Annual Investment Plan and Performance Report Through December 31, 2017

Final Report | May 2018

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.

NYSERDA Record of Revision

Document Title
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Annual Investment Plan and Performance Report Through December 31, 2017

Final Report

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1 Annual CEF Metrics and Financial Report – May 1, 2018

1.1 Introduction

The New York State Energy Research and Development Authority (NYSERDA) is pleased to present the second Annual Metrics and Financial Report for New York State's Clean Energy Fund (CEF)—a component of the Annual Investment Plan and Performance Report. The CEF is designed to support the success of the Reforming the Energy Vision (REV) strategy by working with market participants to develop clean energy market opportunities at scale to advance progress toward the State's clean energy goals as stated in the 2015 State Energy Plan. In particular, the CEF is designed to foster innovation in energy markets by testing new business models and attracting private capital to New York energy markets, facilitating new customer engagement and choice for clean energy services, and extracting value from distributed energy resources that improve system efficiency and reduce consumer energy costs. The CEF is comprised of four portfolios: Market Development, Innovation and Research, NY Green Bank, and NY-Sun. These portfolios work collectively toward meeting New York State's ambitious energy, environmental, and economic goals and are expected to contribute significantly toward the broader New York State Energy Plan goals.

To ensure comprehensive performance reporting on all four CEF portfolios, NYSERDA was directed to file an annual CEF Metrics and Financial Report compiling the performance across the portfolios, including key financial and metrics information in relation to the minimum goals established in the Public Service Commission's (Commission) Order Authorizing the Clean Energy Fund Framework.[1] This report fulfills that requirement and provides a view of the CEF progress toward its 10-year goals through December 31, 2017.[2]

[1] Cases 14-M-0094, et al., *Order Authorizing the Clean Energy Fund Framework*, issued January 21, 2016.

[2] Implementation of the CEF Market Development and Innovation & Research portfolios are currently at the 2-year mark of their 10-year authorized timeline. The NY-Sun Program began prior to the launch of the CEF and is at approximately the 4-year mark its 10-year authorized timeline. Similarly, pursuant to Case 13-M-0412, *Order Establishing New York Green Bank and Providing Initial Capitalization*, NY Green Bank was established in December 2013, and began commercial operations in Summer 2014.

Based on the results achieved to date and the level of achievement currently anticipated to occur in future years, NYSERDA is confident it will meet or exceed the goals for all four CEF portfolios over the life of the fund. However, consistent with the Commission's directives in the CEF Order, NYSERDA will continue to rigorously monitor the performance of the CEF portfolios and revise strategy where necessary to improve or maximize the potential impact and benefits of CEF efforts.

1.2 Progress Summary

1.2.1 Market Development and Innovation and Research Portfolio Development

In its CEF Order, the Commission stated the expectation that new approaches undertaken by NYSERDA would achieve significantly more impact per dollar spent than past efforts, thereby reducing the overall cost of achieving clean energy goals. While building the CEF portfolio, NYSERDA actively monitors investment and progress toward its primary return on investment metric: cost-per-ton of carbon dioxide equivalent (CO_2e) emission reductions.[3] The CO_2e cost-per-ton, along with other key drivers such as achievement of energy efficiency goals, inform the design of the CEF. To support the achievement of greater impact per dollar spent, NYSERDA's strategies fund pilots and projects intended to maximize indirect impacts, which are the market effects expected to accrue over the longer term as a result of the NYSERDA investment and follow on market activity.

The Market Development (MD) and Innovation and Research (I&R) portfolios are currently at the 2-year mark of their 10-year cycle, and significant build and launch activity has taken place. Through December 2017, 43 out of 56 MD and I&R initiatives developed by NYSERDA and filed with the Commission have been launched in the market. Consistent with the guiding philosophy in creation of the CEF, NYSERDA introduced 31 new initiatives in the MD and I&R portfolios that are intended to drive greater impact than traditional program approaches. While these market-transformational efforts are in early phases, NYSERDA believes the initial results are largely positive (as described in further detail below).

[3] For MD specifically, based on available programmatic funding (approximately $2.5 billion, exclusive of evaluation) and minimum goals for the 10-year CEF period (approximately 97 million lifetime metric tons CO_2e, based on the most current emission factor), the portfolio must achieve CO_2e reductions at or below a cost of $27/$CO_2e$ lifetime metric ton.

In the early years of the CEF, these new initiatives will operate alongside 12 transition initiatives—a purposeful mix intended to incorporate a greater proportion of market-enabling activities without disrupting existing market momentum supported by existing NYSERDA and utility programs. NYSERDA will continue to develop and implement new approaches while rigorously monitoring the progress of existing market activities and complementary utility programs.

Consistent with the Commission's 2018 ETIP directive,[4] NYSERDA and the utilities have been actively collaborating on new strategies and innovative approaches in a manner that leverages the strengths of both entities to synergistically move the market. One innovative partnership model in development with two New York utilities is a $50 Million Pay-for-Performance (P4P) energy efficiency pilot being designed to test a market-based approach to investing in energy efficiency by paying for demonstrated energy savings achievements at the portfolio level. Upon approval of an investment plan by DPS, the initial phase of the pilot is expected to launch in 2018 followed by subsequent phases in 2019 and 2020 with additional utility partners and/or market segments.

In building the MD and I&R portfolios, NYSERDA included new ways to seek economically efficient clean energy strategies from the market. The Novel Business Models and Offerings initiative, for example, will help to scale companies and their offerings that developed enhanced value propositions, operational efficiencies, or transactional models that boost customer acceptance of clean energy.

1.2.2 Energy Efficiency as Key Focus of the MD Portfolio

As previous Commission actions have already advanced, energy efficiency is a cornerstone of New York State's strategies to promote clean energy and affordable solutions for consumers while addressing climate change. The recommendations in the comprehensive white paper issued by DPS and NYSERDA on April 26, 2018 are guided by a new 2025 energy efficiency target of 185 TBtu of cumulative annual site energy savings, which 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 ("40 by 30") from 1990 levels.

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[4] Case 15-M-0252, Order Authorizing Utility-Administered Energy Efficient Portfolio Budgets and Targets for 2019–2020, issued March 15, 2018.

Through the CEF, NYSERDA is investing more than $2 billion in funding over the CEF's 10-year life span to support energy efficiency across all fuels, delivering a minimum of 10.6 million megawatt-hours (MWh) in electric savings and 13.4 million MMBtu in non-electric fuel savings over 10 years. Through the market development portfolio, NYSERDA will drive actions to develop a more robust and value-creating market for energy efficiency, with particular attention to reducing energy efficiency retrofits and new construction costs, accelerating innovative solutions for deeper energy retrofits, and advancing targeted financial support to help overcome cost barriers to efficiency investments and ease access for private capital to allow new clean energy interventions. The end goal of CEF market development interventions is to redress the barriers to energy efficiency deployment and adoption to ultimately foster self-sustaining markets for energy efficiency.

1.2.3 MD and I&R Portfolio Optimization

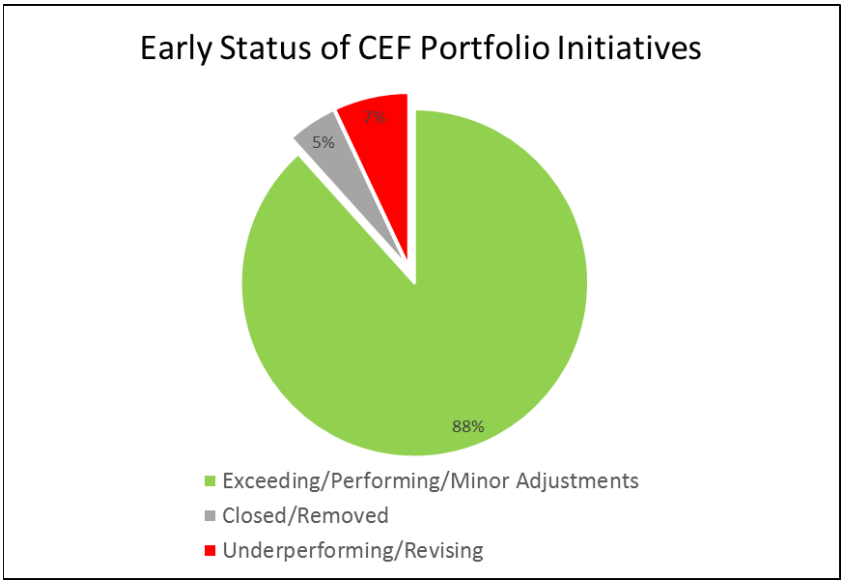
Achieving greater impact per ratepayer dollar involves experimentation with intervention approaches—with tolerance for failure, provided it is addressed swiftly and the portfolio is on track to meet long-term outcomes. Accordingly, the MD and I&R portfolios have seen a mix of success, adjustment, and more substantial correction. NYSERDA is using a "test-measure-adjust" approach to be as responsive to market conditions in real time as possible and redeploy resources from underperforming efforts when appropriate.

The majority (88%) of MD and I&R launched initiatives are on track and have either maintained their original plans or moved forward with minor changes, as noted in Figure 1. As information is gained, NYSERDA modified several of these largely successful initiatives for optimal market alignment. For example, the Real Time Energy Management offering eligibility was broadened beyond equipment sellers to include subscription-oriented vendors. The initiative has been renamed Energy Management to broaden the scope to explore less sophisticated remote energy management (REM) opportunities and expand into other sectors, i.e., industrial and multifamily. Additionally, in the Industry Partnerships initiative, NYSERDA expanded the eligibility of who can lead a project and added funding for more solicitations. Also, the Cleantech Startup Growth initiative was revised to add additional, complementary strategic components, including an enhanced entrepreneurs-in-residence mentoring program and a set of activities focused on investors, corporate/strategic partners, and customers.

Also shown in Figure 1, a smaller percentage of initiatives are undergoing more substantial adjustment (7%) or have been closed/removed due to lack of performance (5%). Closed offerings generally experienced lower customer demand than expected. In the case of NYSERDA's Commercial Implementation Assistance offering, for example, customer needs were met through utility programs. Initiatives undergoing significant adjustment generally required repositioning to better meet the needs of specific market segments. One such initiative, Low- to Moderate-Income Multifamily, is already showing early indications that the redesign has been successful, with project intake beginning to increase to more closely match expectations.

Figure 1. Early Status of CEF Portfolio Initiatives

Market Development and Innovation and Research



1.2.4 NY Sun

NY-Sun represents the most mature of the four CEF portfolios, approximately four years into the 10-year cycle. NY-Sun is performing well, with more than half of the approximately $1.2 billion in programmatic funding committed and nearly equal progress against its renewable capacity and generation goals. Most notably, NY-Sun is well positioned with more than 1.8 gigawatts of installed and pipeline projects counted toward the goal to install 3 gigawatts of solar capacity by 2023. Expanding beyond NY-Sun, more than 2 gigawatts of NYSERDA-supported solar projects are installed or in the pipeline.

1.2.5 NY Green Bank

NY Green Bank, which began commercial operations in Summer 2014, hit its stride in 2016. Through December 31, 2017 overall investments reached $457.5 million. In addition, during the fiscal year ending March 31, 2017, NY Green Bank achieved self-sufficiency with annual revenues exceeding annual expenses for the first time and a year ahead of schedule. The results for the fiscal year ending March 31, 2018 also will report annual and cumulative revenues in excess of expense.

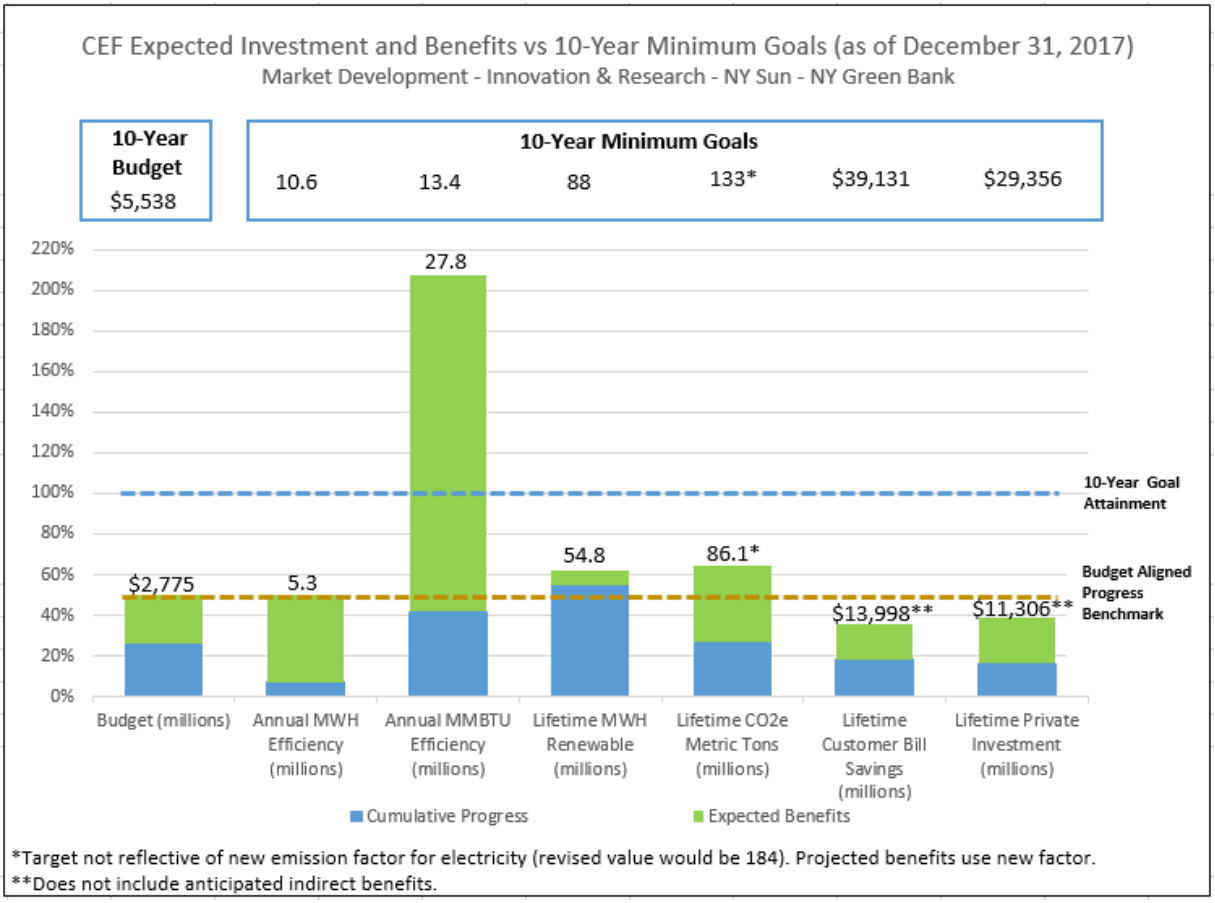
1.2.6 Overall Performance of the CEF

A comprehensive view of investment and benefits progress, inclusive of all four CEF portfolios, is provided in Figure 2. Progress is set in context of the total 10-year programmatic budget authorization[5] and the 10-year minimum goals from the Commission's authorizing order, as shown across the top of Figure 2.

[5] Less Administration and Evaluation for all portfolios.

Figure 2. CEF Expected Investment and Benefits vs. 10-Year Minimum Projected Goals

As of December 31, 2017 (millions)



The stacked bar labeled Budget reflects the sum of all funds expended or committed for projects that are either completed or in the pipeline (Cumulative Progress—blue portion of stacked bar) and the sum of remaining funds not yet associated with completed or pipeline projects but tied to filed investment plans and transaction profiles (Expected Benefits—green portion of stacked bar). The other stacked bars present progress on each key metric for the CEF, including benefits from projects completed or in the pipeline (Cumulative Progress—blue portion of stacked bar),[6] and benefits associated with filed investment plans and transactions profiles, but not yet associated with specific projects (Expected Benefits—green portion of stacked bar).[7]

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6 As pipeline data is not available for NY Green Bank, only actuals are included.

7 With the exception of the NY-Sun Program, which does not have a progressive design/build format and Expected Benefits equals Cumulative Progress.

The energy efficiency MWh and MMBtu values in Figure 1 include only the energy savings/displacement from measures that involve a fuel switch, i.e., combined heat and power systems, electric vehicles, air-source heat pumps, and ground-source heat pumps. These measures, as they exist currently in the CEF portfolio, represent electricity and fuel requirements of 24,966 cumulative annual MWh, 418,214 lifetime MWh, 1,319,559 cumulative annual MMBtu and 19,793,385 lifetime MMBtu. These electricity and fuel requirements have been netted out of the CO_2e emission reductions and customer bill savings to account for both the energy savings and the energy use of these measures.

Cumulative progress data in Figure 2 currently includes estimated direct impacts only (i.e., impacts expected from pilots and projects directly funded by NYSERDA). Many CEF initiatives also anticipate accruing indirect, longer-term market effects from follow-on market activity—this is a foundational premise of the CEF. Indirect impacts are grounded in a theory of change developed for each initiative and NYSERDA will use market evaluation approaches to quantify the indirect impacts as they are expected to accrue over time. Market evaluation approaches involve quantification of baseline adoption levels and market forecast models early in the initiative life and later assessment of market changes related to the interventions undertaken. Market evaluation approaches can include market actor surveys, Delphi panels, comparison group assessments and other methods.

It is anticipated that indirect impacts will generally begin to be measured using these approaches within a few years of initiative launch and continue to be assessed periodically over the duration of the initiative. As these impacts are quantified, they will be incorporated into CEF reporting.

NYSERDA believes planning and deployment of funds is progressing at an appropriate pace given the early stage of this effort. CEF MD and I&R investment plans filed with the Commission, NY-Sun commitments, plus NY Green Bank overall investments through December 31, 2017 represent more than 46% of the total CEF 10-year budget programmed at this time. Approximately two years into the fund, the progressively built MD and I&R portfolios are still ramping up, but they are expected to meet overall contributions to the CEF goals over the 10-year horizon. With 56 initiatives in MD and I&R, NYSERDA is focused on ensuring they are fully operational and that funds are committed and expended to achieve market benefits.

Progress towards realization of benefits is well aligned with overall goals and deployment of funds, as depicted in Figure 2. Specifically:

- Achievement of the energy efficiency MWh and MMBtu goals is on track. The energy efficiency goals are core to the MD portfolio in that they fulfill the "no backsliding from EEPS" achievements required by the CEF Order and help advance State energy policy goals. MMBtu expected benefits are already significantly greater than the minimum projected benefits, due to the expansion into all fuels and the significant potential that exists, especially in the areas of Industrial, Low- to Moderate-Income, Industry Partnerships and across Commercial initiatives.
- Renewable energy MWh generation shows excellent progress largely due to NY-Sun, which began in 2014 and is performing strongly against its goals.
- Carbon dioxide equivalent (CO_2e) emission reduction progress is on track, and NYSERDA is well-positioned to meet the overall goal for the CEF. The CEF's fuel-neutral approach is a driver of success on the CO_2e metric.[8]
- Performance of the customer (participant) bill savings[9] metric is somewhat low, but it is not yet inclusive of estimated indirect bill savings projected to result from the new MD initiatives, which will occur later in the 10-year time frame. NYSERDA's current expectation is that this metric will be attained over the life of the CEF.
- Lifetime private investment benefits are expected to increase in proportion to budget in later stages of the portfolio. At this stage, private investment does not represent recycling (or reinvestment) of NY Green Bank capital nor is progress reflective of indirect private investment, both of which will occur later in the 10-year CEF.

1.2.7 Low- to Moderate-Income Initiatives

The CEF Order directs NYSERDA to allocate a minimum of $234.5 million—inclusive of Administration and Cost Recovery Fee (CRF)—to Low- to Moderate-Income initiatives over the first three years of the CEF.[10] This amount corresponds to programmatic allocations of $210.6 million net of

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8 NYSERDA's electricity emission reduction factor of 1,160 pounds CO2e/MWh is derived using the marginal emission-rate analysis for CO_2 from "Appendix: The Benefits and Costs of Net Energy Metering in New York" Figure 28, and applying a line loss factor of 7.2%. http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=49636&MNO=15-E-0703

9 Customer Bill Savings are calculated as direct energy bill savings realized by customers participating in NYSERDA programs.

10 NYSERDA defines the low-income market segment as households with annual incomes at or below 60% of the State Median Income (SMI), and the moderate-income market segment as households with an annual income between 60% and 80% of the SMI or the Area Median Income (AMI), whichever is greater. Together these form the Low- to Moderate-Income (LMI) market segment.

Administration and CRF. To date, NYSERDA programmed $207.8 million in program funds for 2016–2018, the most significant portion of which supports continuation of the standard offer incentive programs that provide direct incentives to overcome first cost and incremental cost barriers. Beyond these traditional energy efficiency programs, NYSERDA launched market development initiatives to advance the market for clean energy improvements, provide communities with resources to reduce service delivery costs, and improve awareness and education among customers and service providers.

For example, through RetrofitNY NYSERDA seeks to harness the collective market power of affordable housing organizations in the State to entice the architecture, engineering, and construction industry to collaborate on the cutting-edge design and widespread deployment of cost-effective deep retrofit solutions in multifamily buildings. The goal is to create a self-sustaining marketplace for retrofits in tenanted multifamily buildings in the State. While public subsidies will be needed to develop, build, and test the initial retrofit packages, it is anticipated that once proven, these solutions will be implemented on a large scale with operational savings sufficient to support the project.

The allocation of the balance of the required 2016–2019 funds, net Administration and Cost Recovery Fee, will be informed through stakeholder engagements and recommendations from the Clean Energy Advisory Council (CEAC) LMI Working Group. Given the needs of this sector and NYSERDA's desire for additional opportunities to drive more impact in this sector, the ordered level of funding remains an appropriate minimum funding amount and NYSERDA suggests this level remain for the near term.

1.3 Metrics Reporting

The cumulative progress and expected benefits from all four portfolios, alongside the CEF minimum projected benefits, is shown in Table 1 and reflecting similar progress to Figure 2. NYSERDA removes overlap among its CEF portfolios in this roll up, so the sum of individual portfolio tables presented later will not match the totals in Table 1. Direct overlap between NY Green Bank and NY-Sun as well as NY Green Bank and MD has been removed. Also, in terms of total expected indirect benefits in 2025, consistent with its Budget and Benefits Chapter, NYSERDA conservatively included only 50% of the estimated total indirect benefits from market transformation to avoid overlap in these values. An asterisk in the Minimum Projected Benefits columns indicates there is no Commission-ordered goal for that particular metric.

Table 1. CEF Minimum Projected Benefits 2016–2025 and Progress to Date through December 31, 2017

		Cumulative Annual Benefits			Lifetime Benefits		
		Cumulative Progress through December 31, 2017[a]	Total Expected Benefits as of December 31, 2017[b]	Minimum Projected Benefits 2016-2025[c]	Cumulative Progress through December 31, 2017[a]	Total Expected Benefits as of December 31, 2017[b]	Minimum Projected Benefits 2016-2025[c]
Energy Efficiency	MWh	763,474	5,292,803	10,600,000	10,650,317	68,117,990	*
	MMBtu	5,592,581	27,799,866	13,400,000	87,359,887	401,614,041	*
	MW	57	87	*	57	87	*
Renewable Energy[d]	MWh	1,943,794	2,355,612	*	44,369,665	54,779,499	88,000,000
	MW	1,648	2,075	*	1,514	2,075	*
CO2e Emission Reductions (metric tons)		1,689,845	5,738,320	*	35,293,601	84,492,012	133,000,000
Customer Bill Savings[e] ($ million)		$338	$780	*	$7,105	$13,935	$39,131
Private Investment ($ million)		$4,831	$10,464	*	$4,831	$10,984	$29,356

[a] Across the CEF portfolios, Cumulative Progress through December 31, 2017 generally represents the sum of all benefits from projects that are completed and in the pipeline (pipeline data is not available for NY Green Bank).

[b] Across the CEF portfolio, Total Expected Benefits as of December 31, 2017 is inclusive of all benefits associated with filed investment plans and transactions profiles.

[c] Minimum Projected Benefits are from the *Order Authorizing the Clean Energy Fund Framework*, Issued and effective January 21, 2016.

[d] NYSERDA makes no claim to the environmental attributes or any NYGATS certificates that may be associated with these projects.

[e] The estimated retail value of the avoided energy use or of the total clean generation produced by a renewable system.

Progress of the MD portfolio is reflected in Table 2. Cumulative progress represents benefits from all projects completed or in the pipeline, and at this early stage of the CEF, does not include any of the indirect benefit expected to accrue and be measured over the longer term. Total expected benefits will be the result in 2025 from full implementation of NYSERDA's filed investment plans, including the estimated indirect benefits (in the form of energy efficiency, renewable energy and CO_2e emission reductions) from market transformation spurred by the CEF initiatives.

Table 2. Market Development Annual and Lifetime Cumulative Progress and Expected Benefits through December 31, 2017

		Cumulative Annual Benefits		Lifetime Benefits	
		Cumulative Progress through December 31, 2017[a,c]	Total Expected Benefits from Filed Investment Plans as of December 31, 2017[b]	Cumulative Progress through December 31, 2017[a,c]	Total Expected Benefits from Filed Investment Plans as of December 31, 2017[b]
Energy Efficiency	MWh	749,556	5,242,000	10,650,317	67,381,293
	MMBtu	5,580,754	27,548,000	87,359,887	397,644,546
	MW	57	85	57	85
Renewable Energy[d]	MWh	23,650	358,914	324,197	5,410,585
	MW	13	380	13	380
CO2e Emission Reductions (metric tons)		671,563	4,572,658	9,938,130	57,174,702
Customer Bill Savings[e] ($ million)		$127	$549	$1,872	$8,364
Private Investment ($ million)		$1,253	$5,951	$1,253	$5,951

[a] Cumulative Progress through December 31, 2017 represents the sum of all benefits from projects that are completed (installed) and in the pipeline (committed but not yet complete).

[b] Total Expected Benefits from Filed Investment Plans as of December 31, 2017 represents the sum of direct benefits from all investment plans filed with the Commission prior to December 31, 2017. For MWh and MMBtu energy efficiency, MWh renewable energy, and CO_2e emission reductions, 50% of the indirect benefits expected by 2025 are also included, based on the sum of those benefits present in investment plans filed with the Commission prior to December 31, 2017.

[c] Energy Efficiency MWh and MMBtu values represent only the energy savings from CHP systems, Electric Vehicles, Air-Source Heat Pumps, 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.

[d] NYSERDA makes no claim to the environmental attributes or any NYGATS certificates that may be associated with these projects.

[e] The estimated retail value of the avoided energy use or of the total clean generation produced by a renewable system.

NYSERDA's progress in the CEF Market Development portfolio can also be evaluated in the nearer term. When viewed against cumulative annual commitment-based goals through December 31, 2017, the portfolio shows good progress and alignment with these goals, as follows:[11]

- Cumulative Annual Energy Efficiency is at 88% for MWh and 103% for MMBTU
- Lifetime CO_2e Reductions is at 84%
- Lifetime Customer (Participant) Bill Savings is at 90%
- Lifetime Private Investment is at 102%

[11] NYSERDA's CEF Quarterly Performance Report for Q4 2017 was filed in the Department of Public Service's Document Matter Management System under case 14-M-0094 on February 14, 2018, and can also be found at: Clean Energy Fund Quarterly Performance Report (Quarter 4, 2017).

Progress of the Innovation and Research portfolio for the metrics applicable to I&R, is shown in Table 3. Cumulative progress represents the benefits from all projects completed or in the pipeline. Total expected benefits will be the result in 2025 from full implementation of all NYSERDA's filed investment plans, and for CO_2e emission reductions, include indirect benefits from market transformation spurred by the CEF initiatives.

Table 3. Innovation and Research Annual and Lifetime Cumulative Progress and Expected Benefits through December 31, 2017

		Cumulative Annual Benefits		Lifetime Benefits	
		Cumulative Progress through December 31, 2017[a]	Total Expected Benefits from Filed Investment Plans as of December 31, 2017[b]	Cumulative Progress through December 31, 2017[a]	Total Expected Benefits from Filed Investment Plans as of December 31, 2017[b]
Energy Efficiency	MWh	-	N/A	-	N/A
	MMBtu	-	N/A	-	N/A
	MW	-	N/A	-	N/A
Renewable Energy	MWh	-	N/A	-	N/A
	MW	-	N/A	-	N/A
CO2e Emission Reductions (metric tons)		-	75,000	-	750,000
Customer Bill Savings ($ million)		-	N/A	-	N/A
Private Investment ($ million)		$283	$1,219	$283	$1,219

a Cumulative Progress through December 31, 2017 represents the sum of all benefits from projects that are completed (installed) and in the pipeline (committed, but not yet complete).

b Total Expected Benefits from Filed Investment Plans as of December 31, 2017 represents the sum of direct benefits from all investment plans filed with the Commission prior to December 31, 2017. For CO2e emission reductions, 50% of the indirect benefits expected by 2025 are also included, based on the sum of those benefits present in investment plans filed with the Commission prior to December 31, 2017.

NYSERDA's progress in the I&R portfolio can also be evaluated in the nearer term against cumulative annual commitment-based goals through December 31, 2017. Currently, progress toward the private investment annual commitment-based goal is as expected, at 105%.

Progress of the NY-Sun portfolio is shown in Table 4. Cumulative progress represents benefits from all projects completed or in the pipeline. Unlike the other portfolios of the CEF, NY-Sun does not have a progressive build format, therefore Total Expected Benefits as of December 31, 2017 equals Cumulative Progress through December 31, 2017. That said, NY-Sun is on a path to fully meet its 3GW solar capacity goal and be a major contributor toward the CEF lifetime renewable energy generation goal of 88 million MWh.[12]

12 NYSERDA's NY-Sun Annual Performance Report for 2017 was filed in the Department of Public Service's Document Matter Management System under Case 03-E-0188 on April 2, 2018 and can also be found at: nyserda.ny.gov/About/Publications/Program-Planning-Status-and-Evaluation-Reports/NY-Sun-Performance-Reports.

Table 4. NY-Sun Annual and Lifetime Cumulative Progress and Expected Benefits through December 31, 2017

		Cumulative Annual Benefits		Lifetime Benefits	
		Cumulative Progress through December 31, 2017[a]	Total Expected Benefits from Filed Investment Plans as of December 31, 2017[b]	Cumulative Progress through December 31, 2017[a]	Total Expected Benefits from Filed Investment Plans as of December 31, 2017[b]
Energy Efficiency	MWh	-	*	-	*
	MMBtu	-	*	-	*
	MW	-	*	-	*
Renewable Energy	MWh	1,846,605	1,846,605	46,165,135	46,165,135
	MW	1,573	1,573	1,573	1,573
CO2e Emission Reductions (metric tons)		971,624	971,624	24,290,607	24,290,607
Customer Bill Savings ($ million)		$197	$197	$4,915	$4,915
Private Investment ($ million)		$3,295	$3,295	$3,295	$3,295

[a] Cumulative Progress through December 31, 2017 represents the sum of all benefits from projects that are completed (installed) and in the pipeline (contracted but not yet completed; plus applications approved, but not yet contracted).

[b] Unlike the other portfolios of the CEF, NY-Sun does not have a progressive build and approval format, therefore Total Expected Benefits as of December 31, 2017 equals Cumulative Progress through December 31, 2017.

[c] NYSERDA makes no claim to the environmental attributes or any NYGATS certificates that may be associated with these projects.

[d] The estimated retail value of the avoided energy use or of the total clean generation produced by a renewable system.

[e] The sum of all PV project costs reported to NYSERDA by participating contractors, minus the total NYSERDA incentives paid on these projects.

Progress of the NY Green Bank portfolio is shown in Table 5. Cumulative Progress through December 31, 2017 represents benefits from clean energy measures deployed in New York State. Total Expected Benefits from Executed Transactions as of December 31, 2017 will be the result, no later than 2025, from full implementation of all NY Green Bank transactions executed by this date.[13]

[13] NYSERDA's NY Green Bank Metrics, Reporting and Evaluation Report through December 31, 2017 was filed in the Department of Public Service's Document Matter Management System under case 13-M-0412 on February 14, 2018 and can also be found at: NY Green Bank Metrics, Reporting & Evaluation Report (through December 31, 2017).

Table 5. NY Green Bank Annual and Lifetime Cumulative Progress and Expected Benefits through December 31, 2017

		Cumulative Annual Benefits		Lifetime Benefits	
		Cumulative Progress through December 31, 2017[a]	Total Expected Benefits from Executed Transactions as of December 31, 2017[b,c]	Cumulative Progress through December 31, 2017[d]	Total Expected Benefits from Executed Transactions as of December 31, 2017[c,d]
Energy Efficiency	MWh	13,918	50,803	170,879	736,697
	MMBtu	11,827	251,866	189,740	3,969,495
	MW	0	2	0	2
Renewable Energy[e]	MWh	158,191	396,258	3,952,860	9,352,692
	MW	134	332	134	332
CO2e Emission Reductions (metric tons)		91,212	248,598	2,180,479	5,512,973
Customer Bill Savings[f] ($ million)		$27	$72	$643	$1,615
Total Project Costs[g,h] ($ million)		N/A	N/A	N/A	$1,284

[a] Cumulative Progress is the Actual Clean Energy systems deployed in NYS, reported by NYGB's clients, as a result of NYGB's participation in financing these projects in NYS.

[b] Total Expected Benefits from Executed Transactions as of December 31, 2017 represents the sum of the low end of the range for all First-Year estimated energy savings, energy generation and GHG emissions reductions (as also reported in NYGB Quarterly Metrics Reports).

[c] Energy Efficiency values represent MWh savings from the use of CHP systems; natural gas required to run CHP systems is 1,700 MMBtu cumulative annual and 41,000 MMBtu lifetime. Expected emission reductions and customer bill savings are net, including both MWh that add to the benefits and additional natural gas required to run CHP systems that subtract from the benefits.

[d] Cumulative Progress and Expected Benefits are the same measure as reflected in the corresponding Cumulative Annual Benefits calculations, but for each NYGB investment, the relevant annual measure is multiplied by the expected measure life and summed to total Cumulative Progress or Expected Benefits.

[e] NYSERDA makes no claim to the environmental attributes or any NYGATS certificates that may be associated with these projects.

[f] The estimated retail value of the avoided energy use or of the total clean generation produced by a renewable system.

[g] Total Project Costs representing Expected Benefits on a Lifetime Benefits basis, reflect the low end of the range for estimated system deployment to be achieved by the end of the availability period for each transaction, aggregated across all NYGB investments.

[h] The NYGB Metrics, Reporting & Evaluation Plan (see page 15) and in this table, define Total Project Costs to include fair market value ("FMV") data for a subset of NYGB's investments. FMV is an estimated market valuation of fully installed energy projects provided by NYGB's counterparties and is often required for federal income tax purposes, by institutional investors and for certain grant program purposes unconnected with NYGB. As projects progress and the cost of installed equipment and labor are known and reported to NYGB by its counterparties, NYGB will seek to adjust reported values and replace FMV in its aggregated data sets and periodic reporting with those actual costs.

1.4 Financial Reporting

Portfolio-level financial status information for the MD, I&R and NY-Sun portfolios is provided in Table 6.

Table 6. Market Development, Innovation & Research, NY-Sun Portfolio Level Budgets and Spending[14] ($ million)

Initiative	Total Budget[a]	Budget Approved through December 31, 2017[b]	Expended Funds through December 31, 2017[c]	Open Encumbrances through December 31, 2017[d]	Pre-Encumbrances through December 31, 2017[e]	Committed Funds through December 31, 2017[f]	% of Approved Budget Committed through December 31, 2017[g]	Budget Approved Remaining Balance through December 31, 2017[h]
Market Development (2016-2025)								
Program Funds NYS Cost Recovery Fee	$2,346	$1,172	$104	$79	$77	$260	22%	$912
Innovation & Research (2016-2025)								
Program Funds NYS Cost Recovery Fee	$619	$328	$5	$31	$9	$45	14%	$283
NY-SUN (2014-2023)								
Program Funds NYS Cost Recovery Fee	$1,135	$1,135	$239	$383	$7	$629	55%	$507
Total Program Funds and CRF	**$4,101**	**$2,635**	**$348**	**$492**	**$93**	**$933**	**35%**	**$1,702**
Administration	$308	$173	$46	$1	$0.1	$47	27%	$126
Evaluation	$130	$51	$1	$3	$0.01	$4	8%	$47
Total	**$4,538**	**$2,859**	**$395**	**$496**	**$93**	**$984**	**34%**	**$1,875**

a CEF and NY-Sun Order authorized funding.

b Funds approved by DPS as of December 31, 2017.

c Invoices processed for payment by NYSERDA.

d Remaining funding obligated under a contract, purchase order or incentive award.

e Planned funding for contracts awarded and under negotiation.

f The sum of Expended Funds, Open Encumbrances and Pre-Encumbrances.

g The percentage of the committed budget.

h The difference between Budget Approved and Committed funds.

Funding and financial status of NY Green Bank is provided in Tables 7 and 8. NY Green Bank is presented separately from the other CEF portfolios to accurately represent NY Green Bank's unique characteristics, e.g., funds invested by NY Green Bank are ultimately returned and recycled, and revenues are generated to support self-sufficiency and re-investment. Table 8 shows NY Green Bank's Overall Investments to Date against the aggregate NY Green Bank CEF 10-year investment goal, which includes the expected recycling of funds.

14 The total Budget has changed from prior amounts reported to reflect the original Ordered funding authorization less a reduction of $68.3M to the 10-year CEF funding authorization resulting from reduced RGGI funds approved in the 3-year Operating Plan (FY 18-19 through FY 20-21) approved in January 2018.

Table 7. NY Green Bank Portfolio Level Funding and Financial Status ($ million)

	Budgeted Funds	Deployed Funds	Committed Funds	Approved Investments	Current Portfolio[a]	Available Capital[b]
Program Costs & Revenue						
NY Green Bank	$978.4	$290.1	$90.0	N/A	$380.1	$598.3
Revenues in Excess of Operating Expenses	$ -	$ -	$ -	$ -	$ -	$22.3
SUBTOTAL	$978.4	$290.1	$90.0	N/A	$380.1	$620.6
	Budgeted Funds	**Cumulative Expenses**	**Open Encumbrances**	**Pre-Encumbrances**	**Committed Funds**	**Remaining Balance[c]**
Other Costs						
Operating Expenses (Program Administration)[d]	$22.3	$22.3	$ -	$ -	$22.3	$ -
Program Evaluation	$4.0	$0.04	$ -	$ -	$0.04	$4.0
New York State Cost Recovery Fee	$0.6	$0.4	$ -	$ -	$0.4	$0.2
OTHER COSTS TOTAL	$26.9	$22.7	$ -	$ -	$22.7	$4.2
	Budgeted Funds[e]	**Deployed Funds plus Expenses**	**Committed Capital plus Open Encumbrances**	**Pre-Encumbrances**	**Current Portfolio plus Committed Funds**	**Available Capital plus Remaining Balance**
TOTAL	$1,005.3	$312.8	$90.0	$0.0	$402.8	$624.8

a Sum of Deployed Funds and Committed Capital.

b Available Capital reflects the sum of NYGB's initial $1.0 billion capitalization confirmed in the CEF Order, together with Cumulative Revenues, that is not currently Deployed or Committed. As NYGB investments mature and are redeployed into new projects, Available Capital gives a snapshot in time of the funds available for clean energy investment. NYGB's Overall Investments to Date against the goal for aggregate NYGB investment expected over the term of the CEF is shown in Table 8.

c Remaining Balance shows the net of expenses against Budgeted Funds consistent with the CEF Order. As NYGB is required to be self-sufficient, revenue generated is expected to fund operating expenses.

d NYGB Operating Expenses reflect reporting of the budget and actual expenses from "start-up" administrative funding approved through Commission Order. Operating expenses in excess of the originally approved amount are being funded from NYGB revenues and are not reported in this table, but are reflected in its annual financial statement

e NYGB Budgeted Funds include the $1.0 billion capitalization consistent with the CEF Order plus the portion of Cumulative Revenues to Date spent on operations.

Table 8. NY Green Bank Investments to Date ($ million)

CEF 10-Year Investment Goal	Overall Investments to Date	Remaining
$1,900.0	$457.5	$1,442.5

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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