

Reforming the Energy Vision **REV**



What is REV?

In New York, clean energy provides a transformational opportunity to build a stronger economy and foster a healthier environment. Reforming the Energy Vision (REV) is Governor Cuomo's plan to seize that opportunity, creating a cleaner, more resilient, and affordable energy system for all New Yorkers.

New York has been at the forefront of energy leadership and innovation since the earliest days of the system. In 1882, Thomas Edison illuminated lower Manhattan with the world's first commercial electrical grid, and in 1961 Niagara Falls became home to the world's largest hydroelectric facility. Now, through REV, New York is leading the transition to a clean energy economy.

The twentieth-century power system is unsustainable, both environmentally and economically. Rising energy bills, more frequent extreme weather, and the environmental imperative to reduce carbon emissions require us to reinvent how we produce, deliver, and consume energy. Meanwhile, increasingly affordable clean energy technologies such as the rapidly declining costs of solar electric (also referred to as solar PV) and other clean distributed generation alternatives, offer the opportunity to address our energy challenges in innovative ways, creating new jobs, promoting economic development, and improving value for customers. REV unlocks clean energy markets to capture these opportunities, building a brighter future for New York.

REV is a comprehensive approach. Through regulatory overhaul, REV is remaking New York's utilities to encourage the cleanest, most advanced, and efficient power system operation. State programs supporting clean energy are being redesigned to accelerate market growth and unlock private investment. And under REV, New York is deploying innovative energy solutions across State-owned buildings, university campuses, and State vehicle fleets.

The outcome of REV will be a dynamic clean energy economy that empowers communities and customers – across all income levels, geographies, and demographics – to take control of their energy use, driving local economic growth and revitalization, improving the resiliency of our energy system, and protecting our environment.

To ensure we achieve these ambitious goals, New York State has enacted a Clean Energy Standard, legally mandating that renewable sources will provide 50% of the State's electricity by 2030. The transformative effects of REV ensure this mandate will be achieved through the fastest, most cost-effective means.

The clean energy opportunity is now. In New York, we're seizing it.

Why REV?

REV is motivated by the observation that the electricity industry has remained fundamentally unchanged for nearly a century. While other industries and sectors have embraced revolutionary technological advances in the past decades, the electricity system today would be familiar to Thomas Edison himself. The system is built to support the few hours each year when demand is highest, resulting in dramatic inefficiency. The burdens placed upon customers by this archaic model include:

- **Financial Cost:** Electricity bills have risen 32% for the average New York ratepayer since 2004. As the system is sized to meet “peak” demand during the hottest summer days, it is idle nearly half the time. Paying year-round for this idle capacity costs customers around \$2 billion a year. And while overall demand for electricity is flat, “peak” demand continues to increase, resulting in even higher costs to customers. Maintaining the power grid cost New Yorker’s \$17 billion over the past ten years, and if trends are not addressed, \$30 billion will be spent in the coming decade.
- **Environmental Cost:** Electricity generation is a leading cause of greenhouse gas emissions in New York State. To protect the health and welfare of New Yorkers and our environment, we must diversify our sources of energy and accelerate deployment of clean, low-carbon technologies.
- **Resilience:** Superstorm Sandy and Tropical Storms Lee and Irene left millions of New Yorkers without electricity. A more resilient energy system will be better able to power our homes, businesses, and economy in the face of these increasingly common extreme weather events. Hospitals, first responders, community centers, and other places of refuge will also be better prepared to address emergency and safety issues with more resilient power sources.

The Power Industry of Today



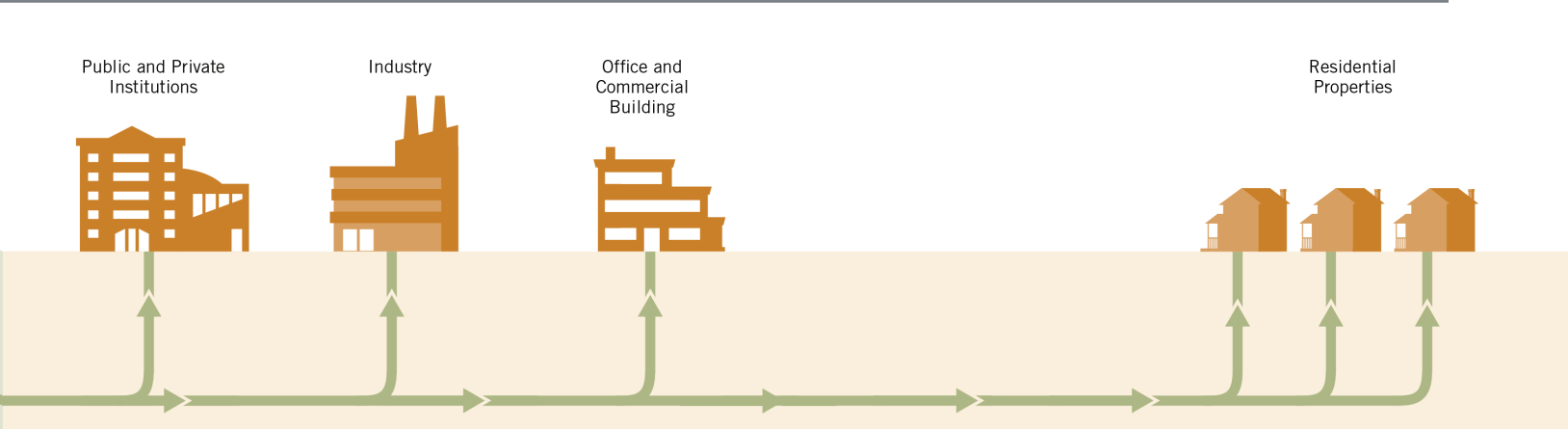
The good news is that innovations in clean energy technologies can provide economic solutions to each of these challenges, and we're already making progress. Smart deployment of resources like solar, wind, energy efficiency, demand response, geothermal, and energy storage is reducing waste on the system to lower costs and emissions. These resources are also enhancing resiliency, creating jobs, and increasing private investment in the State's local and regional economies. New Yorkers saved \$1.1 billion on energy bills from investment in energy efficiency in 2014 alone. From 2012 to 2015, New York saw a 575% growth in solar, with the fourth most number of solar employees in the U.S., employing more than 8,000 New Yorkers in the solar industry today, and that number is growing rapidly. And we reduced carbon emissions by 7.7 million tons in 2013.

REV Clean Energy Goals for 2030

40% **Reduction**
in greenhouse gas emissions from 1990 levels

50% **Generation**
of New York State's electricity must come from renewable energy sources

23% **Decrease**
in energy consumption of buildings from 2012 levels



How We'll Do It: Our Framework for Action

The 2015 State Energy Plan, which serves as the roadmap for REV, centers on three pillars of activity:

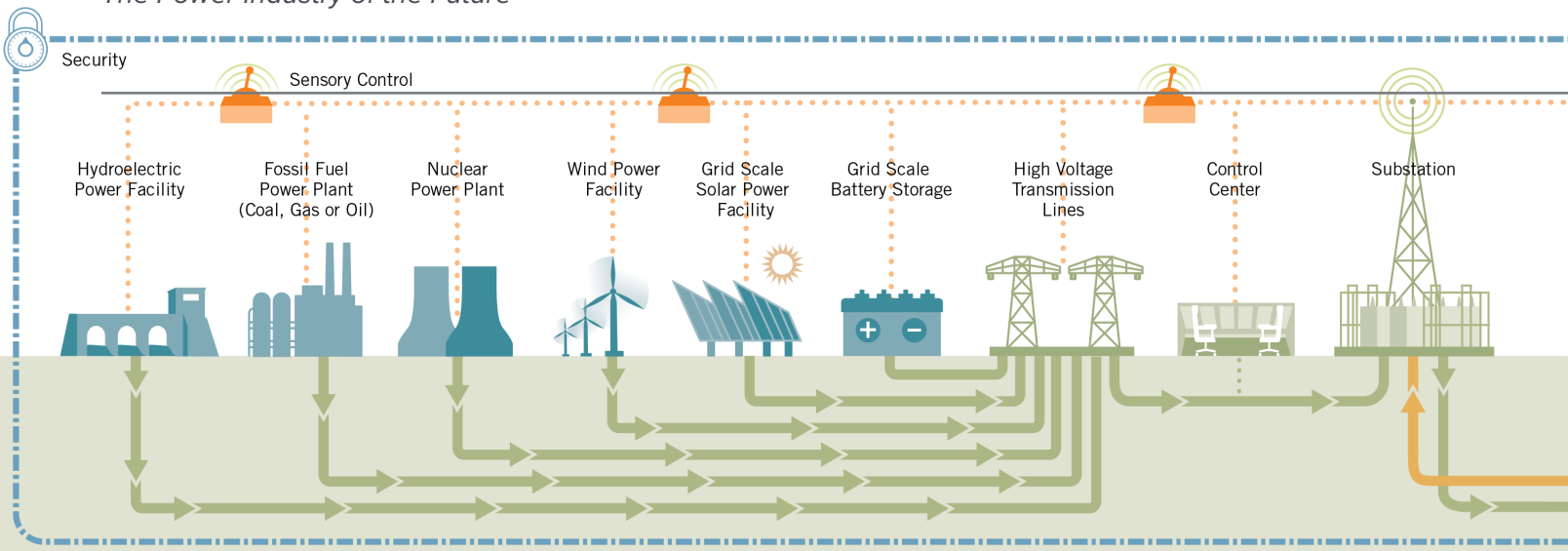
1. Regulatory Reform

New York is changing government regulation to support the development of clean energy markets. In particular, the REV regulatory proceeding is reshaping the State's electric industry and utility business practices. The goal is to encourage new roles and business models for electric utilities and clean energy product and service providers. In the past, the electrical grid has been a one-way channel for energy flowing from a central location to the consumer. Under REV incentives and price signals will encourage utilities to leverage technological innovation. Utilities and third party providers are forming new kinds of partnerships to install clean, distributed energy resources at the "grid edge." These third parties include distributed energy resource providers offering solutions like community microgrids, wind farms, solar farms, or energy efficiency services. Reformed price signals and compensation structures will reward investments that improve overall system efficiency (e.g., by managing loads to reduce peak demand), engage the private sector to invest in clean energy opportunities, and place clean and distributed energy at the core of the utility business model. By aligning the regulatory system to catalyze and leverage innovation, technology advancement, and private investment, New York is creating increased choice and value for consumers while also protecting the environment.

2. Market Activation

For clean energy to become fully integrated into our energy system, New York must address a diverse set of market barriers and gaps. Each year, New York State has spent over \$1 billion to spur a clean energy economy, 80% of which has gone towards one-time grants and incentives to lower the upfront costs associated with renewables and energy efficiency. While these investments have helped drive progress, the strategy of targeting upfront costs alone does not address the full breadth of market barriers and gaps, and consequently will not be sufficient to achieve our goal of developing large-scale, self-sustaining, private sector-driven clean energy markets. For instance, the cost of installed solar has dropped 49% since 2010, onshore wind turbine costs have dropped 30% since 2008, and we know the average energy efficiency retrofit has financially inefficient pay back terms. Yet despite these favorable economic trends and high levels of public subsidy, these and other increasingly affordable solutions have struggled to scale because of other barriers, including limited access to financing, burdensome permitting and local approval processes, and limited consumer trust and

The Power Industry of the Future

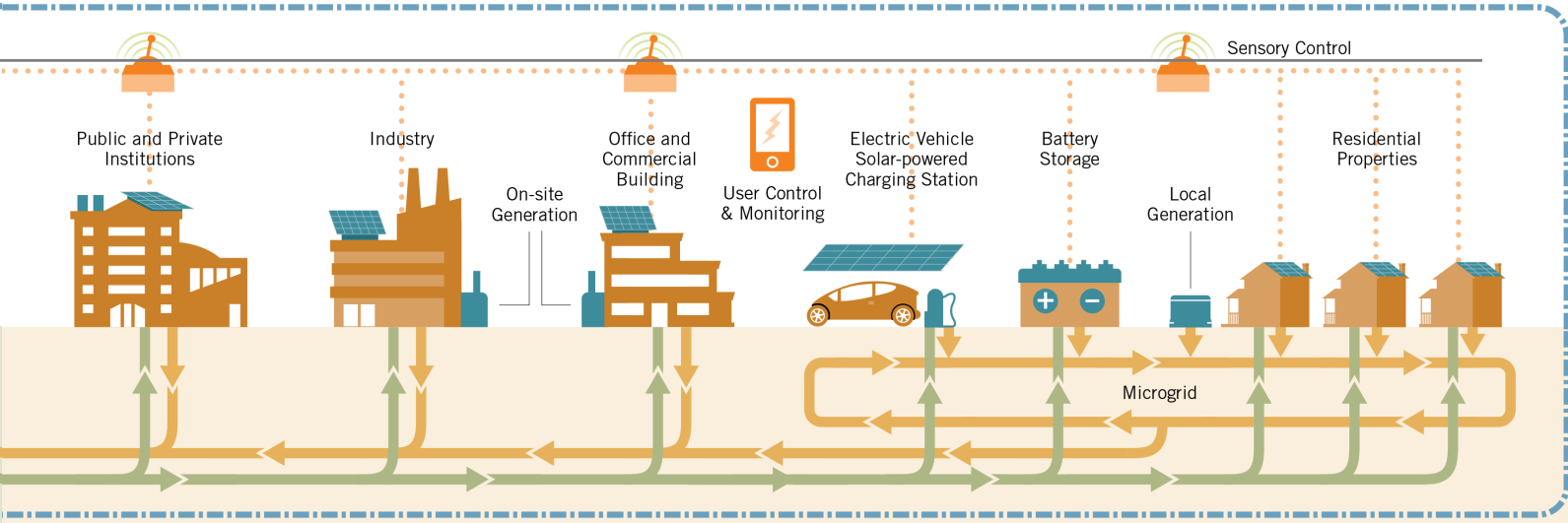


awareness. Our goal is to remove these barriers to unleash the power of the private sector to lead New York’s energy transformation. To accomplish New York’s market transformation objectives, the New York State Public Service Commission (PSC) approved the \$5 billion, ten-year Clean Energy Fund (CEF). Under the CEF, the New York Energy and Research Development Authority (NYSERDA) will focus its resources across four portfolios: NY Green Bank (the nation’s largest); NY-Sun (State investments to expand solar); Market Development; and Innovation and Research, to support the growth and deployment of clean technology solutions. These initiatives will enable scale by reducing multiple barriers to uptake and adoption, stimulating private investment, and influencing policy, codes, and regulation. The CEF also focuses on ensuring that no one is left out of the clean energy transition, providing targeted support to low- to moderate-income (LMI) and rural communities that may not be reached by markets on their own.

3. Leading by Example

In addition to changing our regulatory paradigm and mobilizing the private sector, New York will take the lead in the deployment of clean energy solutions by leveraging the State’s significant public energy assets, including the New York Power Authority (NYPA). NYPA was established as a nationwide model for public power through legislation signed by then-New York Governor Franklin D. Roosevelt in 1931, and is the nation’s largest state power organization. Through its various programs, NYPA has mobilized billions of dollars in private capital, created and retained hundreds of thousands of jobs and saved ratepayers millions of dollars statewide by producing low cost power for New Yorkers. Now, we’re leveraging this unique State asset to lead by example: piloting innovative technologies, demonstrating what’s possible to consumers and businesses, providing their expertise and showcasing opportunities to invest in grid innovation and upgrades that will drive cost savings for consumers. NYPA will also play a critical role in increasing State-owned building efficiency and distributed generation capacity, meeting the Governor’s goal of reducing energy consumption in State facilities at least 20% by 2020.

As the three core activities of REV, each is led by one of New York’s key energy agencies and authorities: Regulatory reform by the New York State Public Service Commission, market activation by NYSERDA, and leading by example by NYPA. By coordinating the actions of DPS, NYSERDA and NYPA through the REV framework and the Clean Energy Standard, New York will be able to achieve the ambitious clean energy targets laid out in the 2015 State Energy Plan.



How We'll Do It: Our Specific Action Initiatives

REV's three core pillars of activities are comprised of over 40 initiatives, grouped in our State Energy Plan into seven interrelated categories:

1. Renewable Energy

Our goal is to support a broad range of renewable options, from rooftop solar panels to grid-scale wind farms, all with an emphasis on integrating these diverse energy sources into the grid. New York is working to reduce soft costs and other market barriers to make these solutions more competitive in the energy market.

Sample initiatives to increase renewable energy deployment include:

- > Large-Scale Renewables Strategy
- > NY-Sun
- > K-Solar
- > Renewable Heat NY
- > Renewable Thermal

2. Buildings and Energy Efficiency

Buildings consume roughly 60% of all energy used in New York State. If we're going to maximize the benefits of clean energy, we need to ensure that our power is being consumed more efficiently by end-users at scale. This applies to individuals, residences, businesses, and State-owned buildings alike. We also know that energy efficiency is the most cost-effective way to reduce greenhouse gas emissions.

Sample initiatives to increase building and energy efficiency include:

- > BuildSmart NY
- > Energy Efficiency Measures in Affordable Housing
- > Increased Emphasis on Net Zero Energy and Passive House Buildings
- > Combined Heat and Power

3. Clean Energy Financing

Because ratepayers and taxpayers cannot and should not finance the State's energy transition alone, the success of REV is dependent on the State's ability to animate markets and attract private capital towards the envisioned clean energy solutions.

Sample initiatives to increase clean energy financing include:

- > NY Green Bank
- > PACE, or Property-Assess Clean Energy Financing

4. Sustainable and Resilient Communities

New York State is made up of 4,270 local governments. Our goal is to empower each locality to adopt more sustainable and resilient energy systems by providing them with access to information, technical guidance, and financing to adopt clean energy solutions that meet their needs and help revitalize their communities.

Sample initiatives to build sustainable and resilient communities include:

- > NY Prize Community Microgrid Competition
- > New York State Community Partnership
- > REV Campus Challenge
- > Five Cities Energy Master Plans

5. Energy Infrastructure Modernization

60% of New York's power generation infrastructure is over 35 years old. As we develop distributed energy resources statewide, it is critical for the safety and resiliency of our current energy system that we maintain — and in some instances enhance — the central grid, which we can do directly through NYPA. It is only by doing so that we can continue to meet the energy needs of New Yorkers and integrate clean and distributed power at scale into our energy system.

Sample initiatives to modernize our energy infrastructure include:

- > Energy Highway
- > Smart Generation and Transmission
- > Low-Cost Power for Economic Development

6. Innovation and R&D

For too long, cutting edge business models and technology solutions have been sitting on the sidelines of New York's energy system. REV seeks to bring those solutions into the mainstream and onto the grid. Initiatives to support innovation and R&D will not only help us build the grid of tomorrow, but also create jobs and attract investment in New York as a global clean energy and technology capital

Sample initiatives to foster innovation and R&D include:

- > REV Demonstration Projects
- > Energy Storage R&D and Commercialization through NY-BEST and Brookhaven National Laboratory
- > CEF Innovation and Research Portfolio

7. Transportation

Transportation accounts for 34% of the State's greenhouse gas emissions and \$26.7 billion in fuel costs annually. A cleaner, more efficient, and sustainable transportation system is critical to advancing New York's energy goals. This will include alternative fuel vehicles (especially plug-in electric vehicles), more efficient public transportation, smarter transportation management infrastructure, consumer education, and close coordination with neighboring states to implement effective regional solutions.

Sample initiatives to improve New York's transportation systems include:

- > ChargeNY
- > Clean Fleets NY and Innovative Ownership Models

New York's Energy Progress Thus Far:

While REV's innovative approaches will yield far more progress in the future, we're already making major strides in our State.

For example:

- > Solar power in New York grew 575% in just three years — from 2012 — 2015. In December of 2014, Long Island celebrated their 10,000th solar installation and continues to expand on that growth.
- > New York is the largest hydroelectric power producer east of the Rocky Mountains.
- > In June of 2015, NYSERDA announced an investment of \$1.5 billion towards large-scale renewables (LSRs). Since it launched last year, school districts in 59 of the State's 62 counties have registered with K-Solar
- > Since K-Solar launched in 2015, school districts in nearly all of the State's 62 counties have registered and have expressed an interest in and have availed themselves of the benefits available under K-Solar to add solar to their schools.
- > In June of 2015, 11 new REV Demonstration Projects were put forward. Their goal is to test how new business models and partnerships with third parties can harness the utility platform, expertise, and brand to reduce clean-energy costs and barriers to marketing, financing, and operations and maintenance while potentially providing new utility-value streams.
- > From 2010 to 2015, ReCharge NY (a NYPA program), created and retained more than 400,000 jobs and spurred \$34 billion in private investment.
- > New York State reduced carbon dioxide emissions by 7.7 million tons in 2013.
- > In December of 2014, the PSC approved a plan for the Brooklyn/Queens Demand Management (BQDM) Program. Rather than building a new \$1 billion substation to meet these two borough's growing energy needs, Con Edison will invest in energy efficiency, locally produced clean power and better energy storage to meet the demands of the community at a far lower cost to ratepayers, the utility, and the environment. This program models the new role utilities are meant to play: maximizing savings for the consumer, integrating clean and local energy solutions, and minimizing environmental impact. Brooklyn/Queens Demand Management (BQDM) is an example of the changing role of utilities in New York's energy system.

Building A Better Energy Future in Our Homes, Our Businesses, and Our Communities:

New York State's REV strategy has been designed with a clear end goal in mind: to make clean, affordable, and resilient energy a reality for all New Yorkers. The following are just a few practical examples of how the future of energy can and will benefit all New Yorkers statewide:

Examples of How REV Can Help [New York Residents](#) Realize a Cleaner, Cheaper Energy Future:

- > A company makes your home more energy efficient at no cost to you by installing energy efficient controls, upgrading the building envelope and/or energy systems, and replacing energy consuming equipment. As a result, your monthly bills go down, and a portion of your savings pays them back for the investment. So you save money without spending a cent.
- > Your "smart" home connects all technological devices and allows you to control them with your phone or computer, giving you unprecedented control over your energy use and helping you save on your electric bill.
- > You live in a Zero Net Energy Home, where strong insulation, a well-sealed envelope, thermal heating and cooling, and solar panels allow you to produce as much energy as you consume every year, while living in a healthy, comfortable environment.
- > You join a "Shared Solar" project, where you virtually purchase solar panels at a location other than your home. Through this process, you will earn credits toward your energy bill that are calculated based on how much renewable energy your portion of the project generates in a billing cycle. This means you will be buying clean energy without covering the upfront installation costs on your own, and you won't need to have a house or a roof fit for solar to do it.
- > You will benefit from a more competitive energy environment, which will give you access to more choice, better products, and improved services.

Examples of How REV Can Help [New York Businesses](#) Cut Costs and Maximize Energy Efficiencies – While Helping to Build a Cleaner, Cheaper Energy Future:

- > Your company installs an on-site cogeneration system (or combined heat and power [CHP] generation), allowing you to power and heat your own business. This reduces your energy costs and is a proven strategy for dealing with weather emergencies. You'll be able to power your business while others endure prolonged power outages.
- > You have an effective energy management strategy with installed technology that increases your property's value, extends the life of energy supplies and assets, generates savings, minimizes the risk of equipment failure, and reduces your building's environmental impact.
- > Real time alerts tell you when energy demand is highest, so you can reduce your load or store energy on-site in batteries and sell power back to the grid.
- > New products from renewable companies like large-scale wind developers let you sign a fix-cost power contract, helping you to better run your business by knowing your monthly energy costs in advance.

Examples of How REV Can Help [New York Communities](#) Build a Safer, Cleaner, More Affordable Energy Future:

- > Your neighborhood builds a microgrid with funding from NY Prize, giving you access to carbon-free energy and powering your fire department, critical care facilities, and other key buildings so they never lose power when extreme weather hits.
- > You form a Community Choice Aggregation (CCA) 2.0 authority for local energy planning. You achieve energy independence by producing your own power, which saves you money while increasing resilience. And you do it based on your own assets and priorities.
- > Your local government lowers its budget and your bills by taking clean energy action, saving taxpayer dollars and making your town more competitive, sparking economic opportunity and jobs.
- > Your neighborhood joins programs like Community Solar NY, in which bulk buying lowers costs for everyone. Community batteries (supported by NY-BEST) provide all members with backup power in case of an outage, all while allowing you to sell excess power back to the grid.

This is the energy future we envision, and what all of REV's activities are working towards.

Get to Know Some REV Initiatives:

The following list offers brief descriptions of some of the REV initiatives mentioned previously. A full list and description of the 40+ New York State initiatives comprising REV is available in the State Energy Plan (<http://energyplan.ny.gov/>):

NY Green Bank (NYGB)

Working to close existing financing gaps in order to build a dynamic clean energy economy. NYGB is the largest green bank in the country with \$1 billion in capital and a goal of attracting greater private sector financing for clean energy projects. NYGB will keep reinvesting those funds over time and leveraging private capital to build an economically scalable clean energy future for New York State.

Shared Renewables

Supporting shared renewable energy for millions of New Yorkers that might not otherwise be able to access renewable energy. Launched by Governor Cuomo in July 2015, the Shared Renewables initiative makes it possible for low-income communities, apartment dwellers, home renters, and more to go renewable. They'll be able to purchase clean and affordable energy from communal renewable projects such as a solar field at a local school or a local wind farm. The goal is statewide access to a range of affordable renewable solutions for every New Yorker.

NY Prize

Offering \$40 million in awards to communities that build their own local energy systems, known as microgrids. These are projects generated by the community and for the community. They'll produce power to use locally, because the less electricity travels, the cheaper and more resilient it becomes. They'll sell excess electricity back to the grid, and power key community institutions like the local fire station in times of power outages. So far, over 120 communities have applied, and 83 have received \$100,000 grants for feasibility studies necessary to lay the groundwork for moving these projects forward across the State.

NY-Sun

A \$1 billion commitment to expand solar throughout the State and transform New York's solar market into a self-sustaining industry. NY-Sun will create 3,000 megawatts of solar projects in the next 10 years, and support New Yorkers who join together to "solarize" their communities. NY-Sun also sets aside funding for low- to moderate-income New Yorkers, as part of its goal to make clean and affordable solar energy a reality for all New Yorkers, regardless of where they live or how much money they make.

New York Battery and Energy Storage Consortium (NY-BEST)

Leading the way in more cost effective energy storage to build a better grid. This is an example of NYSERDA's Clean Energy Fund supporting and incubating promising clean energy innovation across the State. NY-BEST supports technology developers: helping them build partnerships, removing regulatory challenges, providing space in which to safely test their solutions, and getting products to market.

K-Solar

Helping K-12 schools statewide go solar at reduced costs. As public facilities in every community across the State, schools have a unique opportunity to lead by example, leveraging resources from NYPA to demonstrate the benefits of solar to their communities. Not only that, but going solar will save schools money on their electric bills, allowing them to spend less on utilities and more on educating New York's children. So far, 323 school districts have registered into the program to date (over 40% of all the public school districts in NYS).

REV Demo Projects

Designing new utility business models to support the energy system of the future. The REV demonstration projects provide insight on how businesses and innovators can work with utilities to unlock private investment in clean energy and deliver new products and services to customers. REV Demo Projects are an opportunity for the utilities to work with third parties in order to create non-traditional business models that can be scaled and duplicated across the energy system.

Five Cities

Building and implementing energy plans for five of New York's largest cities — Albany, Buffalo, Rochester, Syracuse, and Yonkers — to reduce their energy consumption, strengthen resilience, encourage clean energy investment, and contribute to a cleaner environment. The Five Cities initiative is customer led: the cities identify the challenges for their residents, and then work with NYPA to design custom solutions to meet their needs. Successful implementation of these plans is expected to save \$400 million a year, and the ultimate goal is for cities throughout the State to follow suit and take more control over their own energy planning and use

BuildSmart NY

Working to cut energy use in State buildings 20% by 2020. The government's plan to lead by example is not just good for the environment; it'll save taxpayers tens of millions of dollars on State electricity bills.

Join Us:

We invite you to join us in reforming New York's energy vision by learning more, bringing REV programs to your communities, innovating and investing in clean technology, and educating others. New York has the energy to lead, and together — with the combined efforts of government, industry, and community — we'll build the energy system of tomorrow.

- Join the conversation: **#REV4NY**
- Find us on **Facebook, Twitter, and LinkedIn**
- Visit us online at **www.ny.gov/rev4ny**

