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New York State Green Bank

Business Plan Development

Final Report, September 3rd 2013

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Booz & Company concludes that the Green Bank is a viable use of ratepayer funds to accelerate the deployment of clean energy in NY

- In January 2013, Governor Andrew Cuomo proposed the creation of a $1B Green Bank to mobilize private capital and accelerate the deployment of clean energy; pursuant to this, Booz & Company was retained to assess the market opportunity of this proposal
- After conducting market interviews, concept testing workshops, industry research, and financial modeling, **Booz & Company has found that the New York Green Bank is a viable endeavor that will, when implemented consistent with the guidance provided herein, add significant value to the State's clean energy portfolio**
  - 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 through 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
- The Green Bank model should be enabled by the following:
  - **Flexibility:** The Green Bank management team must operate with a flexible mandate in order to be able to respond to a dynamic marketplace and to manage a portfolio that optimizes the risk / reward trade-off; the risks of being inflexible include potentially "crowding out" the private sector and "getting stuck in an unfavorable market"
  - **Strategic Partnerships:** Strategic partnerships are a key success factor for the Green Bank to operate as a wholesaler
  - **Longitudinal Sustainability:** There must be public confidence that the institution will be capitalized with the required level of funding to meet the Governor's stated objectives and remain in place for multiple years
  - **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 and to the State at large
- However, multiple risk factors require management attention:
  - **Financial risk**: Green Bank leadership must have a solid understanding of credit markets to enable dynamic risk management, i.e. the ability to identify and mitigate risks as they arise
  - **Market positioning**: The Green Bank will introduce a new business model into the marketplace and in order to maximize its effectiveness needs to carefully position itself alongside private sector entities and coordinate with State and utility incentives, grants and rebate programs
  - **Organizational standup**: Successful capital deployment depends on the Green Bank's ability to rapidly build a unique set of capabilities, hire and retain personnel with relevant backgrounds and skill sets, and implement supporting governance structures

Green Bank Overview

Market Assessment

Quantitative Analysis

Operating Model

Appendix

In January 2013, Governor Cuomo proposed a $1B Green Bank to mobilize private capital and accelerate clean energy deployment

Mandate of the Green Bank:

To accelerate deployment of clean energy by removing barriers in financing markets. It will not compete with private sector entities but will instead partner with them, nor will its principal role be to provide subsidy. The Bank will focus its activities on clean energy projects that are economically viable but not currently financeable.

Key objectives of the Green Bank:

1. Provide a bridge to a sustainable and efficient private market that offers clean energy financing services
2. Remove barriers to financing energy efficiency and renewables, and move on once a market is established
3. Partner alongside financial institutions to leverage both their capabilities and investment dollars
4. Work with other entities to evolve clean energy capital markets (in particular, the bond markets)
5. Enhance market confidence in clean energy investing

Source: 2013 State of the State - NY Rising, NY State Green Bank Steering Committee

The primary benefit of the Green Bank is its ability to expand private investment in clean energy at a lower cost to ratepayers

Benefits of the Green Bank

1 Drive Value for Ratepayers by Leveraging Private Capital

- One of the key strengths of the Green Bank is its ability to 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
  - This is achieved by operating the Green Bank as a self-sufficient financial entity
  - As a result of capital preservation, the funds can be repurposed or redeployed once the Green Bank' s objectives have been achieved

2 Transform the Market

- The Green Bank is expected to **increase investor confidence** in clean energy financing by improving understanding of the value of clean energy and reducing perceived risk
- In addition, the bank can **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 and lower transaction costs, the outcomes of which can be measured in terms of reduced cost of capital and expansion into broader market segments

3 Provide Public Benefits

- The clean energy deployed will generate **public benefits**, such as a cleaner environment, a more resilient energy system, economic benefits (e.g. creation of well-paying jobs) and lowered costs of energy

Firstly, expanding private investment in clean energy is enabled by leveraging public capital and *recycling funds*

ILLUSTRATIVE EXAMPLE

Leverage of Private Capital

Example – How is Capital Recycled?

Original Investment

Year 0: Initial investment attracts 3-4x private capital

Year 6: Investment is repaid

Green Bank investments are anticipated to attract multiples of private capital as they are initially deployed. As the bank recoups its investment, funds are re-deployed into new investments (i.e. "recycled")

First Recycling of Funds

Year 6: Funds are recycled into a new investment, attracting 3-4x private capital

Year 12: Investment is repaid

Second Recycling of Funds

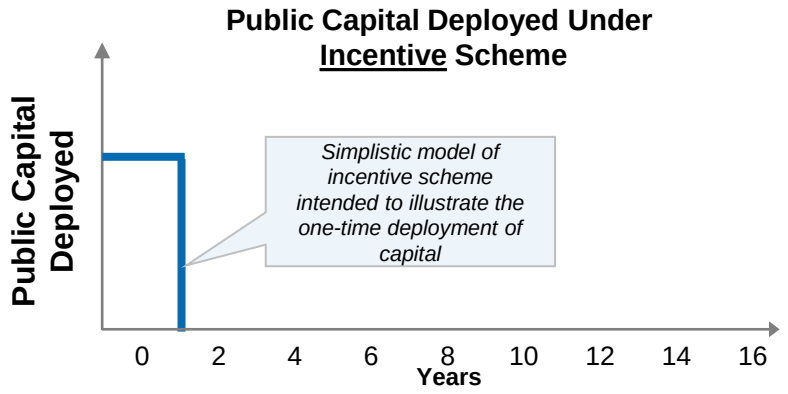
Year 12: Funds are recycled into a new investment, attracting 3-4x private capital

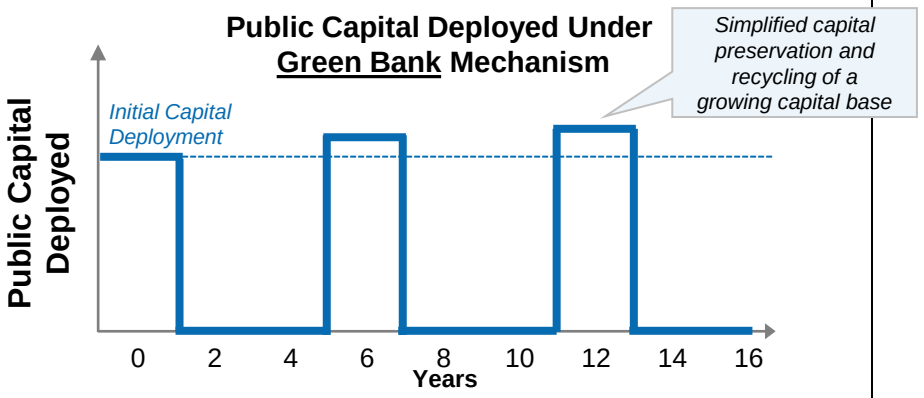
Year 18: Investment is repaid

Public funds are lent

Public funds are repaid

Green Bank versus Incentive Approach



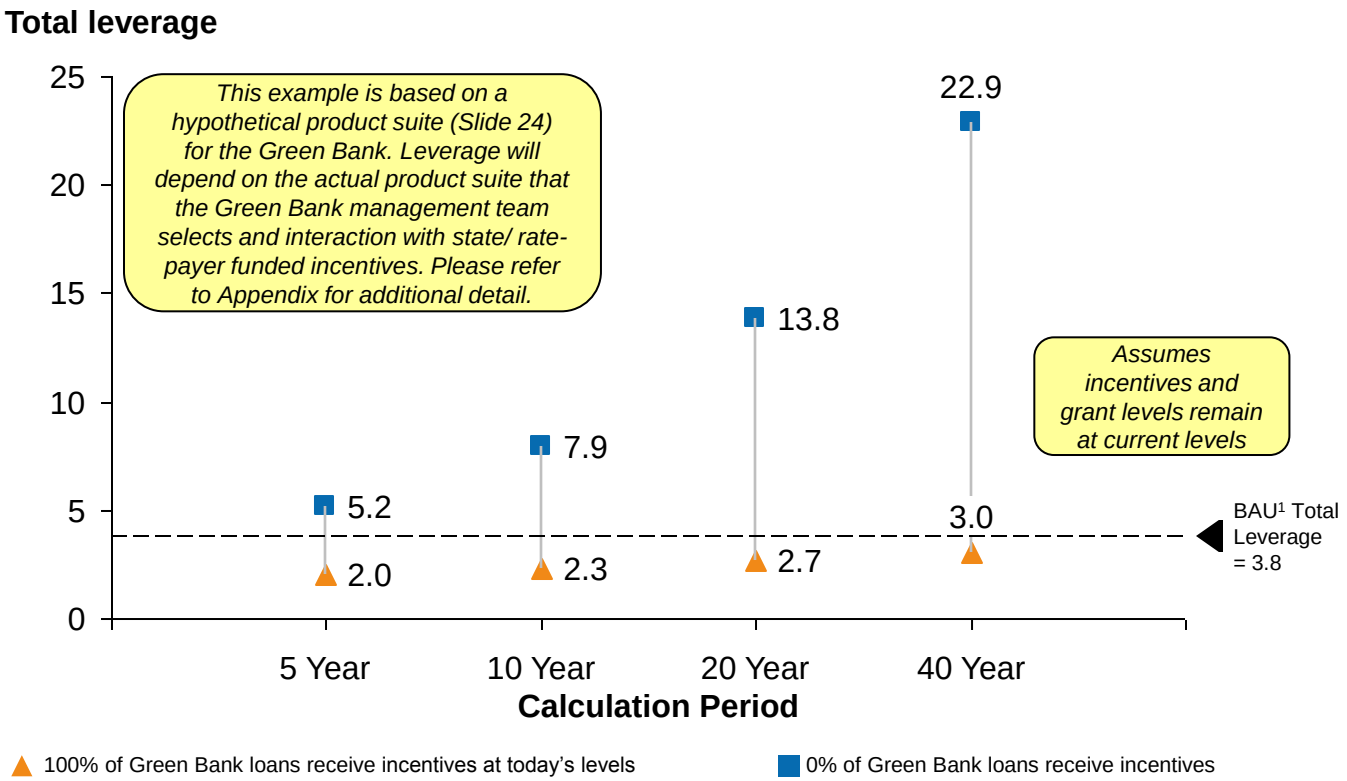


Source: Booz & Company analysis, market research (including stakeholder interviews, concept testing interviews and industry research)

Capital recycling allows the Green Bank to achieve higher upside total leverage, while the downside is similar to "business as usual"

ILLUSTRATIVE EXAMPLE

Green Bank Total Leverage



Total leverage as captured in the chart does not recognize that the Green Bank will receive a return of its capital beyond the calculation period

Discussion

- Maximum upside potential of Green Bank Total Leverage (as denoted by blue squares on graph) occurs where projects supported by Green Bank financing are **not** subsidized with incremental public funds (i.e. clean energy state/ rate-payer funded incentives)
- However, Green Bank Total Leverage is **reduced** where projects supported by Green Bank financing also receive state/ rate-payer funded incentives
- In these scenarios, the downside is not significantly different than BAU[1] Total Leverage, and the differential dissipates over time; at 40 years, for example, there is almost no difference between the lower end of the range and BAU[1]
- Calculations based on conservative assumption that current grant / incentive programs are not redesigned or reduced
- *Note: Some level of state/ rate-payer funded incentives may still be necessary to drive demand*

1) BAU denotes "business as usual"
Note: Assumptions and additional methodology can be found in the Appendix
Source: Booz & Company analysis

Secondly, the Green Bank can drive market transformation

Transformation Drivers

- The root cause of current market barriers / inefficiencies is existing lenders' insufficient understanding of the risk profile and track record of clean energy projects
- In conjunction with NYSERDA, the Green Bank will have the knowledge, experience, and operational capability to identify and support projects that are economically viable but not currently financeable
- The Green Bank can facilitate capital markets by increasing transparency and confidence; for example, by aggregating data and developing conformity standards

Results / Benefits

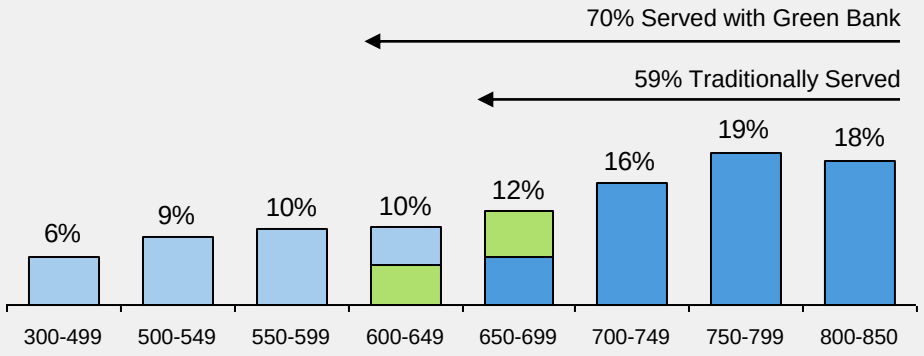
- **Transparency:** The public track record of Green Bank investments drives market transparency and generates baseline for the market to efficiently price a new asset class
- **Market confidence: I**ncreased transparency enables private sector understanding of new asset class and willingness to invest
- **Reduced cost of capital:** Efficient pricing of clean energy project financing effectively reduces the levelized cost of energy
- **Market expansion:** Green Bank credit enhancements for clean energy projects for a broader tier of creditworthiness (currently inefficiently priced) will help build a track record for the private sector to expand its current coverage

Example on following slide

Financing can be expanded, for instance, in both the residential and commercial segments

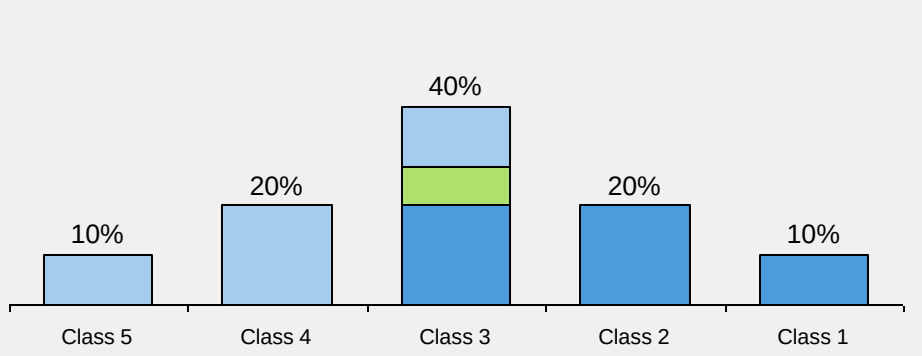
ILLUSTRATIVE

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 NY[1]

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 businesses[3]
- 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 analysis

Finally, we believe the creation of a Green Bank can help generate a host of public benefits, such as job creation and system resilience

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Public Benefits of the Green Bank

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**

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)

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

Economic Benefits

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

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

Our research indicates that the public-private financing model is starting to gain traction both domestically and internationally…

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Domestic

	Institution	Year Established	Initial Capital
1	**Clean Energy Finance and Investment Authority (Connecticut)**	▪ 2011	▪ $48M repurposed funds as initial capital
2	**New York City Energy Efficiency Corporation (New York)**	▪ 2011	▪ $45M federal/city funds and private donations
3	**Keystone Home Energy Loan Program and Warehouse for Energy Efficiency Loans (Pennsylvania)**	▪ 2006	▪ $20M initial capital
4	**Green Energy Market Securitization (Hawaii)**	▪ 2014 start date	▪ $100M initial capitalization anticipated from bond issuance

International

	Institution	Year Established	Initial Capital
5	**Kreditanstalt für Wiederaufbau (Germany)**	▪ 1948	▪ $98B initial capital
6	**Green Investment Bank (U.K.)**	▪ 2012	▪ $4.7B initial capital
7	**Clean Energy Finance Corporation (Australia)**	▪ 2013 start date	▪ $10B initial capital

Sources: Coalition for Green Capital; Institution Websites; Interviews; Booz & Company analysis

… and the Green Bank is collaborating with these organizations to benefit from key lessons learned

Organizational Overview and Best Practices of Domestic Green Banks

	Entity	Organization Overview	Best Practices
1	**CEFIA** (Clean Energy Finance and Investment Authority, Connecticut)	▪ Quasi-public agency commissioned by the Connecticut Governor's Office ▪ **Mission:** To support the governor's and legislature's energy strategy to achieve cleaner, cheaper and more reliable sources of energy while creating jobs and supporting local economic development ▪ **Focus**: Solar, fuel-cell, geothermal, biomass and energy efficiency ▪ **Key Products:** Smart-E Loan (loan loss reserve for longer tenor loans) and Solar Lease II (developed for warehouse of leases)	▪ Launch programs in the first three months to avoid stalling and losing public interest ▪ Strive to yield benefits that steadily decrease incentive dependence ▪ Establish strong partnerships with NGOs, banks, installers, etc. ▪ Work with private lenders rather than competing against them ▪ Use addressable market assessments to help establish quarterly targets
2	**NYCEEC** (New York City Energy Efficiency Corporation)	▪ Legally independent 501 (c)(3) funded by the New York City Mayor's Office ▪ **Mission:** To support New York City's energy and climate action goals by catalyzing an efficiency retrofit financing market for private building owners ▪ **Focus:** energy efficiency, fuel conversion, CHP, eligible distributed generation for large buildings ▪ **Key Products:** Energy Service Agreements, credit enhancement facilities for Fannie Mae/ NYC Housing Development Corporation mortgage-linked loans, ConEdison multifamily energy efficiency program	▪ Focus on large buildings to meet NYC policy goals ▪ Partner with established organizations who already have target audiences (e.g. Fannie Mae, New York City Housing Development Corporation) ▪ Adopt commercial lending practices to enhance credibility and facilitate partnerships ▪ Use credit enhancements to induce energy efficiency mortgage products ▪ Build staff with expertise in finance and engineering
3	**Keystone HELP/ WHEEL** (Home Energy Loan Program and Warehouse for Energy Efficiency Loans, Pennsylvania)	▪ Program run by Pennsylvania State Treasury ▪ **Mission:** Helping Pennsylvania homeowners and contractors with true fixed rate financing programs for affordable energy efficiency and home comfort ▪ **Focus:** Residential energy efficiency ▪ **Key Products:** Direct loans for residential efficiency retrofits, warehouse for energy efficiency loans to establish secondary market	▪ Leverage partnerships with private sector administrator and contractor networks to improve outreach ▪ Strive to achieve scale attractive to private sector partners ▪ Align Green Bank incentives with contractor incentives to encourage contractors to advertise Green Bank programs ▪ Structure Green Bank underwriting standards around Fannie Mae standards to drive conformity
4	**GEMS** (Green Energy Market Securitization, Hawaii)	▪ Program to be run by Hawaii Public Utilities Commission ▪ **Mission:** To create a mechanism to secure low-cost capital for clean energy projects to help Hawaii reach 70% clean energy goal ▪ **Focus:** Solar and energy efficiency ▪ **Key Products:** Program combining on-bill financing with bond issuance (securitized by public benefit charge)	▪ Start with a simple structure, purpose and target market ▪ Use underserved markets as a sales strategy (targeting underserved markets fills a market gap and supports state policy objectives) ▪ Develop large partnership network early on (unions, banks, developers, utilities, environmentalists, chamber of commerce, etc.) ▪ Work with existing players, products, and services (e.g. utilize pre-existing developers and encourage competition among them)

Sources: Booz & Company analysis; Coalition for Green Capital; market research (including stakeholder interviews, concept testing interviews and industry research)

Green Bank Overview

Market Assessment

Quantitative Analysis

Operating Model

Appendix

We conducted a market assessment exercise to reveal market barriers, financing gaps and potential Green Bank offerings

Market Assessment Approach

1 Market Assessment

1A Market Sizing

- Conducted a market sizing analysis to obtain a **directional estimate of the maximum market potential** for clean energy in NY

1B Expert Interviews

- Conducted **~90 interviews with key constituents** in the clean energy landscape including:
  - Financial institutions
  - NGOs
  - Renewable Providers
  - ESCOs (Energy Service Companies)
  - End Users
  - Utilities

2 Market Barriers

- Discovered substantial market **barriers and challenges** in the clean energy financing market

3 Financing Gaps

- Identified **clear financing gaps** resulting from market barriers

4 List of Potential Offerings

- Developed a list of **potential offerings** to address financing gaps
- Focused offerings around **six product families**:
  - Credit enhancements
  - Warehousing
  - Direct lending
  - Structured products
  - Informational
  - Other

*Financing gaps and the list of potential offerings were tested and validated through a set of **10 detailed concept-testing interviews** with leading market participants and potential Green Bank partners*

This analysis revealed a substantial market opportunity for clean energy projects in the State of NY

DIRECTIONAL

Market Sizing Overview

Selected Technologies	Est. Market Size ($B)	Approach
Energy Efficiency	$55	▪ 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	▪ 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	▪ 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	▪ 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	▪ 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	▪ 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

Total market size of ~$85 B excludes potential for utility scale generation, fuel cells, charging stations, solar hot water systems, and other emerging clean energy technologies

Note: Additional market sizing is required to determine specific size of gaps, and to assess the product-specific market sizes
Source: Booz and Company analysis; see appendix for detailed market sizing approach and sources

We also conducted ~90 interviews with constituents who provided a wide range of perspectives on potential roles for the Green Bank

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	Market Feedback
Financial Institutions *(34 interviews)*	▪ Green Bank should not get in the way of private capital, but instead **enable and facilitate capital flow** ▪ High transaction costs can be addressed through **scale and standardization** ▪ Green Bank should play a role in helping financial institutions with **longer term loans** given regulatory constraints on bank capital ▪ Green Bank should help **aggregate smaller loans** to attain volume levels that interest financial institutions
Stakeholders/ NGO *(11 interviews)*	▪ **Limited demand exists** for clean energy across multiple segments, income levels and credit ratings ▪ However, end users lack technical expertise and have **limited awareness of the value proposition** and savings ▪ As such, the Green Bank should be an ecosystem **contributor and facilitator** in the market by providing credit enhancements, serving as an information center, and pushing for simplicity of offerings / underwriting transparency
Renewables Providers *(13 interviews)*	▪ The market for renewables is heavily reliant on the **monetization of tax credits**, with particular challenges around tax law reform uncertainty and the illiquid and overpriced nature of the tax equity market ▪ Furthermore, **NY's unregulated energy market** is a challenge for renewables providers who desire long term price certainty, and the absence of PPAs (Power Purchase Agreements) and a thin market for hedges makes it difficult for them to penetrate the market
ESCOs *(8 interviews)*	▪ The Green Bank can play a role in the **funding of pre-development costs** by providing **conditional loans** based on end-user project adoption guarantee if post-audit expected savings exceed pre-defined threshold ▪ The Green Bank can help address the **lack of project and financing standards** for selling retrofits ▪ The Green Bank can **aggregate a project portfolio** to diversify credit risk and attain sufficient scale for take-out
End Users *(9 interviews)*	▪ The Green Bank should **aggregate information and data** around payments and performance track record ▪ The Green Bank should help end users understand the value of energy efficiency and renewables projects through **educational campaigns to drive demand** ▪ The Green Bank should facilitate the **financing of currently unfunded mandates**, such as energy audits
Utilities and Others *(13 interviews)*	▪ Enthusiasm for Green Bank varies across utilities, but general consensus exists that there is a **an opportunity for loans in the medium credit quality space** (1-2 standard deviations lower than prime) if loan guarantees are put in place ▪ Green Bank should be active in **simplifying and standardizing** end-user options and providing adequate **flexibility** in financing ▪ Potential for **on-bill repayment** to be expanded and used as an enabler for Green Bank financing

Source: Interviews with market constituents and stakeholders

The interview questions focused on market barriers, financing gaps and product ideas for the Green Bank

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Financial Institution Questions

- How much of your energy-related business is currently done in New York State?
- Is there a mismatch between the demand for energy-focused capital and the supply of capital?
- How would you characterize end-use customer demand for energy projects, and what are the key drivers?
- How does your organization generate deal flow?
- What would drive increased end user demand? What about investor demand?
- What financial instruments exist in the market? What are investor preferences?
- Are there any gaps in the financial products landscape? By energy segment, by project size, other?
- If you see an information gap, what specific information is hindering investment?

Energy Efficiency & Renewable Provider Questions

- How much of your business is currently done in New York State?
- How do you create value in the market?
- How do you generate demand and acquire customers? Is there latent demand, in what segments, and how much?
- How is project capital sourced, and from whom?
- What constraints (both financial and non-financial) do you face?
- What types of financial instruments do you primarily use when raising capital?
- How could the Green Bank help you grow your business?
- How could the Green Bank assist your customers?

End-Use Customer Questions

- What is your current level of annual capital expenditure on energy efficiency and renewable energy?
- How do you make your energy efficiency and renewable energy capital decisions?
- How is capital sourced, and from whom?
- What constraints (both financial and non-financial) do you face?
- What financial instruments do you use?
- How could the Green Bank help you grow your business' investment in energy efficiency and renewable energy?

Key barriers revealed by the interviews include underdeveloped secondary markets, high upfront costs and de-prioritization

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	Barrier	Description
High Severity Barriers	Undeveloped secondary market	▪ Non-conformity of existing energy financial products and limited track record for rating agencies ▪ Low volume of transactions makes it challenging to securitize loans
	Large upfront costs	▪ End users not willing to incur large pre-development costs in order to determine whether energy benefits are net positive ▪ Energy projects require large initial capital outlay
	De-prioritization of energy projects	▪ Energy projects compete for funding with other capital-intensive projects
	Energy efficiency loans are oftentimes unsecured	▪ Energy efficiency loans typically lack a collateral asset
	Insufficient understanding of value proposition	▪ Outside of large, sophisticated C&I (commercial and industrial) customers, clean energy project savings are not well understood
	Split incentives	▪ Split incentives arise from the fact that landlords pay for energy upgrades while tenants reap savings from energy bill
Medium Severity Barriers	Inability to scale underwriting process	▪ Energy projects oftentimes necessitate custom loan structures ▪ Limited availability of information re: energy savings and vendor quality burdens underwriters, resulting in high upfront transaction costs
	Limited track record of performance and payments history	▪ Direct energy savings are site-specific and can be difficult to cost-effectively quantify and measure at most sites ▪ Performance and payments data is decentralized, oftentimes proprietary and of limited duration vis-a-vis tenor of lease/loan transactions
	Tax credit uncertainty	▪ PTC (Production Tax Credit) expires at end off 2013; ITC (Investment Tax Credit) falls from 30% to 10% at end of 2016
	Existing debt burden of potential energy customer	▪ Restrictive debt covenants/mortgage lender limitations on external financing ▪ High loan-to-value leaves little/no room for additional debt ▪ Inability/ unwillingness of end-user to add additional debt to balance sheet
Low Severity Barriers	Fragmented vendor landscape	▪ Uncertainty of vendor quality/ reputation results in lower demand for energy efficiency
	Risk aversion of lenders in the current regulatory environment	▪ Existing regulations curtail ability of banks to lend on balance sheet

Financing Gaps

- Medium Credit Quality Financing
- Small Scale Financing
- Financing for Commercially Viable Technologies yet to Achieve Scale
- Tax Equity Funding
- Long Tenor Financing

Additional detail in subsequent page

Source: ~90 interviews with market constituents and stakeholders

These barriers have led to areas with clear financing gaps, such as medium credit quality customers and small scale projects

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Financing Gap	Description	Potential Offerings to Address Gap
Medium Credit Quality Financing	▪ Financing for customers with FICO scores of **~640-700** or a subset of **Class 3** businesses	**Credit Enhancement** · **Warehouses for Securitization** · **Direct Lending/ Investing**
Small Scale Financing	▪ Financing for projects **$2M or less** in size	**Warehouses for Securitization** · **Direct Lending/ Investing** · **Informational**
Financing for Commercially Viable Technologies yet to Achieve Scale	▪ Financing for **technologies with limited deployment to date** (e.g., biomass, microgrids, anaerobic digesters, fuel cells, battery storage, electric vehicle charging stations)	**Credit Enhancement** · **Informational** · **Direct Lending/ Investing**
Tax Equity Funding	▪ Financing for **projects eligible for tax credits**	**Structured Products** · **Direct Lending/ Investing**
Long Tenor Financing	▪ Financing for projects with a tenor **longer than 5-7 years**	**Credit Enhancement** · **Informational** · **Structured Products**

Additional detail in subsequent page

Source: ~90 interviews with market constituents and stakeholders

Several financing gaps can be addressed through a list of potential offerings that the Green Bank can take to market (1 of 2)

Several offerings were validated in concept testing interviews with leading market participants

List of Potential Green Bank Offerings

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	Offering	Technology[1]	High-Level Description
Credit Enhancements	▪ Loan loss reserve for C-PACE	▪ All technologies	▪ The Green Bank commits capital to a loan loss reserve fund to backstop the repayment of a portion of loans by sub-investment grade municipalities participating in the C-PACE (Commercial Property Assessed Clean Energy) financing program
	▪ Loan loss reserve for financing appended to existing mortgage loans	▪ All technologies	▪ The Green Bank commits capital to a loan loss reserve fund to backstop the repayment of the clean energy portion of loans as part of an overall mortgage loan extended by an existing mortgage provider
	▪ Loan loss reserve for tax equity lease funds	▪ Solar, wind	▪ The Green Bank commits capital to a loan loss reserve fund associated with a tax equity lease structure developed by a third party to enable renewable providers to broaden access to financing to the next best tier of customer credit quality
	▪ Technology guarantee	▪ Energy efficiency	▪ The Green Bank guarantees specific energy efficiency technologies to protect financing providers against technology performance risk ▪ The Green Bank may reinsure technology guarantee to other private entities
Warehouses for Securitization	▪ Funding of warehouse for consumer loans	▪ Energy efficiency, solar	▪ The Green Bank directly purchases a corpus of residential, clean energy loans and holds them for pre-determined period (e.g. 3 years) ▪ Once loans build track record, the Green Bank can offload them via a take-out[2]
	▪ Funding of warehouse for medium credit quality loans	▪ All technologies	▪ The Green Bank entirely, or partially, directly funds a corpus of medium credit quality loans and holds them for pre-determined period (e.g. 3 years) ▪ Once loans build track record, the Green Bank can offload them via a take-out[2]
Direct Lending/ Investing	▪ Subordinated debt for solar loan fund	▪ Solar	▪ The Green Bank finances a subordinated debt tranche of a solar loan fund, alongside senior debt holders, and assumes risk of first loss ▪ This enables the solar loan fund to attract senior debt investors into new markets
	▪ Operational revolver loan to fund origination capabilities	▪ All technologies	▪ The Green Bank extends a revolving operational loan or credit line to an entity in order to help it build loan origination capabilities and additional scale ▪ The loan earns a spread above prime rate based on portion of funds accessed

1) "All technologies" indicates energy efficiency, solar, wind and CHP
2) Take-out could potentially occur with the help of a Green Bank credit enhancement

Illustrative examples provided in the Appendix

Several financing gaps can be addressed through a list of potential offerings that the Green Bank can take to market (2 of 2)

Several offerings were validated in concept testing interviews with leading market participants

List of Potential Green Bank Offerings

NON-EXHAUSTIVE

	Offering	Technology[1]	High-Level Description
Structured Products	▪ Funding for tax equity lease fund	▪ Solar, wind, fuel cells	▪ The Green Bank provides sponsor equity as well as subordinated debt into a tax equity lease fund for renewable energy, in conjunction with additional funding from tax equity providers and senior debt providers
	▪ Research project to broaden appeal of tax equity products	▪ Solar, wind	▪ The Green Bank funds a two-year research project to identify, structure and roll out a program that broadens access of tax equity beyond niche, large investors with passive income to other investors that can monetize the tax equity
Informational	▪ Tracking and analysis of performance and payment data	▪ All technologies	▪ The Green Bank aggregates, stores, analyzes and shares market data related to the performance history and payments track record of financed clean energy projects to improve transparency and enhance market understanding of risk
	▪ Development of financing and project standardization	▪ All technologies	▪ The Green Bank takes an active role, in coordination with strategic partners, in defining loan conformity standards and developing evaluation and certification criteria for contractors and lenders
	▪ Platform to match clean energy providers and borrowers	▪ All technologies	▪ The Green Bank establishes platforms / online exchanges to match clean energy providers and borrowers in order to drive increased competition by facilitating price transparency for consumers
	▪ Forum to drive adoption of products with complex accounting (off balance sheet)	▪ All technologies	▪ The Green Bank moderates a forum of participants encompassing large accounting firms and CFOs to clarify accounting treatment and requirements to achieve broader adoption of off-balance sheet products (e.g. ESAs – Energy Service Agreements)
Other	▪ RFP issuance to financial institutions for specific partnership opportunities	▪ All technologies	▪ The Green Bank issues an RFP to major financial institutions to solicit existing project opportunities which could become more viable through Green Bank support ▪ This arrangement shifts the product structuring burden to the private sector
	▪ Provision of low cost financing that leverages unique Green Bank positioning	▪ All technologies	▪ The Green Bank leverages its unique capabilities to structure products that broaden the appeal of clean energy financing (e.g., by working with PSC (Public Service Commission) to arrange a backstop for loan repayments through a rate reduction bond structure
	▪ Financing of commercially viable technologies with limited deployment	▪ Micro-grids, ADG, biomass, fuel cells, battery storage	▪ The Green Bank can participate with a network of lenders who provide capital for niche, emerging technologies such as biomass, anaerobic digesters, micro-grids, solar water heating systems, battery storage and fuel cells

1) "All technologies" indicates energy efficiency, solar, wind and CHP

Illustrative examples provided in the Appendix

To address the market opportunity and deploy a suite of offerings, the Green Bank should adhere to a set of key success factors

Requisites for a Successful NY 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	▪ Strategic partnerships will be essential for the Green Bank to create rapid and tangible impact by utilizing market platforms ▪ Strategic partnerships will 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

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To better understand the viability of a Green Bank, we conducted a quantitative analysis based on a hypothetical product suite

Quantitative Analysis of the Green Bank

- Estimated input parameters for a **hypothetical suite of product families** were used to develop a quantitative model of the Green Bank
- Metrics such as **net yield on assets, leverage, and the recycling of funds** were used to analyze the behavior of product families

- By aggregating the individual product families, an **overall model of the Green Bank** was developed
- The model does not incorporate Green Bank overhead or administrative costs

- Several **financial and non-financial risks** were identified for the Green Bank
- **Sensitivity analysis** on the Green Bank's overall ROI[1] was conducted for key risks to understand the ability of the model to withstand adverse events

1) See slide 25

Four hypothetical products were used to model the Green Bank's impact and financial evolution over time

HYPOTHETICAL

Hypothetical Green Bank Product Families

	Description of Product Families
Credit Enhancement / LLRF[1]	▪ 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	▪ 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	▪ 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)	▪ 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

The outcomes and effectiveness of the Green Bank's hypothetical suite of products are measured using two key metrics

Key Green Bank Metrics

Loss-Adjusted ROI

Gross Product Revenue
– Product Losses (e.g. Defaults)
= Loss Adjusted Revenue

$$\frac{\text{Loss Adjusted Revenue}}{\text{Initial Product Capitalization}} = \textbf{Loss-Adjusted ROI}$$

- Measures product-based income
- Net of product losses
- Does not include product admin costs or organization overhead costs

Leverage Ratio

$$\frac{\text{Total Energy Investment}}{\text{Public Dollars}} = \textbf{Leverage Ratio}$$

Initial Leverage

- Measure of initial leverage based on product design
- Excludes impact of recycling and recapitalization over time
- Static measure calculated from product inputs

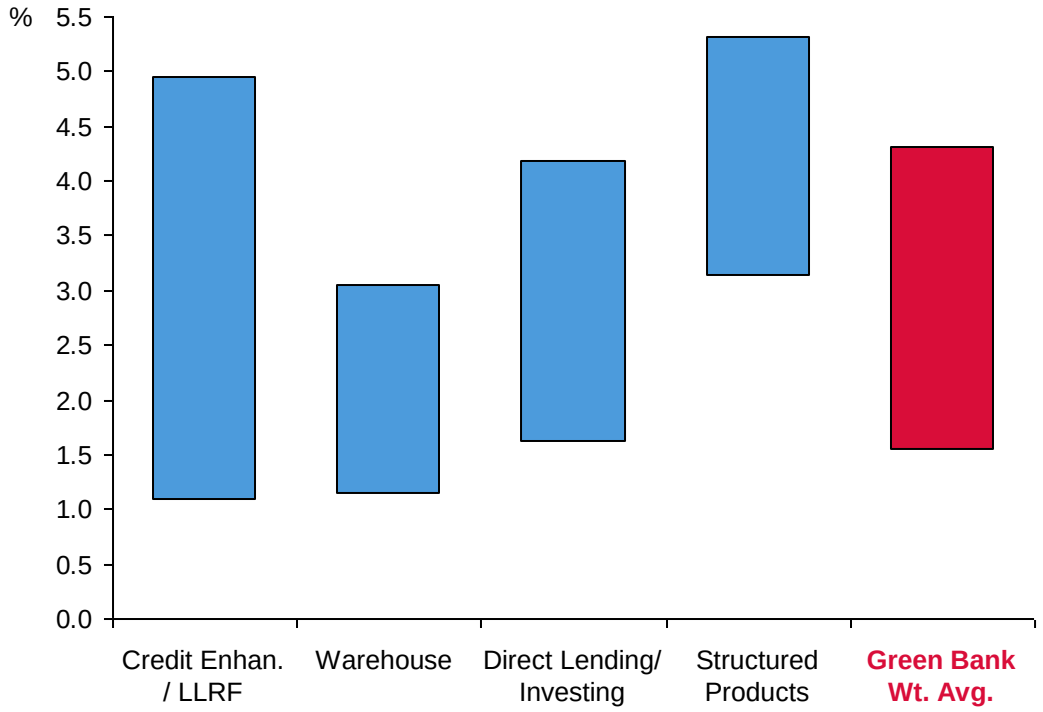
Cumulative Leverage

- Measures leverage achieved over time based on initial leverage, recycling of money and recapitalization
- Leverage increases over time as capital is collected and redeployed multiple times

Based on product modeling, direct lending and investments into lease structures may drive ROI for the Green Bank

HYPOTHETICAL

Annualized ROI by Product[1]



Discussion

- The hypothetical Green Bank portfolio is expected to earn an ROI of approximately 1.5% - 4.1%
  - This range is a function of the prices the Green Bank can charge for its capital
- Credit Enhancements have an expected ROI of approximately 0.4% - 4.2%
  - This wide range reflects the products' sensitivity to the fees the Green Bank is able to charge.
- Warehouse products have an expected ROI of approximately 1.4% to 3.2%
- Direct lending products have an expected ROI of approximately 1.8% - 4.2%, driven by receipt of interest payments of fees
- Structured products are expected to have the highest potential ROI, ranging from approximately 3.2% - 5.4%
  - This higher ROI is possible due to the higher required return for the equity portion of investment

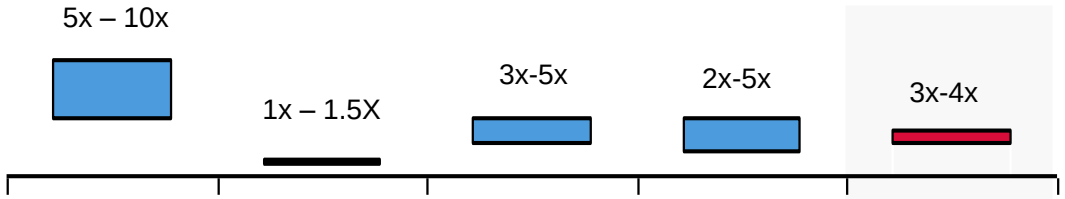
1) ROI is equal to (gross product revenue minus product losses) divided by initial capitalization. Based on 20 year projection of hypothetical product set; analysis assumes that the Green Bank maintains an unlevered balance sheet. High end based on +50% sensitivity testing of loan interest rates and 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)

The initial leverage achieved by Green Bank products will be multiplied over time as capital is recycled and redeployed

HYPOTHETICAL

Initial Leverage by Product[1]



	Credit Enhan. / LLRF	Warehouse	Direct Lending/ Investing	Structured Products	**Green Bank Wt. Avg.**
Initial Leverage	5x-10x	Varies	3x-5x	Varies	3x-4x
Tenor	5-20	7-15	7-15	Varies	5-20
Recycling of Funds	1x -4x	Varies with sales of loans	1x-2x	1x	1x-4x

Discussion

- The Green Bank will leverage private dollars upfront and over time
- The Green Bank portfolio may achieve an initial leverage of 3x-4x, redeploying its capital and achieving further rounds of leverage up to 4 times over 20 years
- Initial leverage is a function of product design and will attract private investment upon initial capital deployment
  - For example, upon initial investment, a loan loss reserve with a 20% loss share will leverage 5 dollars for every public dollar
  - The design of product parameters, based on interviews with current market actors, will drive initial leverage
- Leverage is also created by cash recycling over time
  - As loan and product terms end, cash is returned to the Green Bank and redeployed, once again leveraging private dollars at the upfront ratio

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

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

While product impact is expected to be high, a set of financial and non-financial risks needs to be considered 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 forgoing 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

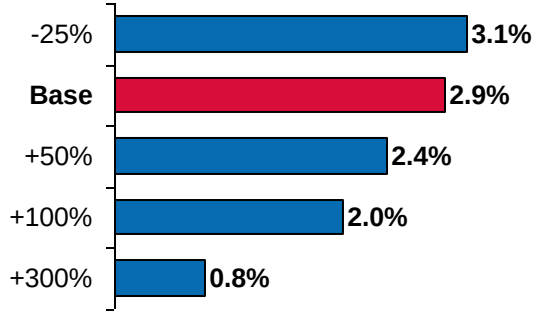
Source: Booz & Company analysis

While Green Bank overall ROI is significantly sensitive to default risk, effect of capital deployment risk is minimal

HYPOTHETICAL

Default Risk

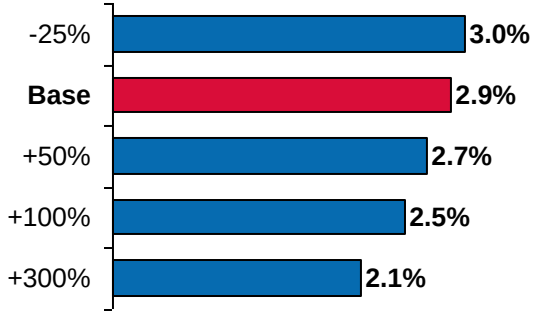
Impact of Default Ratio Scenarios on ROI[1]



- Green Bank ROI is sensitive to default risk because **defaults are the primary non-operating cost for all products**
- Higher defaults lead to **increased loss coverage** for LLR (Loan Loss Reserve) products, and **reduced interest income** for lending/warehouse products
- Impact is partially **minimized due to fees** on several products that are upfront and independent of defaults

Capital Deployment Risk

Impact of Capital Deployment Time on ROI[1]



- Green Bank ROI is **not highly sensitive** to the amount of time it takes to deploy capital
- This is because many **Green Bank offerings recycle and redeploy capital relatively quickly** and multiple times over the 20-year evaluation period
- Therefore the negative impact of a delayed deployment is negated by **positive impact of regular redeployments over time**

1) Sensitivities presented are on the annualized 20-year ROI of the Green Bank. ROI is risk-adjusted, which accounts for default-related losses but no other admin or overhead expenses.

Source: Booz & Company analysis

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We believe that the Green Bank will require four capability sets: energy, financial, business development and operational

PRELIMINARY & NON-EXHAUSTIVE

Capability Set	Capability	Description
Energy Capabilities	Technology expertise	▪ Expertise by technology type e.g., distributed generation, energy efficiency, biomass etc.
	Market expertise	▪ Knowledge about customer segment needs ▪ Expertise on landscape of energy initiatives
	Policy expertise	▪ Knowledge over breadth of relevant energy policies, both federal and state
	Evaluation and measurement	▪ Ability to make energy specific calculations and measurements
Financial Capabilities	Portfolio/ Project risk assessment	▪ Ability to assess and price: credit, operational, liquidity, origination, underwriting, and structuring risks
	Opportunity identification	▪ Identify, assess and value opportunities, e.g., loan loss reserve for energy efficiency fund
	Product development	▪ Expertise to develop and structure financial products;
	Program / Asset management	▪ Day-to-day management of programs, e.g., liaising with warehousing partner
Business Development	Partner identification	▪ Knowledge of partner landscape and screening criteria (e.g., underwriting capabilities)
	Partnership management	▪ Partner relationship development and management
	Partnership negotiation	▪ Defining of terms and conditions with partners; closing transactions
	Partner compliance assessment	▪ Robust tool to assess partner regulatory compliance, e.g., consumer protection
Operational Capabilities	Account management	▪ Customer and client service including complaint processing
	Subsidy tracking	▪ Coordination and assessment of external subsidy programs and grants
	Performance measurement	▪ Metrics tracking, evaluation and documentation
	Servicing	▪ Loan repayment and claims processing
	Treasury and accounting	▪ Preparation of financial statements and budget tracking
	Legal and compliance	▪ Contract drafting and regulatory compliance
	Marketing and communication	▪ Program marketing and news communication
	Government policy and affairs	▪ Management of relationships with public entities, e.g., NY DPS (Department of Public Service)
	HR	▪ Staff management, including benefit administration, hiring, on-boarding and training
	IT	▪ Management and set up of information systems and infrastructure

While capability sets are distinct, there will be significant interplay among capabilities, especially financial and energy

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

We recommend that the Green Bank develop over two phases

ILLUSTRATIVE

Implementation Roadmap

2013 — ***2014***

	Establishment		*Implementation*
Key Activities	▪ ***Leadership establishment & staffing:*** *Appoint Board / advisory group, determine in-house functionality, hire executive director and other key personnel* ▪ ***Strategy & organizational structure:*** *Conduct capability assessment, finalize organizational structure*	▪ ***Operations launch:*** *finalize paperwork, capitalize, establish financial framework* ▪ ***Product launch:*** *Develop Initial products, launch products* ▪ ***Communication:*** *Create communication materials* ▪ ***Facilities Set Up:*** *Set up interim IT infrastructure*	▪ Further operational capability development ▪ Investment and operations review, e.g., financial reporting ▪ Additional capitalization and scaling of activity ▪ Additional personnel hiring as appropriate ▪ Additional product roll-out ▪ Partnership development ▪ Assess and evaluate product and program effectiveness
Milestones	▪ Filing of PSC petitions ▪ Board/advisory group appointment	▪ Additional staffing ▪ Operational launch ▪ Finalization of initial product suite	▪ Additional capitalization ▪ Existing product ramp-up and new product launch
KPI (Key Performance Indicators)	▪ Number of board / advisory group and leadership positions filled ▪ Number of staff positions filled	▪ Initial product interest, e.g., applications, funding requests	▪ Environmental impact e.g., KWh saved, capacity deployed ▪ Financial impact e.g., dollars deployed, capital invested, project default rates ▪ Frequency and severity of process, system errors

Activities in "Early Stage Plan"

To launch operations, the Green Bank will need to execute on key steps across 6 areas

PRELIMINARY

Preliminary Early Stage Plan

Key Areas	Activity	Month 1	Month 2	Month 3
Leadership Establishment & Staffing	Establish Green Bank Board or Advisory Group			
	Retain consultants			
	Hire senior executives			
	Determine in-house functionality and staffing levels			
	Recruit key personnel			
Strategy & Organizational Structure	Conduct capability diagnostic of NYSERDA			
	Finalize organizational structure			
	Develop Board / Advisory group charter, investment and operating strategy			
	Establish corporate planning and reporting structures			
	Establish appropriate sub-committees			
	Establish risk management protocols			
Operations Launch	Legally establish organization if required			
	Capitalize the Green Bank			
	Set up financial accounts e.g., bank accounts			
	Document operational policies & procedures e.g., financial, HR			
	Implement and test management processes, e.g., financial, record keeping			
Product Launch	Develop investment plan			
	Finalize initial product suite			
	Coordinate partnerships for first set of product launch			
	Launch initial set of products			
Communications	Create communication materials and protocols, including website			
	Determine inquiry and response process			
	Finalize application process			
Facilities Set Up	Set up interim IT and communication infrastructure e.g., telephones, copiers			

Source: Booz & Company analysis

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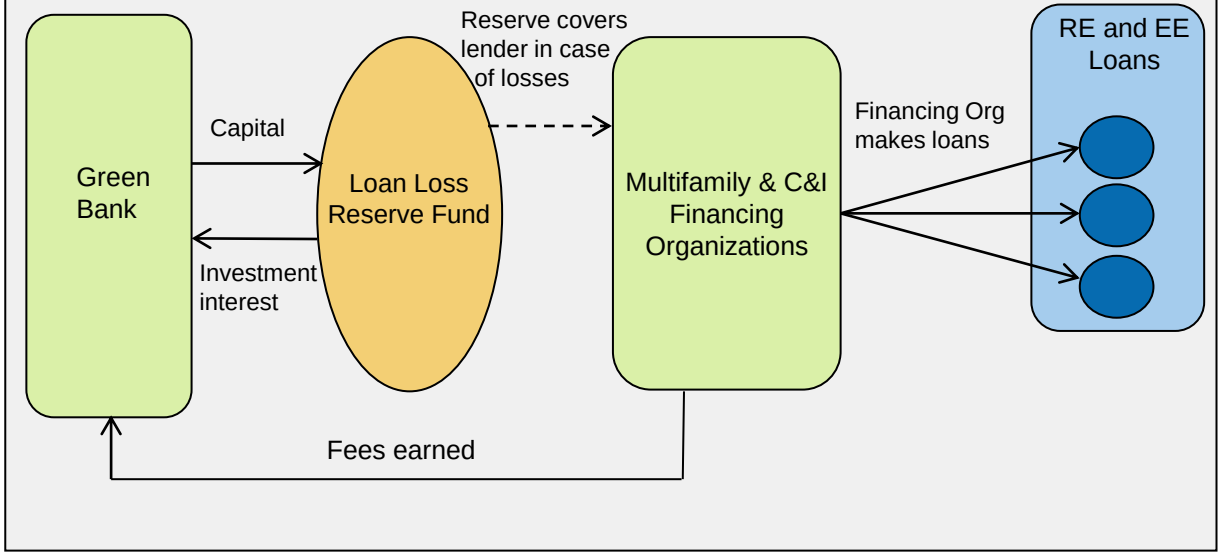
Illustrative Offering No. 1: The Green Bank can fund a loan loss reserve to support projects through existing mortgage providers

Loan Loss Reserve Fund Model



Retail Loan Parameters	
Average Loan Tenor	6-9 years
Average Loan Size	$300,000 – $3,250,000
Assumed Default Rate	0.8% Annually
Target Segment	Multifamily, C&I, MUSH
Technology	EE, Solar PV, CHP
Other	Linked to Existing Mortgage Lenders

Loan Loss Reserve Fund Parameters	
First Loss %	20%
Loss Share	90%
Upfront Fee	4-6%
Annual Charge	3-5%
Interest Earned	E.g., Prevailing Money Market Rate

Product Description

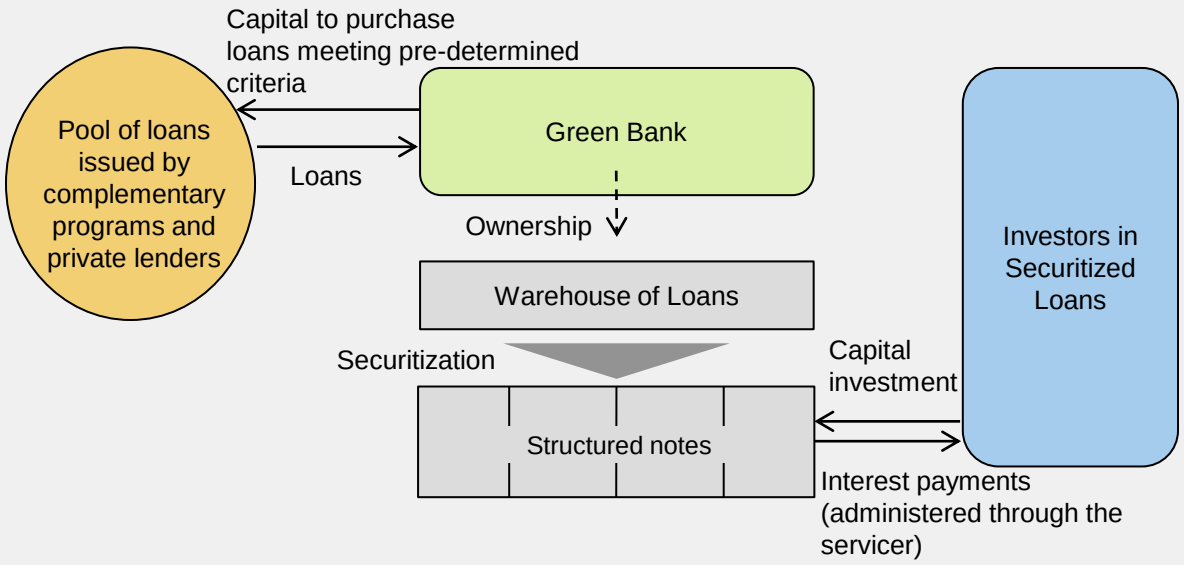
- Establish a Loan Loss Reserve Fund to entice C&I and multifamily mortgage lenders to develop energy efficiency and renewable energy loan products for their existing borrowers
- Cover first losses on a portfolio of Energy Efficiency and Renewable loans; lending partner assumes remainder of the risk
- Encourage lenders to incorporate projected energy savings into underwriting process
- Facilitate the provision of technical/ engineering assistance to underwriters

Green Bank Addressable Market[1]			
Segment	EE	Solar PV	CHP
Multifamily	$19.7	$1.6B	
C&I	$3.2B	$6.8B	
Multiple			$9.7B

Source: 1) Based on Green Bank addressable market by technology, segment, and credit quality distribution. See market sizing analysis for more details
Note: All parameters are illustrative only and represent Booz and Company's opinion based on market research and industry analysis

Illustrative Offering No. 2: The Green Bank can also fund a warehouse to purchase loans from originators

Securitization Model



Product Description

- Develop loan conformity standards for establishing a warehouse
- Purchase conforming loans issued by third-party lenders and hold on balance sheet
- Potential to partner with private sector entity to fund the warehouse
- Partner with rating agencies to provide rating for each class of structured notes
- Sell portfolio or securitize loans when warehouse reaches proposed minimum of $100M
- Key challenge: managing exposure to interest rate risk

Retail Loan Parameters	
Average Loan Tenor	12 - 15 years
Average Loan Size	$10,000 – $15,000
Credit Rating Range	High Credit Quality
Assumed Default Rate	0.8% Annually
Target Segment	Residential
Technology	EE and Solar PV

Securitization Parameters	
Private to Public Funds Ratio	Recycle Rate Dependent
Securitization Fee	1%

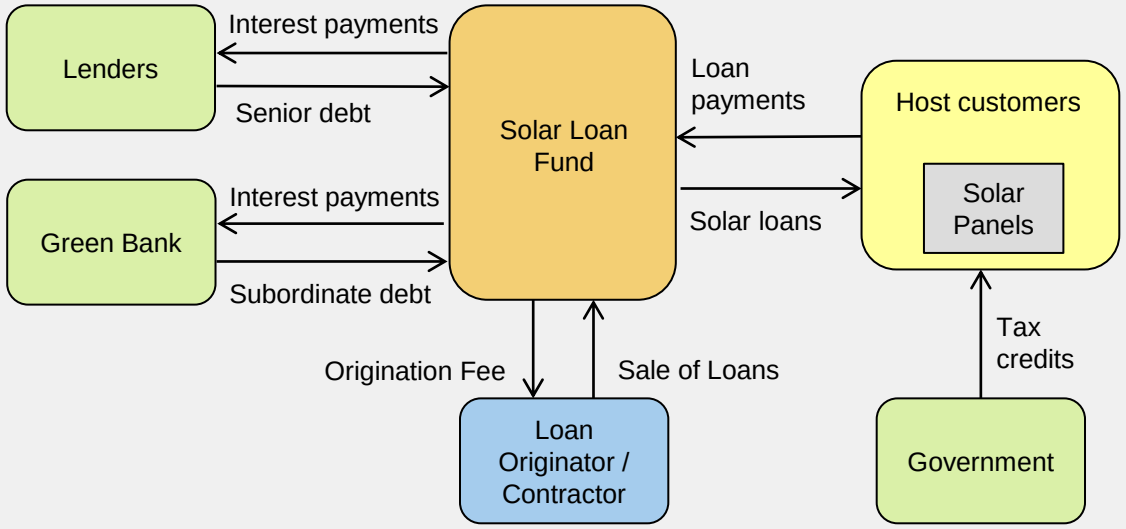
Green Bank Addressable Market[1]		
Segment	EE	Solar PV
Residential	$24.2B	$1.4B

Source: 1) Based on Green Bank addressable market by technology, segment, and creditworthiness distribution. Disparity between EE and Solar PV addressable market is due to relative size of the residential segment for each of these technologies (residential is 50% of the addressable market for EE, 16% of the addressable market for solar PV.) See market sizing analysis for more details

Note: All parameters are illustrative only and represent Booz and Company's opinion based on market research and industry analysis

Illustrative Offering No. 3: For solar, the Green Bank can contribute subordinated debt in loan funds of large scale solar providers

Solar Loan Fund Model



Product Description

- Provide subordinate debt for a solar loan fund to reduce risk for lenders
- Enable home-owners to receive tax credits through 100% ownership of assets, bypassing expensive tax equity capital
- Broaden consumer access to solar financing by lowering interest rate or extending loan tenors
- Potential for secondary market exit for corpus of loans

Retail Loan Parameters	
Average Loan Size	$22,000-$23,000
Average Loan Duration	15 years
Credit Rating Range	High Credit Quality
Assumed Default Rate	0.8% Annually for Host Customer
Target Segment	Residential
Technology	Distributed Solar

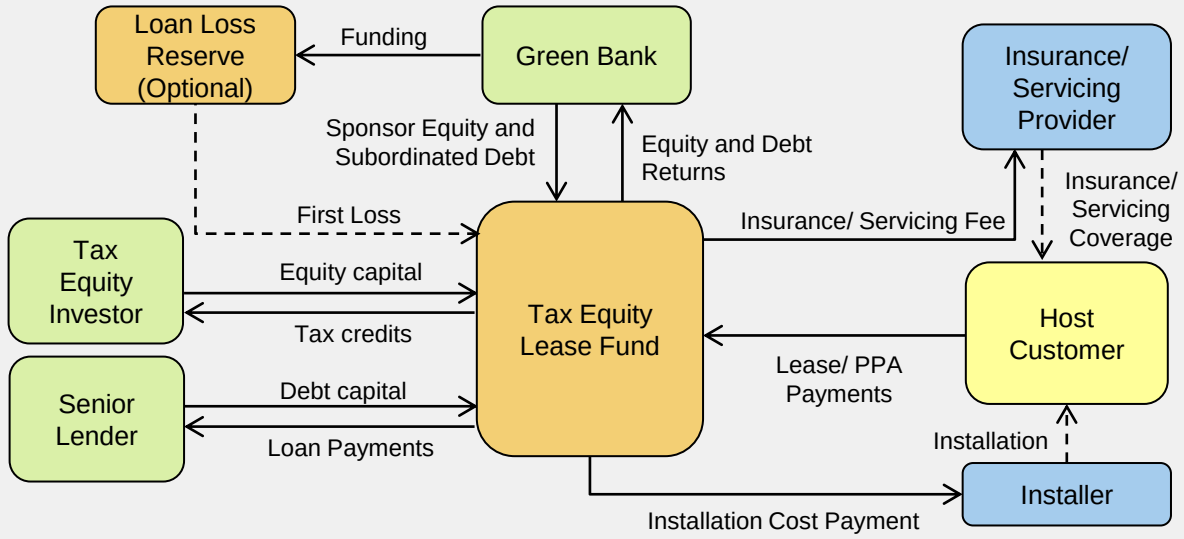
Solar Loan Fund Parameters	
Private to Public Funds Ratio[1]	3:1
Total Debt as % of Fund	100%
Interest Earned	Risk Adjusted Returns

Green Bank Addressable Market[2]	
Segment	Solar PV
Residential	$1.4B

Source: 1) Based on currently implemented programs in the market, with potential to achieve higher leverage with NY Green Bank (e.g., 5:1)
2) Based on Green Bank addressable market by technology, segment, and creditworthiness distribution. See market sizing analysis for more details
Note: All parameters are illustrative only and represent Booz and Company's opinion based on market research and industry analysis

Illustrative Offering No. 4: In order to support small solar installers, the Green Bank can create a lease fund

Tax Equity Lease Fund Model



Product Description

- Create a residential solar tax equity lease fund by providing sponsor equity, subordinated debt and credit enhancements
- Partner with tax equity investors and lenders to support financing for residential solar leases
- Finance and foster competition among smaller-scale solar installers
- Partner with other entities to develop an ecosystem (e.g., insurers, service providers)
- Addresses high upfront costs, risk aversion of lenders and fragmented vendor landscape
- Go to market expected to be longer than one year and via RFP process

Retail Lease Parameters

Average Lease Size	$18,000-$40,000
Average Lease Duration	20 years
Credit Rating Range	High Credit Quality
Assumed Default Rate	0.8% Annually
Target Segment	Residential
Technology	Solar PV, Onshore Wind, Fuel Cell

Tax Equity Lease Fund Parameters[1]

Private to Public Funds Ratio	3:1
Total Debt as % of Fund	50%
GB Debt as % of Total Debt	10%

Green Bank Addressable Market[2]

Segment	Solar PV	Onshore Wind	Fuel Cell
Residential	$1.4B		
Multiple		$3.9B	TBD

Source: 1) In this offering, the Green Bank would make three investments: a loan loss reserve fund with a 20% First Loss, 90% Loss Share, 1-3% upfront frees and 0.5-1.0% annual charges; a subordinated debt investment with 3-5% interest, and an equity investment with an expected IRR of 9%.
2) Based on Green Bank addressable market by technology, segment, and credit quality distribution. See market sizing analysis for more details

Note: All parameters are illustrative only and represent Booz and Company's opinion based on market research and industry analysis

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The market sizing analysis was used to obtain a directional estimate of the maximum market potential for clean energy in NY

Market Sizing Objectives & Scope

- Establish a directional estimate of the total investment potential by segment in NY for energy efficiency
  - Estimate the Green Bank addressable potential by removing the un-addressable and addressed potential from the total technical potential
- Establish a directional estimate of the total investment potential by segment in NY for renewable generation technologies in the intermediate future (next 10 years)
- Establish a directional estimate of the total investment potential in NY for other generation technologies like CHP, biomass, onshore wind, anaerobic digester

Market Sizing Limitations

- Scope only includes potential for energy efficiency and specific generation technologies
- Does **not** encompass:
  - Total potential for utility scale generation
  - Total potential for any other generation types aside from distributed solar PV, CHP, onshore wind, biomass, or anaerobic digesters
- Analysis does not provide:
  - Forecast of potential into long term future (e.g., greater than 10 year horizon)
  - Distinction between fuels (e.g. electricity, gas, petroleum) for energy efficiency opportunities
  - Estimated size of specific market gaps
- Analysis does not incorporate key risks such as:
  - Change in average retrofit costs
  - Technological innovation in renewables
  - Change in legislation and regulation, including incentives

The addressable potential for each technology is sized through a tailored approach

Market	Approach
Energy Efficiency	▪ Total the number of buildings / units or square feet by building type in each sector in New York ▪ Estimate portion of buildings that could benefit from retrofit (all pre-2008 buildings) ▪ Assume an average retrofit cost by building type or square foot per segment
Distributed Solar PV Generation	▪ Estimate new PV installations over next 10 years in NY State from NYSERDA research (2023 estimate) and EIA (Energy Information Administration) current installations (2013 base) ▪ Apply estimated PV installation costs per Watt to size aggregate addressable potential
Onshore Wind	▪ Estimate potential onshore wind installations over the next 10 years in NY State by extrapolating the average annual new installations from 2008-2012 ▪ Apply estimated onshore wind installation costs per Watt to size aggregate addressable potential
CHP	▪ Determine state-wide technical potential for new CHP sites per NYSERDA report ▪ Reduce technical potential by 50% per NYSERDA program experience ▪ Apply historical construction costs per MW to size aggregate addressable potential ▪ Deducts 20% as un-credit worthy
Biomass	▪ Estimate maximum annual energy production based on total forest biomass wood chip supply in New York ▪ Convert annual energy production into generation capacity based on biomass capacity factor ▪ Apply estimated biomass installation costs per Watt to size aggregate addressable potential
Anaerobic Digesters	▪ Estimate maximum potential annual energy production from animal waste, food manufacturing, and municipal wastewater ▪ Convert annual energy production into generation capacity ▪ Apply estimated anaerobic digester installation costs per Watt to size aggregate addressable potential

The energy efficiency total technical potential of $78.1B is sized by estimating building stock or floor space and retrofit estimates

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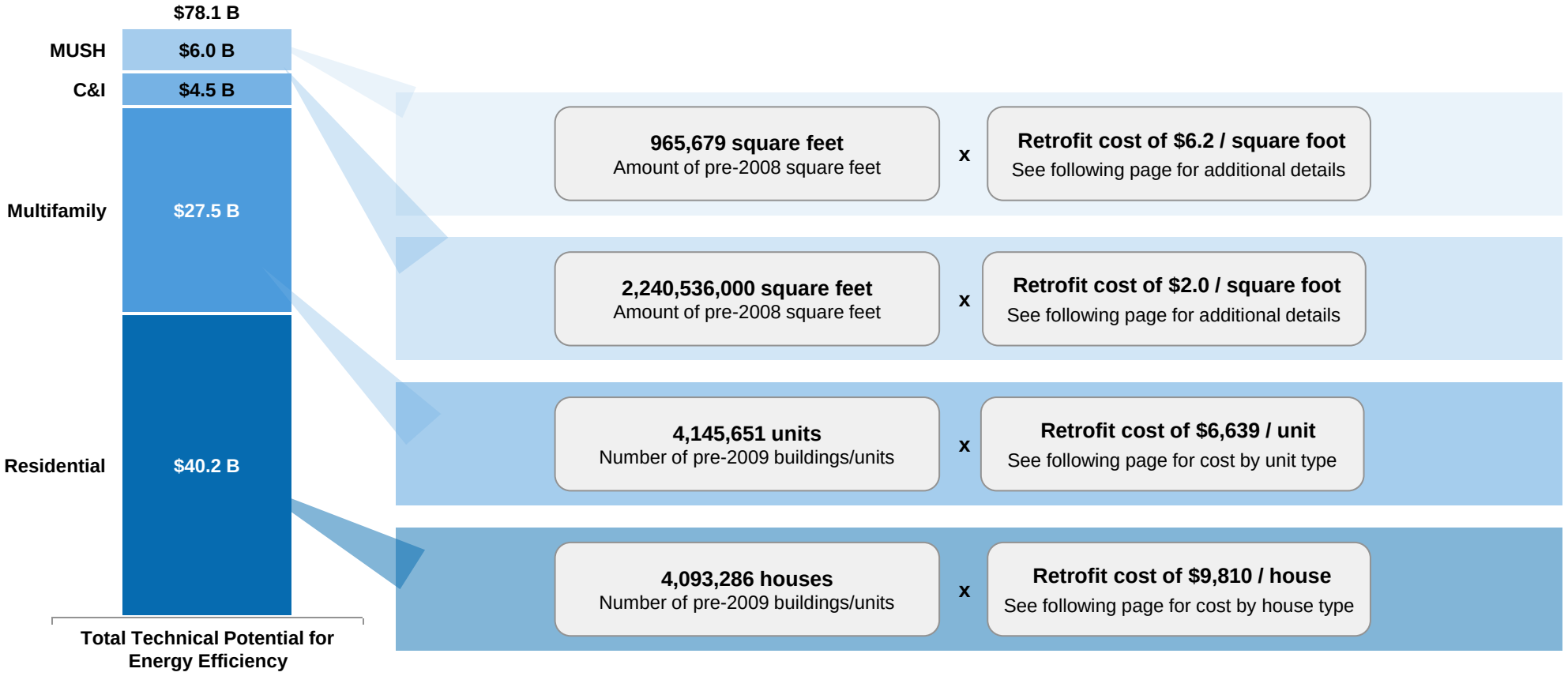


Source: See sizing inputs and source slide

The energy efficiency total technical potential inputs incorporate NYSERDA, NYCEEC, and government and market report data

DIRECTIONAL ONLY

Detailed Segment Assumptions

Residential	Pre-2009 NY Buildings	Retrofit Cost Per Building	Investment ($ B)
Single-Family	3,891,000	$9,810.0	$38.2
Mobile	202,286	$9,810.0	$2.0
Total	**4,093,286**	**$9,810.0**	**$40.2**

Multifamily	Pre-2009 NY Units	Retrofit Cost Per Unit	Investment ($ B)
2-4 units	1,531,407	$9,810.0	$15.0
5+ units	2,614,244	$4,781.0	$12.5
Total	**4,145,651**	**$6,799.6**	**$27.5**

C&I	Square feet (in Thousands)	Retrofit costs per square foot	Investment ($ B)
Office and Bank	750,356	$2	$1.5
Stores and Restaurants	615,918	$2	$1.2
Warehouses	347,820	$2	$0.7
Parking Garage and Auto Service	188,925	$2	$0.4
Amusement	164,340	$2	$0.3
Hotel/Motel	100,546	$2	$0.2
Miscellaneous Nonresidential	72,631	$2	$0.1
Total	**2,240,536**	**$2**	**$4.5**

MUSH	Square feet (in Thousands)	Retrofit costs per square foot	Investment ($B)
Schools, Libraries, Labs	484,333	$5	$2.4
Hospitals and Other Health	228,071	$10	$2.3
Religious	163,203	$5	$0.8
Government Service	90,072	$5	$0.5
Total	**965,679**	**$6.2**	**$6.0**

Note: Retrofit costs per building for residential ,multi-family, and C&I incorporate NYSERDA estimates based on historical program data; MUSH segments represent estimates per NYCEEC market sizing analysis based on historical experience
Number of buildings in NY State based on EIA RECS 2009 (multi-family 5+ units provided by Multifamily Performance Program Market Penetration Estimate); square footage by McGraw Hill per Navigant Existing Facilities Program Report

Source: See sizing inputs and source slide

The Green Bank addressable potential for distributed solar PV generation is $13.4B per NYSERDA growth estimates…

DIRECTIONAL ONLY

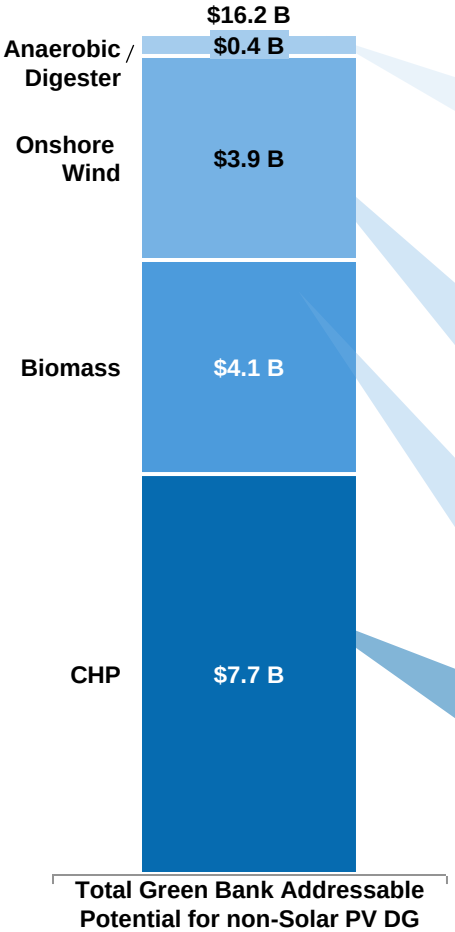
1) MUSH buildings in EIA commercial categorization include Education, Public Assembly, Religious Worship, Health Care, Public Order & Safety
2) Cost per installed Watt represents expected average decline over the next 10 years of 7%, which is an average based on the anticipated decline rates per the US DOE SunShot report
Shows installation cost non-inclusive of any rebates

Note: Growth potential of PV may be subject to pending increases in the New York net metering limits

Source: NYSERDA survey, DOE (Department of Energy), EIA, U.S. Census Bureau, - 2009 American Community Survey, Booz & Company analysis

…while the Green Bank addressable potential for other generation technologies is $16B

DIRECTIONAL ONLY



Anaerobic / Digester

610,000 NY dairy cows (USDA)	x	385 kwh/year Electricity equivalent (OSU)						
100,000 NY beef cows (USDA)	x	230 kwh/year Electricity equivalent (OSU)						
85,741 NY pigs (USDA)	x	32 kwh/year Electricity equivalent (OSU)	/	8,760 h/yr Hours per year	x	75% Anaerobic digester capacity factor per Booz data		
3,952,975 NY poultry (USDA)	x	2.5 kwh/year Electricity equivalent (OSU)						
3,828,500,000 cf/yr Food Manufacturing Biogas Potential (NYSERDA)	x	0.04 kwh/cf Electricity Equivalent assuming 25% efficiency (NYSERDA)	/	8,760 h/yr Hours per year				
6,672,065,000 cf/yr Municipal Wastewater Biogas Potential (NYSERDA)	x	0.04 kwh/cf Electricity Equivalent assuming 25% efficiency (NYSERDA)						

Onshore Wind

243 MW Average wind installations in NY State from 2008-2012 per NREL	x	10 years Intermediate-term timeframe	x	$1.61 / W Onshore wind installation cost per Global Wind Energy Council

Biomass

4.8 M oven dry tons / yr Estimated total forest biomass woodchips in NY per NYSERDA	x	1.83 MWh/oven dry ton per year Electricity equivalent of oven dry ton of woodchips per Atlas Technologies	/	8,760 h/yr Hours per year	x	85% Biomass capacity factor per Booz proprietary data	x	$3.5 / W Biomass installation cost per National Institute of Building Sciences

CHP

	Potential market in NY State per NYSERDA report		Addressable market as % of Total Potential per NYSERDA experience		Average Site Cost ($,k/MW) per NYSERDA data		
Industry sector: 50-500kW	300 MW	x	50%	x	$3,100	-	20% Filters out those not credit worthy
+ Industry sector: 500-1,000kW	195 MW	x	50%	x	$1,950		
+ Commercial sector: 50-500kW	1,240 MW	x	50%	x	$4,900		
+ Commercial sector: 500-1,000kW	1,584 MW	x	50%	x	$3,625		
+ All sectors: >1MW	5,159 MW	x	50%	x	$1,200[1]		

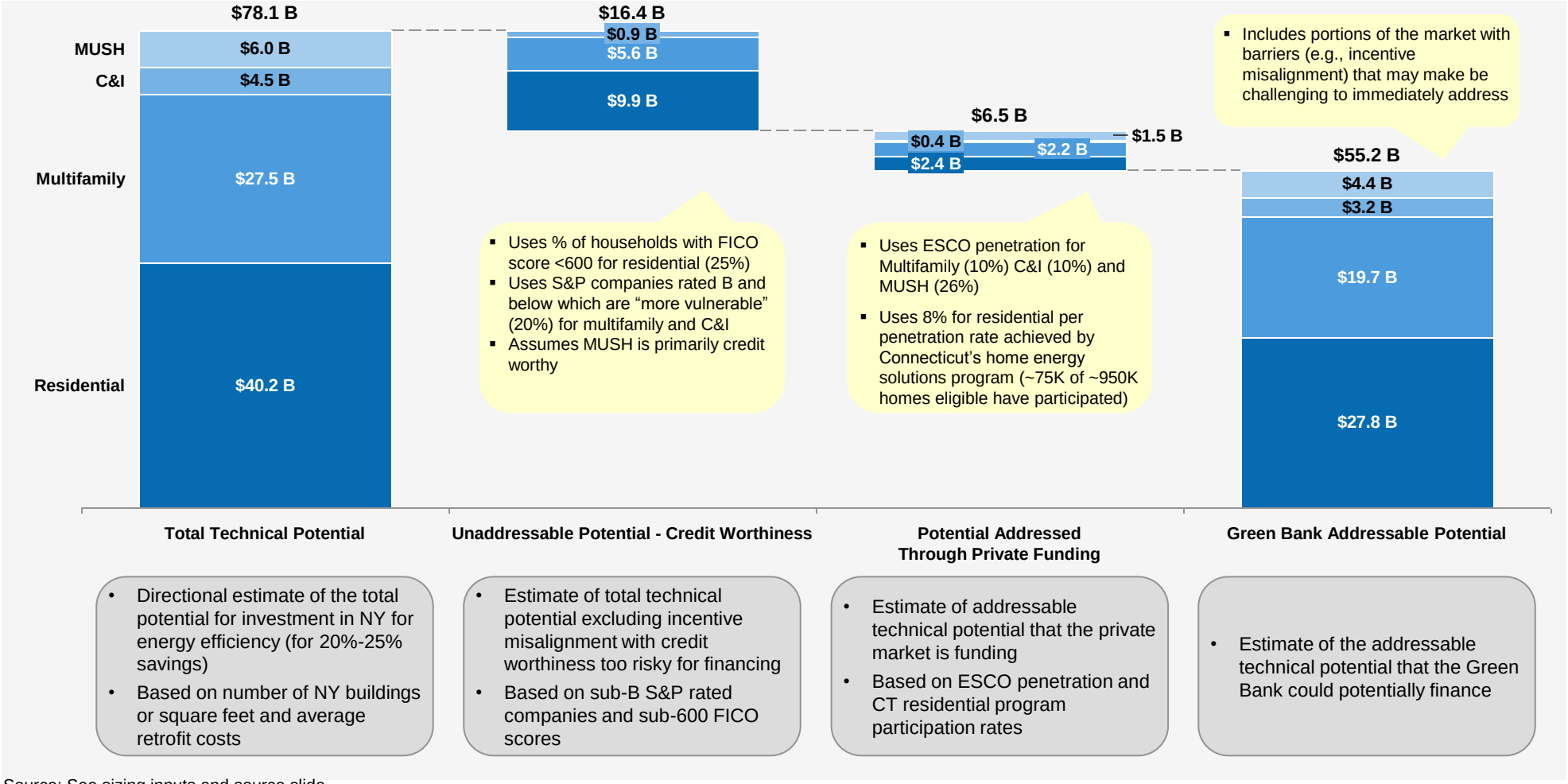
1) Installed CHP System Cost per EPA "Combined Heat and Power Partnership Economic Benefits"

Source: See sizing inputs and source slide

The Green Bank addressable potential removes unaddressable and addressed potential from the total technical potential

DIRECTIONAL ONLY

GB EE Addressable Market as of 2013



Source: See sizing inputs and source slide

Low credit worthiness is represented by FICO score for residential and S&P ratings for multifamily and C&I

DIRECTIONAL ONLY

Credit Worthiness Distribution by Segment

Residential: US FICO Score Distribution
Source: Fair Isaac Corporation; Data for FY 2011 per SolarCity

	% of Distribution	
300 - 499	6.2%	Low Credit Worthiness
500 - 549	8.7%	
550 - 599	9.8%	
600 - 649	10.0%	
650 - 699	12.1%	Medium-High Credit Worthiness
700 - 749	15.5%	
750 - 799	19.4%	
800 - 850	18.3%	

Multifamily and C&I: S&P Companies rated B and below
Source: S&P

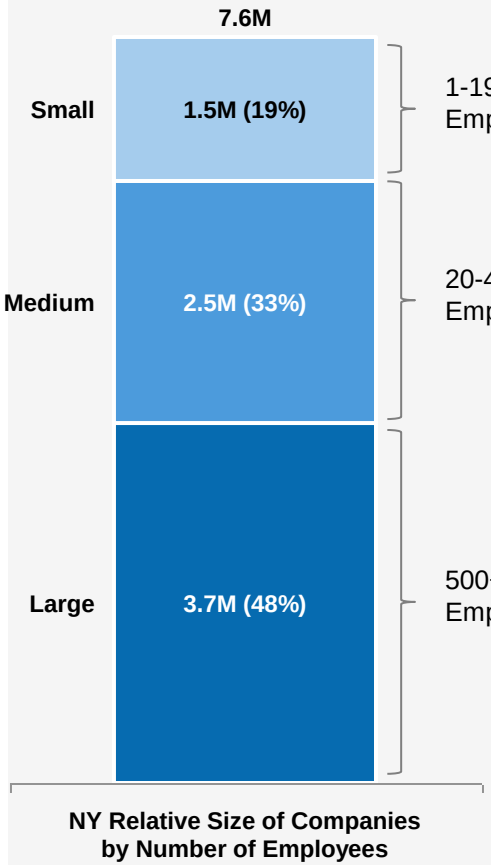
	Calculation
Number of companies rated B and below by S&P ("more vulnerable to adverse business, financial and economic conditions")	674
Total Companies in S&P rated database	3,305
Estimated share that is of low credit worthiness	20%

Source: Fair Isaac Corporation, SolarCity, S&P

The credit worthiness distribution for other sectors is based on small business lending and S&P ratings

DIRECTIONAL ONLY

Size Classification



Credit Worthiness Distribution

- According to the Pepperdine "State of Small Business" report, in 2011 **53%** of small business in New York state were **unsuccessful** receiving a bank loan

Low-Medium Credit Worthiness	High Credit Worthiness
53%	47%

- Medium C&I assumed to be average of "small" and "large" C&I

Low-Medium Credit Worthiness	High Credit Worthiness
48%	53%

- For all US companies rated by the S&P:
  - High Credit Worthiness: AAA to BBB– = **57%**
  - Low-Medium Credit Worthiness: BB+ to D = **43%**
  - Does not include companies "Not Rated"

Low-Medium Credit Worthiness	High Credit Worthiness
43%	57%

Source: US Census Bureau, Pepperdine "State of Small Business" Report, S&P

Green Bank Overview

Market Assessment

Quantitative Analysis

Operating Model

Appendix

Illustrative Examples

Market Sizing Methodology

Modeling Methodology

Glossary

Modeling makes several simplifying assumptions which do not detract from the comparison of the Green Bank vs. BAU

PRELIMINARY AND NON-EXHAUSTIVE

Assumptions	Description	Commentary
▪ *Disregards return of Green Bank capital to ratepayer*	▪ *Model and selected metrics do not capture effect of return of capital at the end of the 10,15,20, 40 year period*	▪ *Not modeled but would favor the Green Bank relative to the BAU if modeled in detail*
▪ *Hypothetical nature of investments*	▪ *Model assumes that financing extended or an incentive approved/allocated will always result in an energy deployment*	▪ *Same assumption is applied to both scenarios, will not affect comparison* ▪ *Separate from loan default rates which are modeled*
▪ *Only key cashflows are modeled*	▪ *Model captures only material cashflows, sufficient to enable the comparison of the Green Bank to the BAU scenario*	▪ *Only material cashflows (value of financing, certain fees and changes) are modeled* ▪ *Holistic model of the Green Bank or BAU capturing overhead, program managers is unnecessary to facilitate the comparison*
▪ *Any changes to current incentive levels are driven by Green Bank activities*	▪ *Model captures hypothetical situations in which incentive levels may fall, but only for Green Bank scenario*	▪ *Any changes to incentive levels in the BAU scenario, absent the creation of the Green Bank, would be the result of economic forces or policy decision external the existence of a Green Bank* ▪ *Therefore modeling BAU scenarios in which incentives change is not within the scope of this analysis*

Source: Booz & Company analysis, Market research

Four hypothetical products were used to model the Green Bank's impact and financial evolution over time

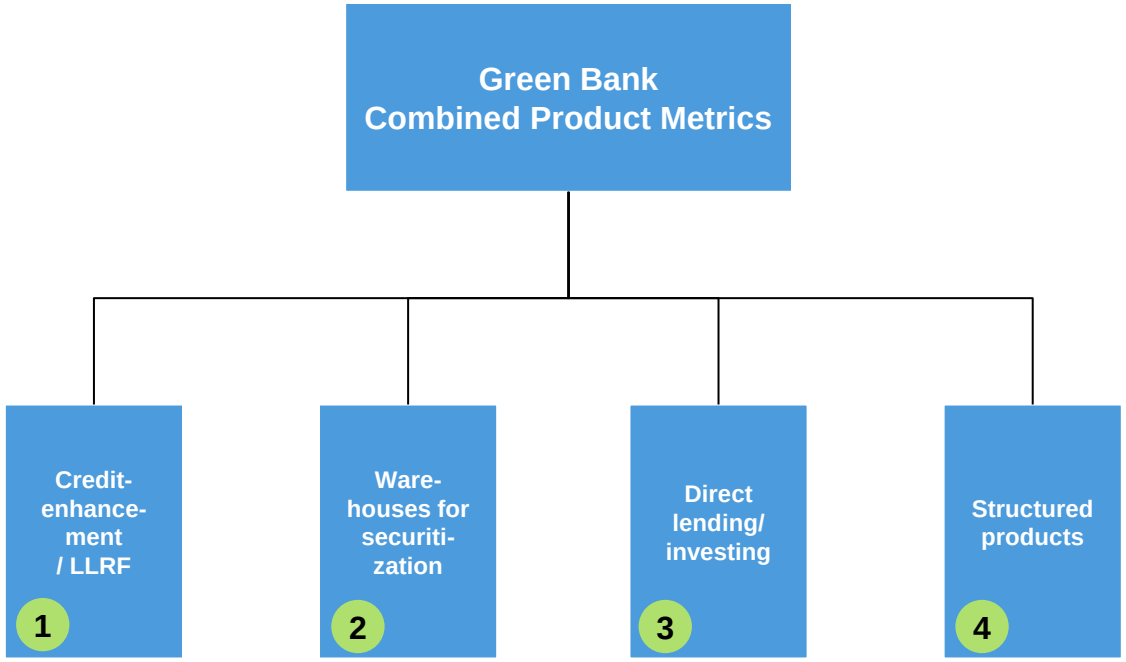
HYPOTHETICAL

Hypothetical Green Bank Product Families

	Description of Product Families
1 **Credit Enhancement / LLRF**	▪ 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
2 **Warehouses for Securitization**	▪ 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
3 **Direct Lending/ Investing**	▪ Simple loan products to be held on balance sheet ▪ Examples of direct investments include subordinated debt, revolving credit facilities, and term loans
4 **Structured Products (Tax Equity Fund)**	▪ 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

Four basic types of cashflow models are used to develop the total leverage ratio

PRELIMINARY



Discussion

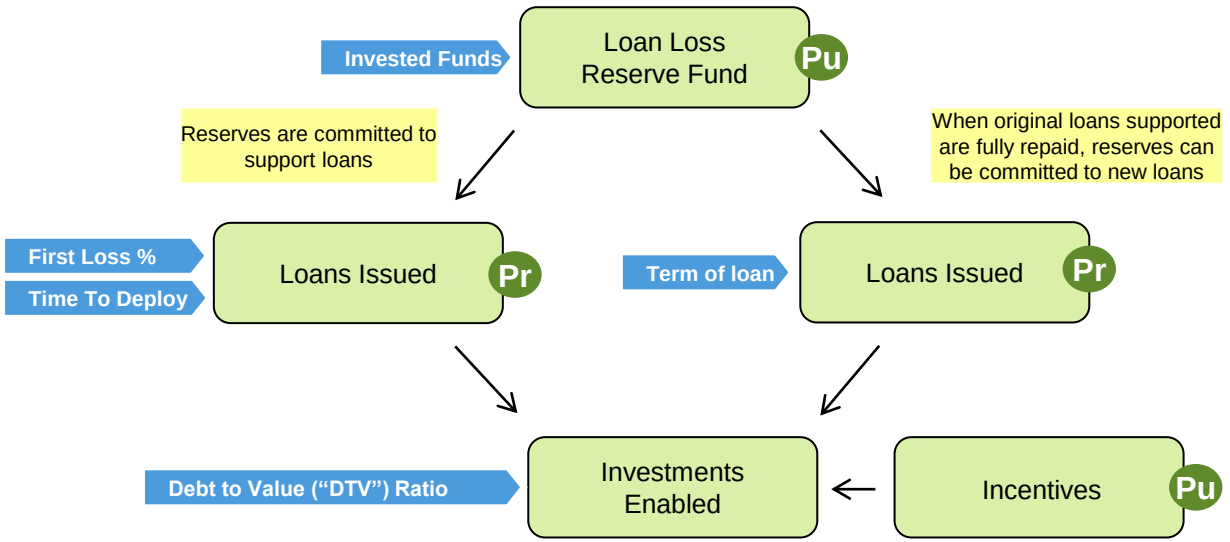
- Four basic model types: credit enhancement / loan-loss return funds, warehouses for securitization, direct lending/investing and structured products
- Models calculate Green Bank capital deployment and total energy investment
- Metrics are combined from the various models
- These metrics are then combined as a weighted average to get Green Bank overall metrics or product family metrics
- Model is also used to generate ROI, sensitivity analysis and additional scenarios where necessary

Product family modeling captures how funds invested in product offerings generate investments

PRELIMINARY

Model Logic – Loan Loss Reserve Fund Example

Illustrative Example



Key assumption | Explanatory Note | Pr Private Funds | Pu Public Funds

Discussion

- Description of model logic for loan loss reserve fund example
  - Credit enhancement and loss guarantees are backed by a reserve fund
  - Loans are enabled by credit enhancement/loss guarantees
  - Loans are reissued on full repayment of loans
  - Excess cashflows are not automatically used to make new loans
- Key cashflows modeled:
  - Loan defaults
  - Loss covered by Green Bank,
  - Money-market investment returns
  - Fee and charges (upfront fee, annual charge, admin fee)

Product model inputs include energy inputs, financial data, invested amounts and assumptions on time to deploy

PRELIMINARY AND NON-EXHAUSTATIVE

Financial Inputs[1]

- Developed using market research and interviews
- Includes product-specific items (escrow investment rates, default rates, fees and charges, administration costs)

Invested Amounts and Time to Deploy

- Based on market and concept testing interviews
- Checked for consistency with market sizing analysis results

Energy Inputs *(Used to calculate impact of incentives)*

Parameter	Residential	Multifamily	C&I	MUSH
Solar Install Cost	$4.92/w	$2.71/w	$2.71/w	$2.71/w
Solar Incentive[2]	$1.40/w	$0.84/w	$0.84/w	$0.84/w
Capacity Factor	13%	13%	13%	13%
Solar Project Life	25 years	25 years	25 years	25 years
EE 1st-Yr Cost	$328.3/MWh	$327.4/MWh	$288.4/MWh	$290.0/MWh
EE Project Life	15 years	15 years	15 years	15 years
Degradation	*Ignoring Degradation and Persistence issues for all Green Bank and BAU scenarios*			

1) Additional detail on financial assumptions is given in Slides 66-69
2) Federal and State Tax Credits for solar are not modeled. Not used to compare BAU versus Green Bank
Source: Solar installation costs, incentives and capacity factor from NYSERDA and DSIRE (Database of State Incentives for Renewables & Efficiency). Energy efficiency costs from Deutsch Bank Climate Change Advisors, "U.S. Building Energy Efficiency Retrofits," March 2012.

Leverage of public dollars in the BAU is fixed, but leverage for Green Bank depends on period of analysis and usage of incentives

PRELIMINARY

Total Leverage Ratio	Business As Usual ("BAU")	Green Bank Usage of Incentives: 0% of Green Bank Dollars Use Incentives	Green Bank Usage of Incentives: 100% of Green Bank Dollars Use Incentives
Period of Analysis: Upfront (Ignoring Recycling)		2 3.5	3 2.1
Period of Analysis: 10 Years	1 3.8	7.9	2.3
Period of Analysis: 20 Years		13.8	2.7

Real world scenarios will fall in between the scenarios in which 0% and 100% of Green Bank investments receive subsidies

Discussion

- BAU leverage ratio is fixed, and is dependent on the share of incentive contribution v. owner contribution to an investment
- Green Bank leverage increases over time as money is recycled
- However, Green Bank leverage decreases based on the extent to which Green Bank investments also use incentives, as more public dollars support the same private investment
- While many Green Bank products may target market segments presently covered by incentives, not all customers receiving Green Bank financing will necessarily seek or receive incentives
- Therefore the true Green Bank leverage ratio will fall between the 0% and 100% ratios in the table

Note: Upfront leverage ratios generated from separate model than 10 year or 20 year Impact Analysis model results.
Source: Allocation data is from NYSERDA's July 10th draft of the NY Green Bank Capitalization and Resource Constraint Analysis.

The overall BAU leverage ratio is a weighted average of the leverage ratios of the underlying programs

PRELIMINARY

BAU Leverage Ratio	Leverage Ratio	Potentially Reallocated Funds ($M)
Energy Efficiency[1]	A 4.2	$115.6
Renewable Energy[2]	B 2.8	$50.0
Weighted Average	1 **3.8**	**$165.6**

Discussion

- BAU leverage ratio is based on the weighted average leverage ratios of energy efficiency and renewable energy programs
- The BAU leverage ratio equals total energy investment (both public and private contribution) divided by incentives provided
- Leverage ratios calculated based on program specific data where available and assumptions where no data was available
- Two leverage ratios are combined as a weighted average, with weightings based on the number of dollars potentially reallocated from each portfolio to the Green Bank in the initial funding request

1) EEPS Energy Efficiency Portfolio Standard
2) RPS Renewable Portfolio Standard

Source: Allocation data is from NYSERDA's July 10th draft of the NY Green Bank Capitalization and Resource Constraint Analysis.

The BAU leverage ratio for Energy Efficiency programs is based on EEPS2 programs

PRELIMINARY

Energy Efficiency Leverage Ratio	Incentive Budget ($M)	Incentive Share of Total Investment	Estimated Owner Contribution ($M)	Total Investment ($M)
Low Income	$153	73%	$57	$210
Residential	$184	19%	$807	$992
Multifamily	$98	35%	$183	$281
C&I	$775	22%	$2,720	$3,493
Total/ Wtd. Average	**$1,211**	**24%**	**$3,767**	**$4,977**

$$\frac{1}{\text{Incentive Share}} = \text{Leverage Ratio} \qquad \frac{1}{24\%} = 4.2$$ A

Discussion

- BAU leverage ratio for EEPS programs is based on data and incentive share assumptions and is for illustrative purposes only.
- Leveraging of public funding is not a performance metric that DPS requires EEPS program administrators to measure or report on. Therefore, there is very little publicly available information on utility program leveraging.
- Sector-specific incentive share figures represent weighted average of underlying programs addressing each sector
- Leverage ratio is calculated as 1 divided by incentive share
- Leverage ratio only captures public dollars spent on incentives, not the entire program budget

Source: NYSERDA Data is taken directly from NYSERDA's leverage data gathered for NY Works Task Force; in the absence of publicly available information, utility cost-share estimates were developed for this illustrative analysis.

The BAU leverage ratio for Renewable Energy is based on RPS programs

PRELIMINARY

Renewable Energy Leverage Ratio	Incentive Budget ($M)	Incentive Share of Total Investment	Estimated Owner Contribution ($M)	Total Investment ($M)
Main Tier	$2,234	37%	$3,842	$6,076
PV	$160	33%	$324	$484
NY-Sun	$227	30%	$529	$756
Solar Thermal	$20	32%	$43	$64
Anaerobic Digesters	$76	36%	$135	$211
Fuel Cells	$23	39%	$35	$58
Small Wind	$21	37%	$37	$58
Total/ Wtd. Average	**$2,761**	**36%**	**$4,945**	**$7,707**

Discussion

- BAU leverage ratio for NYSERDA RPS programs is based on incentive share data gathered by NYSERDA for each program
- Leverage ratio is calculated as 1 divided by incentive share
- Leverage ratio only captures public dollars spent on incentives, not the entire program budget

$$\frac{1}{\text{Incentive Share}} = \text{Leverage Ratio} \qquad \frac{1}{36\%} = 2.8$$ B

1) CST denotes Customer- Sited Tier

Source: CST leveraging is taken directly from NYSERDA's leverage data gathered for NY Work Task Force and NYSERDA estimates of Main Tier Leveraging.

If no Green Bank investments use incentives, the leverage ratio is the average of a hypothetical set of products

PRELIMINARY

Potential Green Bank Products	Hypothetical Allocation ($M)	Typical Product Upfront Leverage	Leverage of Hypothetical GB Products
Loan Loss Reserve Funds	$57	5x – 10x	5.18
Loan Warehouses	$55	1x – 1.5x	1.25
Direct Lending Products	$30	3x – 5x	4.7
Structured Products	$24	2x – 5x	3.4
Total/ Wtd. Average	**$166**		**2 3.5**

INITIAL LEVERAGE RATIOS USED ONLY TO ILLUSTRATE METRIC. GREEN BANK LEVERAGE RATIOS INCREASE OVER TIME THROUGH RECYCLING AND RECAPITALIZATION

Discussion

- Green Bank **initial** leverage ratio is equal to the weighted average of the initial leverage ratios of each hypothetical product
- Leverage ratios illustrated on this page represent the leverage achieved through initial product design, not through recycling and recapitalization
- Estimates for the range of leverage ratios applicable to each product were obtained through market research
- Leverage ratios are weighted based on hypothetical allocation of capital to each group of products

Source: Market Research and Interviews for hypothetical product suite

If all Green Bank investments use incentives, the leverage ratio only depends on BAU and Green Bank leverage with no incentives

PRELIMINARY

$$\text{Leverage Ratio} = \frac{\text{Total Investment Dollars}}{\text{Public Dollars}} = \frac{\text{GB Generated Investment + Incentives}}{\text{GB Dollars + Incentives}}$$

$$\text{GB Generated Investment} = \text{GB Dollars} \times \text{GB Leverage}$$

$$\text{Incentives} = \frac{\text{GB Generated Investment}}{(\text{BAU Leverage} - 1)}$$

$$\frac{(\text{GB Dol} \times \text{GB Lev}) + \frac{(\text{GB Dol} \times \text{GB Lev})}{(\text{BAU Lev} - 1)}}{\text{GB Dol} + \frac{(\text{GB Dol} \times \text{GB Lev})}{(\text{BAU Lev} - 1)}} \Rightarrow \frac{\frac{(\text{GB Dol} \times \text{GB Lev}) \times (\text{BAU Lev} - 1) + (\text{GB Dol} \times \text{GB Lev})}{(\text{BAU Lev} - 1)}}{\text{GB Dol} \times (\text{BAU Lev} - 1) + \frac{(\text{GB Dol} \times \text{GB Lev})}{(\text{BAU Lev} - 1)}} \Rightarrow$$

$$\frac{\cancel{\text{GB Dol}} \times \text{GB Lev} \times [(\text{BAU Lev} - 1) + 1]}{\cancel{\text{GB Dol}} \times [(\text{BAU Lev} - 1) + \text{GB Lev}]} \Rightarrow \boxed{\frac{\text{GB Lev} \times \text{BAU Lev}}{\text{GB Lev} + \text{BAU Lev} - 1}}$$

$$\frac{3.5 \times 3.8}{3.5 + 3.8 - 1} \Rightarrow \mathbf{2.1}\ 3$$

INITIAL LEVERAGE RATIOS USED ONLY TO ILLUSTRATE METRIC. GREEN BANK LEVERAGE RATIOS INCREASE OVER TIME THROUGH RECYCLING AND RECAPITALIZATION

Example: 10% of Green Bank investments also receive incentives

SIMPLIFIED AND ILLUSTRATIVE

Assumptions
- BAU Leverage = 3.8
  - Includes 1 public and 2.8 private dollars, totaling 3.8
- GB Leverage = 13.8 (based on 20 year projections)

Commission decision to deploy $166M to incentive programs or Green Bank

Option 1: Invest $166M in incentives as currently earmarked

Option 2: Invest in the Green Bank

GB Unleveraged Capital

$166M (1)

GB Leveraged Capital

$166M x GB Total Leverage Ratio of 13.8 = $2,292M

Incentives

$82M of Incentives (2)

10% goes to projects with subsidies

90% goes to projects with no subsidies

- $2,292M x 10% = $229M invested
- $229M of GB Private Capital attracts incentives at the BAU leverage ratio of 3.8 to 1
- $229M / (3.8 -1) = $82M in incentives
- Total investment (gross of subsidies) = $311M (4)

- $2.292 x 90% = $2,063M invested (3)

Total Energy Investment

BAU Leverage Ratio of 3.8

GB Total Leverage Ratio = (4)/(1) $\frac{\$311M + \$2,063M}{\$166M + \$82M}$ (3)/(2) = $\frac{\$2,374M}{\$248M}$ = 9.6

For this example, where 10% of GB investments receive subsidies, GB Lev.> BAU

Example: 90% of Green Bank investments also receive incentives

SIMPLIFIED AND ILLUSTRATIVE

Assumptions
- BAU Leverage = 3.8
  - Includes 1 public and 2.8 private dollars, totaling 3.8
- GB Leverage = 13.8 (based on 20 year projections)

Commission decision to deploy $166M to incentive programs or Green Bank

Option 1: Invest $166M in incentives as currently earmarked

Option 2: Invest in the Green Bank

GB Unleveraged Capital

$166M (1)

GB Leveraged Capital

$166M x GB Total Leverage Ratio of 13.8 = $2,292M

Incentives

$737M of Incentives (2)

90% goes to projects with subsidies

10% goes to projects with no subsidies

- $2.292M x 90% = $2,063M invested
- $2,063M of GB Private Capital attracts incentives at the BAU leverage ratio of 3.8 to 1
- $2,063M / (3.8 -1) = $737 in incentives
- Total investment (gross of subsidies) = $2,800M (4)

- $2,292M x 10% = $229M invested (3)

Total Energy Investment

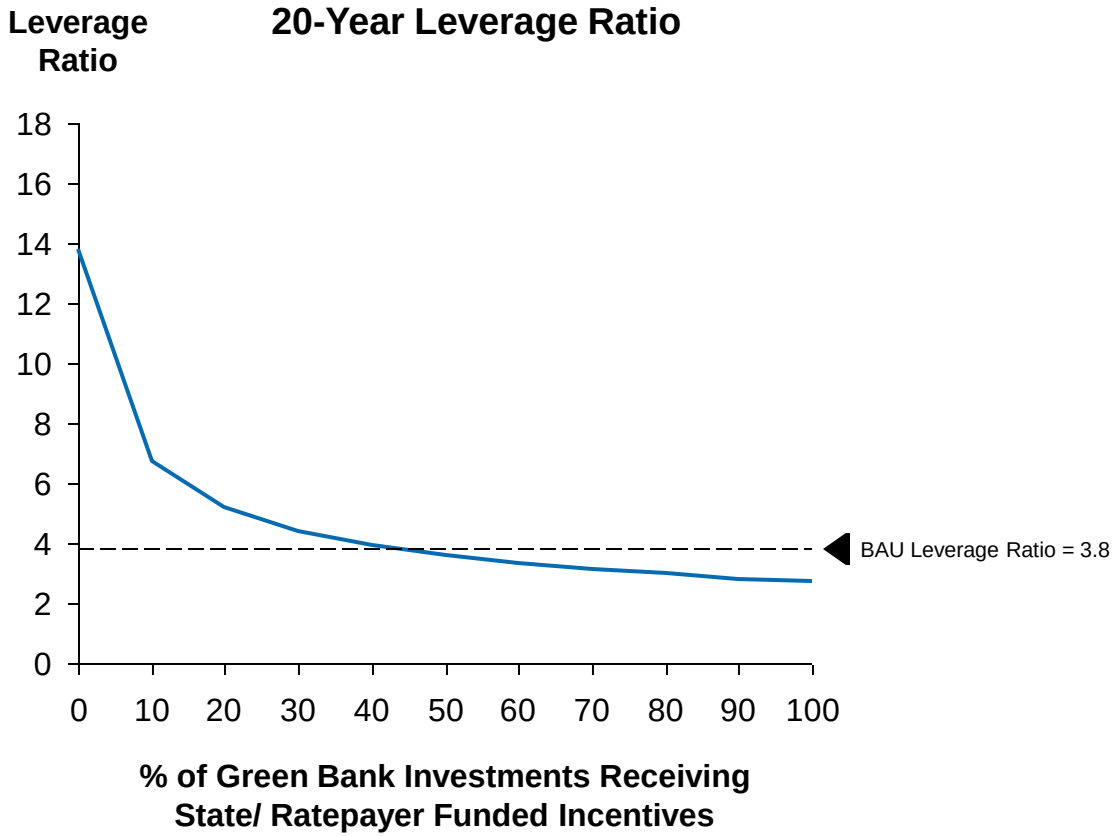
BAU Leverage Ratio of 3.8

GB Total Leverage Ratio = (4)/(1) $\frac{\$2,800M + \$229M}{\$166M + \$737M}$ (3)/(2) = $\frac{\$3,029M}{\$903M}$ = 3.4

For this example, where 90% of GB investments receive subsidies, GB Lev. <BAU

The Green Bank's leverage ratio exceeds that of the BAU when less than 70% of Green Bank dollars also use incentives

ILLUSTRATIVE



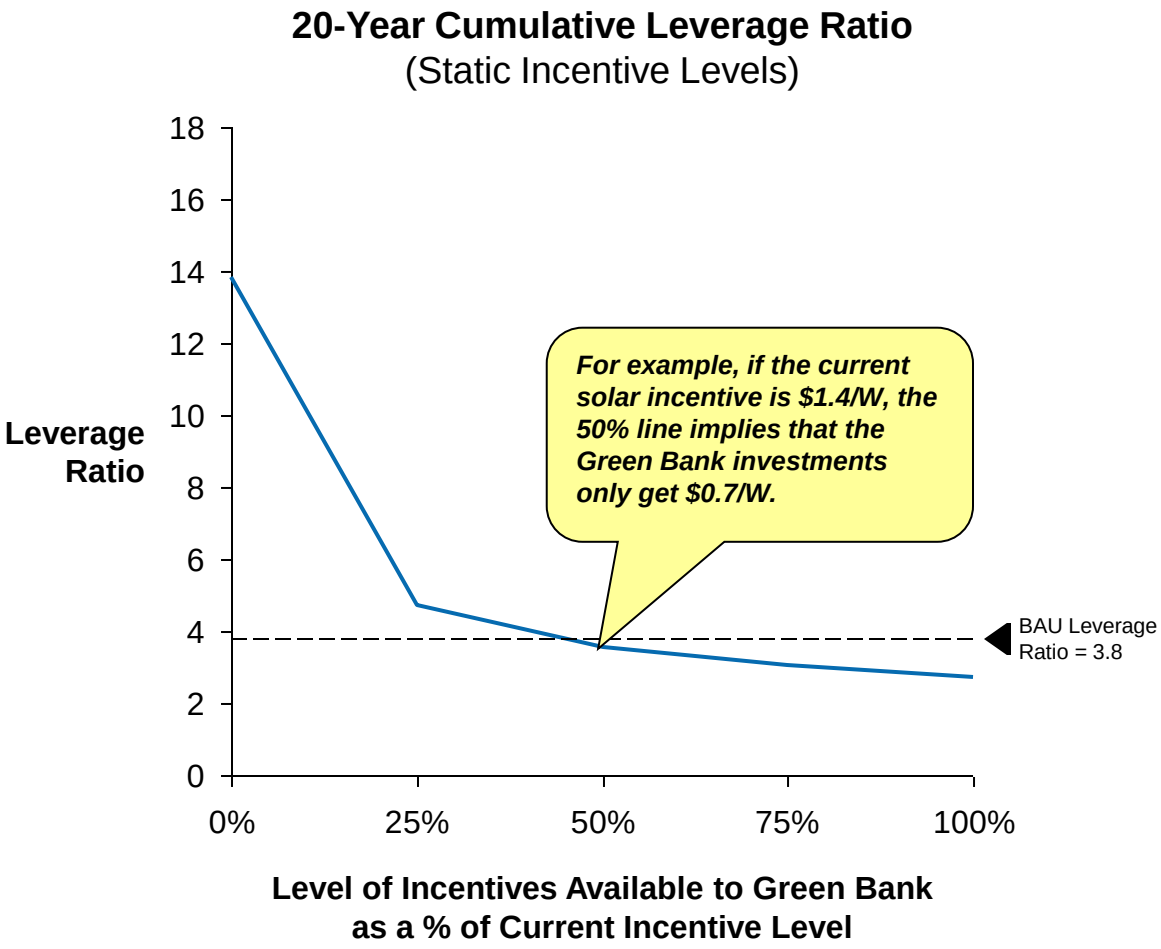
Discussion

- As more Green Bank investments use state-funded/ ratepayer incentives, the Green Bank's leverage ratio falls
- Over a 20-year window of analysis, the Green Bank's leverage may range from ~3 to ~14, depending on usage of incentives
- This range is based on a hypothetical suite of Green Bank products and capital allocation
- Under this hypothetical situation, the Green Bank leverage ratio exceeds BAU when less than 70% of Green Bank dollars also use incentives

Figures represent a HYPOTHETICAL suite of products and allocation of Green Bank capital.

Source: Booz & Company analysis

If limited to 75% or less of existing incentive levels, Green Bank investments achieve leverage that is at least as good as the BAU



Discussion

- The Green Bank leverage ratio is slightly lower than the BAU leverage ratio when Green Bank projects receive the full level of incentives (i.e., 100%)
- If we conservatively assume that 100% of Green Bank investments use incentives, then the 20-year leverage ratio of the Green Bank exceeds that of the BAU when incentives are reduced to roughly 75% of the current level
- As the incentive levels that Green Bank investments are eligible for increases, the leverage ratio climbs significantly
- The chart on the left assumes that
  - Incentives are static over time
  - 100% of Green Bank investments receive incentives

Source: Booz & Company analysis

Key Assumptions And Sourcing (1 of 4): Energy Inputs

ILLUSTRATIVE

ENERGY EFFICIENCY INPUTS

EE First-Year Cost	$/MWh	Source
Residential	$328.3	DB Climate Change Advisors, "U.S. Building Energy Efficiency Retrofits," March 2012.
Multifamily	$327.4	DB Climate Change Advisors, "U.S. Building Energy Efficiency Retrofits," March 2012.
MUSH	$288.4	DB Climate Change Advisors, "U.S. Building Energy Efficiency Retrofits," March 2012.
C&I	$290.0	DB Climate Change Advisors, "U.S. Building Energy Efficiency Retrofits," March 2012.

Technical Inputs		Source
Project Life (Years)	15	Interviews with Existing Market Participants
GWh/Tbtu Conversion	293.07	EIA
MWh/Dth Conversion	0.2931	EIA

SOLAR ENERGY INPUTS

Installation Cost	$/watt	Source
Residential	$4.92	NYSERDA
Multifamily	$2.71	NYSERDA; Governor's July 9, 2013 Press Release
MUSH	$2.71	NYSERDA; Governor's July 9, 2013 Press Release
C&I	$2.71	NYSERDA; Governor's July 9, 2013 Press Release

NY Incentive	$/watt	Source
Residential	$1.40	DSIRE; NYSERDA Website
Multifamily	$0.84	NYSERDA; Governor's July 9, 2013 Press Release
MUSH	$0.84	NYSERDA; Governor's July 9, 2013 Press Release
C&I	$0.84	NYSERDA; Governor's July 9, 2013 Press Release

Technical Inputs		Source
Capacity Factor	13%	NYSERDA
Project Life (Yrs)	25	Interviews with Existing Market Participants

Key Assumptions And Sourcing (2 of 4): LLRF Examples in Hypothetical Set

ILLUSTRATIVE

LLRF - LOAN EXTENSION - MF EE

Parameter	Input	Source
Annual Default Rate	0.80%	Based on GJGNY Residential EE Loan Performance
Years to Deploy	2	Interviews with Existing Market Participants
Loan Term	9	Interviews with Existing Market Participants
Interest on Loan	7%	Interviews with Existing Market Participants
LLRF Coverage Years	4	Interviews with Existing Market Participants
First Loss %	20%	Interviews with Existing Market Participants
Loss Share	90%	Typical product structure
Escrow Interest Rate	0.10%	Assumed Money Market Rate
Upront Fee	5.00%	Market interviews, concept testing and industry research.
Annual Charge	4.50%	Market interviews, concept testing and industry research.
Assumed DTV of Project	80%	Energy Efficiency Finance Corp. LLRF Example

LLRF - TAX EQUITY FUND - RESIDENTIAL SOLAR

Parameter	Input	Source
Annual Default Rate	0.80%	Based on GJGNY Residential EE Loan Performance
Years to Deploy	2	Interviews with Existing Market Participants
Loan Term	20	Interviews with Existing Market Participants
Interest on Loan	9.00%	Interviews with Existing Market Participants
LLRF Coverage Years	10	Interviews with Existing Market Participants
First Loss %	20%	Interviews with Existing Market Participants
Loss Share	90%	Typical product structure
Escrow Interest Rate	0.10%	Assumed Money Market Rate
Upront Fee	5.00%	Market interviews, concept testing and industry research.
Annual Charge	4.50%	Market interviews, concept testing and industry research.
Assumed DTV of Project	50%	Based on Tax Equity Fund Structure

LLRF - PACE - EE INPUTS

Parameter	Input	Source
Annual Default Rate	0.80%	Based on GJGNY Residential EE Loan Performance
Years to Deploy	2	Interviews with Existing Market Participants
Loan Term	6	Interviews with Existing Market Participants
Interest on Loan	7%	Interviews with Existing Market Participants
LLRF Coverage Years	3	Interviews with Existing Market Participants
First Loss %	10%	Interviews with Existing Market Participants
Loss Share	90%	Typical product structure
Escrow Interest Rate	0.10%	Assumed Money Market Rate
Upront Fee	7.50%	Market interviews, concept testing and industry research.
Annual Charge	4.50%	Market interviews, concept testing and industry research.
Assumed DTV of Project	80%	Energy Efficiency Finance Corp. LLRF Example

LLRF - PACE - SOLAR INPUTS

Parameter	Input	Source
Annual Default Rate	0.80%	Based on GJGNY Residential EE Loan Performance
Years to Deploy	2	Interviews with Existing Market Participants
Loan Term	15	Interviews with Existing Market Participants
Interest on Loan	7.00%	Interviews with Existing Market Participants
LLRF Coverage Years	7	Interviews with Existing Market Participants
First Loss %	10%	Interviews with Existing Market Participants
Loss Share	90%	Typical product structure
Escrow Interest Rate	0.10%	Assumed Money Market Rate
Upront Fee	7.50%	Market interviews, concept testing and industry research.
Annual Charge	4.50%	Market interviews, concept testing and industry research.
Assumed DTV of Project	80%	Energy Efficiency Finance Corp. LLRF Example

Key Assumptions And Sourcing (3 of 4): Warehousing & Direct Debt in Hypothetical Set

ILLUSTRATIVE

WAREHOUSE - NYSERDA - RESIDENTIAL EE

Parameter	Input	Source
Annual Default Rate	0.80%	Based on GJGNY Residential EE Loan Performance
Years to Deploy	3	Interviews with Existing Market Participants
Term	12	Interviews with Existing Market Participants
GB % of Total Capital	80%	Interviews with Existing Market Participants
Interst Rate	3.50%	Interviews with Existing Market Participants
Escrow Interest Rate	0.40%	Assumed Money Market Rate
Securitization Fee	1.00%	Bloomberg
Profit Margin in Pool	1.50%	Product-based assumption.

SUBORDINATED DEBT - RESIDENTIAL SOLAR

Parameter	Input	Source
Annual Default Rate	0.80%	Based on GJGNY Residential EE Loan Performance
Term	15	Interviews with Existing Market Participants
Years to Deploy	2	Interviews with Existing Market Participants
GB Debt as a % of Total Debt	25.00%	Interviews with Existing Market Participants
Interst Rate	6.00%	Interviews with Existing Market Participants
Escrow Interest Rate	0.40%	Assumed Money Market Rate

WAREHOUSE - C&I EE

Parameter	Input	Source
Annual Default Rate	0.80%	Based on GJGNY Residential EE Loan Performance
Years to Deploy	3	Interviews with Existing Market Participants
Term	8	Interviews with Existing Market Participants
GB % of Total Capital	80%	Interviews with Existing Market Participants
Interst Rate	3.50%	Interviews with Existing Market Participants
Escrow Interest Rate	0.40%	Assumed Money Market Rate
Securitization Fee	1.00%	Bloomberg
Profit Margin in Pool	1.50%	Product-based assumption.

REVOLVER - C&I EE

Parameter	Input	Source
Annual Default Risk	0.80%	Interviews with Existing Market Participants
% of Facility Used	50.00%	Interviews with Existing Market Participants
Annual Charge on Total	0.50%	Interviews with Existing Market Participants
Interest Rate	8.00%	Interviews with Existing Market Participants
Borrower Leverage	5	Interviews with Existing Market Participants

Key Assumptions And Sourcing (4 of 4): Hypothetical Structured Products

ILLUSTRATIVE

GREEN BANK TAX EQUITY FUND

Parameter	Input	Source
Total Fund Size	$80.0M	Interviews with Existing Market Participants
Sponsor Equity Share	16.6%	Based on CEFIA's Solar Lease 2 Product
Tax Equity Share	33.4%	Based on CEFIA's Solar Lease 2 Product
Senior Debt Share	45.0%	Based on CEFIA's Solar Lease 2 Product
Subordinated Debt Share	5.0%	Based on CEFIA's Solar Lease 2 Product
LLR Size	$6.3M	Based on CEFIA's Solar Lease 2 Product
Term	20	Based on CEFIA's Solar Lease 2 Product
Years to Deploy	2	Interviews with Existing Market Participants
LLR Fund		
Annual Default Rate	0.8%	Based on GJGNY Residential EE Loan Performance
Interest on Loan	9%	Based on CEFIA's Solar Lease 2 Product
LLRF Coverage Years	10	Interviews with Existing Market Participants
First Loss %	16%	Based on Tax Equity Fund Structure
Loss Share	90%	Interviews with Existing Market Participants
Escrow Interest Rate	0.10%	Assumed Money Market Rate
Upront Fee	5.00%	Market interviews, concept testing and industry research.
Annual Charge	4.50%	Market interviews, concept testing and industry research.
Subordinated Debt		
Default Rate	16.00%	Based on GJGNY Residential EE Loan Performance
Interst Rate	3.00%	Based on CEFIA's Solar Lease 2 Product
Escrow Interest Rate	0.40%	Assumed Money Market Rate
Sponsor Equity		
Expected IRR	9%	Based on CEFIA's Solar Lease 2 Product

Green Bank Overview

Market Assessment

Quantitative Analysis

Operating Model

Appendix

Illustrative Examples

Market Sizing Methodology

Modeling Methodology

Glossary

Glossary

Abbreviation	Term	Definition
ADG/ AD	Anaerobic Digestion	Production of methane gas through the breakdown of biodegradable material by microorganisms
C&I	Commercial and Industrial	Buildings used for commercial and industrial purposes
CEFC	Clean Energy Finance Corporation	The Australian Green Bank launched in July 2013 to overcome capital market barriers that hinder the financing, commercialization and deployment of renewable energy, energy efficiency and low emissions technologies
CEFIA	Clean Energy Finance and Investment Authority	The Connecticut Green Bank established in 2011; offers a variety of renewable energy and energy efficiency programs
CHP	Combined Heat Power	Use of wasted heat or power to generate electricity
C-PACE	Commercial-Property Assessed Clean Energy	Program for commercial, industrial, and multifamily buildings that enables homeowners to make energy efficiency repayments through their tax assessment
EE	Energy Efficiency	Products and construction that lead to more efficient use of energy and reduce the amount of energy consumed
EEPS	Energy Efficiency Portfolio Standard	Order instituted by the Public Service Commission in 2007 with the goal of reducing electricity usage in New York by 15% from projected electricity usage in 2015
ESA	Energy Service Agreement	Contract that permits energy efficiency to be packaged as a service so that building owners provide no or minimal upfront capital and pay for the energy efficiency installation over time through passing on accumulated savings to the service provider
ITC	Investment Tax Credit	Federal tax policy that offers 30% tax credit for residential solar systems and will remain in effect through December 31, 2016
LLR	Loan Loss Reserve	Reserve held against total loans on the asset sheet, representing the amount adequate to cover estimated losses
LMI	Low to Moderate Income	Income range defined by US Department of Housing and Urban Development
LTV	Loan to Value Ratio	Ratio of a loan to the value of an asset purchased
MESA	Managed Energy Service Agreement	Similar structure to ESA but where the customer's energy service is managed by a special purpose vehicle
NRDC	Natural Resources Defense Council	New York City-based non-profit environmental advocacy group; promotes renewable energy sources, conservation, energy efficiency, and clean fuels as solutions to reduce the impact of climate change
NYCEEC	New York City Energy Efficiency Corporation	Non-profit financial corporation that catalyzes energy efficiency projects throughout the five boroughs of New York City
PPA	Power Purchase Agreement	Financial arrangement where a third-party owner owns, operates, and maintains a solar system and the customer agrees to site the system and purchase the electric output
PTC	Production Tax Credit	Federal per-kilowatt-hour tax credit for electricity generated by qualified energy resources and sold by the taxpayer to an unrelated person during the taxable year
RFP	Request for Proposal	Solicitation by an agency interested in procurement of a commodity or service, often made through a bidding process
RGGI	Regional Greenhouse Gas Initiative	Market-based regulatory program to reduce greenhouse gas emissions through government auctions of carbon allowances in the Mid-Atlantic and Northeastern regions of the U.S.
ROI	Return on Investment	Net benefit resulting from an investment relative to the amount of capital required
RPS	Renewable Portfolio Standard	Fund gathered through a surcharge on each kilowatt-hour sold by the state's investor-owned utilities to increase the portion of renewable electricity consumed in New York
SBC	Systems Benefit Charge	Charge on customer's bill for all non-exempt New York Utilities that is used to fund NYSERDA energy efficiency and renewable energy programs
UK GIB	United Kingdom Green Investment Bank	The United Kingdom Green Bank established in 2012 with the mission to accelerate the UK's transition to a green economy and to create an enduring Institution, operating independently of Government

Sources: National Non-Food Crops Centre, CEFC, Clark Energy, DSIRE, Energy RealPlay, EPA, Investopedia, NRDC, NYCEEC, NYSERDA, RGGI, UK Green Investment Bank. SEIA