New York State Energy Research and Development Authority

Operations, Accomplishments, Mission Statement, and Performance Measurement Annual Report

Fiscal Year Ended March 31, 2019

Pursuant to Public Authorities Law Section 2800(1)

Final Report | June 2019

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

NYSERDA's Promise to New Yorkers:

NYSERDA provides resources, expertise, and objective information so New Yorkers can make confident, informed energy decisions.

Mission Statement:

Advance innovative energy solutions in ways that improve New York's economy and environment.

Vision Statement:

Serve as a catalyst – advancing energy innovation, technology, and investment; transforming New York's economy; and empowering people to choose clean and efficient energy as part of their everyday lives.

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1 NYSERDA

NYSERDA is governed by a board consisting of 13 members, including the Commissioner of the Department of Transportation, the Commissioner of the Department of Environmental Conservation, the Chair of the Public Service Commission, and the President and CEO of the Power Authority of the State of New York, who serve ex officio. The remaining nine members are appointed by Governor Andrew M. Cuomo of the State of New York with the advice and consent of the Senate and include, as required by statute, an engineer or research scientist, an economist, an environmentalist, a consumer advocate, an officer of a gas utility, an officer of an electric utility, and three at-large members.

2 Mission and Vision

NYSERDA's **mission** is to advance innovative energy solutions in ways that improve New York State's economy and environment.

NYSERDA's **vision** is to serve as a catalyst for advancing energy innovation, technology, and investment; transforming New York's economy; and empowering people to choose clean and efficient energy as part of their everyday lives.

NYSERDA seeks to support the widespread development and use of innovative technologies to improve the State's energy, economy, and environment. NYSERDA's programs and services provide a vehicle for the State to work collaboratively with businesses, academia, industry, the federal government, the environmental community, public interest groups, and energy market participants.

3 Operational Changes and New Initiatives

This section includes a description of NYSERDA's new initiatives. Several of the new initiatives this year modify and build upon prior offerings by NYSERDA and are mainly driven by the continued rollout of the Clean Energy Fund (CEF).

3.1 Clean Energy Fund

During 2018, NYSERDA accomplished several key milestones related to the CEF, including developing and receiving approval to launch many key initiatives. This section describes the establishment of the CEF portfolio, which began with the first initiatives introduced in 2016 and continued to build in 2018.

In June 2015, NYSERDA filed the Clean Energy Fund Information Supplement, paving the way for the 10-year, $5 billion CEF. Through the CEF, NYSERDA seeks to build on its success and momentum to meet evolving market and customer needs. NYSERDA designed the CEF to pursue three long-term outcomes: thriving and self-sustaining clean energy industries able to operate without subsidies; greater levels of private capital invested in clean energy and jobs in New York State; and significant reductions in greenhouse gas (GHG) emissions from the State's energy sector. This investment will span across four program portfolios: Market Development, Innovation and Research, NY Green Bank, and NY-Sun. NYSERDA designed these portfolios to complement the other pillars of the State's energy agenda, including the Reforming the Energy Vision (REV) Regulatory Proceeding, the Clean Energy Standard (CES), and initiatives advanced by the New York Power Authority.

The CEF will employ innovative solutions that remove barriers, solve customer needs, and provide value. The CEF represents a shift in strategies toward engaging market forces and leveraging capital through investments that lower costs and make clean energy more affordable and accessible. Through the CEF, NYSERDA will continue to act as a catalyst for advancing energy innovation and technology, transforming New York State's economy and empowering consumers to make informed energy choices.

In positioning the organization for success under the CEF, NYSERDA is continuing to streamline operations to become more responsive, adaptive, and easier to use. NYSERDA also orients more towards a strategic, market-based approach to identify and size market opportunities as well as to uncover and address customer value propositions in a meaningful way.

The following sections provide a description of new CEF initiatives approved in the reporting year, although some but not all have been launched in this period.

3.1.1 Information Products

Information Products and Brokering was approved in 2018 with $8.5 million in CEF funding. It provides a platform to develop information tools and resources needed to increase customer demand and adoption of energy efficiency and clean energy solutions. This initiative will increase customer demand for energy efficiency and reduce acquisition costs by enabling solution providers.

3.1.2 Energy Storage

New York is at the beginning stages of deploying storage to meet aggressive storage targets of 1,500 MW of advanced energy storage by 2025 and 3,000 MW by 2030. In June 2018, Department of Public Service (DPS) and NYSERDA staff released the New York State Energy Storage Roadmap which includes a series of recommended actions intended to achieve these targets. On December 13, 2018 the New York Public Service Commission (PSC) issued an Energy Storage Order that adopted many of the Roadmap recommendations and authorized incentive funding, bring total available market acceleration bridge incentives to $400 million including Regional Greenhouse Gas Initiative funds authorized by the NYSERDA Board. The first initiative described in this CEF Energy Storage chapter entitled Reducing Barriers to Deploying Distributed Energy Storage, was approved in 2016 and is comprised of $24.5 million in CEF funding. It will primarily target building owners and operators, permitting agencies, and vendors to address stall points confronting energy storage and increasing soft costs. The goal is to reduce total soft costs by up to $50 per kWh for a distribution/bulk storage system and up to $150 per kWh for a customer sited system by 2025 compared to 2017-18 costs. The second initiative of the Energy Storage chapter, Solar Plus Energy Storage, was approved in 2018 and is a first step in NYSERDA's solar plus energy storage market development strategy and includes $40 million to incentivize paired solar + storage projects. This initiative works in conjunction with the first initiative to address soft cost barriers, as well as enabling industry and utilities to address interconnection, metering and compensation mechanisms associated with paired combination systems sooner than otherwise would have occurred. Both initiatives are part of NYSERDA's coordinated intervention strategies to develop and deploy energy storage products and remove market barriers to their adoption.

3.1.3 Workforce Development and Training

Thus far, NYSERDA has committed over $68 million of CEF funds towards two initiatives. Workforce Development Industry Partnerships was approved in 2016 but added $10 million in funding in 2018 to allow for additional projects. The Clean Technology and Energy Efficiency Talent Pipeline initiative was approved in 2018 with $47 million in CEF funding. Its purpose is to ensure that NYS clean technology and energy efficiency businesses have a robust supply of new and existing workers with the required occupational skills. This initiative focuses on expanding training infrastructure which will ultimately lead to soft cost reductions by decreasing the efforts required to getting a worker to full productivity.

3.1.4 Resource Acquisition Transition

The Resource Acquisition Transition initiatives began in 2016 to continue operation and transitioning of programs from legacy portfolios. In 2018, $9 million was added to the Combined Heating and Power initiative and $2.3 million was added to the Single-Family Market Rate program to extend the initiatives through 2019. In addition, $8 million was added to the Anaerobic Digester initiative in 2018 to support refurbishment of previously installed digester systems.

3.1.5 Clean Energy Products

Underutilized Product Support was approved in 2017 and aims to address the barriers in the market and work to bolster availability of advanced products in the supply chain, expand demand for more advanced HVAC technologies among end-users, and support successful business models in the market to increase sales. In 2018, $17.6 million was added to the budget to support activities related to product and appliance standards in New York for product categories that are not currently covered by federal standards, for a total approved budget of $46.4 million.

3.1.6 Multisector Solutions

NYSERDA has approved $106.9 million toward five initiatives aimed at supporting the development and deployment of clean and renewable sources of energy, a more efficient and responsive grid, and more energy-efficient buildings. These multisector solutions will address cross-cutting barriers and opportunities that are not specific to one market sector, including reducing soft costs, providing technical assistance, and increasing confidence in clean energy solutions. Four of these initiatives, The Energy Efficiency Soft-Cost Challenge, Aggregated Technical Services, Commercial and Industrial Carbon Challenge, and Clean Energy Siting and Soft Cost Reduction were approved in 2017. The Pay for Performance (P4P) was approved in

2018 with a budget of $55.76 in CEF funding. P4P structures have not been successfully employed with smaller customers. This initiative aims to solve this issue by working to improve accuracy in savings and estimates. P4P is designed to respond to the energy service contract that guarantees lower cost of energy with the risk of underperforming.

3.1.7 New Construction

The New Construction initiative was approved in 2017 and initially funded at $96.6 million. A modification to the initiative in 2018 added over $52 million to add a Net Zero Energy Commercial/ Industrial Competition. The competition will provide a unique program model in which technical assistance and incentives for all net zero energy technologies (efficiency, renewables, energy storage, electric vehicle charging, etc.) are provided through a single program to align with economic development project timelines.

3.1.8 Innovation Capacity and Business Development

NYSERDA supports a vibrant, self-sustaining, clean energy technology innovation ecosystem to accelerate the growth and scale of new cleantech enterprises in the State. To achieve this goal, NYSERDA has approved $86.3 million of CEF funds through 2021 toward three initiatives to increase the number and success rate of clean energy startups, encourage private investment in startups, facilitate strategic partnerships with corporations, and accelerate scaling. Manufacturing Corps and Novel Business Models and Offerings were approved in 2017. The Cleantech Startup Growth initiative was approved in 2016 but added $9 million in 2018 to support two new activities; 76West and Innovation Advisors. 76West is and accelerator program and business competition to build clean energy businesses and jobs in New York States Southern Tier region. Innovation Advisors continues to seek ways to better serve the entrepreneurs and companies it supports through various initiatives.

3.1.9 Renewable Optimization

NYSERDA has approved $55.5 for two initiatives aimed at optimizing the energy output and uptime of renewable resources. The Energy Storage Technology and Product Development initiative was approved in 2017. The National Offshore Wind Research and Development Consortium was approved in 2018 with a budget of $22.5 million in CEF Funding. The consortium will address US-specific technology issues and accelerate cost reductions in the United States offshore wind sector. It will focus on supporting innovations in wind plant design, developing methods to reduce installation costs, and exploring advanced technological solutions for operations.

3.2 New Efficiency, New York

On April 20, 2018, Governor Cuomo announced the most aggressive energy efficiency strategy in New York State's history, to set the State on a path to accelerate energy efficiency and reduce greenhouse gas (GHG) emissions, decrease consumer energy costs, and create job opportunities. This initiative, known as New Efficiency: New York, will support the growth of energy efficiency businesses and further Reforming the Energy Vision opportunities for market innovation.

Recommendations in the comprehensive energy efficiency initiative white paper were issued by the New York State Department of Public Service (DPS) and NYSERDA on April 26, 2018. The white paper—guided by a new 2025 energy efficiency target of 185 trillion British thermal units (TBtu) of cumulative annual site energy savings—will accelerate progress towards the State's ambitious clean energy goals, including meeting one third of the emissions necessary to achieve 40% reduction of GHG emissions by 2030 (commonly referred to as "40 by 30") from 1990 levels.[1]

In addition, on January 15, 2019. Governor Cuomo's State of the State address announced New York State's nation-leading clean energy and jobs agenda will put the State on a path to carbon neutrality. The Governor proposed the following goals:

- Six thousand megawatts (MW) of solar by 2025
- Seventy percent renewable electricity by 2030
- Nine thousand MW of offshore wind by 2035
- Carbon-free electricity by 2040

With these goals, New York is undertaking one of the most aggressive clean energy agendas in the nation. Through the CEF and its other portfolios, NYSERDA works to foster the transformation of markets, pushing them to accurately value clean energy, energy efficiency, and resilience—while encouraging competition and innovation that delivers value to consumers.

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[1] NYSERDA and DPS. 2018. "New Efficiency: New York". NYSERDA. https://www.nyserda.ny.gov/About/Publications/New-Efficiency.

3.3 Offshore Wind

In his 2019 State of the State address, Governor Cuomo proposed a significant ramp-up of the State's renewable energy goal to 70% of electricity met by renewables by 2030, alongside other renewable energy goals of increasing New York's offshore wind target to 9,000 megawatts by 2035. On November 8, 2018 NYSERDA issued its inaugural solicitation for offshore wind energy pursuant to the New York State Public Service Commission's Order Adopting the Offshore Wind Standard which provides a framework for an initial phase of offshore wind energy solicitations. This solicitation will stimulate the development of the domestic offshore wind industry, reduce the cost of later offshore wind procurements, and allow New York State to realize the direct benefits associated with the construction, operation, and maintenance of offshore wind resources.

3.4 Solar

On June 18, 2018, NYSERDA announced improvements to NY-Sun's highly successful Megawatt Block incentive program for non-residential and large commercial and industrial solar projects. The redesign, made in response to a rapidly changing market, includes expanding the incentives, supporting larger solar projects and encouraging development in a greater variety of locations, including brownfields, landfills and at affordable housing locations. The NY-Sun program supports Governor Andrew M. Cuomo's mandate for 50 percent of the state's electricity from renewable resources by 2030. Additionally, in the annual State of the State address, Governor Cuomo announced plans to double the distributed solar target to 6 GW by 2025.

3.5 Energy Storage

In 2018, Governor Andrew M. Cuomo announced a nation-leading goal of 1,500 Megawatts (MW) of energy storage by 2025. NYSERDA and the New York State Department of Public Service (DPS), together with stakeholders, developed the New York State Energy Storage Roadmap. The Roadmap identified the most promising near-term policies, regulations, and initiatives needed to realize the Governor's ambitious 2025 target on a path to a 2030 storage target.

In December 2018, the New York Public Service Commission (PSC) issued a landmark energy storage order, based upon the Roadmap recommendations. The order established a 3,000 MW by 2030 energy storage goal and deployment mechanisms to achieve both the 2025 and 2030 energy storage targets and focuses on:

- Improving the overall efficiency of the system by stimulating third-party investment
- Uncovering and rewarding locational and time-of-day values
- Spurring the pace of cost-reduction and efficiencies by seeking markets at scale and promoting competition
- Removing impediments to accessing finance as well as data that highlights areas of the grid with the greatest need for the benefits of storage
- Authorizing a total $350 million in bridge incentives to accelerate the energy storage market, including funding for solar-plus-storage projects within the NY-Sun initiative, plus another $53 million RGGI funds
- Directing the New York's six investor-owned utilities to hold competitive procurements for a minimum of 350 MW of bulk-sited energy storage
- Regulatory changes to customer rates and utility solicitations that reflect the environmental benefits and resiliency energy storage brings to the grid
- Recommendations to improve wholesale market design and enable distributed energy resources to meet distribution system and wholesale system needs more cost effectively for ratepayers
- Continued efforts to streamline permitting and siting challenges, reduce the non-hardware costs of energy storage, and ensure straightforward access to market rules and opportunities

3.6 Clean Energy Action Plan

The Clean Energy Action Plan provides relief for businesses and residents affected by a utility company natural gas moratorium. As part of this plan, the State will offer new clean energy incentives and investments to lower energy costs for consumers, promote economic development in effected areas and deliver additional resources for new construction projects, energy efficiency awareness, and community support. The Clean Energy Action Plan includes the following incentives and programs offered by the NYSERDA:

- New Construction: $28 million in incentives and services will be available to new customers, including low- to moderate-income residential developments and waitlisted natural gas customers, to access alternative heating and cooling systems and energy efficiency services.
- Energy Efficiency: $25 million in investments to implement energy efficiency measures for existing customers to reduce overall peak demand constraints.
- Additional Incentives for residential and commercial customers in the moratorium areas to install clean heating and cooling systems.
- Community Outreach: A consumer awareness campaign will help communities, businesses, and individuals access the available programs and incentives to help them heat their homes with clean resources and reduce energy waste. Beginning in April, NYSERDA will sponsor sustainable and clean energy community workshops.

NYSERDA is also increasing its support for the Sustainable Westchester Clean Heating Campaign. The campaign will expand the scope of HeatSmart Westchester—a community level initiative designed to facilitate adoption of fossil-free heating and cooling solutions, such as ground source and air source heat pumps, as well as high-efficiency building envelope measures.

Additionally, Con Edison is deploying $165 million toward heat pumps and increasing gas efficiency in the Westchester area to support residential, multifamily, and commercial and industrial customers. The New York Power Authority (NYPA) is offering an additional $32 million in low-cost financing services to its Westchester customers.

4 Program Accomplishments

NYSERDA's activities are focused on achieving the five strategic goals/outcomes titled, Efficient Use of Energy, Renewable and Diverse Energy Supplies, Clean Energy Economy, A Cleaner Environment, and Contract and Cycle Time/Accessibility, as shown in Table 1. NYSERDA's 2018 accomplishments are organized and reported in alignment with these five strategic outcomes. The accomplishments are stated in a cross-program manner, and notably, include results spanning pre-CEF and CEF initiatives.

Table 1. Mission, Vision, Outcomes

Mission	Advance innovative energy solutions in ways that improve the State's economy and environment.				
Vision	NYSERDA's vision is to serve as a catalyst for advancing energy innovation and technology, transforming New York State's economy, and empowering people to choose clean and efficient energy as part of their everyday lives.				
Stakeholders	New York State energy users, businesses, and institutions engaged in the clean energy economy.				
Core Value	NYSERDA will serve as a source of objective, credible information.				
Strategic Goals/Outcomes	**Efficient Use of Energy** NYSERDA reduces market barriers and spurs demand for energy solutions that reduce the energy consumption and increase the energy efficiency of New York State's residents and businesses.	**Renewable and Diverse Energy Supplies** NYSERDA diversifies New York State's portfolio of energy resources by accelerating development of renewable and distributed generation resources.	**Clean Energy Economy** NYSERDA catalyzes technology innovation, new business opportunities, and private investment in clean energy in New York State.	**A Cleaner Environment** NYSERDA enables markets for new clean energy products and services that can produce meaningful reductions in the environmental impact of energy production and use.	**Contract and Cycle Time, Accessibility** NYSERDA is responsive to customer needs by delivering accurate and timely information, services, and programs.

Tables 2 through 7 provide performance information for each of the five outcomes, including data that describes NYSERDA's annual incremental commitment performance for calendar year 2018 and the total cumulative acquired progress achieved through December 2018.

Targets for calendar year 2019 are also provided for performance measures, when possible. NYSERDA's targets are expressed on a commitment basis (i.e., having to do with when funds are committed to a specific contractual activity), as commitment-based targets more appropriately aligns target setting with the new strategies of the CEF that emphasize engaging market forces toward longer-term, more transformative clean energy outcomes, rather than quick turn-around resource acquisition. Commitment-based targets are the best measure of NYSERDA's success at engaging the market to uncover and address customer value propositions and of NYSERDA's continued endeavors to streamline operations and become more responsive, adaptive, and easier to use. Each metrics table contains three columns on the left side representing the move to a commitment-based view and one column on the right side representing the cumulative total benefits achieved by NYSERDA from completed projects.

- The column **Target CY 2018 Commitments Addition** represents the expected target NYSERDA set in the prior year for additional commitments made during this calendar year.
- The column **Achieved CY 2018 Commitments Addition** represents the commitments NYSERDA achieved during this calendar year.
- The column **Target CY 2019 Commitments Addition** represents NYSERDA's expected target for additional commitments made during the calendar year, representing work to build the project pipeline.
- The column **Cumulative Acquired Benefits at end of CY 2018** represents the total benefits NYSERDA achieved from projects that have been completed through 2018.

The quantitative performance measurement data are supplemented with contextual information, as needed and when available, and highlights of additional 2018 accomplishments.

While the listed performance measures are used to evaluate NYSERDA's progress toward goals, many of the measures are influenced by factors that are out of NYSERDA's direct control, such as economic conditions, changes in energy markets and prices, and federal and State policy and funding decisions. The measures are intended to serve as indicators of progress in the context of these external factors.

Table 2 presents NYSERDA's progress toward the efficient use of energy performance measures. Under the CEF, NYSERDA was ordered to achieve minimum projected benefits of 10.6 million megawatt-hours (MWh) and 13.4 million British thermal units (MMBtu) of annual energy efficiency savings at the end of the 10-year funding period (2016-2025). During 2018, NYSERDA's prior round of programs under the Energy Efficiency Portfolio Standard continued to wrap up, while new initiatives under CEF continue to be developed and launched. Performance against energy efficiency delivery targets shown in Table 2 (electricity and fuel saved) was mixed, as the MMBtu target was exceeded while 81% of the MWh target

was achieved. The underperformance on electricity saved can be attributed to slower than expected market uptake of certain new initiatives. NYSERDA continues to develop and implement new approaches under the CEF, while rigorously monitoring the progress of existing market activities and complementary utility programs. The goal is to build out portfolio diversity in a way that can deliver investment goals while monitoring the performance of every element to keep the portfolio on track for the long-term. NYSERDA commonly refers to this approach with the CEF, in the spirit of "market transformation," as the Test-Measure-Adjust model.

Table 2. Performance Measures—Efficient Use of Energy

	Commitment Pipeline			Acquired Benefits
Performance Measures	**TARGET CY 2018 Commitments Addition**	**Achieved CY 2018 Commitments Addition**	**TARGET CY 2019 Commitments Addition**	**Cumulative Acquired Benefits at end of CY 2018**
Electricity[a] (GWh) saved annually due to improved energy efficiency in New York's buildings and facilities.	675.8	544.4	792.7	8,242
Fossil Fuels[a] (MMBtu) saved (in millions) annually due to improved energy efficiency in New York's buildings and facilities.	4.0	4.2	4.1	18.3
Energy Bill Savings Annual direct energy bill savings realized by participating customers (all programs).	**[c]	$101	$158	$1,342

[a] Starting in 2016, targets and achieved values include, consistent with NYSERDA CEF reporting, only the energy savings from CHP systems, electric vehicles, air source heat pumps, fuel cells and ground source heat pumps. However, CO_2e emission reductions and customer bill savings are fully net, accounting for both the energy savings and the energy use of these measures.

[b] The system benefit charge (SBC) was authorized in 1998 and NYSERDA began programs the following year. Substantial installations had taken place beginning in 2001 and based on an average 16-year measure life, NYSERDA's 292-GWh and 1.6- million MMBtu installations will be "retired" in 2018. These amounts and the associated emission reduction and customer bill savings have been netted out of the Total Acquired Benefits at End of CY 2018 values reported.

[c] The measure will be monitored and reported but a target has not been set. NYSERDA has elected not to establish a target in cases where the measure is a function of a parameter that cannot be reliably predicted (e.g., energy costs) or in cases where the metric is new to NYSERDA.

Table 2a. Comparison Points—Efficient Use of Energy

Comparison Points	
Electricity (GWh)	2017 statewide annual sales of electricity—144,992 GWh[a]
Fossil Fuels (MMBtu)	2016 statewide annual (R,C,I) natural gas and petroleum usage—1,003 million MMBtu[a]
Number of New York households served	2017 occupied housing units in NYS—7,304,332[b]
Number of commercial and industrial customers served	2016 business establishments in NYS—544,073[c]

[a] NYSERDA, Patterns and Trends, Energy Information Administration (EIA), 2018

[b] American Community Survey

[c] U.S. Census Bureau: State and County Quickfacts

Additional highlights for strategic goal/outcome Efficient Use of Energy:

- Since 1998, NYSERDA-administered energy efficiency programs have saved enough electricity to power more than 1.25 million homes each year and enough natural gas, propane, oil, and other heating fuels to heat 268,340 homes each year.
- More than 890,000 households and 38,800 commercial, industrial, and institutional customers reduced their energy use and annual energy bills by participating in NYSERDA programs since 1998.

Table 3 presents NYSERDA's progress toward the renewable and diverse energy performance measures. Under the CES, NYSERDA was ordered to conduct regularly scheduled solicitations for the long-term procurement of qualifying RECs to achieve anticipated and minimum results for the years 2017–2021. Statewide procurement of new Tier 1 large-scale renewable resources (facilities that came into operation on or after January 1, 2015) during the period 2017 to 2021 is expected to total at least 9,347,020 MWh, or approximately 1,869,400 MWh per year.

The contribution from renewable energy resources to meet New York's electric load rose to 28.1% in 2017 from the 2014 baseline of 25.9%, an increase of 2.2%. In addition, as a result of several procurement programs, including annual solicitations for new large-scale renewables, solar incentive programs, and other State procurements, New York has a contracted pipeline of more than 10,000 GWh of renewable generation projects. Once operational, these projects are expected to deliver significant progress towards the achievement of the CES.

On solar PV capacity installed, in 2018, NY-Sun saw fewer new commitments than initially expected due primarily to regulatory uncertainty, and adjusted program requirements. NY's Department of Public Service signaled that it was making changes to the Value of Distributed Energy Resources (VDER) Order, and published whitepapers in July and December 2018 with proposed revisions. Many developers delayed project development until the new VDER Order was released in April 2019. Additionally, as part of NY-Sun's program redesign in February 2018, NYSERDA increased the project maturity milestones requirement for developers to submit project applications to NY-Sun. A large number of projects are still under development but are not appearing in NYSERDA's commitment queue until a later date. Finally, NYSERDA's new bridge incentives for PV projects paired with storage are causing many developers to redesign their systems with batteries, which requires additional time and permitting.

Table 3. Performance Measures—Renewable and Diverse Energy

	Commitment Pipeline			Acquired Benefits
Performance Measures	**TARGET CY 2018 Commitments Addition**	**Achieved CY 2018 Commitment Addition**	**TARGET CY 2019 Commitments Addition**	**Cumulative Acquired Benefits at end of CY 2018**
Renewable resources electricity produced 1) Annual Electricity Production (GWh) delivered to wholesale power market from incentivized installations[b]	1,483	2,979	1,524	3,075[a]
2) Annual Electricity Production (GWh) from on-site installations[b]	*570*	372	863	1,683
Solar PV capacity (GW) from all NYSERDA funded solar PV programs, including NY-Sun 3 GW goal[b]	*0.402*	0.296	*0.6*	*1.254*

[a] Amount is net of any NYSERDA-contracted facilities which have reached their terminus year, after which NYSERDA no longer

has the rights to claim the attributes of their generation.

[b] NYSERDA does not, by filing this report, make any claim to the environmental attributes associated with those megawatt-hours.

NYSERDA has relinquished all such rights and disavows any and all rights to any environmental claims or renewable energy to which it had made claims under previous policies.

Table 3a: Comparison Points—Renewable and Diverse Energy

Comparison Points	
New York Load Served by Renewables	2017 Renewable Energy Serving Load – 28.1% (42,964 GWh's)

a CES Annual Progress Report – 2017 https://www.nyserda.ny.gov/-/media/Files/Publications/Energy-Analysis/RPS/2019-Clean-Energy-Standard-Annual-Progress-Report.pdf

Additional highlights for strategic goal/outcome Renewable and Diverse Energy supplies:

- NYSERDA is currently supporting 110 large-scale renewable generation projects representing 4,449 MW of renewable generation capacity. There are 62 facilities operating with the remainder of the projects under design and construction.
- Of 83 communities awarded funding to conduct feasibility assessments at Stage 1 of the NY Prize Competition, all but one completed their Stage 1 assessment and the completed assessments are posted to the NY Prize website. Of those communities that vied for funding to conduct detailed engineering design and commercial/financial plans at Stage 2 of the competition, 11 were awarded nearly $11 million and work on these plans is anticipated to be completed in mid-2019.

Table 4 presents NYSERDA's progress toward the clean energy economy performance measures. Procurement activities by NYSERDA include the issuance of the second RES solicitations in 2018. Combined with the renewable energy projects previously announced under Governor Cuomo's Clean Energy Standard, New York has now awarded 46 projects worth more than $2.9 billion

As noted earlier, the pipeline of projects in development is robust. In fact, NYSERDA's awards resulting from the 2018 CES solicitation and the 26 projects awarded in the first solicitation account for 20 percent more new renewable capacity than was awarded under the decade-long Renewable Portfolio Standard, the predecessor to Governor Cuomo's Clean Energy Standard.

In the first quarter of 2019, additional large-scale renewable contracts have been executed which are expected to leverage nearly $1 billion of private investment.[2]

[2] See https://www.nyserda.ny.gov/About/Newsroom/2019-Announcements/2019-01-18-NYSERDA-Announces-Details-for-20-Large-Scale-Renewable-Energy-Projects

Table 4. Performance Measures—Clean Energy Economy

Performance Measures	Commitment Pipeline			Acquired Benefits
	TARGET CY 2018 Commitment Addition	Achieved CY 2018 Commitment Addition	TARGET CY 2019 Commitments Addition	Cumulative Acquired Benefits at end of CY 2018
Total funding leveraged from all NYSERDA investments ($million)[a,b]	$3,241	$3,847	$3,101	$12,243

a NYSERDA's data set for leveraged funds began in 2010.

b Data collection for leveraged funds associated with NYSERDA's Technology and Business Development programs is an ongoing effort and the reported values included in this figure represent incomplete data that will be supplemented in future years.

Additional highlights for strategic goal/outcome Clean Energy Economy:

- As a component of the leveraged funding presented in Table 4, NYSERDA's investment in technology and business development has leveraged $144 million in 2018 for a total of $1,428 million through the end of calendar year 2018.
- As a result of NYSERDA's technology and business development investments, there are more than 467 new and improved clean energy products in the market (including 33 new products added in 2018) in all end-use energy sectors from high-efficiency furnaces to advanced lighting controls and hybrid electric buses.
- As of the end of 2018, there are currently 91 new clean energy products in development with support from NYSERDA's technology and business development programs.
- As of the end of 2018, annual sales of products developed with NYSERDA support have reached $2,480 million.[3]
- As of the end of 2018, there are currently 81 clean energy businesses receiving financial support from NYSERDA's technology and business development programs.
- NYSERDA's incubator program, which supports six cleantech incubators across the State, assisted 271 clients and helped these startups raise more than $378 million in private capital as well as almost $105 million of non-NYSERDA grant funding, while generating 1,590 jobs and bringing dozens of new clean energy and clean technology products to the market.

Table 5 presents NYSERDA's progress toward cleaner environment performance measures. The 2018 target for carbon reductions was exceeded (achieving 140%) and can be attributed to the increased overall procurement amount in excess of the anticipated target from the 2018 CES solicitation.

3 Sales data for both 2017 and 2018 have been added to the cumulative total as there is no longer a lag in the collection of annual product sales. Sales were $40 million and $25 million for 2017 and 2018, respectively.

Table 5. Performance Measures—A Cleaner Environment

Performance Measures	Commitment Pipeline			Acquired Benefits
	TARGET CY 2018 Commitment Addition	Achieved CY 2018 Commitment Addition	TARGET CY 2019 Commitments Addition	Cumulative Acquired Benefits at end of CY 2018
CO_2 equivalent emission reductions due to NYSERDA's energy efficiency, renewable and diverse energy programs (annual metric tons) **(All programs)**	1,648,887[a]	2,302,786	2,049,015	8,272,905

[a] The target has been updated from the prior year report.

Table 5a: Comparison Points—A Cleaner Environment

Comparison Points	
CO_2 equivalent emission reductions	2016 annual NYS power sector emissions—31.5 million metric tons CO_2

Energy-related environmental policies in 2018 informed by NYSERDA reports/studies:

- The New York State Offshore Wind Master Plan[4] was released early in Q1 2018 and includes 20 supporting studies, including many focused on wildlife and environmental topics. The Environmental Research Program played a key role in conducting research, analysis, and outreach to evaluate the potential for offshore wind energy development to proceed in a way that is both responsible and cost effective. This Master Plan sets forth New York's comprehensive strategy to reach the 2,400MW goal by 2030.
- Program staff are coordinating with the Department of Homeland Security and Emergency Services' "State Hazard Mitigation Plan" update, which is intended to integrate climate change more fully into the new Plan.
- Program staff worked with Dr. Richard Moss, who is leading the Independent Advisory Committee (IAC) on the National Climate Assessment (NCA). This group was recently disbanded by the Federal administration and reinstated by Governor Cuomo under the auspices of the US Climate Alliance. The IAC is developing recommendations for states and future NCAs.
- Program staff presented on the ClimAID Assessment at a two-day workshop on sub-national climate assessments, held in August 2018 in Washington, D.C., and sponsored by the National Academies. The workshop brought together organizations from across the country to discuss different approaches to climate assessments.

[4] https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/Offshore-Wind-in-New-York-State-Overview/NYS-Offshore-Wind-Master-Plan

- The Program organized a symposium, "Climate Change & Buildings: Adaptation Research Planning," that drew nearly 100 attendees from across the buildings industry to learn about climate impacts and adaptation strategies for the sector.
- The Program sponsored the Wood Stove Design Challenge that was held at the National Mall in Washington, D.C. on November 9–13, 2018. NYSERDA supported this event to demonstrate and evaluate wood stoves for energy efficiency and emissions performance. The Northeast States for Coordinated Air Use Management (NESCAUM) and Hearth Lab Solutions demonstrated an integrated duty-cycle test protocol developed with NYSERDA support to provide a more representative test of wood stove performance, leading to more realistic efficiency and emissions evaluations.
- In October 2018 the Program hosted an Offshore Wind State of the Science Workshop. The two-day workshop was divided into separate sessions that started with a description of the stressors imparted by offshore wind development and proceeded to discuss those stressors by wildlife groups. The event featured speakers from the US and Europe and was attended by more than 180 attendees.

Tables 6 and 7 present NYSERDA's progress toward the contract and cycle time performance measures, which NYSERDA assesses in terms of invoice payment and contract processing timelines. NYSERDA maintained strong performance with regard to prompt payment of invoices. Overall Cycle Time for the Authority improved with a 42% improvement in direct contracts / contract modification and maintenance of improvements for open enrollment / task work orders at < 1 week. These results are part of a four-year trend in year over year improvements for contracting cycle time.

Table 6. Performance Measures—Contract and Cycle Time (Invoicing)

CONTRACT AND CYCLE TIME—INVOICING *NYSERDA is responsive to customer needs—delivering accurate and timely information, services, and programs.*					
Performance Measures	**CY 2016**	**CY 2017**	**TARGET CY 2017**	**CY 2018**	**TARGET CY 2019**
Invoice payment: 1) Number of invoices paid within 30 days	86,138 invoices	65,210 invoices	**[a]	72,053 invoices	**[27]
2) Percent of payments made within 30 days	99.99%	99.99%	100%	99.99%	100%

[a] The measure will be monitored and reported but a target has not been set. NYSERDA elected not to establish a target in cases where the measure is a function of a parameter that cannot be reliably predicted (e.g., energy costs) or in cases where the metric is new to NYSERDA.

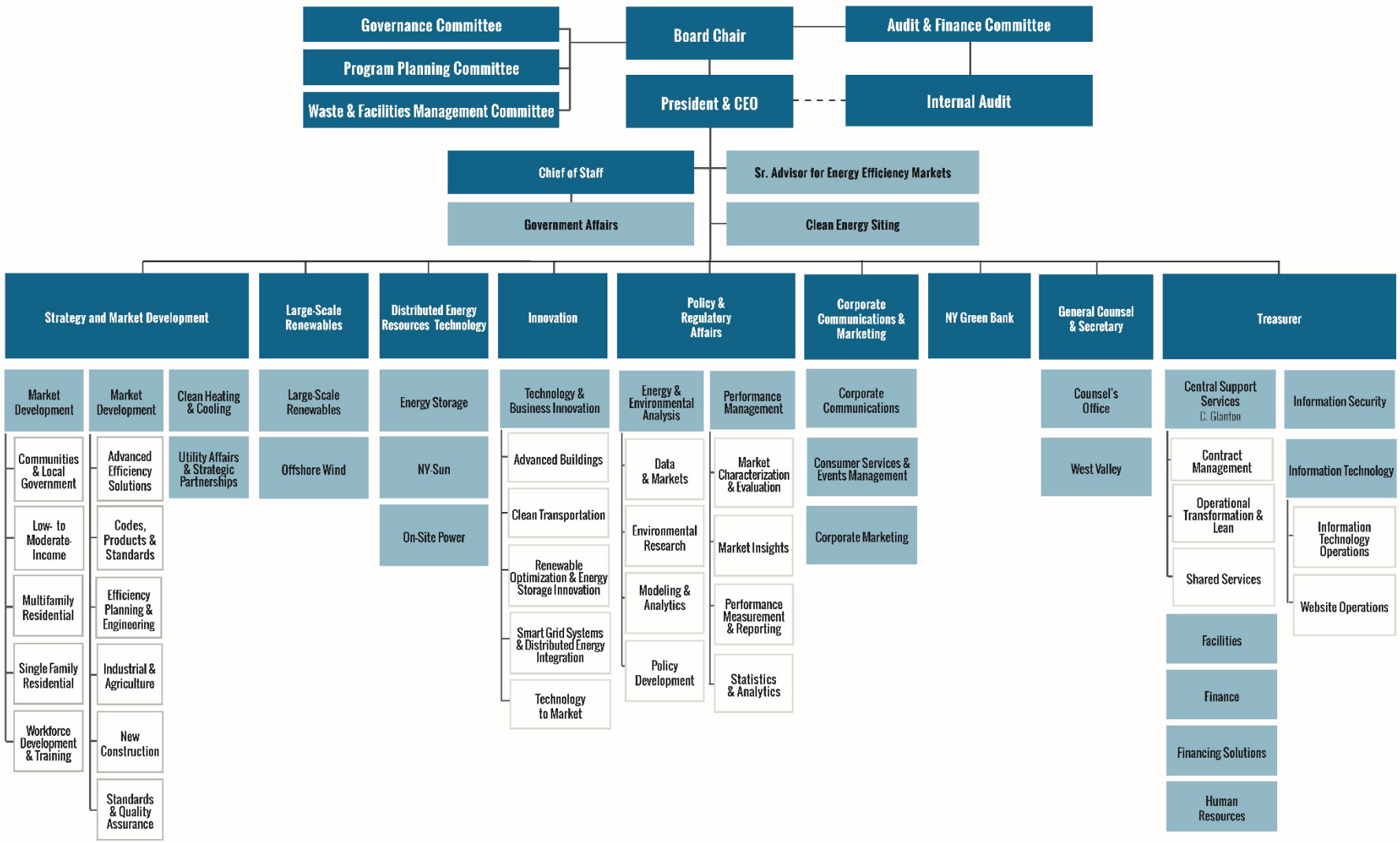
Table 7. Performance Measures—Contract and Cycle Time (Solicitations)

CONTRACT AND CYCLE TIME—SOLICITATIONS *NYSERDA is responsive to customer needs—delivering accurate and timely information, services and programs.*				
Performance Measures	**CY 2017 Median Total No. of Weeks**	**Target CY 2018**	**CY 2018 Median Total No. of Weeks**	**Target CY 2019**
Contract Processing Time—Median time to Process (Weeks): 1) Due Date Solicitations	32	32	30.86	32
2) Open Enrollment and Task Work Orders	2.14	3	2	2
3) Open Enrollment (Automated)[a]	0.71	1	0.85	1
4) All Other Actions (Direct Contracts and Contract Modifications)	1.71	3	1	2

[a] The contracting process for Residential NY-Sun projects has been automated, leading to reduced cycle times. As these processes are fundamentally different than other open enrollment solicitations, we have broken them out into their own category.

5 Program Units

Figure 1. NYSERDA Organizational Structure



5.1 Communities and Local Government

The Communities and Local Government unit provides a unified approach toward local energy action to better serve local communities' needs and to advance clean energy policies statewide. The program is intended to implement a common framework that enables communities to embed clean energy into their planning, help facilitate and prioritize implementation, and recognize/showcase community energy and sustainability actions.

5.2 Efficiency Planning and Engineering

The Efficiency Planning and Engineering Team is an inter-disciplinary group whose primary goal is to increase clean energy investment in commercial buildings. To accomplish this goal the Team engages with commercial stakeholders, sector organizations, service providers and customers to deliver monetary and informational incentives. Sector specific initiatives such as REV Campus Challenge, Commercial Tenant, and the P-12 Initiative are examples of targeted efforts the Team focuses on.

5.3 New Construction

The New Construction unit works across all sectors, including low- to moderate-income (LMI) households, to build market capacity, demonstrate value propositions, and disseminate credible information to drive the market to deep energy savings and zero-net energy performance in construction and substantial renovation projects. This includes strategies to improve contracting, design and construction practices, and promote zero- and positive-net carbon construction and renovation practices that maximize cost-effective carbon reductions.

5.4 Industrial and Agriculture

The Industrial and Agriculture unit looks to advance the latest technologies and techniques to drive the adoption of energy efficiency and process improvements through new strategies, including optimizing energy use and productivity as well as providing credible information toward integrating clean energy into the business mission of the industrial and agriculture sectors.

5.5 Low- to Moderate-Income

The Low- to Moderate-Income unit develops strategies and proposes policy, coordinating across all sectors and various State organizations to streamline and improve the effectiveness of energy services

delivery to LMI households. The LMI unit also manages single-family residential energy efficiency incentive programs.

5.6 Multifamily Residential

The Multifamily Residential unit works to overcome market barriers in the multifamily sector (residential structures containing five or more dwelling units), pursuing strategies to create awareness and demand for energy-efficient and high-performance buildings; increase market capacity to deliver energy services; stimulate consumer demand for energy and environmentally friendly buildings through clear and widely used labeling; expand the pool of trusted energy professionals serving the needs of multifamily building owners by increasing their technical skill sets and tools; demonstrate viability of deep energy retrofits in multifamily affordable housing stock; and further the emergence of performance contracting.

5.7 Single-Family Residential

The Single-Family Residential unit works to overcome market barriers towards the development of a robust, self-sustaining, market-based energy efficiency industry for the existing homes sector (residential structure containing one to four dwelling units) and facilitates the growth of demand for energy services.

5.8 Workforce Development and Training

The Workforce Development and Training unit enables workforce development and training where the lack of a trained workforce inhibits growth in a particular energy industry, or where training is needed to perform critical functions; establishes energy training as a permanent and sustainable part of the community infrastructure; and enables growth of jobs in disadvantaged communities.

5.9 Advanced Efficiency Solutions

The Advanced Efficiency Solutions team is a cross-sectoral group whose primary goal is to accelerate the adoption of energy efficiency in buildings by increasing private sector investment in smart building technologies and services. Initiatives run by the Advanced Efficiency Solutions team advance commercially available solutions that deliver both energy efficiency and leverage

5.10 Codes, Products and Standards

The Codes, Products, and Standards team promotes energy efficiency across sectors through regulatory and supply chain interventions. The team supports building energy code advancement, education, and compliance, working with actors across the construction market, including building owners, developers, and elected officials, with a goal of promoting zero carbon or even net-carbon positive building performance. The team also drives the promotion of improved product and appliance standards, along with the adoption and expansion of building energy and water benchmarking. The team continues to find ways to improve the efficiency and success of program delivery models, including the promotion of statewide supply chain

5.11 Standards and Quality Assurance

The Standards and Quality Assurance unit provides effective and efficient infield quality assurance to support NYSERDA investment in clean energy technologies and foster market-based strategies to increase consumer and investor confidence in clean energy technology and solutions. This includes working to deploy professional certifications and technical/work standards to support quality assurance within the clean energy market.

5.12 Technology and Business Innovation

The Technology and Business Innovation unit facilitates the research, development, and commercialization of new and innovative clean energy technologies that when deployed at scale will deliver meaningful reductions in GHG emissions. Technology and Business Innovation employs a comprehensive strategy that integrates and leverages direct investment in startup and established clean energy companies, establishes sustainable multi-use assets in the State, and fully engages important stakeholders such as researchers, established corporate entities and the investment community. Technology and Business Innovation's direct investments help to determine technical feasibility, assess market opportunities, achieve key product development milestones, and validate new technologies at scale in real-world applications. Strategic investments in statewide multi-use assets provide business incubation, manufacturing support, mentorship, and access to private sector investors and potential development and commercialization partners. Technology and Business Innovation's overall strategy contributes toward the growth of a vibrant clean energy business ecosystem that delivers solutions to the State's pressing environmental, energy, and economic needs.

Technology and Business Innovation has five teams focused on the following areas:

- Smart Grid Systems and Distributed Energy Integration: Accelerate the evolution to a smarter more integrated grid that allows for new value-added services in pursuit of efficiency, sustainability, reliability, resiliency, and affordability.
- Renewable Resource Optimization: Accelerate market adoption and realization of grid and consumer benefits from distributed and renewable resources.
- Buildings: Accelerate development of technologies and systems that can enable net zero energy buildings, deep energy efficiency retrofits and smart buildings—providing value and comfort to occupants and owners.
- Clean Transportation: Accelerate the movement toward an efficient, low-GHG emissions transportation system—enhancing the quality of life in communities across the State.
- Innovation Capacity and Business Development: Catalyze and enable a vibrant, self-sustaining cleantech innovation ecosystem that will accelerate the pace and scale of clean energy and make NYS the place for innovation.

5.13 Energy Storage

The Energy Storage unit will develop and implement a robust energy storage strategy that removes the most impactful barriers preventing adoption in the electric grid, buildings, and transportation sectors. This will enable renewable generation to be used as "flexible resources," increase electric system utilization and resiliency, flatten peak demand, and reduce petroleum dependence to help achieve the State's GHG reduction goals. Initiatives will include targeting soft costs to reduce total installed cost, validating new financing and ownership models, participating in ratemaking and tariff design, removing safety and performance uncertainty, and developing and demonstrating new products and integrated systems—including microgrids. These strategies will be delivered in conjunction with public and private organizations and other NYSERDA teams.

5.14 Large-Scale Renewables

The Large-Scale Renewables unit will sustain and expand the penetration of large-scale renewables in the State and also support the development of the next frontier of renewable resources, including offshore wind. The program will document New York State's progress toward its renewable goals and facilitate New York State's renewables voluntary market through the management of the New York Generation Attribute Tracking System. The program will also provide stakeholder outreach, technical and pre-development assistance to increase acceptance and reduce soft costs associated with the development of these assets as well as assess alternate energy market valuation and transmission solutions for renewables. The team will also manage over $1 billion in existing Renewable Portfolio Standard Main Tier contracts, actively execute its Renewable Energy Standard procurement and contracting role, including management of the nearly $3 billion in agreements awarded over the past two years, and execute on its offshore wind procurement responsibilities as assigned by the New York Public Service Commission.

5.15 NY-Sun

The NY-Sun unit has a multifaceted approach that aims to lower energy costs for all New Yorkers by increasing solar power capacity and the efficiency and reliability of the electric grid. Public-private partnerships help make installing solar technology more affordable for New Yorkers while scaling up the State's solar industry. In addition to the Solar Electric Program, the NY-Sun initiative has programs to help lower statewide solar soft costs, including training for installers and public officials, a standardized permitting and interconnection process, customer aggregation, and consumer education.

5.16 On-Site Power

The On-Site Power unit will direct its major focus on individual buildings and their adoption of natural gas-fueled Combined Heat and Power systems that run daily as well as during a grid outage. The team will also assist the Anaerobic Digester Gas marketplace and the fuel cell marketplace with identifying business models that can lead to self-sustaining markets. On-site Power will also seek to advance the market for hybrid on-site power systems.

5.17 Clean Heating and Cooling

The Clean Heating and Cooling unit will seek to enable a self-sustaining market for clean heating and cooling solutions, helping to increase the viability of net zero energy buildings in the State. Solar thermal, biomass heating, and air and ground source heat pump systems will be explored. Clean heating

and cooling will address barriers to market growth, including low-customer awareness and confidence, limited trained service providers, high-upfront costs, significant soft costs, variable performance data, and lack of affordable financing solutions.

5.18 Financing Solutions

The Financing Solutions unit will develop strategies for mobilizing private capital and market-based financing solutions to support scaled investments in clean energy across sectors and technology areas.

5.19 Energy and Environmental Analysis

The Energy and Environmental Analysis unit assists State policy decision-makers and stakeholders by objectively:

- Identifying and evaluating policy alternatives for addressing vital public needs related to the production, delivery, and use of energy as well as development of new technologies.
- Assessing the impact of energy and environmental policies, programs, and technologies on the State's residents, businesses, environment, and energy systems.
- Providing market intelligence across all energy and fuel types, including all energy systems, market participants, and customer sectors.
- Assessing operational status of energy delivery and fuel storage infrastructure components and advising corrective actions as necessary to expedite return to full operational capacity.
- Assessing retail petroleum fuels and natural gas prices, supplies, and production to enable analyses of and response to market conditions.
- Providing energy-related environmental accountability through analysis of long-term monitoring records and modeling.
- Evaluating the effectiveness of energy-related environmental protection strategies to support regulatory processes.
- Helping prioritize opportunities for mitigation and identifying cross-sector pollution control strategies.
- Coordinating the State's activities on nuclear energy matters, including the regulation of radioactive materials, and monitoring low-level radioactive waste generation and management.
- Fostering informed energy planning through economic analysis and modeling of energy and environmental issues.

5.20 Utility Affairs and Strategic Partnerships

The Utility Affairs and Strategic Partnerships unit manages the Authority's utility engagement strategy under REV, oversees our funding agreement with the Long Island Power Authority, and leads the development of a $50 million energy efficiency Pay-for-Performance partnership program with National Grid and Con Edison.

NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean-energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York State since 1975.

To learn more about NYSERDA's programs and funding opportunities, visit nyserda.ny.gov or follow us on Twitter, Facebook, YouTube, or Instagram.

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