



coalition for green capital

The Value of Public Investment in Green Banks

*Coalition for Green Capital
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Green Banks use public dollars to drive more private clean energy investment, deploy affordable clean energy



- Are focused institutions, created to maximize clean energy adoption
- Use public-purpose money to de-risk & leverage private capital
- Provide financing in many forms to underserved market sectors
- Are market-oriented and flexible, and aim to increase consumer protection, information transparency, and ease of adoption
- Seek to be self-sustaining, and produce dividends for taxpayers
- Complement existing actors and programs, bridging gaps in capital supply chain
- Optimize clean energy solution, combining efficiency and renewable financing

Green Bank is a flexible model that can be implemented under various institutional forms, and can be capitalized using a range of capital sources. But the principles remain consistent.

Important to demonstrate that Green Banks really do work

- one benchmark is existing Utility Incentive Programs

- Policymakers often ask how effective Green Banks really are
 - Easiest way to demonstrate is by comparison to benchmark
- The most common form of public investment in clean energy across the country is utility efficiency incentive programs
 - Nearly \$8 billion of ratepayer funds spent yearly on efficiency incentives
 - Programs created as a way for utilities to “procure least-cost resources”
 - Incentives support demand generation for energy efficiency
- *Green Banks & Incentives are complementary; not “either/or”*
- Some states capitalized their Green Banks by re-directing small piece of incentive funds into the Green Bank for financing
 - Green Banks, can be capitalized with many possible funding sources
 - But created natural experiment to assess Green Banks against benchmark

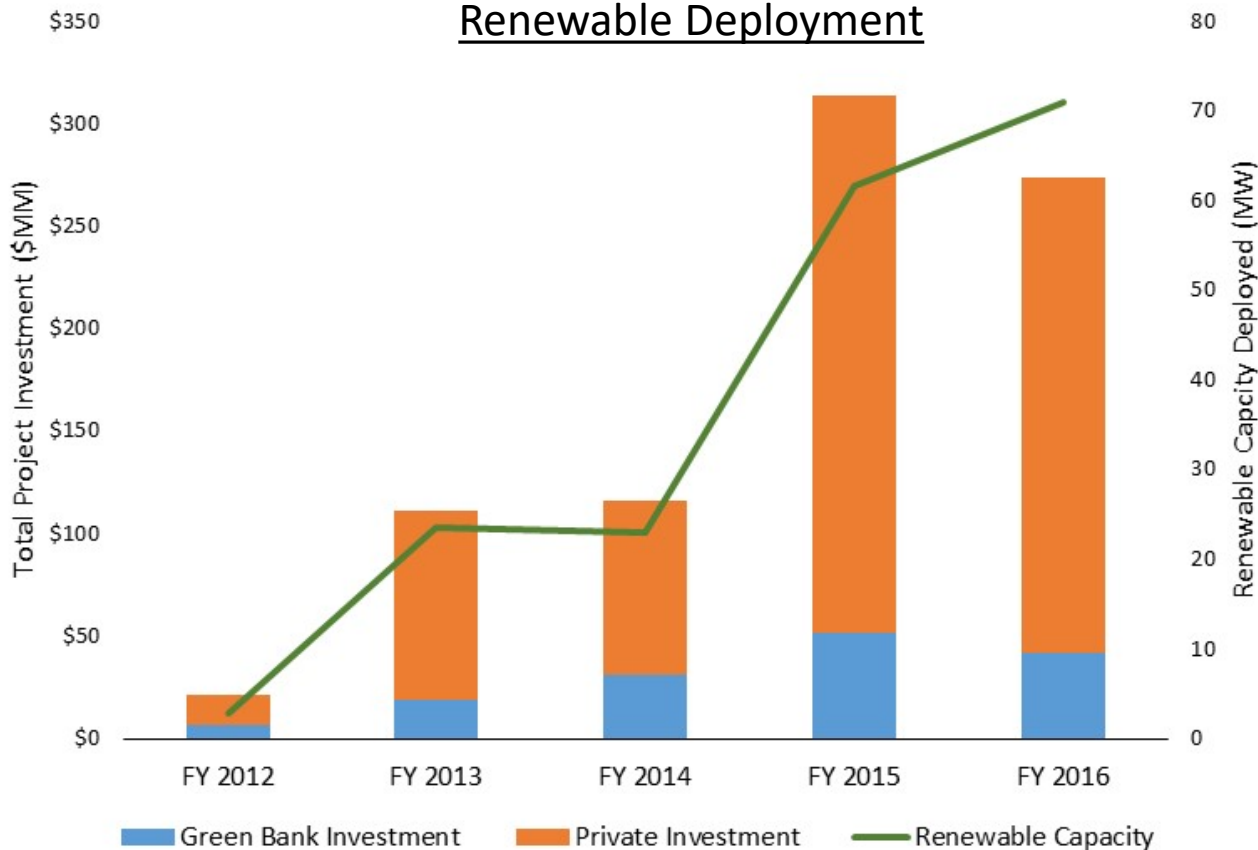
Track record shows that a Green Bank can drive more investment, more clean energy, and CO2 reduction per \$

- **Question: Are Green Banks a good investment of public funds?**
- On many metrics, a Green Bank has better outcomes
 - **More clean energy investment** per dollar of public cost
 - **More clean energy generated/saved** per dollar of public cost
 - **More CO2 emissions reduced** per dollar of public cost
- Green Banks stimulate new business growth and job creation, and produce dividends for taxpayers by preserving funds
- **Conclusion: Green Banks should be created & funded in every state to increase clean energy, investment & enviro outcomes**

The results of the CT Green Bank show what can be accomplished...

In five years, the CT Green Bank drove nearly \$1 billion in clean energy investment, mostly from private capital

Green Bank & Private Investment, and Renewable Deployment

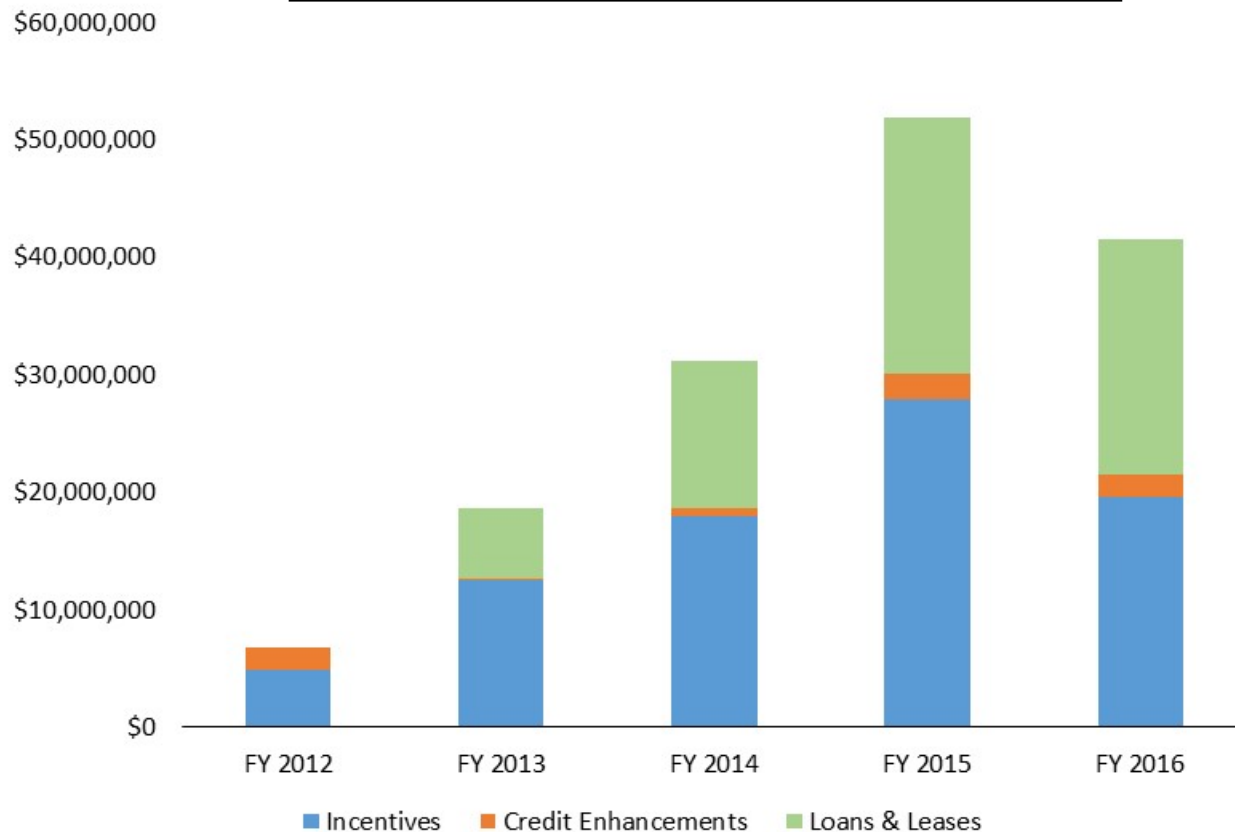


Leverage

Over five years, the Green Bank has made \$150 million of public investment to leverage \$686 million of private investments*

CT Green Bank deployed its own capital with multiple finance techniques, all of which leverage private capital

Amount & Form of Green Bank Investment



Solar Incentives

Nearly all “Incentives” are for residential solar, under a program where CGB pays solar owners cash in exchange for the lifetime stream of RECs. This is effectively a form of REC financing, marketed as subsidy.*

The Green Bank has preserved public capital, and has even returned funds to support state budget shortfalls

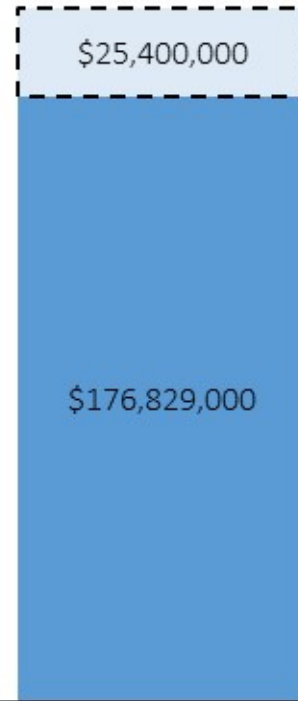
The State Put \$186 Million in public funds into the Green Bank



And effectively all of the capital has been preserved as Green Bank Assets



Public Money Invested in Green Bank



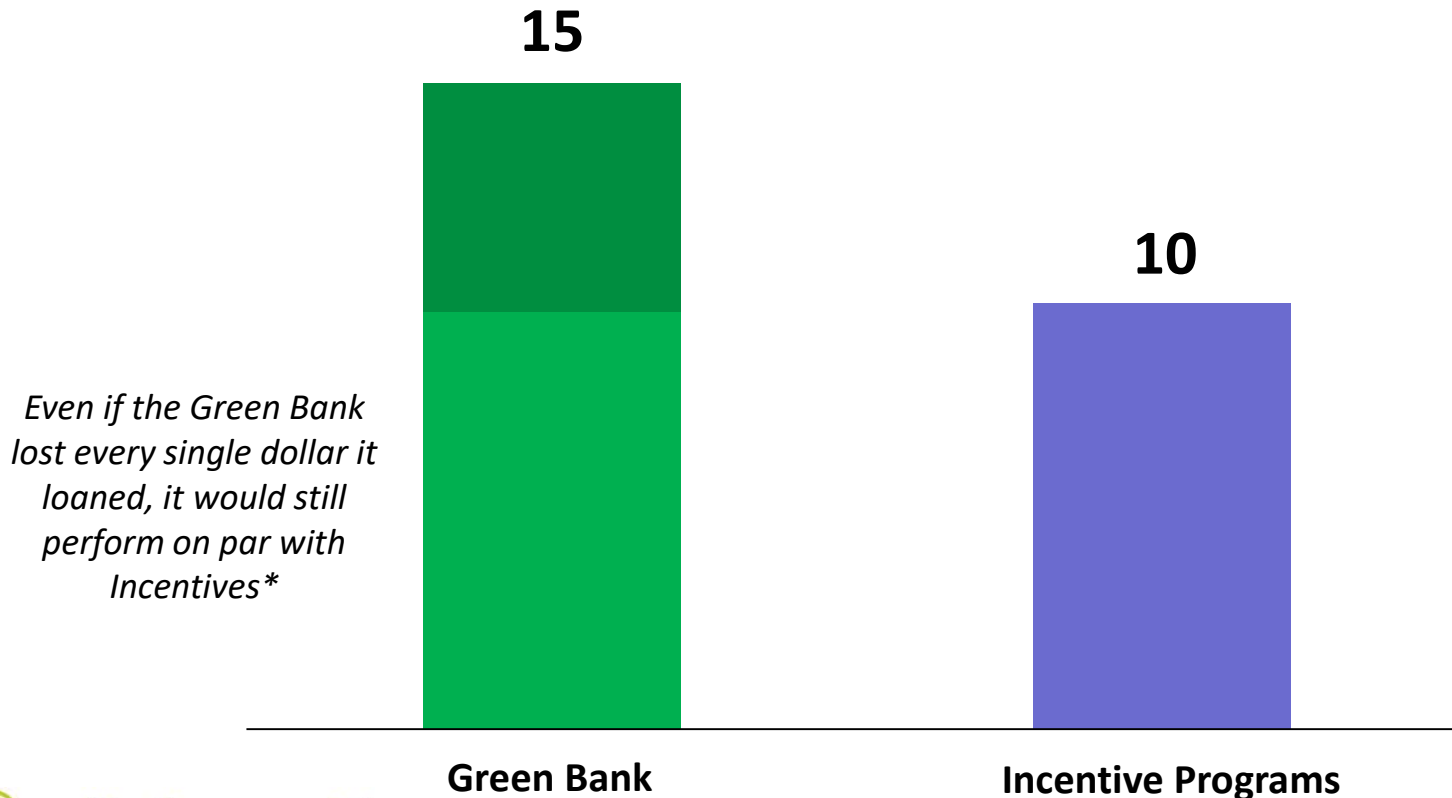
Green Bank Preserved Capital (Total Assets)

Paying Dividends

Green Bank assets totaling \$25.4 million were twice used by the State legislature to plug budget deficits, showing value for money.

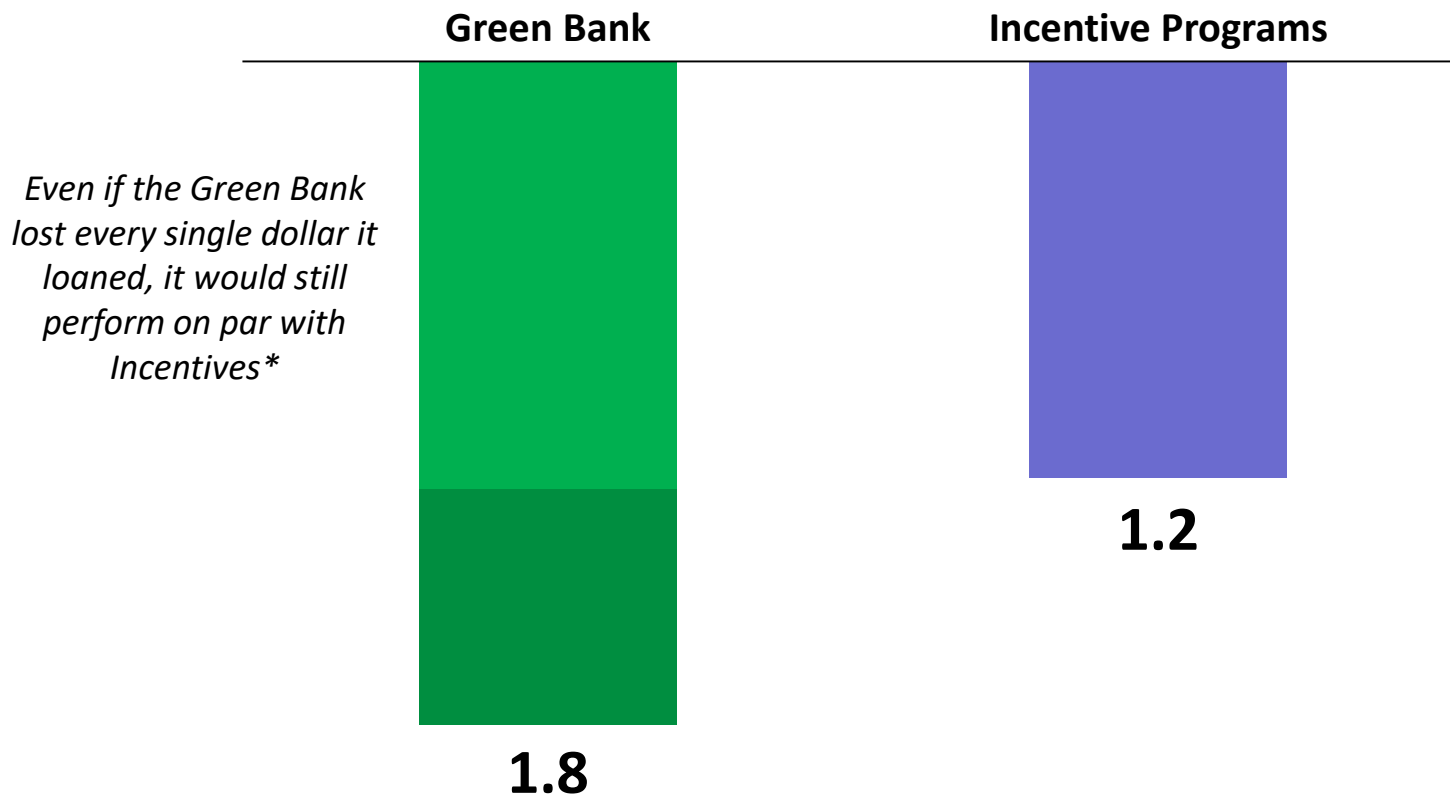
In the last three years, Green Bank has saved or generated more clean energy per dollar of public cost than Incentives

MMBtu of Clean Energy Generated/Energy Saved
Per \$1,000 of Public Cost



And the Green Bank has reduced more CO2 emissions per dollar of public cost than Incentives

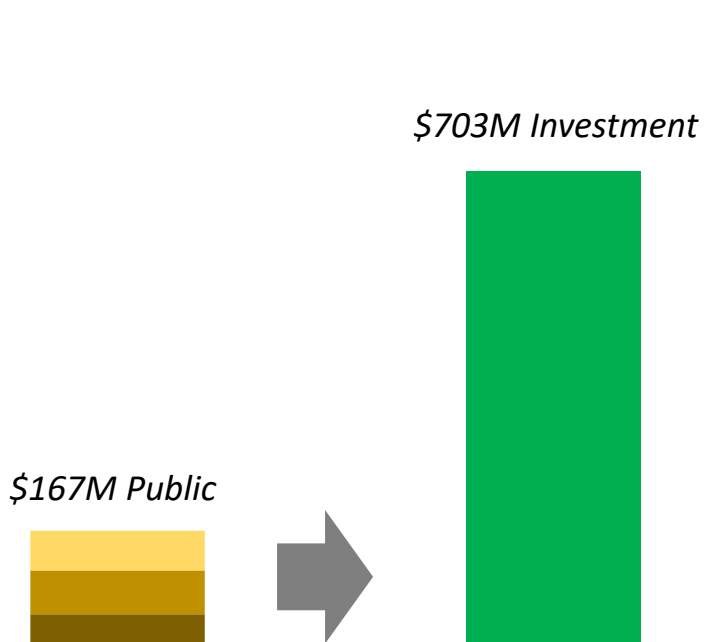
Tons of Annual CO2 Emissions Reduction Per \$1,000 of Public Cost



The Green Bank uses far less public money than the Utility Incentive programs, but drives similar level of investment

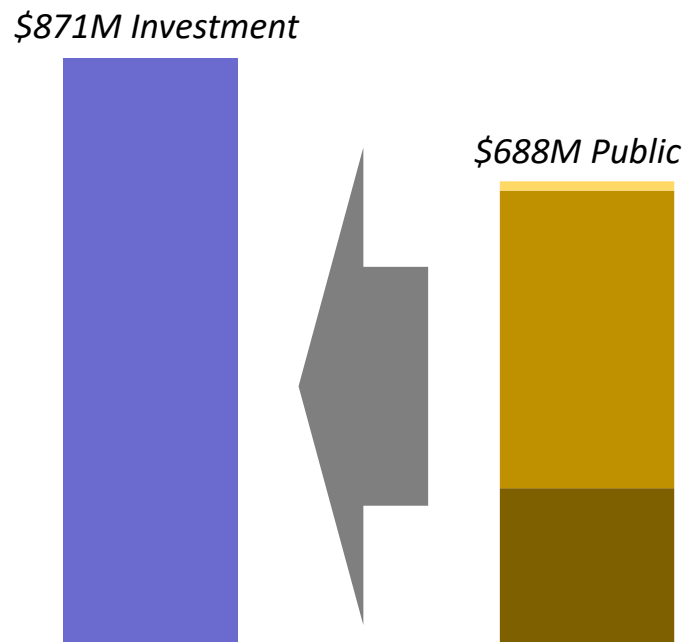
Green Bank

From 2014-2016, the CGB used \$167 million in public funds to spark \$703 million in clean energy project investment.



Utility Incentive Programs

From 2014-2016, the utility incentive programs used \$688 million in public funds to spark \$871 million in clean energy project investment.



■ OpEx ■ Project Incentives ■ Public Project Finance

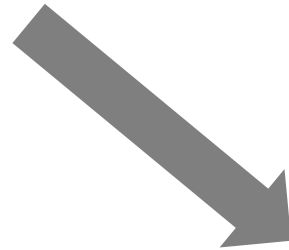
Notes: Only Closed & Completed transactions included.

This is because the Green Bank is designed to leverage many private dollars per public dollar invested

\$4.65x

From 2014-2016 the Green Bank leveraged \$4.65 of private investment per dollar of public investment...

The Green Bank's products are designed to "crowd-in" capital and get more bang for the buck.



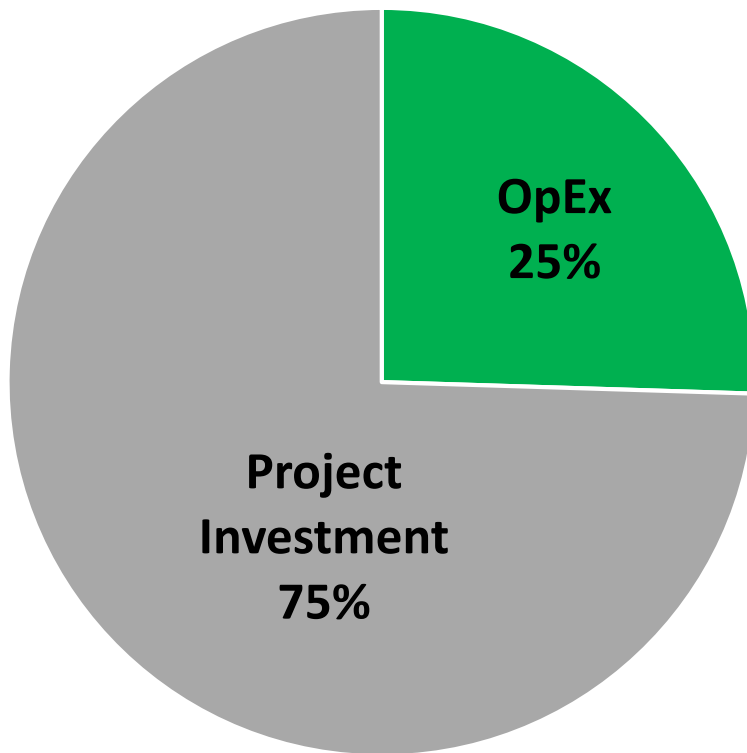
\$0.90x

...while the Incentive Programs leverage \$0.90 of private investment per dollar of public investment.

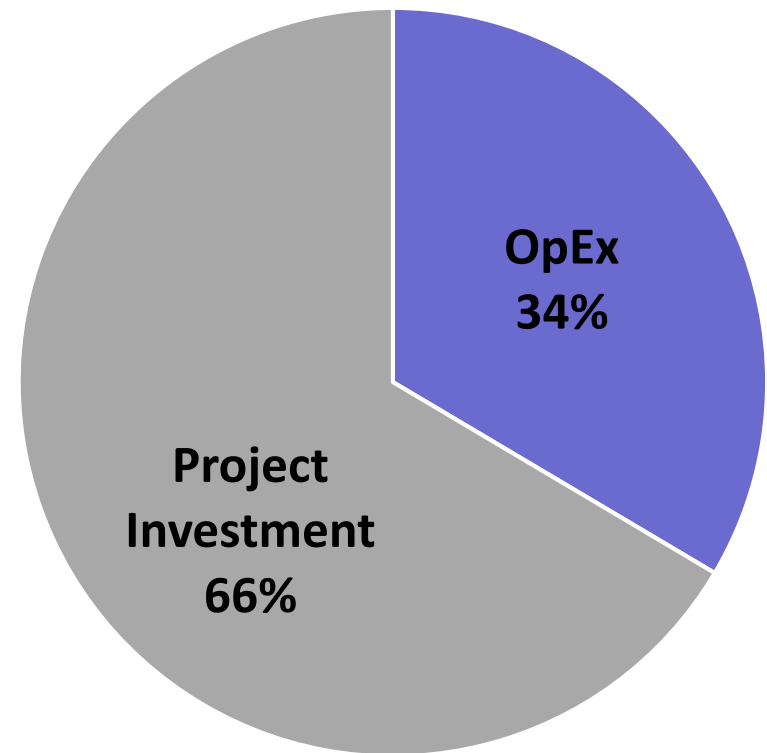
The Green Bank also puts more of its money into project investment rather than operating expenses

Breakdown of Use of Public Funds 2014 - 2016

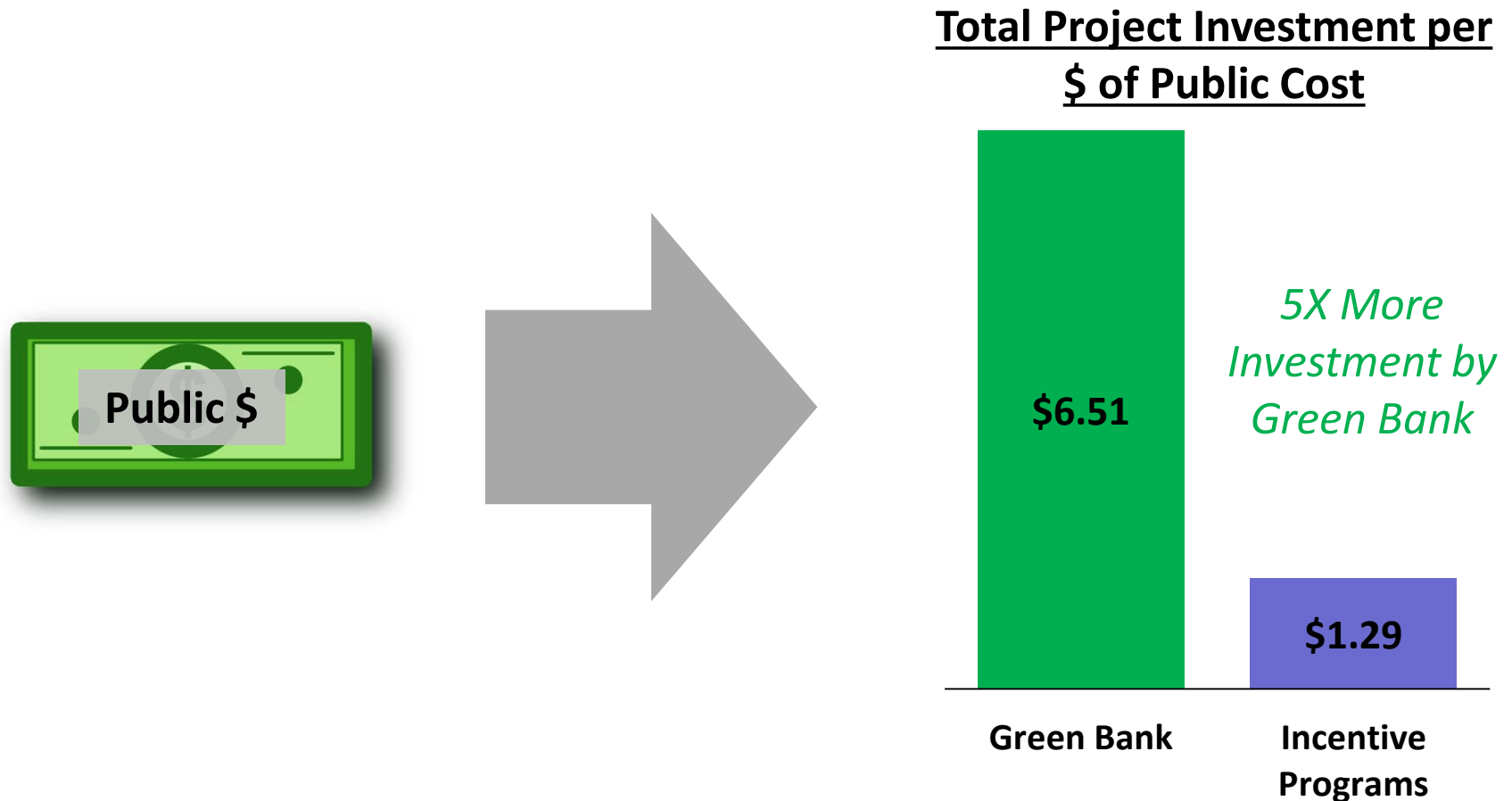
Green Bank



Utility Incentive Programs



Higher leverage and operating efficiency means CGB sparks 5x more investment per dollar of public cost



Notes: Public cost refers to the sum of public funds spent on operating expenses and the public funds spent on incentives. This is considered cost, from an accounting perspective, because they are expenses that do not generate a direct cash flow or asset return. See appendix for further detail.

Public investment in Green Banks can increase energy, economic & enviro outcomes, pay dividends for taxpayers

- Have proven track record of stronger energy, economic and environmental outcomes than the status quo
- Green Banks seek to maximize clean energy market penetration
- Aim to maximize total investment, pairing public & private funds
- Designed to preserve public capital for recycling or other uses
- Enhance and complement existing programs



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Thank You & Appendix

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Definition of terminology & taxonomy

- **Public Incentives** – Funds invested in projects in the form of subsidies, rebates, or grants, with no direct cash or asset return
- **Public Project Finance** – Funds invested in projects, in any form, with the expectation of cash or asset return
- **Public OpEx** – All other spending by the Green Bank or Incentive Programs on any other supporting activity (labor, marketing, etc.) that is not direct project investment (in any form)

| | | Terminology | | | |
|---------------------|----------------------------|--------------------------|-------------------|-------------------------|--------------------------|
| | | Total Public Expenditure | Total Public Cost | Total Public Investment | Total Project Investment |
| Use of Funds | Public OpEx | X | X | | |
| | Public Incentives | X | X | X | X |
| | Public Project Finance | X | | X | X |
| | Private Project Investment | | | | X |

CT Green Bank & Utility Incentive Program Budget & Outcome Data for 2014-2016

2014 - 2016 Budget & Outcome Summary

| Budget | | CGB | Utility |
|--|--|---------------|----------------|
| [A] | OpEx | \$42,583,978 | \$230,636,189 |
| [B] | Project Incentives | \$65,361,063 | \$443,619,985 |
| [C] | Public Project Finance | \$59,100,584 | \$13,781,886 |
| [D] | Private Project Investment | \$578,680,501 | \$413,791,515 |
| Costs & Investment Outcomes | | CGB | Utility |
| [E] = [A] + [B] | Total Public Cost | \$107,945,041 | \$674,256,174 |
| [F] = [A] + [B] + [C] | Total Public Expenditure | \$167,045,625 | \$688,038,060 |
| [G] = [B] + [C] | Total Public Project Investment | \$124,461,647 | \$457,401,871 |
| [H] = [B] + [C] + [D] | Total Project Investment | \$703,142,148 | \$871,193,386 |
| Energy & Environmental Outcomes | | CGB | Utility |
| [I] | Cumulative Annual Clean MMBtu Saved or Generated | 1,670,061 | 7,021,161 |
| [J] | Cumulative Annual CO2 Emissions (tons) | 197,188 | 791,561 |

CT Green Bank & Utility Incentive Program Metrics for 2014-2016

2014 - 2016 Metrics

| Investment Metrics | | CGB | Utility |
|---|--|------------|----------------|
| = [H] / [A] | Total Project Investment per \$ Opex | \$16.51 | \$3.78 |
| = [H] / [E] | Total Project Investment per \$ Total Public Cost | \$6.51 | \$1.29 |
| = [G] / [D] | Private Project Investment per \$ Total Public Project Investment | \$4.65 | \$0.90 |
| = [F] / [D] | Total Private Project Finance per \$ Total Public Expenditure | \$3.46 | \$0.60 |
| = [H] / [F] | Total Project Investment per \$ Total Public Expenditure | \$4.21 | \$1.27 |
| Operating Metrics | | | |
| = [A] / [F] | Opex as % of Total Public Expenditure | 25% | 34% |
| Energy & Environmental Metrics | | CGB | Utility |
| = [I] / [E] | Clean MMBtu Saved or Generated per \$1,000 of Total Public Cost | 15.47 | 10.41 |
| = [I] / [F] | Clean MMBtu Saved or Generated per \$1,000 of Total Public Expenditure | 10.00 | 10.20 |
| = [J] / [E] | CO2 Emissions (tons) per \$1,000 of Total Public Cost | 1.83 | 1.17 |
| = [J] / [F] | CO2 Emissions (tons) per \$1,000 of Total Public Expenditure | 1.18 | 1.15 |

Annual MMBtu savings for Utility Incentive Programs, 2014-2016

Utility Incentive Program Annual Energy Savings

| | Energy Type | Amount Savings | Units | MMBtu Conversion | MMBtu Savings |
|-------------------------|-------------|----------------|----------------------------|------------------|---------------|
| 2014 | Electric | 387,800,000 | kwh | 0.003412 | 1,323,174 |
| 2014 | Gas | 6,300,000 | CCF | 0.1032 | 650,160 |
| 2014 | Oil | 2,100,000 | Gallons Fuel Oil & Propane | 0.1385 | 290,850 |
| 2015 | Electric | 435,800,000 | kwh | 0.003412 | 1,486,950 |
| 2015 | Gas | 5,600,000 | CCF | 0.1032 | 577,920 |
| 2015 | Oil | 1,800,000 | Gallons Fuel Oil & Propane | 0.1385 | 249,300 |
| 2016 | Electric | 442,300,000 | kwh | 0.003412 | 1,509,128 |
| 2016 | Gas | 6,900,000 | CCF | 0.1032 | 712,080 |
| 2016 | Oil | 1,600,000 | Gallons Fuel Oil & Propane | 0.1385 | 221,600 |
| 2014 Total | | | | | 2,264,184 |
| 2015 Total | | | | | 2,314,170 |
| 2016 Total | | | | | 2,442,808 |
| Cumulative Annual Total | | | | | 7,021,161 |

Notes: Conversion factors from EIA. The oil energy savings reflect the savings reported by utilities for both fuel oil and propane. To be conservative, all gallons saved are assumed to be fuel oil, which is more energy rich than propane. All data from annual EE Fund reports to state legislature.

Annual MMBtu savings for CT Green Bank, 2014-2016

CT Green Bank Annual Generation/Energy Savings

| | Annual Energy Savings | Lifetime Renewable Generation | Units | Assumed Years of Lifetime | Annual Generation | MMBtu Conversion | Annual Clean Energy MMBtu |
|-------------------------|-----------------------|-------------------------------|-------|---------------------------|-------------------|------------------|---------------------------|
| 2014 | 235,005 | NA | MMBtu | | | | 235,005 |
| 2014 | NA | 746,784 | MWh | 25 | 29,871 | 3.1420 | 93,856 |
| 2015 | 648,248 | NA | MMBtu | | | | 648,248 |
| 2015 | NA | 1,506,653 | MWh | 25 | 60,266 | 3.1420 | 189,356 |
| 2016 | 284,535 | NA | MMBtu | | | | 284,535 |
| 2016 | NA | 1,743,010 | MWh | 25 | 69,720 | 3.1420 | 219,061 |
| 2014 Total | | | | | | | 328,861 |
| 2015 Total | | | | | | | 837,604 |
| 2016 Total | | | | | | | 503,596 |
| Cumulative Annual Total | | | | | | | 1,670,061 |

Notes: Energy savings are reported annually by the CGB. Renewable generation (across technologies) is reported in lifetime. It is assumed the average lifetime of renewable projects is 25 years. Conversion factors from EIA. All data from CGB 2016 CAFR. Only includes Closed & Completed transactions.

CT Green Bank annual energy, economic and environmental outcomes for the state, 2012-2016

| | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 |
|--|------------|--------------|--------------|--------------|--------------|
| Energy Outcomes | | | | | |
| Number of Clean Energy Projects | 417 | 1,118 | 2,410 | 6,500 | 8,208 |
| Annual Energy Savings (MMBtu) | 9,334 | 59,481 | 235,005 | 648,248 | 284,535 |
| Renewable Capacity (MW) | 2.9 | 23.5 | 22.9 | 61.7 | 70.9 |
| Lifetime Production (MWh) | 68,388 | 1,419,346 | 746,784 | 1,506,653 | 1,743,010 |
| Job Outcomes | | | | | |
| Jobs Direct | 88 | 559 | 550 | 1,449 | 1,666 |
| Jobs Indirect | 142 | 1,132 | 885 | 2,331 | 2,679 |
| Total Jobs | 230 | 1,691 | 1,435 | 3,780 | 4,345 |
| Lifetime CO2 Emissions Reductions | | | | | |
| Emission Reduction (Tons) | 35,459 | 178,437 | 271,093 | 815,138 | 870,334 |
| Home Equivalents | 326 | 15,293 | 4,429 | 7,594 | 8,561 |
| Cars of the Road Equivalents | 236 | 1,967 | 1,629 | 5,439 | 5,725 |

Notes to analysis

- Only Closed & Completed CT Green Bank transactions are included in analysis.
- The CT Green Bank's Residential Solar Investment Program (RSIP) is categorized as an incentive for purposes of this analysis. The RSIP is a cash payment to a residential solar PV owner in exchange for the lifetime stream of RECs generated by the PV system. This could be classified as REC financing, as the Green Bank's payment is made in exchange for a stream of future value.
- The RSIP is offered in two forms; an upfront one-time payment at time of installation, or a performance-based incentive (PBI), which is paid out over the first 6 years of a system based on the amount of annual system generation. In the CT Green Bank's detailed annual P&L statement, which shows each line item of expenses, only one year's worth of PBI payment is reported each year. This accurately reflects the cash flow expense incurred in that year. However, from an investment perspective, the CT Green Bank reports the full six years'-worth of PBI payments being invested at the point of system installation, as all of that capital has been committed. Those figures are shown in Table 26 of the CAFR. For purposes of this analysis, the value of the full six years'-worth of PBI payments are reported, to better reflect the Green Bank's true financial commitments.
- The CT Green Bank's annual OpEx is equal to the total amount of funds spent on everything other than incentives, project finance or provision for loan loss reserve. This includes all staff compensation and benefits, administrative expenses, marketing, program development, consultants and lawyer fees

Notes to analysis

- Utility Incentive Program analysis is inclusive of all electric and gas efficiency programs reported to the regulator by The Connecticut Light and Power Company, The United Illuminating Company, The Yankee Gas Services Company, Connecticut Natural Gas Corporation and, Southern Connecticut Gas Company (and their corporate predecessors).
- Utility Incentive Programs figures for this analysis derived from detailed budgets for each program year as presented to the regulator in annual plan filings.
- Utility Incentive Programs includes three categories of figures:
 - Incentives: These are the actual direct Incentive figures for each program as reported by the utilities.
 - OpEx: This is the sum of all expenses reported by utilities, other than Incentives. This includes overall program administration budgets and the administrative, marketing and service costs contained within in each individual residential or C&I line item program. This also includes all program expenditure on education and training and other non-incentive-based programs.
 - Private Investment: The CT Green Bank specifically reports on the private investment that is paired with or leveraged by Green Bank investment in a project. The utilities report private investment in a project as “Customer Cost” as part of their reporting for the purposes of the Total Resource Cost Test.
- Utility Incentive Programs report their CO2 emissions reduction in terms of annual reduction. The Green Bank reports emissions reduction in terms of lifetime reduction. To create comparable analysis, the Green Bank figures are divided by the number of years of the weighted average life of Green Bank projects.
- Amount of funds spent annually on finance assumed equal to 2015 (\$4.9 million).

Sources for analysis

- CT Green Bank investment, energy outcomes and environmental outcomes data
 - CT Green Bank, Comprehensive Annual Financial Report, for Fiscal Year ended June 30, 2016
 - Breakdown of investment level by phase of project approval is provided directly by CT Green Bank
- CT Green Bank breakdown of operating expenses
 - Detailed financial statements for FY 2014-2016 provided directly by the CT Green Bank
- Utility Incentive Program spending data
 - 2014 Annual Update of the 2013-2015 Electric and Natural Gas Conservation and Load Management Plan, Docket No. 13-03-02 Compliance Filing, Feb 28, 2014
 - 2015 Annual Update of the 2013-2015 Electric and Natural Gas Conservation and Load Management Plan, Public Act 11-80 Section 33, Dec 22, 2014.
 - 2016-2018 Electric and Natural Gas Conservation & Load Management Plan, Connecticut General Statutes-Section 16-245m(d), Oct 1, 2015
- Utility Incentive Program energy savings & carbon emissions reduction data
 - Energy Efficiency Board 2014 Programs and Operations Report, Connecticut Energy Efficiency Fund, March 1, 2015
 - Energy Efficiency Board 2015 Programs and Operations Report, Connecticut Energy Efficiency Fund, March 1, 2016
 - Energy Efficiency Board 2016 Programs and Operations Report, Connecticut Energy Efficiency Fund, March 1, 2017