

**NY GREEN
BANK**



Introducing the New York Green Bank

John Rhodes
NYSERDA President and CEO

Mission and Vision

- Accelerate deployment of clean energy by addressing gaps and barriers in financing markets.
- Partner with private sector entities.
 - It will not compete with them, nor will its principal role be to provide subsidy.
- Provide a bridge to an independent, sustainable and efficient private sector clean energy financing market.

Guiding Principles

- Address market barriers and inefficiencies impeding scale of clean energy financing.
- Work with existing intermediaries making progress in the market.
- Focus on clean energy projects that are economically viable but not currently financeable.
- Earn a reasonable rate of return on investments

Guiding Principles

- Facilitate the development of clean energy capital markets.
- Enhance market confidence in clean energy investing.
- Maintain administrative flexibility to respond to market needs.

Potential Products

- Credit Enhancement: Assist private sector lenders by taking on a portion of the risk associated with loans in return for a fee.
- Direct Lending: Simple loan products to be held on balance sheet - subordinated debt, revolving credit facilities, and term loans.
- Develop Secondary Markets: Build pool of loans through direct lending to borrowers and replenish funds by selling pool into capital markets.

Benefits

Drive Value for Ratepayers by Leveraging Private Capital

1

- Expand private investment in clean energy at a lower cost to ratepayers by leveraging **multiples of private capital** and to redeploy them once investments mature.
- The Green Bank can **drive more value for the public dollar** by preserving/ growing its capital.

Transform the Market

2

- **Increase investor confidence** in clean energy financing by improving understanding of and reducing perceived risk.
- Develop a supplier base through growing the market.
- **Enable the transition** to a formal, standardized, scalable and more predictable clean energy financing market with a reduced need for state/ rate-payer funded incentives.

Provide Public Benefits

3

- Generate **public benefits** – cleaner environment, more resilient energy system, economic benefits (e.g. creation of well-paying jobs) and lowered costs of energy.

Operating Principles

- Prudent steward of ratepayer funds, with strong risk management, internal controls, accountability, and performance measurement
- Oriented to engage with private sector finance entities on a commercial basis
- Experienced leadership and staff, with strong Investment Committee and Advisory Council

Sam Bloustein
Principal, Booz & Company

Booz & Company was retained by the State to assist in building the business plan for the New York Green Bank

Booz & Company's Role

- Key objectives of the business plan: **assess the market needs** for a Green Bank, **analyze and demonstrate the value of a Green Bank** approach to stakeholders, **outline potential offerings** of the Green Bank, and **chart a path** to execution.
- The Booz & Company team worked with **NYSERDA** to develop these materials.

Activities Performed

- **Market needs assessment** included ~90 market interviews and a baseline analysis of other Green Bank initiatives and clean energy incentive programs in New York State.
- **Market analysis** determined size of opportunity for Green Bank.
- **Impact analysis** illustrated the potential for Green Bank returns and its ability to leverage private capital.
- **Road map** for implementation.

Findings

- Booz & Company concluded that the New York Green Bank is a **viable endeavor** that will add **significant value** to the State's clean energy portfolio by financing clean energy projects with a mechanism that preserves and recycles public funds.
- The Green Bank model should be enabled by **flexibility, strategic partnerships, longitudinal sustainability, and supporting policy.**
- Risk factors requiring management attention include **financial risk, market positioning, and organizational stand up.**

Several financing barriers exist for clean energy projects

NOT EXHAUSTIVE

Market Assessment Findings

Key Barriers	Description
Undeveloped Secondary Market	<ul style="list-style-type: none"> Challenges to securitization: Non-conformity of existing energy financial products and limited track record for rating agencies.
Large Upfront Costs	<ul style="list-style-type: none"> End users unwilling to incur large pre-development costs in order to determine whether energy benefits are net positive.
De-prioritization of Energy Projects	<ul style="list-style-type: none"> Energy projects compete for funding with other capital-intensive end-user projects.
Energy Efficiency Loans Are Often Unsecured	<ul style="list-style-type: none"> Energy efficiency loans typically lack a collateral asset.
Insufficient Understanding of Value Proposition	<ul style="list-style-type: none"> Outside of large, sophisticated C&I (commercial and industrial) customers, clean energy project savings are not well understood.
Split Incentives	<ul style="list-style-type: none"> Split incentives arise from the fact that landlords pay for energy upgrades while tenants reap savings from energy bill.

Financing Gaps

Medium Credit Quality Financing

Small Scale Financing

Financing for Commercially Viable Technologies Yet to Achieve Scale

Tax Equity Funding

Long Tenor Financing

Source: ~90 interviews with market constituents and stakeholders

For selected technologies, we estimate a market size of ~\$85B for clean energy financing

Market Sizing Overview

NOT EXHAUSTIVE

Selected Technologies	Est. Market Size (\$B)	Approach
Energy Efficiency	\$55	<ul style="list-style-type: none"> Assumes an average retrofit cost by square foot for all pre-2008 buildings in New York. Removes demand addressed by private sector and demand unaddressed due to low credit quality. Assumes entire remaining market participates (i.e., all pre-2008 building / units).
Solar PV	\$13	<ul style="list-style-type: none"> Calculates the difference between current, 2013 PV generation and the anticipated 2023 PV generation of 5 MW and applies a \$ / MW cost. Does not assume entire market participates.
CHP	\$8	<ul style="list-style-type: none"> Estimates total new potential in NY for CHP sites, deducts 50% as addressable based on prior NYSERDA experience, and applies average site cost. Does not assume entire market participates.
Biomass	\$4	<ul style="list-style-type: none"> Estimates total annual forest biomass wood chip supply in NY and converts annual energy production into capacity based on biomass capacity factor. Applies estimated biomass installation costs per Watt to size aggregate addressable potential. Assumes utilization of entire residual wood chip supply from New York logging / lumber industry.
Onshore Wind	\$4	<ul style="list-style-type: none"> Takes 5 year average of new wind installations and assumes the same current rate for the next 10 years and applies an average estimated onshore wind installation cost per Watt to size aggregate addressable potential.
Anaerobic Digesters (ADG)	<\$1	<ul style="list-style-type: none"> Estimates maximum potential annual energy production from all NY animal waste, food manufacturing, and municipal wastewater and converts annual energy production into generation capacity. Applies estimated ADG installation costs per Watt to size aggregate addressable potential. Assumes entire supply of waste is utilized.

***Estimated market size of ~\$85B based on above selection of technologies;
Green Bank may offer products and services to a broader range of technologies / project types***

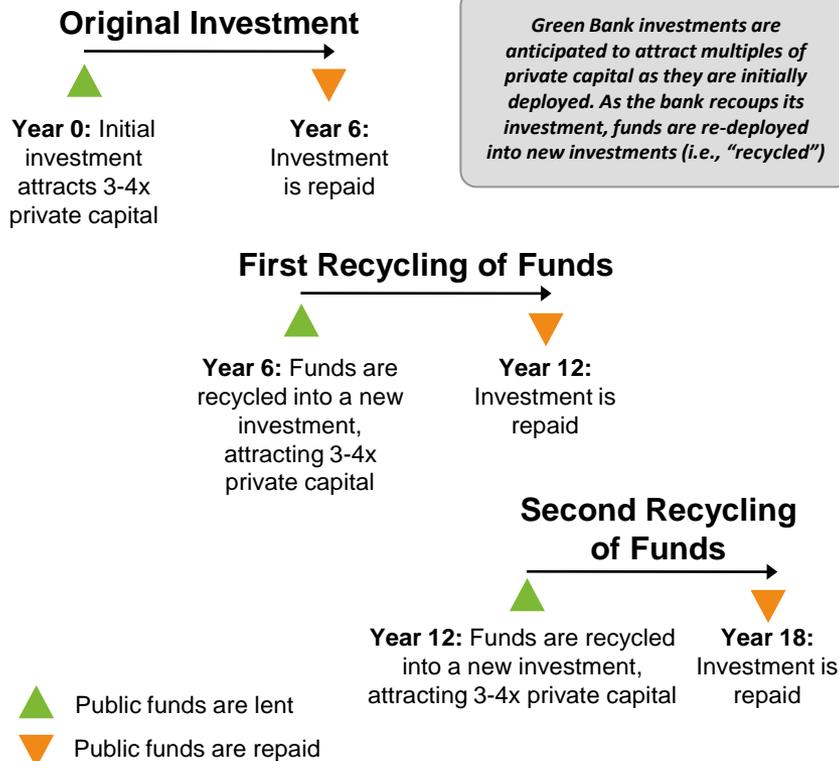
Note: Additional market sizing would be required to determine specific size of gaps, and to assess the product-specific market sizes

Source: Booz and Company analysis

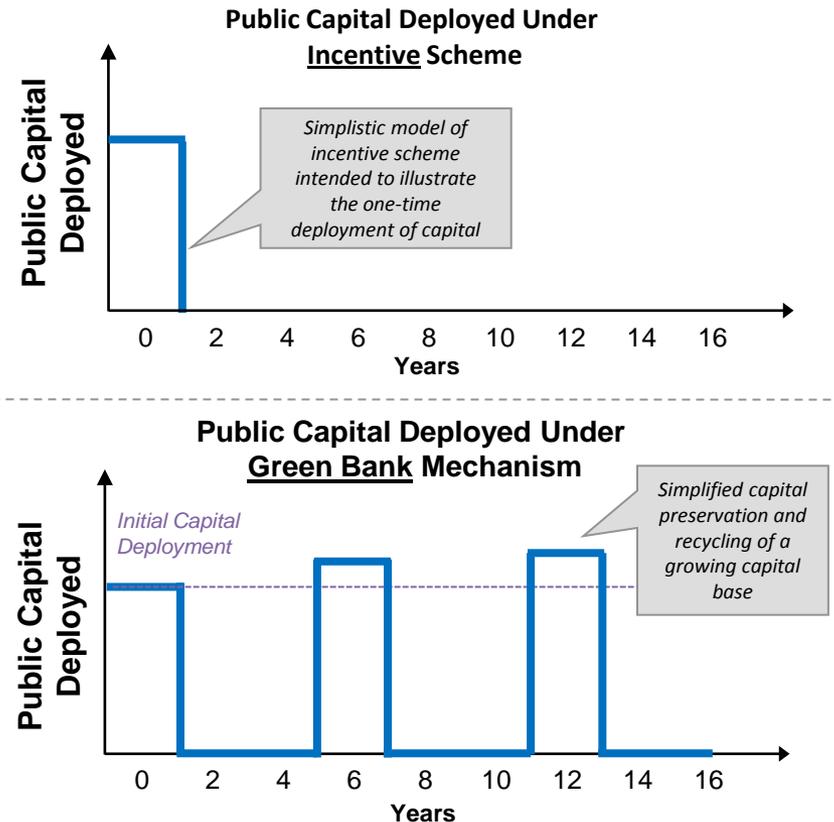
The Green Bank is uniquely positioned to leverage private capital while preserving ratepayer funds

ILLUSTRATIVE

Example – How is Capital Recycled?



Green Bank Versus Incentive Approach

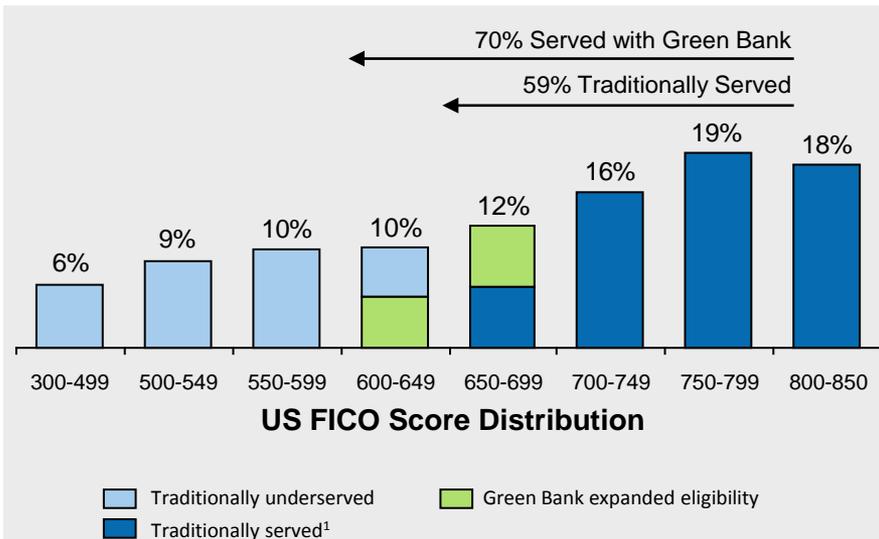


Source: Booz & Company analysis, market research (including stakeholder interviews, concept testing interviews and industry research)

Additionally, the Green Bank can expand access to capital for a broad range of end-use customers

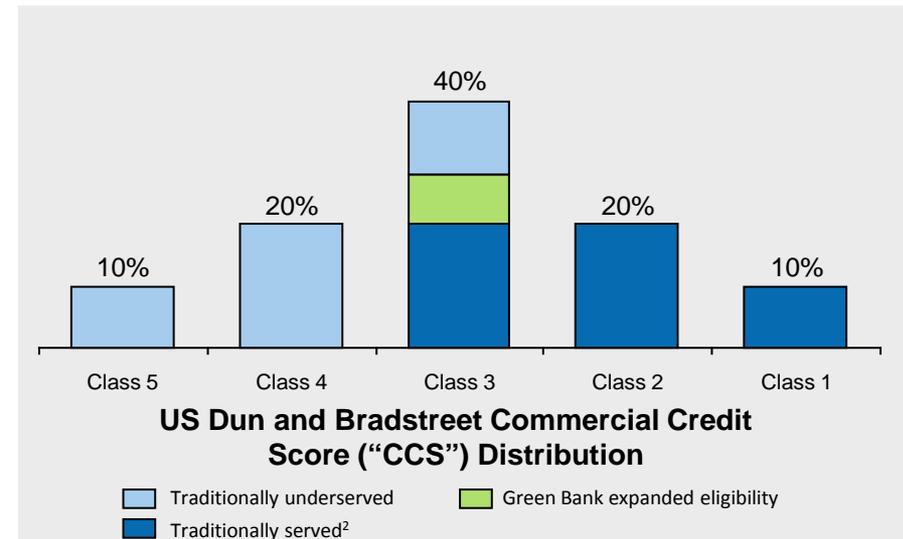
ILLUSTRATIVE

Example for Residential Market Expansion



- Green Bank can expand access to financing to lower tier of FICO scores, expanding access to **financing to incremental 11% of NY households**
- Total New York households is ~ 8,000,000
- Impact is equivalent to an additional ~880,000 households in NY¹

Example for Commercial Market Expansion



- Traditionally served markets are Class 1, Class 2 and a percentage of Class 3 (~50% of businesses)
- The Green Bank can provide service to more businesses within Class 3 and as a result cover an additional 4%-8% of businesses³
- The Green Bank would expand eligibility from 50% of businesses to 54%-58% of businesses

1) 8,000,000 x (5% + 6%); based on expanding eligibility from 0% of 600-649 and 50% of 650-699 range to 50% of 600-649 and 100% of 650-699 range

2) Based on market interviews, desk research and market sizing analysis

3) Assumes that Green Bank will expand served market from 50% of Class 3 to between 60% and 70% of Class 3. This is equivalent to incremental 4% (10% * 40%) to 8% (20% * 40%)

Source: 2013 NYSERDA Strategic Plan, market research/ interviews, Booz & Company analysis

The Green Bank will also generate public benefits, such as job creation and system resilience

Primary Public Benefits of the Green Bank

Economic Benefits

- Create **new jobs** by enabling a flourishing clean energy market.
- Create opportunities for growth across multiple market segments (multiplier effect).

System Resilience

- Drive increased penetration of **distributed generation**, which supports system reliance by reducing burden on centralized power.
- Diversify energy supply to **reduce macro-economic risks** from a specific commodity shock (e.g. sudden falls in refining capabilities or rising oil prices).

Cleaner Environment

- Increase **penetration of clean energy** projects across a broad array of consumers.
- Reduce reliance on **fossil fuels** and polluting sources of power.
- Accelerate overall **decrease in carbon emissions**.

Scale Generation

- Increase penetration and **expand clean energy markets** through financing.
- Generate scale by **driving conformity standards**, contractual standardization and facilitating access to capital markets.

Clean Energy Leadership

- Position **NY as a leader** in development of clean energy financing market and helping to finance migration to a “Utility 2.0” model.
- Establish a model for other states to emulate.

Greater Transparency and Awareness

- Standardize processes for **greater market transparency** across all segments
- Create **greater market activity** through attractive financing offerings.
- Generate awareness about energy savings and benefits for consumers.
- Simplify consumers’ purchasing process for clean energy adoption.
- Increase confidence in consumers through reduced perception of risk.

To deliver these benefits, the Green Bank must maintain operational flexibility and seek strategic partnerships

Requisites for a Successful New York Green Bank

Flexibility

- The Green Bank should be flexible and adaptive in order to:
 - Balance the diversity of organizational objectives.
 - Respond to the market as it reacts to the Green Bank's offerings.
 - Maintain a "light touch" to ensure that the private sector is not crowded out.

Strategic Partnerships

- Essential for the Green Bank to create rapid and tangible impact by utilizing market platforms.
- Allow the Green Bank to operate at a wholesale level and leverage capabilities of existing organizations to develop a pipeline of projects.

Longitudinal Sustainability

- The Green Bank needs to secure longitudinal sustainability to execute its mandate.
 - The market needs to have confidence that the institution will remain in place for multiple years.
 - The market needs to "organize around \$1B," requiring the full extent of capitalization.

Supporting Policy

- A policy framework must be created to ensure that Green Bank products are coordinated with other state/ rate-payer funded incentives to optimize the return to the ratepayers.

Key financial and non-financial risks must be monitored and mitigated

Key Risk Categories

Financial Risks

Default Risk

- Risk that borrower defaults due to inability to make payments on time or at all, or due to project performance reasons.

Balance Sheet Risk

- Risk that the Green Bank is unable to off-load assets (e.g., warehouse) from its balance sheet, thereby tying up capital and foregoing recycle rate.

Capital Deployment Risk

- Risk that capital allocated is not deployed rapidly enough due to lower demand than expected for segment-specific or market-related reasons.

Non-Financial Risks

Capabilities Risk

- Risk that capabilities required to implement offerings are not fully met or not met in a timely manner, leading to a delay in offering roll-out.

Partnership Risk

- Risk that partners back out or revoke existing agreements due to changes in priorities or financial inability to meet requirements.

Legal / Regulatory Risk

- Risk that legal or regulatory changes adversely impact offering demand or the ability to structure products as originally designed.

Political Risk

- Risk that political or public events adversely impact the perception or outcome of Green Bank's objectives, resulting in overall entity risk.

Source: Booz & Company analysis

Several commonly-used financial products may enable the Green Bank to address the aforementioned financing gaps

Hypothetical Green Bank Product Families

HYPOTHETICAL

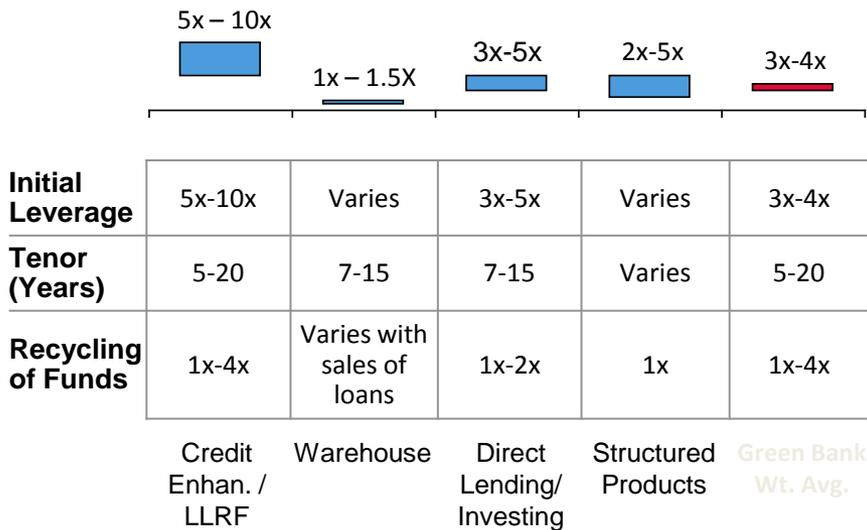
	Description of Product Families
Credit Enhancement / LLRF¹	<ul style="list-style-type: none"> Includes loan loss reserves and credit enhancement products funded by a reserve. Products assist private sector lenders by taking on a portion of the risk associated with loans in return for a fee.
Warehouses for Securitization	<ul style="list-style-type: none"> Direct provision of financing with the intention of bundling loans for securitization. Build pool of loans through direct lending to borrowers and replenish funds by selling pool into capital markets.
Direct Lending/ Investing	<ul style="list-style-type: none"> Simple loan products to be held on balance sheet. Examples of direct investments include subordinated debt, revolving credit facilities, and term loans.
Structured Products (Tax Equity Fund)	<ul style="list-style-type: none"> More complex investments that may serve multiple functions in a single bespoke arrangement. Examples of structured products include a tax equity fund that combines a debt investment, an equity investment and a loan loss reserve to support parallel private investments.

1) LLRF stands for Loan Loss Reserve Fund

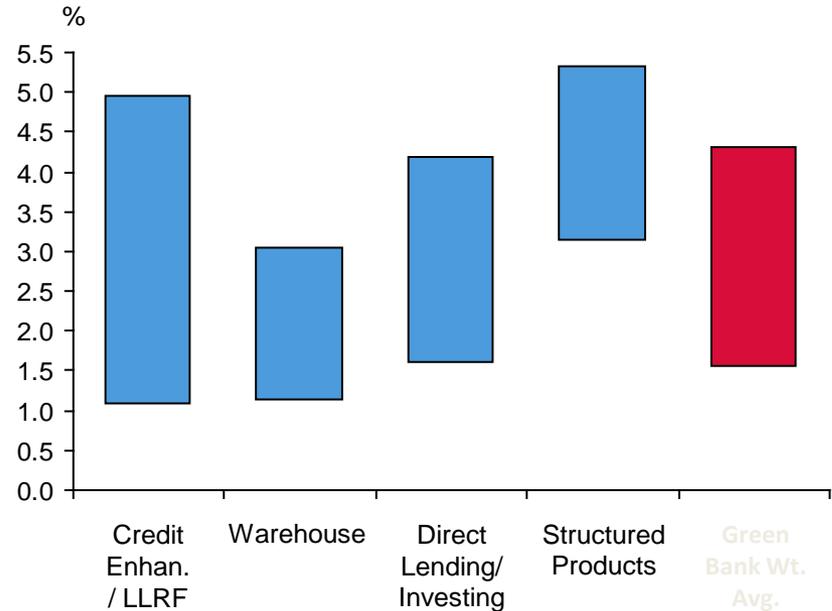
Market-backed analysis yields returns which may enable the bank to operate on a self-funding basis

HYPOTHETICAL

Initial Leverage by Product¹



Annualized ROI by Product^{2,3}



1) Leverage by Product calculated as Total Energy Investment divided by Public Dollars

2) Annualized ROI reflects Gross Product Revenue less product losses (e.g. defaults); measures product-based income, net of product losses; does not include product admin costs or organization overhead costs

3) ROI is equal to (gross product revenue minus product losses) divided by initial capitalization. Based on 20 year projection of hypothetical product set; analysis assumes that the Green Bank maintains an unlevered balance sheet. High end based on +50% sensitivity testing of loan interest rates and upfront fees. Low end based on -50% sensitivity testing of loan interest rates and fees. Additional methodology in Appendix. Green Bank range based on midpoint of low and high scenarios illustrated in ROI discussion

Source: Booz & Company analysis; market research (including stakeholder interviews, concept testing interviews and industry research)

Booz & Co. has found that the Green Bank is a viable endeavor that will add significant value to NY State

- There are multiple clean energy **financial barriers the Green Bank can eliminate** to facilitate the flow of private capital to areas of the market that are not served by traditional and non-traditional lenders.
- **Market participants indicate a high degree of enthusiasm for partnering with the Green Bank.**
- The proposed **\$1B in capitalization is consistent** with Booz & Company's market sizing analysis (estimated market size of ~\$85B).
- A Green Bank offers multiple **unique benefits**, including increased value of ratepayer dollars by preserving and recycling public funds while leveraging private capital, catalyzing market transformation, and generating a host of other public goods (e.g. cleaner environment, system resilience, job creation, etc.).
- This type of public / private partnership is an **emerging trend** that is slowly gaining traction both domestically and globally; NY State has an opportunity to become a market leader with the Green Bank.

Jeff Pitkin
NYSERDA Treasurer

Illustration: Financing Barriers

S&P: AAA
Moody's: Aaa
(See "RATINGS" herein)

NEW ISSUE — BOOK-ENTRY-ONLY

In the opinion of Hawkins Delafield & Wood LLP, Bond Counsel to New York State Energy Research and Development Authority, interest on the Series 2013A Bonds (as hereinafter defined) (i) is included in gross income for Federal income tax purposes pursuant to the Internal Revenue Code of 1986, as amended (the "Code"), and (ii) is exempt, under existing statutes from personal income taxes imposed by the State of New York or any political subdivision thereof (including The City of New York). See "TAX MATTERS" herein.



\$24,300,000
NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT
AUTHORITY
Residential Energy Efficiency Financing Revenue Bonds, Series 2013A
(Federally Taxable)

Dated: Date of Delivery

Due: July 1, as shown below

New York State Energy Research and Development Authority (the "Authority") is offering its Residential Energy Efficiency Financing Revenue Bonds, Series 2013A (the "Series 2013A Bonds"), in the aggregate principal amount set forth above.

The Series 2013A Bonds will be limited obligations of the Authority, payable solely from and secured by Pledged Loan Payments and Pledged Interest Subsidies held by The Bank of New York Mellon (the "Trustee"), under the Indenture (as hereinafter defined).

Interest on the Series 2013A Bonds will be payable on January 1 and July 1 of each year, commencing on January 1, 2014.

Serial Bonds: \$18,455,000

July 1 Maturity	Principal Amount	Interest Rate %	Price %	CUSIP [†]
2014	\$2,195,000	0.350	100	64985LAA6
2015	2,080,000	0.550	100	64985LAB4
2016	2,105,000	1.028	100	64985LAC2
2017	1,930,000	1.621	100	64985LAD0
2018	1,775,000	1.971	100	64985LAE8
2019	1,755,000	2.372	100	64985LAF5
2020	1,800,000	2.772	100	64985LAG3
2021	1,780,000	2.986	100	64985LAH1
2022	1,590,000	3.206	100	64985LAJ7
2023	1,445,000	3.406	100	64985LAK4

\$5,845,000 4.106% Term Bond due July 1, 2028, Price 100%, CUSIP[†] number 64985LAL2

Payments, when due, of principal of, interest on and redemption premium, if any, on the Series 2013A Bonds are guaranteed pursuant to the Series 2013A Guarantee (the "Series 2013A Guarantee") issued by the New York State Environmental Facilities Corporation (the "Guarantor"),



Governance

- System of Internal Controls and Accountability.
- Synergistic Structure.
- Advisory Council.
- Investment Committee.

Funding

- Initial Capitalization.

	Amount (\$mil)
PSC Petition	
> NYSERDA SBC3 uncommitted program funds	\$3.5
> NYSERDA EEPS1 uncommitted program funds	\$22.1
> Utility EEPS1 uncommitted program funds	\$90.0
> RPS funding	<u>\$50.0</u>
Total Petition	\$165.6
RGGI funds (Mar-Sept 2013 auctions)	<u>\$44.7</u>
Total Phase I Funding	<u>\$210.3</u>

- Subsequent Capitalization.

- Determined through 2014 proceeding.

Evaluation

- Goal – Assess overall Green Bank effectiveness.
- Leverage current evaluation expertise.
- Funded at \$4 million.

NY GREEN BANK



Opportunities for Questions