What Can be Learned from the Northeast's Use of Microgrids

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Jessica Ciccone Adams and Kristen Nye Larson

EXECUTIVE SUMMARY

As energy decisionmakers pursue strategies to bolster the resilience of the electric grid and to integrate renewable energy sources, an increasing number are turning to microgrids. Microgrids are small-scale electricity generation and distribution systems with control capability, that are capable of operating autonomously and even disconnect from the main grid. More sophisticated microgrids are capable of integrating different energy sources, and providing power sufficient to support industrial operations or university campuses.

The Northeastern United States most impacted in the 2012 aftermath of Hurricane Sandy are each moving forward with different microgrid models.

Connecticut leads the nation in the establishment and development of microgrids, with projects underway in several cities, utilizing innovative financing mechanisms.

In **New York**, where some 8 million customers experienced sustained power interruptions in late October 2012, initiatives underway feature the diverse incorporation of renewable energy sources and energy storage in addition to increased reliability of electricity supplies.

New Jersey policymakers have embraced elements of models being developed by these two neighboring states, while laying important groundwork for microgrids to support vital transportation services.

Also discussed in this report are significant regulatory and governance challenges to microgrid implementation, and various approaches to their resolution.

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JESSICA CICCONE ADAMS AND KRISTEN NYE LARSON

INTRODUCTION

Protecting the country's power supply has become more important as the frequency of severe weather increases, causing more damage to our nation's infrastructure. Using public-private partnerships and funds from Hurricane Sandy recovery efforts, Connecticut, New York and New Jersey have created innovative programs to ensure a continued, uninterrupted, cleaner energy supply and better protect critical facilities during times of disaster.

Part of the solution includes using microgrids, local energy grids with control capability which can disconnect from the traditional grid and operate autonomously. Globally, microgrids are becoming increasingly popular, however growth varies widely across geographic region. Due to the declining reliability of its electricity distribution, North America is the most fertile environment for microgrids with planned, proposed, and deployed capacity of 2,874 megawatts, (roughly 66%) of the global microgrid market.

Microgrids are essentially small-scale electricity generation and distribution systems that incorporates various distributed energy resources and can be managed locally and, if necessary, independently from the main grid. Diesel-powered microgrids are most common in the rural areas of many developing countries and at internet server farms to ensure a steady flow of power even if a natural disaster or terrorist attack should cause sustained power interruptions.[1]

Across the United States, microgrids have served essential functions for many decades. Backup electric generators powered by gasoline installed to provide households with temporary respite from storm damage are perhaps the smallest and most common. Larger microgrids have traditionally been used for campus-size institutions such as industrial parks or colleges.

As incentives for different stakeholders have begun to align, microgrids are gaining momentum. Indeed, this momentum is indicative of a paradigm shift as federal investments in new energy sources come online, state and local governments plan for resiliency in the face of severe weather, utilities strive to optimize energy storage, and technology providers from different sectors pursue opportunities

[1] Adrienne Thompson, "All Eyes on Connecticut: Microgrid Pilot Program Gets Underway." Worldwide Institute, August 13, 2013.

to disrupt and innovate. In terms of investment, development and deployment, as new vendors enter this space, and previously undiscovered projects come to the fore, the robustness of the microgrid sector becomes increasingly clear.[2]

Connecticut, New York and New Jersey are three states where the stakeholders' incentives are aligning. In an effort to help others understand the forces at work, this paper discusses: How the projects are funded; their implementation; hurdles to overcome; and questions to consider moving forward.

CONNECTICUT - LEADING THE WAY

Today the most significant microgrid program in the United States is in Connecticut. Lawmakers and utilities there are further along than those in any other state in terms of putting real money into viable on-the-ground projects.

The program passed into law in 2012, one year after 8 million residents lost power due to Hurricane Irene. Worth a combined 15 megawatts of distributed generation capacity, meant to keep hospitals, fire stations and community centers running during severe storms, lawmakers in Connecticut funded $18 million to nine different projects.[3]

The initiative gained momentum after Hurricane Sandy hit in October 2012. Indeed, the state's Department of Energy and Environmental Protection (DEEP) sped up the application process and almost three dozen Connecticut cities, towns, universities, hospitals, and companies applied to participate in the Microgrid Pilot Program. Once completed, power from renewable, fuel-cell, and fossil-fuel sources will be delivered to the project areas with the capacity to serve on an around-the-clock basis, without having to connect to the larger grid for support.

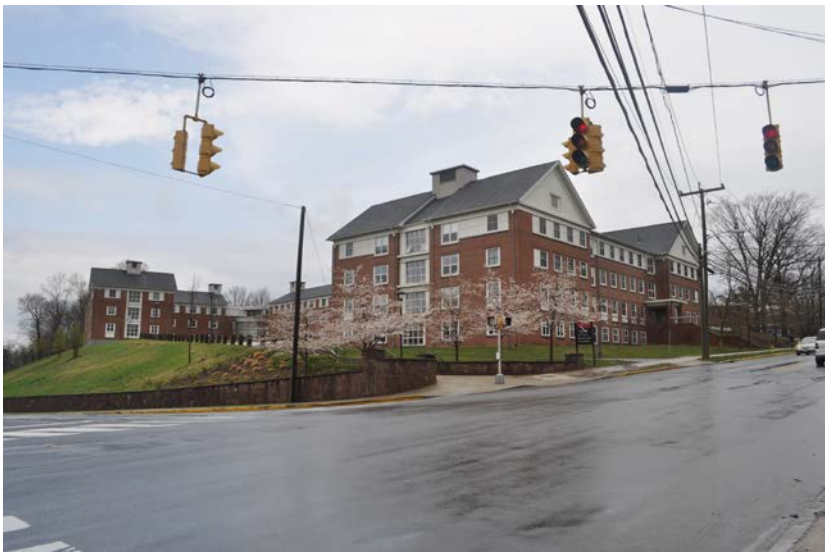
The nine funded applications represent a cross-section of institutions and businesses that the state prioritized to safeguard during severe storms: police stations, supermarkets, university dormitories, city halls, senior centers, fire departments, gas stations, cell towers, and emergency shelters. The program still emphasizes existing fossil-fuel-fired infrastructure in its first round. It includes fossil fuel and renewable energy generators with capacities ranging from 50 kilowatts to 5 megawatts, along with some limited battery storage options as well. If the main grid falters, these microgrids will be able to maintain power on their own. In addition to these pilot projects, Connecticut Governor Daniel Malloy appropriated another $30 million for additional microgrid projects over the next two years.[4]

Projects in Bridgeport, Fairfield, Groton, Hartford, Middletown, Storrs, Windham and Woodbridge have also started to come online. One of the first was Wesleyan University's 3.2-megawatt combined heat

[2] John Romankiewicz, Chris Marnay, Nan Zhou, Min Qu, *International Microgrid Assessment: Governance, Incentives and Experience*. ECEEE Summer Study Proceedings 2013.
[3] Jeff St. John, "Multi-Million dollar proposals in Conn. and Mass. offer different paths to community energy resiliency," Greentechmedia.com, April 1, 2014.
[4] Adrienne Thompson.

and power (CHP) system to power its athletic center during emergencies. Natural gas is a reliable backup energy source during natural disasters and underground pipes are far less susceptible to wind and flooding damage than overhead power lines. Wesleyan's CHP system can light and heat the university's athletic center in order to shelter up to 48,000 residents, as well as to serve as a Federal Emergency Management Agency distribution center.[5]

One project in Hartford involves reshaping the city's utility infrastructure to link building power systems across utility rights-of-way (i.e., roads). "From a big-picture policy perspective, the microgrid program is another way of tackling the governor's mandate of cheaper, cleaner reliable electricity. At the same time, it's about ensuring this level of reliability, so that if the larger grid goes down, these microgrids pop up, and these facilities can serve their intended function, to increase safety and quality of life for our residents," explained Alex Kragie, deputy chief of staff at DEEP.[6]



Wesleyan University's 3.2-megawatt combined heat and power (CHP) system was one of Connecticut's first microgrids.

Another pertinent aspect of Connecticut's program is that it only helps with the purchase of generation equipment – funding the design, construction and operation of the physical and IT assets needed to link generation units together. Big, pre-existing university CHP systems and municipal steam-heat systems are the cheapest, most reliable resource to start with in that context, which means non-traditional generation from renewable sources is only a sliver of the state's total first-round project energy mix.

The state's Request For Proposals (RFP) sets certain review criteria governing how it's going to pick winning proposals, 45% of which is based on "financial, managerial and operational capability," including proposed projects' ability to access financing on a cost-per-kilowatt basis. Technical merits account for 25%, while combining public and private facilities is worth 20%. Environmental benefits, or the "use of clean, renewable, and reliable generation resources in the project," only account for 10%. [7]

[5] Jeff St. John.
[6] *Ibid.*
[7] Jeff St. John.

Kragie could not predict whether the next round of competition would have a greater clean energy component, "It will depend on what's in the proposals." He did explain that the state's Green Bank, (a public financing institution providing low-cost, long-term financing support to clean, low-carbon projects by leveraging public funds through the use of various financial mechanisms) formed a microgrid team to look at low-cost clean power financing options. In addition, DEEP was eager to start the next round of clean energy projects with the state's reverse auction program, a first of its kind. That program required utilities to purchase a combined 31 megawatts of projects in a first auction of zero- and low-emissions energy credits in 2012. A law signed in June, 2013 modified the renewable portfolio standad, expanding the quaifying energy sources. The results showed how innovative financing can successfully drive down the cost of clean energy, which is a huge step towards grid parity.[8]

As for grid interconnection, green resources are allowed access to the state's existing net metering laws for designated Class 1 resources, as well as smaller amounts in special riders for other types of natural gas generators. Considering the inflexibility utilities have been known to show when asked to work with customers that can generate their own power, United Illuminating and Connecticut Light & Power set an innovative and successful example for utility companies in other states.[9]

NEW YORK – SHORING UP FOR STORM RESILIENCE

New York is also investing in microgrids, although in a less direct way. In January of 2013, to strengthen the state's storm resilience in the wake of Hurricane Sandy, New York Governor Andrew Cuomo allocated $40 million in competitive grants to build community microgrids. The money was part of a broad $17 billion storm preparedness plan. The competition was designed to fund at least ten "independent, community-based electric distributions systems" across the state.[10]

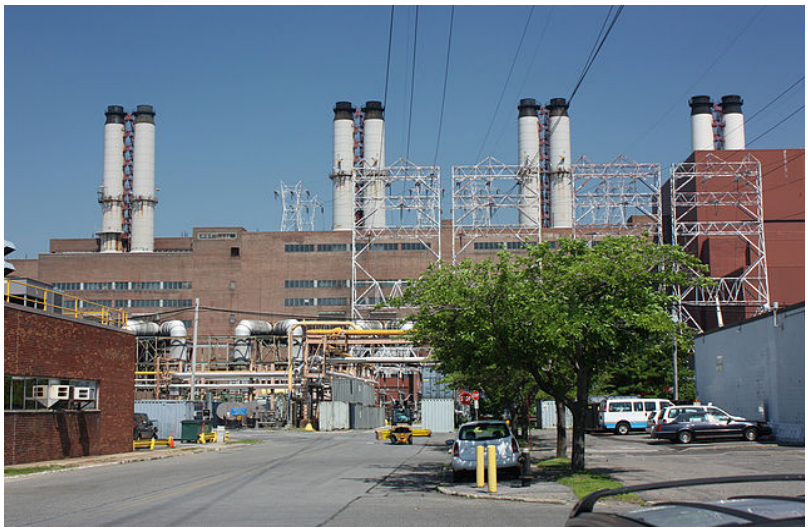
The project's purpose is to support communities of about 40,000 residents and to operate in conjunction with the grid most of the time. However during emergencies, the microgrids would be able to disconnect and power themselves, providing stable electricity for critical systems such as hospitals, police departments, fire stations, and gas stations. In October 2013, Governor Cuomo announced an additional competition to direct $10 million more for two projects in Nassau and Suffolk counties, areas that sustained heavy damage from Hurricane Sandy, as part of an $815 million recovery package specifically for Long Island.[11]

The scope and scale of New York's potential microgrid resources is broad. Large-scale projects include multi-megawatt combined heat and power systems on the state's universities, including Cornell, New

[8] Phil Zahodiakin, "Connecticut Auction Cuts Clean Energy Costs." Breaking Energy, December 11, 2012.
[9] *Ibid.*
[10] Jeff St. John, "New York Plans $40M in Prizes for Storm-Resilient Microgrids." The Energy Collective, January 12, 2014.
[11] Anthony Rifilato, "Cuomo announces $815 million for next phase of Sandy recovery." *Long Beach Herald*, November 13, 2013.

York University and Stony Brook University. The state is also spending $25 million to provide emergency generators to about 1,000 gas stations near major highways and hurricane evacuation routes, with further discussion around expanding that initiative under the new plan. These initiatives comprise a small part of the $17 billion allocated for projects such as billion-dollar transportation overhauls, wastewater improvements and coastal protection and flood control projects, as well as $1.37 billion in transmission and distribution grid hardening work.[12]

Today, modern microgrids are meant to go beyond diesel generators, offering not just emergency backup power, but also incorporating clean, renewable energy resources like rooftop solar photovoltaic panels with energy storage and on-site energy management systems. The New York State Smart Grid Consortium includes state agencies, universities and research labs, big utilities, and smart grid vendors including General Electric and IBM. The Consortium describes the promise of community microgrids as "the means to increase reliability and give local communities more control of their energy systems, while also allowing for the adoption of clean and efficient distributed energy sources such as solar or combined heat and power," not to mention electric vehicle adoption. It remains to be seen whether New York's new competition can help deliver projects that live up to this type of microgrid promise.[13]



Modern microgrids can incorporate diverse energy sources, including natural gas as well as renewables.

New York's Consolidated Edison (Con Edison) has invested in its own multi-billion-dollar grid projects that put storm preparedness at the forefront with an investment in microgrids. Indeed, since Hurricane Sandy's destruction, with 8 million residents without power at its peak, utilities on the East Coast have spent billions reinforcing their assets with concrete, steel, repairs and retrofits, like waterproofing substations. However, they are also investing in some longer-range goals that coincide with the region's ongoing smart grid and microgrid projects, especially in light of facing regulatory imperatives to make these investments. Governor Cuomo opened an investigation into the state's utilities' response to Hurricane Sandy, which led to the re-privatization of the Long Island Power

[12] Jeff St. John, "New York Plans $40M in Prizes for Storm-Resilient Microgrids."
[13] *Ibid.*

Authority, after 82% of their customers were left without power after the storm, some for over two weeks.[14]

That investigation led Con Edison to announce a $2.2 billion multi-year set of grid strengthening projects in preparation for future storms, to cost individual customers about $3 per month in additional rates. Almost half of the funding went to a four-year plan for fortifying transfer stations, power lines and other grid assets. Particular emphasis went to shore up the low-lying, flood-prone substations and specific underground grid assets that received most of the damage from the storm.[15]

Other investments are addressing additional resilience strategies as well, including grid capacity improvements to match a projected peak demand of 13,200 megawatts, much of which will be on the bulk hardware, such as transformers and feeders.[16]

Understanding that there is only so much one utility can do to increase the capacity of the nation's largest metropolitan area, pursuing other innovative solutions such as on-site energy storage, distributed generation and demand response merit attention as part of summer peak management solutions.[17]

NEW JERSEY – LOOKING TO ITS NEIGHBORS

In the wake of Hurricane Sandy, New Jersey faced major rebuilding, and looked to its neighbors to learn from their experiences. New Jersey efforts tapped into $200 million from its Community Development Block Grant-Disaster Recovery allocation to establish an Energy Resilience Bank (ERB), similar to Connecticut's Green Bank. The goal of the ERB is to leverage public and private capital, as well as the authority of the state to fund energy infrastructure projects that provide cleaner, more reliable sources of electricity.[18]

During its analysis of past resources, officials discovered only 7% of the state's vital water supply capacity was capable of functioning without grid power, a major concern for a community's sustainability in a crisis. To combat this issue, the ERB will support distributed energy resources at critical facilities, beginning with water and wastewater treatment plants, since combined heat and power technology can be easily accessed for energy resources. The ERB is facilitating funding to help research and implement alternative energy sources including fuel cells, combined heat and power, resilient solar and other distributed generation, microgrids, and smart grid technologies. These

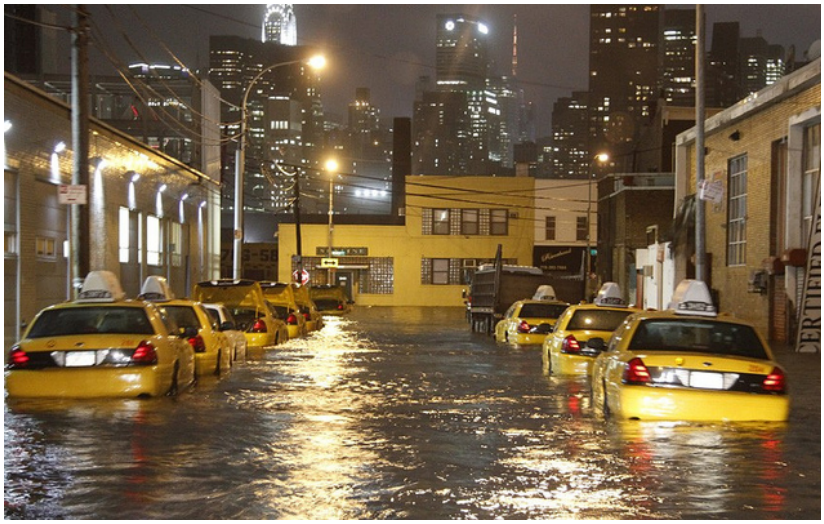
[14] Katherine Tweed, "82% of LIPA Customers Lost Power During Sandy." Greentechmedia.com, October 31, 2012
[15] "Fortifying the Future in New York City, Con Edison Flood-Proofing Substations, Using Smart Grid Technology, Installing Stronger Equipment to Reduce Storm Outages & Speed Restoration; $1.2 Billion Investments for Summer Reliability." Con Edison Press release, May 28, 2013.
[16] *Ibid*.
[17] *Ibid.*
[18] Herman K. Trabish, "New Jersey Puts Up $200m for Microgrids, Distributed Energy to Bolster Resiliency." Utilitydive.com, July 24, 2014.

alternative sources have the potential to provide energy storage for hospitals, emergency response centers, town centers, transit networks and regional high schools designated as disaster shelters.[19]

New Jersey's Public Service Electric & Gas (PSE&G) invested $4 billion into the "Energy Strong" plan to protect critical facilities and deploy smart grid across its distribution network. Despite the high investment, PSE&G said it did not anticipate passing on any rate increases to consumers.[20]

In addition, the U.S. Department of Energy is partnering with New Jersey on a study aimed at supplying microgrid capabilities for New Jersey Transit that will power the transit system between Newark, Jersey City and Hoboken as well as critical stations and maintenance facilities. It is the first state to seriously consider a microgrid to supply power to keep a public transportation system running during times of natural disaster.[21]

New Jersey Transit is spearheading this plan, recognizing that ongoing and accessible transportation services are especially important to help evacuate residents from an area that is likely to be impacted by a natural disaster. In New Jersey officials are focused on an area called "TransGrid" that includes Jersey City, Kearney, Secaucus, Hoboken, Harrison and Newark.



Microgrid strategies hold potential to limit sustained power outages after major storms like Hurricane Sandy in 2012.

Stakeholders are working through some logistical challenges with building the microgrids to support transit lines, which include ensuring that the system is "islanded" during times of natural diasters. Islanding disconnects the microgrid from the main power grid. The power for the transporation microgrids will likely use gas generators or electricity generated by solar panels. Microgrid communities in New Jersey are facing challenges in terms of state regulations which could require them to face the same financial regulations as large utilities. This type of one-size-fits-all regulation is likely cost-prohibitive for small microgrid supporters.[22]

[19] I*bid*.
[20] Katherine Tweed.
[21] Julia Pyper, "Are Microgrids the Answer to City-Disrupting Disasters?" *Scientific American*, September 11, 2013.
[22] Brady Dale, "How NJ Transit Plans to Storm-Proof Trains," nextcity.org, November 3, 2014.

BARRIERS TO ENTRY

As these states secure different energy sources, such as microgrids, to prepare for more severe weather and other challenges, microgrid supporters are faced with several barriers that most simply can be categorized as economical and institutional.

Economic Barriers

Both larger utilities and smaller entities must consider the economic barriers for creating microgrids. All stakeholders must look at whether the benefits and costs can be accurately reflected in pricing to incentivize development that is at the same time beneficial to the customer, utility and society as a whole.[23]

Utilities, especially larger ones, face challenges to making microgrids cost-effective if they are to undertake the approach themselves. However, if a smaller entity or community spearheads the microgrid, there are often regulations and red tape that make it fiscally challenging for a successful and easy launch.

Micro generators are a natural fit to be owned by local businesses and individuals, so large utilities potentially fear a loss of business -- and an end to the near monopoly status they still hold in many states. Microgrids go against the traditional business model, as they give the customer the option of reducing their dependence on their local utility. Traditional business models for cost recovery may no longer be feasible if the mass grid defections many experts anticipate appear imminent.

Raising rates on remaining customers to recover costs or lost earnings raise the threat of more departures, eventually triggering a downward spiral for the large utilities.[24]

Large utilities are under state mandates to diversify its use of renewable energy – defined as renewable portfolio standards (RPS). Microgrids – especially when offered and built using renewable energy – offer another way for the utility to meet these mandates. RPS are compliance mandates in 33 states and the District of Columbia. While some renewable projects require extensive environmental reviews and are publically controversial, microgrids are fairly straightforward and uncontroversial. Using microgrids to satisfy RPS requirements could force a utility to be innovative while meeting a mandate at the same time.

Illinois is a notable area where one major utility is making efforts to keep up with the microgrid demand and marketplace. The state's largest utility, Commonwealth Edison, backed 2015 state session legislation to support "$300 million in funds to finance six microgrid pilot projects that would serve healthcare, homeland security, transportation and water services. The projects would utilize renewable energy sources that could include wind, solar, fuel cells, gas and geothermal tech. Although the state allows customers to choose their electricity suppliers and it has a competitive energy sector, the state's

[23] John Romankiewicz, Chris Marnay, Nan Zhou.
[24] Adrienne Thompson.

Citizens Utility Board (CUB) raised some concerns about the legislation. CUB said while microgrids are important to the community, its vital to ensure that this marketplace remains competitive and that large utilities don't dominate the market."[25]

In July 2014, New York's Central Hudson Gas and Electric testified before state regulators in support of several renewable energy projects, including a microgrid project to increase power reliability and efficiency. Central Hudson proposed that a customer or a group of customers could access a minimum of 500 kilowatts of power through a single contract for a microgrid. The utility is using a proactive approach to use its expertise in the design, build and operation of the microgrid network for customers who are asking for it. Regulators will need to continue to watch out for any anti-competitive behavior that would give these large utility providers an advantage. Ensuring innovation can thrive by maintaining a balanced and level playing field for competition is critical.[26]

There are other utilities that also see the potential of a new revenue stream for microgrid expansion. The U.S. Department of Energy, the California Energy Commission, and San Diego Gas & Electric are partnering to complete a pilot project in Borrego Springs. The $10 million grant integrates many microgrid elements including smart meters, distributed generation, and storage. A few municipal utilities, such as Austin (TX) Energy and the Sacramento (CA) Municipal Utility District, are also moving forward with smart grid and microgrid-like projects[27]

Regulatory Challenges

Although the push to build microgrids is growing strong in Connecticut, the laws and rules governing the sale and transmission of power have yet to fully catch up. Currently state regulations are unclear and new laws enabling microgrids have yet to be tested in court. "In nearly every state, the legal and regulatory challenges to implementing microgrids are by far the biggest hurdle," said Sara C. Bronin, professor of law and program director for the Center for Energy and Environmental Law at the University of Connecticut. "The technology is there. We have nationally recognized interconnection standards that would allow microgrids to be connected to the electric grids. What we don't have is a legal framework for private or public-private microgrid owners and operators who are not public utilities to create microgrids without having to go through years of legal and regulatory hurdles."[28]

Although some progress has occurred, many questions remain unanswered. Connecticut passed a law in 2013 legalizing microgrids that distribute electricity across public streets as long as the power source generates less than 5 megawatts of electricity. However, the laws do not define land-use rules regarding the site infrastructure required for microgrids. Physical infrastructure is also a challenge. The microgrid is required to be located near the properties being served, however zoning ordinances

[25] Elisa Wood, "Illinois Lawmakers Consider $300M for Utility Microgrids," March 23, 2015.
[26] Jesse Jenkins, "Should Electricity Distribution Utilities Build, Own, and Operate Microgrids For Their Customers?" TheEnergyCollective.com, September 16, 2014
[27] Adrienne Thompson.
[28] Bobby Magill, "Microgrids: A New Kind of Power Struggle in New York and Connecticut. State law isn't keeping up with the push for microgrids." Greentechmedia.com, September 16, 2013

usually prevent large-scale mechanical equipment from being situated in the dense urban areas that microgrids aim to serve."[29]

Another grey area yet to be defined is the legal status of businesses created to implement a microgrid. "If neighbors wanted to get together to do a microgrid project, what business form would they take when they get together?" Bronin asked. "Connecticut, as most states do, needs to enact legislation that allows private parties to organize into specialized entities that will allow them to own and operate microgrids."[30]

The Clean Coalition, a California based non-profit organization was developed to support efforts to create community-initiated microgrids. Clean Coalition is working with the large California utility Pacific Gas & Electric, to launch a microgrid for a community group known as Hunters Point, named after their location in an area of economic redevelopment in Southeast San Francisco. The Hunters Point microgrid would be almost entirely self-sufficient with an overall power source of 50 megawatts, which would service about 20,000 residential and commercial customers. Most of its energy would be sourced from solar installations. The goal of the project is to not only create this community microgrid, but to also utilize renewable energy sources. Clean Coalition sees the Hunters Point project as a community-based microgrid model that can be replicated in other states and jurisdictions.[31]

Concerns have been raised before the New York State Public Service Commission, which regulates all electric plants, that some microgrids and their operators have not been recognized as legal entities under state law. To date, there are no specific rules governing microgrids. As of now, they are only regulated by ad hoc Public Service Commission rulings, and it is unclear what future regulations will be enacted.[32]

Without sufficiently clear state regulatory regimes, financing a microgrid project in New York can be prohibitive. Raising capital will require accounting for transaction and compliance costs, a large percentage of capital outlays. Currently, if a local microgrid project needs to run a wire across a public street, the owner would be subjected to the same regulations large utilities are required to comply with and costs would likely make the project financially unviable. Additionally, running that wire would require local city and state approvals, but which regulations apply aren't always clear, according to the New York State Energy Research and Development Authority study.[33]

"Currently, the Public Service Commission is examining many issues regarding microgrids, including what rules and regulations should apply," said New York Department of Public Service spokesperson Pamela Carter.[34] As policymakers consider how to navigate the potential paradigm shift for energy producers and various ways of offering services to the consumer, there are various ways to incentivize microgrid owners and utilities.

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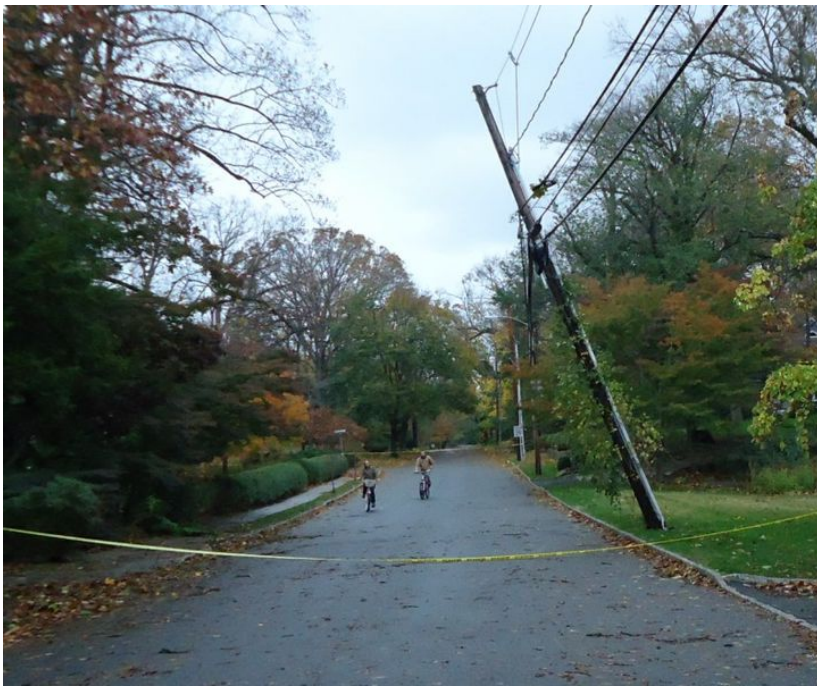
[29] *Ibid.*
[30] *Ibid*.
[31] Elisa Wood, "How to Make a Community Microgrid: Follow San Francisco?", GreenBiz.com, September 2, 2014.
[32] Bobby Magill.
[33] *Ibid.*
[34] *Ibid.*

Policy Incentives

As mentioned earlier, renewable portfolio standards are state mandated renewable energy requirements for utilities. RPS's are most successful in driving renewable energy projects when combined with the federal production tax credit. States often design them to drive a particular technology by providing "carve out" provisions that mandate a certain percentage of electricity generated comes from a particular technology. States can choose to apply the RPS requirement to all its utilities or only the investor owned utilities. States can also define what technologies are eligible to count towards the RPS requirements.[35]

Because of this flexibility, no two states' RPS programs are alike. Each state takes into account a host of policy objectives (e.g. economic growth, diversity of energy supply, environmental concerns), and variables (e.g. local resource endowment, political considerations, and the capacity to expand renewable energy production).[36] At the very least, this means different RPS targets over so many years (e.g. Connecticut's 27% by 2020[37]; New Jersey's 22.5% by 2021; and New York's 30% by 2015[38]). Policymakers can use RPS programs to incentivize and promote microgrid programs and work on the accompanying regulatory challenges.



Long-range power grid resilience strategies have included billions of dollars in grid strengthening programs.

Feed-In Tariffs are an incentive originally designed to accelerate investment in renewable energy technologies, but now can be used in conjunction with microgrids by offering long-term contracts to energy producers, typically based on the cost of generation of each technology. The goal of feed-in

[35] Barry G. Rabe, *Race to the Top - The Expanding Role of U.S. State Renewable Portfolio Standards*. University of Michigan, Pew Center on Global Climate Change, June 2006
[36] *Ibid.*
[37] "Connecticut Renewable Portfolio Standards Overview", Department of Energy & Environmental Protection Public Utilities Regulatory Authority, July 2012.
[38] New York Public Service Commission, Renewable Portfolio Standard - Home Page.

tariffs is to offer cost-based compensation to energy producers, providing price certainty and long-term contracts that help finance more energy investments.[39]

Microgrid Governance

The Connecticut and New York examples show that as utilities comply with RPS and cap and trade policies, it makes sense for policymakers to inventory the current incentive policies, analyze the barriers, and make the necessary changes to streamline microgrid deployment. As noted in Connecticut, planning proactively for impact by developing standards and processes ahead of time will help simplify interconnection. In addition it will help to evaluate large-scale impacts of distributed generation in the long term. [40]

Since microgrids must be able to show the monetized benefits to incentivize deployment, it makes sense to proactively review and modify electricity rates. On the consumer side, rates should be assessed by how well the utility can adjust for time-of-use pricing and if charges can be an incentive for load shifting and energy efficiency. On the seller side, utilities should consider marketing of lower costs (if applicable) and/or promotion of 'greener' energy. Many consumers have an easier time tolerating higher costs for improved services and offerings that include renewable energy sources.

CONCLUSION

State governments need to be proactive by ensuring they can react swiftly as microgrids grow in popularity and need. Microgrids have been around and utilized for decades, but the industry is now at a point where it can leverage the old structure to promote renewable energy and improved power infrastructure. Governments shouldn't wait for the next natural disaster to react to its precarious power structure. Gathering situational data and information from areas in the Northeast that were hit by Hurricanes Sandy and Irene and the outcomes from those experiences can impact many other power-weak areas in the United States.

State leaders in the Northeast should keep watch of neighboring states to share best practices and innovative solutions for microgrids. Stakeholders can also look nationwide to other states including California and Illinois, where officials are creating incentives and addressing regulatory challenges. While Connecticut is one of the nation's leaders in microgrid incentives and financial support, it's important to note that the state is faced with regulatory challenges. New York microgrid and power regulations seem to be creating similar roadblocks. Major utilities and consumer microgrid advocates could partner to advocate for more flexible regulations to open up the marketplace. The California-based Clean Coalition and its relationship with Pacific Gas & Electric is a good model for a community/utility working relationship.

[39] "Feed-in tariff: A policy tool encouraging deployment of renewable electricity technologies." U.S. Energy Information Administration, May 30, 2013.

[40] John Romankiewicz, Chris Marnay, Nan Zhou.

Large utilities should also recognize the importance of diversifying its power sources. Utilities can use microgrids as a way to meet RPS state mandates, while at the same time improving service to its customers. Being a leader in this area, when marketed well and done in a financially sound way, can enhance a company's offerings. Consumer and regulatory groups should work closely with the utilities and keep a close eye on its efforts in the microgrid area to ensure the marketplace remains open and accessible.

As stakeholders move forward, exploring opportunities for an ongoing nationwide dialogue or repository of information might also be helpful. Microgrids provide stability to areas that are especially weather prone, but also can be useful in rural areas where power access is unreliable. Stakeholders across the United States are struggling with similar regulatory and financial challenges and would benefit from collaboration and information sharing.

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