RESILENTPOWER A project of **CleanEnergy**Group

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NYC's Policy Target and Roadmap for Resilient Solar+Storage



April 4, 2017

Housekeeping



All participants are in "Listen-Only" mode. Select "Use Mic & Speakers" to avoid toll charges and use your computer's VOIP capabilities. Or select "Use Telephone" and enter your PIN onto your phone key pad.

Submit your questions at any time by typing in the Question Box and hitting Send.

This webinar is being recorded.

You will find a recording of this webinar, as well as previous Resilient Power Project webinars, online at:

www.resilient-power.org

Who We Are





SURDNA FOUNDATION

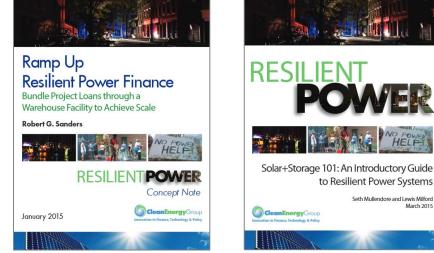
Fostering sustainable communities in the United States

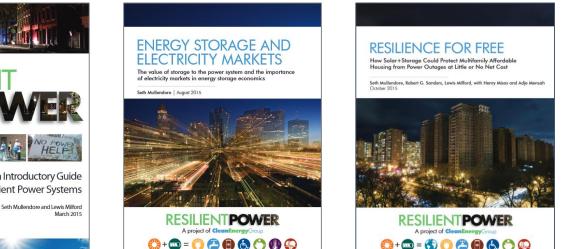
www.resilient-power.org



Resilient Power Project

- Increase public/private investment in clean, resilient power systems
- Engage city officials to develop resilient power policies/programs
- Protect low-income and vulnerable communities
- Focus on affordable housing and critical public facilities
- Advocate for state and federal supportive policies and programs
- Technical assistance for pre-development costs to help agencies/project developers get deals done
- See <u>www.resilient-power.org</u> for reports, newsletters, webinar recordings





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CONTACT

Seth Mullendore Project Manager seth@cleanegroup.org (802) 223-2554 x213

The Resilient Power Project, a joint initiative of Clean Energy Group and Meridian Institute, is focused on accelerating market development of resilient, clean energy solutions for affordable housing and critical community facilities in low-income and disadvantaged communities. The Project is targeted to the deployment of solar PV combined with energy storage (solar+storage) - to power essential services during extended power outages and to reduce the economic burden of energy costs in vulnerable communities. The goal is to further clean energy equity by ensuring that all communities have access to the economic, health, and resiliency benefits that solar and energy storage technologies can provide.

Clean Energy Group's role in this process is to inform, coordinate, and assist in the planning and implementation of resilient power projects in underserved communities, in both rural and urban areas, across the country. In addition to providing program guidance to policy makers and technical assistance to developers and community organizations, we also prepare reports and analysis on resilient power programs and projects, clean ----- P----- t--t- --- d b---t-----t----

Follow the Resilient Power Project on Twitter

Tweets by @Resilient_Power



@Resilient Power

Webinar today: American Samoa's Solar+Storage Microgrid, with @solarcity, @EPA, & the American Samoa Power Authority bit.ly/2kO0BUA



Today's Speakers

- Laurie Reilly, Director of Communications, Sustainable CUNY
- Kathryn Wright, Senior Consultant, Meister Consultants Group
- **Ben Mandel**, Renewable Energy Policy Advisor, NYC Mayor's Office of Sustainability







Moderator: Seth Mullendore, Project Director, Clean Energy Group

NYSOLAR SMART DG Hub Overview of Resilient Solar Roadmap April 2017



Sustainable CUNY- An Objective Platform





U.S. Department of Energy | State of New York | New York City | CUNY | Private Foundations

Challenge

Build and stabilize an emerging energy sector in changing environments

Trigger

Hurricane Sandy October 29, 2012



Hardware Technologies

Policy & Legal





Software Technologies

Economics & Finance







Smart DG Hub- Resilient Solar Project



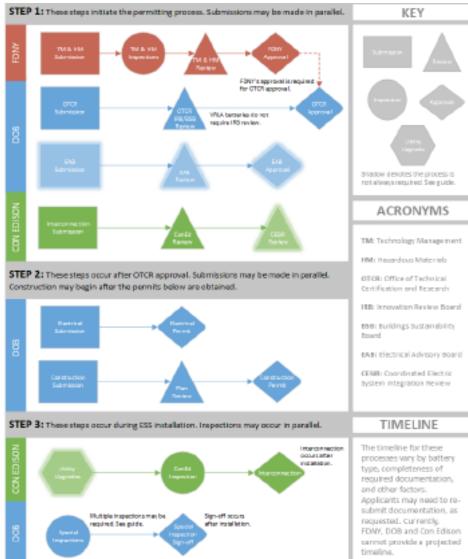
NY SOLAR MAP Going Sola	ar · Installing Solar · Financing Sola	lar· Solar+Storage Resources	s• NYC Solar• About• Help	
Resources for the Current Process for Installing Solar+Storage				
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The Energy Storage Systems Permitting and Interconnection Process Guide for New York City	Economics and Finance of Solar+Storage Fact Sheet	Guidance Memo for Including Storage in Community Solarize Programs	NYC Solar+Storage Glossary	
Resilient Solar PV Systems Hardware Fact Sheet	Economic and Resiliency Impact of PV and Storage on New York Critical Infrastructure			
Solar+Storage and Aicrogrid Communications Fact Sheet	Solar and Storage Cost Survey	and a start it and a start		
Solar+Storage Retrofit Guidelines				
	1000			







Sample of the Process Guide for Permitting and Interconnection- VRLA



CONSULTANTS GROUP



FDNY

DOB

Con Edison



Smart DG Hub- Resilient Solar Project



A Roadmap to Resilient Solar In New York



Develop a sustainable market through better policy

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Compensate resilient PV for the services it provides to the grid



Create invenctives to value the imrpoved resiliency of sites with resilient PV



Provide education and outreach about resilient PV systems and their benefits to installers and consumers







Introduction



Resilient solar allows buildings and infrastructure to continue to operate when the grid is down. This roadmap focuses on the deployment of solar+storage on critical infrastructure like the fire house depicted below.

Smart

Battery Storage

Solar Photovoltaics Back up Power Provides critical infrastucture electricity during grid outages

Saves Money Host sites save on their electric bill by reducing consumption from the grid



Grid Support Delivers a variety of support services to the grid

Fossil Fuel Reduction Reduces emissions harmful to our health and environment







Hardware

- o Core Components
- o AC vs. DC-coupling
- Case Study: Emerging Storage Use Cases
- Case Study: Modeling resilient PV
- Barriers & Solutions
- Practitioner experience

Policy

- o Regional activities and opportunities
- Case Study: MA Peak demand reduction
- Case Study: Con Ed/NYSERDA Support for NYC's Storage Market
- Barriers & Solutions

• Permitting processes

NYSELAR SMART DG Hub

New York City Resilient Solar Roadmap March 2017

Software

- Use cases and applications
- Case Study: Interoperability Retrofits
- o Barriers & Solutions
- Customer data availability



Economics

- roving the economics t survey Study: Ca/Germany incentives Study: NYSolar map resiliency calculator
- Barriers & Solutions
- High project costs







Barriers & Solutions: Hardware

Hardware

Barrier – Practitioner Experience

Solutions – Publicize Installation Best Practices

"Online resources concerning the relevant federal, state, and local **safety and fire codes and standards should be made available to installers and residents**. For example, the County of Santa Clara, CA..."

- Manufacturers
- NYC DOB
- Industry Associations
- Municipal Officials
- PV Trainers Network
- Smart DG Hub







Barriers & Solutions: Software

Software

Barrier – Interoperability Challenges

Solution – Finalize and Incorporate Industry Standards

Currently, no standardized open protocols exist. Different industry groups are currently working on creating communication standardizations for system components and grid wide connectivity. Disseminating ongoing protocol developments by MESA, SIWG, the <u>SunSpec</u> <u>Alliance</u>, and NREL will aid energy storage's ability to communicate with the grid and between system components...

- SunSpec Alliance
- MESA
- NREL
- Smart Inverter Working Group (SIWG)
- Industry Associations
- Smart DG Hub







Barriers & Solutions: Economics

Economics

Barrier – Valuing Resiliency

Solution – Quantification of Value

There have been ongoing efforts to quantify the value of resilient power through the Smart DG Hub and the New York Prize program for microgrids. The DG Hub will be working to develop a methodology and/or tool that quantifies the loss avoidance mechanism offered by resilient power projects...

- NY Prize •
- Smart DG Hub N
- City of San Francisco SMP • Team
- FEMANYSERDA
 - DER Industry
 - Insurance Industry







Barriers & Solutions: Policy

Policy

Barrier – Permitting Processes

Solution – Streamline Permitting Processes

"Processes for solar+storage should be investigated that expedite review periods, encourage consistency in permitting requirements across the state, and account for projected increases in permitting throughput..."

- NYC DOB
- FDNY
- Smart DG Hub
- NYSERDA

- NY-Best
- NYS AHJs
- NYC Solar
 Partnership







Roadmap Implementation Tracker



NY Solar Map Portal Pages > Project Tracker Test > Roadmap test 1

Roadmap Implementation Tracker

In the aftermath of Hurricane Sandy it was determined that while the 672 solar arrays on NYC rooftops at that time sustained little or no damage during the storm, they were unable to supply critically needed power during the subsequent outage. For safety reasons, solar installations without battery backup are wired to automatically shut down during grid outages. Virtually none of NYC's systems had battery backup power.

The City University of New York formed the Smart Distributed Generation Hub (Smart DG Hub) to develop a strategic pathway to a more resilient distributed energy system, and won Federal and State support for the Smart DG Hub-Resilient Solar Project in 2014. The three-year project will create a roadmap for the integration and tracking of resilient solar systems, conduct analysis for deploying resilient solar electric systems on designated critical infrastructure facilities, and integrate values for resiliency into the solar calculator found on the New York Solar Map.

The DG Hub leveraged a diverse group of stakeholder perspectives, ranging from electric utilities to local non-profits, to develop the barriers and solutions presented in the categories of software, hardware, economics and finance. This website will provide updates on progress toward these activities. The full Roadmap and executive summary are available.

Before you begin:

Why resilient PV?

Introduction and Context

Software Hardware

Economics

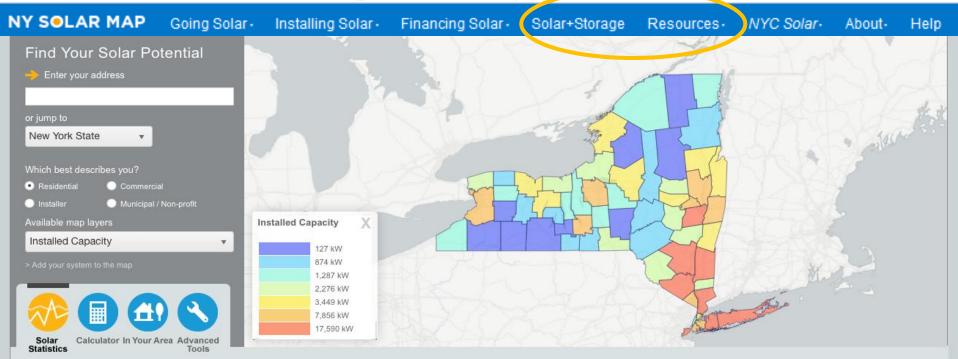




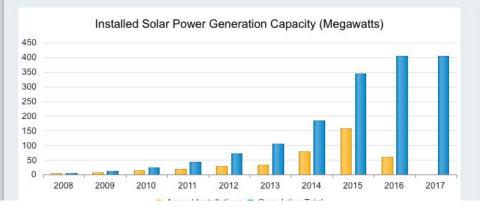


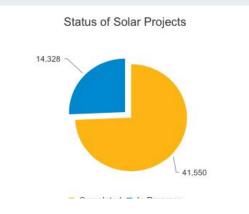
NY Solar Map and Portal





Solar Statistics for New York State

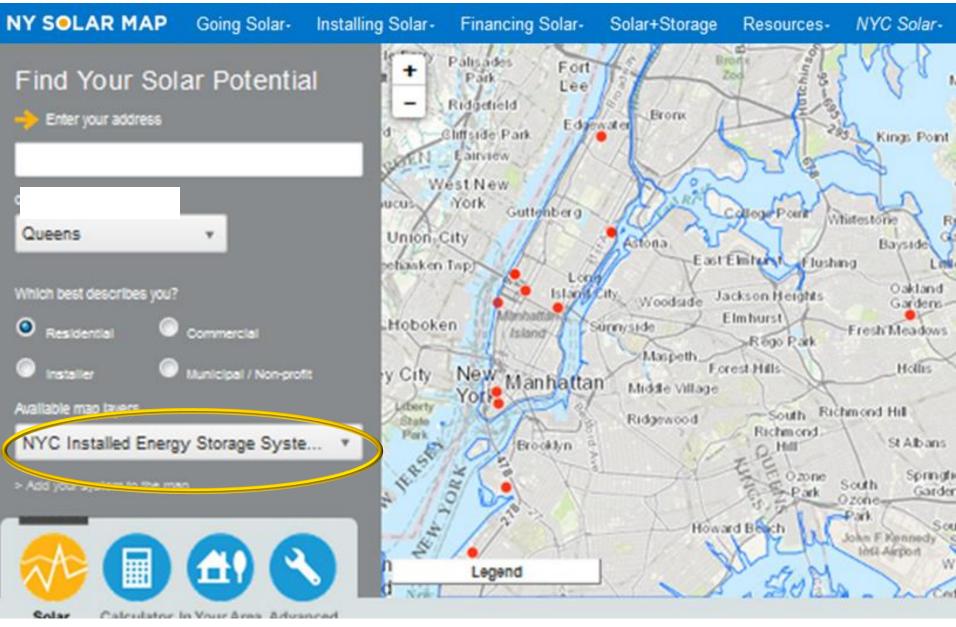




nysolarmap.com

Smart DG Hub- Resilient Solar Project





nysolarmap.com

NYC's 80x50 Vision for Energy Storage

Check to see if the theme is unique. Here's

organization with any other organization out

there. Does the theme still work? If so, I'

aid your theme is still too generic.

easy way to do this. Swap out the name of your

Benjamin Mandel Renewable Energy Policy Advisor NYC Mayor's Office of Sustainability

Clean Energy Group Resilient Power Project Webinar April 4, 2017



New York City will continue to be the world's most dynamic urban economy where families, businesses, and neighborhoods thrive. This will require new investments in housing, transportation, and jobs to support a growing population.

New York City will have an inclusive, equitable economy that offers well-paying jobs and opportunity for all to live with dignity and security. Inclusive growth will require actions to raise wages and lift New Yorkers out of poverty, achieve better health outcomes, and ensure economic opportunity for all.

New York City will be the most sustainable big city in the world and a global leader in the fight against climate change. We seek to drastically reduce our greenhouse gas emissions, send far less waste to landfills, and achieve the best air quality of any big city in the country.

New York City's neighborhoods, economy, and public services will be ready to withstand and emerge stronger from the impacts of climate change and other 21st century threats. This means making investments in our communities and infrastructure to build resiliency in the face of future shocks and stresses.

Mayor Bill de Blasio

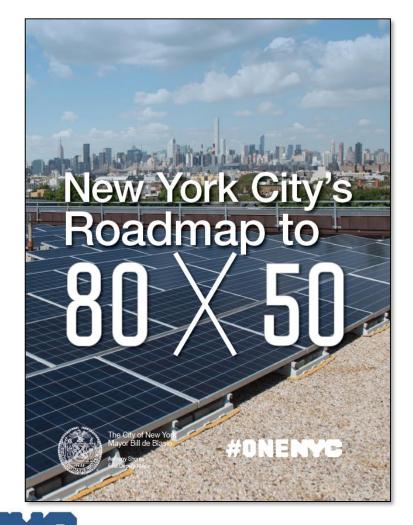
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Anthony Shorris First Deputy Mayor

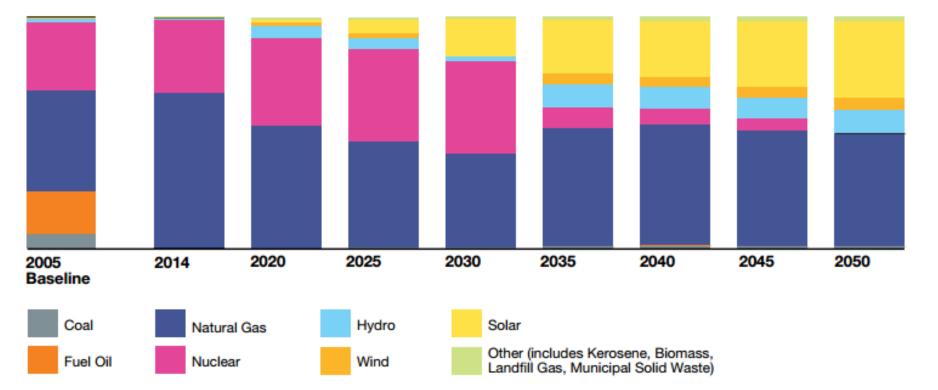
A new analytical roadmap to achieve 80x50



Sustainability

- First-of-its-kind integrated modeling of the city's GHG emissions across four sectors: energy, buildings, transportation, and waste
- Analysis of the trends that will drive future GHG emissions
- Understanding that 80x50 will be less of a technical challenge, more of a societal, financial, and institutional challenge
- Opportunity to align 80x50 investments to achieve expanded job access and economic inclusion

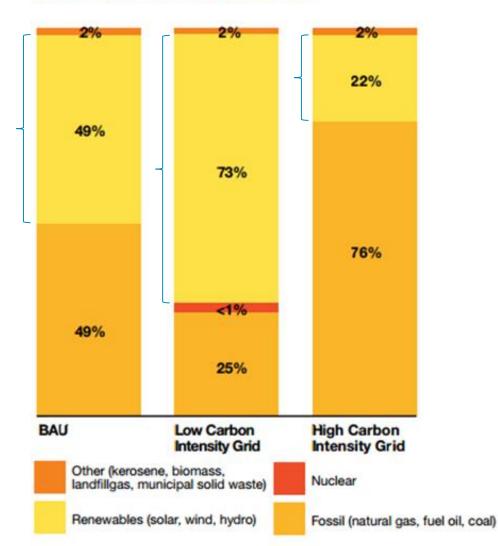
NYC's energy supply will depend increasingly on renewable energy



Business as Usual Electric Grid Fuel Mix



NYC's energy supply will depend increasingly on renewable energy

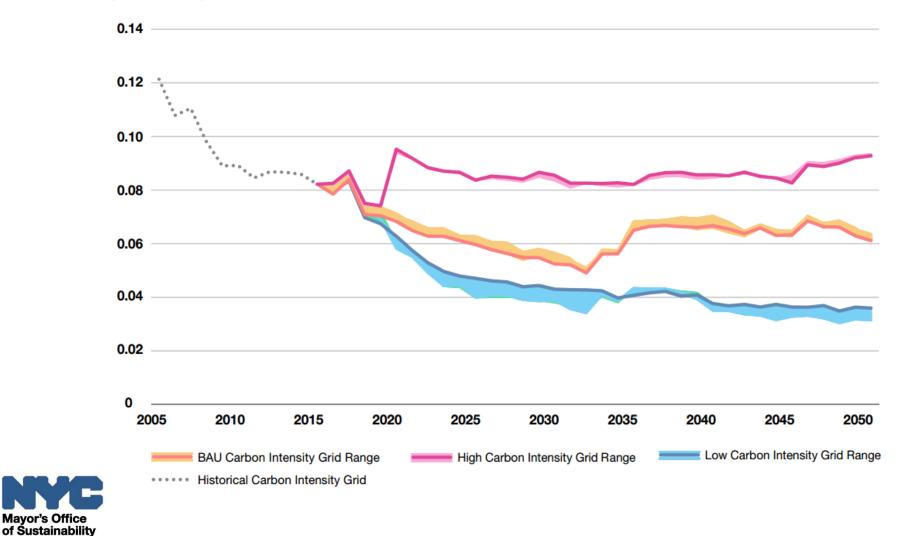


2050 Electric Grid Fuel Mix by Scenario



Other sectors will rely on a clean electricity grid to achieve 80 × 50

Modeled Future Carbon Intensity of Electric Grid and Ranges based on Changes to NYC Electric Demand (tCO₂e/MMBtu)



Mayor's Office

Energy storage can help set NYC on low-carbon grid trajectory

Energy Supply	Buildings	Transportation
Energy storage can:	Energy storage can:	Energy storage can:
Firm in-city renewable energy resources	Enhance demand management capabilities	Mitigate grid impacts associated with electric vehicle charging
Enhance grid flexibility/stability with increasingly intermittent bulk supply	Provide resiliency for critical loads	Moderate demand charges for fast charger site hosts
Defer/avoid traditional utility upgrades		



to meet growing load

100 MWh by 2020: The nation's first municipal energy storage target

- Motivated by cross-cutting use cases
- Informed by ESS project pipeline with input from:
 - Con Edison (BQDM, Virtual Power Plant)
 - NYC Dept of Citywide Administrative Services (IDEA Program)
 - NYC Economic Development Corporation (RISE:NYC)
 - CUNY (NYSolar Smart DG Hub)
 - NYSERDA
- Will be facilitated by new FDNY Sustainability Unit
 - Additional engineers and administrative staff
- FDNY and NYC DOB working in partnership with CUNY, DNV-GL, NY-BEST, Cadmus Group on NYSERDA-funded streamlining effort



Next steps

- Staff up!
- Gain experience with real-world applications of various technologies in parallel with testing
- Coordinate with utilities and State entities to create a supportive environment for energy storage





An enclosed lithium-ion battery energy storage system being installed as part of a microgrid at the Marcus Garvey Village in Brownsville, Brooklyn in March 2017 (photo credit: Demand Energy)

Thank you!

Benjamin Mandel Renewable Energy Policy Advisor NYC Mayor's Office of Sustainability bmandel@cityhall.nyc.gov (212) 676-3274



Thank you for attending our webinar

Seth Mullendore Project Director Clean Energy Group <u>seth@cleanegroup.org</u>

Find us online: <u>www.resilient-power.org</u> <u>www.cleanegroup.org</u> <u>www.facebook.com/clean.energy.group</u> @cleanenergygrp on Twitter @Resilient Power on Twitter





Upcoming Webinar

Tools for Building More Resilient Communities with Solar+Storage

Thursday, April 6, 1-2:30pm ET

www.cleanegroup.org/webinars