system congestion and therefore higher emissions and costs. New York will also seek to realize the potential benefits and efficiencies of investments that further integrate solar-PV and other customer-driven resources to address localized reliability issues. In New York City in particular, the uniquely designed distribution system deserves special attention with respect to options for allowing the development of clean renewable, customer-driven resources in a manner that maintains reliability. The development of such clean energy in New York City is particularly beneficial given the size of its overall load and air quality issues.

Electric transmission and distribution system upgrades or expansions will be needed to support continued large-scale renewable development of various technologies. For large-scale wind energy development, there exist undeveloped wind resources in some parts of the State, but insufficient bulk transmission system capacity exists to move all the energy output throughout the State. This potential "bottlenecking" of renewable resources could thwart steady progress towards the State's renewable energy goals and the attendant benefits. Further, in certain instances the operation of one renewable energy facility may displace output from other renewable energy facilities when both facilities need "space" on the same transmission lines.

NYSERDA, NYPA, and the New York Independent System Operator (NYISO) are involved in a comprehensive study of real-time transmission line condition monitoring with the expectation that real-time data and analysis could allow high-voltage transmission lines to be operated dynamically, without the large contingencies now used to set transfer limits and control operation. Dynamically operating the bulk transmission system is expected to increase the allowable flow of electric power from upstate to the load centers downstate. Real-time monitoring and forecasting also pertain to integration of wind power as a reliable power source. The NYISO implemented a centralized wind forecasting system in June 2008 that forecasts the amount of energy expected to be produced by each wind plant for the Day-Ahead and Real-Time markets. While this system is designed for land-based wind facilities, the potential for offshore wind energy to meet load shows promise, given the better relative coincidence of offshore wind strength with load curves.

In 2012, Governor Cuomo's Energy Highway Blueprint announced major initiatives to address these transmission system needs and to fuel economic growth through an upgraded and modernized electric power system. The Blueprint identifies projects and strategies to spur private sector investment to maintain reliability and capitalize on lower cost energy resources. The Energy Highway Blueprint, envisioned as a public-private initiative to upgrade and modernize New York State's electricity system, could support the integration of both grid-connected and distributed behind-the-meter renewable resources, as well as develop the technologies and capabilities to operate a smart grid system that results in a dynamic grid capable of integrating renewable resources more effectively. In addition, the Governor established the New York Works Fund to help create jobs and rebuild the State's transportation infrastructure. A comprehensive review is also under way through the New York State Tax Reform and Fairness Commission to address long-term changes to the tax system that could spur private sector growth and foster opportunities for alternate fuel technologies in the transportation sector.

VIII. Technology Research and Development

Several activities in New York are advancing innovation in new renewable resource technologies as well as the means of storing and dispatching the resulting energy. New York's long-standing support for advanced energy research and development has been widely recognized. The American Council for an Energy-Efficient Economy (ACEEE) ranked New York tied for first place in the country for its programs that support public and private research, development and demonstrations. NYSERDA's R&D Program has supported the development and commercialization of innovative energy and environmental products, technologies, and processes since 1975. The New York State Foundation for Science, Technology and Innovation also supports technology development and commercialization with particular focus on the assistance that New York's colleges and universities can provide to

private sector companies in the clean energy sector. For example, the Center for Advanced Technology (CAT) in Future Energy Systems at Rensselaer Polytechnic Institute conducts R&D on new energy systems and energy efficiency, including solar-PV systems, fuel cells, cellulosic ethanol, smart lighting, and advanced materials. Another example is the Advanced Energy Center at the State University of New York at Stony Brook, which is working with other universities around the State to provide a comprehensive set of services to various business sectors active in Smart Grid technology development and deployment.

In support of the NY-Sun Initiative, NYPA and NYSERDA have developed the Solar Market Acceleration Program ("Solar MAP") to target solar energy cost reductions. Solar MAP has a total budget allocation of up to $30 million over five years and will fund solar research and project activity in three main areas: innovation research grants, demonstration projects, and soft-cost reduction strategies. The NY-BEST (Battery and Energy Storage Technology Consortium), funded with $25 million, will help develop advanced energy storage technologies. Storage of energy will be necessary to support the expansion of intermittent and distributed renewable generation. Technologies under development are flow and stationary batteries, flywheels, subterranean and above-ground compressed air energy storage and electric vehicles.

Additionally, in April 2011, the College of Nanoscale Science and Engineering (CSNE) at SUNY Albany received a $57.7 million federal grant from the Department of Energy to support the U.S. Photovoltaic Manufacturing Consortium (PVMC) along with $5 million from NYSERDA. Headquartered in New York's Capital Region, the PVMC is a partnership between CSNE, SEMATECH and the University of Central Florida. The goal of this effort is to increase the United States' share of the solar-PV product market by using public funds to leverage private investment.

IX. Conclusion

New York's achievements to date and continued support of innovative renewable energy policies and programs place the State in a leadership position in the nation in the long-term transition to a clean energy economy, founded in part on the energy production from renewable resources. As renewable energy resources are further developed, there will be a continued value to ensuring these resources result in improved reliability of the State's energy systems, insulating consumers from volatility in market prices and high energy costs, reducing environmental impacts in the energy generation sector, and growing the State's economic opportunities. The several processes in place in New York, including the State Energy Plan and other administrative and program activities, will provide the needed forums to help the State further explore future opportunities for technology and project development, build and expand opportunities for public-private partnerships and engage the knowledge and skills of New York's diverse workforce to harness the State's abundant renewable resource potential.[28]

Endnotes

1. Correspondence should be directed to Carl Mas: cjm@nyserda.gov.ny.
2. The National Renewable Energy Laboratory's 2010 Renewable Energy Data Book, produced Rachel Gelman and edited by Scott Gossett, www.nrel.gov/analysis/pdfs/51680.pdf.
3. Primary energy is typically defined as energy that has not undergone a conversion process and thus represents the energy content of the raw fuels that are input into the energy system.
4. NYSERDA, NYPA, and LIPA program data.
5. *NY-Sun Initiative*, http://ny-sun.ny.gov/.
6. Press Release, Office of the Governor, Governor Cuomo Announces $46 Million Awarded Through NY-Sun for Large Solar Power Installations to Add 52 MW of Solar Capacity (March 28, 2013), http://www.governor.ny.gov/press/03282013cuomo_46mil_nysun_52mw_solar_capacity.
7. NYSERDA, *PON 2149—Solar Thermal Incentive Program*, http://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/PON-2149-Solar-Thermal-Incentive-Program.aspx.
8. NYSERDA, *2009 Renewable Energy Assessment*, http://www.nysenergyplan.com/final/Renewable_Energy_Assessment.pdf.
9. *Id.*
10. We define potential as bounded technical potential (BTP) for a given resource as an estimate of the total available thermal or electric energy based on consideration of the primary physical, social, and technological factors at play.
11. The American Wind Energy Association estimates that New York has a potential capacity of 7,080 MW.
12. NYSERDA, *2009 Renewable Energy Assessment*, http://www.nysenergyplan.com/final/Renewable_Energy_Assessment.pdf.
13. NYSERDA, *2012 RPS Report*, http://www.nyserda.ny.gov/Program-Planning/Renewable-Portfolio-Standard/Documents.aspx.
14. New York has a wide range of policies and programs that support the growing PV market. These include net-metering regulations, workforce development, technology and business development initiatives, outreach programs, and residential tax credits, as well as direct incentives.
15. Analysis performed on reported installed costs within the NYSERDA PON 2112 and 2589 programs. Calculations were performed on average 2008 installed costs for non-residential solar PV to Q4 reported installed costs for non-residential solar PV.
16. Press Release, Office of the Governor, Governor Cuomo Announces Comprehensive NY-Sun Initiative to Expand Solar development in New York (April 19 2012), available at http://www.governor.ny.gov/press/04192012-sun-initiative; see also, *About The NY-Sun Initiative, available at* http://ny-sun.ny.gov/about.
17. US DOE Wind and Water Power Program, *An Assessment of Energy Potential at Non-Powered Dams in the United States* (April 2012).
18. US DOE Wind and Hydropower Technologies, Feasibility Assessment of the Water Energy Resources of the United States for New Low Power and Small Hydro Classes of Hydroelectric plants (Jan. 2006).
19. Georgia Tech Research Corporation, *Assessment of Energy Production Potential from Tidal Streams in the United States, Final Project Report* (June 29, 2011), Award Number: DE-FG36-08GO18174.

20. Electric Power Research Institute, Mapping and Assessment of the United States Ocean Wave Energy Resource (2011).
21. 2009 New York State Energy Plan.
22. Pace Energy and Climate Center, Renewable Fuels Roadmap (2010), http://www.nyserda.ny.gov//sitecore/content/Home/Publications/Research-and-Development-Technical-Reports/Biomass-Reports/Renewable-Fuels-Roadmap.aspx (prepared for NYSERDA, NYSDEC and NYS Department of Agriculture & Markets).
23. NYSERDA program data.
24. *Renewable Fuels Roadmap, supra* note 22.
25. Eligible resources in the Main Tier include biogas, biomass, liquid biofuel, fuel cells, hydroelectric, solar-PV, ocean or tidal power, and wind. Out-of-state resources are also included to support interstate commerce, promote energy supply security and diversity, and allow the State to acquire resources sufficient to meet its renewable energy goals at the lowest cost.
26. Over 85 percent of the expected annual generation comes from two sources, anaerobic digester biogas at 119,390 MWh and solar-PV at 95,587 MWh of electricity.
27. See Chapter 436, Laws of 2012; RECs are defined as "generation attribute certificates shall mean the environmental, vintage and other attributes associated with the generation of kilo-watt-hours and/or megawatt-hours of electrical energy, generation attribute certificates shall exist as a commodity separate and apart from kilowatt-hours and/or megawatt hours." Assembly Bill A.6114C, *available at* http://assembly.state.ny.us/leg/?default_fld=&bn=A06114&term=2011&Summary=Y&Text=Y.
28. To follow the process of the New York State Energy Plan please see: http://www.nysenergyplan.com/.

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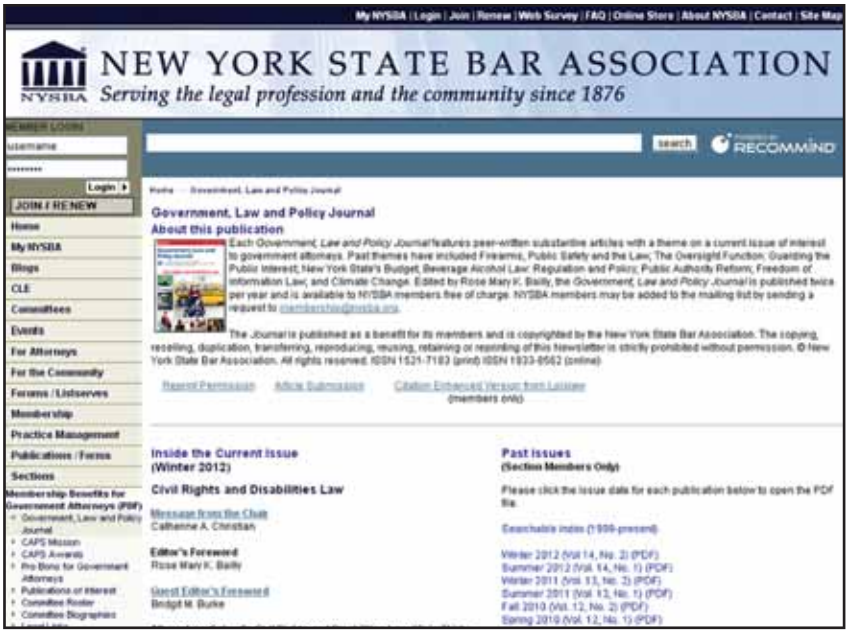

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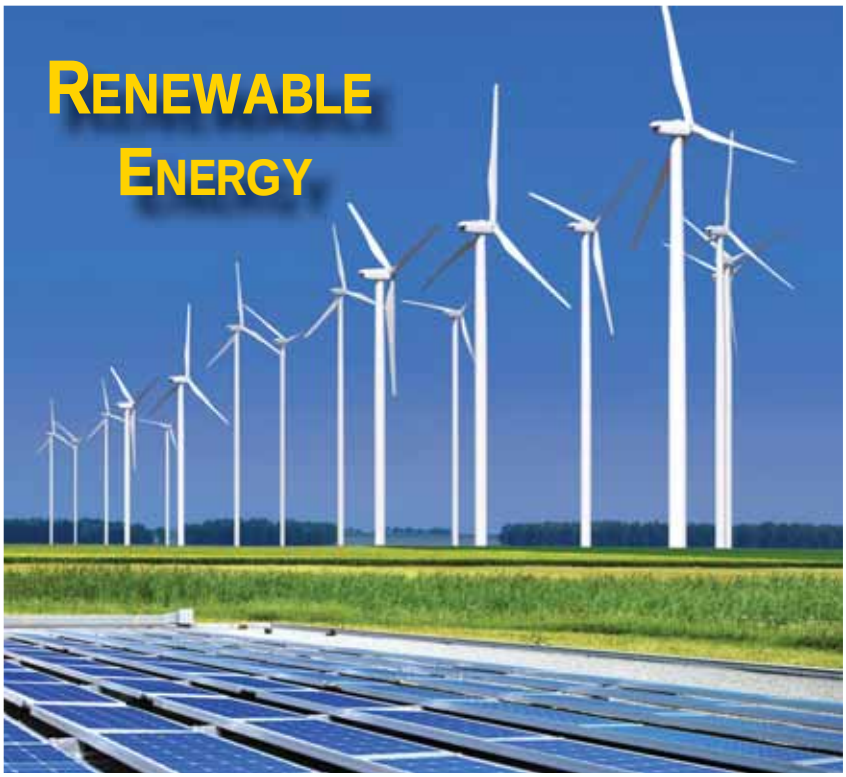

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