NEW YORK STATE OF OPPORTUNITY. | NYSERDA

The Energy to Lead

Biennial Report to the 2015 State Energy Plan

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The leadership shown by Governor Cuomo and New York State to make bold emissions reductions commitments is vital to solving the climate crisis.

Al Gore, Former Vice President

Introduction

In 2015, New York's Governor Andrew M. Cuomo declared that "climate change is an issue of society's sustainability. To deny that climate change is real is to defy reason… In the case of climate change, denial is not a survival strategy."[1] The federal government's decision to abdicate its role in protecting citizens from climate change and harnessing the benefits of a clean energy economy puts forward-thinking states like New York in the driver's seat. New York will continue pushing forward in the global fight against climate change by driving innovation and unleashing private sector markets to foster and scale clean energy solutions.

Governor Cuomo's nation-leading Reforming the Energy Vision (REV) strategy provides the unifying vision for carrying out the climate change measures and innovative clean energy solutions detailed in the 2015 State Energy Plan (SEP). REV initiatives are working to create a clean, resilient, and more affordable energy system by increasing private sector investment in clean energy solutions, spurring technology innovation, driving down technology costs, integrating more clean, distributed resources onto the grid, and bolstering the resiliency of the energy system while improving consumer choice and affordability. This two-year update shows that New Yorkers can take pride in the progress of REV in achieving these outcomes and the ambitious 2030 goals established in the 2015 SEP:

- 50 percent renewable electricity consumption
- 40 percent reduction in greenhouse gas (GHG) emissions from 1990 levels
- 600 trillion British thermal unit (TBtu) increase in statewide energy efficiency

Under Governor Cuomo, New York is pursuing wide-ranging endeavors on multiple fronts, from the grassroots level, to community and state partnerships, to the state being a key signatory to national and international agreements to advance these three goals.

[1] governor.ny.gov/news/rush-transcript-governor-cuomo-announces-new-actions-reduce-greenhouse-gas-emissions-and-lead

Under the leadership of Governor Cuomo, New York is undertaking an astonishingly comprehensive and ambitious effort to remake its energy systems and reduce its carbon emissions... It's arguably the most important clean energy policy initiative in the country today.

David Roberts, Energy and Climate Change Writer, Vox

New Yorkers know through firsthand experience that climate change is a serious problem and aggressive action is needed to chart a path toward a more sustainable future. The state is empowered by its communities to lead the nation in addressing the harmful effects of GHG emissions that have contributed to more frequent and intense heat waves, severe storms, rising sea levels, and other extreme weather events.

At the local level, municipal governments are enthusiastically embracing the call to action on combating climate change. More than 200 municipalities have taken the Climate Smart Communities (CSC) Pledge, representing 60 percent of New Yorkers outside of New York City. In 2014, Governor Cuomo launched the CSC Certification program, and 16 leading communities have undergone the voluntary but rigorous review process to become a certified CSC. In addition, more than 240 communities across the state have chosen to participate in the Clean Energy Communities program, which provides financial resources and technical support for clean energy actions by local governments. This community engagement process has led to over 646 clean energy actions, with 100 communities receiving the Clean Energy Community designation and eligibility for a grant of up to $250,000 to support further clean energy activities by the municipality.

Modernizing the state's electrical grid for the 21st century is one of the cornerstones of New York's REV and will drive further reductions in GHG emissions. This includes increasing the state's renewable energy resources, under Governor Cuomo's Clean Energy Standard (CES), thereby ensuring that 50 percent of all the electricity consumed in New York comes from sources such as solar, wind, and hydropower. In support of the CES, New York State Energy Research and Development Authority (NYSERDA) and New York Power Authority (NYPA) released in June of 2017 the largest renewable energy solicitation ever put

Thanks to Governor Cuomo's leadership, New York has recently made quantum leaps forward on climate and clean energy policy.

Jackson Morris, Director, Eastern Energy Project, Natural Resources Defense Council

forward by a state. NY Green Bank (NYGB) leveraged $440 million of its capital to drive a total investment of $1.59 billion in clean energy projects and will raise private sector funding to expand its growth and support for innovative clean energy solutions.

Key to the achievement of the CES and carbon abatement goals is a renewed and greater focus on energy efficiency by all of the state's energy agencies, authorities, and investor-owned utilities intended to promote an increased adoption of energy-saving technologies in buildings and industrial facilities throughout the state.

New York engages on a regional level as one of nine mid-Atlantic and Northeast states in the Regional Greenhouse Gas Initiative (RGGI), the nation's first mandatory, market-based cap-and-trade program. To date, RGGI has facilitated a 46 percent reduction in CO_2 emissions from New York's power plants, including a 90 percent reduction in coal-fired generation, while providing the state with over $1 billion in proceeds to support further carbon abatement and clean energy development. Governor Cuomo led the charge in getting the other RGGI states to agree to a 30 percent reduction of the RGGI cap by 2030. He has also committed to decommissioning the state's two remaining coal-fired power plants by 2020 to drive even greater reductions in our carbon footprint.

New York is the most fuel-efficient state in the nation based on motor fuel consumed per capita. One in every three transit trips in the country occurs in New York. The state supports diverse multi-modal opportunities and is working to increase the availability of low-carbon options that reduce emissions. To drive reductions in the transportation sector, New York is implementing a zero-emission vehicles (ZEV) sales mandate, which requires manufacturers to sell approximately 800,000 to 1 million hybrid, plug-in, all-electric, or fuel cell vehicles in New York by 2025. New York is also a party to the eight-state ZEV

Memorandum of Understanding (MOU), under which the states agree to pursue various measures, such as public-private partnerships, public fleet purchases, and financial incentives, in support of a market for electric vehicles (EVs).[2] Given that New York is part of a region criss-crossed by interstate highways and featuring multistate regional transit systems, New York works with 10 other mid-Atlantic and Northeastern states in the Transportation and Climate Initiative (TCI) on developing regional solutions to reduce emissions from the transportation sector.

On a national level, New York is a founder in the newly formed U.S. Climate Alliance,[3] a bipartisan coalition of states committed to filling the void left by the federal government in meeting the standards set forth in the Paris Climate Agreement. In addition, New York is one of the signers of the Under2 MOU, an international agreement[4] among states, provinces, and cities worldwide committing to keep the global average temperature from increasing 2 degrees Celsius (or 3 degrees Fahrenheit) by 2100.

While many of its benefits are already being realized, the REV strategy, as seen through the 2015 SEP initiatives, is about more than just the next year or two. It embodies a long-term approach for achieving energy and environmental sustainability that will improve the quality of life for our children and grandchildren. The details that follow provide further substance about New York's commitment to climate and clean energy leadership.

[2] Learn more about the Zero-Emission Vehicles Memorandum of Understanding here: zevstates.us

[3] Learn more about the U.S. Climate Alliance here: usclimatealliance.org/

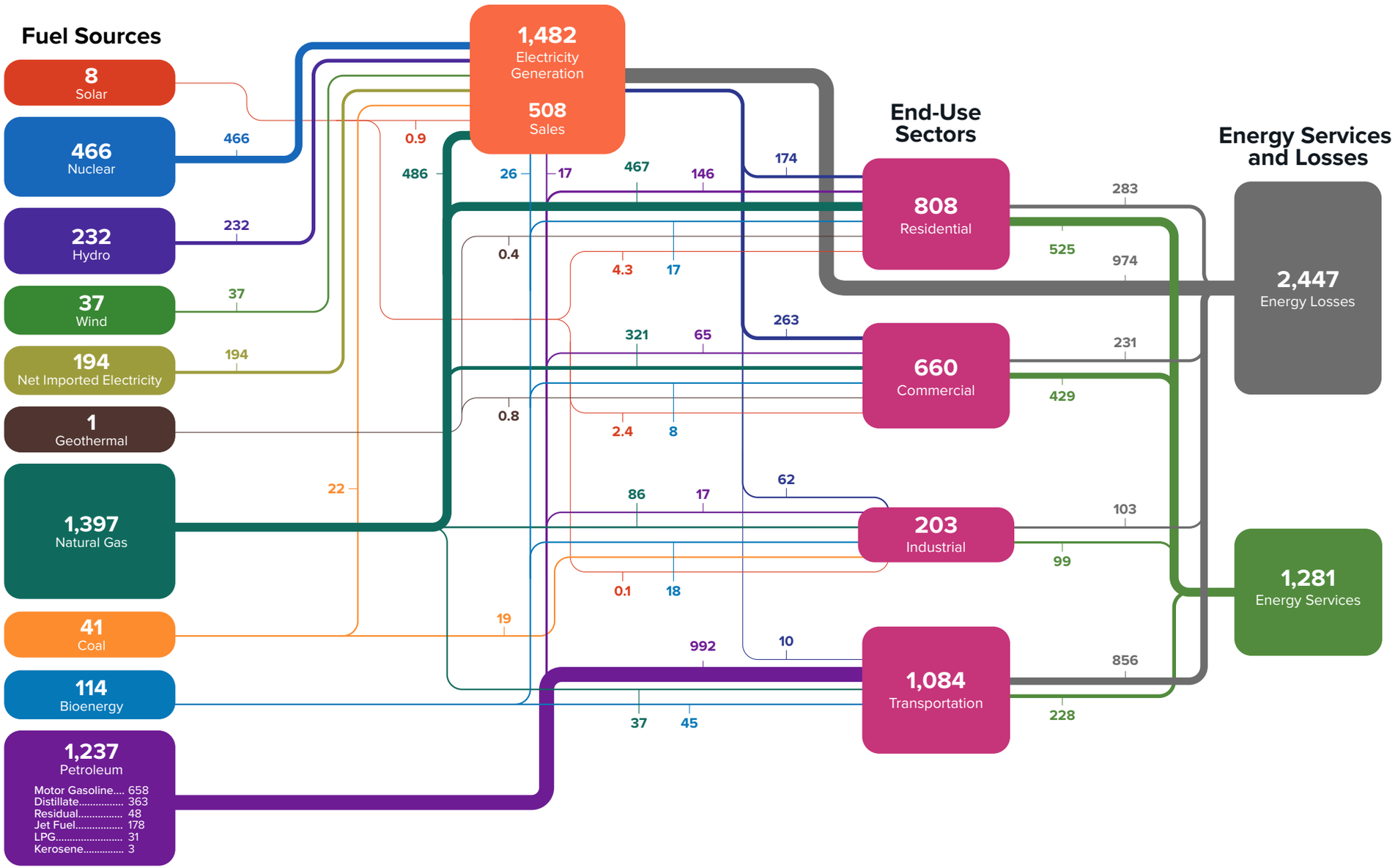
[4] Learn more about the Under2 MOU here: under2mou.org/

2015 **New York State Energy Flow**

As of 2015, New York State ranked eighth nationally in energy consumption. New York State uses the lowest amount of energy per person and has the lowest energy consumption per unit of gross state product in the U.S. The New York State Energy Flow diagram (on the following page) shows the major fuel sources that comprise New York State's vast energy system and how those fuel sources provide energy to the various end-use sectors, such as residential, commercial, industrial, and transportation. The transportation sector is the largest end-user, requiring 39.3 percent of energy, followed by residential (29.4 percent), commercial (23.9 percent), and industrial (7.4 percent). More than 70 percent of New York's energy comes from fossil fuels such as natural gas (37.5 percent), petroleum (33.2 percent), and coal (1.1 percent) used to heat homes, move vehicles, and power the electric grid. Nearly two-thirds of the energy used in New York State is lost during conversion from the primary energy source to a useful form such as space heat or powering of a mechanical process. The two largest energy losses are waste heat from electricity generation, transmission, and distribution, and the heat produced by combustion engines that drive the cars, buses, trains, planes, and boats in the transportation sector.

2015 New York State Energy Flow Diagram (TBtu)

Estimated New York Energy Consumption in 2015: 3,728 TBtu



Source: NYSERDA, Patterns and Trends, New York State Energy Profiles: 2001–2005, published October 2017. Motor gasoline includes ethanol which is not included in Total Petroleum so sums may differ from the total. Electricity Sales (508 TBtu) are a part of the total Electricity Generation sector (1,482 TBtu). Bioenergy includes ethanol (45 TBtu), wood (36 TBtu), landfill gas (6 TBtu), and waste (26 TBtu). Geothermal energy in this case represents ground source heat pumps. Electricity losses are calculated as the difference between energy input for electricity generation and energy from retail electricity sales. Energy losses for the end-use sectors are based on the following estimated end-use efficiency factors from the Lawrence Livermore National Laboratory: 65 percent for the residential sector, 65 percent for the commercial sector, 49 percent for the industrial sector, and 21 percent for the transportation sector. Totals may not equal the sum of components due to rounding.

Notable Achievements

Renewable Energy

- Implemented the Clean Energy Standard, which requires 50 percent of the electricity consumption in the state to be generated by renewable resources by 2030.
- Grew solar capacity in the state nearly 800 percent from 2011 to 2016 through the NY-Sun program.
- Approved the first offshore wind farm in New York.

Buildings and Energy Efficiency

- Launched the 10-year, $5 billion Clean Energy Fund in January 2016. The Fund's four portfolios—Market Development, Innovation and Research, NY Green Bank, and NY-Sun—will collectively work toward meeting the state's ambitious energy, environmental, and economic goals.
- Saved a total of $131 million in energy costs for New York State agencies through the BuildSmart NY initiative.
- Updated New York's building codes to enable energy savings of up to 30 percent for new residential construction and up to 7 percent for new commercial construction over the prior building code.

Clean Energy Financing

- Received more than $2.1 billion in requests for NY Green Bank capital through September 2017, demonstrating an interest and need for clean energy financing.
- Invested $440.9 million of NY Green Bank capital—while mobilizing $3 of private sector funding for each dollar invested—to support financing for 28 clean energy projects through September 2017.
- Reached the point of self-sufficiency, with revenues exceeding operating expenses, in March 2017, a full year earlier than projected.

Notable Achievements

Sustainable and Resilient Communities

- Enrolled 241 communities representing a population of 4.7 million in New York's Clean Energy Communities program. Additionally, 211 municipalities, representing one-third of the state's population, have committed to act on climate change by becoming registered Climate Smart Communities.
- Awarded funds to support 83 feasibility studies and 11 design and engineering plans through New York's community microgrid competition NY Prize, advancing local independent and resilient grid systems.
- Signed up more than 80 of the state's 250 higher education institutions to participate in the REV Campus Challenge and advance sustainability on their campus and their surrounding communities.

Energy Infrastructure Modernization

- Completed the Marcy South Series Compensation smart grid project, which is providing an additional 440 megawatts of capacity without requiring new transmission lines or new rights-of-way.
- Decreased the known inventory of leak-prone pipe by 10.6 percent between 2015 and 2016, and by 37 percent since 2011.
- Approved utility Distributed System Implementation Plans, detailing investments that will support each utility's role as a new distributed system platform provider; Distributed System Implementation Plans also share system data, highlight areas of the grid that would be well served by distributed energy resources, and provide load and distributed energy resource forecasts.

Notable Achievements

Innovation and R&D

- Made a commitment to invest $728 million over 10 years in innovation and research and development through the New York State Energy Research and Development Authority Clean Energy Fund.
- Funded innovative clean energy businesses through 76West, the Southern Tier clean energy competition. Top prize winners are: Micatu, for its optical sensor that gives highly precise voltage readings so utilities can reduce energy use, and Skyven Technologies, for its solar thermal technology designed for cooler climates and low heat processes like pasteurization.
- Began implementing 15 Reforming the Energy Vision Demonstration Projects, ranging from online marketplaces that connect customers with energy services and products to new business models for energy storage technologies.

Transportation

- 25,000 New Yorkers own an electric vehicle; only 500 owned an electric vehicle when Governor Andrew M. Cuomo took office.
- Launched a $55 million electric vehicle rebate program to support 40,000 additional electric vehicle purchases.
- Eliminated nearly 4 million single occupancy vehicle trips, 200 million vehicle miles traveled, and 16,500 tons of CO_2 emissions through the 511NY Rideshare program.

Renewable Energy

> Governor [Andrew M.] Cuomo's commitment to reach 50 percent renewable electricity by 2030 can dramatically change and modernize the energy landscape in New York, sending a strong signal to attract new private investment in renewables, like wind and solar. The Clean Energy Standard will allow New York to be ahead of the curve in creating clean energy jobs in the renewable energy industry.

Anne Reynolds, Executive Director, Alliance for Clean Energy New York

Renewable Energy

Progress

In 2014, New York received 25 percent of its electricity from renewable resources.[5] The 2015 SEP established a goal for New York to double its renewable electricity output to 50 percent by 2030.

In December 2015, Governor Cuomo requested the Department of Public Service (DPS) turn the 50 by 30 goal into an actionable target. In August 2016, the Public Service Commission (PSC) issued the Order "Adopting a Clean Energy Standard," requiring all load-serving entities (utilities as well as energy service companies, or ESCOs) to acquire an increasing amount of renewable electricity through the year 2030, starting in January 2017.[6] NYPA and Long Island Power Authority (LIPA) will pursue the CES on behalf of their customers as well.

In support of the CES, NYSERDA and NYPA announced in June of 2017 a solicitation for up to 2.5 million megawatt hours of renewable electricity, the largest renewable energy solicitation by a state. The authorities have received more than 200 project proposals in response.

The 2015 SEP introduced a wide array of tools that will support the growth of and access to renewable energy. In July 2015, the PSC adopted an order instituting the Shared Renewables initiative, also referred to as Community Distributed Generation (CDG), allowing all New Yorkers to access the benefits of clean energy resources. NYPA has launched the K-Solar program, which has dozens of schools now under contract to install solar arrays to serve their facilities. Those installations will account for more than 23 megawatts of power.

[5] New York Independent System Operator, *Power Trends 2015: Rightsizing the Grid*, March 28, 2017. nyiso.com/public/webdocs/media_room/press_releases/2015/Child_PowerTrends_2015/ptrends2015_FINAL.pdf

[6] Public Service Commission. *Case 15-E-0302: Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard*, April 10, 2017. documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=15-E-0302&submit=Search+by+Case+Number

Renewable Energy

Progress

Offshore wind (OSW) will be a major contributor to the CES, and New York is laying the groundwork to responsibly and cost-effectively advance its development. In his 2016 State of the State address, Governor Cuomo called on NYSERDA to produce the New York State OSW Master Plan by the end of 2017. In September 2016, NYSERDA released a blueprint that outlined the process, steps, and timeline for developing the final plan in alignment with Governor Cuomo's end of 2017 target.

To achieve these objectives, in his 2017 State of the State address, Governor Cuomo also announced a nation-leading goal of developing up to 2.4 gigawatts of OSW capacity by 2030. As a first step in advancement of that goal, the LIPA Board of Trustees in January of 2017 approved a power purchase agreement that will result in the first OSW farm in New York. When completed, the 90-megawatt project, 30 miles southeast of Montauk, will be capable of providing enough electricity for up to 50,000 households.

NYSERDA also issued a letter in October of 2017 requesting that the federal Department of the Interior's Bureau of Ocean Energy Management (BOEM) identify and lease four additional wind energy areas. The areas proposed by NYSERDA could each generate up to 800 megawatts of offshore wind energy.

> **The strong interest in the New York offshore wind auction demonstrates that this industry is ready to make the big capital investments needed to allow Long Island and New York to harvest this clean and reliable offshore energy source. We commend Governor Cuomo, NYSERDA, and LIPA for taking the needed steps to bring offshore wind power to New York.**
>
> *Gordian Raacke, Executive Director, Renewable Energy Long Island*

NY-Sun: *Highlight*

NY-Sun: Renewable Energy Initiative Highlight

NY-Sun has made notable strides in growing solar throughout New York State. From the time Governor Cuomo took office through the end of 2016, New York saw a nearly 800 percent increase in installed solar photovoltaic (PV) capacity.[7] In 2016, with available support from the NY-Sun program, 64,926 projects were installed statewide—a significant increase from the 8,989 solar PV projects existing in 2011. The 2016 PV installations total nearly 744 megawatts of capacity, including 99 shared solar, or CDG, projects totaling 242 megawatts. Shared solar projects represented the majority of new solar capacity additions in 2016.

In April 2016, Long Island's residential solar market became the first in the state to reach self-sufficiency and achieve the NY-Sun program goal of no longer needing NY-Sun subsidies to grow its solar market.[8]

Collectively, these efforts position the state to meet Governor Cuomo's goal to install 3,000 megawatts of solar capacity by 2023.

[7] Governor Cuomo, "Governor Cuomo Announces Nearly 800 Percent Growth of New York Solar Power Over Past Five Years," March 20, 2017. governor.ny.gov/news/governor-cuomo-announces-nearly-800-percent-growth-new-york-solar-power-over-past-five-years

[8] NYSERDA, *NY-Sun Annual Performance Report Through December 31, 2016*, page 1, April 10, 2017. nyserda.ny.gov/About/Publications/Program-Planning-Status-and-Evaluation-Reports/NY-Sun-Performance-Reports

NY-Sun: *Working for New Yorkers*

NY-Sun Working for New Yorkers: New York's First Community Shared Solar Project

Three dozen residents in New York's Southern Tier came together and made use of NY-Sun's financial incentives to establish the state's first community shared solar project. Instead of installing solar panels on individual rooftops, the residents chose to subscribe and receive a portion of the electrical output generated from an 1,100 panel solar farm in the village of Trumansburg in Tompkins County. The project is owned and operated by local developer Renovus Solar and generates up to 359 kilowatts of electricity, enough to meet the needs of 60 residents, while reducing GHG emissions by 220 metric tons.

"The interconnection of this project is a landmark moment, not only for the dozens of local families who now have access to the many benefits of solar power, but also for New York State as a whole. Community shared solar makes renewable energy possible for everyone—people whose homes and sites don't qualify for solar, renters, and even low- and moderate-income families who never thought solar was possible for them. These projects have the potential to be a cornerstone of REV, and we couldn't be more proud to be laying the tracks that will lead New York to a renewable energy future."

Joe Sliker, President and CEO, Renovus Solar

Renewable Energy

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Clean Energy Standard		Beginning in 2017, all load-serving entities, such as utilities and energy service companies, will acquire an increasing amount of renewable electricity through 2030. NYPA and LIPA will also participate.	• In August 2016, the PSC issued the Order "Adopting a CES." • In January 2017, NYSERDA made a $360 million investment to support 11 utility-scale clean energy projects, which include hydroelectric plants, onshore wind facilities, a solar farm, and a fuel cell project. • In June 2017, NYSERDA and NYPA issued solicitations for renewable energy project proposals that would deliver a total of up to 2.5 million megawatt-hours of renewable electricity. • NYSERDA and NYPA received more than 200 renewable energy project proposals, with 88 submitted to NYSERDA from 30 clean energy developers and more than 130 submitted to NYPA from 51 clean energy developers. • DPS staff is preparing recommendations for consideration of eligibility changes for Tier 2 (existing, baseline renewables), in consultation with stakeholders. Staff recommendations were provided to the Commission and noticed for public comment in October 2017, with comments due in January 2018.	DPS, NYSERDA, NYPA, LIPA	IN-PROGRESS	• All state agencies will increase the amount of renewable electricity consumed at their facilities. • All State University of New York (SUNY) campuses will increase renewable energy consumption. • NYSERDA will determine winning renewable energy project proposals by November 2017. • NYPA will evaluate project proposals and present meritorious projects to NYPA customers to gauge their interest in receiving the energy from those projects. If customers express interest, power purchase agreements will be negotiated and executed. • LIPA recently selected an additional two utility-scale solar projects totaling approximately 60 megawatts; 31 commercial rooftop solar projects totaling 20 megawatts; and three fuel cell projects totaling 40 megawatts.

Renewable Energy

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NY-Sun		Provide long-term, declining incentives to support the creation of a self-sustaining solar market in New York. Efforts under this initiative will bring solar power to 150,000 homes and businesses by 2020 and achieve 3,000 megawatts of solar capacity in New York by 2023.	• In April 2016, Long Island's residential solar market was first to achieve self-sufficiency, no longer needing state subsidies. • NYSERDA launched the Affordable Solar Onsite Residential Incentive in November 2015, which doubles the NY-Sun incentives for low- to moderate-income (LMI) residents. • NYSERDA supported 49 community Solarize campaigns that led to 1,600 solar projects while saving $2.9 million for participants. • NYSERDA launched the first state-supported Solarize campaign focused on aggregating manufacturers. • Through the NY-Sun PV Trainers Network, NYSERDA trained 11,059 local officials, first responders, and code officials. • NYSERDA and DPS created a solar interconnection ombudsperson at each agency to assist developers and customers with project complaints, questions, or delays. • In 2016, NYSERDA introduced the NY-Sun Solar Guidebook to help local governments develop a solar-friendly environment. It released an updated Guidebook in September 2017 with chapters that addressed new issues including the State Environmental Quality Review (SEQR) process and siting solar on agricultural lands.	NYSERDA, DPS	IN-PROGRESS	• NYSERDA and DPS are updating the Standardized Interconnection Requirement application to reduce delays in getting distributed generation projects, such as residential solar, connected to the grid. • NYSERDA will implement an LMI Community Solar Initiative to support broader access to New York's solar market.
K-Solar		Provide tools, technical expertise (including free solar feasibility assessments), and access to financing to help K-12 schools cost-effectively go solar, and to educate students about clean energy.	• NYPA has provided 330 free assessments at schools throughout the state, with 48 schools signing contracts to purchase a total of 24 megawatts of solar power. • The first K-Solar project finished construction and is operational. • NYPA has held 12 educational workshops with more than 300 teachers present.	NYPA	IN-PROGRESS	• To further accelerate K-Solar, as part of the Clean Climate Careers Initiative, NYPA will double its annual investments in solar, as well as energy efficiency, from $150 million to $300 million. • This investment will enable NYPA to install more than 125 megawatts of solar capacity on schools, as well as other public buildings, by 2020. • An additional eight K-12 solar projects are expected to be operational by the end of 2017.

Renewable Energy

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Shared Renewables		Also referred to as CDG, Shared Renewables provides an option to customers and communities that otherwise could not implement renewable energy projects to take advantage of solar and other renewable energy sources.	• The first Shared Renewables project began operation in October 2016 in the Southern Tier, providing nearly 360 kilowatts of power to three dozen residents in Tompkins, Steuben, and Schuyler counties. • As of the end of 2016, NYSERDA's NY-Sun pipeline included 99 CDG projects. These projects total 242 megawatts and represent the majority of new solar capacity added in 2016. • In its March 13, 2017, Order, the PSC found that the 10-member minimum requirement should not apply to CDG projects that are located on the site of a property serving multiple residential or non-residential customers.	DPS, NYSERDA	IN-PROGRESS	• The Value of Distributed Energy Resources (VDER) Phase Two Order will provide additional improvements to the Shared Renewables program.

Renewable Energy

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Offshore Wind		Responsibly and cost-effectively develop the state's OSW potential to meet Governor Cuomo's goal of building up to 2.4 gigawatts of OSW energy capacity by 2030 and support achievement of the CES.	• In September of 2016, NYSERDA released a blueprint that outlines the process, steps, and timeline to develop the New York State OSW Master Plan, including studies on various topics (environmental, supply chain, and grid interconnection) and stakeholder outreach to help inform issues of concern, and identification of potential wind energy areas for leasing by the federal BOEM. • BOEM established the first wind energy area of 79,000 acres approximately 12 miles offshore of Jones Beach and held a lease auction for this area at the end of 2016. The lease auction was the most competitive sale in U.S. history, with Statoil Wind U.S. LLC winning the auction. The lease agreement was executed in March 2017. • In October of 2017, the state submitted a request for BOEM to identify and lease four new wind energy areas. Each wind energy area can accommodate at least 800 megawatts of OSW generation. To support its request, the state submitted an area for consideration to locate these new wind energy areas. The area begins more than 20 miles from the shore. • DOS is the state lead to the BOEM-NY Task Force and is formulating a leasing schedule with BOEM and NYSERDA to develop areas proposed in the Master Plan before 2030, planning for the next task force meeting, and convening meetings of the state Renewable Energy Work Group to discuss proposals with other agencies. • In January of 2017, LIPA signed a power purchase agreement with Deepwater Wind to procure 90 megawatts of electricity from the nation's largest OSW farm, and the first OSW procurement toward the 2.4 gigawatt goal. When complete, the South Fork Wind Project could provide enough electricity to power 50,000 homes. DOS has completed its review of Deepwater's survey for potential transmission corridors and landfall locations for consistency with New York's coastal policies.	NYSERDA, DPS, DOS, LIPA	IN-PROGRESS	• NYSERDA, DOS, other state agencies, and stakeholders will complete the New York State OSW Master Plan by the end of 2017, which will define an approach for maximizing OSW potential while considering system and environmental impacts. • DOS will continue leading state interactions with BOEM to advance the wind energy area identification and leasing process for project development, finalize plans for the next task force meeting, and convene the state Renewable Energy Working Group. • NYSERDA will work with Statoil Wind U.S. LLC to responsibly develop New York's first federal lease area that, if fully developed, could produce up to 1 gigawatt of wind-generated electricity. • NYSERDA is planning to file a report on options for OSW power offtake and an OSW cost analysis with the PSC by the end of 2017. • LIPA will execute its Integrated Resource Plan that identifies and addresses issues in furtherance of the CES and Governor Cuomo's goals of 2.4 gigawatts of OSW.

Renewable Energy

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Renewable Heat NY		Advance a sustainable market for high efficiency, low-emitting wood heating systems.	• NYSERDA funded 200 efficient wood heating projects. • NYSERDA removed/recycled 21 wood boilers and 140 wood stoves, which will decrease by 20 tons the amount of particulate matter released annually. • NYSERDA trained 250 individuals in the installation of advanced wood heating systems. • NYSERDA sponsored research by Clarkson University that identified a method to suppress off-gassing of wood pellets held in storage bins, thereby increasing storage safety.	NYSERDA, DEC, DOH	IN-PROGRESS	• NYSERDA is working with Clarkson University to conduct pilots that demonstrate the success of the off-gassing suppression method. • NYSERDA and the DOH are working with Brookhaven National Laboratory to investigate the health implications of ultrafine particle emissions from advanced biomass systems.
NEW* **Renewable Heating and Cooling**		Encourage the adoption of renewable heating and cooling technologies such as ground- and air-source heat pump systems and solar hot water systems.	• As part of the Clean Energy Fund (CEF), NYSERDA released the Renewable Heating and Cooling Policy Framework, which focuses on reducing technology costs, introduces mandates for renewable heating and cooling construction and renovations, and implements a two-year, $15 million rebate program to stimulate geothermal heat pump adoption. • NYSERDA sponsors the Renewable Thermal Alliance, a public-private partnership of over 120 stakeholders dedicated to developing infrastructure for large-scale deployment of renewable thermal technologies.	NYSERDA, DPS, NYPA, LIPA	IN-PROGRESS	• NYSERDA, DPS, and NYPA are engaging with stakeholders to collect their feedback and develop additional programs to support the framework. • NYSERDA plans to introduce a community renewable heating and cooling program, similar to Solarize, that will facilitate education and purchasing opportunities for communities. • NYSERDA and NYPA will promote the installation of geothermal heat pumps at SUNY institutions and state-owned buildings through the Geothermal Campus Challenge program. • LIPA will provide rebates through its energy efficiency and renewables programs for geothermal projects. • NYSERDA is working with electric and gas utilities to develop non-wires and non-pipeline alternatives for expansion using renewable heating and cooling technologies.

**New to the 2015 State Energy Plan*

Renewable Energy

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Clean Organic Waste Management		Cut energy consumption in New York's water resource recovery plants and reduce and divert food waste from landfills.	• NYSERDA released a report identifying $22 million in annual savings that could be achieved by diverting food waste from landfills. This diversion would also help to decrease CO_2 emissions associated with waste management—the equivalent of removing up to 37,000 cars from the road.	NYSERDA, DEC	LAUNCHED	• NYSERDA will work with a group of water resource recovery facilities to create whole plant energy master plans that will provide communities a process for reducing energy consumption. • NYSERDA will produce a benefit/cost analysis of potential site-specific energy efficiency and renewable energy projects at waste resource recovery facilities. These analyses will assist municipalities with incorporating these projects into their capital improvement plans. • DEC and NYSERDA will continue to provide a suite of programs to enhance food recycling through donations and composting.
NEW* **Clean Energy for Agriculture**		In 2012, New York's farmers spent a collective $443 million on utilities, gasoline, fuels, and oils. Governor Cuomo tasked NYSERDA and DAM with forming a task force of state agencies and external partners to produce recommendations for improving energy affordability and increasing clean energy deployment in the agriculture sector.	• NYSERDA, DAM, DEC, DPS, and task force members developed a strategic plan containing 20 initiatives designed to build awareness of clean energy opportunities in New York's farming communities and to facilitate the developing and sharing of best practices. • Under the CEF, NYSERDA launched a competition to strategically source pioneering anaerobic-digester-gas-to-electricity installation and demonstration pilot projects that offer the prospect of reduced costs, improved performance and value, and sustainable business models. Successes can form the basis for subsequent coaching regarding cost-reduction and revenue-enhancement strategies.	DAM, NYSERDA, DEC, DPS	LAUNCHED	• DAM, NYSERDA, and DEC chief executives have signed a two-year MOU to continue working together on the task force to implement the initiatives of the strategic plan. Other key stakeholders have been invited to sign the MOU and join the initiative. • NYSERDA is finalizing the CEF investment plans containing agriculture sector strategies that will move forward the energy efficiency initiatives identified in the strategic plan. These include developing a best practices guide, providing technical assistance, and supporting demonstrations of innovative, underused, commercially available technologies and practices that result in energy efficiency improvements on farms.
Sustainable Fuel Production		Support in-state production of sustainable, low-carbon fuels to reduce New York's dependence on petroleum fuels purchased from out of state.	• New York is one of four states that restrict the sale of gasoline/ethanol blends containing more than 10 percent ethanol by volume (E10). DAM continues to work on developing a draft regulation that would allow gas stations the option of supplying blends greater than E10.	NYSERDA, DAM	IN-PROGRESS	• NYSERDA will work with companies, state and federal agencies, universities, incubators, and others to help enhance in-state development of beneficial biofuels.

**New to the 2015 State Energy Plan*

Buildings and Energy Efficiency

> [The REV Track 2 Order] incents utilities to drive forward the REV, by tying together customer and shareholder outcomes. It brings important REV objectives such as system efficiency and energy efficiency into the core business of the utility. Until now these important functions and many others like [them] have not been a central focus of utilities. This is all about to change.

Walter Rojowsky, Energy and Utilities Advisor, PA Consulting Group

Buildings and Energy Efficiency

Progress

Over the past two years, New York has built a solid foundation on which to make serious and lasting gains toward achieving the SEP's energy efficiency goal.

Energy efficiency is among the most essential and cost-effective actions needed to support an effective climate policy. Energy efficiency is a smart investment—reducing overall energy spend, system costs, and emissions in a cost-effective manner.

Increasing energy efficiency will be critical to realizing the state's nation-leading energy and climate goals of reducing overall emissions by 40 percent and supplying 50 percent of the state's electricity from renewable energy by 2030 (known as "40 by 30" and "50 by 30," respectively). Hence, a third prong in the 2015 SEP set a 2030 goal of increased energy efficiency of 600 TBtu from 2012 levels, which equates to approximately a 23 percent reduction from the buildings sector.

Current state progress toward this goal has been meaningful. The current annual rate of energy efficiency investment throughout the state over the next three years is expected to be about $450 million (NYSERDA $180 million, utilities $220 million, and LIPA $50 million), in addition to NYPA's energy efficiency financing activities of $200 million a year, with a planned increase for energy and solar investments to $300 million. These programmed activities by themselves are estimated to achieve nearly the entirety of the 2015 SEP energy efficiency goal by 2030, with the remaining gap expected to be filled by market-based activity. However, in order to ensure achievement of Governor Andrew M. Cuomo's 40 by 30 GHG reduction goal, New York will need more of every resource—including energy efficiency—than is currently programmed or anticipated.

Setting ambitious goals for energy efficiency is only the beginning—multiple state agencies are working in concert with New York's utilities, businesses, and local communities

Buildings and Energy Efficiency

Progress

to apply REV principles to mobilize additional energy efficiency. At its core, REV is about unleashing the locational and temporal value of clean Distributed Energy Resources (DER), including energy efficiency, through the provision of data and information supporting new business models and customer choice.

The Commission's 2016 authorization of the CEF is an integral component of REV. Through the CEF, NYSERDA has committed to direct $2.7 billion in funding over the CEF's 10-year life span to support market development activities, with a focus on energy efficiency. NYSERDA's Market Development approach to energy efficiency follows three main avenues:

- First, reducing the costs of retrofits. Specifically, NYSERDA is emphasizing soft cost reduction, including a focus on cost-drivers such as customer acquisition, project development, and performance verification as activities that are ripe for cost reduction and that are addressable by state-level intervention by an entity like NYSERDA.
- Second, preserving market momentum through "bridge incentives" that provide temporary financial support to promising interventions while scaling up these interventions to establish self-sustaining markets and reduce the need over time for financial support.
- Third, accelerating innovative solutions and driving toward deeper energy retrofits. This encompasses innovation in business models, such as those that seek new models of customer procurement, or pay-for-performance models; innovation in deployment of technology, such as real-time energy management; and other strategies to advance the market toward delivering buildings that achieve extremely high performance levels, like passive house or net-zero energy.

Buildings and Energy Efficiency

Progress

The RetrofitNY initiative uses all three of these avenues, in its pursuit of catalyzing a large-scale, self-sustaining industry capable of delivering truly deep energy retrofits of New York's existing multifamily residential buildings to achieve or approach net-zero energy performance.

Beyond the CEF's initiatives, the Commission is actively driving greater utility focus on energy efficiency as a resource. In its February 26, 2015, REV Order, the Commission directed utilities to implement a portfolio of energy efficiency programs that, at a minimum, maintains their energy efficiency annual savings goals at their previously approved levels—authorizing the expenditure of $241 million per year. Importantly, the Commission is directing that this base level of utility-driven energy efficiency be built upon. Through rate case programs, demonstration projects, non-wires alternatives, and their Distributed System Implementation Plans (DSIPs), utilities are not only being directed to increase energy efficiency savings in innovative ways, but also being offered incentives to stretch to achieve higher levels of savings for the benefit of their customers, their system, and our environment.

Greater efficiency in new construction and renovation projects is also being driven by updated codes for commercial and residential buildings adopted by the New York State Fire Prevention and Building Code Council in 2016. This 2016 update will provide 30 percent savings for new residential construction and 7 percent savings for new commercial construction relative to the prior building code.

BuildSmart NY and New York Energy Manager: *Highlight*

BuildSmart NY and New York Energy Manager: Buildings and Energy Efficiency Initiative Highlight

The BuildSmart NY program is progressing toward its 2020 goal of reducing energy consumption by 20 percent in state-owned and -managed facilities. This will help to achieve a broader goal under the SEP of increasing statewide energy efficiency by 600 TBtu by 2030. Since the program's initiation, NYPA has implemented 95 BuildSmart NY projects that are yielding an annual $49 million in savings for state agencies.[9]

A cornerstone of the BuildSmart NY program is NYPA's New York Energy Manager (NYEM) facility. Customers served include Empire State Plaza, City University of New York, SUNY, and the Jacob K. Javits Convention Center. In its providing of real-time data and advanced analytics, NYEM leads to better and more informed energy choices, consistent with Governor Cuomo's REV strategy.

Currently, NYEM hosts utility data for 7,500 state buildings and is live connected to 1,200 buildings through smart meters. NYPA plans to expand the system and its services to a total of 20,000 buildings over the next five years.

> **"The New York Power Authority's Energy Manager program may be the single biggest effort to integrate building-side energy management data with statewide energy goals."**
>
> *Jeff St. John, Senior Editor, GreenTech Media*

[9] nypa.gov/-/media/nypa/documents/document-library/operations/buildsmartny-eo88-annual-progress-report-2016.pdf

New York: **Providing Low-Income Households with Clean Energy Opportunities**

It is essential that the benefits of New York's clean energy revolution flow through to the low- to moderate-income sector of the state's population. New York State oversees a number of initiatives and programs designed to increase access to clean energy solutions and reduce energy burdens for low- and moderate-income households.

New York: **Providing Low-Income Households with Clean Energy Opportunities**

Energy Affordability Policy

On February 16, 2017, the PSC issued an order adopting a universal Energy Affordability Policy, which seeks to limit energy costs for New York's LMI households to no more than 6 percent of household income.

- As an initial step to reaching all eligible households, the Commission directed that utilities open their low-income discount programs to all households that currently receive the Home Energy Assistance Program (HEAP), regardless of fuel or benefit type.
- Statewide, the enhanced low-income discount program will serve approximately 1.65 million customers, at a cost of approximately $260 million, an increase of approximately 87 percent to existing programs.

In concert with the Commission's adoption of the Energy Affordability Policy, Governor Cuomo directed the formation of a task force to develop new strategies to reduce the energy burden and increase access to clean energy benefits for all of the state's low-income households. Governor Cuomo also established the Environmental Justice (EJ) & Just Transition Working Group made up of EJ organizations, community leaders, and health and labor advocates to develop recommendations for state agencies to consider in crafting a statewide EJ policy and individual agency EJ action plans.

New York: **Providing Low-Income Households with Clean Energy Opportunities**

EmPower NY

NYSERDA's EmPower NY program provides no-cost energy efficiency services to households at or below 60 percent of the state median income (SMI), and is available to homeowners and to renters. The program is funded through the CEF and is delivered by a network of more than 200 energy efficiency and weatherization contractors across the state.

Assisted Home Performance with ENERGY STAR®

The Assisted Home Performance with ENERGY STAR program is a whole-house energy efficiency program, administered by NYSERDA and funded through the CEF. The program provides incentives for energy efficiency upgrades to households that have an annual income of up to 80 percent of area median income or SMI, whichever is higher. Eligible customers receive a discount covering 50 percent of the cost of eligible energy efficiency improvements up to $4,000 per project for single-family homes, and up to $8,000 for two- to four-unit residential homes.

Multifamily Performance Program

NYSERDA's LMI component of the Multifamily Performance Program addresses cost barriers experienced by owners of LMI properties when implementing clean energy upgrades. The program provides incentives for work scopes designed to achieve at least 25 percent whole-building source energy savings.

New York: **Providing Low-Income Households with Clean Energy Opportunities**

Affordable New Construction

NYSERDA's new construction program promotes high performance for the construction of affordable low-rise and high-rise multifamily projects by providing: financial incentives to overcome the incremental cost of building to a higher performance threshold, such as passive house design, or net-zero energy standards; and providing technical assistance, tools, and resources on high-performance new construction techniques, with an emphasis on integrated design solutions and predevelopment cost reductions.

RetrofitNY

RetrofitNY will help preserve and improve the performance of affordable housing properties, while driving improved resiliency and tenant health as well as comfort.

Affordable Solar

NYSERDA's Affordable Solar program, part of NY-Sun, provides incentives to help lower the cost of installing rooftop solar for LMI customers. The program doubles the current NY-Sun incentive for solar electric system installations for eligible homeowners.

In December 2016, NYSERDA announced the availability of predevelopment funding to help expand access to the benefits of solar to LMI households. Funding will be awarded through an open solicitation to support the projects that lead to the implementation and operation of solar installations for multifamily affordable housing and shared solar installations that provide access to LMI households.

New York: **Providing Low-Income Households with Clean Energy Opportunities**

REVitalize

Through REVitalize, NYSERDA seeks to bridge the gap in access to clean energy solutions for LMI communities and EJ areas by supporting the planning and development of community-scale clean energy projects. NYSERDA will work with community-based organizations (CBO) that serve or represent lower-income communities and EJ areas to procure the technical assistance needed to address key planning and development issues such as identifying successful models of community engagement, site selection, identifying ownership and finance structures, customer enrollment, and mechanics for the allocation of benefits.

New York:
Market Development and the Clean Energy Fund

To support the advancement of a growing energy efficiency market, which allows consumers to choose energy efficiency as a routine energy service and provide the energy efficiency industry with greater opportunity, the CEF will pursue the following general strategies to advance market development for energy efficiency:

- Provide information, data, and education for customers and service providers to raise awareness and demand, reduce customer acquisition costs, train clean energy workforces, and improve customer confidence.
- Offer technical assistance, and provide standardized and simple, robust tools for clean energy partners, including service providers, contractors, and energy decision makers such as code officials and local government leaders to lower soft costs and address implementation constraints.
- Provide quality assurance for proposed clean energy solutions and deliver performance validation, monitoring, and verification of new clean energy technologies to improve customer confidence.
- Pilot, demonstrate, and replicate new technologies and business models to advance innovative, scalable, deeper, and more cost-effective solutions.
- Collaborate with utilities and other state agencies (e.g., Department of Energy Conservation [DEC], Department of Housing Community Renewal) to foster an economy-wide market transition to collectively address critical barriers to energy efficiency and clean energy.
- Re-engineer the customer experience to provide better service to NYSERDA's customers, and industry and community partners.
- Engage communities and partners to support the deployment of energy efficiency across all sectors.
- Enable aggregation of different customer types (e.g., residences, municipalities, businesses, real estate portfolios) to reduce costs through economies of scale and leverage peer pressure to break through inertia.

New York: **Energy Efficiency Principles**

New York's national leadership on climate change must be met with an equally steadfast and robust commitment to energy efficiency.

New York: **Energy Efficiency Principles**

New York's national leadership on climate includes an equally robust commitment to energy efficiency. The state's energy efficiency policies and programs are designed to realize the multiple benefits that come from this energy resource including: saving consumers money by reducing energy bills, saving utilities money by avoiding more costly investments in the utility system, preserving public health and protecting the environment by avoiding greenhouse gas emissions and other pollutants, and creating jobs for New Yorkers in a growing industry. New York's approach is geared to achieve continued value from the launch of the historic, $5 billion Clean Energy Fund; from robust utility-sponsored programs; from lead-by-example programs where state facilities prove out energy efficiency approaches and benefits; and from continued enhancement of strong and effective codes and standards. These activities will drive an energy efficiency market where consumers are choosing energy efficient options as part of meeting their everyday energy needs, and where a thriving industry of energy efficiency service providers delivers those services to consumers.

New York: **Energy Efficiency Principles**

New York's approach to the State Energy Plan goals will lower the costs and speed the achievement of these goals through deployment of energy efficiency solutions that create the most value for both consumers and the state's energy system, and draw on innovation and investment from all sectors. To ensure market growth at a pace and in a manner needed to meet the state's objectives, New York's energy efficiency activities will be guided by a set of principles, including the following:

- Communicate clearly New York's energy efficiency policy and plan towards the 2030 vision.
- Regularly update New York's 2030 vision and implementation paths to pursue significant levels of energy efficiency in alignment with long-term energy policy objectives.
- Integrate and establish complementary strategies across all engaged entities.
- Establish energy efficiency strategies that achieve emissions reductions from all energy sources and fuels as well as across market segments, to support the 40X30 greenhouse gas emissions reduction goal cost effectively and at increasing depth of energy savings.
- Establish energy efficiency strategies to catalyze thriving clean energy markets and private sector investments leading to greater scale, impact and cost reduction, while recognizing the full value of energy efficiency.
- Engage with market participants to best inform program strategies for scale and impact.
- Prioritize initiatives to address the unique barriers faced by low and moderate income energy consumers.

New York: **Energy Efficiency Principles**

- Prioritize innovative initiatives and programs that deliver energy efficiency services at lower costs and greater levels of scale, led by market-enabling approaches implemented under the Clean Energy Fund and designed for broader market deployment upon demonstrated success.
- Ensure the cost effectiveness of portfolios of publicly-supported energy efficiency programs.
- Modernize the measurement and verification of energy efficiency savings to provide more market-relevant data, thereby increasing confidence among consumers, utilities, and service providers in the energy savings.
- Develop methods of measuring market-driven energy efficiency that achieves reduction in load and energy usage without direct intervention from state-funded programs.

These principles will guide the state's decision-making on energy efficiency and also its development and adoption of policies and programs in response to market dynamics, so as to deliver energy and savings benefits to all New Yorkers and to help them understand how energy efficiency is contributing the state's energy, environmental, and economic objectives. The state's clean energy goals and objectives are already bold and nation-leading, and New York will continue to seek innovation and new business models to expand the market for energy efficiency.

Buildings and Energy Efficiency

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
BuildSmart NY		Reduce energy consumption by 20 percent in state-owned and -managed facilities by 2020.	• NYPA implemented 95 BuildSmart projects yielding state agencies $9 million in annual savings. • NYPA initiated the NYEM program, a secure smart grid system that tracks the energy usage of 3,500 state buildings and is live connected to 1,200 buildings, allowing for real-time tracking of energy usage and the identification of savings opportunities. • NYSERDA's CEF initiative, Real-Time Energy Management, is supporting real-time energy management services like NYEM.	NYPA, NYSERDA, LIPA	IN-PROGRESS	• To accelerate BuildSmart, as part of the Clean Climate Careers Initiative, NYPA will double its annual investments in energy efficiency, as well as solar, from $150 million to $300 million. • NYPA plans to expand the NYEM program to 20,000 buildings over the next five years. • LIPA and NYPA are working together to implement NYEM on Long Island. • NYSERDA will accelerate market adoption of real-time energy management services through the sharing of best practices and case studies alongside offering financing for pilot projects.
NYSERDA Energy Efficiency Strategies		Through the CEF, apply innovative strategies to reduce costs, increase private investment, accelerate customer demand, and build self-sustaining markets for energy efficiency services.	• Through June 2017, NYSERDA submitted the CEF initiatives representing funding of $1.3 billion with projected benefits of 31 million metric tons of GHG emission reductions, nearly $6 billion in participant bill savings, and $5.8 billion in private investment. • Due to the nature of the progressively built CEF portfolio, a number of these initiatives are in their infancy, having just recently been launched. More initiatives will continue to be added to the portfolio.	NYSERDA	IN-PROGRESS	• Through the CEF, NYSERDA will invest $2.7 billion through 2026 in Market Development, the bulk of which will be directed to energy efficiency-focused solutions. • NYSERDA will engage with utilities, the private sector, and third-party providers to reduce costs of retrofitting existing buildings, expand efficiency financing, and accelerate innovation in and adoption of energy efficiency. • The CEF Order called for a Commission review in 2017. To facilitate this review NYSERDA will file a compiled Investment Plan and Performance Report on November 1, 2017, which will be issued for public comment prior to Commission action.
Utility Energy Efficiency Strategies		Through annual Energy Efficiency Transition Implementation Plans (ETIPs), utilities propose energy efficiency programs that drive greater adoption and provide increased value to customers in support of the state's ambitious clean energy goals.	• As of July 2015, each utility filed initial ETIPs for calendar years 2016–2018, which collectively estimated energy savings of nearly 579,000 megawatt-hours and 1,657,000 dekatherm hours for 2016. • On June 1, 2017, utilities filed ETIPs for calendar years 2017–2020. • Through the REV Track 2 Order, the Commission established the framework for an earnings adjustment mechanism, or performance-based incentive, for utilities that go beyond their established efficiency targets.	DPS	IN-PROGRESS	• Utilities will increasingly integrate energy efficiency solutions and investments into their various REV initiatives, including DSIPs. • Earnings adjustment mechanisms and increased savings targets will be considered within each utility's rate case. • The June 1, 2017, Utility ETIP budgets and metrics plans are expected to be acted on by early 2018.

Buildings and Energy Efficiency

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Energy Efficiency Measures in Affordable Housing Developments		Collaborate with building owners, property managers, and the private sector to deploy and improve the energy efficiency of the state's affordable multifamily housing stock.	• As part of the CEF, NYSERDA launched the RetrofitNY initiative to entice the private sector to retrofit affordable housing units to the highest energy efficiency standards, up to 70 percent below typical consumption levels. • New York State agencies introduced a statewide Integrated Physical Needs Assessment (IPNA) to create a uniform approach to integrating energy and water efficiency opportunities for state and New York City affordable housing programs. • HCR provided extra points for passive house design in its Unified Funding Application process for projects seeking 9 percent tax credits. • HCR's Housing Finance Agency became the first in the nation to have its bonds certified by the Climate Bonds Initiative. More than $200 million in "Green Bonds" have been issued, which finance new, low-carbon construction projects.	NYSERDA, HCR	IN-PROGRESS	• Through RetrofitNY, NYSERDA will procure deep energy retrofit designs to be tested on proof-of-concept buildings. • NYSERDA will continue to work with affordable housing agencies to improve the IPNA tool and process, and increase the number of buildings conducting this type of enhanced assessment.
NEW* **Retrofit 20,000 Homes**		Increase the number of low-income residential homes retrofitted for energy efficiency.	• Increase the number of low-income homes receiving energy efficiency or weatherization services from NYSERDA's CEF EmPower NY program and HCR's Weatherization Assistance Program.	NYSERDA, OTDA, HCR	LAUNCHED	• The Office of Temporary and Disability Assistance (OTDA) will transfer $14 million of low-income HEAP funds to NYSERDA, which NYSERDA will match with CEF funds, to provide HEAP recipients with energy efficiency services.

**New to the 2015 State Energy Plan*

Buildings and Energy Efficiency

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Combined Heat and Power		Increase the implementation of combined heat and power (CHP) cogeneration systems to give individual buildings the ability to produce their own efficient heat and electricity.	• Approximately 600 CHP systems have been installed statewide, and current deployment is five times faster than it was a decade ago. • NYSERDA built and maintains a catalog of pre-approved vendors for CHP systems and service providers. • NYSERDA and LIPA joined the U.S. Department of Energy's (DOE's) CHP for Resiliency Accelerator Partnership Program to share lessons and develop best practices around CHP incorporation into emergency plans. • PSC exempted CHP systems under 15 megawatts from standby charges for four years. • The REV Track 2 Order provided additional and favorable changes to remove barriers and increase CHP system uptake. • The Commission approved Con Edison's standby rate pilot that extends the standby rate exemption for 10 years for CHP systems up to 50 megawatts and battery storage systems up to 25 megawatts of battery storage. The pilot will also test innovative standby pilot rate options to help reduce the cost to customers.	NYSERDA, LIPA, DPS	IN-PROGRESS	• NYSERDA will support DOE in expanding NYSERDA's pre-approved vendor catalog for use in the CHP eMarketplace. • The Commission will monitor the progress of Con Edison's standby rate pilot.
Building Codes		Minimum mandatory state standards for newly constructed or renovated residential and commercial buildings. Localities may choose to exceed these standards.	• In October 2016, the New York State Fire Prevention and Building Code Council approved the update to align the New York State Energy Conservation Construction Code with the American Society of Heating, Refrigerating and Air-Conditioning Engineers 90.1–2013 and the 2015 International Energy Conservation Code applicable to commercial and residential buildings for new construction and renovation. This update will provide an energy savings of 30 percent for new residential construction, and of 7 percent for new commercial construction over the prior building code.	DOS, NYSERDA, DOH	COMPLETE	• DOS and NYSERDA will provide training to increase compliance. Under the CEF, NYSERDA will further incent training by listing energy code enforcement as a High-Impact Action under its Clean Energy Communities program. • DOH will continue to provide training to code enforcement officers, engineers, and architects on the effects of energy codes on indoor temperature and humidity. • NYSERDA will release a voluntary model stretch energy code, NYStretch-Energy, for use by local governments and others in New York State. It will provide additional energy savings over the New York State Energy Conservation and Construction Code of 14 percent for new residential construction and 8 percent for new commercial construction.

Buildings and Energy Efficiency

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Appliance and Products Standards		Address upstream and midstream supply chain barriers that result in a limited quantity of clean and efficient products for some equipment/ technology categories.	• As a CEF initiative, NYSERDA launched a solicitation designed to overcome supply chain barriers to the adoption of an underutilized clean energy product: air source heat pumps. • NYSERDA is conducting a New York-specific technical feasibility study to assess the market opportunity and savings potential of proactively issuing and implementing current and new standards for appliances and products.	NYSERDA, DOS	IN-PROGRESS	• NYSERDA will implement additional CEF appliance and product pilot programs and initiatives throughout the state to learn how best to optimize the supply chain and product uptake.

Clean Energy Financing

> New York State is among the leaders of continued U.S. action on climate change, and that leadership is demonstrated in two newly released request for proposals that are expected to significantly boost the state's pipeline of solar and energy efficiency projects that currently have a hard time finding financing.

Douglass Sims, Director of Strategy and Finance,
Natural Resources Defense Council's Center for Market Innovation

Clean Energy Financing

Progress

Access to clean energy financing plays a central role in scaling clean energy markets to the point of self-sufficiency and has grown markedly in the past two years in New York.

From the introduction of the 2015 SEP through September 30, 2017, NYGB closed 28 deals for which it provided over $440 million of capital. As a result of the revenue generated through its transactions, NYGB has reached the point of self-sufficiency, meaning revenues exceed operating expenses, and is reinvesting earnings into new clean energy projects. NYGB will grow its success by seeking to raise capital directly from the private sector and translate its model to other states by assisting in the establishment of new Green Bank offices.

New Yorkers are also increasingly turning to Property Assessed Clean Energy (PACE) financing as a means of paying for clean energy projects. Through June 2017, NYSERDA's non-profit, local development corporation partner Energy Improvement Corporation (EIC) provided $1.9 million in Energize NY PACE financing in support of clean energy projects.

By 2021, EIC estimates deploying $50 million of Energize NY PACE financing in support of additional projects. In March 2017, NYSERDA introduced guidance to expand PACE financing to commercial and multifamily facilities not involved with a NYSERDA or utility program, which is the current requirement.

> **Private investment is key to driving climate investment to scale. Green Banks can provide a critical link in the climate finance architecture, using limited public-purpose funding to take on risk and leverage private capital quickly and effectively to support large-scale low-carbon investment and enable countries, cities, and states to meet their climate goals.**
>
> *Reed Hundt, CEO, Coalition for Green Capital*

NY Green Bank: *Highlight*

NY Green Bank: Clean Energy Financing Initiative Highlight
NYGB continues to attract growing private sector participation to finance clean energy projects that will benefit New York's economy while helping the state meet its clean energy and climate goals. The success of NYGB detailed below can serve to benefit other states, and NYGB will provide assistance to those states interested in establishing their own Green Bank offices.

NYGB established itself as a leading sustainable infrastructure financier, having met three key objectives during the most recent fiscal year, 2016–2017:

1. Commit $200 million to clean energy investments.
2. Have expected total value of projects deployed in the state of New York be at least three times NYGB's commitment on average across the portfolio.
3. Grow revenue and manage costs to put NYGB on pace to reach positive net income in 2018.

At the end of September 2017, NYGB had provided $440.9 million, leveraging private sector funds at a rate of 3:1, to support 28 transactions across a multitude of energy technologies, including solar electric, energy efficiency, wind, and bioenergy. Many sectors across the state's economy are benefiting as a result, including residential homeowners, commercial enterprises, municipalities, universities, schools, and hospitals.

NY Green Bank: *Highlight*

NYGB earns a market rate of return for capital provided and reinvests its earnings into new clean energy projects. This has allowed it to become a self-sustaining entity with no need for additional public investment. NYGB announced that it had achieved self-sufficiency (meaning that its income exceeds its operating expenses) on March 31, 2017, one full year earlier than expected. It has realized a net income of $17.8 million since inception.

The clean energy projects in the NYGB portfolio to date will help reduce GHG emissions by up to 7.4 million metric tons over the projects' lifetime, equivalent to removing 54,800 to 72,500 cars from our roadways for 22 years.[10]

[10] See NYGB Q2 Public Filing by visiting: greenbank.ny.gov/Resources/Public-Filings

NY Green Bank: *Working for New Yorkers*

NY Green Bank Working for New Yorkers:
Hebrew Homes for the Aged at Riverdale Project

NYGB engaged with Bank of America Merrill Lynch (BoA Merrill) to co-invest in a $14 million tax-exempt equipment lease that will enable deep energy retrofits at Hebrew Homes for the Aged at Riverdale. Hebrew Homes began as The Hebrew Home for the Aged in 1917 when it started providing services out of a synagogue in Harlem. Today, it operates a 32-acre campus in Riverdale.

The investment will replace older infrastructure with cleaner, more efficient equipment—including steam and electric generators, air handlers, a cooling tower, and an absorption chiller—yielding approximately $1.6 million in annual savings and a 64- to 78-ton reduction in annual GHG emissions. A portion of the cost savings will be used to make the equipment lease payments; the remainder will be used to support and enhance the facilities to the benefit of the 12,000 residents, patients, and members of the community.

Deep energy retrofits require longer-term leases that extend beyond the number of years BoA Merrill would normally finance; however, NYGB was able to structure an innovative product that allowed BoA Merrill to stay within its usual term and financing and allowed the project to move forward. This partnership is designed to build confidence for investing in longer-term, small to mid-sized energy efficiency projects, like this deep energy retrofit project at Hebrew Homes at Riverdale. The solution could be applied at other elder care facilities throughout the state.

Clean Energy Financing

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NY Green Bank		A state-sponsored sustainable infrastructure investor that collaborates with the private sector to overcome financial market barriers and finance clean energy projects throughout New York State. NYGB is the largest Green Bank in the nation.	• As of September 30, 2017, NYGB, a component of the CEF, had grown its investment portfolio to $440.9 million, which is estimated to drive lifetime GHG emissions reductions of between 5.5 and 7.4 million metric tons, equivalent to removing between 54,800 and 72,500 cars from the road for a period of 22 years. • NYGB achieved self-sufficiency on March 31, 2017, by generating annual net income of $2.7 million—one full year earlier than expected. • As of September 30, 2017, NYGB had generated a total of $23 million in revenues. • As part of the U.S. Climate Alliance, NYGB announced plans to expand its focus nationwide, through working with both states involved in the Climate Alliance that are seeking financing for clean energy projects and states interested in utilizing NYGB's $1 billion origination, underwriting, and back office services. • Issued a request for proposals (RFP) for technical and legal services as NYGB evaluates opportunities for nationwide expansion.	NYSERDA	IN-PROGRESS	• Commit $550 million (cumulative) to NYGB investments over the fiscal year ending March 31, 2018, with an average of $50 million in closed transactions per quarter. • Maintain an average, portfolio-wide mobilization ratio of at least 3:1 (the ratio of total project costs [cumulative] to NYGB overall investments to date), driving toward a ratio of at least 8:1 across all NYGB investments by the end of the CEF term. • Continue to grow revenues and manage expenses to maintain self-sufficiency and generate net income. • Raise $1 billion in private sector capital to expand support for clean energy projects.
Property Assessed Clean Energy		NYSERDA and EIC, NYSERDA's non-profit local development corporation partner, work with municipalities to drive local enabling legislation and adoption of Energize NY PACE financing. PACE financing allows an entity to pay for energy upgrades through its property tax assessment.	• Through June 2017, EIC provided $1.9 million to support 15 Energize NY-financed clean energy projects. • NYSERDA finalized Commercial PACE guidelines to expand the availability of PACE financing to commercial and multifamily entities not participating in a NYSERDA or utility program.	NYSERDA	IN-PROGRESS	• EIC will provide up to $50 million by 2021 to support additional projects, which will reduce CO_2 emissions by an estimated 48,000 metric tons annually. • NYSERDA may issue additional guidance regarding PACE in the single-family residential sector.

Sustainable and Resilient Communities

I am grateful to Governor [Andrew M.] Cuomo and NYSERDA for recognizing our efforts and for promoting the use of clean energy. The science is clear; we must reduce our carbon emissions or our children and grandchildren will suffer. We have the technology: solar, wind, high-efficiency lighting, and alternative fuel vehicles. The beauty of these things is that they are better for the environment and can actually save us money. They're right for us now and right for the future of our children.

Patrick R. Vecchio, Smithtown Town Supervisor

Sustainable and Resilient Communities

Progress

New Yorkers know firsthand the realities of climate change, and state agencies are collaborating with communities to offer significant clean energy, sustainability, and climate mitigation and adaptation resources.

Launched in August of 2016, NYSERDA's Clean Energy Communities program provides direct technical support, tools, resources, and recognition for local governments that complete High-Impact Actions demonstrating clean energy leadership. At no cost to the local governments, regional Clean Energy Communities Coordinators are available to provide added capacity for cash-strapped communities looking to develop and prioritize clean energy goals. In addition, their assistance can help communities earn grant funding and recognition as clean energy leaders from NYSERDA through the broader program. Execution of four out of the 10 High-Impact Actions qualifies a local government for a grant of up to $250,000, with no local cost share, to support additional clean energy projects.

One High-Impact Action is for a community to aggregate the buying power of individuals to procure their energy supply through the adoption of a Community Choice Aggregation (CCA) program. New CCA models that can help to further the SEP and REV goals are being evaluated. Data obtained through NYSERDA's Utility Energy Registry (UER) program will assist communities in evaluating policies and programs, like CCA, that best serve their needs.

The CSC program offers state support for local governments to take action on climate change. Local governments can access CSC resources at no cost; participation is free and voluntary. To become a CSC, municipalities commit to act on climate change by passing a resolution that includes the 10-point CSC Pledge. Communities that go beyond the CSC Pledge by completing and documenting a suite of concrete actions that mitigate and adapt to climate change at the

Sustainable and Resilient Communities

Progress

One of the lessons we learned from Superstorm Sandy was the importance of ensuring that facilities providing vital services and emergency shelter continue to have power so they can address residents' health and safety needs. This grant takes Huntington one step closer toward ensuring that if another storm like Sandy occurs, we can seamlessly transition into our emergency mode. I thank Governor Cuomo and NYSERDA for creating the NY Prize Community Microgrid Competition and for selecting Huntington as one of the winners.[11]

Frank P. Petrone, Huntington Supervisor

local level are designated a certified CSC. A CSC certification is also one of the 10 High-Impact Actions under Clean Energy Communities.

Communities can learn the latest climate change projections and impacts through the New York Climate Change Science Clearinghouse (NYCCSC) website, a comprehensive database that provides scientifically sound climate science data and literature. DEC also adopted statewide sea-level rise regulations in 2017. This information will help communities prepare for climate change as well as provide support for New York State Division of Homeland Security and Emergency Services (DHSES) and its state agency partners as they begin to update the state's Hazard Mitigation Plan.

The state continues to bolster the resiliency of its infrastructure and the preparedness of its citizens. Over 130,000 New Yorkers have received hazard preparedness training through the state's Civilian Preparedness Corps. This preparedness training is complemented by preparing the state's systems and infrastructure to withstand natural disasters. Microgrids are energy systems that can run independent of the larger electrical grid, providing substantial resiliency benefits during times when the central electric grid experiences failure. The NY Prize community microgrid competition awarded $8 million to support project feasibility studies in Round 1 and nearly $11 million to support microgrid design and engineering plans in Round 2. NYSERDA anticipates issuing an RFP in the beginning of 2018 to initiate Round 3, which is expected to lead to project build-outs.

[11] governor.ny.gov/news/governor-cuomo-announces-11-million-awarded-community-microgrid-development-across-new-york

REV Campus Challenge: *Highlight*

REV Campus Challenge: Sustainable and Resilient Communities Initiative Highlight

The REV Campus Challenge program promotes clean energy at New York's institutions of higher education by recognizing and supporting the development and implementation of clean energy goals and projects on college campuses and in surrounding communities. Enrolled institutions self-select one of three membership levels based on their own assessment of the current state of progress in advancing clean energy solutions on campus. Member institutions are given access to NYSERDA's Roadmaps Technical Assistance program, which provides funding to work with energy consultants to better understand and pursue clean energy opportunities on campuses and create action plans to guide implementation.

In its first year, more than 50 of the state's 250 colleges and universities signed up to participate in the REV Campus Challenge program.

REV Campus Challenge: *Working for New Yorkers*

REV Campus Challenge Working for New Yorkers: Energy to Lead Competition

As part of the REV Campus Challenge, Governor Cuomo launched the Energy to Lead Competition to inspire student-led groups from two- and four-year institutions to develop innovative renewable energy, energy efficiency, and GHG reduction solutions for their campuses and surrounding communities. The first round of the competition spurred more than 40 proposals from across the state, and led to the award of three $1 million prizes to Bard College, SUNY at Buffalo, and SUNY Broome Community College. The GHG reductions achieved by these projects will be the equivalent of taking 17,000 cars off the road each year.

Bard's winning proposal will demonstrate how to finance and use cutting-edge micro hydropower power generators to reduce GHG emissions.

SUNY Buffalo is collaborating with local partners to install up to 100 megawatts of solar power throughout the campus and the city.

SUNY Broome Community College is demonstrating how a geothermal system can harness the energy stored in the earth to heat and cool a campus while generating savings.

In August 2017, Governor Cuomo announced a second round of the Energy to Lead Competition available exclusively to REV Campus Challenge member institutions.

> **"The greening of SUNY Broome just took a huge leap forward. We can't thank the Governor and NYSERDA enough for such a critical award. This initiative will substantially decrease our carbon footprint while fostering student involvement in sustainability efforts and entrepreneurship. It must be noted that students were integral to the development of this proposal. What better way to inspire the green innovators of the future!"**
>
> *Kevin E. Drumm, President, SUNY Broome Community College*

New York: **Leading the Way on Climate Policy**

The 2015 SEP called for a 40 percent reduction in GHG emissions from the energy sector[12] by 2030.

[12] The energy sector refers to power generation, industry, buildings, and transportation

New York: **Leading the Way on Climate Policy**

Governor Cuomo has taken this ambitious goal further[13] to ensure that New Yorkers are protected from the worst effects of climate change.

Under2 Memorandum of Understanding, U.S. Climate Alliance, Executive Order 166

On the eve of the United Nations Framework Convention on Climate Change in Paris and alongside Former Vice President Al Gore, Governor Cuomo signed the Under2 MOU, committing New York State to reducing the impacts of climate change by keeping temperature increases to under 2 degrees Celsius. Over 185 subnational governments, representing 38 countries on six different continents, have joined New York in taking this pledge.[14] This represents more than 1.2 billion people and $28.8 trillion in gross domestic product, which is over 16 percent of the global population and 39 percent of the global economy.

Governor Cuomo took additional action in response to the U.S. federal government's decision to withdraw the U.S. from the Paris Agreement on climate change. New York became one of the founding states in forming the U.S. Climate Alliance.[15] The Alliance represents a bipartisan coalition of governors committed to upholding the Paris Climate Agreement and reduce GHG emissions 26–28 percent by 2025 compared to 2005 levels. Similar to the Under2 MOU, the U.S. Climate Alliance represents 36 percent of the national population and $7 trillion in gross domestic product.

Governor Cuomo then redoubled New York State's efforts for continued action on climate, by signing Executive Order 166 (EO 166). EO 166 reaffirmed the state's policy for a 40 percent reduction in GHG emissions from 1990 levels by 2030, expanding that requirement to all sectors of the state's economy. All state policies and programs must demonstrate consistency with this goal, and state agencies have been directed to implement measures that have been identified to reduce emissions.

[13] governor.ny.gov/news/governor-cuomo-joined-vice-president-gore-announces-new-actions-reduce-greenhouse-gas-emissions

[14] To learn more about the Under2 MOU, visit: under2mou.org/background/

[15] usclimatealliance.org

New York: **Leading the Way on Climate Policy**

Regional Greenhouse Gas Initiative Program Review

In his 2017 State of the State address, Governor Cuomo called upon the other eight RGGI states to join New York in supporting an additional reduction to the RGGI cap of at least 30 percent from 2020 to 2030. Subsequently, the states agreed to a cap reduction that fulfills Governor Cuomo's target and will reduce the cap approximately 65 percent from when RGGI went into effect in 2009.

To date, RGGI has facilitated a 46 percent reduction in CO_2 emissions from New York's power plants, including a 90 percent reduction in coal-fired generation, while providing the state with over $1 billion in proceeds to support further carbon abatement and clean energy development. Recent analysis also shows that RGGI has produced numerous health and productivity benefits for its member states, including 13,000–16,000 avoided respiratory illnesses, 35–390 avoided heart attacks, and 300–830 avoided deaths.[16]

Make New York Coal Free by 2020

In his 2016 State of the State address, Governor Cuomo boldly committed New York to a coal-free future by 2020. Since Governor Cuomo's announcement, two of the state's four coal plants, Huntley and Dunkirk in Western New York, have gone offline. DEC is preparing regulations to effectuate the Governor's goal.

Methane Reduction Plan

Governor Cuomo has directed state agencies to reduce all major sources of methane as part of a three-year comprehensive Methane Reduction Plan. Methane is second only to CO_2 in its

[16] abtassociates.com/RGGI

New York: **Leading the Way on Climate Policy**

contribution to climate change and accounts for 9 percent of New York's GHG emissions.[17] Led by DEC, in collaboration with DPS, New York State Department of Agriculture and Markets (DAM), NYSERDA, and the Soil and Water Conservation Committee, the plan identifies 25 actions to reduce methane emissions from oil and gas, landfills, and agriculture. Together, these actions are designed to reduce methane emissions in line with the Governor's goal to reduce GHG emissions 40 percent by 2030.

> **Governor Cuomo's Drive Clean Rebate will provide consumers with vehicle options that are both economically and environmentally conscious. The increased use of electric cars will play a critical role in helping New York achieve Governor Cuomo's goal to reduce GHG emissions 40 percent by 2030.**
>
> *Kathy Hochul, Lieutenant Governor of New York*

Supporting Zero-Emission Vehicles

The state's climate goals cannot be achieved without a rapid transition to vehicles powered by electricity, either directly or indirectly. Decarbonization of the electricity sector will increase the emission reduction benefits of battery-powered vehicles or fuel cell vehicles powered by hydrogen.

New York implements California's ZEV sales mandate, which will require manufacturers to sell approximately 800,000 to 1 million plug-in or fuel cell vehicles in New York by 2025. New York is also a party to the eight-state ZEV MOU, under which the states agree to pursue policies that support the market for EVs. Among the measures that New York has implemented are the Drive Clean Rebate offerings of up to $2,000 per EV along

[17] See NYSERDA's Greenhouse Gas Inventory here: nyserda.ny.gov/About/Publications/EA-Reports-and-Studies/Energy-Statistics

New York: **Leading the Way on Climate Policy**

with municipal ZEV incentives for municipalities to buy electric and fuel cell vehicles and invest in charging infrastructure. Under Governor Cuomo's Charge NY initiative, the state has supported the installation of 1,700 public charging stations, and is on track to achieve the goal of 3,000 public charging stations by 2018.

Transportation and Climate Initiative

While a diversified transportation system is essential to support the state's economic growth and prosperity, the transportation sector is also the largest contributor of GHG emissions. Given that New York is part of a region criss-crossed by interstate highways and featuring multistate regional transit systems, New York works with 10 other mid-Atlantic and Northeastern states in TCI on developing regional strategies to reduce emissions from the transportation sector. TCI established the Northeast Electric Vehicle Network, which helps to eliminate barriers to EV ownership, promote clean fuel corridors throughout the region, and identify optimal locations for EV charging stations.

Since November 2015, the participating states have been evaluating the potential for a market-based program to use market forces and incentives to reduce carbon emissions. With the adoption of new policies and deployment of new technologies, the region can speed the implementation of innovative transportation solutions that significantly reduce congestion and pollution, including preparing for a future with ZEV and enhancing the availability of high-quality public transportation services. On November 13, 2017, seven TCI jurisdictions joined New York in announcing that they would be

New York: **Leading the Way on Climate Policy**

seeking public input in 2018 on the opportunities for a regional emission reduction strategy to provide social, economic and public health benefits, in addition to reducing carbon emissions.[18]

Empowering Climate Smart Communities

Under Governor Cuomo's leadership, municipal governments have received much-needed support to take action on climate—and they've responded with enthusiasm. In 2014, Governor Cuomo launched the CSC certification program, and 16 leading communities have undergone the voluntary but rigorous review process. Receiving CSC certification is one of the 10 High-Impact Actions under the Clean Energy Communities program.[19] NYSERDA and DEC are also launching a web portal that will streamline the process of municipalities participating in the CSC certification and Clean Energy Communities programs. The 2016 budget introduced a new competitive grant program within the Environmental Protection Fund to continue to boost local action. In the first round, $11 million was made available through the Consolidated Funding Application process to support all municipalities in the implementation of climate adaptation, GHG emission reduction, and planning related to CSC certification. Eligible applications totaled more than $30 million and awards were announced for 29 projects throughout the state.[20]

[18] www.transportationandclimate.org/exploring-regional-solutions-improve-transportation-and-reduce-emissions

[19] For a full list of the 10 High-Impact Actions, please visit: nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Communities/Action-Items

[20] governor.ny.gov/news/governor-cuomo-announces-more-700-million-economic-development-resources-awarded-sixth-round

Sustainable and Resilient Communities

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NY Prize Community Microgrids Competition		A first-in-the-nation, $40 million competition to help communities develop microgrids—standalone energy systems that can operate independently during a power outage.	• In Stage 1 of this CEF competition, NYSERDA received more than 130 submissions, and 83 proposals were awarded funding to support project feasibility studies. • In Stage 2, 11 proposals were awarded a total of $10.8 million in funding for project design and business planning.	NYSERDA	IN-PROGRESS	• NYSERDA anticipates issuing the Stage 3 competitive RFP to support project build-outs in the beginning of 2018 with awards being issued during the fall of 2018.
Five Cities Energy Plan		Demonstrate the value of municipal energy planning for energy efficiency by collaborating with the five largest cities in the state: Albany, Buffalo, Rochester, Syracuse, and Yonkers. The goal is to reduce their municipal energy consumption 20 percent by 2020.	• Supported by NYPA staff and grants totaling $4 million, 200 locations in the five cities have received efficiency upgrades in lighting; Heating, Ventilation, and Air Conditioning (HVAC); and building controls. • NYPA launched a Race-to-the-Top competition to accelerate the energy efficiency progress in the five cities. An additional $3.6 million was allocated for 10 winning projects.	NYPA	IN-PROGRESS	• NYPA, in collaboration with commercial banks, will offer municipalities low-cost capital to support development of energy efficiency and solar projects.
New York State Community Partnership		Streamline the state's community-focused clean energy, sustainability, and climate mitigation and adaptation resources and simplify information for interested participants.	• NYSERDA launched its CEF Clean Energy Communities program, which provides technical support, tools, resources, and recognition for local governments that complete four out of 10 High-Impact Actions demonstrating clean energy leadership. • The state's CSC program complements Clean Energy Communities by offering free state support for local governments to take action on climate change as well as a competitive grant program.	NYSERDA, DEC	COMPLETE	

Sustainable and Resilient Communities

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NEW* **Clean Energy Communities**		Provide direct technical support, tools, resources, and recognition for local governments that complete four of 10 High-Impact Actions demonstrating clean energy leadership. Clean Energy Communities Coordinators provide assistance to communities looking for grant funding (up to $250,000), templates for procurement and contracts, and technical help in support of clean energy projects.	• As of October 12, 2017, communities have completed more than 646 actions, with 100 of those communities receiving the Clean Energy Community designation.	NYSERDA	IN-PROGRESS	• NYSERDA will continue to support existing Clean Energy Communities and to encourage other localities to participate in the program. • Applications for grant funding will be reviewed through September 30, 2019, or until funds are exhausted, whichever comes first. • Grant availability is regularly updated on NYSERDA's Clean Energy Communities program page.

**New to the 2015 State Energy Plan*

Sustainable and Resilient Communities

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NEW* **Climate Smart Communities**		An interagency partnership that provides state support, at no cost, to local governments that pass resolutions to take action on climate change.	• 211 municipalities have committed to act on climate change by becoming registered CSCs, which includes passing a resolution and taking a 10-point CSC pledge. • 16 municipalities have completed a rigorous program to become certified CSCs. • As part of Governor Cuomo's expansion of the Environmental Protection Fund, DEC initiated the competitive CSC grant program in 2016 for local governments to implement climate change actions and seek certification. • With funding from NYSERDA and the Centers for Disease Control and Prevention's Environmental Public Health Tracking program (CDC EPHT), DOH has developed a New York-specific heat vulnerability index (HVI) to identify heat-vulnerable populations and areas in the state (outside of New York City). With continued funding from CDC EPHT and additional funding from the National Aeronautics and Space Administration (NASA), DOH is using the New York-specific HVI to develop community heat vulnerability maps at the census tract level.	DEC, NYSERDA, DPS, DOS, DOT, DOH	IN-PROGRESS	• NYSERDA and DEC are developing a web portal that will streamline the process of municipalities participating in the CSC program, which is a High-Impact Action in the Clean Energy Communities program. • With funding from NASA and CDC EPHT, DOH will use local scale temperature and health data to validate the HVI.
NEW* **Community Energy Engagement Program**		Build awareness and increase uptake of local renewable and energy-efficient solutions.	• As part of the CEF, NYSERDA made $5.5 million available for qualified community organizations to provide locally focused energy awareness and education support services.	NYSERDA	LAUNCHED	• NYSERDA will select and contract with one competitively selected organization from each of the 10 Regional Economic Development Councils. • Supported by NYSERDA funding, these organizations will act as community energy advisors and work with localities to increase clean energy deployment across residential, multifamily, and small businesses, with an emphasis on LMI households.
NEW* **REVitalize**		Support the planning of community-scale clean energy projects that benefit low-income and EJ communities.	• NYSERDA issued an RFP that will provide CEF funding to five CBOs that provide services or otherwise represent LMI communities or EJ areas to aid the planning and development of a community-scale clean energy project. • NYSERDA is conducting interviews with interested CBOs to understand their challenges in planning and developing community-scale clean energy projects.	NYSERDA	LAUNCHED	• NYSERDA is developing best practices for planning a community-scale clean energy project to overcome knowledge gaps and accelerate the timeline from project planning to implementation.

**New to the 2015 State Energy Plan*

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Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NEW* **Healthy Homes Project**		Part of Governor Cuomo's Health Across All Policies Initiative and in coordination with DOH and HCR, NYSERDA is exploring the potential for a statewide health, housing, and energy intervention. The Healthy Homes project seeks to align public and private resources in order to implement a comprehensive, statewide intervention strategy that addresses the energy and health burdens faced by low-income communities.	• NYSERDA is conducting a feasibility study that will take inventory of existing state resources, explore additional funding sources, and assess the potential for the delivery of a statewide intervention. The study will estimate the potential energy savings and avoided healthcare expenditures of a statewide, coordinated intervention.	NYSERDA, DOH, HCR	LAUNCHED	• If the feasibility analysis yields an affirmative conclusion, NYSERDA will seek to design and implement a pilot program to validate the results.

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Sustainable and Resilient Communities

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
REV Campus Challenge		Provide interested institutions of higher education with support and resources to facilitate clean energy adoption. Enrolled institutions self-select one of three membership levels based on their progress in advancing a clean energy future: **Participant** Institutions that are interested in pursuing clean energy **Achiever** Institutions that have made some formal clean energy commitments and progress, and are looking to scale up their efforts **Leader** Institutions with demonstrated advancement of clean energy commitments, and that are working on deeper energy savings and innovative projects	• Governor Cuomo announced the Energy to Lead Competition, attracting more than 40 colleges and universities to submit their ideas for bringing innovative clean energy solutions to their campus and community. Three, $1 million prizes were awarded to three separate New York colleges. • Governor Cuomo announced a second round of the Energy to Lead Competition available to REV Campus Challenge members in August of 2017. • NYSERDA launched the Roadmaps Technical Assistance program. The program provides financial support for REV Campus Challenge members to hire a third-party energy consultant that will assist in evaluating existing campus energy conditions and in establishing a roadmap for managing changing campus energy needs. • Since launching in October 2015, more than 80 of the state's 250 institutions have signed up to participate in the REV Campus Challenge.	NYSERDA, LIPA	IN-PROGRESS	• Focus on giving recognition to schools that have made clean energy investments since the launch of REV Campus Challenge. • Issue first annual survey to REV Campus Challenge members to gauge progress and future needs. • LIPA and NYSERDA are working together to implement the REV Campus Challenge program on Long Island.

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Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Community Choice Aggregation		Allow municipalities to aggregate the buying power of individual customers within their territory (on an opt-out basis) in order to solicit bids from third-party energy retailers competing to provide power to the community.	• The PSC approved an order expanding CCAs beyond Westchester Power, the state's first CCA. • Westchester Power now includes 20 municipalities accounting for over 110,000 electric customers. • The Commission approved an implementation plan that allows for seven Upstate local governments—the City of Elmira; the towns of Oneonta, Montour, Horseheads, Union, and Binghamton; and Village of Montour Falls—to form CCAs, which could begin operations early in 2018. • NYSERDA introduced a CCA toolkit to help get more communities involved. • NYSERDA launched the UER, an online platform that provides access to community-scale utility energy demographics used in clean energy project planning, implementation, and assessment. • The PSC is examining whether large, investor-owned energy utilities should be directed to populate and regularly update the UER.	DPS, NYSERDA	IN-PROGRESS	• New York will continue to explore more advanced forms of CCA and how they can be implemented to contribute to the SEP and REV goals. • NYSERDA was awarded funding by DOE to partner with other organizations and expand the UER to other states. • The PSC will continue to review filed CCA Implementation Plans for compliance and program approval.

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Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Smart Growth		Planned community growth that integrates economic development with quality-of-life needs, focusing on the rehabilitation of urban centers to prevent sprawl. By promoting a compact, mixed-use design in downtown areas served by robust public transit systems, smart growth and transit-oriented development (TOD) can reduce dependence on personal vehicles and revitalize urban areas.	• Governor Cuomo announced $50 million for a fourth round of funding for smart growth to transform distressed areas into vibrant hubs. • In April 2017, the DOT awarded $112.2 million for projects that provide alternative transportation options (e.g., bicycle, pedestrian, and multi-use path projects, safe routes to school), and for transportation-related projects and programs that reduce congestion and will help meet the requirements of the Clean Air Act. • In August 2017, Governor Cuomo announced that Hicksville was the recipient of $10 million as part of the Downtown Revitalization Initiative. A major component of Hicksville's plan is the TOD that reduces automobile dependence and vehicle miles traveled, which in turn reduces petroleum use and other automobile-based energy consumption. • DEC released for public comment a set of regulatory amendments to SEQR that would classify certain sustainable development and TOD projects as Type II actions with no requirement for further review under SEQR. • In the fall of 2016, Governor Cuomo held a series of sustainability conferences throughout New York focused on smart growth and TOD. • DOS announced and received applications to develop countywide resiliency plans that would combine smart growth and climate resiliency. • Governor Cuomo announced that the state would be the first in the nation certified as "Age-Friendly" by the World Health Organization and American Association of Retired Persons. The "Age-Friendly NYS" initiative places a strong emphasis on smart growth principles.	DOS, NYSERDA, DOT, ESD, DEC	IN-PROGRESS	• Feedback from the sustainability conferences, along with the state's ongoing work, will inform recommendations from the TOD Working Group that will be introduced by the end of 2017. • DOS will review smart growth countywide resiliency grants. • Age-Friendly New York State interagency group will implement age-friendly agency activities.

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Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Access Floodplain Data		Provide publicly accessible maps, data sets, documents, and other tools that address climate change mitigation and adaptation to aid municipalities in flood preparation and planning.	• In May 2016, NYSERDA launched the NYCCSC website where climate data is housed. • In February 2017, DEC adopted sea-level projections for New York, which will be used for future infrastructure planning.	DEC, DOS, NYSERDA	IN-PROGRESS	• NYCCSC will continue to be populated with the latest scientific information to support further planning and preparation. • DEC and DOS will provide guidance pursuant to the Community Risk and Resiliency Act, so that applicants to affected state programs are able to consider sea level rise, storm surge, and flooding. • DEC is developing additional resources that complement the NYCCSC, including state Flood Risk Management Guidance, to assist local and state government decision making.
NEW* **Update State Hazard Mitigation Plan**		A five-year plan to identify and mitigate hazards to promote more resilient and sustainable communities. The plan enables New York to receive funding through the Federal Emergency Management Agency's (FEMA's) Hazard Mitigation Grant Program (HMGP).	• FEMA's HMGP granted $1.5 billion in funding that the state used to enhance emergency power systems at gas stations, schools, and hospitals, and to develop the Mesonet weather detection system.	DHSES	IN-PROGRESS	• DHSES will begin working with other state agency partners to develop a new State Hazard Mitigation Plan that factors in the latest climate change projections to ensure that the state is planning for these hazards.
NEW* **Citizen Preparedness Corps**		Train and prepare the citizens of New York to respond to natural and human-made disasters.	• DHSES provided over 130,000 New Yorkers with free training in disaster preparedness from various government agencies including the American Red Cross and the Division of Military and Naval Affairs.	DHSES	IN-PROGRESS	• DHSES will continue to promote and offer preparedness training to interested community members.

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Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NEW* **New York State Mesonet Network**		Provide New Yorkers and emergency responders with the most granular and up-to-date meteorological data. As the centerpiece of the New York State Early Warning Weather Detection System, it facilitates rapid response by emergency responders to catastrophic weather events.	• 125 state-of-the-art environmental monitoring stations have been located in every county in the state. Each station has automated sensors that measure temperature, humidity, wind speed and direction, pressure, radiation, and soil information every three to 30 seconds.	DHSES	COMPLETE	• The data collected by weather stations will be processed in real time, provided to relevant partners such as the National Weather Service, and used to help DHSES develop weather prediction models that are more accurate and reliable.
NEW* **Under2 MOU**		A commitment to reduce the impact of climate change by working to keep temperature increases to under 2 degrees Celsius.	• Governor Cuomo signed the Under2 MOU international agreement on the eve of the United Nations Framework Convention on Climate Change in Paris.	DEC	COMPLETE	• New York State will continue taking bold action to reduce GHG emissions to meet the goal, and work to convince more governments to join.
NEW* **RGGI Program Review**		Periodic review by the states participating in the RGGI to measure the success of their market-based cap-and-trade system to reduce GHG emissions.	• RGGI has facilitated a 46 percent reduction in CO_2 emissions from New York's power plants, decreased negative health effects due to air quality, and provided more than $1 billion in proceeds to be used for renewable energy, energy efficiency, and carbon abatement. • In his 2017 State of the State address, Governor Cuomo called upon the eight other RGGI states to join New York in supporting an additional 30 percent reduction in the RGGI cap by 2030. • In August 2017, the RGGI states announced that they had reached an agreement to lower the emissions cap by 30 percent by 2030.	DEC, NYSERDA, DPS	IN-PROGRESS	• Following the completion of the program review, DEC will seek public comment on proposed revisions to Title 6 New York Codes, Rules, and Regulations Part 242.
NEW* **Coal Free by 2020**		Governor Cuomo's commitment to decommission or repower New York's remaining coal-fired power plants by 2020.	• In 2016, two of New York's four remaining coal plants went offline.	DEC, DPS	IN-PROGRESS	• DEC is preparing regulations to effectuate the Governor's goal of a coal-free power sector by 2020.

**New to the 2015 State Energy Plan*

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Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NEW* **Energy Affordability Proceeding**		In January 2015, the Commission opened a proceeding to examine the low-income programs offered by the major electric and gas utilities in New York State. The primary purposes of the proceeding were to standardize utility low-income programs to reflect best practices where appropriate, streamline the regulatory process, and ensure consistency with the Commission's statutory and policy objectives.	• On February 16, 2017, the PSC issued an order adopting a universal Energy Affordability Policy, which seeks to limit energy costs for LMI New York households to no more than 6 percent of household income. • As an initial step to reaching all eligible households, the Commission directed that utilities open their low-income discount programs to all households that currently receive HEAP, regardless of fuel or benefit type. • Statewide, the enhanced low-income discount program will serve approximately 1.65 million customers at a cost of approximately $260 million, an increase of approximately 87 percent to existing programs. • LIPA adopted a tariff consistent with the PSC Order in July of 2017.	DPS, LIPA	COMPLETE	• In concert with the Commission's adoption of the Energy Affordability Policy, Governor Cuomo also directed the formation of a task force to develop new strategies so that low-income households have greater access to clean energy and are better served by the state's energy efficiency and assistance programs.
NEW* **U.S. Climate Alliance**		In response to President Trump's decision to withdraw from the Paris Accord, New York Governor Cuomo, California Governor Edmund G. Brown Jr., and Washington State Governor Jay Inslee formed the Alliance to convene states committed to achieving the U.S. goal of reducing emissions 26–28 percent from 2005 levels and meeting or exceeding the targets of the federal Clean Power Plan.	• Since it launched, 11 additional states, Puerto Rico, and American Samoa have committed to joining New York, California, and Washington in the Alliance. • The bipartisan coalition announced in New York during Climate Week 2017 that the states are on track to a 24–29 percent reduction in emissions by 2025, to support the Paris Agreement.	NYSERDA, DEC	LAUNCHED	• The Alliance will act as a forum to sustain and strengthen existing climate programs, promote the sharing of information and best practices, and implement new programs to reduce carbon emissions from all sectors of the economy.

**New to the 2015 State Energy Plan*

Energy Infrastructure Modernization

> Why New York? It is the most forward-thinking state in North America in considering how we build the critical elements of a distributed grid.

Alison Smith, Director of Markets, Urban Future Lab

Energy Infrastructure Modernization

Progress

Governor Andrew M. Cuomo's REV initiative incorporates grid modernization at all levels.

Some 60 percent of New York's power infrastructure is over 35 years old, and billions of dollars would be needed merely to maintain the system that has existed for the past 100 years. REV is addressing this need by driving investments at the customer end of the electric system, harnessing digital technology with two-way communicating smart meters, demand management programs, energy efficiency, solar energy, EVs, and energy storage ranging from household batteries to EVs.

As directed by PSC, the utilities jointly filed a supplemental DSIP on November 1, 2016, to identify common tools, processes, and protocols to manage DERs and support retail markets over the next five years. This collective action plan complements the utilities' individual five-year DSIP, which provide information that can assist third parties in identifying products to enhance the value and resiliency of the electric grid.

REV implementation is underway. One example of this is Con Edison's installation, the first of more than 3.6 million electric smart meters and 1.2 million gas smart meters that will help residential and business customers actively manage their energy usage and take control of their monthly bills. A net benefit of more than $1 billion will result from consumers using new energy-saving products, while advanced metering infrastructure technology will make the entire Con Edison system more responsive and reliable by using data and two-way communications to monitor power outages and service restorations during storms. The new technology will also lead to lower GHG emissions by facilitating significant energy demand reductions.

New community solar projects and other "behind-the-meter" resources will be compensated based on their environmental attributes and benefits to the electric system in accordance with the Phase

Energy Infrastructure Modernization

Progress

One VDER Order, New York's interim policy for evolving beyond net metering. Subsequent work is underway to establish valuation of all types of distributed resources, allowing customers to be paid for providing grid solutions. The growth of these solutions must occur in a manner that benefits the environment and protects the consumer. DEC released and will be revising distributed energy emissions standards that bolster REV's efforts to install clean behind-the-meter solutions. The Public Service Commission enacted the first consumer protection standards for distributed energy resources. These regulations will ensure that DER suppliers provide residential and small business customers with price comparisons, billing information, and plain-language contracts.

Alternatives to traditional power distribution facilities are another way REV is using new technologies to modernize and expand the capabilities of New York's energy infrastructure. For example, the Commission recently extended Con Edison's successful BQDM program, which began in 2014. Rather than building a new $1 billion substation to meet growing energy demand, Con Edison's BQDM invested in energy efficiency, locally produced clean power, and better energy storage to meet the demands of the community at a lower cost to ratepayers, the utility, and the environment. Over 50 of these non-wires-alternative projects have now been identified across the state, with the potential to offset over 400 megawatts of traditional projects and save hundreds of millions of dollars.

Grid modernization is proceeding at the transmission level as well. In December 2015, the PSC adopted an order that approved a specific portfolio of transmission projects designed to reduce congestion and deliver up to 1,000 megawatts of surplus upstate electricity to the

Energy Infrastructure Modernization

Progress

We need an energy transition to clean energy and we need to do it so we protect the good union jobs of those who construct, operate, and maintain power plants in this country. I commend Governor Cuomo's leadership and this first step toward meeting the needs of climate and workers together, and the IBEW Local 3 is devoting the resources needed to train the next generation of skilled electrical workers for a clean energy future.

Christopher Erikson, Business Manager, IBEW Local 3[21]

heavily populated downstate region. Completed in June of 2016, the Marcy South Series Compensation Project is also working to increase cross-state power flow capability by up to 440 megawatts, allowing for integration of additional amounts of clean surplus upstate power, including wind resources. New York will continue to evaluate transmission upgrade opportunities that support the state's public policies, such as the CES, and further reduce congestion to allow supply to flow to areas of high demand.

Methane is second only to CO_2 in its contribution to climate change, accounting for 9 percent of New York's GHG emissions.[22] DPS continues to work with utilities to upgrade the state's energy infrastructure and reduce the amount of leak-prone pipe, which contributes to methane emissions. This effort is a component of Governor Cuomo's 25-point Methane Action Plan to reduce methane from oil and gas, agriculture, and landfills.

Modernizing New York's energy infrastructure has generated and will continue to generate clean energy jobs across New York. The state and its partners are working to ensure that all New Yorkers—from youth in disadvantaged communities to recent two-year and four-year college graduates to dislocated workers—are ready to seize upon these employment opportunities.

[21] governor.ny.gov/news/governor-cuomo-announces-major-climate-and-jobs-initiative-partnership-worker-institute-cornell

[22] See NYSERDA's Greenhouse Gas Inventory here: nyserda.ny.gov/About/Publications/EA-Reports-and-Studies/Energy-Statistics

Strengthening Cybersecurity: *Highlight*

Strengthening Cybersecurity:
Energy Infrastructure Modernization Initiative Highlight

Recent cyber and physical attacks underscore the importance of both modernizing and protecting the state's energy assets. The 2015 utility-focused cybersecurity summit held by the DPS identified several action items that have been incorporated into the Department's cybersecurity work. One problem identified, and which continues to present concern, is the need for more prompt and complete cybersecurity information sharing, both between the federal government and states and between government and the private sector.

Currently DPS is working with New York's utilities to develop a Joint Utility Cybersecurity and Privacy Framework for incorporation into the utilities' DSIPs. The framework establishes a set of agreed-upon protocols to secure interactions, data, and processes that occur on distributed system platforms and defend against cyber and physical threats. It will use national and international standards and guidelines established by the National Institute of Standards and Technology, the International Organization for Standardization, and the International Electrotechnical Commission.

Separately, utilities are developing a common cybersecurity framework to establish protocols for vetting DER providers requesting data from utility companies.

DPS participates in a broader cybersecurity effort spearheaded by DHSES to refine and improve intergovernmental cyber information sharing pathways for the protection of the electric sector and other critical infrastructure sectors in New York.

Strengthening Cybersecurity *for New Yorkers*

Strengthening Cybersecurity for New Yorkers: Department of Public Service Utility Oversight and Protection in Practice

The DPS's oversight of utility companies cybersecurity and their protection from cyber breach of the Personally Identifiable Information (PII) of their customers will continue to evolve to reflect changes in the energy industry and changes in technology.

One of the principal ways to facilitate consumer adoption of demand response, renewable energy products, energy efficiency, and other DER is to create a digital marketplace which brings consumers and service providers together, making it easy for consumers to shop for these products and enabling customers to select vendors to supply their energy needs.

This new multi-participant energy delivery and information exchange construct will necessitate cybersecurity at the highest level of diligence to ensure the integrity of the constant real-time transactions. Accordingly, the PSC ordered the utilities to adhere to certain practices and procedures for the protection of customer information housed in their digital data systems. Among those requirements are mandatory third-party audits by highly credentialed cybersecurity experts who evaluate the quality of customer privacy protection at the utilities. In addition, the DPS unit charged with utility security oversight conducts regular and ongoing reviews of utility adherence to cybersecurity standards and best practices.

Strengthening Cybersecurity *for New Yorkers*

The same level of cybersecurity diligence will be expected of the new participating service providers in the developing distributed energy marketplace. It is imperative that both consumers and service providers have complete confidence in this digital marketplace. Providing consumers with the opportunity to easily but safely share their PII with DER providers and other vendors they select will help consumers obtain customized quotes for solutions that are most directly applicable to them, and facilitate informed and more efficient cost-saving purchase decisions.

New York: **Creating Clean Energy Job Opportunities**

With almost 146,000 workers across the state, New York's clean energy economy accounts for a growing segment of the statewide labor market.

New York: **Creating Clean Energy Job Opportunities**

Between the last quarters of 2015 and 2016, the sector grew by 3 percent, and employers project growing their workforce by another 7 percent by the end of 2017. Clean energy activity is robust enough to employ nearly 82,000 workers who spend most of their time supporting clean energy-related business activities.

The state's clean energy sector is a healthy mix of both emerging and commercial technologies, with employment opportunity across a variety of trades, including installation, research and engineering, sales, and manufacturing. The professional and business services sector has become an increasingly important component of the clean energy economy; these workers account for the second-largest value chain activity, after installation, and provide an array of clean energy-related research, consulting, legal, information technology, and design services.

In addition to the breadth of technology and business activity, New York's clean energy market has a healthy ecosystem of vendors and suppliers. Despite a small manufacturing and trade sector, over half of all clean energy employers report that they source products primarily from in-state suppliers. The customer base is largely in-state as well—74 percent of firms report primarily in-state customers. More nascent technology sectors like alternative transportation or grid modernization and storage report the highest out-of-state market activity.

Clean energy employment is spread across several major technology categories. To date, energy efficiency firms and workers account for most of the employment activity. The sector supports about 110,000 workers, 51 percent of whom spend the majority of their time working with energy efficiency technologies. Employers expect to add another 7,000 employees by the end of 2017.

New York: **Creating Clean Energy Job Opportunities**

The renewable electric generation sector exhibits a high proportion of majority-time workers—77 percent, or 17,324 employees, are reported to spend the majority of their time working with renewable energy technologies. The sector grew the most out of all technologies, and employers still expect to see employment grow by another 12 percent by the end of 2017, despite solar industry uncertainty.

Alternative transportation grew by 2 percent and is expected to grow by another 6 percent by the end of the year. Of the 8,409 jobs in alternative transportation, 53 percent, or 4,439, workers spend the majority of their time supporting clean transportation technologies. With 64 percent of employers indicating that their customers are primarily outside the state, alternative transportation firms are the most export-focused of all technology segments.

Grid modernization and storage, an area of significant innovation activity, supports 1,412 jobs.

The renewable fuels sector is the only technology that saw employment decline between Q4 2015 and Q4 2016, but employers project a rebound of 4 percent by the end of 2017.[23]

Despite the growing market, many clean energy businesses had trouble finding qualified applicants for open positions. Three-quarters of firms engaged in hiring activity between the end of 2015 and 2016 reported overall hiring difficulty.

[23] To see the full Clean Energy Industry Report, visit: nyserda.ny.gov/About/Publications/2017-New-York-Clean-Energy-Industry-Report

Energy Infrastructure Modernization

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NEW* **Value of Distributed Energy Resources**		Move toward a more accurate valuation and compensation structure for DER, such as behind-the-meter solar and wind, and manage impact on non-participants.	• The PSC adopted a Phase One Order that established an interim valuation for technologies eligible for net-energy metering (solar PV, small wind, micro hydropower, fuel cells, small CHP systems, and anaerobic digesters). The valuation stack is comprised of the price of the energy, the avoided carbon emissions, the cost savings to customers and utilities, and other savings from avoiding expensive capital investments. Qualifying projects may be configured as: mass market; large-scale, onsite; remote net metering; and CDG. • Utilities filed their VDER Implementation Plans in May 2017. • The Phase One Implementation Order was released September 14, 2017. • Phase Two was kicked off in June with the formation of three working groups (rate design, value stack, LMI) starting a multi-year process for development in these areas.	DPS, NYSERDA	IN-PROGRESS	• A Phase Two Order(s) addressing non-Net Energy Metering technologies—demand management, demand response, and energy efficiency—as well as rate design changes for rooftop mass market customers and grid access fees for other projects will be considered by the PSC by the end of 2018.

**New to the 2015 State Energy Plan*

Energy Infrastructure Modernization

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NEW* **Preparing for Opportunities in the Clean Energy Economy**		Develop the skills of New Yorkers both in, and coming into, the workforce to thrive in the state's growing clean energy sector.	• NYSERDA completed a Clean Energy Jobs Study that is designed to quantify, characterize, and analyze clean energy industry jobs in New York. The study used an industry standard methodology to leverage DOE Energy Jobs data, collect and augment it with new data, and design a state-specific report to highlight the strength of New York's clean energy industry and job sector. • The state launched Clean Climate Careers in partnership with the Industry Labor Relations School's Worker Institute at Cornell University. • NYSERDA formed an industry partnership with building maintenance and operations employers to identify labor-related barriers to participating in the clean energy economy. • NYSERDA launched several demonstration projects to highlight the energy savings associated with having trained employees. • NYSERDA provided $15 million through the Clean Energy Workforce Opportunity Program to hire expert faculty and purchase equipment, which will facilitate energy course offerings and learning opportunities at SUNY two- and four-year institutions. • NYPA provided nearly $1 million to rehabilitate an academic building and equipment to facilitate energy efficiency and conservation courses at Herkimer Community College. • NYSERDA, in partnership with DOE, Fort Drum, and SUNY Canton, trained 121 military veterans in clean energy job skills through the Solar Ready Vets initiative. • NYPA partnered with New York State utilities to transition returning military veterans into opportunities in the energy sector. In 2015, this program facilitated the hiring of 168 veterans in the energy sector, a 68 percent increase from 2014. • DEC issued its $1 million Green Skills Grant in July with awards announced in September. • DOS created the New York State Community Greenworks initiative, which will train low-income workers in distressed and EJ communities in green-tech jobs—green building, clean energy, and green infrastructure, among others.	NYSERDA, DOL, NYPA, DEC, DOS	IN-PROGRESS	• NYSERDA will use its discussions with industry partners and learnings from the demonstrations to inform development of best practices templates that NYSERDA will share across the building operations and maintenance community, including other employers considering workforce development interventions as well as colleges, universities, and labor groups. • NYSERDA plans to replicate a similar model across other clean energy sectors, beyond the building maintenance and operations community. • NYSERDA will produce an update to its Clean Energy Industry Report in 2018 and in 2019. • DOS will announce recipients of Greenworks funding.

**New to the 2015 State Energy Plan*

Energy Infrastructure Modernization

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Energy Highway		Upgrade and modernize New York's electric grid to deploy greater levels of renewables, increase capacity, and improve flexibility.	• 11 of the Energy Highway initiatives are complete; two will not move forward as proposed. • The PSC adopted an order in its AC Transmission Proceeding approving two transmission corridors to be used by developers to design projects to reduce congestion and bring 1,000 megawatts of power from upstate to downstate while minimizing visual and environmental impacts. • AC Transmission project proposals are being evaluated by the New York Independent System Operator (NYISO) to determine which most benefits the transmission system for the least cost. • The PSC has also identified Public Policy Transmission needs in Western New York to allow for the full output of the state's Niagara hydroelectric facility. • NYISO released a draft report of its evaluation of the projects submitted to relieve Western New York congestion and allow for full output of the Niagara facility. The report identified four projects as the finalists for selection. • NYPA is proceeding with the re-build of the Moses-Adirondack transmission lines. These lines will be modernized and built to allow for future increases in transfer of renewable energy from the Northern part of the state. • The NYISO Board has approved the selection of NextEra to build Western New York transmission upgrades.	NYPA, DPS, DEC, NYSERDA, ESD	IN-PROGRESS	• New York will continue to evaluate transmission upgrade opportunities in support of the state's policies (e.g., the CES), which also reduce transmission congestion to areas of high demand.
NEW* **Utility Dynamic Load Management Programs**		An opt-in demand response program for electricity customers that provides incentives for reducing electricity usage during times of heavy demand.	• The Commission instituted Dynamic Load Management programs for all electric utilities in New York. This program consists of a peak load-shaving Commercial System Relief Program, a local reliability supporting Distribution Load Relief Program, and a residential and small commercial-focused Direct Load Control Program.	DPS	COMPLETE	• Monitor annual progress and make revisions for program improvements as needed.

**New to the 2015 State Energy Plan*

Energy Infrastructure Modernization

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NEW* **Closure of Indian Point**		Cease operation of the Indian Point nuclear facility by 2021, whose operations are a safety concern for the 20 million people within a 50-mile radius of the plant.	• Governor Cuomo reached an agreement with Indian Point's operator, Entergy, to close the two remaining operating reactors 14 years ahead of schedule, while replacing lost electricity with clean energy and energy efficiency.	DPS, DEC, DOL, DTF, ESD, NYSERDA, DHSES, NYPA	IN-PROGRESS	• A task force of state agencies and other officials will work with the community and impacted workers during the transition to mitigate tax revenue and job loss. The task force will also work to ensure Entergy's compliance with the Closure Agreement. • The state will work to ensure adequate clean generation will backfill the loss of supply from Indian Point.
Smart Generation and Transmission		Transform New York's energy infrastructure through a series of projects and investments into a modern, flexible, and resilient power grid for the 21st century.	• NYPA completed its Marcy South Series Compensation project. By installing three capacitor banks in series, the first ever to be used in New York State, NYPA increased the capacity of 135 miles of its existing transmission lines from Oneida to Sullivan counties by 440 megawatts.	NYPA	IN-PROGRESS	• NYPA will continue smart grid technology to increase reliability, resiliency, and optimization of current transmission lines and power-generating assets while also integrating bulk renewables, distributed generation, and microgrids.
Distribution System Platform Providers		Advance a transactive energy system among energy providers to enable real-time use of DER based on time and price signals. This serves to make clean energy integration a core business function of utilities serving as Distributed Service Platform (DSP) providers.	• In April 2016 the PSC issued a Guidance Order for DSIPs to inform the transition of the state's investor-owned utilities to a modern utility model serving as a DSP provider. • In November 2016 investor-owned utilities jointly filed a supplemental DSIP to identify common tools, processes, and protocols to move toward managing DER, and to support retail markets. This plan complements the individual utilities' own five-year plans to integrate distributed resource systems. • In March 2017, the PSC issued a DSIP Order focusing on hosting capacity, interconnection portals, non-wires alternatives, energy storage, and aggregated customer data privacy. • Each utility has created a Benefit Cost Analysis Handbook focusing on key areas, which will ensure that their plans and subsequent third-party investments are coordinated and in line with the REV goals.	DPS	IN-PROGRESS	• Over the next five years utilities plan to enhance the use of DER through the sharing of system and customer data. This will improve the development of solutions to meet the energy needs of consumers and utilities while ensuring proper investment in accordance with REV.

**New to the 2015 State Energy Plan*

Energy Infrastructure Modernization

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Reduce Reliance on Petroleum Heating Products		Convert from petroleum-based fuels to cleaner heating fuels while also encouraging the use of high-efficiency heating equipment.	• DPS and utilities have established programs in all territories to encourage customer conversions from dirtier to cleaner sources of fuel.	DPS, NYSERDA	IN-PROGRESS	• DPS will utilize utility rate cases to encourage fuel conversion activities that align with state GHG goals and to mitigate costs associated with upgrading infrastructure.
Limit Methane Emissions		Upgrade the state's aging natural gas pipeline network to reduce, and eventually eliminate, leakage and develop standards to reduce fugitive methane emissions.	• The state's 11 major natural gas distribution companies decreased the known inventory of leak-prone pipe by 10.6 percent between 2015 and 2016, and by 37 percent since 2011. Most of the state's gas utilities will have retired all such pipe within 10 years. • Governor Cuomo announced the Methane Reduction Plan, a suite of 25 strategies designed to reduce methane emissions from New York's oil and gas sector, landfills, and agriculture.	DEC, DPS, DAM, NYSERDA	IN-PROGRESS	• DPS's pipeline replacement targets for 2017, 2018, and 2019 are 500.5 miles, 525 miles, and 550 miles, respectively. • DPS is developing incentive mechanisms for achieving leak-prone pipe backlog reduction. • DEC, DPS, DAM, NYSERDA, and the Soil and Water Conservation Committee will work to implement the 25 strategies contained in the Methane Reduction Plan by 2020. • Through rate cases, DPS will work with utilities to establish standardized interconnection requirements that provide transparent rules and procedures for renewable gas sources (landfills, anaerobic digester processes, etc.) to access local gas utility distribution systems.
Emissions Standards for Clean Distributed Resources		Ensure priority is given to clean and non-emitting generation and thermal energy sources such as solar power and ground/air source heat pumps.	• On December 1, 2016, DEC put new regulatory standards into effect to minimize air pollution from DER while maintaining system reliability; however, these regulatory standards are currently stayed pursuant to litigation.	DEC, DPS	IN-PROGRESS	• DEC is considering new regulatory strategies to reduce nitrogen oxides emissions from electricity production during peak demand.

Energy Infrastructure Modernization

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Strengthen Cybersecurity		Identify best practices and next steps related to timely sharing of information and coordination between energy agencies in response to cyber threats.	• DPS held a cybersecurity summit, which identified several action items that have been incorporated into the department's cybersecurity work. These actions include prompt and complete cybersecurity information sharing between government entities and also with the private sector.	DPS, DHSES	IN-PROGRESS	• New York State partner agencies are working together to improve cyber information sharing between government agencies. • DPS and New York's utilities are working together on a framework to establish common protocols to both secure transactions on distributed system platforms and defend against cyber and physical threats. • Utility staff are developing a common cybersecurity framework to establish protocols for vetting DER providers that request data from utilities.
Low-Cost Power for Economic Development		Support economic development by providing NYPA low-cost power to companies in exchange for their commitment to expand investment and create or retain jobs.	• As of October 1, 2017, NYPA has 849 companies that have taken advantage of this program, and that have pledged to invest $33 billion to create and retain 400,000 jobs.	NYPA	IN-PROGRESS	• NYPA will continue this program to further advance job creation in New York while encouraging the usage of clean energy.
NEW* **Protecting Equipment and Personnel Using Drones**		Perform transmission asset inspections that would otherwise be more costly or hazardous.	• 13 utilities from across the country joined NYPA for a demonstration of how drones can be used for transmission asset inspection. • NYPA has issued an RFP and is in the process of bid evaluation for purchase of two drones.	NYPA	IN-PROGRESS	• NYPA plans to implement the use of drone technology to supplement existing transmission tower and line inspections.

**New to the 2015 State Energy Plan*

Energy Infrastructure Modernization

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
NEW* **Reducing Barriers to Distributed Energy Storage Deployment**		Reduce soft costs for energy storage, increase ability to "stack values" by performing multiple grid functions, and increase deployment. Soft costs can comprise 25 percent or more of total installed cost today.	• Retained subject matter experts to help with reducing soft costs of grid storage by at least 25 percent by 2019. This includes permitting, customer acquisition, vendor education to maximize tariffs and regulations, and financing costs. • Released a $15 million competitive solicitation funded by the CEF to support pilot projects that deploy commercialized storage solutions for use cases that address grid needs in addition to those of a host site. • Efforts to encourage storage innovation and market development have invigorated the energy storage job market. Since 2012, employment in this sector has grown 30 percent to approximately 3,900 in 2015 with $900 million in annual revenues by New York State firms. By 2030, the sector could employ 26,000 with $8 billion in annual revenues.	NYSERDA, NYPA, LIPA, DPS	LAUNCHED	• Pursuant to the Commission's orders under REV, utilities are considering non-wires alternatives including energy storage to save ratepayers money. • The VDER proceeding is examining how energy storage should be compensated. • Each of the state's investor-owned electric utilities must install at least two energy storage projects at a substation by the end of 2018. • An energy storage roadmap is underway to identify electric system needs that energy storage is uniquely suited to address under various scenarios approaching 50 percent renewable generation and 40 percent GHG reduction by 2030, ranges of storage that can address these needs with net benefits to ratepayers, and potential programmatic and policy interventions that could help to build this future state.

**New to the 2015 State Energy Plan*

Innovation and R&D

> To replace fossil fuels in New York's power mix, [Governor Andrew M.] Cuomo has launched a whopping $5 billion for clean energy investments. That's huge—equivalent to the total amount the U.S. federal government spends on all energy research and development, according to a report from the American Energy Innovation Council. So, that size investment would not only secure New York's place as a clean energy leader, but by investing so much in renewables, the state would go a long way in helping to make the technologies cheaper and easier for others to adopt.

Phil Newell, Writer, Nexus Media[24]

[24] livescience.com/53738-ten-reasons-new-york-is-greener-than-california.html

Innovation and R&D

Progress

REV is fostering an environment that accelerates the pace of innovation to create and advance clean energy businesses throughout the state.

NYSERDA's CEF commits a total of $728 million toward supporting and growing the state's clean technology startups, proof-of-concept centers, and business incubators as well as advancing cutting-edge clean energy technologies in smart grid, renewables and DER, high-performance buildings, and transportation.

Advancing clean energy technologies like battery storage is important in achieving the targets established under the CES as well as the goals of REV; it also represents a key job growth opportunity in New York's clean energy economy. Jobs in the storage sector grew 30 percent between 2012 and 2015, and storage-related jobs in the state are expected to increase four- to seven-fold over the next 10 years, facilitated by initiatives outlined in the 2015 SEP and through NYSERDA's CEF. Such initiatives include the New York Battery and Energy Storage Technology Consortium (NY-BEST), which consists of government, academia, and private entities. Started in 2009 with $25 million in seed funding from NYSERDA, NY-BEST has grown to 150 members, 25 percent of which are from outside of the state, and is helping to support New York as a leader in energy storage solutions.

NYPA, NYSERDA, LIPA, NYISO, and the state's investor-owned utilities have entered into an MOU to join and support NYPA's Advanced Grid Integration Laboratory for Energy (AGILe). AGILe and its users will concentrate research on improvements that will benefit the transmission system, complementing the CEF's Innovation and Research and Development (R&D) portfolio and its focus on the distribution-related system and behind-the-meter resources.

Innovation and R&D

Progress

Allowing utilities to test new technologies and business models is one of the functions of REV demonstration projects. All of the state's investor-owned utilities have filed REV demonstrations, and 15 of those demonstrations are in various stages of implementation across the state. Data collected from REV demonstration projects will also assist the process of integrating local resources into system planning, development, and operations on a system and statewide scale.

New York is an environment ripe for testing new business models and partnerships, such as those fostered by REV demonstration projects. It is also a great place to start a new clean energy business. NYSERDA launched 76West, a four-year clean energy competition and business development program that will grow clean energy technologies and jobs in the 11-county Southern Tier. The $20 million competition is bringing entrepreneurial attention to the region and is supporting the state's growing clean energy sector. It reflects similar approaches to those of Western New York's highly successful 43North business competition.[25] Governor Cuomo recently announced that NYSERDA would provide additional support to the Southern Tier region by opening the state's seventh, and the region's first, clean tech incubator in Binghamton.

These targeted investments and strategic partnerships are foundational to New York's innovation and R&D leadership. Among all states, New York ranks third in procuring DOE R&D funding, and third in the number of clean technology patents.[26]

[25] For more information on 76West, please visit: nyserda.ny.gov/All-Programs/Programs/76west

[26] nyserda.ny.gov/Partners-and-Investors/Clean-Energy-Startups/NYS-a-National-Leader-in-Cleantech

76West Clean Energy Competition: *Highlight*

76West Clean Energy Competition: Innovation and R&D Initiative Highlight

New York's policies are creating a business atmosphere rich with opportunity to develop and commercialize groundbreaking concepts. Through the 76West Clean Energy Competition the state is taking promising new concepts and providing their developers with capital and business development support to foster their long-term success.

Each round of the four-round competition awards a top prize of $1 million in addition to one $500,000 prize and four $250,000 prizes. Awards from the first two rounds have been made, with the third and fourth rounds of the competition being planned for 2018 and 2019. Prize money will help companies to grow their innovative concepts while introducing and growing clean energy opportunities in the Southern Tier.

76West: *Working for New Yorkers*

76West Working for New Yorkers: Innovation Competition
In the first round of the competition, Micatu received the $1 million grand prize for its highly precise sensor that will provide utilities with a more accurate voltage reading, enabling them to better track and understand energy use. This will enhance the identification of potential efficiencies that can be translated into savings for customers. The second round awarded the $1 million grand prize to Skyven Technologies for its solar space and heating technology that can be deployed across a wide range of climates, including upstate New York, and used in support of agriculture and manufacturing processes.

> **Before the competition, I'd never been to the Southern Tier. It has surprised me at all levels. Being from Texas, an energy state, we have a lot to learn from this state on clean energy.**
>
> *Arun Gupta, Founder and CEO, Skyven Technologies*

> **It's going to help us in many ways: we're going to hire more people, bring in more high-tech jobs, help us with R&D, and help put all this money back in to help us grow.**
>
> *Mike Oshetski, CEO, Micatu*

Innovation and R&D

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Energy Storage R&D and Commercialization		Develop the energy storage technologies and business models to support a clean and resilient grid by collaborating with researchers at academic institutions, R&D facilities, and NY-BEST.	• The membership of NY-BEST has grown to 150 partners from the public and private sectors, including 25 percent from outside New York State. • The Battery Testing and Commercialization Center at Eastman Park in Rochester, a subsidiary of NY-BEST, is conducting testing and validation for energy storage developers to introduce new technologies into the marketplace. • Empire State Development (ESD) awarded $1.2 million to NY-BEST toward the establishment of a user facility at Eastman Business Park that allows small-scale battery cell manufacturing. • The Rochester Institute of Technology has begun hosting a battery prototyping center to give companies, researchers, and entrepreneurs a place to test their storage ideas. • NYSERDA launched a four-round, $6.3 million competitive offering to fund product development and field testing of new energy storage technologies. The focus is on technologies that have not yet been commercialized but could support renewable power sources in New York.	NYSERDA, ESD, DPS	IN-PROGRESS	• NYSERDA will award funds through the competitive offering through 2018.
Advanced Grid Innovation Laboratory for Energy		Create a world-class R&D laboratory in the Capital Region to develop the electric grid of tomorrow.	• NYPA collaborated with NYSERDA, LIPA, NYISO, and the state's investor-owned utilities to develop a mutual agenda to govern the use of AGILe to support modernizing New York's electric grid. • NYPA trustees approved an initial $20 million investment. • Design, engineering, procurement, and staffing are underway.	NYPA, NYSERDA	IN-PROGRESS	• AGILe will focus first on transmission-oriented research, including advanced transmission applications, cybersecurity, sensors, and power systems simulations technologies, complementing NYSERDA's ongoing research into distribution-related technologies and solutions.
76West		A competition focused on growing entrepreneurs and attracting resources from the U.S. and around the world to build clean energy businesses and create jobs in New York State's Southern Tier region.	• The first round awarded six winning companies prize money totaling $2.5 million, with the $1 million grand prize going to Micatu for its sensor that provides more precise voltage readings to aid utilities in better understanding energy use and potential system efficiencies. • The second round awarded another six companies with a total of $2.5 million. The $1 million grand prize went to Skyven Technologies, a company specializing in solar heating to reduce fossil fuel use in agriculture. • To support 76West winners and other clean tech companies, and in connection with the Core Innovation and R&D initiative, NYSERDA launched a new clean tech incubator in Binghamton.	NYSERDA	IN-PROGRESS	• The winning companies will use the prize money to implement their innovations and expand job opportunities, which will help New York advance its clean energy and carbon reduction goals. • The competition will have a third and fourth round.

Innovation and R&D

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Core Innovation and R&D		Facilitate the development, commercialization, and market entry of new, market-ready clean energy technologies with the aim of growing the clean energy market sector in New York, and providing for greater energy affordability, system resiliency, and consumer choice.	• NYSERDA created the Clean Business Incubator Network, which helped member startups attract over $200 million in private investment. • NYSERDA developed the proof-of-concept center, which is starting up new businesses around academic research in clean energy. • NYSERDA started the Entrepreneurs-in-Residence program, which connects experienced entrepreneurs with new companies to provide coaching.	NYSERDA	IN-PROGRESS	• Through the CEF, NYSERDA will invest more than $700 million in strategies that include: improving performance and reducing costs of solar, energy storage, and wind; accelerating a digitally enhanced and dynamically managed high-performing electric grid; smart buildings; and developing next-generation HVAC solutions specific to New York State.
REV Business Model Demonstrations		Foster groundbreaking new solutions that illuminate the REV future by showing how new products and services can capture latent value on the grid, and how new business models can monetize and distribute that value among customers, third parties, and utilities.	• Since July of 2015, 15 REV Demonstration projects are being implemented across all utility service territories. • As a part of the CEF, NYSERDA launched the REV Connect initiative and web portal in August of 2017 to support the deployment of new technologies, partnerships, and business models.	DPS, NYSERDA	IN-PROGRESS	• Utilities will file quarterly reports tracking their progress. These will be available on the DPS website. • As individual REV Demonstrations conclude, determinations will be made regarding their expansion or applicability to other utilities.

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Encouraging the rapid transition to electric vehicles is an all-around win for our climate, our public health, and our economy. Governor [Andrew M.] Cuomo's continued commitment to increase accessibility to electric vehicle charging on our highways and at our homes and workplaces will help speed our transition to a 21st-century clean transportation system.

Kat Fisher, Electric Vehicles Initiative Organizer, New York Sierra Club

Transportation

Progress

New York State is leading the nation in programs that support innovation, economic development, and the transition to a low-carbon transportation future.

A low-carbon transportation future depends on an efficient multi-modal system and clean transportation options for drivers and travelers. The 2015 SEP introduced initiatives designed to reduce fossil fuel consumption and GHG emissions through investments in: EVs and charging stations; transportation demand management; smart mobility; and consumer education.

New York, alongside seven other states, signed the ZEV MOU, collectively committing to the deployment of 3.3 million ZEVs by 2025. To date, more than 25,000 EVs have been purchased and are supported by a network of over 1,700 charging stations.

To further induce the uptake of EVs, NYSERDA in 2017 introduced a $55 million EV rebate program that provides New York State residents with rebates of up to $2,000 on their purchase of an electric car.

The state also invests in projects and programs that enhance alternative transportation options and reduce congestion, including smart mobility and transportation demand management programs. DOT's 511NY program introduced a redesigned mobile app featuring live traffic updates. The program also now features the 511NY Rideshare program that is helping to reduce the number of single-occupancy vehicle rides or miles traveled. In April 2017, $112.2 million was awarded to projects that support bicycle and

Transportation

Progress

pedestrian enhancements or improve transit access or reduce congestion and emissions across the state. In June 2016, Governor Cuomo introduced the state's first comprehensive pedestrian safety action plan, which provides $110 million for sidewalk infrastructure improvements. DOT and partner agencies plan to launch the state's first bicycle map, linked to the 511NY Rideshare program, to better support the use of transportation alternatives like biking.

Through its participation in the TCI, New York is partnering with 11 other Northeast and mid-Atlantic states and the District of Columbia to explore additional policies to increase efficient transportation and related alternatives that will advance the state toward reducing GHG emissions by 40 percent by 2030 and 80 percent by 2050. In 2018, New York and 7 other TCI members will solicit public feedback to help inform which regional policies the jurisdictions pursue.

Charge NY: *Highlight*

Charge NY: Transportation Initiative Highlight
Since its launch in 2013, Governor Cuomo's Charge NY program has advanced market penetration of EVs and charging stations throughout New York. Only 500 New Yorkers owned EVs when Governor Cuomo took office in 2011. As of September 2017, that number stood at more than 25,000, and the state is pursuing a multitude of efforts to build on that significant progress.

In 2017, Governor Cuomo launched the Drive Clean Rebate program to further accelerate uptake of EVs, including all-electric, plug-in hybrid, and fuel cell cars. The $55 million program provides four rebate levels, up to $2,000, at the point of sale and is expected to support up to 40,000 additional EV purchases.

Charge NY: *Highlight*

Charge NY: Transportation Initiative Highlight

New York has advanced new initiatives to further progress toward Governor Cuomo's goal of 3,000 charging stations by the end of 2018. Complemented by new statewide campaigns to promote EV use and charging stations, the initiatives include:

1. NYSERDA and NYPA partnering on 500 new charging stations at workplace locations of public sector and private sector employers.
2. LIPA developing a program to bring additional EVs on Long Island. The program includes installation of charging stations at select PSEG Long Island facilities to encourage employee adoption of EVs and investing in workplace charging systems for businesses that commit to having at least five employees driving EVs, with the goal of 100 new charging stations in operation by the end of 2018.
3. NYPA installing the first four fast-charging stations along the New York Thruway in January 2016. The stations are capable of fully charging an EV in 30 minutes or less. The Thruway Authority plans to increase the total number of charging stations at Thruway travel plazas and other parking lots to 73.
4. DEC providing rebates to municipalities for a significant proportion of the costs of installing EV charging stations at public facility sites and for purchasing or leasing the vehicles beginning in 2016. That includes rebates of up to $250,000 for electric and fuel cell vehicle charging facilities and $5,000 for ZEVs.

Charge NY: *Working for New Yorkers*

Charge NY Working for New Yorkers: Increasing Electric Vehicle Deployment through Outreach

The state's education and outreach efforts are designed to increase deployment of EVs. Many of these efforts are already underway across various communities in the state and are leading to an increase in EV sales. In addition to those efforts mentioned above, this includes:

- A project led by Sustainable Hudson Valley to conduct community-based EV marketing.
- A project with Clean Communities of Central New York to work with a major car dealer in the Syracuse area on new ways to reach customers and facilitate better EV buying experiences.
- A project led by Calstart to create a workplace EV charging program in New York City that offers incentives to employers that install charging stations and to employees who purchase an EV.
- A project led by Energetics and the Electrification Coalition to accelerate EV adoption in Rochester through a combination of public outreach and engagement, additional charging station installations, and close collaboration with the city government and other key stakeholders in the community.

> **"NYSADA [New York State Automobile Dealers Association], representing 1,000 New York auto dealers, is very appreciative and commends Governor Cuomo for allowing a rebate for electric vehicles for the benefit of clean air and the environment for all New Yorkers."**
>
> *Robert Vancavage, President, NYSADA*

Transportation

Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
ChargeNY		Build a self-sustaining market for EVs, with a goal of 3,000 EV charging stations to support an expected 40,000 EVs on the road in New York by 2018.	• Since 2011, New Yorkers have purchased over 25,000 EVs supported by over 1,700 charging stations statewide. • In March 2017, Governor Cuomo launched the Drive Clean Rebate program to further accelerate uptake of EVs. $55 million has been earmarked to provide rebates of up to $2,000. As of September 1, more than 2,300 EV rebates had been issued. • The New York State Truck Voucher Program has supported the purchase or lease of 35 electric trucks and buses. • Installation of four fast charging stations along the Thruway was completed in January 2016; additional fast charging stations have been installed at the Long Island Welcome Center and Broome Gateway rest areas. • In November 2016, New York State received a number of designations for Alternative Fuel Corridors, primarily along I-87, I-90, I-84, and a small stretch of I-95. For EVs, these designations were partially the result of having publicly available alternative fueling infrastructure no further than 50 miles apart or within five miles of a highway. These designations will help New Yorkers who are traveling in Alternative Fuel Vehicles identify travel routes where they can refuel or charge.	NYSERDA, DEC, DPS, NYPA, LIPA, DOT	IN-PROGRESS	• NYSERDA and NYPA are partnering to bring 500 new charging stations to workplaces across the state by the end of 2018. • The Thruway plans to increase the total number of charging stations at its travel plazas and other parking lots to 73. • LIPA is replacing 20 vehicles in its fleet with EVs and is developing a program to enhance the penetration of EVs on Long Island through the installation of charging stations at workplaces.

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Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Clean Fleets NY and Innovative Ownership Models		Encourage the uptake of clean vehicles for state use, with a goal by DEC, NYPA, and NYSERDA that at least 50 percent of all new, administrative-use vehicles purchased in 2016 will be ZEV.	• As of the end of 2016, DEC, NYSERDA, and NYPA had achieved the stated goal. • The Clean Fleets Team educated municipal and government fleet managers on Governor Cuomo's ZEV goals as well as the benefits of ZEVs. • The first round of DEC's municipal ZEV rebate program in 2016 offered up to $5,000 for ZEVs, and up to $250,000 for electric and fuel cell vehicle charging facilities for public use. • DEC awarded $1.77 million in rebates to municipalities for purchase/lease of 79 eligible ZEVs and installation of 194 ports of EV charging and one new hydrogen fuel cell refueling station.	DEC, NYPA, NYSERDA	COMPLETE	• DEC rebates to municipalities in support of ZEV vehicles and charging infrastructure are authorized to continue through 2023. • NYPA is offering charging station financing and installation services to four municipalities under the DEC program, which will result in a total of 68 charging stations.
Financial Mechanism to Capture Value of Alternative Transportation		A regional collaboration of 11 Northeast and mid-Atlantic states and the District of Columbia that seeks to develop the clean energy economy and reduce oil dependence and GHG emissions from the transportation sector.	• New York and other Northeastern states working together through the TCI announced they are seeking to develop a potential market-based approach for lowering carbon emissions from transportation. States have begun exploring the costs and benefits of potential emissions reduction strategies and alternative approaches to designing a market-based emissions reduction program.	DOT, DEC, NYSERDA	IN-PROGRESS	• New York and 7 other TCI jurisdictions will undertake a public process in 2018 to solicit feedback on opportunities to reduce pollution, boost the economy, improve public health, and expand mobility options through transitioning to a lower carbon transportation system.
Smart Mobility through Improved Information and Communication		Optimize how travelers, vehicles, and transportation infrastructure communicate in an effort to reduce fuel consumption and emissions through the use of technology.	• DOT launched a mobile app to give travelers access to the 511NY, which has been enhanced to include live traffic updates, route planning, and Park & Ride information. • 511NY includes 511NY Rideshare, DOT's travel demand management program. The program also provides outreach and technical support for employers interested in offering employee commuter benefit services. • Since 2010, nearly 4 million single occupancy vehicle trips, 200 million vehicle miles traveled, and 16,500 tons of CO_2 emissions have been eliminated through participation in the 511NY Rideshare program. • In March of 2017, NYSERDA and DOT announced $2.75 million for 15 projects that support smart mobility and advanced transportation.	DOT, NYSERDA	IN-PROGRESS	• DOT and NYSERDA are engaged in the implementation of a regional mobility management system to increase safety and optimize transportation efficiency in Western New York at the U.S.-Canadian border. • DOT and NYSERDA plan to issue another solicitation for smart mobility projects in 2018.

Transportation

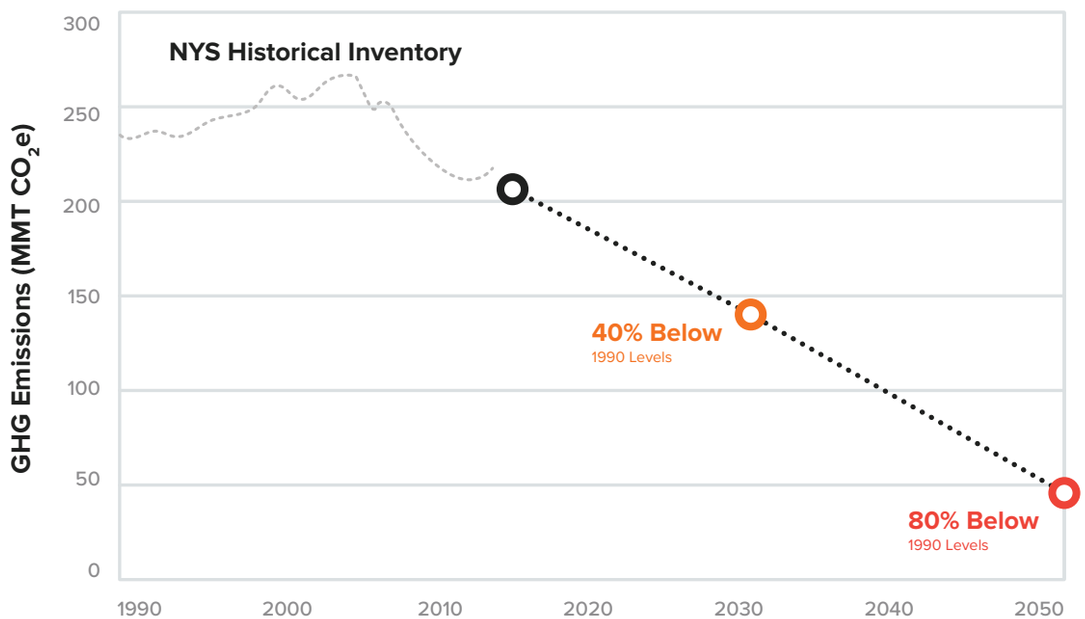
Initiative Tracker

Initiative	Category	Description	Progress	Agencies	Status	Next Steps
Efficient Public Transportation		Deploy new energy-saving products and methods to improve the efficiency of the Metropolitan Transportation Authority (MTA) public transportation vehicles and systems in New York State.	• New York State has made investments in the efficiency of its public transportation systems with a focus on efficient subway cars, energy capture, integrating electric buses into transit fleets, and improving overall bus service. • MTA has reduced its building energy consumption by 27.2 percent since the initiative's inception, which is the largest energy use intensity reduction of any BuildSmart agency. • NYPA is supporting an MTA pilot for 10 electric buses.	NYSERDA, NYPA, MTA	IN-PROGRESS	• NYSERDA and NYPA will work with MTA to research, develop, and deploy new innovations which further reduce the MTA's energy use. • NYPA will collect and use pilot data to determine the best charging practices to solve the technical and economic challenges of expanding the use of electric buses. • If the pilot is successful, MTA has a long-term plan to expand the project to 500 electric buses. • NYSERDA plans to provide $18 million over the next five years to fund R&D related to public transportation and electrified rail energy efficiency improvements.
Expanding Transportation Demand Management Programs		Promote non-motorized transportation options, such as walking and biking, by providing the infrastructure to integrate them safely with traditional vehicle transportation systems.	• In June of 2016, Governor Cuomo introduced the state's first pedestrian safety action plan. This $110 million, five-year, multi-agency initiative improves infrastructure and provides education and enforcement surrounding pedestrian transportation outside of New York City. • In 2017, Governor Cuomo announced the establishment of the Empire State Trail, which, when completed in 2020, will create a 750-mile biking and walking pathway from New York City to Canada and from Albany to Buffalo. • In the fall of 2017, DOT issued a call for pedestrian safety projects on local roads.	DOT, NYSERDA, NYPA, DOH	IN-PROGRESS	• NYSERDA and DOT will continue to issue funding solicitations to support travel demand management projects with the potential to reduce GHG emissions. • DOT and its partner agencies will launch a statewide bike paths and trails mapping effort to provide bicyclists up-to-date information on bicycle travel routes.

Where We Go From Here:
Continuing New York's Climate Leadership

Continuing New York's Climate Leadership

As articulated in the 2015 SEP, New York State has adopted GHG emissions reduction goals of 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. EO 166, signed in June of 2017, reaffirmed and expanded these goals beyond energy-related emissions to call for an economy-wide reduction of GHG emissions. The 2015 SEP also established two targets, alongside the emissions reduction goal, that will initiate movement toward realizing these goals.



New York State GHG Emissions, historical and goals (1990–2050)

Continuing New York's Climate Leadership

To meet the state's climate goals, New York will need to transition its energy systems away from fossil fuels, while also reducing other sources of GHG emissions, including landfills and refrigerants. With respect to energy system transitions, the state will need to pursue three broad strategies: 1) energy efficiency and conservation in all sectors, 2) "decarbonized" or zero- and low-carbon electricity, and 3) fuel-switching that replaces fossil fuel-based energy sources with electricity and lower-emitting biofuels.

The level of transformation required in the state's energy system is ambitious, but also feasible with existing technologies and concerted and coordinated efforts in all major sectors of the economy. Continued support of innovation and investment in low-carbon technologies across all sectors will be essential to maintain a steady decline in technology cost, maximize value to the state's energy and transportation systems, develop new technology options for emissions reduction, and enable communities and energy consumers to realize their own environmental and economic ambitions as the state advances with its broad policy goals.

Key opportunity areas for the state to pursue in achieving the 40 by 30 goal are as follows:

- Buildings
  Electrifying thermal end-uses in buildings (such as space heating) is a core opportunity, providing both greater efficiency than fossil fuel technologies and emission reduction benefits over time as electricity generation becomes cleaner. The state can substantially enhance progress from electrification by orienting programs toward incentivizing deeper energy savings from every building retrofit project. Since

Continuing New York's Climate Leadership

success in the buildings sector depends significantly on consumers moving to new technologies to provide needed services, strategies to mitigate delivery risk and increase consumer awareness, such as market development approaches from the state's CEF, should be prioritized. The state can seek to develop electrification policies and opportunities as steps for early action. Developing low-carbon bioenergy products, such as renewable pipeline gas, may be considered to further mitigate delivery risks in the buildings sector.

- Transportation
  Despite the anticipated influx of approximately 1 million electric light-duty vehicles under current policies, significant work remains to achieve deep emissions reductions in the transportation sector. In particular, ZEVs will likely need to substantially increase as a percentage of new light-duty vehicle sales by 2030. Other key activity areas within the transportation sector necessary for achieving 40 by 30 include medium- and heavy-duty vehicle efficiency and light-duty vehicle travel demand reductions from smart growth practices and other demand management strategies. Advanced, low-carbon biofuels, in particular renewable diesel, for the state's medium- and heavy-duty vehicle fleet are also likely to be a necessary component of most pathways to 40 by 30.
- Industry
  New York State's industrial sector is diverse, with major sectors including manufacturing, construction and cement, paper, food and agriculture, metals, glass, and chemicals. Given this diversity, there are few GHG mitigation solutions common to all sectors available. However, GHG emissions from industrial energy and processes represent an important contribution to achieving 40 by 30 and the movement to a clean energy economy. Energy efficiency, technology innovations, and partnerships with industrial leaders in New York are primary strategy opportunities to reduce industrial energy combustion emissions.

Continuing New York's Climate Leadership

- **Electricity Generation**
  New York State's electricity grid, which has already cut emissions by half since 1990, leads the way in decarbonization among energy sectors. Achieving a higher renewable generation share is already underway as a contributor for meeting the 40 by 30 target. This strong performance, built on past and current policies, will need to be leveraged into other sectors, such as buildings and transportation, to achieve deeper decarbonization levels, particularly if low-carbon, sustainable biofuels are not available at scale in New York.
- **Non-Combustion GHGs**
  Reducing emissions from non-combustion sources, particularly methane and refrigerant gases, represents an important and emerging area for the state in achieving its 40 by 30 goal. Refrigerant gases have been a key driver of increased non-combustion GHG emissions since 1990, and replacing these with alternative, low global warming potential refrigerant gases will be an important GHG reduction strategy. In addition, pursuing opportunities to reduce methane emissions from all sectors and sources, including waste, agriculture, and natural gas infrastructure, is an essential component of achieving 40 by 30.

As New York expands upon its climate leadership, the state will evaluate opportunities to improve current efforts and, where needed, develop new initiatives that address each of these key areas. The 2019 State Energy Planning Process will present an opportunity to explore how the state can build upon existing strategies and introduce new initiatives that will achieve the 40 by 30 and 80 by 50 goals.

Abbreviations & Acronyms

A–H

AGILe
Advanced Grid Innovation Laboratory for Energy

BoA MERRILL
Bank of America Merrill Lynch

BOEM
Bureau of Ocean Energy Management

BQDM
Brooklyn/Queens Demand Management Program

CBO
Community-Based Organizations

CCA
Community Choice Aggregation

CDC
Centers for Disease Control and Prevention

CDG
Community Distributed Generation

CEF
Clean Energy Fund

CES
Clean Energy Standard

CHP
Combined Heat and Power

CSC
Climate Smart Community

DAM
New York State Department of Agriculture and Markets

DEC
New York State Department of Energy Conservation

DER
Distributed Energy Resources

DHSES
New York State Division of Homeland Security and Emergency Services

DOE
U.S. Department of Energy

DOH
New York State Department of Health

DOL
New York State Department of Labor

DOS
New York State Department of State

DOT
New York State Department of Transportation

DPS
New York State Department of Public Service

DSIP
Distributed System Implementation Plan

DSP
Distributed Service Platform

DTF
Department of Taxation and Finance

EIC
Energy Improvement Corporation

EJ
Environmental Justice

EO 166
Executive Order 166

EPHT
Environmental Public Health Tracking

ESCO
Energy Service Company

ESD
Empire State Development

ETIPS
Energy Efficiency Transition Implementation Plans

EV
Electric Vehicle

FEMA
Federal Emergency Management Agency

GHG
Greenhouse Gas

HCR
New York State Homes and Community Renewal

HEAP
Home Energy Assistance Program

HMGP
Hazard Mitigation Grant Program

Abbreviations & Acronyms

H–Z

HVAC
Heating, Ventilation, and Air Conditioning

HVI
Heat Vulnerability Index

IPNA
Integrated Physical Needs Assessment

LIPA
Long Island Power Authority

LMI
Low- to Moderate-Income

MOU
Memorandum of Understanding

MTA
Metropolitan Transportation Authority

NASA
National Aeronautics and Space Administration

NY-BEST
New York Battery and Energy Storage Technology Consortium

NYCCSC
New York Climate Change Science Clearinghouse

NYEM
New York Energy Manager

NYGB
New York Green Bank

NYISO
New York Independent System Operator

NYPA
New York Power Authority

NYSADA
New York State Automobile Dealers Association

NYSERDA
New York State Energy Research and Development Authority

OSW
Offshore Wind

OTDA
New York State Office of Temporary and Disability Assistance

PACE
Property Assessed Clean Energy

PII
Personally Identifiable Information

PSC
Public Service Commission

PSEG
Public Service Enterprise Group

PV
Photovoltaic

R&D
Research and Development

REV
Reforming the Energy Vision

RFP
Request for Proposals

RGGI
Regional Greenhouse Gas Initiative

SEP
State Energy Plan

SEQR
State Environmental Quality Review

SMI
State Median Income

SUNY
State University of New York

TBtu
Trillion British Thermal Units

TCI
Transportation and Climate Initiative

TOD
Transit-Oriented Development

UER
Utility Energy Registry

VDER
Value of Distributed Energy Resources

ZEV
Zero-Emission Vehicle

NYSERDA