

Sustainable Energy Annotated Bibliography

by Manna Jo Greene

Archer, Christina L., and Mark Z. Jacobson. "Supplying Baseload Power and Reducing Transmission Requirements by Interconnecting Wind Farms." *Journal of Applied Meteorology and Climatology* 46 (2007): 1701-717. Print. Wind is the world's fastest growing energy source. Because it is intermittent, though, wind is not used to supply baseload electric power currently. This article suggest that interconnecting wind farms through the transmission grid is a simple and effective way of reducing deliverable wind power swings caused by intermittency. As more wind farms are connected in an array, wind speed correlation among sites decreases and so does the probability that all sites experience the same wing regime at the same time. This study examines the benefits of interconnected wind farms at 19 sites located in the Midwestern U.S. It concluded that an average of 33% and a maximum of 47% of yearly averaged wind power from interconnected farms can be used a reliable, baseload electric power. Additionally the authors found that interconnecting multiple wind farms to a common point and then connecting that point to a far away city can allowed the long distance portion of capacity to be reduced by approximately 20% with only a 1.6% loss of energy. www.stanford.edu/group/efmh/winds/aj07_jamc.pdf

Brown, Steven E.F. "Renewable Energy Passes Nuclear as U.S. Power Source." *Denver Business Journal* January (2012): 1-2. Web. 9 Aug. 2012. A article from the Denver Business Journal which outlines renewable energy passing nuclear energy as a power source in the United States. A report by the EIA showed that renewable energy sources generated 6.944 quadrillion Btus of energy compared to 6.173 quadrillion Btus from nuclear power. Solar energy production grew from 82 trillion Btus to 87 trillion Btus during this time period. <http://www.bizjournals.com/denver/news/2012/01/10/renewable-energy-passes-nuclear-as.html?page=2>

Clean, Secure Energy and Economic Growth: A Commitment to Renewable Energy and Enhanced Energy Independence. Rep. Vol. 1. Albany, NY: Renewable Energy Task Force, 2008. Print. A policy roadmap for addressing the potential of the state of New York in utilizing renewable energy resources to meet its growing energy needs. The report notes that New York is home to the largest capital investment firms in the world, the 14th windiest state in the country, and has a great potential for development of solar, natural hydropower and biomass energy production. The report notes that to utilize these resources and achieve energy independence requires a modification of the way we live our lives, and public acceptance that each of us can make a difference in this effort. It will require consumers, policy makers, and businesses to collaborate and move forward with the same goal in mind. www.citizenscampaign.org/PDFs/lt_RETf_Report.pdf

Clemmer, Steve. "U.S. Renewable Electricity Future Is Within Reach." Weblog. *The Equation*. Union of Concerned Scientists, 8 Aug. 2012. Web. 13 Aug. 2012. Blog post from the Union of Concerned Scientists about the release of a report from the National Renewable Energy Laboratory (NREL) stating that the U.S. could generate 80% of its energy needs by 2050 with commercially available technologies while also meeting peak demand every hour of every day in every part of the country. The 850 pages part is arguably the most comprehensive review of the potential of renewables for the future of the U.S. It includes detailed assessments of costs, opportunities and challenges for all renewable sources and how they can be potentially integrated into the electricity system. Major findings include; no new technologies are needed, energy can be provided every hour in every sector, multiple options are possible in every sector and use of renewables will have benefits for climate change and water management. The report suggests new policies are needed to drive these substantial changes. <http://blog.ucsusa.org/u-s-renewable-electricity-future-is-within-reach>

Corcoran, Bethany A., Nick Jenkins, and Mark Z. Jacobson. "Effects of Aggregating Electric Load in the United States." *Energy Policy* 46 (2012): 399-416. Print. This study quantifies the effects of aggregating electric load over various combinations (Aggregation Groupings) of the 10 FERC regions in the U.S. Generator capacity capital cost savings, load energy shift operating cost savings, reserve equipment cost savings and transmissions costs due to aggregation were calculated for each grouping. Transmission costs outweighed cost savings due to aggregation in all scenarios and nearly all aggregation groupings. This study found little economic benefit in aggregating electric

load alone without aggregating renewable energy generators simultaneously except in the west and northwest U.S.A. The study found that if aggregation of load alone is desired, small regional consolidations yield the lowest overall cost. www.stanford.edu/group/efmh/jacobson/Articles/I/CombiningRenew/CorcoranEnPol12.pdf

Delucchi, Mark A., and Mark Z. Jacobson. "A Plan for a Sustainable Future: How to Get All Energy from Wind, Water and Solar Power by 2030." *Scientific American* (2009): 57-65. Print. An examination of the author's proposal to power the global energy needs using renewable resources by 2030. The authors examine the current state of renewable resource usage and suggest what would be needed to achieve this goal. They suggest the installation of 3.8 million large wind turbines, 90,000 solar plants, and hundreds of tidal, geothermal and photovoltaic rooftop installations throughout the world. They suggest that the costs of generating power in this manner would be less than that of traditional fossil fuel and nuclear generation. Shortages of a few specialty materials needed for construction as well as political will are the greatest barriers to achieving this goal. www.stanford.edu/group/efmh/jacobson/Articles/I/sad1109Jaco5p.indd.pdf

Delucchi, Mark A., and Mark Z. Jacobson. "Providing All Global Energy with Wind, Water, and Solar Power, Part II: Reliability, System and Transmission Costs and Politics." *Energy Policy* 39 (2011): 1170-190. Print. This article is part II of a study of the feasibility of providing all the world's energy using renewable energy sources such as solar, wind, tidal and geothermal sources. The articles addresses the problem of variable energy production by renewable sources suggesting multiple solutions including; demand responses management, storing electric power on site, over-sizing peak generation capacity, producing hydrogen with excess, storing electric power in vehicle batteries, forecasting weather to predict energy supply needs. The authors found that costs for renewable energy will be similar to costs of today, thus suggesting that barriers to use of renewable energy sources are social and political. www.stanford.edu/group/efmh/jacobson/Articles/I/DJEnPolicyPt2.pdf

Department of Homeland Security. Division of Homeland Security and Emergency Services. *Hurricane Irene / Tropical Storm Lee Overview*. 1st ed. Vol. 1. Albany, NY: DHS, 2012. Print. A presentation overview by the Department of Homeland Security and Emergency Services office on the affects of Hurricane Irene and Tropical Storm Lee on the state of New York and the state's energy grid. Provides information on emergency response to these storms and the costs incurred by the state and federal governments. In addition the presentation provides pertinent information on the electric grid outages statewide during these storm events and the lessons learned for NY energy providers to prevent outages in the future. <http://www.nysenergyplan.com/meeting/DHSES%20Presentation%20July%2009%202012%20SEP%20Meeting.pdf>

Energize NY, Annual Report on Progress and Accomplishments 2011. Rep. Bedford: Energize NY, 2011. Print. The objective of this project is to increase energy efficiency in buildings, to reduce energy use and costs, support and develop the local economy, and improve the quality of life (health, safety, comfort, Green House Gas Emissions and air quality) of community participants. Energize seeks a market transformation that dramatically increases building energy efficiency upgrades from a historically low baseline of under 1% of New York homes to a significantly higher concentration in the Energize areas of operation. The program will increase the number of assessments and the assessment to upgrade ratio through a mix of: 1) web services and social media, 2) local municipal engagement and program rollout, 3) the development and deployment of a toolkit that supports a robust community based marketing effort, and 4) the rollout of Energize Finance, a Property Assessed Clean Energy (PACE) Benefit Financing program that will help building owners finance their upgrades. In 2011 Energize NY launched two websites, deployed its first generation of a "customer management system," created a toolkit for other municipalities and organizations to use to promote Energize ideas and spread them through social media, videos, manuals and other means, launched NWEAC Towns a pilot project in Bedford, and developed Energize finance operations. http://energizeny.org/images/.../2011_Progress_and_Accomplishments.pdf

Energy Advisory Panel. Supervisor's Office Town of Bedford, NY. *Town of Bedford Climate Action Plan*. Vol. 1. Bedford: Town of Bedford, 2010. Print. The Bedford Energy Advisory Panel spent two years collecting and examining data on energy consumption and waste generation across all sectors, speaking with experts, researching

best practices, and working with the town department heads to select the reduction measures with the most impact and greatest feasibility for Bedford. This plan is a compilation of that research and serves as an excellent model for other municipalities who want to develop energy management, waste generation, sustainability and climate action plans of their own. www.bedfordny.info/html/pdf/green/2009%20Sept%20Draft%20Action%20Plan.pdf

Hart, Elaine K., and Mark Z. Jacobson. "The Carbon Abatement Potential of High Penetration Intermittent Renewables." *Energy and Environmental Science* 5 (2012): 6592-601. Print. This article examines the carbon abatement potential of wind turbines, photovoltaics and concentrating solar plants using dispatch simulations using 2005-06 California meteorological and load data. The results of this study suggest that shallow carbon emissions reductions (up to 20% of base) can be achieved most efficiently with geothermal power and demand reductions via increased energy efficiency and conservation. Major reductions may require the construction of major renewable energy systems and improved system flexibility and control. Results also suggest that 90-100% carbon emission reductions will rely on development of demand response and energy storage facilities with power capacities of at least 65% of peak demand and energy capacity large enough to accommodate seasonal energy storage. www.stanford.edu/group/efmh/jacobson/Articles/I/CombiningRenew/HartEES12Online.pdf

Hart, Elaine K., Eric D. Stoutenburg, and Mark Z. Jacobson. "The Potential of Intermittent Renewables to Meet Electric Power Demand: Current Methods and Emerging Analytical Techniques." *Proceedings of the IEEE* 100.2 (2012): 322-34. Print. This paper provides a good framework for understanding the existing body of literature that has been devoted to the behavior and reliability of intermittent renewable energy sources and discusses recent electric grid integration analyses within this framework. www.stanford.edu/group/efmh/jacobson/Articles/I/CombiningRenew/HartIEEE2012.pdf

Hoffman, Andrew J., and Rebecca Henn. "Overcoming the Social and Psychological Barriers to Green Building." *Organization and Environment* 21.4 (2008): 390-419. Print. This article argues that environmental progress in the building, design and construction industry will continue to be stalled if the significant social and psychological barriers; individual, organizational and institutional are not addressed and overcome. Seven strategies for doing so are suggested by the authors including; issue framing, targeting the right demographic, education, structural and incentive change, indemnifying risk, green building standard improvements, and tax reform. http://webuser.bus.umich.edu/ajhoff/pub_academic/2008%20O&E%20Green%20Building.pdf

Hoste, Graeme R. G., Michael J. Dvorak, and Mark Z. Jacobson. "Matching Hourly and Peak Demand by Combining Different Renewable Energy Sources: A Case Study for California 2020." *Stanford University Department of Civil and Environmental Engineering: Atmosphere / Energy Program* (2011): 1-19. Print. This paper examines the barrier integration into the electric power grid faced by renewable energy usage. The authors examine the use of linked renewable energy resources to reduce intermittency problems within the electric grid. The authors use California as an example of a grid in which solar, wind, geothermal and hydroelectric sources could be combined to meet a large portion of the state's energy demands. www.stanford.edu/group/efmh/jacobson/Articles/I/CombiningRenew/HosteFinalDraft

Fehrenbacher, Katie. "10 Solar Projects in India That Can Help Fight Grid Blackouts." *Gigaom* (2012): 1-3. Web. 20 Aug. 2012. This article examines potential solutions to the current blackout crisis in India including; solar microgrids in rural areas, megawatt solar rooftops, combining solar and water power, use of solar powered lanterns, giant solar thermal projects and use of solar concentration systems for cooking, heating and industrial applications. The author also suggests selling solar power in a "pay as you go" system to further encourage residents to adopt the practice. She suggests by setting a nationwide goal for solar power India can meet its electricity needs and prevent blackouts in the future. <http://gigaom.com/cleantech/10-solar-projects-in-india-that-can-help-fight-grid-blackouts/>

Gordon, Mike, Leo Wiegman, Maria Fields, and Herb Oringel. *Mid-Hudson Energy Solutions Roadmap*. Issue brief. Vol. 1. Northern Westchester County: NWEAC, 2011. Print. This "roadmap" represents five cohesive energy solution pathways for the Mid-Hudson valley. Solutions 1-3 address issues related to the "demand" side of the energy grid dealing with energy efficiency, demand response and microgrids. Solutions 4 and 5 address supply side

energy issues focusing on renewable energy sources and energy storage. The plan suggests that Mid-Hudson businesses could save an estimated 80 million dollars in the commercial sector and another 119 million in the residential sector due to energy efficiency upgrades money that could be reinvested into local job retention and economic development. www.nweac.org/2011/10/26/the-mid-hudson-regional-energy-solutions-road-map/

Haccou, Herbert A. "Promoting Sustainable Renovation in NWE Cities: Ingredients for Successful Knowledge Transfer." EU Living Green Project. Ludwigsberg, Germany. 20 Oct. 2009. Lecture. A European project entitled EU Living Green in which old "historical heritage" buildings were retrofitted and renovated using sustainable building techniques to be more energy efficient. The project worked to produce a "toolbox" on sustainable renovation techniques as well as ideas on how to transfer this knowledge to contractors and building owners. The project hopes to enhance the practical application of sustainable renovation by involving people through inspirational visits to the buildings, local renovation programs, Living Green labs, awareness raising methods and partnerships. The project also hopes to disseminate what it has learned throughout the process in the form of workshops, films, conferences and a website.

Jacobson, Mark Z. "Review of Solutions to Global Warming, Air Pollution and Energy Security." *Energy and Environmental Science* 2 (2009): 1148-173. Print. This paper reviews and ranks major proposed energy-related solutions to global warming, air pollution mortality, and energy security while considering impacts of the solutions on water supply, land use, wildlife, resource availability, reliability, thermal pollution, water pollution, nuclear proliferation, and under-nutrition. To place electricity and liquid fuel options on an equal footing, twelve combinations of energy sources and vehicle type were considered. The overall rankings of the combinations (from highest to lowest) were (1) wind-powered battery-electric vehicles (BEVs), (2) wind-powered hydrogen fuel cell vehicles, (3) concentrated-solar-powered BEVs, (4) geothermal-powered-BEVs, (5) tidal-powered-BEVs, (6) solar-photovoltaic-powered-BEVs, (7) wave-powered- BEVs, (8) hydroelectric-powered-BEVs, (9-tie) nuclear-powered-BEVs, (9-tie) coal-with-carbon-capture-powered-BEVs, (11) corn-E85 vehicles, and (12) cellulosic-E85 vehicles. The relative ranking of each electricity option for powering vehicles also applies to the electricity source providing general electricity. Because sufficient clean natural resources (e.g., wind, sunlight, hot water, ocean energy, etc.) exist to power the world for the foreseeable future, the results suggest that the diversion to less-efficient (nuclear, coal with carbon capture) or non-efficient (corn- and cellulosic E85) options represents an opportunity cost that will delay solutions to global warming and air pollution mortality. www.stanford.edu/group/efmh/jacobson/Articles/I/ReviewSolGW09.pdf

Jacobson, Mark Z., and Mark A. Delucchi. "Providing All Global Energy with Wind, Water, and Solar Power, Part 1: Technologies, Energy Resources, Quantities and Areas of Infrastructure and Materials." *Energy Policy* 39 (2011): 1154-169. Print. An analysis of providing all the world's energy needs with renewable resources such as wind, water, solar and geothermal energy sources. The article discusses renewable energy systems and makes suggestions for the number of installations of these systems needed to provide energy for the entire world in 2030. The article suggests these resources would reduce world energy demand by 30% and require only .41-59% increase in land usage. The authors suggest that the barriers to this development are social and political and not economic. www.stanford.edu/group/efmh/jacobson/Articles/I/JDEnPolicyPt1.pdf

Lovins, Amory B. "Accelerating Renewables: Expanding the Policy and Marketing Toolkit." American Council for Renewable Energy Organizing Conference. Washington D.C. 10 July 2002. Address. A keynote presentation by Amory Lovins a research scientist from the Rock Mountain Institute of CO. Dr. Lovins suggests renewable energy usage can be spread quickly after being mostly stagnant since the early 1970's. He suggests renewable energy development can be encouraged through marketing, competitive pricing, correcting incentives for renewable usage, scrapping inefficient technologies, breaking through cost barriers, deploying mass retrofits of existing structures, and understanding "natural capitalism" and demand. He suggests these goals can be accomplished through systems of regulation; taxation and innovation after social and political barriers have been overcome. These may be overcome by new policy imperatives, new integrated and more efficient systems, new drivers, motivators and marketing tools, and new policy frameworks and decision processes. www.rmi.org/Knowledge-Center/Library/E02-07_AcceleratingRenewables

Lynch, J. Peter. "Feed-In Tariffs: The Proven Road Not Taken... Why Not?" Principal Solar Institute. 2012. Print. Feed-in tariffs (FIT) are a policy mechanism designed to accelerate investment in renewable energy technologies. Producers of renewable energy are paid a set rate for the electricity they produce, usually differentiated according to the technology used (wind, solar, biomass, et. al.) and the size of the installation. FITs guarantee that anyone who generates electricity from a renewable energy source—whether they are a homeowner, small business, or large electric utility—is able to sell that electricity into the grid and receive long-term payments for each kilowatt-hour produced. This document details arguments in favor of adopting feed-in-tariffs for renewables in the U.S.
http://www.principalsolarinstitute.org/uploads/custom/3/ documents/Feed-In_Tariffs.pdf

Michael, Karl. "New York State Energy Efficiency and Renewable Energy Potential Study." NY State Energy Planning Board Meeting. NYSERDA Offices, Albany, NY. July 9, 2012. Speech. The purpose of this NYSERDA study was to develop a quantitative assessment of the long-term technical, economic, and achievable potentials for: End-use energy efficiency improvements and conservation opportunities applicable to electricity, petroleum, and natural gas use in the residential, commercial, industrial, and government sectors; and renewable energy, including grid-level electricity generation and customer-sited production of electricity and thermal energy. The study found that significant efficiency potential exists across all sectors and fuel types. Electric efficiency shows the greatest potential to reduce primary energy use. Across all fuel types, the commercial sector holds the largest efficiency potential. The study also found that substantial potential exists for increases in hydropower, bioenergy, wind power, and solar energy. Wind and solar provide the greatest potential for growth.
www.nwcouncil.org/dropbox/6th%20Plan%20Industrial/Industrial%20Conservation%20Data%20Catalogue/ISC%20Document%20Catalogue_Public%20Version-5%20June%202009/Documents/Tier%201/NewYorkSt_%20EE&ER%20Potential%20in%20New%20York%20Vo1%201_%20Aug%202003.pdf

Mitchell, Travis. "California Continues Renewable Energy Push." *Fierce Energy* (2012): 1-3. Web. 18 Sept. 2012. <http://www.fierceenergy.com/story/california-continues-renewable-energy-push/2012-09-13?goback=.gde_3303264_member_164948157>. A article which provides a good overview on the state of California's efforts to enact legislation which expands access to solar energy development for CA citizens. State lawmakers are recently sent three pieces of renewable-energy-inspired legislation to the desk of Governor Jerry Brown. The bills all touch on solar energy policy and, if signed into law, would extend existing policies designed to encourage wide-scale adoption of solar energy technology. The bills primarily aim to lower the costs of solar energy by helping to remove the initial costs and investments. To that end, Bill 2249 amends the Solar Water Heating and Efficiency Act of 2007, which created a 10-year \$250 million program aimed at installing 200,000 solar water heaters in homes and businesses across California. Bill 2249 updates the 2007 law by extending incentives to commercial pools and, in the process, remove cost burdens that have caused towns, schools and community centers to shy away from purchasing solar heating devices. Continuing the trend of building up existing legislation, the California Senate voted 22-12 to pass SB1222, which reforms the solar PV permitting system.
http://www.fierceenergy.com/story/california-continues-renewable-energy-push/2012-09-13?goback=.gde_3303264_member_164948157

New York State Department of Homeland Security and Emergency Services. Office of Cyber Security. *Cyber Security and the Energy Infrastructure*. By Karen Sorady. 1st ed. Vol. 1. Albany, NY: DHS, 2012. Print. A presentation by the Department of Homeland Securities Office of Cyber Security on the dangers of cyber attacks to the electric grid and grid control system. The presentation provides a overview of the dangers of cyber attacks and the various attacks and potential attacks which have occurred historically. The presentation indicates that there are in fact weaknesses in many power grid systems which make them vulnerable to cyber attack by hackers. The report suggests that current energy executives do not appreciate the dangers of cyber attacks and are not prepared to properly address them. It suggests installing layers of security in three areas; people, technology and operations.
<http://www.nysenergyplan.com/meeting/DHSES%20Presentation%202%20July%209%202012%20SEPB%20Meeting.pdf>

New York Power Authority. Office of Energy Policy. *Energy Highway Initiative*. By Jill C. Anderson. 1st ed. Vol. 1. Albany, NY: NYenergyhighway.com, 2012. Print. A presentation by Jill Anderson director of Energy Policy at the New York Power Authority on the NY Energy Highway initiative. Includes information on the members of the task force, the reason for the current need for the energy highway project, the task forces objectives, a project timeline, information on the response received to the project, and important next steps. The presentation provides a overview of the needs for the development of a new energy highway for the state of NY in coming years as old transmission lines are replaced, new sources of power are developed and new environmental and policy constraints are met.

<http://www.nysenergyplan.com/meeting/NYPA%20Presentation%20July%209%202012%20SEPB%20Meeting.pdf>

New York State Energy Research and Development Authority. *Patterns and Trends: New York State Energy Profiles 1995 - 2009*. 1st ed. Vol. 1. Albany, NY: NYSERDA, 2010. Print. This report by NYSERDA provides a 15-year overview of New York State energy related data compiled by the Energy Analysis Program of the New York State Energy Research and Development Authority (NYSERDA). This annual report is prepared to assist individuals, businesses, and institutions in making informed energy decisions that will promote sustainable economic growth. The data in the report are collected and reported by sector and end use for: energy production and use; sources of energy supply; fuel prices; and total energy expenditures. Comparisons across states and to the U.S. average are also provided for some data sets.

http://www.nyserda.ny.gov/~media/Files/Publications/Energy-Analysis/1995_2009_patterns_trends_rpt.ashx

"New York City Solar Map." *New York City Solar Map*. New York City Solar America City Partnership, Sustainable CUNY, 11 May 2012. Web. 3 Sept. 2012. This map shows existing solar PV and solar thermal installations in NYC and gives an estimate of solar PV potential for every rooftop in the five boroughs. The New York City Solar Map is a tool that all New Yorkers can use to learn about the potential for solar on their buildings and across the city. It also provides practical information and steps for installing solar.

<http://nycsolarmap.com/>

Oringel, Herb. *New York State Energy Solutions Roadmap*. Issue brief. Vol. 1. Northern Westchester County: NWEAC, 2012. Print. The goals of this report produced by NWEAC are to estimate the cost savings and job creation benefits of demand side energy efficiency and supply side energy production, to identify specific policy and regulatory tools that will achieve energy efficiency, stored energy and distribution improvements and enable string use of renewable energy sources. The report looks to enhance grid reliability and motivate private sector funding to enhance demand side efficiency opportunities. The report recommends the use of community choice aggregation, energy efficiency certificates, and demand response programs for area customers.

www.clearwater.org/wp-content/uploads/2009/11/The-New-York-State-Energy-Solutions-Road-Map_NWEAC_2012_03_12.pdf

Patel, Tara. "France Taxing Carbon Emitters in an Effort to Overhaul Consumer Energy Costs." *Renewable Energy World.com* (2012): 1-2. Web. 18 Sept. 2012. An article on changes in French law which will make energy more affordable while compensating by raising taxes on industries that pollute air quality. France will extend to 4 million households lower rates for electricity and natural gas to make energy more affordable while at the same time raising taxes on industries that pollute the air, Prime Minister Jean-Marc Ayrault said today. Making more people eligible for so-called "social" utility rates will make energy more accessible to french citizens Existing law allows for 1 million households to benefit from the legislative changes. The legislation is part of France's effort to lower its reliance on nuclear power and lower costs for consumers.

<http://www.renewableenergyworld.com/rea/news/article/2012/09/france-taxing-carbon-emitters-in-an-effort-to-overhaul-consumer-energy-costs?>

Perez, Richard. "Renewable Energies: Our Solar Future." *Daylight and Architecture Magazine* 1 Sept. 2009: 1-5. Web. 20 Aug. 2012. An article, which discusses the potential for providing the world's power using solar and other renewable energy sources, such as wind and biomass along increases in energy efficiency. The author suggests that the solution lies in the construction of large-scale solar power plants and the usage of small-scale built-in solar

arrays on buildings. While stressing that demand-side conservation and efficiency are an inherent part of any solution, a nearly 100% supply-side renewable future for the planet is not inconceivable. Given the size of the finite reserves and the size of the renewable solar supply, logic alone would say that such a future is inevitable. Beyond conservation and efficiency, a comprehensive solar approach will first involve maximizing the utilization of the direct end-use solar applications, which have the highest on-site solar-to-application efficiencies: hot water, daylight, passive heating and passive cooling where climate permits.

www.asrc.cestm.albany.edu/perez/2010/DA12_perez.pdf

Perez, Richard, and Thomas Thompson. "University at Albany." 2008. MS 1. University at Albany, Albany, NY. There is a common misconception that New York doesn't get enough sun and that solar power is both too expensive and too unreliable to serve NY's energy needs. The reality is quite different. In fact, from Buffalo to Broadway and from the St. Lawrence Seaway to Montauk Point, solar electric PV power can lower the cost of energy in NYS, eliminate blackouts, strengthen the electric grid; clean the air and jump start NY's economic might with good, 21st century jobs. Right now, in spite of possessing a surprisingly strong solar resource, NYS is behind other states and even other countries. However, NY still has time to act, through sound government policy that leverages private sector investment, and become one of the world's leading manufacturers of and markets for solar energy, in all of its forms, but especially in the area of photovoltaics.

www.asrc.cestm.albany.edu/perez/publications/Other%20Papers%20and%20Applications/2008-solar-energy-a-new-york-perspective.pdf

Pierce, Vanessa, and Arjun Makijani. "EUtah Blueprint." *EUtah Blueprint, HEAL Utah*. Healthy Environment Alliance of Utah, 01 Dec. 2010. Web. 02 July 2012. A comprehensive study on the development of the state of Utah's renewable energy resources to replace the state's coal based energy economy. Using technology that is commercially available today, Utah's wind, solar, and geothermal resources can be paired with utility-scale storage to provide the same level of reliability that electric utilities demand today. And if we are bold enough to pioneer the development of an intelligent and distributed electricity system that would use rooftops and passive buildings as much as large scale renewable resources, Utah has the resources to become the technological leader of the 21st century grid. The least cost and lowest risk way to face the uncertainties of the present is to couple renewable energy and energy efficiency improvements with natural gas and compressed air energy storage. The study shows that pairing renewable resources with energy storage allows renewable energy to provide 75 - 100% of a state's electricity needs. http://healutah.org/files/TheBluePrintFINAL_medRes.pdf

Stoutenburg, Eric D., and Mark Z. Jacobson. "Reducing Offshore Transmission Requirements by Combining Offshore Wind and Wave Farms." *IEEE Journal of Oceanic Engineering* 36.4 (2011): 552-61. Print. The authors of this article argue that by combining offshore wind and wave energy into a single energy farm drastically reduces hours of zero power output and intermittent loss problems. The different power output profile of combined farms with a higher frequency of hourly power output near the annual capacity factor potentially allows for a reduction in the required capacity of the offshore transmission system. This reduces optimal transmission capacity by up to 8% as compared to 100% wind or wave farm.

<http://www.stanford.edu/group/efmh/jacobson/Articles/I/Wind&wave/StoutenburgIEEE11.pdf>

"Tidal Energy." *HI Energy: Highlands and Islands of Scotland, Harnessing Nature's Power*. HI Energy, 6 May 2012. Web. 13 Aug. 2012. The explore program provides news, case studies, supply chain industry database, and details about the growing energy industry in the Highlands and Islands of Scotland. This website examines the tidal energy development around the Pentland Firth and Orkney waters off Scotland. Developers expect these installations to generate 1.6Gw of power production by 2020. These sites currently represent 25% of Europe's tidal power resources and 50% of the UK's. Sites for testing tidal systems and for doing environmental research on their effects have also been set up in the area making it one of the leading areas for tidal energy development in the world. www.hi-energy.org.uk/Renewables/Tidal-Energy.htm

Town of Bedford, NY. Supervisor's Office Town of Bedford, NY. *Town of Bedford Energy Conservation Code*. Vol. 1. Bedford: Town of Bedford, 2012. Print. The purpose of this article is to protect the public health, safety

and welfare of the residents of Bedford by reducing energy use, particulate and greenhouse gas emissions, thus also protecting the integrity of the environment. The Town recognizes that energy conservation provides not only important environmental benefits but also reduces the cost of owning a home. Homes rated to a HERS index of 70 or lower or that qualify for the New York ENERGY STAR® Homes program while also verified to meet the New York State Energy Conservation Code offer homeowners a more comfortable and a healthier environment, provide significant savings on monthly energy bills, reduce the costs associated with homeownership and rising energy prices and prevent unnecessary economic hardships and strengthen our community. www.ecode360.com/BE0790

Treadway, Nat. *Annual Baseline Assessment of Choice in Canada and the United States*. Rep. Vol. 1. Washington D.C.: Distributed Energy Financial Group, LLC., 2011. Print. In North America, and in jurisdictions throughout the world, a century of electric industry regulation is undergoing a dramatic transformation. The Annual Baseline Assessment of Choice in Canada and the United States (ABACCUS) is intended to chart some aspects of the transformation by tracking the progress of jurisdictions in reforming market rules and creating opportunities for entrepreneurs. The U.S. states and Canadian provinces that have opened retail electric markets to energy suppliers (i.e., allowed “direct access” or “consumer choice”) have seen a surge in new products and service innovation. Retail energy suppliers are introducing products and services, which are not available in utility service territories that require regulatory approval of each tariff or consumer offering. Retail energy suppliers are competing with one another to present the best products and services as quickly as possible. Policymakers throughout North America must understand that deliberate policy choices were made in successful jurisdictions to foster retail electricity competition. As a result, these places are experiencing lower prices that timely adjust to the lower fuel (power plant input costs) and electric commodity prices, and they are witnessing the offering of new products and services that consumers are embracing. www.defgllc.com/content/defg/abaccus.asp

Vaughn, Kelly. "Empire State Building Retrofit Surpasses Energy Savings Expectations." Weblog post. *RMI Outlet*. Rocky Mountain Institute, 31 May 2012. Web. 09 Aug. 2012. An article outlining the success of the recent energy retrofits on the Empire State Building in New York City, which has saved the building's owners an estimated 2.4 million dollars a year. The building exceeded its energy efficiency goals by 5% leading to these significant cost savings. The article suggests that this is a strong example of the potential for retrofitting to save energy and reduce costs for building owners. It provides a comprehensive breakdown of the energy efficiency measures undertaken to achieve this reduction and consequent cost savings. http://blog.rmi.org/blog_empire_state_retrofit_surpasses_energy_savings_expectations

Vote Solar: Community Solar Bill Will Bolster California's Economy." Weblog post. *Solar Industry Mag.com*. Solar Industry, 07 June 2012. Web. 4 Aug. 2012. A blog articles which discusses the benefits of proposed community solar programs in the state of California which would allow utility customers to participate in community solar programs and receive credits on their utility bills for doing so. This allows customers who are not able to generate their own power through solar usage to participate in programs which promote renewable and clean energy sources. The program will create thousands of potential jobs and double the amount of rooftop solar installations in the state. http://www.solarindustrymag.com/e107_plugins/content/content.php?content.10477

Wigington, Linda. "1000 Home Challenge: 70% Reduction in Total Energy Consumption, Demonstrating Deep Energy Reductions." *1000 Home Challenge*. Affordable Comfort Inc., 16 Jan. 2010. Web. 5 Aug. 2012. A website whose goal is to reduce energy usage by 70-90% in 1000 homes and serve as a model for home energy efficiency in the United States and Canada. The site contains case studies of energy home retrofits and resources for those looking to make their home more energy efficient. The website also contains webinars which provide instruction on specific strategies for increasing energy efficiency. <http://thousandhomechallenge.com/>

Wimberly, Jeff. *New Behavioral Approaches to Energy Conservation*. Publication. Vol. 1. Washington D.C.: Distributed Energy Financial Group, LLC., 2012. Print. A study of new approaches to change people's behaviors in regard to energy conservation. Many utilities are implementing programs to change consumer's behaviors in hopes of reducing demand loads. The study examines what motivates behavioral change including, situations, emotions, and reasoning. The study finds that behavioral approaches are beneficial for a number of reasons

including; cost effective in the first year, easy to quantify, ability to scale quickly, meets regulatory requirements, and customer satisfaction. The study suggests three key points in creating behavioral approaches; is data and information clear, actionable and attention grabbing? Have we engineered a high-probability decision-making context? Do we cater to the distinct psychology of our particular target audience(s)? The major challenge is that energy utilities commonly think differently than their customers and do not segment their customers to better understand them. This report suggests program success most likely will hinge on the correct application and marketing of the program itself. The report then examines how this approach could work with new "prepay" energy strategies being used by utilities.

www.defglc.com/Assets/downloads/detech%20behavioral%20approaches%20executive%20summary%20vf.pdf